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General

About this manual

Introduction

This manual is written to meet the needs of the service technician and provides basic instructions for completing the service and maintenance. Maintenance according to this manual can improve the reliability of the work. Replacement spare parts

The maintenance spare parts of Chang'an Automobile Co., Ltd. are manufactured according to the original standard. Therefore, only the genuine maintenance spare parts of Chang'an Automobile Co., Ltd. can be used for maintenance service.

Special tool

All special tools required for each service are provided in the special tools table provided prior to the start of each procedure. Additional illustrations are provided, if necessary, to help identify these specialized equipment. Special tools can be ordered through Chang'an Automobile Co., Ltd.

Important safety instructions

Proper maintenance methods and proper repair procedures are critical to the reliability of all motor vehicle operations and the safety of service personnel.

It is not possible for this manual to foresee all conditions and to prompt relevant warnings and suggestions. If any person fails to comply with this manual, it must be confirmed before maintenance that the selected maintenance methods, tools and parts neither endanger personal safety nor damage the integrity of the vehicle.

Warnings, Precautions and Reminders in this Manual

⚠ **Warning**
To indicate that personal injury may occur if this manual is not followed.

Caution is used to indicate damage to the vehicle and the maintenance equipment used if the correct procedure is not followed.

When you read this manual, you will encounter "Warning," "Caution" signs.

How to use this manual

This manual includes maintenance and repair service procedures.

This manual is described in chapters and sections, and chapters of specific system are concentrated in relevant chapters. Each chapter briefly describes a special part of the vehicle.

This manual is divided into 11 chapters: Overview, engine, transmission, chassis, electrical system, body exterior maintenance, body interior maintenance, restraint system, body maintenance (accident vehicle maintenance), circuit diagram, calibration and matching learning.

The first page of this manual has a catalogue of all the chapters. Each specific chapter generally includes the following contents: Specification, composition and location distribution, introduction of system function principle, common methods, fault symptom diagnosis, DTC fault code diagnosis, disassembly and installation, and spare parts atlas.

The left and right sides of the vehicle are determined in the driver's seat position looking forward.

The left and right sides of the engine are determined in the

direction of the front camshaft pulley at the flywheel.

Specifications

The main contents of the specification part include material specification, component specification, general specification (refers to the parts that cannot be summarized into other specification tables) and torque specification. In addition to torque specifications

Not English, only Metric.

Composition and position

distribution

Composition and position distribution mainly cover all parts of the system; The exact position of the parts on the vehicle (machine) is shown in the figure.

System functional principle introduction

The system function and principle introduction part mainly describes the system component and the function and principle of the new system. The new system here refers to the system that has not appeared in the vehicle model previously produced by the complete vehicle factory, in order to familiarize the maintenance technicians with the function and principle of the system. It contains all the functional descriptions, system running diagrams and so on that the system can implement.

Common methods

The common method section mainly describes the general inspection procedure information of the system.

DTC Diagnostic

DTC diagnostic is the part of a component or system that is diagnostic tested for the PC Tester. It usually includes: Terminal list of control module, fault code table, data flow list, active test list, DTC diagnostic process.

Fault symptom diagnosis

The fault symptom diagnosis part is for the vehicle system fault that cannot be determined only through visual inspection, excluding the component or system diagnostic test by computer inspection. Generally includes inspection and confirmation (appearance inspection table), fault symptom table and fault diagnosis process.

Health and safety prevention

Introduction

Many operations related to vehicle maintenance and repair will bring threats and hazards to human health. A number of hazardous operations and their associated hazardous articles and equipment are listed below. Pay special attention to the following dangerous goods.

The list is not complete, so safety and health should always be at the

forefront of actual operations. Before using any product, consult the material

safety specification sheet provided by the manufacturer or supplier of the

product.

Acid, base and metal

- Corrosive soda ash, sulfuric acid.
- Electrolyte and cleaning materials.
- Irritating and corrosive substances to skin, eyes, nose, throat and clothing, inflammable substances, which can destroy ordinary protective suit substances.

Avoid splash on skin, eyes and clothing. Wear suitable protective clothing, protective gloves and goggles. Do not breathe acid mist. Place some eye wash bottles, cleaning water and soap near the workplace so that they can be used in the event of an accident.

Place "hazardous eyes"

sign. Airbag

Flammable, explosive substances - Smoking prohibitions must be observed.

The airbag is installed on the steering wheel and the instrument panel in front

of the passenger to protect the life safety of the front passenger. The airbag

contains high explosive substances, which will produce high temperature and

high pressure gas 2500 ° C when ignited.

The gas generator used for airbag is sodium azide. This substance is sealed in the module and will be completely released when the airbag is deployed. Do not attempt to open the airbag by yourself, which will result in sodium azide explosion. If the gas generator breaks, wear fully protected work clothes when handling.

After the airbag is deployed normally, it is necessary to wear protective gloves and goggles when handling the site.

Used airbags must be packed in plastic bags in strict accordance with local regulations and discarded in designated chemical waste treatment yard.

After direct contact with the generated gas, thoroughly clean the site (affected area) with water. Seek medical assistance if needed.

1 Airbag - Action to be performed:

- Position airbag vertically.
- Keep airbag dry.
- When transporting the airbag, face the unsealed side of the airbag toward the body.
- The airbag should have the sealing face up.
- Carefully inspect the airbag for damage.
- When connecting the airbag, stand on the side.
- It shall be confirmed that all test equipment is correctly calibrated and maintained.
- Clean hands after transporting deployed airbags.

2 Airbag - operation to be prohibited:

- Never put flammable substance or gas generator together with airbag.
- The storage temperature of the gas generator shall not exceed 80 ° C.
- Airbag cannot be placed upside down.

- Do not open the gas generator housing.
- Do not place anything on the airbag.
- Do not use damaged airbags.
- Do not touch the airbag and gas generator within 10 minutes after combustion.
- Never use the meter probe on the

airbag circuit. A/C refrigerant

Flammable substances - No smoking must be observed.

Contact of refrigerant with skin may cause frostbite.

The manufacturer's instructions must be strictly followed. Wear protective gloves and glasses to avoid strong light.

If the refrigerant accidentally touches the skin or eyes, rinse with water immediately. Inadvertently touch the eyes with refrigerant and rinse them with the correct cleaning agent. Do not rub them. Seek medical assistance if necessary.

A/C refrigerant - Prohibited:

- Do not expose A/C refrigerant to sunlight or heat.
- When filling refrigerant, do not put the filling bottle vertically and the filling port should be facing down.
- Prevent frosting on A/C refrigerant bottle.
- Prevent the A/C refrigerant bottle from dropping.
- In any case, it is prohibited to discharge the modulated refrigerant to the atmosphere.
- Do not mix refrigerants, such as Fluoride R12 and

R134a. Sealant and adhesive

Flammable substances - No smoking must be observed.

In general, the sealant and adhesive should be stored in the non-smoking area and must be kept clean and tidy, such as on the shelves covered with disposable paper towels, preferably removed from the packing box and placed separately; Packing boxes, including sub-packing boxes, shall be affixed with corresponding labels.

1 Solvent sealant and adhesive

The manufacturer's instructions must be followed.

2 Water-soluble sealants and adhesives

Such water-soluble viscose based on polymer emulsion and rubber latex may contain a small amount of volatile toxic substances and chemicals harmful to human beings. Avoid contact with eyes and skin, and ensure good ventilation when using.

3 Hot melt adhesive

The solid state of such substances is safe. In a molten state they can cause combustion and release toxic gases that are harmful to health. When working, you must wear correct protective work clothes, use thermostatic heater with automatic power-off function, and have enough suction equipment.

4 Resin type sealants and adhesives such as epoxides and resin formaldehyde

The adhesive must be mixed in a well-ventilated place because it can release harmful

or toxic volatile substances. Skin contact with undried resin and hardener will cause

dermatitis, and some toxic and harmful chemicals will be absorbed by the skin.

If the spilled material enters the eyes, it will cause damage to the eyes. Therefore, keep good ventilation and avoid contact with skin and eyes when working.

5 Anaerobic cyanoacrylate and acrylic adhesives

Most of these adhesives are irritating, cause allergies or damage to the skin and respiratory tract. Some of them are highly irritating to the eyes. Avoid contact with skin and eyes and follow the manufacturer's instructions.

Do not allow cyanoacrylate adhesive to contact skin and eyes.

If it is accidentally touched, please put on a clean wet cloth or see a doctor immediately. Do not touch the injured part by hand. Choose a well-ventilated place because water vapor can irritate the nose.

6 Isocyanate (polyurethane) sealant and adhesive

No person suffering from asthma or other respiratory system disease shall have access to or access to such substances.

Excessive exposure to these substances can irritate eyes and respiratory system. Too high a concentration stimulates nervous system and can cause loss of consciousness when the situation is serious. Prolonged exposure to these substances can affect your health.

Prolonged contact with the skin will irritate the skin, and severe dermatitis will occur. If you accidentally enter your eyes, it will damage your eyes. Any spraying action must be carried out in a well-ventilated place and keep the vapor and sprayed particles away from the breathing area.

Proper gloves and glasses and mask must

be worn when working. Antifreeze

Antifreeze includes: Isopropyl alcohol, ethylene glycol, methanol.

Highly flammable, flammable and combustible.

It is used for solution in vehicle cooling system and wiper spray.

Antifreeze produces vapor when heated. Avoid inhalation of such gases.

Antifreeze or other harmful substances may enter the body through the skin. If you inadvertently

drink antifreeze may be fatal, you must seek medical attention in time. It is prohibited to use such

substances in any cooling or industrial water systems associated with food processing or drinking

water systems.

Electrolyte

The gas released by the battery during charging can cause explosion. Do not use open flame or

Mars when charging the battery. Good ventilation must be ensured. Brake fluid

Brake fluid may cause slight irritation to the skin and eyes. Contact with skin and eyes should be avoided as far as possible. Due to low vapor pressure, steam harmful to human body will not be inhaled at room temperature.

Gas.

Chemicals

Chemicals include solvent, sealant, adhesive, paint, resin foam, electrolyte, antifreeze, brake fluid, fuel, oil and grease. Care must be taken when using and storing such substances. They may be toxic, harmful, corrosive and irritating, flammable and produce some harmful gases and dust.

Exposure to such chemicals for extended periods of time can affect human health to varying degrees.

1 Chemicals - Operations to be performed:

- Carefully read the label on the dangerous goods container and the corresponding publicity materials and instructions to obtain relevant safety information. A safety and health data sheet for the substance is available from the manufacturer.
- If the skin and clothes are contaminated with such chemicals, clean them in time. Replace the seriously contaminated clothes and clean them.
- Work instructions shall be prepared and protective clothing shall be worn to prevent such substances from contaminating the skin and eyes and to prevent inhalation of harmful gases, acid mist, dust, smoke, etc., and combustion and explosion caused by such substances.
- Wash hands immediately after contact with such substances.
- The work area shall be clean, tidy and free from leaks.
- Chemicals should be managed and stored in strict accordance with national and local regulations.
- Prevent child contact.

2 Chemicals - Prohibited Operations:

- Mixing chemicals without the manufacturer's instructions is prohibited. Mixing certain chemicals will produce toxic and harmful substances; Release toxic and harmful gases or explosions.
- It is forbidden to spray chemicals, especially solvent chemicals, in narrow spaces, such as in a vehicle.
- It is forbidden to heat or burn chemicals without following the manufacturer's instructions. Some chemicals are flammable and some release toxic or harmful gases when burning.
- Do not place the container open. The gas emitted from the container will poison the human body or cause explosion. Some gases heavier than air are concentrated in narrow areas.
- Do not transport chemicals in unlabeled containers.
- Do not wash hands or clothes with chemicals. Chemicals, especially solvents and fuel, can dry the skin, irritate the skin with epithelial dermatitis, or absorb some toxic and harmful substances through the skin.
- It is forbidden to store other articles in empty tanks where chemicals have been stored without special treatment.
- Do not smell chemicals. Instantaneous high concentrations of

gas can cause poisoning or injury. Anticorrosive substance

It is a flammable substance and must comply with the regulations on prohibiting smoke and fire.

There are many types of such substances, please follow the manufacturer's instructions. It may contain solvents, resins or finished oil. Contact with skin and eyes should be avoided. Such substances shall not be sprayed in the enclosed space and shall only be applied with good ventilation.

Dust

Dust can be toxic and irritating to human skin. Avoid inhaling dust or other dust from powdery chemicals.

Wear mask in case of poor air circulation. Extremely fine dust of flammable substances can cause explosion.

Explosion critical limits and sources of ignition shall be avoided.

Electric shock

Improper use or use of defective electrical equipment can cause electric shock.

All electrical equipment shall be inspected periodically to ensure that it is in good condition. Defective equipment shall be clearly identified and removed from the work area. Ensure that the wires, cables, plugs, sockets are free from wear, knotting, cutting, cracking, or other damage. Do not allow the electrical equipment and wires to come into contact with water, and ensure that the electrical equipment is fused.

If electrical equipment is properly used and equipment with problems is not used, there is a fatal risk of violating this operation.

When lifting the vehicle, ensure that the wires of electrical tools are not cut off or

damaged. Ensure the electrician is trained in first aid. If shocked:

- Turn off the power before touching the victim.
- If the power cannot be switched off, use dry non-conductive material to push or drag the victim away from the power supply.
- Perform CPR immediately.
- Seek medical

assistance.

Exhaust

Exhaust gases include toxic and harmful, asphyxiating chemicals such as carbon monoxide, nitric oxide, acetaldehyde, aromatic hydrocarbons and lead-containing gases. The engine must be after the rule out exhaust or in the air flow

It can only be

started in the open

place. Gasoline

engine

Gasoline engine will not have signs before toxic and harmful exhaust gas is generated. Their hazards may be immediate or latent.

Soundproofing

Soundproofing is used to isolate sound and noise. Cellulose and chips cause skin irritation. This is usually a physical effect rather than a chemical reaction. Work practice guidelines and gloves must be prepared to avoid prolonged contact with the skin.

Fire protection

Many substances related to vehicle maintenance are flammable substances. Some of them release toxic or harmful gases after burning. Pay strict attention to fire safety when storing and using flammable substances or solvents, especially when welding or being close to electrical equipment. Before using welding or heating equipment, ensure that there is no flammable material around and place fire extinguishers nearby.

First aid

The workshop must be equipped with first aid trained personnel in

addition to meeting legal requirements. Any substance must be rinsed

with clean water for at least 10 minutes after splashing into the eye.

Clean the skin with water and soap after it is contaminated with chemicals. Flush with cold water to cool down immediately after being burned by some substances. If smoke is inhaled, immediately turn to a place with fresh air. If it still does not work, please send it to the hospital immediately.

If you accidentally drink some liquids, please see the doctor immediately and tell the name and composition

of the liquids. Do not attempt to vomit unless otherwise specified on the label. Foam - Polyurethane

Foam is used to isolate sound and noise. Foam is also present in the seats and spring struts.

Operate in strict accordance with the manufacturer's instructions. Unreacted ingredients are irritating and can damage skin and eyes. Wear gloves and protective glasses.

Persons with chronic respiratory system disease, asthma, bronchitis trachea or history of allergy are not allowed to work at or near unvulcanized materials. Some ingredients, vapors or sprays are irritating and may be toxic.

Never breathe vapor and spray. Use these substances in a well-ventilated place and take measures to protect respiratory system. After spraying, do not immediately remove the mask until the mist is completely dispersed.

Burning immature components and matured foams produces toxic and harmful gases. Do not smoke, use open flame or electric tools when handling foam. Any heat cutting of the foam must be done in a ventilated area.

Fuel

Avoid skin contact with fuel as much as possible. If not, clean with

water and soap. Gasoline

Flammable substances - No smoking must be observed.

Accidentally swallowing gasoline will stimulate mouth and throat, and will cause sleepiness and confusion if absorbed by stomach. A small amount of petrol can also kill children. If inhaled liquid reaches the lung, serious injury will occur. Long-term gasoline exposure can dry and irritate the skin. Gasoline entering into the eye may cause blindness. Gasoline contains a large amount of benzene, and inhalation of benzene can cause poisoning. The gasoline concentration must be very low, and the high concentration can stimulate the eyes, nose and throat, vomit, dizziness, chest distress shortness of breath and even make the person unconscious.

Gasoline shall be transported or used where air is circulated. Care must be taken to avoid operating in closed areas.

There must be a special preventive measure for cleaning and maintenance of the gasoline depot.

Gasoline cannot be used as cleaning agent or siphon with the mouth. Kerosene(Paraffin)

Kerosene is also used as heating fuel, solvent and detergent.

Kerosene is a flammable substance - smoking prohibition must be observed.

Accidentally swallowing kerosene will stimulate mouth and throat. Long-term contact with such substances will dry and irritate the skin. For example, splashing into the eyes will cause slight irritation. In general, a small amount of volatilization does not produce harmful vapor. Volatilization due to high temperature should be avoided (acid mist can occur during dewaxing). Avoid contact with skin and eyes as much as possible and ensure airflow.

High-pressure gas cylinder

High-pressure gas cylinders usually contain oxygen, acetylene, argon and propane at a pressure of 138 bar. Special care should be taken when handling such high-pressure cylinders to avoid mechanical damage to the high-pressure cylinders or the high-pressure cylinder switchgear. The gas in each high-pressure gas cylinder shall be clearly marked out.

High-pressure gas cylinders shall be stored in a well-ventilated place and shall be protected from

rain, snow or direct sunlight. Acetylene and propane cylinders should not be placed near oxygen

cylinders. Strictly avoid leakage of high-pressure gas cylinder and avoid fire source.

Universal service tools/equipment

All tools and equipment shall be kept in good condition, and correct safety equipment shall be used if necessary.

Do not use service tools/equipment beyond its design scope. Maintenance equipment such as hoist and jack cannot be overloaded. Damage to the equipment due to overload is generally less obvious, but may be fatal when you next use the equipment.

Do not use damaged or faulty tools/equipment, especially high-speed running equipment such as grinding wheel. Damaged grinding wheels can break without any warning and cause serious injury.

Wear protective glasses when using grinding wheels, chisels or sandblasting equipment. Wear a suitable mask when using sandblasting or spraying equipment. And confirm to operate in a well-ventilated place to prevent dust, acid mist and smoke.

High-pressure air, lubricating oil and fluid test equipment

High-voltage equipment, especially joints, shall be inspected regularly and kept in good condition.

It is forbidden to direct the high-pressure nozzle, such as diesel filler, to human skin, because oil can

penetrate human subcutaneous tissue and cause serious disease. Legal Affairs

The use and handling of materials in the workshop must comply with legal provisions on safety and health.

In order to create a safe working environment and avoid environmental pollution, workshop personnel

must be familiar with the national legal provisions on safety and health. Lubricating oil and grease

Prolonged exposure to mineral oil should be avoided. All lubricants and greases are irritating to eyes and skin.

1 Waste engine oil

Prolonged exposure to mineral oil will dry the skin, irritate the person and develop dermatitis. In addition, skin cancer can occur if mineral oil containing toxic and harmful substances is used. Proper skin protection and cleaning equipment must be provided.

Do not use spent engine oil as lubricating oil or in any equipment that may come into contact with the skin.

2 Health protection:

- Avoid long contact with oil, especially engine oil.
- Wear protective clothing including gloves.
- Do not put greasy cloth in your pocket.
- Avoid oil contamination of clothing.
- Do not wear greasy clothes and shoes. protective suit should be cleaned regularly.
- In case of accidental injury, first aid shall be provided immediately.
- Use protective cream to protect your hands before working.
- Clean the grease with soap and water. Do not use gasoline, diesel, kerosene, diluent and solvent to clean the skin.
- If skin is abnormal, please see a doctor immediately.
- If possible, please degrease the oil first.
- If oil can cause eye injury, wear goggles.

3 Environmental protection

The spent engine oil can only be burned in the approved place. If the location is uncertain, please confirm with the local authority.

Waste engine oil must be disposed of at a designated location by an approved waste contractor or recycler. If in doubt, consult your local authority.

It is illegal to directly dump waste engine oil on the ground, sewer, drain or water source.

Noise

Some operations produce high decibel noise, which may damage the

hearing. Wear ear protectors at this time. Coating

Paint is a flammable substance, and smoking is prohibited.

1 Single component

It may contain some toxic and harmful pigments, desiccants and other solvents. Spray only in well-ventilated places.

2 Multi-component

It may contain some toxic and harmful unreacted resins and resin curing

agents. The manufacturer's instructions must be followed and painting must be

done in a well-ventilated place away from the crowd. The operator shall wear

protective mask.

Solder

Solder is a mixture of many metals with a lower melting point than the metals (usually lead and tin). There is usually no toxic lead gas generated during welding. Oxygen-containing acetylene flames cannot be used because they can produce lead-containing smoke at very high temperatures.

Some smoke may be generated when the flame is sprayed onto the grease-bearing surface. Avoid inhalation. Care must be taken to remove excess solder and ensure that no fine lead dust is produced. If inhaling lead dust, it will be harmful to human body. Gas mask must be worn. Solder leaks and filings must be uniformly collected and disposed of quickly to prevent air contamination by lead. Lead ingestion or dust ingestion of solder shall be avoided.

Solvent

Common solvents include acetone, petroleum solvent oil, toluene, xylene and chloroform. Use clean and dewaxing substances, paints, plastics, resins and diluents. Some substances are flammable. Prolonged contact with such substances will dry the skin with irritation. Some toxic and harmful substances will be absorbed through the skin.

If accidentally splashed into the eye, there will be strong irritation and even blindness. High-concentration solvent exposure to steam or smoke generated in the air can irritate the eyes and throat, causing dizziness and headache. Severe can cause loss of consciousness.

Excessive exposure of low-concentration solvents to the air for a long time will produce vapors and

fumes. As there is no obvious symptom, it will often cause more serious toxicity. Avoid splashing such

substances on people's eyes, skin and clothes. Wear protective work clothes, protective gloves and

protective glasses.

When using such substances, ensure that the site is well ventilated, that smoke, vapor and spray

are avoided as much as possible, and that the container is sealed. Do not use in narrow spaces.

When spraying materials with solvents such as paint and adhesive, it shall be ensured that the site is well

ventilated and gas mask shall be used when the air circulation is not smooth. Heating or burning may only

be carried out under the special guidance of the manufacturer.

Suspension load

Warning

Temporary piecing of lifting equipment is prohibited.

Heavy objects are dangerous when lifted or suspended. Never work on unsupported, suspended or lifted

objects, such as suspended engines. Ensure that lifting equipment such as jacks, lifters, axle supports and

harnesses are in good condition and regularly inspected.

Welding

Welding procedures include spot welding, arc welding and gas welding.

1 Resistance welding

During spot welding, a large number of high-speed melted metal particles will be released. Care must be taken to protect the skin and eyes.

2 Arc welding

During arc welding, there is a large amount of ultraviolet radiation, which can damage the skin and eyes of the operator and other nearby people. Gas shielded welding is quite dangerous and personal protective suit must be worn and shielded to protect others.

When using arc welding, it is recommended that contact lens wearers resume wearing normal glasses. Arc light will release microwave to dry the contact lens wearer's cornea and lens due to water loss, and even blindness. There will be metal splash when using arc welding, and proper eye and skin protection must be taken.

When the welding core or its protective layer is polluted, the heat of welding arc will make the metal molten pool generate smoke and gas during welding. These gases may be toxic. Avoid inhalation of such gases. The toxic gas in the working area must be rule out, especially when the air is not flowing smoothly or when a large amount of welding is known in advance. In special cases or in narrow areas, the oxygen hood must be worn.

3 Gas welding(Gas cut)

If oxyacetylene flame is used for welding and cutting, special care shall be taken to avoid leakage of such gas, which may cause combustion and explosion.

Metal splashes may occur when using gas welding. Appropriate measures must be taken to protect skin and eyes. The welding flame is very dazzling and the eyes must be protected. As the ultraviolet radiation generated by gas welding is less than that by arc welding, protective glasses can be used.

Some toxic gases are generated when using gas welding, but such toxic gases are generated by welding coating, especially cutting damaged parts. Inhalation of such gases shall be avoided.

During brazing, the metal in the brazing electrode will produce toxic gas. If there is cadmium in the brazing electrode, it will be very dangerous. When such a situation occurs, take special care to avoid inhaling toxic gases and seek the help of an expert.

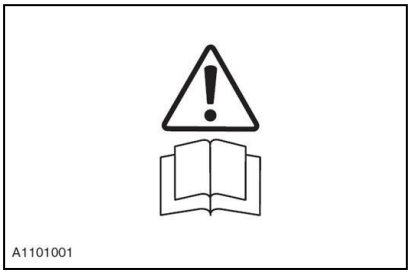
Special precautions shall be taken before welding or cutting in vehicles with flammable substances, such as

fuel volatilization or vaporization from the fuel tank. Warning signs on the vehicle

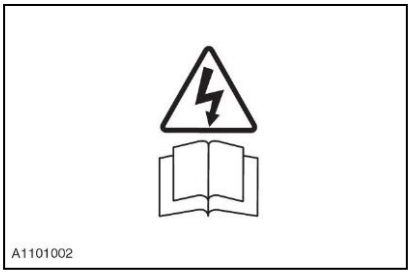
Warning signs are visible on various vehicle components. Do not move these signs. The owner or maintenance personnel must pay attention to such warning signs.

The most common warning signs are listed below and annotated.

1 Refer to the relevant part of the professional manual when touching or attempting to adjust any component for service.



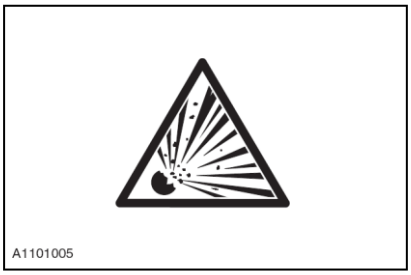
2 Indicates being careful of the internal high voltage. Do not touch while the engine or ignition is running.



3 This logo indicates caution that the component contains corrosive substances.

4 This means that flammable and explosive liquids or vapors nearby are not allowed to use open flames.

5 This sign (usually connected to the above 4 warning signs) indicates an object that may explode nearby.



6 This sign means that children are not allowed to enter unmanaged places.

Standard Workshop Manual

Vehicles in workshop

When servicing a vehicle in a workshop, ensure that:

- Apply parking brake or fixed wheels to prevent the vehicle from moving back and forth.
- When working in front of the vehicle, remove the ignition key.
- If you want to start the vehicle engine, make sure the site is well ventilated, or use exhaust manifold to rule out exhaust.
- If necessary, there should be enough space to lift the vehicle to replace the tire.
- Fender pads shall be provided for maintenance in the engine compartment.
- Cut off the power supply of the battery before repairing the engine, performing repairs under the vehicle or lifting the vehicle.

Warning

When performing arc welding on the vehicle, disconnect the harness of the generator to avoid damaging the generator internals with excessive current. If welding equipment is used on the vehicle, place a fire extinguisher nearby.

Towing vehicle

Warning

During vehicle towing, the ignition switch of the vehicle rotates to "ACC" position. (Turn on the steering lock and start the warning lamp) so that the steering lamp, horn and brake lamp can operate normally; otherwise, personal injury may occur.

Caution The movable tow hook has a left-hand thread, which must be tightened completely before towing the vehicle. When a towing vehicle is required, use a towing hook. The towing rope must fasten the hook.

And the traction rope must be connected to another vehicle to prevent the rope from entangling the vehicle body.

When towing an auto-shift vehicle, the gear must be in position N. The towing speed of the automatic transmission vehicle must not exceed 50 km/h or the trailer distance exceeds 50 km. In the case of a towing vehicle with an excessive distance, the drive wheels must be completely off the ground.

The vehicle can be transported with a low floor trailer or tractor. Connect auxiliary battery with jumper wire

Warning

If the auxiliary battery has been charged and treated with gas, apply a plug or cover the vent with wet clothes when connecting the jumper to reduce the explosion hazard caused by arc ignition when connecting the jumper. Personal injury can occur if this procedure is not followed.

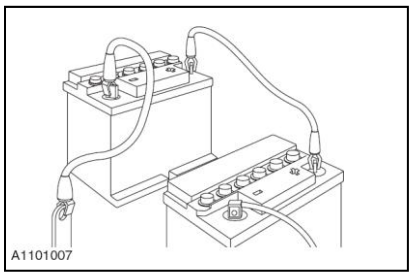
Warning

Short circuit of current will discharge the battery. If there is discharge phenomenon, the vehicle still has live circuit after normal circuit is cut off. When the jumper wire is connected, the battery housing will deform.

Warning

When the vehicle cannot be started, jumper start is considered the only feasible method for starting the vehicle. In this case, the battery discharged after startup must be recharged immediately to avoid permanent damage.

- It is necessary to check whether the jumper wire can bear the load, and it is necessary to use heavy-duty conductor.
- The auxiliary battery must be guaranteed to have the same voltage as the vehicle battery. The two batteries must be connected in parallel.
- Before jumping the wiring, the wiring controlled by the switches must be checked for disconnection. This reduces the risk of arcing during final wiring.



Warning

When connecting the wire to the battery, it must be checked that the terminals of the jumper are not in contact with each other or grounded through the body. Fully charged battery, such as short circuit through jumper wire, can discharge with current above 1000 A and generate strong arc. Rapid heating of jumpers and terminals can even cause the battery to explode. Failure to comply with this rule may result in personal injury.

Jumper wires must be connected in the following order:

- Connect the positive pole of the auxiliary battery first, and then the positive pole of the vehicle battery.
- The negative pole of the auxiliary battery, and then the other end is connected to the grounding terminal at least 300 mm from the battery end of the vehicle, such as the lifting lug of the engine.

Lower the engine speed before disassembling the jumper wire. Before removing the jumper wire from the vehicle with an undercharged battery, turn on the blower or rear stop glass defrosting to reduce the high voltage generated when removing the jumper wire.

Remove the jumper wire in the reverse order of the connection, and do not short the terminal of the jumper wire.

Do not rely on the alternator to restore battery power. If the alternator is used for charging, the engine must operate continuously for more than 8 hours without any other load on the battery. Component cleaning

To prevent dirt on the entrance, remove dirt deposits, grease, exploded parts or assemblies before removing the jumper. When reassembling, carefully clean the parts before inspecting and assembling.

Cleaning method:

- Dry cleaning
- Remove accumulated dirt with a soft brush.
- Scrape dirt off with metal sheet or wooden strips.
- Wipe with a cloth.

Warning

Compressed air sometimes has high water content, especially when used in hydraulic system.

- Clean dirt with compressed air. (Wear protective glasses when using this method)
- Clean dry dust with a vacuum cleaner. This method is commonly used to clean the friction plate dust.
- Steam cleaning method.

Warning

Most solvents are harmful to human body and need to be handled carefully. Refer to "Safety Health Prevention" and manufacturer's safety precautions. Failure to do so will result in injury to the human body. There is a large amount of solvent suitable for component cleaning. Some components such as brake hydraulic component and electrical assembly must be cleaned by special cleaning agent.

Calibration of important measuring equipment

Warning

Failure to follow the following recommendations can result in personal injury or damage to components.

Some important equipment are quite important, such as torque wrench, multimeter, exhaust gas analyzer and test line, etc. Such equipment must be calibrated regularly according to the manufacturer's instructions. Solvent, sealant, adhesive

⚠ Warning

Use all solvents, sealants and adhesives with considerable care. Certain chemicals or volatile aerosols pose a threat to human health. Strictly follow the manufacturer's instructions and do not use any substances with safety questions.

⚠ Warning

If you have questions about the suitability of any special solvent or sealant, please contact the manufacturer for storage, handling and application of the substance. “Sub-section "Safety and Health Prevention" describes some commonly used chemicals, dangerous goods, their use methods and corresponding safety measures to be taken.

Road test or roller test bench test

In many cases, a road test or a roller bench test is required. A detailed description of the pre-test inspection procedure will be detailed below, starting the engine and stopping, pre-drive inspection, in-test inspection and final inspection after completion of the test.

The vehicle may not be subjected to a test drive until all performance tests have been completed. However, optional testing may be performed for those items related to the system being inspected.

⚠ Warning

If the brake system pressure is low, the brake pedal travel is too large, or the hydraulic system leaks, the test drive is prohibited. Test drive is not allowed until the problem is found and corrected. It is recommended to perform the pre-inspection test before road test. Perform functional tests on these systems/lines that affect the safe driving of the vehicle (e.g. brakes, lights, steering, etc.):

- Engine oil level.
- Engine coolant level.
- Whether the tire pressure is qualified, whether the type and pattern are applicable, and whether the wear limit is exceeded.
- Is there enough fuel in the tank for a test drive.
- Whether oil (engine oil, hydraulic oil, fuel) and water leak around the engine and transmission and under the vehicle. Note the location of the possible leakage and wipe the nearby area clean so that the degree of leakage can be easily checked after the test.

Starting the engine

Caution Start the engine in cold state or within 1.5 km time of initial driving, the accelerator pedal shall not exceed half of the stroke. Do not run the engine at high speed or depress the accelerator pedal to the bottom when the vehicle is cold.

Check when ignition is switched off

- Apply parking brake.
- Whether the shift lever is in neutral position.
- Do all gauge (except fuel gauge) pointers point to zero. When turning on the ignition switch, confirm

- Does the ignition switch indicator light come on.
- Does the engine temperature pointer read correctly.
- Does the fuel pointer read the tank level.
- Display the park brake indicator and level indicator.

Road or roller test bench test check

Warning

During the road test, check the brake system when the vehicle is running at a relatively slow speed. If the brake runs off or other problems, please find out the problem and adjust it. Do not go on the road until the problem is solved.

- Press the clutch pedal easily.
- Low gear engagement and clutch engagement are stable.
- The parking brake is operated freely, and the parking brake is released quickly and completely. Drive smoothly when releasing the clutch, and the vehicle does not slip or shake.
- Shift gear smoothly, and there is no abnormal noise or vibration in the transmission.
- The engine output power is normal, the output power is normal, the acceleration is stable, the accelerator pedal is free to operate, and the engine idle speed returns to normal.
- There is no excessive or abnormal smoke emission from the engine during normal driving, heavy load or overspeed driving.
- Steering operation includes whether the power steering is normal, stable, accurate, the steering wheel is too heavy or too light, and direction swing.
- The steering wheel returns automatically after turning.
- Odometer, oil pressure warning lamp, coolant temperature pointer, tachometer pointer reading is correct or working normally.
- The switch and control system are operating normally, the warning light (indicator) is operating normally and will turn off automatically after the steering wheel returns.
- The heating and ventilation system works properly.
- Brake system works

normally. Brake test

Warning

When detecting the brake, avoid inhaling smoke released by the hot brake. Smoke

may contain asbestos dust harmful to human body. Avoid detecting brakes on many roads,

which may cause inconvenience or danger to others.

Warning

Brake tests, including heavy step braking, should not be performed on new brake shoes/discs or friction pads/discs unless the component is already running-in because the new brake friction component is not fully effective until it is fully running-in.

Depress the brake pedal lightly and heavily, and test the brake under various vehicle speed conditions with normal operation of

each gear. Let the vehicle slide, pay attention to the tendency of vehicle deviation, or brake sticking phenomenon. After the

vehicle stops (stop of non-emergency brake), carefully check the brake temperature. If the brake disc is very hot or much more

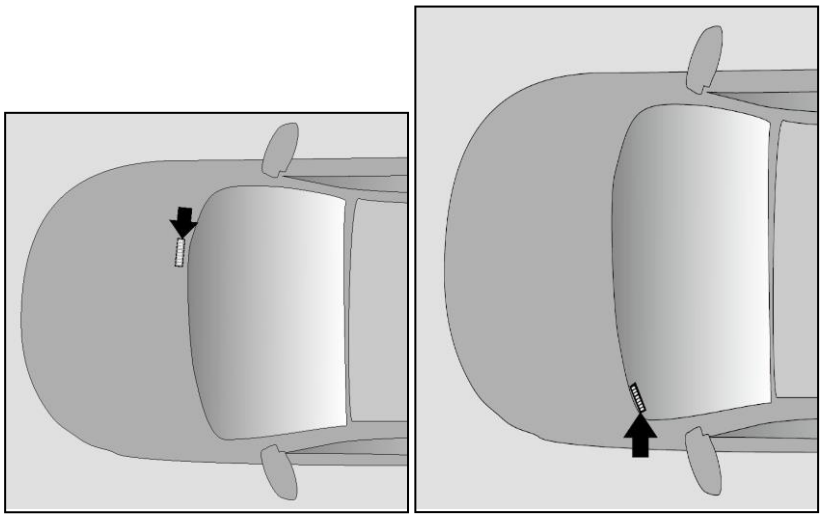
hot than other brake discs, there is brake sticking phenomenon.

After completing the test, check

- Whether there is leakage of engine oil, coolant, hydraulic pressure, air and fuel.
- Abnormal high temperatures of any rotating component or assembly, such as wheel hub, transmission, axle, etc., may indicate tight assembly or insufficient lubrication.

Identification code

Vehicle identification code(VIN)



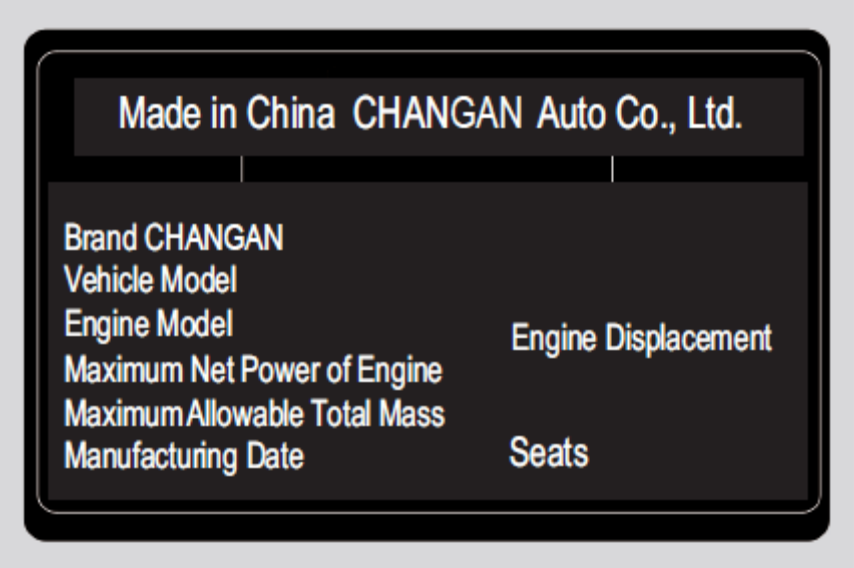
Note: The picture is for position reference only. Please refer to the actual model.

Serial number	Description	Serial number	Description
1	Body VIN printing position	2	Sticking position of instrument panel VIN number

Meaning of VIN code(17-digit letter + number combination)

Serial number	Description	Serial number	Description
1 -3	Manufacturer identification code	8	Drive type
4	Vehicle category code	9	Check number
5	Vehicle master parameter code	10	Year code
6	Engine type	11	Manufacturer code
7	Body type	12 - 17	Production No.

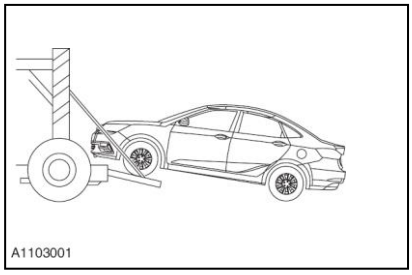
Product label



Note: The picture is for reference only. Please refer to the actual model.

Lifting and towing

Caution The model picture in this section is only an operation diagram, and the actual model shall prevail.



For vehicles driven by front wheels, when towing, lift the front wheels to the rear wheels, turn the ignition switch to "ACC" position, and unlock the steering wheel so that the front wheels are in front. The steering wheel is locked by a special locking mechanism and a hazard warning lamp is illuminated.

Warning

Do not touch the front wheels during towing, otherwise the transmission may be damaged.

Caution The trailer distance shall not exceed 25 km and the trailer speed shall not exceed 40 km/h.

Support

Warning

Always park the vehicle on a hard flat ground. If you want to jack up the vehicle on soft ground, you must place the load dispersing block under the jack. Always place the stop in the opposite direction of the diagonal wheel position at the jacking point. Failure to follow these instructions may result in personal injury.

When the vehicle needs to be repaired with a jack, it is essential to fully understand the following instructions. The correct support points must be confirmed, usually in the open area between the front and rear wheels. When using a jack, use a gasket to protect the paint from damage.

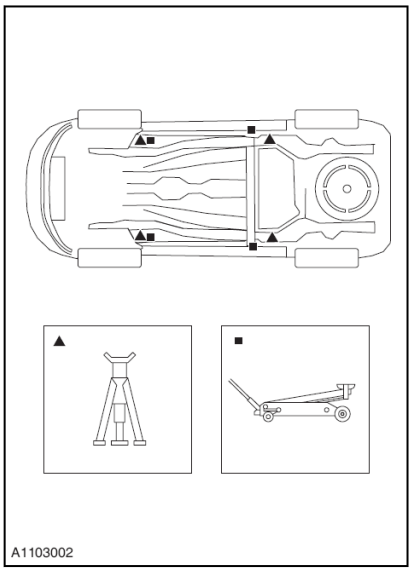


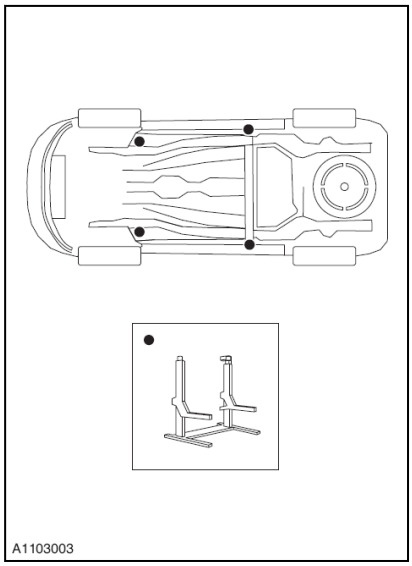
Figure 1:

Lifting

Warning

Using the correct lifting position is very important for lifting safety. Otherwise, it may damage the vehicle or cause personal injury.

Caution Horizontal pads must be used in the lifting position when lifting the vehicle with a two-pillar lift.



Maintenance interval

Maintenance items

1 Do not start the engine where it is prohibited to start.
2 When it is necessary to start the engine for maintenance, the parking brake must be fully braked and the shift lever must be in neutral.
3 Do not touch any components of the ignition system after the engine is started.
4 When the engine is running, hands, clothes, tools and other objects shall not contact cooling fan, drive belt and other rotating parts.
5 Do not touch any heat removal parts, such as exhaust manifold, A/C high-pressure pipe, muffler, etc. to avoid burns.
6 Do not make any conductive objects close to the positive and negative poles of the battery to avoid short circuit, resulting in battery damage, fire, explosion and other accidents.
7 Do not discharge any liquid on the vehicle at will, such as gasoline, engine oil, coolant, brake fluid, power steering fluid (if equipped), etc. These liquids pollute the environment.
8 Prevent water from entering the control unit during cleaning and maintenance.
9 For electronic throttle valve faults, do not disassemble it for repair.
10 The fuel system maintains high-pressure gasoline in the fuel circuit even if the engine is not running. Therefore, the replacement of fuel pipe and fuel filter should be carried out in a well-ventilated place.
11 The ECU temperature shall not exceed 80 ° C in the event of a thermal simulation of the fault or a service operation that may increase the vehicle temperature.
12 When disconnecting the harness connector of the control module, the ignition switch must be turned to the "OFF" position.
13 Equipment that may cause electromagnetic interference should not be installed near the ECU to avoid interference.
14 When welding the vehicle, disconnect the harness connector of each control module and disconnect all battery connection harnesses.

Routine maintenance plan

Regular maintenance content and duration

The duration is determined by mileage or number of months. All inspection, adjustment, lubrication and other maintenance work shall be carried out in strict accordance with the time specified in the table. Regular maintenance symbol:

R - indicates replacement; I - means that inspection may require adjustment, lubrication, cleaning and replacement; A - indicates adjustment.

Maintenance under harsh driving conditions

If the vehicle is often used under harsh conditions, please refer to the following table for maintenance:

A: Repeated short circuit distance.

B: Rough and muddy road driving. C: Driving on dusty roads.D: Extremely cold or saline road.

E: Repeat the short distance in extremely cold and frosty weather.

Component name	Maintenance mode	Maintenance interval	Harsh condition items
Drive belt	I. R	Every 60000 km or three years	B. C
Engine oil and oil filter	R	Every five, 000 km or three months	A.B.C.D. E
Air filter element	I. R	Every 2500 km or every three months, increase cleaning and maintenance frequency under severe driving conditions, and replace according to specific conditions.	C
Spark plug	R	Every 10000 km or every six months	A.B.C.D. E
Drive shaft and dust cover	I	Every 5000 km or every three months	B.C.D. E
Chassis upper bolts and nuts	I	Every 5000 km or every three months	A.B.D. E
Brake discs and brake friction pads	I	Every 5000 km or every three months	A.B.C.D. E
Manual transmission fluid	R	Check regularly every 20000 km or 12months (whichever comes first), and replace the transmission oil in case of any abnormality.	A.C.D. E
Automatic transmission fluid	R	Lifelong maintenance-free	A.C.D. E

Component name	Maintenance mode	Maintenance interval	Harsh condition items
Throttle body assembly	-	Clean the throttle valve body once every 10000 km according to the cleaning specifications. In case of troubleshooting related to the throttle valve body in the case of more than 5000 km, the throttle valve body shall be inspected for carbon deposit or coking, and cleaned according to the situation.	A.B.C.D. E
Tie rod end joint, tie rod dust cover	I	Every 5000 km or every three months	B.C. D
Parking brake(EPB and rear caliper)	I	Every 5000 km or every three months	A.B.C.D. E
Front suspension ball joint	I	Every 5000 km or every three months	A.B.D. E

Description and operation of noise, vibration and irregularity

Meaning of NVH in Automotive Engineering

This chapter gives a general overview of how noise and vibration are generated and eliminated on the vehicle.

Caution The model picture in this section is only an operation diagram, and the actual model shall prevail.

Meaning of NVH in Automotive Engineering

N = Noise - Sound, audible.

V = Vibration - vibration, can be felt.

H = Irregularity - jitter, tremble, can be heard and felt.

Type of noise in vehicle engineering

Noise in vehicle engineering is classified according to sound intensity as follows:

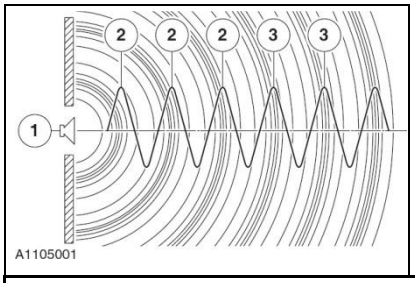
- Low Noise - Low rumble, buzzing.
- Medium Noise - Rapid buzzing.
- High Noise - a loud howl, a harsh whistle.
- Loud howling and whistling can

stab ears. Production position of

sound of different intensity on vehicle:

- Low-key noise mostly comes from the engine.
- Low-profile noise can also be generated on the road surface, especially on rough road surfaces.This is also a form of low noise, just as the driver feels the vibration of the vehicle.
- High-profile noise (such as howling and sharp whistling) is usually generated by airflow or accessories (such as generator, power steering pump and drive belt).
- Clicking occurs when the vehicle travels on uneven surfaces. These unstable noises are usually caused by

shock absorbers, chassis components or interior loose components. Sound is transmitted by air



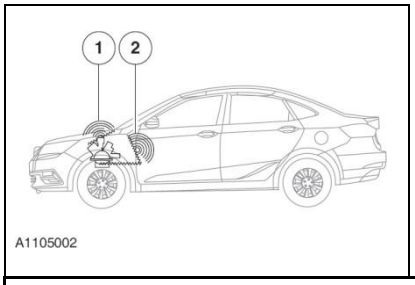
Project	Description
1	Sound source(Such as engine)
2	Sound wave
3	Amplitude

Sound travels through the object

Caution

Noise transmitted through air and objects is a major concern of automobile engineering.

Sound travels through air and objects



Project	Description
1	Air-borne noise
2	Body noise

Examples:

- Noise from the engine.
- Directly through the air.
- It is transmitted from the engine to the vehicle body by vibration and radiated to the driver compartment by sound wave.

Vibration technology

- No one can hear vibration waves with frequency lower than 20 Hz or frequency higher than 20,000 Hz, 20 kHz.
- The engine is installed flexibly and can vibrate up and down when driving on uneven road surface.
- When the flexible installation fails, the vibration will be transmitted

from the engine to the body to the cab. The following rules apply:

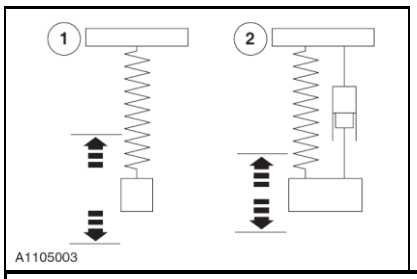
- Automotive technology is concerned not only with low frequency vibration but also with unaudible high frequency vibration.
- Low frequency vibration is usually visible.
- High frequency vibration can be heard or felt by the

floor and steering wheel. Resonance

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

Damping

- If a damper is connected in parallel with the spring, the vibration of the object will be attenuated.
- The vehicle damper is made according to this principle.
- Damping affects the resonance of the object or system.
- The vibration is attenuated by the action of the shock absorber, so as to eliminate the body vibration.
- The vehicle damper is actually a damper, which damps the vibration of the vehicle body.



Project	Description
1	Undamped vibration
2	Damping vibration

Sound insulation

In vibration science, sound insulation means

decoupling of components and systems.

Examples:

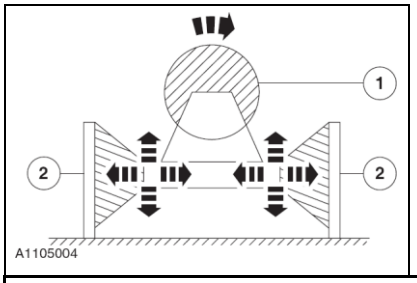
The engine is mounted on an elastic support seat to allow as little vibration as possible to pass into the body.

In automobile engineering, rubber cushion is the closest to sound

insulation technology. It acts like a spring. The effect of

decoupling depends on the structure of the component.

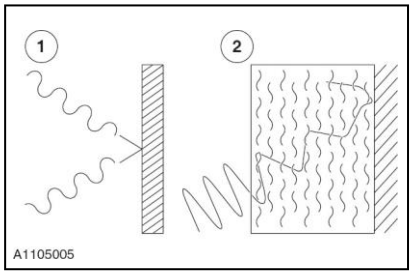
Directional mounting of rubber gasket for optimum sound insulation



Project	Component name	Description
1	Engine	Power unit
2	Engine bracket	Engine installation

Absorption

- Sound is reflected against a hard surface.
- If it encounters a soft outer surface, it will be absorbed. Its effect depends on the material and thickness of the absorbed object.



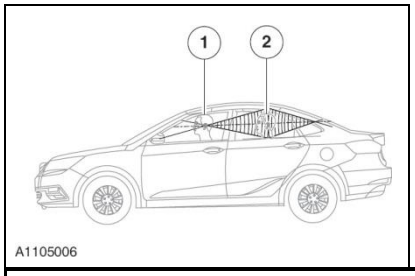
Project	Description
1	Reflected wave
2	Suction wave

Examples:

- All sound insulation components such as door trim panel, carpet, headliner, luggage rack and seat are related to body quarantine.
- This will directly reflect the sound wave and reduce the occurrence of Hall effect.

Noise and vibration phenomena on the vehicle

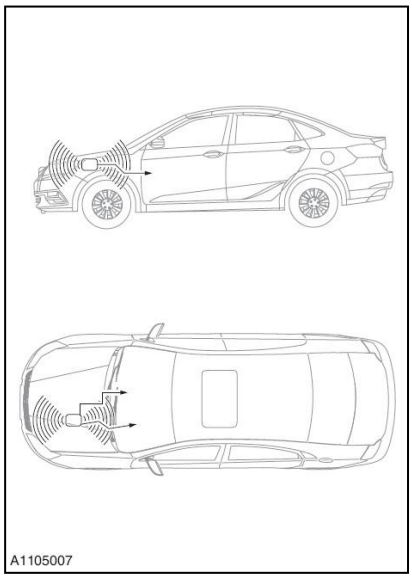
The noise level varies depending on the location of the passenger on the vehicle. Vehicle sound/noise wave(Standing wave)



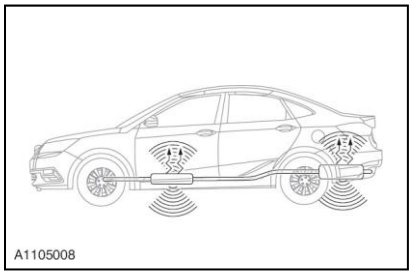
Project	Description
1	Driver in "trough"
2	Rear passenger in "wave crest"

Noise and vibration caused by intake and exhaust systems

The intake system serves as the vehicle's source of air and solid noise.



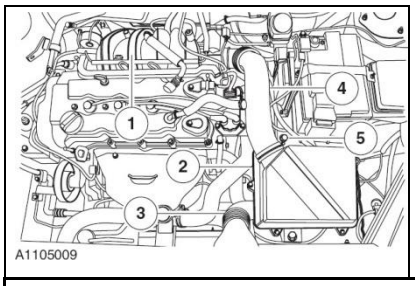
The exhaust system serves as the vehicle's source of air and solid noise.



Sound propagation path:

- The figure above shows the mode of transmission of the noise generated by the intake and exhaust systems.
- In addition to air noise, solid noise is the main source of noise in the intake and exhaust systems. In order to minimize noise, the sound insulation pads must be installed securely.
- The exhaust system is a typical vibration component. Good sound insulation device is required during installation, and the system layout, direction and connection points with the body shall be selected properly to reduce the transmission of solid noise.

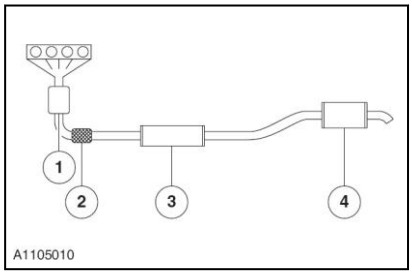
Intake system



Project	Component name	Description
1	Intake manifold	-
2	Air filter assembly	-
3	Air filter inlet trachea	-
4	Air filter out trachea	-
5	Fixed component(Rubber pad)	Securing air cleaner housing

- The length and volume of the intake system are fixed and cannot be changed during service operations. Pay attention to the fastening between the connecting parts during operation, so as not to leak air.
- The surface of the intake system component is subject to great 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 solid vibration generated on the surface of the intake system from being transmitted to the body, pay attention to the following points during maintenance operation: A. Install the whole intake system and the body quarantine on the rubber pad and maintain proper degree of freedom; B. Road trachea cannot be in direct contact with the vehicle body. Foam sound insulation pads must be installed in contact with the vehicle body or other components.

Exhaust system



Project	Component name	Description
1	Three-way catalytic converter	Catalytic converter
2	-	Decoupling device
3	Front muffler	Auxiliary muffler
4	Rear muffler	Main muffler

The exhaust system must not be installed too tightly.

Caution Rubber pads for suspension exhaust systems can also propagate vibration, in some cases a source of noise. It is therefore necessary to leave an appropriate degree of freedom when installing the exhaust system. The rubber pads must not be installed too tightly.

The exhaust manifold and catalytic converter (if directly connected to the engine) must be rigidly connected

to the engine (no gap should be left at the connection to the bracket). Simple question test:

- The exhaust system removes all suspension gaskets.
- Hang the exhaust system with a rope (maximum two-point suspension).
- Check the noise level of the cockpit during the road test.
- If the noise is eliminated, the exhaust gasket is the source of noise.
- Then conduct a road test every time one gasket is installed back to check the noise level.
- Use this procedure to find the gasket causing the noise.

Body

Function

- Vehicle requirements are multifaceted, especially for vehicles in motion. It is emphasized here that other main components causing noise in the vehicle, such as engine and gasket. However, the body is

  One of the most important components involved in NVH.
- The components described herein refer specifically to places where vibrations or noises occur according to their functions. The body contains or is associated with all of these components.
- The body produces not only air but also solid noise.
- The body must be able to absorb vibrations from all components and do not propagate them to the interior of the body as far as possible.
- The main parts of NVH in the vehicle body are roof steel plate, side wall and floor. Due to its structure, when vibration or noise propagates, it will be greatly enhanced as a loudspeaker.

Higher body requirements

- Excellent fall or crash performance.
- Spacious interior.
- Corrosion resistance.
- Light weight.
- Good aerodynamic profile.

Because sometimes these requirements cannot be met at the same time, only one compromise can be taken. For example, to meet the NVH performance, it is necessary to ensure the overall rigidity of the vehicle body as far as possible, and to ensure the good cushioning during collision, it is necessary to ensure the vehicle body has certain flexibility as far as possible. Therefore, only crinkle or bend parts of the vehicle body.

Examples:

The following factors must be taken into account to ensure the watertightness of the body but not the requirements for noise or vibration at the same time:

- Fit window correctly.
- Correctly install

sealing strip. Other

points for attention:

- All access to the engine compartment.
- Door and window sealing strip.
- Heater and vent.
- Sunroof drain channel pipe.

Cross parts between side wall and body are often vibration or noisy transmission channels. Possible corrective measures are:

- Block mounting (e.g. A-pillar and side wall) in critical locations for good sound insulation.

Caution Using foam blocks or filling foam is a good means of sound insulation. If there is noise such as wind, tire, engine or road surface, check the foam block in the corresponding part.

- Fit foam blocks in the affected area.
- Fill the appropriate notch or cavity with foam.

Fault symptom diagnosis and test inspection and confirmation

1 Operate the vehicle to reproduce the condition and confirm the customer's problem.
2 Visually check whether obvious fault cause can be found.
3 If a visual inspection or customer described problem is found to be obvious, fix it (if possible) before proceeding to the next step.
4 If the problem persists after inspection, identify the symptoms and refer to the symptom table.

How to use this diagnostic procedure section

Noise, vibration and NVH issues, which become more and more important because the vehicle is more and more sensitive to these vibrations. This section is used to assist in identifying these problems. This section presents diagnostic procedures based on symptoms. For example, if the condition occurs at high speed, the most likely starting point for diagnosis is "rocking and vibration while driving."

The road test procedure can identify the type of condition and how to identify vibration from shaking. Road test quick check is used to confirm whether the cause has been found or rule out.

Confirm the condition, review the appropriate sections and perform the correct diagnosis. When the situation has been confirmed, the work is half done. Perform according to diagnostic procedure.

Quick checks are described in the steps, while other relevant tests and adjustments are listed in the general procedure. Be sure to perform the steps and make records for future reference of important data.

Customer Interview

Road testing and customer interviews (if possible) can provide information to identify the problem and provide the correct diagnostic starting point. Condition confirmation

NVH usually occurs in four areas:

- Tire
- Engine accessories
- Suspension
- Drive train

Therefore, it is important to be able to put the NVH question quarantine in a specific area as soon as possible. The easiest and quickest way to do this is to perform a road test according to the instructions. An approved appropriate NVH diagnostic tester may be used to aid in diagnostic and test procedures.

Noise diagnosis procedure

Off-axle noise

The five most common non-axle noises are exhaust, tires, roof frame, trim and transmission.

Therefore, before performing the drive train removal and diagnosis, verify that the following conditions are not the cause of the noise:

- In some cases, the sound of exhaust sounds very much like gear noise. Some may be mistaken for rumbling of wheel bearing.
- Tyres, especially snow tyres, emit a high-pitched rumble similar to gear noise. Radiant tyres also have this feature. At the same time, any non-standard tyre with a unique tread pattern may also rumble.
- The trim panel will also whistle or whine.
- When the automatic transmission is engaged, or when the throttle is applied or released, there may be metal tapping sound. This is due to backlash somewhere in the drive train.
- The rumbling of the bearing sounds like a marble roll. This is usually caused by

wheel bearing damage. Noise condition

- Gear noise is usually the roar or whine caused by gear damage or improper bearing preload. It occurs at different speeds and driving conditions or may continue

  Of.

- A typical chuckle sounds like a wooden stick inserted into a rotating bicycle wheel. It occurs when the 64 km/h decelerates and usually continues until the vehicle stops. The frequency varies with vehicle speed.
- Knock sounds like a gibberish, which occurs and becomes louder during acceleration or

deceleration. The location of the repair can be found by removing some parts. Rattling, knocking or

friction may be caused by the following reasons

- Wear, damage or incorrect installation of wheel bearings, suspension or brake components.
- Before disassembling the transmission for diagnosis and maintenance of gear

noise, check and rule out tires, exhaust and trim panels. Vibration condition

Vibration on the road may be caused by:

- The front or rear wheels are not balanced.
- Tire is out of circle.
- Jitter or vibration during acceleration may be caused by the following reasons:
- Damaged powertrain/drive train mount.
- Constant velocity (CV) connector too high operating angle due to incorrect body height. Check body height, confirm

correct spring rate and check items under inoperable conditions. Road test

The part driven by the gear produces a certain amount of sound. Some noises are acceptable and may only be heard at certain speeds or under different driving conditions, e.g. in a fresh shop

Good asphalt pavement. A little noise must be considered normal.

Road tests and customer interviews (if possible) provide the information needed to confirm the condition and provide direction for the correct diagnostic start point.

1 Record the entire diagnostic process. Even the smallest information must be recorded as it may become the most important.

2 Do not touch any part until you have completed the road test and a thorough visual inspection of the vehicle. Keep the tire pressure and the load of the vehicle in the state when it is first discovered. Adjusting the tire pressure, vehicle load or other adjustments may reduce the strength of the condition to a level that cannot be clearly confirmed. It may also cause something to enter the system, preventing correct diagnosis.

3 A visual inspection is considered part of the initial inspection procedure and any seemingly abnormal conditions are noted. Record the tire pressure, but do not adjust them first. Record leaks, loosened nuts and bolts, or traces of possible friction between components to gloss. Check the loading space for unusual loads.

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

5 Perform a road test quick check as soon as the condition reappears. This helps to find the correct diagnostic procedure. Perform more than one quick road test check to confirm correct results. Remember, road test quick checks may not tell you where the problem is, but they can tell you that the problem is not there.

Road test quick check

1 **24 ~ 80 km/h:**

Slight acceleration, a whimper is heard, the front baseplate may also feel vibration. It is particularly obvious when the engine speed is specified and the throttle opening is accelerated at the specified speed. It also emits a whimpering sound depending on the component causing the noise. Refer to the sobs in the symptom table.

2 Acceleration/deceleration:

During slow acceleration and deceleration, sometimes the steering wheel/pillar, seat, front floor panel, front door trim panel or front end sheet metal feel rocking. It is a low frequency vibration with a period of about 9 ~15 times per second. It sometimes increases due to slightly pressing the brake. Refer to Idle rumble/shake/vibration in the symptom table.

3 High speed:

The front floor panel or seat feels an invisible vibration but is accompanied by a sound or rumbling or humming. When the clutch pedal (manual transmission) is depressed or the shift lever is in neutral (automatic transmission) and the engine idles downwards. If you still feel vibration, it may be the wheel, tire, front brake disc, wheel hub or front axle. Refer to Shaking and Vibration on Motion in the Symptom Chart.

4 Engine speed sensitivity:

When the engine reaches a certain speed, it will feel vibration. It disappears when coasting in neutral. This vibration is more pronounced when the vehicle is stationary and the engine is operated at the speed of the fault. It may be caused by any component, from the accessory drive belt to the clutch, or the torque converter running with the engine when the vehicle is stopped. Refer to Shaking and Vibration on Motion in the Symptom Chart.

5 Noise and vibration (rattling, snapping or friction) during steering may be caused by:

- Front wheel bearing is worn, damaged or installed incorrectly.
- Damaged powertrain/drive

train mount. Road condition

Experienced technicians will choose a route for road testing for NVH diagnostics. The selected road shall be fairly flat and free of undulations (unless special

Condition). A flat asphalt road with different speeds is preferred. Gravel or rough roads are not suitable because of additional road noise. Once the route is established and used, the road noise variable can be removed from the test results.

Caution Some problems only occur on flat asphalt roads.

If a customer complains that noise or vibration occurs on a particular road, it may be caused by the road surface. If

possible, the vehicle can be tested on the same type of road. Vehicle preparation

Perform a thorough visual inspection of the vehicle before performing a road test. Record any seemingly abnormal conditions. No repairs or adjustments may be performed until the road test is complete, except

When it is impossible for the vehicle to operate or the condition may cause injury to the technician. After confirming the

condition, always install all removed parts back.

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Overview

The JL473ZQ7 engine is a forward and rear engine independently developed by Chang'an Company. Based on the concept of "independent innovation · energy saving and environmental protection · safe and fashionable · classic products · economic and practical," it is positioned at low cost and strong power to meet the vehicle requirements of Chang'an platforms. The complete vehicle must meet the fuel consumption target value of Phase IV passenger car and meet the requirements of national VI emission regulations.

Advanced technology:

1 Pressurization system (solenoid-controlled wastegate valve for accurate control of wastegate valve to speed up catalytic ignition and reduce fuel consumption).
2 Neutral VVT, continuous variable intake and exhaust valve timing (DVVT), double overhead camshaft (DOHC), increase engine power while effectively reducing emissions.
3 The cylinder head integrated exhaust manifold (IEM) reduces the exhaust temperature under high load conditions, and reduces the mixture enrichment; Increase warm-up speed, improve fuel economy and original emissions.
4 Metal timing chain drive. Compared with the traditional rubber timing belt, the timing chain is durable, not easy to malfunction, and can be lifelong maintenance-free.
5 Cooling and heat management system: Double thermostat can effectively increase warm-up speed, reduce friction and fuel consumption.
6 Lubrication system: Full variable displacement engine oil pump, accurate control of engine oil pressure based on different engine load conditions, on-demand supply, pressure closed-loop control, effectively reduce power consumption compared with the traditional quantitative pump.
7 Application of low friction technology: Low friction coating is adopted for connecting rod bushing, main bearing bushing and piston ring, and advanced honing technology and other low friction technologies are adopted for cylinder block; Hydraulic roller rocker arm reduces fuel loss, reduces noise, improves NVH, eliminates valve clearance adjustment, and eliminates maintenance for life.
8 High-efficiency combustion system: 350 bar high-pressure multiple in-cylinder direct injection system, 350 bar high-pressure fuel injection system achieves excellent atomization effect of fuel injection bundle, achieves high-quality oil and gas mixing, and achieves high-efficiency combustion. Multiple injections meet different requirements of full MAP working conditions to achieve the performance objectives of improving power, reducing fuel consumption, reducing oil dilution and suppressing knock;
9 Lightweight design: All-aluminum alloy cylinder block, cylinder head, plastic intake manifold, plastic cylinder head cover, intercooler in and out trachea adopt plastic, lightweight design.
10 Free-standing oil pump. Variable displacement oil pump internal asymmetric structure

technology further reduces mechanical noise and improves NVH quality. Superior quality:

In addition to using advanced technology, the engine has undergone rigorous bench test and complete vehicle test. After repeated high-strength road reliability test and test of various extremely severe working conditions such as high temperature, high cold and plateau, the quality of the product is ensured.

1 Performance: JL473ZQ7 maximum net power 133KW, maximum net torque 300N•m: Low emission: Meet national VIb emission. Low emission: Meet national V emission
2 Outstanding fuel saving performance: Low friction, shortened warm-up time, advanced engine heat pipe
3 Lightweight: The intake manifold assembly and intake pipe are made of plastic, which greatly reduces the engine weight.
4 Reliability aspect: The engine has passed strict bench and road test, and completed 3 high adaptability verification, with high reliability and durability.
5 Modular design: The modular design reduces the manufacturing cost of the engine, which has a high cost performance ratio.
6 Compact size, compact shape (Packaging), leading structure design, modular and integrated parts, reducing the number of parts
7 The application of these new technologies enables the engine to achieve a higher energy output at a smaller displacement, greatly saving fuel consumption; Improved engine durability

⚠ Warning

Before removing or installing any electrical device, always disconnect the battery negative cable first when the tool or device is easily accessible to exposed electrical terminals. Disconnect this cable to prevent injury or damage to the vehicle. If not specified, the ignition switch must be turned to the LOCK position.

Caution Each time the air filter is removed, the air inlet must be blocked to prevent foreign matter from entering. Foreign matter may block the cylinder intake passage during starting and cause serious damage.

Caution note: For maintenance involving dismantling of "water pump and water pipe above generator," "cloth or other auxiliary articles shall be used to block the generator to prevent liquid from entering the generator."

Maintenance precautions

The following parts must be replaced when reassembling

Project	Description	Project	Description
1	Valve stem seal	11	Oil inlet and return pipe gasket of supercharger
2	Double-mass flywheel mounting bolt	12	Supercharger upper cover with gasket assy.
3	Water pump gasket	13	M18 process hole plug sealing gasket
4	Crankshaft rear oil seal	14	M12 process hole plug sealing gasket
5	Signal plate screw	15	Overflow trachea gasket
6	Crankshaft front oil seal		
7	Engine oil pressure sensor assembly		
8	Cylinder gasket assembly		
9	Pressurizer inlet and return pipe gasket		
10	Supercharger inlet and return pipe gasket		

Mechanical system specifications

Material specification

Name	Specifications	Capacity
Sealant	Tianshan 1591 H(All joint surfaces of oil pan and crankcase; T-shaped area of joint surface of cylinder block, front end of cylinder head and front cover; Crankcase upper body and lower body joint surface; Front cover)	-
Thread locking compound	Tianshan 1262(Cylinder head water plug)	-
Thread locking compound	Loctite 620(All bolts of cylinder block; Bolt and plug of cylinder head except water plug)	-
Oil	Sn and above 0W-20	4.4L Maintenance 3.9 L

General specifications

Name	Specifications
Engine type	Vertical, in-line four-cylinder, water-cooled, four-stroke, double overhead camshaft
Fuel supply mode	In-cylinder direct injection
Intake mode	Turbocharging
Timing drive mode	Timing chain
Cylinder diameter	73.5mm
Piston stroke	88 mm
Displacement	1494 ml
Maximum power(General)	138kW/5500 rpm
Maximum torque(General)	300Nm/1500 ~ 4000 rpm
Idle speed	650±50 rpm
Ignition sequence	1-3-4 - 2

Torque specification

Name	N·m	lb-ft	lb-in
Oil pressure sensor	16		-
Cylinder head cover bolt	10	-	89
Intake manifold bolt	23	17	-
Supercharger connecting nut	40		-
Main oil passage is blocked	26	-	-
Tensioner screen blocked	23	-	-

Name		N·m	lb-ft	lb-in
Connecting bolt between front cover and cylinder head		50	37	-
PCJ Oil passage blocked		32	24	-
Oil passage is blocked (3rd shaft seat of cylinder block		26		-
Water pump mounting bolt		40	17	-
Oil pan bolt		10	-	89
Oil pan drain plug		55	41	-
Oil pump mounting bolt		23	17	-
Connecting bolt of front gear train idler and cylinder block		50	37	-
Crankshaft pulley combination bolt		120+135°	89	-
Camshaft cover bolt		10	8	-
Retaining bolt of engine right suspension bracket cushion assembly		50	37	-
Center-mounted solenoid valve		50+38°	-	-
Camshaft position sensor cover retaining bolt		10	-	89
Timing guide rail		16	-	-
Cylinder head bolt		25+180°	18	-
Connecting rod bearing		20+90°	12	-
Main bearing cap bolt		35+120°	46	-
Flywheel bolt		40 ＋ 45°	-	-
Unmarked bolt	M6	10	-	89
	M8	23	17	-
	M10	50	37	-
	M12	80	65	-

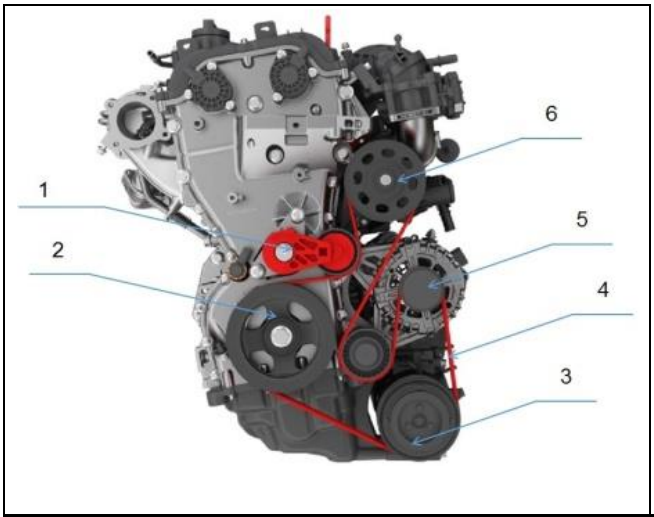
Tightening torque specification

Serial number	Main part number	Name	Assembly position	Tightening method
1	1002041	Main bearing cap bolt	Crankcase	Angle method: (35 N·m±2 N· m) plus (90°±5°), monitoring: 60-110 N·m
2	1004033	Connecting rod bolt	Connecting rod cap	Angle method: (20 N·m±2N· m) plus (90°±5°), monitoring: 50±15 N·m

3	1003161	Cylinder head connecting bolt	Camshaft	Angle method: (25 N·m±2 N· m) plus (180 °±5°), monitoring: 45-110N·m
4	1000130	Crankshaft pulley combination bolt	Crankshaft	Angle method: (120 N·m±5 N· m) plus (135 °±5°), monitoring: 320 ±60 N·m
5	1005011	Flywheel bolt	Double mass flywheel and crankshaft connection	Angle method: (40 N·m±3 N· m) plus (45°±3°), monitoring: 60-115N.m
Remarks: 1.For the definition of angle method, refer to General Rules for Fastening of Fasteners GB/T 16823.2 -1997; 2. Pay attention to the main bearing cover bolt, cylinder head connecting bolt, connecting rod bolt and crankshaft pulley combination bolt, and do not scratch the thread; During storage and assembly, make sure that the bolts are clean, free from rust and scratches, and there is anti-rust oil on the surface and no impurities; 3. Main bearing cap bolt, cylinder cap connecting bolt, connecting rod bolt and crankshaft pulley combination bolt cannot be reused. After sales, replace with new bolt once dismantled.4. Flywheel bolts are self-contained glue (blue glue) and can only be used once. After dismantling, it is necessary to clean the mounting hole and replace it with a new bolt. Tightening must be completed within 2 min and reverse loosening is not allowed. In principle, it is not allowed to perform torque detection after tightening. If torque detection is required, it is necessary to clean the mounting hole and replace it with a new fastener for assembly.				

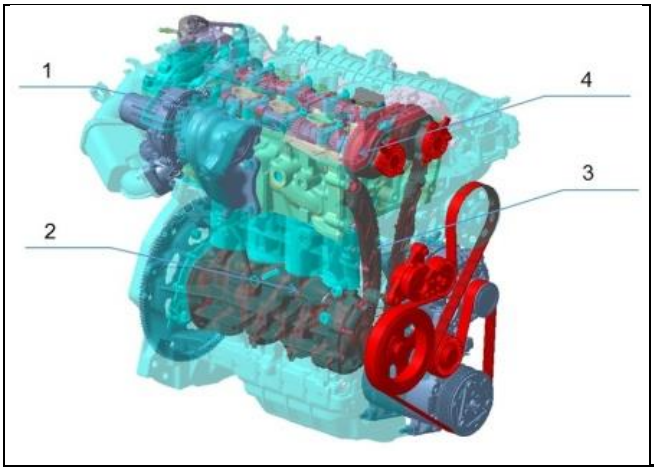
Composition and position distribution

Front end wheel train layout



Project	Description	Project	Description
1	Front end gear train tensioning wheel assembly	4	Front gear belt
2	Crankshaft damping pulley	5	Integral alternator assembly
3	Compressor assembly	6	Water pump pulley

Component position diagram



Project	Description	Project	Description
1	Intake and exhaust wheel axle	4	Electromagnet assembly(VVT)
2	Crankshaft group		
3	Front end gear train		

System functional principle introduction

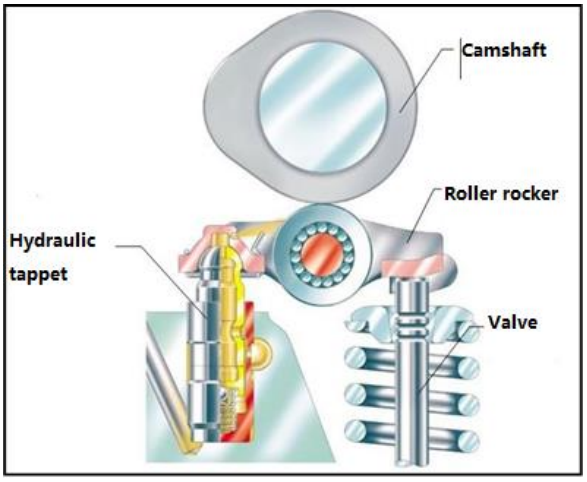
Engine mechanical system includes engine crank and connecting rod mechanism, timing system, valve mechanism and crankcase assembly; The main working process is combustion pressure expansion after fuel and air mixture is ignited by spark plug. During work stroke, high-pressure fuel gas is used to push piston to move linearly. The linear motion of piston is converted into crankshaft system rotation motion through crank connecting rod mechanism. The crankshaft rotation motion drives front-end gear train accessories to rotate through front-end pulley (including generator, water pump and compressor). At the same time, the crankshaft drives intake and exhaust camshaft to rotate through timing system. The intake and exhaust camshaft drives valve mechanism to work. In addition, the coordination of ignition system, lubrication system and cooling system enables engine to cycle. Engine mechanical system is main engine frame and main support part of other engine systems.

Inspection of part structure principle

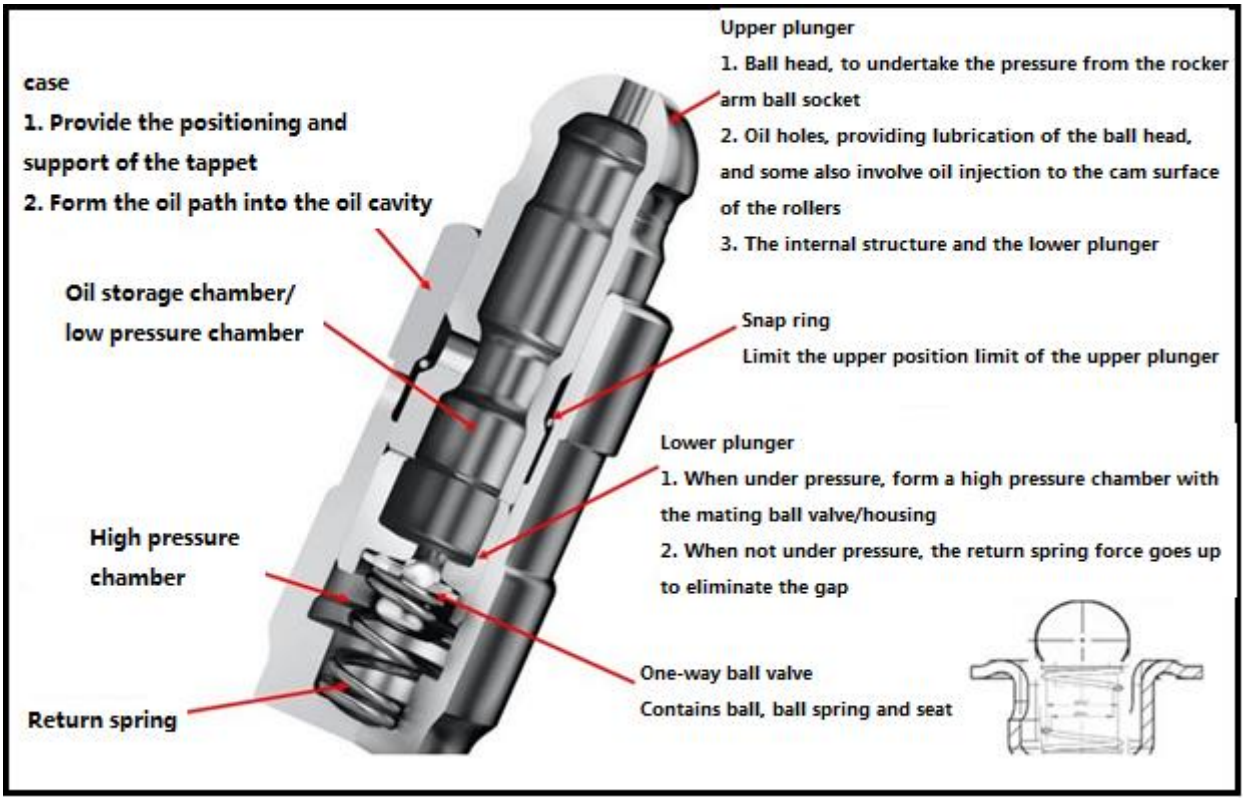
Rocker arm group(Roller rocker arm, hydraulic tappet)

Structure and principle

Rocker arm assembly includes roller rocker arm and hydraulic tappet. Its function is to convert rotational motion of camshaft into up and down motion of valve. Contact between roller rocker arm and camshaft through roller bearing to reduce friction. At the same time, the roller rocker arm and hydraulic tappet are used together to eliminate valve clearance timely to obtain better NVH performance.



Schematic diagram of hydraulic tappet structure is as follows



Front end gear train tensioning wheel assembly

Function

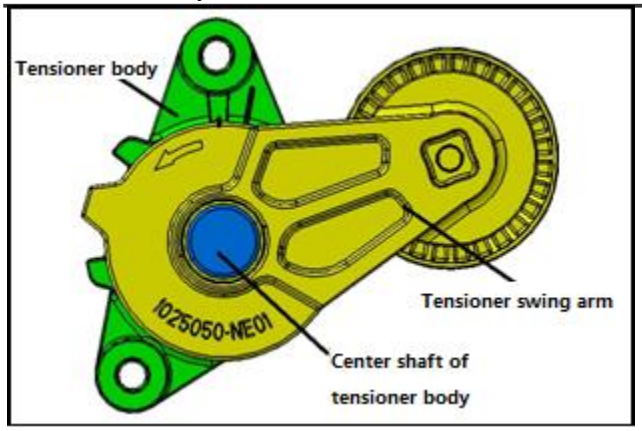
Automatically tension the front gear train belt to

ensure normal operation of the front gear train.

Working principle

The tensioning wheel is mounted on the engine body through bolts. The tensioning wheel body is equipped with compressed spring. Under the action of spring force, the swing arm of the tensioning wheel can rotate around the central shaft of the tensioning wheel body to come.

Automatically adjust the tensioning pulley position to maintain the front belt tension within a reasonable range.



Timing tensioner

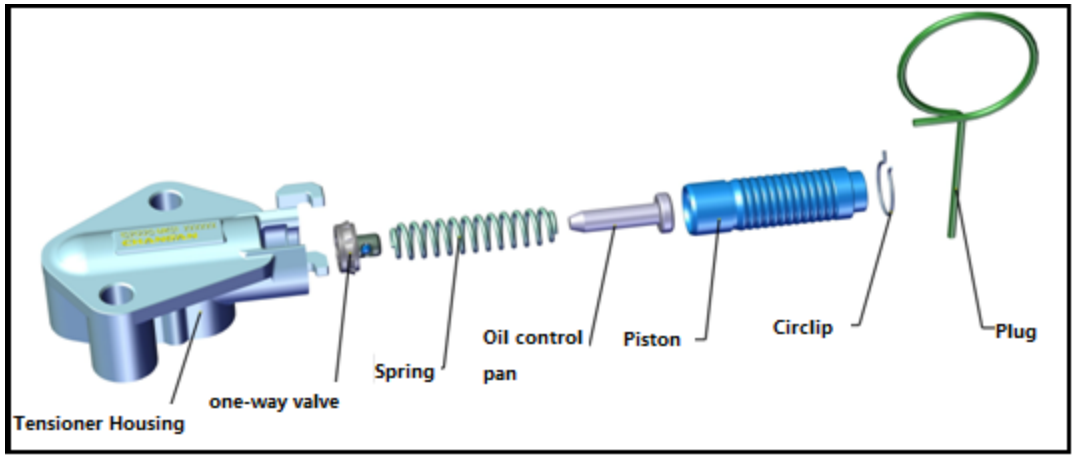
Function

Keep the timing chain under proper tension during transmission, prevent the timing chain from loosening and falling off, and reduce the wear of timing chain and sprocket. Working principle

The engine oil enters the tensioner to form a high-pressure oil chamber, and the timing chain is tensioned by the oil pressure + spring force. When the high-pressure chamber is in compression state, the internal hydraulic components form oil pressure damping to absorb vibration in the transmission process, and excess oil leaks to the outside of the assembly through the fitting clearance and oil control pan to play the role of overpressure protection and lubrication.

Structure

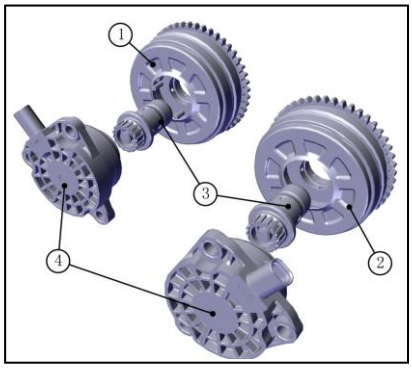
The tensioner is a hydraulic element with ratchet structure. The component consists of housing, check valve, spring, oil control pan, piston, snap spring and pin.



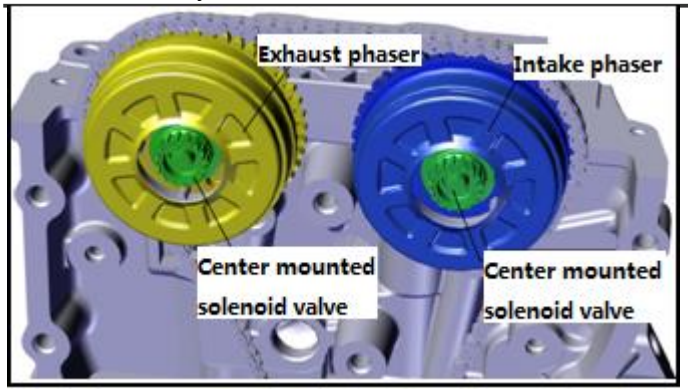
VVT system(Phaser, solenoid valve, solenoid)

Structure

VVT is a middle-mounted hydraulic VVT structure, including 1. exhaust phaser (initial position: Most lagging position); 2. Intake gas phaser (initial position: Most advanced position); 3. Middle-mounted solenoid valve; 4. Middle-mounted electromagnet

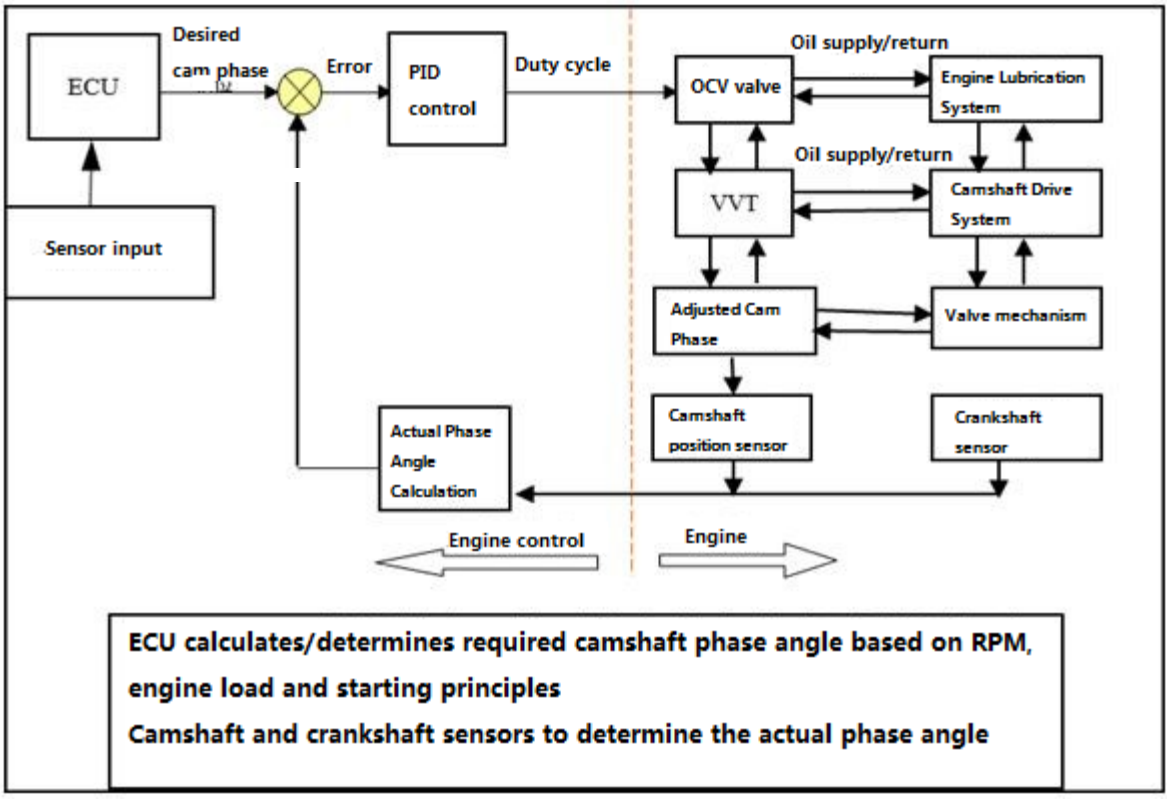


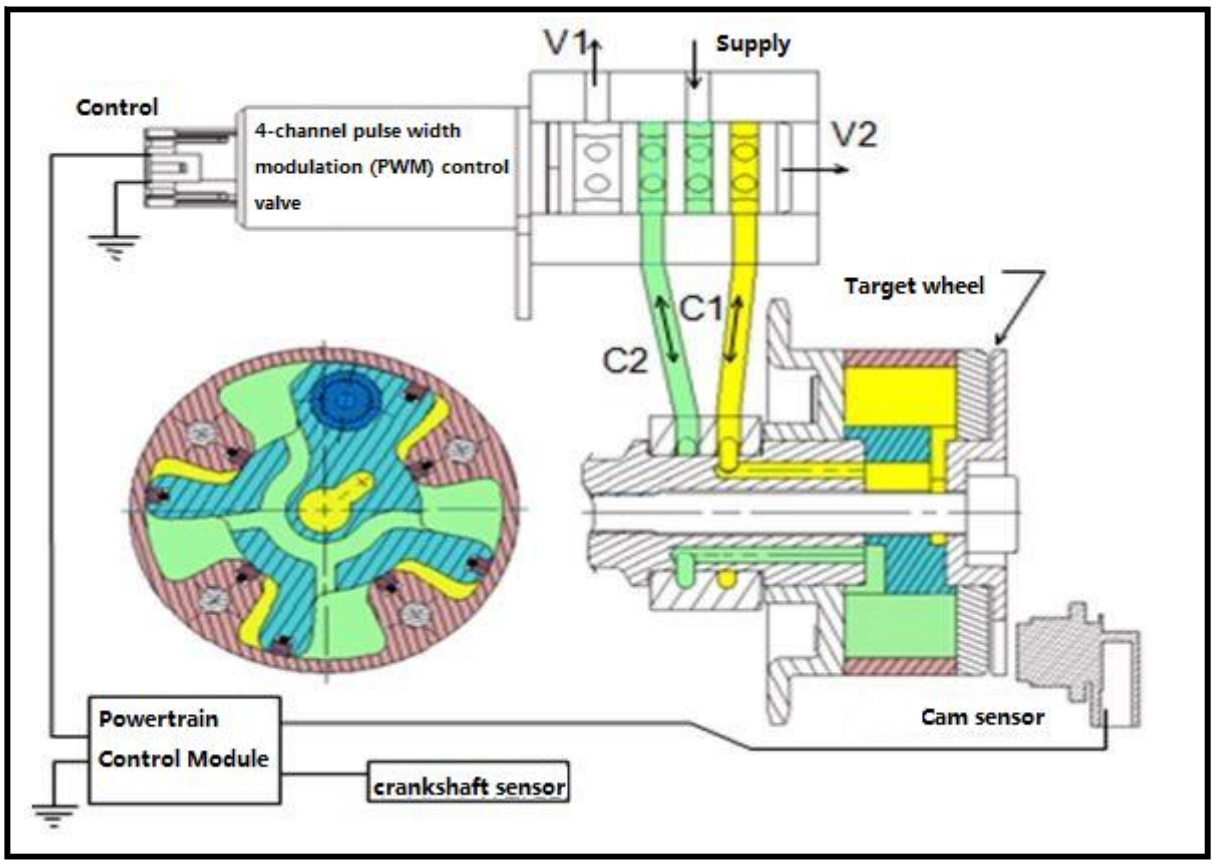
The intake and exhaust phasers are installed at the front end of the camshaft respectively, and are connected with the camshaft through the middle-mounted solenoid valve. Meanwhile, the middle-mounted solenoid valve introduces the engine oil from the camshaft into the phaser, and adjusts the phase advance or lag through the oil pressure change. Install solenoid on front cover



Working principle

According to the calculated phase difference between the target phase and the actual phase, ECU output duty ratio (PID) controls the middle-mounted solenoid stroke, so as to control the opening degree of the solenoid valve. The solenoid valve opens with different degrees, and the engine oil of different flow flows into the phaser advance or lag oil chamber. Different oil pressure drives the phaser to convert different phase changes, so as to realize the camshaft phase advance, lag or hold at different angles, so as to ensure the normal operation of the engine and give play to the best performance.

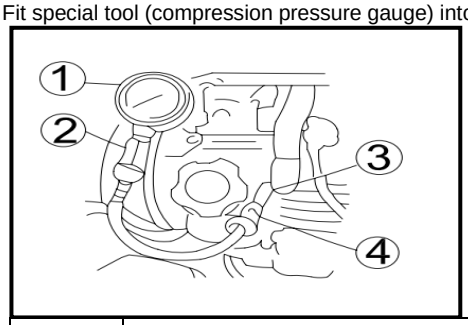



V1
Supply
Control
4-channel pulse width
modulation (PWM) control
valve
V2
Target wheel
C1
C2
Powertrain
Control Module
crankshaft sensor
Cam sensor

Common method
cylinder pressure check

Check the compression pressure of the 4 cylinders as follows.

1 The engine warms up below normal operating temperature.
2 Shut down the engine after warm-up. After the engine warms up, place the transmission shift lever in the neutral position and fix the parking brake and counter at the drive wheel.
3 Disconnect the harness connector for the fuel injector.
4 Remove ignition coil assembly and all spark plugs.
5 Fit special tool (compression pressure gauge) into the spark plug bore.



Project	Special tool
1	09915-64510-001 Pressure gauge
2	09915-64510-002 Joint
3	09915-64530 Hose
4	09915-67010 Retainer

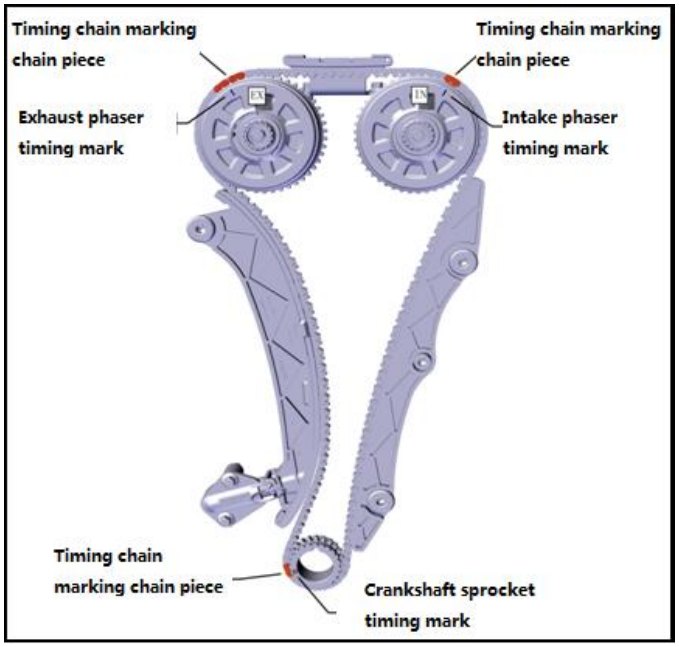
6 The manual transmission needs to depress the clutch to reduce the engine starting load and depress the accelerator pedal to make the throttle valve fully open. (Automatic transmission does not require this action)
7 Start the engine with a fully charged battery and read out the maximum pressure on the compression pressure gauge.
8 Operate each cylinder in steps 5 to 7 and record the cylinder compression pressure.
9 Compare with the specifications in the following table:

Compression pressure	
Limit(Minimum)	900kPa
Maximum pressure difference between two cylinders	100kPa

10 After inspection, install the spark plug and ignition coil assembly, and connect the fuel injector harness connector.

Calibration timing method

1 When removing the engine front cover, rotate the crankshaft clockwise to check whether the timing marks of the engine timing mechanism are aligned, as shown in the figure below.



2 Check the timing chain assembly, timing chain rail fixing assembly and timing chain moving rail assembly for wear and cracks, and

replace if necessary.

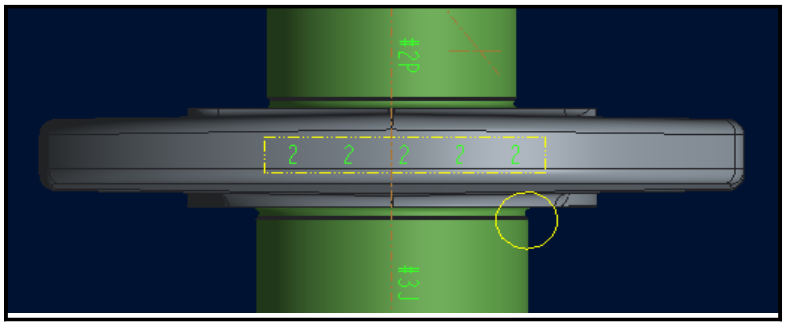
3 Check the timing chain tensioner assembly to see if there is stagnation, and replace it if necessary.

Matching method of connecting rod bush and crankshaft main bush

Matching method of main bearing bush

Crankcase main bearing hole grouping: 5 numbers engraved on the cylinder block, from left to right and from top to bottom, respectively represent the crankshaft hole diameters of main bearing cover "1," "2," "3," "4" and "5." Crankcase main bearing hole diameter is divided into 1, 2 and 3 groups.

Crankshaft main journal grouping: Five numbers are engraved on the crankshaft fourth sector plate, from left to right, representing the diameter grouping of the first, second, third, fourth and fifth main journals respectively. Crankshaft main journal diameter is divided into 1, 2 and 3 groups.



Main bearing bushings are grouped according to the thickness of bearing bushings, which are divided into 5 groups. Each group is engraved with corresponding digital identifiers such as "1," "2," "3," "4" and "5" on the back of the bearing bushings.

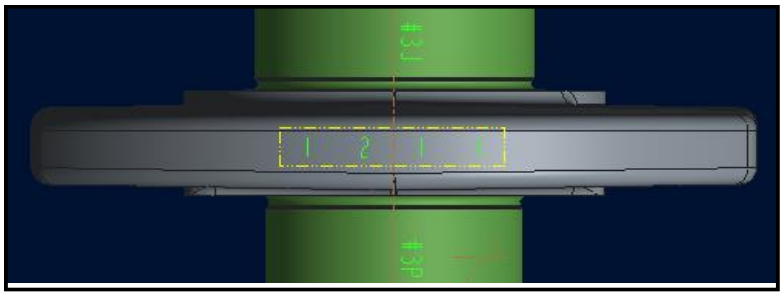
Principle of main bearing shell: The sum of grouping value of crankcase main bearing hole + grouping value of crankshaft main journal + grouping value of main bearing shell thickness is equal to 7. For example, the first main bearing hole of crankcase is 2, the first main journal of crankshaft is 3, and the optional main bearing bush group is 2. The second main bearing hole of crankcase is 1, the second main journal of crankshaft is 1, and the optional main bearing bush group is 5.Detailed bearing shell thickness and matching relationship shall be carried out according to the following table.Heat of people heat of people

Table: Crankshaft Connecting Rod Journal, Connecting Rod Big Hole And Connecting Rod Bearing Shell Size Grouping Fit Table

Fit clearance 0.014～0.032				Crankshaft main journal diameter group					
				1		2		3	
				Grouping mark					
				1		2		3	
Crankcase spindle bore grouping mark	Group	Marking	Grouping size range	$\varphi48^{-0}_{-0.006}$		$\varphi48^{-0.0061}_{-0.012}$		$\varphi48^{-0.0121}_{-0.018}$	
	1	1	$\varphi52^{+0.006}_{0}$	5	$2^{-0.007}_{-0.01}$	4	$2^{-0.004}_{-0.007}$	3	$2^{-0.001}_{-0.004}$
	2	2	$\varphi52^{+0.012}_{+0.0061}$	4	$2^{-0.004}_{-0.007}$	3	$2^{-0.001}_{-0.004}$	2	$2^{+0.002}_{-0.001}$
	3	3	$\varphi52^{+0.018}_{+0.0121}$	3	$2^{-0.001}_{-0.004}$	2	$2^{+0.002}_{-0.001}$	1	$2^{+0.005}_{+0.002}$

Matching method of connecting rod bush

Crankshaft connecting rod journal grouping: Four numbers are engraved on the fifth sector plate of the crankshaft, from left to right, representing the diameter grouping of the first, second, third and fourth connecting rod journals respectively. Crankshaft connecting rod neck diameter, divided into 1, 2 and 3 groups.



Big-end hole grouping of connecting rod: Big-end side of connecting rod is carved with diameter and size grouping, big-end hole diameter of connecting rod is divided into 3 groups: 1, 2 and 3.

The connecting rod bearing shells are grouped according to the thickness of the bearing shells, which are divided into three groups in total. The back of each bearing shell is engraved with corresponding digital marks such as "1," "2" and "3."

Connecting rod bearing with bearing principle, the sum of connecting rod big end diameter grouping value + crankshaft connecting rod journal grouping value + connecting rod bearing thickness grouping value is equal to 6. If you can't get 6, go to 6. Example 1: The big end hole of connecting rod is 2, the first connecting rod neck of crankshaft is 3, and the optional connecting rod bearing bush group is 1. Example 2: The big end hole of connecting rod is 1, the second connecting rod neck of crankshaft is 1, the optional connecting rod bush group is 3, and the sum is 5. Example 3: The big end hole of connecting rod is 3, the second connecting rod neck of crankshaft is 3, the optional connecting rod bush group is 1, and the sum is 7.

Fit clearance: 0.014 -0.042				Crankshaft connecting rod journal diameter group					
				1		2		3	
				Group marking					
				1		2		3	
Connecting rod bore	Group	Marking	Grouping size range	$\varphi44^{0}_{-0.006}$		$\varphi44^{-0.0061}_{-0.012}$		$\varphi44^{-0.0121}_{-0.018}$	
	1	1	$\varphi47^{+0.006}_{0}$	3	$1.5^{-0.007}_{-0.011}$	3	$1.5^{-0.007}_{-0.011}$	2	$1.5^{-0.003}_{-0.007}$
	2	2	$\varphi47^{+0.012}_{+0.0061}$	3	$1.5^{-0.007}_{-0.011}$	2	$1.5^{-0.003}_{-0.007}$	1	$1.5^{+0.001}_{-0.003}$
	3	3	$\varphi47^{+0.018}_{+0.0121}$	2	$1.5^{-0.003}_{-0.007}$	1	$1.5^{+0.001}_{-0.003}$	1	$1.5^{+0.001}_{-0.003}$

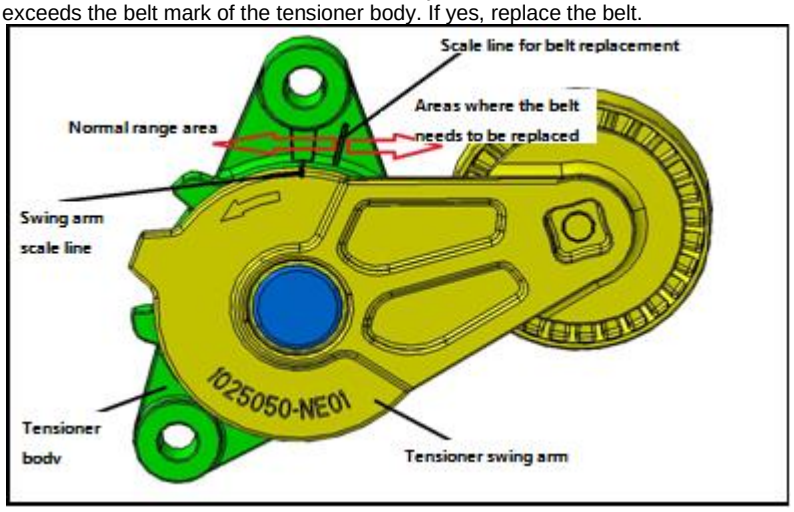
Front end belt tension check

Warning

Disconnect negative wire before checking and adjusting belt tension

1 Check the belt for cracks, cuts, deformations, wear and dirt. If it is necessary to replace the belt, refer to: Front gear train

2 Check the belt tension. If the front-end belt is too loose, the alternator voltage, cooling system and air conditioner will be affected, and the belt will be overheated and worn early. Check whether the belt mark on the swing arm of the front-end belt tension wheel exceeds the belt mark of the tensioner body. If yes, replace the belt.



3 Connect negative wire to battery terminal

Fault symptom diagnosis check and confirmation

1 Confirm the problems raised by the customer and check accordingly.
2 Check appearance for obvious mechanical damage.
3 Resolve the discovered problem before proceeding to the next inspection.
4 If the cause cannot be confirmed from the appearance, confirm the symptoms first, and then check according to the symptom table.

Appearance check list

Mec
· Coolant leakage · Oil leakage · Fuel leakage · Obviously damaged or worn parts

Fault symptom table

Symptoms	Possible causes	Measures
Engine misfire	• Electronic control system • Fuel system • Ignition system • Mechanical system - Combustion chamber carbon deposit - Camshaft - Near, exhaust valve - Piston - Piston ring - Cylinder - Intake blocked - Poor exhaust	Engine misfire is a comprehensive fault.
Abnormal internal noise under the engine	• Oil pan deformation • Oil strainer is deformed or damaged. • Oil pressure too low • Excessive clearance between crankshaft and bearing • Crankshaft axial clearance is too large	Reference: Troubleshooting of abnormal sound in cylinder
Accessory belt noise diagnosis	• Front gear belt • Related fasteners • Front gear train tensioner wheel • Front gear train tensioner • Front gear train idler • Crankshaft pulley • Alternator • Water pump • A/C compressor	Reference: Front gear train belt noise diagnosis

Symptoms	Possible causes	Measures
Engine temper **Fuel ignition in Cautio intake manifold, serious** **n Blast noise.**	• Electronic control system fault • Engine timing • Mixture is too lean • Intake valve group • Exhaust system blocked • Engine control module	Reference: Engine temper
Engine firing **Fuel ignition in Cautio exhaust system, serious** **n Blast noise.**	• Electronic control system fault • Engine timing • Ignition too late • Mixture too rich • Exhaust valve group • Exhaust system leakage • Engine control module	Reference: Engine firing
Abnormal exhaust(White smoke)	• Coolant enters combustion chamber	Coolant enters the combustion chamber.
Abnormal exhaust(Blue smoke)	• Burning oil	Reference: Abnormal exhaust(Blue smoke)
Abnormal exhaust(Black smoke)	• Mixture too rich	Reference: Abnormal exhaust(Black smoke)
Cold knock for two or three minutes and/or knock increases with engine torque	• Electronic control system fault	Reference: On-board diagnosis
	• Engine oil viscosity too low	• Fill the engine oil with viscosity consistent with the expected seasonal temperature.
	• Excessive clearance between piston and cylinder wall	Reference: Low speed knock
	• Connecting rod positioning(End play, bending, twisting)	
	• Excessive clearance of piston pin	
Knock occurs during idling and warm-up	• Electronic control system fault	Reference: On-board diagnosis
	• Engine oil viscosity too low	• Fill engine oil with viscosity consistent with expected seasonal temperature
	• Fuel quality	• Use 92,95, No. 98 national six (b) vehicle gasoline
	• Engine timing	Reference: High speed knock
	• Excessive clearance between piston and cylinder wall	
	• Connecting rod positioning(End play, bending, twisting)	
	• Excessive clearance of piston pin	
Main bearing noise **Cautio Remove the accessory drive belt to rule out by the accessory** **n Use a stethoscope to locate the engine noise.** **Cautio Main bearing noise can be loaded on the engine** **n When heard, its noise is loud and dull, and the louder the load, the louder the noise.** **Cautio The tapping sound is regular and varies with the speed.** **n Turn.**	• Oil pump pressure too low	Reference: Oil pressure check
	• Crankshaft axial clearance is too large	Reference: Main bearing shell, crankshaft and cylinder block
	• Crankshaft journal out of circle	
	• Excessive clearance between crankshaft and bearing	

Symptoms	Possible causes	Measures
Cautio Low oil pressure will also produce with this situation **n Live.** **Cautio engine oil is too thin or there is no engine on the bearing.** **n Oil, bearing will produce knocking noise.**		
Noise symptoms of connecting rod and connecting rod bearing	• Oil pump pressure too low	Reference: Fault symptom table
	• Large end side clearance of connecting rod exceeds the limit	
	• Tightening torque of connecting rod bolt	
	• Connecting rod twist/bend out of range	
	• Crank roundness and taper out of range	
	• Connecting rod bearing clearance out of range	
Piston and piston pin noise	• Oil pump pressure too low	Reference: Fault symptom table
	• Incorrect installation of connecting rod and piston	
	• Connecting rod twist/bend out of range	
	• Excessive clearance of piston pin	
	• Excessive clearance between piston and cylinder wall	
	• Piston ring groove clearance is too large	
Valve drive group noise	• Hydraulic tappet stagnation	Reference: Fault symptom table
	• Roller rocker arm damage	
	• Oil pump pressure too low	
	• Cam lobe damage	
	• Camshaft journal clearance is too large	
	• Camshaft axial clearance is too large	
	• Valve spring is too soft	
	• Valve stuck	
	• Clearance between valve stem and valve guide is too large	
	• Valve seat ring is loose	
Engine cannot be started - crankshaft does not rotate	• Accessory driveline components stuck	Reference: Engine cannot be started - crankshaft does not rotate
	• Cylinder stuck due to hydraulic pressure	
	• Camshaft stuck or broken	
	• Valve system components are stuck or broken	
	• Foreign matter in cylinder	
	• Crankshaft or connecting rod bearing is stuck	

Symptoms	Possible causes	Measures
	• Connecting rod bent or broken	
	• Crankshaft fracture	
Coolant enters combustion chamber **Cautio White out of row trachea above acceptable range** **n Smoke and/or gas with coolant odor.** **Cautio Remove the spark plug, and the spark plug is immersed with cooling.** **n Fluid.**	• Engine overheating - Coolant level too low - Cooling fan does not work - Thermostat fault	Reference: Fault symptom table
	• Cylinder head gasket has fault	Replace cylinder head gasket. Reference: Camshafts, valves and cylinder heads
	• Cylinder head warping	Replace cylinder head and gasket. Reference: Camshafts, valves and cylinder heads
	• Cylinder head cracking	Replace cylinder head and gasket. Reference: Camshafts, valves and cylinder heads
	• Cylinder liner or cylinder block cracking	Replace cylinder head. Reference: Camshafts, valves and cylinder heads
	• Cylinder head or cylinder block has holes	Replace cylinder head or cylinder block. Reference: Camshafts, valves and cylinder heads
Coolant into engine oil **Cautio engine oil is foam and discolored.** **n** **Cautio "excessive" engine oil** **n**	• Engine overheating - Coolant level too low - Cooling fan does not work - Thermostat fault	Reference: Fault symptom table
	• Cylinder head gasket fault	Replace cylinder head gasket. Reference: Camshafts, valves and cylinder heads
	• Cylinder head warping	Replace cylinder head and gasket. Reference: Camshafts, valves and cylinder heads
	• Cylinder head cracking	Replace cylinder head and gasket. Reference: Camshafts, valves and cylinder heads
	• Cylinder liner or cylinder block cracking	• Replace cylinder block. Reference: Main bearing shell, crankshaft and cylinder block
	• Cylinder head or cylinder block has holes	Replace cylinder head or cylinder block. Reference: Main bearing shell, crankshaft and cylinder block camshaft, valve and cylinder head

Troubleshooting of abnormal sound in cylinder

Test conditions	Details/Results /Measures
1. Confirm the working condition of abnormal sound.	
	A. Abnormal sound only occurs at idle speed. ? Yes, go to Step 2 B. Abnormal sound only occurs at engine working condition around 2000 rpm. ? Yes, go to Step 4
2.After removing the PCJ connector, confirm whether the abnormal sound disappears or becomes weak.	

	? Yes, record the engine and vehicle production date and report to the engine PVT department by PVT provides maintenance plan. ? No, request technical support.
3. Use stethoscope to judge the position with strongest abnormal sound is inside the cylinder head cover, inside the cylinder block or inside the oil pan.	
	A. Abnormal sound comes from inside of cylinder head cover Dismantle cylinder head cover to check tappet, valve and other valve mechanism . Abnormal sound comes from the cylinder block and requests to replace the engine. C. Abnormal sound comes from inside of oil pan Replace oil pump
4. Drain the engine oil and check whether there are aluminum chips in the oil.	
	? Yes, confirm Laval, replace engine ? No, request technical support

Front gear train belt noise diagnosis

Caution 1 Stethoscope will help determine where engine noise is generated

2 Be sure to use the correct front wheel train belt.

3 Coplanarity (coplanarity of crankshaft pulley and related front-end pulley) may cause abnormal wear, noise and falling off of drive belt.

4 Sudden increase of heavy load may cause belt slip and emit noise, for example: Air conditioning system compressor starts, throttle valve opens quickly when the engine is running, etc.

5 Excessive load may also cause abnormal belt noise, such as excessive filling of air conditioning system, flat clamping of power steering system hose and excessive power steering fluid.

Test conditions	Details/Results /Measures
1. Check front gear train belt	
	A. Remove the front wheel train belt. Reference front gear train Abnormal sound disappears: Check whether the front gear train belt is broken, foreign matter is stuck, etc.
	Is there any of the above? ? Yes Replace front wheel train belt. ? No Go to Step 2 Abnormal sound exists: Check other systems.
2. Check relevant fasteners	

	A. Check whether all fasteners related to front gear train belt are loose or deformed. Is there any looseness or deformation ? Yes Tighten or replace. ? No Go to Step 3.
3. Check front gear train tensioning wheel assembly	
	. Remove front wheel train belt. Reference front gear train B. The bearing shall be free of jamming, abnormal sound, etc. C. The pulley surface shall be free of distortion, crack, etc. D. The body shall be free of cracking, fracture, etc. Do not loosen the pulley bolts. Is there any of the above? ? Yes Tighten or replace. ? No Go to Step 4.
4. Check front gear train idler gear assembly	
	A. Bearing can not be stuck, abnormal sound, etc. B. The pulley surface shall be free of distortion, crack, etc. Whether the pulley bolt cannot be loosened or not ? Yes Tighten or replace. ? No Go to Step 5.
5. Check crankshaft pulley and relevant accessories pulley	

	A. The pulley shall be free of distortion, crack, etc. Whether there is foreign matter in the wheel groove. Is there any of the above? ? Yes Remove foreign objects, tighten or replace components. ? No Go to Step 6.
6. Check alternator, water pump and A/C compressor bearings one by one.	
	A. The bearing shall be free of jamming, abnormal sound, etc. Is there any of the above? ? Yes Replace. ? No Check the system.

Engine temper

1. Check engine DTC	Using a scan tool, test for engine DTCs Is there a DTC? ? Yes reference: DTC diagnostic operation ? No to step 2.
2. Check the vacuum of intake system	Check the intake system vacuum degree and judge the intake system.Reference: Does the intake manifold pressure check leak? ? Yes Service.Refer to Intake Manifold Pressure Low Diagnostic Procedure ? No to step 3.
3. Check fuel pressure	Check fuel pressure, refer to high-pressure fuel pressure Check low-pressure fuel pressure Check Is the oil pressure too low? ? Yes Perform symptom measures. Reference engine powerless(Insufficient oil pressure) ? No to Step 4.
4. Check fuel injector	Inspect whether the fuel injector is blocked. ? Yes Clean or replace. ? No to step 5.

5. Spark plug test	Perform a spark plug test. Within specifications.Reference inspection and confirmation ? No Cleaning or replacement. ? Yes to step 6.
6. Check cylinder pressure	Perform cylinder pressure check.Check whether the reference cylinder pressure is within the standard range? ? Yes to step 7. ? No Repair.
7. Check exhaust system	Perform the exhaust system blockage diagnosis procedure.Refer to Exhaust System Blockage Diagnostic Procedure Blockage? ? Yes Replace exhaust system ? No to step 8.
8. Check engine timing	Check whether the engine timing is correct.Is the reference calibration timing method correct? ? No Adjust. ? Yes to step 9.
9. Replace engine control module	Replace the engine control module.Reference electronic controller unit Verify the system works properly.

Engine firing

1. Check engine DTC	Using a scan tool, test for engine DTCs Is there a DTC? ? Yes reference: DTC diagnostic operation ? No to step 2.
2. Check fuel pressure	Check fuel pressure, refer to high-pressure fuel pressure Check low-pressure fuel pressure Check whether the engine oil pressure is too low? ? Yes Perform symptom measures. Reference engine powerless(Insufficient oil pressure)

	? No to Step 4.
3. Check fuel injector	Inspect whether the fuel injector is blocked. ? Yes Clean or replace. ? No to step 5.
4. Spark plug test	Perform a spark plug test. Within specifications.Reference inspection and confirmation ? No Cleaning or replacement. ? Yes to step 6.
5. Check cylinder pressure	Perform cylinder pressure check.Check whether the reference cylinder pressure is within the standard range? ? Yes to step 7. ? No Repair.
6. Check exhaust system	Perform the exhaust system blockage diagnosis procedure.Refer to Exhaust System Blockage Diagnostic Procedure Blockage? ? Yes Replace exhaust system ? No to step 8.
7. Check engine timing	Check whether the engine timing is correct.Is the reference calibration timing method correct? ? No Adjust. ? Yes to step 9.
8. Replace engine control module	Replace the engine control module.Reference electronic controller unit Verify the system works properly.

Abnormal exhaust(Blue smoke)

Caution Often accompanied by carbon deposits in the combustion chamber with oil meeting specifications

Test conditions	Details/Results /Measures
1. Check engine oil	
	A. Check whether the engine oil level is too low. ? Yes

	Return to normal level, go to step 2. ? No Go to step 2.
2. Check throttle valve and intake manifold	
	A. Inspect whether there is oil stain or oil accumulation in the throttle valve and intake manifold. ? Yes Clean up to step 3. ? No Go to Step 3.
3. check supercharger inlet and curved sweep trachea	
	A. Check whether the turbocharger inlet and curved sweep trachea have oil trace. ? Yes Clean up to step 5. ? No Go to Step 4.
4. Check supercharger outlet	
	A. Inspect whether the supercharger air outlet has oil stain. ? Yes Clean up to step 6. ? No Go to Step 5.
5. Check oil-gas separator assembly	
	A. Inspect whether there is oil sludge or damage in the oil-gas separator assembly. ? Yes Replace the oil-gas separator assembly. ? No Go to Step 6.
6. Supercharger bearing inspection	
	A. Inspect whether the supercharger bearing is damaged.

	? Yes Replace the supercharger assembly. ? No Go to Step 7.
7. Check piston ring or valve fault	
	A. Add an appropriate amount of engine oil into the cylinder block. ? Significantly increased pressure, check piston rings.Reference: Piston, piston pin (ring), connecting rod ? The pressure does not increase much, check the valve. Reference: Camshafts, valves and cylinder heads
8. Check supercharger vortex end	
	A. Inspect whether there is oil dirt at the turbocharger vortex end, and whether the bearing is loose or damaged. ? Yes Replace the supercharger. ? No Go to step 9.
9. Check valve stem seal	
	A. Inspect valve stem seal. Is it leaking? ? Yes Replace. Reference: Camshafts, valves and cylinder heads ? No Verify the system works properly.

Abnormal exhaust(Black smoke)

1. Check engine DTC	Using a scan tool, test for engine DTCs Is there a DTC? ? Yes reference: DTC diagnostic operation ? No to step 2.
2. Check fuel pressure	Check fuel pressure, refer to high-pressure fuel pressure Check low-pressure fuel pressure Check

	Is the oil pressure too low? ? Yes Perform symptom measures. Reference engine powerless(Insufficient oil pressure) ? No to Step 4.
3. Check fuel injector	Inspect whether the fuel injector is blocked. ? Yes Clean or replace. ? No to step 5.
4. Spark plug test	Perform a spark plug test. Within specifications.Reference inspection and confirmation ? No Cleaning or replacement. ? Yes to step 6.
5. Replace engine control module	Replace the engine control module.Reference electronic controller unit Verify the system works properly.

Supercharger abnormal sound troubleshooting

Test conditions	Details/Results/Measures
1. Confirm abnormal sound characteristics	
	A. "Crunch" sounds like metal friction ? Yes, go to step 2. B. Clatter clatter like metal clatter ? Yes, go to step 3. C. Sounds like whistling or "hissing" breathing ? Yes, go to step 4.
2. Check whether there is abnormal sound when the engine is not ignited and only power on and power off.	
	Yes, the abnormal sound is the friction noise of the metal tie rod of the supercharger, which will gradually disappear with the use time, similar to the abnormal sound of the wiper and brake pad, and will be generated randomly. ? No, not supercharger abnormal sound
3. When driving at low speed, quickly release the accelerator, and check whether abnormal sound occurs in the instant of the accelerator.	
	Yes, do not handle the slight abnormal sound and comfort the customer; Replace the supercharger with severe abnormal sound. ? No, not supercharger abnormal sound.
4. Check whether abnormal sound occurs during vehicle acceleration.	

	? Yes, go to step 5. ? No, not supercharger abnormal sound.
5. Check whether there is leakage in each pipeline.	
	? Yes, fasten line connection. ? No, the slight abnormal sound is not handled to appease the customer; Replace the supercharger with severe abnormal sound.

Engine cannot be started - crankshaft does not rotate

Test conditions	Details/Results/Measures
1. Check whether the accessory drive system components are faulty.	Remove the front gear train belt and try to turn the crankshaft with a wrench. Reference: Front end gear train Does the crankshaft rotate freely? ? Yes. Repair or replace accessory driveline components ? No. Go to Step 2
2. Check whether the cylinder is stuck due to liquid.	Remove all spark plugs and check for water/oil/antifreeze. Reference: Spark plug Does it meet the requirements? ? Yes. Inspect the cylinder block, cylinder head and cylinder head gasket for cracks, inspect or repair. ? No. Go to Step 3
3. Check whether the timing system is out of order.	Check the crankshaft timing phase and camshaft timing phase for misalignment or tooth jumping. Reference: Timing mechanism Does the crankshaft rotate freely? ? Yes. Repair or replace accessory driveline components. ? No. Go to Step 4
4. Check whether the valve system components are abnormal.	Remove timing mechanism. Reference: Camshaft position sensor Camshaft is stuck or broken. • Valve rocker arm is stuck or broken. • The valve and valve spring are stuck or broken. Is there any of the above? ? Yes. Repair or replace faulty parts ? No. Go to Step 5

5. Check whether the cylinder block assembly is abnormal.	Inspect the cylinder block assembly. Reference: Main bearing shell, crankshaft and cylinder block The piston is broken. • Foreign matter in cylinder. • Are the connecting rods bent or broken? ? Yes. Repair or replace. ? No. Go to Step 6
6. Whether the crank connecting rod structure is abnormal	Inspect the cylinder block assembly. Reference: Crank pin and connecting rod bearing shell • Crankshaft broken. • Bearing pad slag. • Shaft bearing • Is there any of the above? ? Yes. Repair or replace.

Low speed knock

Definition

When the engine is running at a large load, the fuel mixture in the cylinder will automatically ignite before ignition of the spark plug, or it will automatically ignite at the end after ignition of the spark plug, resulting in a sudden increase in the burst pressure in the cylinder, which is obviously higher than the abnormal combustion phenomenon of the cylinder pressure in the normal working cycle.

Phenomenon

Normally, when knocking occurs, it can be heard that the engine has crackle sound

similar to metal knocking, and the engine will disappear after the load is reduced.

Continuous engine knock may damage internal cylinder components, such as spark plugs, valves, pistons, etc., and may even cause broken pistons, broken connecting rods, cylinder block breakdown, etc.

Reason

Under normal conditions, the engine control module can adjust the ignition angle to control the occurrence of knock. When the following conditions occur, uncontrolled knock may occur: 1) User fuel number or unqualified quality; 2) Engine water temperature is abnormally high; 3) Engine intake air temperature is abnormally high; 4) Engine timing adjustment error; 5) Engine knock sensor damage

Handling method

If the engine is suspected to be damaged by knock, it is recommended to first use the fault diagnostic scanner to detect the engine DTC to confirm whether there is abnormal excessive number of knocks. If there is excessive number of knocks, please contact the manufacturer's engineer for handling. Refer to DTC diagnostic operation method.

High speed knock

Reference: Low speed knock

Removing and installing engine assembly

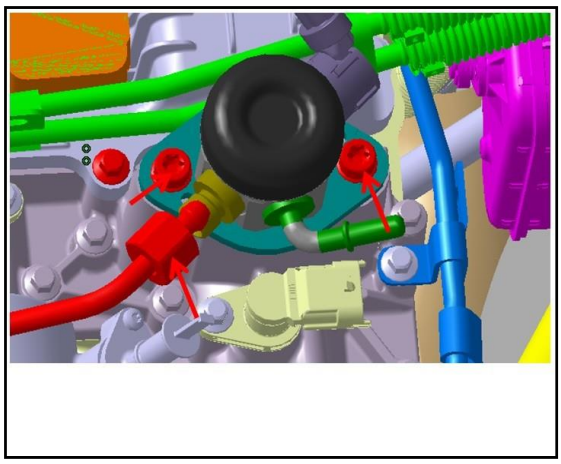
Removal

1 Dismantle high-pressure fuel pump: Disconnect battery negative wire, disconnect high-pressure fuel pump solenoid valve end connector, dismantle low-pressure fuel pipe, and release fuel system pressure; In case of long-time shutdown for maintenance, the engine shutdown time must be more than 8h before removing the high-pressure oil pump oil outlet pipe; In case of temporary shutdown inspection, disconnect the high-pressure fuel pump solenoid valve connector and run at idle speed for about 10 s before disassembling the high-pressure fuel pump oil outlet pipe. Remove the high-pressure fuel pump oil outlet pipe and disconnect the battery negative wire. Describe the fuel pressure relief steps to reduce the fuel pressure in the fuel pipe.

Warning Wear goggles

Warning There may be residual fuel injection, which shall be collected and processed centrally.

Remove the high-pressure oil pump bolts, loosen each mounting bolt alternately, one turn each time until the plunger spring is completely released. After removing the bolts, take the high-pressure oil pump out of the mounting base in the direction of the plunger axis to avoid the high-pressure oil pump swing



Warning

Fuel vapor is dangerous and easily ignited, leading to serious injury and damage. Always keep fuel away from sparks and flames

Warning

If the fuel line is cut, high-pressure fuel may be injected. Because of the following hazards during fuel injection, always perform the "Fuel line safety procedure" to prevent fuel from splashing. - If fuel comes into contact with skin and eyes, it may cause irritation. - If fuel ignites and causes fire, it may cause serious personal injury and injury, and damage components and equipment. If fuel pipeline is cut off, high-pressure fuel may be sprayed out. Because of the following hazards during fuel injection, always perform the "Fuel line safety procedure" to prevent fuel splash

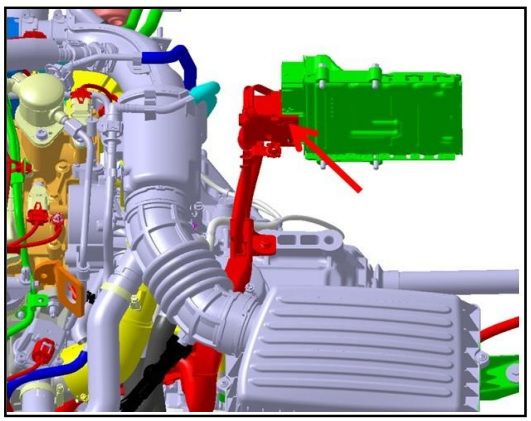
Warning

People with static electricity can cause fire or even explosion, leading to major accidents such as death or serious injury. Before working on the fuel system, touch the body to release static electricity.

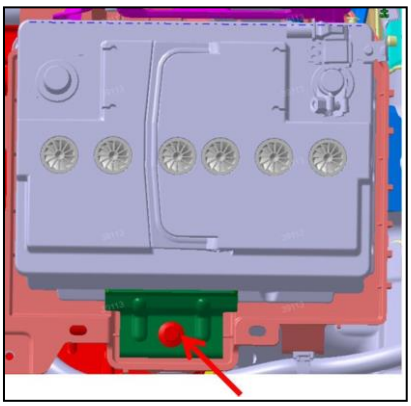
Warning

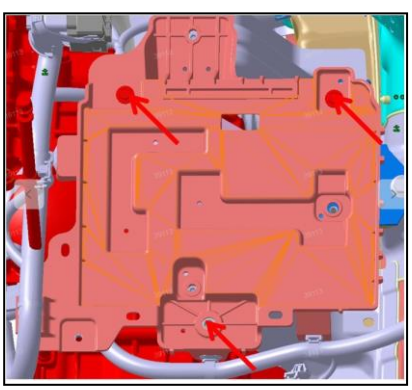
If foreign matter enters the fuel passage, it may cause damage to fuel supply/injection related parts. When removing/installing fuel supply/injection related components, be sure not to allow foreign matter to enter the fuel passage.

2 Disconnect the ECU connector connected to the engine.

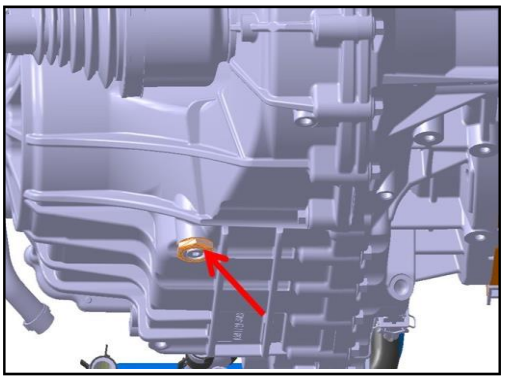


3 Removing battery and battery retaining bracket

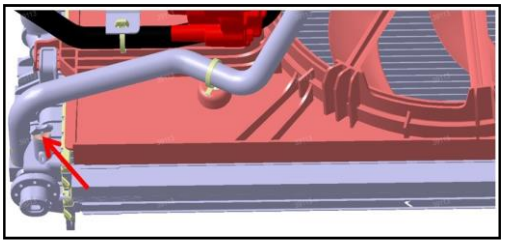




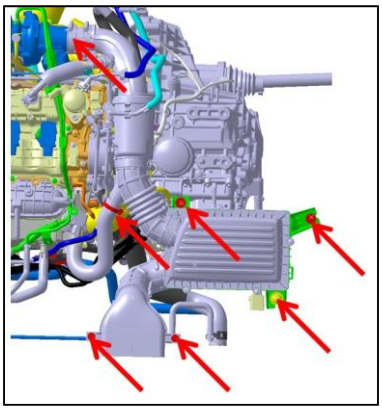
4 Drain transmission oil

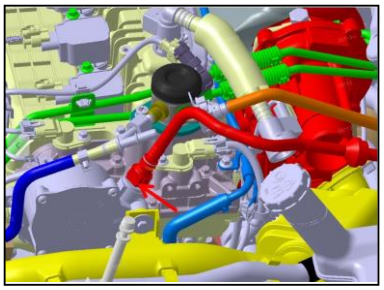


5 Drain cooling water

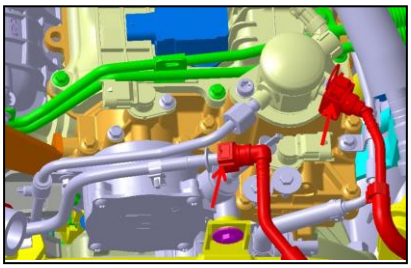


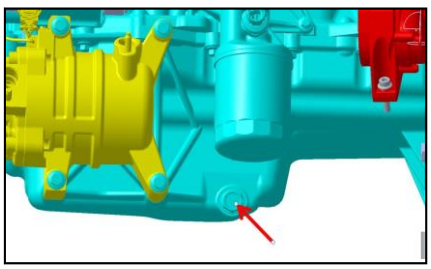
6 Removing air inlet trachea and vacuum line



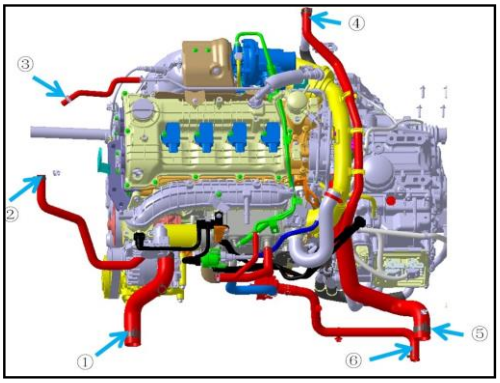


7 Disconnecting all connectors connected to the engine fuel system





8 Disconnect all connectors connected to the engine cooling system

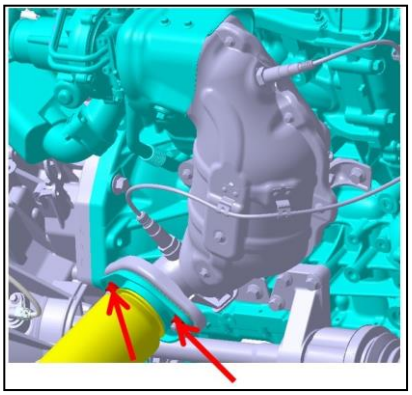


9

Drain the engine oil through the engine oil pan drain plug.

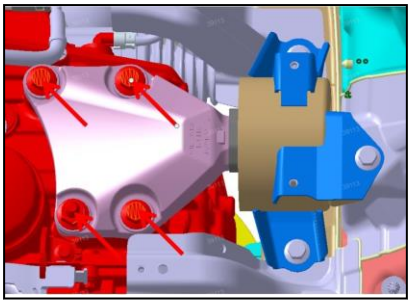
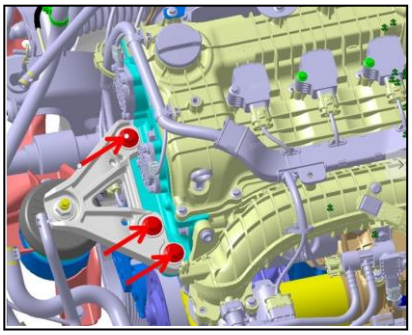
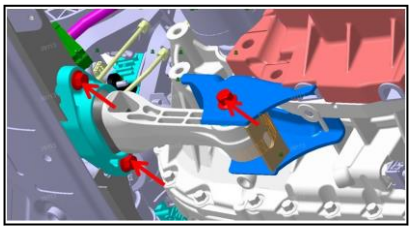
10

Disconnect three-way catalytic converter and muffler.

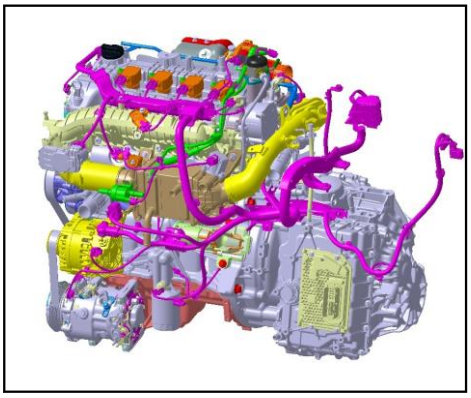


11 Lifting vehicle

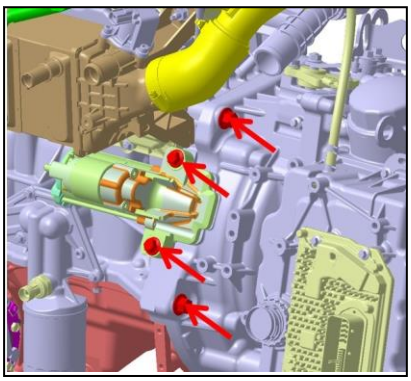
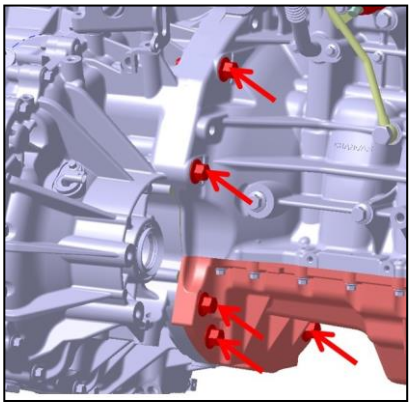
12 Remove engine right bracket bolts and left and rear cushion bolts.

13 Take engine assembly with transmission out of the engine compartment

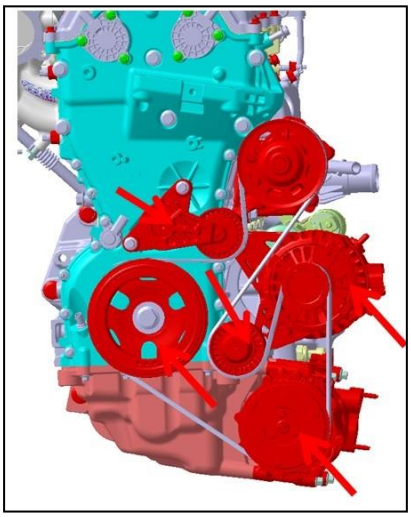


14 Remove the connecting bolts between the starter motor and the transmission engine to separate the engine from the transmission.

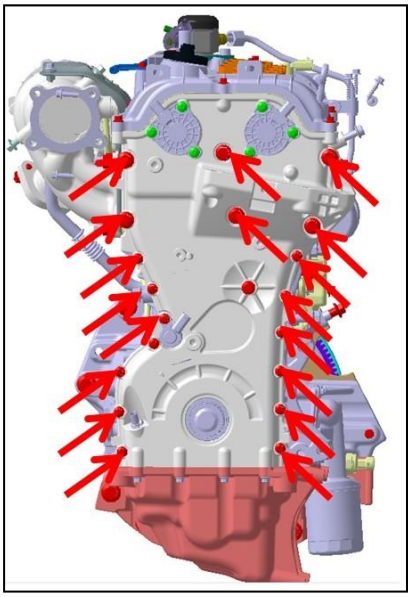



15 Remove engine wire harness, ignition coil, overflow trachea, cylinder head cover heat shield, and then remove engine cylinder head cover and intake and exhaust systems.

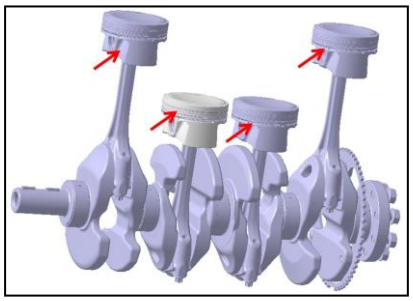
16 Removing front engine belt and wheel train accessories



17 Removing front cover



18 Dismantle engine cylinder head assembly, dismantle engine crank connecting rod mechanism, take out engine piston and crankshaft and other parts.



Installation

1 Install the engine body according to the reverse of the installation and removal procedure, and tighten the bolts with the torque specified in the torque specification sheet.

2 Connect engine and transmission and tighten bolts to the specified torque

3 Put the engine assembly with transmission into the engine compartment, and tighten the right engine bracket bolts and the left and rear cushion bolts.

4 Connect the parking brake cable to the parking brake lever, and adjust the parking brake.

5 Connecting corresponding wire harness plug on engine

6 Check to ensure that all removed components are reinstalled in the original location and that no reinstalled components are reinstalled.

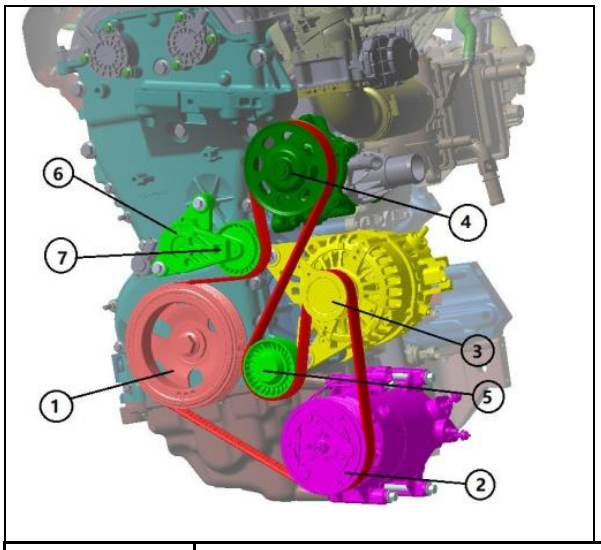
7 Fill engine oil, oil grade is CTS-03.08.06 0W-20 or SN/GF-5 0W-20, filling amount is 3.9±0.1 L (one barrel, change oil filter) or 3.7 L (no change oil filter)

8 Refill the engine coolant and vent the air in the system

9 Connect negative wire of battery (battery)

10 Check each joint for fuel leakage, coolant leakage and exhaust leakage

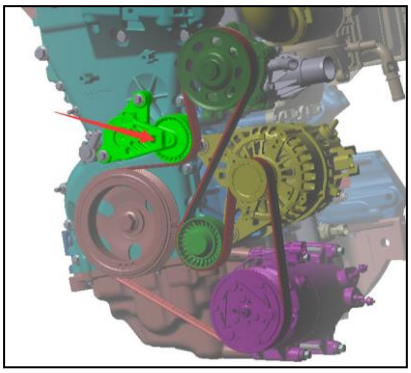
Front end gear train



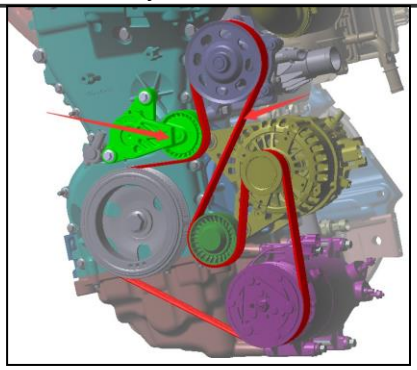
Project	Description
1	Crankshaft damping pulley assembly
2	A/C compressor assembly
3	Alternator assembly
4	Water pump assembly
5	Front gear train idler gear assembly
6	Front end gear train tensioning wheel assembly
7	Tensioning pulley pulling point

Removal

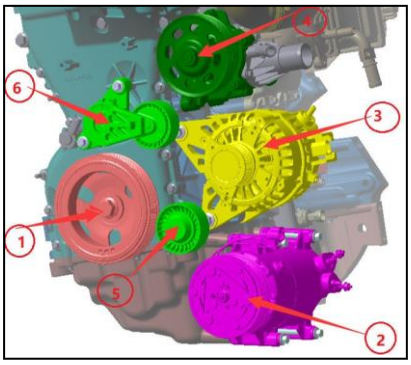
1 Use torque wrench (middle head) to pull front end gear train tensioning wheel assembly counterclockwise at tensioning wheel pulling point.



2 Remove belt and loosen tensioning pulley slowly



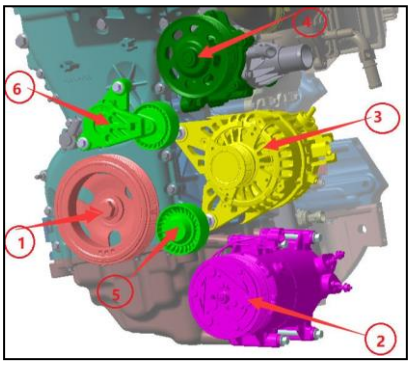
3 Remove crankshaft damping pulley in sequence (see main bearing shell, crankshaft and cylinder block), A/C compressor assembly (see A/C compressor), alternator assembly (see smart generator), water pump assembly (see water pump), front gear train idler assembly (using 13# sleeve, torque 50±3N.m), front gear train tensioner assembly (using 10# sleeve, torque 32±2N.m)



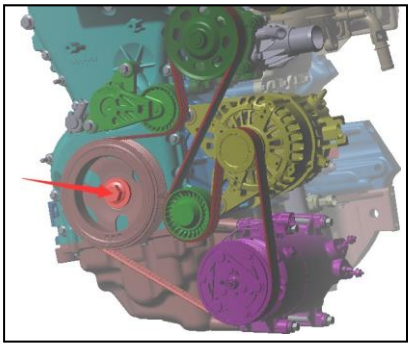
4 Check whether each accessory pulley rotates flexibly, whether it is polluted by oil dirt, mud water, etc., whether there is breakage or damage in the wedge groove of the pulley, and replace in case of abnormality.

Installation

1 Install the crankshaft damping pulley assembly (refer to main bearing shell, crankshaft and cylinder block), A/C compressor assembly (refer to A/C compressor), alternator assembly (refer to intelligent generator), water pump assembly (refer to water pump), front gear train idler assembly (use 13# sleeve, torque 50±3N.m), front gear train tensioner assembly (use 10# sleeve, torque 32±2N.m) in the corresponding position of the engine.

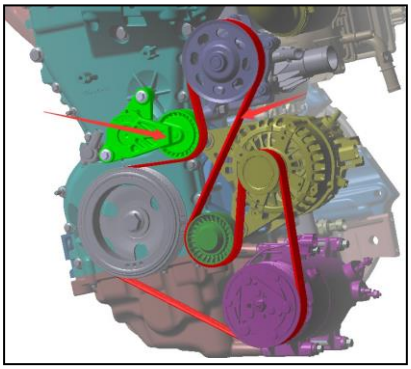


Warning Crankshaft No.1 bolt can only be reused once, and must be replaced after the second removal.

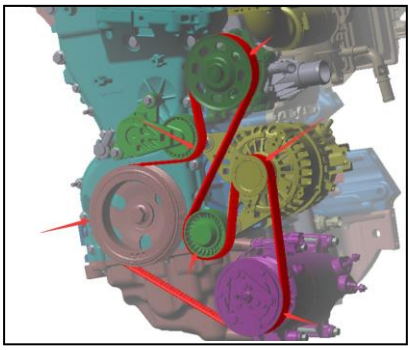


2 As shown in the above figure, wind the belt around the front end wheel train side, use a torque wrench to pull the front end wheel

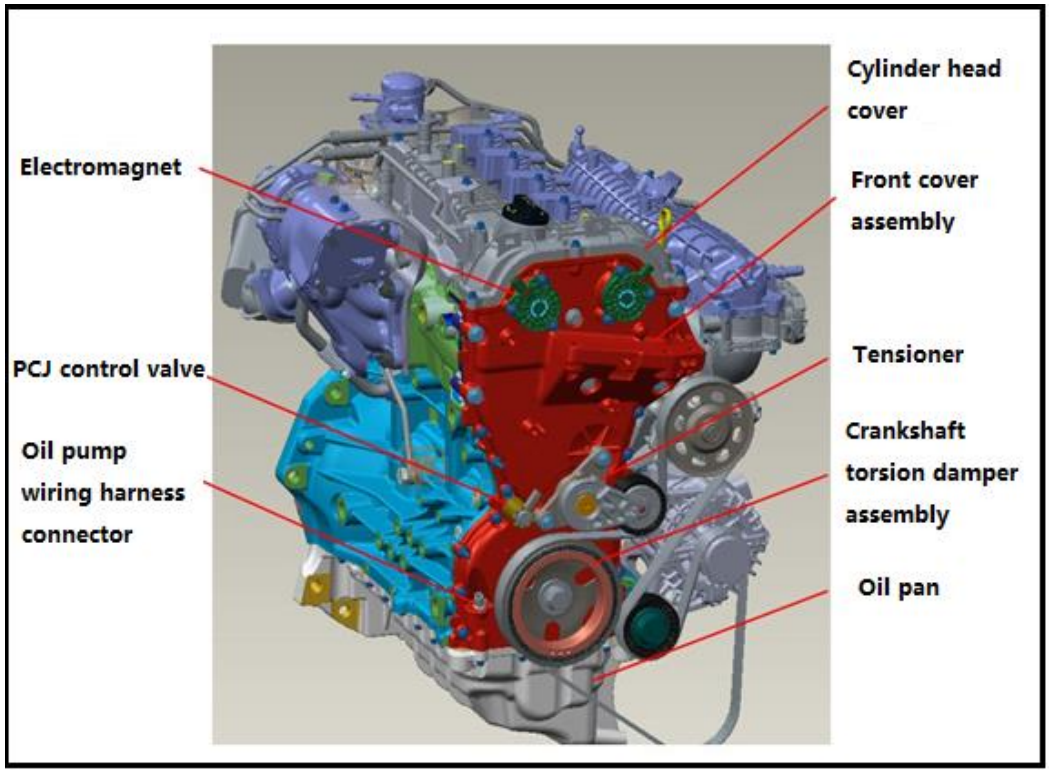
train tensioning wheel assembly counterclockwise at the tensioning wheel pulling point, insert the belt, and slowly loosen the tensioning wheel.



3 Check whether the belt is fitted in the wedge groove. If there is any abnormality, remove the belt and repeat installation step 2 again.

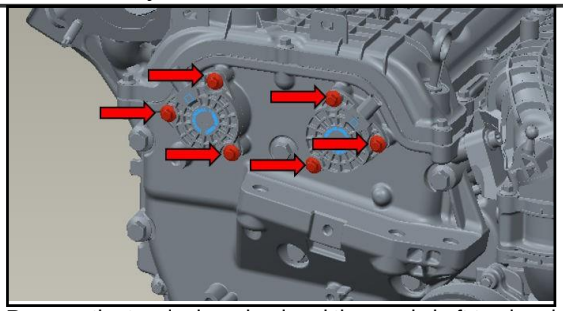


Front cover assembly



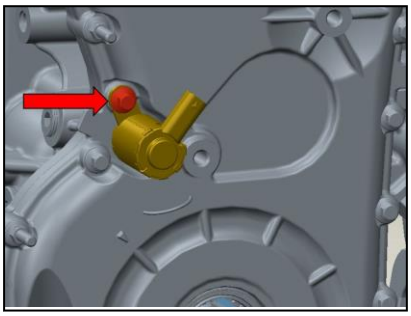
Removal

1 Drop the engine. Refer to: Engine assembly
2 Remove cylinder head cover. Refer to: Cylinder head cover
3 Remove 6 electromagnet mounting bolts and remove 2 electromagnets. Tool: Sleeve (8). Torque: 10±1N.m



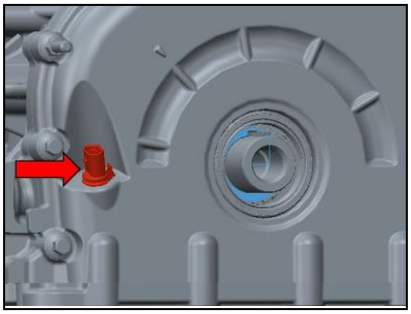
4 Remove the tensioning wheel and the crankshaft torsion damper assembly. Refer to: Front gear train

5 Remove the PCJ control valve mounting bolts and remove the PCJ control valve. Tool: Sleeve (8). Torque: 10±1N.m

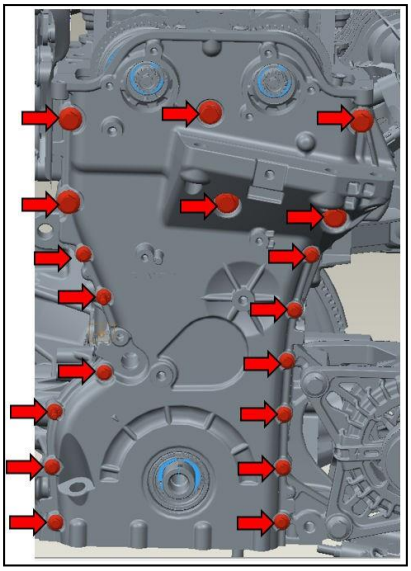


6 Remove oil pan. Refer to: Oil pan

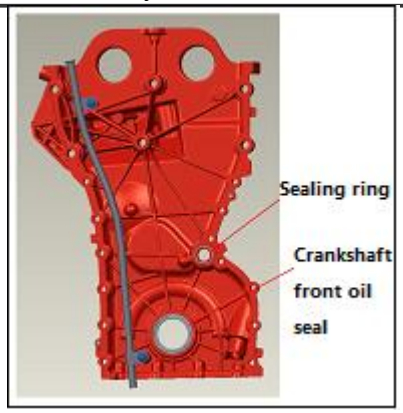
7 Push the oil pump harness connector out of the socket.



8 Remove the FRT cover assembly mounting bolts with a suitable sleeve, and 13M6 bolts are connected with the cylinder block. Tools: Sleeve (1 3), Torque: 10±1N.m, and 6 bolts are connected with the cylinder head.
M10 bolts, tool: Sleeve (8), torque: 50±3N.m.



9 Remove the front cover assembly. If it is difficult to remove it, use a glue hammer to tap it slightly, and then use a flat screwdriver to pry down the front cover.



Installation

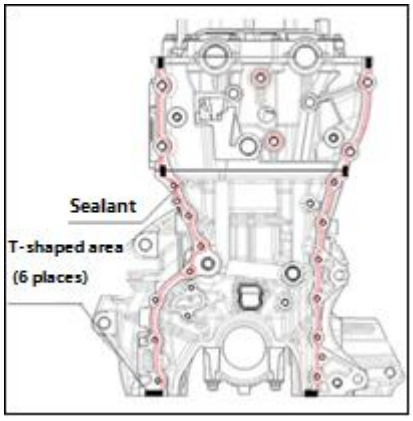
1 Check whether there is scratch on each mounting surface of the front cover assembly used for installation. If the replaced front cover assembly is used directly, clean the residual sealant with a blade.

2 Replace sealing ring.

3 Replace the crankshaft front oil seal. Press the crankshaft front oil seal assembly into the oil seal hole of the front cover assembly with the oil seal pressing tool. The end face of the oil seal shall be parallel to the end face of the oil seal hole (not inclined). The end face of the oil seal concave hole shall be about 2±0.25 mm. The oil seal spring shall not displace or fall off.

Warning Ensure the front oil seal is clean during assembly. Do not touch the oil seal lip by hand. The oil seal outer diameter cannot be coated with sealant during assembly.

4 Re-apply the glue with the glue spray gun according to the glue path on the large surface of the front cover.



5 Position through the locating pin and install the front cover assembly.

6 Use a suitable sleeve to connect the cylinder block with 13 M6 bolts. Tool: Sleeve (13), and 6 M10 bolts with cylinder head. Tool: Sleeve (8). Tighten with torque wrench in sequence, and the torque requirements are as follows:

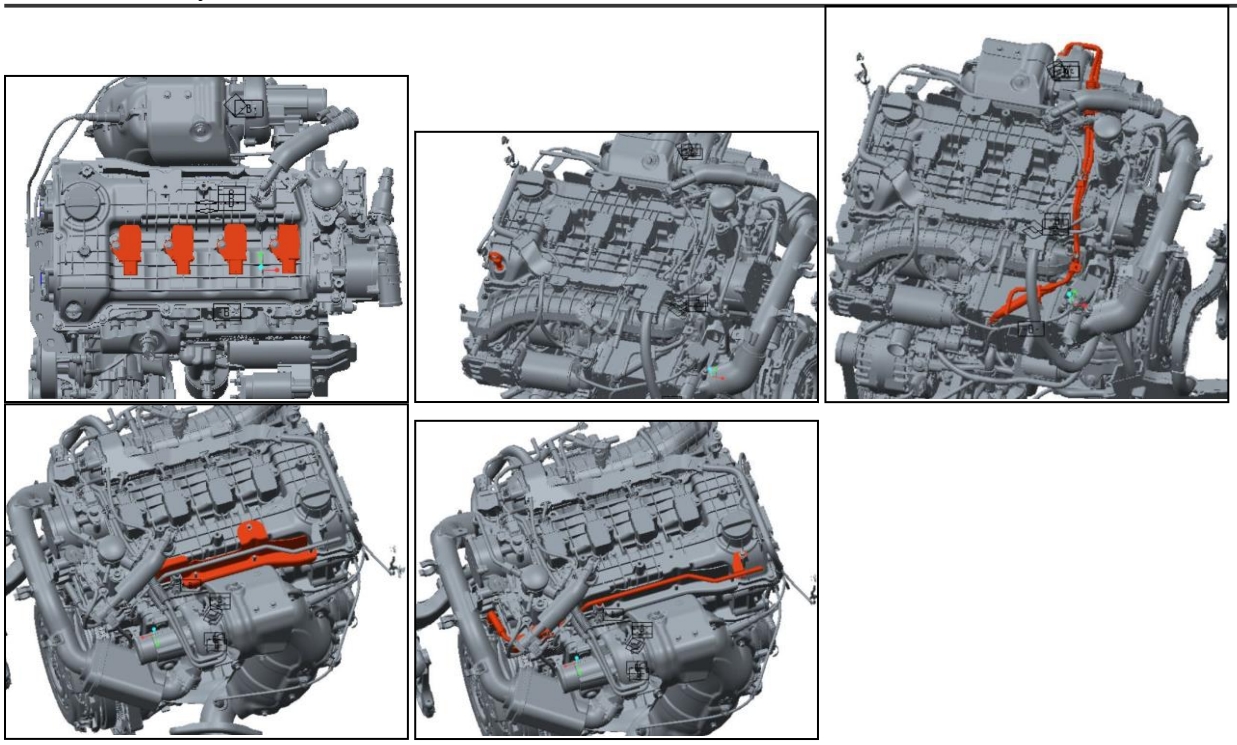
M10	M6
50±3N.m	10±1N.m

7 Install other parts peripherals.

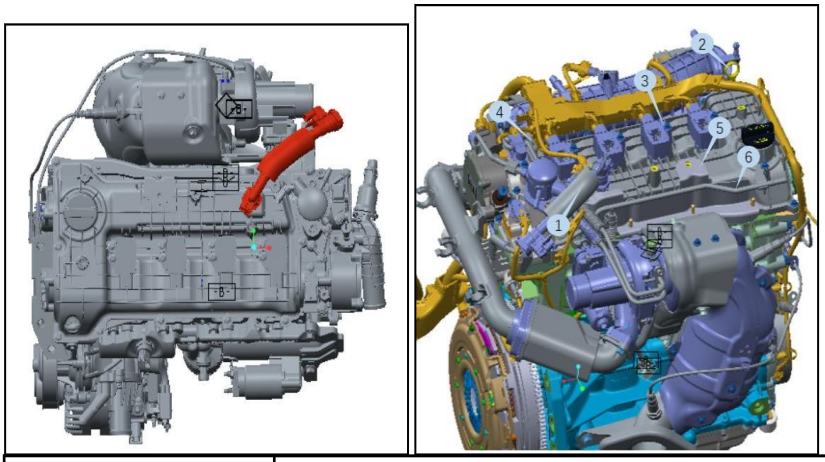
Cylinder head cover

Removal

1. Disconnect the positive and negative battery wires.
2. After removing the engine trim cover, remove the ignition coil, oil dipstick, supercharger water inlet and outlet pipes, cylinder head cover heat shield, overflow trachea, etc.



3.Disengage breather hose from cylinder head cover.



Serial number	Part name
1	Breather hose
2	Oil dipstick
3	Ignition coil
4	Water inlet and outlet pipe of supercharger
5	Cylinder head cover heat shield
6	Overflow trachea

Installation

1.Correctly fit spark plug sealing ring and cylinder head cover sealing ring into cylinder head cover

Warning Before installation, check each part for deterioration or damage, and replace it if any defect is found.

2.Fit the cylinder head cover on the cylinder head and tighten the bolts to the specified torque.

Warning When installing the cylinder head cover, carefully prevent the cylinder head cover sealing ring and spark plug sealing ring from displacing or falling off.

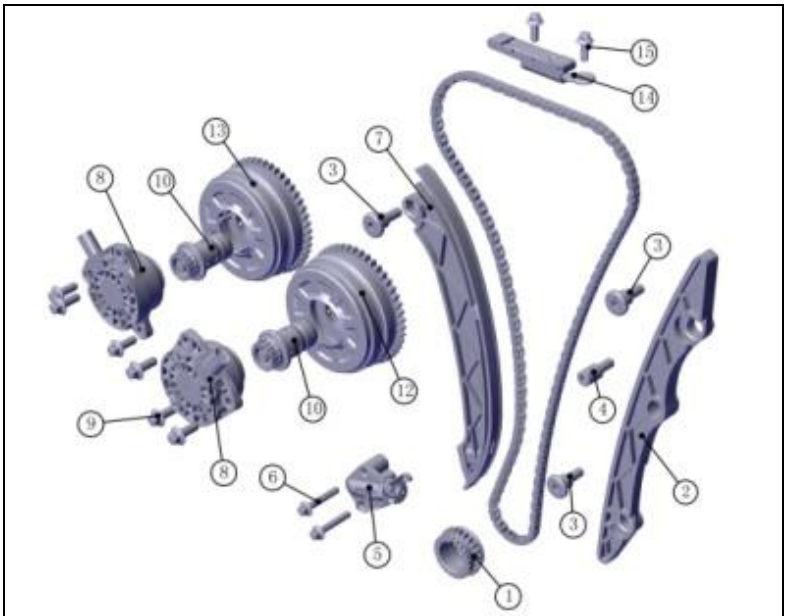
3.Connecting breather hose to cylinder head cover

4.Install engine trim cover, ignition coil, oil dipstick, supercharger inlet and outlet pipes, cylinder head cover heat shield, overflow trachea, etc.

5.Connect positive and negative battery wires

Warning **Before installation, check each part for deterioration or damage, and replace it if any defect is found.**

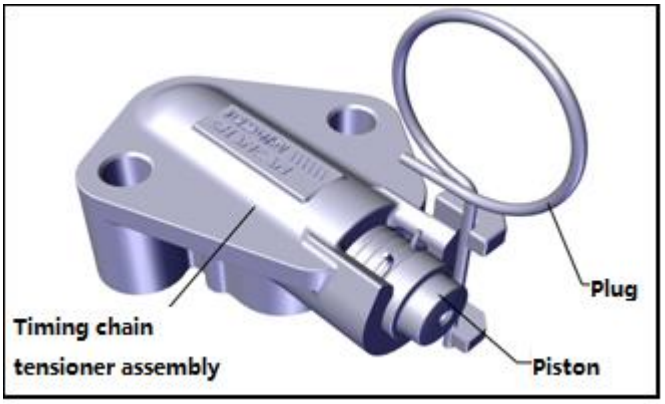
Timing mechanism



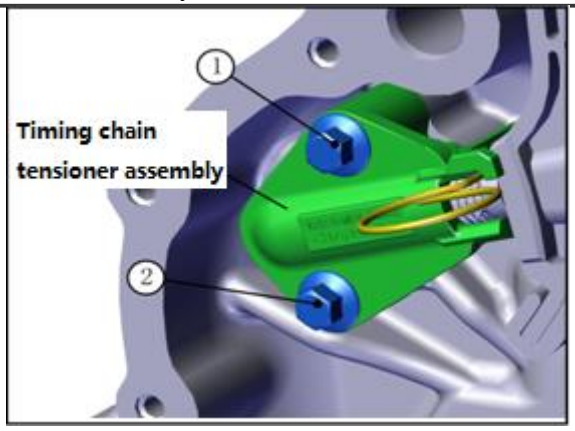
Project	Description	Project	Description
1	Crankshaft timing sprocket 1021211 -MK01-AA	9	Bolt 1031046 -A01-S 343
2	Timing chain rail fixing assy. 1021230 - MK01	10	Center-mounted solenoid valve assembly 1006080 - NE01-AA
3	Timing chain guide rail bolt 1000213 -B01	11	Timing chain assy. 1021210 - MK01- AA
4	Bolt 1031022 -B01	12	Intake phaser assy. 1006030 - NE01
5	Timing chain tensioner assembly 1021220 - MK01	13	Exhaust phase indicator assy. 1006040 -NE01
6	Cylinder head cover mounting short bolts 1000239 - B04	14	Guide rail assembly between camshafts 1021250 - MK01
7	Timing chain movable rail assy. 1021240 - MK01	15	Bolt 1031045 -A01-S 112
8	Center type electromagnet assy. 1006060 - NE01-AA		

Removal

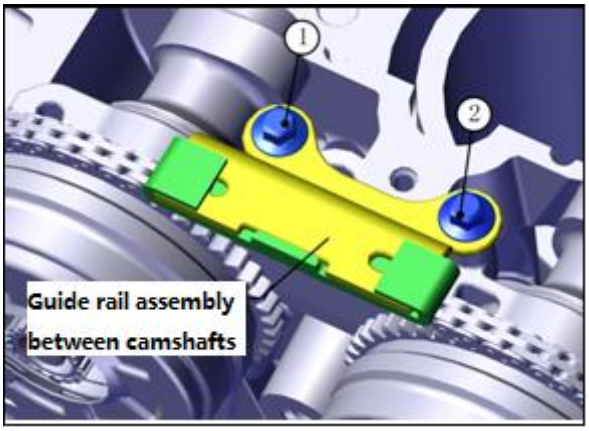
1. Lock the piston head of the timing chain tensioner assembly with the bolt to prevent the piston from rebounding and facilitate subsequent repair and assembly, as shown in the figure below.



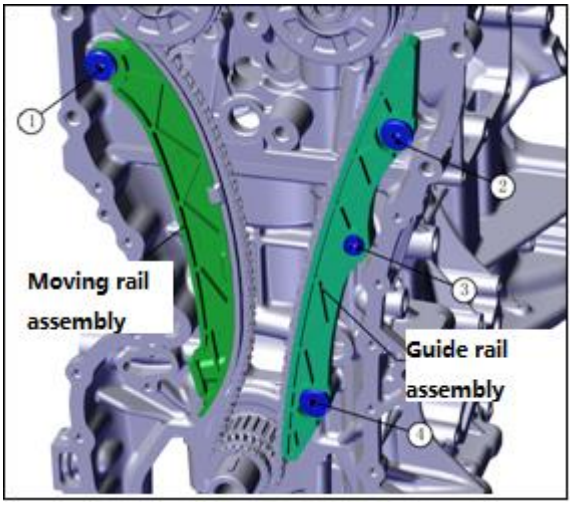
2. Remove connecting bolt with nail sleeve, and take out timing chain tensioner assembly



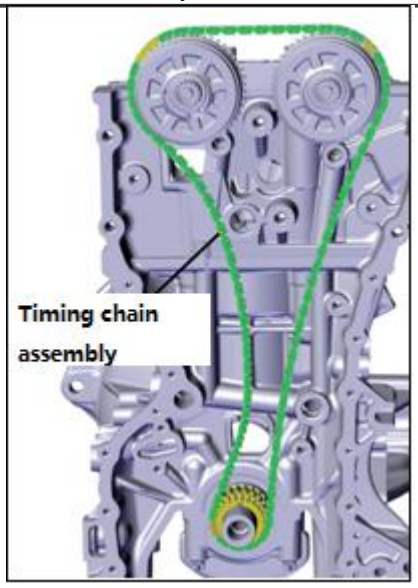
3. Remove connecting bolt with nail sleeve, and take out guide rail assembly between camshafts.



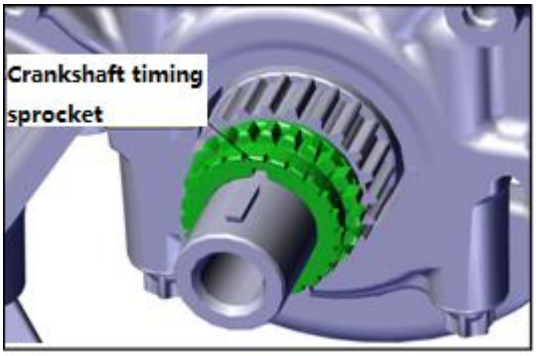
4. Dismantle connecting bolt with ratchet wrench and hexagon socket, and take out timing chain movable rail assembly and timing chain rail fixing assembly respectively.



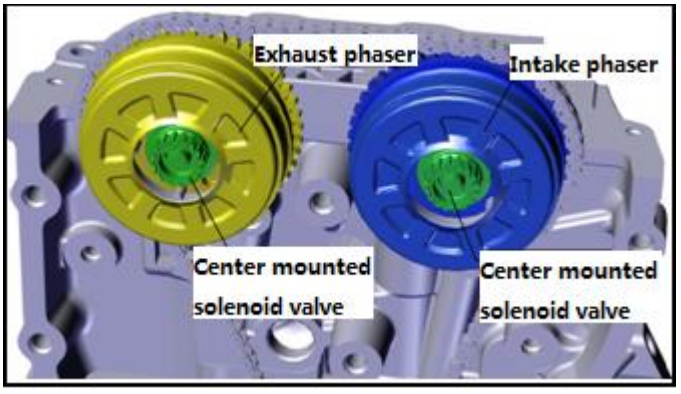
5. Take out the timing chain assembly manually from the intake and exhaust gas phaser assembly and the crankshaft timing sprocket.



6. Remove the crankshaft timing sprocket manually from the front end of the crankshaft.



7. Fix hexagon of intake and exhaust camshaft with positioning tool or wrench, then dismantle middle-mounted solenoid valve assembly with ratchet wrench and inner flower sleeve (non-standard), and then take out middle-mounted solenoid valve assembly and intake and exhaust phaser assembly respectively.



Installation

1. Install intake/exhaust gas phaser assembly and center-mounted solenoid valve assembly

When installing the phaser, the contact surface between the phaser and the camshaft should avoid oil sticking. Install the intake and exhaust phasers on the front journal of the intake and exhaust camshaft respectively, align the locating pin with the pin hole, and then manually pre-bring the middle-mounted solenoid valve until it cannot rotate, and tighten the middle-mounted solenoid valve according to the angle method, specifically (50±2.5) N·m + (38±3)? And monitoring torque (110-170) N·.
M.

Caution middle-mounted solenoid valve assembly, universal at intake and exhaust sides.

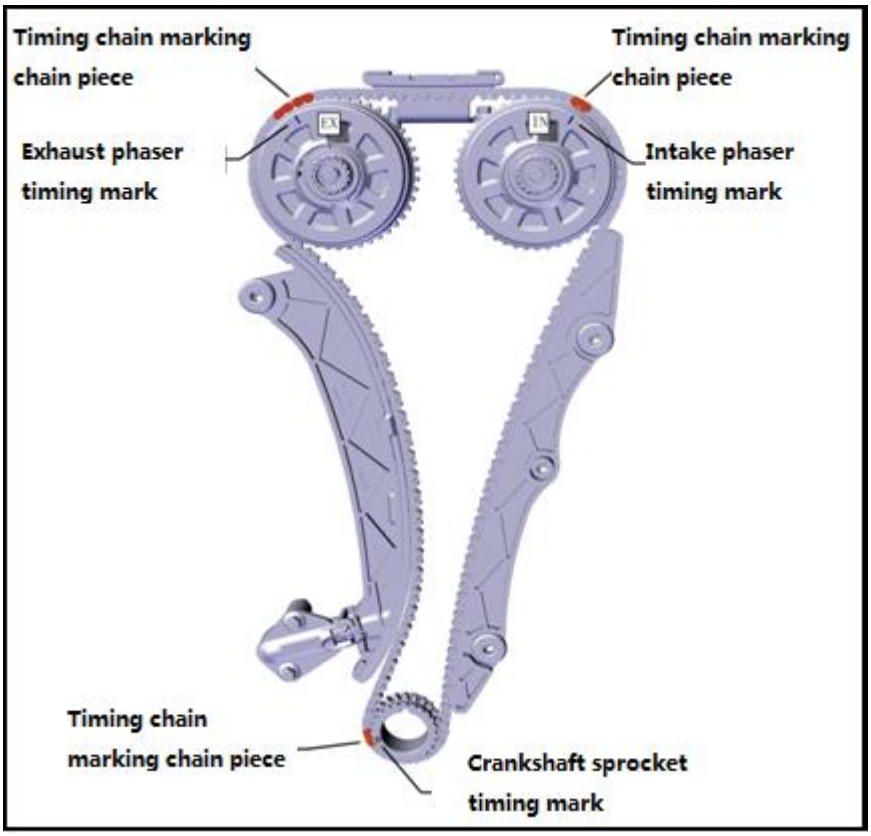
2. Install crankshaft timing sprocket

When installing the crankshaft timing sprocket, the marked surface on the crankshaft timing sprocket is installed outwards, and clamp the crankshaft timing sprocket into the key.

3. Install timing chain assembly

Install the timing chain assembly on the crankshaft timing sprocket and the intake and exhaust phaser assembly, the timing chain mark points to the front, and the timing mark on the assembly timing chain assembly is aligned with the marks on the intake and exhaust phaser assembly and the crankshaft timing sprocket. Wherein, the polka dots on the front end surface of the crankshaft timing sprocket are aligned with the center of the timing chain monolithic copper chain plate, the black rectangular mark points on the front cover

surface of the intake phaser are aligned with the center of the timing chain monolithic copper chain plate, and the black rectangular mark points on the front cover surface of the exhaust phaser are aligned with the center of the timing chain monolithic copper chain plate, as shown in the following figure.



4. Install timing chain movable rail assembly, timing chain rail fixing assembly and guide rail assembly between camshafts

Install timing chain rail fixing assembly and timing chain moving rail assembly, and tighten connecting bolts according to torque method, specifically (16±2) N·m. Then, gently shake the rail assembly to ensure normal movement.

Install the guide rail assembly between camshafts and tighten the connecting bolts according to the torque method, specifically (10±1) N·m.

5. Install timing chain tensioner assembly

Before the timing chain tensioner assembly is assembled, do not pull out the tensioner latch. Install the timing chain tensioner assembly and tighten the connecting bolts according to the torque method, specifically (10±1) N·m. After the assembly of the timing mechanism is completed, check whether the timing marks are aligned and whether the timing chain assembly is in the guide groove of the moving rail assembly and the rail fixing assembly, and then pull out the tensioner latch after ensuring the accuracy. After the Caution timing mechanism chain system is assembled, do not rotate the crankshaft in the reverse direction (counterclockwise).

Camshafts, valves and cylinder heads

1. Removal

1 Drop the engine assembly from the engine compartment and drain the engine coolant and oil. Refer to Engine Assembly

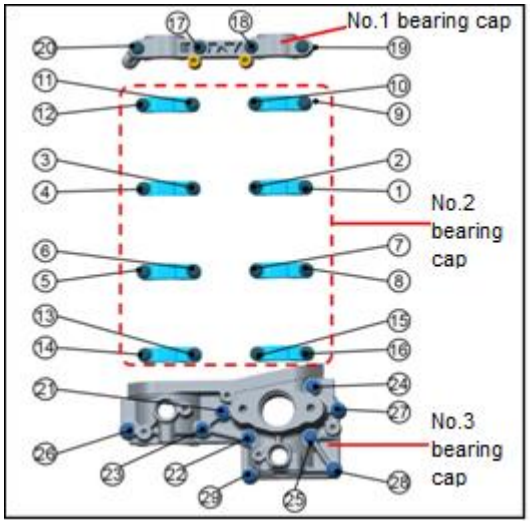
2 Remove the starter motor and transmission assembly from the engine and remove the dual-mass flywheel assembly. Refer to Dual-mass Flywheel Assembly Removal and Installation.

3 Remove engine intake and exhaust system, oil pan and cylinder head cover assembly Remove peripheral components. Refer to Supercharger and Three-Way Catalyst, Oil Pan, Variable Displacement Oil Pump

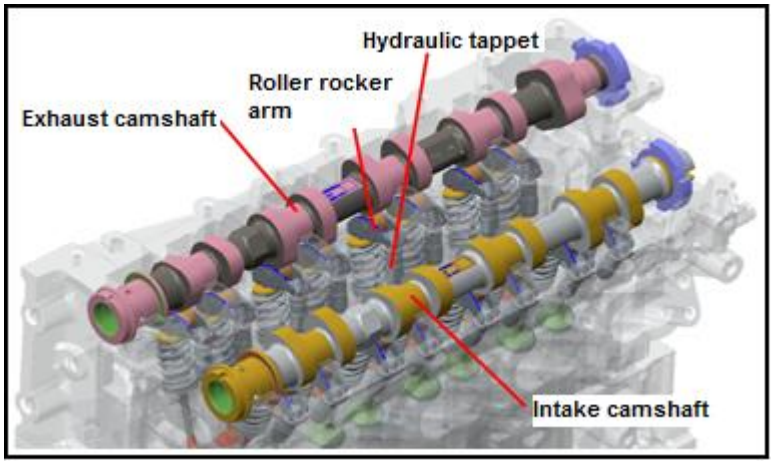
4 Remove cylinder head cover. Refer to Cylinder Head Cover

5 Remove front cover assembly and timing mechanism. Refer to Front Cover Assembly, Timing Mechanism

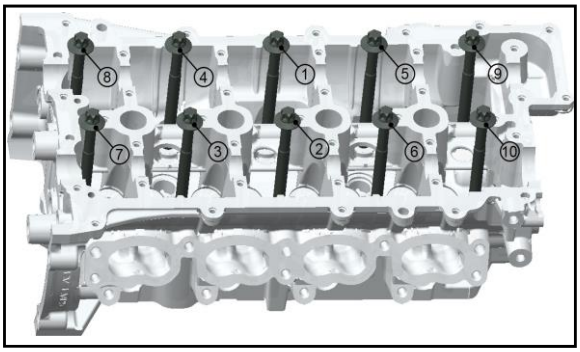
6 Remove camshaft No.1, No./2 and No./3 bearing caps respectively, and loosen the bolts step by step according to the decreasing sequence of 29,1 in the figure below. Use nail sleeve.



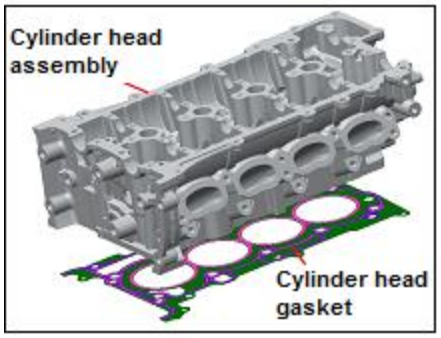
7 Remove intake and exhaust camshaft assembly, take out roller rocker arm and hydraulic tappet.



8 When removing the cylinder head bolts, loosen the bolts step by step in the decreasing sequence from 10 to 1 shown in the figure below (from both ends to the middle). Use bolt sleeve.

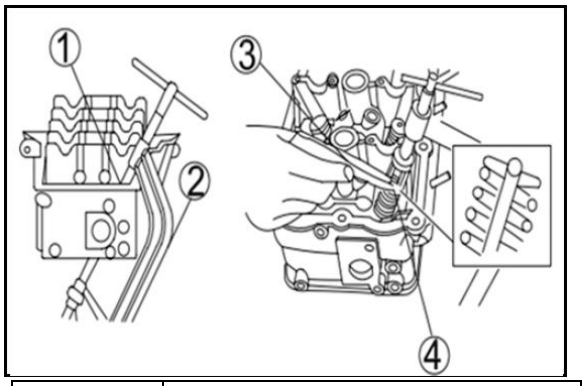


9 Remove the cylinder head assembly and cylinder head gasket assembly.



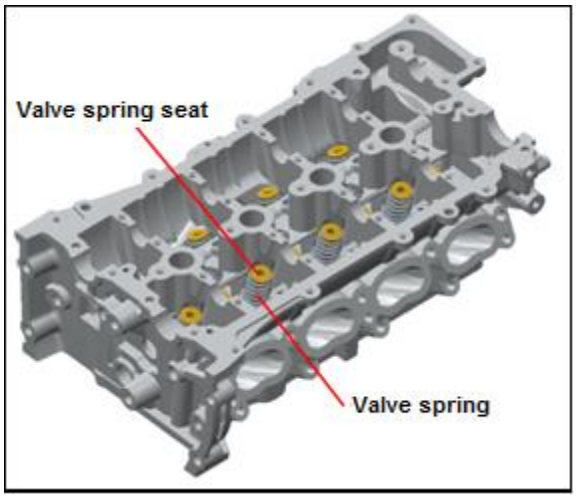
Note The cylinder head assembly cannot be reused once removed. A new cylinder head gasket assembly must be used when reassembling.

10 Use valve lifter to squeeze valve spring seat, and then use tweezers to remove conical lock block.

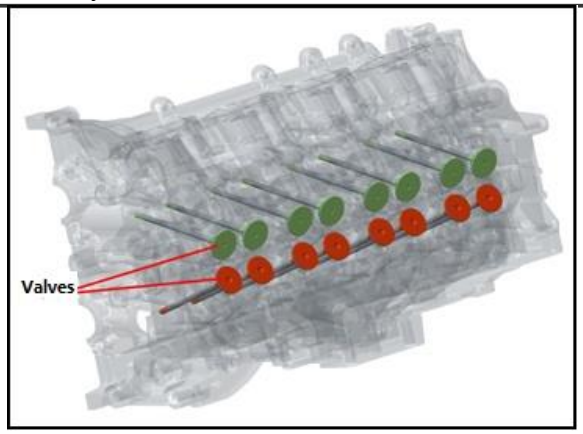


Project	Description
1	Valve spring seat
2	Special tool
3	Tweezers
4	Valve lock block

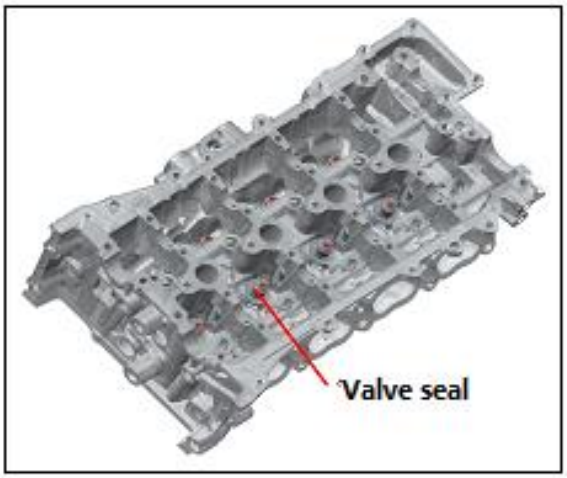
11 Release valve lifter tool and take out valve spring seat and valve spring.



12 Remove the gas from the combustion chamber side.



13 Use valve stem seal caliper to remove valve stem seal.



Caution Once the valve stem seal is removed, it cannot be reused. A new valve stem seal must be used when reassembling.

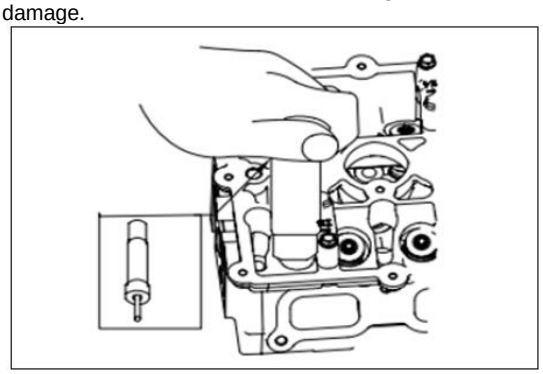
14 Position the removed valve assembly components in sequence so that they can be fitted in the original position.

2. Installation

1 Valve mechanism assembly

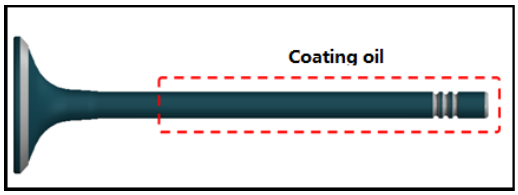
Valve cylinder head assembly shall be free of foreign matter.

Press the valve stem seal into the valve guide tube with the valve stem seal assembly tool, and confirm it is in place without damage.

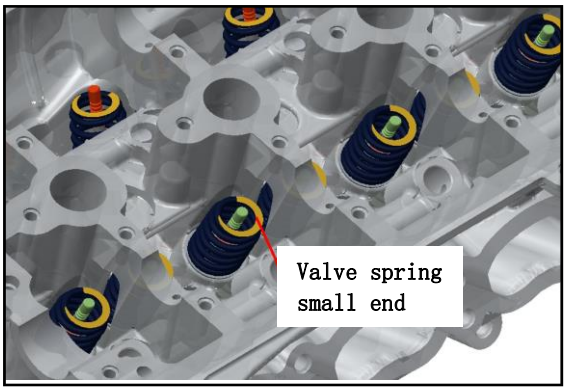


Note When installing valve stem seal, never knock valve stem seal installation tooling with hammer or other things. When installing the valve stem seal onto the guide tube, just press the special tooling by hand.

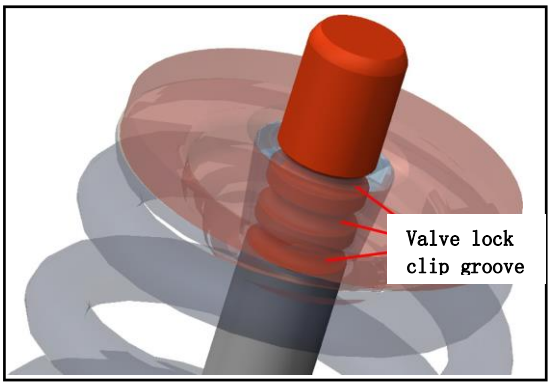
When installing the valve, apply gasoline engine oil on the valve stem and rod end, and then install the valve guide tube without jamming.



The small end of the valve spring shall be arranged above, and shall fall into the seat hole correctly without skew.

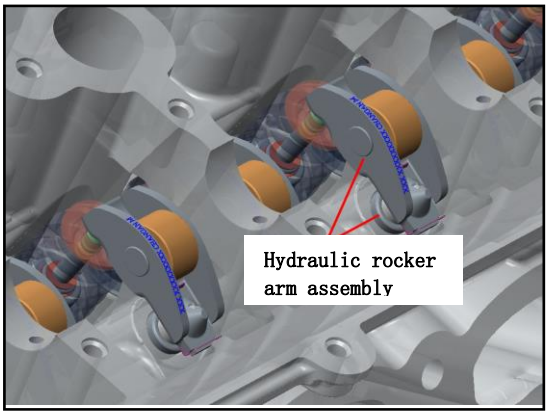


The valve spring seat should be seated in the valve spring, press down the valve spring seat with the valve lifter, install the valve conical lock block with tweezers, and clamp it in the valve lock clamp groove correctly without missing or falling off.



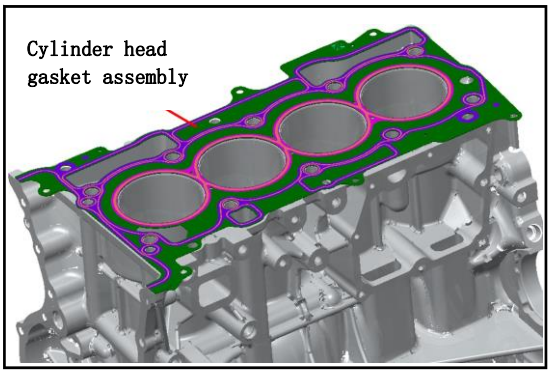
2 Installation of hydraulic rocker arm assembly

Before installing the hydraulic rocker arm assembly, apply gasoline engine oil on the cylinder head mounting hole, and then respectively install the assembled hydraulic rocker arm assembly in the rocker arm hole of the cylinder head. The rocker arm working arc shall be located on the working surface of intake and exhaust valves. The rocker arm working arc shall not be damaged during the installation process. After the hydraulic rocker arm assembly is installed in place, ensure that there is no abnormal blocking phenomenon.



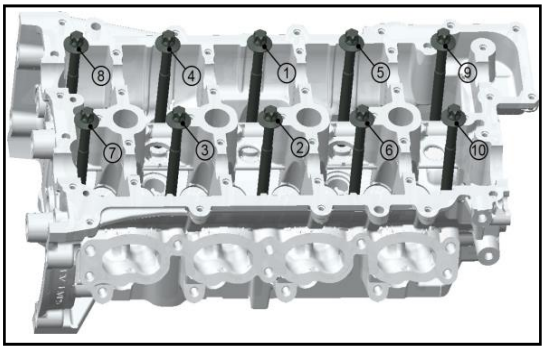
3 Installation of cylinder head gasket

Once removed, the cylinder head gasket assembly cannot be reused. During installation, a new cylinder head gasket assembly must be used to ensure that the oil holes are aligned and not reversed.



4 Installation of cylinder head sub-assembly

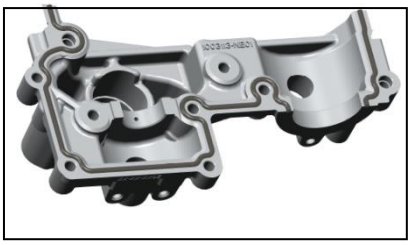
Remove the camshaft cover before installing the cylinder head sub-assembly, rotate the crankshaft to make the top surfaces of the four pistons basically at the same height, then install the cylinder head locating pin and cylinder head, and seat in place. "Torque plus angle method" shall be adopted for cylinder head combination bolts in reverse sequence of removal (increasing sequence from 1to 10), tighten cylinder head connection bolts according to specified process requirements, tighten synchronously with tightening machine or tighten cylinder head connection bolts symmetrically in sequence from middle to both sides. (Note: All bolts shall be pre-tightened to (25±2) Nm before rotating (180 ±5)? And the angle shall be calculated from (25±2) Nm).



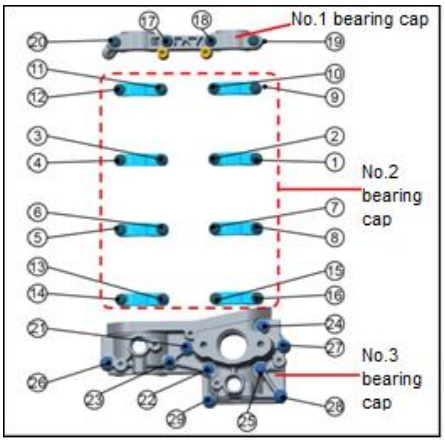
Caution Once the cylinder head connecting bolts are removed and cannot be reused, they must be replaced with new cylinder head connecting bolts.

5 Camshaft installation

- Camshaft, shaft hole, bearing cover and bearing seat joint surface shall be clean and free of foreign matter;
- Before placing the camshaft, apply gasoline engine oil to the cylinder head camshaft shaft diameter and hydraulic rocker arm roller installation position;
- After the camshaft is coated with gasoline engine oil, correctly install it on the bearing seat. During the process of installing the camshaft, do not touch or scratch the working arc surface of all camshafts and rocker arms or impact the rocker arms;
- After placing the camshaft, apply gasoline engine oil on the diameter of the camshaft, and apply sealant on the No. 3 bearing cap of the camshaft. The sealant path is shown in the shadow in the figure below.



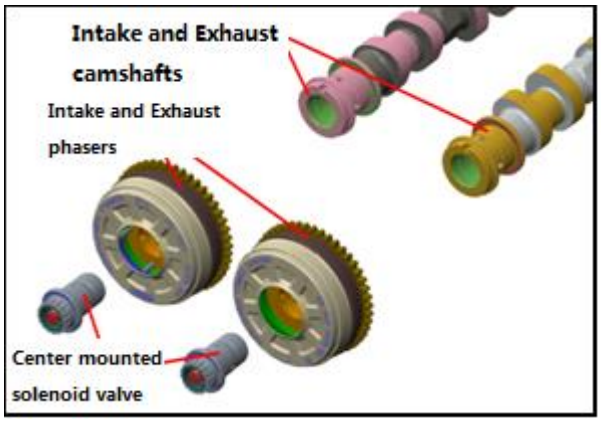
- Install camshaft No. 1, No./2 and No./3 bearing caps in sequence, and tighten the upper bolts symmetrically in the sequence from the middle to both sides or tighten to the specified torque with a tightening machine at the same time. The bolt tightening sequence is as shown in the following figure (sequence from 1to 29).



- Before assembling the camshaft until the chain is in place, do not rotate the crankshaft to prevent any cylinder piston from being at TDC to prevent the valve from colliding with the piston.

6 Installation of phaser assembly and center-mounted solenoid valve assembly

When installing the middle-mounted solenoid valve assembly, fix the camshaft assembly first, then install the intake and exhaust phaser assemblies to the front end journals of the intake and exhaust camshaft assemblies respectively, and finally install the middle-mounted solenoid valve assembly as shown in the figure below. Finally, use special bolt sleeve to tighten the middle-mounted solenoid valve assembly according to the specified requirements.



Main bearing shell, crankshaft and cylinder block

1. Removal

1 Drop the engine assembly from the engine compartment and drain the engine coolant and oil. Refer to Engine Assembly

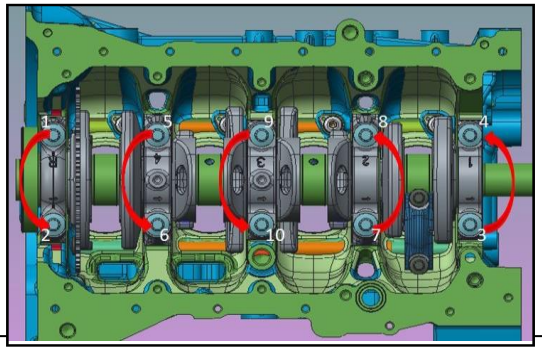
2 Remove the starter motor and transmission assembly from the engine and remove the dual-mass flywheel assembly.Refer to Dual-mass Flywheel Assembly

3 Remove engine intake and exhaust system, oil pan and cylinder head cover assembly. Refer to Supercharger and Three-Way Catalyst, Oil Pan, Variable Displacement Oil Pump, Cylinder Head Cover

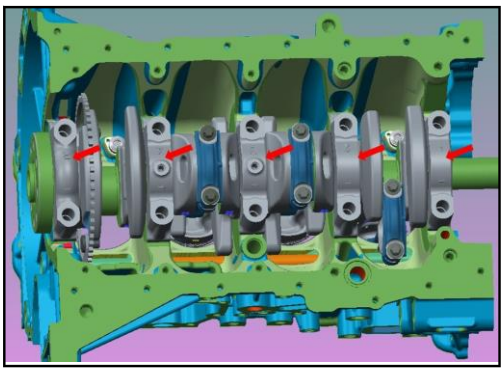
4 Remove engine front gear train and engine timing mechanism. Refer to FRT gear train timing mechanism.

5 Remove cylinder head from cylinder block. Refer to Camshaft, Valve and Cylinder Head

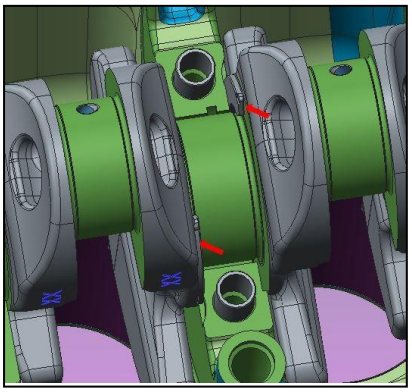
6 Loosen the main bearing cap screws in turn with a sleeve of size E12 from both sides to the middle



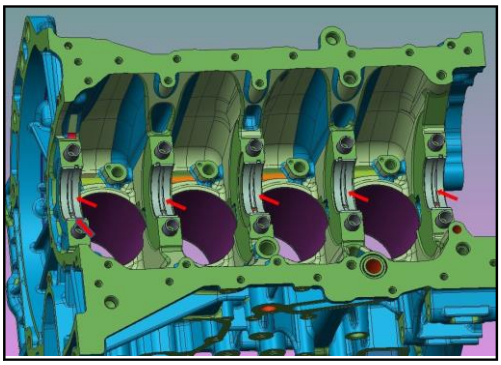
7 Remove the main bearing cover from the cylinder block. The injection shaft cover is provided with locating pin. It is difficult to remove it.



8 Rotate the crankshaft, take out the crankshaft thrust plate, and then remove the crankshaft.



9 Take out the bearing shell from the cylinder block and main bearing cap in the circumferential direction.



2. Check

1 Crankshaft Crankshaft thrust clearance:

Assemble bearing bushing and thrust plate in normal process, and measure the crankshaft thrust clearance after crankshaft is assembled.

Read out the displacement in the axial (thrust) direction of the crankshaft with a dial indicator, and if it exceeds its limit value, replace the thrust plate with a new one.

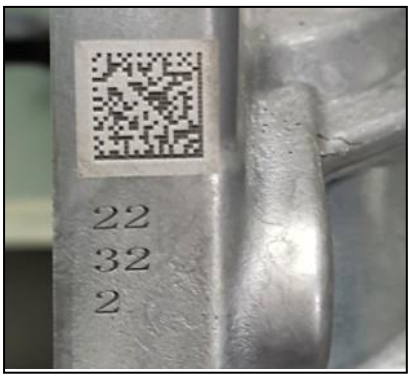
Name	Alignment	Limit value
Crankshaft thrust clearance	0.1～0.3 mm	0.3m

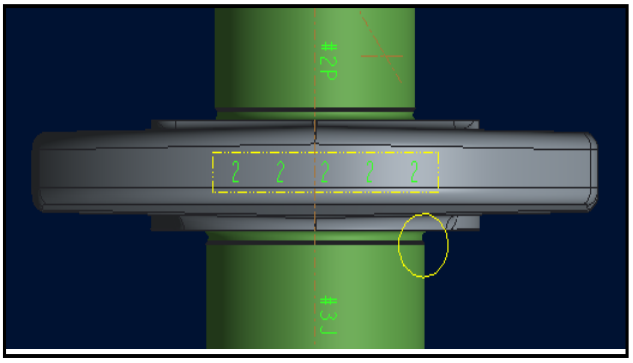
2 Main bearing shell surface wear inspection

Inspect the scratch, wear and damage of the main bearing shell surface. If any defects are found, replace the upper main bearing shell and the lower main bearing shell at the same time. It is not allowed to replace only half of the bearing shell.

3 Selection of main bearing shell

Mark 5 numbers on the cylinder block and press from left to right and from top to bottom to represent the crankshaft hole diameters of main bearing caps "1," "2," "3," "4" and "5" respectively. Crankcase main bearing hole diameter is divided into 1, 2 and 3 groups.



- Five numbers are engraved on the fourth sector plate of the crankshaft, from left to right, representing the diameter groups of the first, second, third, fourth and fifth main journal respectively. Crankshaft main journal diameter is divided into 1, 2 and 3 groups.
- 

Main bearing bushings are grouped according to the thickness of bearing bushings, which are divided into 5 groups. Each group is engraved with corresponding digital identifiers such as "1," "2," "3," "4" and "5" on the back of the bearing bushings.

- **Principle of main bearing shell: The sum of grouping value of crankcase main bearing hole + grouping value of crankshaft main journal + grouping value of main bearing shell thickness is equal to 7. For example, the first main bearing hole of crankcase is 2, the first main journal of crankshaft is 3, and the optional main bearing bush group is 2. The second main bearing hole of crankcase is 1, the second main journal of crankshaft is 1, and the optional main bearing bush group is 5.**

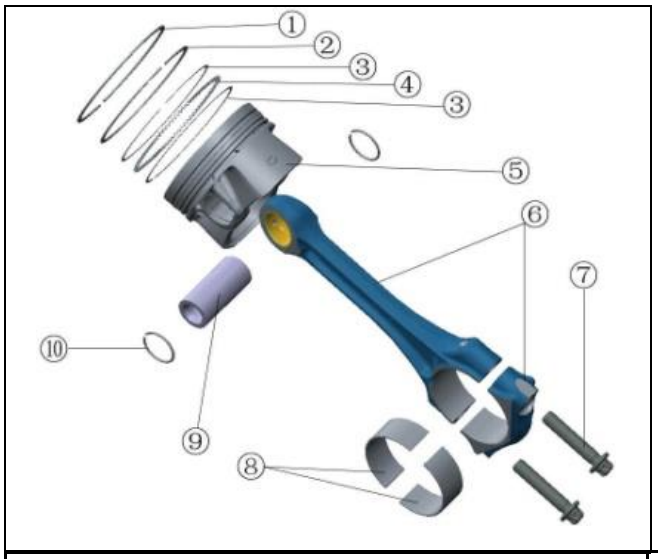
3. **Installation**

1 Installation sequence is reverse to removal sequence.

- **Warning The upper and lower main bearing bushings are optional. No confusion is allowed.**
- **Warning Gasoline engine oil shall be coated at the joint surface of main bearing shell and crankshaft and the main journal surface of crankshaft. The upper main bearing shell (with oil hole) shall be installed in the bearing seat of upper body of crankcase. The lower main bearing shell (without oil hole) shall be installed in the main bearing cap. The upper and lower main bearing shells shall not be installed inversely or incorrectly. The back of bearing shell shall be closely fitted with the surface of bearing seat hole, and the end surface shall be flush with the joint surface of upper and lower bodies of crankcase.**
- **Warning The joint surface of the crankcase and main bearing cover shall be kept clean and free of metal chips and other foreign matters. Install the crankshaft and thrust plate into the crankcase. The oil groove on the thrust plate of the crankshaft shall face the crankshaft.**
- **Warning Tighten the main bearing cap bolts according to the torque specified in Appendix Table A. Tighten the main bearing cap bolts according to the sequence shown in the following figure (one to ten increments) by "torque plus angle method," or tighten them simultaneously by a tightening machine. When tightening, all bolts shall be pre-tightened to (35±2) Nm, then rotated by (120 ±5)? And the angle shall be calculated from (35±2) Nm).**
- **Warning Once the main bearing cap bolts are removed and cannot be reused, they must be replaced with new ones.**

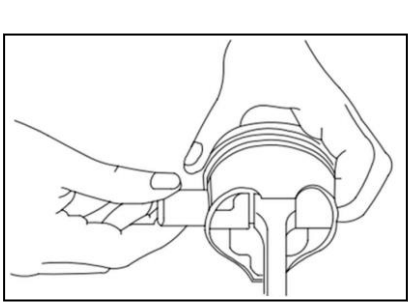
Piston, piston pin (ring), connecting rod

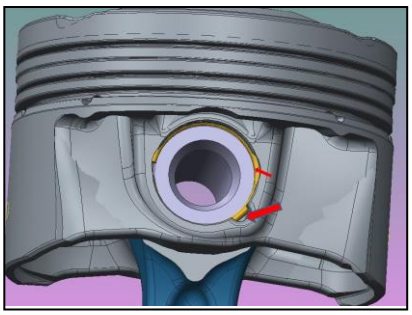
Removal



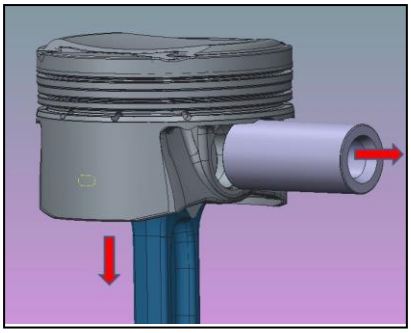
Project	Description
1	Gas ring
2	Scraper ring
3	Wiper blade
4	Lining ring
5	Piston
6	Connecting rod assembly
7	Connecting rod bolt
8	Connecting rod bearing shell
9	Piston pin
10	Piston pin snap ring

1 Drop the engine assembly from the vehicle. Refer to: Engine assembly
2 Remove transmission and flywheel. Refer to: Double mass flywheel assembly
3 Remove front gear train. Refer to: Front gear train
4 Remove intake-exhaust system. Refer to: Intake manifold, supercharger and three-way catalytic converter
5 Remove cylinder head cover, oil pan, front cover, oil pump. Refer to: Cylinder head cover, oil pan, front cover assembly, variable displacement oil pump
6 Remove timing system. Refer to: Timing mechanism
7 Remove cylinder head from cylinder block. Refer to: Camshaft, Valve and Cylinder Head
8 Take the piston rod group out of the cylinder block. Refer to: Crank pin and connecting rod bearing bush
9 Using a pencil or quick-dry paint, mark the cylinder number on all pistons (item 5 in the table), connecting rods and connecting rod bushing covers (item 6 in the table).
10 Using the piston ring expander, remove the air ring (item 1), scraper ring (item 2), scraper blade (item 3) and liner ring (item 4) from the piston (item 5).
11 Using a small screwdriver or special tool, take the piston pin circlip (item 10 in table) out of the circlip groove of the piston (item 5 in table) and at the same time press out the piston pin (item 9 in table).





12 Push piston pin (item 9 in table) out of pin bore of piston (item 5 in table), separate connecting rod (item 6 in table) and piston (item 5 in table)



Cleaning

Clean the carbon deposit, grease and sealant on the piston head, ring groove, piston ring and cylinder

block with metal cleaning agent and proper tools. Check

Inspect the cylinder wall for deep scratches or uneven convex and concave; inspect the piston and piston ring for wear, cracks or other damages; replace the damaged or faulty cylinder, piston and piston ring.

Assembly

The installation sequence is the reverse of the removal sequence.

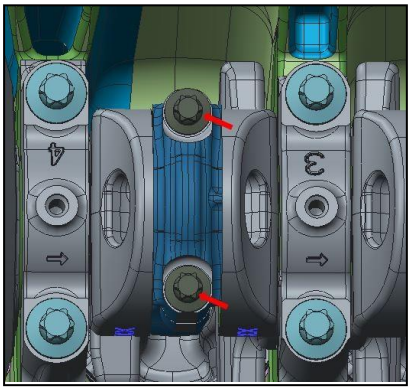
Warning When assembling the piston pin snap ring, do not point the snap ring opening at the piston pin hole notch.

Crank pin and connecting rod bearing bush

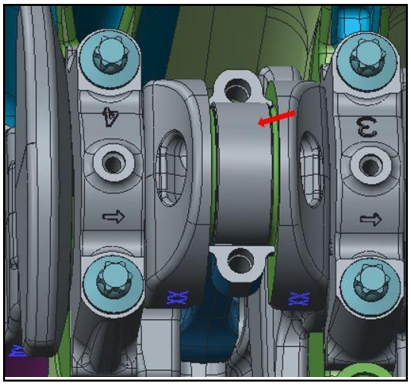
Removal

1. Drop the engine from the vehicle. Refer to: Engine assembly
2. Remove transmission and flywheel. Refer to: Double mass flywheel assembly
3. Remove front gear train. Refer to: Front gear train
4. Remove intake system, exhaust system. Refer to: Intake manifold, supercharger and three-way catalytic converter
5. Remove cylinder head cover, oil pan, front cover, oil pump. Refer to: Cylinder head cover, oil pan, front cover assembly, variable displacement oil pump
6. Remove timing mechanism. Refer to: Timing mechanism
7. Remove cylinder head sub-assembly. Refer to: Camshaft, Valve and Cylinder Head

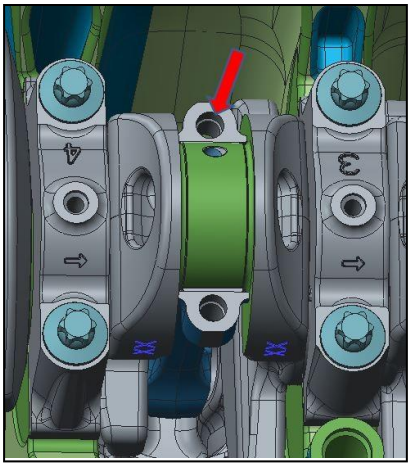
8 Using a E10 sleeve, loosen the connecting rod bolts.



9 Take out the connecting rod cap, and take out the connecting rod bearing bush stuck on the journal.

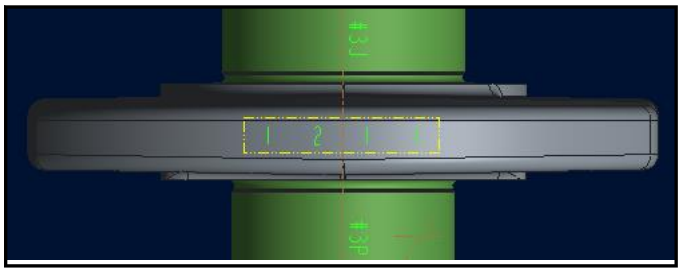


10 Push the piston connecting rod assembly out of the cylinder bore, pay attention not to damage the crankshaft connecting rod journal and cylinder bore.



Check

Four numbers are engraved on the fifth sector plate of the crankshaft, from left to right, representing the diameter groups of the first, second, third and fourth connecting rod necks respectively. Crankshaft connecting rod journal diameter, 1, 2, 3 of 3
Group.



The connecting rod big end side is engraved with diameter and size groups, and the connecting rod big end hole diameter is divided into 3 groups: 1, 2 and 3.

The connecting rod bearing shells are grouped according to the thickness of the bearing shells, which are divided into three groups in total. The back of each bearing shell is engraved with corresponding digital marks such as "1," "2" and "3."

Bearing fitting principle, the sum of connecting rod big end diameter grouping value + crankshaft connecting rod journal grouping value + connecting rod bearing shell thickness grouping value is equal to 6.If you can't get 6, go to 6. For example, connecting rod big end hole is 2, crankshaft first connecting rod journal is 3, and optional connecting rod bearing bush group is 1. The big end hole of connecting rod is 1, the second connecting rod neck of crankshaft is 1, the optional connecting rod bush group is 3, and the sum is 5. The big end hole of connecting rod is 3, the second connecting rod neck of crankshaft is 3, the optional connecting rod bush group is 1, and the sum is 7. Detailed bearing shell thickness and matching relationship shall be carried out according to the following table.

Assembly

The installation sequence is the reverse of the removal sequence.

Warning **The tightening torque of the connecting rod bolts is 20Nm+90° (7.5 ftlb.).**

Warning **Once the connecting rod bolts are removed and cannot be reused, they must be replaced with new connecting rod bolts.**

Lubrication system specifications

Component specification

Name	Specifications		
Oil pump type	Vane oil pump		
Oil pressure	Engine speed	Idle speed	3,000 rpm
	Oil pressure	80 ~ 250 kPa	120 ~ 500 kPa

General specifications

Lubricating oil specification

Application	Specifications	
Viscosity	0W20	
Grade	CTS-03.08.06 0W-20	
Maintenance filling amount	3.9±0.1L	

Lubricating oil flow diagram

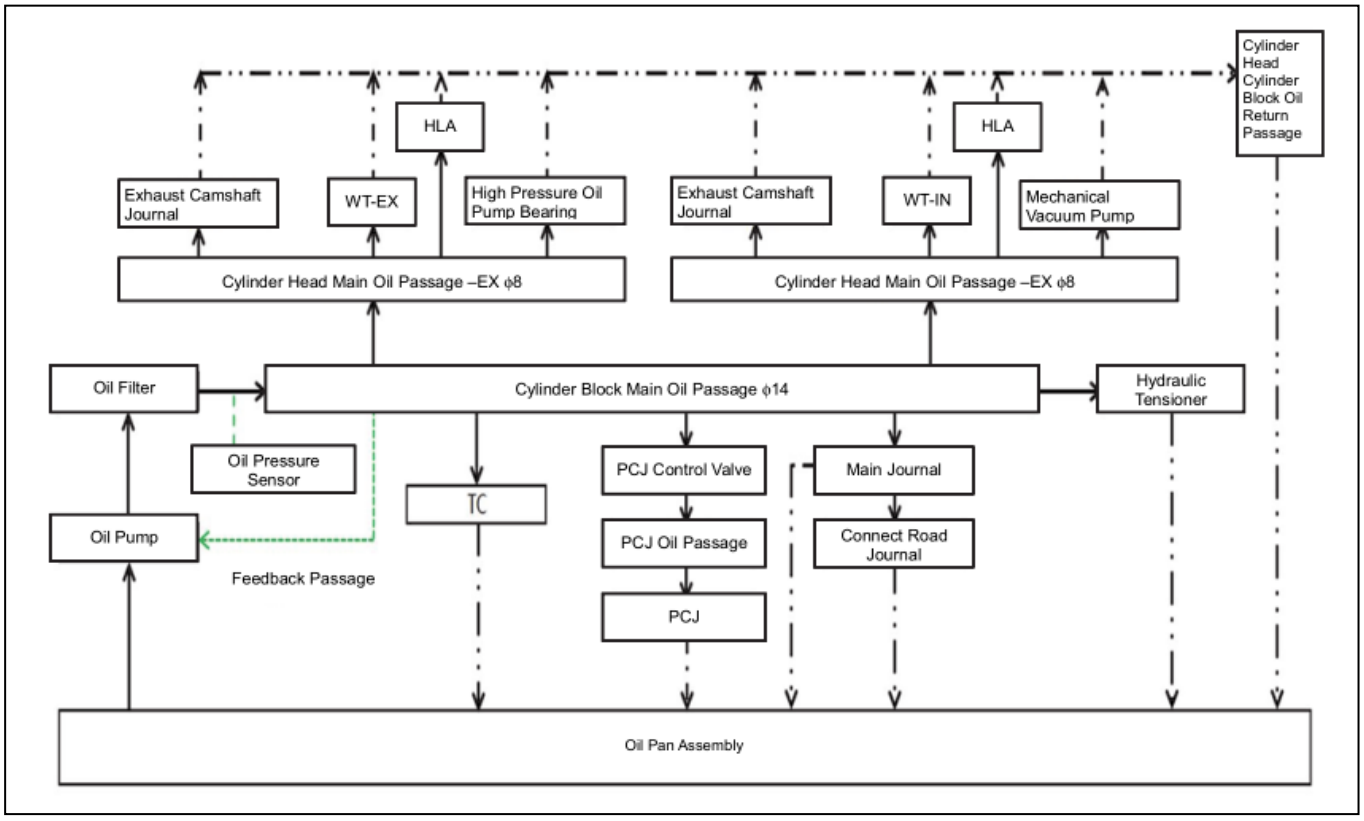


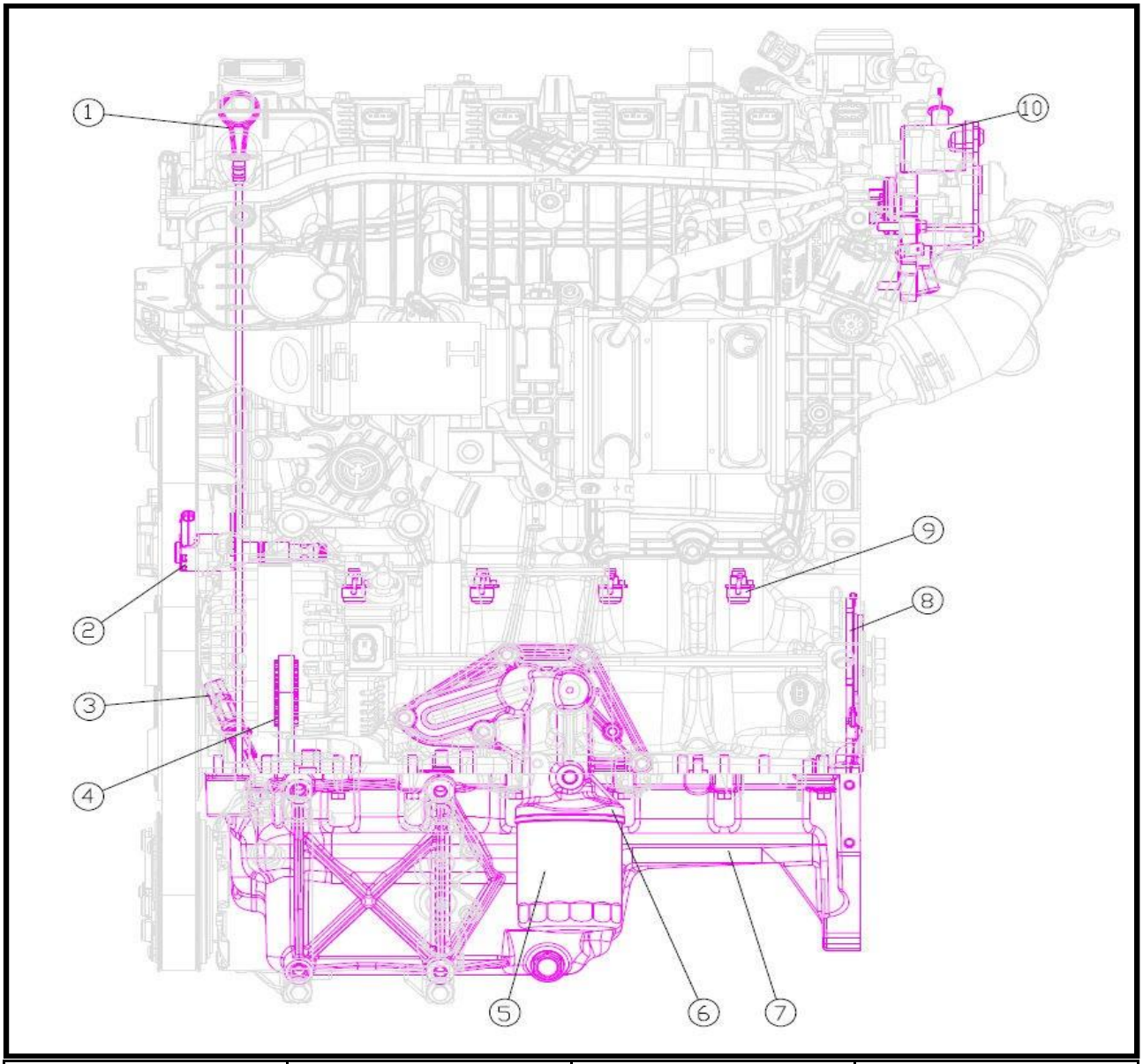
Figure 2:

Torque specification

Name	Nm	lb-ft	lb-in
Oil pan drain plug	45±5	33	-
Oil pan retaining bolts and nuts	10±1	-	89
Oil pump retaining bolt	23±2	17	-
Tightening torque of oil filter	30±2	22	-
Tightening torque of oil filter connecting pipe	23±2	17	-

Engine oil filter support retaining bolt	10±1	-	89
Mechanical vacuum pump fastening bolt	10±1	-	89
Piston cooling nozzle control valve retaining bolt	10±1	-	89
Piston cooling nozzle retaining bolt	25±2	18	-
Retaining bolt of lower reinforced plate of crankcase	10±1	-	89
Crankshaft rear end cover retaining bolt	10±1	-	89

Composition and position distribution



Serial number	Part number	Name	Remarks
1	1009040-NE01	Oil level gauge assembly	
2	1004050-NE01	Piston cooling nozzle control valve	
3	1011010-NE03	Oil pump assembly	Full variable oil pump, integrated proportional solenoid valve and wiring harness
4	1005035-NE01	Oil pump pulley	
5	1012010-B01	Engine oil filter assembly	
6	1012020-NE01	Engine oil filter support assembly	
7	1009010-NE01	Oil pan assembly	
8	1000281-NE01	Crankshaft rear end cover	
9	1004040-NE01	Piston cooling nozzle assembly	
10	3541010-MK01	Mechanical vacuum pump assembly	

System functional principle introduction

The lubrication system is used to continuously deliver enough and proper temperature clean engine oil to the friction surface of all transmission parts when the engine works, and form oil film between the friction surfaces to realize liquid friction.The oil pump is driven by the crankshaft through the belt. After passing through the oil pump, the oil enters the oil filter with enough high pressure, and the filtered oil enters the main oil passage. Part of the oil reaches the crankshaft journal bearing. The oil from the crankshaft journal bearing is supplied to the connecting rod bearing through the inclined passage drilled on the crankshaft. Part of the oil enters the piston cooling nozzle oil passage through the piston cooling nozzle control valve, and the fuel injection nozzle sprays the oil to lubricate the piston, piston ring and cylinder wall. Part of the engine oil enters the cylinder head and lubricates the camshaft journal and shaft cover through the cylinder head oil passage. Finally, it flows back to the oil pan through the oil return passage of cylinder block and cylinder head.

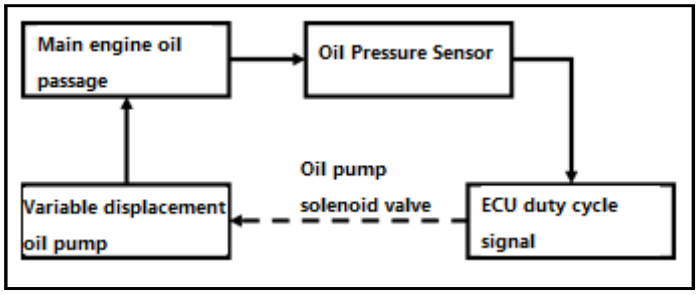
Structural principle of parts
Check variable displacement oil pump

Function:

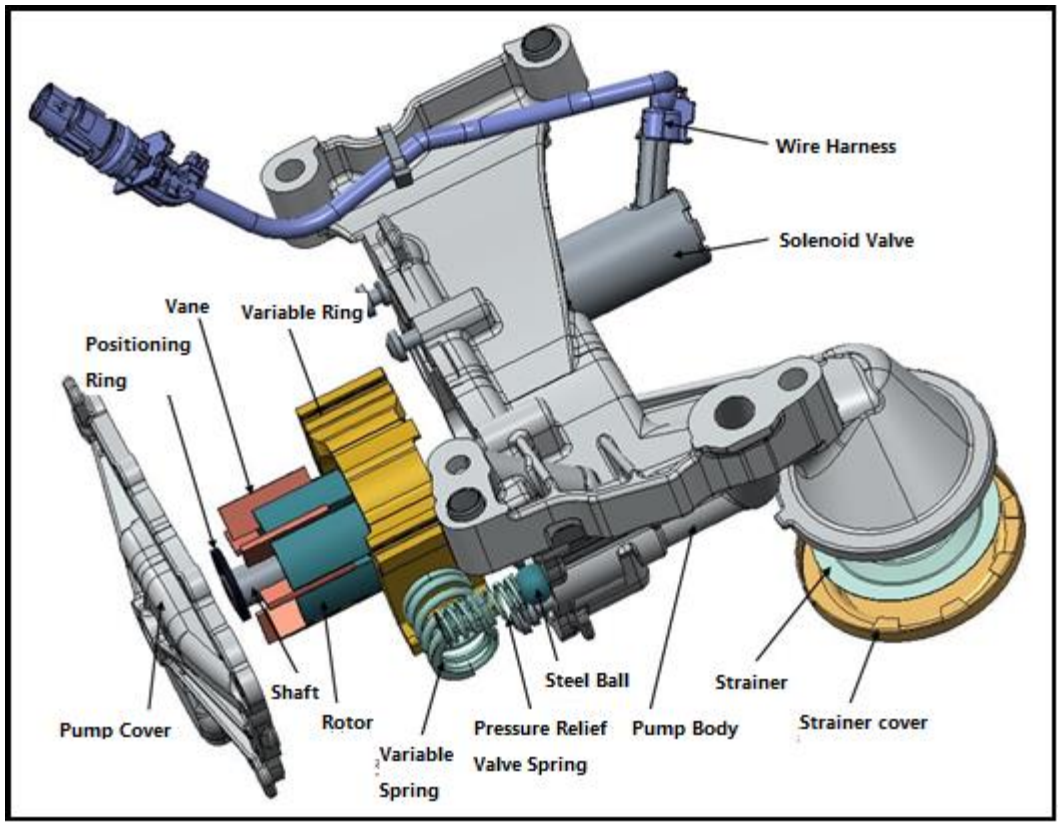
Ensure that the engine oil circulates in the lubrication system, and at any speed of the engine, send sufficient amount of engine oil to the lubrication position at enough high pressure, and continuously and forcibly supply oil to all friction surfaces, so that the engine gets reliable lubrication, thereby reducing the friction loss of parts.

Working principle:

When the oil pump is running, use the volume change between the vane and the pump chamber to make the low-pressure oil become the high-pressure oil. The variable displacement oil pump can set different pressure targets according to the pressure demand of the engine, and then increase or decrease the displacement of the oil pump through ECU adjustment to reach the set target pressure. Its working cycle is shown in the figure below.

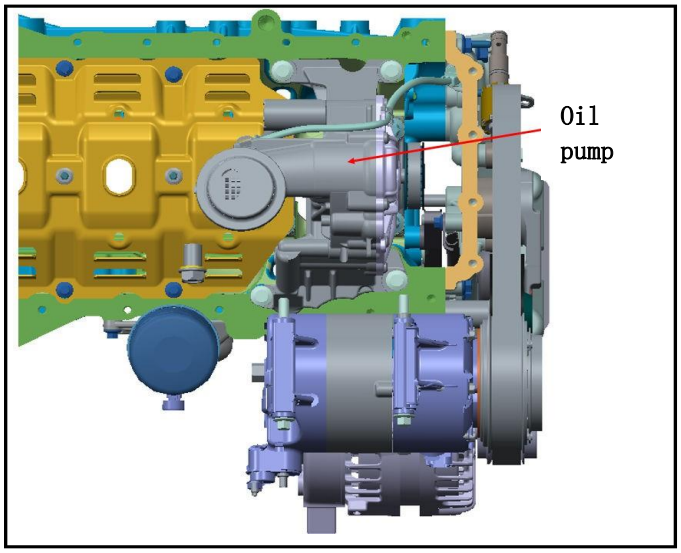


Product structure:

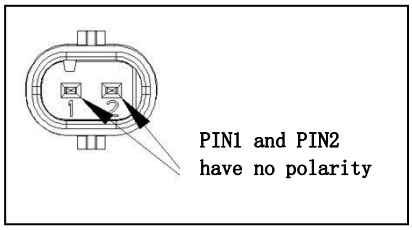


Arrangement position:

The oil pump is mounted on the bottom surface of the engine cylinder block and is located inside the oil pan.



Interface definition:



Resistance characteristics:

The resistance may vary slightly due to temperature, but generally does not exceed 8~16Ω. Product fault and troubleshooting:

Before troubleshooting a single product, check the harness link first, and then troubleshoot a single product after confirming that there is no problem.

1 Check whether the engine oil pump harness appearance is damaged, whether the housing is cracked, whether the connector terminal is rusted, and whether there is water in the connector.

2 Use a multimeter to check whether the resistance of oil pump solenoid valve is within the normal range. When there is a problem, ABA is recommended for interchangeability verification.

Engine oil pressure sensor assembly

Function

The engine oil pressure alarm assembly is an absolute pressure sensor installed on the engine

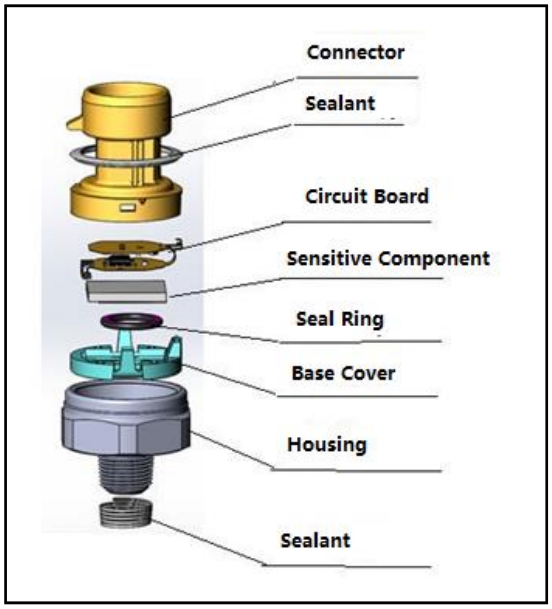
main oil passage and fed back to the control system oil pressure. Working principle

The oil pressure sensor consists of a pressure sensitive element and a signal processing circuit. The engine oil pressure acts on the sensitive element to produce signal change, which is processed by the signal circuit and then outputted to the outside.

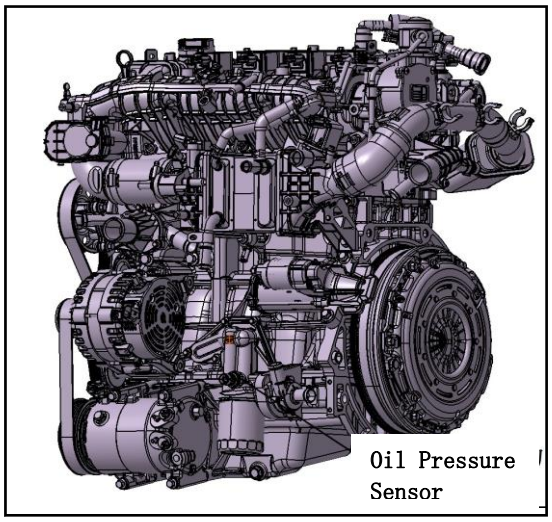
Proportional voltage signal to pressure input.

Product structure

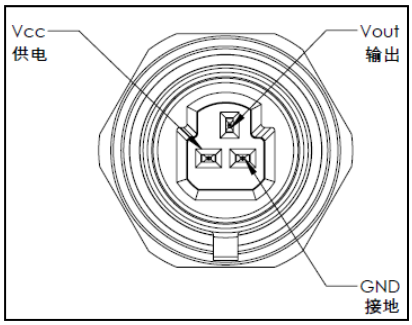
1 Single structure



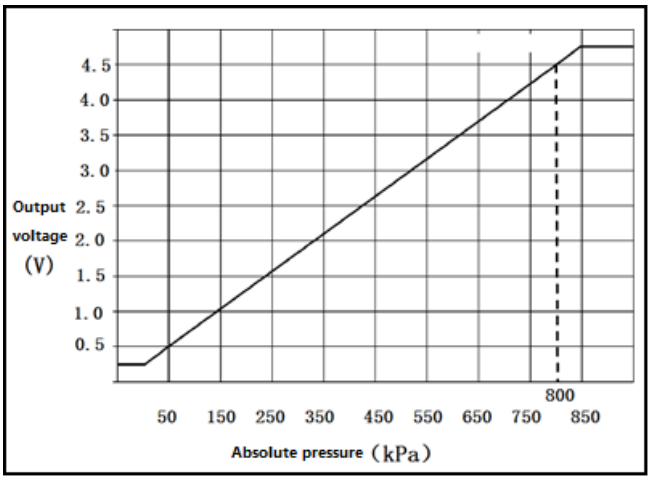
2 Layout structure



3 Interface definition



Characteristics



The oil pressure outputs a voltage signal proportional to the oil pressure. Product fault and troubleshooting

Warning Before performing product unit inspection, perform relevant inspection of harness connection first, and then perform product unit inspection after confirming that there is no problem.

Unit inspection

1 The complete vehicle is only powered on and does not start the engine. The sensor supply voltage is 5 V. At this time, the sensor output voltage should be 0.75±0.05 V..

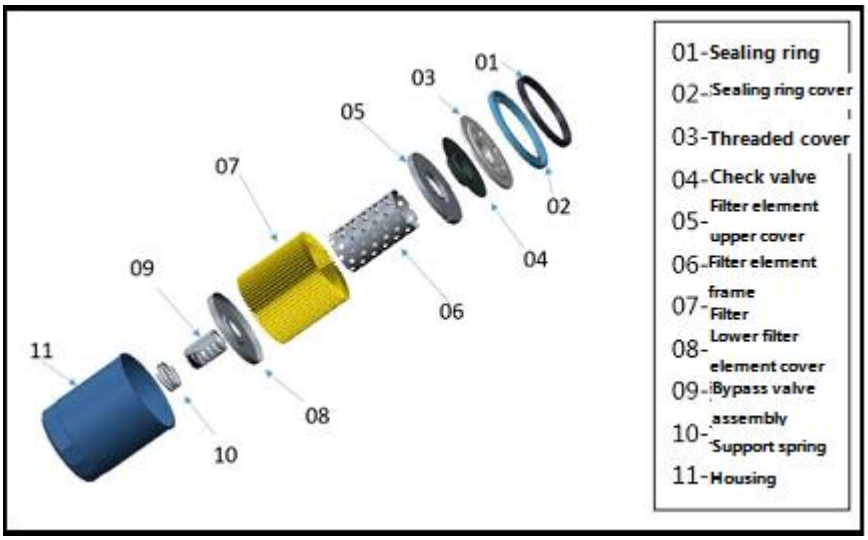
2 Start the engine, and the sensor output voltage shall change with the engine working condition.

Warning When there is a problem, ABA is recommended for interchangeability verification.

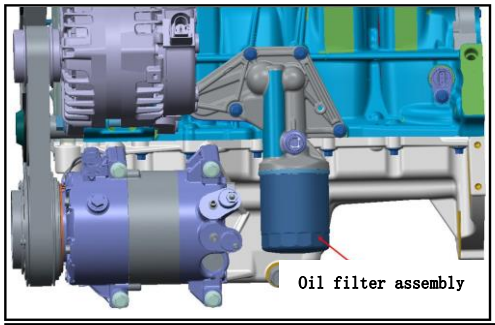
Oil filter

Function: When the engine oil passes through, the insoluble impurities in a certain diameter range are blocked by the porous fiber layer component and separated from the engine oil.

Oil filter structure:



The oil filter is installed on the oil filter support.



Piston cooling nozzle control valve

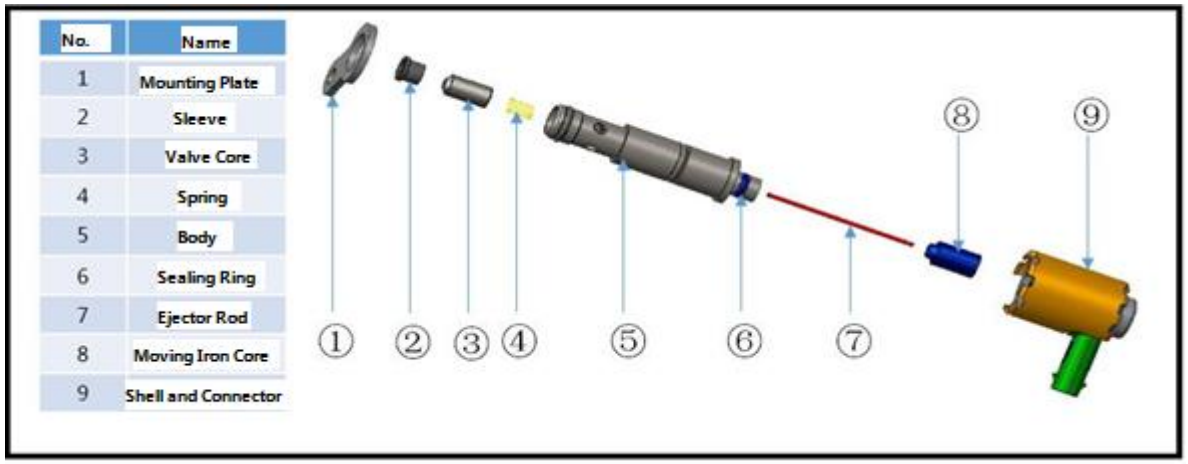
Function:

It is arranged on the engine cylinder block and used to control the opening or closing of the piston cooling nozzle oil passage so as to control whether the piston is injected with fuel for cooling.

Working principle:

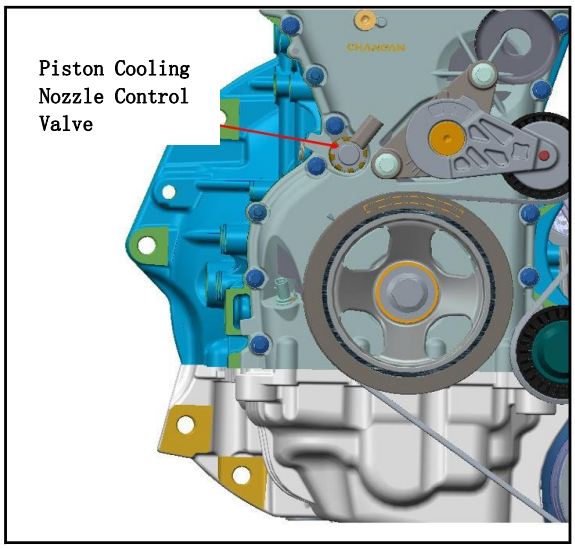
Use the electromagnetic force to push the valve core to move to open and close the valve.

Single structure:

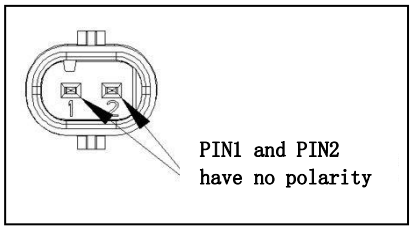


Arrangement position:

The piston cooling nozzle control valve is arranged on the main oil passage of the cylinder block.



Interface definition:



Resistance characteristics:

The resistance will vary slightly due to temperature, but generally does not exceed 10~20Ω. Product fault and troubleshooting:

Before performing product unit inspection, perform relevant inspection of harness connection first, and then perform product unit inspection after confirming that there is no problem.

1 Inspect whether the appearance is damaged, whether the housing is cracked, whether the connector terminal is rusted, and whether there is water in the connector.

2 Use a multimeter to check whether the resistance of the control valve is within the normal range. When there is a problem, ABA is recommended for interchangeability verification.

Common methods

Oil pressure check

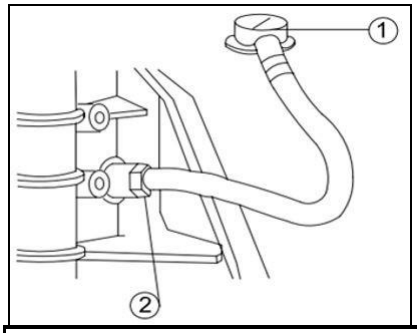
Attention

Before checking the oil pressure, check the following items:

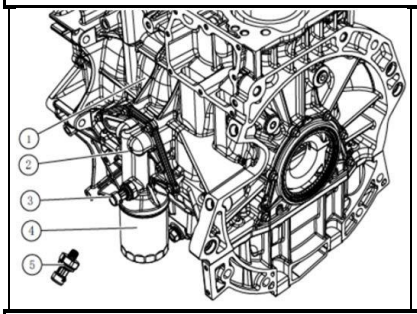
1 Oil level in the oil pan. If the oil level is low, fill to the high oil level mark on the dipstick.
2 Quality of oil. If the oil is discolored or deteriorated, replace the oil.
3 Oil leakage. If oil leakage is

found, repair it. Inspection steps:

1 Lift the vehicle and remove the fender.
2 Remove oil pressure sensor.
3 Install the oil pressure gauge into the oil pressure sensor mounting hole.
4 Fix the oil pressure gauge.
5 Disconnect the oil pump harness connection.
6 Start the engine and warm it up to the normal operating temperature.
7 After preheating, increase the engine speed to 3000 rpm and measure the oil pressure.



Serial number	Tool
1	09915-77310 Oil pressure gauge
2	09915-78211 Oil pressure gauge holder
Engine speed	Pressure range
Idle speed	80~250kPa
3000 rpm	120~500kPa



Serial number	Name
1	Crankcase assembly
2	Engine oil filter support assembly
3	Oil pressure sensor
4	Engine oil filter assembly
5	Apply sealant

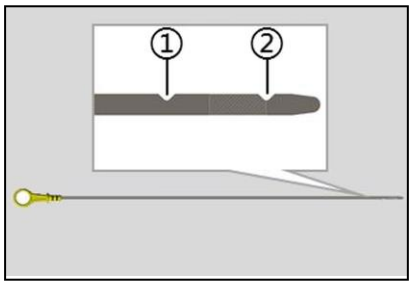
8 After checking the oil pressure, shut down the engine and remove the oil pressure gauge.
9 The oil pressure sensor is a self-contained adhesive product, which cannot be reused. In case of special conditions, it must be reused. Before reinstalling the oil pressure sensor, it is necessary to apply sealant on the thread and tighten it according to the specified torque.

Tightening torque: 14±1N•m (7.5 ftlb.)

10 Start the engine and check the oil pressure sensor for leaks.
11 Shut down the engine and connect the harness terminal with the oil pressure sensor and oil pump harness again.

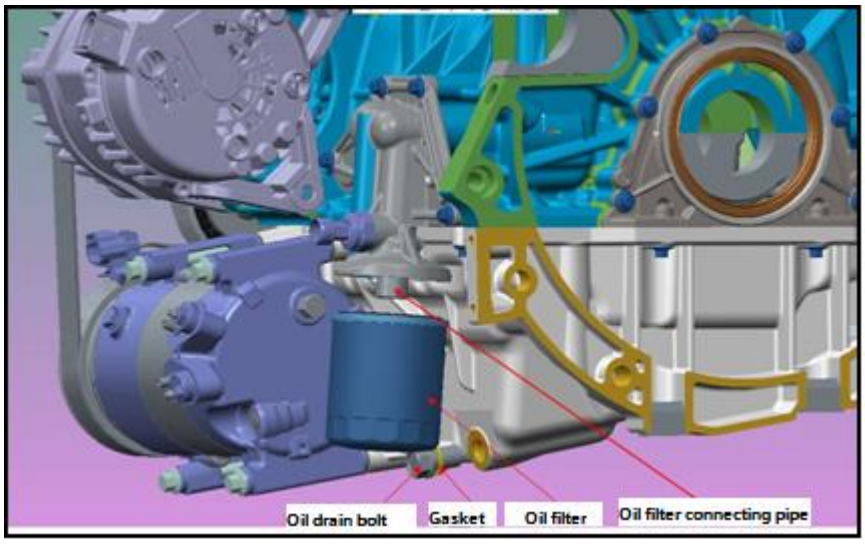
Oil level check

1 Park the vehicle on a level ground.
2 Confirm that the vehicle is cold.
3 Pull out the oil dipstick, wipe it with a clean, lint-free soft cloth, insert the dipstick again, pull it out, and check the oil level. Check whether the engine oil level is in MIN (min.) and MAX
(Max. 1) Between marks



Oil and oil filter replacement

1 Lift the vehicle and remove the fender.
2 Remove oil drain bolt of oil pan, rule out engine oil.
3 Use three-claw chuck or chain to remove oil filter.
4 Before assembling the oil filter, check whether the oil filter connecting pipe is loose, and check the torque according to 23±2Nm.
5 Coat sealing ring for oil filter with a little clean oil and tighten in accordance with 30±2Nm.
6 Assemble oil pan drain bolt with torque of 45±5Nm.
7 Fill in the oil, confirm the oil level according to the oil level inspection specification, and then tighten the filler cap.
8 Start the engine and check the oil filter and drain bolt for oil leakage.



Fault symptom diagnosis check and confirmation

1 Confirm the customer's problem.
2 Visually inspect for visible signs of mechanical or electrical damage.
3 If the observed or raised problem is obvious and the cause has been found, the cause must be corrected before proceeding to the next step.
4 If the problem cannot be found obviously, confirm the fault and refer to the symptom table.

Appearance check list

Mechanical	Electrical
• Oil pan • Oil pan joint surface • Oil filter • Oil filter support • Oil filter support mating surface • Piston cooling nozzle control valve	Electrical plug connection

Fault symptom table

If the fault occurs but no DTCs are stored in the ECM and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Oil pressure warning lamp is always on	Lack of oil, oil pump damage, oil filter blockage, oil pressure sensor damage, other such as engine friction pair system and electrical connector fault	Check oil pressure sensor: 1.Switch off the ignition.2. Disconnect plug connection for oil pressure sensor.3.Switch on the ignition and start the engine.4.Check whether the engine oil warning lamp is always on. If it is always on, check the engine oil pressure sensor.
		Check engine oil pressure: 1.Perform oil pressure check procedure to check whether the oil pressure is normal 2.If the engine oil pressure is normal, go to the next step.
		Check oil pump: 1.Remove oil pump 2.Check whether the oil pump is normal?3.If there is a problem, replace the oil pump.
		Inspect the harness circuit, instrument and friction pair, and replace if there is any problem.
Oil pressure warning lamp does not light up	Engine oil pressure sensor damage, instrument display fault, circuit fault	Check harness circuit, instrument and friction pair, and replace if there is problem.
		Check oil pressure sensor: 1.Switch off the ignition.2. Disconnect plug connection for oil pressure sensor.3.Switch on the ignition and start the engine.4.Check whether the engine oil warning lamp is always on. If it is always on, check the engine oil pressure sensor.
Engine oil abnormal elimination	Leakage in sealing parts of engine	Check for leakage: 1.Inspect the sealing parts of the engine.Is there any oil leakage?? Is the repair leak point.Test whether the system works properly.? No 2.Start the engine.3. Visually inspect the flue gas color of engine exhaust trachea. Does the engine exhaust trachea exhaust blue smoke?? No The system is normal. ? Yes to step 2.
	The oil/gas separator assembly is damaged or works abnormally.	Check oil-gas separator assembly: 1.Inspect the oil and gas separator assembly for oil sludge or damage.? Yes Replace oil-gas separator assembly.? No to step 3.
	Abnormal clearance between engine valve mechanism and engine piston cylinder	Check engine valve mechanism and engine piston cylinder: 1.Check whether the engine valve mechanism and the fitting clearance between the engine piston and the cylinder are abnormal and repair.

Caution Before diagnosis, ensure the oil level, oil viscosity and quality are normal. Replace or add oil if necessary

Oil pressure warning lamp is constantly on diagnostic process

Caution Before diagnosis, ensure the oil level, oil viscosity and quality are normal. If necessary, change or add oil.

Symptoms	Possible causes	Measures
Oil pressure warning lamp is always on	Lack of oil, oil pump damage, oil filter blockage, oil pressure sensor damage, other such as engine friction pair system and electrical connector fault	Check oil pressure sensor: 1.Switch off the ignition.2. Disconnect plug connection for oil pressure sensor.3.Switch on the ignition and start the engine.4.Check whether the engine oil warning lamp is always on. If it is always on, check the engine oil pressure sensor.
		Check engine oil pressure: 1.Perform oil pressure check procedure to check whether the oil pressure is normal 2.If the engine oil pressure is normal, go to the next step.
		Check oil pump: 1.Remove oil pump 2.Check whether the oil pump is normal?3.If there is a problem, replace the oil pump.
		Inspect the harness circuit, instrument and friction pair, and replace if there is any problem.

Oil Abnormal Consumption Diagnostic Process

Caution First check whether there is engine oil leakage. If not, check according to the following steps.

Test conditions	Details/Results /Measures
1. Check engine oil	
	A. Check whether the engine oil level is too low. ? Yes Return to normal level, go to step 2. ? No Go to step 2.
2. Check throttle valve and intake manifold	
	A. Inspect whether there is oil stain or oil accumulation in the throttle valve and intake manifold. ? Yes Clean up to step 3. ? No Go to Step 3.
3. check supercharger inlet and curved sweep trachea	

	A. Check whether the turbocharger inlet and curved sweep trachea have oil trace.
	? Yes Clean up to step 5. ? No Go to Step 4.
4. Check supercharger outlet	
	A. Inspect whether the supercharger air outlet has oil stain. ? Yes Clean up to step 6. ? No Go to Step 5.
5. Check oil-gas separator assembly	
	A. Inspect whether there is oil sludge or damage in the oil-gas separator assembly. ? Yes Replace the oil-gas separator assembly. ? No Go to Step 6.
6. Supercharger bearing inspection	
	A. Inspect whether the supercharger bearing is damaged. ? Yes Replace the supercharger assembly. ? No Go to Step 7.
7. Check piston ring or valve fault	
	A. Add an appropriate amount of engine oil into the cylinder block. ? Significantly increased pressure, check piston rings.Reference: Piston, piston pin (ring), connecting rod ? The pressure does not increase much, check the valve. Reference: Camshafts, valves and cylinder heads
8. Check supercharger vortex end	

	A. Inspect whether there is oil dirt at the turbocharger vortex end, and whether the bearing is loose or damaged. ? Yes Replace the supercharger. ? No Go to step 9.
9. Check valve stem seal	
	A. Inspect valve stem seal. Is it leaking? ? Yes Replace. Reference: Camshafts, valves and cylinder heads ? No Verify the system works properly.

High oil consumption

Detailed fault cause diagnosis analysis

1. Poor placement of the vehicle or short shutdown time may lead to misjudgment of less engine oil. It is recommended to check the engine oil quantity as follows: Park the vehicle in the horizontal parking space, and pull out the oil level gauge after the engine stalls for 10 minutes for inspection. If it is found that the oil level is lower than the lower scale line of the oil dipstick, it indicates that the amount of oil is small. It is recommended to add it. If the oil level is above the lower scale line, the engine can run normally. There are many reasons for less oil, such as insufficient oil filling amount during maintenance, use of non-specified model oil, oil leakage, oil burning, etc.
2. It is recommended to check whether there is oil trace on the ground after parking for a long time, and whether there is blue smoke in row trachea when the engine is started. If there is no abnormality and the engine oil is small, it is recommended that you add engine oil properly for observation for a period of time. If there is abnormality, please go to 4S shop for maintenance in time.
3. Generally, engine oil burning may be caused by poor sealing of piston ring and cylinder wall, poor sealing of valve oil seal, poor oil separation of crankcase ventilation system, poor sealing of turbocharger rotary shaft sealing ring and excessive oil filling.

Solution

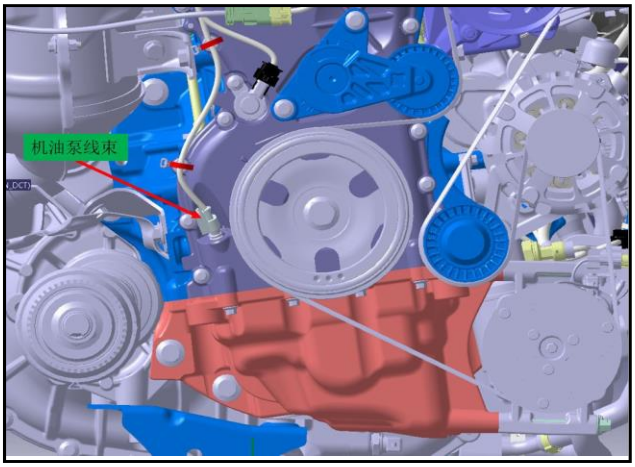
It is recommended to go to 4S store for maintenance in time, and general maintenance steps and key points.

1. The maintenance technician first confirms whether the engine oil level is normal, and comprehensively inspects the engine outside to see whether there is obvious oil leakage trace, and the engine oil level caused by rule out oil leakage is too low;
2. The maintenance technician shall confirm the cause of excessive oil consumption, and handle or repair according to engine damage. Reference: Oil Abnormal Consumption Diagnostic Procedure
3. If the engine oil needs to be replaced or supplemented, fill the engine oil of the model specified in the product manual, and wait for 10 minutes to observe that the oil level is between the highest scale and the lowest scale of the oil dipstick;
4. After overhaul, the customer can compare with the phenomenon before overhaul to preliminarily judge the overhaul effect. In daily use, use the fuel provided by the regular gas station, regularly carry out maintenance and replacement of air filter element and engine oil filter element, and carry out daily maintenance of the vehicle.

Removing and installing variable displacement oil pump

Removal

1 Lift the vehicle and remove the bottom guard.
2 Disconnect the engine oil pump harness from the engine harness.



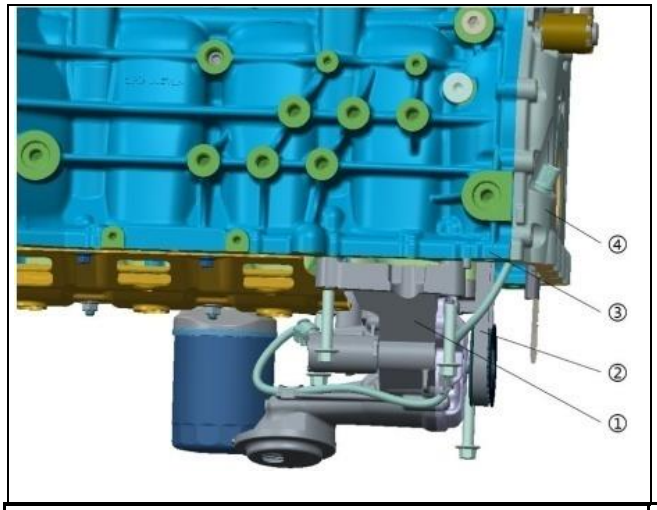
3 Remove oil pan drain bolt with wrench, size M14, and drain engine oil.
4 Remove oil pan. Reference: Oil pan
5 Exit the oil pump harness connector from the front cover toward the inside of the oil pan.
6 Remove oil pump bolt with wrench, specification M8,

and then remove oil pump. Check

1 Remove the engine oil pump assembly for inspection. If there are problems in the engine oil pump harness and appearance, replace them if necessary.
2 Check whether the oil pump oil outlet sealing ring is damaged. If there is a

problem with the sealing ring, replace it if necessary. Installation

1 The installation position of oil pump assembly is as shown in the figure below. Firstly, assemble the oil pump belt in place, and then tighten the mounting bolts according to the torque specifications.



Serial number	Name
1	Oil pump assembly
2	Oil pump belt
3	Crankcase assembly
4	Front cover assembly

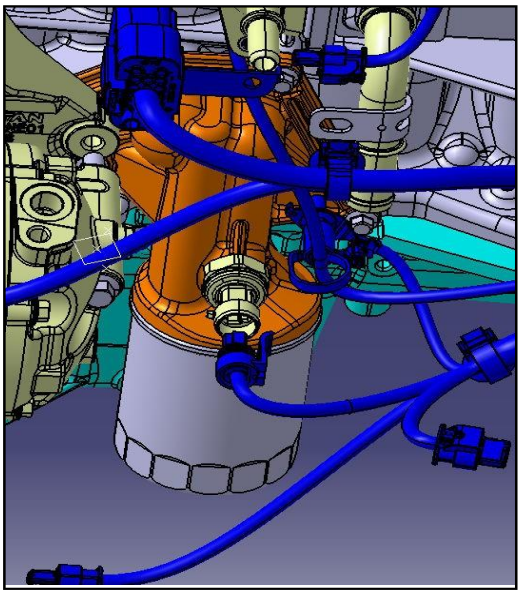
2 Install the oil pump harness connector to the front cover.
3 Install oil pan assembly.
4 Restore the engine oil pump harness connection, and check to ensure all parts have been installed back in place.
5 Refill engine with oil
6 After installation, start the engine to check the engine oil pressure, and check each joint without oil leakage.

Oil pressure sensor

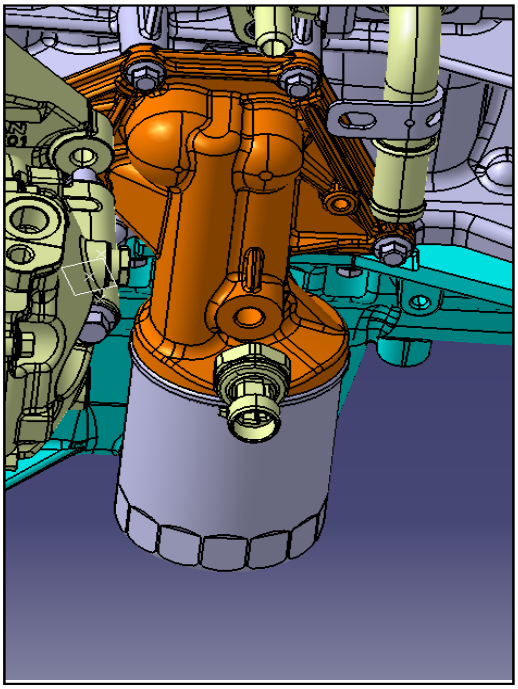
Removal

1 Power off the vehicle;

2 Disconnect the harness connector;



3 Use 24# wrench to remove sensor assembly.



Installation

Installation reverse to removal

Warning **Before installation, check each part for deterioration or damage, and replace it if any defect is found. Before installing the sensor, clean the mounting hole to prevent iron scraps and other debris.**

The installation torque should be

within 14±1Nm. Clean the oil stain

after replacing the sensor.

Do not replace the sensor when the vehicle is powered on.

Oil pan

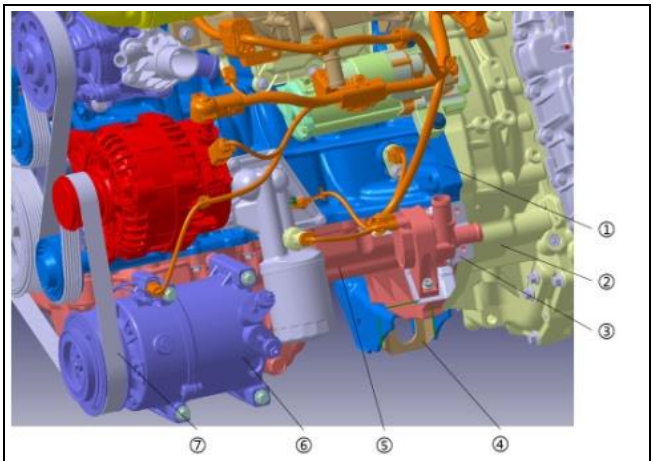
Removal

1 Lift the vehicle and remove the bottom guard.

2 Remove oil pan drain bolt with wrench, size M14, and drain engine oil.
3 Remove front wheel train belt. Reference: Front end gear train
4 Use a wrench to remove the compressor bolts, size is M8, and other pipelines can be removed without removing them.
5 Remove the rear suspension mounting bracket with a wrench, refer to: Rear suspension module
6 Use a wrench to remove the mounting bracket bolts of electronic auxiliary water pump, size M6, and other pipelines can be removed without removing them.
7 Remove the oil pan mounting bolts, bolt size M6, and

then remove the oil pan. Cleaning

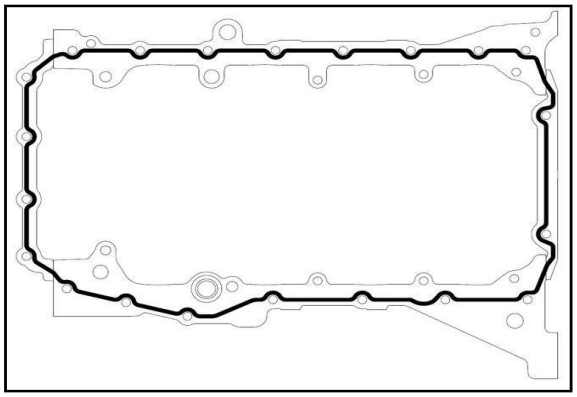
Clean the oil, old sealant and contaminants on the joint surface of the oil pan and cylinder block, and clean the inside of the oil pan.



Serial number	Name
1	Crankcase assembly
2	Transmission assembly
3	Electronic auxiliary water pump bracket
4	Rear suspension bracket
5	Oil pan assembly
6	Compressor assembly
7	Front gear belt

Installation

1 Before installing the oil pan, apply glue to the surface of the cylinder block (in the joint area with the oil pan). The glue path is as shown in. Make sure the secret propolis is installed before hardening and tighten the bolts crosswise to the torque specified in the torque specification sheet.



2 Install all removed parts back in place.
3 Install oil pan drain bolt, tightening torque 45±5Nm (7.5 ftlb.).
4 Refill the engine with engine oil, start the engine and check each joint for oil leakage.

Cooling system specifications

Component specification

Name	Specifications
Thermostat type	Wax type
Thermostat opening temperature(Assemble on water pump)	82± 2 ℃
Thermostat full open lift(Assemble on water pump)	At 95oC water temperature, lift ≥8 mm
Thermostat opening temperature(Assemble on cylinder head)	100±2℃
Thermostat full open lift(Assemble on cylinder head)	Lift ≥8 mm at 115 ° C water temperature
Water pump type	Centrifugal impeller pump
Number of water pump blades	6 pieces

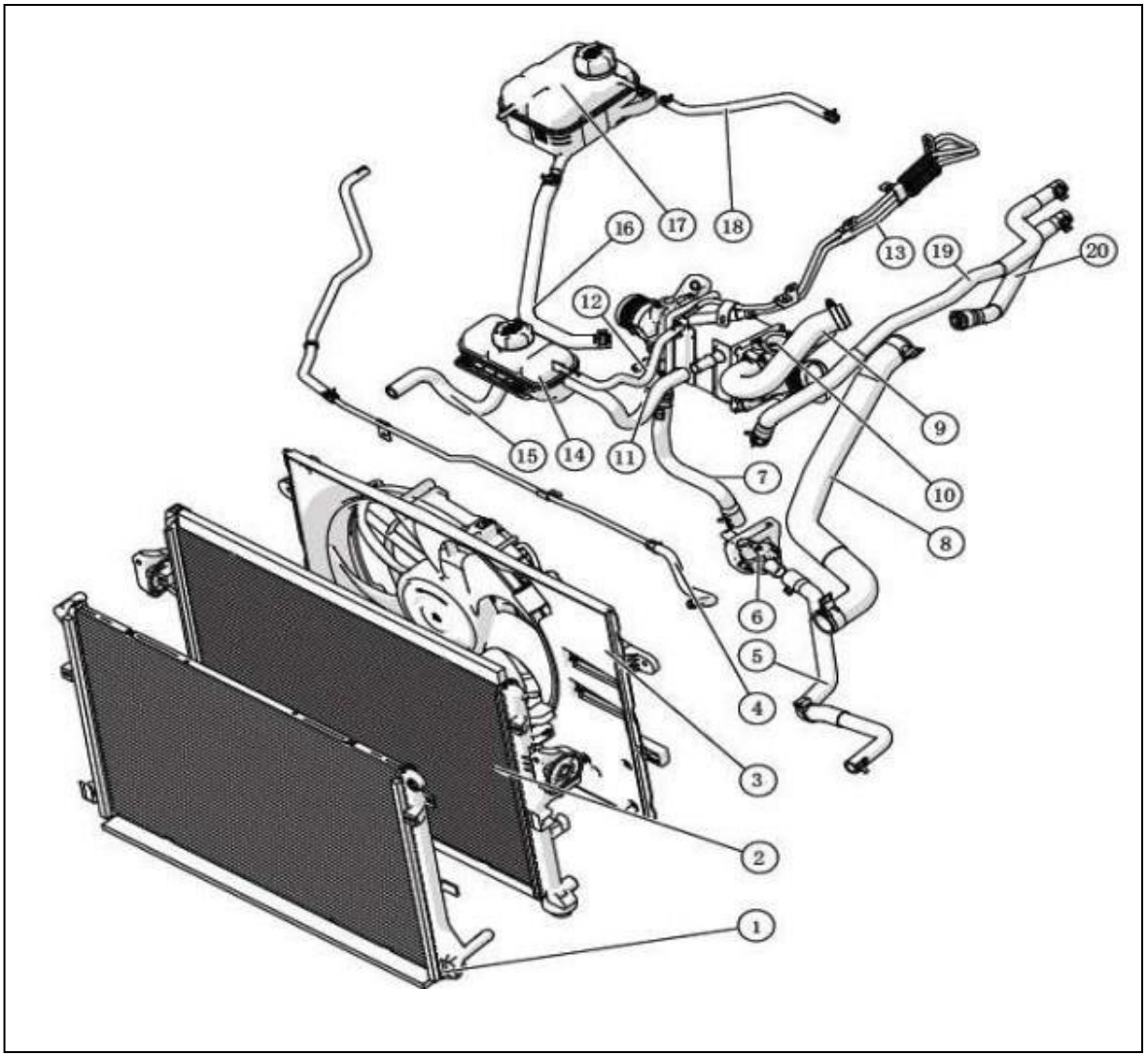
General specifications

Application	Specifications
Coolant type	BASF G30
Cooling type	Water cooling
Engine coolant capacity(Containing water bottle)	6.2±0.1L
Intercooled cryogenic system coolant capacity(Containing water bottle)	2.5±0.1L

Torque specification

Name	Nm
Water pump retaining bolt	40±3
Thermostat assy. II fixing short bolt	10±1
Thermostat assembly retaining bolt	10±1
Electronic auxiliary water pump retaining bolt	10±1

Composition and position distribution



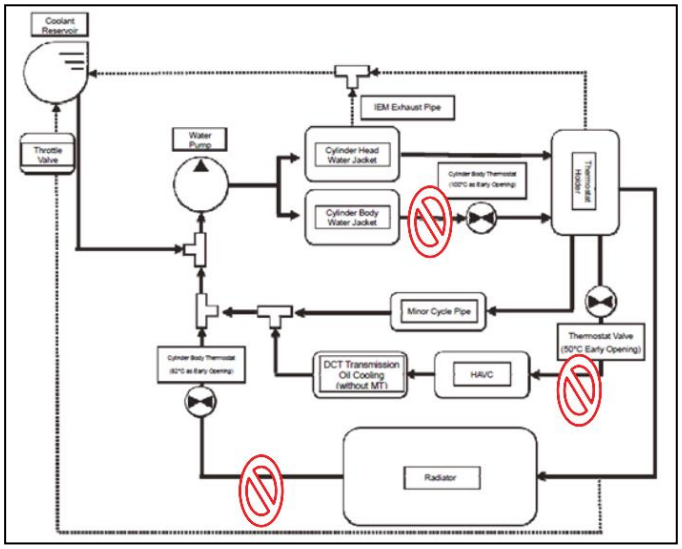
Project	Description	Project	Description
1	Low temperature radiator assy.	2	High temperature radiator assy.
3	Cooling fan assembly	4	Radiator overflow trachea assembly
5	Low-temperature radiator water outlet hose	6	Electronic auxiliary water pump
7	Intercooler water inlet hose	8	Radiator water inlet hose
9	Intake relief valve hose	10	Intercooler assembly
11	Intercooler water outlet hose	12	Supercharger water return hose
13	Supercharger water return pipe	14	Low temperature reservoir assembly
15	Low-temperature radiator water inlet hose	16	Engine water makeup pipe
17	High temperature reservoir assembly	18	Overflow trachea(Reservoir side)
19	HVAC water outlet hose	20	HVAC water inlet hose

System functional principle introduction
System overview

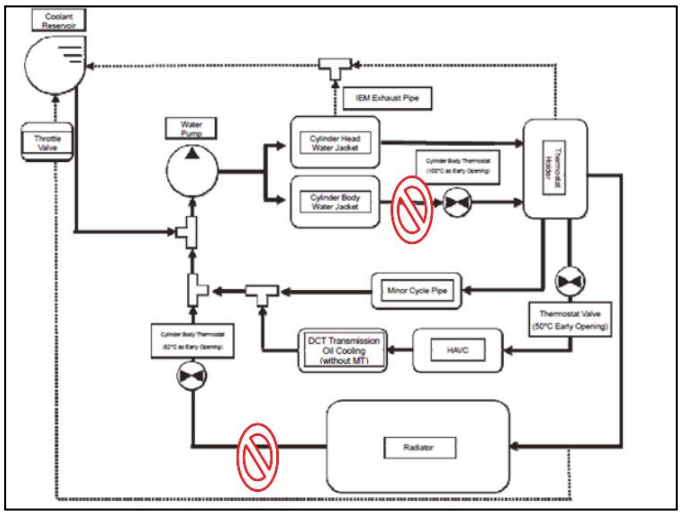
Cooling system includes high-temperature cooling system and low-temperature cooling system: High-temperature cooling system cools engine through high-temperature radiator to prevent engine from overheating; The cryogenic cooling system cools the supercharger and intercooler through the cryogenic radiator to reduce the intake air temperature and supercharger temperature.

High temperature cooling system

High temperature cooling system includes radiator, HVAC, transmission oil cooling, fluid reservoir, hose, water pump, thermostat, temperature control valve, etc. When the engine is cold starting: The engine does not reach the ideal working temperature (generally about 90 ° C), therefore, the coolant temperature shall reach the normal working temperature in a short time as far as possible, and the heat generated by the engine shall be exchanged with the outside as little as possible. At this time, all thermostats and temperature control valves are not opened, so that the coolant only circulates in the engine block, the heat generated around the cylinder head wall surface is brought to other parts of the engine to make the temperature rise rapidly, the water pump circulates the engine coolant in the cylinder block, and then the engine coolant circulates in the engine cylinder head water jacket, small circulation and water pump, which is called "small circulation" (as shown in the figure below).



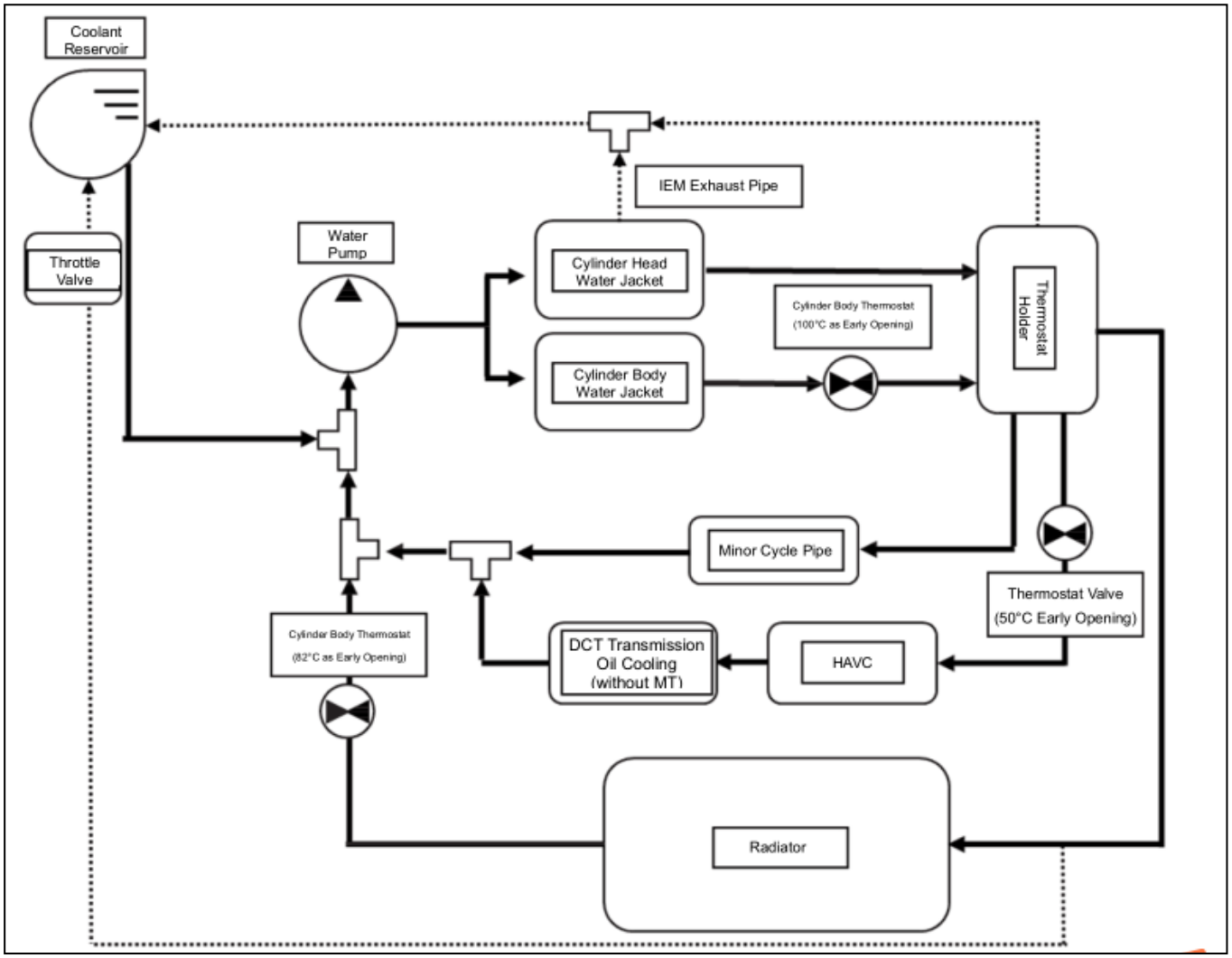
When the outlet water temperature of the engine reaches 50℃, the temperature control valve is opened due to the heating demand of the heating ventilation. At this time, the engine still does not reach the ideal working temperature (generally about 90 C), and the water temperature will continue to rise until the equilibrium temperature of the coolant is reached.



It should be noted that if the engine cannot reach the ideal working temperature for a long time, it will aggravate the wear of the engine, and the combustion of the mixed gas in the combustion chamber is insufficient, and long-term operation will cause serious carbon deposition.

When the antifreeze temperature reaches the target temperature (water inlet 82℃), the cylinder head thermostat at the water inlet is opened, and the engine coolant is pumped by the water pump to the engine cylinder head water jacket, HVAC, radiator, etc., which is called "large circulation"; When the water temperature at the thermostat seat reaches 100 ° C, the cylinder body thermostat starts to open to 110 ° C, and the cylinder body thermostat is fully opened to prevent overheating of the cylinder body and cylinder liner.

Schematic diagram of high temperature cooling system

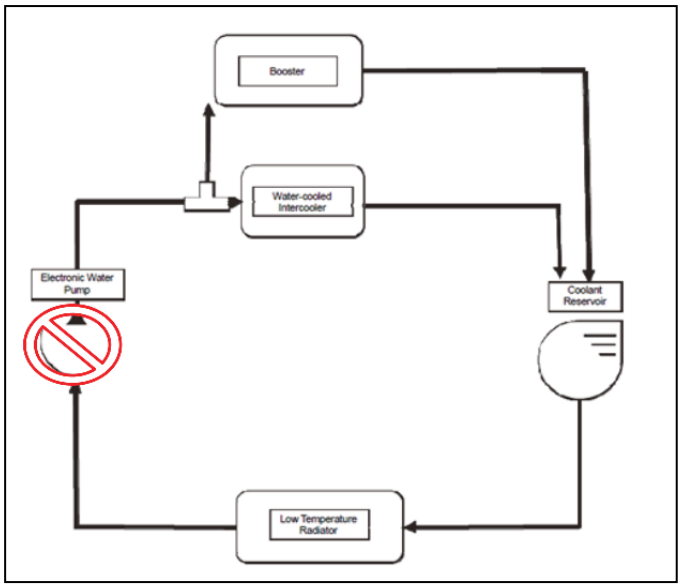


Excessive high water temperature for a long time will result in engine knock, increase fuel consumption, and serious conditions will result in engine cylinder pulling. Therefore, if there is high water temperature alarm on water temperature gauge, please go to 4S shop for inspection. Note: In DCT model, transmission oil cooling is added after HVAC water circuit in cooling system of MT model, which is connected in series in water circuit.

Cryogenic cooling system

The cryogenic cooling system consists of intercooler, electronic auxiliary water pump, cryogenic radiator, supercharger, fluid reservoir and related pipelines. It mainly cools the intercooler to lower the intake air temperature through the pumping action of the electronic auxiliary water pump; Cool the supercharger to lower the supercharger bearing temperature. Its ideal operating temperature is about 45℃, and a slight increase in summer water temperature (about 10-15℃) is normal.

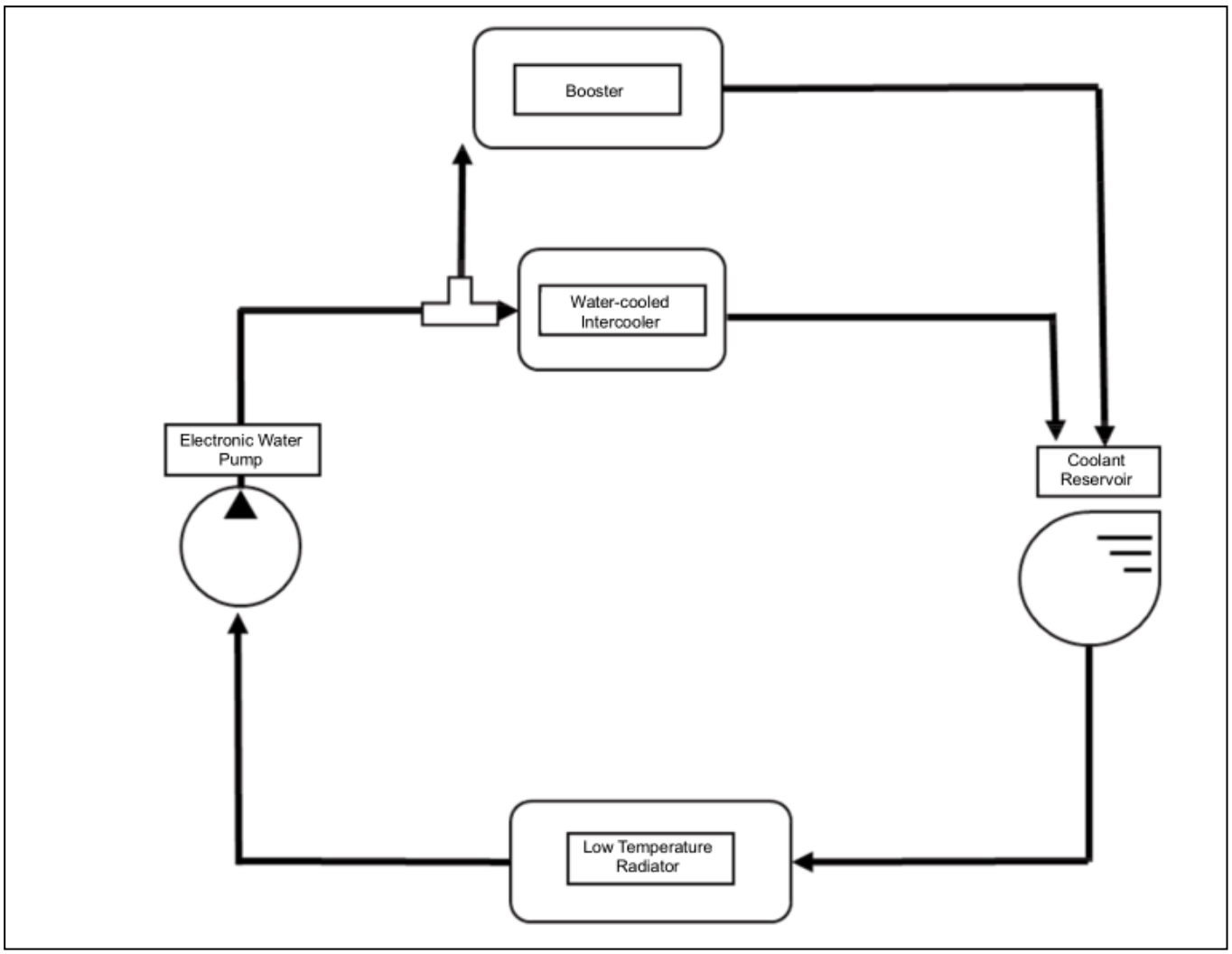
When the engine runs at low ambient temperature (such as winter in northeast region) or low load (such as idle condition), the electronic auxiliary water pump does not start and the coolant does not flow, as shown in the following figure.



When the engine is in medium and high load operation, ECU controls the speed of electronic water pump through throttle intake temperature and duty ratio of engine load control electronic water pump. Then the intake air temperature and supercharger bearing temperature are reduced.

When the engine is stopped, because the supercharger temperature is still high, the electronic water pump will continue to run for a period of time to reduce its temperature.

Schematic diagram of cryogenic cooling system



Function description

High-temperature cooling system: Cool the engine through a high-temperature radiator to prevent the engine from overheating, so that the engine always works in the optimum temperature range.

Cryogenic cooling system: Lower the engine throttle intake temperature through the cryogenic radiator cooling water cooling intercooler.

Structural principle of parts
Check cooling fan assembly

S 203 Project adopts brushless motor fan, PWM duty cycle control and control frequency 50~100 Hz. Four pins are respectively 1# connected to 12 V power supply, 2# connected to ignition wire and 3# connected to PWM.
Signal wire, 4# grounded.

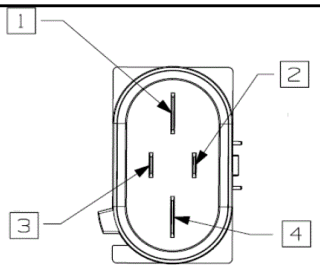


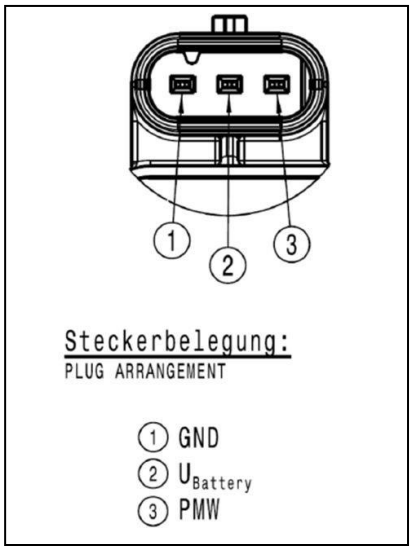
Fig. 10 – Front view

PIN	FUNCTION	PIN NAME
1	Battery Voltage	+12V
2	Ignition	IGN
3	PCM PWM driving signal	CMD
4	Power Ground	GND

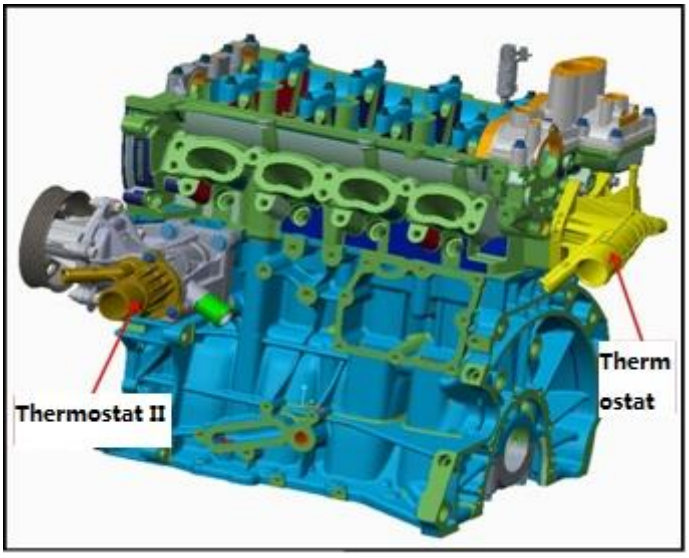
Electronic auxiliary water pump

ST159120

Electronic auxiliary water pump adopts PWM duty cycle control, control frequency 10~110HZ. Three pins are respectively 1# "GND" grounding, 2# "U battery" is connected to 12 V power supply, and 3# "PMW" is signal wire.



Thermostat

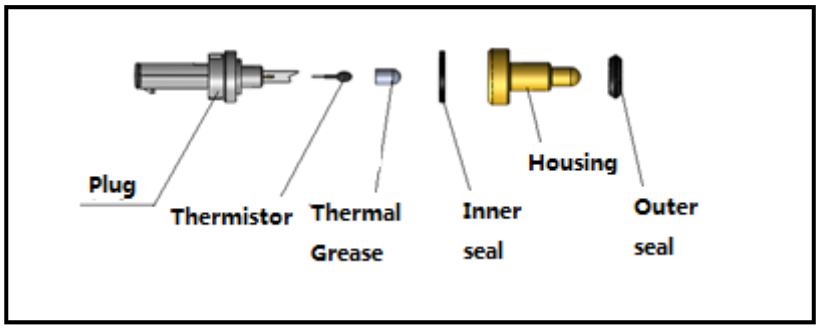


S 203 model adopts double mechanical thermostat, in which the picture thermostat assembly II is the main thermostat, and the initial opening temperature is 82℃, which is used for the cooling system to control whether the large cycle is opened. After-sales phenomena such as high engine water temperature, low engine water temperature (such as fault code P012800 thermostat fault), please check the thermostat assembly II emphatically; In the picture, the thermostat assembly is a secondary thermostat, and the initial opening temperature is 100 ° C, which is used to control whether the engine cylinder block water jacket branch flow is opened or not and whether the HVAC branch flow is opened. If there is no hot air after the engine (engine water temperature is above 65℃), please check and repair the cylinder block thermostat.

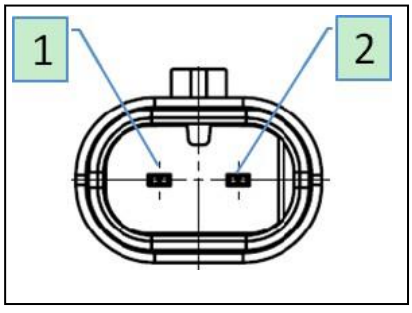
Coolant temperature sensor

Function: Water temperature sensor is used to monitor engine coolant temperature and provide coolant temperature information for engine ECU, so as to realize more accurate engine working. Working principle: The temperature sensing element of water temperature sensor is a negative temperature coefficient temperature sensor. The higher the temperature, the lower the resistance.

Product structure - single structure



Interface definition: Where 1 and 2 can be interchanged



Water temperature sensor R-T characteristics

t(℃)	Rmin.(kΩ)	Rmax.(kΩ)
-40	40.66	47.57
-30	23.27	26.90
-20	13.82	15.79
-10	8.477	9.584
0	5.358	6.000
10	3.480	3.862
20	2.318	2.550
30	1.579	1.724
40	1.099	1.191
50	0.7796	0.8390
60	0.5631	0.6021
70	0.4135	0.4394
80	0.3084	0.3258
90	0.2333	0.2452
100	0.1789	0.1870
110	0.1389	0.1445
120	0.1086	0.1135
130	0.0859	0.0902

Common methods

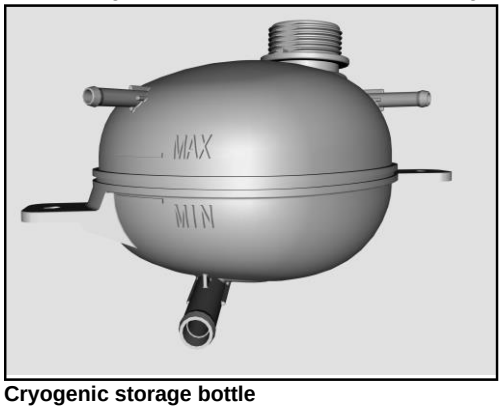
Reservoir cap inspection

1 Clean the reservoir cap and sealing section.
2 Check sealing rubber of reservoir cap for damage or rollover. If the reservoir cap does not meet the requirements, replace it.

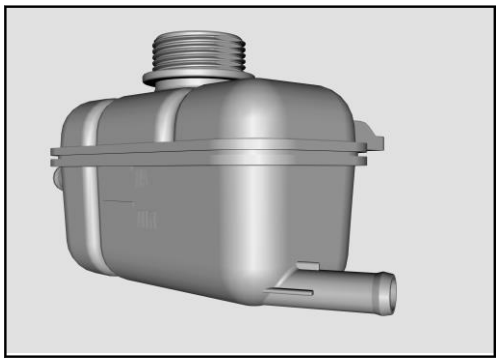
Coolant level check

⚠Warning⚠ Warning⚠ Warning

When the engine is cooled, check the reservoir coolant level. The normal coolant level shall be between the water storage bottles "MAX" and "MIN" marks. High temperature storage bottle



Cryogenic storage bottle



Coolant leakage check

1. Check the engine coolant level.

2. Install the tester to the filler of the reservoir.

3.Apply pressure with tester to make the pressure reach 160 kPa.

4. Observe the tester pressure change, pipeline joints and radiator core for leakage of antifreeze.

Standard: When the pressure reaches 160kPa, maintain the pressure for 2 minutes, and the pressure does not change, and the pipeline joints and radiator core are free of water leakage. If the pressure indicated by the pressure gauge pointer decreases, this may indicate water leakage. Repair or replace the corresponding parts.

Warning Make sure that the internal pressure of the radiating water tank does not exceed 200kpa in the cold machine state during inspection, otherwise it may cause damage.

Coolant level drain fill

⚠Warning

1. After the engine cools down, dismantle the reservoir cap. While pressing down, slowly rotate the water storage bottle cap in the counterclockwise direction to the first blocking position, slowly release the water storage bottle cap, and remove the water storage bottle cap after the pressure is released.

2. After the reservoir cap is opened, remove the radiator hose and drain the coolant in the system.

3. Assemble radiator hose. Fill the system with water and run the engine until the upper radiator hose is hot and hard.

4. Repeat steps 1, 2 and 3 until the liquid discharged in the system is close to colorless.

5. Remove the water storage bottle, remove the water storage bottle, pour out the liquid, clean the inside of the water storage bottle with soapy water, rinse thoroughly with clean water, drain, and install the water storage bottle and hose.

6. Fill the reservoir with coolant until "MAX" line

7. When the vehicle is idling, pay attention to the change of coolant level in the storage bottle during the process. After the liquid level drops, replenish the coolant at any time. Tighten the accumulator cap, run the engine from 2500 rpm to 3000 rpm to the fan, then return to idle speed for 1 min, and the vehicle stops. After the engine is cooled, check whether the coolant level drops. If so, repeat the above process several times until the coolant level in the storage bottle no longer drops.

Fault symptom diagnosis check and confirmation

1 Confirm the customer's problem.
2 Visually inspect for visible signs of mechanical or electrical damage.
3 If the observed or raised problem is obvious and the cause has been found, the cause must be corrected before proceeding to the next step.
4 If the visual inspection is passed, confirm the fault and refer to the fault symptom table.

Appearance check list

Mechanical	Electrical
Coolant leakage	Fuse
Gasket or seal	Harness
Hose or hose plug	Electrical plug connection
Reservoir pressure cap and seal	Engine coolant temperature (ETC) sensor
Water storage bottle	Electronic fan
Radiator	Engine control unit ECM
Water pump	/
Thermostat housing	/
Heater tank	/
Accessory drive belt	/

Fault symptom table

If the fault occurs but no DTCs are stored in the ECM and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Coolant loss	Hose or hose joint	Check whether the hose is aged and whether the hose joint leaks.
	Radiator	Check radiator for leaks
	Water pump	Check the water pump for leaks. Install a new set of water pump assembly and gasket as required
	Thermostat assembly	Check the thermostat for leaks. Install a new set of thermostat assembly as required
	Reservoir cap	Check that the reservoir cap is always locked and damaged. Install a new set of reservoir caps as required.
	Water storage bottle	Inspect the water storage bottle for damage. Install a new set of water storage bottles as required.
	Heater core	Check the heater tank for leaks.
	Engine	Inspect the engine, cylinder head, cylinder block and cylinder gasket.

Symptoms	Possible causes	Measures
Engine overheating(Traces of coolant boiling)	Cooling system cannot maintain pressure	• Inspect the water storage bottle for damage. Install a new set of water storage bottles as required. • Inspect the water pump or water pump gasket for damage. Install a new set of water pumps or water pump gaskets as required. • Inspect the engine, cylinder head, cylinder block and cylinder gasket.
	Air in system	Cooling system air is released.
	Reservoir cap	Inspect the reservoir cap for locking and damage. Install a new set of reservoir caps as required.
	Water storage bottle	Inspect the reservoir for damage. Install a new set of water storage bottles as required.
	Coolant level or condition	• Check coolant level. Re-add cooling system as required. Coolant level drain fill • Check coolant condition. If the coolant condition is poor, release and refill with new coolant.
	Coolant contamination	Replacing coolant
	Water tank grille	Inspect the water tank grille for air blockage or damage. Repair or install new parts as required.
	Water pump	Check whether the water pump leaks or fails.Install a new set of water pumps or water pump gaskets as required. Water pump
	Thermostat	Check the thermostat for failure. Install a new set of thermostat assembly as required Thermostat
	Accessory drive belt	Check the condition of the accessory drive belt.
	Engine	Inspect the engine, cylinder head, cylinder block and cylinder gasket.
	Electronic fan	Check whether the electronic fan can operate normally cooling fan assembly
Symptoms	**Possible causes**	**Measures**
Engine cannot reach normal working temperature	Thermostat	Perform the thermostat test kit test in the cooling system. Install a new set of thermostat housing and thermostat housing gaskets as required.
	Electronic fan	Check whether the electronic fan can operate normally. Cooling fan assembly
Turn on A/C fan with great jitter and noise	A/C pressure high	Detect A/C pressure. If the high pressure exceeds 1.52 MPa, the cooling fan is running at high speed. Compared with cooling fan running at low speed, excessive jitter and noise are normal.
	The cooling fan is attached with mud.	If mud is attached to the fan blades, clean the scattered blades.
	Balance weight on cooling fan blade falls off	If the balance weight is found to fall off, replace the cooling fan.

Lack of coolant

1.Install the tester to the filling port of the water storage bottle, apply pressure with the tester to make the pressure reach 160 kPa, and observe the tester pressure change, whether the pipeline joints and radiator core leaks antifreeze.

High water temperature

1. Antifreeze leakage. High water temperature

2. Cooling fan fault, resulting in high water temperature

3. Engine fault causes high water temperature.

Fan locked

1.Connect the diagnostic scanner, press the ignition switch, and read the fault code. If the P0483-71 fault code appears, it means the cooling fan is blocked.

2.After clearing the P0483 fault code, perform the active test with the diagnostic scanner. If the fan works normally, the fan function is restored to normal and no treatment is taken. If the fan does not operate properly, replace it with a new cooling fan.

Note: The brushless fan controller has the function of blocking rotation protection. When motor blocking rotation is detected, the system will make the first interval 5s, the second interval 18 S and the third interval 33 S, and then try to start every 60 S until the start is successful. If the fault is detected for the first time and the fault still exists after 320S, the fault code will be sent continuously until the fault code is stopped after successful start-up attempt.

Cooling fan fault

Fault type	General equipment	Maintenance mode
Fan locked	Diagnostic scanner	1.Connect the diagnostic scanner, press the ignition switch, and read the fault code. If the P0483-71 fault code appears, it means the cooling fan is blocked. 2. After clearing the fault code, perform the active test with the diagnostic scanner. If the fan works normally, the fan function is restored to normal and no treatment is taken. 3. If the fan cannot operate normally, replace it with a new cooling fan.
Fan overcurrent	Diagnostic scanner	1.Connect the diagnostic scanner, press the ignition switch and read the fault code. If the P0483-72 fault code appears, it means that the cooling fan has overcurrent fault. 2. After clearing the fault code, perform the active test with the diagnostic scanner. If the fan operates normally, the fan function is restored to normal and no treatment is taken. 3. If the fan cannot operate normally, check whether the fan fuse is normal. If the fuse is normal, replace the cooling fan. If the fuse is abnormal, change the fuse.
Fan internal electronic fault	Diagnostic scanner	1.Connect the diagnostic scanner, press the ignition switch and read the fault code. If the P0483-73 fault code appears, it indicates that the cooling fan has internal fault. 2. After clearing the fault code, perform the active test with the diagnostic scanner. If the fan works normally, the fan function is restored to normal and no treatment is taken. 3. If the fan cannot operate normally, replace it with a new cooling fan.
Fan overheating	Diagnostic scanner	1.Connect the diagnostic scanner, press the ignition switch and read the fault code. If the P0483-74 fault code appears, it means the cooling fan has overheat protection. 2. After clearing the fault code, perform the active test with the diagnostic scanner. If the fan works normally, the fan function is restored to normal and no treatment is taken. 3. If the fan cannot operate normally, replace it with a new cooling fan.
Other	Diagnostic scanner	Check whether the harness connector is damaged; Check whether the harness pin is abnormal; Check the circuit connection and disconnection;

The cooling fan adopts brushless motor, controlled by PWM signal, and the motor has diagnostic function.

Blocked rotation protection: When a blocked rotation is detected and the fan stops running, the system will attempt to start every 30 S until the start is successful. If the fault is detected for the first time and such fault still exists after 90 S, the fault code will be sent continuously until the fault code is stopped after successful start-up attempt.

Fan overcurrent: When overcurrent is detected and the fan stops running, the system will attempt to start every 30 S until the attempt is successful. If the fault is detected for the first time and the fault still exists after 90 S, the fault code will be sent continuously until the fault code is stopped after successful start-up attempt.

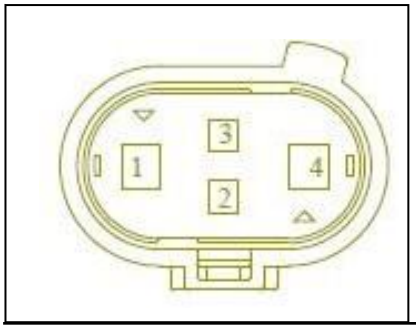
Fan internal electronic fault: When the internal electronic fault is detected, the fan stops running, and the system will attempt to start every 30 S until the attempt is successful. If the fault is detected for the first time and such fault still exists after 90 S, the fault code will be sent continuously until the fault code is stopped after successful start-up attempt.

Overheat protection: When the internal temperature of the motor reaches 140 ° C, the fan stops running; When the temperature drops below 125 ° C, the fan returns to normal operation.

Cooling fan does not rotate

Test conditions	Details/Results/Measures
1. Check fault code	A. Connect the diagnostic scanner and press the ignition switch. B. diagnose engine system.Is there any cooling system fault code? ? Yes Reference: Cooling fan faulty? No to step 2.
2. Check fuse	A. Check the status of cooling fan fuse. Is the fuse normal? ? Yes to step 3. ? No Inspect and repair the fuse circuit and replace the fuse.
3. Inspect the cooling fan main relay power supply circuit.	A. Switch to off gear.B. Use multimeter to check whether the voltage of No.2 hole of cooling fan connector is 0V.C. Switch to ON gear.D. Use a multimeter to check whether the voltage of hole 2 of cooling fan connector is equivalent to that of battery.Is the voltage normal? ? Yes to step 4. ? No Repair and check the main relay circuit.
4. Check main power circuit of cooling fan	A. Switch to off gear.B. Use multimeter to check whether the voltage of No.1 hole of cooling fan connector is equivalent to that of battery. Is the voltage normal? ? Yes to step 5. ? No Repair and check the fan main power circuit.
5. Check cooling fan grounding	A. Remove the battery negative electrode.B. Use a multimeter to drive the resistance from hole No.4 of cooling fan connector to the pile head of battery sensor.Is the standard resistance ≤ 5Ω normal? ? Yes to step 6. ? No Check whether the cooling fan grounding is secure and check the grounding harness circuit.
6. Check cooling fan control terminal circuit	A. Remove the battery negative electrode.B. Use multimeter to drive resistance from No.3 hole of cooling fan connector to No.3 hole of ECU 4.Is the standard resistance ≤ 5Ω normal? ? Yes Replace cooling fan motor.Confirm system is normal? No

Cooling fan connector



Cooling fan normally rotates

Water temperature sensor fault will cause the maximum duty cycle of cooling fan to rotate for a long time.

Thermostat test

1. Check whether the air exhaust valve of thermostat is clean. If the valve is blocked, the engine will overheat.

2. Check the valve seat for foreign matter, and the valve seat shall be free of foreign matter; otherwise, the valve will not be installed tightly.

3. Inspect the thermostat seal for broken, deformed or other damage.

4. Check the constant temperature action of wax ball as follows:

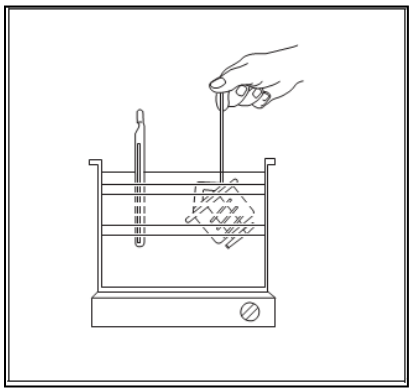
- Remove

  thermostat.

  Thermostat

  - Immerse the thermostat in heated water.
  - Place thermometer in water.
  - Heat the water, observe the thermostat, and check whether the temperature when the valve starts to open is the specified temperature.

    Thermostat assembly II: Initial opening temperature 82℃, full opening temperature 95℃; Thermostat assembly: The initial opening temperature is 100 ° C, which avoids misjudgment, and it is not recommended to test the product.
  - If the temperature at which the valve starts to open is significantly lower or higher than the specified temperature, replace it with a new thermostat. Using a thermostat that has not met the specified temperature will cause a tendency to overcool or overheat.



Removing and installing cooling fan assembly

Removal

1.Disconnect the battery negative harness with 10mmT sleeve.

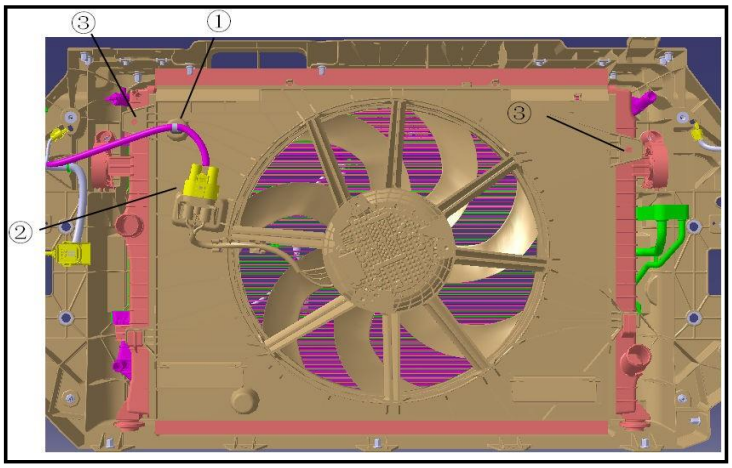
2.Remove the air filter body and inlet trachea canister stop valve air filter.

3. Disconnect the cooling fan connector, and take out the fixing point of the harness on the fan.

4.Remove retaining bolts (3) of cooling fan on radiator with 10 mm

sleeve, one on the left and one on the right, and dismantle torque:

6N.m



Installation

Installation sequence is reverse to removal sequence

Water pump

Caution Do not dismantle the engine

Unable to disassemble water pump assembly

If the water pump requires any repair, replace the assembly and replace the water pump gasket. Removal

1. Disconnect the negative battery harness.Battery assembly

2. Loosening radiator drain plug Draining cooling system

3. Remove front wheel train belt and radiator hose. Front end gear train

4. Remove the throttle valve assembly. Electronic throttle body

5. Remove the water pump M10 retaining bolts. Removal tool: M10Torque wrench, torque: 40 Nm

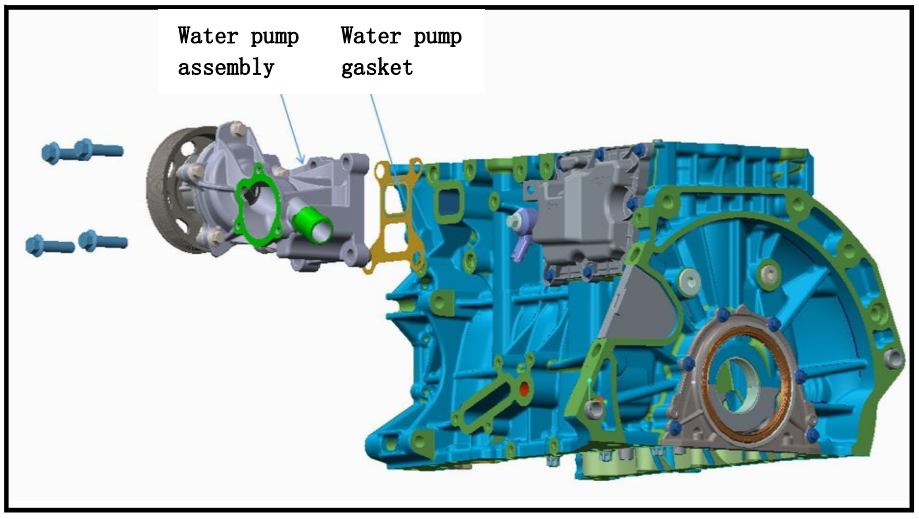


Figure 4:

1. Remove the water pump assembly. Check the sealing gasket of thermostat assembly II for damage. If damage is found, the sealing

gasket must be checked. If damage is found, the sealing gasket of water pump must be replaced.

2. Check whether each hose is broken or damaged. If necessary, please replace and turn the water pump by hand for flexible operation. If the water pump does not rotate flexibly or there is noise, replace it.

3. Turn the water pump by hand for flexible operation. If the water pump does not rotate flexibly or there is noise, it is necessary to replace and check whether the impeller of the water pump is damaged. It needs to be replaced in time.

4. Check whether the impeller of water pump is damaged. If necessary,

clean the joint surface of engine cylinder block and water pump in time.

Installation

1. Install a new water pump gasket (the water pump gasket is a disposable part, new parts are required for each disassembly and assembly) Install a new water pump gasket.

2. The installation sequence is the reverse of the removal sequence.

3. Refill coolant.

4. Start the engine and check the cooling system for leakage.

Electronic auxiliary water pump

Removal

1. Disconnect battery negative harness battery assembly

2. Lift the vehicle and remove the fender.

3. Unscrew the low-temperature radiator drain valve and drain the low-temperature system coolant.

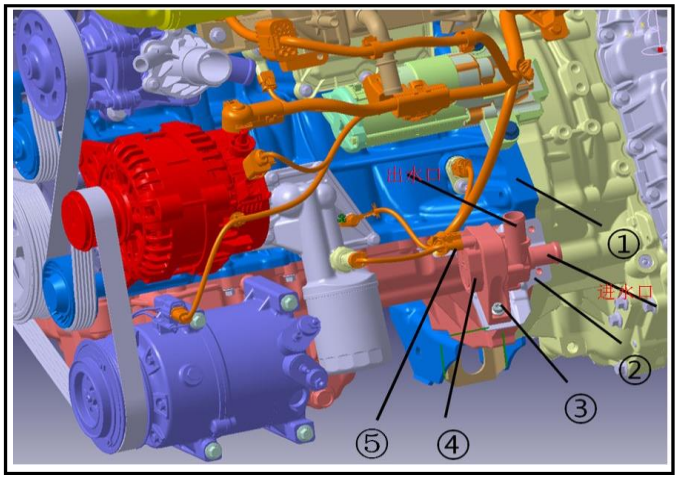
4. Dismantle connector of electronic auxiliary water pump

5. Remove the hose connected to the water inlet and water outlet of the electronic auxiliary water pump, and remove the tool clamp.

6.Remove mounting bolt 3 of electronic auxiliary water pump,

removal tool M6 socket + torque wrench Removal torque: 10

NM



Installation

1. The installation sequence is opposite to the removal sequence.

2. Refill coolant

3. Start the engine and check the cooling system for leakage.

Thermostat

1. Removal

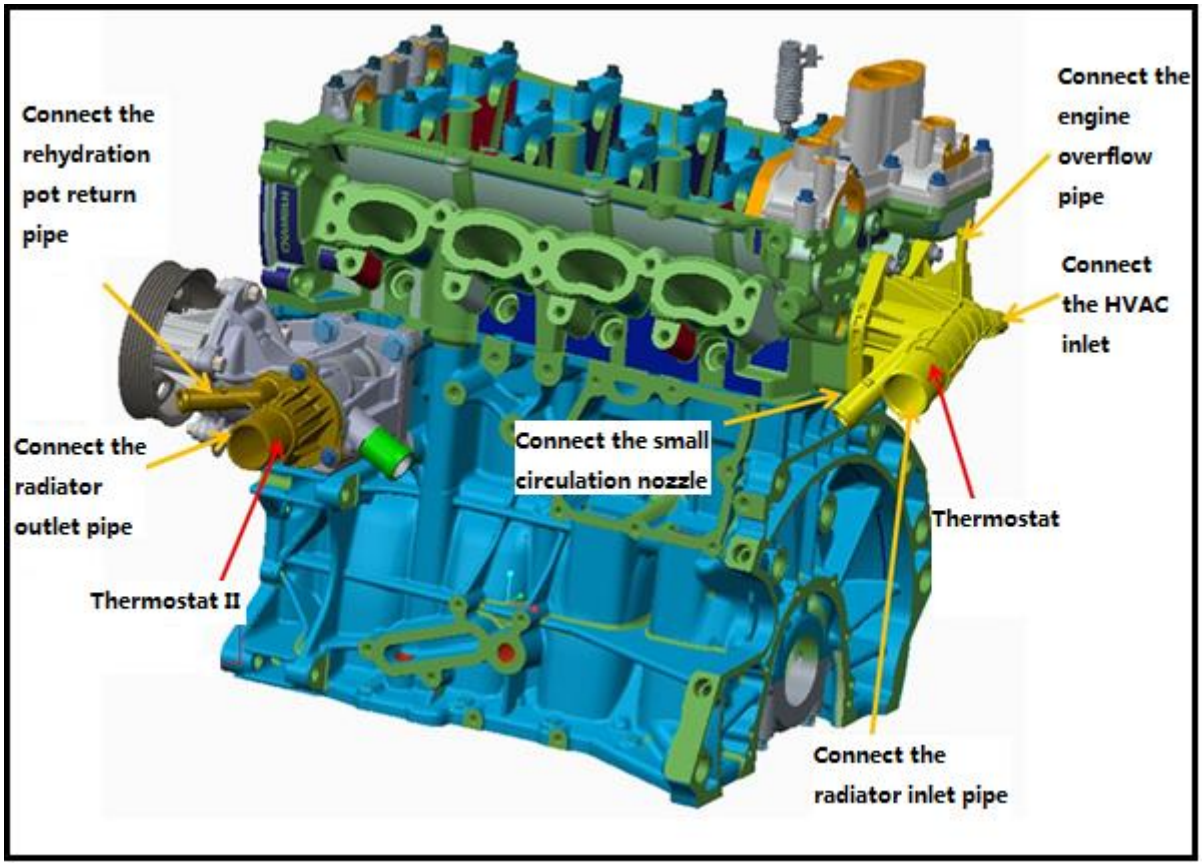
1	Remove battery negative wire battery assembly
2	Lifting the vehicle
3	Drain coolant and tighten draining and filling of draining race coolant
4	Lower the vehicle
5	Dismantle water outlet hose of radiator of thermostat assembly II, and use tool clamp.
6	Dismantle the hose of the water return port of the upper fluid reservoir of thermostat assembly II, and use a tool clamp.
7	Remove the water inlet hose on the thermostat assembly and use a tool clamp.

8 Dismantle engine overflow trachea interface hose on thermostat assembly, and use tool clamp.

9 Remove the small circulation interface hose on the thermostat assembly, and use tool clamp.

10 Remove thermostat assembly from cylinder head using tool M6 hexagon socket + torque wrench

11 Remove thermostat assembly II from water pump, use tool M6 socket + torque wrench



2. Check

1 Check whether the air exhaust valve of thermostat assembly II is clean. If the valve is blocked, the engine will overheat.

2 Check whether the valve seat has foreign matter. The valve seat should be free of foreign matter. Otherwise, the valve will not be installed tightly.

3 Inspect the thermostat assembly, thermostat assembly II seal for fracture, deformation or other damage.

4 Check whether each hose is broken or damaged, and replace if necessary.

5 Check the constant temperature action of wax ball as follows: A. Submerge the thermostat assembly and thermostat assembly II into water, and gradually heat the water; B Check whether the temperature when the valve starts to open is the specified temperature; C If the temperature when the thermostat valve starts to open is significantly higher or lower than the specified temperature, replace it with a new thermostat. Use of a thermostat that does not meet the specified temperature will cause overheating or overcooling.

3. Installation

1 Install thermostat assembly II onto water pump assembly

2 Install thermostat assembly to cylinder head

3 Connect all hose

4 Cooling system filling coolant

5 Connect battery negative wire

6 Inspect all parts for leakage after installation.

Coolant temperature sensor

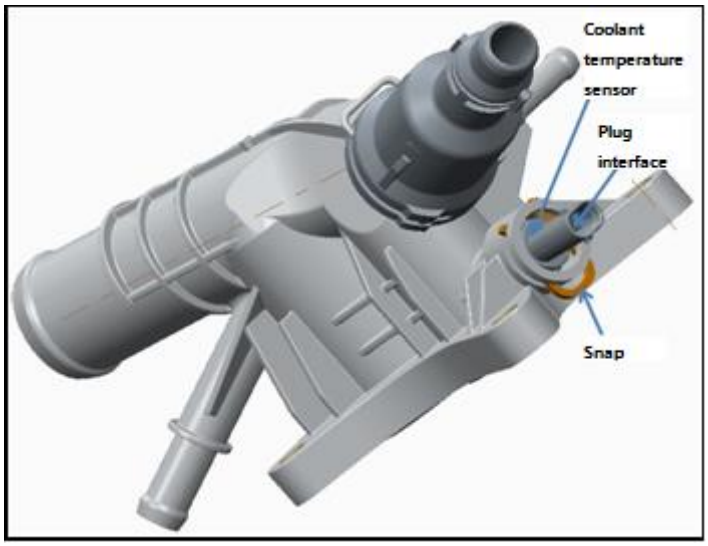
Removal

1 Vehicle power off

2 Remove thermostat assembly thermostat

3 Disconnect water temperature sensor connector

4 Remove the buckle, remove the water temperature sensor, and use a tool to lift it up



Installation

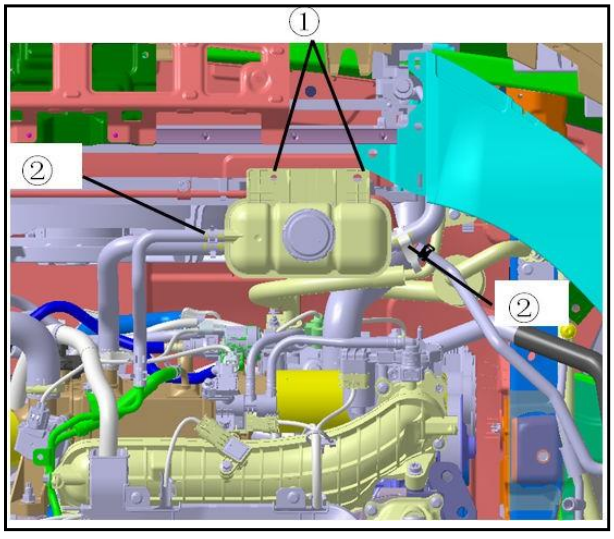
1 Install the water temperature sensor on the thermostat base, and install the clips.

2 Connect water temperature sensor with harness end

Cryogenic storage bottle

Removal

1. Disconnect the battery negative harness with a 10 mm sleeve.
2. Lift the vehicle.
3. Loosen the low-temperature radiator drain valve, drain the low-temperature radiator system coolant coolant drain and fill.
4. Put down the vehicle.
5. Use clamp pliers to loosen fixing clamp (2) connecting cooling pipeline with low-temperature storage bottle.
6. Dismantle mounting bolts of 2 low-temperature water storage bottles with 10 mm sleeve
7. Take out removal torque of low-temperature storage bottle: 6N.m



Installation

1. The installation sequence is opposite to the removal sequence.
2. Refill coolant Draining and refilling
3. Start the engine and check the cryogenic cooling system for coolant leakage.

High temperature storage bottle

Removal

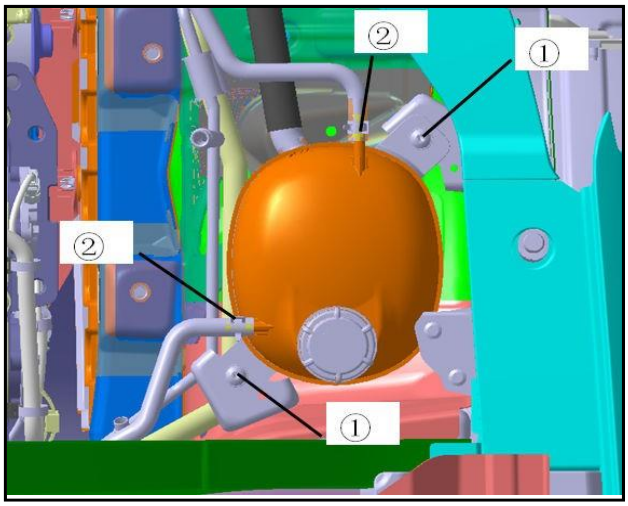
1. Disconnect the battery negative electrode with a 10 mm sleeve.
2. Lift the vehicle.
3. Loosen the high-temperature radiator drain valve and drain the coolant of the high-temperature radiator system.

4. Put down the vehicle.

5. Use clamp pliers to loosen fixing clamp (2) connecting cooling pipeline with high-temperature storage bottle.

6. Dismantle mounting bolts of 2 high-temperature water storage bottles with 10 mm sleeve

7.Take out removal torque of high-temperature storage bottle: 6N.m



Installation

1. The installation sequence is opposite to the removal sequence.

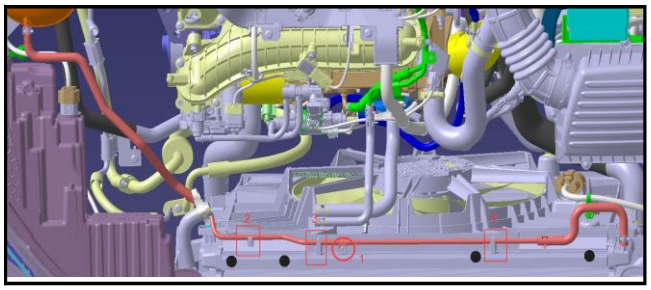
2. Refill coolant Draining and refilling

3. Start the engine and check the high-temperature cooling system for leakage of coolant.

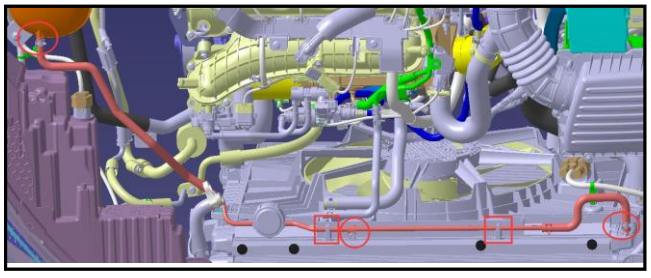
Overflow trachea

Removal

1. Use a torx screwdriver to remove one bracket fixing screw on the fan in the following figure, and take out the metal pipe from the clamping point at 2.3.4 of the fan in the following figure.



2. Use fishtail pliers to clamp the two elastic clamps at the connector of radiator and water storage bottle in the following figure away from the connector, pull out the hose from the connector, and take out the overflow trachea assembly.



Installation

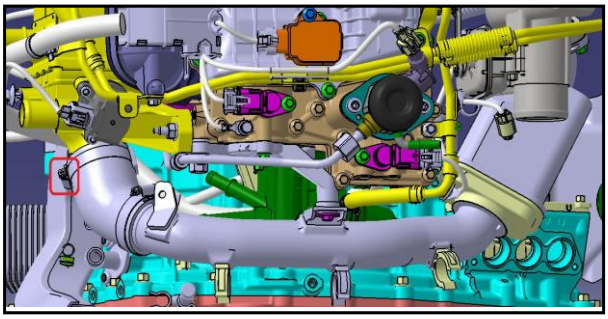
1. Clamp the overflow trachea assembly into the corresponding clamping points of the fan, and drive the retaining screws with a torque gun, torque 1.5±0.5N.

2. Use fishtail pliers to assemble one elastic clamp on the hose at both ends of overflow trachea, insert the hose into the connector of radiator and water storage bottle, and clamp the clamp into the "earth" mark two horizontal lines of the hose connector.

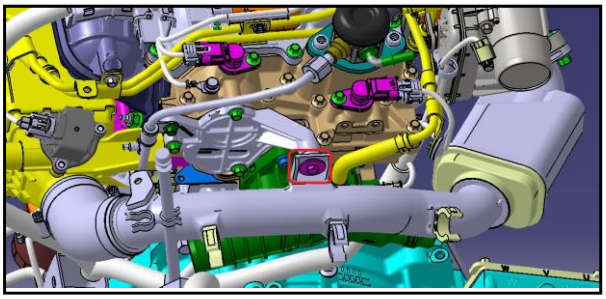
Intercooler connecting pipe

Removal

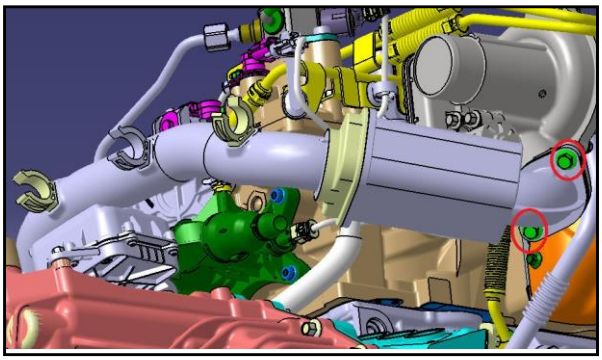
1 Loosen the worm clamp at the connection between the hose and the intercooler interface with a sleeve or screwdriver;



2 Loosen and remove the bolts on the bracket fixed on the vacuum tube or end cap with sleeve;

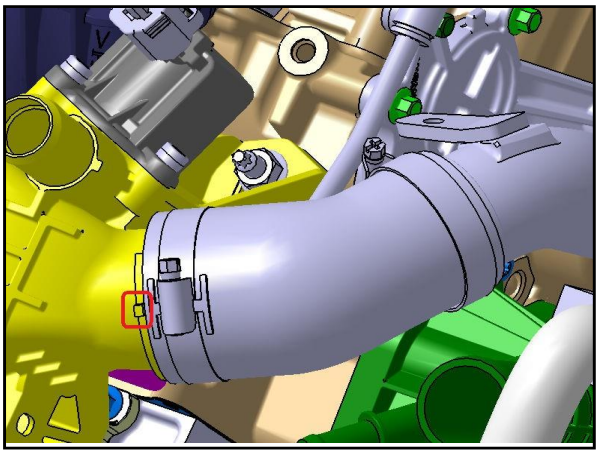


3 Loosen and remove the 2 bolts connected with the supercharger compressor outlet flange with sleeve, and then remove the whole intercooled pipe assembly.

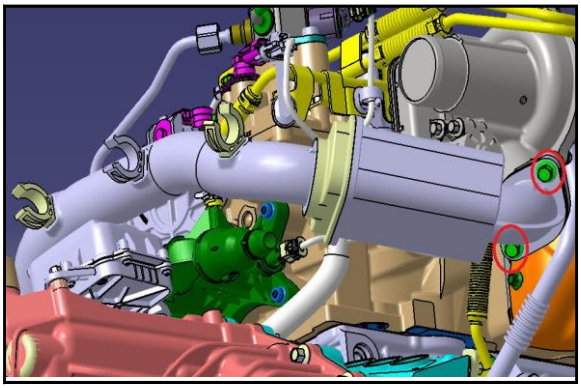


Installation

1 Assemble the hose to the intercooler connector, align the hose I-shaped mark with the intercooler upper boss, and do not tighten the worm clamp.

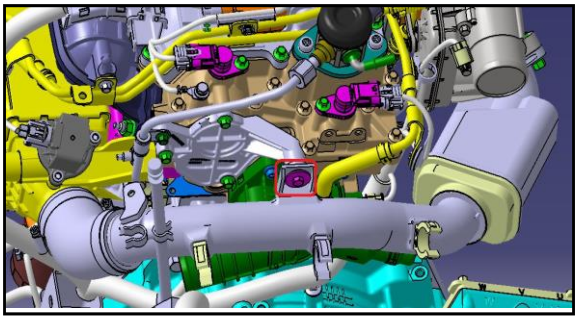


2 2 bolts at the outlet flange of pre-turbocharger compressor, not tightened

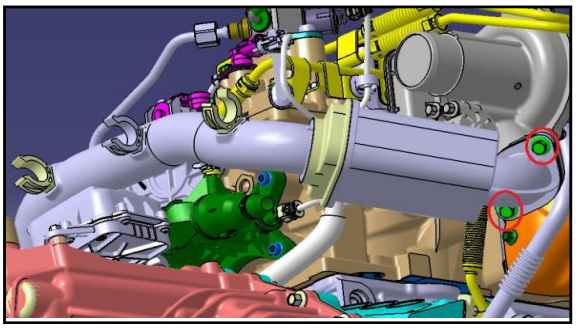


3 Do not tighten the fixing bolts on the vacuum pump or end cover at the intermediate bracket;

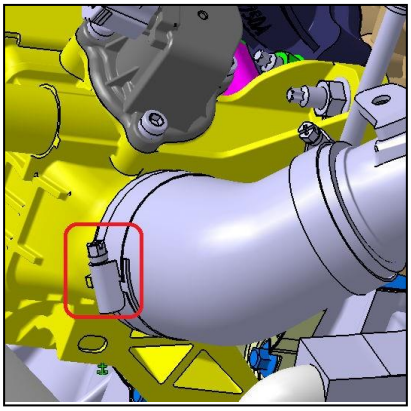
4 Check whether the intercooler end hose is displaced and assemble it to the limit guard, and do not tighten the worm clamp;



5 Tighten the two bolts of the supercharger compressor outlet with a torque gun, torque 23±2N.m



6 Tighten the worm clamp on the rubber hose at the intercooler joint with a torque gun, with a torque of 6±1N.m;



7 Tighten the bolts at the intermediate fixing bracket with a torque gun, with a torque of 10±1N.m.

HVAC inlet/outlet pipe

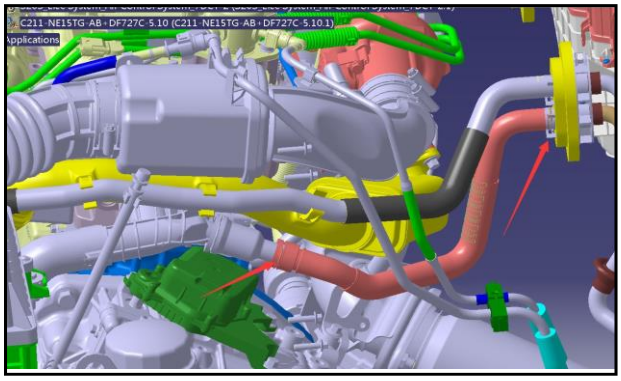
Removal

I. HVAC water inlet pipe assembly:

1. Clamp the clamp on the HVAC core end off the coupling using a fishtail pliers

2. Pull off wire spring of quick-plug connector at thermostat end using

3. Remove the HVAC water inlet pipe assembly from the joints at both ends.

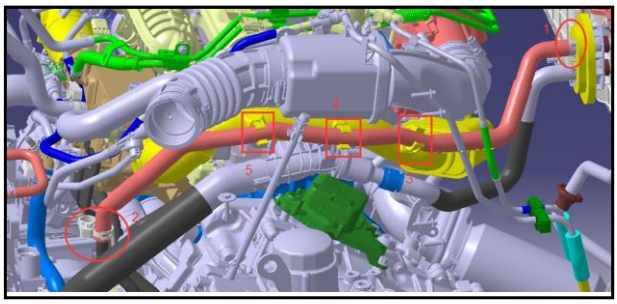


I. HVAC water outlet pipe assembly

1. Use fishtail pliers to clamp the clamps at both ends of HVAC core and water inlet pipe assembly away from the pipe joint.

2. Take out the three clamping points on trachea from the water outlet pipe of the warm palace

3. Pull out pipe connectors at both ends and take out water pipe



Assembly

I. HVAC water inlet pipe assembly:

1. Use fishtail pliers to assemble 1 elastic clamp at the end of rubber pipe "earth" mark.

2. Connect the rubber hose "earth" mark end to the HVAC core end, the "earth" mark is facing upward, and install the clamp in the middle of the two horizontal lines of "earth" mark.

3. Insert the quick-plug connector into the corresponding connector of

thermostat and hear "click" sound, that is, assemble to position 2 and

HVAC water outlet pipe assembly.

1. Use fishtail pliers to assemble 1 elastic clamp at both ends of hose

2. Connect the rubber hose yellow "soil" mark end to the HVAC core end, the "soil" mark end faces upward, insert the white "soil" mark end into the inlet pipe assembly II end, the "soil" mark is facing forward, and install the clamps at both ends to the middle of the "soil" mark two horizontal lines.

3. Clamp the middle part of water pipe onto the three pipe clips on trachea

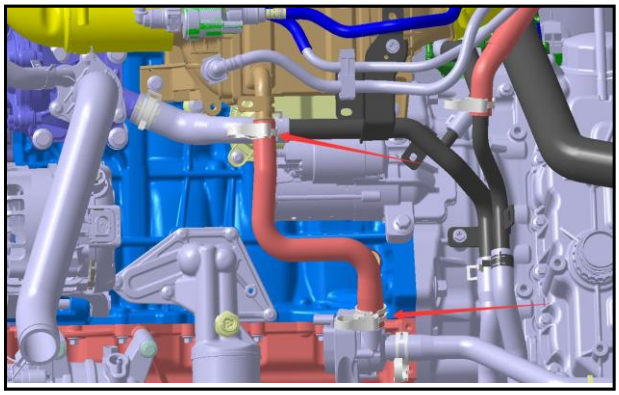
Intercooler inlet/outlet pipe

Removal

I. Water inlet pipe of water-cooled intercooler

1. Use fishtail pliers to clamp the clamps at both ends of the charge air cooler and the electronic water pump kettle away from the pipe joint.

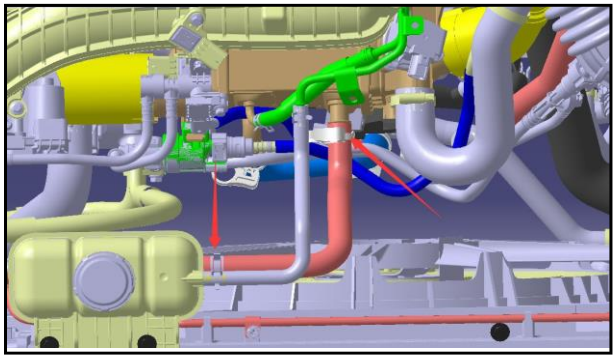
2. Pull out pipe connectors at both ends and take out water pipe



II. Water cooler water outlet pipe assembly

1.Use fishtail pliers to clamp the clamps at both ends of the charge air cooler and kettle pump out of the pipe joint.

2.Pull out pipe connectors at both ends and take out water pipe



Assembly

I. Water inlet pipe of water-cooled intercooler

1.Use fishtail pliers to assemble 1 elastic clamp at both ends of hose

2.Insert the yellow "soil" label end of the hose into the water pot end of the electronic water pump, and the "soil" label end faces front; insert the white "soil" label end into the intercooler end, and the "soil" label end faces front; install the clamps at both ends into the middle of the two horizontal lines of the "soil" label.

II. Water cooler water outlet pipe assembly

1.Use fishtail pliers to assemble 1 elastic clamp at both ends of hose

2.Insert the yellow "earth" mark end of the hose into the pump end of the kettle with the "earth" mark facing upward, insert the white "earth" mark end into the intercooler end with the "earth" mark facing upward, and install the clamps at both ends into the middle of the two horizontal lines of the "earth" mark.

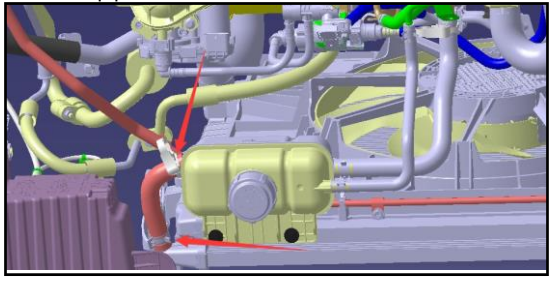
Low temperature system radiator upper and lower water pipes

Removal

I. Low temperature radiator water inlet pipe

1.Use fishtail pliers to clamp the clamps at both ends of the kettle and low-temperature radiator away from the pipe joint.

2.Pull out pipe connectors at both ends and take out water pipe

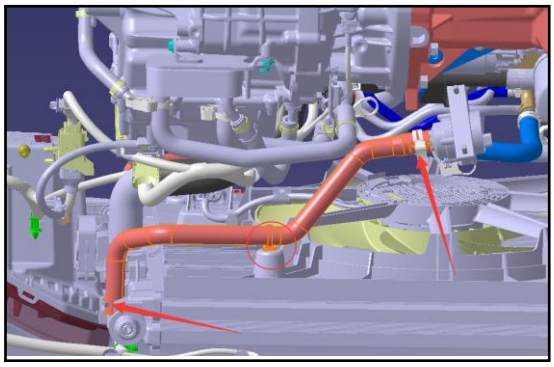


II. Low-temperature radiator water outlet pipe assembly

1.Use fishtail pliers to clamp the clamps at both ends of the resistance water pump and low-temperature radiator away from the pipe joint.

2.Use a flat bolt knife to take out the pipe clamp clamped on the fan.

3.Pull out pipe connectors at both ends and take out water pipe



Assembly

I. Low temperature radiator water inlet pipe

1.Use fishtail pliers to assemble 1 elastic clamp at both ends of hose

2.Insert the white "soil" label end of the hose into the low-temperature radiator end, the "soil" label end faces upward, insert the yellow "soil" label end into the kettle end, the "soil" label end faces upward, and install the clamps at both ends into the middle of the two horizontal lines of the "soil" label.

II. Low-temperature radiator water outlet pipe assembly

1.Use fishtail pliers to assemble 1 elastic clamp at both ends of hose

2.Insert the yellow "soil" label end of the hose into the resistance water pump end, and the "soil" label end faces downward; insert the white "soil" label end into the low-temperature radiator end, and the "soil" label end faces the outer side of the radiator; install the clamps at both ends into the middle of the two horizontal lines of the "soil" label.

3.Clamp the middle pipe clip into the corresponding waist hole of the fan.

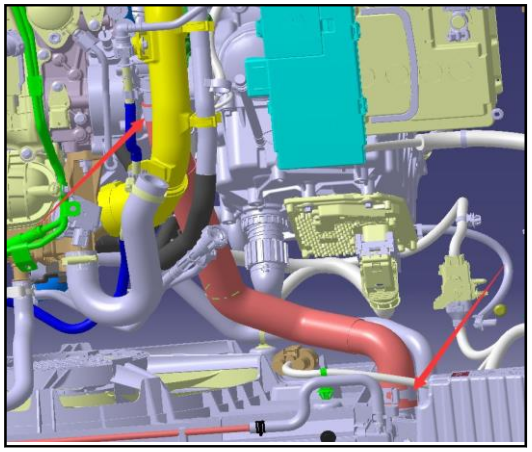
High temperature system radiator upper and lower water pipes

Removal

I. Radiator water inlet pipe

1.Use fishtail pliers to clamp the clamps at both ends of water pipe away from the pipe joint.

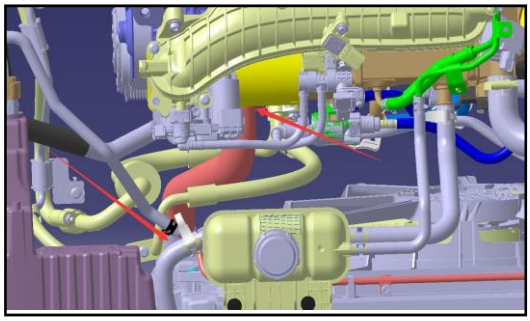
2.Pull out the pipe connectors at both ends and take out the rubber hose.



II. Radiator water outlet pipe

1.Use fishtail pliers to clamp the clamps at both ends of water pipe away from the pipe joint.

2.Pull out the pipe connectors at both ends and take out the rubber hose.



Assembly

I. Radiator water inlet pipe

1. Use fishtail pliers to assemble 1 elastic clamp at both ends of hose

2. Insert the rubber hose white "earth" mark end into the engine end, and the "earth" mark is toward the transmission side; insert the yellow "earth" mark end into the low-temperature radiator end, and the "earth" mark is facing upward; install the clamps at both ends into the middle of the two horizontal lines of the "earth" mark.

II. Radiator water outlet pipe

1. Use fishtail pliers to assemble 1 elastic clamp at both ends of hose

2. Insert the rubber hose white "earth" mark end into the engine end with "earth" mark facing upwards, insert the yellow "earth" mark end into the low-temperature radiator end with "earth" mark facing downwards, and install the clamps at both ends into the middle of the two horizontal lines of "earth" mark.

Intake system specifications

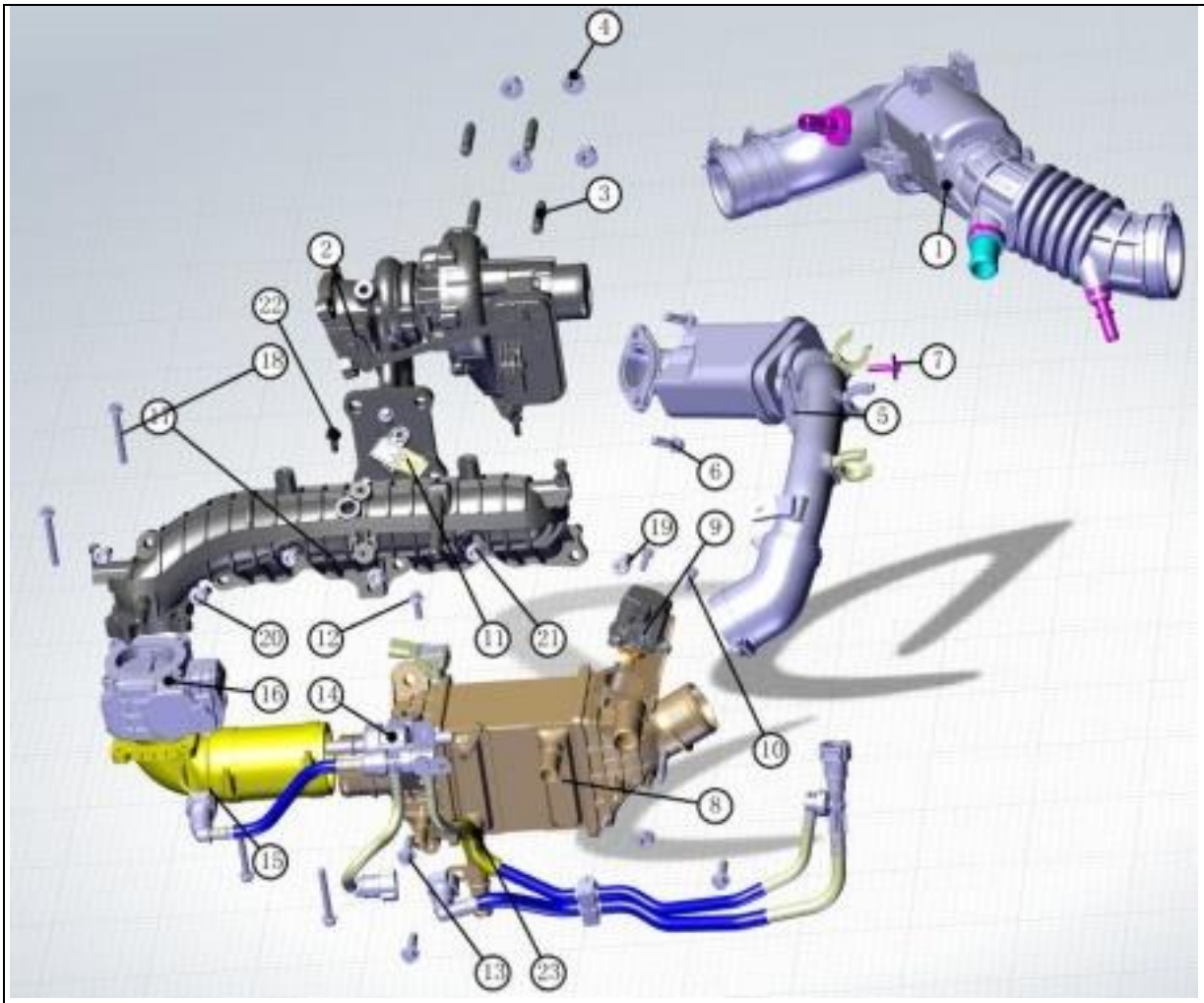
General specifications

Application	Specifications
Vacuum degree of intake manifold under idling condition	**42 kPa**

Torque specification

Name	**Nm**
Intake manifold assembly mounting nut/bolt	23±2
Intake manifold assembly mounting stud	6±1
Throttle body assembly connecting bolt	10±1
Water-cooled intercooler assembly mounting stud	6±1
Water-cooled intercooler assembly mounting nut/bolt	23±2
Intercooler inlet trachea assembly mounting bolt	23±2
Retaining bolt of intercooler inlet trachea assembly	23±2
Intercooler inlet trachea assembly hoop	5±0.5
Intercooler outlet trachea assembly hoop	5±0.5
Air filter upper cover connecting screws	1.5±0.2
Air filter assembly mounting bolt	9±1
Air filter pipe clamp(Rubber tube)	4±0.5

Component position distribution



Project	Description	Project	Description
1	Air filter with accessory assembly	13	Bolt
2	Supercharger assy.	14	Canister control valve assembly
3	Stud	15	Intercooler outlet trachea assy.
4	Nut	16	Electronic throttle body assembly
5	Intercooler inlet trachea assembly	17	Intake manifold assembly
6	Bolt	18	Bolt
7	Bolt	19	Stud
8	Water-cooled intercooler assembly	20	Nut
9	ECRV valve	21	Bolt
10	Bolt	22	Bolt
11	Temperature and pressure sensor assembly	23	Canister control valve outlet trachea assembly
12	Bolt		

System functional principle introduction

The ambient air enters the air filter with accessory assembly, is filtered by the air filter element, pressurized by the supercharger, enters the water-cooled intercooler assembly through the intercooler inlet trachea assembly, and then enters the intercooler outlet trachea assembly, electronic throttle body assembly and intake manifold assembly into the cylinder. The canister control valve pipeline is connected to the intake manifold assembly. Gasoline vapor in the canister enters the intake manifold assembly through this pipe, and enters the cylinder together with fresh air after mixing. The ambient air enters the air filter, is filtered by the air filter element, pressurized by the supercharger, enters the intercooler to cool the air, and then enters the intercooler pipe, throttle body and intake manifold to enter the cylinder. Crankcase vent pipe is connected to the intake manifold, through which the exhaust gas from the crankcase enters the cylinder with fresh air.

Inspection of part structure principle

Common methods

Intake manifold pressure check

Intake leakage diagnosis process

Test conditions	Details/Results/Measures
1. Check whether there is air leakage	
	A. Start the engine. B. Listen for air leakage. Is there any hissing air leak? ? Yes Check the leakage point and repair the leakage component. ? No Go to step 2.
2. Inspect the pipeline connected with intake manifold assembly.	
	A. Check whether the canister control valve trachea is aged or not sealed tightly. Is the pipeline normal? ? Yes Go to Step 3 ? No Service lines.
3. Check the vacuum of intake system	
	A. Perform intake system vacuum check procedure. Vacuum standard: Does 42±5 kPa have normal vacuum? ? Yes The system is normal. ? No Go to Step 4.
4. Inspect intake manifold assembly or electronic throttle body assembly	

	A. Inspect the sealing of intake manifold assembly or electronic throttle body assembly. Is the intake manifold assembly or electronic throttle body assembly leaking? ? Yes Repair the intake manifold assembly or electronic throttle body assembly. ? No
	Check engine valve mechanism. Reference timing mechanism camshaft, valve and cylinder head

Cleaning method of air filter element

The daily maintenance interval of the air filter element shall be strictly in accordance with the following table. Please refer to the air filter element for detailed maintenance procedures.

Maintenance interval	Km(×1000)	5	15	25	35	45	55	65	75	85	95	105
	Number of months	3	9	15	21	27	33	39	45	51	57	63
Maintenance items	Engine air filter element	I	I	R	I	R	I	R	I	R	I	R

Table I indicates inspection and R indicates replacement.

Fault symptom diagnosis check and confirmation

1 Confirm the customer's problem.
2 Check the appearance check list for visible signs of mechanical or electrical damage.
3 If the observed or raised problem is obvious and the cause has been found, the cause must be corrected before proceeding to the next step.
4 If the inspection is passed, confirm the fault and refer to the fault symptom table.

Appearance check list

Mechanical part
• Air filter assembly • Air filter line • Water-cooled intercooler • Water-cooled intercooler pipeline • Throttle body • Intake manifold

Fault symptom table

If the fault occurs but no DTCs are stored in the ECM and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Intake leakage	Air filter and its inlet and outlet pipeline connections leak	Reinstall the relevant connection trachea way in and out or replace the damaged part.
	Intake manifold related connection pipeline connection leakage	
	Electronic throttle valve connection leakage	
	Crankcase vent pipe connection leakage	
	Fuel tank evaporative emission pipe leaks	
	Intercooler inlet trachea circuit leakage	
	Primary pipeline of intercooler leaks	
	Intercooler leakage	
	Supercharger pressure end connector leakage	
Intake block	Air filter element is blocked	Check air filter and replace air filter element if necessary
	Foreign matter entering trachea	Disassemble the air filter cover, check whether there is foreign matter in the air filter and into the trachea, and remove the foreign matter.

Intake leakage diagnosis process

Test conditions	Details/Results/Measures
1. Check whether there is air leakage	
	A. Start the engine. B. Listen for air leakage. Is there any hissing air leak? ? Yes Check the leakage point and repair the leakage component.

	? No Go to step 2.
2. Inspect the pipeline connected with intake manifold assembly.	
	A. Check whether the canister control valve trachea is aged or not sealed tightly. Is the pipeline normal? ? Yes Go to Step 3 ? No Service lines.
3. Check the vacuum of intake system	
	A. Perform intake system vacuum check procedure. Vacuum standard: Does 42±5 kPa have normal vacuum? ? Yes The system is normal. ? No Go to Step 4.
4. Inspect intake manifold assembly or electronic throttle body assembly	
	A. Inspect the sealing of intake manifold assembly or electronic throttle body assembly. Is the intake manifold assembly or electronic throttle body assembly leaking? ? Yes Repair the intake manifold assembly or electronic throttle body assembly. ? No Check engine valve mechanism.

Intake manifold pressure low diagnostic flow

Test conditions	Details/Results/Measures
1. Check whether there is air leakage	
	A. Start the engine. B. Listen for air leakage. Is there any hissing air leak? ? Yes Check the leakage point and repair the leakage component. ? No Go to step 2.
2. Inspect the pipeline connected with intake manifold assembly.	

	A. Check whether the canister control valve trachea is aged or not sealed tightly. Is the pipeline normal? ? Yes Go to Step 3 ? No Service lines.
3. Check the vacuum of intake system	
	A. Perform intake system vacuum check procedure. Vacuum standard: Does 42±5 kPa have normal vacuum? ? Yes The system is normal. ? No Go to Step 4.
4. Inspect intake manifold assembly or electronic throttle body assembly	
	A. Inspect the sealing of intake manifold assembly or electronic throttle body assembly. Is the intake manifold assembly or electronic throttle body assembly leaking? ? Yes Repair the intake manifold assembly or electronic throttle body assembly. ? No Check the supercharger and its lines to determine whether the supercharger is working properly and whether there is leakage at the relevant line connection.

Removing and installing intake manifold assembly

1. Torque specification

Name	Nm	lb-ft	lb-in
Intake manifold mounting nut and bolt	23±2	17	-
Throttle body connecting bolt	10±1	-	89

Removal

1. Remove the trim cover, and loosen the bolts of the intake manifold upper protection box and the trachea assembly bolts of the canister control valve. Torque 10±1Nm

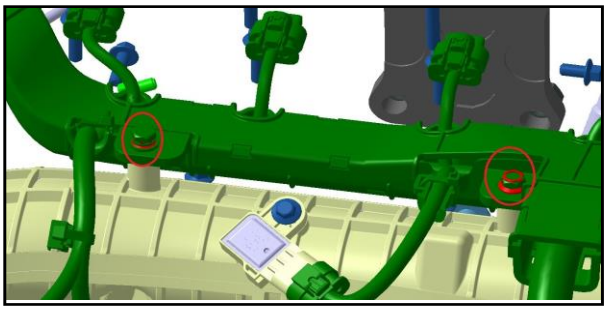


Figure 5

2. Disconnect electronic throttle body harness connector and temperature and pressure sensor connector (on intake manifold and water-cooled intercooler).

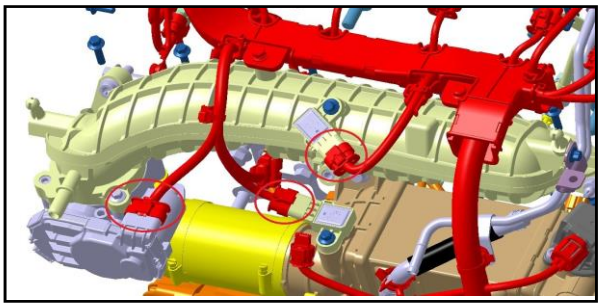


Figure 6

3. Disconnect the quick-change joint on the canister control valve out of the trachea assembly from the intake manifold and water-cooled intercooler.

4. Remove the canister control valve assembly assembled on the water-cooled intercooler.

6. Remove bolt 7, remove bolt 6

7. Loosen hoop bolt of intercooler inlet trachea assembly, and remove intercooler inlet trachea assembly.

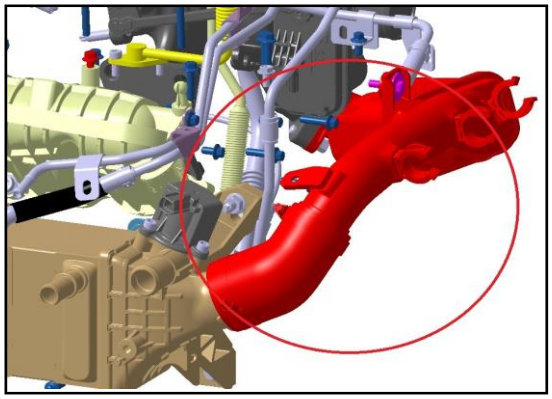


Figure 7

8. Remove the mounting nuts and bolts of water-cooled intercooler assembly. Torque 10±1Nm

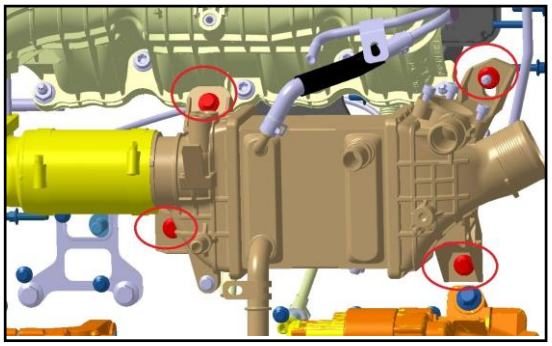


Figure 8

9. Remove the mounting nuts and bolts of intake manifold assembly.

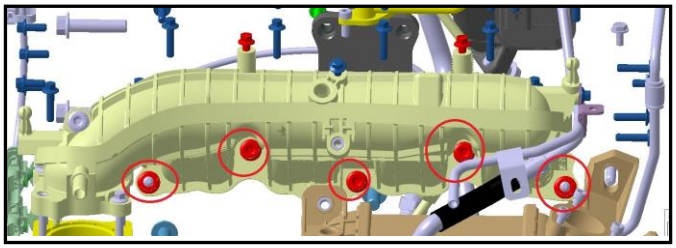


Figure 9

10. Remove the water-cooled intercooler assembly, intercooler outlet trachea assembly, electronic throttle body assembly and intake manifold assembly from the engine.

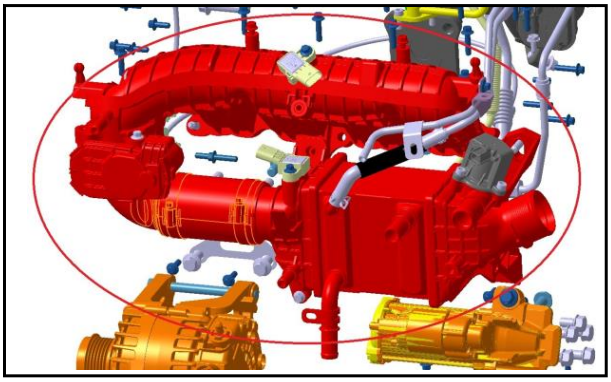


Figure 10

11. Loosen hoop bolt of intercooler outlet trachea assembly (intercooler side), and loosen electronic throttle body bolt.

12. Dismantle water-cooled intercooler assembly, intercooler outlet trachea

assembly, electronic throttle body assembly and intake manifold assembly.

Installation

Install in reverse order of removal and observe the following points.

1. Before installation, confirm that the sealing ring at the intake manifold, the trachea sealing ring of the intercooler and the trachea sealing ring of the intercooler are intact, the electronic throttle body assembly and the intake manifold assembly surface, and the electronic throttle body and the trachea assembly surface of the intercooler are clean and free of foreign matter.

2. Assemble water-cooled intercooler assembly, intercooler outlet trachea assembly, electronic throttle body assembly and intake manifold assembly on the engine together after being assembled outside; When placing, avoid interference between water-cooled

intercooler assembly and peripheral harness.

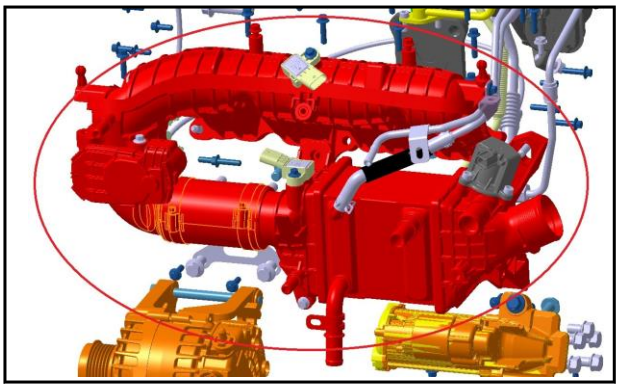


Figure 11

3. Pre-tighten the intercooler and intake manifold mounting bolts.

4. Tighten the bolts or nuts to the torque in the Torque Specification in the front.

5. The end of intercooler inlet trachea assembly and intercooler outlet trachea assembly hose shall be assembled to the limiting boss, and the hoop shall be fixed in the middle of "I" mark; If the hose is damaged, replace it during installation. Install the hose end to the limiting boss and pre-install the flange bolt and intermediate retaining bolt for the intercooler inlet trachea assembly; Tighten the hose clamp, tighten the flange bolts, and finally tighten the intermediate retaining bracket bolts.

6. Assemble electronic throttle body and temperature and pressure sensor harness

7. Assemble the quick-change joint on canister control valve out of trachea assembly with intake manifold and water-cooled intercooler.

8. If the sealing ring at the intake manifold, the trachea sealing ring of the intercooler inlet and the trachea sealing ring of the intercooler outlet are damaged, they shall be replaced during installation.

9. Start the engine and check whether the engine idle speed is normal after heating.

Air filter element

1. Removal

1 Loosen the screws securing the air cleaner upper cover.

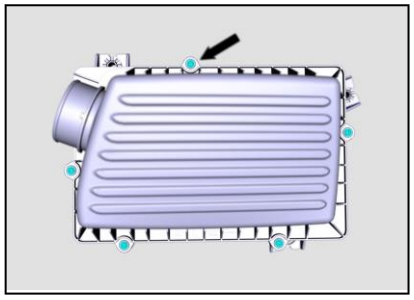


Figure 12:

2 Lift the upper cover of the air filter, and take out the air filter element from the air filter housing.

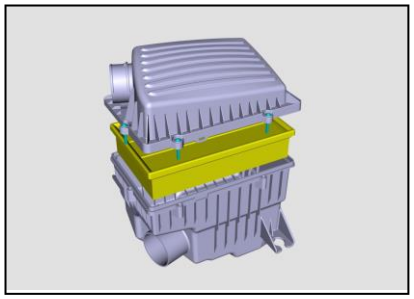


Figure 13:

3 Inspect the air filter element for dirt.

4 During maintenance, compressed air can be used to blow away the dirt from the clean side of the air filter element. When the service

life is reached, replace the air filter element.

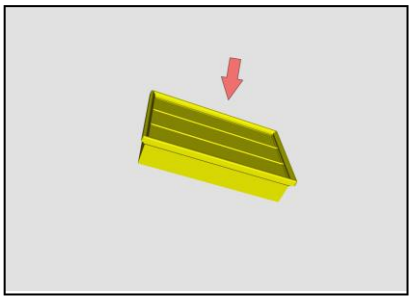


Figure 14:

2. Installation

Install in the reverse order of removal, noting the following:

1 Before installation, confirm that the air filter upper cover and the air filter element are clean and free of foreign matter.

2 Make sure that the air cleaner element is installed in place in the air cleaner housing before tightening the screws.

3 The tightening torque of the screws is 1.5±0.2Nm (48 ftlb.).

Air filter assembly

1. Removal

1 Loosen the clamp (1) that secures the trachea-way air filter.

2 Remove 2 retaining bolts (2) for fixing air filter assembly.

3 Pull out the rubber gasket (3) fixing the air cleaner assembly.

4 Take out the air cleaner assembly.

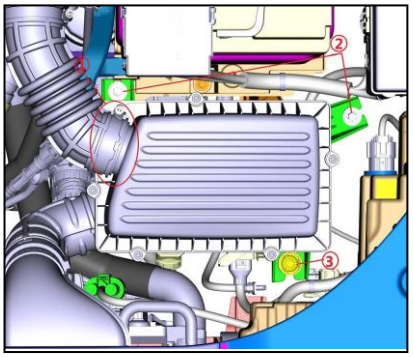


Figure 15:

2. Installation

Install in the reverse order of removal, noting the following:

1 Before installation, confirm that the air filter assembly, inlet trachea-way and outlet trachea-way are clean and free of foreign matter.

2 Before tightening the bolts and hoops, confirm that the air filter assembly and the trachea-way inlet and outlet are installed in place.

3 Tightening torque of air cleaner assembly retaining bolt is 10±1Nm, and tightening torque of trachea-way clamp is 4±0.5Nm.

Water-cooled intercooler assembly

Removal

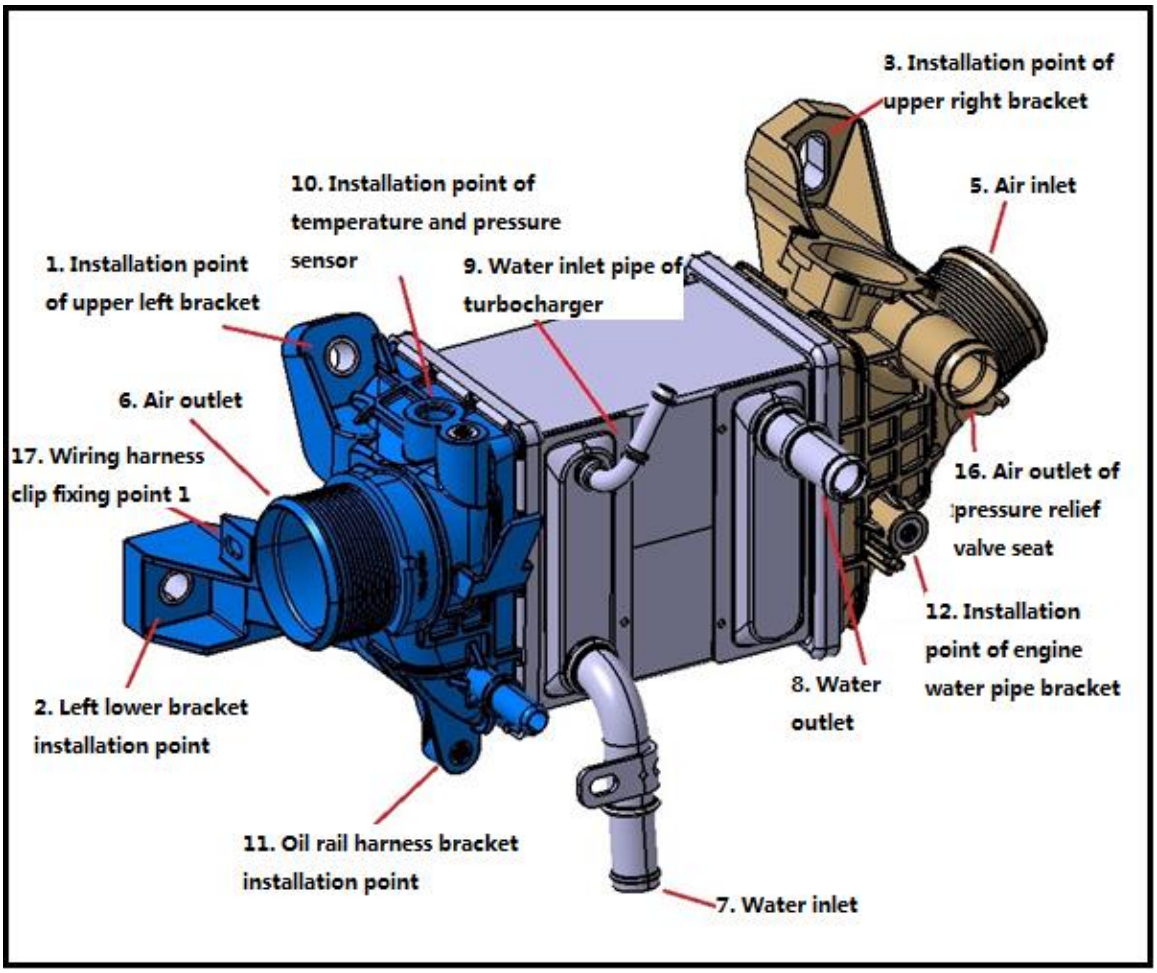


Figure 16

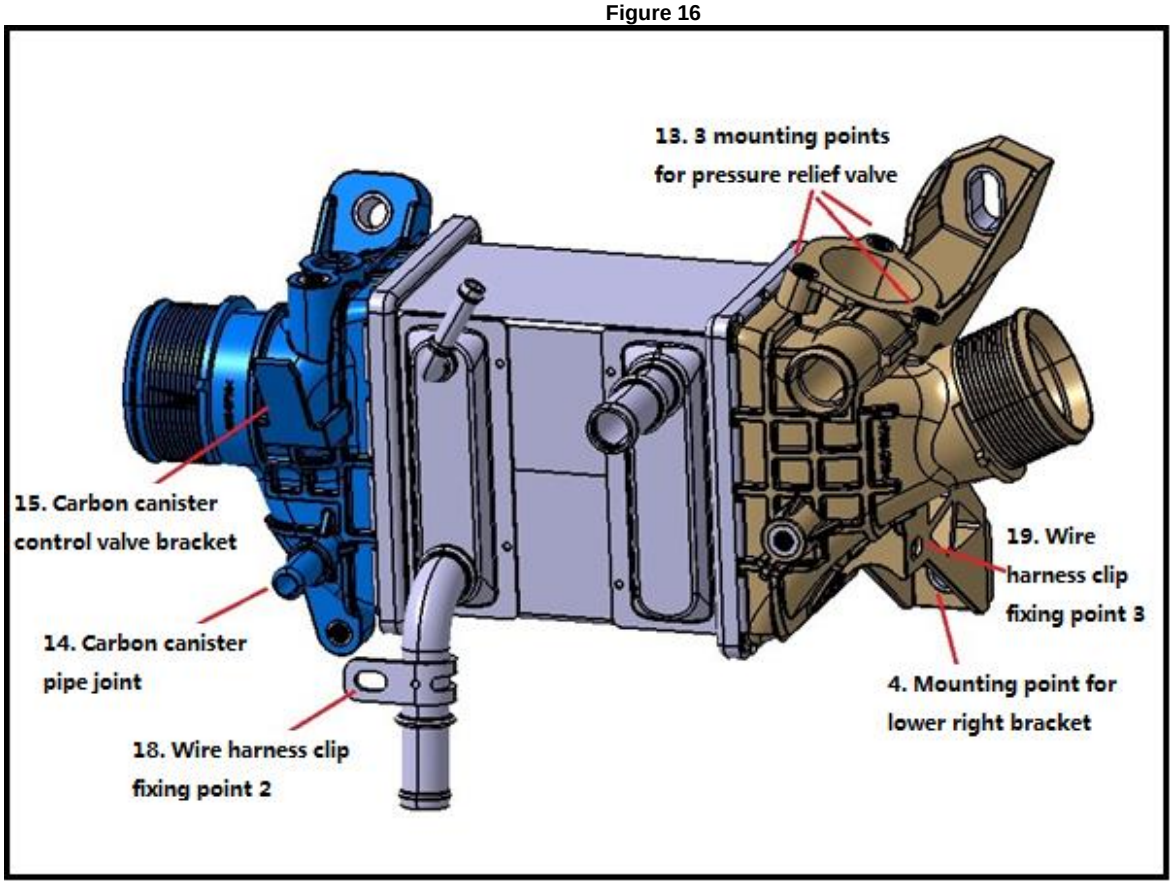


Figure 17

1

Remove the trim cover, loosen the bolts of the upper wire protection box of the intake manifold and the bolts of the canister control valve out of the trachea assembly;

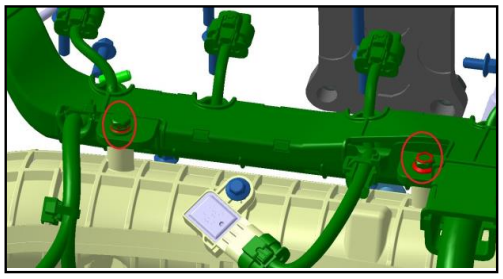


Figure 18

2

Dismantle the bolts of mounting point of 12 engine water pipe bracket;

3

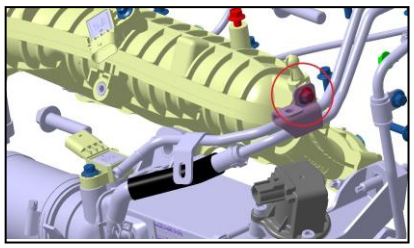


Figure 19

Dismantle the hoop at the air inlet of intercooler 5, and detach the rubber pipe of intercooler trachea;

4

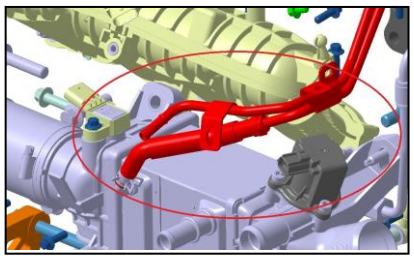


Figure 20

Remove the harness connector on the pressure relief valve, remove the bolts at the 3 mounting points of the 13 pressure relief valve, and remove the pressure relief valve;

5

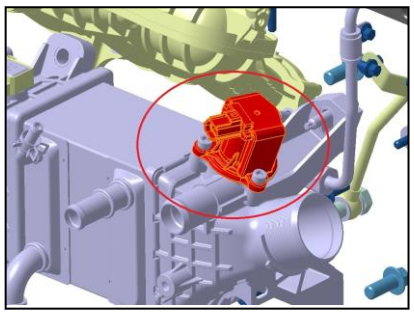


Figure 21

Dismantle the hoop at the air outlet of the 16 pressure relief valve seat, and dismantle the pressure relief valve pipe (rubber pipe);

6 Disconnect the plastic pipe joint at the 14 canister pipe joint;

7 Gently remove the canister control valve installed on the 15 canister control valve bracket;

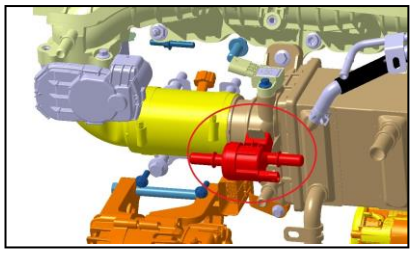


Figure 22

Remove harness connector of temperature and pressure sensor, dismantle mounting bolt of 10 temperature and pressure sensor, and remove temperature and pressure sensor;

9

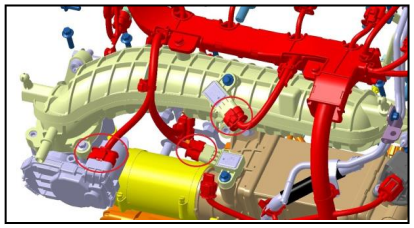


Figure 23

Dismantle water inlet pipe (plastic pipe) of intercooler at 7 water inlet;

10

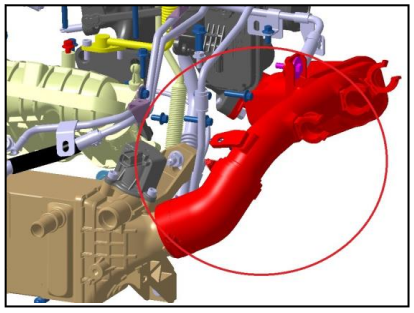


Figure 24

Dismantle water outlet pipe (rubber pipe) of intercooler at 8 water outlet;

11

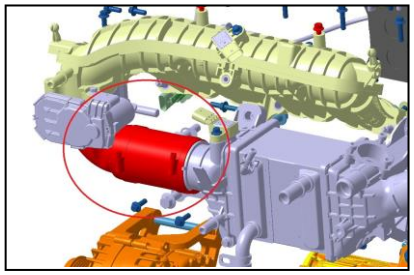


Figure 25

Slightly disassemble the water inlet pipe (rubber pipe) at the water inlet pipe opening of 9 supercharger;

12 Dismantle harness clips of 17 harness clip fixing point 1, 18 harness clip fixing point 2, 19 harness clip fixing point 3; Dismantle the hoop at the 6 outlet;

13 Remove 1 left upper bracket mounting point, 2 left lower bracket mounting point, 3 right upper bracket mounting point, 4 right lower bracket mounting point.

14 Remove water-cooled intercooler assembly.

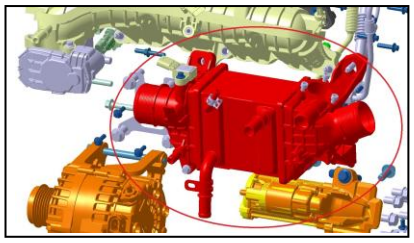


Figure 26

Installation

1 Assemble temperature and pressure sensor to water-cooled intercooler;

2 Assemble water-cooled intercooler assembly onto rubber pipe of intercooler outlet trachea, and tighten hoop;

3 Assemble 1 left upper bracket mounting point, 2 left lower bracket mounting point, 3 right upper bracket mounting point, 4 right lower bracket mounting point;

4 Assemble harness clips of 17 harness clip fixing point 1, 18 harness clip fixing point 2, 19 harness clip fixing point 3;

5 Assemble 9 water inlet pipe (rubber pipe) at water inlet pipe opening of supercharger;

6 Assemble the intercooler water outlet pipe (rubber pipe) at the 8 water outlet;

7 Assemble the intercooler water outlet pipe (rubber pipe) at the 8 water outlet;

8 Assemble harness connector of temperature and pressure sensor;

9 Assemble 12 engine water pipe bracket mounting point bolts; Torque 10±1Nm

10 Assemble the plastic pipe joint at the 14 canister pipe joint;

11 Gently assemble the canister control valve installed on 15 canister control valve bracket;

12 Assemble pressure relief valve pipe (rubber pipe) and tighten hoop;

13 Assemble pressure relief valve;

14 Assemble rubber pipe of intercooler into trachea and tighten hoop;

15 Assemble the intake manifold upper protection box bolt and canister control valve outlet trachea assembly bolt;

16 Fit trim cover.

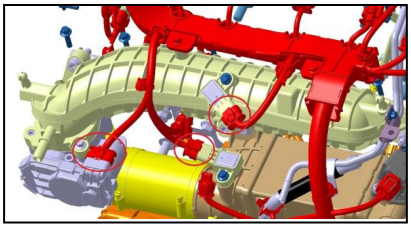
Electronic throttle body assembly

Torque specification

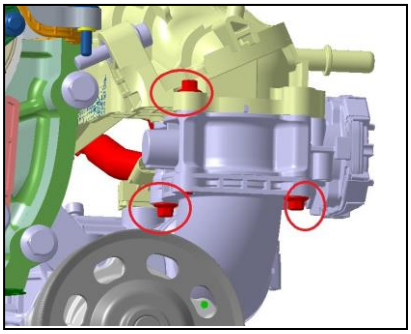
Name	Nm	lb-ft	lb-in
Throttle body connecting bolt	10±1	-	89

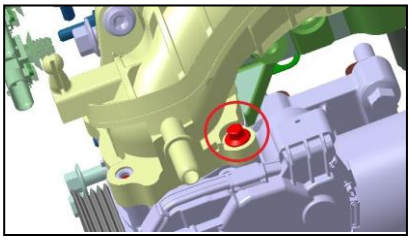
Removal

1 Remove the electronic throttle body harness connector.



2 Remove the electronic throttle body mounting bolts.





3 Slightly press the intercooler out of trachea and pull out the electronic throttle body assembly.

4 Check carbon deposit at electronic throttle body valve plate and clean with

special cleaning agent if necessary. Installation

Install in reverse order of removal and observe the following points.

1 Before installation, confirm that the sealing ring at the intake manifold is intact, the electronic throttle body assembly and the intake manifold assembly surface, the electronic throttle body and the intercooler outlet trachea assembly surface are clean without foreign matter, and the intercooler outlet trachea sealing ring is intact.

2 Tighten the electronic throttle body mounting bolts to the torque specified in the Torque Specification.

3 Assemble electronic throttle body harness connector.

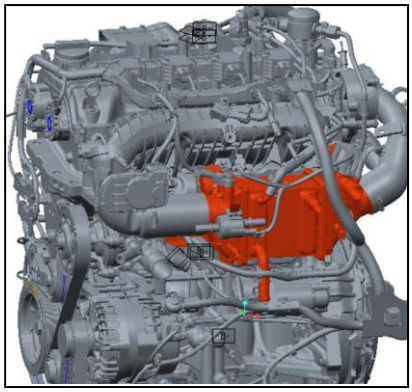
4 If seal ring at intake manifold and trachea seal ring of intercooler are damaged, it is necessary to replace it during installation.

5 Start the engine and check whether the engine idle speed is normal after heating.

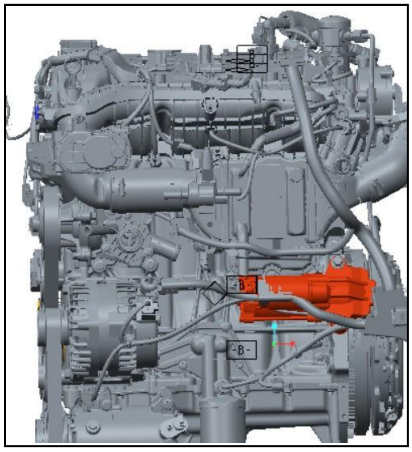
Oil-gas separator assy.

Removal

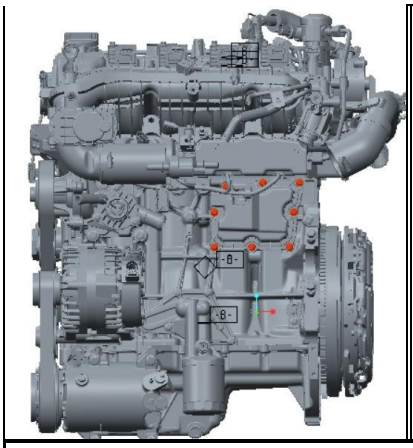
1. Remove engine trim cover; Removing and installing trim cover for engine
2. Dismantle water-cooled intercooler assembly water-cooled intercooler assembly

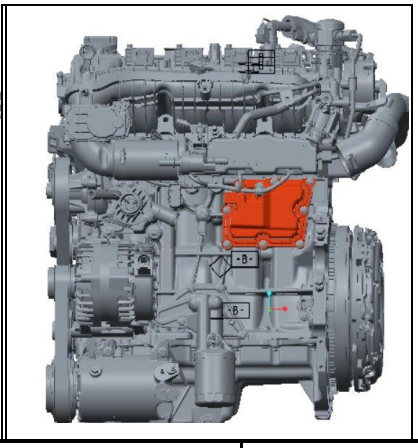


3. Remove starter assembly of starter motor

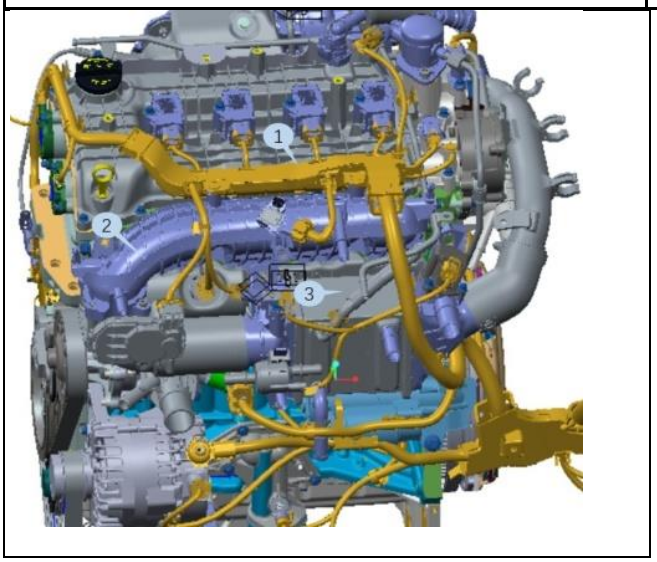


4. Dismantle mounting bolts of oil/gas separator assembly, and take down oil/gas separator assembly.



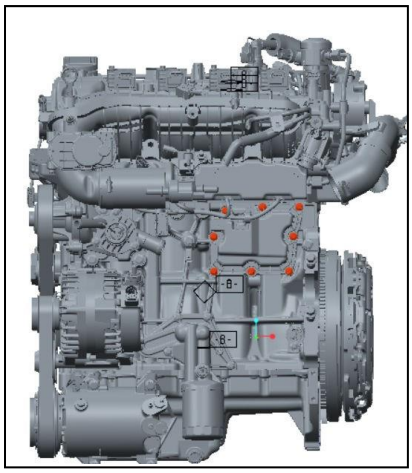


Serial number	Part name
1	Engine harness
2	Intake manifold assembly
3	Water-cooled intercooler assembly
4	Bolt
5	Oil-gas separator assy.
6	Starter motor



Installation

As shown in the figure, install the oil/gas separator assembly to the crankcase, and the tightening torque of eight M6 bolts is 10±1N·m.



Warning Before using the oil/gas separator assembly, it is necessary to check whether the sealing ring is damaged and assembled in place, and it can be used only after the inspection is qualified.

Exhaust system specifications

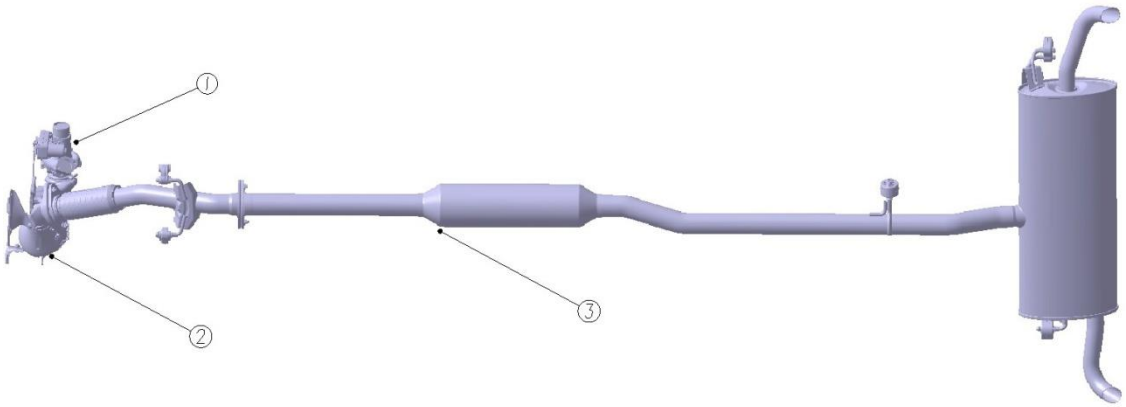
Component specification

Name	Specifications
Cylinder head cover assembly	421.5×276.2×141

Torque specification

Name	Nm	lb-ft	lb-in
Exhaust manifold mounting bolts and nuts	36	-	-
Oxygen sensor assembly	50	37	-
Supercharger and exhaust manifold connecting bolts and nuts	40	-	-
Muffler front pipe and three-way catalytic converter connecting bolt	23	17	-
Three-way catalytic converter reinforced pillar retaining bolt	10	-	89
Heat shield retaining bolt	10	-	89
Intake connecting pipe mounting bolt	10	-	89
Muffler inlet pipe assembly and three-way catalytic converter connecting nut	50	37	-
Connecting nut of front muffler assembly and muffler inlet pipe assembly	50	37	-
Connecting nut of rear muffler assembly and front muffler assembly	50	37	-

Composition and position distribution



Serial number	1	2	3
Part name	Supercharger assy.	Three-way catalytic converter assy.	Muffler with accessory assembly

System functional principle introduction

Three-way catalyst poisoning

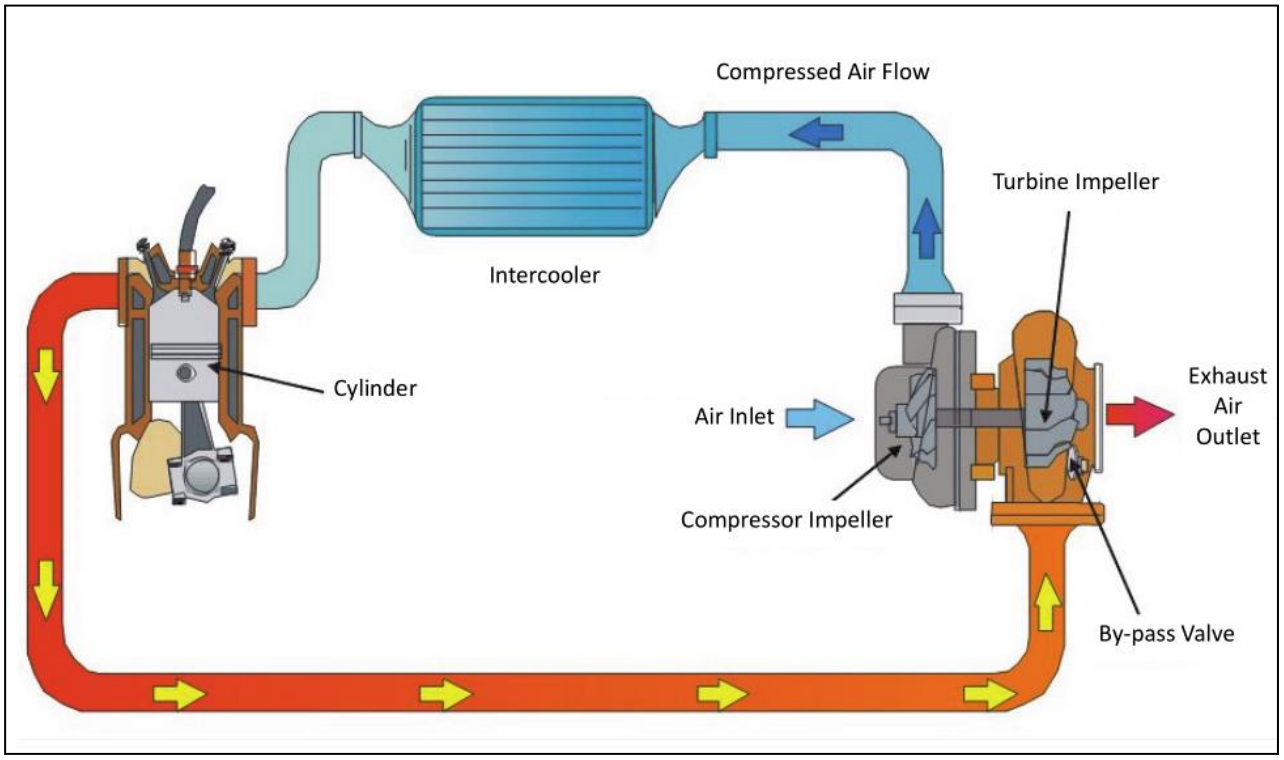
If the fuel contains more than 5 mg/L lead, the catalyst will be severely poisoned. Therefore, it is prohibited to use leaded gasoline for vehicles equipped with three-way catalytic converter.

If the oil consumption is too high, zinc and phosphorus in the oil can cause catalyst poisoning. The discharge of H2S from the three-way catalytic converter is most noticeable. The gas smells like rotten eggs. Replace the fuel of other brands to solve the problem. To reduce H2S emissions, ensure that CO emissions at idle speed meet standards and the engine exhaust system works properly.

Warning

If the temperature exceeds 900 °C, the catalyst carrier will melt. In order to prevent the occurrence of such faults, the causes of the faults shall be described and repaired in detail. Due to excessive back pressure, catalyst melting is often accompanied by power drop.

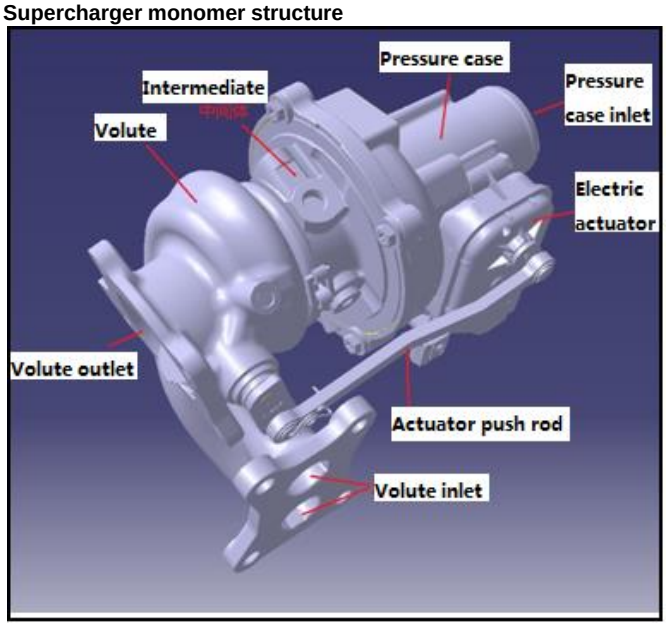
Supercharger principle



The exhaust gas from the engine exhaust manifold drives the turbocharger turbine to rotate, and the turbine drives the pressure impeller coaxial with it to rotate. The impeller compresses the fresh air by centrifugal force, thus increasing the density of air entering the intake manifold of the engine, so that the engine can burn more fuel and then generate more power.

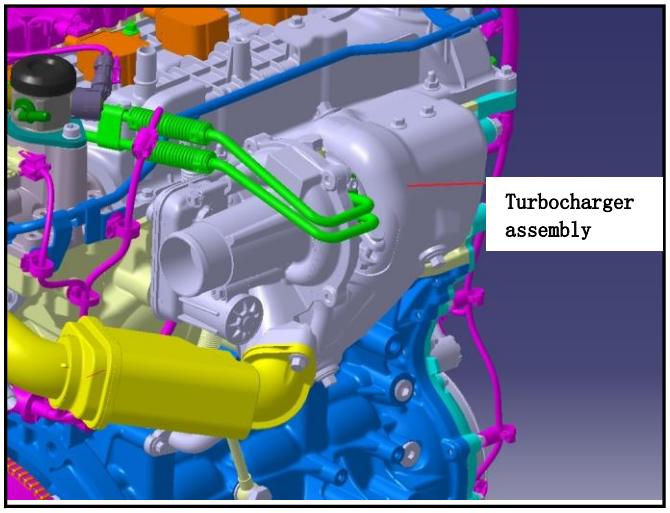
Check supercharger with structural principle of parts

Supercharger monomer structure

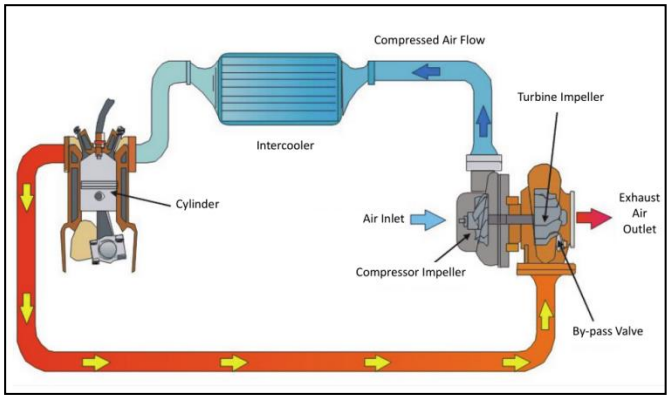


Supercharger layout structure

The supercharger assembly is arranged on the rear side of the engine compartment, close to the cab, and fixedly connected with the engine cylinder head through stud studs.



Supercharger principle



The exhaust gas from the engine exhaust manifold drives the turbocharger turbine to rotate, and the turbine drives the pressure impeller coaxial with it to rotate. The impeller compresses the fresh air by centrifugal force, thus increasing the density of air entering the intake manifold of the engine, so that the engine can burn more fuel and then generate more power.

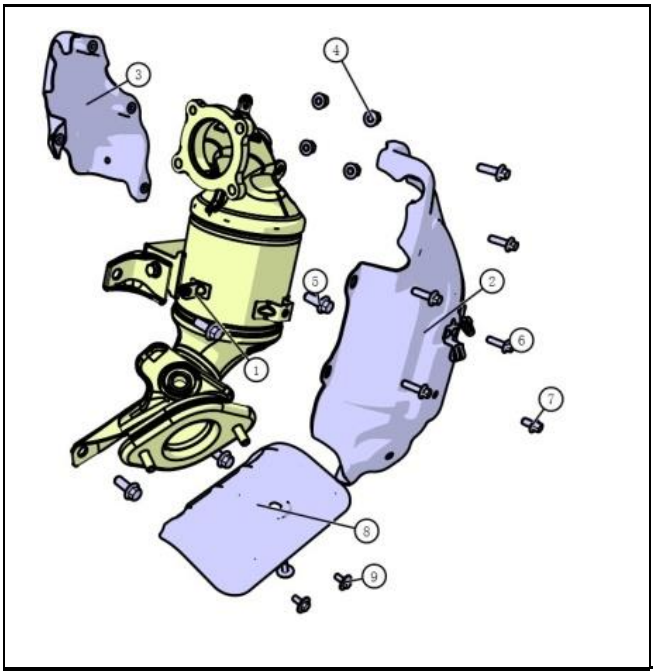
Three-way catalytic converter

Component description

The three-way catalytic converter is similar to a small muffler in shape. Because of its high working temperature, the three-way catalytic converter body and surrounding body are protected by heat shield. Three-way catalytic converter controls three emissions: HC, CO and

NOx

Exploded view



Project	Description	Project	Description
1	Three-way catalytic converter assy.	6	Bolt
2	Three-way catalytic converter upper cover assembly	7	Bolt
3	Three-way catalytic converter lower cover assembly	8	Drive shaft heat shield
4	Supercharger connecting nut	9	Hexagon bolt and plain washer assembly
5	Bolt		

Warning

If the fuel contains more than 5 mg/L lead, the catalyst will be severely poisoned. Therefore, it is prohibited to use leaded gasoline for vehicles equipped with three-way catalytic converter. If the oil consumption is too high, zinc and phosphorus in the oil can cause catalyst poisoning. The discharge of H2S from the three-way catalytic converter is most noticeable. The gas smells like rotten eggs. Replace the fuel of other brands to solve the problem. To reduce H2S emissions, ensure that CO emissions at idle speed meet standards and the engine exhaust system works properly.

Warning

If the temperature exceeds 900 °C, the catalyst carrier will melt. In order to prevent the occurrence of such faults, the causes of the faults shall be described and repaired in detail.

Due to excessive back pressure, catalyst melting is often accompanied by power drop.

Muffler with accessories

Function: Guide the engine exhaust to be discharged smoothly to reduce exhaust noise.

Working principle: After the engine burns, the exhaust gas is discharged through the exhaust passage trachea. In the process of exhaust emission, airflow noise generated by engine combustion is released. As a noise reduction device, the noise in the pipeline is attenuated by sound wave superposition interference through the pipeline cross section change.

Common methods

Fault symptom diagnosis check and confirmation

Parts	Inspection and confirmation content
Muffler with accessory assembly	Check the muffler for gas leakage.
Three-way catalytic converter assy.	Check three-way catalytic converter for air leakage.
Supercharger assy.	Check the tightness and tightness of the connecting pipeline between the air filter and the supercharger, and between the supercharger and the engine inlet and outlet trachea. There should be no loose connection, broken pipeline, or improper installation of the air filter element; Check whether the supercharger inlet and return pipes are damaged or blocked, and whether the connecting bolts at the joints are loose; The oil return pipe shall be free of excessive bending, aging, sludge blockage, etc.; Check engine oil quality and change engine oil and oil filter regularly; Check the air filter and clean or replace the filter element regularly; Check whether the engine crankcase ventilation system is smooth, whether the engine waste trachea (i.e. crankcase through trachea) is blocked and broken, and whether the crankcase pressure is normal.

Appearance check list

Parts	Visual inspection
Muffler with accessory assembly	Inspect the muffler for signs of collision or scratch.
Three-way catalytic converter assy.	Inspect the three-way catalytic converter for signs of bump, scratch, etc.
Supercharger assy.	1. Check whether the flange connecting surfaces of the supercharger assembly have marks such as bump and scratch; 2.Check whether the turbocharger actuator push rod moves smoothly and whether there is stagnation; 3.Inspect the supercharger pressure wheel blade and turbine blade for damage; Gently rotate the wheel by hand to check whether the shaft system rotates smoothly and whether there is jamming.

Fault symptom table

If the fault occurs but no DTCs are stored in the ECM and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Exhaust system blocked	• Row trachea • Three-way catalytic converter • Muffler • Exhaust port blocked after corrosion inside exhaust trachea • Exhaust system component connection	System overview
Exhaust system leakage	Exhaust system components misaligned or incorrectly installed	• Position and tighten exhaust system components to the specified torque • Ensure row trachea hook is in the correct position and not loose
	• Seal or gasket leakage • Exhaust manifold and cylinder head • Exhaust manifold and three-way catalytic converter assembly • Three-way catalytic converter assembly and front muffler assembly • Front muffler assembly and rear muffler assembly	Replace leaking seals or gaskets
	Irregular joint surface at flange connection	If necessary, repair or replace the relevant components.
	The exhaust manifold is cracked or disconnected.	Replace exhaust manifold
	Leakage at welded connection of exhaust system components	Replace leaking components

Exhaust back pressure high diagnosis process

Test conditions	Details/Results/Measures
1. Visual inspection of turbocharger vortex inlet	A. Inspect whether there is foreign matter at the inlet of the turbocharger vortex end. Is there any foreign matter at the inlet of the turbocharger vortex? ? Yes Remove foreign objects. ? No Go to step 2.
2. Check three-way catalytic converter	A. Remove the three-way catalyst. B. Check three-way catalyst. Is the three-way catalytic converter normal? ? Yes Go to Step 3. ? No Replace the three-way catalyst.
3. Check muffler	A. Remove muffler. B. Check muffler. Is the muffler normal? ? Yes Check the connection position of exhaust system components and test whether the system works normally. ? No Replace the muffler.

Exhaust system blockage diagnosis process

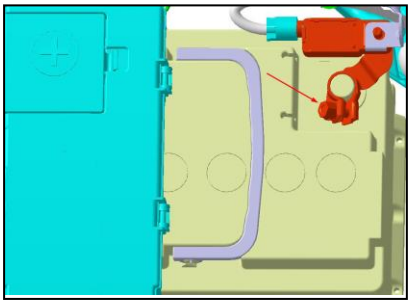
Test conditions	Details/Results/Measures
Visual inspection bank trachea port	Check whether there is foreign matter at port trachea of row. Whether there is foreign matter at port trachea ? Yes Clear foreign body ? No Go to Step 2
Back pressure check	Perform an exhaust back pressure check. Is exhaust back pressure normal ? Yes System normal ? No Go to Step 3
Check three-way catalytic converter	Remove the three-way catalytic converter to perform exhaust back pressure check. Is exhaust back pressure normal ? Yes System normal ? No
	Replace the three-way catalyst. Go to Step 4
Check muffler	Remove muffler Checking muffler. Is the muffler normal? Remove the three-way catalytic converter to perform exhaust back pressure check. Is exhaust back pressure normal ? Yes Check three-way catalyst. Is the three-way catalytic converter normal ? No Check the connection position of exhaust system components and test whether the system works normally.

Removal and installation

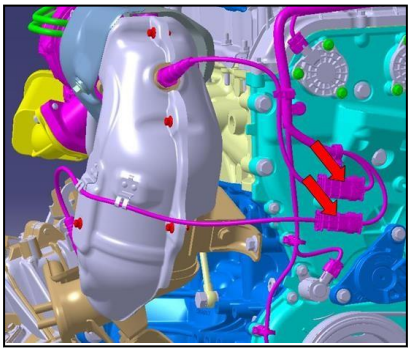
Supercharger and three-way catalytic converter

1. Removal

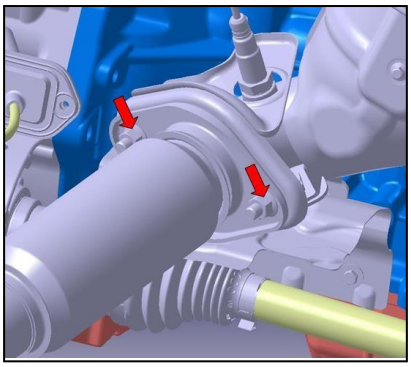
1. Detaching negative wire of battery



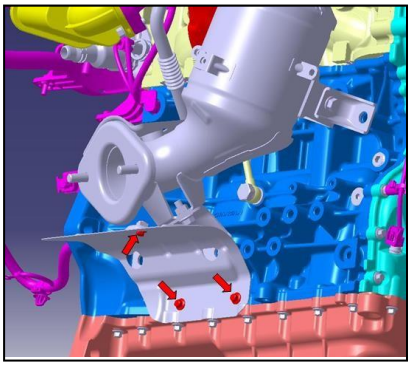
2. Disconnect the upstream oxygen sensor connecting wire.



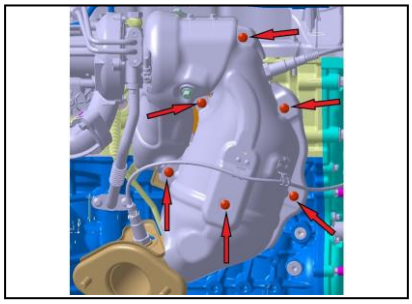
3. Remove the three-way catalytic converter and muffler connecting nuts. Tool: Sleeve (1 5), torque: 50N.m±5N.m



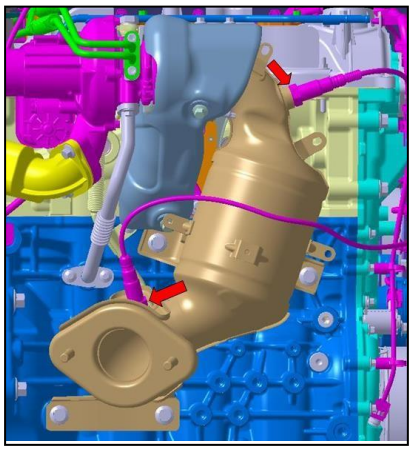
4. Remove the drive shaft heat shield connecting bolts, and remove the drive shaft heat shield. Tool: Sleeve (8), torque: 10N·m±1N·m



5. Remove the connecting bolts of upper and lower cover assemblies of three-way catalytic converter. Tool: Sleeve (8), torque: 10N·m±1N·m

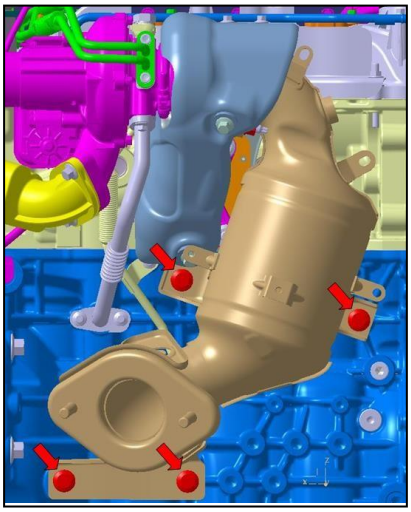


6. Remove front and rear oxygen sensor assembly. Tool: Sleeve (2 2), torque: 50N.m±5N.m



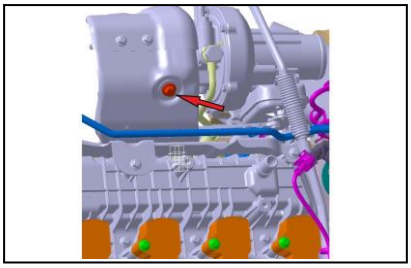
7. Remove the connecting nuts of three-way catalytic converter and supercharger. Tool: Sleeve (1 3), torque: 23N.m±2N.m

8. Remove three-way catalytic converter bracket bolts. Tool: Sleeve (1 3), torque: 50N.m±3N.

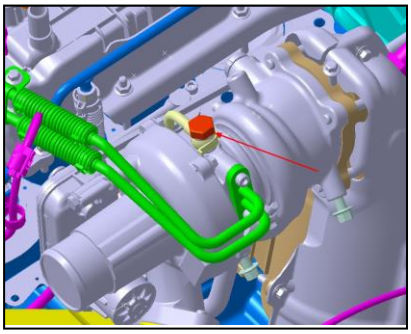


9. Remove the three-way catalytic converter assembly.

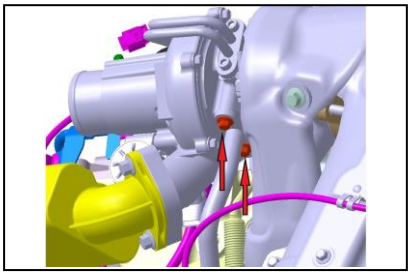
10. Remove the connecting bolts of the supercharger upper cover assembly. Tool: Sleeve (1 0), torque: 23N.m±2N.m



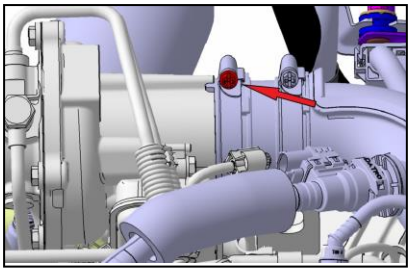
11. Remove the turbocharger oil inlet pipe mounting bolts. Tool: Sleeve (18Torque: 34N·m±2N·m



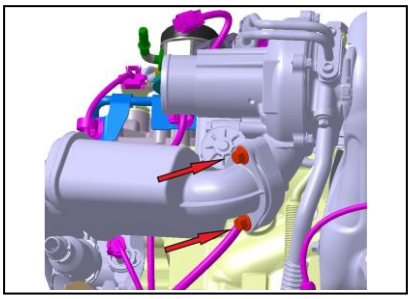
12. Remove the turbocharger oil return pipe mounting bolts. Tool: Sleeve (8), torque: 10N·m±1N·m



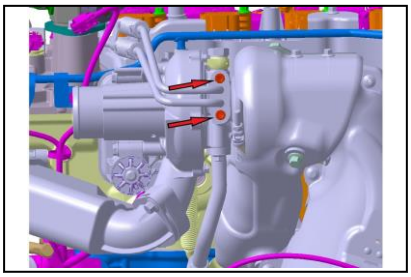
13. Remove the air filter connecting pipe mounting bolts. Tool: Sleeve (7), torque: 4N·m±0.5N·



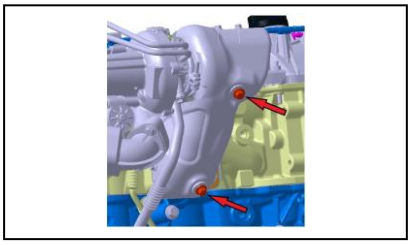
14. Remove the intercooled trachea mounting bolts. Tool: Sleeve (10), torque: 23N·m±2N·m



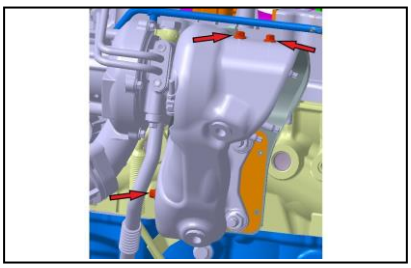
15. Remove the water inlet and outlet pipe mounting bolts of the supercharger. Tool: Hexagon socket, torque: 10N·m±1N·m



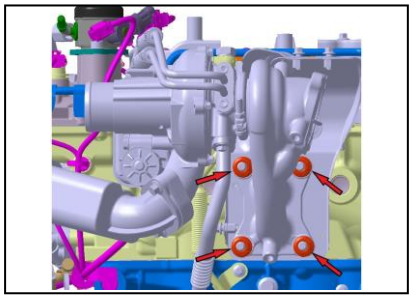
16. Remove the turbocharger lower cover and turbocharger mounting bolts. Tool: Sleeve (1 0), torque: 23N.m±2N.m



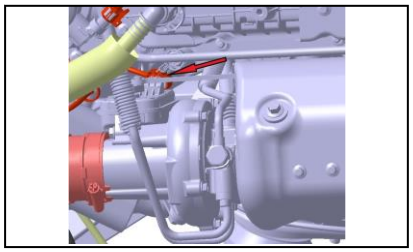
17. Remove the mounting bolts of the booster lower cover assembly. Tool: Sleeve (8), torque: 10N·m±1N·m



18. Remove the connecting stud of supercharger and cylinder head. Tool: Sleeve (1 5), torque: 40N·m±3 N·m



19. Pull off wire harness connector for supercharger.

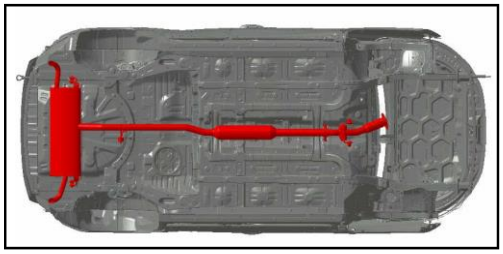


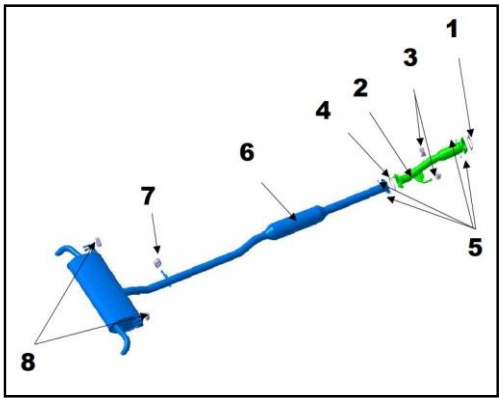
20. Remove the supercharger assembly, and the supercharger is removed.

1. Installation

Install the supercharger and three-way catalytic converter in the reverse order of the above removal.

Muffler with accessories

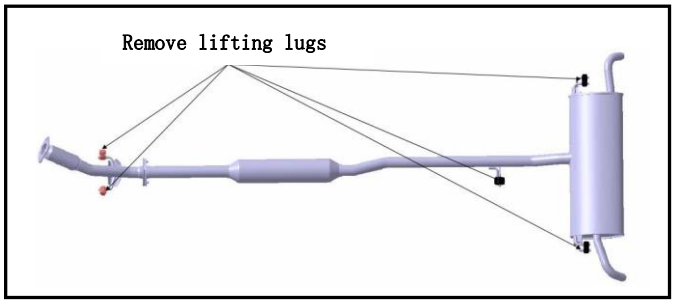




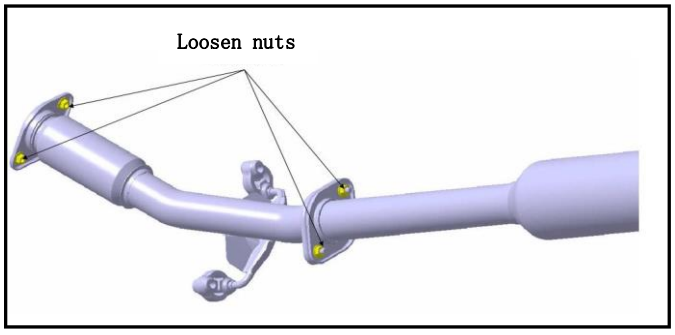
Serial number	Part name
1	Gasket
2	Muffler inlet pipe assy.
3	Lifting lug
4	Gasket
5	Exhaust system nut
6	Muffler assembly
7	Lifting lug
8	Lifting lug

Removing procedure of muffler with accessory assembly:

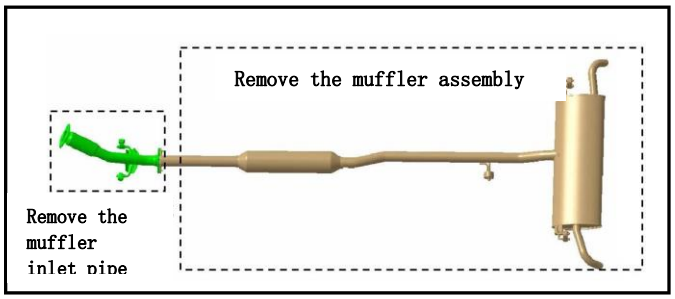
1. Dismantle lifting lug.



2. Loosen the nut. Tool: 15 # sleeve.



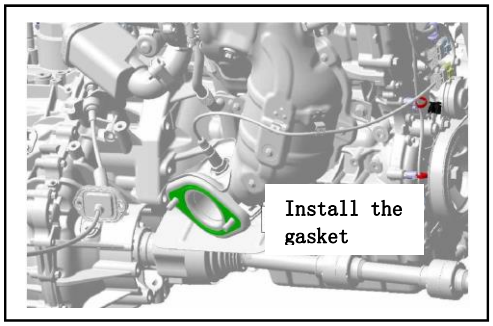
3. Remove the muffler assembly and muffler inlet pipe assembly.



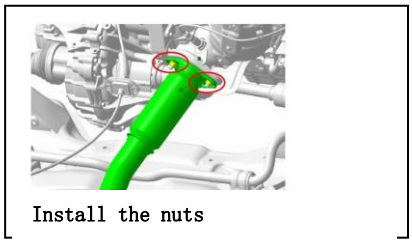
Precautions for removing muffler with accessory assembly:

1. When removing the lifting lug, do not use sharp objects to scratch the surface of the lifting lug. Muffler with accessory assembly assembly steps:

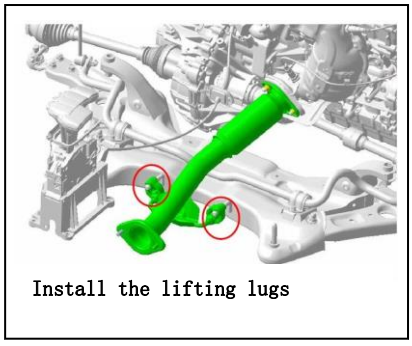
1. Assemble the new gasket on the three-way catalytic converter outlet flange stud.



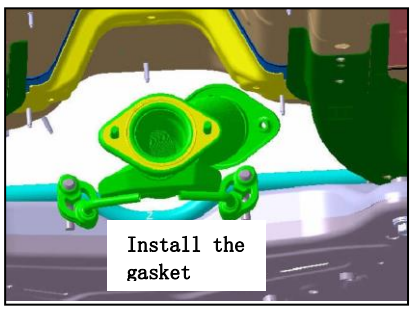
2. Install the muffler inlet pipe assembly to the rear of the engine three-way catalyst through the nut.



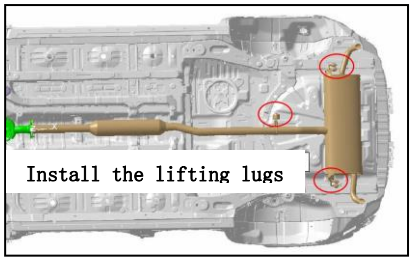
3. Assemble muffler inlet pipe assembly to front subframe through lifting lug.



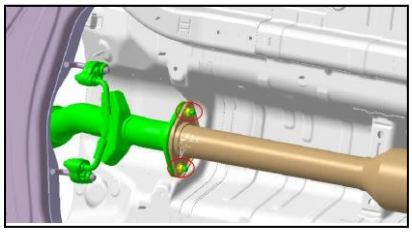
4. Assemble new sealing gasket on the rear flange bolt of muffler inlet pipe assembly.



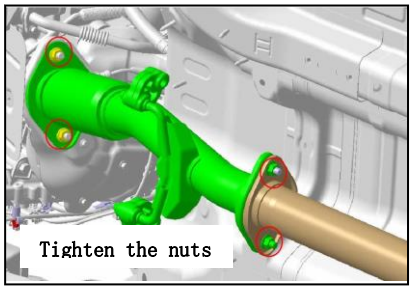
5. Install muffler assembly on vehicle body through lifting lug.



6. Connect the muffler inlet pipe assembly with the muffler assembly through nuts.



7. Tighten the nuts. Tool: 15 # sleeve. Torque: (50±3) N.m.



Muffler with accessory assembly assembly precautions:

1. Replace the new gasket connected to the front and rear of the disassembled faulty part, and the old gasket is not allowed.(After the installed gasket is removed, the original sealing performance is reduced, and it is easy to cause exhaust gas leakage.)

2. When installing lifting lugs, for ease of installation, use neutral lubricant or soapy water to coat lifting lug holes. It is not allowed to use waste engine oil and other rubber-corrosive grease.

Fuel system specifications

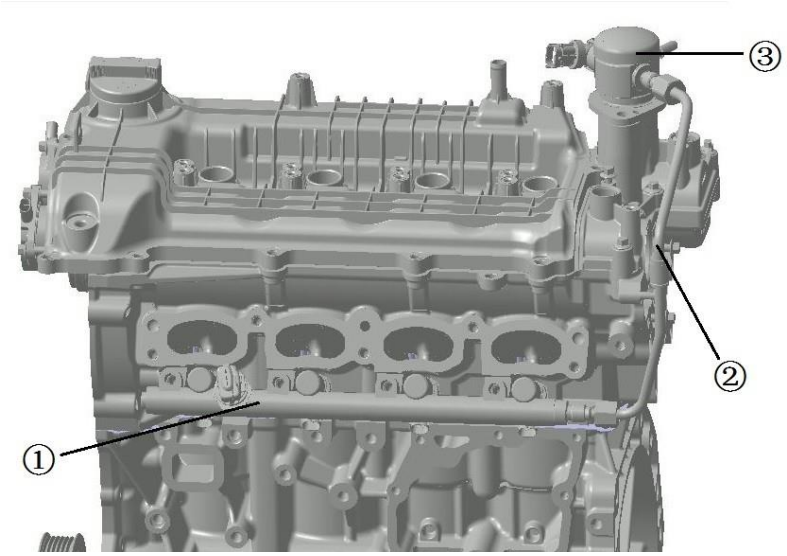
Component specification

Name	Specifications
Fuel injector resistance	At room temperature, 1.83 Ω±5%; 1. At other temperatures, the resistance value will exceed the deviation; 2. The accuracy requirement of multimeter is 0.01Ω.
Minimum resistance of oil quantity sensor(The float is at the highest point)	(30±2) Ohm
Maximum resistance of oil quantity sensor(Floater at lowest point)	(260 ±3) Ohm
Rated pressure of fuel pump with fuel sensor	500kpa
Fuel pump assembly (pump core) output flow	13.5 V voltage, pressure 500kPa, not less than 100 L/h
Rated volume of fuel tank assembly	55L

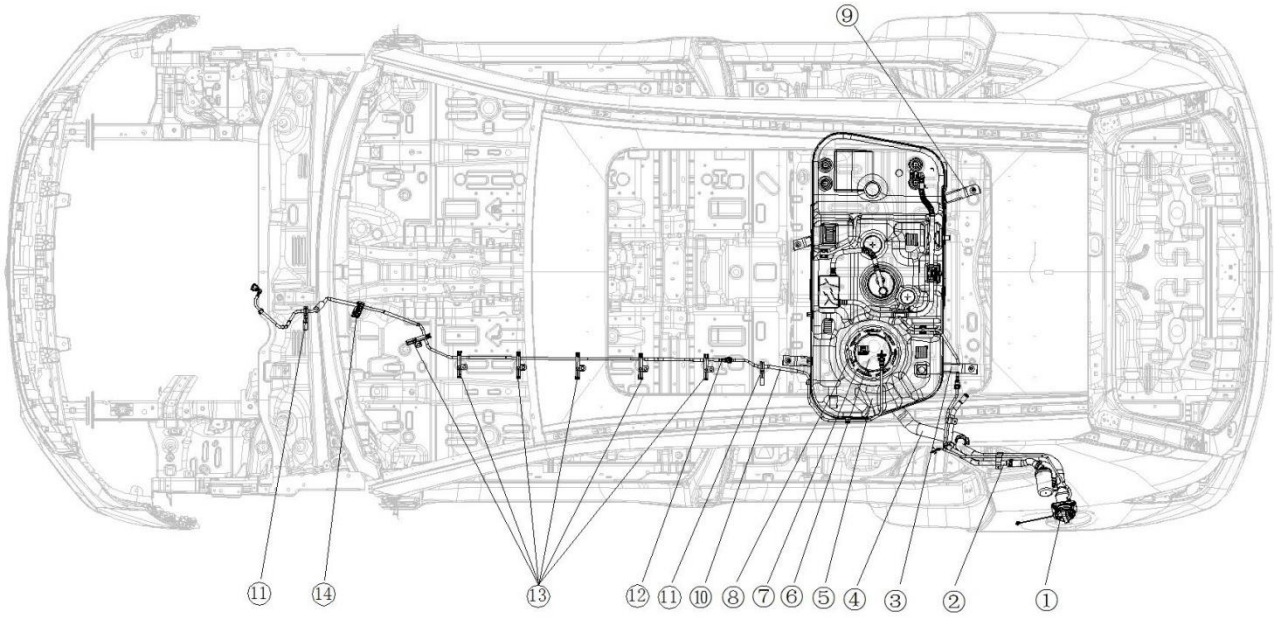
Torque specification

Name	Nm
Fuel manifold assembly mounting bolt	32±2
Filler pipe assembly and filler box mounting bolt	5±1
Filler pipe assembly mounting bracket and body mounting bolt	23±3
Fuel tank fixing belt assembly and body mounting bolts	63±5
Fuel tank filling hose assembly connecting hoop	5±0.5
Fuel pump flange and fuel tank assembly are rotationally clamped.	135 ~ 406(Torque as auxiliary, angle as main, 15-17 degrees)

Composition and position distribution



Serial number	Component name	Quantity
1	Fuel manifold assembly	1
2	High-pressure oil pump oil outlet pipe assy.	1
3	High-pressure fuel pump assembly	1



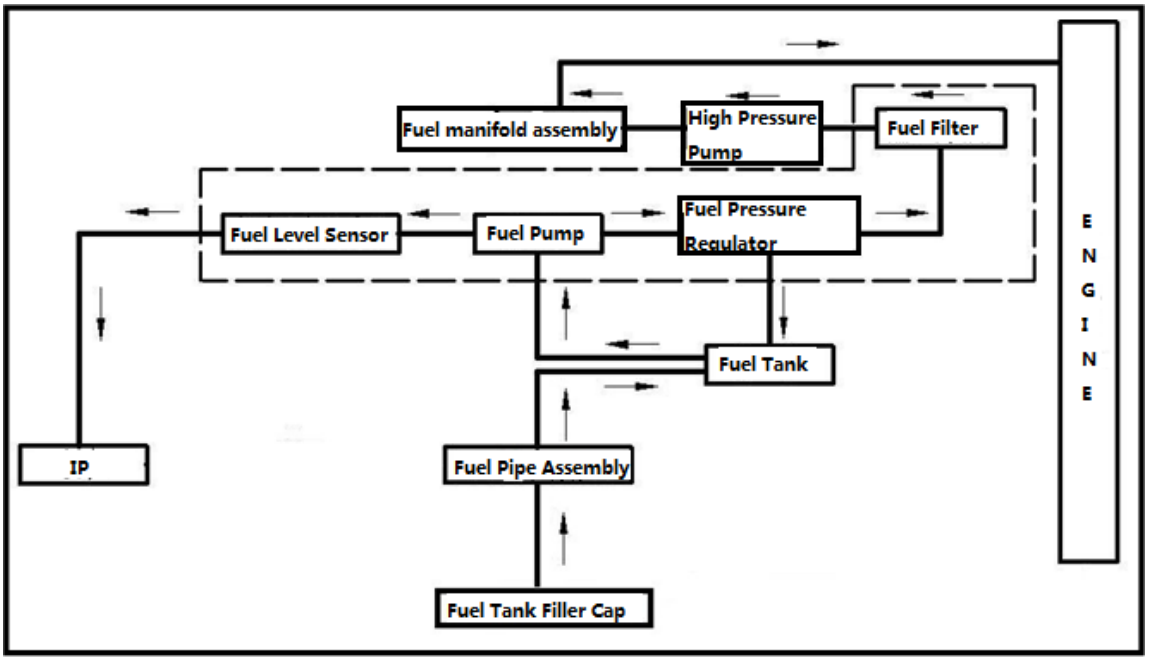
Serial number	Component name	Quantity
1	Fuel tank filler cap assembly	1
2	Filler pipe assy.	1
3	Fuel tank fixing belt assembly(Left)	1
4	Fuel tank filling hose assembly	1
5	Fuel tank assembly	1
6	Fuel pump and bracket assembly	1
7	Fuel pump flange	1
8	Fuel pump sealing ring	1
9	Fuel tank fixing belt assembly(Right)	1
10	Fuel tank fuel pipe assembly	1
11	Fuel pipe clamp assy. I	2
12	Oil supply connecting pipe assy.	1
13	Fuel pipe clamp assy. I	6
14	Fuel pipe clamp assembly	1

System overview

Fuel system

The fuel system complies with national 6b emission regulations, has ORVR refueling oil and gas recovery function, and adopts no fuel return system. Fuel tank assembly rated volume 55 L;

Fuel system includes fuel tank filler cap assembly, fuel filler pipe assembly, fuel tank assembly, fuel pump and bracket assembly, fuel supply pipeline, high-pressure fuel pump, fuel manifold, fuel injector, fuel pressure sensor, etc. for storage, delivery and cleaning of fuel.



Direct fuel injection system(GDI)

1. Direct injection system uses porous fuel injectors to directly inject high-pressure fuel into the combustion chamber, and the atomized fuel injected from the porous fuel is conducive to vaporization, and the air temperature in the combustion chamber will decrease accordingly. Therefore, explosion-proof performance, higher compression ratio and engine output power can be obtained;
2. There is no time lag from the start of fuel injection to the fuel injection into the combustion chamber, so high response performance can be achieved.

Structural principle of parts
Check fuel quantity sensor with fuel pump

Function

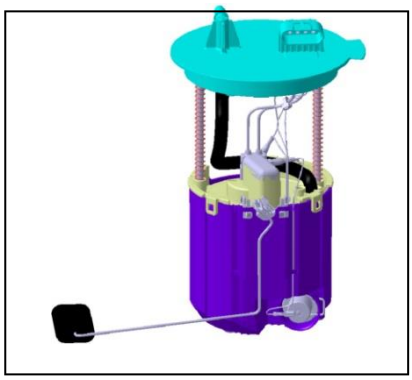
The fuel pump with fuel quantity sensor assembly is installed on the fuel tank to provide

enough fuel for the engine and complete fuel quantity indication with the instrument. Working

principle

The fuel in the fuel tank is pumped out by the fuel pump assembly, fine filtered by the fuel fine filter assembly, and then adjusted to the specified pressure by the pressure regulating valve assembly. Regulated fuel is delivered to the engine

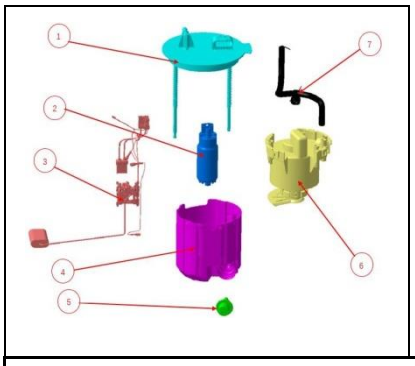
Fuel distribution header or high-pressure fuel pump, surplus fuel returns from pressure regulating valve assembly to fuel tank; The fuel floater floats up and down with the fuel level change of the fuel tank, and the fuel quantity sensor assembly converts the position change of the fuel floater into a resistance signal and outputs it to the instrument to display the fuel quantity.



Product structure

monomer structure

Fuel pump with fuel quantity sensor assembly is composed of flange assembly, pressure regulating valve, fuel pump, oil tank assembly, fuel quantity sensor assembly, fuel fine filter assembly, etc. Spring self-precompression is realized according to the height of fuel tank.

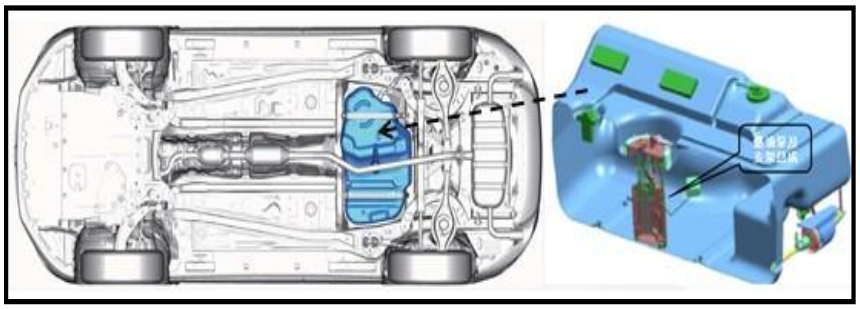


Serial number	Component name	Function
1	Flange assembly	For assembly installation, positioning and connector interface and pipeline connection
2	Fuel pump assembly	Suction and delivery of fuel in the tank to the engine fuel distribution header or high-pressure fuel pump
3	Oil quantity sensor assembly	Convert the oil quantity change into resistance signal information and provide it to the instrument.

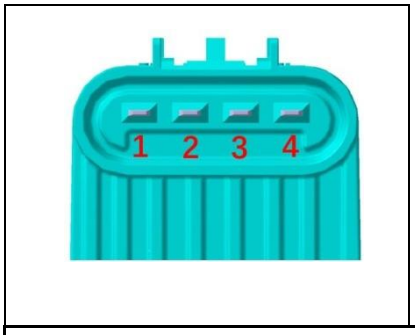
Serial number	Component name	Function
4	Oil reservoir assembly	Fix fuel pump, fuel sensor, etc., and store fuel, etc.
5	Pressure regulating valve assembly	Adjust fuel delivery pressure
6	Fuel fine filter assembly	Used for fine filtration of impurities in fuel
7	Fuel pipe	Fuel delivery

Layout structure

The fuel pump with fuel sensor assembly is arranged on the fuel tank, and the complete vehicle is located at the bottom of the rear seat.



Interface definition



Interface No.	Interface definition
1	Fuel pump power supply positive
2	Sensor positive
3	Sensor negative
4	Fuel pump power supply negative

Basic performance

Name	Specifications
Rated pressure of fuel pump with fuel sensor	500kPa
Fuel pump assembly (pump core) output flow	13.5 V voltage, pressure 500kPa, not less than 100 L/h
Maximum resistance of oil quantity sensor(Floater at lowest point)	(260 ±3) Ω
Minimum resistance of oil quantity sensor(The float is at the highest point)	(30±2) Ω

Product fault and troubleshooting

Warning

Fuel or fuel evaporative gas is highly flammable. To avoid fire or explosion hazard, keep away from the fire source and do not allow operators to use mobile phones when performing this procedure. Do not drain or store discharged fuel in an open container. Prepare a dry chemical fire extinguisher nearby before performing this procedure.

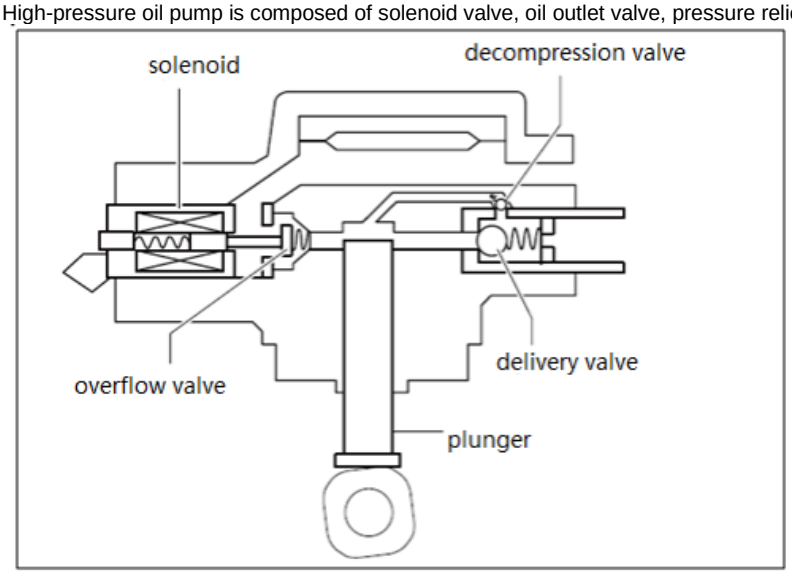
Fuel pump and bracket assembly inspection

1. Perform fuel pump and bracket assembly removal process;
2. Check the appearance of fuel pump and bracket assembly for obvious damage, mechanical damage or rust; if yes, replace the fuel pump and bracket assembly;
3. Check whether all electrode plugs PIN pins of fuel pump and assembly are bent or corroded; if yes, replace fuel pump and bracket assembly; Fuel filter maintenance
1. The fuel filter is integrated on the fuel pump and bracket assembly in the fuel tank, and cannot be removed separately;
2. Replace the fuel pump and bracket assembly as a whole during maintenance. Refer to the removal and installation of the fuel pump and bracket assembly.
3. After replacement, run the engine for several minutes, and check whether the connecting parts leak oil.
4. The fuel filter maintenance interval shall be carried out according to the maintenance period table in the instruction manual.

High-pressure oil pump

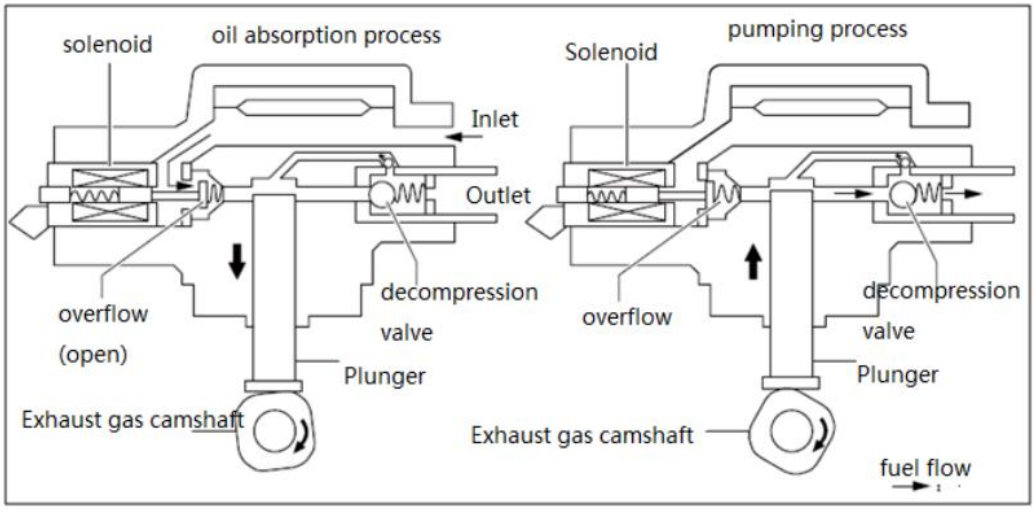
Structure

High-pressure oil pump is composed of solenoid valve, oil outlet valve, pressure relief valve and pump body.



Working principle

The piston is driven up and down by the cam at the rear end of the exhaust camshaft to segment and pump the fuel out; According to the control signal from ECU, control the solenoid valve of high-pressure fuel pump to open or close, so as to establish high-pressure fuel according to; If the fuel pressure exceeds the set value, the pressure relief valve is opened to ensure safety.



High-pressure oil pump resistance check

Warning The accuracy requirement of multimeter is 0.01Ω; At other temperatures, the resistance value may exceed the deviation of ±5%. Pay attention to distinguish the deviation caused by the product itself and temperature.

1 Disconnect the high-pressure oil pump connector without pressing the ignition switch.

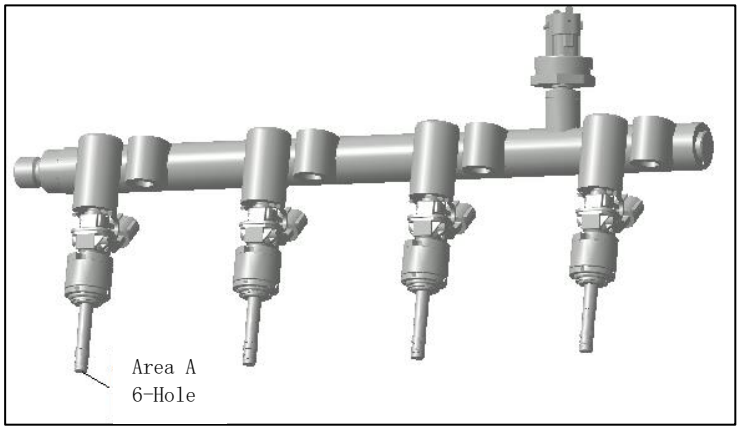
2 Measure the resistance between two pin pins of high-pressure oil pump with a multimeter.(Nominal value 0.52Ω)

3 Connect high-pressure oil pump connector

Fuel manifold assembly(Fuel injector)

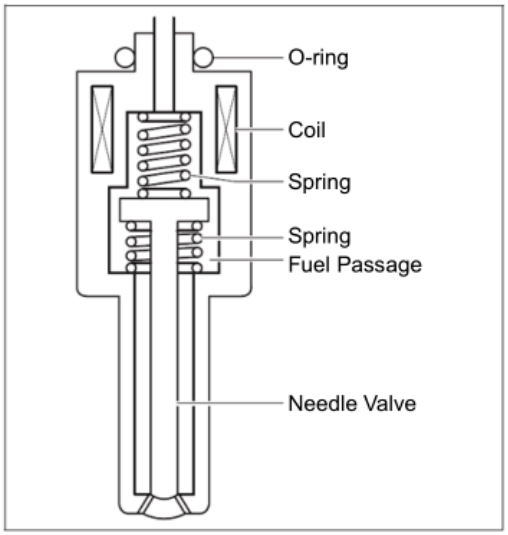
Fuel manifold assembly structure

The fuel manifold assembly is integrated with the fuel pressure sensor and fuel injector by the fuel manifold. The fuel injector has 6 fuel injection holes in area A as shown in the figure.



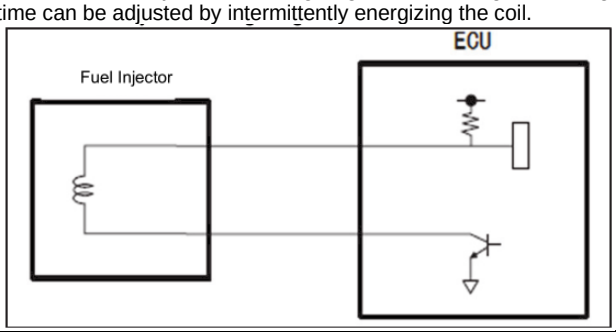
Fuel injector structure

Fuel injector includes valve seat, needle valve assembly, spring, coil, O-ring, etc.

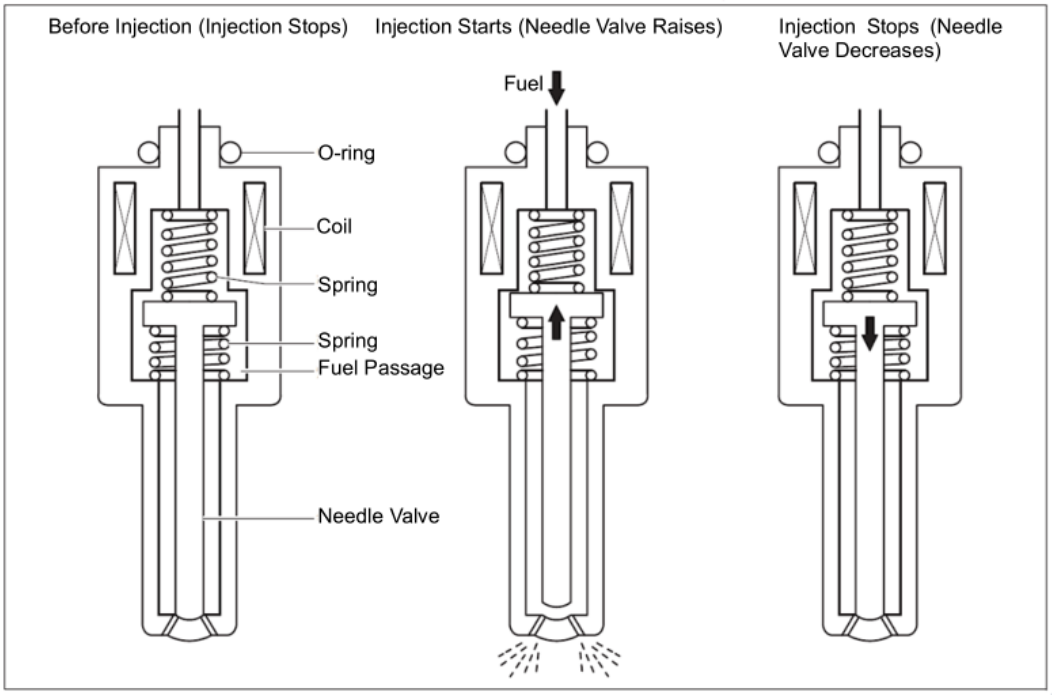


Working principle of fuel injector

Control the fuel injector coil energizing time according to ECU signal to realize fuel injection. The fuel injection time is controlled by ECU. The injection time can be adjusted by intermittently energizing the coil.



Before injection (without fuel injection), when the coil is not energized, the high-pressure fuel injection passage sent by the fuel header is pressurized and the needle valve is not injected. Fuel injection start (needle valve open) sends a signal from ECU, the coil generates excitation current, thereby opening the needle valve to start fuel injection. Fuel injection stops (needle valve is closed) When stopping energizing the coil, the pressure in the oil passage increases, and the needle valve is pressed to close under the action of spring to stop fuel injection.



Check fuel header assembly (fuel injector resistance)

Disconnect the fuel injector connector without pressing the ignition switch, and measure the resistance between two pin pins of the fuel injector.(Standard: 1.83 Ω±5%)

Warning The accuracy requirement of multimeter is 0.01Ω; At other temperatures, the resistance value may exceed the deviation of ±5%. Pay attention to distinguish the deviation caused by the product itself and temperature.

Fuel tank

Function

The independent tank assembly fixed to the lower body of the vehicle for storing fuel is an integral part of the fuel tank body, fuel filler, valve body, pipe joint and other accessories.

Working principle

1.The fuel is filled into the fuel tank through ICV valve, and the fuel filling quantity is controlled to the rated volume through CFLVV combination valve and fed back to the fuel filling gun for automatic tripping;

2.The fuel tank is connected to the outside through CFLVV combination valve to realize fuel vapor recovery passage and internal and external pressure balance;

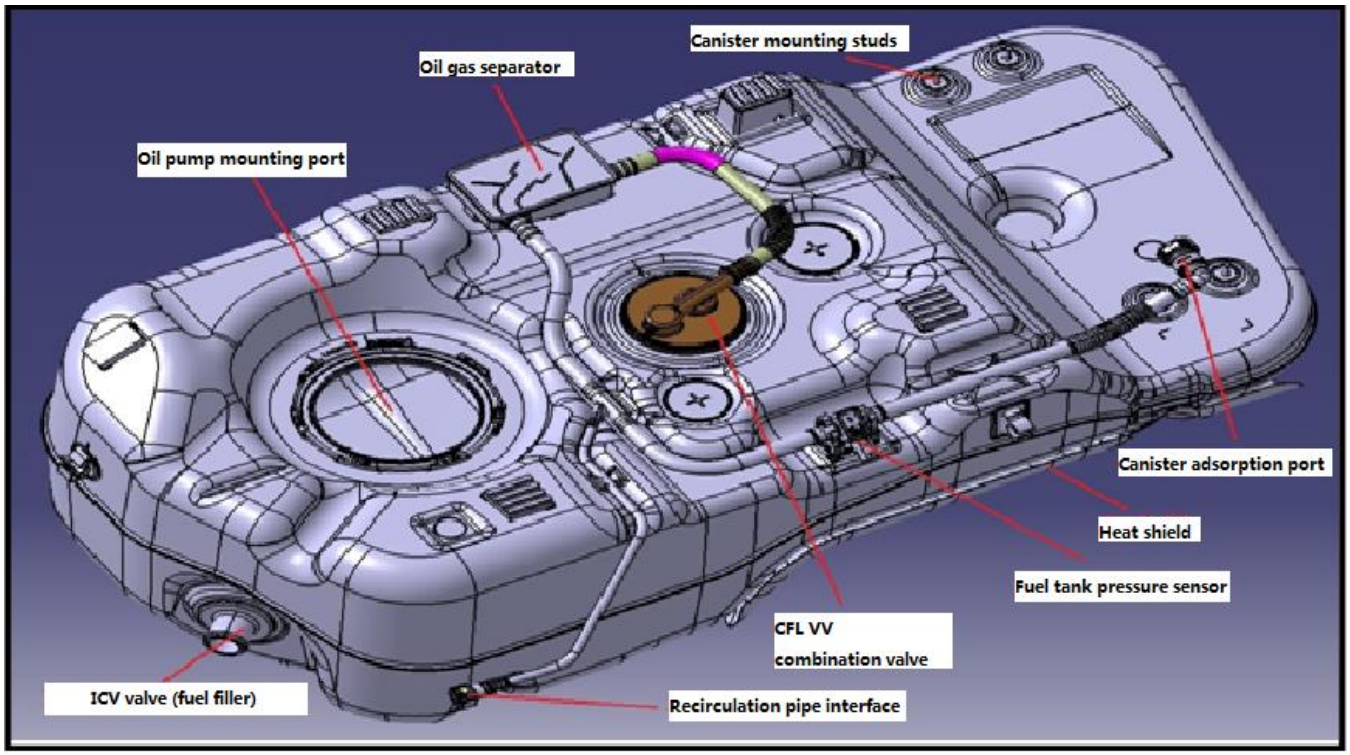
3. The built-in oil and gas separator prevents the liquid fuel from flowing into the canister assembly, causing the canister assembly to weaken and fail;

4.The built-in fuel tank pressure sensor realizes the OBD

diagnostic function required by laws and regulations.

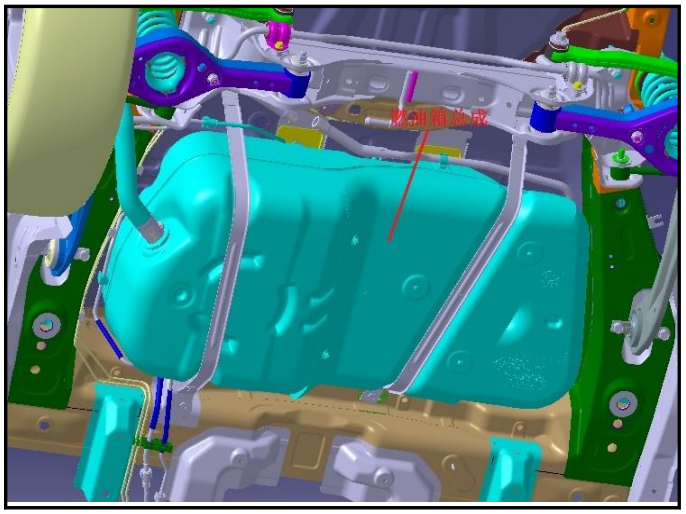
Product structure

1. Single structure



2. Layout structure

The fuel tank assembly is arranged under the rear row seat of the complete vehicle, and is fixedly connected to the lower body through left and right metal fixing belts:



Product fault and troubleshooting

1. Check whether the mounting nut of fuel tank fixing belt is loose; if not, tighten according to the specified torque;

2. Inspect the fuel tank and all connecting parts for oil leakage; if yes, replace the fuel tank assembly;

Common methods

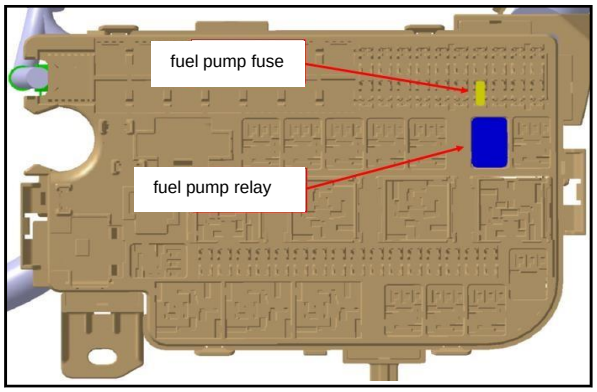
Inspection of low-pressure oil pressure

⚠Warning

Fuel system pressure relief

1. Place the shift gear in neutral gear and the parking gear in tension parking state.

2. Open the engine cover and unplug the fuel pump fuse or relay.

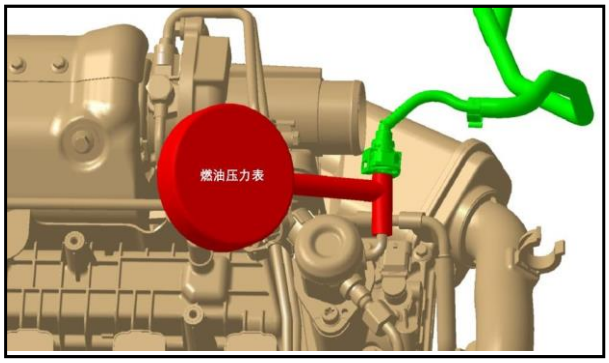


3. Turn the ignition switch to "START" until the engine stops

4. Set the ignition switch to OFF, plug in the fuel pump fuse or relay,
and close the engine cover. Fuel system pressure test

1. Perform pressure relief operation on the fuel system.

2.Open the engine cover, disconnect the battery negative cable, and connect the fuel pressure gauge to the fuel line and the engine.



3. Connect the battery negative cable.

4. Perform the fuel pressure test:

1) Idle speed pressure test: After starting the engine and running the vehicle at idle speed for one minute, check whether the idle speed fuel pressure within five minutes is within the range of (450 ~ 550) kPa. Otherwise, refer to the non-pump fuel diagnosis process (relevant in the low-pressure fuel supply system).

2) High speed pressure test: Press the accelerator pedal and control the engine speed to stabilize at 4000 ~ 5000 rpm. Check whether the high speed fuel pressure within 30 s is not less than 450kPa. Otherwise, refer to the acceleration weak diagnosis process (related in the low pressure fuel supply system).

3) Pressure maintenance test: The vehicle is flameout. Check whether the fuel pressure at 20 min after flameout is not less than 250kPa. Otherwise, refer to the starting difficulty diagnosis process.(Low pressure fuel supply system)

Perform.

High-pressure oil circuit oil pressure check

Inspection and confirmation

1 1. Visual inspection indicates that high voltage has obvious mechanical or electrical damage marks; Inspection items: Oil circuit, harness, high-pressure oil pump, control unit(ECU)

2 If the problem observed or raised is obvious and the cause has been determined, correct the cause first.

3 If the visual inspection passes, check as follows:

- Check whether the harness and high-pressure oil pump and whether the harness and ECU are connected reliably; If yes, next check; If - No, tighten first.
- Check the harness for open circuit. If yes, replace the harness; E.g. - No, next check
- Check the high-pressure oil pump resistance. If it is infinite, replace the high-pressure oil pump; If normal, next check
- Change the high-pressure fuel pump of the faulty vehicle to the normal vehicle, and check whether the same fault occurs. If yes, replace with a new high-pressure fuel pump; If no, reinstall the high-pressure oil pump, and if the fault occurs again,

check the next step; If the fault is eliminated, check the harness connection to ensure reliability;

- Check whether ECU and fuel pump are normal.

Fuel system pressure relief

1 Place the shift gear in neutral gear and the parking gear in tension parking state.
2 Open the engine cover and unplug the fuel pump fuse.
3 Press the ignition switch, start the engine, and run it until the engine stops.
4 Do not press the ignition switch, plug in the fuel pump fuse, and close the engine cover.

Fuel filling

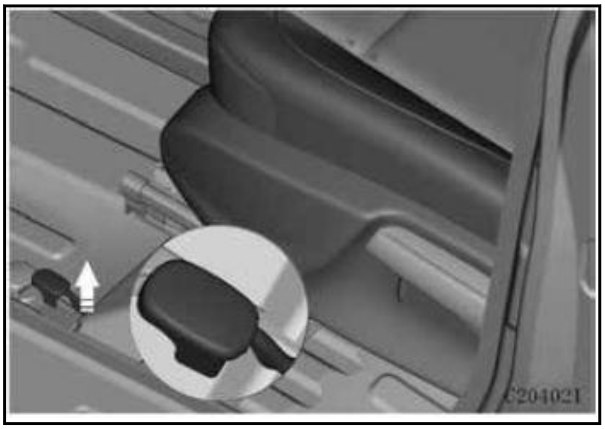
Warning

The process includes fuel treatment. Pay attention to whether there is fuel spill at any time and pay attention to precautions for fuel treatment, otherwise personal injury may be caused.

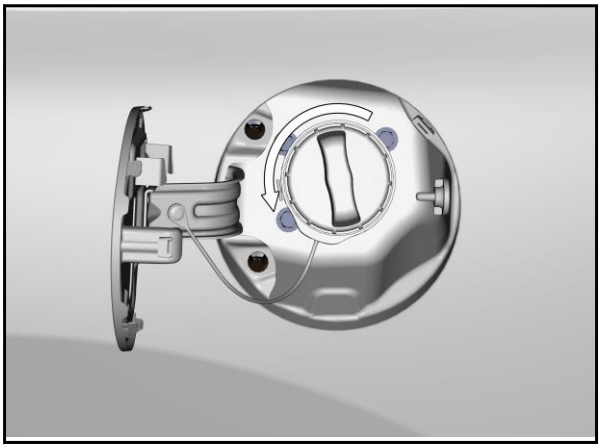
Warning

When working on fuel components, do not use any form of open flame and do not start the engine. High flammability mixture generated during operation may be ignited. Improper operation may cause personal injury.

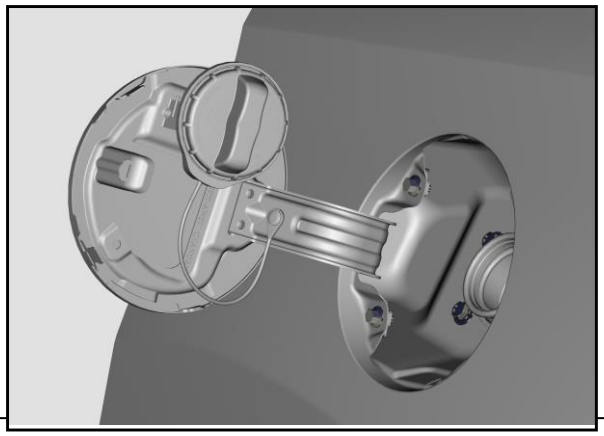
1 Turn the ignition switch to OFF position and close all doors and windows.
2 Pull up the fuel filler cover unlocking handle to slightly open the fuel filler cover.



3 Fully open the filler flap.
4 Turn the filler cap counterclockwise and remove.



5 Position the filler cap on the back side of the tank door.



6 Insert the filler opening of the fuel gun nozzle completely into the tank, hang it and fill it.

Danger

To prevent injection due to excessive fuel pressure, open the filler cap slowly.

Extend the fuel gun as far as possible to the depth of the fuel tank, otherwise the fuel may spill or spill out of the fuel tank, resulting in the risk of fire and explosion.The automatic closing of the fuel gun indicates that the fuel tank is full. Do not continue filling at this time. Otherwise, the fuel may be spilled and the fuel system may be damaged.

Danger

Warning Do not splash the fuel on the paint surface, otherwise it may damage the paint surface.

If ice does not open around the fuel tank door, push or tap the fuel tank door to open the fuel tank door.

7 Install the filler cap on the filler opening and close it clockwise until clear locking sound is heard. Close the filler opening cover.

Warning

Fuel tank drain

Warning

The process includes fuel treatment. Pay attention to whether there is fuel spill at any time and pay attention to precautions for fuel treatment, otherwise personal injury may be caused.

Warning

When working on fuel components, do not use any form of open flame and do not start the engine. High flammability mixture generated during operation may be ignited. Improper operation may cause personal injury.

1 Fuel system pressure relief, see Fuel system pressure relief section
2 Lifting vehicle
3 Drain the fuel in the fuel pipe; Place a container under the fuel pipe joint at the floor, and then disconnect the fuel pipe assembly of the fuel tank from the fuel supply connecting pipe assembly; Connect fuel tank fuel pipe assembly to container with hose.
4 Lower the lift
5 Unplug the fuel pump relay, take a section of iron wire or copper wire to connect the fuel pump relay, make the fuel pump start to work, pump out the fuel in the fuel tank, and start to drain the fuel. Observe the fuel flow at the outlet of the hose. When the flow is significantly reduced and the fuel contains air, stop discharging the fuel.

Fault symptom diagnosis check and confirmation

Warning

The process includes fuel treatment. Pay attention to whether there is fuel spill at any time and pay attention to precautions for fuel treatment, otherwise personal injury may be caused.

Warning

When working on fuel components, do not use any form of open flame and do not start the engine. High flammability mixture generated during operation may be ignited. Improper operation may cause personal injury.

1. Confirm the customer's problem.

2. Visually inspect for visible signs of mechanical or electrical damage.

Mechanical part	Electrical part
• Fuel line damage • Quick coupling damage • Fuel leakage • Fuel tank filler cap is damaged. • Fuel tank filler pipe damaged • Fuel tank damage	• Fuel pump circuit • Fuel pump relay • Fuel pump and bracket assembly

3. If the observed or raised problem is obvious and the cause has been found, the cause must be corrected before proceeding to the next step.

4.If the problem cannot be found obviously, confirm the fault and refer to the symptom table.

Appearance check list

Warning

The process includes fuel treatment. Pay attention to whether there is fuel spill at any time and pay attention to precautions for fuel treatment, otherwise personal injury may be caused.

Warning

When working on fuel components, do not use any form of open flame and do not start the engine. High flammability mixture generated during operation may be ignited. Improper operation may cause personal injury.

Fuel pump and bracket assembly inspection

1 Refer to chapter Fuel pump and bracket assembly to remove fuel pump and bracket assembly.
2 Check the appearance of fuel pump and bracket assembly for obvious damage, mechanical damage or rust; if yes, replace the fuel pump and bracket assembly;
3 Check whether all electrode plugs PIN pins of fuel pump and assembly are bent or
corroded; if yes, replace fuel pump and bracket assembly; Filler cap and filler pipe inspection

1 After unscrewing the fuel filler cap, check whether the fuel filler accessory has obvious oil dirt and whether the sealing gasket of the fuel filler cap is damaged. If yes, replace the fuel filler pipe and the fuel filler cap;
2 Inspect the fuel filler cap housing and lifting rope for
damage; if so, replace the filler cap; Fuel tank check

1 Check whether the torque of mounting nut of fuel tank fixing belt is loose; if not, tighten as specified;
2 Check whether the fuel tank has oil leakage; if yes,
replace the fuel tank assembly; Fuel supply pipeline and
connecting piece

1 Check whether the fuel supply pipeline joint is assembled normally; if not, re-assemble;
2 Check whether the fuel supply pipeline and connecting parts
are damaged; if so, replace the damaged parts; Check fuel header
assembly (fuel injector resistance)

1 The transmission gearshift lever is placed in "Neutral" and parking brake can be applied;
2 Disconnect the fuel injector connector without pressing the ignition switch; Measure resistance between terminals of fuel injector

Note: The accuracy requirement of multimeter is 0.01Ω; At other temperatures, the resistance value may exceed the deviation of ±5%. Pay attention to distinguish the deviation of product itself and the deviation caused by temperature. Check the resistance of high-pressure oil pump.

1 Disconnect the high-pressure oil pump connector without pressing the ignition switch.
2 Measure resistance between terminals of high-pressure oil pump

3 Connect high-pressure oil pump connector

Fault symptom table

If the fault occurs but no DTCs are stored in the ECM and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Measures
Diagnosis process without oil pump(Low pressure fuel supply system)	Diagnosis flow without pump oil (related in low-pressure fuel supply system)
Start difficult diagnostic process(Low pressure fuel supply system)	Start difficult diagnosis process (related in low-pressure fuel supply system)
Accelerate weak diagnosis process(Low pressure fuel supply system)	Accelerated weakness diagnosis process (related in low pressure fuel supply system) diagnosis process
No diagnostic flow for oil level indication(Fuel quantity sensor related, integrated on fuel pump and bracket assembly)	Fuel level indication does not allow diagnostic process (fuel quantity sensor related, integrated on fuel pump and bracket assembly) diagnostic process

Inaccurate oil level indication

Test conditions	Details/Results /Measures
1. General inspection	
	A. Perform fuel pump and bracket assembly removal and assembly procedures. Visually check whether the floater rod is obviously bent or deformed, whether the oil floater can rotate freely, and whether the oil floater can float normally in gasoline. ? No Replace the original fuel pump and bracket assembly. ? Yes Perform step 2.
2. Clean impurity/colloid	
	A. Use alcohol or gasoline to clean the impurities/colloids accumulated on the surface of the oil quantity sensor resistance plate, re-load the vehicle, and check whether the fault is eliminated. ? Yes Repair completed. ? No Perform step 3.
3. Oil quantity signal detection	
	A. Connect the oil sensor signal wire with a multimeter (ohmic gear), swing the floater rod slowly from the lowest point to the highest point, test whether the maximum and minimum resistance values of the oil sensor meet the component specifications, whether the resistance value changes slowly and uniformly from large to small during swing, and whether there is no open circuit phenomenon. ? Yes rule out Fuel sensor problem. ? No Replace the original fuel pump and bracket assembly.

Engine weakness(Insufficient oil pressure)

Test conditions	Details/Results/Measures
1. General inspection	

	A. Check the oil pressure of low-pressure oil passage, and check whether the oil pressure of high-speed pressure test is greater than 450kPa. ? Yes rule out Fuel system fault. ? No Perform step 2.
2. Pipeline inspection	
	Check whether there is leakage at the oil supply pipe and connector. ? Yes Repair or replace the corresponding faulty parts. ? No Perform step 3.
3. Interchange inspection	
	A. After replacing the fuel pump and bracket assembly for the test, check the oil pressure of the low-pressure oil passage, and check whether the oil pressure of the pressure maintaining test is greater than 450kPa. ? Yes Replace the original fuel pump and bracket assembly. ? No Non-fuel pump fault, further troubleshooting

Diagnosis process without oil pump(Low pressure fuel supply system)

Warning

Test conditions	Details/Results /Measures
1. General inspection	
	A. Carry out low-pressure oil pressure check, and check whether the oil pressure value of idle speed pressure test is within (450 ~ 550) KPa. ? Yes rule out Fuel system fault. ? No Perform step 2.
Inspection of 2. circuit, signal, pipeline, etc.	
	Check whether the fuel pump relay is faulty, whether the fuel pump fuse is blown, and whether the corresponding terminal in the engine compartment fuse box is off. Refer to Low Pressure Oil Pressure Check ? Yes Replace the damaged fuse or relay and repair the fuse box terminal. ? No

Test conditions	Details/Results /Measures
	Unplug the fuel pump connector, connect the connector pin 1,4 with a multimeter, start the vehicle, and check whether the voltage is within 8-16 V. ? No Repair or replace the corresponding harness. ? Yes Inspect the fuel supply lines and joints for leaks or blockages. ? Yes Replace corresponding pipeline ? No Perform step 3.
3. Inspection of fuel pump and bracket assembly	
	A. Perform fuel pump and bracket assembly removal and installation process Use a multimeter to test the internal resistance of the fuel pump motor for zero or infinity (i.e. short circuit or open circuit status). ? Yes Replace fuel pump and bracket assembly.

Start difficult diagnostic process(Low pressure fuel supply system)

Warning

Test conditions	Details/Results/Measures
1. General inspection	
	A. Check the oil pressure in the low-pressure oil passage, and check whether the oil pressure in the pressure retaining test is greater than 250kPa. ? Yes rule out Fuel system fault. ? No Perform step 2.
2. Pipeline inspection	
	Check whether there is leakage at the oil supply pipe and connector. ? Yes

	Repair or replace the corresponding faulty parts. ? No Perform step 3.
3. Interchange inspection	
	A. After replacing the fuel pump and bracket assembly for the test, check the oil pressure of the low-pressure oil passage, and check whether the oil pressure of the pressure maintaining test is greater than 250kPa. ? Yes Replace fuel pump and bracket assembly. ? No Non-fuel pump fault, further troubleshooting

Accelerate weak diagnosis process(Low pressure fuel supply system)

Warning

Test conditions	Details/Results/Measures
1. General inspection	
	A. Check the oil pressure of low-pressure oil passage, and check whether the oil pressure of high-speed pressure test is greater than 450kPa. ? Yes rule out Fuel system fault. ? No Perform step 2.
2. Pipeline inspection	
	Check whether there is leakage at the oil supply pipe and connector. ? Yes Repair or replace the corresponding faulty parts. ? No Perform step 3.
3. Interchange inspection	
	A. After replacing the test fuel pump and bracket assembly, perform low-pressure oil pressure check whether the high-speed pressure test oil pressure is greater than 450kPa. ? Yes

	Replace the original fuel pump and bracket assembly. ? No Non-fuel pump fault, further troubleshooting

No diagnostic flow for oil level indication(Fuel quantity sensor related, integrated on fuel pump and bracket assembly)

Warning

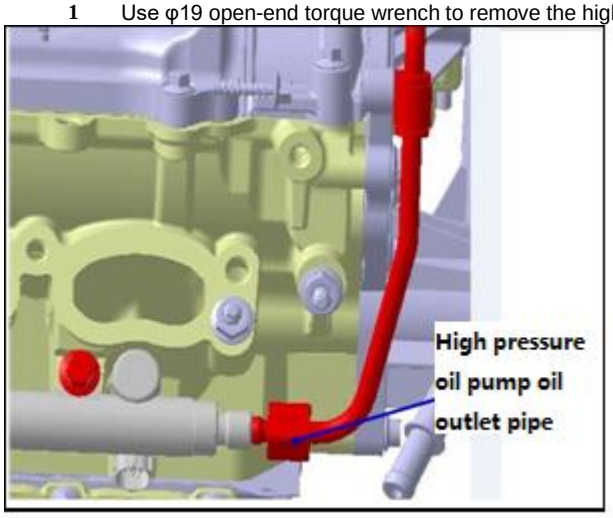
Test conditions	Details/Results /Measures
1. General inspection	
	A. Perform fuel pump and bracket assembly removal and installation procedures. Visually check whether the floater rod is obviously bent or deformed, whether the oil floater can rotate freely, and whether the oil floater can float normally in gasoline. ? No Replace the original fuel pump and bracket assembly. ? Yes Perform step 2.
2. Clean impurity/colloid	
	A. Use alcohol or gasoline to clean the impurities/colloids accumulated on the surface of the oil quantity sensor resistance plate, re-load the vehicle, and check whether the fault is eliminated. ? Yes Repair completed. ? No Perform step 3.
3. Oil quantity signal detection	
	A. Connect the oil sensor signal wire with a multimeter (ohmic gear), swing the floater rod slowly from the lowest point to the highest point, test whether the maximum and minimum resistance values of the oil sensor meet the component specifications, whether the resistance value changes slowly and uniformly from large to small during swing, and whether there is no open circuit phenomenon. ? Yes rule out Fuel sensor problem. ? No Replace the original fuel pump and bracket assembly.

Removal and installation

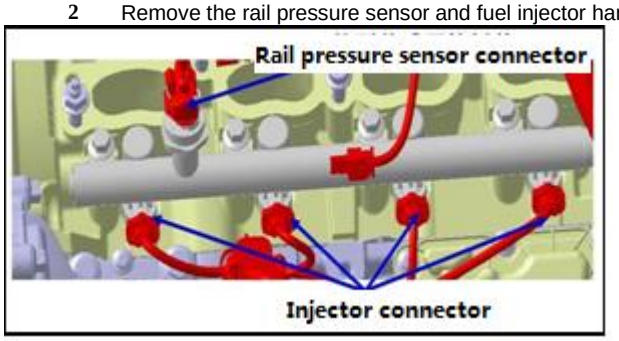
Removal and installation of fuel manifold assembly

1. Removal

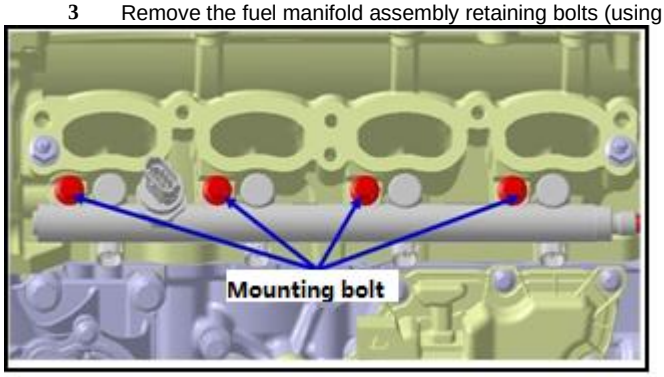
   1 Use φ19 open-end torque wrench to remove the high-pressure oil pump oil outlet pipe nut;



   2 Remove the rail pressure sensor and fuel injector harness connector.



   3 Remove the fuel manifold assembly retaining bolts (using M8 sleeve), and remove the fuel manifold assembly from the engine.



2. Installation

   Installation sequence is reverse to removal sequence

Nylon pipe quick-change joint

1. Removal

   ⚠Warning

   Warning⚠

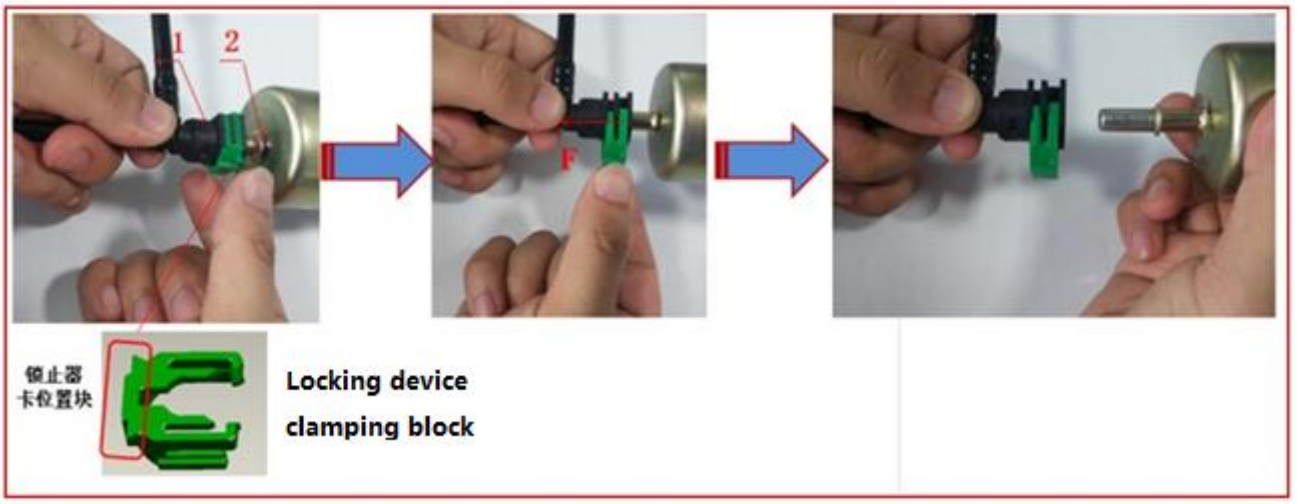
   Pull-tab type misfit-proof joint:

   Method 1(Labor)

1 Pinch the nylon pipe assembly with the left hand (close to the quick-connect end), and pinch the lock block with the thumb and index finger of the right hand (see the figure below).

2 Hold the two locking blocks of the lock by the right hand and pull them out slightly, so that the lock in the figure is open.(See figure below)

3 The male plug can be separated from the quick connect fitting by holding the fitting line assembly with the left hand and applying an appropriate force F outwards (see figure below).



Method 2(With tools)

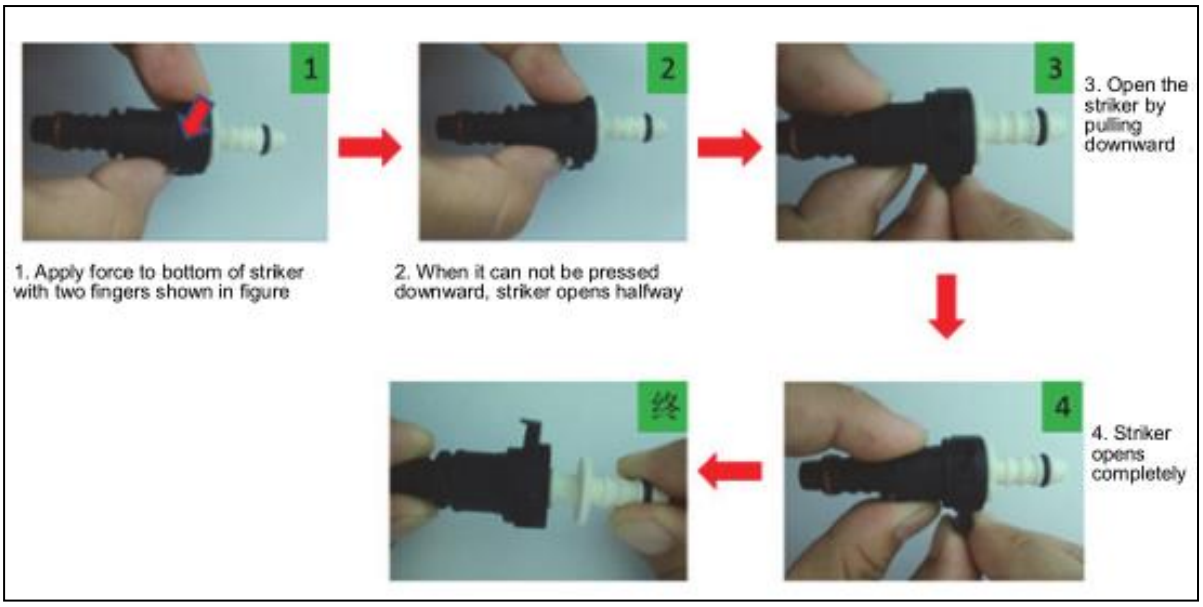
1 Prepare a word driver(Diameter 3~5 mm)

2 Pinch the connector pipeline assembly with the left hand (close to the quick connector end), pick up the prepared screwdriver with the right hand, insert the flat end of the screwdriver into the square groove of the locker along the horizontal direction (see the figure below), pull the locker slightly outwards along the horizontal direction of the connector, and the locker is in the open state at this time;

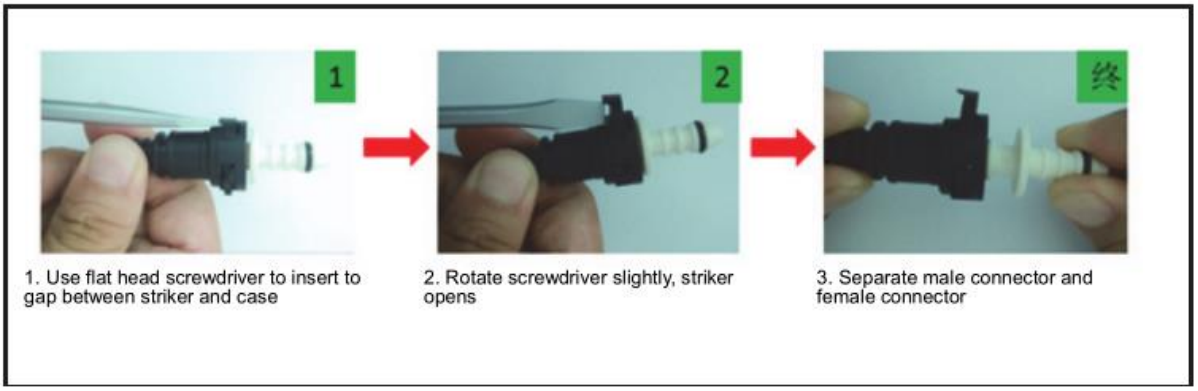
3 The male plug can be separated from the quick connect fitting by holding the fitting line assembly with the left hand and applying an appropriate force F outwards (see figure below).

Button-type misfit-proof joint:

Method 1(Labor)

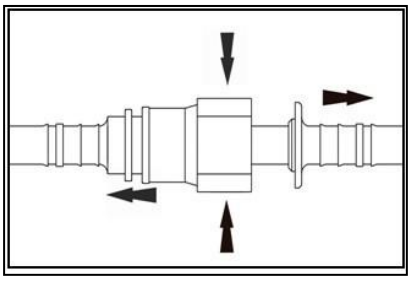


Method 2(With tools)



Push button connector:

Pinch the female joint locating clip, release it, and pull out the connected pipeline in the opposite direction of the coaxial direction;



2. Installation

Warning

Warning

Pull-tab type misfit-proof joint:

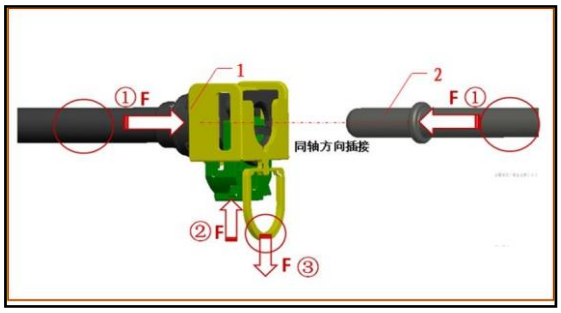
1 Clean the surface of male plug; It is recommended to lubricate the circumferential surface of male plug with 40# lubricating oil under conditions.

2 Hold the two pipelines, and insert the male connector into the female connector hole with proper force along the coaxial direction as shown in the figure (avoid oil leakage caused by damage to the sealing ring in the female connector due to

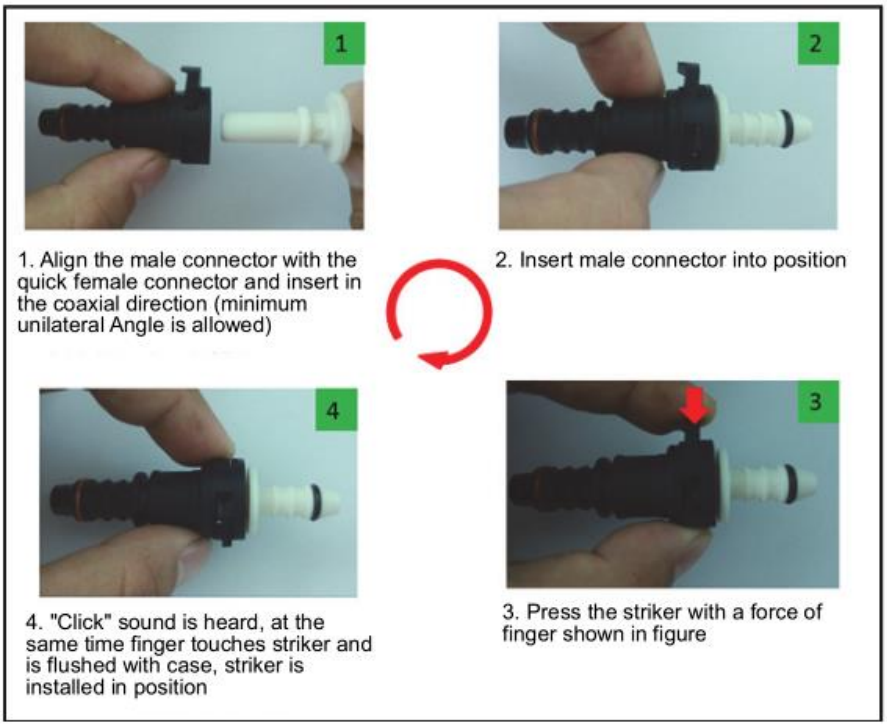
improper tilting assembly, and the tilt shall be < 5°);

3 After completing step 2 above, gently push up the locker in the figure, and the locker will move forward along the guide rail until it cannot be pushed;

4 After completing the above three steps, pull the pipe with proper force for 2~3 times to ensure that the joint and the opposing parts are firmly installed. Complete the fitting.



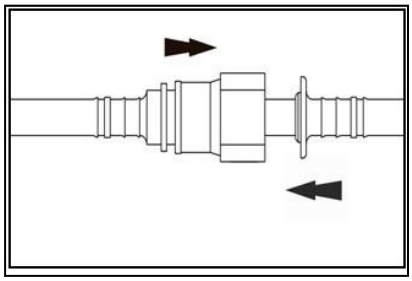
Push-button misfit-proof joint:



Push-button connector:

1 The male connector shall be inserted along the coaxial direction of the quick connector to avoid damage to the inner sealing ring of the female connector due to improper tilting assembly.

2 When inserting, you can hear a click and pull back the end face of the quick connector by hand.



Filler pipe assy.

1. Removal

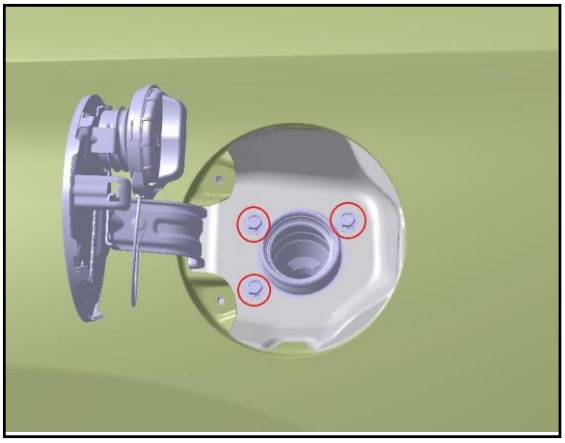
⚠Warning Warning⚠

1 Remove filler cap assembly, refer to Filler cap chapter

2 Remove the three M6

bolts at the filler port.

Torque: 5±1N.m

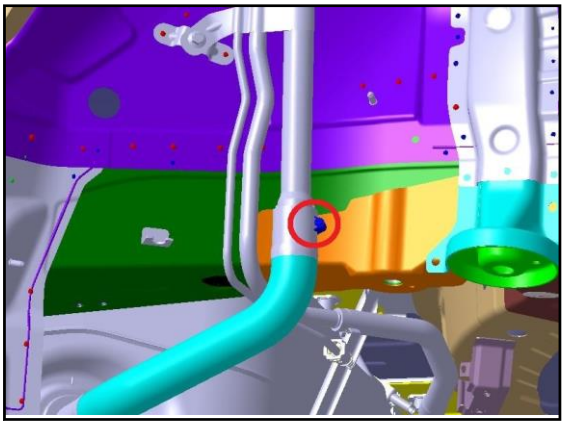


3 Remove rear left wheel assembly, see Wheels and tyres section

4 Remove rear left wheel cover assembly, refer to Wheel cover and engine side shield chapter

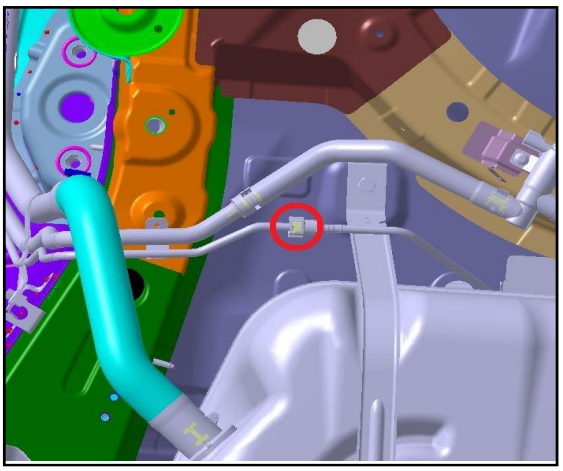
5 Remove the worm drive clamp connecting the filler

pipe assembly and the filler hose assembly Torque:

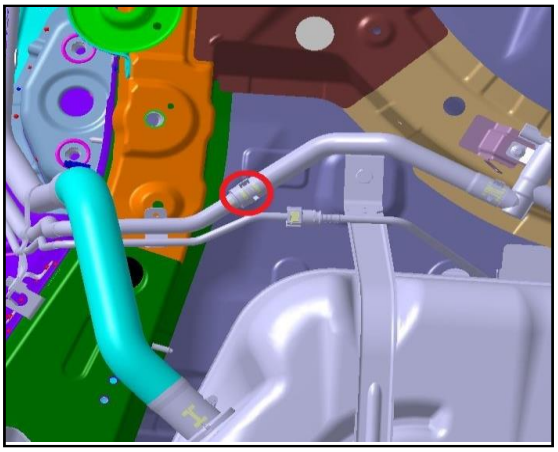


5±1N.m

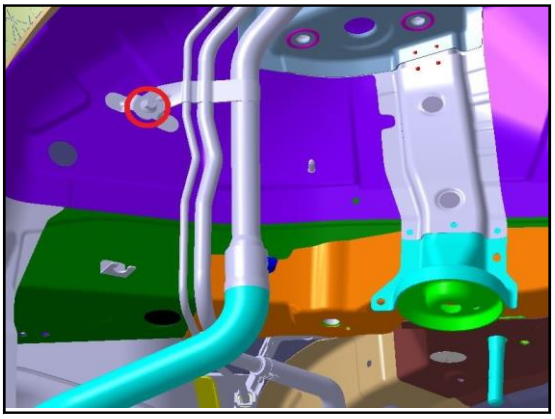
6 Remove the quick-change joint connection between the filler pipe assembly and the fuel tank recirculation pipe. Refer to the nylon pipe quick-change joint section.



7 Dismantle elastic clamp connection between oil filler pipe assembly and canister atmospheric connecting pipe II.



8 Dismantle oil filler pipe assembly and rear hub bag inner plate assembly (left) connectionM8 bolt torque: 23±3N.m



9 Remove filler pipe assembly

2. Installation

The installation process is the reverse of the removal process.

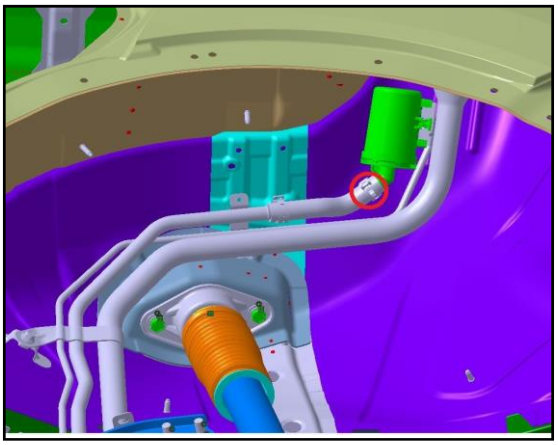
Canister stop valve air filter

1. Removal

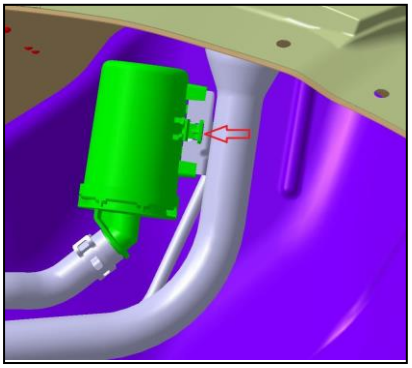
1 Remove rear left wheel assembly, see Wheels and tyres section

2 Remove rear left wheel cover assembly, refer to Wheel cover and engine side shield chapter

3 Dismantle elastic clamp connection between canister stop valve air filter and rubber pipe.



4 Press the assembly buckle properly in the direction shown in the figure to remove the canister stop valve air filter.



2. Installation

The installation process is the reverse of the removal process.

Fuel tank assembly

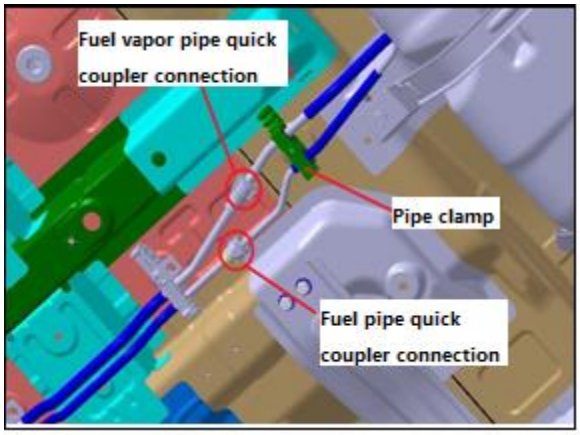
1. Removal

⚠Warning Warning⚠

1 Fuel system pressure relief, see Fuel system pressure relief section

2 Remove the left lower guard plate assembly (left) in the chassis and the left lower guard plate assembly (right) in the chassis. Refer to the bottom guard plate section.

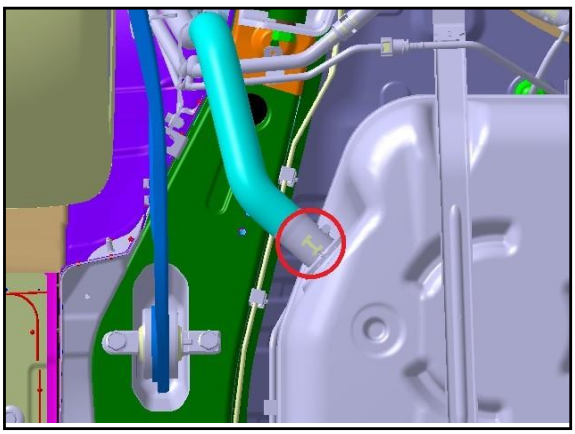
3 Open the fixed pipe clamp of fuel pipe, and disconnect the connection of fuel pipe and quick-change joint of fuel steam trachea. Refer to the section on quick-change joint of nylon pipe.



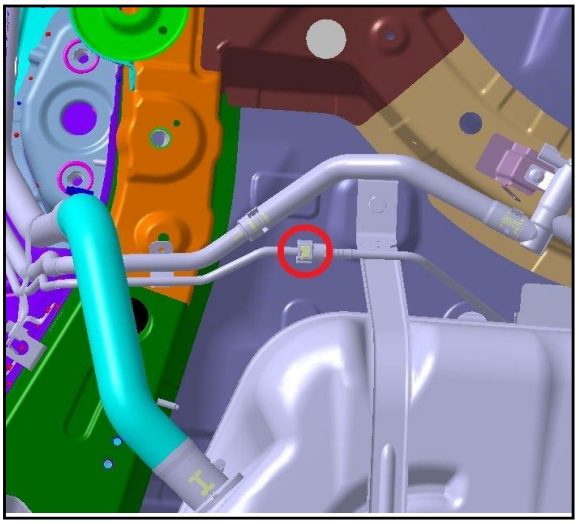
4 Drain fuel, see Fuel tank drain section

5 Dismantle the worm drive clamp connection between fuel tank filling hose assembly and fuel tank assembly.

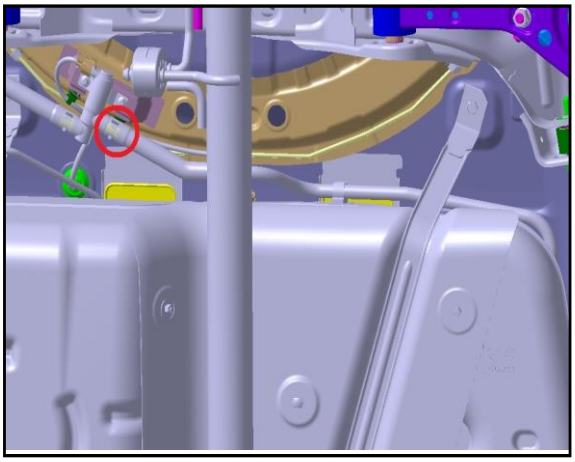
Torque: 5±1N.m



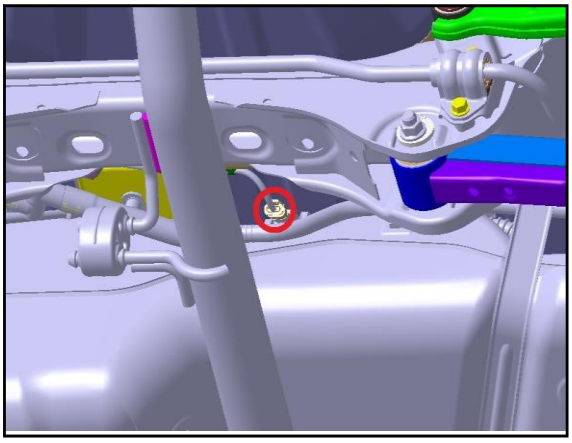
6 Remove the connection between filler pipe assembly and recirculation pipe quick-change joint of fuel tank assembly. Refer to nylon pipe quick-change joint section.



7 Dismantle the elastic clamp connection between canister atmospheric connecting pipe assembly and canister stop valve.



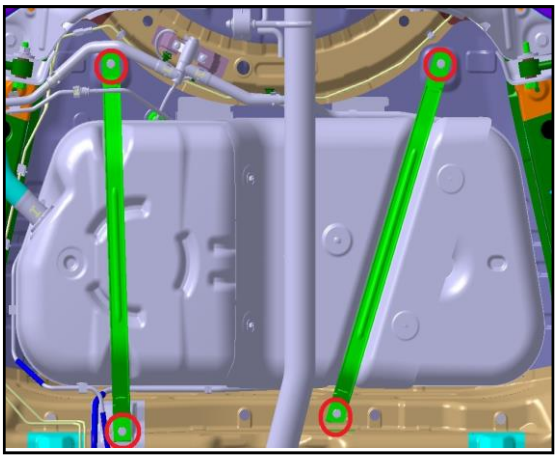
8 Disconnect connector of harness and fuel tank pressure sensor assembly.



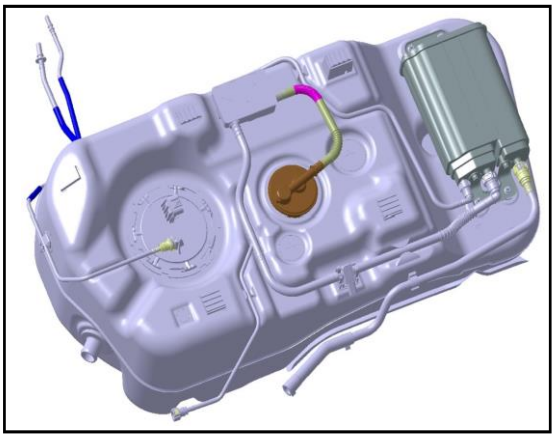
9 Support the fuel tank with a flat jack;

Warning

10 Remove the mounting bolts (4) of the fuel tank fixing belt assembly (left)/(right); Remove the fuel tank fixing belt assembly (left)/(right); Torque: 63±5N.m



11 Slowly lower the flat jack, disconnect the harness connector of the fuel pump during the process, and remove the fuel tank sub-assembly;



Warning

12 Refer to chapter Fuel pump and bracket assembly to remove fuel pump and bracket assembly.

13 Remove canister assembly, refer to Canister Assembly

2. Installation

The installation process is the reverse of the removal process.

Fuel pump and bracket assembly

Removal

Warning

The process includes fuel treatment. Pay attention to whether there is fuel spill at any time and pay attention to precautions for fuel treatment, otherwise personal injury may be caused.

Warning

Do not use open flames of any kind when working on fuel components. High flammability mixture generated during operation may be ignited. Improper operation may cause personal injury.

Warning

Before removing or replacing the fuel pump and bracket assembly, disconnect the negative terminal of the battery.

Warning

When inspecting or replacing the fuel pump and bracket assembly, it is prohibited to smoke or close to the fire source.

Warning

The fuel pump and bracket assembly can only be removed after the fuel pressure in the fuel line system is removed.

1. Dismantle fuel tank assembly, see fuel tank assembly dismantling and installation procedures for details;

2. Dismantle the fuel pipe assembly of fuel tank and the connection between fuel return pipe assembly of fuel tank and fuel pump inlet and outlet; refer to the procedure of nylon pipe quick-change joint dismantling and installation for joint dismantling;

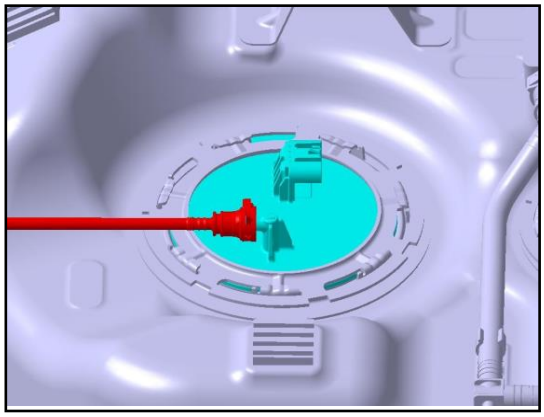


Figure 27:

3. Remove the fuel pump flange in a counterclockwise direction using the special disassembly tool for the fuel pump in No.6 of China;

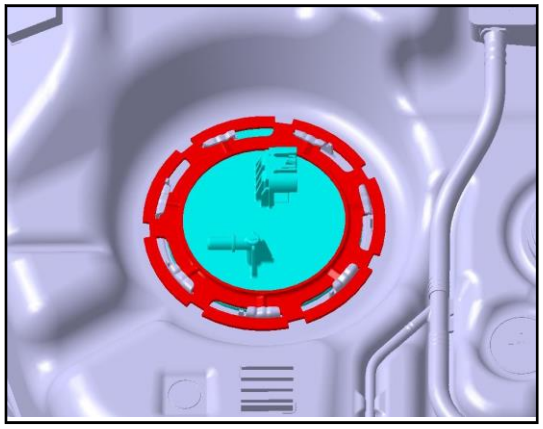


Figure 28:

4. Take out fuel pump and bracket assembly;

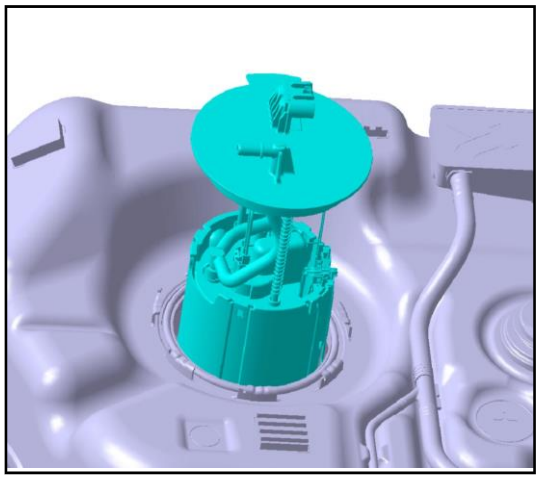


Figure 29:

Caution Do not damage the level sensor assembly during fuel pump removal,

otherwise it will cause oil level indication fault. Installation

Caution Do not damage the level sensor assembly during installation.

Caution After installing the fuel pipe and oil return pipe, ensure that there is no leakage.

1. Other installation process is opposite to removal process.

Fuel supply pipeline and connecting piece

1. Removal

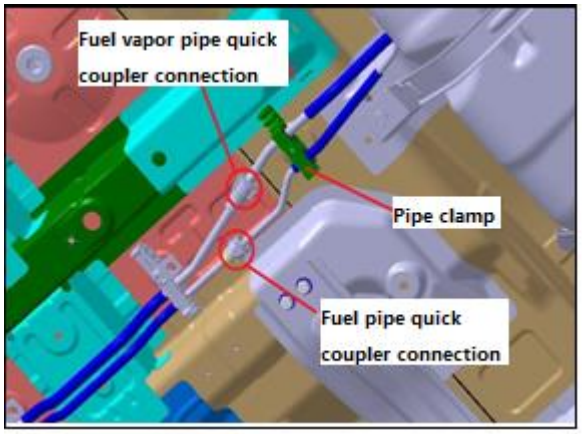
Warning

Warning

1 Fuel system pressure relief, see Fuel system pressure relief section

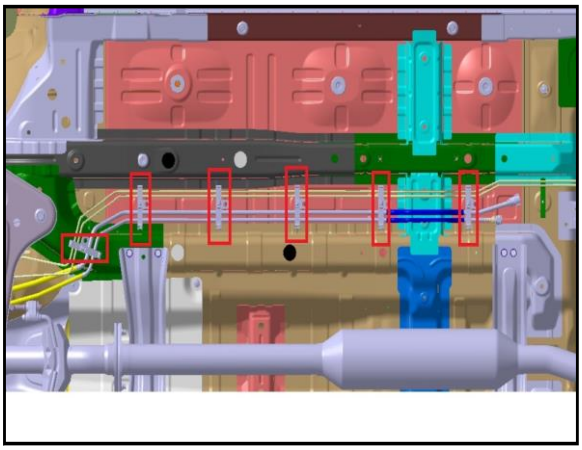
2 Remove the left lower guard plate assembly (left) in the chassis and the left lower guard plate assembly (right) in the chassis. Refer to the bottom guard plate section.

3 Open the fixed pipe clamp of the fuel pipe at the position shown in the figure below with a straight line, and disconnect the connection between the fuel pipe and the quick-change joint of fuel steam trachea. Refer to the section on quick-change joint of nylon pipe.



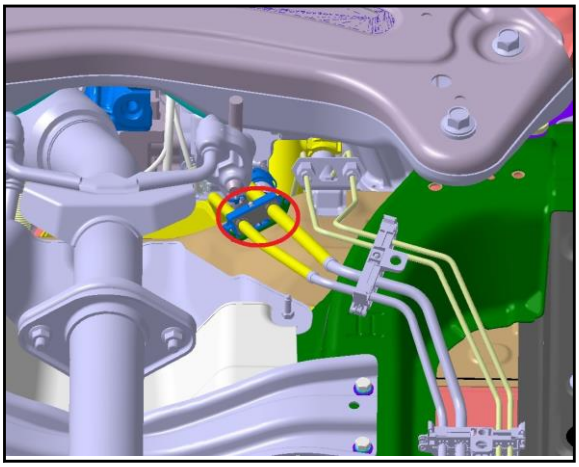
4 Place a container under the disconnected fuel line fitting to hold residual fuel from the line after the fuel system has been relieved of pressure

5 Open the 6 fuel line retaining clips in the position shown in the following figure with a straight line, and the line droops to further release the residual fuel inside.

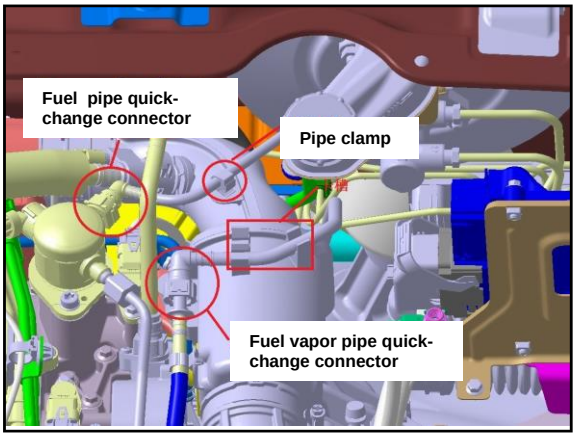


6 Remove the fuel line retaining clip at the position shown in the figure below.

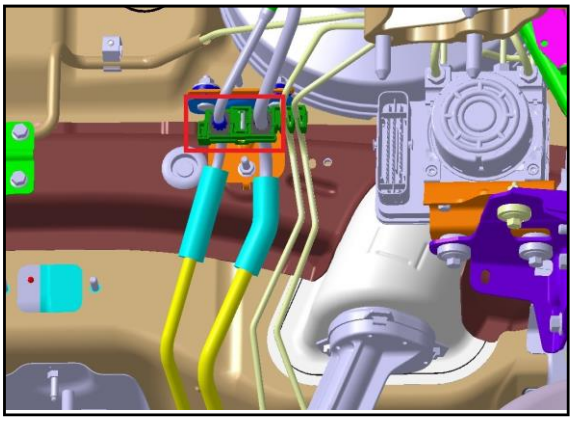
Caution The fuel pipe clamp assembly here becomes the disposable pipe clamp. Replace with a new fuel pipe clamp assembly after removal.



7 Open the front cover, disconnect the fuel pipe and fuel steaming trachea quick-change connector at the position shown in the figure below in the engine compartment, disconnect the fuel pipe from the fixing buckle on the air filter outlet trachea assembly, and take out the fuel steaming trachea from the clamping groove on the air filter outlet trachea assembly. Refer to the nylon pipe quick-change connector section.



8 Open the fuel line fixing pipe clip at the engine compartment cross member as shown in the figure below.



9 Remove the oil supply connecting pipe assembly and canister desorption connecting pipe assembly II and place them in a ventilated and cool place.

2. Installation

The installation process is the reverse of the removal process.

Fuel pump with fuel level sensor assembly

Removal

Warning

The process includes fuel treatment. Pay attention to whether there is fuel spill at any time and pay attention to precautions for fuel treatment, otherwise personal injury may be caused.

Warning

Do not use open flames of any kind when working on fuel components. High flammability mixture generated during operation may be ignited. Improper operation may cause personal injury.

Warning

Before removing or repairing the fuel pump and bracket assembly, disconnect the negative terminal of the battery.

Warning

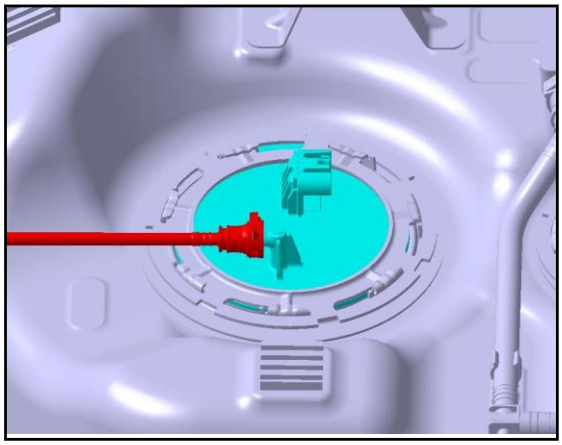
When inspecting or repairing the fuel pump and bracket assembly, it is prohibited to smoke or close to the fire source.

Warning

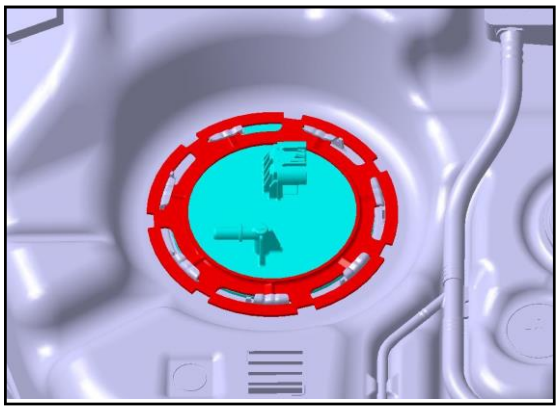
The fuel pump and bracket assembly can only be removed after the fuel pressure in the fuel line system is removed.

1. Refer to the fuel tank assembly removal and installation procedure. Remove the fuel tank first.

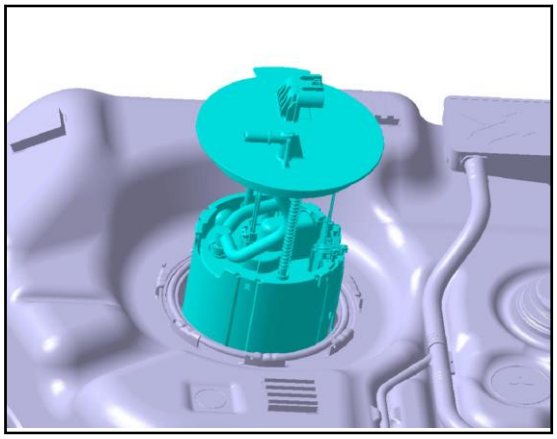
2. Remove fuel pipe and return pipe connector, refer to nylon pipe quick-change connector;



3. Remove chuck with special tooling



4. Take out fuel pump and bracket assembly;



Warning Do not damage the level sensor assembly during fuel pump removal, otherwise it will cause oil level indication fault. Installation

Warning Do not damage the level sensor assembly during installation.

Warning After installing the fuel pipe and oil return pipe, ensure that there is no leakage.

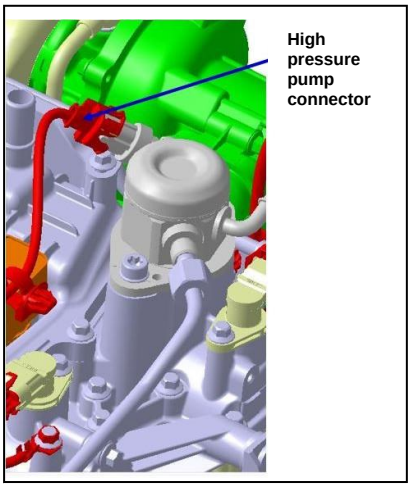
1. The installation process is opposite to the removal process.

Removal and installation of high-pressure oil pump

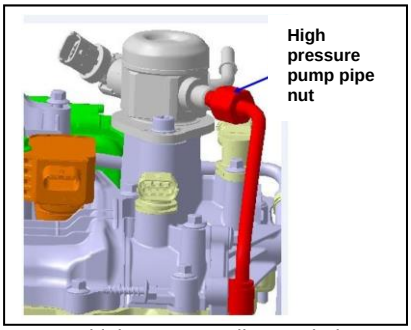
Removal

Warning a.If the shutdown time is < 4h, the fuel system shall be released before dismantling the high-pressure fuel pump. Method: After starting the vehicle, disconnect the low-pressure fuel pump electric circuit fuse, and idle speed until automatic flameout; If the parking time is > 4h, remove it.

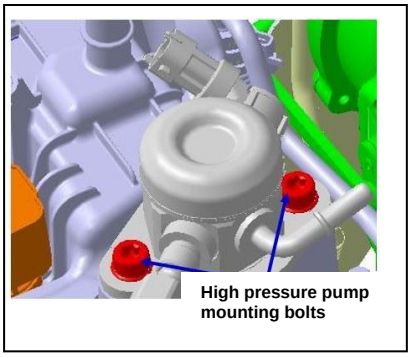
1 Disconnect the high-pressure oil pump solenoid valve end connector.



2 Remove the high-pressure oil pump oil outlet pipe. Refer to the removal and installation of high-pressure oil pump oil outlet pipe.



3 Remove high-pressure oil pump bolt



Warning After removing the high-pressure fuel pump and other parts, ensure that no foreign matter enters the fuel passage for installation.

The installation sequence is reverse to the removal sequence, and leakage check is required after installation. Leak check

Power on the vehicle, touch the nuts at both ends of the high-pressure fuel pipe with your fingers, there is no oil leakage and no obvious gasoline smell. Then start the vehicle to step on neutral gear for 3000 revolutions and maintain for 10 seconds. Check the fuel injector and fuel rail body connection, nuts at both ends of the high-pressure fuel pipe, low-pressure fuel pipe and fuel inlet joint of high-pressure fuel pump, pipeline above the fuel tank and near the fuel tank at the same time. If there is no oil leakage and no obvious gasoline smell, it is considered qualified.

Fuel injection nozzle(Fuel manifold)

Note: The fuel injectors are secondary components in the fuel manifold and are not replaced separately.

High-pressure oil supply pipe

⚠Warning

Warning

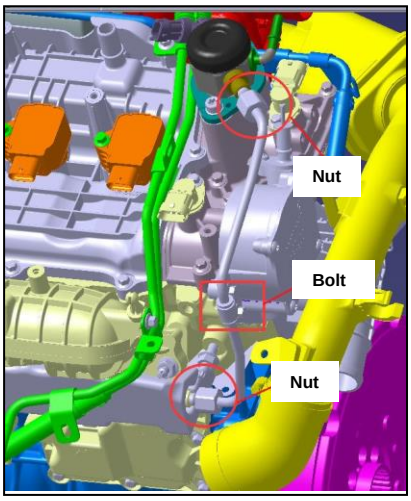
Removal

1 When the vehicle is static, cold and powered off, remove the engine trim cover.

2 Check whether there is gasoline leakage at the nuts of the high-pressure fuel pipe connecting the fuel pump end and the fuel header end. If there is gasoline leakage, stop the operation, and immediately report it for troubleshooting.

3 Remove intercooler assembly, refer to Intercooler section

4 Loosen the retaining bracket bolts first, and then loosen the nuts at both ends slowly.(No order)



Installation

1 Visually inspect the ball joint at both ends of high-pressure oil pipe and the joint mating surface of oil pump and fuel header without obvious scratches, trachoma and other defects, and pre-install nuts at both ends of high-pressure oil pipe by hand until tightened;

2 Tighten the nuts at both ends to (15±1) N•m in the sequence of fuel manifold end before fuel pump end.

3 Tighten the high-pressure oil pipe bracket bolts to (10±1) N•m to ensure that the bracket fully fits the mounting surface.

4 Tighten the nuts at both ends according to the sequence of first fuel manifold end and then fuel pump end to (32±2) N•m, 5. draw color code in the visible area on the nut surface at both ends. The color code shall penetrate into the butt joint (high-pressure fuel pump/high-pressure fuel rail) and be continuously visible.

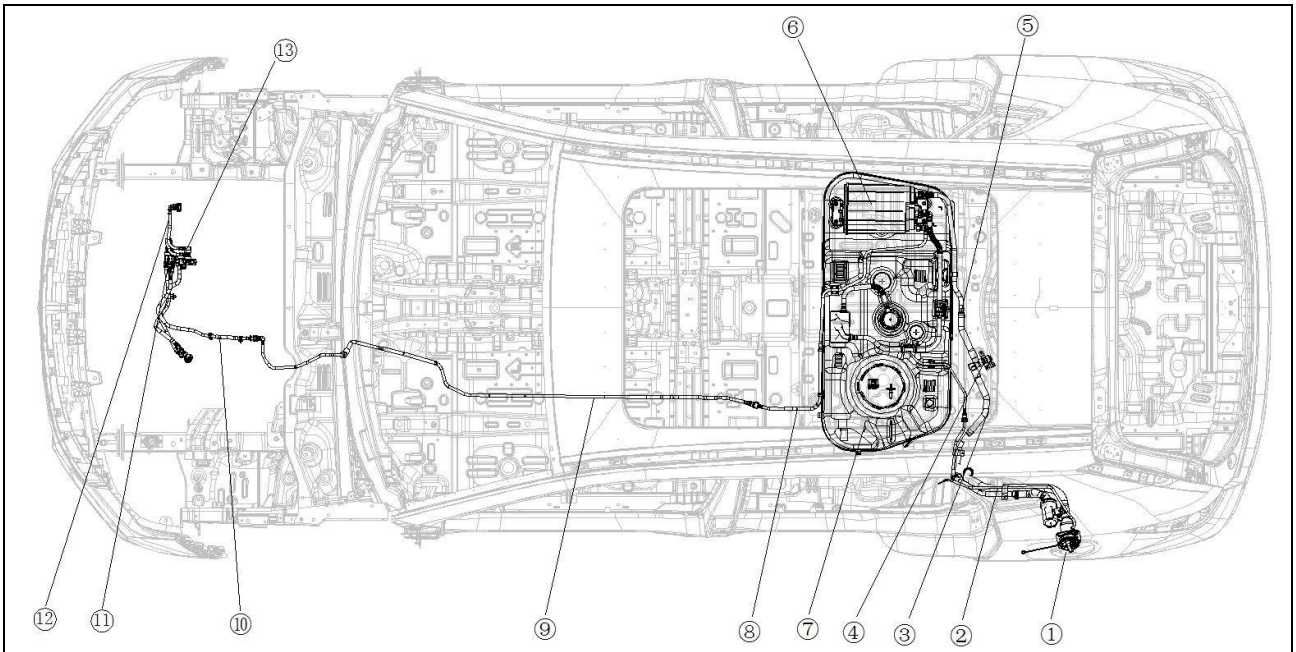
Fuel vapor system specifications

Torque specification

Name	Nm	lb-ft	lb-in
Canister stop valve mounting bolt	10±1		
Mounting bolt of high pressure desorption pressure sensor	5±1		
Canister control valve outlet trachea assembly and engine assembly intake manifold mounting bolts	5±1		

Canister assembly and fuel tank assembly mounting bolts 4±0.5

Composition and position distribution



Serial number	Component name	Quantity
1	Fuel tank filler cap assembly	1
2	Filler pipe assy.	1
3	Canister to atmosphere connecting pipe II	1
4	Canister stop valve assembly	1
5	Canister atmospheric connecting pipe assy.	1
6	Canister assembly	1
7	Fuel tank assembly	1
8	Canister desorption connecting pipe assembly I	1
9	Canister desorption connecting pipe assy. II	1
10	Canister desorption connecting pipe assy. II	1
11	Canister control valve assembly	1
12	Canister control valve outlet trachea assembly	1
13	High pressure desorption pressure sensor assembly	1

System functional principle introduction

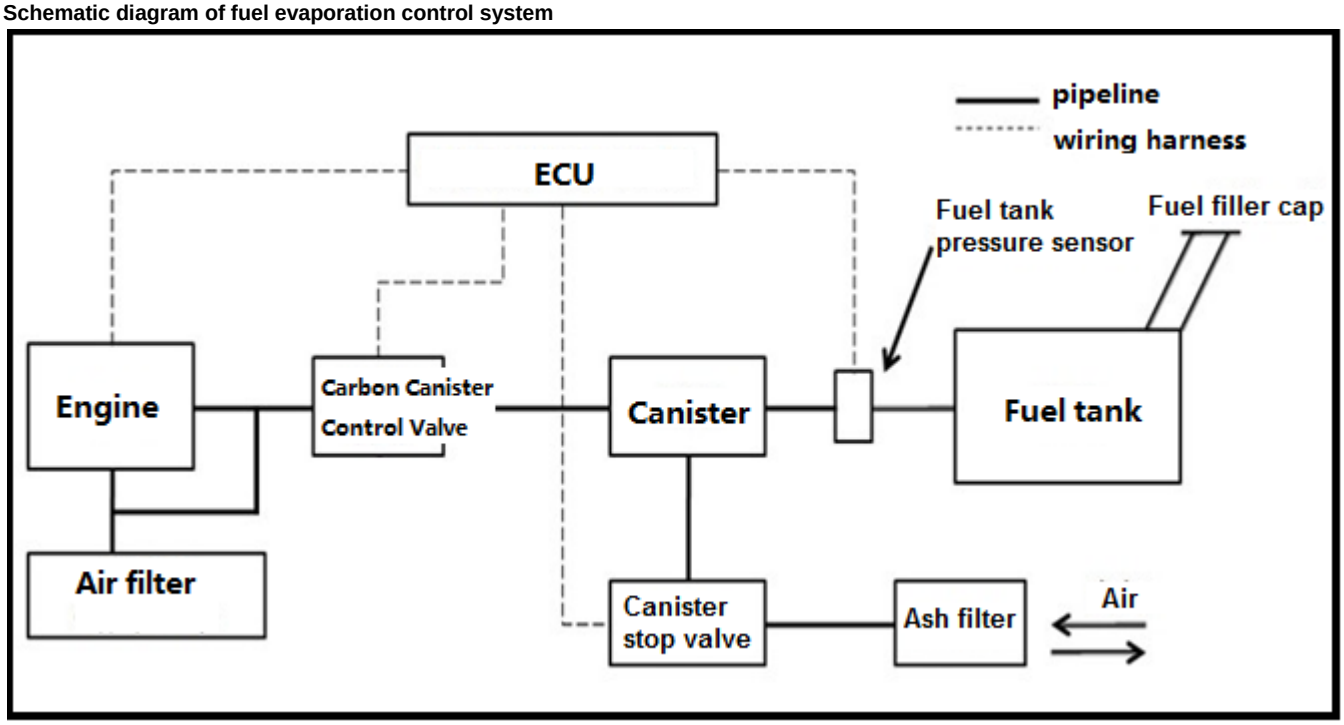
System function

Fuel evaporation control system includes fuel tank assembly, fuel tank pressure sensor assembly, canister assembly, canister stop valve assembly, canister ash filter, canister control valve assembly, high pressure desorption pressure sensor assembly, fuel evaporation trachea-way and connecting parts, etc.;

Collect and store the fuel vapor in the fuel tank in the canister, and send the fuel vapor to the cylinder for combustion when the engine reaches a specific working condition;

Control the opening and closing of canister control valve and canister stop valve and collect the output signals of tank pressure sensor assembly and high pressure desorption pressure sensor assembly through ECUs, and perform OBD-related function diagnosis on the whole fuel evaporation control system.

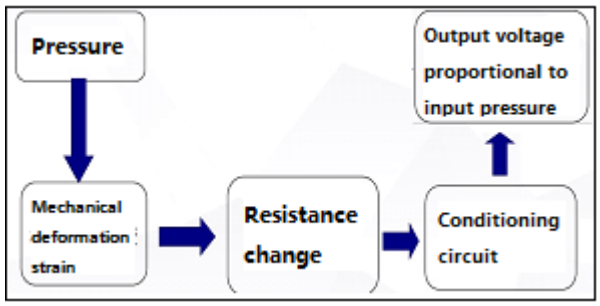
Schematic diagram of fuel evaporation control system



Structural principle of parts
Check fuel tank pressure sensor assembly

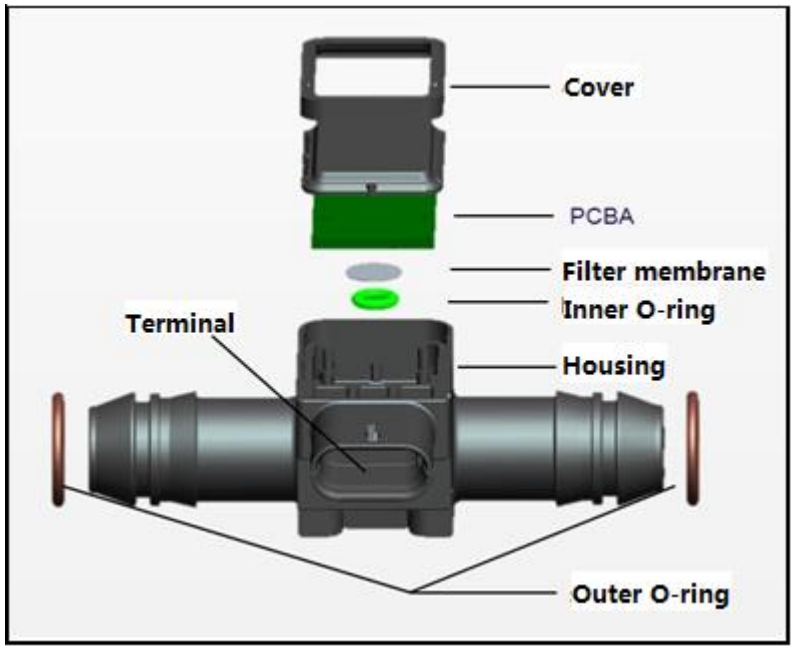
Function

It is used to detect the current pressure value in the fuel evaporation system and transmit it to ECU for determining whether the current system pressure value is reasonable and whether there is leakage. Working principle



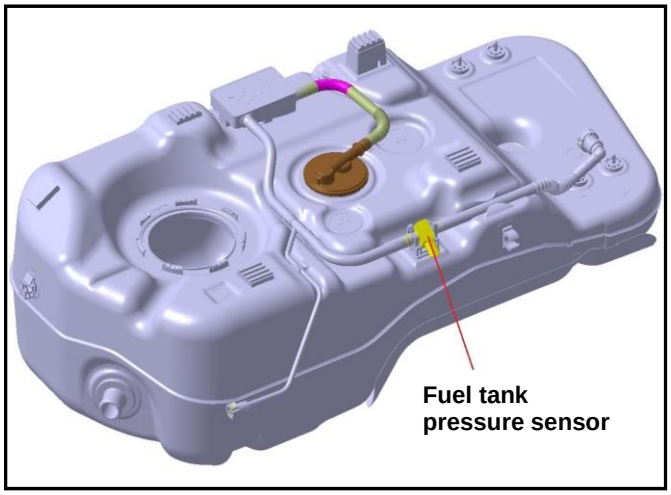
Product structure

1. Single structure

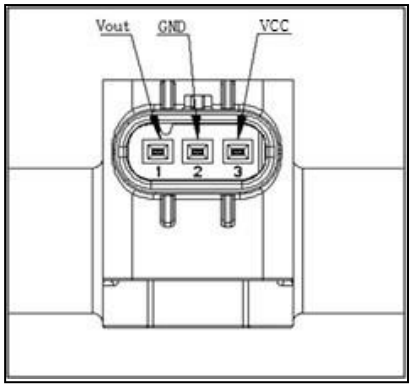


2. Layout structure

The r assembly is arranged on the fuel tank assembly.

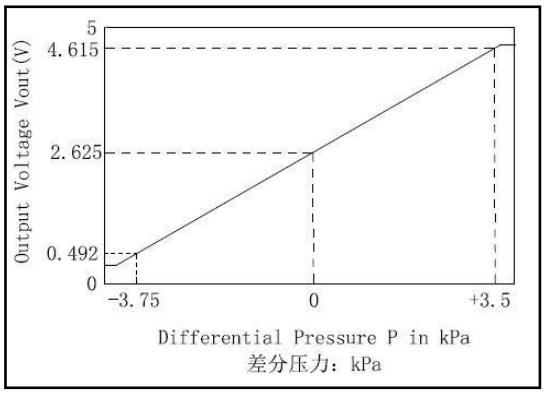


3. Interface definition



Note: Vout signal output, GND grounding,
VCC power supply product characteristics
Voltage output curve:

The sensor is a relative pressure sensor, which represents the pressure difference between the measured gas and the ambient atmospheric pressure.



Product fault and troubleshooting

Before troubleshooting a single product, check the harness connection first, and then troubleshoot a single product after confirming that there is no problem.

Check whether the terminal of fuel tank pressure sensor harness connector is rusted and whether the terminal is horizontal; Inspect the harness of the corresponding power supply, signal and ground of the sensor for open circuit or short circuit. If present, replace wiring harness. Because of the harness problem, the fuel tank pressure sensor related fault will also be reported.

Tank pressure signal check:

1. Power on the complete vehicle;

2. Open the filler cap to make the internal and external air pressures of the fuel tank equal.

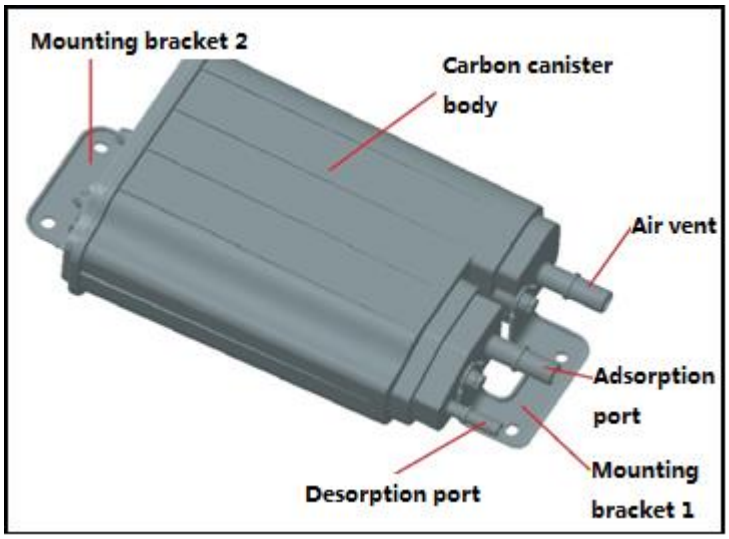
3. Working condition: Do not start in power-on state, read sensor power supply pin shall have 5V voltage; Under normal power supply conditions, the output of fuel tank pressure voltage shall be about 2.6 V; Close the fuel tank door, and it can be judged that the sensor body has no fault as long as the fuel tank pressure and voltage fluctuate slightly (may increase or decrease) under any working conditions (rocking the vehicle body, rapid acceleration/deceleration).

If the sensor cannot rule out fault after the above troubleshooting, it is necessary to take a new fuel tank pressure sensor product, plug the original fuel tank pressure sensor connector into the new product, do not start in the power-on state, the sensor output should be about 2.6 V, plug one end of the sensor, blow/suck air at the other end with a mouth, the sensor voltage changes, the original vehicle sensor fault can be confirmed.

Canister assembly

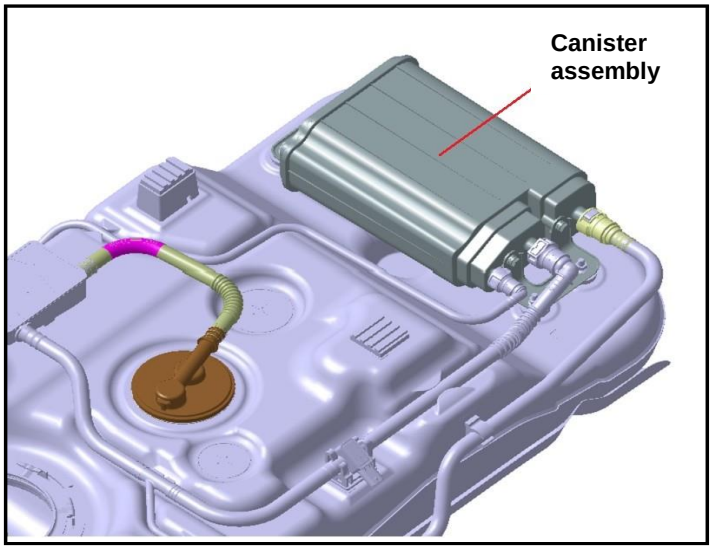
Function

The canister is an emission control device containing activated carbon particles for
adsorption and storage of fuel vapors from the fuel tank.
The fuel vapor is stored in the canister all the time. When certain conditions are met, the engine control module will energize
the canister control valve, so that the fuel vapor is sucked into the engine cylinder and the product structure is burned.
1. Single structure



2. Layout structure

The canister assembly is arranged on the right side of the upper tank of the fuel tank.



Product fault and troubleshooting

1. Check whether the canister vent is blocked; if yes, replace it;
2. Appearance inspection of canister: No crack or deformation; replace if any;
3. Remove the canister and shake it by hand. If there is abnormal sound, replace it;
4. Inspect the connecting pipe on the canister. If it is blocked or damaged, replace it;
5. Use a suitable air source to blow in from one of the canister nozzles, and the other two nozzles should have air flow out. If there is no gas flowing out, replace it.

Canister stop valve(Through the engine)

Function

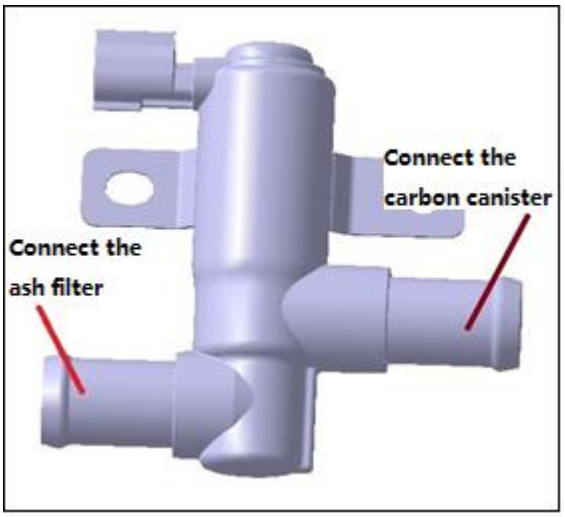
Canister stop valve is a normally-open valve, which is installed between canister and ash filter. When it is not working, the valve is normally open and enough gas is allowed to pass through. When working, it is controlled by ECU, close vent and cooperate to complete fuel evaporation system leakage diagnosis.

Working principle

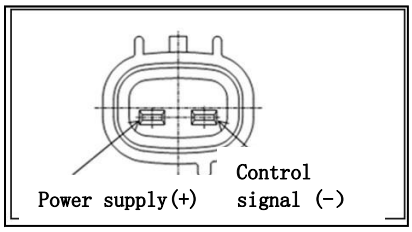
During leakage diagnosis, the stop valve is energized by the ECU switch signal, the internal coil of the stop valve generates excitation function, and the valve stem assembly overcomes the spring force under the excitation function to realize valve closing, that is, close the vent hole, and complete leakage diagnosis in coordination with the fuel evaporation system. When there is no diagnosis, the stop valve is not energized, the valve is opened and enough gas is allowed to pass.

Structure and characteristics

Canister stop valve is mainly composed of housing, solenoid coil, spring, valve stem component, connector, connecting trachea, etc. When it is not working, it is not energized, it is in valve opening state and enough gas is allowed to pass; when it is working, it is in valve closing state and air vent is closed.

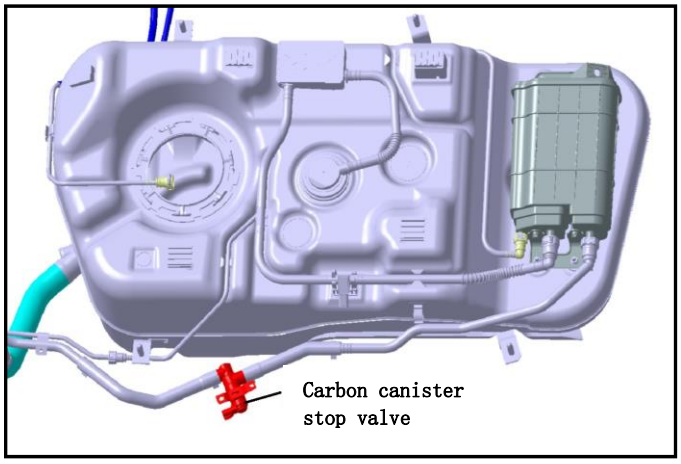


Canister stop valve is of 2PIN structure, and the definition of each pin is as shown in the figure below.



At normal temperature, the resistance between pin 2

PIN of canister stop valve is 59±4Ω. Layout structure



Fault check

Warning Before product unit inspection, system pipeline and harness shall be inspected first, and after confirming that there is no problem, product unit inspection shall be conducted:

1) When the leakage fault is reported, first use the leakage test equipment to detect and confirm the leakage point.

2) Check whether the harness is normal or disconnect the harness connector in case of fuel tank suction deflation or frequent refueling jumping gun. The shut-off valve is always closed due to possible short circuit of the harness.

1. Internal sealing of canister stop valve (such as reporting leakage fault): When both ends are energized (12 V), blow air from either end of the valve to the other end, and observe whether the other end can feel air flow. If air flow can be felt, it indicates that the valve has internal sealing problem.

2. Internal ventilation of canister stop valve (in case of fuel tank suction collapse or frequent refueling jumping gun): In case of no power supply, blow air from either end of the valve to the other end, and observe whether the other end can feel air flow. If air flow can be felt, it indicates that the internal ventilation of the valve is normal; if air flow is not felt, it indicates that the valve is blocked or stuck.

3. Internal circuit connection of canister stop valve: Use multimeter to measure resistance between pin 59±4Ω of canister stop valve at

normal temperature, and observe whether it is 59±4Ω. If it is not, it indicates that there is short circuit or open circuit in canister stop valve.

Warning When there is a problem, ABA is recommended for interchangeability verification.

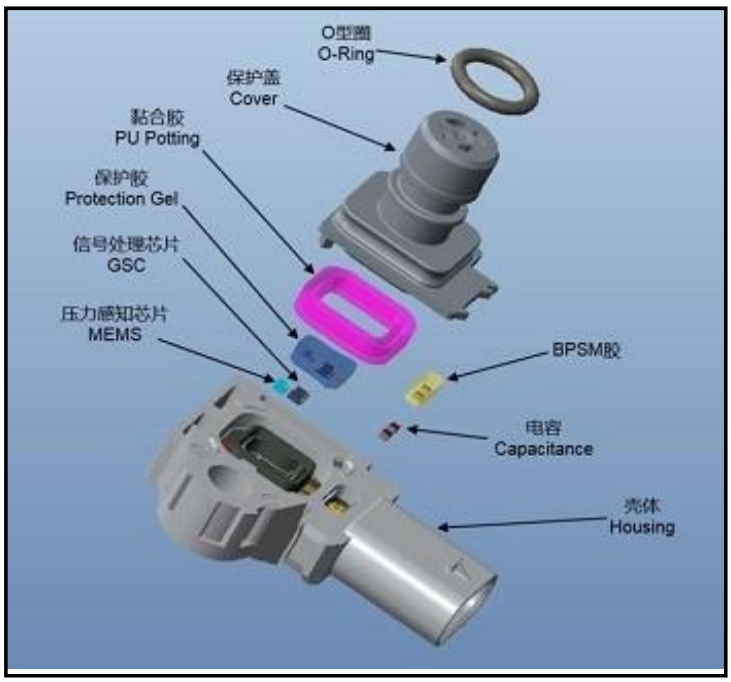
High pressure desorption sensor

Function

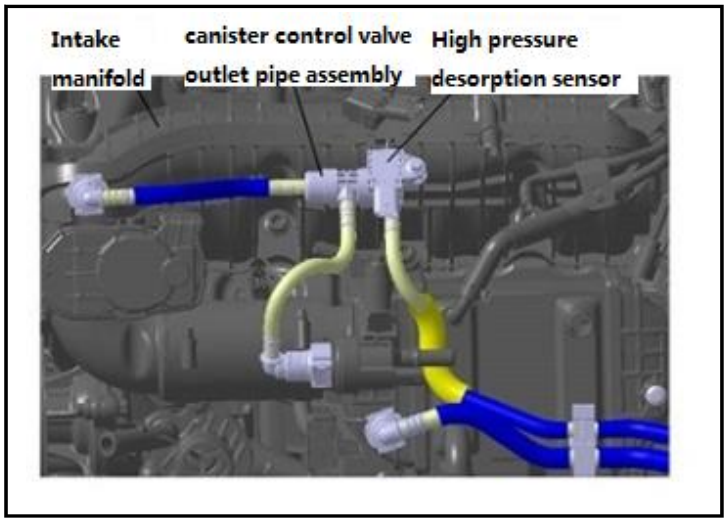
Due to the new requirements of national emission regulation No. 6, it is required to diagnose the leakage of fuel evaporation system. For the pipeline between canister control valve and air filter of supercharger type, it is required to add high-pressure desorption pressure sensor for the pipeline, detect the current pipeline pressure, feed back the detected pressure signal to ECU, and then judge whether the system has leakage through whether the pressure change reaches the expectation.

Product structure:

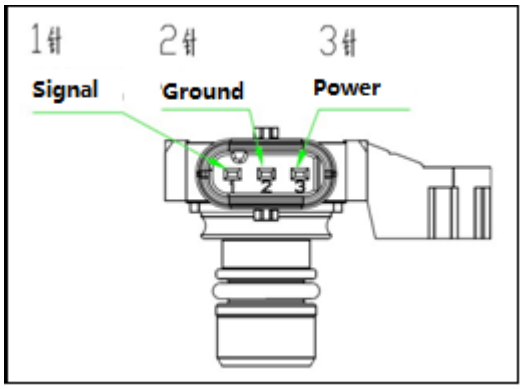
1 Single structure



2 Layout structure

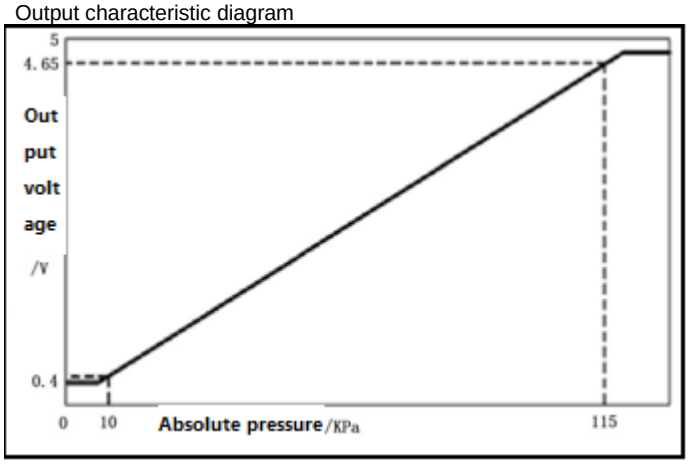


3 Interface definition



Features:

Output characteristic diagram



Product fault and troubleshooting

When high pressure desorption pressure sensor related fault is reported, check according to the following steps:

1 Whether the connector is reliably connected, whether the power supply of the sensor is normal, whether there is foreign matter in the connector, whether the harness terminal is normal, and whether the fault still exists after three cycles of power-on detection after the connector is re-connected in place.

2 Check the appearance of the sensor for abnormal damage.

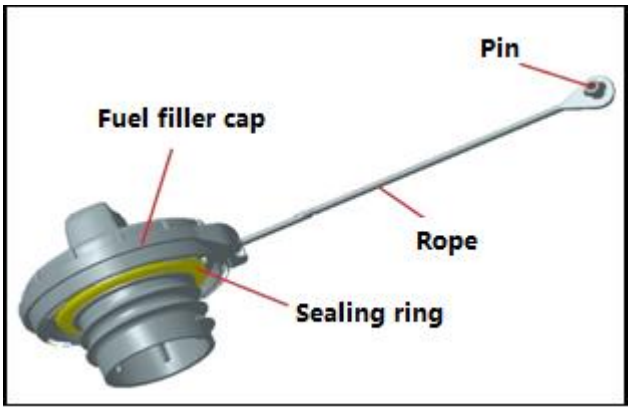
Filler cap

Function

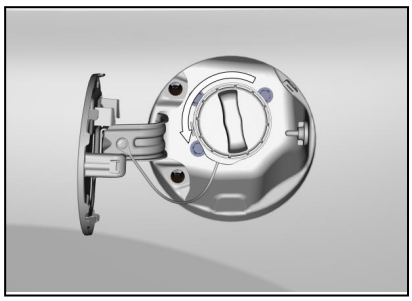
The fuel tank filler cap assembly is assembled to the filler pipe assembly to ensure the system tightness; Remove the port cover and place it in cooperation with the fuel tank door outer panel reinforcement;

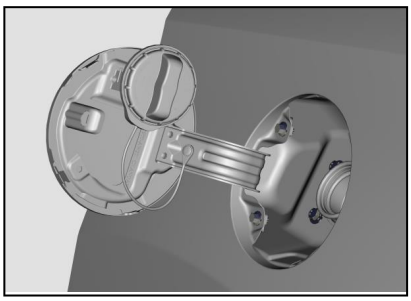
The hanging rope is clamped with the body fuel tank door assembly rotary arm through the bolt. Product structure

1. Single structure



2. Layout structure





Product fault and troubleshooting

1. After unscrewing the fuel filler cap, check whether the fuel filler accessory has obvious oil contamination, and check whether the sealing ring of the fuel filler cap is damaged and the assembly is abnormal. If it is damaged, replace the fuel filler cap. If it is abnormal, reassemble the sealing ring in place;

2. Check whether the fuel filler cap housing and hanging rope are damaged; if so, replace the filler cap;

Common methods

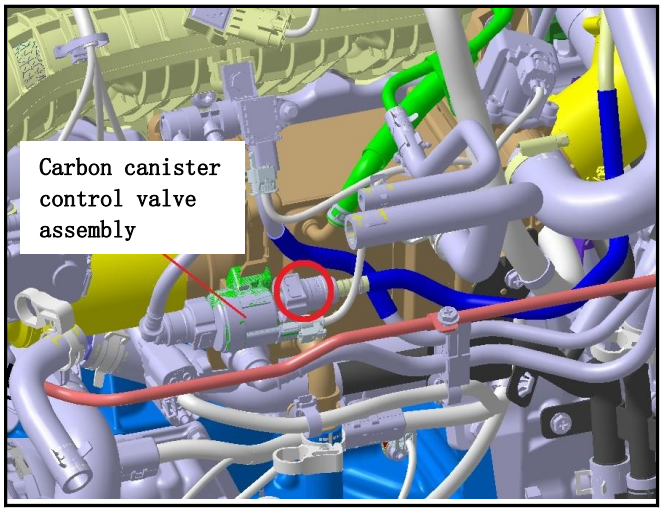
Fuel vapor system leakage detection

Testing the required tool
Smoke Leak Tester

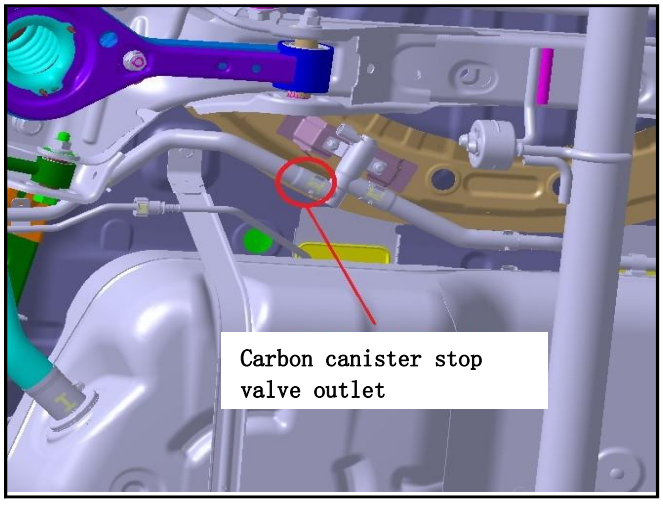
Test method

1. Lift the vehicle;

2. Disconnect the assembly connection of nylon pipe quick-plug connector of canister control valve air inlet as shown in the following figure;



3.Connect the smoke leakage detector trachea with the nylon pipe quick connector, and plug the canister stop valve outlet artificially or turn it off with 12 V electric power;



4. Start smoke leakage detector according to the instruction manual (the instrument is in test gear);

5. Observe the change of instrument air pressure of smoke leakage meter, and confirm whether there is leakage in fuel steam system;

6. If there is leakage, adjust the smoke leakage detector switch to smoke position, and continuously observe until the smoke leaks to confirm the

leakage point.

Fault symptom diagnosis check and confirmation

Warning

The process includes fuel treatment. Pay attention to whether there is fuel spill at any time and pay attention to precautions for fuel treatment, otherwise personal injury may be caused.

Warning

When working on fuel components, do not use any form of open flame and do not start the engine. High flammability mixture generated during operation may be ignited. Improper operation may cause personal injury accident

1 Confirm the customer's problem;
2 Visually inspect for visible mechanical or electrical damage;

Mechanical part	Electrical part
Steaming trachea-way damage	Canister control valve damaged
Quick-change joint is damaged	Electrical connector/circuit damage

3 If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step;
4 If the visual inspection is passed, confirm the fault and refer to the symptom table.

Appearance check list

Warning

The process includes fuel treatment. Pay attention to whether there is fuel spill at any time and pay attention to precautions for fuel treatment, otherwise personal injury may be caused.

Warning

When working on fuel components, do not use any form of open flame and do not start the engine. High flammability mixture generated during operation may be ignited. Improper operation may cause personal injury.

Canister control valve inspection

1 Appearance inspection of canister control valve: No crack, deformation, no corrosion of wiring terminal; if yes, replace;
2 Check the resistance of canister control valve, and the resistance shall comply with 16Ω±4Ω regulations; otherwise, replace it;
3 Dismantle canister control valve and inhale air into the valve; canister control valve shall not be ventilated;
4 Remove the canister control valve, apply 12 V battery voltage to the two wiring terminals of the valve, and inhale air into the canister control valve. At this time, the canister control valve should be ventilated. Canister inspection

1 Check whether the canister vent is blocked; if yes, replace it;
2 Appearance inspection of canister: No crack or deformation; replace if any;
3 Remove the canister and shake it by hand. If there is abnormal sound, replace it;
4 Inspect the connecting pipe on the canister. If it is blocked or damaged, replace it;
5 Use a suitable air source to blow in from one of the canister nozzles, and the other two nozzles should have air flow out. If there is no gas flowing out, replace it.

Fault symptom table

Symptoms	Measures
Fuel system size leakage fault	Fuel system size leakage fault diagnosis process
Interior gasoline smell heavy	Gasoline smell re-diagnosis process

Gasoline smell heavy

Warning

The following troubleshooting flow chart contains diagnostic and maintenance procedures for the fuel system. Before servicing the fuel system, read the following warning: Fuel vapor is dangerous. It can easily catch fire, leading to serious injury and damage. Always keep fuel away from sparks and flames.

Warning Disconnecting/connecting the quick-release connector without cleaning may damage the fuel lines and the quick-release connector. Before disconnecting, be sure to clean the joint of quick release connector and ensure that there is no foreign matter.

Test conditions	Details/Results /Measures
1. General inspection	
	A. Visually inspect all parts and connections of the fuel system for fuel leakage. B. Check that the O-ring seal does not fit into the lip of the filler pipe assembly after the filler cap is normally assembled. Check whether it is normal? ? Yes Go to step 2. ? No Repair or replace the faulty parts.
2. Check fuel pressure	
	A. Refer to section Checking whether the fuel pressure is too high in the low-pressure fuel passage. ? Yes Repair the blocked fuel pipeline, and replace the fuel pump and bracket assembly. ? No Go to Step 3.
3. Check canister solenoid valve seal and canister	
	A. Check the pipeline connected to the canister solenoid valve for leakage. B. Check the canister for leaks. Check whether it is normal? ? Yes Repair the leaking area, repair or replace the canister.

Fuel system size leakage fault

Warning

The following troubleshooting flow chart contains diagnostic and maintenance procedures for the fuel system. Before servicing the fuel system, read the following warning: Fuel vapor is dangerous. It can easily catch fire, leading to serious injury and damage. Always keep fuel away from sparks and flames

Warning Disconnecting/connecting the quick-release connector without cleaning may damage the fuel lines and the quick-release connector. Before disconnecting, be sure to clean the joint of quick release connector and ensure that there is no foreign matter.

Large leakage: When the engine runs, the shut-off valve closes the closed evaporation system, and the canister control valve opens. Use the engine manifold negative pressure to vacuum the closed space of the fuel evaporation system. Detect the vacuum degree according to the fuel tank pressure sensor. When the target vacuum degree is reached within the specified time, it is considered that there is no large leakage. Otherwise, there is a large leakage.

Small leakage: When the diagnosis of large leakage is completed and there is no fault, the evaporation system reaches the target vacuum at this time, then close the canister control valve (the stop valve still remains closed) to form a completely sealed space to maintain pressure. Within the specified time, there is no small leakage if the pressure change rate is within the set value, otherwise there is small leakage.

Test conditions	Details/Results/Measures
1. Confirm ECU data	
	Check whether the original vehicle ECU data version is the latest. If not, write the latest version and download the data online or contact the technical room.
2. Check pipeline	
	Visually inspect whether the connecting pipeline between canister control valve and canister and fuel tank is bent (twisted), broken, loose or off, and whether the pipeline between canister and stop valve is broken, loose or off. Repair or replace if any.

Test conditions	Details/Results/Measures
3. Check the evaporation system for leaks.	
	Refer to Leakage Testing of Fuel Steam System. If there is leakage, repair or replace parts directly.
4. Check fuel tank filler cap	
	Check whether the fuel filler cap is installed skewed; if so, unscrew the fuel filler cap; further check whether the seal ring of the fuel filler cap is deformed or tilted; if yes, repair or replace it;
5. Check canister control valve	
	Idle speed of the vehicle. The diagnostic scanner reads the duty ratio of canister control valve. When the duty ratio exceeds 12%, confirm that the canister control valve is in working state (feel vibration). Then dismantle the canister control valve connecting canister end pipeline, feel if there is inspiratory air by hand. If there is no inspiratory air, repair or replace it.
6. Check fuel tank pressure sensor	
	1.The vehicle is powered on but does not start the engine, open the filler cap, read the data stream "fuel tank pressure sensor voltage," and the normal condition is 2.6±0.3 V; 2. Tighten the fuel filler cap, start the engine, idle the vehicle, read the data stream by the diagnostic scanner, confirm the canister control valve is open, and then manually block the stop valve or close the valve separately with 12 V electric power to see whether the fuel tank pressure sensor voltage changes; If the voltage value becomes small and is not less than 0.3 ±0.05 V after stability, the rule out sensor is faulty; If the voltage value becomes larger, it is preferable to perform ABA check on the fuel tank pressure sensor. If it is judged that the sensor is faulty, replace it directly; If the fault does not follow the sensor again, troubleshoot the next step.
7. Check whether it is blocked, oil, water or soil.	
	1. Check whether the pipeline, canister and canister stop valve are filled with oil, water and soil; Clean if any; 2. Check whether the pipeline and canister are blocked (when the vehicle idle speed is started and the duty ratio of canister control valve read by the diagnostic scanner exceeds 12%, dismantle the pipeline between canister and stop valve to see if there is suction at canister port, and if there is suction, it is not blocked); if yes, replace it directly; Fuel filling is generally caused by over-filling of the user. It is required to remind the customer that it is forbidden to refuel manually after the instrument displays full fuel level and trips the gun.

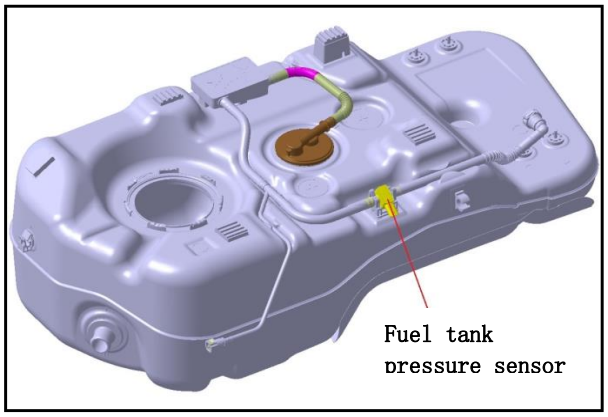
If any abnormality is found in a certain step, repair or replace the parts, and then perform forced diagnosis with diagnostic scanner to detect whether there is current fault. If there is any fault, proceed to the next step for troubleshooting. If there is no fault, solve it.

If no abnormality is found in the above detection, clear the fault code and continue to observe, and pay attention to the customer to tighten the fuel tank cap after refueling, and request technical support if necessary.

Removal and installation

Fuel tank pressure sensor assembly

The fuel tank pressure sensor assembly is integrated into the canister suction line attached to the fuel tank assembly and cannot be removed separately. Refer to Fuel tank assembly section for fuel tank assembly removal and installation.



Canister assembly

Warning

Warning

Removal

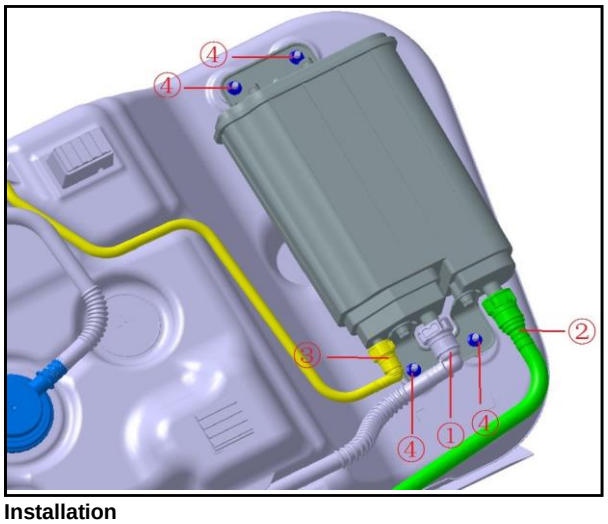
1 Remove fuel tank assembly, refer to Fuel tank assembly chapter

2 Respectively disconnect 3 quick-change joints of canister adsorption connecting pipe assembly (integrated on fuel tank assembly), canister atmospheric connecting pipe assembly, canister desorption connecting pipe assembly I and 3 joints of canister assembly. For joint removal, refer to nylon pipe quick-change joint section.

3 Dismantle (4) hexagon flange nut

with sleeve, and take down canister

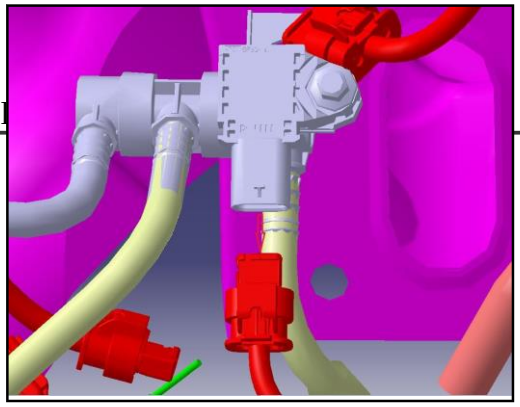
assembly torque: 4±0.5N.m



Installation

Installation process is reverse to removal process

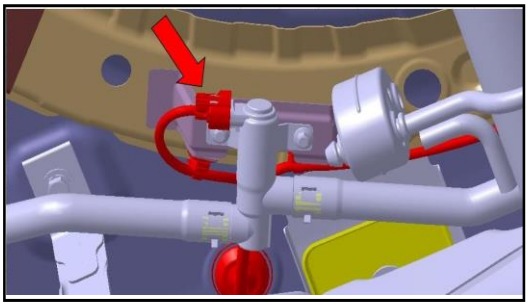
Canister stop valve(Through the engine)



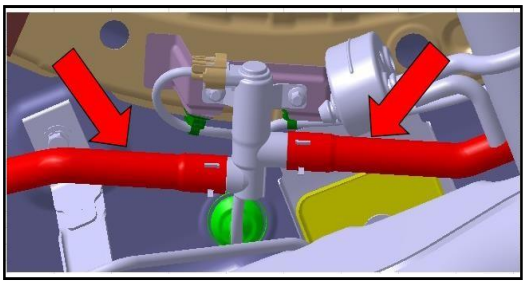
Removal

1 Do not press the ignition switch;

2 Unplug the harness connector;



3 Remove clamps and pipelines connected at both ends of canister stop valve;



4 Loosen the two mounting bolts, tool: Sleeve, torque: 10±1 N.m;

5 Remove the canister stop valve from the bracket.

Installation

Reverse the order of installation and removal

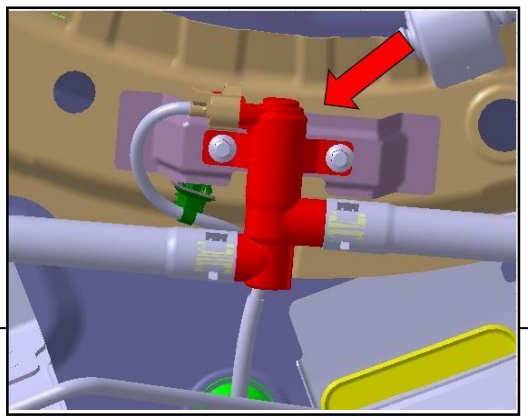
Warning **Before installation, check each part for deterioration or damage, and replace it if any defect is found.**

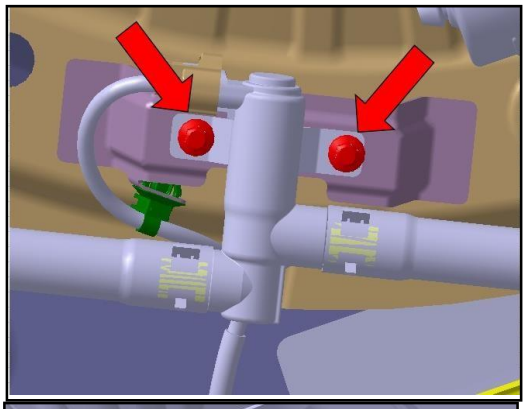
High pressure desorption sensor

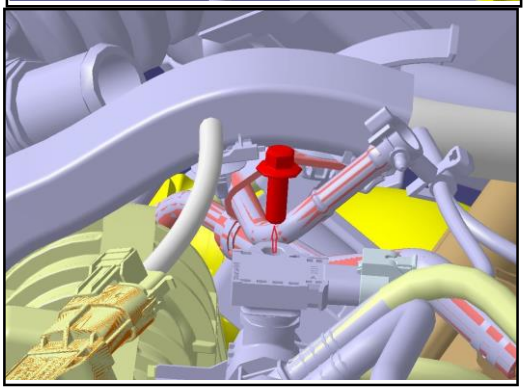
Removal

1 Disconnect the harness connector;

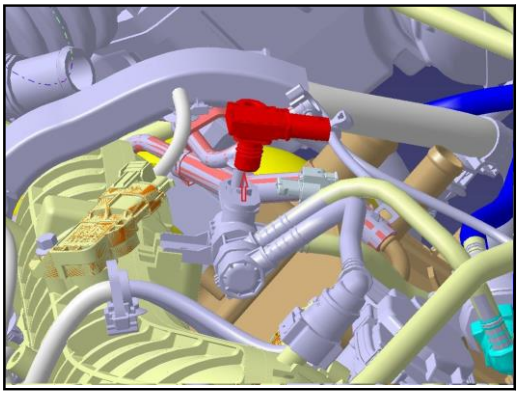
Dismantle mounting bolt of high pressure desorption pressure sensor with socket or open wrench and dismantle sensor assembly with open wrench;







2 Pull off high-pressure desorption sensor.



Installation

Installation in reverse order of removal

Warning

Before installation, check each part for deterioration or damage, and replace it if any defect is found;

Before assembling the sensor, apply a little lubricating oil on the

sensor 0-ring seal, pay attention not to enter the pressure probe hole;

The installation torque shall be within the range of 5±1Nm;

Clean the mounting hole before installing the

sensor to prevent debris and other debris;

Clean the oil stain after replacing the sensor;

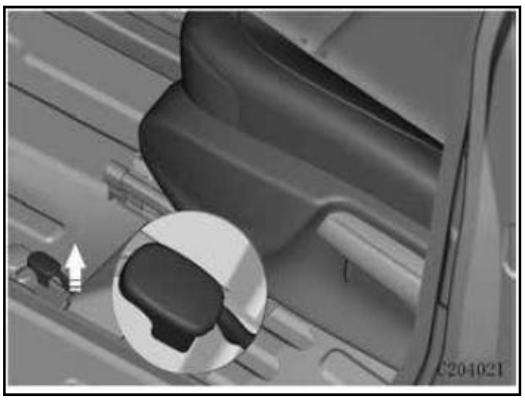
Do not replace the sensor when the vehicle is powered on.

Fuel tank filler cap assembly

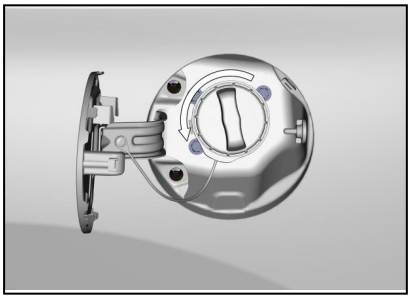
Warning

⚠Warning Removal

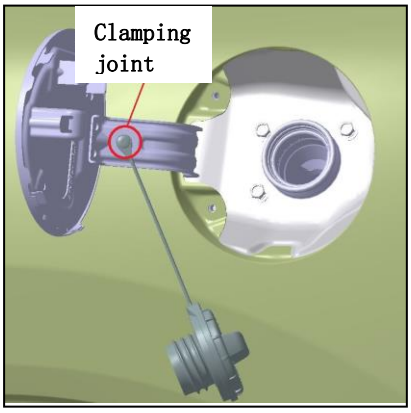
1 Pull up the fuel filler cover unlocking handle at the left side of the driver's seat, and slightly open the fuel filler cover on the left rear side of the vehicle.



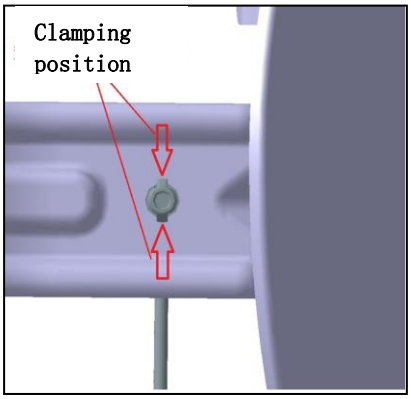
2 Fully open the filler cap plate, rotate the filler cap counterclockwise and remove it.



3 Remove the clamping connection between the cable bolt of the fuel filler cap and the body fuel tank door assembly swing arm.



Rotate the body fuel tank door to a proper position, squeeze one hand with sharp-nosed pliers slightly from the back of the rotary arm at the clamping joint to clamp the barb of the rope latch, pull the rope with the other hand, pull the clamping structure out, and then remove the port cover.



Warning Once the rope latch of the fuel tank filler cap assembly has been removed, it is forbidden to assemble and use the filler cap repeatedly, and a new fuel tank filler cap assembly should be assembled. Installation

The installation process is the reverse of the removal process.

Fuel steam related pipeline(Fuel tank to canister)

Canister suction connecting pipe assembly is integrated on the fuel tank assembly, and the pipe cannot be removed

separately. Disconnect the connection between canister suction connecting pipe assembly and canister assembly suction port. Please refer to canister assembly removal section.

Fuel steam related pipeline(Canister to ash filter)

Warning

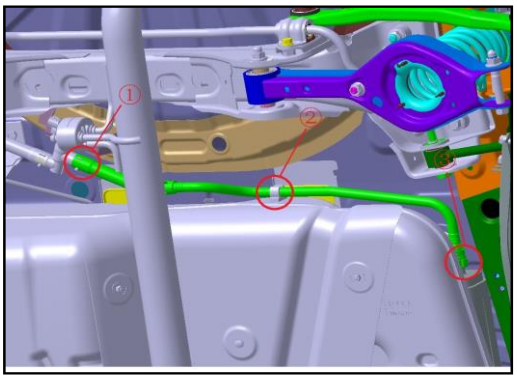
Warning Removal

1 **Lift the vehicle.**

2 Dismantle the elastic clamp connection ((1)) between canister atmospheric connecting pipe assembly and canister stop valve air inlet with calipers;

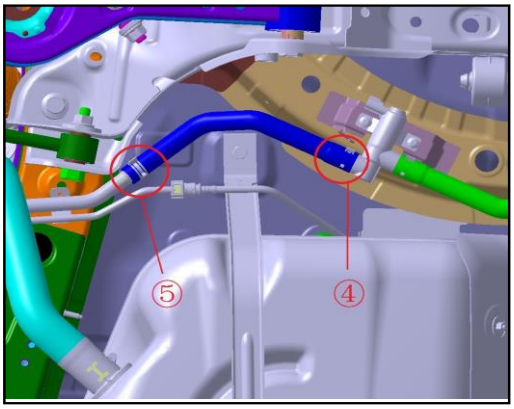
3 Dismantle the clamping connection ((2)) between canister atmospheric connecting pipe assembly and fuel tank body welded pipe clamp;

4 Dismantle the quick-change joint connection between canister atmospheric connecting pipe assembly and canister assembly atmospheric opening (3 places);



5 Use a caliper to dismantle the elastic clamp connection between canister atmospheric connecting pipe II and canister stop valve air outlet (4);

6 Use a caliper to dismantle the elastic clamp connection between canister atmospheric connecting pipe II and oil filler pipe assembly (5);



7 Remove filler neck assembly, refer to

Filler neck assembly chapter Installation

The installation process is the reverse of the removal process.

Ignition system specifications

Component specification

Name	Specifications
Spark plug model	HU10A80P
Spark plug clearance	0.6~ 0.7 mm
Ignition coil model	DX000A0A

Torque specification

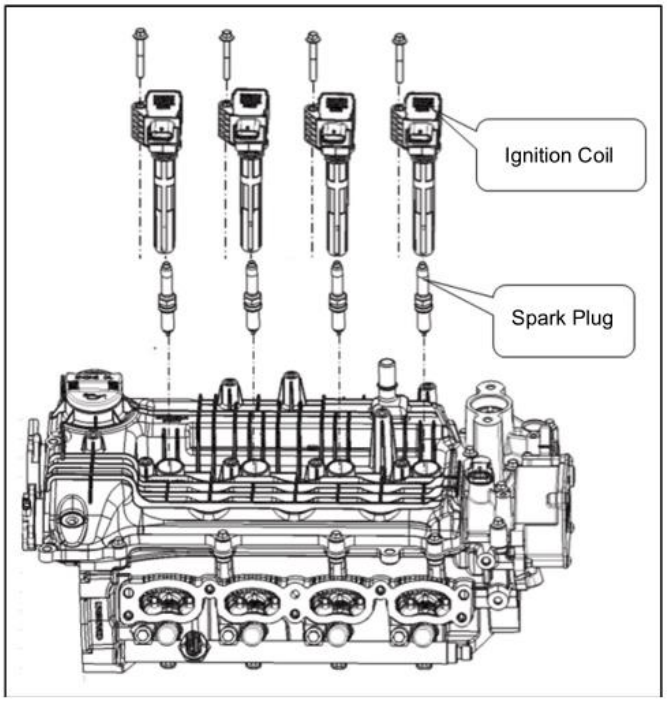
Name	N. M	lb-ft	lb-in
Spark plug	22.5±2.5	/	/
Ignition coil retaining bolt	10±1	/	/

General specifications

Application	Specifications
Ignition type	Independent ignition of each cylinder
Ignition sequence	1 - 3 - 4 - 2

Composition and position distribution

The position of ignition coil and spark plug of the vehicle is shown in the figure below:



System overview

The ignition system is a device used in gasoline engines to ignite the in-cylinder mixture. According to the ignition signal sent by the ECU, the ignition coil provides sufficient high voltage to the spark plug according to the cylinder ignition sequence at any engine speed and load, so as to generate spark between the spark plug electrodes and ignite the compressed mixture in the cylinder.

The ignition coil generates the high voltage required to ignite the mixture through electromagnetic induction, and transmits the generated high voltage to the spark plug. Spark is generated between the spark plug electrodes to ignite the in-cylinder compression mixture. Installation position: The ignition coil is located on the upper part of the spark plug and directly connected to the spark plug.

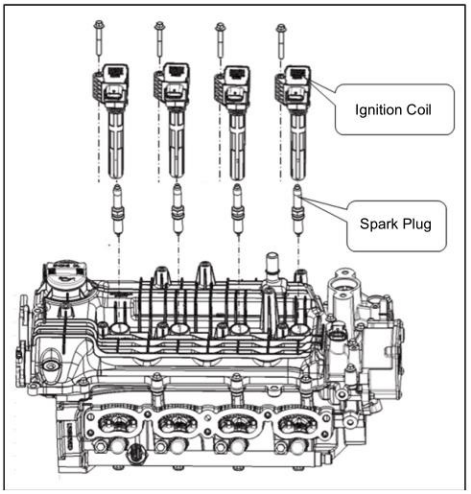


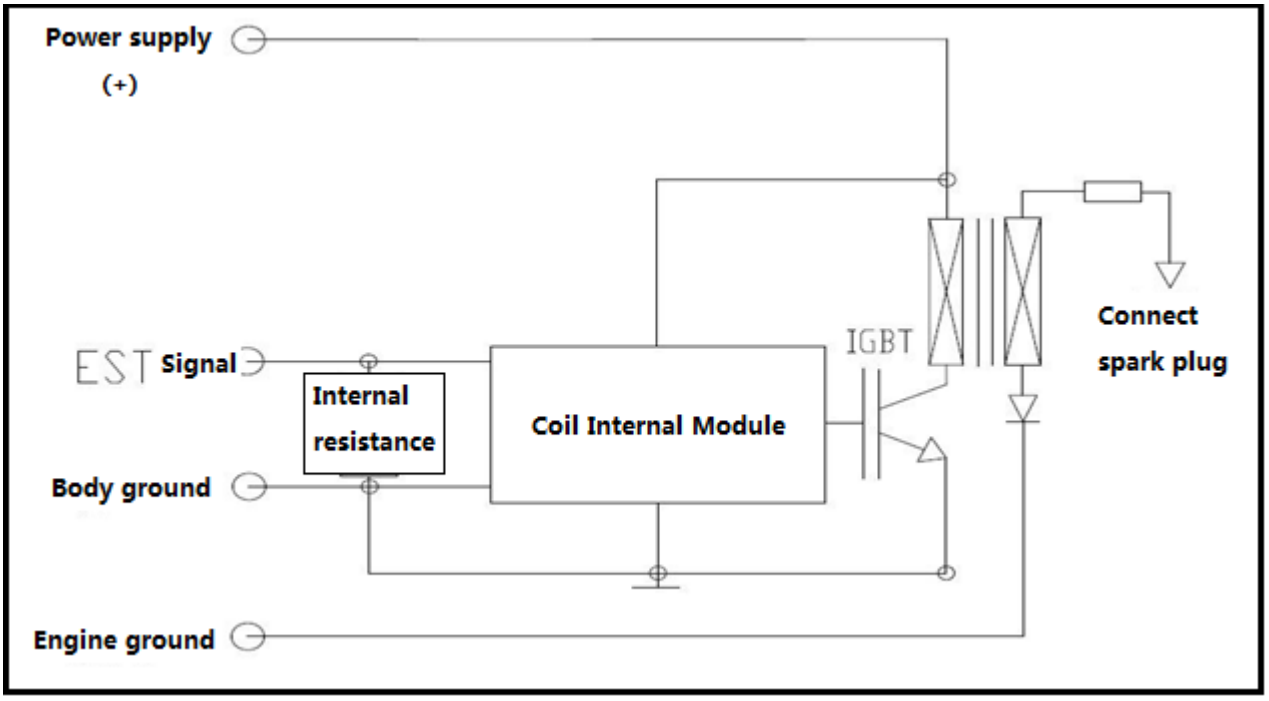
Figure 30:

Structural principle inspection of parts

General inspection

Check of ignition coil

Schematic diagram of ignition coil is as follows::



1 Ask the customer about the fault condition of the vehicle.
2 Read the vehicle DTC and confirm the cylinder with "misfire" fault.
3 Interchange the ignition coil of the cylinder with "misfire" fault with the ignition coil of the normal cylinder, and then run the vehicle under the faulty condition.
4 If the misfire fault code changes to the original normal working cylinder following the ignition coil, please replace the ignition coil.

Caution It is unlikely that all four ignition coils will not work properly. To avoid replacing the normal ignition coil, perform the above procedure, identify the faulty ignition coil and replace it.

This type of coil has internal ignition module, milliohmmeter cannot directly measure the primary resistance of ignition coil. Spark plug inspection

1 Technical specifications: Model and part number are consistent with vehicle configuration.
2 Carbon deposit: If carbon is adsorbed on the spark plug, after the engine is warmed up, it can idle at 2000 rpm~2500 rpm without load for 5 min.

Caution Carbon may be adsorbed on the electrode or ceramic body of the spark plug during vehicle delivery to the 4S store or during winter repetitive short drive. If the spark plug electrode or ceramic volume carbon is large (black), which causes such faults as unstable idling speed or difficult starting, carbon shall be burned out by performing engine idling without load.

When no load idling is performed, pull up the parking brake and depress the foot brake to move the shift lever to neutral gear (MT) or shift the shift lever to P gear (AT) to prevent accidents and serious injuries.

3 If any of the following faults occur, replace the spark plug.

- Broken ceramic body
- Electrode broken

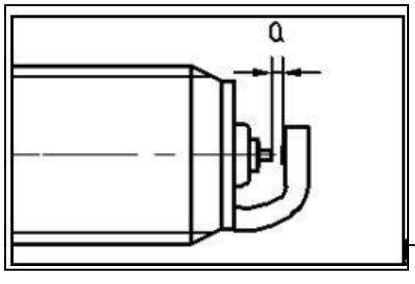
4 Interchangeability check

Note: The following operations are performed when the spark plugs are inspected visually.

1) Interchange the spark plug of the cylinder with misfire fault with the spark plug of the normal cylinder, and then run the vehicle under the faulty condition.
2) If the misfire fault code changes to the original normal working cylinder following the spark plug, please replace the spark plug.

Spark plug

Spark plug electrode initial gap "a": 0.6~0.7 mm



Common method
spark plug tripping

⚠Warning Warning Warning⚠⚠

1. For "neutral gear" of transmission shift lever, apply parking brake reliably.

2.Turn ignition switch to "LOCK" position (ignition switch is not pressed for new vehicles) and disconnect fuel injector plug connection.

3.Remove ignition coils, remove spark plugs.

4.Connect the ignition coil and spark plug, and ground the spark plug at a reliable grounding point of the engine.

5.Start the engine and observe the spark status at the spark plug clearance.

6.Turn the ignition switch to "LOCK" position. (Do not press ignition switch)

7.Install spark plug and ignition coil.

Ignition advance angle monitoring

Ignition of vehicle, connect diagnostic scanner

Enter the engine control unit and select the ignition pin in the data flow for test.

Fault symptom diagnosis check and confirmation

Fault symptom table

Fault symptom		Reason	Handling method
Engine cannot be started	Engine does not start or is difficult to start; Or the engine stops suddenly during running and does not catch fire when restarting.	1. Battery power loss	Troubleshooting battery faults
		2. Battery pole wiring is loose or poor contact	Check whether the wiring is secure
		3. Ignition coil harness plug falls off.	Check whether the wiring is secure, reassemble or replace
		4. Ignition coil harness connector is loose.	Replace or reassemble
		5. Spark plug does not trip	Perform the "Ignition Spark Test" and if it does not trip, perform the Ignition Coil Assembly Check and Spark Plug Check or Replace.
		6. Other engine problems	Check engine
Individual cylinder does not work	When the engine is running at various speeds, row trachea can hear gun sound and row trachea has black smoke.	1. Ignition coil harness connector is loose.	Replace or reassemble
		2. Spark plug does not trip	Perform the "Ignition Spark Test" and if it does not trip, perform the Ignition Coil Assembly Check and Spark Plug Check or Replace.
		3. Other engine problems	Check engine
Insufficient engine power	Engine is difficult to start, and acceleration and climbing are weak during driving.	1. Individual cylinder does not work	Refer to previous fault diagnosis.
		2. Ignition coil leakage	Replacement
		3. Ignition coil harness connector is loose.	Replace or reassemble
		4. The spark plug has serious carbon deposit.	Replacement

Appearance check list

Ignition system fault diagnosis process

Serial number	Operation	Judge "Yes"	Judge "No"
Step 1	Is the engine ignition system fault diagnosis flow checked	Go to Step 2	Enter fault diagnosis process
Step 2	Record the operating conditions and user description of the vehicle in case of problems.	Go to Step 3	Enter fault diagnosis process
Step 3	Read the fault code through the diagnostic scanner, check whether there is "misfire" fault display, and confirm which cylinder is faulty.	Go to Step 4	Enter fault diagnosis process
Step 4	After the fault is cleared, restart, whether there is still "misfire" fault display	Go to Step 5	Enter fault diagnosis process
Step 5	Check whether the connection of ignition coil harness connector is reliable and whether the harness is on/off.	Go to Step 6	Reconnect
Step 6	Check the coils one by one to see if the results meet the requirements.	Go to Step 7	Replacing ignition coil in question
Step 7	Check the spark plugs one by one, and the inspection results meet the requirements.	Good ignition system	Replace the faulty spark plug.

Warning The "misfire" fault displayed in the diagnostic scanner is not all caused by the ignition system. Engine misfire diagnosis is a comprehensive evaluation result, which may be related to software data or hardware.

Fault symptom table

If the fault occurs but no DTCs are stored in the ECUs and the cause of the fault cannot be determined in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.
(There are many possible reasons for the following fault symptoms, only when the fuel system needs to be checked).

Test strip	Possible causes	Troubleshooting method
1. Troubleshooting of supercharger related engine	Air filter element too dirty	Clean or replace filter element as appropriate
	The connecting pipeline between compressor outlet and intake manifold is not smooth.	Remove debris from blocked lines or replace damaged parts as appropriate
	Pipeline leakage between compressor and engine intake manifold	Re-tighten fasteners or replace damaged parts as appropriate
	Air filter to compressor pipeline leakage	Re-tighten fasteners or replace damaged parts as appropriate
	Three-way catalytic converter or muffler is not smooth	Remove debris from blocked lines or replace damaged parts as appropriate
	Leakage at the connection between turbine inlet and engine exhaust manifold	Re-tighten fasteners or replace gaskets as appropriate
	Abnormal wear of engine piston ring causes channeling	Refer to this manual to replace the engine piston ring.
	Supercharger damage	Replace supercharger
2. The spark plug has serious carbon deposit and does not trip.	Spark plug has carbon deposit	Clean or replace
	Spark plug does not trip	Troubleshoot as follows: 1.For "neutral gear" of transmission shift lever, apply parking brake reliably.2. Disconnect the fuel injector plug without pressing the ignition switch.Warning: Continuous opening of fuel injector may cause fire.3. Removing ignition Coil, remove spark plug.4. Connect the ignition coil and spark plug, and ground the spark plug at a reliable grounding point of the engine.5. Start the engine and observe the spark plug. Status.6. The engine stops and the ignition switch is not pressed.7. Install spark plug and ignition coil;
3. Troubleshooting of electronic throttle valve	Electronic throttle is stuck in the position with small opening	Check whether the electronic throttle valve is stuck in a position with a small opening due to ice or oil dirt. If yes, repair and replace the electronic throttle valve.
	Electronic throttle is stuck at a large opening	Whether the electronic throttle valve is stuck in a position with large opening due to ice or oil dirt. If yes, repair and replace the electronic throttle valve.
4. Troubleshooting of high-pressure fuel rail and high-pressure fuel pump	High pressure rail pressure too low	Check whether there is oil leakage, check whether the fuel is insufficient, check whether the low-pressure fuel pump is damaged, check whether the working capacity of the high-pressure fuel pump is reduced, if yes, replace the relevant parts.
	High pressure rail pressure too high	Check whether the high-pressure oil pump control is normal, whether the pressure relief valve is blocked or not, and if yes, repair the high-pressure oil pump.
	Working capacity of high-pressure oil pump decreases	Check whether there is leakage of fuel passage, check whether the fuel is insufficient, check whether the low-pressure fuel pump is damaged, check whether the working capacity of the high-pressure fuel pump is reduced, repair the fuel passage, add fuel, repair the low-pressure fuel pump and repair the high-pressure fuel pump.

Insufficient power diagnosis process

If the fault occurs but no DTCs are stored in the ECUs and the cause of the fault cannot be determined in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

(There are many possible reasons for the following fault symptoms, only when the fuel system needs to be checked)

- There are many reasons involved in insufficient power, and it is necessary to carry out troubleshooting respectively according to the description of actual vehicle problems, as shown in the following table.

Serial number	Operation	Yes	No
1	If the diagnostic scanner detects no fault, check the vehicle status, including whether the engine works smoothly and whether the vehicle related system has any fault.	Go to Step 1	Check whether the supercharger works normally.
	Damage, etc., if relevant parts are not checked according to the symptom list.		
2	Check whether the supercharger works abnormally. If not, proceed to the next step.	Go to Step 2	Check the intake system for leaks and loose connections, etc.
3	Check whether the intake system works abnormally or whether there is leakage. If not, proceed to the next step.	Go to Step 3	Check exhaust system blockage
4	Check whether the exhaust system is blocked. If not, proceed to the next step.	Go to Step 4	Check whether the ignition system does not trip.
5	Check whether the ignition system does not jump or the spark plug coking phenomenon, if not, proceed to the next step.	Go to Step 5	Inspect whether the electronic throttle is stuck or not in place.
6	Check whether the electronic throttle valve works abnormally. If yes, proceed to the next step.	Go to Step 6	Does the fuel header have insufficient pressure building capacity
7	Check whether the low-pressure fuel header line oil pressure is normal.	Go to Step 7	Check fuel lines for insufficient pressure build-up
8	After checking the above related systems, follow the steps below.	Fault part confirmation	Repair and replace relevant parts in case of problems.
9	If the problem is still rule out after one by one troubleshooting, technical support is required.	Technical support	If the problem is repeated, ask for technical support.

No fire tripping diagnosis

Check spark plug without ignition according to the following steps

Test conditions	Troubleshooting method
Check that the spark plug does not trip	Follow the steps below for troubleshooting
	1. For "neutral" transmission shift lever, apply parking brake reliably.
	2. Disconnect the fuel injector plug without pressing the ignition switch.
	Warning Continuous opening of fuel injector may cause fire.
	3. Dismantle ignition coil and spark plug.
	4. Connect the ignition coil and spark plug, and ground the spark plug at a reliable grounding point of the engine.
	5. Start the engine and observe the spark status of the spark plug.
	6. Engine stops, ignition switch is not pressed.
	7. Install spark plug and ignition coil

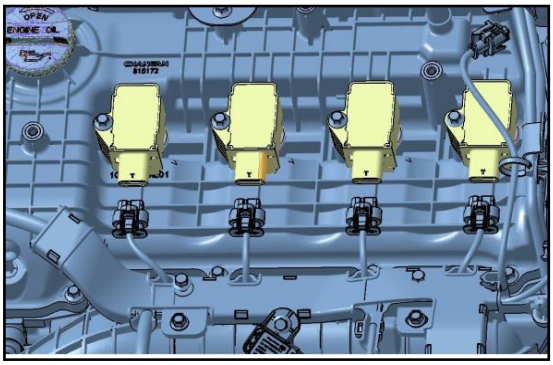
Removal and installation

Ignition Coil Removal/Installation

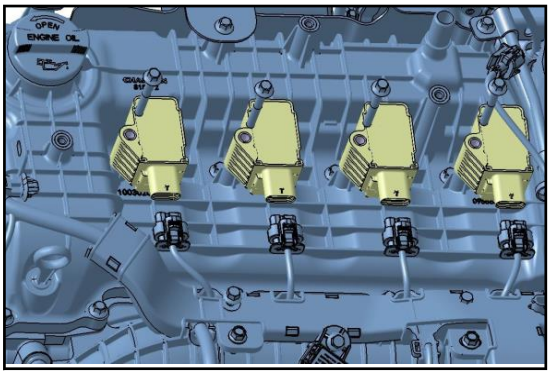
1. Removal

1 Power off the vehicle.

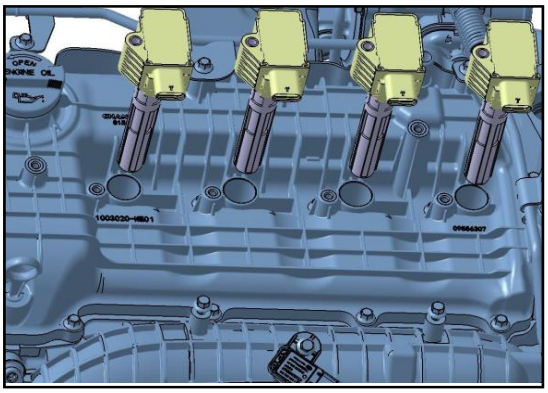
2 Pull off ignition coil harness connector.



3 Use T-sleeve to remove retaining bolt.



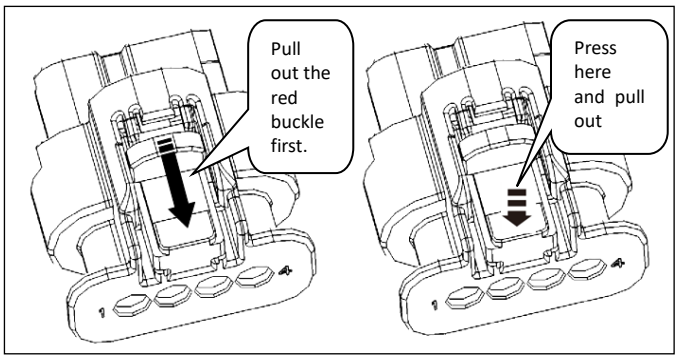
4 Pull off ignition coil.



2. Installation

Installation is in reverse order of removal.

Caution Remove the connector of ignition coil and harness as shown in the figure.

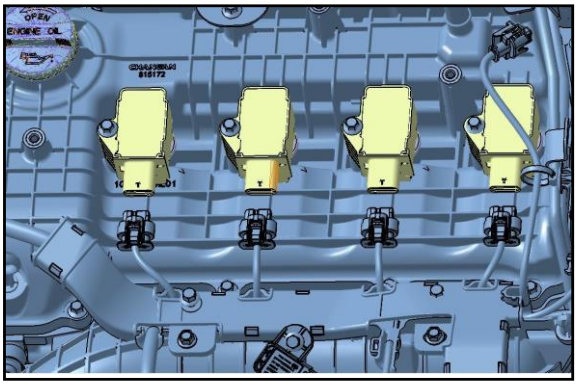


Spark plug removal/installation

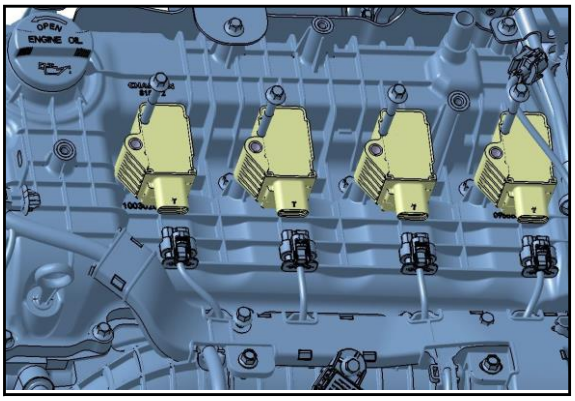
1. Removal

1 Power off the vehicle.

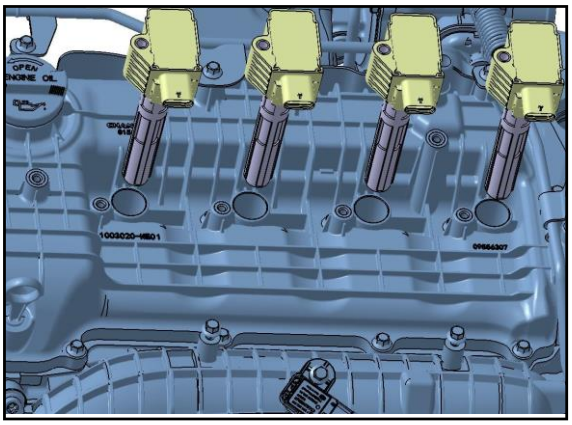
2 Disconnect the ignition coil harness connector.



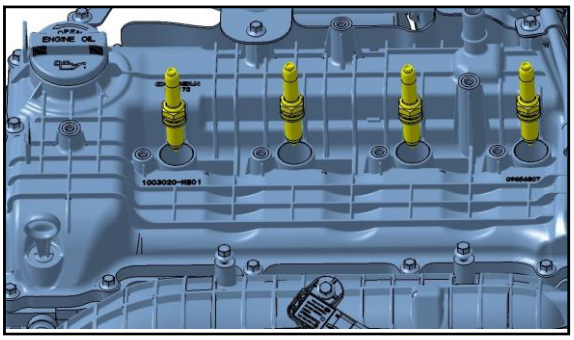
3 Use T-sleeve to remove the fixing bolt of ignition coil.



4 Pull off ignition coil.



5 Remove and take out spark plug with torque wrench and special socket for spark plug.



2. Installation

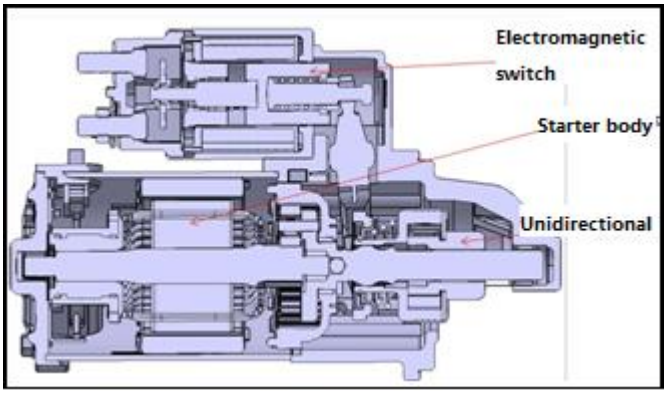
Installation is the reverse of the removal procedure.

Caution If a non-conforming spark plug is installed, the engine performance will be degraded. When replacing, install only the spark plugs that meet the vehicle configuration requirements.

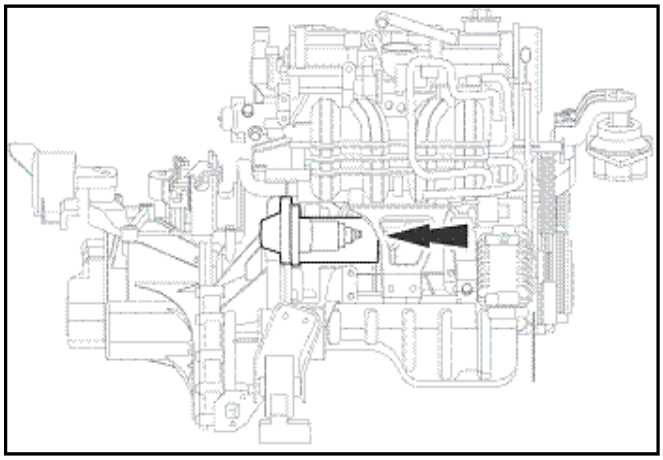
Starting system

Composition and position distribution

The starter consists of electromagnetic switch, starter body and unidirectional device as shown in the figure below.



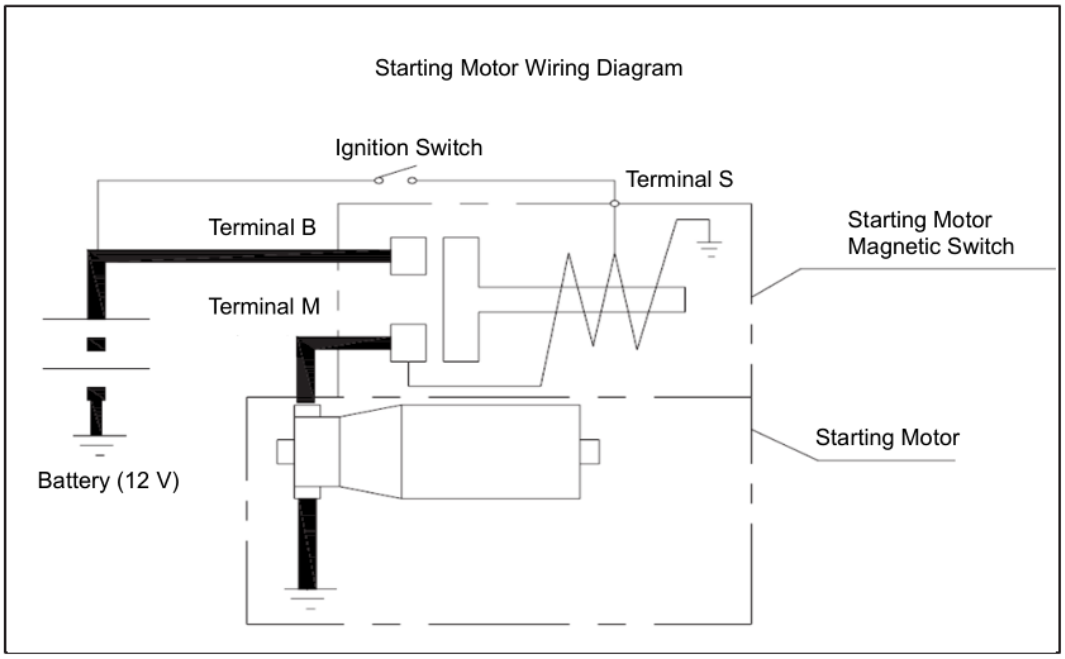
The starter is arranged at the front end of the engine and the intake side, see the figure below for details.



System functional principle introduction
System overview

The starter system mainly consists of battery, ignition switch and starter motor related circuits, all of which are connected by electric wires. When the ignition switch is set to the "ST" position, the power supply supplies the starting motor electromagnetic switch. The electromagnetic switch coil generates a magnetic field to cause the moving iron core and gear transmission rod to move, causing the pinion to mesh with the engine flywheel ring gear. The electromagnetic switch contacts are closed and the starting starts.

When the engine starts, the pinion overspeed clutch protects the armature and prevents the flywheel drive pinion from driving the armature until the switch is disconnected. At this time, the return spring causes the pinion to disengage.



Starter assembly working principle

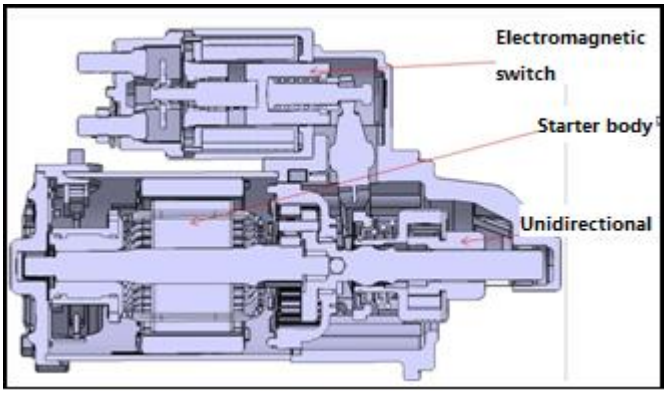
Use the vehicle key to turn on the ignition switch of the vehicle, power on terminal S of the starter motor electromagnetic switch, pull in the electromagnetic switch, and eject the starter motor unidirectional device to the meshing position with the engine flywheel. At this time, the terminals M and B of the electromagnetic switch are turned on, the battery current flows into the starter, the starter starts to run and drives the flywheel to start the engine; After the key switch is reset, the starter S terminal is powered off, the unidirectional switch is returned, the electromagnetic switch M and B terminals are disconnected, and the starter stops working.

Basic parameters of starter assembly

Index	Starter with start-stop function
Rated voltage	12V
Power	1.2KW
Power supply performance	12 V, 60Ah

Part structure principle
check starter motor

Starter motor consists of electromagnetic switch, starter body and unidirectional device



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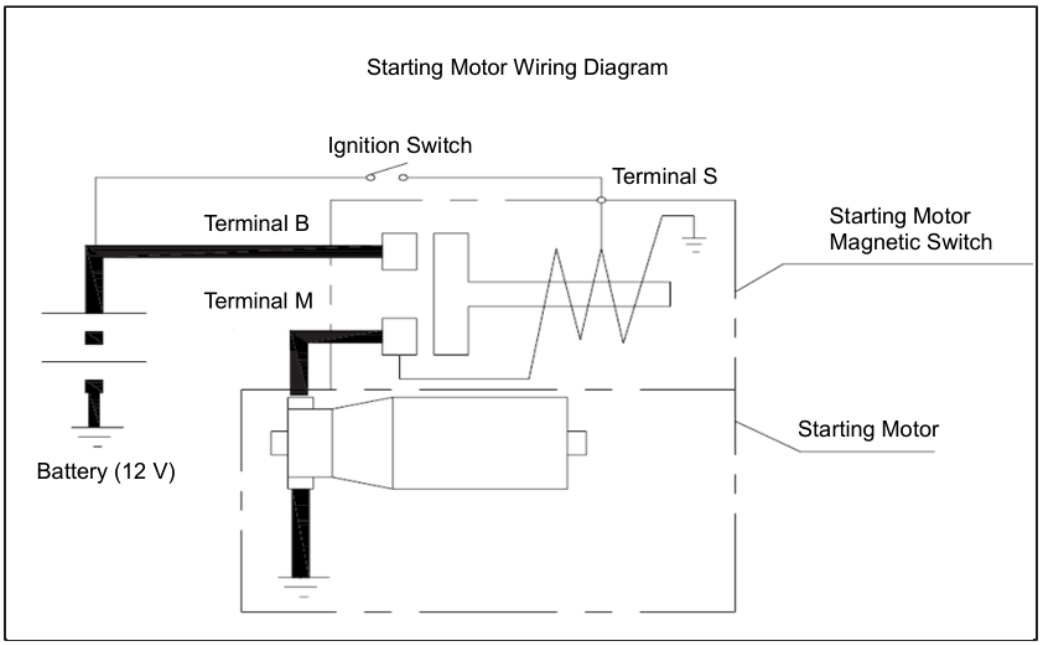


Common methods

Starting motor electromagnetic switch check

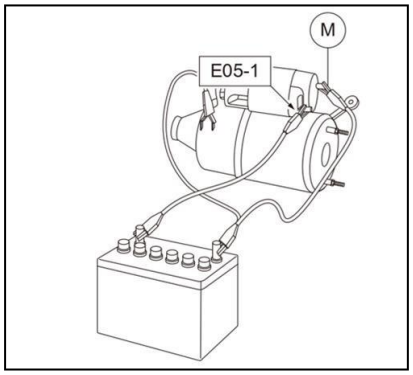
General equipment: Multimeter

Warning

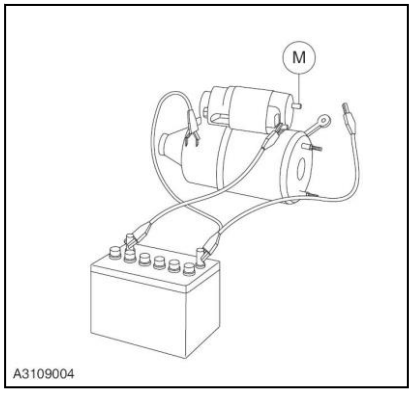
Electromagnetic switch test

Warning The excitation coil must be disconnected from the terminal "M" before testing.

1 Removing starter motor armature lead from solenoid switch
2 Use jumper wire to reliably connect starter motor housing and electromagnetic switch housing with battery negative electrode.
3 Connect one end of the other jumper wire to the positive terminal of battery, and connect the other end to terminal 1 of starter motor harness connector E05.
4 Start motor pinion should be removed
5 Remove the negative wire of "M" terminal, and the pinion of starter motor shall not return.

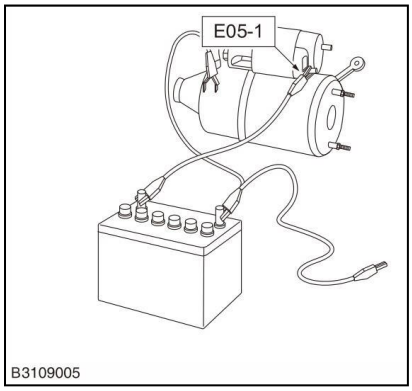


6 Connect the lead pinion as described above, then remove the negative lead of "M" terminal, and check whether the pinion rotates outwards; otherwise, replace the electromagnetic switch.



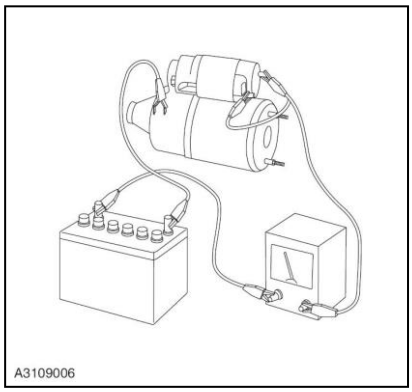
Starting motor pinion return check

1 Use jumper wire to reliably connect starter motor housing and electromagnetic switch housing with battery negative pole.
2 Use another pivot jumper wire to connect one end to battery positive, and the other end to connect terminal 1 of starter motor harness connector E05.
3 The pinion of the starter motor should move out.
4 Disconnect the battery positive jumper wire and the pinion should return quickly.



Starter motor no load test

1 Make sure that the battery is fully charged.
2 Connect the starter motor, battery and tester as shown in the figure.
3 Run the starter motor and confirm it rotates smoothly. If the starter motor does not rotate smoothly, check the starter motor device.
4 Measure the voltage and current while the starter motor is running.
5 If not, replace the starter motor.



Fault symptom diagnosis check and confirmation

1 Confirm the customer's problem
2 Visual inspection for visible signs of mechanical or electrical damage

Appearance check list

Mechanical	Electrical
Starter motor	Fuse battery Starting relay harness Loose joint or corrosion

1. If the observed or raised problem is obvious and the cause has been found, the cause must be corrected before proceeding to the next step.
2. If the problem passes visual inspection, confirm the fault and refer to the fault symptom table.

Fault symptom table

If the fault occurs but no DTCs are stored in the ECM and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Starter cannot run	• Battery • Starting relay • Circuit • Starter motor • Ignition switch	• Starter fails to run diagnostic process Refer to Starter Failure Diagnostic Procedure
Starter cannot stop running	• Ignition switch • Starting relay • Starter motor	• Starter Cannot Stop Running Diagnostic Procedure Reference Starter Cannot Running Diagnostic Procedure
Starting motor running slowly diagnosis process	• Battery • Starting relay • Circuit • Starter motor • Ignition switch • Belt drive system	Starting motor running slowly diagnosis process Refer to the starting motor slow running diagnostic procedure.

Starter fails to run diagnostic process

Test conditions	Details/Results/Measures
1. General inspection	
	A. Inspect the battery positive and negative harness plugs for signs of damage, oxidation, poor contact, loosening, etc. B. Inspect the battery positive electrode and starter connection harness plug for signs of damage, aging, poor contact, loosening, etc.

Test conditions	Details/Results/Measures
	C. Inspect the engine grounding connection harness plug for signs of damage, aging, poor contact and loosening. Check whether the result is normal? ? Yes Go to step 2. ? No Repair the fault point.
2. Check fuse	
	A. Check starter control circuit fuse SB08. Rated capacity of insurance: 40 A Is the fuse normal? ? Yes Go to Step 3. ? No Overhaul the safety circuit and replace the rated capacity safety.
3. Check battery	
	A. Check the battery voltage. Standard voltage: 11 ~ 14 V ? Yes Go to Step 4. ? No Charge the battery. Or replace with a new battery.
4. Check starting relay	
	A. Replace a new relay. B. Turn the ignition switch to the "ST" position. Is starting normal? ? Yes Replace the relay. ? No

Test conditions	Details/Results/Measures
	Go to Step 5.
5. Check ignition switch	
	A. Turn the ignition switch to "LOCK" position. B. Disconnect ignition switch harness plug P37. C. Turn the ignition switch to "ST" position. D. Measure the resistance between terminal 4 and terminal 5 of ignition switch harness plug P37. Standard resistance: Is the resistance less than 5 Ω normal? ? Yes Go to Step 6. ? No Replace the ignition switch.
6. Check starter power supply circuit	
	A. Measure voltage of starter motor solenoid switch harness plug E04 terminal No.1 to ground. Standard voltage: 11 ~ 14 V Is the voltage normal? ? Yes Go to Step 7. ? No Repair or replace the relevant harness.
7. Check power supply circuit of electromagnetic switch	
	A. Replace a good starter motor relay. B. Turn the ignition switch to "ST" position to start normally? ? Yes Replace start relay. ? No to step 6.
8. Check starter motor	
	A. Perform no load test. Reference: Starter motor no load test Is the starter motor tested qualified?

Test conditions	Details/Results/Measures
	? Yes Replace the starter motor electromagnetic switch. Confirm the system is normal. ? No Replace the starter motor.
9. Check power supply circuit of electromagnetic switch	
	A. Turn the ignition switch to "LOCK" position. B. Remove relay ER12 for engine compartment electrical appliance centre C01. C. Disconnect the starter motor solenoid switch harness plug E03. D. Measure the resistance between terminal 96 of relay ER12 of engine compartment electrical center C01 and terminal 1 of starter motor electromagnetic switch harness plug E03. Standard resistance: Is resistance less than 5 Ω normal? ? Yes Go to step 10. ? No Repair or replace the relevant harness.
10. Inspect the ignition switch power supply circuit.	
	A. Turn the ignition switch to "LOCK" position. B. Remove fuse SB08 of engine compartment electrical appliance center C01. C. Disconnect ignition switch harness plug P37. D. Measure the resistance between terminal 65 of fuse SB08 of engine compartment electrical center C01 and terminal 5 of ignition switch harness plug P37. Standard resistance: Is resistance less than 5 Ω normal? ? Yes Go to Step 11. ? No Repair or replace the relevant harness.
11. Check relay ER12 control circuit	

Test conditions	Details/Results/Measures
	A. Turn the ignition switch to "LOCK" position. B. Remove relay ER12 for engine compartment electrical appliance centre C01. C. Disconnect ignition switch harness plug P37. D. Measure terminal 4 of ignition switch harness plug P37 and engine compartment electrical center C01 Resistance between relay ER12 terminal No.98. E. Measure the resistance between terminal 98 of relay ER12 of engine compartment electrical center C01 and body grounding. Standard resistance: Is resistance less than 5 Ω normal? ? Yes Go to Step 12. ? No Repair or replace the relevant harness.
12. Check grounding circuit of starting relay	
	A. Turn the ignition switch to "LOCK" position. B. Remove starter relay ER12. C. Measure the resistance between terminal 97 of starter relay ER12 and reliable grounding. Standard resistance: Less than 5 Ω Is the resistance normal? ? Yes Go to step 13. ? No Repair the circuit between terminal 97 of starter relay ER12 and grounding G 302.
13. Replace engine compartment electrical center C01	
	A. Turn the ignition switch to "LOCK" position. B. Replace engine compartment electrical center C01. Confirm the system is normal.

Starting motor cannot stop running diagnostic process

Test conditions	Details/Results/Measures
1. Check automatic return function of ignition switch	
	A. Turn the ignition switch to the "LOCK" position. B. Disconnect ignition switch harness plug P37. C. Turn the ignition switch to "ST" position and quickly release the key. D. Measure the resistance between terminal 4 and terminal 5 of ignition switch harness plug P08. Standard resistance: Is the resistance 10 MΩ or higher normal? ? Yes Go to step 2. ? No Replace the ignition switch.
2. check starting relay ER12	
	A. Replace a new relay. B. Turn the ignition switch to "ST" position and quickly release the key. Does the starter motor stop? ? Yes Replace the relay. ? No Go to Step 3.
3. Inspect the starter relay control circuit is short to power supply.	
	A. Turn the ignition switch to "ST" position and quickly release the key. B. Measure the voltage between terminal 98 of relay ER12 of engine compartment electrical center C01 and body grounding. Standard voltage: 0 V Is the voltage normal? ? Yes Go to Step 4. ? No

Test conditions	Details/Results/Measures
	Repair the short circuit between terminal 98 of relay ER12 of engine compartment electrical center C01 and terminal 5 of ignition switch harness plug P37 to power supply positive.
4. Inspect whether the power supply circuit of electromagnetic switch is short to power supply.	
	A. Turn the ignition switch to "ST" position and quickly release the key. B. Measure the voltage between the starter solenoid switch harness plug E03 terminal No.1 and body ground. Standard voltage: 0 V Is the voltage normal? ? Yes Go to Step 5. ? No Repair terminal 1 of starter solenoid switch harness plug E03 and engine compartment electrical center. Short circuit fault between terminal 96 of C01 relay ER12 and power supply positive pole.
5. Replace starter motor	
	A. Turn the ignition switch to the "LOCK" position. B. Remove battery negative harness. Replace starter. Reference: Removal and installation Confirm the system is normal.

Starting motor running slowly diagnosis process

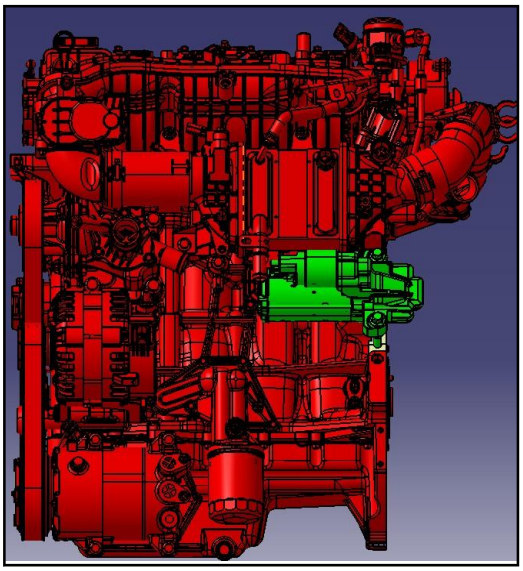
Test conditions	Details/Results/Measures
1. General inspection	
	A. Inspect the battery positive and negative harness plugs for signs of damage, oxidation, poor contact, loosening, etc. B. Inspect the battery positive electrode and starter connection harness plug for signs of damage, aging, poor contact, loosening, etc. C. Inspect the engine grounding connection harness plug for signs of damage, aging, poor contact, loosening, etc. Check whether the result is normal? ? Yes

Test conditions	Details/Results/Measures
	Go to step 2. ? No Repair the fault point.
2. Check engine and belt drive system	
	A. Inspect whether the engine and belt drive system are stuck mechanically. Is there jamming? ? Yes Repair the stuck fault. ? No Go to Step 3.
3. Check battery	
	A. Check the battery voltage. Standard voltage: Is the voltage of 11 ~ 14 V normal? ? Yes Go to Step 4. ? No Charge the battery. Or replace with a new battery.
4. Check starter motor	
	A. Perform no load test. Reference: Does the starter motor test without load pass the starter motor test? ? Yes Repair engine mechanical fault. Reference: Engine cannot be started - crankshaft does not rotate ? No Replace the starter motor.Reference: Removal and installation

Removing and installing starter assembly

1. Removal

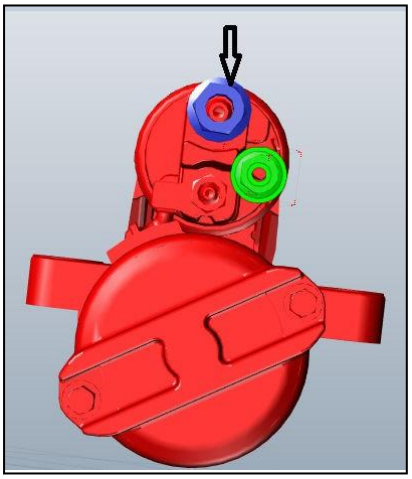
The starter assembly is installed on the engine as shown in the following figure:



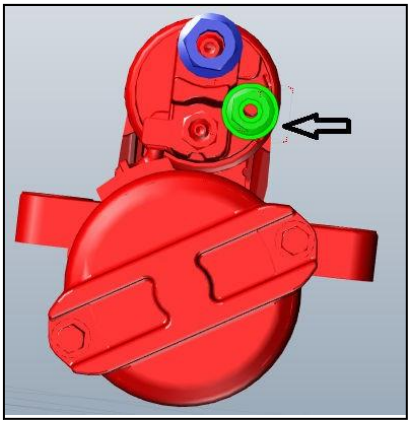
1 Disconnect battery negative harness

2 Jacking up the vehicle and supporting it

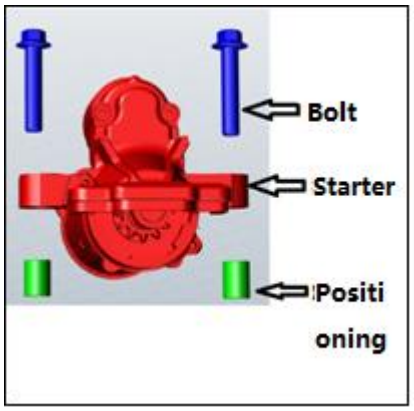
3 Remove B+ harness connector M8 retaining nut of starter motor, and remove B+ harness.



4 Remove the starting motor solenoid switch harness connector M6 retaining nut, and remove the excitation harness.



5 Remove retaining bolt M10 on starter motor



6 Remove the starter motor from the vehicle.

2. Installation

Installation sequence is reverse to removal sequence

During installation, B+ retaining nut torque 11±1N.m, excitation end retaining nut torque 7±1N.m, starter retaining bolt torque 50±3N.m

Charging system specifications

Torque specification

Name	Nm	lb-ft	lb-in
Battery positive pole head retaining nut	5	3. 7	-
Battery negative pole head retaining nut	5	3. 7	-
Battery ground wire and battery sensor retaining nut	11	8	-

Component description

Alternator

Alternator features a solid state regulator inside. All parts of the regulator are installed in a non-breathable box. The regulator is mounted on the slip ring and frame together with the brush holder assembly, and the set voltage of the generator cannot be adjusted.

The generator rotor bearing contains sufficient grease and does not require regular lubrication. The two brushes flow current through the two slip rings to the excitation coil on the rotor. Under normal conditions, the brush can be maintained for a long time.

The stator winding is mounted inside the laminated core, which is the generator frame element. The rectifier connected to the stator winding consists of 6 diodes which convert the AC voltage on the stator into the DC voltage on the alternator output terminal. The central diode is used to convert the fluctuation of neutral point voltage into DC to increase the output of the generator.

The capacitor mounted on the regulator assembly provides voltage protection to the diode and suppresses interference from radio waves.

Battery

The vehicle adopts maintenance-free battery. The difference from the traditional battery is that there is no vent plug on the

battery cover, and the battery is completely sealed except for the small vent on both sides of the battery. Compared with

conventional batteries, this battery has the following advantages:

1 No refill is required during the life of the battery

2 Overcharge protection

3 Not easy to leak like conventional battery

4 Smaller weight and volume, larger capacity

Battery voltage is often low and the vehicle cannot be started after overnight. Consider the fault causes from the following aspects:

1 The electric equipment in the vehicle is not turned off overnight, resulting in overdischarge of the battery.

2 The driving speed is slow and the running time stops. The generator generates insufficient power at low speed.

3 The electrical load of the vehicle exceeds the generator output, in particular the vehicle is equipped with aftermarket fittings

4 The charging system has fault, such as electric shortness of breath circuit, alternator belt slip, alternator fault or voltage regulator fault.

5 Improper use of battery, including failure to keep battery harness terminals clean and tight, or loose battery fixing pressure plate

6 Mechanical fault in electrical system, such as short circuit or pinch

Battery self-discharge

In theory, the self-discharge of battery is inevitable. Although the self-discharge of maintenance-free battery is far less than that of ordinary battery, there is still a certain degree of self-discharge. Even if the open circuit is used for a long time, the battery charge will be obviously lost. Self-discharge of battery is mainly affected by the following factors:

1 The higher the temperature, the higher the self-discharge rate. Generally, the self-discharge rate of the battery will increase by about 2.7 times for every 10℃ increase in temperature. The difference between the battery self-discharge rate of the vehicle stored in summer and winter is large.

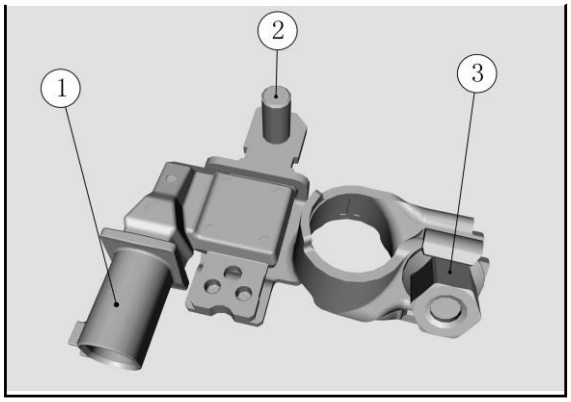
2 The storage conditions have great influence, high humidity and high dust, which will aggravate the self-discharge of battery.

Warning Battery standing time is related to many factors. In general, sufficient batteries can still start the vehicle after being left standing for 6 months with the negative wire removed. Battery sensor

It is used to collect voltage, current and temperature of battery assembly, calculate and process input signal of battery assembly, provide basis for ECU of vehicle to control engine start-stop system and intelligent generator system, and must match with established

Battery part number	Battery sensor part number
3703010-AW01	3703020-MK04

battery assembly to ensure more accurate collection value. The matching relationship between battery assembly and battery sensor is as follows:



Ⓒ LIN-wire interface, pin 1 is KL30, pin 2 is LIN

(2) For fixing M6 bolt post of battery grounding wire

(3) Precautions on battery and battery sensor of sensor

negative pliers used to fix battery sensor assembly on negative

pole of battery:

1 Do not easily remove the battery sensor when repairing the vehicle. (If it is necessary to cut off the vehicle battery power supply, you can remove the harness at the battery sensor end)

2 If the battery sensor is de-energized, the re-acquisition of the start-stop function needs to be based on the following conditions:

- When the battery and battery sensor are normally connected, close all appliances, and leave the vehicle standing for more than 4 hours after locking.
- More than 4 consecutive starts(Stop more than 0.3 s in ON position for each start)

3 Without removing the original vehicle battery, if external power supply or external battery is required to start the vehicle, please connect the external negative terminal to the battery sensor stud, and do not directly hang on the vehicle battery negative terminal. If the battery sensor cannot detect current if it is not connected according to the requirements, it may report battery status error and disable STT function.

4 Battery and battery sensor must use products of manufacturer and model specified by Chang'an Company and shall not be replaced at will. Otherwise, vehicle starting and stopping functions may be affected.

General specifications

Battery specification

Index	AGM battery
Specifications	Maintenance-free L2
Mass	18.1kg

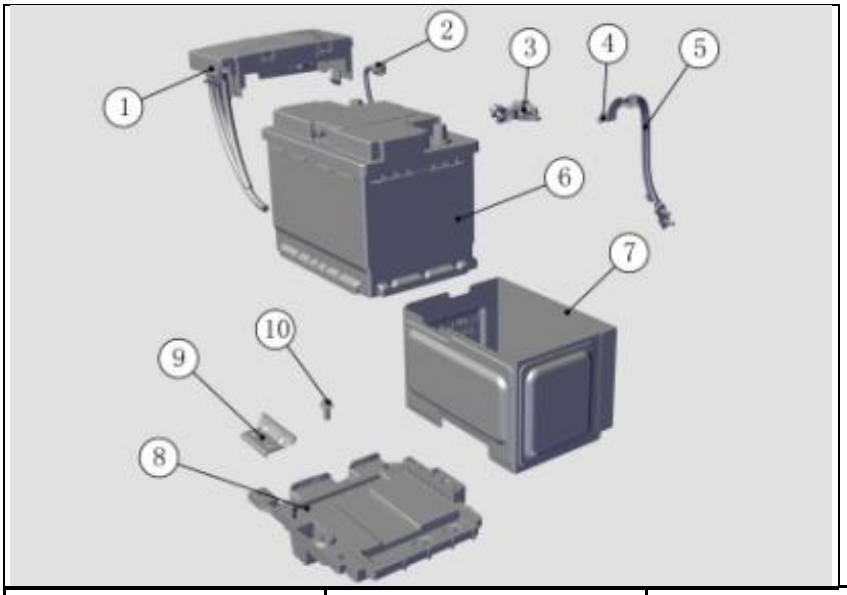
Nominal voltage	DC12V
20 h rated capacity	60Ah
Reserve capacity	≥100min
Charging acceptance	≥15A
-18℃ Low temperature starting capacity	CCA ≥680 A

Battery sensor specifications

Index	Specifications
Working voltage range	6-18V
Sensor wake-up current	>250 mA, <-250 mA
Rated working current of sensor	<22.5mA
Sensor quiescent current after complete vehicle sleep	<0.15mA
Measure battery current range	±1500 A
Continuous working current	±155 A
Insulation resistance	≥10MΩ

Composition and position distribution

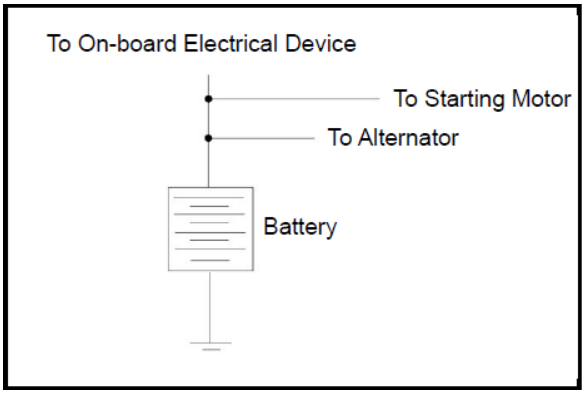
Battery and accessories



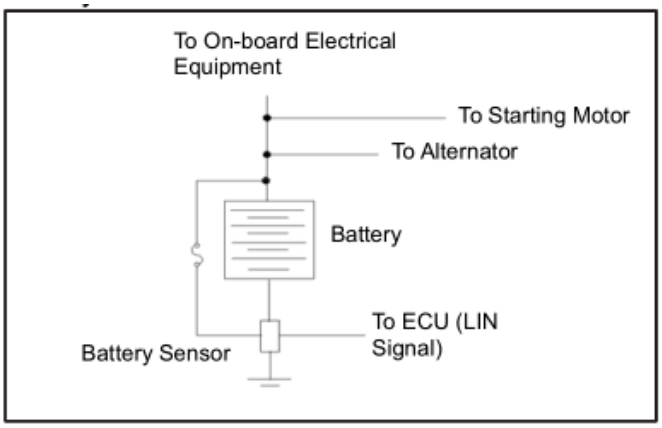
Serial number	Name	Serial number	Name
1	Battery positive fuse box	6	Battery assembly
2	Battery sensor harness	7	Battery trim cover
3	Battery sensor assembly	8	Battery tray assembly
4	Battery negative grounding wire retaining nut	9	Battery assembly fixing pressure plate
5	Battery negative grounding wire	10	Hexagon flange bolt

System functional principle introduction

The common charging system usually consists of the generator and battery assembly. The voltage generated by the generator of the system is usually constant. With the increase of vehicle load, the generator increases the speed and power generation to meet the demand of larger load.



Intelligent charging system is composed of intelligent generator, battery sensor and battery assembly. Intelligent generator is controlled by ECU. Battery sensor collects voltage, current, temperature, SOH and SOC of battery assembly, and transmits information to ECU. ECU judges whether to charge according to battery status.



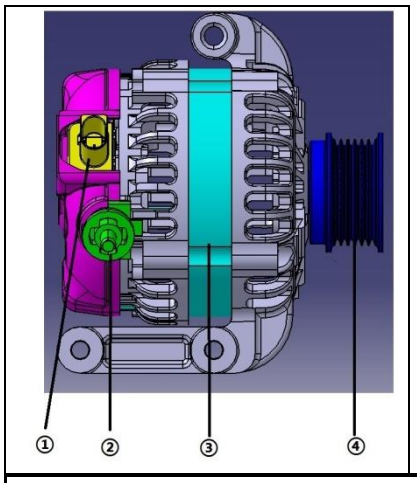
CS55PLUS adopts intelligent alternator charging system

Part structure principle inspection intelligent generator

Function definition

When the engine starts and runs normally, the function of the generator is to supply power to all electrical equipment on board as the main power supply, and also to charge the battery. Intelligent alternator voltage regulation range is 10.6-16 V.

Product structure

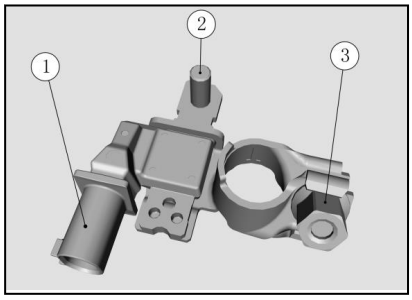


Ⓒ	Intelligent generator LIN terminal
②	Intelligent generator B+ end
③	Generator body
④	Pulley

Battery sensor

It is used to collect voltage, current and temperature of battery assembly, calculate and process input signal of battery assembly, and provide basis for ECU of vehicle to control engine start-stop system and intelligent generator system. It must match the established battery assembly to ensure more accurate acquisition values. The matching relationship between battery assembly and battery sensor is as follows:

Battery part number	Battery sensor part number
3703010-AW01	3703020-MK04



ⒸLIN-wire interface, pin 1 is KL30, pin 2 is LIN;

(2) Used to fix M6 bolt post of battery grounding wire;

(3) Sensor negative pliers for fixing battery sensor assembly on battery negative pole.

Battery

The vehicle adopts maintenance-free battery. The difference from the traditional battery is that there is no vent plug on the battery cover, and the battery is completely sealed except for the small vent on both sides of the battery. Compared with conventional batteries, this battery has the following advantages:

1 There is no need to add supplemental fluid during the life of the battery.
2 Overcharge protection.
3 It is not as easy to leak as a conventional battery.
4 Smaller weight and volume, larger capacity.

Battery voltage is often low and the vehicle cannot be started after overnight. Consider the fault causes from the following aspects:

1 Electric equipment in the vehicle is not turned off overnight, resulting in overdischarge of the battery;

2 The driving speed is slow and the running time stops, and the generator generates insufficient power at low speed;
3 The electrical load of the vehicle exceeds the output of the generator, especially the vehicle is equipped with after-sales equipment;
4 The charging system is faulty, such as electric shortness of breath circuit, alternator belt slip, alternator fault or voltage regulator fault;
5 Improper use of battery, including failure to keep battery harness terminals clean and tight, or loose battery fixing pressure plate;
6 Mechanical faults in electrical system, such

as conductive short circuit or pinch; Battery self-

discharge

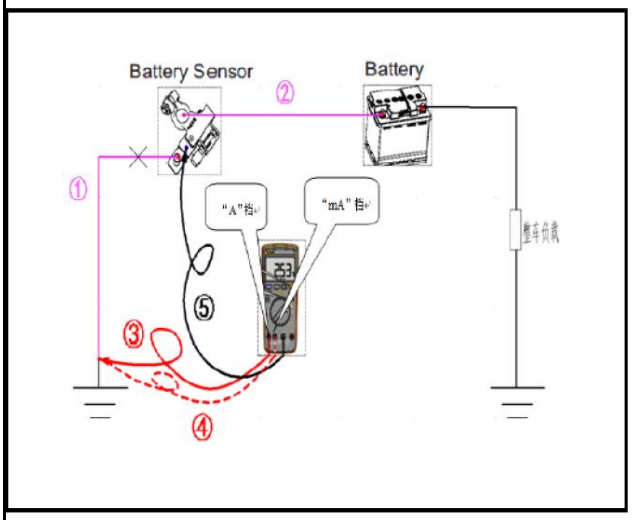
In theory, the self-discharge of battery is inevitable. Although the self-discharge of maintenance-free battery is far less than that of ordinary battery, there is still a certain degree of self-discharge. Even if the open circuit is used for a long time, the battery charge will be obviously lost. Self-discharge of battery is mainly affected by the following factors:

1 The higher the temperature, the higher the self-discharge rate. Generally, the self-discharge rate of the battery will increase about 2.7 times for every 10℃ increase in temperature. The difference between the battery self-discharge rate of the vehicle stored in summer and winter will be large;
2 The storage conditions have great influence, high humidity and high dust, which will aggravate the self-discharge of battery.

Warning Battery standing time is related to many factors. In general, sufficient batteries can still start the vehicle after being left standing for 6 months with the negative wire removed.

Common methods

Dark current detection method

Test equipment	High-precision multimeter (with "mA" gear) or data acquisition equipment, connecting lines, clamps. For vehicles with non-constant dark current (the average quiescent current fluctuation within 1s is greater than 1 mA), the sampling frequency of the data acquisition equipment used shall be greater than 5-10 times the quiescent current frequency.
Dark current test condition	The vehicle is powered off but not locked: 1 Open the door (only for vehicles with power saving function or without door lamp); 2 Open the engine compartment cover; 3 Open the sunroof (sunroof version only); 4 Open the trunk door; 5 The power supply gear is "OFF," and the key is not removed. (Non-PEPS)
Wiring diagram of test procedure 	1 Before dark current test, the vehicle shall start the engine and activate various electrical systems of the vehicle to work normally; 2 After the vehicle stalls, set the power supply gear to "OFF," measure the voltage at both ends of the battery with a multimeter and record it; 3 As shown in the attached left figure, connect the multimeter red probe (3) to "A" position, and connect the red probe (3) and black probe (5) to the battery sensor or battery negative clamp (sensorless model) negative grounding wire terminal and body grounding respectively; 4 Disconnect the vehicle battery original negative grounding wire Ⓒ. Do not interrupt the vehicle power supply during the wiring process. Otherwise, restart from step a). Short the red and black probes of the multimeter with short wiring to avoid burnout of the multimeter;(Refer to the above method for connection mode of data acquisition equipment.) 5 According to the preset vehicle working condition, switch the multimeter to "mA" gear after the vehicle sleeps, disconnect the tool short wiring, observe the display current value of the multimeter or current data equipment, and observe the current value for 10 min after the current value stabilizes to the minimum value. The current value cannot be reversed. Bomb, record the result. **Warning If the vehicle needs to be unlocked or locked, short the red and black probes of the multimeter. For vehicles with non-constant dark current (the average fluctuation of dark current in 1s is greater than 1 mA), the digital equipment shall be used to collect dark current.**

Battery charging method

1 Common lead acid battery/EFB battery

Method 1: Constant voltage current limiting charging(Constant voltage charger)

For ordinary battery, it is recommended to charge the battery with constant voltage 14.0 V (the maximum value shall not exceed 16 V, and the charging current shall not exceed 15 A) charger until the current is about 1-3A;

Method 2: Constant current charging (constant current charger)

Constant current charging according to the following specifications: Charging current (A) =C20/10, (C20- 20 h rate capacity, this value can be found on the part surface label in Ah). If multiple batteries are charged in parallel, the current value will increase. Refer to the following figure for the correspondence between charging time and initial battery voltage:

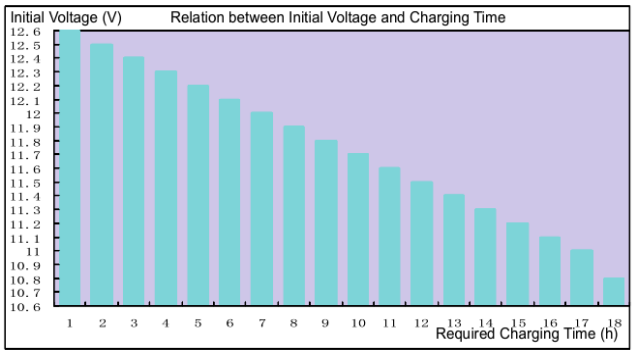


Figure 31

2 AGM battery

Battery voltage at 11 V-12.5 V

Method 1: Constant voltage current-limiting charging:

Constant voltage 14.2-14.8 V (max. 14.8 V, charging current shall not exceed 6 A) is charged. After charging, when the current is reduced to 0.5 A or reduced (about 1-3A) for three hours, it is fully charged. The time is 3-10 hours, depending on the power deficit.

Method 2: Constant current charging:

Strictly control the charging time according to the figure below, and remove the battery when the time is up. No timeout is allowed. Charge current (A) =C20/10, (C20- 20 h rate capacity, this value can be found on the part surface label in Ah).

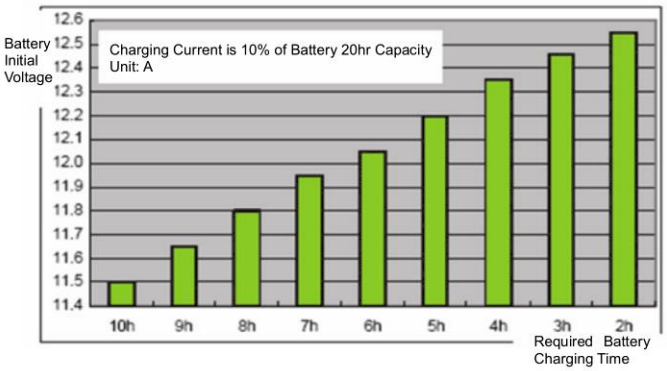


Figure 32

Battery voltage below 11 V

In this case, the battery is over-discharged, and special AGM battery charger specified by Chang'a shall be used for charging. It is recommended to charge the battery to the equipment voltage of 14.8v with a small current and a constant current of about 2A.

Warning

- The battery should be placed where the child cannot access it. The battery contains sulfuric acid to avoid contact with skin, eyes, or clothing. When working near the battery, wear goggles to
  Avoid spraying acid solution to eyes. If the acid solution is sprayed on the skin or eyes, it must be immediately rinsed with clean water for at least 15 minutes and the doctor must be called quickly. If the acid solution is eaten by mistake, please send it to the doctor immediately. Strictly observe the safety rules, otherwise serious casualties may occur.

- Explosive gas will be generated during battery charging and discharging. In order to avoid casualties, do not allow flame, spark or inflammable and explosive objects to be near the battery. When charging or working close to the battery, wear protective protective screen to protect the face and eyes. Often in ventilated position. Strictly observe the safety rules, otherwise serious casualties may occur.
- All manufacturer's instructions must be followed when using any charging equipment. Strictly observe the safety rules, otherwise serious casualties may occur.
- Do not turn on the charging device until the charger is connected to the battery. Strictly observe the safety rules, otherwise serious casualties may occur.
- After charging, turn off the charging device before removing the battery. Strictly observe the safety rules, otherwise serious casualties may occur.
- Do not put the battery in the vehicle for charging. After removing it, charge and discharge it on the charging and discharging equipment. Strictly observe the safety rules, otherwise serious casualties may occur.
- It is incorrect to rely on the vehicle generator to charge the battery that has discharged power, because the charging system can ensure the battery charging is completed after more than 8 hours of continuous driving in the state of no electrical equipment load.

Battery sensor self-learning

When repairing the vehicle, if the battery sensor is powered off, in order to ensure the sampling accuracy of the battery sensor, self-learning of the battery sensor needs to be performed as follows:

1. When the battery and battery sensor are normally connected, turn off all electrical appliances and leave the vehicle standing for more than 4 hours after locking the vehicle;
2. After standing, start the vehicle once.

Fault symptom diagnosis check and confirmation

1 Confirm the customer's problem
2 Visually inspect for visible signs of mechanical or electrical damage.
3 If the observed or raised problem is obvious and the cause has been found, the cause must be corrected before proceeding to the next step.
4 If the problem cannot be found obviously, confirm the fault and refer to the symptom table.

Appearance check list

Mechanical	Electrical
• Front gear belt • Alternator	• Fuse • Harness • Electrical connector • Battery • Battery harness • Charging system warning lamp

Fault symptom table

If the fault occurs but no DTCs are stored in the ECM and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Insufficient battery charge	• Front gear belt • Alternator regulator • Alternator	Reference: Battery undercharging diagnosis process
Battery overcharge	• Alternator regulator • Alternator	Reference: Intelligent generator diagnostic process
Charging indicator lamp is always on	• Drive belt wear • Front end belt tensioner damaged • Alternator • Circuit fault	Reference: Charging indicator lamp is always on
Charging indicator lamp does not light up	• Instrument light emitting diode • Instrument • Circuit fault	Reference: Charging indicator lamp not on
Generator noise	• Front gear belt • Bearing • Stator and rotor	Reference: Generator Noise Diagnostic Procedure

Diagnostic process of insufficient battery charge

Test conditions	Details/Results/Measures
1. Check alternator charging voltage	
	A. Start the engine to increase the engine speed from idle speed to 2000 rpm. B. Use a multimeter to measure the voltage of battery positive wire to negative.

	Is the voltage no less than 12.8 V? ? Yes The system is normal. ? No Go to step 2.
2. Check battery	
	A. Execute battery. Reference: Battery charging method Reference: Dark current detection method Reference: Does battery sensor self-learning check normal? ? Yes Go to Step 3. ? No Repair the faulty harness, fuse or battery.
3. Check generator	
	A. Perform intelligent generator fault diagnosis. Reference: Intelligent generator diagnostic process

Battery overcharge diagnosis process

Test conditions	Details/Results/Measures
1. Check alternator charging voltage	
	A. Start the engine to increase the engine speed from idle speed to 2000 rpm. B. Use a multimeter to measure the voltage of battery positive wire to negative. Is the voltage higher than 16 V? ? Yes Replace the generator. ? No The system is normal.

Charging indicator lamp is constantly on diagnostic process

Test conditions	Details/Results/Measures
1. Check front wheel train belt	
	A. Check the front gear train belt installation. B. Check the front belt tension. Reference: Inspection and confirmation Is the alternator belt normal? ? Yes Go to step 2. ? No Adjust or replace the front gear train belt or tensioner.
2. Check battery and battery sensor	
	Reference: Dark current detection method Reference: Battery charging method Reference: Battery sensor self-learning Whether the battery and battery sensor are normal? ? Yes Go to Step 3. ? No Replace battery or battery sensor
3. Check generator	
	Reference: Intelligent generator diagnostic process: Whether the generator is normal ? Yes The system is normal, please handle according to relevant DTC. ? No Replace generator

Charging indicator lamp does not illuminate diagnostic process

Test conditions	Details/Results/Measures
1. Check charging indicator light emitting diode	

	A. Turn the ignition switch to the "ON" position. B. Measure the voltage between terminal 16 of combination instrument harness plug P22 and body grounding from the rear of combination instrument. Standard voltage: 11 ~ 14 V Is the voltage normal? ? Yes Go to step 2. ? No Overhaul the instrument circuit or replace the instrument.
2. Inspect the circuit from combination instrument to alternator.	
	A. Turn the ignition switch to "LOCK" position. B. Disconnect the alternator harness connector E24 and instrument cluster harness connector P22. C. Measure from terminal 1 of alternator harness connector E24 to instrument harness connector P22. Resistance between terminals No.Standard resistance: Is the resistance less than 5 Ω normal? ? Yes Replace the generator. ? No Repair the circuit.

Generator noise diagnosis process

Diagnostic prompt: Alternator noise may be caused by electrical or mechanical noise. Electrical noise (electromagnetic whimpering) usually varies with the electrical load applied to the generator, which is the normal operating characteristic of all generators and should be distinguished during maintenance diagnosis, otherwise it may cause unnecessary customer complaints. When diagnosing the generator with mechanical noise, first check whether the components around the generator are loose, interfere with each other and other abnormal appearance. In some cases, even if the noise sounds very light in the engine compartment, it will be transmitted into the passenger compartment. If this is the case, replacing the generator cannot solve the fault, thus causing misjudgment.

Test conditions	Details/Results/Measures
1. Check front wheel train belt	
	A. Inspect the front gear train belt for missing teeth. B. Check front gear train belt tension. Reference front gear train Whether the front gear train belt is normal. ? Yes

	Go to step 2. ? No Repair the front wheel train belt.
2. Check generator noise	
	A. Remove front wheel train belt. B. Start the engine to run. Is generator noise still burning? ? Yes Check compressor and booster pump noise. ? No Replace the generator.

Intelligent generator diagnosis process

Serial number	Test item	Test process and measures
1	Return the ignition key to OFF position and turn on the low beam lamp. Test battery terminal voltage	U Read battery terminal voltage ≥12 V? ? Yes Go to Step 2 ? No Charge or replace the battery before proceeding to step 2.
2	Start the vehicle, open the engine compartment cover and check the wheel train.	U Check whether the wheel train slips or gets stuck. ? Yes Pleas e handle ? No Go to Step 3
3	Turn off the vehicle, turn the ignition key to ON position, and read the DTC with the diagnostic scanner.	U Read whether there is fault code in step "4." ? Yes Handle according to the maintenance method corresponding to fault code in step "4." ? No Go to Step 5.
4	**Fault code**	**Corresponding processing method**
	Intelligent generator high temperature fault	Clear the DTC with a diagnostic scanner and the vehicle is stationary for 30 minutes. Start the vehicle, and if the intelligent generator high temperature fault is reported subsequently, replace the generator.
	Mechanical fault of intelligent generator	**Replace generator**
	Intelligent generator circuit fault	Check the alternator B+ harness for looseness and corrosion. Please handle it. Use a multimeter to test B+ line on and off. If the B+ line is free of looseness, corrosion and access, replace the alternator.

	LIN bus readback error supporting communication between EMS and smart generator	Check whether the alternator LIN wire connector is loose, the pins are bent, oxidized, etc. Please handle. Test LIN line on and off with a multimeter. If the signal wire path is normal, replace the power generation. **Machine**
	LIN bus response timeout supporting communication between EMS and smart generator	Check whether the alternator LIN wire connector is loose, the pins are bent, oxidized, etc. Please handle. Test LIN line on and off with a multimeter. If the signal wire path is normal, replace the power generation. **Machine**
	LIN bus frame error supporting communication between EMS and smart generator	Check whether the alternator LIN wire connector is loose, the pins are bent, oxidized, etc. Please handle. Test LIN with a multimeter Wire on/off. If the signal wire path is normal, replace the generator.
	Lin bus checksum error supporting communication between EMS and smart generator	Check whether the alternator LIN wire connector is loose, the pins are bent, oxidized, etc. Please handle. Test LIN line on and off with a multimeter. If the signal wire path is normal, replace the power generation. **Machine**
5	Return the ignition key to OFF position and disconnect the alternator signal terminal connector. Start the vehicle, depress the accelerator under idle condition, increase the engine speed to no less than 3000 rpm for 5s, turn on the A/C and turn on the headlights. Test the generator terminal voltage, that is, test the generator B+ stud and the generator housing. The test method is shown in the following figure.	U Read whether the alternator terminal voltage is ≥13 V. ? Yes **The intelligent generator has no fault. Please check the battery sensor, battery. Whether the alternator connector is connected reliably. Whether the battery positive wire, transmission grounding wire and battery grounding wire are loose, rusted, etc.** ? No **Please replace alternator** **Warning This step read voltage must read alternator B+ stud (multimeter test point not on harness terminal and connecting nut) to generator housing** Do not read the voltage between the bodies.

Removing and installing smart generator

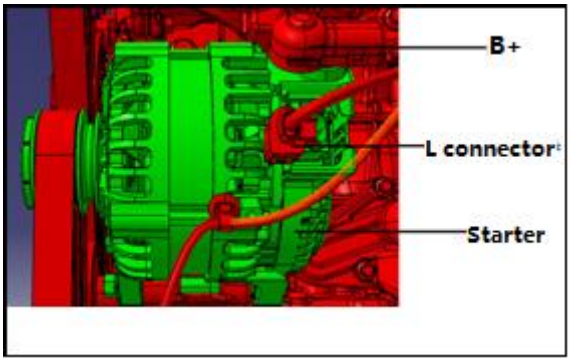
Removal

1.Disconnect the negative battery harness.

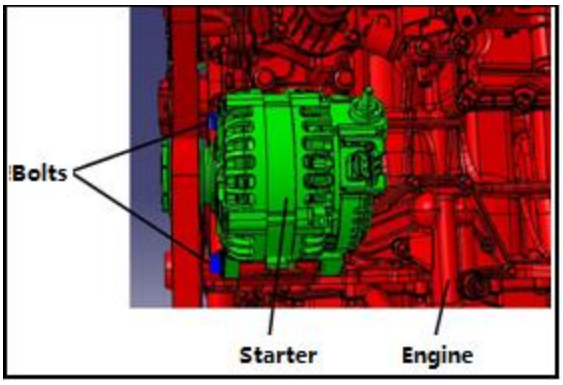
Warning **Ensure that the negative battery harness pile head is disconnected during the next operation.**

2.Jack up the vehicle and support it.

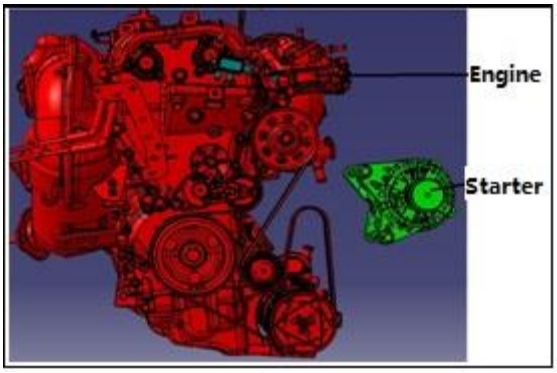
3.Disconnect alternator harness connector and B+ end retaining nut.



4.Remove the upper and lower retaining bolts of generator.



5.Remove generator from vehicle



Warning

When the engine is in hot state, do not repair it to avoid burns. When the system is cooled, it can be repaired.

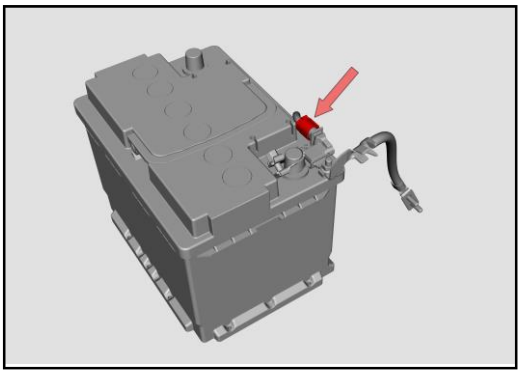
Installation

Installation and
removal sequence
reverse torque
Alternator retaining bolt torque 50±3N.m, alternator B+ nut torque 15±1N.m

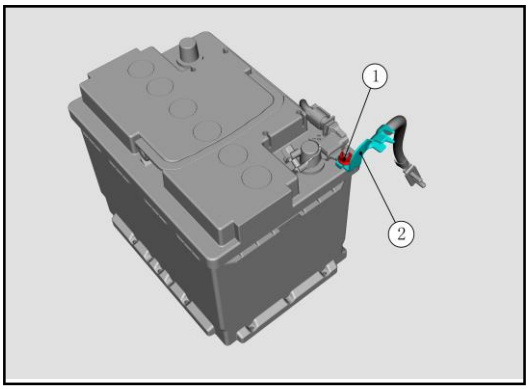
Battery sensor

1. Removal

1 Disconnect the battery sensor connector.

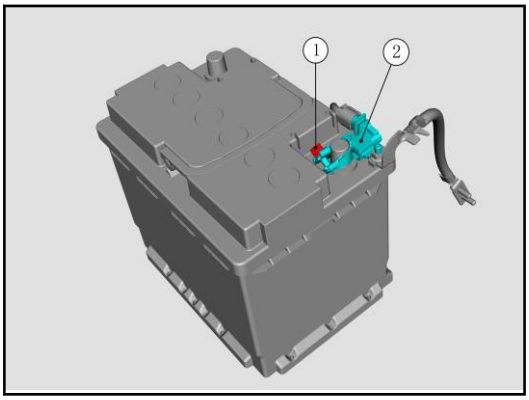


2 Use a 10 mm sleeve to disconnect the battery negative grounding wire nut, and remove the negative grounding wire.



Note: 1: Grounding wire nut; 2: Battery negative grounding wire

3 Loosen the negative clamp nut with a 10 mm sleeve and remove the battery sensor.



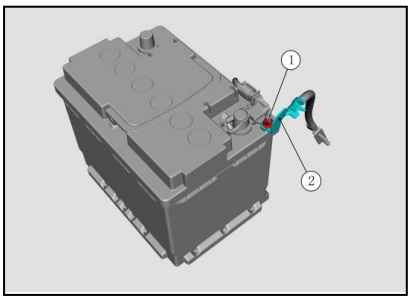
Note: 1: Negative clamp nut; 2: Battery sensor

Warning Before installation, check each part for deterioration or damage, and replace it if any defect is found.

Warning After replacing the battery assembly or battery sensor, leave it to stand for more than 4 hours. Do not start the engine during battery sensor recovery to ensure battery sensor sampling accuracy.

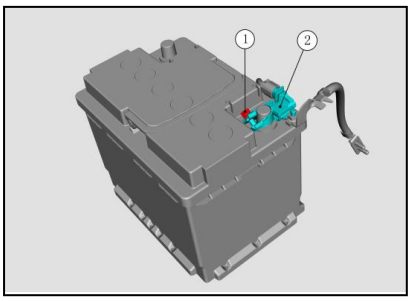
2. Installation

1 First tighten the battery sensor and negative grounding wire nut with 10 mm sleeve, and the nut tightening torque is 11N.m.



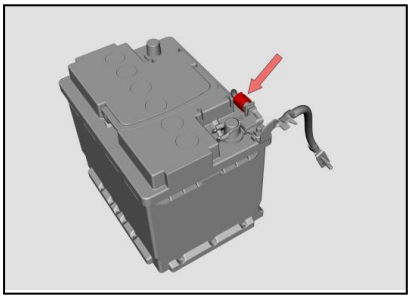
Note: 1: Grounding wire nut; 2: Battery negative grounding wire

2 Assemble the battery sensor to the battery negative, and tighten the negative clamp nut with a 10 mm sleeve, with a torque of 5N.m.



Note: 1: Negative clamp nut; 2: Battery sensor

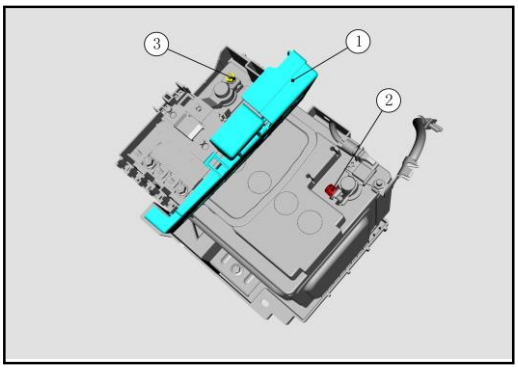
3 Connect the battery sensor assembly connector.



Battery assembly

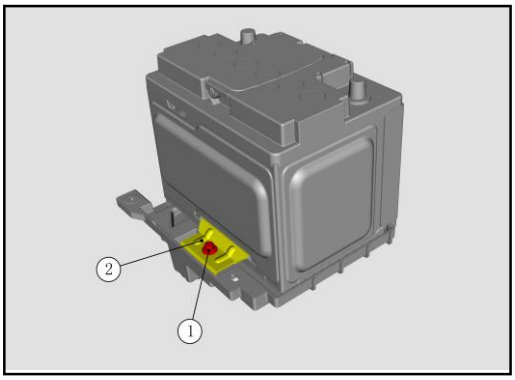
1. Removal

1 Open the battery positive fuse box cover, adopt 10 mm sleeve, disconnect the battery negative clamp nut first, and then disconnect the positive nut;



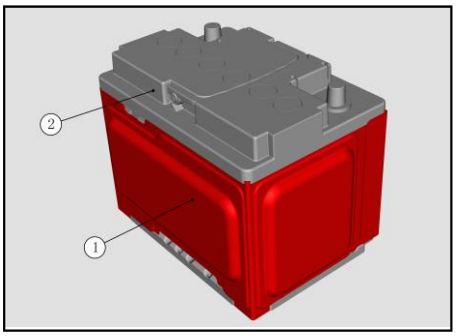
Note: 1: Battery positive fuse box cover; 2: Negative clamp nut; 3: Positive nut.

2 Loosen the fastening nut of battery pressure plate with 10 mm long sleeve, and remove the battery pressure plate;



Note: 1: Nut; 2: Battery pressure plate.

3 Remove the battery trim cover and battery assembly.



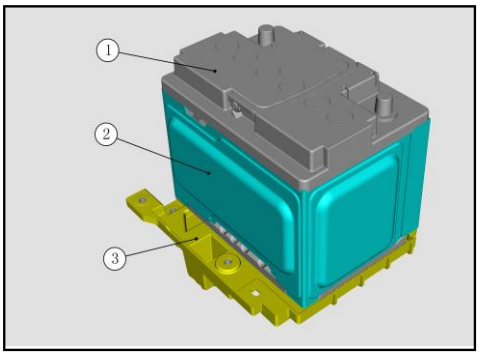
Note: 1: Battery trim cover; 2: Battery assembly

Warning Before installation, check each part for deterioration or damage, and replace it if any defect is found.

Warning When installing the fixing nut, carefully prevent the battery pole from breaking and avoid the risk of battery leakage in the later stage; The negative grounding wire will generate a short spark, which is a normal phenomenon and should not be excessively worried.

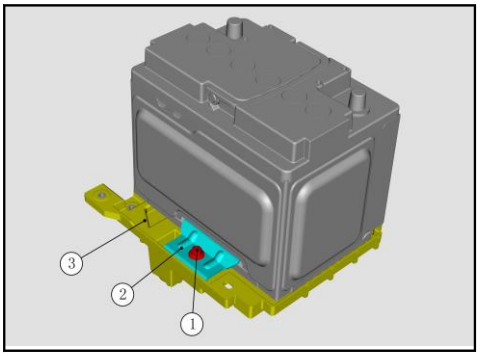
2. Installation

1 Place the battery trim cover and battery assembly on the battery tray stably;



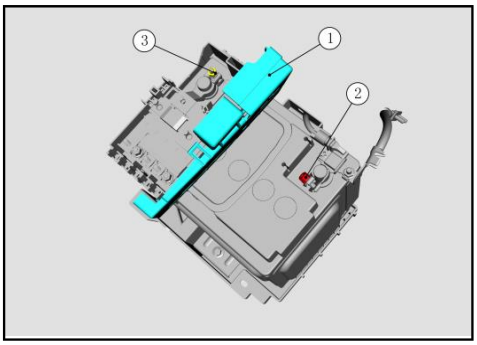
Note: 1: Battery assembly; 2: Battery trim cover; 3: Battery tray assembly.

2 Align the battery pressure plate holes, and tighten the bolts with 10 mm long sleeve, and the tightening torque is 8~12N.m;



Note: 1: Bolt; 2: Battery pressure plate; 3: Battery tray assembly.

3 First install the positive fixing nut and the positive fuse box cover, and then install the negative fixing nut. The installation torque is 5N.m.



Note: 1: Battery positive fuse box cover; 2: Negative clamp nut; 3: Positive nut.

Spare parts atlas

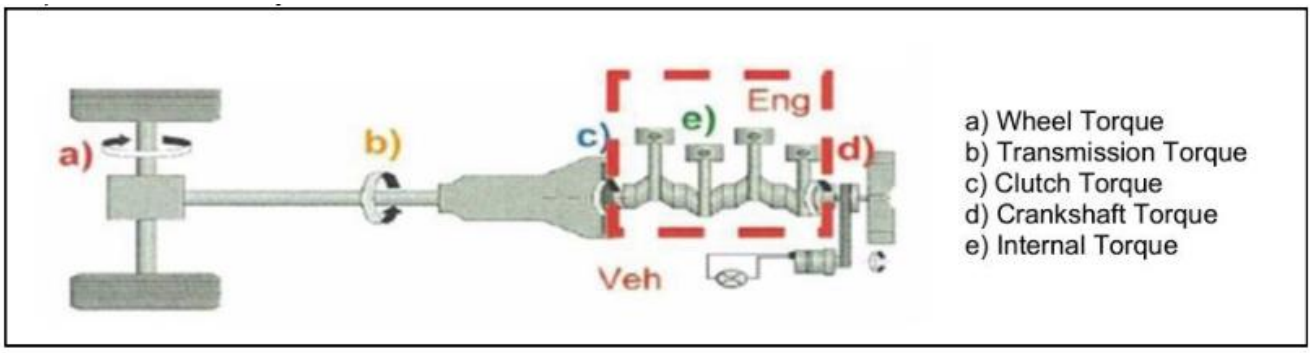
F280301

Engine control system composition and position distribution

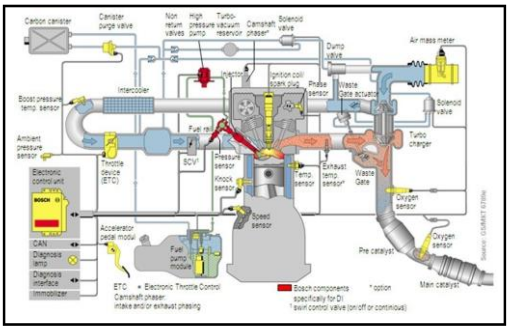
1 System frame composition

UAES GDI system is a torque control based system developed on MG1US008 ECU platform. Its main purpose is to link a large number of different control objectives and convert various engine requirements into control variables of torque or efficiency, as shown in Figure 1. The MG1US008 system can arrange these requirements according to the priority order, execute the highest priority requirement, obtain the required engine control variables such as intake air volume, fuel injection volume and ignition time through the torque conversion module, and implement each control variable.

2 Rows have no effect on other variables. This is the advantage of torque-based control system



3 System block diagram composition and position



System functional principle introduction

MG1US008-Motronic engine management system is an electronically operated gasoline engine control system. It provides many control characteristics related to operators and vehicles or equipment. The system adopts the combination of open loop and closed loop (feedback) control to provide various control signals for engine operation. The basic functions of the system include: Starting control, heating control of heating engine and three-way catalytic converter, fuel cut-off control of acceleration/deceleration and reverse drag, idle control, closed-loop control, mixture control function, evaporative emission control, knock control, OBD diagnostic control, etc. In addition, additional functions include engine control anti-theft function, start-stop control, fan control, A/C control, VVT control, turbocharging control, etc.

1 **Starting control:** During starting, special calculation method shall be adopted to control charge, fuel injection and ignition timing. At the beginning of the process, the air in the intake manifold is stationary and the internal pressure in the intake manifold is displayed as ambient atmospheric pressure. The electronic throttle is designated as a fixed opening parameter based on the current starting temperature. The fuel injection mode and injection amount vary according to the engine temperature to promote better mixing of oil and gas in the cylinder. In order to form reliable combustible mixture near the spark plug, the fuel mixture shall be enriched before the engine reaches a certain speed. Once the engine starts to run, the system immediately starts to gradually reduce the fuel injection amount until the start-up working condition is over and the start-up enrichment is completely canceled. Ignition angle under starting conditions
Also constantly adjusted. Changes with engine temperature, intake air temperature and engine speed. High pressure starting is usually used. In case of fault mode or extremely low temperature, use low-voltage starting.

2 **Heating control of warm-up engine and three-way catalytic converter:** The engine still needs to be supplied with additional fuel injection quantity within a period of time after starting at low temperature, and may be injected multiple times according to the working condition, cylinder charge and
The ignition angle is adjusted to compensate for higher engine torque requirements; The process continues until the appropriate temperature threshold is reached. In this stage, the most important is the
Rapid heating because rapid transition to three-way catalytic converter start-up can significantly reduce exhaust emissions. Under this condition, the exhaust gas is used for "three-way catalytic converter heating" by means of proper fuel injection mode (multiple injection) and moderate delayed ignition advance angle.

3 **Acceleration/deceleration and reverse drag fuel cut control:** Under actual conditions, a small part of fuel injected into the cylinder will not participate in the combustion process in time. Instead, it forms a
Oil film. When the throttle valve opening increases, a small part of injected fuel is absorbed by the oil film. Therefore, it is necessary to inject the corresponding supplementary fuel amount to compensate it and prevent the mixture from accelerating. Thinning. Once the load factor is reduced, the additional fuel contained in the fuel film is released again, and the injection duration must be reduced during deceleration. Reverse towing or towing condition means that the engine provides negative power at the flywheel. In this case, the engine friction and pumping loss can be used to decelerate the vehicle. When the engine is in reverse towing or towing conditions, fuel injection is cut off to reduce fuel consumption and exhaust emissions, and more importantly to protect the three-way catalyst. Once the speed drops to the recovery fuel supply speed set above idle speed, the fuel injection system will supply fuel again. In fact, there is a range of recovery speed in ECU program, which is different according to the changes of engine temperature, gear position, engine speed dynamic change and other parameters, and prevents the speed from dropping to the specified minimum threshold through calculation. Once the injection system is refilled, the system begins to refill with the initial injection pulse. After fuel injection is restored, torque-based control system makes engine torque increase slowly and smoothly (smooth transition).

4 **Idle speed control:** When idling, the engine does not provide torque to the flywheel. To ensure stable operation of the engine at the lowest possible idle speed, the closed-loop idle speed control system must maintain a balance between the generated torque and the "power consumption" of the engine. A certain amount of power needs to be generated at idle speed to meet various load requirements. They include internal friction from the engine crankshaft and the valve mechanism as well as auxiliary components such as the water pump. The MG1US008 system uses torque as the main control strategy to determine the engine output torque required to maintain the required idle speed under any operating conditions based on closed loop idle control. The output torque increases as the engine speed decreases and decreases as the engine speed increases. The system sounds by requiring more torque
New "interference factors" should be used, such as start-stop of A/C compressor or shift of automatic transmission. In case of low engine temperature, additional torque is also required to compensate for greater internal friction losses and/or to maintain higher idle speeds. The sum of all these output torque requirements is transferred to the torque coordinator, which performs processing calculations to obtain the corresponding charge density, mixture composition and ignition timing.

5 **Closed-loop control:** Exhaust aftertreatment of three-way catalytic converter is an effective method to reduce the concentration of harmful substances in exhaust gas. Three-way catalytic converter can reduce hydrocarbon (HC), carbon monoxide (CO) and nitrogen.
Oxides (NOx) of 98% or more convert them to water (H2O), carbon dioxide (CO2) and nitrogen (N2). But only when the engine excessive air coefficient =1 attached
Such high efficiency can be achieved in a very narrow range. The goal of closed loop control is to ensure that the mixture concentration is within this range.The closed loop control system only works with oxygen sensors. The oxygen sensor monitors the oxygen content in the exhaust gas at the three-way catalytic converter side. The lean gas mixture generates about 100 mV sensor voltage and the rich gas mixture.
(I) Generate sensor voltage of about 800 mV. When =1, the sensor voltage has a jump. The closed loop control responds to the input signal (1= mixture too lean, 1= mixture too rich) modifies the control variable to produce a correction factor as a multiplier to correct the injection duration.

6 **Evaporative emission control:** The fuel in the fuel tank is heated and fuel vapor is formed due to external radiated heat and return heat transfer. Due to evaporative emission regulations
These vapors, which contain large amounts of HC, are not allowed to vented directly into the atmosphere. Fuel vapor in the system is collected in the activated carbon canister through the conduit and passes through it when appropriate
Purge into the engine to participate in the combustion process. The purge air flow is achieved by the ECU controlling the canister control valve. This control works only when the closed loop control system is closed loop.

7 **Knock control:** The system detects the characteristic vibration when knock occurs through the knock sensor installed in the appropriate position of the engine, and converts it into an electronic signal for transmission to the ECU.
Management. ECU uses special processing algorithm to detect whether knock occurs in each combustion cycle of each cylinder. Knock closed loop control is triggered once a knock is detected. When
After the knock hazard is eliminated, the ignition of the affected cylinder is gradually advanced to the predetermined ignition advance angle.

8 **OBD Fault diagnosis: T**he electronic control unit constantly monitors the sensor, actuator, relevant circuit, malfunction indicator lamp, battery voltage, etc., and even the electronic control unit itself, and detects the rationality of sensor output signal, actuator drive signal and internal signal (such as closed loop control, coolant temperature, knock control, idle speed control and battery voltage control). The ECU sets the fault in the fault memory of the RAM as soon as a link is found to be faulty or a signal value is

unreasonable.

Information record. Fault information records are stored in the form of fault codes and displayed in the order of fault occurrence.

9 **Cruise control function:** Cruise control, as an electronic control technology of the vehicle, is mainly used to keep the vehicle driving at the target speed set by the driver. Closed-loop adjustment of the system can ensure that the electronic throttle opening is adjusted in real time to maintain the constant speed of the vehicle in the process of changing the driving resistance of the vehicle, or the driver responds and follows the new target speed in time after readjusting the target speed. The cruise control function can realize vehicle uniform speed, point acceleration/deceleration, continuous acceleration/deceleration without the driver controlling the accelerator pedal, and work

Memory the target speed when exiting, and then restore the original target speed with one button. Real-time dynamic adjustment of cruise control speed does not need to be controlled by the driver through electronic accelerator pedal, which greatly reduces the labor intensity of the driver during long-distance high-speed driving, and improves driving stability and comfort.

Inspection of part structure principle

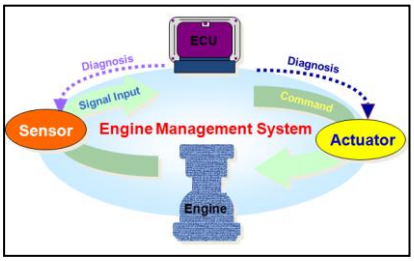
Electronic controller unit(ECU)

1 Function

Engine ECU: Generally installed in the engine compartment (on the ECU bracket on the battery side), it is used to calculate and process the information input by various sensors of the engine, and then output commands to control the actions of relevant actuators to achieve the purpose of controlling the work of the engine.

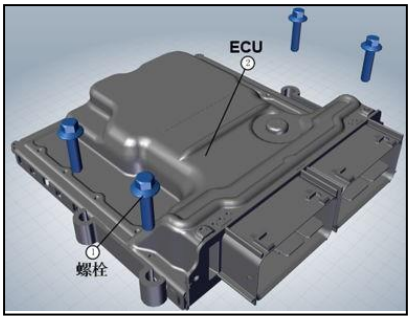
2 Working principle

The engine electronic control unit automatically collects the input signals of various sensors according to the predetermined program, calculates the function, and then outputs the signal to drive the actuator, so as to control the electronic equipment of the engine operation, and diagnose the engine operation function.

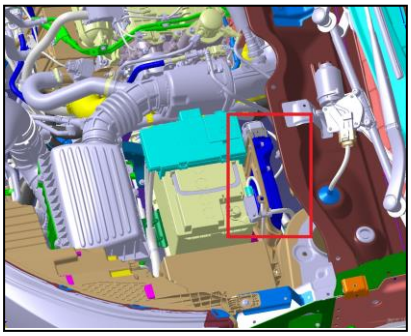


3 Product structure

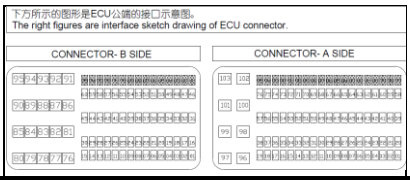
（1） Single structure(As shown below)



（2） Layout structure: ECU is arranged in engine compartment(On the ECU bracket on the battery side, as shown in the following figure)



（3） Interface definition: ECU is divided into two interfaces, A interface and B interface. Detailed interface schematic diagram and pin definition are as follows.



Hole position	Pin definition	Hole position	Pin definition
A001	Starter low-side control 1	B001	Sensor power supply 5V(5V2)
A002	Cooling fan relay(Medium speed)	B002	Sensor power supply 5V(5V2)
A003	Start/stop switch indicator lamp control	B003	Sensor power supply 5V(5V3)
A004	PWM fan control signal	B004	/
A005	Electronic auxiliary water pump	B005	/

A006	Main relay	B006	Analog sensor ground 1
A007	/	B007	Analog sensor ground 2
A008	Switch oxygen sensor	B008	Analog sensor ground 3
A009	Analog sensor ground 5	B009	Boost pressure temperature sensor ground(Intercooling)
A010	/	B010	Camshaft position sensor ground(Exhaust)
A011	/	B011	Camshaft position sensor ground(Intake)
A012	/	B012	2nd cylinder ignition
A013	Accelerator pedal position sensor 1 ground	B013	4th cylinder ignition
A014	Sensor power supply 5V(5V1)	B014	First cylinder ignition
A015	Accelerator pedal position sensor 1 power supply (5V2)	B015	3rd cylinder ignition
A016	Accelerator pedal position sensor 2 power supply (5V3)	B016	Sensor power supply 5V(5V1)
A017	/	B017	Sensor power supply 5V(5V1)
A018	/	B018	Sensor power supply 5V(5V3)
A019	/	B019	/
A020	Starter low-side control 2	B020	Crankshaft position sensor ground
A021	Cooling fan relay(High speed)	B021	/
A022	Piston cooling nozzle control valve	B022	Water temperature sensor signal 1
A023	Canister control valve	B023	Oil pressure sensor
A024	A/C compressor relay	B024	Cruise control signal
A025	Intake relief control valve	B025	/
A026	Low-pressure fuel pump relay	B026	High desorption pressure sensor signal
A027	/	B027	Boost pressure sensor signal(Intercooling)
A028	Switch oxygen sensor ground	B028	Boost pressure sensor signal(Intake manifold)
A029	Accelerator pedal sensor 2 ground	B029	Boost temperature sensor signal(Intercooling)
A030	Brake vacuum sensor	B030	Camshaft position sensor signal(Intake)
A031	Accelerator pedal position sensor 1	B031	Fuel tank pressure sensor
A032	/	B032	Conductive PCV pipe
A033	A/C medium pressure switch	B033	/
A034	/	B034	Electronic throttle valve feedback signal 2
A035	/	B035	/
A036	/	B036	Rail pressure sensor signal
A037	/	B037	/
A038	/	B038	Boost temperature sensor signal(Intake manifold)
A039	Cooling fan relay(Low speed)	B039	/
A040	Center-mounted electromagnetic signal(Exhaust)	B040	Electronic throttle valve feedback signal 1
A041	Center-mounted electromagnetic signal(Intake)	B041	/

A042	/	B042	/
A043	/	B043	/

A044	/	B044	/
A045	/	B045	Camshaft position sensor signal(Exhaust)
A046	Ignition switch	B046	Knock sensor(+)
A047	Lin bus	B047	Knock sensor(-)
A048	Wire oxygen IP	B048	/
A049	Wire oxygen VM	B049	/
A050	/	B050	/
A051	Accelerator pedal position sensor 2	B051	/
A052	/	B052	/
A053	P/N switch	B053	/
A054	Start/stop main switch	B054	Electric actuator position signal
A055	Stop lamp switch signal	B055	/
A056	Brake switch	B056	/
A057	Starter state feedback signal	B057	Crankshaft position sensor signal
A058	Canister stop valve	B058	/
A059	Oil pump assembly	B059	/
A060	/	B060	/
A061	Switch oxygen heating	B061	/
A062	Wire oxygen heating	B062	/
A063	Continuous power supply	B063	/
A064	Refresh and Body CAN Low	B064	/
A065	Refresh and Body CAN High	B065	/
A066	/	B066	/
A067	Line oxygen VN	B067	/
A068	/	B068	/
A069	/	B069	/
A070	Calibration and application CAN high	B070	/
A071	Calibration and application CAN low	B071	/
A072	/	B072	/
A073	/	B073	/
A074	KL50 signal input	B074	/
A075	/	B075	/
A076	/	B076	4th cylinder fuel injection +
A077	/	B077	Fourth cylinder fuel injection -
A078	/	B078	First cylinder fuel injection -
A079	/	B079	3rd cylinder fuel injection +
A080	/	B080	2nd cylinder fuel injection +
A081	/	B081	Electric actuator control-
A082	/	B082	Electric actuator control +
A083	/	B083	First cylinder fuel injection +

A084	/	B084	3rd cylinder fuel injection -
A085	/	B085	2nd cylinder fuel injection -
A086	/	B086	Electronic throttle control -
A087	/	B087	/
A088	/	B088	/
A089	/	B089	/
A090	/	B090	Oil pressure control valve -
A091	/	B091	Electronic throttle control +
A092	/	B092	/
A093	/	B093	/
A094	/	B094	/
A095	/	B095	Oil pressure control valve +
A096	ECU ground 4		
A097	ECU ground 3		
A098	ECU ground 2		
A099	ECU ground 1		
A100	Main relay power supply 1		
A101	Main relay power supply 2		
A102	Main relay power supply 3		
A103	Main relay power supply 4		

4 Product fault and troubleshooting

Before performing product unit inspection, perform relevant inspection of harness connection first, and then perform product unit inspection after confirming that there is no problem. Inspect whether the appearance of ECU is damaged, whether the connector is ablated, and whether there is water in the connector. When there is a problem, ABA is recommended for interchangeability verification.

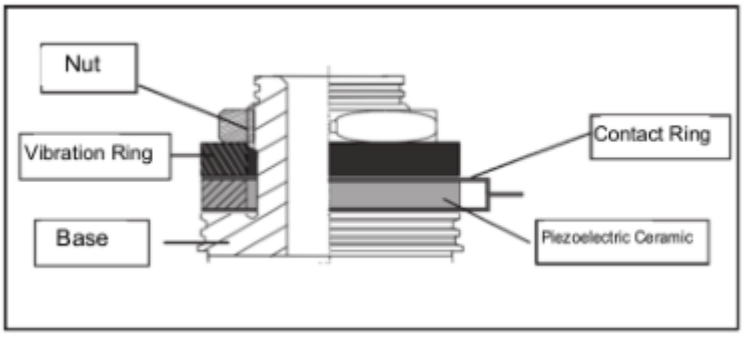
Knock sensor

Function

The knock sensor is installed close to the engine cylinder block, detects the engine vibration in real time, and converts the engine vibration into electrical signal and transmits it to ECU for knock detection by using piezoelectric effect. When the engine is knocked, the cylinder vibration acceleration will increase rapidly, and the sensor electrical signal will change drastically to determine that the engine is knocked.

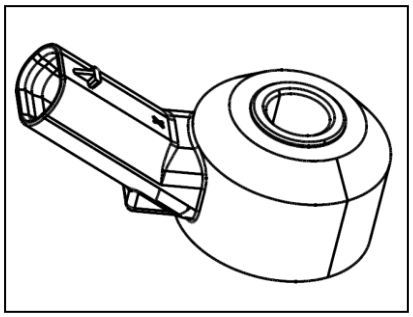
Working principle

Knock sensor is a kind of vibration acceleration sensor installed on the engine cylinder block. The sensor's sensitive element is a piezoelectric element. The vibration of the engine cylinder block is transmitted to the piezoelectric crystal through the mass in the sensor. Piezoelectric crystal generates voltage on two pole faces due to pressure generated by mass vibration, which converts vibration signal into alternating voltage signal output. Because the frequency of vibration signal caused by engine knock is much higher than that of normal vibration signal of engine, ECU can distinguish knock signal and non-knock signal after filtering the knock sensor signal.

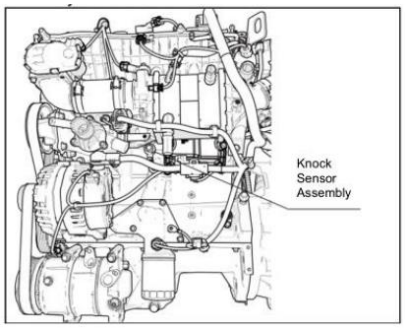


Product structure

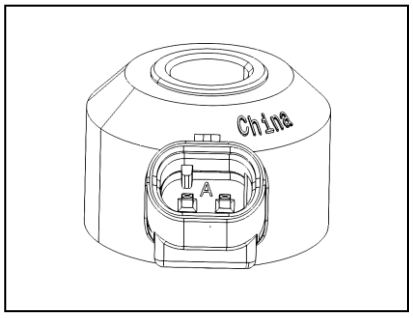
1 Single structure



2 Layout structure



3 Interface definition



Both PINs have no polarity and are signal output pins.

Characteristics

1 Insulation resistance between 2PIN at room temperature is greater than 1MΩ.

2 Sensitivity:

5 kHz: 23~34 mV/g

8 kHz: 22~37 mV/g

13 kHz: 22~40 mV/g

18 kHz: 22~43 mV/g

Product fault and troubleshooting

Warning Before performing product unit inspection, perform relevant inspection of harness link first, and then perform product unit inspection after confirming that there is no problem.

Warning **When the engine fault lamp is on to report the relevant faults of knock sensor, if there are other faults such as engine misfire and vehicle jitter that may cause abnormal engine vibration at the same time, rule out other faults before judging the knock sensor.**

The inspection steps of the unit are as follows:

1 Check the resistance between the sensor terminal connector housing and terminal with a multimeter. Normally, the resistance shall be greater than 6 megohms;

2 Turn the multimeter in millivolt gear, knock the cylinder block near the installation point of knock sensor with a small metal hammer, detect whether there is voltage change between the sensor output terminals (terminals 1# and 2#), and if there is voltage change, it proves that the sensor is normal and can identify the vibration signal of the cylinder block.

Warning **When there is a problem, ABA is recommended for interchangeability verification.**

Crankshaft position sensor

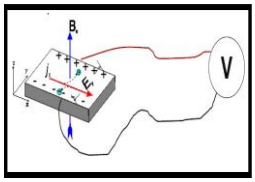
Function

Crankshaft position sensor: Generally installed on the cylinder block or transmission, it is used to detect

the current position of the crankshaft and then determine the top dead center of cylinder 1 of the

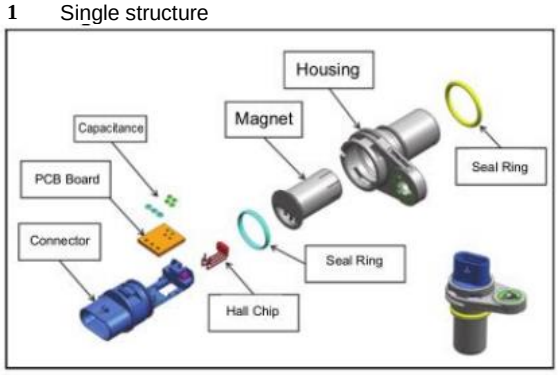
crankshaft. Working principle

Hall effect principle: If the conductor has current and magnetic field perpendicular to the current, voltage will be generated in the lateral direction.



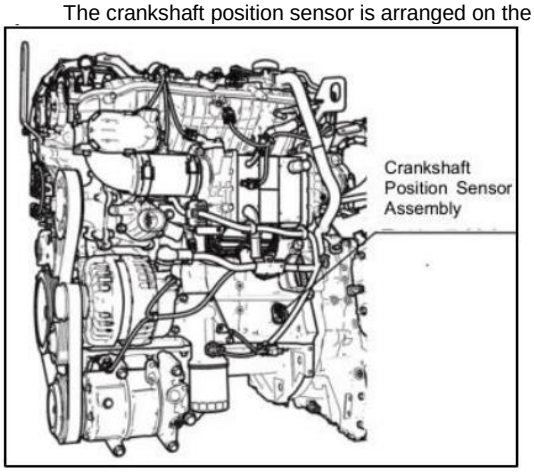
Product structure

1 Single structure

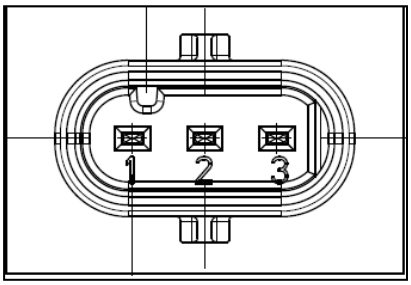


2 Layout structure

The crankshaft position sensor is arranged on the cylinder block.



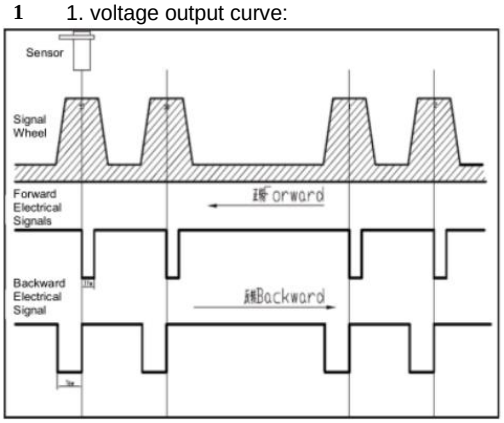
3 Interface definition



1 Power supply; 2 ground; 3 Signal

Characteristics

1 1. voltage output curve:



2 Electrical parameters:

Parameter	Symbol	Lower Limit Value	Normal Value	Upper Limit Value	Unit	Note
Forward Output Pulse Width	T_{fw}	38.25	45	51.75	us	
Backward Output Pulse Width	T_{bw}	76.5	90	103.5	us	
Supply Voltage	Us	4.75		16	V	
Output Signal Voltage	Uso	0		18	V	
Output Signal Low Voltage	Uol			0.5	V	
Output Signal High Voltage	Uoh	Uso-0.5	Uso-0.3		V	

Product fault and troubleshooting

Warning Before performing product unit inspection, perform relevant inspection of harness link first, and then perform product unit inspection after confirming that there is no problem. Inspect whether the crankshaft position sensor is damaged, whether the housing is cracked, whether the connector terminal is rusted, and whether there is water in the connector.

Crankshaft position sensor check: Use oscilloscope to check whether the output signal voltage of crankshaft position sensor is within the range of electrical parameters, and whether the forward and reverse rotation signal pulse width is normal.

Water temperature sensor assembly

Function:

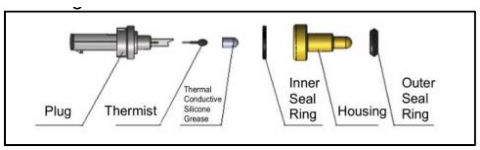
Water temperature sensor is used to monitor engine coolant temperature and provide coolant temperature

information for engine ECU, so as to realize more accurate engine operation. Working principle:

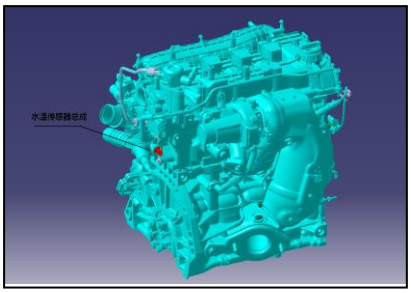
The temperature sensing element of water temperature sensor is a negative temperature coefficient temperature sensor. The higher the temperature, the lower the resistance.

Product structure:

1 Single structure:

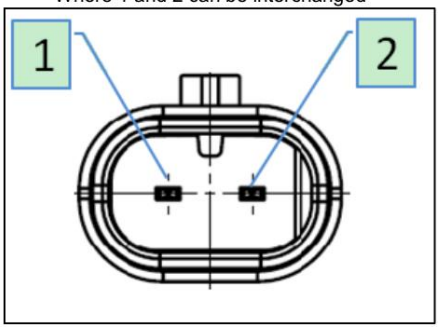


2 Layout structure:



3 Interface definition:

Where 1 and 2 can be interchanged



Features:

R-T Features:

t(℃)	Rmin.(kΩ)	Rmax.(kΩ)
-40	40.66	47.57
-30	23.27	26.90
-20	13.82	15.79
-10	8.477	9.584
0	5.358	6.000
10	3.480	3.862
20	2.318	2.550
30	1.579	1.724
40	1.099	1.191
50	0.7796	0.8390
60	0.5631	0.6021
70	0.4135	0.4394
80	0.3084	0.3258
90	0.2333	0.2452
100	0.1789	0.1870
110	0.1389	0.1445
120	0.1086	0.1135
130	0.0859	0.0902

Product fault and troubleshooting:

Warning Before performing product unit inspection, perform relevant inspection of harness link first, and then perform product unit inspection after confirming that there is no problem. Unit inspection

1 (Remove the connector) Turn the digital multimeter to the ohmic position. Connect the two probes to pins 1,2 of the sensor respectively. The rated resistance at 20℃ is 2.3kΩ-2.5kΩ. Other temperatures can be evaluated by the above table. Start when the vehicle is cold, let the water temperature rise gradually, and observe the change of sensor resistance. When measuring, you can also use the simulation method. Put the sensor head in the hot water, and the sensor resistance shall gradually decrease as the head temperature rises. The specific value depends on the temperature of the hot water.

2 Check the water temperature parameter in the engine diagnostic scanner, it can be close to the current water temperature energy, and there is obvious change, and judge according to the displayed data value.

Warning When there is a problem, ABA is recommended for interchangeability verification.

Warning **For the problem that the water temperature is always on the center line (the display range of the center line is large 50℃ -110 ° C), it is necessary to use a diagnostic scanner to read the data flow of the water temperature combined with the actual water temperature. In summer, due to the high temperature in the engine compartment, it is easy to appear the phenomenon that the water temperature is always on the center line (this is a normal phenomenon).**

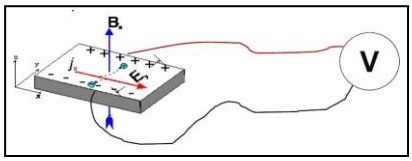
Camshaft position sensor

Function

Camshaft position sensor: Generally installed on the cylinder head or cylinder head cover, with the crankshaft

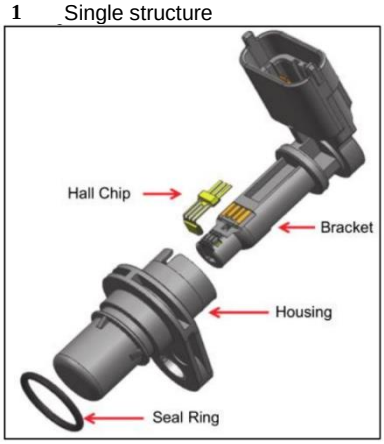
position sensor signal to determine the current engine cylinder working stroke. Working principle

Hall effect principle: If the conductor has current and magnetic field perpendicular to the current, voltage will be generated in the lateral direction.

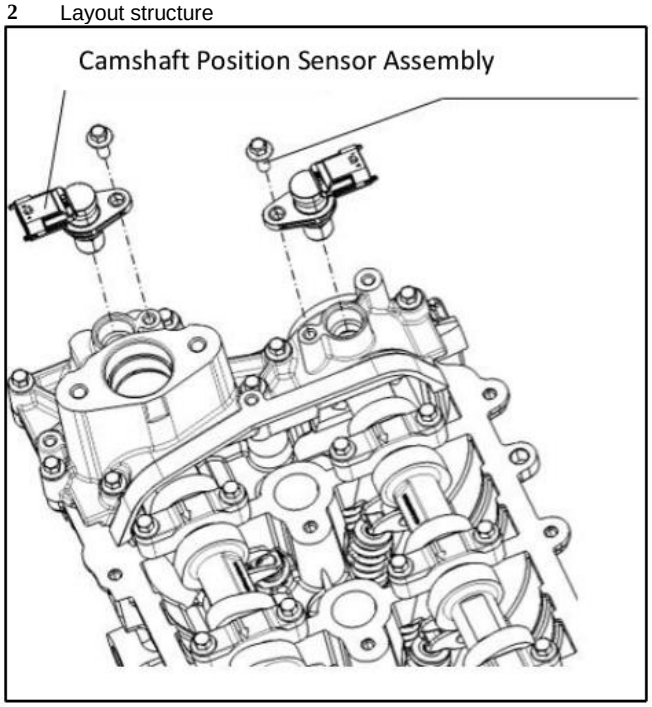


Product structure

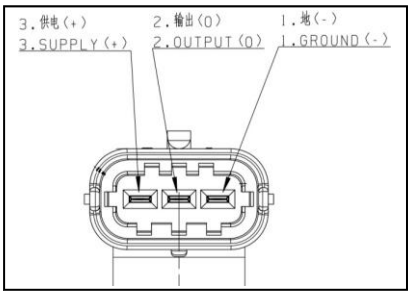
1 Single structure



2 Layout structure



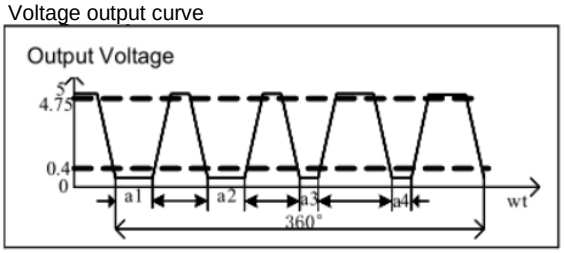
3 Interface definition



3 Power supply; 2 Output; 1 Ground signal

Characteristics

Voltage output curve



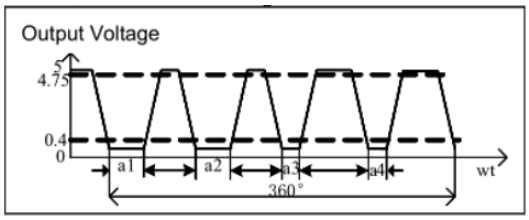
Product fault and troubleshooting

Warning Before performing product unit inspection, perform relevant inspection of harness link first, and then perform product unit inspection after confirming that there is no problem. Check whether the appearance of camshaft position sensor is damaged, whether the housing is cracked, whether the connector terminal is rusted, and whether there is water in the connector. Camshaft position sensor check:

1 NE1 is a dual VVT system with two camshaft position sensors; The fault code will distinguish intake camshaft position sensor fault or exhaust camshaft position sensor fault, align the camshaft position sensor, and observe whether the fault code follows the sensor;

2 If the following sensor reports a fault, it can be judged that the camshaft position sensor is damaged. If there is no following camshaft position sensor, check the harness;

3 If the fault code does not judge the intake or exhaust fault, it is necessary to read the camshaft position sensor output voltage with an oscilloscope. The normal signal is as follows:



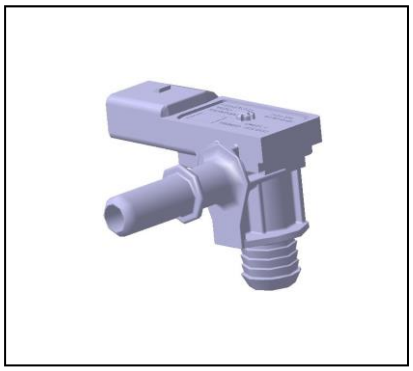
Vacuum pressure sensor assembly

Function:

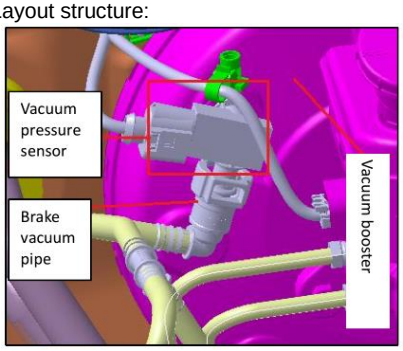
There is pressure sensing original in the sensor. When the measured pressure is different, the pressure sensing film deformation of the pressure sensing original is different. Change the pressure signal into voltage signal through Wheatstone bridge and input to ECU. ECU will know the measured pressure according to the voltage signal and pressure-voltage signal characteristic curve. Used in brake system to provide vacuum signal of vacuum booster. Realize closed-loop control of vacuum degree monitoring in activation of STT function and HBB function of ESP to improve driving safety and comfort.

Product structure:

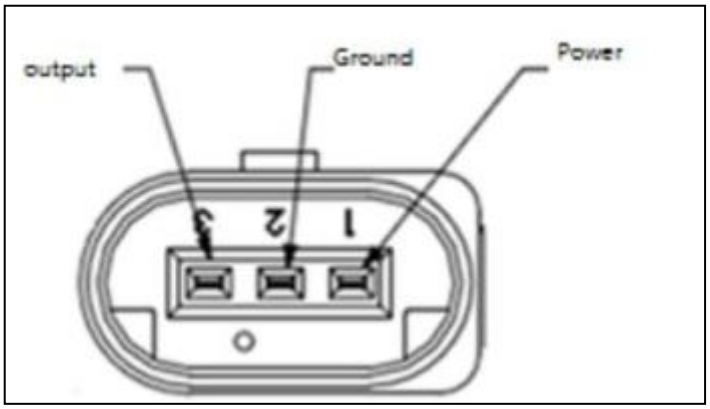
1 Single structure:

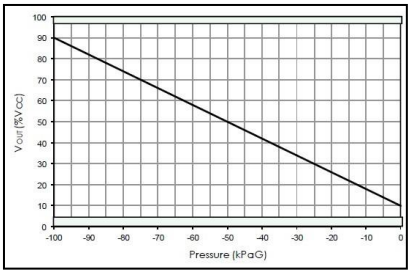


2 Layout structure:



3 Interface definition:





Pressure signal characteristic curve:

When relevant fault of vacuum pressure sensor is reported, check according to the following steps:

Whether the parts are reliably connected, whether the power supply of the sensor is normal, whether there is foreign matter in the connector, whether the harness terminal is normal, and whether the fault still exists after three cycles of power-on detection after the connector is re-connected in place;

Check the appearance of the sensor for abnormal damage.

Boost pressure temperature sensor

Function:

Used in an electronically controlled fuel injection system to provide intake air pressure and temperature signals. Realize closed loop control and improve the control accuracy of ECU for air-fuel ratio. A single vehicle has two boost pressure and temperature sensors, which are installed in front and back of the throttle respectively. The boost pressure and temperature sensor in front of the throttle (intercooled pipe) is used to control the boost degree of the supercharger in a closed loop manner. The boost pressure and temperature sensor in back of the throttle (intake manifold) is used to calculate the inflation model. The intake volume is controlled in a closed loop manner based on the torque and throttle position to ensure the exhaust, power and fuel economy of the vehicle.

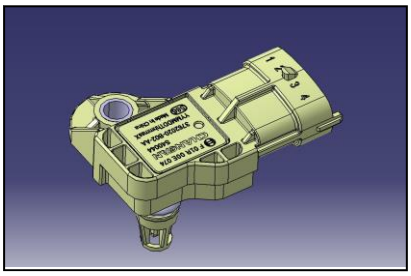
Working principle:

1 Pressure measurement principle: There is pressure sensing original in the sensor. The pressure sensing original is composed of a chip, and a pressure diaphragm is etched on the chip. The pressure diaphragm has four piezoresistors which form a Wheatstone bridge as strain elements. Besides this pressure diaphragm, the chip also integrates signal processing circuit. The active surface of silicon chip is subject to this near-zero voltage, and its surface is subject to the pressure to be measured. The thickness of silicon chip is only several microns, so the change of measured pressure will cause mechanical deformation of silicon chip, and four piezoelectric resistors will be deformed with the change of resistance value. After passing through the signal processing circuit of silicon chip, the voltage signal with linear relationship with pressure will be formed. , voltage signal is input to ECU, and ECU obtains the measured pressure according to voltage signal and pressure-voltage signal characteristic curve.

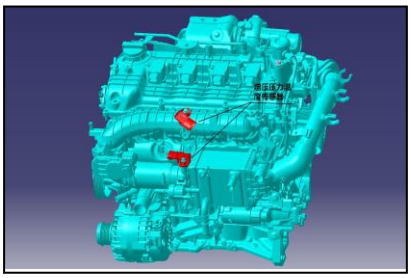
2 Temperature measurement principle: The temperature measurement of supercharging pressure and temperature sensor is of NTC type. The temperature is different and the resistance value of NTC original part is different. Obtain the measurement temperature according to the corresponding relationship between the two.

Product structure:

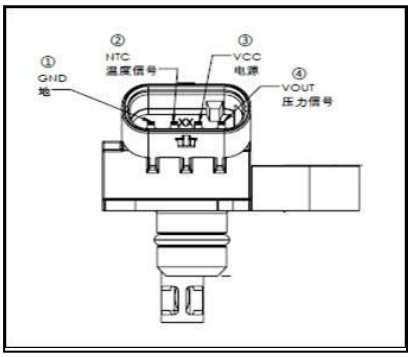
1 Unit structure: The main structure of the boost pressure temperature sensor assembly (3762020 -MK01) is assembled by housing, NTCs, sealing rings, pressure chip and cover plate. The detailed structure is as shown in the figure below: 1- housing 2-NTC 3-sealing ring 4- pressure chip 5- cover plate



2 Arrangement structure: Two boost pressure and temperature sensors are used for each vehicle, one in front and one in front of the throttle, wherein the front of the throttle is located on the intercooler pipe and the rear of the throttle is located on the intake manifold. The arrangement structure of the two positions is shown in the following two figures:



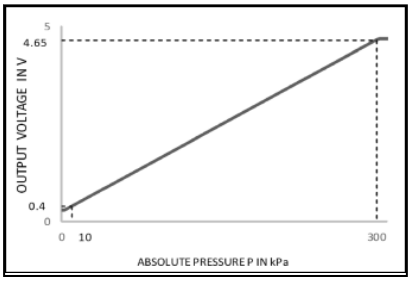
3 Interface definition: This sensor is of 4pin structure and integrates pressure measurement and temperature measurement. The definition of each pin pin is shown in the following figure:



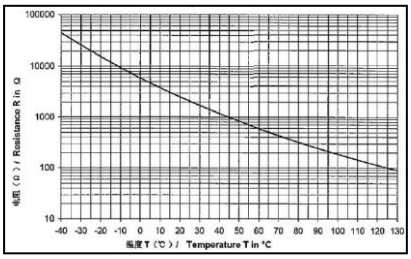
Product characteristics:

This sensor has a pressure range of 10~300kpa and a temperature range of -40℃~ 130 ° C.

1 Pressure signal characteristic curve:



2 Temperature signal characteristic curve:



Product fault and troubleshooting:

Warning Before performing product unit inspection, perform relevant inspection of harness link first, and then perform product unit inspection after confirming that there is no problem:

1 If a sensor on the vehicle reports a fault, install the front and rear sensors of the throttle valve interchangeably, and observe whether the fault follows the parts. If the fault does not follow the parts, confirm that the parts have no problem. If the fault follows the parts, continue to troubleshoot the sensor unit.

2 Simple measurement method: Check whether the faulty boost pressure and temperature sensor harness connector terminal is rusted. If not,

2.1 Temperature sensor part: Turn the digital multimeter to the ohmic position, the two probes respectively contact the pins 1,2 of the sensor, the rated resistance at 20℃ is 2.5 KΩ±5%, other corresponding resistance values are measured according to the temperature characteristic curve, and the analog method can also be used, specifically, use the hot-spot blowing air to supply air to the sensor (note that it is too close to be reliable), observe the change of the sensor resistance, and the resistance should be reduced at this time.

2.2 Pressure sensor part: When the connector is assembled, test the voltage output signal of pins 3 and 4 with fine wire or other methods. At idle speed, the reference voltage of pin 3 shall be 5V, and the voltage of pin 4 is about 0.5 V-1V (the specific value is related to the vehicle model); In neutral state, slowly step on the accelerator, and the voltage of pin 4 slightly increases; Press the accelerator quickly, the voltage of pin 4 can reach about 3V-4V (the specific value is related to the model), and then drop to about 0.5 V-1V (the specific value is related to the model).

Off).

Warning **When there is a problem, ABA is recommended for interchangeability verification.**

Electronic throttle body

Function

Throttle body is one of the main components of the engine intake system. Its main function is to adjust the intake passage area according to the driver's driving intention, so as to control the intake volume to meet the intake demand under different engine working conditions.

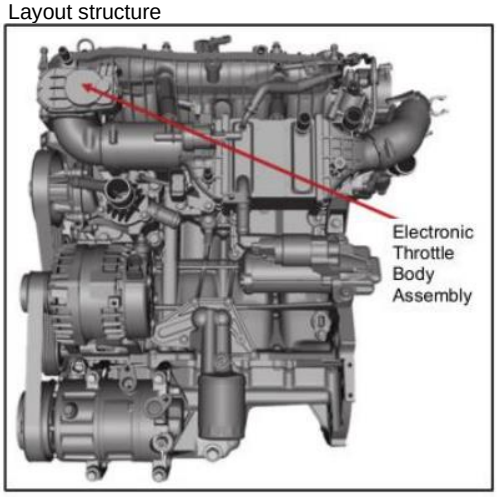
Working principle

The actuator applies force to the throttle body according to the PWM signal input by the ECU to open the throttle body to the specified angle; The sensor part is designed for two-way redundancy and is used to detect the actual opening angle of throttle valve body, and feed back the signal to ECU for precise control.

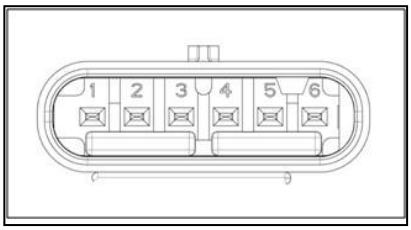
Structure and characteristics

The throttle body is installed on the intake manifold, mainly including body, actuator and sensor. Actuator part controls throttle valve plate through internal gear transmission structure; The sensor part is divided into contact type and non-contact type according to different detection principles.

Layout structure



Interface definition



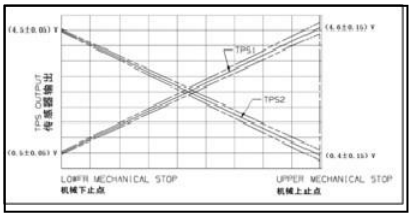
1	2	3	4	5	6
M-	M+	TPS2	VCC	GND	TPS1

TPS output characteristic

temperature: Room temperature 23℃

Sensor working voltage: V CC =5V

	TPS1(V)	TPS2(V)
Mechanical bottom dead center	0.5±0.05	4.5±0.05
Mechanical top dead center	4.6±0.15	0.4±0.15



Fault check

Warning Check the harness connection first, confirm that there is no problem, and then conduct single product inspection.

Warning Before product unit inspection, observe whether the main passage of throttle valve body has serious carbon deposit/oil dirt. If yes, clean it according to throttle valve body cleaning manual.

1 Check throttle body sensor

Step on the accelerator pedal, use the EFI system diagnostic scanner to read the throttle body 1 signal voltage value and throttle body 2 signal voltage value, and observe whether the following output characteristics are met. If not, replace the throttle body.

Temperature: Room temperature 23℃

Sensor working voltage V

CC =5V V TPS1: 0.45-

4.75 V

V TPS2: 0.25 V-4.55 V

V TPS1 + V TPS2 = V CC

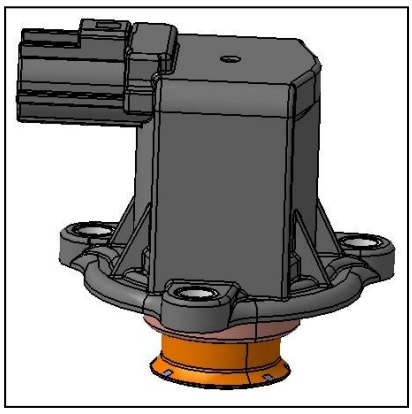
2 Throttle body actuator check

Remove the throttle body, and push the throttle body valve plate by hand for jamming. If yes, replace the throttle body. Use a digital multimeter to measure whether the resistance between throttle body M+ and throttle body M- is less than 100 ohms. If not, the throttle body motor may have open circuit fault, so it is necessary to replace the throttle body.

Intake relief valve assembly

Function

The intake relief valve assembly will only be used for the pressurized vehicles, and is arranged on the intake system from the pressurized to the throttle body, with bypass pipeline connected to the pressurized vehicle. Generally, after opening the accelerator, the pressure relief valve can discharge the pressurized gas back to the natural intake side, so as to avoid such faults as supercharger surge caused by excessive gas pressure in the intake system.

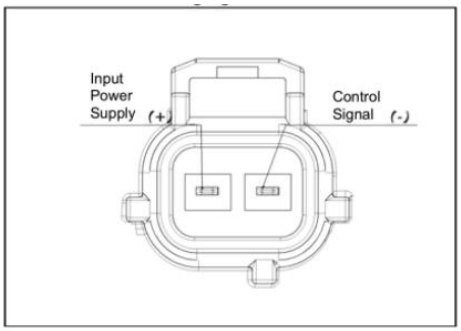


Working principle

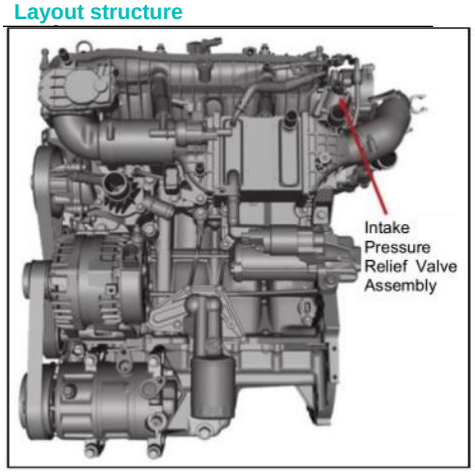
When the intake pressure relief valve is not connected to the switch signal, the intake pressure relief valve is normally closed and forms a sealed chamber with the counterpart. The pressurized gas enters the cylinder through the throttle valve to participate in combustion. When receiving the switch signal, the valve head rises under the action of electromagnetic force, and the pressurized gas can return to the pressurized front through the bypass pipeline. After pressure relief, the valve head returns to closed state under the action of spring force and gravity.

Structure and characteristics

Intake pressure relief valve is an electromagnetic switch valve, which is composed of electromagnetic coil, magnetic conductive component and valve core component. The intake relief valve has only two pins, as shown in the figure below:



Layout structure



Characteristic parameters

Coil resistance: Rw= 12±1 Ω× 1+ Tw-23℃ 0.0039/℃, i.e. at 23℃, the coil resistance of intake relief

valve shall be 11~13Ω. Fault check

Recommended troubleshooting methods:

Caution Before inspecting the intake relief valve unit, please confirm whether the harness connector is plugged in place, whether there are problems such as water ingress, corrosion and retreat terminals inside the connector, and whether the whole harness is connected normally.

1 Connect the two pins of the pressure relief valve with a multimeter and check whether the resistance is normal (about 12ohm);

2 Remove the lower intake relief valve to check whether there is fracture inside the valve head.

Caution The interchangeability verification is recommended when there is a problem.

Canister control valve

Function

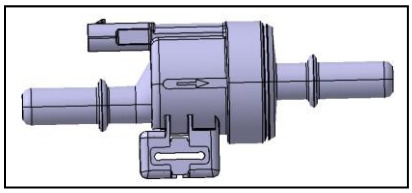
The canister control valve is mounted on the bracket on the charge air cooler in series with the canister to engine line. Under the drive of ECU, it is used to control the flow of fuel vapor entering the engine during canister desorption, and cooperate with the system to complete the leakage diagnosis function of fuel evaporation system.

Working principle

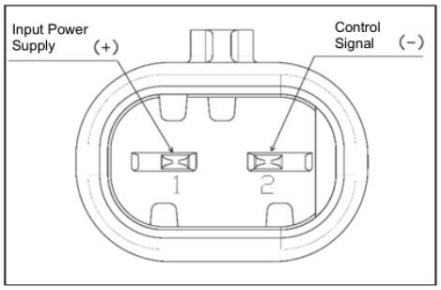
When canister desorbs, the fuel vapor flow through canister control valve is related to the duty ratio of the electric pulse signal output by ECU to canister control valve on one hand, and the pressure difference between inlet and outlet of canister control valve on the other hand. When there is no electrical pulse, the canister control valve is closed.

Structure and characteristics

Canister control valve is a normally closed solenoid valve, which consists of solenoid coil, magnetic conductive component, spring and valve core component, etc. When there is no electrical signal, the valve element assembly closes the air flow channel under the action of spring force; When there is an electrical signal, the solenoid coil generates an electromagnetic force, and the valve core component opens the airflow channel against the spring force under the electromagnetic force.



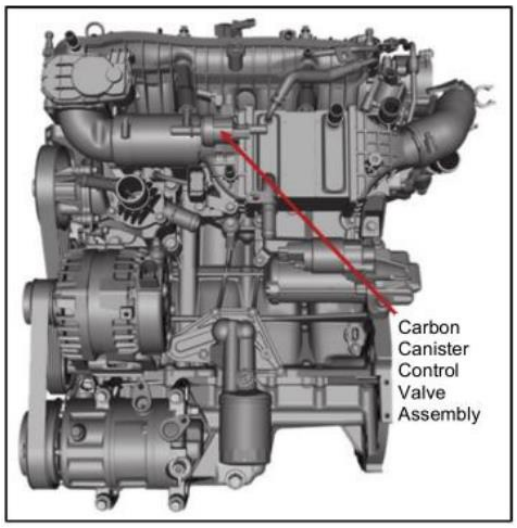
Canister control valve is of 2PIN structure, and the definition of each pin is as shown in the figure below:



At normal temperature, the resistance between pin 2

PIN of canister control valve is 16±2Ω. Layout

structure



Fault check

Warning Before performing product unit inspection, perform relevant inspection of harness link first, and then perform product unit inspection after confirming that there is no problem.

1. Internal sealing of canister control valve: In case of no power supply, blow air from either end of the valve to the other end, and observe whether the other end can feel air flow. If it can feel air flow, it indicates that the valve has internal sealing problem.

2. Internal solenoid coil of canister control valve: Use a multimeter to measure the resistance between two pins of canister control valve at normal temperature, and observe whether it is 16±2Ω. If it is not, it indicates that there is short circuit or open circuit problem in internal solenoid coil of canister control valve.

Warning When there is a problem, ABA is recommended for interchangeability verification.

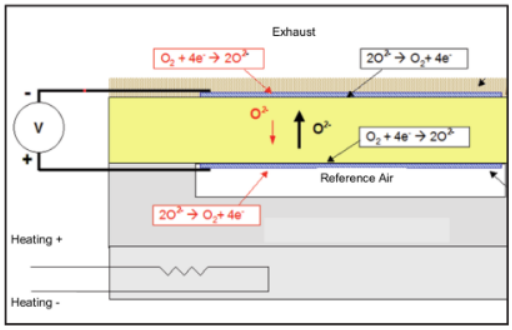
Oxygen sensor(Wire oxygen)

Function

It is used in feedback system of electronically controlled fuel injection device to realize closed loop control and improve the control accuracy of ECU for air-fuel ratio. It is installed on the exhaust gas passage to measure the oxygen content in the exhaust gas and determine whether gasoline and air are completely burned, so as to ensure that the three-way catalytic converter has the maximum conversion efficiency for HC, CO and NOX in the exhaust gas, and ensure the vehicle emission, power and fuel economy.

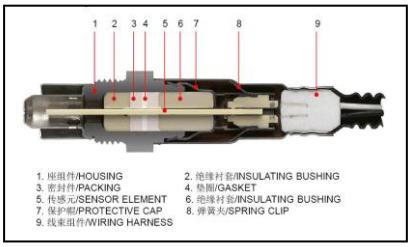
Working principle

The working principle of zirconia element is equivalent to a simple solid-state primary battery. According to electrochemical principle, there will be potential difference between two electrodes due to difference of oxygen ion concentration. When the engine air-fuel ratio is lean, the oxygen ion concentration in the exhaust gas is relatively high, and the forward current is output; Conversely, when the air-fuel ratio is rich, the oxygen ion concentration in the exhaust gas is relatively low, and the negative current is output.

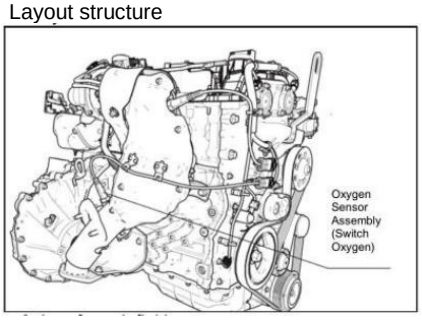


Product structure

1 Single structure



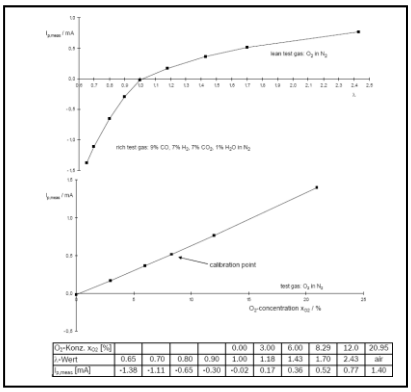
2 Layout structure



3 Interface definition

Characteristics

1 Voltage output curve:



O_2-Konz. x_{O2} [%]					0.00	3.00	6.00	8.29	12.0	20.95
λ-Wert	0.65	0.70	0.80	0.90	1.00	1.18	1.43	1.70	2.43	air
I_{pmes} [mA]	-1.38	-1.11	-0.65	-0.30	-0.02	0.17	0.36	0.52	0.77	1.40

2 Resistance characteristics:

At normal temperature (23 °C), the heating end (three-pin and four-pin) resistance is 2.6Ω± 0.6Ω. Product fault and troubleshooting

Warning Before performing product unit inspection, perform relevant inspection of harness connection first, and then perform product unit inspection after confirming that there is no problem.

Warning Check whether the terminal of oxygen sensor harness connector is rusted and whether the terminal is horizontal; Check the oxygen sensor heating control wire, signal wire and signal ground wire for open circuit or short circuit. If present, replace wiring harness. Because of harness fault, oxygen sensor related fault will also be reported.

Front oxygen signal check:

1 Engine running time: More than 2 minutes.

2 Water temperature: Greater than 60℃.

3 **Working condition: Idle speed (700 rpm -800 rpm) -high speed (3000 rpm-4000 rpm) -idle speed (700 rpm -800 rpm). Data reading tool: Diagnostic scanner.**

Normal output of sensor lamda signal output is as follows:

Idle speed: The lamda signal should oscillate slightly around one.

Release immediately after pressing the accelerator: The lamda signal should first decrease and then increase, and finally gradually rise to a small oscillation near No.1.

WarningWhen there is a problem, ABA is recommended for interchangeability verification.

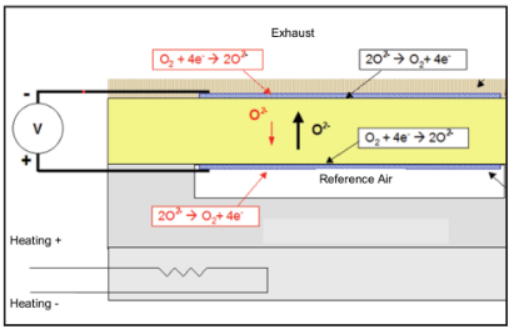
Rear oxygen sensor

Function:

It is used in feedback system of electronically controlled fuel injection device to realize closed loop control and improve the control accuracy of ECU for air-fuel ratio. It is installed on the exhaust gas passage to measure the oxygen content in the exhaust gas and determine whether gasoline and air are completely burned, so as to ensure that the three-way catalytic converter has the maximum conversion efficiency for HC, CO and NOX in the exhaust gas, and ensure the vehicle emission, power and fuel economy.

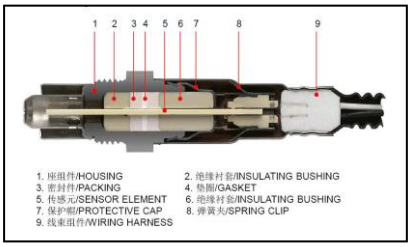
Working principle:

The working principle of zirconia element is equivalent to a simple solid-state primary battery. According to electrochemical principle, there will be potential difference between two electrodes due to difference of oxygen ion concentration. When the engine air-fuel ratio is lean, the oxygen ion concentration in the exhaust gas is relatively high, the oxygen ion concentration difference between the inner and outer electrodes is small, that is, the potential difference is small, and the output voltage signal of the oxygen sensor is close to 0V; Conversely, when the air-fuel ratio is rich, the oxygen ion concentration in the exhaust gas is relatively low, the oxygen ion concentration difference between the inner and outer electrodes is large, that is, the potential difference is large, and the output voltage of the sensor is close to 1V.

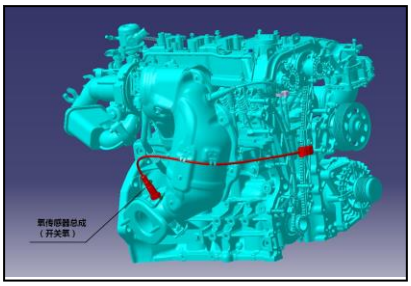


Product structure:

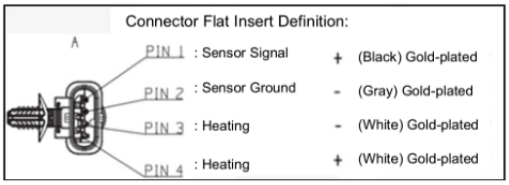
1 Single structure:



2 Layout structure:

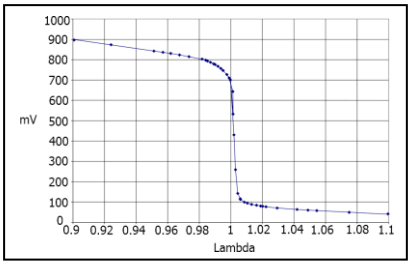


3 Interface definition:



Features:

1 Voltage output curve:



2 Resistance characteristics:

At normal temperature (23 °C), the resistance of heating end (3pin, 4pin) is 9Ω± 2Ω.

Product fault and troubleshooting:

Before performing product unit inspection, perform relevant inspection of harness link first, and then perform product unit inspection after confirming that there is no problem.

Check whether the terminal of oxygen sensor harness connector is rusted and whether the terminal is horizontal; Check the oxygen sensor heating control wire, signal wire and signal ground wire for open circuit or short circuit. If present, replace wiring harness. Because of harness fault, oxygen sensor related fault will also be reported.

1 Rear oxygen signal check:

1.1 Engine running time is greater than 10 minutes.

1.2 Water temperature: Greater than 60℃.

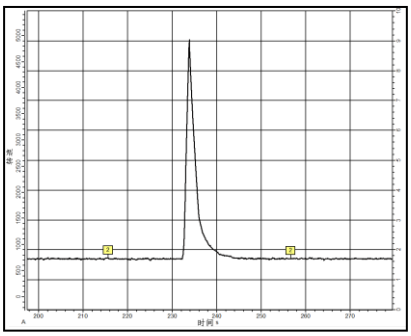
1.3 Working condition: Idle speed (700 rpm -800 rpm) -high speed (3000 rpm-4000 rpm)

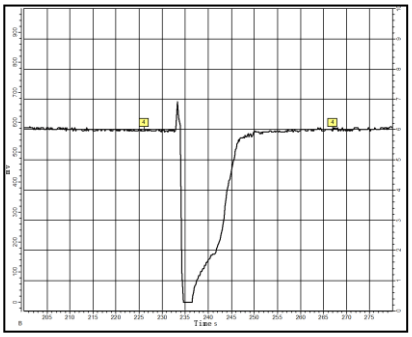
-idle speed (700 rpm -800 rpm). Data reading tool: Diagnostic scanner.

Normal output curve of sensor is as follows:

Idle speed: The signal oscillates in a small range of 600mv-800mv.

Release the accelerator immediately after pressing the accelerator: The sensor signal impulse height (700mv-900mv) drops to 0mv, and then gradually rises and oscillates.





2 Check the resistance characteristics of rear sensor heating end:

Under normal temperature (23 °C) condition, the sensor heating terminal resistance is 9Ω± 2Ω. When the vehicle is hot, the resistance value will be high, but it will not exceed 20Ω.

Warning **When there is a problem, ABA is recommended for interchangeability verification.**

DTC Diagnostic Description

Data flow standard

Data stream name	Ignition switch "ON"	Idling	Engine speed 2,500rpm
Maximum indicated torque	55.9 %	57.5 %	73.1 %
Driver target torque	0.0 %	13.6 %	11.7 %
Actual engine torque	10.4 %	13.7 %	11.1 %
Filtered engine coolant temperature	91.5 ℃	96.8 ℃	94.5 ℃
Engine speed	0.0 rmb	708.3 rmb	2,479.0 rmb
Engine running time after starting	0.0 s	96.8 s	1504.0 s
Filtered speed	0.0 km/h	0.0 km/h	0.0 km/h
Ambient pressure	965.0 hPa	966.2 hPa	966.2 hPa
Battery voltage	12.6 V	13.5V	13.9 V
Throttle valve opening	6.4 %	2.4 %	5.9 %
Intake air temperature	37.5 ℃	36.0 ℃	39.8 ℃
Ambient temperature	20.5 ℃	20.5 ℃	20.5 ℃
Accelerator pedal angle	0.0%	0.0%	3.5%
Fuel consumption	0.0 L/s	0.000312L/s	0.000598 L/s
Engine load	0.0 %	28.1 %	16.8 %
Air flow	0 kg/h	4 kg/h	20 kg/h
Downstream catalytic converter oxygen sensing voltage	0.349 V	0.731 V	0.584 V
Inflation efficiency(Relative inflation)	99.8 %	22.5 %	14.3 %
ETS-path environmental conditions for monitoring diagnosis	128	128	128
Torque path is used as diagnostic basis for environmental conditions in function and function monitoring	96	96	96
Function monitoring: Actual torque response at torque comparison	72.2 %	8.9 %	10.2 %
Alternative model of engine temperature signal in case of error	93.0 ℃	53.3 ℃	53.3 ℃
Expected throttle opening	1.6 %	2.4 %	5.5 %
Model exhaust gas temperature of downstream catalyst	50 ℃	410 ℃	495 ℃
Unfiltered engine coolant temperature	93.8 ℃	95 ℃	96.0 ℃
Function monitoring: Calculate actual torque	72.2 %	8.2 %	11.3 %
Actual ignition advance angle	0.0 °	-1.5 °	30.8 °

Data stream name	Ignition switch "ON"	Idling	Engine speed 2,500rpm
Secondary inflation model mass air flow correction coefficient	1.000	0.982	1.064
Valve opening calculated by throttle voltmeter 1	6.40 %	2.34 %	5.76 %
Valve opening calculated by throttle voltmeter 2	6.45 %	2.34%	5.79 %
PID control quantity of control throttle valve	65.6 %	12.1%	9.6 %
8-bit accuracy variable for span opening	0.0 %	0.0 %	0.0 %
First signal voltage of electronic throttle valve in straddling mode	0.8 V	0.8 V	0.8 V
Accelerator pedal opening indicated by sensor voltage 1	0.5 V	0.5 V	0.5 V
Vehicle acceleration in longitudinal direction	0.0 m/s²	0.0 m/s²	0.0 m/s²
Intake manifold pressure	966.3 hPa	480 hPa	260 hPa
Clutch operand detection	0	0	0
Unfiltered intake air temperature	40.5 ℃	38.3 ℃	43.5 ℃
Unfiltered vehicle speed	0.0 km/h	0.0 km/h	0.0 km/h
Sampling battery voltage	3.6 V	4.0 V	4.0 V
Oil temperature	101.9 ℃	92.9 ℃	107.9 ℃
Lambda closed loop control coefficient of Bank1	1.000	1.014	0.983
Mixture self-learning multiplication correction factor	1.000	1.000	1.000
Throttle potentiometer 1 voltage	0.8 V	0.6V	0.8 V
Throttle potentiometer 2 voltage	4.2 V	4.4 V	4.3 V
Mixture self-learning addition correction	0.0	0.0	0.0
Accelerator pedal potentiometer 1 voltage	0.8 V	0.7 V	0.9 V
Accelerator pedal potentiometer 2 voltage	0.4 V	0.4 V	0.5 V
2 times the voltage of accelerator pedal potentiometer 2	0.8 V	0.8 V	0.9 V
Internal resistance of rear oxygen sensor	0.0 hm	660 hm	720 hm
Upstream catalytic converter exhaust temperature	50.0 ℃	437.3 ℃	508.8 ℃
Fuel injection time	0.0 ms	0.2 ms	0.1 ms
Cylinder No.1 delayed ignition knock control	0.0 °	0.0 °	0.0 °
Cylinder No.2 delayed ignition knock control	118.5 °	118.5 °	118.5 °
Cylinder 3 delayed ignition knock control	182.3 °	121.1 °	60.8 °
Cylinder 4 delayed ignition knock control	4.5 °	110.5 °	180.0 °
Reference voltage of cylinder 1 knock control	0.977 V	0.082 V	0.162 V

Data stream name	Ignition switch "ON"	Idling	Engine speed 2,500rpm
Reference voltage of cylinder 2 knock control	0.977 V	0.078 V	0.197 V
Reference voltage of cylinder 3 knock control	0.977 V	0.077 V	0.214 V
Reference voltage of cylinder 4 knock control	0.977 V	0.084 V	0.172 V
Coolant temperature at start-up	94.5 ℃	90.5 ℃	91.5 ℃
Standard air charge calculated by canister control	0.0 kg/h	0.596 kg/h	1.869 kg/h
Basic ignition angle	0 °	0°	31 °
Misfire cylinder number statistics	0	0	0
Cylinder No.1 misfire times	0	0	0
Cylinder No.2 misfire times	0	0	0
Cylinder No.3 misfire times	0	0	0
Number of misfire of cylinder 4	0	0	0
Idle speed control Expected torque Corrected target torque change under idle control	0.0 %	0.0 %	0.0 %
Front oxygen sensor voltage	0.4 V	0.6 V	0.8 V
Rear oxygen sensor voltage	0.5 V	0.7 V	0.7 V

Troubleshooting process according to fault code

1 The following troubleshooting is performed only after the current steady-state fault is confirmed; otherwise, diagnostic errors will be caused.
2 "Multimeter" refers to digital multimeter, and it is forbidden to check the EFI system circuit with pointer multimeter.
3 Overhaul vehicles with anti-theft system. If ECU replacement occurs, pay attention to anti-theft matching for ECU after replacement.
4 If the fault code indicates that a circuit voltage is too low, it means that the circuit may be short to ground; If the fault code indicates that a circuit voltage is too high, it means that the circuit may be shorted to the power supply; If the fault code indicates a circuit fault, it means that there may be open circuit or multiple circuit faults in the circuit.

Diagnostic aid

1 The fault code cannot be cleared, and the fault is a steady state fault; In case of accidental fault, check harness connector for looseness.
2 Do not ignore the impact of vehicle maintenance, cylinder pressure and

mechanical ignition timing on the system during overhaul. PCODE list

Serial number	Fault code	Description	Is the engine fault lamp on
1	P049900	Canister vent valve control circuit voltage too high	✓
2	P049800	Canister vent valve control circuit voltage too low	✓
3	P044700	Canister vent valve control circuit open	✓
4	P242200	Canister vent valve stuck closed	✓
5	P064500	A/C Compressor relay control circuit open	×
6	P064700	A/C Compressor relay control circuit voltage too high	×
7	P064600	A/C Compressor relay control circuit voltage too low	×
8	P056300	Battery voltage too high	✓

9	P056200	Battery voltage too low	✓
10	P055800	Brake chamber vacuum pressure sensor voltage too high	✓
11	P055700	Brake chamber vacuum pressure sensor voltage too low	✓
12	P050400	Brake signal correlation fault	×
13	P057100	Brake signal is out of sync	×
14	P150000	Vehicle receives crash cut-off signal	×
15	P150100	Airbag communication information is unreasonable	×
16	P142000	Can hardware register response timeout	✓
17	P050C24	Coolant temperature sensor 1 cold start calibration is unreasonable(Positive deviation)	✓
18	P050C23	Coolant temperature sensor 1 cold start calibration is unreasonable(Negative deviation)	✓
19	P011900	Coolant temperature sensor 1 circuit voltage is unreasonable	✓
20	P011623	Coolant temperature sensor 1 signal is unreasonable (Low side)	✓
21	P011626	Coolant temperature sensor 1 signal is unreasonable (Sticky)	✓
22	P011800	Coolant Temperature Sensor 1 Circuit High Voltage	✓
23	P011700	Coolant Temperature Sensor 1 Circuit Low	✓
24	P012800	Unreasonable thermostat performance(The water temperature cannot reach the nominal opening temperature of the thermostat.)	✓
25	U007300	Can bus 1 Bus OFF fault	✓
26	U01B000	Lost communication with EBS module	×
27	U012200	Lost communication with ESP module	✓
28	U010100	Loss of communication with TCM module	✓
29	U350200	Can module input voltage too high	✓
30	U350100	Can module input voltage too low	✓
31	U012800	Lost communication with EPB module	×
32	U012287	Lost communication with ESP module node 2	×
33	U012286	Lost communication with ESP module node 3	×
34	U014688	Lost communication with GW module node 1	×
35	U014687	Lost communication with GW module node 2	×
36	U015500	Communication with IPK is lost or signal is abnormal.	×

37	U015100	Loss of communication with SRS module	×
38	P151000	Knock sensor signal evaluation diagnosis	✓
39	P019128	The characteristic curve of the rail pressure sensor of the high-pressure oil passage is negatively offset.	✓
40	P019129	Oil rail pressure sensor characteristic curve of high-pressure oil passage is forward offset	✓

41	P019400	High-pressure oil passage oil rail pressure sensor signal sticking fault	✓
42	P019300	High pressure oil rail pressure sensor circuit voltage too high	✓
43	P019200	High pressure oil rail pressure sensor circuit voltage too low	✓
44	P019000	The high-pressure oil passage rail pressure sensor voltage signal is unreasonable.	✓
45	P045128	Fuel tank pressure sensor signal offset fault	✓
46	P045300	Tank pressure sensor circuit voltage too high	✓
47	P045200	Tank pressure sensor circuit voltage too low	✓
48	P128200	Tank pressure sensor signal out of range(Forward)	✓
49	P128300	Tank pressure sensor signal out of range(Negative)	✓
50	P04512A	Fuel tank pressure sensor signal sticking rationality fault	✓
51	P045125	Tank pressure sensor signal oscillation fault	✓
52	P013300	Upstream oxygen sensor aging	✓
53	P143000	Battery type change fault	×
54	P143100	EBS or battery fault	×
55	P143200	EBS communication load rate is too high	×
56	P050B00	Ignition angle efficiency monitoring during catalyst heating(Idle speed)	✓
57	P06DC00	Secondary oil pump control circuit voltage too high	✓
58	P06DB00	Secondary oil pump control circuit voltage too low	✓
59	P06DA00	Secondary oil pump control open circuit	✓
60	P138824	The cold start calibration of ambient temperature sensor is unreasonable.(Positive deviation)	✓
61	P138823	The cold start calibration of ambient temperature sensor is unreasonable.(Negative deviation)	✓
62	P007000	Ambient temperature sensor CAN communication loss	✓
63	P034100	Intake camshaft sensor signal unreasonable fault(Bank1)	✓
64	P001676	Crankshaft - Intake camshaft Initial Installation Position Unreasonable Fault(Bank1)	✓
65	P034300	Intake camshaft sensor signal short circuit to power supply(Bank1)	✓
66	P034200	Intake camshaft sensor signal short circuit to ground (Bank1)	✓
67	P001678	Crankshaft-intake camshaft relative position deviation is too large fault(Bank1)	✓

68	P036600	Unreasonable fault of exhaust camshaft sensor signal(Bank1)	✓
69	P001776	Improper initial installation position of crankshaft-exhaust camshaft(Bank1)	✓

70	P036800	Exhaust camshaft sensor signal short circuit to power supply(Bank1)	✓
71	P036700	Exhaust camshaft sensor signal short circuit to ground (Bank1)	✓
72	P001778	Crankshaft-exhaust camshaft relative position deviation is too large fault(Bank1)	✓
73	P033664	Crankshaft sensor pulse width signal is unreasonable	✓
74	P033900	Unreasonable fault of speed sensor signal	✓
75	P261700	Speed sensor signal loss fault	✓
76	P057700	Cruise control circuit voltage too high	×
77	P057600	Cruise control circuit voltage too low	×
78	P057500	Unreasonable fault of cruise control signal	×
79	P057800	Cruise control button sticking fault	×
80	P058500	Cruise control module AD conversion fault	×
81	P217700	Air-fuel ratio closed-loop control self-learning value exceeds the upper limit (Middle load area)	✓
82	P217800	Air-fuel ratio closed loop control self-learning value exceeds the lower limit (Middle load area)	✓
83	P046300	Oil level sensor circuit voltage too high	✓
84	P046200	Oil level sensor circuit voltage too low	✓
85	P046000	Oil level sensor original signal out of range	✓
86	U067600	Oil level sensor signal loss/failure/calibration error	✓
87	P25B000	Oil level sensor signal sticking fault	✓
88	P128400	Fuel level signal out of range	✓
89	P046129	Fuel level signal is unreasonable	✓
90	P209700	Closed loop correction value based on downstream oxygen sensor exceeds the upper limit - too high	✓
91	P209600	Closed loop correction value based on downstream oxygen sensor exceeds the lower limit - too lean	✓
92	P048371	Cooling fan rationality Type 1 fault	×
93	P048372	Cooling fan rationality Type 2 fault	×
94	P048000	Cooling fan 1 control circuit open	×
95	P063400	Cooling fan 1 drive chip overheating	×
96	P069200	Cooling fan 1 control circuit voltage too high	×
97	P069100	Cooling fan 1 control circuit voltage too low	×

98	P144000	Intelligent generator circuit fault	×
99	P144100	Mechanical fault of intelligent generator	×
100	P144200	Intelligent alternator communication fault	×
101	P001100	Improper operation of intake camshaft locked position	✓
102	P001400	Unreasonable operation fault of exhaust camshaft lock position	✓
103	P001000	Intake VVT control circuit open	✓

104	P001300	Exhaust VVT control circuit open	✓
105	P208900	Intake VVT control circuit voltage too high	✓
106	P209100	Exhaust VVT control circuit voltage too high	✓
107	P208800	Intake VVT control circuit voltage too low	✓
108	P209000	Exhaust VVT control circuit voltage too low	✓
109	P000A00	Intake VVT operation fault(Slow)	✓
110	P000B00	Exhaust VVT operation fault(Slow)	✓
111	P003C00	Intake VVT operation fault(Stuck)	✓
112	P005A00	Exhaust VVT operation fault(Stuck)	✓
113	P053F22	High pressure oil circuit pressure too high fault during catalyst heating	✓
114	P053F21	Low pressure of high-pressure oil circuit during catalyst heating	✓
115	P008985	High pressure oil supply oil pressure PID control deviation is too large	✓
116	P008984	High pressure oil supply oil pressure PID control deviation is too small	✓
117	P008800	High pressure oil rail pressure is too high	✓
118	P008700	Low pressure of high-pressure oil rail	✓
119	P013800	Downstream oxygen sensor signal wire is short to power supply	✓
120	P013700	Downstream oxygen sensor signal wire is short to ground.	✓
121	P223200	Downstream oxygen sensor signal wire coupled to heating wire	✓
122	P013600	Downstream oxygen sensor signal open circuit	✓
123	P005400	Downstream oxygen sensor heating internal resistance is unreasonable	✓
124	P003800	Downstream oxygen sensor heating control circuit voltage too high	✓
125	P003700	Downstream oxygen sensor heating control circuit voltage too low	✓
126	P003600	Downstream oxygen sensor heating control circuit open	✓
127	P013A00	Downstream oxygen sensor reaction is slow from rich to lean	✓
128	P227100	Downstream oxygen sensor aging - signal continuously too rich	✓
129	P227000	Downstream oxygen sensor aging - signal continuously lean	✓
130	P02CD00	Cylinder No.1 CVO self-learning adjustment up to upper limit	✓
131	P02D100	Cylinder No.3 CVO self-learning adjustment up to upper limit	✓

132	P02D300	Cylinder No.4 CVO self-learning adjustment up to upper limit	✓
133	P02CF00	Cylinder No.2 CVO self-learning adjustment up to upper limit	✓
134	P062B9A	Similar working condition path of self-learning adjustment overrun fault	✓
135	P02CC00	Cylinder No.1 CVO self-learning adjustment reaches the lower limit	✓
136	P02D000	Cylinder No.3 CVO self-learning adjustment reaches the lower limit	✓
137	P02D200	Cylinder No.4 CVO self-learning adjustment reaches the lower limit	✓
138	P02CE00	Cylinder No.2 CVO self-learning adjustment reaches the lower limit	✓

139	P062B64	Circuit signal unreasonable fault similar working condition path	✓
140	P062B96	ECU control unit fault(All cylinders have CVO fault)	✓
141	P126100	Cylinder No.1 CVO circuit signal unreasonable fault	✓
142	P126300	Cylinder No.3 CVO circuit signal unreasonable fault	✓
143	P126400	Cylinder No.4 CVO circuit signal unreasonable fault	✓
144	P126200	Cylinder No.2 CVO circuit signal unreasonable fault	✓
145	P035100	Cylinder No.1 ignition coil control circuit open	✓
146	P035300	Cylinder No.3 ignition coil control circuit open	✓
147	P035400	Cylinder 4 ignition coil control circuit open	✓
148	P035200	Cylinder No.2 ignition coil control circuit open	✓
149	P230100	Cylinder No.1 ignition coil control circuit voltage too high	✓
150	P230700	Triplex ignition coil control circuit voltage too high	✓
151	P231000	Cylinder No.4 ignition coil control circuit voltage too high	✓
152	P230400	Cylinder No.2 ignition coil control circuit voltage too high	✓
153	P230000	Cylinder No.1 ignition coil control circuit voltage too low	✓
154	P230600	Triplex ignition coil control circuit voltage too low	✓
155	P230900	Cylinder No.4 ignition coil control circuit voltage too low	✓
156	P230300	Cylinder No.2 ignition coil control circuit voltage too low	✓
157	P05EC00	Multiple injection monitoring fault during catalyst heating	✓
158	P020100	Cylinder No.1 fuel injector control circuit open	✓
159	P020300	Cylinder No.3 fuel injector control circuit open	✓
160	P020400	Cylinder No.4 fuel injector control circuit open circuit	✓
161	P020200	Cylinder No.2 fuel injector control circuit open	✓
162	P214800	I. High-side control circuit voltage of cylinder 4 injector is too high or too low, or low-side control circuit voltage of cylinder 4 injector is too high or too low	✓
163	P215100	II. High-side control circuit voltage of cylinder No.3 fuel injector is too high or too low, or low-side control circuit voltage of cylinder No.2 fuel injector is too low or too high	✓
164	P026200	Cylinder No.1 fuel injector low side control circuit voltage too high or too low	✓
165	P026800	Triplex injector low-side control circuit voltage too high or too low	✓

166	P027100	Cylinder No.4 fuel injector low side control circuit voltage too high or too low	✓
167	P026500	Cylinder No.2 fuel injector low side control circuit voltage too high or too low	✓
168	P02EE00	Cylinder No.1 fuel injector high and low side control circuits are mutually shorted	✓
169	P02F000	High and low side control circuits of cylinder No.3 fuel injector are mutually shorted.	✓

170	P02F100	Cylinder No.4 fuel injector high and low side control circuits are mutually shorted.	✓
171	P02EF00	Cylinder No.2 fuel injector high and low side control circuits are mutually shorted	✓
172	P00CE24	Intake air temperature sensor 1 cold start calibration is unreasonable(Positive deviation)	✓
173	P00CE23	Intake air temperature sensor 1 cold start calibration is unreasonable(Negative deviation)	✓
174	P011400	Intake air temperature sensor 1 circuit voltage is unreasonable	✓
175	P011300	Intake air temperature sensor 1 circuit voltage too high	✓
176	P011200	Intake Air Temperature Sensor 1 Circuit Low	✓
177	P011126	Intake air temperature sensor 1 signal is unreasonable (Sticky)	✓
178	P138024	Intake air temperature sensor 2 cold start calibration is unreasonable(Positive deviation)	✓
179	P138023	Intake air temperature sensor 2 cold start calibration is unreasonable(Negative deviation)	✓
180	P009900	Intake air temperature sensor 2 circuit voltage is unreasonable	✓
181	P009800	Intake air temperature sensor 2 circuit voltage too high	✓
182	P009700	Intake Air Temperature Sensor 2 Circuit Low	✓
183	P009626	Intake air temperature sensor 2 signal is unreasonable (Sticky)	✓
184	P062900	Fuel pump relay control circuit voltage too high	✓
185	P062800	Fuel pump relay control circuit voltage too low	✓
186	P062700	Fuel pump relay control circuit open	✓
187	P032600	Knock sensor signal circuit voltage too high	✓
188	P032500	Knock sensor signal circuit voltage too low	✓
189	P032800	Short circuit diagnosis of knock sensor A terminal to power supply	✓
190	P032700	Short circuit diagnosis of knock sensor A end to ground	✓
191	P032815	Short circuit diagnosis of knock sensor terminal B to power supply	✓
192	P032714	Short circuit diagnosis of knock sensor B end to ground	✓
193	P023400	Turbocharger boost pressure display too high	✓
194	P029900	Turbocharger boost pressure display too low	✓
195	P142800	LIN1 bus message receiving time exceeds limit	×

196	P141500	LIN bus response timeout supporting communication between EMS and smart generator	×
197	P141700	Lin bus checksum error supporting communication between EMS and smart generator	×
198	P142100	Lin hardware register response timeout	✓
199	P050700	Engine idle speed is high	✓
200	P050600	Engine idle speed is low	✓

201	P050A22	Engine idle speed is too high during catalyst heating	✓
202	P050A21	Engine idle speed too low during catalyst heating	✓
203	P030000	Engine random or multi-cylinder misfire fault	Flash lamp or ✓
204	P030100	Physical cylinder 1 misfire fault detected	Flash lamp or ✓
205	P030300	Physical triplex misfire fault detected	Flash lamp or ✓
206	P030400	Physical cylinder 4 misfire fault detected	Flash lamp or ✓
207	P030200	Physical cylinder No.2 misfire fault detected	Flash lamp or ✓
208	P036300	Engine misfire triggering fuel cut	Flash lamp or ✓
209	P070000	Transmission control fault request illuminates MIL Lamp	✓
210	P15A000	CPU0: MPU fault(Register, DSPR, PSPR)	✓
211	P15A100	CPU0: DCACHE/DSPR ECC No Correctable fault	✓
212	P15A200	CPU0: DCACHE/DSPR address fault	✓
213	P15A300	CPU0:DCACHE TAG SRAM ECC ircorrectable fault	✓
214	P15A400	CPU0:DCACHE TAG SRAM Ground Address fault	✓
215	P15A500	CPU0:PCACHE TAGRAM ECC Ircorrectable fault	✓
216	P15A600	CPU0:PCACHE TAGRAM address Fault	✓
217	P15A700	CPU0: PCACHE/PSPR ECC No Correct fault	✓
218	P15A800	CPU0:PCACHE/PSPR address fault	✓
219	P15A900	CPU1:Lockstep comparator fault	✓
220	P15AA00	CPU1:MPU fault(Register, DSPR, PSPR)	✓
221	P15AB00	CPU1:DCACHE/DSPR ECC No Correct fault	✓
222	P15AC00	CPU1:DCACHE/DSPR address fault	✓
223	P15AD00	CPU1:DCACHE TAGRAM ECC Ircorrectable fault	✓
224	P15AE00	CPU1:DCACHE TAGRAM address Fault	✓
225	P15AF00	CPU1:PCACHE TAGRAM ECC Ircorrectable fault	✓
226	P15B000	CPU1:PCACHE TAGRAM address Fault	✓
227	P15B100	CPU1:PCACHE/PSPR ECC No Correct fault	✓
228	P15B200	CPU1:PCACHE/PSPR address fault	✓

229	P15B300	LMU:SRAM ECC monitoring fault	✓

230	P15B400	LMU:SRAM ECC Uncorrectable fault	✓
231	P15B500	LMU:SRAM address fault	✓
232	P15B600	SMU: recovery Timer 0 timeout fault	✓
233	P15B700	SMU: recovery Timer 1 timeout fault	✓
234	P15B800	PMU:PFLASH ECC Uncorrectable Multiple bit fault	✓
235	P15B900	PMU:PFLASH address fault	✓
236	P15BA00	PMU:PFLASH ECC monitoring fault (Covering all ECC modules)	✓
237	P15BB00	PMU:PFLASH EDC comparator fault Covering all PFLASH instances	✓
238	P15BC00	SCU/CGU: system PLL OSC_WDT: Input clock overrun fault	✓
239	P15BD00	SCU/CGU: system PLL VCO clock Event missing fault	✓
240	P15BE00	SCU/EVR: EVR 1.3 V Digital undervoltage Fault	✓
241	P15BF00	SCU/EVR: EVR 3.3 V overvoltage fault	✓
242	P15C000	SCU/EVR: external power supply overvoltage fault	✓
243	P15C100	SCU/WDTS: Safety watchdog timeout fault	✓
244	P15C200	SCU/WDTCPU0: Watchdog CPU0 Extra Time fault	✓
245	P15C300	SCU/WDTCPU1: Watchdog CPU 1 Super Time fault	✓
246	P15C400	At SCU/CGU: PLL_ERAY VCO Clock event loss fault	✓
247	P15C500	SCU/WDTCPU2: Watchdog CPU 2 Super Time fault	✓
248	P15C600	SCU/DTS: temperature sensor overflow fault	✓
249	P15C700	Fault detected by Registers: register monitoring	✓
250	P15C800	SCU/LSCU: SCU Configuration Fault: Monitor Dual Rail Properties from lockstep LSCU Alarm	✓
251	P15C900	SCU/CGU: clock monitoring: STM out of frequency range fault	✓
252	P15CA00	SCU/CGU: clock monitoring: PLL_ERAY out of frequency range fault	✓
253	P15CB00	SCU/CGU: clock monitoring: PLL out of frequency range fault	✓
254	P15CC00	SCU/CGU: clock monitoring: SRI out of frequency range fault	✓

255	P15CD00	SCU/CGU: clock monitoring: SPB out of frequency range fault	✓
256	P15CE00	SCU/CGU: clock monitoring: GTM out of frequency range fault	✓

257	P15CF00	SCU/CGU: clock monitoring: ADC out of frequency range fault	✓
258	P15D000	GTM: SRAMs Uncorrectable fault	✓
259	P15D100	FLEXRAY:SRAM address fault	✓
260	P15D200	Misc SRAMs:SRAM ECC Uncorrectable fault	✓
261	P15D300	Misc SRAMs:SRAM address fault	✓
262	P15D400	GTM: SRAMs address fault	✓
263	P15D500	CAN: SRAM Uncorrectable fault	✓
264	P15D600	CAN: SRAM address fault	✓
265	P15D700	FLEXRAY:SRAM ECC Uncorrectable Fault	✓
266	P15D800	CPU2:MPU fault(Register, DSPR, PSPR)	✓
267	P15D900	CPU2: DCACHE/DSPR ECC No Correctable fault	✓
268	P15DA00	CPU2: DCACHE/DSPR address fault	✓
269	P15DB00	CPU2: DCACHE TAG SRAM ECC ircorrectable fault	✓
270	P15DC00	CPU2:DCACHE TAG SRAM ground Address fault	✓
271	P15DD00	CPU2:121 PCACHE TAGRAM ECC ircorrectable fault	✓
272	P15DE00	CPU2:PCACHE TAGRAM address Fault	✓
273	P15DF00	CPU2: PCACHE/PSPR ECC No Correct fault	✓
274	P15E000	CPU2: PCACHE/PSPR address fault	✓
275	P068500	Main relay open circuit fault	✓
276	P068700	Short circuit fault of main relay to power supply	✓
277	P068600	Main relay short circuit to ground fault	✓
278	P025100	Flow control valve high or low control circuit open	✓
279	P025400	Flow control valve high-side control circuit voltage too high or too low	✓
280	P009000	Flow control valve high-side control circuit high-low side short circuit	✓
281	P025900	Flow control valve low side control circuit voltage too high or too low	✓
282	P153000	AD converter zero test monitoring fault	✓
283	P153100	AD converter given voltage test monitoring fault	✓
284	P157100	Close drive level check fault or communication fault in path check	✓
285	P060D00	Second layer accelerator pedal	✓

		signal rationality fault	
286	P152000	Load prediction monitoring fault	✓

287	P152100	Oil circuit monitoring fault in fuel cut-off mode	✓
288	P152200	Fuel circuit monitoring fault in fuel supply mode	✓
289	P153900	Synchronization process rationality check(Based on speed and synchronous count)	✓
290	P153700	Load comparison monitoring fault	✓
291	P153500	Mixture monitoring fault	✓
292	P153600	Working mode monitoring fault	✓
293	P061C00	2nd floor engine speed monitoring fault	✓
294	P153800	Ignition angle signal, harness or ECU fault	✓
295	P152700	First floor safety fuel cut-off monitoring fault	✓
296	P152800	2nd floor safety fuel cut-off monitoring fault	✓
297	P152900	Starter control monitoring fault	✓
298	P061A00	2nd floor torque monitoring fault(Torque comparison fault)	✓
299	P157200	Under normal voltage conditions, ABE is activated.	✓
300	P157300	Monitoring error response fault	✓
301	P157400	Errorpin is activated and monitoring communication is normal	✓
302	P157500	Overvoltage causes DVE drive shutdown fault	✓
303	P218700	Air-fuel ratio closed-loop control self-learning value exceeds the upper limit (Idle speed)	✓
304	P218800	Air-fuel ratio closed loop control self-learning value exceeds the lower limit (Idle speed)	✓
305	P222722	Ambient pressure sensor pressure unreasonable high fault	✓
306	P222721	Ambient pressure sensor pressure unreasonable low fault	✓
307	P222785	Ambient pressure sensor signal too high during start	✓
308	P222784	Ambient pressure sensor signal is too low during start	✓
309	P120200	Ambient pressure sensor pressure overrange high fault	✓
310	P120300	Ambient pressure sensor pressure overrange low fault	✓
311	P222900	Short circuit fault of ambient pressure sensor to power supply	✓
312	P222800	Ambient pressure sensor short circuit to ground fault	✓
313	P222729	Ambient pressure sensor signal fault	✓
314	P010800	Intake manifold pressure sensor short circuit to power supply fault	✓

315	P010700	Intake manifold pressure sensor short circuit to ground fault	✓
316	P219500	LSU oxygen sensor characteristic offset (lean side) fault	✓
317	P219600	LSU oxygen sensor characteristic offset (rich side) fault	✓

318	P052300	High oil pressure sensor circuit voltage/duty cycle	×
319	P052200	Oil pressure sensor circuit voltage/duty cycle low	×
320	P121000	Low duty cycle of oil pressure sensor circuit	×
321	P120000	Intake pressure sensor pressure overrange high fault	✓
322	P120100	Intake pressure sensor pressure overrange low fault	✓
323	P00C721	Intake pressure sensor signal is too low during start	✓
324	P00C722	Intake pressure sensor signal is too high during start	✓
325	P010622	Intake pressure sensor pressure is far higher than model pressure unreasonable fault	✓
326	P010621	Intake pressure sensor pressure is far lower than model pressure unreasonable fault	✓
327	P01062A	Intake pressure sensor signal value abnormal without fluctuation fault	✓
328	P046800	High load desorption line pressure sensor circuit voltage too high	✓
329	P046700	High load desorption line pressure sensor circuit voltage too low	✓
330	P128500	High load desorption line pressure sensor signal exceeds upper threshold	✓
331	P128600	High load desorption line pressure sensor signal exceeds lower threshold	✓
332	P25AB00	Piston cooling nozzle control valve control circuit voltage too high	✓
333	P25AA00	Piston cooling nozzle control valve control circuit voltage too low	✓
334	P25A900	Piston cooling nozzle control valve control circuit open	✓
335	P023800	Boost pressure sensor short circuit to power supply	✓
336	P023700	Boost pressure sensor short circuit to ground	✓
337	P120400	High overrange fault of boost pressure	✓
338	P120500	Supercharging pressure out of range low fault	✓
339	P023622	Unreasonably high boost pressure fault	✓
340	P023621	Unreasonable boost pressure low fault	✓
341	P212300	Electronic accelerator pedal position sensor 1 signal voltage too high	✓
342	P212800	Electronic accelerator pedal position sensor 2 signal voltage too high	✓
343	P212200	Electronic accelerator pedal position sensor 1 signal voltage too low	✓

344	P212700	Electronic accelerator pedal position sensor 2 signal voltage too low	✓

345	P14A300	Start/stop indicator lamp (green lamp) circuit voltage is too high	×
346	P14A400	Start/stop indicator lamp (green lamp) circuit voltage is too low	×
347	P14A500	Start/stop indicator lamp (green lamp) circuit open circuit	×
348	P05BD00	Sticking fault of starting and stopping main switch	×
349	P064100	5V power supply module 1 has fault	✓
350	P065100	Chip 5V supply voltage 2 fault	✓
351	P069700	5V power supply module 3 has fault	✓
352	P14AC00	The starter is damaged or the starter supply circuit is interrupted.	×
353	P14AD00	Engine is blocked or the starter and flywheel are not engaged.	×
354	P14AE00	Short circuit fault between starter feedback voltage signal wire KL50r and power supply or R1 relay sticking	×
355	P14AF00	Short circuit fault between starter feedback voltage signal wire KL50r and ground	×
356	P00C600	High voltage starting does not operate normally	✓
357	P26F000	Starter relay Crank relay cannot disengage fault	×
358	P26F200	Drive chain status PT State Relay cannot disengage fault	×
359	P26F100	Starter Relay Crank relay or Drive Chain Status Relay PT State Relay Does Not Engage	×
360	P226100	Mechanical fault of turbocharger relief valve	×
361	P26E400	Starter relay control circuit fault - control terminal B	×
362	P26E600	Starter relay control circuit voltage too high	×
363	P26E500	Starter relay control circuit voltage too low	×
364	P061500	Starter relay control circuit fault - control terminal A	×
365	P063441	Starter drive chip 1 overheating	×
366	P061700	Starter relay control circuit voltage too high	×
367	P061600	Starter relay control circuit voltage too low	×
368	P213800	Electronic accelerator pedal position sensor signal is unreasonable	✓
369	P044200	Evaporation system 1.0 mm leakage	✓
370	P045500	Evaporation system 2.2 mm leaks or tank cap is not tightened	✓
371	P04F000	High load desorption pipeline fault - canister valve fault	✓
372	P049600	Canister solenoid valve stuck normally open	✓

373	P049700	Canister solenoid valve stuck normally closed	✓
374	P045900	Canister control valve control circuit voltage too high	✓

375	P045800	Canister control valve control circuit voltage too low	✓
376	P044400	Canister control valve control circuit open	✓
377	P042000	Three-way catalytic converter oxygen storage capacity aging	✓
378	P155100	Electronic throttle lower limit position initialization self-learning fault	✓
379	P155000	Electronic throttle valve self-learning condition is not satisfied	×
380	P155600	Throttle mechanical bottom dead center self-learning maximum fault again	×
381	P155700	Throttle mechanical bottom dead center self-learning minimum fault again	×
382	P156100	DVE position control deviation fault	✓
383	P156000	Throttle body PID adjustment out of range	✓
384	P155800	Throttle limp position and initial self-learning deviation out of range	×
385	P155900	Throttle limp position above upper limit	×
386	P155A00	Throttle limp position and previous self-learning deviation exceed limit	×
387	P155B00	Throttle limp position below lower limit	×
388	P210000	Electronic throttle drive stage fault(Open circuit)	✓
389	P211800	Electronic throttle drive stage fault(Overheating or overcurrent)	✓
390	P155400	Return spring check maximum fault	✓
391	P155500	Return spring check minimum fault	✓
392	P012300	Electronic Throttle Position Sensor 1 Signal Circuit High Voltage	✓
393	P012100	Electronic throttle position sensor 1 signal is unreasonable	✓
394	P022300	Electronic Throttle Position Sensor 2 Signal Circuit High Voltage	✓
395	P022200	Electronic Throttle Position Sensor 2 Signal Circuit Low	✓
396	P022100	Electronic throttle position sensor 2 signal is unreasonable	✓
397	P210300	Electronic throttle drive stage fault(Short circuit)	✓
398	P210600	Electronic throttle drive stage fault(Unreasonable)	✓
399	P012200	Electronic Throttle Position Sensor 1 Signal Circuit Low	✓
400	P024477	Turbocharger electronic waste valve target position and actual position deviation out of range fault	✓
401	P024437	Turbocharger electronic waste valve duty ratio overrange fault	✓

402	P024300	Boost Exhaust Control Circuit Open	✓
403	P003A22	Turbocharger electronic wastegate primary zero position self-learning over upper limit fault	✓

404	P003A21	Turbocharger electronic wastegate primary zero position self-learning out of lower limit fault	✓
405	P003A72	Turbocharger electronic wastegate zero position self-learning over upper limit fault	✓
406	P003A73	Turbocharger Electronic Waste Valve Zero Position Self-learning Out of Lower Limit Fault	✓
407	P256500	Turbocharger electronic wastegate position sensor voltage too high fault	✓
408	P256400	Turbocharger electronic wastegate position sensor low voltage fault	✓
409	P024600	Boost Exhaust Control Circuit High or Low	✓
410	P170300	Pressurized exhaust control circuit communication fault	✓
411	P064D00	LSU integrated chip register write fault	✓
412	P005300	Upstream oxygen sensor heating circuit fault	✓
413	P003200	Upstream oxygen sensor heating control circuit voltage too high	✓
414	P003100	Upstream oxygen sensor heating control circuit voltage too low	✓
415	P003000	Upstream oxygen sensor heating control circuit open	✓
416	P225100	Open circuit of upstream oxygen sensor IPE	✓
417	P224300	Upstream oxygen sensor RE wire open circuit	✓
418	P013200	Upstream oxygen sensor signal circuit voltage too high (APE IPE RE wire is short to power supply)	✓
419	P013100	Upstream oxygen sensor signal circuit voltage too low (APE IPE RE wire is short to ground)	✓
420	P064D13	LSU integrated chip SPI communication fault	✓
421	P241400	Upstream oxygen sensor output voltage is unreasonable	✓
422	P12C200	Crankcase Vent Line Diagnostic Circuit High	✓
423	P12C300	Crankcase Vent Line Diagnostic Circuit Low	✓
424	P003500	Boost relief valve control circuit voltage too high	✓
425	P003400	Boost relief valve control circuit voltage too low	✓
426	P003300	Boost relief valve control circuit open	✓
427	P223713	LSU oxygen sensor APE wire open circuit	✓
428	P063000	VIN code is not written or incompatible	×
429	P121200	Vehicle speed sensor performance fault(Speed exceeding maximum range)	✓
430	P050000	Vehicle speed sensor input	✓

		signal fault	
431	P050165	Vehicle speed sensor performance fault(Vehicle speed is too low when sliding fuel cut)	✓
432	P050166	Vehicle speed unreasonable fault - vehicle speed too low fault under heavy engine load	✓
433	P161500	EMS and Vehicle Theft Deterrent Configuration Mismatch	×
434	P051300	Reply received by EMS is inconsistent with internal calculation result	×

435	P161300	EMS received incorrect response format	×
436	P063300	EMS does not learn SK	×
437	P161200	Invalid value for SupplierID	×
438	P161000	EMS does not receive a valid PEPS reply, and the engine is prohibited from starting.	×
439	P161400	PEPS approval reply checksum error	×
440	P130000	Electronic water pump additional fault	×
441	P130100	Electronic water pump dry running fault	×
442	P261D00	Turbo cooling electronic water pump control circuit voltage too high	×
443	P261C00	Turbine cooling electronic water pump control circuit voltage too low/rationality fault	×
444	P261A00	Turbine cooling electronic water pump control circuit open circuit	×
445	P130500	Electronic water pump temperature too high fault	×
446	P130800	Electronic water pump blocking fault	×
447	P261000	Unreasonable shutdown timing fault	✓
448	P06869E	ECM/PCM main relay sticking fault or short circuit to ground fault	✓
449	P06B842	Error reading NVM Block	✓
450	P06B843	Error writing NVM Block	✓

Fault code details

Drive stage(Actuator)

P023400

Supercharger overcharge

1. Fault triggering conditions:

Boost pressure is higher than the target boost pressure plus a certain offset

2. Possible fault causes:

1) The supercharger relief valve is damaged;
2) The wastegate valve is damaged (fully closed);

3. Post-fault treatment and phenomena:

1) Prohibit turbocharger control;

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Inspect the supercharger relief valve for damage	Yes	Replace pressure relief valve
		No	Next step
2	Check wastegate for damage(Fully off state)	Yes	Replace bypass valve
		No	Diagnostic aid

P029900

Insufficient supercharger boost pressure

1.Fault triggering conditions:

1) Actual boost pressure is much lower than target boost pressure minus a certain offset

2. Possible fault causes:

1) Pipeline between compressor outlet and throttle valve leaks;
2) Pipeline leakage between turbine and exhaust trachea;
3) Wastegate valve or drain valve fails;
4) The supercharger is damaged;
5) Compressor impeller and other working parts are too dirty or damaged;
6) Exhaust manifold leaks or is blocked;
7) Air filter dirt;

3. Post-fault treatment and phenomena:

1) Prohibit turbocharger control;

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Pipeline leakage from compressor outlet to throttle	Yes	Service pipeline
		No	Next step
2	Pipeline leakage between turbine and exhaust trachea	Yes	Service pipeline
		No	Next step
3	Exhaust manifold leaks or is blocked	Yes	Service pipeline
		No	Next step
4	Air filter	Yes	Clean and replace air filter
		No	Next step
5	Wastegate valve or drain valve fails and is normally open.	Yes	Replace faulty parts
		No	Next step
6	Compressor impeller and other working components are too dirty or damaged.	Yes	Clean and replace the faulty parts.
		No	Next step
7	Supercharger damage	Yes	Replace supercharger
		No	Diagnostic aid

P226100

The supercharger drain solenoid valve is mechanically faulty or the pipeline is blocked.

1.Fault triggering conditions:

1) The number of front throttle pressure fluctuations is greater than a certain threshold

2. Possible fault causes:

1) The drain control valve harness is disconnected;
2) The drain control valve is damaged;
3) Drain control valve pin or circuit at ECU end is damaged.

3. Post-fault treatment and phenomena:

1) Prohibit turbocharger control;

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check whether the drain control valve harness is interrupted	Yes	Repair harness
		No	Next step
2	Check drain control valve for damage	Yes	Replace relief valve
		No	Next step
3	Inspect whether the drain control valve pin or circuit at ECU end is damaged.	Yes	Check ECU
		No	Diagnostic aid

P024477

Supercharger electronic waste valve target position deviates too much from actual position

1.Fault triggering conditions:

1) Deviation between target position and actual position of turbocharger electronic waste valve exceeds the threshold

2. Possible fault causes:

1) Actuator status is inconsistent with SPEC;

2) The actuator is blocked by foreign matter at the dead position;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner and set the ignition switch to "on."	Yes	Next step
2	Read and save fault frozen frame information	No	Next step
3	Check whether the electronic waste valve is stuck.	Yes	Replace electronic throttle valve
		No	Next step
4	Check whether the harness and connectors are aged.	Yes	End
		No	Diagnostic aid

P024437

Supercharger electronic waste valve target position deviates too much from actual position

1.Fault triggering conditions:

Turbocharger Electronic Waste Valve Control Duty Cycle Overrange

2. Possible fault causes:

1) Actuator status is inconsistent with SPEC;

2) The actuator is blocked by foreign matter at the dead position;

3. Post-fault treatment and phenomena:

None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps

1	Connect the diagnostic scanner and set the ignition switch to "on."	Yes	Next step
2	Read and save fault frozen frame information	No	Next step
3	Check whether the electronic waste valve is stuck.	Yes	Replace electronic throttle valve
		No	Next step
4	Check whether the harness and connectors are aged.	Yes	End
		No	Diagnostic aid

P024300

Supercharger electronic wastegate control circuit open

1. Fault triggering conditions:

1) Drive channel self-diagnosis fault

2. Possible fault causes:

1) The connector is not properly connected or in poor contact;
2) The supercharger electronic wastegate control circuit pin is open;
3) ECU end corresponding electronic waste valve control circuit pin is open circuit or internal circuit is damaged;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Inspect the connector for improper connection or poor contact.	Yes	Reconnect
		No	Next step
2	Check supercharger electronic wastegate control circuit pin for open circuit	Yes	Wiring harness maintenance
		No	Next step
3	Inspect whether the corresponding electronic waste valve control circuit pin at ECU end is open circuit or internal circuit is damaged.	Yes	Check ECU
		No	Diagnostic aid

P003A22/P003A72

Supercharger electronic waste valve primary zero position self-learning value is too large/Supercharger electronic waste valve zero position self-learning value is too large

1. Fault triggering conditions:

1) Learned zero voltage exceeds upper limit

2. Possible fault causes:

1) Actuator status is inconsistent with SPEC;
2) The actuator is blocked by foreign matter at the dead position;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps

1	Push the supercharger to the closed position manually, read out the position voltage, whether it is outside the SPEC range	Yes	Replace supercharger assembly
		No	Next step
2	Check whether there is foreign matter near the turbocharger off position.	Yes	Remove foreign matter
		No	Diagnostic aid

P003A21/P003A73

Supercharger electronic waste valve primary zero self-learning value is too small/Supercharger electronic waste valve zero self-learning value is too small

1. Fault triggering conditions:

1) Learned zero voltage exceeds the lower limit

2. Possible fault causes:

1) Actuator status is inconsistent with SPEC;

2) The actuator is blocked by foreign matter at the dead position;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Push the supercharger to the closed position manually, read out the position voltage, whether it is outside the SPEC range	Yes	Replace supercharger assembly
		No	Next step
2	Check whether there is foreign matter near the turbocharger off position.	Yes	Remove foreign matter
		No	Diagnostic aid

P256500

Turbocharger electronic wastegate position sensor signal voltage too high

1. Fault triggering conditions:

1) Turbocharger electronic wastegate position sensor voltage above limit

2. Possible fault causes:

1) Sensor circuit is short to power supply or open;

2) ECU corresponding pin is short circuit to power supply or open circuit;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner and set the ignition switch to "on."	Yes	Next step
2	Read and save fault frozen frame information	No	Next step
3	Inspect whether the electronic waste valve position sensor harness has short circuit to power supply or open circuit.	Yes	End
		No	Diagnostic aid

P256400

Turbocharger electronic wastegate position sensor signal voltage too low

1.Fault triggering conditions:

Turbocharger electronic wastegate position sensor voltage below limit

2. Possible fault causes:

1) Sensor circuit is short to ground or open;

2) ECU corresponding pin is short to ground or open;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner and set the ignition switch to "on."	Yes	Next step
2	Read and save fault frozen frame information	No	Next step
3	Check electronic waste valve position sensor harness for short circuit to ground or open circuit	Yes	End
		No	Diagnostic aid

P024600

Supercharger electronic wastegate control circuit voltage too high or too low

1.Fault triggering conditions:

1) Drive channel self-diagnosis fault

2. Possible fault causes:

1) The connector is not properly connected or in poor contact;

2) The supercharger electronic wastegate control circuit pin is short to power supply or ground;

3) Drive pin corresponding to ECU is short to power supply or ground;

3. Post-fault treatment and phenomenon: None

4.Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Inspect the connector for improper connection or poor contact.	Yes	Reconnect
		No	Next step
2	Exhaust control valve drive circuit pin is short to power supply or ground	Yes	Wiring harness maintenance
		No	Next step
3	The drive pin corresponding to ECU is short to power supply or ground or internal circuit is damaged.	Yes	Check ECU
		No	Diagnostic aid

P003300

Supercharger drain solenoid control circuit open

1.Fault triggering conditions:

1) Drive channel self-diagnosis fault

2.Possible fault causes:

1) The connector is not properly connected or in poor contact;

2) The supercharger drain solenoid valve control circuit pin is open;

3) ECU end corresponding drain solenoid valve control circuit pin is open circuit or internal circuit is damaged;

3.Post-fault treatment and phenomena:

None

4. **Diagnostic process**

Serial number	Operation steps	Test result	Next steps
1	Inspect the connector for improper connection or poor contact.	Yes	Reconnect
		No	Next step
2	Check whether the supercharger drain solenoid valve control circuit pin is open.	Yes	Wiring harness maintenance
		No	Next step
3	Inspect whether the corresponding drain solenoid valve control circuit pin at ECU end is open circuit or internal circuit is damaged.	Yes	Check ECU
		No	Diagnostic aid

P003400

Supercharger drain solenoid control circuit voltage too low

1. **Fault triggering conditions:**

1) Drive channel self-diagnosis fault

2. **Possible fault causes:**

1) Boost and relief flow control valve drive circuit is short to ground;

2) ECU end corresponding boost/relief flow control valve drive circuit is short to ground;

3. **Post-fault treatment and phenomenon: None**

4. **Diagnostic process**

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the supercharger drain solenoid valve control circuit pin is short to ground.	Yes	Wiring harness maintenance
		No	Next step
2	Inspect whether the corresponding drain solenoid valve control circuit pin at ECU end is short to ground.	Yes	Check ECU
		No	Diagnostic aid

P003500

Supercharger drain solenoid control circuit voltage too high

1. **Fault triggering conditions:**

1) Drive channel self-diagnosis fault

2. **Possible fault causes:**

1) Boost and relief flow control valve drive circuit is short to power supply;

2) ECU end corresponding boost/relief flow control valve drive circuit is short to power supply;

3. **Post-fault treatment and phenomenon: None**

4. **Diagnostic process**

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the supercharger drain solenoid valve control circuit pin is short to power supply.	Yes	Wiring harness maintenance
		No	Next step

2	Inspect whether the corresponding drain solenoid valve control circuit pin at ECU end is short to power supply.	Yes	Check ECU
		No	Diagnostic aid

P25A900

Piston cooling nozzle control valve control circuit open

1. Fault triggering conditions:

1) Drive channel self-diagnosis fault

2.Possible fault causes:

1) The piston cooling nozzle control valve connector is not properly connected or in poor contact;
2) Piston cooling nozzle control valve circuit is open;
3) The piston cooling nozzle control circuit corresponding to ECU is open;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	The connector is not properly connected or in poor contact.	Yes	Reconnect
		No	Next step
2	Piston cooling nozzle control valve signal terminal pin open circuit	Yes	Repair harness
		No	Next step
3	Open circuit of pin at supply end of piston cooling nozzle control valve	Yes	Repair harness
		No	Next step
4	Piston cooling nozzle control valve is damaged.	Yes	Replace control valve
		No	Next step
5	The pin of piston cooling nozzle control end corresponding to ECU end is open circuit. Or internal circuit damage	Yes	Check ECU
		No	Diagnostic aid

P25AA00

Piston cooling nozzle control valve control circuit voltage too low

1. Fault triggering conditions:

1) Drive channel self-diagnosis fault

2.Possible fault causes:

1) Signal end of piston cooling nozzle control valve is short to ground;
2) Pin of piston cooling nozzle control end corresponding to ECU end is short circuit to ground;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Signal end of piston cooling nozzle control valve is short to ground.	Yes	Repair harness
		No	Next step

2	Pin of piston cooling nozzle control end corresponding to ECU end is short circuit to ground.	Yes	Check ECU
		No	Diagnostic aid

P25AB00

Piston cooling nozzle control valve control circuit voltage too high

1. Fault triggering conditions:

1) Drive channel self-diagnosis fault

2. Possible fault causes:

1) Signal end of piston cooling nozzle control valve is short to power supply;

2) Pin of piston cooling nozzle control end corresponding to ECU end is short circuit to power supply;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Signal end of piston cooling nozzle control valve is short to power supply.	Yes	Repair harness
		No	Next step
2	Pin of piston cooling nozzle control end corresponding to ECU end is short circuit to power supply.	Yes	Check ECU
		No	Diagnostic aid

P068500

Main relay control circuit open

1. Fault triggering conditions:

1) The ignition switch key is in the ON position;

2) The status of the solenoid valve supplied by the main relay is wrong, and the ECU receives the faulty hardware diagnostic flag bit;

2. Possible fault causes:

1) Circuit, pin short circuit or open circuit between main relay and ECU output control;

2) Main relay fault;

3. Post-fault treatment and phenomena:

1) Engine shutdown

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check whether the circuit between main relay and ECU output control is short circuit or open circuit.	Yes	Repair harness
		No	Next step
2	Check main relay for hardware fault	Yes	Repair or replace faulty parts
		No	Diagnostic aid

P26F000

Starting relay is stuck

1. Fault triggering conditions:

1) Starting relay stagnation time exceeds the threshold

2.Possible fault causes:

1) The starting relay is damaged;

2) The corresponding pin of starting relay is short to power supply;

3. Post-fault treatment and phenomena:

1) Prohibit automatic start-stop function;

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check whether the starting relay is damaged, and whether it cannot be reset for a long time after pressing.	Yes	Replace starting relay
		No	Next step
2	Check whether the corresponding pin of starting relay is short to power supply.	Yes	Wiring harness maintenance
		No	Diagnostic aid

P068600

Main relay control circuit voltage too low

1. Fault triggering conditions:

1) The ignition switch key is in the ON position;

2) The status of the solenoid valve supplied by the main relay is wrong, and the ECU receives the faulty hardware diagnostic flag bit;

2. Possible fault causes:

1) Circuit and pin between main relay and ECU output control are short to ground;

2) Main relay fault;

3. Post-fault treatment and phenomena:

1) Engine shutdown

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check whether the circuit between main relay and ECU output control is short to ground.	Yes	Repair harness
		No	Next step
2	Check main relay for hardware fault	Yes	Repair or replace faulty parts
		No	Diagnostic aid

P26F200

Drive chain relay is stuck

1. Fault triggering conditions:

1) The starter feedback signal can be detected by starting the test pulse when the drive chain is locked.

2. Possible fault causes:

1) Transmission chain relay switch bonding damage;

3. Post-fault treatment and phenomena:

1) Prohibit automatic start-stop function;

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check transmission chain relay switch adhesion for damage	Yes	Replace relay
		No	Diagnostic aid

P068700

Main relay control circuit voltage too high

1. Fault triggering conditions:

1) The ignition switch key is in the ON position;

2) The status of the solenoid valve supplied by the main relay is wrong, and the ECU receives the faulty hardware diagnostic flag bit;

2. Possible fault causes:

1) Circuit and pin between main relay and ECU output control are short to power supply;

2) Main relay fault;

3. Post-fault treatment and phenomena:

1) Engine shutdown

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check whether the circuit between main relay and ECU output control is short circuit to power supply.	Yes	Repair harness
		No	Next step
2	Check main relay for hardware fault	Yes	Repair or replace faulty parts
		No	Diagnostic aid

P06869E

Main relay control circuit voltage too low

1. Fault triggering conditions

1) In ECU power-off stage, the voltage after main relay is disconnected is greater than the reasonable value range.

2. Possible fault causes:

1) In ECU power-off stage, UBR voltage is greater than reasonable value range after main relay is disconnected;

3. Post-fault treatment and phenomenon: None

4.Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Main relay sticking	Yes	Replace relay
		No	Next step
2	UBR harness has interference, short circuit UBD	Yes	Wiring harness maintenance
		No	Diagnostic aid

P26F100

Starting relay or drive chain relay not engaged

1. Fault triggering conditions:

1) There is a starter request but no starter feedback signal

2. Possible fault causes: 1) Starting relay is damaged; 2) The transmission chain relay is damaged;

3. Post-fault treatment and phenomena:

1) Prohibit automatic start-stop function;

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check starting relay for damage	Yes	Replace relay
		No	Next step
2	Check drive chain relay for damage	Yes	Replace relay
		No	Diagnostic aid

P26E400

Drive chain relay control circuit open

1. Fault triggering conditions:

1) Drive channel self-diagnosis fault

2. Possible fault causes:

1) Connector is not firmly connected or in poor contact;
2) Drive chain relay control circuit is open;
3) ECU corresponding transmission chain relay control circuit pin is open circuit or damaged;

3. Post-fault treatment and phenomenon: None

4.Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Connector is not firmly connected or in poor contact	Yes	Reconnect
		No	Next step
2	Drive chain relay control circuit open	Yes	Wiring harness maintenance
		No	Next step
3	Drive chain relay fuse broken or damaged	Yes	Replace relay

P26E500

Drive chain relay control circuit voltage too low

1. Fault triggering conditions:

1) Drive channel self-diagnosis fault

2. Possible fault causes:

1) Drive chain relay control circuit is short to ground;
2) ECU corresponding transmission chain relay control circuit pin is short to ground;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Drive chain relay control circuit short circuit to ground	Yes	Wiring harness maintenance
		No	Next step
2	ECU corresponding transmission chain relay control circuit pin is short to ground.	Yes	Maintenance ECU

		No	Diagnostic aid

P26E600

Drive chain relay control circuit voltage too high

1.Fault triggering conditions:

1) Drive channel self-diagnosis fault

2. Possible fault causes:

1) Drive chain relay control circuit is short to power supply;

2) ECU corresponding transmission chain relay control circuit pin is short to power supply;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Drive chain relay control circuit is short to power supply	Yes	Wiring harness maintenance
		No	Next step
2	ECU corresponding transmission chain relay control circuit pin is short to power supply	Yes	Maintenance ECU
		No	Diagnostic aid

P061500

Start relay control circuit open

1.Fault triggering conditions:

1) Drive channel self-diagnosis fault

2. Possible fault causes:

1) Connector is not firmly connected or in poor contact;

2) Start relay control circuit is open;

3) ECU corresponding start relay control circuit pin is open circuit or damaged;

3. Post-fault treatment and phenomenon: None

4. Post-fault treatment and phenomena:

Serial number	Operation steps	Test result	Next steps
1	Connector is not firmly connected or in poor contact	Yes	Reconnect
		No	Next step
2	Start relay control circuit open	Yes	Wiring harness maintenance
		No	Next step
3	Start relay fuse is broken or damaged	Yes	Replace relay
		No	Next step
4	ECU corresponding starter relay control circuit pin open circuit or damaged	Yes	Check ECU
		No	Diagnostic aid

P061600

Starting relay control circuit voltage too low

1. Fault triggering conditions:

1) Drive channel self-diagnosis fault

2. Possible fault causes:

1) Start relay control circuit is short to ground;

2) ECU corresponding start relay control circuit pin is short to ground;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Start relay control circuit short to ground	Yes	Wiring harness maintenance
		No	Next step
2	ECU corresponding start relay control circuit pin is short to ground.	Yes	Maintenance ECU
		No	Diagnostic aid

P061700

Start relay control circuit voltage too high

1. Fault triggering conditions:

1) Drive channel self-diagnosis fault

2. Possible fault causes:

1) Start relay control circuit is short to power supply;

2) ECU corresponding start relay control circuit pin is short to power supply;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Start relay control circuit is short to power supply	Yes	Wiring harness maintenance
		No	Next step
2	ECU corresponding start relay control circuit pin is short to power supply	Yes	Maintenance ECU
		No	Diagnostic aid

P130100/P130500/P130800

Electronic auxiliary water pump idle/Electronic auxiliary water pump high temperature/Electronic auxiliary water pump blocked

1. Fault triggering conditions:

1) Electronic auxiliary water pump self-diagnosis

2. Possible fault causes:

1) Electronic auxiliary water pump is damaged;

3. Post-fault treatment and phenomena:

None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."	Yes	Next step
2	Read and save fault freeze frame information.	Yes	Next step
3	Replace the electronic auxiliary water pump and observe whether the fault is repeated.	Yes	Diagnostic aid
		No	End

P261A00

Electronic auxiliary water pump control circuit open

1. Fault triggering conditions:

1) Drive channel self-diagnosis fault

2. Possible fault causes:

1) Connector is not firmly connected or in poor contact;
2) Electronic auxiliary water pump control circuit pin is open;
3) ECU corresponding electronic auxiliary water pump control circuit pin is open circuit or damaged;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the connector is not firmly connected or in poor contact.	Yes	Reconnect
		No	Next step
2	Check electronic auxiliary water pump control circuit pin for open circuit	Yes	Wiring harness maintenance
		No	Next step
3	Inspect whether the ECU corresponding electronic auxiliary water pump control circuit pin is open circuit or damaged.	Yes	Check ECU
		No	Diagnostic aid

P261C00

Electronic auxiliary water pump control circuit voltage too low

1. fault triggering conditions:

1) Drive channel self-diagnosis fault

2 Possible fault causes:

1) Electronic auxiliary water pump control circuit is short to ground;
2) ECU corresponding electronic auxiliary water pump control circuit is short to ground;

3. Post-fault treatment and phenomena:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check electronic auxiliary water pump control circuit pin for short circuit to ground	Yes	Wiring harness maintenance
		No	Next step

2	Inspect whether the ECU corresponding electronic auxiliary water pump control circuit pin is short to ground.	Yes	Check ECU
		No	Diagnostic aid

P261D00

Electronic auxiliary water pump control circuit voltage too high

1. Fault triggering conditions:

1) Drive channel self-diagnosis fault

2. Possible fault causes:

1) Electronic auxiliary water pump control circuit is short to power supply;

2) ECU corresponding electronic auxiliary water pump control circuit is short to power supply;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check electronic auxiliary water pump control circuit pin for short circuit to power supply	Yes	Wiring harness maintenance
		No	Next step
2	Inspect whether the ECU corresponding electronic auxiliary water pump control circuit pin is short to power supply.	Yes	Check ECU
		No	Diagnostic aid

P155100/P155000

Electronic throttle body lower limit position initialization self-learning fault/Electronic throttle body self-learning condition is not satisfied

1. Fault triggering conditions:

1) Throttle valve self-learning must meet seven conditions simultaneously: No DVE or monitoring fault; The speed is 0; Vehicle speed is 0; Pedal is 0; Battery voltage is greater than 10 V; Engine
Water temperature is greater than 5 degrees; Intake air temperature is greater than 5 degrees

2. Possible fault causes:

1) DVE Self-learning conditions are not satisfied

2) When the water temperature or intake air temperature sensor is faulty, the temperature conditions are not satisfied because the correct temperature is not collected;

3) Some complete vehicle factories do not turn on heating in winter, which may cause this fault when the temperature is too low.

3.Post-fault treatment and phenomena:

None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Refer to the above 7 conditions and check whether there is any unsatisfied	Yes	Go to the second step
		No	Replace the complete vehicle controller and go to the third step.
2	Current cycle acquisition at fault reporting ThrVlv_OffsLrn_I. StOffsLrnRlsCond, against the value of this variable: Bit 0: Vehicle speed is zero; Bit 1: Engine speed is zero; Bit 2: Battery voltage 10-16 V room;	Yes	Turn to the third step
		No	After replacing the complete vehicle controller, turn to the third step.

	Bit 3: Intake air temperature is between 5℃ -100 ° C; Bit 4: Engine water temperature is between 5℃ -100 ° C.		
3	Clear the fault code, restart the vehicle, and check whether the fault code is eliminated.	Yes	End
		No	Diagnostic aid

P155600/P155700

Electronic throttle body mechanical bottom dead center self-learning maximum fault again/Electronic throttle body mechanical bottom dead center self-learning minimum fault again

1. fault triggering conditions:

1) The learned upper and lower dead center positions of throttle valve are out of reasonable range, and fault is reported.

2 Possible fault causes:

1) Throttle valve or ECU is abnormal in throttle valve self-learning process;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	When the temperature is greater than 5 ° C, re-ignite, trigger the throttle valve self-learning once with the diagnostic scanner, and observe whether the throttle valve can successfully complete the self-learning.	Yes	Next step
		No	Replace throttle valve or ECU
2	Clear the fault code, restart the vehicle, and check whether the fault code is eliminated.	Yes	End

P156100/P155400/P155500

Electronic throttle body actual position deviates too much from target position/Electronic throttle body return spring check maximum fault/Electronic throttle body return spring check minimum fault

1. Fault triggering conditions:

1) After each ignition switch is set to "ON," the system will command DVE to open to a certain opening degree through ECUs, then check whether DVE can reach within specified time, and then check whether DVE can return within specified time; If the specified position cannot be reached within the specified time, it is judged as P 155500; If it cannot return to the specified range within the specified time after opening, it is judged as P 155400. When the ECU drives the throttle valve, the ECU will always compare the target opening with the actual throttle valve feedback opening. When the deviation between the target and the actual exceeds a certain value and it is confirmed after a certain time, it will be judged as P 156100.

2.Possible fault causes:

1） Open circuit or short circuit somewhere on pin PIN of electronic throttle drive motor;

2） The valve piece of electronic throttle body is dirty or has foreign matter, which makes the valve piece stuck.

3. Post-fault treatment and phenomena:

None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Actual opening ThrVlv_ratActIntB1 and target opening ThrVlv_ratDesB1 Does it match	Yes	Go to the second step
		No	Repeat measurement until reappearance
2	Whether plugging connector, wiggling harness and other actions will affect the fault frequency.	Yes	Turn to the third step
		No	Go to Step 4

3	Verify the cause of the harness through the electronic throttle flywire connection.	Yes	Replace harness, go to step 5
		No	Go to Step 4
4	Replace the throttle body to determine whether there is a throttle valve internal problem.	Yes	Turn to the fifth step
		No	Replace the complete vehicle controller and go to the fifth step.
5	Clear the fault code, restart the vehicle, and check whether the fault code is eliminated.	Yes	End
		No	Diagnostic aid

P156000

Electronic throttle body duty ratio adjustment is too large

1. Fault triggering conditions:

1) The duty cycle of the ECU output to the throttle valve is continuously more than 80.0% and above 5 s

2. **Possible fault causes:**

1) Open circuit or short circuit somewhere on pin PIN of electronic throttle drive motor

2) The valve piece of electronic throttle body is dirty or has foreign matter, so that the valve piece is stuck;

3) ECU internal throttle drive chip is abnormal.

3.Post-fault treatment and phenomena:

None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Observe whether the fault occurs together with P 156100.	Yes	It is likely that the motor pin PIN is faulty. Go to the second step.
		No	Go to the second step
2	Determine whether the throttle valve internal problem by replacing the throttle valve body	Yes	Go to Step 4
		No	Turn to the third step
3	Replace ECU to judge whether it is ECU internal throttle drive module fault	Yes	Go to Step 4
		No	Troubleshooting other fault codes
4	Clear the fault code, restart the vehicle, and check whether the fault code is eliminated.	Yes	End
		No	Replace complete vehicle controller

P155800/P155A00/P155900/P155B00

Electronic throttle body limp position and first self-learning deviation out of range/Electronic throttle body limp position and last self-learning deviation out of range/Electronic throttle body limp position too high/Electronic throttle body limp position too low

1. Fault triggering conditions:

Throttle learned position out of range

2.Possible fault causes:

Throttle valve or ECU is abnormal in throttle valve self-learning process;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps

1	When the temperature is greater than 5 ° C, set the ignition switch to "ON" again, trigger the throttle valve self-learning once with the diagnostic scanner, and observe the section. Whether the valve can successfully complete self-learning	Yes	Go to the second step
		No	Replace ECU or throttle valve
2	Clear the fault code, restart the vehicle, and check whether the fault code is eliminated.	Yes	End
		No	Replace ECU or throttle valve

P210000/P211800/P210300/P210600

Electronic throttle body drive circuit open/Electronic throttle body drive circuit excessive current/Electronic throttle body drive circuit fault/Engine control module fault

1. Fault triggering conditions:

1) Signal fault or ECU fault

2. Possible fault causes:

1) Throttle valve fault (valve plate stuck or motor fault);

2) The throttle drive module in ECU is faulty.

3.Post-fault treatment and phenomena:

None

4.Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Determine whether the throttle valve internal problem by replacing the throttle valve body	Yes	Replace throttle body, turn to the third step
		No	Go to the second step
2	Replace ECU to determine whether it is ECU internal throttle drive module fault.	Yes	Replace throttle body, turn to the third step
		No	Replace complete vehicle controller
3	Clear the fault code, restart the vehicle, and check whether the fault code is eliminated.	Yes	End
		No	Replace complete vehicle controller

P012100/P022100

Electronic throttle body position sensor 1 signal unreasonable/Electronic throttle body position sensor 2 signal unreasonable

1. Fault triggering conditions:

1) Add the first channel signal and the second channel signal of electronic throttle body to compare with 5V. If the deviation exceeds the threshold value and the time elapses to confirm, compare the two channels of signals with the signal converted by the inflation pressure. If the deviation exceeds a certain value and the time elapses to confirm, the fault is reported.

2. Possible fault causes:

1) The first circuit of electronic throttle valve is short to the second circuit signal wire;

2) Resistance on electronic throttle valve 5V power supply line or GND line causes signal terminal 5V to be pulled low or zero voltage to be raised.

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Collect and observe two signal ThrVlv_uRawSens1B1 ThrVlv_uRawSens2B1 Add? Deviation 5V	Yes	Go to the second step
		No	Repeat measurement until

2	Whether plugging connector, wiggling harness and other actions will affect the fault frequency.	Yes	Turn to the third step
		No	Turn to the fifth step
3	Measure the voltage drop of each section of harness through AD Scan. If the harness is ideal, there is no voltage drop. If there is voltage drop, it indicates that the harness or connector has resistance.	Yes	Go to Step 4
		No	Turn to the fifth step
4	Verify the cause of the harness through the electronic throttle flywire connection.	Yes	Replace harness, go to step 6
		No	Turn to the fifth step
5	Replace the throttle body to determine whether there is a throttle valve internal problem.	Yes	Go to Step 6
		No	Replace complete vehicle controller, go to step 6
6	Clear the fault code, restart the vehicle, and check whether the fault code is eliminated.	Yes	End
		No	Diagnostic aid

P012300/P022300

Electronic throttle body position sensor 1 circuit signal voltage too high/Electronic throttle body position sensor 1 circuit signal voltage too high

1. Fault triggering conditions:

1) A certain voltage value of throttle valve signal is higher than a certain value and lasts for a certain time.

2. Possible fault causes:

1) Electronic throttle valve first or second signal wire is short to power supply

2) Open circuit of electronic throttle valve signal grounding wire will cause two circuit faults to be reported at the same time.

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Collect and observe two signal ThrVlv_uRawSens1B1 ThrVlv_uRawSens2B1, No Pull around 5V.	Yes	Go to the second step
		No	Repeat measurement until reappearance
2	Whether plugging connector, wiggling harness and other actions will affect the fault frequency.	Yes	Turn to the third step
		No	Go to Step 4
3	Verify the cause of the harness resistance through the electronic throttle wiring.	Yes	Replace harness, go to step 5
		No	Go to Step 4
4	Replace the throttle body to determine whether there is a throttle valve internal problem.	Yes	Turn to the fifth step
		No	Replace the complete vehicle controller and go to the fifth
5	Clear the fault code, restart the vehicle, and check whether the fault code is eliminated.	Yes	End
		No	Diagnostic aid

P012200/P022200

Electronic throttle body position sensor 1 circuit signal voltage too low/Electronic throttle body position sensor 2 circuit signal voltage too low

1. Fault triggering conditions:

1) Throttle signal voltage is lower than a certain value and lasts for a certain time.

2. Possible fault causes:

1) Open circuit of electronic throttle valve first circuit and second circuit signal wire;

2) Electronic throttle valve first circuit or second circuit signal wire is short to ground;

Open circuit of electronic throttle 5V power supply wire will cause two circuit faults to be reported at the same time.

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Collect and observe two signal ThrVlv_uRawSens1B1 ThrVlv_uRawSens2B1, No drop near zero.	Yes	Go to the second step
		No	Repeat measurement until reappearance
2	Whether plugging connector, wiggling harness and other actions will affect the fault frequency.	Yes	Turn to the third step
		No	Go to Step 4
3	Verify the cause of the harness resistance through the electronic throttle wiring.	Yes	Replace harness, go to step 5
		No	Go to Step 4
4	Replace the throttle body to determine whether there is a throttle valve internal problem.	Yes	Turn to the fifth step
		No	Replace the complete vehicle controller and go to the fifth
5	Clear the fault code, restart the vehicle, and check whether the fault code is eliminated.	Yes	End
		No	Diagnostic aid

P14AC00

Starter damaged or starter supply circuit interrupted

1. Fault triggering conditions:

1) No pressure drop during starting, no starting feedback signal, no engine running

2.Possible fault causes:

1) The starter supply circuit is disconnected or the power supply is shorted;

2) The starter body is damaged or cannot work normally;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check starter supply circuit for disconnection or damage	Yes	Wiring harness maintenance
		No	Next step
2	Check whether the starter body is damaged or not working properly.	Yes	Repair or replace starter
		No	Diagnostic aid

P14AD00

Engine blocked or starter not engaged with flywheel

1. Fault triggering conditions:

1) There is pressure drop and starting feedback signal during starting, but the engine does not rotate.

2. Possible fault causes:

1) Engine crankshaft or flywheel is blocked;

2) Starter and flywheel cannot be engaged;

3. **Post-fault treatment and phenomenon: None**

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check whether the engine crankshaft and flywheel are blocked by foreign matter.	Yes	Remove foreign matter
		No	Next step
2	Turn the key to "Start" and check whether the starter and flywheel Can engage normally	Yes	Diagnostic aid
		No	Adjust installation position of both

P14AE00

Starter feedback voltage signal wire voltage is too high or R1 relay is stuck

1. Fault triggering conditions:

1) No start request, but starter feedback voltage signal set time exceeds threshold

2. Possible fault causes:

1) Start feedback signal wire is short to power supply;

3. Post-fault treatment and phenomenon: None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the starter switch feedback signal wire is short to power supply.	Yes	Wiring harness maintenance
		No	Diagnostic aid

P14AF00

Starter feedback voltage signal line voltage too low

1. Fault triggering conditions:

1) The engine can be started normally, but there is no starter feedback voltage signal.

2. Possible fault causes:

1) Start feedback signal wire is open;

2) Start feedback signal wire is short to ground

3.Post-fault treatment and phenomena:

None

4. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check starter switch feedback signal wire for short circuit to ground or open circuit	Yes	Wiring harness maintenance

		No	Diagnostic aid

Evaporation system

P049900

Vent stop valve control circuit voltage too high

1. Fault triggering conditions:

1. Battery voltage is greater than 9V(Reference value)
2. Drive stage in working state
3. The output current is too large and the fault duration is too long.

2. Possible fault causes:

1. Short circuit in control circuit between vent stop valve and ECM to power supply fault
2. Vent stop valve supply line short circuit to power supply
3. Vent stop valve damaged

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect the vent stop valve connector for damage	Yes	Repair or replacement
		No	Next step
2	Check vent stop valve control circuit for faults	Yes	Repair or replace circuit
		No	Next step
3	Check vent stop valve body for faults	Yes	Replace parts
		No	Seek diagnostic assistance

P049800

Vent stop valve control circuit voltage too low

1. Fault triggering conditions:

1. Battery voltage is greater than 9V
2. Drive stage is not working
3. The output voltage is too low and the fault duration is too long.

2. Possible fault causes:

1. Short circuit to ground fault in control circuit between vent stop valve and ECM
2. Vent stop valve supply line short circuit to ground
3. Vent stop valve damaged

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect the vent stop valve connector for damage	Yes	Repair or replacement
		No	Next step

2	Check vent stop valve control circuit for faults	Yes	Repair or replace circuit
		No	Next step
3	Check vent stop valve body for faults	Yes	Replace parts
		No	Seek diagnostic assistance

P044700

Vent stop valve control circuit open

1. Fault triggering conditions:

1. Battery voltage is greater than 9V(Reference value)
2. Drive stage in working state
3. The output voltage is too low and the fault duration is too long.

2. Possible fault causes:

1. Check vent stop valve or ECM connector
2. Check control circuit between vent stop valve and ECM
3. Check ventilation stop valve hardware

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the vent stop valve connector falls off or is damaged.	Yes	Reconnect or repair
		No	Next step
2	Check vent stop valve control circuit for faults	Yes	Repair or replace circuit
		No	Next step
3	Check vent stop valve body for faults	Yes	Replace parts
		No	Seek diagnostic assistance

P242200

Vent stop valve blocked

1. Fault triggering conditions:

1. Canister valve open
2. Canister vent valve open
3. Fuel level <85%(Reference value)
4. Cumulative canister flushing time >200s(Reference value)
5. Fuel tank pressure vacuum too low

2. Possible fault causes:

1. Vent stop valve stuck in normally closed position
2. Vent line of evaporative system is blocked(Water and oil intake)
3. Evaporative system vent line air filter blockage
4. Tank pressure sensor signal abnormal(Signal offset or jamming)

3. Post-fault treatment and phenomenon:

1. When the fuel tank vacuum pressure is too high, the fuel tank pressure protection logic starts, and the EMS forcibly closes the canister control valve and forcibly opens the ventilation stop valve.

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the vent stop valve is stuck in the normally closed position.	Yes	Replace vent stop valve
		No	Next step
2	Check whether the pipelines on both sides of ventilation stop valve are blocked.	Yes	Replacing or repairing lines
		No	Next step
3	Check if the vent stop valve line air filter is blocked.	Yes	Replace or clean the filter.
		No	Next step
4	Check whether the fuel tank pressure sensor signal is abnormal.	Yes	Replace sensor
		No	Seek diagnostic assistance

P045128

Fuel tank pressure sensor signal offset

1. Fault triggering conditions:

1. Canister vent stop valve open
2. Ambient pressure >700hPa(Reference value)
3. Ambient temperature 0~45℃(Reference value)
4. Fuel level <85%(Reference value)
5. Tank pressure sensor signal offset is too large and duration is too long

2. Possible fault causes:

1. Tank pressure sensor signal circuit fault
2. Fuel tank pressure sensor hardware fault
3. Pipeline from fuel tank to canister is blocked.

3. Post-obstacle treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check tank pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Check tank pressure sensor body for faults	Yes	Replace parts
		No	Next step
3	Check whether the fuel tank to canister pipeline is blocked.	Yes	Repair or replace lines
		No	Seek diagnostic assistance

P045300

Tank pressure sensor signal voltage too high

1. Fault triggering conditions:

1. Engine not starting
2. Tank pressure sensor voltage too high and duration too long

2. Possible fault causes:

1.Tank pressure sensor signal circuit fault

2.Fuel tank pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check tank pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Check tank pressure sensor body for faults	Yes	Replace parts
		No	Seek diagnostic assistance

P045200

Tank pressure sensor signal voltage too low

1. Fault triggering conditions:

1.Engine not starting

2.Tank pressure sensor voltage too low and duration too long

2. Possible fault causes:

1.Tank pressure sensor signal circuit fault

2.Fuel tank pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check tank pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Check tank pressure sensor body for faults	Yes	Replace parts
		No	Seek diagnostic assistance

P128200

Fuel tank pressure sensor signal forward out of upper limit

1. Fault triggering conditions:

1.Ambient pressure >=700HPa(Reference value)

2.Engine not starting and duration >4s(Reference value)

3.Canister vent stop valve open for duration >3s(Reference value)

4.Ambient temperature 0~45℃(Reference value)

5.Tank pressure too high and duration too long

2. Possible fault causes:

1.Tank pressure sensor signal circuit fault

2.Canister vent stop valve stuck closed

3.Pipeline from fuel tank to canister is blocked.

4.Fuel tank pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check tank pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Check whether the canister vent stop valve is stuck closed.	Yes	Check control circuit or replace parts
		No	Next step
3	Check whether the fuel tank to canister pipeline is blocked.	Yes	Repair or replace lines
		No	Next step
4	Check tank pressure sensor body for faults	Yes	Replace parts
		No	Seek diagnostic assistance

P128300

Fuel tank pressure sensor signal forward exceeds lower limit

1. Fault triggering conditions:

1. Ambient pressure >=700hPa(Reference value)
2. Engine not starting and duration >4s(Reference value)
3. Canister vent stop valve open for duration >3s(Reference value)
4. Ambient temperature 0~45℃(Reference value)
5. Tank pressure is too low and duration is too long

2. Possible fault causes:

1. Tank pressure sensor signal circuit fault
2. Canister vent stop valve stuck closed
3. Pipeline from fuel tank to canister is blocked.
4. The canister control valve is stuck normally open.
5. Fuel tank pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check tank pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Check whether the canister vent stop valve is stuck closed.	Yes	Check control circuit or replace parts
		No	Next step
3	Check whether the fuel tank to canister pipeline is blocked.	Yes	Repair or replace lines
		No	Next step
4	Check whether the canister control valve is stuck normally open.	Yes	Check control circuit or replace parts

		No	Next step
5	Check tank pressure sensor body for faults	Yes	Replace parts
		No	Seek diagnostic assistance

P04512A

Fuel tank pressure sensor signal stuck

1. Fault triggering conditions:

1.Vehicle speed >5 km/h(Reference value)

2.Fuel tank pressure -3000 ~1500Pa(Reference value)

3.Ambient temperature 0~45℃(Reference value)

4.Ambient pressure >=700hPa(Reference value)

5.Fuel tank pressure change too low

2. Possible fault causes:

1.Tank pressure sensor signal circuit fault

2.Fuel tank to canister to canister control valve line blocked or disconnected

3.The canister control valve is stuck normally open or closed.

4.Fuel tank pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check tank pressure sensor circuit for faults	Yes	Repair or replace circuit
No	Next step		
2	Check whether the fuel tank to canister to canister control valve line is blocked or disconnected.	Yes	Replacing lines
No	Next step		
3	Check whether the canister control valve is stuck normally open or closed.	Yes	Check control circuit or replace parts
No	Next step		
4	Check tank pressure sensor body for faults	Yes	Replace parts
No	Seek diagnostic assistance		

P045125

Tank pressure sensor signal fluctuates too much

1. Fault triggering conditions:

1.Canister vent stop valve open for duration >3s(Reference value)

2.Vehicle speed <=30 km/h(Reference value)

3.Ambient temperature 0~45℃(Reference value)

4.Tank pressure changes too much and lasts too long

2. Possible fault causes:

1.Tank pressure sensor signal circuit fault

2.Canister control valve hardware fault

3.Fuel tank pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check tank pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Check whether the canister control valve works abnormally.	Yes	Check control circuit or replace parts
		No	Next step
3	Check tank pressure sensor body for faults	Yes	Replace parts
		No	Seek diagnostic assistance

P046000

Oil level resistance signal error

1. Fault triggering conditions:

1.Complete vehicle is powered on or operates after being powered on.

2.The original oil level signal is too large.

2. Possible fault causes:

1.Abnormal harness connection of oil level sensor

2.Oil level sensor hardware fault

3.Can signal abnormal

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oil level sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Inspect the instrument, gateway CAN communication corresponding harness and controller for faults.	Yes	Replace parts
		No	Next step
3	Check whether the oil level sensor body is faulty.	Yes	Replace parts
		No	Seek diagnostic assistance

U067600

Oil level resistance signal loss

1. Fault triggering conditions:

1.Complete vehicle is powered on or operates after being powered on.

2.Engine control unit cannot receive oil level resistance signal CAN communication

2. Possible fault causes:

1.Can communication line fault

2.Instrument and gateway controller fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the corresponding harness of instrument and gateway CAN communication is faulty.	Yes	Repair or replace circuit
		No	Next step
2	Check whether there is fault in instrument and gateway controller body.	Yes	Replace parts
		No	Seek diagnostic assistance

P25B000

Oil level resistance signal stuck

1. Fault triggering conditions:

1.Vehicle speed =0 km/h duration <5s(Reference value)

2.Fuel consumption >=29 L or fuel level change >=100 L(Reference value)

3.Absolute value of difference between actual fuel consumption volume and fuel level signal change volume per test cycle >25 L(Reference value)

4.The difference between each test cycle oil level signal and test start oil level is too small.

2. Possible fault causes:

1.Abnormal harness connection of oil level sensor

2.Oil level sensor hardware fault

3.Fuel tank internal level float is stuck

4.Can signal abnormal

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oil level sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Inspect the instrument, gateway CAN communication corresponding harness and controller for faults.	Yes	Replace parts
		No	Next step
3	Check whether the fuel level sensor float in the fuel tank is stuck.	Yes	Replace parts
		No	Next step
4	Check whether the oil level sensor body is faulty.	Yes	Replace parts
		No	Seek diagnostic assistance

P046800

High desorption pipeline pressure sensor signal voltage too high

1. Fault triggering conditions:

1.Engine running

2.High desorption pipeline pressure sensor voltage is too high and duration is too long

2. Possible fault causes:

1.High desorption pipeline pressure sensor signal circuit fault

2.High desorption pipeline pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the high desorption line pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Inspect whether the high desorption pipeline pressure sensor body is faulty.	Yes	Replace parts
		No	Seek diagnostic assistance

P046700

High desorption pipeline pressure sensor signal voltage too low

1. Fault triggering conditions:

1.Engine running

2.High desorption line pressure sensor voltage is too low and duration is too long

2. Possible fault causes:

1.High desorption pipeline pressure sensor signal circuit fault

2.High desorption pipeline pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the high desorption line pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Inspect whether the high desorption pipeline pressure sensor body is faulty.	Yes	Replace parts
		No	Seek diagnostic assistance

P128500

High desorption pipeline pressure sensor signal exceeds upper limit

1. Fault triggering conditions:

1.Engine running

2.High desorption pipeline pressure sensor signal too high and duration too long

2. Possible fault causes:

1.High desorption pipeline pressure sensor signal circuit fault

2.Venturi disconnected

3.The low-load desorption pipeline check valve is damaged and does not function in one direction.

4.High desorption pipeline pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the high desorption line pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Check Venturi for disconnection	Yes	Repair or replace lines
		No	Next step
3	Inspect the low load desorption line check valve for damage	Yes	Replace high desorption pipeline
		No	Next step
4	Inspect whether the high desorption pipeline pressure sensor body is faulty.	Yes	Replace parts
		No	Seek diagnostic assistance

P128600

High desorption pipeline pressure sensor signal exceeds the lower limit

1. Fault triggering conditions:

1.Engine running

2.High desorption pipeline pressure sensor signal is too low and duration is too long

2. Possible fault causes:

1.High desorption pipeline pressure sensor signal circuit fault

2.Venturi or high load desorption line check valve is blocked

3.High desorption pipeline pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1.None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the high desorption line pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Check whether Venturi pipe or high load desorption line check valve is blocked.	Yes	Repair or replace lines
		No	Next step
3	Inspect whether the high desorption pipeline pressure sensor body is faulty.	Yes	Replace parts
		No	Seek diagnostic assistance

P044200

Evaporation system 1 mm leakage

1. Fault triggering conditions:

1.Ambient temperature 0℃~45℃(Reference value)

2.Battery voltage 11~16 V(Reference value)

3.No fault of mixture

4.Parking idle speed condition

5.Air-fuel ratio closed loop control

6.Starting water temperature 0℃~45℃(Reference value)

7.The vacuum attenuation gradient is too large.

2. Possible fault causes:

1.Vent stop valve is not sealed tightly

2.Fuel tank cap is not tightened or sealing ring is deformed.

3.Evaporation system pipeline connection is not tight.

4.Slight damage to oil/gas separator, canister or filler pipe

5.Oil pump installation seal is not tight

3. Post-fault treatment and phenomenon:

1.None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Disconnect canister control valve from canister end connector, connect smoke generator in this position, and disconnect vent stop valve from atmospheric line connector.	/	Next step
2	Connect the diagnostic scanner, and set the ignition switch to "ON." Forcibly close the ventilation stop valve through the diagnostic scanner action test.	/	Next step
3	Make the smoke generator work and find the leakage point through smoke.(Vent stop valve internal leakage, each connector, pipeline damage, fuel tank cap seal, canister slight damage, etc.)	/	Next step
4	Repair according to leakage point(Parts replacement or repair)	/	Next step
5	Use the smoke generator again to confirm whether the leakage point fault is repaired.	Yes	Next step
		No	Repeat step 1~5
6	Restore the pipeline connections, start the engine at idle speed, and perform forced diagnosis through evaporation leakage diagnosis in the diagnostic scanner action test. (The diagnosis waits for more than five minutes), read the DTC and confirm whether DTC P044200 exists.	No	Repair completed
		Yes	Repeat step 1~6

P045500

Evaporation system coarse leakage or fuel tank cap is not tightened

1. Fault triggering conditions:

1.Ambient temperature 0℃~45℃(Reference value)

2.Battery voltage 11~16 V(Reference value)

3.No fault of mixture

4.Parking idle speed condition

5.Air-fuel ratio closed loop control

6.Starting water temperature 0℃~45℃(Reference value)

7.Target vacuum cannot be established during diagnosis

2. Possible fault causes:

1.Evaporation system has pipeline not connected

2.Fuel tank cap not closed

3.Canister control valve stuck in normally closed position

4.Damaged oil/gas separator, canister or filler pipe

5.Vent stop valve cannot close

6.Low desorption pipeline falls off

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Confirm whether the low desorption pipeline falls off.	Yes	Replacing or repairing lines
		No	Next step
2	Start the engine at idle speed, and force open the canister control valve through the diagnostic scanner action test. (10% opening is recommended), confirm whether the canister control valve cannot be opened.	Yes	Replace canister control valve
		No	Next step
3	Stop the electric ignition, disconnect the canister control valve from the canister end connector, connect the smoke generator at this position, and disconnect the vent stop valve from the atmospheric pipeline connector.	/	Next step
4	Connect the diagnostic scanner, and set the ignition switch to "ON." Forcibly close the ventilation stop valve through the diagnostic scanner action test.	/	Next step
5	Make the smoke generator work and find the leakage point through smoke.(Fuel tank cap is not closed, pipeline is not connected or damaged, vent stop valve cannot be closed, canister is damaged, etc.)	/	Next step
6	Repair according to leakage point(Parts replacement or repair)	/	Next step
7	Use the smoke generator again to confirm whether the leakage point fault is repaired.	Yes	Next step
		No	Repeat step 1~5
8	Restore the pipeline connections, start the engine at idle speed, and perform forced diagnosis through evaporation leakage diagnosis in the diagnostic scanner action test. (The diagnosis waits for more than five minutes), read the DTC and confirm whether DTC P045500 exists.	No	Repair completed
		Yes	Repeat step 1~6

P04F000

High desorption pipeline flow is too low

1. Fault triggering conditions:

1.Canister flushing cumulative flow >=2g(Reference value)

2.High load pipeline vacuum >14000Pa(Reference value)

3.Pressure change in desorption line is too low

2. Possible fault causes:

1.High desorption pipeline falls off or is damaged

2.High desorption pipeline or connection joint is blocked

3.High desorption pressure sensor is not sealed tightly

4.Low load line check valve is damaged

5.Canister valve stuck normally open or normally closed

3. Post-fault treatment and phenomenon:

1.None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Confirm whether all connection joints of high desorption pipeline fall off or are damaged.	Yes	Replacing or servicing joints
		No	Next step
2	Confirm whether the high desorption pipeline and all connection joints are blocked.	Yes	Replace or repair pipeline and connection joint
		No	Next step
3	Confirm whether the seal of high desorption pressure sensor is not tight.	Yes	Replace or repair seal-related parts
		No	Next step
4	Confirm whether the low load pipeline check valve is damaged.	Yes	Replacing lines
		No	Next step
5	Confirm whether the canister valve is stuck normally open or normally closed.	Yes	Replace parts
		No	Seek diagnostic assistance

P049600

Canister control valve is stuck normally open

1. Fault triggering conditions:

1.Ambient temperature 0℃~45℃(Reference value)

2.Battery voltage 11~16 V(Reference value)

3.No fault of mixture

4.Parking idle speed condition

5.Air-fuel ratio closed loop control

6.Starting water temperature 0℃~45℃(Reference value)

7.Tank pressure changes too much after canister control valve and vent stop valve are closed

2. Possible fault causes:

1.The canister control valve is stuck in the normally open position.

2.The canister control valve seat is not sealed tightly.

3.Tank pressure sensor fault(Signal offset or jamming)

3. Post-fault treatment and phenomenon:

1.When the tank vacuum pressure is too high, the tank pressure protection logic starts, and the EMS forcibly closes the canister control valve and forcibly opens the ventilation stop valve.

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine, set the duty ratio of canister control valve to zero with diagnostic scanner action test, and disconnect the canister control valve and canister pipeline connection.	Yes	Replace canister control valve
		No	Next step

	Head, check canister control valve for air flow		
3	Power on and start the engine, read the fuel tank pressure sensor with a diagnostic scanner, and check whether the fuel tank pressure sensor signal is abnormal.	Yes	Replace sensor
		No	Seek diagnostic assistance

P049700

Canister control valve stuck normally closed

1. Fault triggering conditions:

1.Ambient temperature 0℃~45℃(Reference value)

2.Battery voltage 11~16 V(Reference value)

3.No fault of mixture

4.Parking idle speed condition

5.Air-fuel ratio closed loop control

6.Starting water temperature 0℃~45℃(Reference value)

7.Pressure change in desorption pipeline is too low

2. Possible fault causes:

1.Canister control valve stuck in normally closed position

2.Canister control valve internal blockage

3.Desorption pressure sensor fault(Signal offset or jamming)

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine, use diagnostic scanner to test and set different canister control valve duty ratio, disconnect canister control valve and canister pipeline connector, and check whether canister control valve has no air flow.	Yes	Replace canister control valve
		No	Next step
3	Power on and start the engine, read the desorption pressure sensor with a diagnostic scanner, and check whether the desorption pressure sensor signal is abnormal.	Yes	Replace sensor
		No	Seek diagnostic assistance

P045900

Canister control valve control circuit voltage too high

1. Fault triggering conditions:

1.Battery voltage >9V(Reference value)

2.Complete vehicle is powered on

3.Drive stage in working state

4.Output current too high and duration too long

2. Possible fault causes:

1.Canister control valve control circuit is short to power supply

2.Canister control valve body fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the canister control valve control circuit is short to power supply.	Yes	Repair or replace circuit
		No	Next step
2	Inspect the canister control valve internal circuit for damage.	Yes	Replace canister control valve
		No	Seek diagnostic assistance

P045800

Canister control valve control circuit voltage too low

1. Fault triggering conditions:

1. Battery voltage >9V(Reference value)
2. Complete vehicle is powered on
3. Drive stage is not working
4. Output voltage too low and duration too long

2. Possible fault causes:

1. Canister control valve control circuit short circuit to ground
2. Canister control valve body fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check canister control valve control circuit for short circuit to ground	Yes	Repair or replace circuit
		No	Next step
2	Inspect the canister control valve internal circuit for damage.	Yes	Replace canister control valve
		No	Seek diagnostic assistance

P044400

Canister control valve control circuit open

1. Fault triggering conditions:

1. Battery voltage >9V(Reference value)
2. Complete vehicle is powered on
3. Drive stage is not working
4. Output voltage too low and duration too long

2. Possible fault causes:

1. Canister control valve control circuit and connector disconnected
2. Canister control valve body fault

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps

1	Check canister control valve control circuit and connector for disconnection	Yes	Repair or replace circuit
		No	Next step
2	Inspect the canister control valve internal circuit for damage.	Yes	Replace canister control valve
		No	Seek diagnostic assistance

P12C200

Crankcase ventilation system electrical conduit connection falls off or circuit voltage is too high

1. Fault triggering conditions:

1.Complete vehicle is powered on

2.Crankcase vent line diagnostic circuit measured voltage too high and for too long

2. Possible fault causes:

1.Crankcase ventilation system electrical conduit falls off

2.Crankcase ventilation system electrical wiring short circuit to high voltage or disconnection

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the crankcase ventilation system electrical wiring pipe falls off.	Yes	Repair or replace lines
		No	Next step
2	Check crankcase ventilation system electrical wiring for short circuit to high voltage or disconnection	Yes	Repair or replace lines
		No	Seek diagnostic assistance

P12C300

Crankcase ventilation system electrical conduit circuit voltage too low

1. Fault triggering conditions:

1.Complete vehicle is powered on

2.Crankcase vent line diagnostic circuit measured voltage too low and duration too long

2. Possible fault causes:

1. Crankcase ventilation system electrical conduit circuit short circuit to ground

3. Post-fault treatment and phenomenon:

1. None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check crankcase ventilation system electrical wiring for short circuit to ground	Yes	Repair or replace lines
		No	Seek diagnostic assistance

VVT&cooling&pressure sensor P000A00

Fault code P000A00: Slow operation response of intake VVT

1. Fault triggering conditions:

1.Engine running

2.Speed 600 r/min-7000 r/min(Reference value)

3.Engine oil temperature 10℃ -120 ° C(Reference value)

4. VVT poor follow-up of actual position to target position

2.Possible fault cause:

1.Insufficient pressure of OCV oil valve

2.OCV oil valve blocked, leaking

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the cam phase adjuster works normally.(Dirt is blocked, engine oil leaks, stuck)	Yes	Next step
		No	Perform necessary overhaul and maintenance
2	Check whether the working condition of OCV oil control valve is normal.	Yes	Diagnostic aid
		No	Perform necessary overhaul and maintenance

P003C00

Fault code P003C00: Intake VVT running stagnation

1. Fault triggering conditions:

1.Engine running

2.Speed 600 r/min-7000 r/min(Reference value)

3.Engine oil temperature 10℃ -120 ° C(Reference value)

2. Possible fault causes:

1.Insufficient pressure of OCV oil valve

2.OCV oil valve blocked, leaking

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the cam phase adjuster works normally.(Dirt is blocked, engine oil leaks, stuck)	Yes	Next step
		No	Perform necessary overhaul and maintenance
2	Check whether the working condition of OCV oil control valve is normal.	Yes	Diagnostic aid
		No	Perform necessary overhaul and maintenance

P000B00

Fault code P000B00: Exhaust VVT running response is slow

1. Fault triggering conditions:

1.Engine running

2.Speed 600 r/min-7000 r/min(Reference value)

3.Engine oil temperature 10℃ -120 ° C(Reference value)

2. Possible fault causes:

1.Insufficient pressure of OCV oil valve

2.OCV oil valve blocked, leaking

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the cam phase adjuster works normally.(Dirt is blocked, engine oil leaks, stuck)	Yes	Next step
		No	Perform necessary overhaul and maintenance
2	Check whether the working condition of OCV oil control valve is normal.	Yes	Diagnostic aid
		No	Perform necessary overhaul and maintenance

P005A00

Fault code P005A00: Exhaust VVT running stagnation

1. Fault triggering conditions:

1.Engine running

2.Speed 600 r/min-7000 r/min(Reference value)

3.Engine oil temperature 10℃ -120 ° C(Reference value)

2. Possible fault causes:

1.Insufficient pressure of OCV oil valve

2.OCV oil valve blocked, leaking

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the cam phase adjuster works normally.(Dirt is blocked, engine oil leaks, stuck)	Yes	Next step
		No	Perform necessary overhaul and maintenance
2	Check whether the working condition of OCV oil control valve is normal.	Yes	Diagnostic aid
		No	Perform necessary overhaul and maintenance

P001000

Fault Code P001000: Intake VVT Control Circuit Open

1. Fault triggering conditions:

1.Engine running

2.System voltage is greater than 11 V and less than 16 V(Reference value)

3.ECU detects intake VVT control circuit open circuit

2. Possible fault causes:

1.Intake VVT control valve harness fault

2.Intake VVT control valve hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check intake VVT control valve harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the intake VVT control valve hardware is faulty.	Yes	Repair or replace control valve
		No	Diagnostic aid

P001300

Fault Code P001300: Exhaust VVT Control Circuit Open

1. Fault triggering conditions:

1. Engine running
2. System voltage is greater than 11 V and less than 16 V(Reference value)
3. ECU detects exhaust VVT control circuit open circuit

2. Possible fault causes:

1. Exhaust VVT control valve harness fault
2. Exhaust VVT control valve hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the exhaust VVT control valve harness is faulty.	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the exhaust VVT control valve hardware is faulty.	Yes	Repair or replace control valve
		No	Diagnostic aid

P208800

Fault code P 208800: Intake VVT control circuit voltage too low

1. Fault triggering conditions:

1. Engine running
2. System voltage is greater than 11 V and less than 16 V(Reference value)
3. ECU detects intake VVT control circuit short circuit to ground

2. Possible fault causes:

1. Intake VVT control valve harness fault
2. Intake VVT control valve hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check intake VVT control valve harness for faults	Yes	Repair or replace wiring harness
		No	Next step

2	Check whether the intake VVT control valve hardware is faulty.	Yes	Repair or replace control valve
		No	Diagnostic aid

P208900

Fault code P 208900: Intake VVT control circuit voltage too high

1. Fault triggering conditions:

1. Engine running
2. System voltage is greater than 11 V and less than 16 V(Reference value)
3. ECU detects intake VVT control circuit short circuit to power supply

2. Possible fault causes:

1. Intake VVT control valve harness fault
2. Intake VVT control valve hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check intake VVT control valve harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the intake VVT control valve hardware is faulty.	Yes	Repair or replace control valve
		No	Diagnostic aid

P209000

Fault code P 209000: Exhaust VVT control circuit voltage too low

1. Fault triggering conditions:

1. Engine running
2. System voltage is greater than 11 V and less than 16 V(Reference value)
3. ECU detects exhaust VVT control circuit short circuit to ground

2. Possible fault causes:

1. Exhaust VVT control valve harness fault
2. Exhaust VVT control valve hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the exhaust VVT control valve harness is faulty.	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the exhaust VVT control valve hardware is faulty.	Yes	Repair or replace control valve
		No	Diagnostic aid

P209100

Fault code P 209100: Exhaust VVT control circuit voltage too high

1. Fault triggering conditions:

1.Engine running

2.System voltage is greater than 11 V and less than 16 V(Reference value)

3.ECU detects exhaust VVT control circuit short circuit to power supply

2. Possible fault causes:

1.Exhaust VVT control valve harness fault

2.Exhaust VVT control valve hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the exhaust VVT control valve harness is faulty.	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the exhaust VVT control valve hardware is faulty.	Yes	Repair or replace control valve
		No	Diagnostic aid

P001100

Fault code P001100: Intake VVT does not return to the initial position

1. Fault triggering conditions:

1.Crankshaft and camshaft self-learning completed

2.Start-up completion time is less than 2S

3.Shutdown duration is greater than 5s

2. Possible fault causes:

Intake VVT phase regulator and oil control valve fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the working status of intake VVT phase regulator and oil control valve.(Dirt is blocked, stuck, engine oil pressure is not completely relieved, lock pin is invalid, etc.)	Yes	Perform necessary overhaul and maintenance
		No	Diagnostic aid

P001400

Fault code P001400: Exhaust VVT does not return to the initial position

1. Fault triggering conditions:

1.Crankshaft and camshaft self-learning completed

2.Start-up completion time is less than 2S

3.Shutdown duration is greater than 5s

2. Possible fault causes:

Exhaust VVT phase regulator and oil control valve fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the working status of exhaust VVT phase regulator and oil control valve.(Dirt is blocked, stuck, engine oil pressure is not completely relieved, lock pin is invalid, etc.)	Yes	Perform necessary overhaul and maintenance
		No	Diagnostic aid

P050C24

Fault code P050C24: Water temperature sensor cold start check temperature too high

1. Fault triggering conditions:

1. Vehicle immersion time is greater than 8h(Reference value)
2. Vehicle power-on time is greater than 3s(Reference value)
3. No relevant fault codes of water temperature sensor, intake air temperature sensor, boost temperature sensor and ambient temperature sensor

2. Possible fault causes:

1. Water temperature sensor internal fault
2. Water temperature sensor circuit short circuit fault

3. Post-fault treatment and phenomenon:

1. Adopt default water temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Leave the vehicle standing overnight, connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Do not start the engine, use the diagnosis to read the temperature value of the water temperature sensor, and check whether it is consistent with the ambient temperature.	Yes	Seek manufacturer's assistance
		No	Replace water temperature sensor
3	Replace the water temperature sensor, repeat the above operation, and read whether the water temperature is consistent with the ambient temperature.	Yes	End of service
		No	Next step
4	Replace the harness, repeat the above operation, and read whether the water temperature is consistent with the ambient temperature.	Yes	End of service
		No	Seek manufacturer's assistance

P050C23

Fault code P050C23: Cold start check temperature of water temperature sensor is too low.

1. Fault triggering conditions:

1. Vehicle immersion time is greater than 8h(Reference value)
2. Vehicle power-on time is greater than 3s(Reference value)
3. No relevant fault codes of water temperature sensor, intake air temperature sensor, boost temperature sensor and ambient temperature sensor

2. Possible fault causes:

1. Water temperature sensor internal fault
2. Water temperature sensor circuit short circuit fault

3. Post-fault treatment and phenomenon:

1. Adopt default water temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Leave the vehicle standing overnight, connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Do not start the engine, use the diagnosis to read the temperature value of the water temperature sensor, and check whether it is consistent with the ambient temperature.	Yes	Seek manufacturer's assistance
		No	Replace water temperature sensor
3	Replace the water temperature sensor, repeat the above operation, and read whether the water temperature is consistent with the ambient temperature.	Yes	End of service
		No	Next step
4	Replace the harness, repeat the above operation, and read whether the water temperature is consistent with the ambient temperature.	Yes	End of service
		No	Seek manufacturer's assistance

P011900

Fault code P011900: Excessive fluctuation of water temperature sensor signal
1. Fault triggering conditions:

1.No water temperature sensor voltage is too low or too high

2.The change value of the original voltage of the water temperature sensor in a short time is greater than 1V.(Reference value)

2. Possible fault causes:

1.Water temperature sensor fault

2.Water temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Adopt default water temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine and use the diagnosis to read whether the original voltage of the water temperature sensor changes greatly.	Yes	Next step
		No	Seek manufacturer's assistance
3	Replace the water temperature sensor, repeat the above operation, and read whether the original voltage of the water temperature sensor changes greatly.	Yes	Next step
		No	End of service
4	Replace the harness, repeat the above operation, and read whether the original voltage of water temperature changes greatly.	Yes	Seek manufacturer's assistance
		No	End of service

P011623

Fault code P011623: Coolant sensor temperature signal too low
1. Fault triggering conditions:

1.Engine in operation

2.No low or high voltage fault of water temperature sensor

3.The water temperature when the engine is started is lower than 20℃.(Reference value)

4.Engine speed is greater than 1500 rpm and duration is greater than 10 s(Reference value)

2. Possible fault causes:

1.Water temperature sensor internal fault

2.Water temperature sensor circuit fault

3.Thermostat stuck normally open

4.Cooling fan normally rotates

3. Post-fault treatment and phenomenon:

1. Adopt default water temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine and use the diagnosis to read out whether the actual water temperature of the water temperature sensor is low.	Yes	Next step
		No	Seek manufacturer's assistance
3	Check whether the cooling fan runs normally.	Yes	Repair fan
		No	Next step
4	Replace the water temperature sensor, repeat the above operation, and read whether the actual water temperature of the water temperature sensor is low.	Yes	Next step
		No	End of service
5	Replace the harness, repeat the above operation, and read whether the actual water temperature of the water temperature sensor is low.	Yes	Seek manufacturer's assistance
		No	End of service
6	Replace the thermostat, repeat the above operation, and read whether the actual water temperature of the water temperature sensor is low.	Yes	Seek manufacturer's assistance
		No	End of service

P011626

Fault code P011626: Coolant sensor signal stuck

1. Fault triggering conditions:

1. Engine shutdown time is greater than 2h(Reference value)

2. Engine starting water temperature is between -40℃~75℃(Reference value)

3.No low or high voltage fault of water temperature sensor

2. Possible fault causes

1.Water temperature sensor fault

2.Water temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Adopt default water temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine, press the accelerator in place, read the water temperature sensor with the diagnosis, and observe whether the water temperature changes.	Yes	Seek manufacturer's assistance
		No	Next step

3	Replace the water temperature sensor, repeat the above operations, read the water temperature sensor, and observe whether the water temperature changes.	Yes	End of service
		No	Next step
4	Replace the harness, repeat the above operation, read the water temperature sensor, and observe whether the water temperature changes.	Yes	End of service
		No	Seek manufacturer's assistance

P011800

Fault code P011800: Water temperature sensor signal voltage too high

1. Fault triggering conditions:

1.Vehicle in operation

2.Original voltage of water temperature sensor is too high

2. Possible fault causes:

1.Water temperature sensor fault

2.Water temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Adopt default water temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine and use the diagnosis to read the original voltage value of the water temperature sensor is greater than 4.9 V.	Yes	Next step
		No	Seek manufacturer's assistance
3	Replace the water temperature sensor, repeat the above operation, and read the original voltage value of the water temperature sensor is greater than 4.9 V.	Yes	Next step
		No	End of service
4	Replace the harness, repeat the above operation, and read the original voltage value of water temperature sensor is greater than 4.9 V.	Yes	Seek manufacturer's assistance
		No	End of service

P011700

Fault code P011700: Water temperature sensor signal voltage too low

1. Fault triggering conditions:

1.Vehicle in operation

2.Original voltage of water temperature sensor is too low

2. Possible fault causes

1.Water temperature sensor fault

2.Water temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Adopt default water temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step

2	Start the engine and use the diagnosis to read the original voltage value of the water temperature sensor is less than 0.1 V.	Yes	Next step
		No	Seek manufacturer's assistance
3	Replace the water temperature sensor, repeat the above operation, and read the original voltage value of the water temperature sensor is less than 0.1 V.	Yes	Next step
		No	End of service
4	Replace the harness, repeat the above operation, and read the original voltage value of water temperature sensor is less than 0.1 V.	Yes	Seek manufacturer's assistance
		No	End of service

P012800

Fault code P012800: Thermostat fault

1. Fault triggering conditions:

1. Engine water temperature during vehicle starting is between -10℃~40℃(Reference value)
2. Ambient temperature at vehicle start is greater than -10℃(Reference value)
3. No relevant faults of water temperature sensor and ambient temperature sensor
4. Vehicle in driving process(Non-idle condition)
5. Vehicle A/C blower is in off state

2. Possible fault causes:

1. Thermostat is stuck at normally open position

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	After standing overnight, connect the diagnostic scanner and set the ignition switch to "ON."		Next step
2	Start the engine, use the diagnosis to read the actual water temperature of the water temperature sensor, drive the vehicle normally, and observe whether the actual water temperature rises to 85℃.	Yes	Seek manufacturer's assistance
		No	Next step
3	Replace the thermostat, repeat the above operation, leave the vehicle standstill for 8h, start the engine, read the actual water temperature of the water temperature sensor with diagnosis, drive the vehicle normally, and observe whether the actual water temperature rises to 85℃.	Yes	End of service
		No	Seek manufacturer's assistance

P138824

Fault code P 138824: Ambient temperature sensor cold start check temperature too high

1. Fault triggering conditions:

1. Vehicle immersion time is greater than 8h(Reference value)
2. Vehicle power-on time is greater than 3s(Reference value)
3. No relevant fault codes of water temperature sensor, intake air temperature sensor, boost temperature sensor and ambient temperature sensor

2. Possible fault causes:

1. Environmental sensor fault
2. Ambient temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Adopt default ambient temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Leave the vehicle standing for 8h and connect the diagnostic scanner.		Next step
2	Power on the vehicle and do not start the engine. Use the diagnosis to read whether the temperature value of the ambient temperature sensor is consistent with the actual ambient temperature.	Yes	Seek manufacturer's assistance
		No	Next step
3	Replace the ambient temperature sensor, repeat the above operation, and read whether the temperature value of the ambient temperature sensor is consistent with the actual ambient temperature.	Yes	End of service
		No	Next step
4	Replace the harness, repeat the above operation, and read out whether the temperature value of the ambient temperature sensor is consistent with the actual ambient temperature.	Yes	End of service
		No	Seek manufacturer's assistance

P138823

Fault code P 138823: Ambient temperature sensor cold start check temperature too low

1. Fault triggering conditions:

1. Vehicle immersion time is greater than 8h(Reference value)
2. Vehicle power-on time is greater than 3s(Reference value)
3. No relevant fault codes of water temperature sensor, intake air temperature sensor, boost temperature sensor and ambient temperature sensor

2. Possible fault causes:

1. Environmental sensor fault
2. Ambient temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Adopt default ambient temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Leave the vehicle standing for 8h and connect the diagnostic scanner.		Next step
2	Power on the vehicle and do not start the engine. Use the diagnosis to read whether the temperature value of the ambient temperature sensor is consistent with the actual ambient temperature.	Yes	Seek manufacturer's assistance
		No	Next step
3	Replace the ambient temperature sensor, repeat the above operation, and read whether the temperature value of the ambient temperature sensor is consistent with the actual ambient temperature.	Yes	End of service
		No	Next step
4	Replace the harness, repeat the above operation, and read out whether the temperature value of the ambient temperature sensor is consistent with the actual ambient temperature.	Yes	End of service
		No	Seek manufacturer's assistance

P007000

Fault code P007000: Can communication loss of ambient temperature sensor

1. Fault triggering conditions:

1. The vehicle is in power-on state.

2. Possible fault causes:

1. Can network fault
2. Gateway fault
3. A/C controller fault

3. Post-fault treatment and phenomenon:

1. Adopt default environment problem

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Refer to CAN network, gateway and A/C controller maintenance process.		

P00CE24

Fault code P00CE24: Intake pressure and temperature sensor temperature signal cold start check temperature too high

1. Fault triggering conditions:

1. Vehicle immersion time is greater than 8h(Reference value)
2. Vehicle power-on time is greater than 3s(Reference value)
3. No relevant fault codes of water temperature sensor, intake air temperature sensor, boost temperature sensor and ambient temperature sensor

2. Possible fault causes:

1. Intake pressure temperature sensor fault
2. Intake pressure temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Adopt default intake temperature

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Leave the vehicle standing for 8h and connect the diagnostic scanner.		Next step
2	Power on the vehicle and do not start the engine. Use the diagnosis to read whether the temperature value of the inlet pressure gas temperature sensor is consistent with the actual ambient temperature.	Yes	Seek manufacturer's assistance
		No	Next step
3	Replace intake air pressure and temperature sensor, repeat the above operation, and read whether the temperature value of intake air temperature sensor is consistent with the actual ambient temperature.	Yes	End of service
		No	Next step
4	Replace the harness, repeat the above operation, and read whether the temperature value of intake pressure and temperature sensor is consistent with the actual ambient temperature.	Yes	End of service
		No	Seek manufacturer's assistance

P00CE23

Fault code P00CE23: Intake pressure and temperature sensor temperature signal cold start check temperature too low

1. Fault triggering conditions:

1. Vehicle immersion time is greater than 8h(Reference value)
2. Vehicle power-on time is greater than 3s(Reference value)
3. No relevant fault codes of water temperature sensor, intake air temperature sensor, boost temperature sensor and ambient temperature sensor

2. Possible fault causes:

1. Intake pressure temperature sensor fault
2. Intake pressure temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Default intake air temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Leave the vehicle standing for 8h and connect the diagnostic scanner.		Next step
2	Power on the vehicle and do not start the engine. Use the diagnosis to read whether the temperature value of the inlet pressure gas temperature sensor is consistent with the actual ambient temperature.	Yes	Seek manufacturer's assistance
		No	Next step
3	Replace intake air pressure and temperature sensor, repeat the above operation, and read whether the temperature value of intake air temperature sensor is consistent with the actual ambient temperature.	Yes	End of service
		No	Next step
4	Replace the harness, repeat the above operation, and read whether the temperature value of intake pressure and temperature sensor is consistent with the actual ambient temperature.	Yes	End of service
		No	Seek manufacturer's assistance

P011400

Fault code P011400: Intake pressure and temperature sensor temperature signal voltage fluctuates too much

1. Fault triggering conditions:

1. Vehicle in running state
2. The change value of the original temperature voltage of the intake pressure and temperature sensor in a short time is greater than 1V.(Reference value)

1. Possible fault causes:

1. Intake pressure temperature sensor fault
2. Intake pressure temperature sensor circuit fault

2. Post-fault treatment and phenomenon:

1. Adopt default intake temperature

3. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine and use the diagnosis to read whether the original temperature voltage of intake pressure and temperature sensor changes greatly.	Yes	Next step
		No	Seek manufacturer's assistance
3	Replace intake pressure and temperature sensor, repeat the above operation, and read whether the original temperature voltage of intake pressure and temperature sensor changes greatly.	Yes	Next step
		No	End of service
4	Replace the harness, repeat the above operation, and read whether the original temperature voltage of intake pressure and temperature sensor changes greatly.	Yes	Seek manufacturer's assistance
		No	End of service

P011300

Fault code P011300: Intake pressure and temperature sensor temperature signal voltage too high

1. Fault triggering conditions:

1. Vehicle is powered on
2. Intake pressure and temperature sensor original temperature voltage is too high

2. Possible fault causes:

1. Intake pressure temperature sensor fault
2. Intake pressure temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Adopt default intake temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine and use diagnosis to read the original temperature voltage value of intake pressure and temperature sensor is greater than 4.9 V.	Yes	Next step
		No	Seek manufacturer's assistance
3	Replace water temperature sensor, repeat the above operation, and read the original temperature voltage value of intake pressure and temperature sensor is greater than 4.9 V.	Yes	Next step
		No	End of service
4	Replace the harness, repeat the above operation, and read the original temperature voltage value of intake pressure and temperature sensor is greater than 4.9 V.	Yes	Seek manufacturer's assistance
		No	End of service

P011200

Fault code P011200: Intake pressure and temperature sensor temperature signal voltage too low

1. Fault triggering conditions:

1.Vehicle is powered on

2.Intake pressure and temperature sensor original temperature voltage is too small

2. Possible fault causes:

1.Intake pressure temperature sensor fault

2.Intake pressure and temperature sensor circuit

3. Post-fault treatment and phenomenon:

1. Adopt default intake temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine and use the diagnosis to read the original temperature voltage value of intake pressure and temperature sensor is less than 0.1 V.	Yes	Next step
		No	Seek manufacturer's assistance
3	Replace water temperature sensor, repeat the above operation, and read the original temperature voltage value of intake pressure and temperature sensor is less than 0.1 V.	Yes	Next step
		No	End of service
4	Replace the harness, repeat the above operation, and read the original temperature voltage value of intake pressure and temperature sensor is less than 0.1 V.	Yes	Seek manufacturer's assistance
		No	End of service

P011126

Fault code P011126: Intake pressure and temperature sensor temperature signal is stuck

1. Fault triggering conditions:

1.When the engine is started, the water temperature is less than 50℃.(Reference value)

2. Possible fault causes:

1.Intake pressure temperature sensor fault

2.Intake pressure temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Adopt default intake temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine and use the diagnosis to read whether the intake pressure temperature sensor temperature signal changes greatly.	Yes	Next step
		No	Seek manufacturer's assistance
3	Replace the water temperature sensor, repeat the above operation, and read whether the temperature signal of intake pressure and temperature sensor changes greatly.	Yes	Next step
		No	End of service
4	Replace the harness, repeat the above operation, and check whether the temperature signal of intake pressure and temperature sensor changes greatly.	Yes	Seek manufacturer's assistance
		No	End of service

P138024

Fault code P 138024: Supercharging pressure temperature sensor temperature signal cold start check temperature too high

1. Fault triggering conditions:

1.Vehicle immersion time is greater than 8h(Reference value)

2.Vehicle power-on time is greater than 3s(Reference value)

3.No relevant fault codes of water temperature sensor, intake air temperature sensor, boost temperature sensor and ambient temperature sensor

2. Possible fault causes:

1.Boost pressure temperature sensor fault

2.Boost pressure temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Default boost temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Leave the vehicle standing for 8h and connect the diagnostic scanner.		Next step
2	Power on the vehicle and do not start the engine. Use the diagnosis to read whether the temperature value of the inlet pressure gas temperature sensor is consistent with the actual ambient temperature.	Yes	Seek manufacturer's assistance
		No	Next step
3	Replace intake air pressure and temperature sensor, repeat the above operation, and read whether the temperature value of intake air temperature sensor is consistent with the actual ambient temperature.	Yes	End of service
		No	Next step
4	Replace the harness, repeat the above operation, and read whether the temperature value of intake pressure and temperature sensor is consistent with the actual ambient temperature.	Yes	End of service
		No	Seek manufacturer's assistance

P138023

Fault code P 138023: Supercharging pressure temperature sensor temperature signal cold start check temperature too low

1. Fault triggering conditions:

1. Vehicle immersion time is greater than 8h(Reference value)
2. Vehicle power-on time is greater than 3s(Reference value)
3. No relevant fault codes of water temperature sensor, intake air temperature sensor, boost temperature sensor and ambient temperature sensor

2. Possible fault causes:

1. Boost pressure temperature sensor fault
2. Boost pressure temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Default boost temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Leave the vehicle standing for 8h and connect the diagnostic scanner.		Next step
2	Power on the vehicle and do not start the engine. Use the diagnosis to read whether the temperature value of the inlet pressure gas temperature sensor is consistent with the actual ambient temperature.	Yes	Seek manufacturer's assistance
		No	Next step
3	Replace intake air pressure and temperature sensor, repeat the above operation, and read whether the temperature value of intake air temperature sensor is consistent with the actual ambient temperature.	Yes	End of service
		No	Next step
4	Replace the harness, repeat the above operation, and read whether the temperature value of intake pressure and temperature sensor is consistent with the actual ambient temperature.	Yes	End of service
		No	Seek manufacturer's assistance

P009900

Fault code P009900: Voltage fluctuation of supercharging pressure and temperature sensor temperature signal is too large.

1. Fault triggering conditions:

1. Vehicle in running state
2. The change value of the original temperature voltage of the boost pressure temperature sensor in a short time is greater than 1V.(Reference value)

2. Possible fault causes:

1. Boost pressure temperature sensor fault
2. Boost pressure sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Default boost temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine and use the diagnosis to read out whether the original temperature voltage of the boost pressure temperature sensor changes greatly.	Yes	Next step
		No	Seek manufacturer's assistance
3	Replace the intake pressure and temperature sensor, repeat the above operations, and read out the boost pressure and	Yes	Next step

	temperature.		

	Does the sensor original temperature voltage change greatly	No	End of service
4	Replace the harness, repeat the above operation, and read whether the original temperature voltage of the boost pressure temperature sensor changes greatly.	Yes	Seek manufacturer's assistance
		No	End of service

P009800

Fault code P009800: Boost pressure temperature sensor temperature signal voltage too high

1. Fault triggering conditions:

1. Vehicle is powered on
2. The original temperature voltage of the boost pressure temperature sensor is too high.

2. Possible fault causes:

1. Boost pressure temperature sensor fault
2. Boost pressure temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Default boost temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine and use the diagnosis to read the original temperature voltage value of the boost pressure temperature sensor is greater than 4.9 V.	Yes	Next step
		No	Seek manufacturer's assistance
3	Replace the water temperature sensor, repeat the above operation, and read the original temperature voltage value of the boost pressure temperature sensor is greater than 4.9 V.	Yes	Next step
		No	End of service
4	Replace the harness, repeat the above operation, and read the original temperature voltage value of the boost pressure temperature sensor is greater than 4.9 V.	Yes	Seek manufacturer's assistance
		No	End of service

P009700

Fault code P009700: Boost pressure temperature sensor temperature signal voltage too low

1. Fault triggering conditions:

1. Vehicle is powered on
2. The original temperature voltage of the boost pressure temperature sensor is too small.

2. Possible fault causes:

1. Boost pressure temperature sensor fault
2. Boost pressure temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Default boost temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step

2	Start the engine and use the diagnosis to read the original temperature voltage value of the boost pressure temperature sensor is less than 0.1 V.	Yes	Next step
		No	Seek manufacturer's assistance
3	Replace the water temperature sensor, repeat the above operation, and read the original temperature voltage value of the boost pressure temperature sensor is less than 0.1 V.	Yes	Next step
		No	End of service
4	Replace the harness, repeat the above operation, and read the original temperature voltage value of the boost pressure temperature sensor is less than 0.1 V.	Yes	Seek manufacturer's assistance
		No	End of service

P009626

Fault code P009626: Boost pressure and temperature sensor temperature signal is stuck

1. Fault triggering conditions:

1.When the engine is started, the water temperature is less than 50℃.(Reference value)

2. Possible fault causes:

1.Boost pressure temperature sensor fault

2.Boost pressure temperature sensor circuit fault

3. Post-fault treatment and phenomenon:

1. Default boost temperature

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Start the engine and use the diagnosis to read whether the temperature signal of the boost pressure temperature sensor changes greatly.	Yes	Next step
		No	Seek manufacturer's assistance
3	Replace the water temperature sensor, repeat the above operation, and read whether the temperature signal of the boost pressure temperature sensor changes greatly.	Yes	Next step
		No	End of service
4	Replace the harness, repeat the above operation, and read out whether the temperature signal of the boost pressure temperature sensor changes greatly.	Yes	Seek manufacturer's assistance
		No	End of service

P052200

Fault code P052200: Engine oil pressure sensor signal voltage too low

1. Fault triggering conditions:

1.Vehicle is powered on

2.Oil pressure sensor voltage too low

2. Possible fault causes:

1) Engine oil pressure sensor signal end is short to ground;

2) The corresponding engine oil pressure sensor signal pin at ECU end is short circuit to ground;

3) The connector is not properly connected or in poor contact;

3. Post-fault treatment and phenomenon:

None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON." Do not start the engine, and observe whether the "measured value of engine oil pressure sensor" in the data flow is very low, which can reach the lowest range of engine oil pressure under normal conditions. Alternatively, use a multimeter to measure whether the voltage between the engine oil pressure sensor signal terminal and ground is close to or equal to 0V.	Yes	Next step
2	Set the ignition switch to "OFF," and check whether the connector is not properly connected or in poor contact.	Yes	Reconnect
		No	Next step
3	Inspect whether the oil pressure sensor signal terminal is short to ground.	Yes	Wiring harness maintenance
		No	Next step
4	Inspect whether the corresponding engine oil pressure sensor signal pin at ECU end is short to ground.	Yes	Check ECU
		No	Diagnostic aid

P052300

Fault code P052300: Oil pressure sensor signal voltage too high

1. Fault triggering conditions:

1. The vehicle is in power-on state.

2 Engine oil pressure sensor voltage too high

2. Possible fault causes:

1) Engine oil pressure sensor signal end is short to power supply;

2) The corresponding engine oil pressure sensor signal pin at ECU end is short circuit to power supply;

3. Post-fault treatment and phenomenon:

None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON." Do not start the engine, and observe whether the "measured value of engine oil pressure sensor" in the data flow is very low, which can reach the lowest range of engine oil pressure under normal conditions. You can also use a multimeter to measure whether the voltage between the oil pressure sensor signal terminal and ground is close to or equal to 4.9 V.	Yes	Next step
2	Inspect whether the oil pressure sensor signal terminal is short to power supply.	Yes	Wiring harness maintenance
		No	Next step
3	Inspect whether the corresponding engine oil pressure sensor signal pin at ECU end is short to power supply.	Yes	Check ECU
		No	Diagnostic aid

P055800

Fault code P055800: Brake vacuum pressure sensor signal voltage too high

1. Fault triggering conditions:

1.Battery voltage is greater than 9V(Reference value)

2.Drive stage in working state

2. Possible fault causes:

1) Brake vacuum sensor signal end is short to ground;

2) Open circuit of sensor 5V reference voltage terminal;

3) Signal pin of brake vacuum sensor corresponding to ECU end is short circuit to ground;

3. Post-fault treatment and phenomenon:

None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON." Do not start the engine, measure the voltage at the brake vacuum sensor signal terminal with a multimeter, and check whether the voltage is close to or equal to 0V.	Yes	Next step
2	Set the ignition switch to "OFF" and check the brake vacuum sensor. Is the signal terminal short circuit to ground	Yes	Wiring harness maintenance
		No	Next step
3	Inspect whether the sensor 5V reference voltage terminal is open circuit.	Yes	Wiring harness maintenance
		No	Next step
4	Inspect whether the brake vacuum sensor signal pin end corresponding to ECU end is short to ground.	Yes	Check ECU
		No	Diagnostic aid

P055700

Fault code P055700: Brake vacuum pressure sensor signal voltage open circuit

1. Fault triggering conditions:

1.Battery voltage is greater than 9V

2.Drive stage in working state

2. Possible fault causes:

1.Brake vacuum sensor signal end is short to ground or open circuit

2.Sensor 5V reference voltage terminal open circuit

3.ECU end corresponding brake vacuum sensor signal pin end is short circuit to ground or open circuit

3. Post-fault treatment and phenomenon:

After fault is reported, ECU adopts default vacuum

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON." Do not start the engine, measure the voltage at the brake vacuum sensor signal terminal with a multimeter, and check whether the voltage is close to or equal to 0V.	Yes	Next step
2	Set the ignition switch to "OFF," and check whether the brake vacuum sensor signal terminal is short to ground.	Yes	Repair harness
		No	Next step

3	Inspect whether the sensor 5V reference voltage terminal is open circuit.	Yes	Repair harness
		No	Next step
4	Inspect whether the brake vacuum sensor signal pin end corresponding to ECU end is short to ground.	Yes	Overhaul ECU
		No	Diagnostic aid

Oxygen Sensor&Catalyst&Parts

P013300

Fault code P013300: Front oxygen sensor response is too slow
1. Fault triggering conditions:

1. Engine running
2. Engine speed 1200 rpm-2720 rpm
3. Engine water temperature >= 20℃
4. Upstream oxygen sensor dynamic response is too slow

2. Possible fault causes:

1. Intake and exhaust system leakage
2. Oxygen sensor aging, slow response

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect the intake and exhaust systems for air leakage.	Yes	rule out Leakage
		No	Next step
2	Replace the sensor and track whether the fault occurs again.	Yes	Diagnostic aid

P209700

Fault code P 209700: Rear oxygen sensor closed loop correction too rich
1. Fault triggering conditions:

1. Engine running
2. Engine speed 1200 rpm-2720 rpm
3. Engine water temperature >= 20℃
4. Closed loop correction value based on rear oxygen is too thick

2. Possible fault causes:

1. Intake and exhaust system leakage
2. Negative characteristic deviation of front oxygen(Too rich)
3. Some aging of rear oxygen
4. Severe catalyst degradation

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps

1	Check the intake and exhaust systems for air leakage.	Yes	rule out Leakage
		No	Next step
2	Replace the front oxygen sensor and track whether the fault occurs again.	Yes	Next step
		No	End
3	Replace the rear oxygen sensor and track whether the fault occurs again.	Yes	Next step
		No	End
4	Check catalyst for deterioration	Yes	Next step
		No	Diagnostic aid
5	Replace the catalyst and track whether the fault occurs again.	Yes	Diagnostic aid
		No	End

P209600

Fault code P 209600: Rear oxygen sensor closed loop correction too lean

1. Fault triggering conditions:

1. Engine running
2. Engine speed 1200 rpm -2720 rpm
3. Engine water temperature >= 20℃
4. Closed loop correction value based on rear oxygen is too thin

2. Possible fault causes:

1. Intake and exhaust system leakage
2. Negative characteristic deviation of front oxygen(Lean)
3. Some aging of rear oxygen
4. Severe catalyst degradation

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the intake and exhaust systems for air leakage.	Yes	rule out Leakage
		No	Next step
2	Replace the front oxygen sensor and track whether the fault occurs again.	Yes	Next step
		No	End
3	Replace the rear oxygen sensor and track whether the fault occurs again.	Yes	Next step
		No	End
4	Check catalyst for deterioration	Yes	Next step
		No	Diagnostic aid
5	Replace the catalyst and track whether the fault occurs again.	Yes	Diagnostic aid

		No	End

P013800

Fault code P013800: Rear oxygen sensor signal voltage too high
1. Fault triggering conditions:

1. System voltage is greater than 11 V and less than 16 V
2. The rear oxygen sensor open circuit fault is not detected in the last driving cycle.
3. Rear oxygen sensor voltage signal value too high

2. Possible fault causes:

1. Rear oxygen sensor harness fault
2. Rear oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P013700

Fault code P013700: Rear oxygen sensor signal voltage too low
1. Fault triggering conditions:

1. System voltage is greater than 11 V and less than 16 V
2. The rear oxygen sensor open circuit fault is not detected in the last driving cycle.
3. Rear oxygen sensor voltage signal value too low

2. Possible fault causes:

1. Rear oxygen sensor harness fault
2. Rear oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P223200

Fault code P 223200: Rear oxygen sensor signal wire and heater wire are mutually shorted.
1. Fault triggering conditions:

1.System voltage is greater than 11 V and less than 16 V

2.The rear oxygen sensor open circuit fault is not detected in the last driving cycle.

2. Possible fault causes:

1.Rear oxygen sensor harness fault

2.Rear oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P013600

Fault code P013600: Rear oxygen sensor signal open circuit

1. Fault triggering conditions:

1.System voltage is greater than 11 V and less than 16 V

2.The rear oxygen sensor open circuit fault is not detected in the last driving cycle.

3.Rear oxygen sensor voltage out of range

2. Possible fault causes:

1.Rear oxygen sensor harness fault

2.Rear oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P005400

Fault code P005400: Rear oxygen sensor heating current is too low

1. Fault triggering conditions:

1.The immersion time is more than 120 seconds.

2.Intake air temperature >-30℃

3.System voltage is greater than 11 V and less than 16 V

4.There is no oxygen sensor signal fault in the current driving cycle and the previous driving cycle.

2. Possible fault causes:

1.Rear oxygen sensor harness fault

2.Rear oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P003800

Fault code P003800: Rear oxygen sensor heating control circuit voltage too high

1. Fault triggering conditions:

1.Engine running

2.System voltage is greater than 11 V and less than 16 V

3.ECU detects rear oxygen sensor heating control circuit short circuit to power supply

2. Possible fault causes:

1.Rear oxygen sensor harness fault

2.Rear oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P003700

Fault code P003700: Rear oxygen sensor heating control circuit voltage too low

1. Fault triggering conditions:

1.Engine running

2.System voltage is greater than 11 V and less than 16 V

3.ECU detects rear oxygen sensor heating control circuit short circuit to ground

2. Possible fault causes:

1.Rear oxygen sensor harness fault

2.Rear oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P003600

Fault code P003600: Rear oxygen sensor heating control circuit open circuit

1. Fault triggering conditions:

1. Engine running
2. System voltage is greater than 11 V and less than 16 V
3. ECU detects rear oxygen sensor heating control circuit open circuit

2. Possible fault causes:

1. Rear oxygen sensor harness fault
2. Rear oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P013A00

Fault code P013A00: Rear oxygen sensor response is too slow

1. Fault triggering conditions:

1. Reliable signal of rear oxygen sensor
2. Engine speed 520 rpm-4000 rpm
3. The response time of rear oxygen sensor voltage signal from rich to lean is too slow.

2. Possible fault causes:

Rear oxygen sensor aging

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Replace downstream oxygen sensor and connect the harness. Start the vehicle and operate until the coolant temperature reaches the normal value. Multiple times, the vehicle speed is around 70 and the accelerator pedal slides, and the fault recurs.	Yes	Diagnostic aid
		No	End

P227100

Fault code P 227100: Rear oxygen sensor signal is continuously too rich
1. Fault triggering conditions:
1. Reliable signal of rear oxygen sensor
2. Engine speed 1000 rpm -4000 rpm
3. Rear oxygen voltage continuously high
2. Possible fault causes:
1. Exhaust system leakage
2. Oxygen sensor aging
3. Post-fault treatment and phenomenon:
None
4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the exhaust system for air leakage and gasket for damage.	Yes	rule out Leakage
		No	Next step
2	Replace downstream oxygen sensor and connect the harness. Start the vehicle and operate until the coolant temperature reaches the normal value. Multiple times, the vehicle speed is around 70 and the accelerator pedal slides, and the fault recurs.	Yes	Diagnostic aid
		No	End

P227000

Fault code P 227000: Rear oxygen sensor signal continuously lean
1. Fault triggering conditions:
1. Reliable signal of rear oxygen sensor
2. Engine speed 1000 rpm -4000 rpm
3. Rear oxygen voltage continuously low
2. Possible fault causes:
1. Exhaust system leakage
2. Oxygen sensor aging
3. Post-fault treatment and phenomenon:
None
4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the exhaust system for air leakage and gasket for damage.	Yes	rule out Leakage
		No	Next step
2	Replace downstream oxygen sensor and connect the harness. Start the vehicle and operate until the coolant temperature reaches the normal value. Multiple times, the vehicle speed is around 70 and the accelerator pedal slides, and the fault recurs.	Yes	Diagnostic aid
		No	End

P219500

Fault code P 219500: Front oxygen sensor characteristic offset fault
1. Fault triggering conditions:
1. Engine running

2. Possible fault causes:

1.Exhaust system leakage

2.Oxygen sensor aging

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the exhaust system for air leakage and gasket for damage.	Yes	rule out Leakage
		No	Next step
2	Replace downstream oxygen sensor and connect the harness. Start the vehicle and operate until the coolant temperature reaches the normal value. Multiple times, the vehicle speed is around 70 and the accelerator pedal slides, and the fault recurs.	Yes	Diagnostic aid
		No	End

P219600

Fault code P 219600: Front oxygen sensor characteristic offset fault

1. Fault triggering conditions:

1. Engine running

2. Possible fault causes:

1.Exhaust system leakage

2.Oxygen sensor aging

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the exhaust system for air leakage and gasket for damage.	Yes	rule out Leakage
		No	Next step
2	Replace downstream oxygen sensor and connect the harness. Start the vehicle and operate until the coolant temperature reaches the normal value. Multiple times, the vehicle speed is around 70 and the accelerator pedal slides, and the fault recurs.	Yes	Diagnostic aid
		No	End

P064D00

Fault code P064D00: Front oxygen sensor fault

1. Fault triggering conditions:

1.Complete vehicle is powered on

2.System voltage is greater than 11 V and less than 16 V

3.ECU detects front oxygen sensor fault

2. Possible fault causes:

1.LSU oxygen sensor is damaged

2.ECU internal communication abnormal

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Replace the oxygen sensor, and check whether the fault occurs again.	Yes	Next step
		No	End
2	Replace ECU, and check whether the fault occurs again.	Yes	Diagnostic aid
		No	End

P005300

Fault code P005300: Front oxygen sensor heating current is too low

1. Fault triggering conditions:

1. Engine starting water temperature >-10℃
2. Engine shutdown time is more than 300 seconds
3. System voltage is greater than 11 V and less than 16 V

2. Possible fault causes:

1. Front oxygen sensor harness fault
2. Front oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P003200

Fault code P003200: Front oxygen sensor heating control circuit voltage too high

1. Fault triggering conditions:

1. Engine running
2. System voltage is greater than 11 V and less than 16 V
3. ECU detects that front oxygen sensor heating control circuit is short to power supply.

2. Possible fault causes:

1. Front oxygen sensor harness fault
2. Front oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step

2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P003100

Fault code P003100: Front oxygen sensor heating control circuit voltage too low

1. Fault triggering conditions:

1. Engine running
2. System voltage is greater than 11 V and less than 16 V
3. ECU detects front oxygen sensor heating control circuit short circuit to ground

2. Possible fault causes:

1. Front oxygen sensor harness fault
2. Front oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P003000

Fault code P003000: Front oxygen sensor heating control circuit open circuit

1. Fault triggering conditions:

1. Engine running
2. System voltage is greater than 11 V and less than 16 V
3. ECU detects front oxygen sensor heating control circuit open circuit

2. Possible fault causes:

1. Front oxygen sensor harness fault
2. Front oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P225100

Fault code P 225100: Front oxygen sensor wiring open circuit

1. Fault triggering conditions:

1.Engine running

2.System voltage is greater than 11 V and less than 16 V

3.ECU detects front oxygen sensor VM wire open circuit

2. Possible fault causes:

1.Front oxygen sensor harness fault

2.Front oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P224300

Fault code P 224300: Front oxygen sensor wire open circuit

1. Fault triggering conditions:

1.Engine running

2.System voltage is greater than 11 V and less than 16 V

3.ECU detects open circuit of front oxygen sensor RE wire

2. Possible fault causes:

1.Front oxygen sensor harness fault

2.Front oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P013200

Fault code P013200: Front oxygen sensor signal circuit voltage too high(UN, VM, IA, IP wire short circuit to power supply)

1. Fault triggering conditions:

1.Complete vehicle is powered on

2.System voltage is greater than 11 V and less than 16 V

3.ECU detects front oxygen sensor signal circuit voltage is too high

2. Possible fault causes:

1.Front oxygen sensor harness fault

2.Front oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P013100

Fault code P013100: Front oxygen sensor signal circuit voltage too low(UN, VM, IA, IP wire short circuit to ground)

1. Fault triggering conditions:

1.Complete vehicle is powered on

2.System voltage is greater than 11 V and less than 16 V

3.ECU detects that front oxygen sensor signal circuit voltage is too low.

2. Possible fault causes:

1.Front oxygen sensor harness fault

2.Front oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P064D13

Fault code P064D13: Front oxygen sensor fault

1. Fault triggering conditions:

1.Complete vehicle is powered on

2.System voltage is greater than 11 V and less than 16 V

3.ECU detects front oxygen sensor fault

2. Possible fault causes:

1.LSU oxygen sensor is damaged

2.ECU internal communication abnormal

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Replace the oxygen sensor, and check whether the fault occurs again.	Yes	Next step
		No	End
2	Replace ECU, and check whether the fault occurs again.	Yes	Diagnostic aid
		No	End

P241400

Fault code P 241400: Front oxygen sensor signal voltage is unreasonable

1. Fault triggering conditions:

1. Engine running
2. System voltage is greater than 11 V and less than 16 V
3. The oxygen sensor has no circuit fault and the target air-fuel ratio is lean.

2. Possible fault causes:

1. Front oxygen sensor exposed to air
2. Front oxygen sensor harness fault
3. Front oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the oxygen sensor is not correctly installed, it is installed outside the exhaust manifold and comes into contact with the atmosphere.	Yes	Reinstalling oxygen sensor
		No	Next step
2	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
3	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P223713

Fault code P 223713: Front oxygen sensor wire open circuit

1. Fault triggering conditions:

1. Engine running
2. System voltage is greater than 11 V and less than 16 V
3. ECU detects front oxygen sensor APE wire open circuit

2. Possible fault causes:

1. Front oxygen sensor harness fault
2. Front oxygen sensor hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oxygen sensor harness for faults	Yes	Repair or replace wiring harness
		No	Next step
2	Check whether the oxygen sensor hardware is faulty.	Yes	Repair or replace oxygen sensor
		No	Diagnostic aid

P050B00

Fault code P050B00: Cold start ignition advance angle deviation is too large

1. Fault triggering conditions:

1.Vehicle speed is greater than 0

2.Absolute value of speed change is less than 50 rpm(Reference value)

2. Possible fault causes:

1 There are other fault codes such as throttle valve fault or misfire fault.

2 Electronic throttle is stuck in the position with small opening

3 Intake manifold leaks; Excessive exhaust resistance; Supply pressure too low

4 ECU hardware fault

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Diagnostic scanner check whether there are other faults such as misfire fault and throttle valve fault.	Yes	rule out These faults are sufficient
		No	Next step
2	Check whether the electronic throttle card is in the position with small opening	Yes	Repair throttle system
		No	Next step
3	Check whether there is intake manifold leakage; Excessive exhaust resistance; The fuel supply pressure is too low;	Yes	rule out Corresponding system problems
		No	Seek diagnostic assistance

P151000

Fault code P 151000: Knock sensor signal is unreasonable

1. Fault triggering conditions:

1.Speed greater than 2500 rpm(Reference value)

2. Possible fault causes:

1. Knock sensor is damaged.

2. ECU hardware fault

3. Post-fault treatment and phenomenon:

None

3. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Check knock sensor for damage	Yes	Replace sensor

		No	Next step
2	Check whether ECU hardware fault exists	Yes	Check ECU
		No	Diagnostic aid

P032600

Fault code P032600: Knock signal abnormal
1. Fault triggering conditions:
1.Speed greater than 2500 rpm(Reference value)
2. Possible fault causes:
1 Knock sensor damage
2 ECU hardware fault
3 Engine abnormal
3. Post-fault treatment and phenomenon:
None
4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check knock sensor for damage	Yes	Replace sensor
		No	Next step
2	Check whether ECU hardware fault exists	Yes	Check ECU
		No	Next step
3	Is the engine abnormal	Yes	Check engine
		No	Diagnostic aid

P032500

Fault Code P032500: Knock Sensor Circuit Open
1. Fault triggering conditions:
1.Engine speed and load stability
2.Engine water temperature is greater than 40℃(Reference value)
3.Engine speed greater than 2000 rpm(Reference value)
2. Possible fault causes:
1 The connector is not properly connected or disconnected.
2 Open circuit of control circuit between knock sensor and ECU
3 Knock sensor damage
3. Post-fault treatment and phenomenon:
None
4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect the connector for improper connection or poor contact.	Yes	Reconnect or replace connector

		No	Next step
2	Check whether the control circuit between knock sensor and ECU is open to ground.	Yes	Repair harness
		No	Next step
3	Inspect whether the knock sensor connecting harness is not standard shielding. Wire, subject to electromagnetic interference	Yes	Using standard shield wire
		No	Next step
4	Check knock sensor for damage	Yes	Replace sensor
		No	Seek diagnostic assistance

P032800/P032815

Fault code P032800: Signal voltage at end A of knock sensor is too high Fault code P032815: Signal voltage at end B of knock sensor is too high 1. Fault triggering condition:

1.Engine speed and load stability

2.Engine speed greater than 1000 rpm(Reference value)

2. Possible fault causes:

1 Control circuit between knock sensor and ECU is short circuit to power supply.

2 Knock sensor damage

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check knock sensor connector for falling off or damage	Yes	Reconnect or repair
		No	Next step
2	Check whether the control circuit between the vibration sensor and ECU is short to power supply.	Yes	Repair or replace wiring harness
		No	Next step
3	Replace knock sensor, re-connect and check whether the fault is eliminated.	Yes	End
		No	Diagnostic aid

P032700/P032714

Fault code P032700: Knock sensor terminal A signal voltage is too low Fault code P032714: Knock sensor terminal B signal voltage is too low 1. Fault triggering condition:

1.Engine speed and load stability

2.Engine speed greater than 1000 rpm(Reference value)

1. Possible fault causes:

1 Control circuit between knock sensor and ECU is short to ground.

2 Knock sensor damage

2. Post-fault treatment and phenomenon:

None

3. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check knock sensor connector for falling off or damage	Yes	Reconnect or repair
		No	Next step
2	Check whether the control circuit between the vibration sensor and ECU is short to ground.	Yes	Repair or replace wiring harness
		No	Next step
3	Replace knock sensor, re-connect and check whether the fault is eliminated.	Yes	End
		No	Diagnostic aid

P06DC00

Fault code P06DC00: Oil pump solenoid valve control circuit voltage too high

1. Fault triggering conditions:

1. Battery voltage is greater than 10 V.(Reference value)

1. Possible fault causes:

1 Oil pump solenoid valve supply circuit short circuit to power supply

2 Control circuit between solenoid valve and ECU is short circuit to power supply.

3 Solenoid valve damage

2. Post-fault treatment and phenomenon:

None

3. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Inspect the connector for improper connection or poor contact.	Yes	Reconnect or replace connector
		No	Next step
2	Check whether the control circuit between solenoid valve and ECU is short to power supply.	Yes	Repair harness
		No	Next step
3	Check solenoid valve for damage	Yes	Replace solenoid valve
		No	Ask for help

P06DB00

Fault code P06DB00: Oil pump solenoid valve control circuit voltage too low

1. Fault triggering conditions:

1. Battery voltage is greater than 10 V.(Reference value)

2. Possible fault causes:

1 Oil pump solenoid valve supply circuit short circuit to ground

2 Control circuit between solenoid valve and ECU is short circuit to ground

3 Solenoid valve damage

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect the connector for improper connection or poor contact.	Yes	Reconnect or replace connector
		No	Next step
2	Check whether the control circuit between solenoid valve and ECU is short to ground.	Yes	Repair harness
		No	Next step
3	Check solenoid valve for damage	Yes	Replace solenoid valve
		No	Ask for help

P06DA00

Fault Code P06DA00: Oil Pump Solenoid Valve Control Circuit Open

1. Fault triggering conditions:

1. Battery voltage is greater than 10 V.(Reference value)

2. Possible fault causes:

1 The connector is not properly connected or disconnected.

2 Open circuit between oil pump solenoid valve and ECU

3 Solenoid valve damage

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect the connector for improper connection or poor contact.	Yes	Reconnect or replace connector
		No	Next step
2	Check whether the control circuit between solenoid valve and ECU is open.	Yes	Repair harness
		No	Next step
3	Check solenoid valve for damage	Yes	Replace solenoid valve
		No	Ask for help

P064500

Fault Code P064500: Air Conditioner Compressor Relay Control Circuit Open

1. Fault triggering conditions:

1.Battery voltage is greater than 9V(Reference value)

2.Drive stage in working state

2. Possible fault causes:

1 Connector is not firmly connected or in poor contact

2 Open circuit of control circuit between A/C compressor relay and ECU

3 A/C compressor relay control circuit supply end open circuit

4 A/C compressor relay fuse blown or damaged

3. Post-fault treatment and phenomenon:

None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Connector is not firmly connected or in poor contact	Yes	Reconnect
		No	Next step
2	Open circuit of control circuit between A/C compressor relay and ECU	Yes	Wiring harness maintenance
		No	Next step
3	A/C compressor relay control circuit supply end open circuit	Yes	Wiring harness maintenance
		No	Next step
4	A/C compressor relay fuse blown or damaged	Yes	Service relay
		No	Diagnostic aid

P064600

Fault code P064600: A/C compressor relay control circuit voltage too low

1. Fault triggering conditions:

1. Battery voltage is greater than 9V(Reference value)

2. Drive stage in working state

2. Possible fault causes:

1 A/C compressor relay supply circuit is short to ground

2 Control circuit between A/C compressor relay and ECU is short to ground.

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Is the A/C compressor relay supply line short to ground	Yes	Wiring harness maintenance
		No	Next step
2	Control circuit between A/C compressor relay and ECU is short to ground.	Yes	Wiring harness maintenance
		No	Diagnostic aid

P064700

Fault code P064700: A/C compressor relay control circuit voltage is too high 1.Fault triggering condition:

1. Battery voltage is greater than 9V(Reference value)

2. Drive stage in working state

2. Possible fault causes:

1 A/C compressor relay power supply circuit is short to power supply

2 Control circuit between A/C compressor relay and ECU is short to power supply.

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Is the A/C compressor relay power supply circuit short to power supply	Yes	Wiring harness maintenance
		No	Next step
2	Whether the control circuit between A/C compressor relay and ECU is short to power supply	Yes	Wiring harness maintenance
		No	Diagnostic aid

P056300

Fault code P056300: Battery voltage too high

1. Fault triggering conditions:

1.Vehicle speed is greater than 25 km/h(Reference value)

2.Engine running time is greater than

180 seconds (reference value) Voltage

is greater than 17 V (reference value)

2. Possible fault causes:

1 Engine harness grounding point fault

2 Generator regulator fault

3. Post-fault treatment and phenomenon:

None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "OFF." Multimeter Measure the battery voltage, whether it is too high	Yes	Next step
2	Is the engine harness grounding point faulty	Yes	Wiring harness maintenance
		No	Next step
3	Is the alternator regulator faulty	Yes	Service regulator
		No	Diagnostic aid

P056200

Fault code P056200: Battery voltage too low

1. Fault triggering conditions:

1.Engine running time is greater than 180 seconds(Reference value)

2.Voltage between 2.5~10 V (reference value)

2. Possible fault causes:

1 All pins connected to battery or main relay on ECU are open circuit.

2 Battery leakage or damage

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "OFF." Multimeter Measure the battery voltage, whether it is too low	Yes	Next step
2	Check whether all pins of battery or main relay on ECU are open circuit.	Yes	Wiring harness maintenance
		No	Next step
3	Is the engine harness grounding point faulty	Yes	Wiring harness maintenance
		No	Next step
4	Regulator failure	Yes	Service regulator
		No	Next step
5	Battery leakage or damage	Yes	Replace battery
		No	Next step
6	Generator fault	Yes	Maintenance generator
		No	Diagnostic aid

P048000

Fault Code P048000: Fan Control Circuit Open

1. Fault triggering conditions:

1. Drive stage work

2. Possible fault causes:

1 Cooling fan relay control circuit open

2 Control circuit pin of cooling fan relay corresponding to ECU end is open circuit

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	The connector is not properly connected or in poor contact.	Yes	Reconnect
		No	Next step
2	Cooling fan relay circuit signal terminal open circuit	Yes	Wiring harness maintenance
		No	Next step
3	Cooling fan relay fault(Fuse blown or damaged)	Yes	Wiring harness maintenance
		No	Next step
4	The pin of corresponding cooling fan relay at ECU end is open circuit or internal circuit is damaged.	Yes	Check ECU

		No	Diagnostic aid

P069200

Fault code P069200: Fan control circuit voltage too high
1. Fault triggering conditions:

1. Drive stage work

2. Possible fault causes:

1 Cooling fan relay control circuit is short to power supply

2 Control circuit pin of cooling fan relay corresponding to ECU end is short to power supply.

3. Post-fault treatment and phenomenon:

None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Cooling fan relay circuit signal terminal is short to power supply	Yes	Wiring harness maintenance
		No	Next step
2	The pin of cooling fan relay corresponding to ECU end is short to power supply.	Yes	Check ECU
		No	Diagnostic aid

P069100

Fault code P069100: Fan control circuit voltage too low
1. Fault triggering conditions:

1. Drive stage operation

2. Possible fault causes:

1 Cooling fan relay control circuit short circuit to ground

2 Control circuit pin of cooling fan relay corresponding to ECU end is short to ground.

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Cooling fan relay circuit signal terminal is short to ground.	Yes	Wiring harness maintenance
		No	Next step
2	The pin of cooling fan relay corresponding to ECU end is short to ground.	Yes	Check ECU
		No	Diagnostic aid

P050700

Fault code P050700: Engine idle speed too high
1. Fault triggering conditions:

1.The idle speed control speed is higher than the target idle speed 200 r/min(Reference value)

2. Possible fault causes:

1 Electronic throttle is stuck in the position with large opening

2 There is air leakage in the system; Fuel injector dripping; Supply pressure too high

3. Post-fault treatment and phenomenon:

Disable engine idle speed adjustment

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Whether the electronic throttle is stuck at a small opening due to ice or oil dirt.	Yes	Repair and replace electronic throttle valve
		No	Next step
2	Whether intake manifold leaks; Whether the fuel injector is blocked; Excessive exhaust resistance; Supply pressure too low	Yes	rule out Corresponding system problems
		No	Diagnostic aid

P050600

Fault code P050600: Engine idle speed too low

1. Fault triggering conditions:

1.The idle speed control speed is lower than the target idle speed 100 r/min(Reference value)

2. Possible fault causes:

1 Electronic throttle is stuck in the position with small opening

2 Intake manifold leaks; Fuel injector is blocked; Excessive exhaust resistance; Supply pressure too low

3. Post-fault treatment and phenomenon:

Disable engine idle speed adjustment

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Whether the electronic throttle is stuck at a small opening due to ice or oil dirt.	Yes	Repair and replace electronic throttle valve
		No	Next step
2	Whether intake manifold leaks; Whether the fuel injector is blocked; Excessive exhaust resistance; Supply pressure too low	Yes	rule out Corresponding system problems
		No	Diagnostic aid

P06XXXX&P15XXXX

Fault codes: P06XX and P15XX related fault codes, as detailed in the following table:

P063445	Engine control unit fault
P062B9A	Engine control unit fault
P062B64	Engine control unit fault
P062B96	Engine control unit fault
P15A000	Engine control unit fault
P15A100	Engine control unit fault
P15A200	Engine control unit fault
P15A300	Engine control unit fault
P15A400	Engine control unit fault
P15A500	Engine control unit fault

P15A600	Engine control unit fault
P15A700	Engine control unit fault
P15A800	Engine control unit fault
P15A900	Engine control unit fault
P15AA00	Engine control unit fault
P15AB00	Engine control unit fault
P15AC00	Engine control unit fault
P15AD00	Engine control unit fault
P15AE00	Engine control unit fault
P15AF00	Engine control unit fault
P15B000	Engine control unit fault
P15B100	Engine control unit fault
P15B200	Engine control unit fault
P15B300	Engine control unit fault
P15B400	Engine control unit fault
P15B500	Engine control unit fault
P15B600	Engine control unit fault
P15B700	Engine control unit fault
P15B800	Engine control unit fault
P15B900	Engine control unit fault
P15BA00	Engine control unit fault
P15BB00	Engine control unit fault
P15BC00	Engine control unit fault
P15BD00	Engine control unit fault
P15BE00	Engine control unit fault
P15BF00	Engine control unit fault
P15C000	Engine control unit fault
P15C100	Engine control unit fault
P15C200	Engine control unit fault
P15C300	Engine control unit fault
P15C400	Engine control unit fault
P15C500	Engine control unit fault

P15C600	Engine control unit fault
P15C700	Engine control unit fault
P15C800	Engine control unit fault
P15C900	Engine control unit fault
P15CA00	Engine control unit fault
P15CB00	Engine control unit fault
P15CC00	Engine control unit fault
P15CD00	Engine control unit fault
P15CE00	Engine control unit fault
P15CF00	Engine control unit fault
P15D000	Engine control unit fault
P15D100	Engine control unit fault
P15D200	Engine control unit fault
P15D300	Engine control unit fault
P15D400	Engine control unit fault
P15D500	Engine control unit fault
P15D600	Engine control unit fault
P15D700	Engine control unit fault
P15D800	Engine control unit fault
P15D900	Engine control unit fault
P15DA00	Engine control unit fault
P15DB00	Engine control unit fault
P15DC00	Engine control unit fault
P15DD00	Engine control unit fault
P15DE00	Engine control unit fault
P15DF00	Engine control unit fault
P15E000	Engine control unit fault
P153000	Engine control unit fault
P153100	Engine control unit fault
P157100	Engine control unit fault
P060D00	Engine control unit fault
P152000	Engine control unit fault

P152100	Engine control unit fault
P152200	Engine control unit fault
P153900	Engine control unit fault
P153700	Engine control unit fault
P153500	Engine control unit fault
P153600	Engine control unit fault
P061C00	Engine control unit fault
P153800	Engine control unit fault
P152700	Engine control unit safety fuel cut-off monitoring fault
P152800	Engine control unit fault
P152900	Engine control unit fault
P061A00	Engine control unit fault
P157200	Engine control unit fault
P157300	Engine control unit fault
P157400	Engine control unit fault
P157500	Engine control unit fault
P222722	Engine control unit built-in ambient pressure sensor fault
P222721	Engine control unit built-in ambient pressure sensor fault
P222785	Engine control unit built-in ambient pressure sensor fault
P222784	Engine control unit built-in ambient pressure sensor fault
P120200	Engine control unit built-in ambient pressure sensor fault
P120300	Engine control unit built-in ambient pressure sensor fault
P222900	Engine control unit built-in ambient pressure sensor fault
P222800	Engine control unit built-in ambient pressure sensor fault
P222729	Engine control unit built-in ambient pressure sensor fault
P063444	Engine control unit fault
P063441	Engine control unit fault
P063000	Engine control unit VIN code not written or incorrect
P261000	Engine control unit fault
P06B842	Engine control unit fault
P06B843	Engine control unit fault

1. Fault triggering conditions:

1. Power on controller

2. Possible fault causes:

Internal fault of engine control unit 3. Post-fault treatment and phenomenon: Engine shutdown

4. Diagnostic process:

Step	Operation	Yes	No
1	Replace ECM	Turn to section Step 2	Troubles hooting other fault codes
2	Clear the fault code, restart the vehicle, and check whether the fault code is eliminated.	Fault Exclude, the system is normal	

P14A500

Fault Code P14A 500: Start/stop indicator lamp control circuit open circuit

1. Fault triggering conditions:

1. Trigger start/stop switch

2. Possible fault causes:

1 Connector is not firmly connected or in poor contact

2 Start/stop indicator lamp control circuit pin open circuit

3 ECU corresponding start/stop indicator lamp control circuit pin is open circuit or damaged

3. Post-fault treatment and phenomenon:

None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the connector is not firmly connected or in poor contact.	Yes	Reconnect
		No	Next step
2	Check start/stop indicator lamp control circuit pin for open circuit	Yes	Wiring harness maintenance
		No	Next step
3	Inspect whether ECU corresponding start/stop indicator lamp control circuit pin is open circuit or damaged.	Yes	Check ECU
		No	Diagnostic aid

P14A400

Fault Code P14A 400: Start/stop indicator lamp control circuit voltage too low

1. Fault triggering conditions:

1. Trigger start/stop switch

2. Possible fault causes:

1 Start/stop indicator lamp control circuit pin is short to ground.

2 ECU corresponding start/stop indicator lamp control circuit pin is short to ground.

3. Post-fault treatment and phenomenon:

None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Check start/stop indicator lamp control circuit pin for short circuit to ground	Yes	Wiring harness maintenance
		No	Next step
2	Inspect whether the corresponding start/stop indicator lamp control circuit pin of ECU is short to ground.	Yes	Check ECU
		No	Diagnostic aid

P14A300

Fault Code P14A 300: Start/stop indicator lamp control circuit voltage is too high

1. Fault triggering conditions:

1. Trigger start/stop switch

2. Possible fault causes:

1 Start/stop indicator lamp control circuit pin is short to power supply

2 ECU corresponding start/stop indicator lamp control circuit pin is short to power supply

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the start/stop indicator lamp control circuit pin is short to power supply.	Yes	Wiring harness maintenance
		No	Next step
2	Inspect whether the corresponding start/stop indicator lamp control circuit pin of ECU is short to power supply.	Yes	Check ECU
		No	Diagnostic aid

P05BD00

Fault code P05BD00: Start/stop main switch is stuck

1. Fault triggering conditions:

1. Trigger start/stop switch

2. Possible fault causes:

1 Starting and stopping main switch is damaged

2 The corresponding pin of starting and stopping main switch is short to power supply.

3. Post-fault treatment and phenomenon:

None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the starting and stopping main switch is damaged and whether it is pressed for a long time. Cannot reset.	Yes	Replace starting and stopping main switch
		No	Next step
2	Check whether the corresponding pin of starting and stopping main switch is short to power supply.	Yes	Wiring harness maintenance
		No	Diagnostic aid

P064100

Fault code P064100: Sensor 5 V power supply 1 circuit fault

1. Fault triggering conditions:

1. Complete vehicle is powered on

2. Possible fault causes:

1 5V power supply module 1 has overvoltage or undervoltage problem

3. Post-fault treatment and phenomenon:

The electronic throttle valve works in the protection mode, so that the engine works in the limp mode, and the engine output torque will be limited.

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	There is harness signal interference	Yes	Shielded harness
		No	Diagnostic aid

P065100

Fault code P065100: Sensor 5 V power supply 2-way fault

1. Fault triggering conditions:

1. Complete vehicle is powered on

2. Possible fault causes:

1 5V power supply module 2 has overvoltage or undervoltage problem

3. Post-fault treatment and phenomenon:

The electronic throttle valve works in the protection mode, so that the engine works in the limp mode, and the engine output torque will be limited.

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	There is harness signal interference	Yes	Shielded harness
		No	Diagnostic aid

P069700

Fault code P065100: Sensor 5 V power supply 3-way fault

1. Fault triggering conditions:

1. Complete vehicle is powered on

2. Possible fault causes:

5V power supply module 3 has overvoltage or undervoltage problem

3. Post-fault treatment and phenomenon:

The electronic throttle valve works in the protection mode, so that the engine works in the limp mode, and the engine output torque will be limited.

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	There is harness signal interference	Yes	Shielded harness
		No	Diagnostic aid

Fuel&misfire

P00C600

High voltage starting does not operate normally

1. Fault triggering conditions:

1) Oil circuit leakage
2) Insufficient fuel
3) Low-pressure oil pump is damaged.
4) Working capacity of high-pressure oil pump decreases
5) Fuel injector damage
6) Replace the new oil pipe or the new vehicle just offline, the oil line pressure has not been established, and the fault may be reported;

2. Possible fault causes:

1) Oil circuit leaks;
2) Insufficient fuel;
3) Low-pressure oil pump is damaged;
4) Working capacity of high-pressure oil pump decreases;
5) Fuel injector damage
6) Replace the new oil pipe or the new vehicle just offline, the oil line pressure has not been established, and the fault may be reported;

3. Post-fault treatment and phenomenon:

1) None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Read and save fault frozen frame information		Next step
3	Check for oil leakage	Yes	Repair oil circuit
		No	Next step
4	Check for insufficient fuel	Yes	Add fuel
		No	Next step
5	Check low-pressure oil pump for damage	Yes	Service low-pressure oil pump
		No	Next step
6	Check whether the working capacity of high-pressure oil pump decreases.	Yes	Service high-pressure oil pump
		No	Next step
7	Check fuel injector for damage	Yes	Replacing fuel injector
		No	Next step
8	Has new oil pipe been replaced or has new vehicle just been offline?	Yes	Next step
		No	Diagnostic aid
9	Clear the fault and start the vehicle for 10 min, so that the oil pressure is fully established.	Yes	Diagnostic aid
		No	End

	Get up, shut down and start again, and check whether the fault occurs again.		

P150000

Vehicle receives crash cut-off signal

1. Fault triggering conditions:

1) Vehicle CAN network communication is normal
2) Complete vehicle is powered on
3) Airbag controller communication is normal.
4) Vehicle receives crash cut-off signal

2. Possible fault causes:

1) The vehicle collides and the airbag pops up. The CAN network is normal.
2) The airbag and ECU are connected to the harness, and the vehicle is powered on due to electromagnetic interference.
3) The signal sent by airbag to ECU is wrong and unreasonable.

3. Post-fault treatment and phenomenon:

1) Stop fuel supply and the vehicle cannot be started normally.

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the vehicle collides and the airbag pops up.	Yes	Clear DTC
		No	Next step
2	Inspect whether the connecting harness between airbag and ECU has electromagnetic interference.	Yes	Replacing or repairing lines
		No	Next step
3	Check whether the signal sent by airbag to ECU is wrong or unreasonable.	Yes	Please consult airbag supplier
		No	Seek diagnostic assistance

P127000

High pressure rail pressure sensor signal exceeds upper limit

1. Fault triggering conditions:

1) Complete vehicle is powered on
2) No other fault suppression

2. Possible fault causes:

1) High-pressure oil rail pressure sensor signal circuit fault
2) High pressure rail pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Check high-pressure oil rail pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Inspect whether the high-pressure oil rail pressure sensor body is faulty.	Yes	Replace parts

		No	Seek diagnostic assistance

P019128

High pressure rail pressure sensor characteristic negative offset

1. Fault triggering conditions

1) Engine running time after starting >=30 s(Reference value)
2) Engine speed <25 r/min(Reference value)
3) Rail pressure too low

2. Possible fault causes:

1) High-pressure oil rail pressure sensor signal circuit fault
2) High pressure rail pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check high-pressure oil rail pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Inspect whether the high-pressure oil rail pressure sensor body is faulty.	Yes	Replace parts
		No	Seek diagnostic assistance

P019129

High pressure rail pressure sensor characteristic forward offset

1. Fault triggering conditions:

1) Engine water temperature at last shutdown >50℃(Reference value)
2) Starting water temperature <=37℃(Reference value)

Downtime >=20000 s(Reference value)

Engine speed <25 r/min(Reference value)

2. Possible fault causes:

1) High-pressure oil rail pressure sensor signal circuit fault
2) High pressure rail pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check high-pressure oil rail pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Inspect whether the high-pressure oil rail pressure sensor body is faulty.	Yes	Replace parts
		No	Seek diagnostic assistance

P019400

High-pressure oil rail pressure sensor signal stuck

1. Fault triggering conditions:

1) Engine speed 600 ~4000 r/min(Reference value)
2) Rail pressure >=10000Kpa(Reference value)
3) High pressure rail pressure sensor average voltage <=4.5 V(Reference value)
4) Rail pressure sensor voltage does not fluctuate before and after fuel injection.

2. Possible fault causes

1) High-pressure oil rail pressure sensor signal circuit fault
2) High pressure rail pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check high-pressure oil rail pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Inspect whether the high-pressure oil rail pressure sensor body is faulty.	Yes	Replace parts
		No	Seek diagnostic assistance

P019300

High pressure rail pressure sensor signal voltage too high

1. Fault triggering conditions:

1) Complete vehicle is powered on
2) High pressure rail pressure sensor voltage >4.8 V(Reference value)

2. Possible fault causes:

1) High-pressure oil rail pressure sensor signal circuit fault
2) High pressure rail pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check high-pressure oil rail pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Inspect whether the high-pressure oil rail pressure sensor body is faulty.	Yes	Replace parts
		No	Seek diagnostic assistance

P019200

High pressure rail pressure sensor signal voltage is too low

1. Fault triggering conditions:

1) Complete vehicle is powered on
2) High pressure rail pressure sensor voltage <0.2 V(Reference value)

2. Possible fault causes:

1) High-pressure oil rail pressure sensor signal circuit fault

2) High pressure rail pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check high-pressure oil rail pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Inspect whether the high-pressure oil rail pressure sensor body is faulty.	Yes	Replace parts
		No	Seek diagnostic assistance

P019000

High pressure oil rail pressure sensor signal fluctuates too much

1. Fault triggering conditions:

1) Complete vehicle is powered on

2) The rail pressure sensor signal voltage fluctuates between the maximum and minimum values.

2. Possible fault causes:

1) High-pressure oil rail pressure sensor signal circuit fault

2) High pressure rail pressure sensor hardware fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check high-pressure oil rail pressure sensor circuit for faults	Yes	Repair or replace circuit
		No	Next step
2	Inspect whether the high-pressure oil rail pressure sensor body is faulty.	Yes	Replace parts
		No	Seek diagnostic assistance

P217700

Fuel system is too lean under non-idling conditions

1. Fault triggering conditions:

Water temperature >=71℃(Reference value)

2) Intake air temperature <80℃(Reference value)

Target air-fuel ratio 0.98~1.02(Reference value)

4) Non-catalytic converter heating, full load enrichment and transition conditions

2. Possible fault causes:

1) Oil circuit system hardware leakage or blockage

2) trachea-way fault

3) Oxygen sensor harness connector circuit fault

4) Oxygen sensor fault

3. Post-fault treatment and phenomenon:

1) Fuel system access open loop control

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the fuel condition and ask the customer whether to fill the gasoline with the specified mark? Whether the vehicle works abnormally after refueling.	Yes	Replace fuel
		No	Next step
2	Check whether the low-pressure and high-pressure fuel pressures are abnormal under various working conditions.	Yes	Check fuel supply system
		No	Next step
3	Check fuel injector for leakage or blockage	Yes	Replace parts
		No	Next step
4	Check whether the inlet trachea circuit is blocked, leaking, flattened or damaged; Whether the canister control valve is stuck; Whether the valve clearance is abnormal; Whether the throttle valve body is polluted, resulting in airway obstruction; Does VVT work abnormally	Yes	Repair or replacement
		No	Next step
5	Check whether the ignition coil, cylinder wire and spark plug work abnormally.	Yes	Replace parts
		No	Next step
6	Check oxygen sensor circuit for faults	Yes	Repair or replace wiring harness
		No	Next step
7	Check oxygen sensor body for faults	Yes	Replace parts
		No	Seek diagnostic assistance

P217800

Fuel system is too rich under non-idling conditions

1. Fault triggering conditions:

Water temperature >=71℃(Reference value)

2) Intake air temperature <80℃(Reference value)

Target air-fuel ratio 0.98~1.02(Reference value)

4) Non-catalytic converter heating, full load enrichment and transition conditions

2. Possible fault causes:

1) Oil circuit system hardware leakage or blockage

2) trachea-way fault

3) Oxygen sensor harness connector circuit fault

4) Oxygen sensor fault

3. Post-fault treatment and phenomenon:

1) Fuel system access open loop control

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the fuel condition and ask the customer whether to fill the gasoline with the specified mark? Whether the vehicle works abnormally after refueling.	Yes	Replace fuel
		No	Next step

2	Check whether the low-pressure and high-pressure fuel pressures are abnormal under various working conditions.	Yes	Check fuel supply system
		No	Next step
3	Check fuel injector for leakage or blockage	Yes	Replace parts
		No	Next step
4	Check whether the inlet trachea circuit is blocked, leaking, flattened or damaged; Whether the canister control valve is stuck; Whether the valve clearance is abnormal; Whether the throttle valve body is polluted, resulting in airway obstruction; Does VVT work abnormally	Yes	Repair or replacement
		No	Next step
5	Check whether the ignition coil, cylinder wire and spark plug work abnormally.	Yes	Replace parts
		No	Next step
6	Check oxygen sensor circuit for faults	Yes	Repair or replace wiring harness
		No	Next step
7	Check oxygen sensor body for faults	Yes	Replace parts
		No	Seek diagnostic assistance

P218700

Fuel system at idle speed is too lean.

1. Fault triggering conditions:

Water temperature >=71℃(Reference value)

2) Intake air temperature <80℃(Reference value)

Target air-fuel ratio 0.98~1.02(Reference value)

4) Non-catalytic converter heating, full load enrichment and transition conditions

2. Possible fault causes:

1) Oil circuit system hardware leakage or blockage

2) trachea-way fault

3) Oxygen sensor harness connector circuit fault

4) Oxygen sensor fault

3. Post-fault treatment and phenomenon:

1) Fuel system access open loop control

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the fuel condition and ask the customer whether to fill the gasoline with the specified mark? Whether the vehicle works abnormally after refueling.	Yes	Replace fuel
		No	Next step
2	Check whether the low-pressure and high-pressure fuel pressures are abnormal under various working conditions.	Yes	Check fuel supply system
		No	Next step
3	Check fuel injector for leakage or blockage	Yes	Replace parts
		No	Next step

4	Check whether the inlet trachea circuit is blocked, leaking, flattened or damaged; Whether the canister control valve is stuck; Whether the valve clearance is abnormal; Whether the throttle valve body is polluted, resulting in airway obstruction; Does VVT work abnormally	Yes	Repair or replacement
		No	Next step
5	Check whether the ignition coil, cylinder wire and spark plug work abnormally.	Yes	Replace parts
		No	Next step
6	Check oxygen sensor circuit for faults	Yes	Repair or replace wiring harness
		No	Next step
7	Check oxygen sensor body for faults	Yes	Replace parts
		No	Seek diagnostic assistance

P218800

Fuel system at idle speed is too rich.

1. Fault triggering conditions:

Water temperature >=71℃(Reference value)

2) Intake air temperature <80℃(Reference value)

Target air-fuel ratio 0.98~1.02(Reference value)

4) Non-catalytic converter heating, full load enrichment and transition conditions

2. Possible fault causes:

1) Oil circuit system hardware leakage or blockage

2) trachea-way fault

3) Oxygen sensor harness connector circuit fault

4) Oxygen sensor fault

3. Post-fault treatment and phenomenon:

1) Fuel system access open loop control

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the fuel condition and ask the customer whether to fill the gasoline with the specified mark? Whether the vehicle works abnormally after refueling.	Yes	Replace fuel
		No	Next step
2	Check whether the low-pressure and high-pressure fuel pressures are abnormal under various working conditions.	Yes	Check fuel supply system
		No	Next step
3	Check fuel injector for leakage or blockage	Yes	Replace parts
		No	Next step
4	Check whether the inlet trachea circuit is blocked, leaking, flattened or damaged; Whether the canister control valve is stuck; Whether the valve clearance is abnormal; Whether the throttle valve body is polluted, resulting in airway obstruction; Does VVT work abnormally	Yes	Repair or replacement
		No	Next step
5	Check whether the ignition coil,	Yes	Replace parts

	cylinder wire and spark plug work abnormally.	No	Next step

6	Check oxygen sensor circuit for faults	Yes	Repair or replace wiring harness
		No	Next step
7	Check oxygen sensor body for faults	Yes	Replace parts
		No	Seek diagnostic assistance

P053F22

Cold start high pressure rail pressure too high

1. Fault triggering conditions:

1) Engine running time >=5s(Reference value)
2) Catalyst heating activation
3) The difference between expected pressure of high-pressure fuel rail and actual pressure is too large.

2. Possible fault causes:

1) High-pressure oil pump control fault
2) Pressure relief valve is blocked
3) High pressure rail pressure sensor hardware or circuit fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the high-pressure oil pump works abnormally.	Yes	Replace parts
		No	Next step
2	Check whether the pressure relief valve works abnormally.	Yes	Replace parts
		No	Next step
3	Check the high-pressure oil rail pressure sensor body and circuit for faults.	Yes	Replace parts or circuits
		No	Seek diagnostic assistance

P053F21

Cold start high-pressure oil rail pressure is too low

1. Fault triggering conditions:

1) Engine running time >=5s(Reference value)
2) Catalyst heating activation
3) The difference between expected pressure of high-pressure fuel rail and actual pressure is too low.

2. Possible fault causes:

1) Oil circuit leakage
2) Insufficient fuel
3) Low-pressure oil pump fault
4) High-pressure oil pump fault
5) High pressure rail pressure sensor hardware or circuit fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oil circuit for leaks	Yes	Repair oil circuit
		No	Next step
2	Check for insufficient fuel	Yes	Add fuel
		No	Next step
3	Check whether the low-pressure oil pump works abnormally.	Yes	Replace parts
		No	Next step
4	Check whether the high-pressure oil pump works abnormally.	Yes	Replace parts
		No	Next step
5	Check the high-pressure oil rail pressure sensor body and circuit for faults.	Yes	Replace parts or circuits
		No	Seek diagnostic assistance

P008985

High-pressure oil pump oil pressure PID adjustment exceeds upper limit

1. Fault triggering conditions:

1) Engine running time >=5s(Reference value)
2) Catalyst heating not activated
3) High pressure rail pressure sensor voltage 0.2~4.8 V(Reference value)

2. Possible fault causes:

1) Oil circuit leakage
2) Insufficient fuel
3) Low-pressure oil pump fault
4) High-pressure oil pump fault
5) High pressure rail pressure sensor hardware or circuit fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oil circuit for leaks	Yes	Repair oil circuit
		No	Next step
2	Check for insufficient fuel	Yes	Add fuel
		No	Next step
3	Check whether the low-pressure oil pump works abnormally.	Yes	Replace parts
		No	Next step
4	Check whether the high-pressure oil pump works abnormally.	Yes	Replace parts
		No	Next step

5	Check the high-pressure oil rail pressure sensor body and circuit for faults.	Yes	Replace parts or circuits
		No	Seek diagnostic assistance

P008984

High-pressure oil pump oil pressure PID adjustment exceeds the lower limit

1. Fault triggering conditions:

1) Engine running time >=5s(Reference value)
2) Catalyst heating not activated
3) High pressure rail pressure sensor voltage 0.2~4.8 V(Reference value)

2. Possible fault causes:

1) High-pressure oil pump control fault
2) Pressure relief valve is blocked
3) High pressure rail pressure sensor hardware or circuit fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the high-pressure oil pump works abnormally.	Yes	Replace parts
		No	Next step
2	Check whether the pressure relief valve works abnormally.	Yes	Replace parts
		No	Next step
3	Check the high-pressure oil rail pressure sensor body and circuit for faults.	Yes	Replace parts or circuits
		No	Seek diagnostic assistance

P008800

High pressure oil rail pressure is too high

1. Fault triggering conditions:

1) Engine running time >=5s(Reference value)
2) Catalyst heating not activated
3) High pressure rail pressure sensor voltage 0.2~4.8 V(Reference value)
4) Deviation between target rail pressure and actual rail pressure is too high

2. Possible fault causes:

1) High-pressure oil pump control fault
2) Pressure relief valve is blocked
3) High pressure rail pressure sensor hardware or circuit fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the high-pressure oil pump works abnormally.	Yes	Replace parts

		No	Next step
2	Check whether the pressure relief valve works abnormally.	Yes	Replace parts
		No	Next step
3	Check the high-pressure oil rail pressure sensor body and circuit for faults.	Yes	Replace parts or circuits
		No	Seek diagnostic assistance

P008700

High pressure rail pressure is low

1. Fault triggering conditions:

1) Engine running time >=5s(Reference value)
2) Catalyst heating not activated
3) High-pressure oil rail pressure sensor voltage 0.2~4.8 V (reference value
4) Deviation between target rail pressure and actual rail pressure is too large

2. Possible fault causes:

1) Oil circuit leakage
2) Insufficient fuel
3) Low-pressure oil pump fault
4) High-pressure oil pump fault
5) High pressure rail pressure sensor hardware or circuit fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check oil circuit for leaks	Yes	Repair oil circuit
		No	Next step
2	Check for insufficient fuel	Yes	Add fuel
		No	Next step
3	Check whether the low-pressure oil pump works abnormally.	Yes	Replace parts
		No	Next step
4	Check whether the high-pressure oil pump works abnormally.	Yes	Replace parts
		No	Next step
5	Check the high-pressure oil rail pressure sensor body and circuit for faults.	Yes	Replace parts or circuits
		No	Seek diagnostic assistance

P02CD00/P02D100/P02D300/P02CF00

Cylinder 1/3/4/2 CVO self-learning adjustment up to upper limit

1. Fault triggering conditions:

Engine water temperature -30~ 120 ° C(Reference value)

2. Possible fault causes:

1) The corresponding cylinder injector is damaged.

2) Relevant circuit fault of corresponding cylinder injector

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the corresponding cylinder injector is damaged.	Yes	Replacing fuel injector
		No	Next step
2	Check the corresponding cylinder injector circuit for faults	Yes	Repair or replace circuit
		No	Seek diagnostic assistance

P02CC00/P02D000/P02D200/P02CE00

Cylinder 1/3/4/2 CVO self-learning adjustment reaches lower limit

1. Fault triggering conditions:

Engine water temperature -30~ 120 ° C(Reference value)

2. Possible fault causes:

1) The corresponding cylinder injector is damaged.

2) Relevant circuit fault of corresponding cylinder injector

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the corresponding cylinder injector is damaged.	Yes	Replacing fuel injector
		No	Next step
2	Check the corresponding cylinder injector circuit for faults	Yes	Repair or replace circuit
		No	Seek diagnostic assistance

P126100/P126300/P126400/P126200

One/three/four/two cylinder CVO circuit signal unreasonable fault

1. Fault triggering conditions:

Engine water temperature -30~ 120 ° C(Reference value)

2. Possible fault causes:

1) Relevant circuit fault of corresponding cylinder injector

2) The corresponding cylinder injector is damaged.

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check cylinder No.1 fuel injector circuit for faults	Yes	Repair or replace circuit

		No	Next step
2	Inspect cylinder No.1 fuel injector for damage	Yes	Replacing fuel injector
		No	Seek diagnostic assistance

P020100/P020300/P020400/P020200

Cylinder 1/3/4/2 fuel injector control circuit open

1. Fault triggering conditions:

1) Battery voltage 9~16 V(Reference value)

2) Current fuel supply

2. Possible fault causes:

1) The connector of corresponding cylinder injector is not properly connected or in poor contact.

2) Relevant circuit of corresponding cylinder injector is open

3) Corresponding cylinder injector internal circuit fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the corresponding cylinder injector connector is not properly connected or in poor contact.	Yes	Repair or replace circuit
		No	Next step
2	Check the corresponding cylinder injector circuit for faults	Yes	Repair or replace circuit
		No	Next step
3	Inspect whether the corresponding cylinder injector is damaged.	Yes	Replacing fuel injector
		No	Seek diagnostic assistance

P214800

High and low voltage of cylinder 1 and cylinder 4 fuel injector control circuit are too high or too low.

1. Fault triggering conditions:

1) Battery voltage 9~16 V(Reference value)

2) Current fuel supply

2. Possible fault causes:

1) High-side control circuit of cylinder 1 or 4 fuel injector is short to power supply.

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether cylinder No.1 fuel injector high-side control circuit is short to power supply.	Yes	Repair or replace circuit
		No	Next step
2	Inspect whether high-side control circuit of cylinder 4 fuel injector is short to power supply.	Yes	Repair or replace circuit
		No	Seek diagnostic assistance

P215100

II. High/low voltage of cylinder No.3 fuel injector control circuit is too high or too low.

1. Fault triggering conditions:

1) Battery voltage 9~16 V(Reference value)

2) Current fuel supply

2. Possible fault causes:

1) Cylinder No.2 or No.3 fuel injector high-side control circuit is short to power supply.

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether cylinder No.2 fuel injector high-side control circuit is short to power supply.	Yes	Repair or replace circuit
		No	Next step
2	Inspect whether cylinder No.3 fuel injector high-side control circuit is short to power supply.	Yes	Repair or replace circuit
		No	Seek diagnostic assistance

P026200/P026800/P027100/P026500

Low or high voltage at low end of cylinder 1/3/4/2 fuel injector control circuit

1. Fault triggering conditions:

1) Battery voltage 9~16 V(Reference value)

2) Current fuel supply

2. Possible fault causes:

1) Corresponding cylinder injector control circuit is short to power supply

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the corresponding cylinder injector control circuit is short to power supply.	Yes	Repair or replace circuit
		No	Seek diagnostic assistance

P02EE00/P02F000/P02F100/P02EF00

Cylinder 1/3/4/2 fuel injector control circuit high/low end short circuit

1. Fault triggering conditions:

1) Battery voltage 9~16 V(Reference value)

2) Current fuel supply

3) Low side voltage <2.5 V

4) High side voltage <2.5 V

2. Possible fault causes:

1) Corresponding cylinder injector high-side control circuit and low-side control circuit are short-circuited.

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the corresponding cylinder injector high/low control circuit is short to each other.	Yes	Repair or replace circuit
		No	Seek diagnostic assistance

P062900

Fuel pump relay control circuit voltage too high

1. Fault triggering conditions:

1) Battery voltage >9V(Reference value)
2) Complete vehicle is powered on
3) Drive stage is not working
4) Output voltage too high

2. Possible fault causes:

1) Fuel pump relay control circuit is short to power supply
2) Fuel pump relay internal fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check fuel pump relay control circuit for short circuit to power supply	Yes	Repair or replace circuit
		No	Next step
2	Check fuel pump relay for damage	Yes	Replace relay
		No	Seek diagnostic assistance

P062800

Fuel pump relay control circuit voltage too low

1. Fault triggering conditions:

1) Battery voltage >9V(Reference value)
2) Complete vehicle is powered on
3) Drive stage in working state
4) Low output voltage)

2. Possible fault causes:

1) Fuel pump relay control circuit short circuit to ground
2) Fuel pump relay internal fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check fuel pump relay control circuit for short circuit to ground	Yes	Repair or replace circuit
		No	Next step
2	Check fuel pump relay for damage	Yes	Replace relay

		No	Seek diagnostic assistance

P062700

Fuel pump relay control circuit open

1. Fault triggering conditions:

1) Battery voltage >9V(Reference value)
2) Complete vehicle is powered on
3) Drive stage is not working
4) Output voltage 2~4.5 V(Reference value)

2. Possible fault causes:

1) Fuel pump relay control circuit disconnected
1) Fuel pump relay internal fault

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check fuel pump relay control circuit for disconnection	Yes	Repair or replace circuit
		No	Next step
2	Check fuel pump relay for damage	Yes	Replace relay
		No	Seek diagnostic assistance

P025100

High-pressure oil pump flow control valve control circuit open

1. Fault triggering conditions:

1) Battery voltage 9~16 V(Reference value)
2) Current fuel supply

2. Possible fault causes:

1) High-pressure oil pump flow control valve high-side or low-side control circuit is disconnected.

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check whether the high-side control circuit of high-pressure oil pump flow control valve is disconnected.	Yes	Repair or replace circuit
		No	Next step
2	Check whether the low-side control circuit of high-pressure oil pump flow control valve is disconnected.	Yes	Repair or replace circuit
		No	Seek diagnostic assistance

P025400

High-pressure oil pump flow control valve control circuit high-side voltage too high or too low

1. Fault triggering conditions:

1) Battery voltage 9~16 V(Reference value)

2) Current fuel supply

2. Possible fault causes:

1) High-side control circuit of high-pressure oil pump flow control valve is short to power supply or ground.

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the high-side control circuit of high-pressure oil pump flow control valve is short to power supply.	Yes	Repair or replace circuit
		No	Next step
2	Check high-side control circuit of high-pressure oil pump flow control valve for short circuit to ground	Yes	Repair or replace circuit
		No	Seek diagnostic assistance

P009000

The high and low ends of the high-pressure oil pump flow control valve control circuit are mutually shorted.

1. Fault triggering conditions:

1) Battery voltage 9~16 V(Reference value)

2) Engine speed >40 r/min(Reference value)

3) Current fuel supply

2. Possible fault causes:

1) High-pressure oil pump flow control valve high-side and low-side control circuits are mutually short-circuited.

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Check the high-side and low-side control circuits of the high-pressure fuel pump flow control valve for mutual short circuit.	Yes	Repair or replace circuit
		No	Seek diagnostic assistance

P025900

High-pressure oil pump flow control valve control circuit low side voltage too high or too low

1. Fault triggering conditions:

1) Battery voltage 9~16 V(Reference value)

2) Current fuel supply

2. Possible fault causes:

1) High-pressure oil pump flow control valve low-side control circuit is short to power supply or ground.

3. Post-fault treatment and phenomenon:

1) None

4. Diagnostic process:

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the low-side control circuit of high-pressure oil pump flow control valve is short to power supply.	Yes	Repair or replace circuit
		No	Next step

2	Check high-pressure oil pump flow control valve low-side control circuit for short circuit to ground	Yes	Repair or replace circuit
		No	Seek diagnostic assistance

P035100/ P035300/ P035400/ P035200

Cylinder 1/3/4/2 ignition coil control circuit open

1. Fault triggering conditions:

1) ECU detects the corresponding cylinder ignition coil control circuit open circuit

2. Possible fault causes:

1) The connector is not properly connected or disconnected.

2) Signal terminal open circuit

2) Signal terminal open circuit

3. Post-fault treatment and phenomenon:

1) Stop fuel injection of corresponding cylinder

2) Disable closed loop fuel control

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Inspect the connector for improper connection or poor contact.	Yes	Reconnect or replace connector
		No	Next step
2	Check whether the ignition coil signal terminal is open circuit	Yes	Repair harness
		No	Next step
3	Check ignition coil for damage	Yes	Replace ignition coil
		No	Next step
4	Inspect whether the ignition coil pin or circuit corresponding to ECU end is damaged.	Yes	Check ECU
		No	Diagnostic aid

P230100/ P230700/ P231000/ P230400

High voltage of ignition coil control circuit of cylinder 1/3/4/2

1. Fault triggering conditions:

1) ECU detects that the corresponding cylinder ignition coil control circuit is short to power supply.

2、 Possible fault causes:

1) The connector is not properly connected or disconnected;

2) Signal terminal short circuit;

3) The ignition coil is damaged;

3、 Post-fault treatment and phenomena:

1) Stop fuel injection of the corresponding cylinder;

2) Disable closed loop fuel control;

4、 Diagnostic process

Serial number	Operation steps	Test result	Next steps

1	Inspect the connector for improper connection or poor contact.	Yes	Reconnect or replace connector
		No	Next step
2	Check whether the ignition coil signal terminal is shorted to the power supply.	Yes	Repair harness
		No	Next step
3	Check ignition coil for damage	Yes	Replace ignition coil
		No	Next step
4	Inspect whether the ignition coil pin or circuit corresponding to ECU end is damaged.	Yes	Check ECU
		No	Diagnostic aid

P230000/ P230600/ P230900/ P230300

Low voltage of ignition coil control circuit of cylinder 1/3/4/2

1. Fault triggering conditions:

1) ECU detects the corresponding cylinder ignition coil control circuit is short to ground.

2. Possible fault causes:

1) The connector is not properly connected or disconnected.
2) Signal terminal short circuit
3) Ignition coil damage

3. Post-fault treatment and phenomenon:

1) Stop fuel injection of corresponding cylinder
2) Disable closed loop fuel control

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Inspect the connector for improper connection or poor contact.	Yes	Reconnect or replace connector
		No	Next step
2	Check whether the ignition coil signal terminal is short circuit to ground.	Yes	Repair harness
		No	Next step
3	Check ignition coil for damage	Yes	Replace ignition coil
		No	Next step
4	Inspect whether the ignition coil pin or circuit corresponding to ECU end is damaged.	Yes	Check ECU
		No	Diagnostic aid

P030000/P030100/P030200/P030300/ P030400/P036300

Single cylinder or multi-cylinder misfire/1 cylinder misfire/2 cylinder misfire/3 cylinder misfire/4 cylinder misfire/engine misfire triggering fuel cut-off

1. Fault triggering conditions:

1) No misfire diagnosis related DTC(Intake pressure temperature sensor, coolant temperature sensor, throttle position sensor, crankshaft position sensor, camshaft position sensor, vehicle speed sensor, etc.)

2) Engine speed range is 450 rpm~6500 rpm(Reference value)

3) Battery voltage range 11 V~16 V(Reference value)

4) Coolant temperature range -7℃~ 120 ° C(Reference value)

5) Fuel level >15%(Reference value)

6) Atmospheric pressure >72kPa(Reference value)

2. Possible fault causes:

1) ECM misfire self-learning learning is incorrect(Replace ECU, engine, flywheel and other self-learning)

2) Ignition system fault(Faulty connection of spark plug, ignition coil, ECM end and ignition coil control circuit and related connectors, etc.)

3) Fuel supply system fault(Incorrect fuel pressure, fuel injector leakage, blockage, damage, etc., incorrect connection fault between ECM end and fuel injector control circuit and relevant connectors, etc.)

4) Intake system leaks, exhaust system is blocked

5) Poor use of vehicle oil, insufficient maintenance (engine oil is not replaced as required), serious carbon deposit

6) Engine mechanical problems(Incorrect ignition timing, incorrect valve timing, 58X gear plate processing and installation problems, valve leakage, abnormal VVT operation, engine cylinder block internal damage, etc.)

7) Crankshaft position sensor installed incorrectly

3. Post-fault treatment and phenomenon:

1) Low misfire: Only record the fault code and turn on the fault MIL;

2) High misfire degree: Forced fuel cut-off, idling jitter, insufficient power; MIL flashing at 1 Hz

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Connect the diagnostic scanner, and set the ignition switch to "ON."		Next step
2	Read out the fault code and check whether it exists. ECM gear learning fault	Yes	The diagnostic scanner performs ECM gear learning.
		No	Next step
3	Check ignition system (circuit, ignition coil, spark plug) for physical faults	Yes	Repair or replace faulty parts
		No	Next step
4	Check fuel system (circuit, fuel injector, high and low pressure fuel pump, oxygen sensor) for physical faults	Yes	Repair or replace faulty parts
		No	Next step
5	Inspect whether the intake/exhaust system has leakage or blockage physical fault.	Yes	Repair or replace faulty parts
		No	Next step
6	Check vehicle oil and maintenance for abnormality	Yes	Oil change or maintenance
		No	Next step
7	Check engine for mechanical problems (Incorrect ignition timing, incorrect valve timing, processing and installation of 58X gear plate, valve leakage, low cylinder pressure, abnormal VVT operation, internal damage of engine cylinder block, etc.)	Yes	Repair or replace faulty parts
		No	Next step
8	Check whether the engine and complete vehicle harness are abnormal.	Yes	Repair or replace wiring harness
		No	Seek diagnostic assistance

P033664/P033900

Crankshaft sensor pulse width signal unreasonable/crankshaft position sensor signal unreasonable

1. Fault triggering conditions:

1) Speed sensor DGI signal fault counter exceeds the threshold

2. Possible fault causes:

1) The connector is not properly connected or disconnected.
2) Sensor fault
3) Signal interference when the engine is started or stopped
4) Signal wheel produces wrong signal

3. Post-fault treatment and phenomenon:

1) None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Inspect the connector for improper connection or poor contact.	Yes	Wiring harness maintenance
		No	Next step
2	Check wiring harness for external interference	Yes	Shielded harness
		No	Next step
3	Check speed sensor for damage or fault	Yes	Replace sensor
		No	Next step
4	Check whether the original signal of speed signal wheel is faulty.	Yes	Reinstall or replace signal wheel
		No	Diagnostic aid

P261700

Crankshaft position sensor signal loss

1. Fault triggering conditions

1) ECU does not detect valid engine speed pulse signal within a certain time.

2. Possible fault causes:

1) The connector is not properly connected or disconnected.
2) Sensor fault
3) Short circuit of control circuit between crankshaft position sensor and ECU
4) Sensor installation position error

3. Post-fault treatment and phenomenon:

1) None

4. Diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Inspect the connector for improper connection or poor contact.	Yes	Wiring harness maintenance
		No	Next step
2	Check crankshaft position sensor for damage or fault	Yes	Replace sensor
		No	Diagnostic aid

Fault symptom diagnosis check and confirmation

Check and confirm layout position

The ECM is designed to be installed in the engine compartment (but not on the engine body), and shall be placed in an easy-to-maintain place. The ECM assembly position shall be sufficiently ventilated, and the ECM installation direction shall be such that the heat dissipating fins on the housing conform to the air flow direction, so as to effectively prevent the heat released by the surrounding parts from dissipating heat to the ECM; The installation position shall effectively prevent electromagnetic and RF interference of other parts to ECM; Do not install the ECM in a position that is very dirty and damp, or is liable to cause water ingress or water droplets to spill; The ECM housing must be properly grounded to the vehicle, and the ECM housing and retaining bolts must be electrically insulated from the vehicle chassis.

Appearance check list

The housing of ECM is composed of aluminum alloy upper cover and aluminum alloy bottom plate press buckle, and assembled with silicone seal. The upper cover is covered with black coating, and the bottom plate is not specially treated and coated, but shall not have sharp burrs and sharp edges. (The material of upper cover and bottom plate is aluminum alloy AW -5754.)Nominal dimensions of housing of ECM are as follows (excluding female end of ECM connector): Without bracket: Length 200 .7 mm, width 181 mm, thickness 45 mm; Bracket included: Length 200 .7 mm, width 202 .5 mm, thickness 46 mm. Product identification label is affixed in the middle of ECM housing, which can indicate customer information, engine model, ECM number and calibration data version number. ECM connector has two configurations: 198 pins and 164 pins. Connector pin material is CuZn30, large terminal is tinned, and small terminal is silver plated.

Fault phenomenon and judgment method

1 Fault phenomenon: Unstable idle speed, poor acceleration, unable to start, high idle speed, out-of-standard exhaust gas, difficult start, A/C failure, injector control failure, flameout, etc.

2 General fault cause:

- Due to electrical overload of external device, internal parts of ECU are burnt down, resulting in failure.
- The circuit board is rusted due to ECU water intake.
- The status of the part changes or the self-learning value is cleared.

3 Maintenance precautions:

- Do not dismantle ECU randomly during maintenance;
- Please dismantle the battery head for more than 1 minute before dismantling ECU;
- Disassemble ECU before electric welding, and store ECU after disassembling;
- It is forbidden to install any circuit on the ECU connecting line.

4 Simple measurement method:

- (Connect connector) Read engine fault record with engine data K line;
- Remove connector) Check whether ECU connection line is in good condition and check whether ECU power supply and grounding circuit are normal;
- Check whether the external sensor works normally, whether the output signal is credible and whether the circuit is in good condition;
- Check whether the actuator works normally and whether the circuit is in good condition;
- Finally replace ECU for test.

Troubleshooting process according to fault symptoms

Before starting the steps of fault diagnosis according to engine fault phenomenon, preliminary inspection shall be carried out first:

1 Confirm the engine malfunction indicator lamp works normally;
2 Check with a fault diagnostic scanner and confirm that there is no fault information record;
3 Confirm that the fault phenomenon of the owner complaint

exists, and confirm the conditions under which the fault occurs. Then

perform visual inspection:

1 Check whether there is fuel pipeline leakage;
2 Check whether the vacuum pipeline is broken or kinked, and whether the connection is correct;
3 Check whether the inlet trachea circuit is blocked, leaking, flattened or damaged;
4 Check whether the high voltage line of the ignition system is broken and aged, and whether the ignition sequence is correct;
5 Check whether the harness grounding is clean and firm;
6 Inspect each sensor and actuator connector for looseness or poor contact.

Important note: If the above phenomenon exists, first carry out maintenance work according to the fault

condition, or else it will affect the later fault diagnosis and repair work. Diagnostic aid

1 Confirm that the engine has no fault records;
2 Confirm the symptom of complaint;
3 Check according to the above steps, and no abnormality is found;
4 Do not ignore the impact of vehicle maintenance, cylinder pressure, mechanical ignition timing and fuel on the system during overhaul;
5 Replace ECU and perform test.

If the fault phenomenon can be eliminated at this time, the fault position is in ECU; if the fault phenomenon still exists at this time, replace the original ECU, repeat the process, and perform overhaul again.

When starting, the engine does not rotate or rotates slowly.

General fault position

- Battery
- Starter motor
- Harness or ignition switch
- Engine mechanical part diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Use a multimeter to check whether the voltage between two battery terminals is about 8-12 V when the engine is started.	Yes	Next step
		No	Replace battery
2	Keep the ignition switch in the starting position, and use a multimeter to check whether the positive terminal of the starter motor has voltage above 8V.	Yes	Next step
		No	Repair or replace wiring harness
3	Remove the starter motor and check the working condition of the starter motor. Check it for open circuit or stuck due to poor lubrication.	Yes	Repair or replace starter motor
		No	Next step
4	If the fault only occurs in winter, check whether the engine lubricating oil and gearbox oil are improperly selected, resulting in excessive resistance of starter motor.	Yes	Replace the lubricating oil with a proper number.
		No	Next step
5	Check whether the internal mechanical resistance of the engine is too large, causing the starter motor to not rotate or rotate slowly.	Yes	Overhaul engine internal resistance
		No	Diagnostic aid

When starting, the engine can be driven but cannot be started successfully.

General fault position

· Fuel tank is free of oil;

· Fuel pump;

· Speed sensor;

· Ignition coil;

· Engine

mechanical part.

Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Connect the fuel pressure gauge (the access point is the front end of the fuel inlet pipe of the fuel distribution pipe assembly), start the engine, and check whether the fuel pressure is around 350kPa.	Yes	Next step
		No	Overhaul fuel supply system
2	Connect EFI system diagnostic scanner, observe "engine speed" data item, start the engine, and observe whether there is speed signal output.	Yes	Next step
		No	Overhaul speed sensor circuit
3	Pull out the split line of one cylinder, connect the spark plug, make the spark plug electrode 5 mm from the engine block, start the engine, and check whether there is blue and white high-pressure fire.	Yes	Next step
		No	Overhaul ignition system
4	Check the pressure of each cylinder of the engine, and observe whether the engine cylinder has insufficient pressure.	Yes	rule out Engine mechanical fault
		No	Next step

Hard to start

General fault position

- Fuel water
- Fuel pump
- Coolant temperature sensor
- Fuel pressure regulator vacuum pipe
- Ignition coil diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Connect the fuel pressure gauge (the access point is the front end of the fuel inlet pipe of the fuel distribution pipe assembly), start the engine, and check whether the fuel pressure is around 350kPa.	Yes	Next step
		No	Overhaul fuel supply system
2	Pull out the split line of one cylinder, connect the spark plug, make the spark plug electrode 5 mm from the engine block, start the engine, and check whether there is blue and white high-pressure fire.	Yes	Next step
		No	Overhaul ignition system
3	Remove the coolant temperature sensor connector, start the engine, and observe whether the engine is started successfully. (Or connect a 300 ohm resistance in series at the coolant temperature sensor connector to replace the coolant temperature sensor, and observe whether the engine starts successfully at this time.)	Yes	Overhaul circuit or replace sensor
		No	Next step
4	Check whether the fuel pressure regulator vacuum pipe is loose or leaks.	Yes	Overhaul or replace
		No	Next step
5	Check the fuel condition and observe whether the fault phenomenon is caused by just after refueling.	Yes	Replace fuel
		No	Next step

Cold start difficulty

General fault position

- Fuel water
- Fuel pump
- Coolant temperature sensor
- Fuel injector
- Ignition coil
- Throttle body
- Engine mechanical part diagnostic steps

Serial number	Operation steps	Test result	Next steps
1	Connect the fuel pressure gauge (the access point is the front end of the fuel inlet pipe of the fuel distribution pipe assembly), start the engine, and check whether the fuel pressure is around 350kPa.	Yes	Next step
		No	Overhaul fuel supply system
2	Pull out the split line of one cylinder, connect the spark plug, make the spark plug electrode 5 mm from the engine block, start the engine, and check whether there is blue and white high-pressure fire.	Yes	Next step
		No	Overhaul ignition system
3	Remove the coolant temperature sensor connector, start the engine, and observe whether the engine is started successfully. (Or connect a 2500 ohm resistance in series at the coolant temperature sensor connector to replace the coolant temperature sensor, and observe whether the engine starts successfully at this time.)	Yes	Overhaul circuit or replace sensor
		No	Next step
4	Gently depress the accelerator pedal and observe whether it is easy to start.	Yes	Clean throttle valve and idle airway
		No	Next step
5	Remove the fuel injector, and check the fuel injector for leakage or blockage with the fuel injector special cleaning analyzer.	Yes	Replacement of fault
		No	Next step
6	Check the fuel condition and observe whether the fault phenomenon is caused by just after refueling.	Yes	Replace fuel
		No	Next step
7	Check the pressure of each cylinder of the engine, and observe whether the engine cylinder has insufficient pressure.	Yes	rule out Engine mechanical fault
		No	Next step

Normal speed, difficult to start at any time

General fault position

- Fuel water
- Fuel pump
- Coolant temperature sensor
- Fuel injector
- Ignition coil
- Electronic throttle body
- Intake port
- Ignition timing
- Spark plug
- Engine mechanical part diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Check whether the air filter is blocked and whether the intake passage is leaking.	Yes	Overhaul intake system
		No	Next step
2	Connect the fuel pressure gauge (the access point is the front end of the fuel inlet pipe of the fuel distribution pipe assembly), start the engine, and check whether the fuel pressure is around 350kPa.	Yes	Next step
		No	Overhaul fuel supply system
3	Pull out the split line of one cylinder, connect the spark plug, make the spark plug electrode 5 mm from the engine block, start the engine, and check whether there is blue and white high-pressure fire.	Yes	Next step
		No	Overhaul ignition system
4	Check the spark plugs of each cylinder, and observe whether the type and clearance meet the specifications.	Yes	Next step
		No	Adjust or replace
5	Remove the coolant temperature sensor connector, start the engine, and observe whether the engine is started successfully.	Yes	Overhaul circuit or replace sensor
		No	Next step
6	Gently depress the accelerator pedal and observe whether it is easy to start.	Yes	Clean throttle valve and idle airway
		No	Next step

Serial number	Operation steps	Test result	Next steps
7	Remove the fuel injector, and check the fuel injector for leakage or blockage with the fuel injector special cleaning analyzer.	Yes	Replacement of fault
		No	Next step
8	Check the fuel condition and observe whether the fault phenomenon is caused by just after refueling.	Yes	Replace fuel
		No	Next step
9	Check the pressure of each cylinder of the engine, and observe whether the engine cylinder has insufficient pressure.	Yes	rule out Engine mechanical fault
		No	Next step
10	Check whether the ignition sequence and ignition timing of the engine meet the specifications.	Yes	Next step
		No	Overhaul ignition timing

Normal starting, but unstable idling at any time

General fault position

· Fuel water;

· Fuel injector;

· Spark plug;

· Throttle body and idle bypass passage;

· Intake port;

· Electronic throttle body;

· Ignition timing;

· Spark plug;

· Engine mechanical part. Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check whether the air filter is blocked and whether the intake passage is leaking.	Yes	Overhaul intake system
		No	Next step
2	Check whether the idle speed regulator is stuck.	Yes	Clean or replace
		No	Next step
3	Check the spark plugs of each cylinder, and observe whether the type and clearance meet the specifications.	Yes	Next step
		No	Adjust or replace

Serial number	Operation steps	Test result	Next steps
4	Inspect the throttle body and idle bypass passage for carbon deposits.	Yes	Cleaning
		No	Next step
5	Dismantle the fuel injector, and use the special cleaning analyzer of the fuel injector to check whether the fuel injector has leakage, blockage or flow error.	Yes	Replacement of fault
		No	Next step
6	Check the fuel condition and observe whether the fault phenomenon is caused by just after refueling.	Yes	Replace fuel
		No	Next step
7	Check the pressure of each cylinder of the engine, and observe whether there is large difference in the engine cylinder pressure.	Yes	rule out Engine mechanical fault
		No	Next step
8	Check whether the ignition sequence and ignition timing of the engine meet the specifications.	Yes	Next step
		No	Overhaul ignition timing

Normal starting, unstable idle speed during warm-up

General fault position

- Fuel water
- Coolant temperature sensor
- Spark plug
- Throttle volume carbon
- Intake port
- Engine mechanical part

Serial number	Operation steps	Test result	Next steps
1	Check whether the air filter is blocked and whether the intake passage is leaking.	Yes	Overhaul intake system
		No	Next step
2	Check the spark plugs of each cylinder, and observe whether the type and clearance meet the specifications.	Yes	Next step
		No	Adjust or replace
3	Inspect the throttle body for carbon deposits.	Yes	Cleaning related parts
		No	Next step
4	Remove the coolant temperature sensor connector, start the engine, and observe whether the engine idle speed is unstable during warm-up.	Yes	Overhaul circuit or replace sensor
		No	Next step

Serial number	Operation steps	Test result	Next steps
5	Dismantle the fuel injector, and use the special cleaning analyzer of the fuel injector to check whether the fuel injector has leakage, blockage or flow error.	Yes	Replacement of fault
		No	Next step
6	Check the fuel condition and observe whether the fault phenomenon is caused by just after refueling.	Yes	Replace fuel
		No	Next step
7	Check the pressure of each cylinder of the engine, and observe whether there is large difference in the engine cylinder pressure.	Yes	rule out Engine mechanical fault
		No	Next step

Normal starting, unstable idle speed after warm-up

General fault position

- Fuel water
- Coolant temperature sensor
- Spark plug
- Throttle volume carbon
- Intake port
- Engine mechanical part diagnosis process

Serial number	Operation steps	Test result	Next steps
1	Check whether the air filter is blocked and whether the intake passage is leaking.	Yes	Overhaul intake system
		No	Next step
2	Check the spark plugs of each cylinder, and observe whether the type and clearance meet the specifications.	Yes	Next step
		No	Adjust or replace
3	Inspect the throttle body for carbon deposits.	Yes	Cleaning related parts
		No	Next step
4	Remove the coolant temperature sensor connector, start the engine, and observe whether the engine idle speed is unstable during warm-up.	Yes	Overhaul circuit or replace sensor
		No	Next step
5	Dismantle the fuel injector, and use the special cleaning analyzer of the fuel injector to check whether the fuel injector has leakage, blockage	Yes	Replacement of fault
		No	Next step

Serial number	Operation steps	Test result	Next steps
6	Check the fuel condition and observe whether the fault phenomenon is caused by just after refueling.	Yes	Replace fuel
		No	Next step
7	Check the pressure of each cylinder of the engine, and observe whether there is large difference in the engine cylinder pressure.	Yes	rule out Engine mechanical fault
		No	Next step

Normal starting, unstable idle speed or flameout under partial load such as: Air conditioning

General fault position

- A/C system
- Idle speed regulator
- Injector diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Inspect the throttle body for carbon deposits.	Yes	Cleaning related parts
		No	Next step
2	Observe whether the engine output power increases when the A/C is turned on, that is, observe the change of ignition advance angle, fuel injection pulse width and intake air volume with the EFI system diagnostic scanner.	Yes	Go to Step 4
		No	Next step
3	Connect the EFI system adapter, disconnect the 75# pin connection wire of the electronic control unit, and check whether the harness terminal is high level signal when the A/C is turned on.	Yes	Next step
		No	Overhaul A/C system
4	Check whether the A/C system pressure, compressor electromagnetic clutch and A/C compression pump are normal.	Yes	Next step
		No	Overhaul A/C system

Normal starting and high idle speed

General fault position

- Throttle body and idle bypass passage
- Vacuum pipe
- Idle speed regulator
- Coolant temperature sensor

- Ignition timing

Serial number	Operation steps	Test result	Next steps
1	Check whether the accelerator cable is stuck or too tight.	Yes	Adjustment
		No	Next step
2	Check the intake system and the connected vacuum pipe for air leakage.	Yes	Overhaul intake system
		No	Next step
3	Remove the idle speed regulator, and check the throttle body, idle speed regulator and idle speed bypass passage for carbon deposits.	Yes	Cleaning related parts
		No	Next step
4	Remove the coolant temperature sensor connector, start the engine, and observe whether the engine idle speed is too high.	Yes	Overhaul circuit or replace sensor
		No	Next step
5	Check whether the ignition timing of the engine complies with specifications.	Yes	Next step
		No	Overhaul ignition timing

Speed does not go off or flameout during acceleration

General fault position

· Fuel water

· Intake pressure sensor and throttle position sensor

· Spark plug

· Throttle body and idle bypass passage

· Intake port

· Idle speed regulator

· Fuel injector

· Ignition timing

· Row trachea diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check whether the air filter is blocked.	Yes	Overhaul intake system
		No	Next step

Serial number	Operation steps	Test result	Next steps
2	Connect the fuel pressure gauge (the access point is the front end of the fuel inlet pipe of the fuel distribution pipe assembly), start the engine, and check whether the fuel pressure is around 350kPa during acceleration.	Yes	Next step
		No	Overhaul fuel supply system
3	Check the spark plugs of each cylinder, and observe whether the type and clearance meet the specifications.	Yes	Next step
		No	Adjust or replace
4	Remove the idle speed regulator, and check the throttle body, idle speed regulator and idle speed bypass passage for carbon deposits.	Yes	Cleaning related parts
		No	Next step
5	Check whether intake pressure sensor, throttle position sensor and their circuits are normal.	Yes	Next step
		No	Overhaul circuit or replace sensor
6	Remove the fuel injector, and check the fuel injector for leakage or blockage with the fuel injector special cleaning analyzer.	Yes	Replacement of fault
		No	Next step
7	Check the fuel condition and observe whether the fault phenomenon is caused by just after refueling.	Yes	Replace fuel
		No	Next step
8	Check whether the ignition sequence and ignition timing of the engine meet the specifications.	Yes	Next step
		No	Overhaul ignition timing
9	Check whether exhaust of exhaust trachea is smooth.	Yes	Next step
		No	Repair or replace row trachea

Slow response during acceleration

General fault position

· Fuel water;

· Intake pressure sensor and throttle position sensor;

· Spark plug;

· Throttle body and idle bypass passage;

· Intake port;

· Idle speed regulator;

· Fuel injector;

· Ignition timing;

· Row trachea.

Diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Check whether the air filter is blocked.	Yes	Overhaul intake system
		No	Next step
2	Connect the fuel pressure gauge (the access point is the front end of the fuel inlet pipe of the fuel distribution pipe assembly), start the engine, and check whether the fuel pressure is around 350kPa during acceleration.	Yes	Next step
		No	Overhaul fuel supply system
3	Check the spark plugs of each cylinder, and observe whether the type and clearance meet the specifications.	Yes	Next step
		No	Adjust or replace
4	Remove the idle speed regulator, and check the throttle body, idle speed regulator and idle speed bypass passage for carbon deposits.	Yes	Cleaning related parts
		No	Next step
5	Check whether intake pressure sensor, throttle position sensor and their circuits are normal.	Yes	Next step
		No	Overhaul circuit or replace sensor
6	Remove the fuel injector, and check the fuel injector for leakage or blockage with the fuel injector special cleaning analyzer.	Yes	Replacement of fault
		No	Next step
7	Check the fuel condition and observe whether the fault phenomenon is caused by just after refueling.	Yes	Replace fuel
		No	Next step
8	Check whether the ignition sequence and ignition timing of the engine meet the specifications.	Yes	Next step
		No	Overhaul ignition timing
9	Check whether exhaust of exhaust trachea is smooth.	Yes	Next step
		No	Repair or replace row trachea

Weak during acceleration, poor performance

General fault position

· Fuel water

· Intake pressure sensor

· Spark plug

· Ignition coil

· Throttle body

· Intake port

· Fuel injector

· Ignition timing

· Row trachea diagnostic process

Serial number	Operation steps	Test result	Next steps
1	Inspect for clutch slip, low tire pressure, brake drag, incorrect tire size, incorrect four-wheel alignment, etc.	Yes	Repair
		No	Next step
2	Check whether the air filter is blocked.	Yes	Overhaul intake system
		No	Next step
3	Connect the fuel pressure gauge (the access point is the front end of the fuel inlet pipe of the fuel distribution pipe assembly), start the engine, and check whether the fuel pressure is around 350kPa during acceleration.	Yes	Next step
		No	Overhaul fuel supply system
4	Pull out the split line of one cylinder, connect the spark plug, make the spark plug electrode 5 mm from the engine block, start the engine, and check whether the high-pressure fire intensity is normal.	Yes	Next step
		No	Overhaul ignition system
5	Check the spark plugs of each cylinder, and observe whether the type and clearance meet the specifications.	Yes	Next step
		No	Adjust or replace
6	Inspect the throttle body and airway for carbon deposits.	Yes	Cleaning related parts
		No	Next step
7	Check whether intake pressure sensor and throttle circuit are normal.	Yes	Next step
		No	Overhaul circuit or replace sensor
8	Remove the fuel injector, and check the fuel injector for leakage or blockage with the fuel injector special cleaning analyzer.	Yes	Replacement of fault
		No	Next step
9	Check the fuel condition and observe whether the fault phenomenon is caused by just after refueling.	Yes	Replace fuel
		No	Next step

Serial number	Operation steps	Test result	Next steps
11	Check whether exhaust of exhaust trachea is smooth.	Yes	Next step
		No	Repair or replace row trachea

Removal and installation

Electronic controller unit

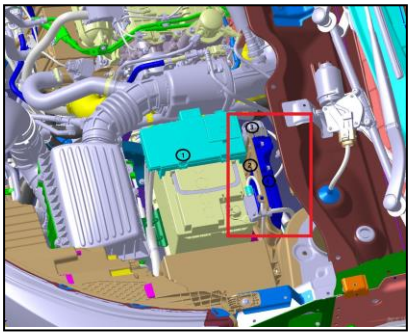
1. Removal

   1 Remove battery. Reference: Battery assembly Battery assembly

   2 Remove the ECU mounting bracket (as shown in Figure 2): Remove the mounting bolts of 4 ECU bracket with M6 sleeve.

   3 Manually remove the harness connector at ECU end (as shown in Figure 3), and then use M6 sleeve to remove 4 ECU mounting bolts.

   4 Take out 4 ECU mounting bolts and remove ECU.(As shown in Figure 4)



2. Installation

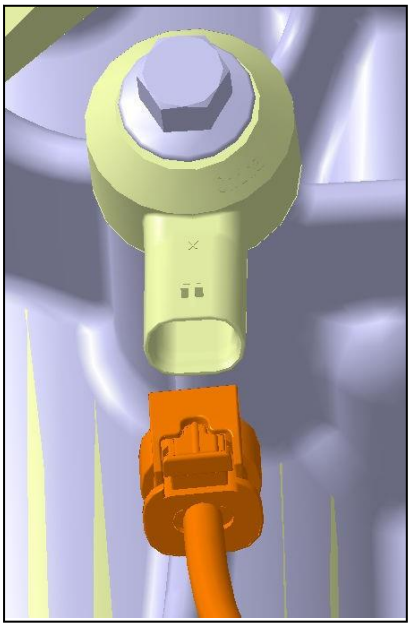
   1 **Installation sequence is reverse to removal sequence**

Knock sensor

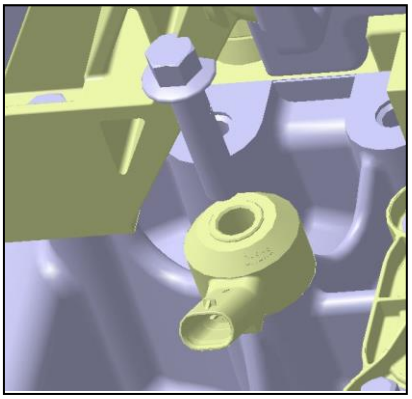
1. Removal

   1 Power off the vehicle.

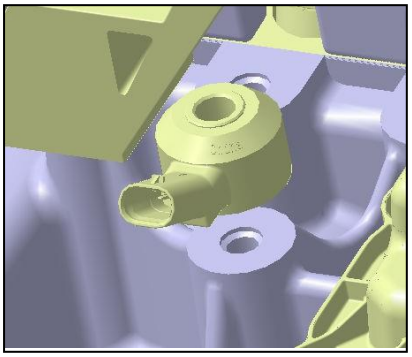
   2 Release knock sensor connector.



   3 Loosen the knock sensor bolts.



4 Remove knock sensor.



2. Installation

Installation reverse to removal

Warning **Before installation, check each part for deterioration or damage, and replace it if any defect is found.**

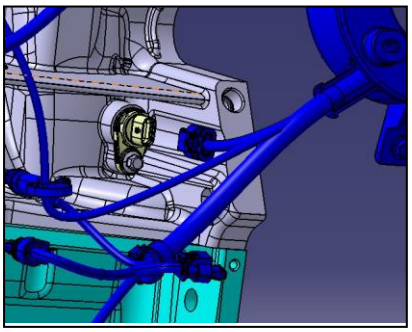
Fix the knock sensor to the mounting hole with bolts, and ensure that the mounting surface of the knock sensor is clean during installation. Tightening torque 20±1Nm (7.5 ftlb.).

Crankshaft position sensor

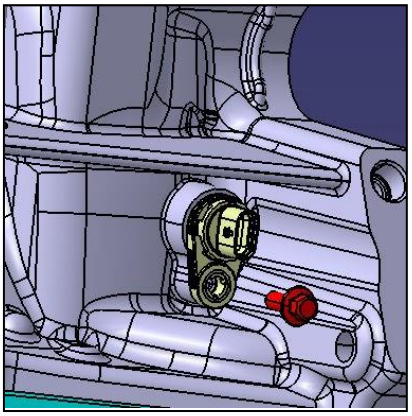
1. Removal

1 Power off the vehicle.

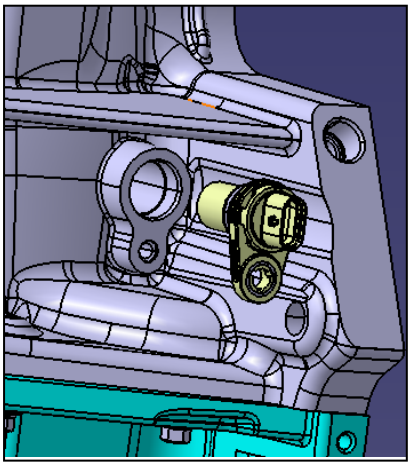
2 Unplug the harness connector.



3 Use T-sleeve to remove retaining bolt.



4 Remove the crankshaft position sensor.



2. Installation

Installation is reverse to removal.

Warning Before installation, check each part for deterioration or damage, and replace it if any defect is found. Clean the mounting hole before mounting the crankshaft position sensor to prevent iron scraps and other debris.

Before installing the sensor into the mounting port, apply a small amount of lubricating oil at the sealing ring, and then gently screw the sensor into the mounting port. It is not allowed to knock.

The installation torque should be within 10±2Nm.

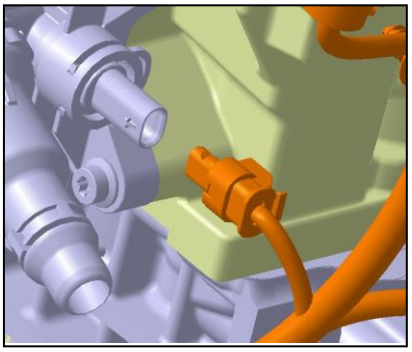
Replace the crankshaft position sensor and clean the oil stain. Do not replace the crankshaft position sensor when the vehicle is powered on.

Water temperature sensor

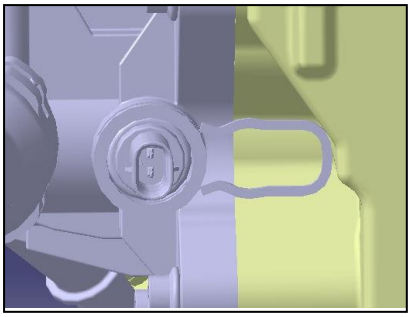
1. Removal

1 Power off the vehicle.

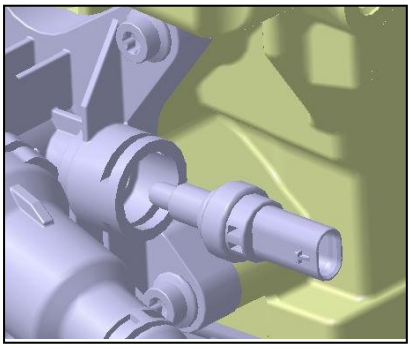
2 Disconnect the harness connector.



3 Remove the buckle.



4 Remove water temperature sensor.



2. Installation

Installation is reverse to removal.

Warning Before installation, check each part for deterioration or damage. If any defect is found, clean the mounting hole before installing the water temperature sensor to prevent iron chips and other sundries.

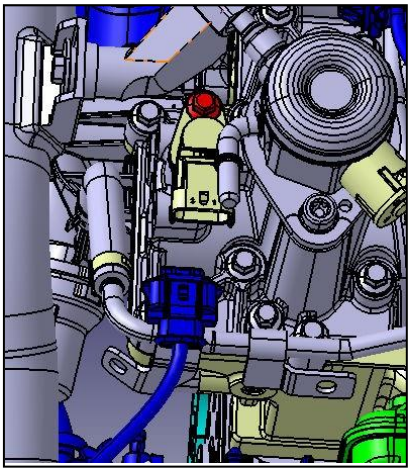
When the coolant is in hot state, do not repair it to avoid burns. When the system is cooled, it can be repaired.

Camshaft position sensor

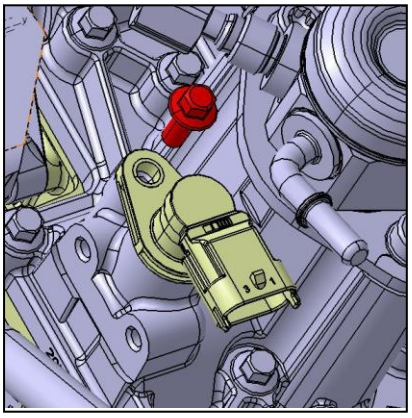
1. Removal

1 Power off the vehicle.

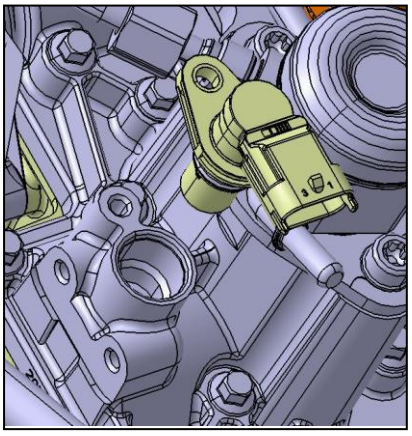
2 Disconnect the harness connector.



3 Use T-sleeve to remove retaining bolt.



4 Remove the camshaft position sensor assembly.



2. Installation

Installation reverse to removal

Warning Before installation, check each part for deterioration or damage, and replace it if any defect is found. Clean the mounting hole before mounting the camshaft position sensor to prevent iron scraps and other debris.

Before installing the sensor into the mounting port, apply a small amount of lubricating oil at the sealing ring, and then gently screw the sensor into the mounting port. It is not allowed to knock.

The installation torque should be within 10±2Nm.

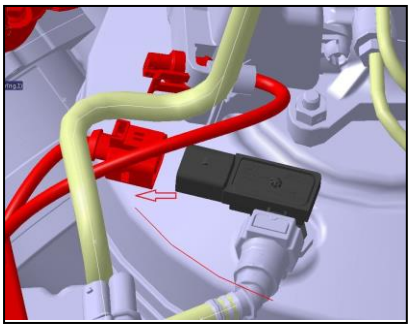
Replace the camshaft position sensor and clean the oil stain. Do not replace the camshaft position sensor when the vehicle is powered on.

Vacuum pressure sensor

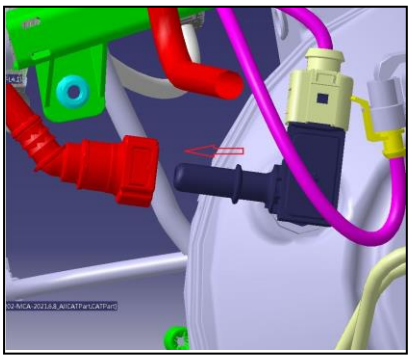
1. Removal

1 Vehicle power off

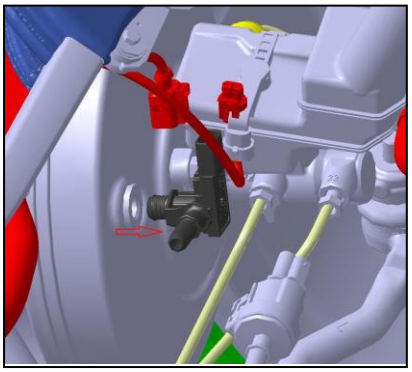
2 Disconnect the harness connector.



3 Remove connecting lines.



4 Remove the sensor unit.



2. Installation

Installation in reverse order of removal

Warning **Before installation, check each part for deterioration or damage, and replace it if any defect is found. Clean the mounting hole before installing the sensor.**

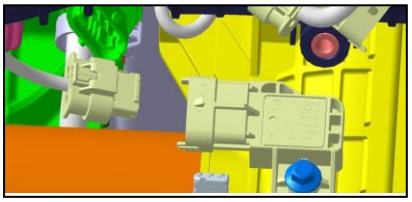
Do not replace the sensor when the vehicle is powered on.

Boost pressure temperature sensor

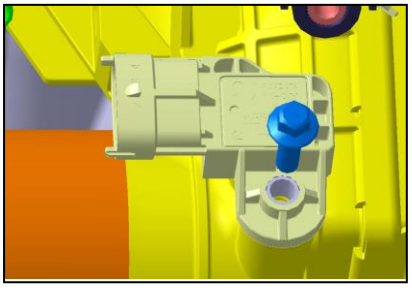
1. Removal

   1 Power off the vehicle.

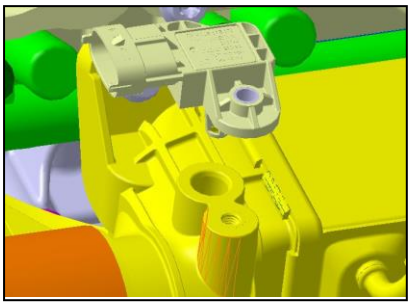
   2 Unplug the harness connector.



   3 Remove the bolts that fasten the sensor with the sleeve.



   4 Remove the sensor unit.



2. Installation

   Installation reverse to removal

   Warning **Before installation, check each part for deterioration or damage, and replace it if any defect is found.**

   Before assembling the sensor, apply a little lubricating oil on the sensor 0-ring seal. Be careful not to enter the pressure probe hole. The installation torque should be within 10±2Nm.

   Clean the mounting hole before installing the sensor to prevent debris and other debris. Clean the oil stain after replacing the sensor.

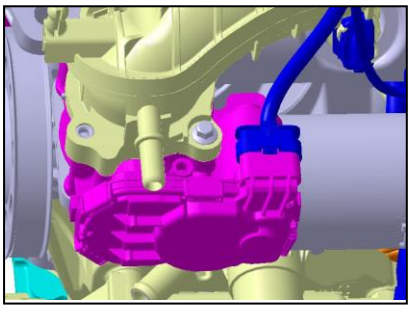
   Do not replace the sensor when the vehicle is powered on.

Electronic throttle body

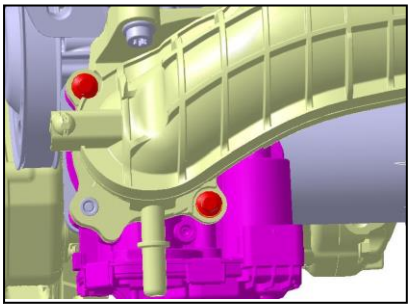
1. Removal

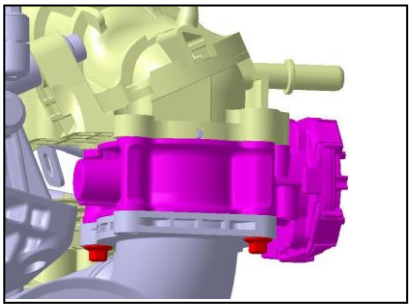
1 Power off the vehicle;

2 Unplug the throttle body connector;

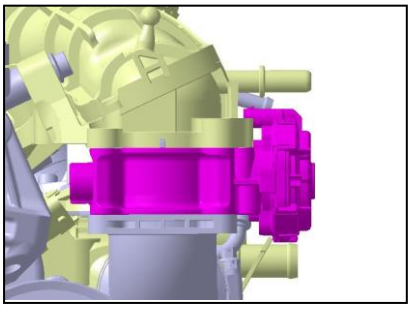


3 Remove the connecting bolts of throttle body, intake manifold and intercooler outlet trachea;





4 Remove throttle body.



2. Installation

Installation reverse to removal

3. Throttle body self-learning

1 Turn the ignition switch to "ON" position and wait for 60 s;

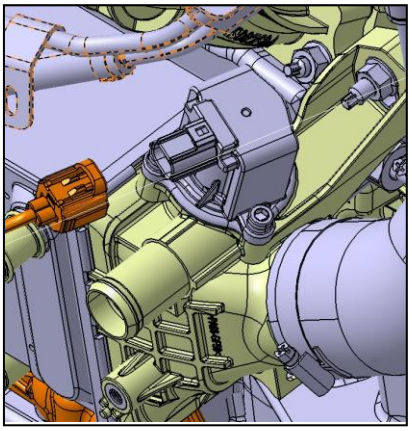
2 Start the vehicle and stop ignition when the idle speed is stable;

3 Turn the ignition switch to "OFF" position, wait for 10 s, and finish self-learning.

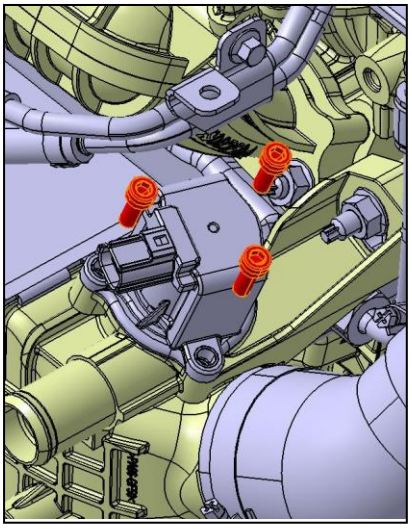
Intake relief valve

1. Removal

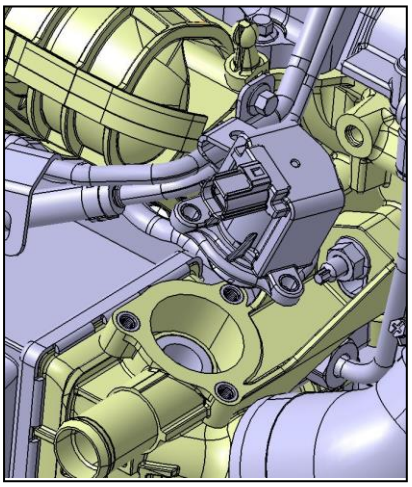
1 Pull off wire harness connector.



2 Loosen the three mounting bolts.



3 Remove the intake relief valve assembly from the counterpart.



2. Installation

The installation process is the reverse of the removal process.

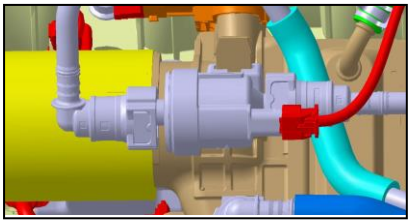
Warning Pay attention to connector direction during installation; Pay attention to the bolt tightening torque 10±1 N·m when installing; It is necessary to prevent foreign matter such as particles from entering the pressure relief valve.

Canister control valve

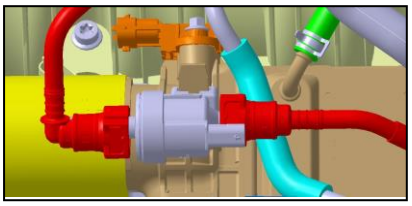
1. Removal

   1 Turn off the ignition switch to "OFF" position.

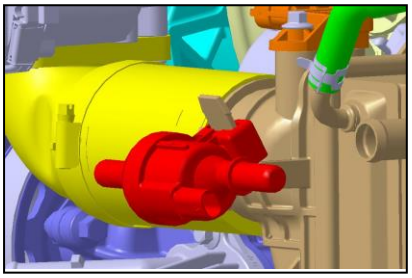
   2 Unplug the canister control valve connector.



   3 Remove the lines connecting both ends of the canister control valve.



   4 Remove the canister control valve from the bracket.



2. Installation

   Installation process is reverse to removal process

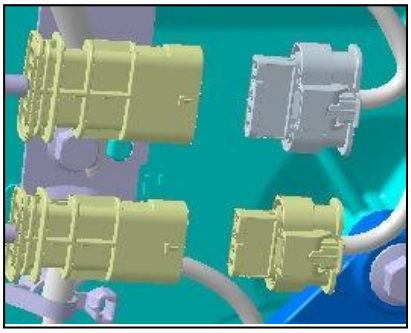
Warning

Oxygen sensor(Wire oxygen)

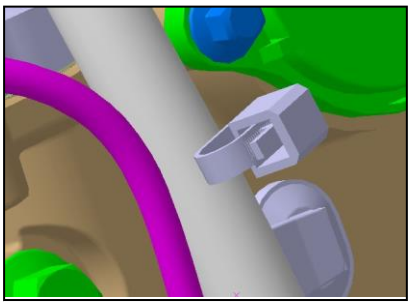
Removal

1 Power off the vehicle.

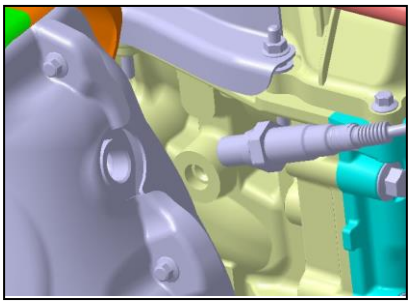
2 Disconnect the harness connector.



3 Remove the tie.



4 Remove oxygen sensor with a tool.



Installation

Warning **Before installation, check each part for deterioration or damage, and replace it if any defect is found.**

1 Install the oxygen sensor on row trachea and tighten the bolts to the specified torque. (50 Nm±5Nm).

2 Connect the connector to the harness end and clip it into the bracket.

3 Fasten the harness with a tie.Warning

Bundle the harness to avoid tightening the harness.

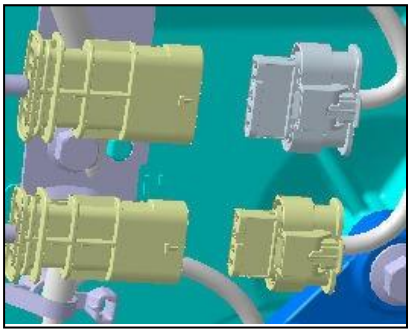
⚠Warning

Rear oxygen sensor

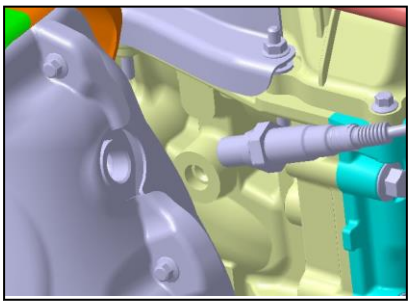
Removal

1 Power off the vehicle.

2 Disconnect the harness connector.



3 Remove oxygen sensor with a tool.



Installation

Warning **Before installation, check each part for deterioration or damage, and replace it if any defect is found.**

1 Install the oxygen sensor on row trachea and tighten the bolts to the specified torque. (50 Nm±5Nm).

2 Connect the connector to the harness end and clip it into the bracket.

3 Install the rear oxygen sensor harness into the U-shaped

groove of the harness bracket on the heat shield. Warning

Harness should not be tight.

⚠Warning

Spare parts atlas

F210601 F210602

F210603

Automatic Sion

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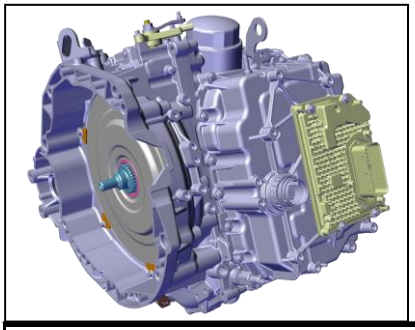
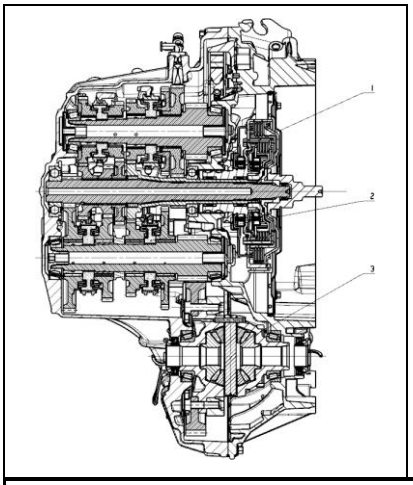
Automatic transmission specification



Transmission specification		TM047FDB
Gear ratio	1st gear	4.214
	2nd gear	3.105
	3rd gear	1.724
	4th gear	1.268
	5th gear	1.270
	6th gear	1.049
	7th gear	0.891
	Reverse gear	3.664
	Final reduction ratio	3.842(1/3/4/R) 3.042(2/5/6/7)
Dead weight		Approx. 80 kg
Automatic transmission fluid rating		4.8±0.1L
Automatic transmission fluid specification		Castrol BOT 351C4

Composition and position distribution

Dual-clutch automatic transmission DF 727 is a dual-clutch automatic transmission with seven-gear automatic transmission. Dual clutch automatic transmission mainly includes dual clutch, power train, shift train, hydraulic system and electronic control system. The hydraulic control system is based on the hydraulic pressure generated by the oil pump. The dual-clutch automatic transmission control unit sends signals to the solenoid valve. The hydraulic control system controls the dual clutch and valve body module according to the driving conditions of the vehicle to realize gear shift without power interruption. Dual clutch automatic transmission includes 1 dual clutch, 4 synchronizers, 1 differential



Serial number	Name	Purpose
1	Dual clutch	Transmit and cut off power to realize no power interruption during gearshift
2	Synchronizer	Shift gear
3	Differential mechanism	Complete vehicle steering

System overview

Actuator worksheet

Gear	VBS3(Shift pressure control solenoid valve)	VBS4(Shift pressure control solenoid valve)	SOL1(Gear selector switch solenoid valve)	SOL2(Gear selector switch solenoid valve)
REV	1	0	0	0
1st	0	1	1	1
2nd	0	0	0	0
3rd	0	1	0	0
4th	1	0	0	1
5th	1	0	1	0
6th	0	1	1	0
7th	0	1	0	1

TCU control function automatic shift control

In each shift mode, the TCU controls the shift solenoid valve (PWM1, PWM2, PWM3) to open or close according to the engine speed signal, input shaft speed signal, output shaft speed signal, vehicle speed signal, accelerator pedal signal and brake pedal position signal, and operates the pressure control solenoid valves VBS3, VBS4, SOL1 and SOL2 linearly to control the hydraulic pressure in the hydraulic control system to realize the automatic change of the transmission between various gears.

Driver adaptive mode control

During driving, the automatic transmission is always in adaptive mode. There is no switch available for the driver to select the drive mode. Once specific conditions appear, TCU will select suitable gear shifting mode for driving state and automatically shift mode to improve smooth gear shifting.

Self-diagnosis function

TCU communicates with engine control module through monitoring sensor and electronic components. If transmission-related fault is detected, TCU self-diagnosis function will illuminate fault indicator on combination instrument to remind driver to repair timely and store in TCU memory in the form of fault code.

Fault protection function

In case of automatic transmission system fault, TCU will output a control signal to realize fault protection function. This control can only make the vehicle operate within the minimum distance. If the shift solenoid valve or clutch pressure control solenoid valve fails, the TCU will cancel some gears. When brake fault is detected, crawling function will be canceled.

Inspection of part structure principle

TCU

Function

Transmission control unit assembly (TCU): Generally installed on

the transmission and used to control the transmission to

automatically shift gears. Working principle

- Automatic shift control

  In each gear shift mode, the transmission control unit assembly (TCU) controls the gear shift solenoid valves (PWM1, PWM2, PWM3) to open or close according to the engine speed signal, input shaft speed signal, output shaft speed signal, vehicle speed signal, accelerator pedal signal and brake pedal position signal, and operates the pressure control solenoid valves VBS3, VBS4, SOL1 and SOL2 linearly to control the hydraulic pressure in the hydraulic control system to realize the automatic change of the transmission between various gears.
- Driver adaptive mode control

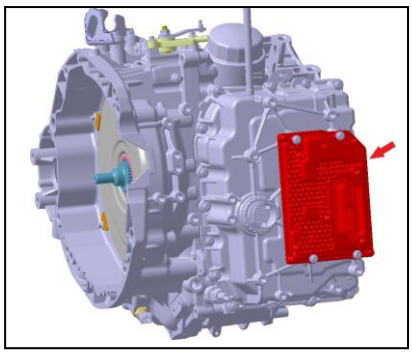
  During driving, the automatic transmission is always in adaptive mode. There is no switch available for the driver to select the drive mode. Once a specific condition occurs, the transmission control unit assembly (TCU) will select the appropriate shift mode for the driving state and the automatic shift mode to realize smooth shift.
- Self-diagnosis function

  The transmission control unit assembly (TCU) communicates with the engine control module through the monitoring sensor and electronic components. If a transmission-related fault is detected, the TCU self-diagnosis function will illuminate the malfunction indicator on the combination instrument to remind the driver of timely maintenance and store it in the memory of the transmission control unit assembly (TCU) in the form of a fault code.
- Fault protection function

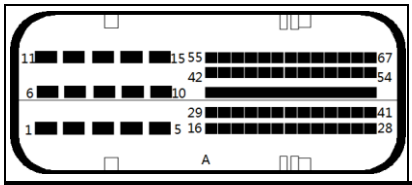
  When the automatic transmission system fails, the transmission control unit assembly (TCU) will output a control signal to realize the fault protection function. This control can only make the vehicle operate within the minimum distance. If the shift solenoid valve or clutch pressure control solenoid valve fails, the transmission control unit assembly (TCU) will cancel some gears. When brake fault is detected, crawling function will be canceled.

Product structure

Transmission control unit assembly (TCU) is arranged on transmission oil pan



Interface definition



Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
Pin_5	Ground wire	Power ground	0V-1V	Always ground the body;	
Pin_6	HSD3 solenoid valve(+)	BAT electric	Battery voltage	Ignition switch on, body ground	

Pin_7	Ground wire	Power ground	0V-1V	Always ground the body;	
Pin_8	Odd clutch solenoid valve (Negative pole)	PWM signal	0V-14V	Ignition switch on, body ground	PWM signal, normally measured by oscilloscope, and voltage signal corresponding to PWM duty cycle can be measured by multimeter.
Pin_9	AR1 solenoid valve(Negative pole)	PWM signal	0V-14V	Ignition switch on, body ground	PWM signal, normally measured by oscilloscope, and voltage signal corresponding to PWM duty cycle can be measured by multimeter.
Pin_10	Logic solenoid valve 1(Negative pole)	PWM signal	0V-14V	Ignition switch on, body ground	PWM signal, normally measured by oscilloscope, and voltage signal corresponding to PWM duty cycle can be measured by multimeter.
Pin_11	HSD1 solenoid valve(+)	BAT electric	Battery voltage	Ignition switch on, body ground	
Pin_12	HSD2 solenoid valve(+)	BAT electric	Battery voltage	Ignition switch on, body ground	
Pin_15	Power supply +	BAT electric	Battery voltage	Ignition switch on, body ground	
Pin_16	TIP+	Low level active	12V	Ignition switch on, body ground	
			0-1V	TIP in manual mode +	When TIP+, the voltage will be pulled down to 0V, the TIP+ switch will resume, and the voltage will resume.
Pin_18	Reverse gear signal output	Low level active	12V	Ignition switch on, body ground	
			0-1V	Reverse gear	
Pin_19	Vehicle CAN high	Other	2.5V-3.5V	Ignition switch on, body ground	
Pin_20	Vehicle CAN low	Other	1.5V-2.5V	Ignition switch on, body ground	
Pin_22	P/N signal output	Low level active	12V	D and R gear, ignition switch on, ground to body	
			0-1V	P and N gear, ignition switch on, ground to body	
Pin_24	5V ground wire	Signal ground	0V-1V	Always ground the body;	
Pin_30	TIP-	Low level active	12V	Ignition switch on, body ground	
			0-1V	TIP- in manual mode	When TIP-, the voltage will be pulled down to 0V, the TIP- switch will resume, and the voltage will resume.

Pin_32	Key switch input	IGN Electrical	12V	Ignition switch on, body ground	
Pin_33	Logic solenoid valve 2(Negative pole)	PWM signal	0V-14V	Ignition switch on, body ground	PWM signal, normally measured by oscilloscope, and voltage signal corresponding to PWM duty cycle can be measured by multimeter.
Pin_34	5V ground wire	Signal ground	0V-1V	Always ground the body;	
Pin_39	Bottom case oil temperature sensor	Analog signal	0V-5V	Ignition switch on, body ground	
Pin_40	Manual mode	Low level active	0-1V	In manual mode, ignition switch on, ground to body	
Pin_42	5V+ 1(K1/Fork#1#4/PRND)	Sensor power supply	5V	Ignition switch on, body ground	
Pin_43	8V1	Sensor power supply	8V	Ignition switch on, body ground	
Pin_44	Main pressure solenoid valve(Negative pole)	PWM signal	0V-14V	Ignition switch on, body ground	PWM signal, normally measured by oscilloscope, and voltage signal corresponding to PWM duty cycle can be measured by multimeter.
Pin_45	Lubrication solenoid valve(Negative pole)	PWM signal	0V-14V	Ignition switch on, body ground	PWM signal, normally measured by oscilloscope, and voltage signal corresponding to PWM duty cycle can be measured by multimeter.
Pin_47	Even clutch solenoid (Negative pole)	PWM signal	0V-14V	Ignition switch on, body ground	PWM signal, normally measured by oscilloscope, and voltage signal corresponding to PWM duty cycle can be measured by multimeter.
Pin_48	AR2 solenoid valve(Negative pole)	PWM signal	0V-14V	Ignition switch on, body ground	PWM signal, normally measured by oscilloscope, and voltage signal corresponding to PWM duty cycle can be measured by multimeter.
Pin_49	5V ground wire	Signal ground	0V-1V	Always ground the body;	
Pin_51	Clutch 1 pressure sensor	Analog signal	0V-5V	Ignition switch on, body ground	
Pin_52	Clutch 2 pressure sensor	Analog signal	0V-5V	Ignition switch on, body ground	
Pin_53	8V+ 2	Sensor power supply	8V	Ignition switch on, body ground	
Pin_54	5V+ 2(K2/Fork#1#4)	Sensor power supply	5V	Ignition switch on, body ground	

Pin_57	Fork 2 signal	Analog signal	0V-5V	Ignition switch on, body ground	
Pin_58	Fork 3 signal	Analog signal	0V-5V	Ignition switch on, body ground	
Pin_60	Odd clutch speed	PWM signal	10HZ-10KHZ		
Pin_61	5V_1 Digital ground	Signal ground	0V-1V	Always ground the body;	
Pin_62	Even clutch speed	PWM signal	10HZ-10KHZ	The diagnostic scanner reads the speed as main and the multimeter as auxiliary.	
Pin_63	Output shaft speed	PWM signal	10HZ-10KHZ	The diagnostic scanner reads the speed as main and the multimeter as auxiliary.	
Pin_64	Fork 1 signal	Analog signal	0V-5V	Ignition switch on, body ground	
Pin_65	Fork 4 signal	Analog signal	0V-5V	Ignition switch on, body ground	
Pin_66	Gear sensor signal	Analog signal	0V-5V	Ignition switch on, body ground	

Input shaft sensor

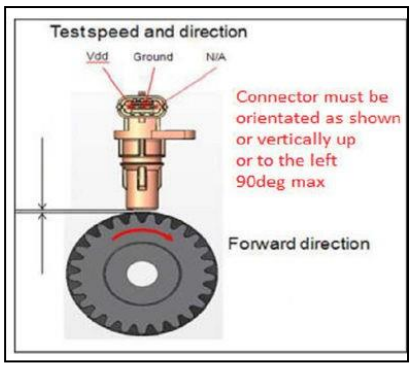
Function:

Generally installed on the transmission cylinder block, it is used to

detect the speed of the target gear and send the signal to the

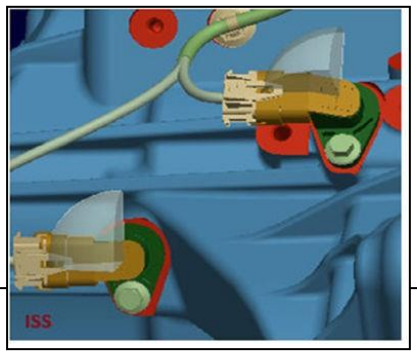
transmission control unit. Working principle:

Use Hall principle to process magnetic field signal to convert to output voltage, output voltage is PWM square wave

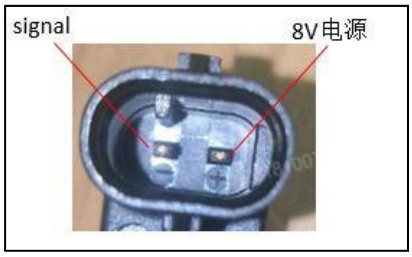


Product structure:

1 Layout structure:



2 Interface definition



Features:

技术参数 Parameter	符号 Symbol	最小值 Min	设计值 Typ	最大值 Maxi	单位 Unit
供电电压 Supply Voltage	Vcc	4	-	18	V
供电电流（低） Low Supply Current	Icc(Low)	5	-	8	mA
供电电流（高） High Supply Current	Icc(High)	12	-	16	mA
正向旋转频率 Operating Frequency, Forward Rotation	fwo	0	-	12	KHz
反向旋转频率 Operating Frequency, Reverse Rotation	fwr	0	-	7	KHz
输出信号上升时间（10%-90%） Output Rise Time	Tr	-	2	4	μs
输出信号下降时间（90%-10%） Output Fall Time	Tf	-	2	4	μs
正转脉宽 Pulse Width, Forward Rotation	tw(FWD)	38	45	52	μs
反转脉宽 Pulse Width, Reverse Rotation	tw(REV)	76	90	104	μs
工作温度 Working Temperature	TA	-40	-	140	℃
储存温度 Storage Temperature	TS	-40	-	150	℃

Product fault and troubleshooting:

Description Before performing product unit inspection, perform relevant inspection of harness link first, and then perform product unit inspection after confirming that there is no problem. Speed sensor check:

1 Check whether the appearance of the speed sensor is damaged, whether the housing is cracked, whether the connector terminal is rusted, and whether there is water in the connector.

2 Use a multimeter to detect whether the sensor capacitance value is within the normal range 8nF-12nF;

3 If the sensor capacitance is normal, in case of power supply, it is necessary to read whether the output voltage of the speed sensor is normal with an oscilloscope, and the normal voltage signal is about 0.5-0.8 V, or

1.2-1.6 V approx.

Description When there is a problem, ABA is recommended for interchangeability verification.

Gear sensor

Function:

The gear sensor is close to the engine mating surface, and the complete vehicle is located in the upper middle of the engine compartment. It sends gear information including the automatic transmission (DCT) shift lever to the transmission control module. The PRND gear sensor can only start the engine when it is in the Park (P) and Neutral (N) positions to prevent reckless driving. This operation is used for shift control of PRND gear sensor. The gear sensor inputs information about the driver's actual operation of the shift lever directly to the TCM.

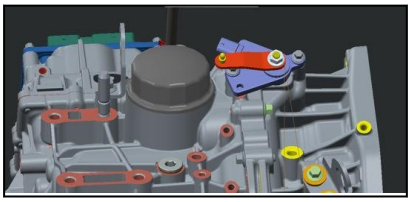
Working principle:

The Hall principle is used to process the magnetic field

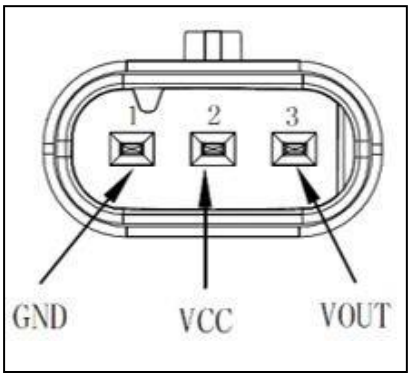
signal to convert it into an output voltage, which is an

analog signal product structure:

1 Layout structure:



2 Interface definition:



Features:

序号	位置	角度[°]	输出电压(V)
1	电气起点 ㉙	10	$0.3^{+0.14}$
2	P ㉚	15.88	0.82±0.14
3	R ㉛	34.20	2.43±0.14
4	N ㉜	44.22	3.31±0.14
5	D ㉝	54.14	4.18±0.14
6	电气终点 ㉞	60	$4.7^{0}_{-0.14}$

Product fault and troubleshooting:

Description Before performing product unit inspection, perform relevant inspection of harness link first, and then perform product unit inspection after confirming that there is no problem. Gear sensor check:

1 Check whether the appearance of the gear sensor is damaged, whether the housing is cracked, whether the connector terminal is rusted, and whether there is water in the connector.

2 Use a multimeter to detect whether the resistance between sensor pin PIN is normal. The resistance between power supply and ground ranges from 100 to 300 ohms. The resistance between power supply and signal ranges from 100 to 300 ohms. The resistance between signal and ground ranges from 50~ 200 ohms.

3 If the sensor resistance is normal, use the oscilloscope to read the voltage between the signal and the ground. The normal voltage signal changes with the change of gear, and the voltage range is 0.3 V-4.7 V. Description When there is a problem, ABA is recommended for interchangeability verification.

Oil temperature sensor

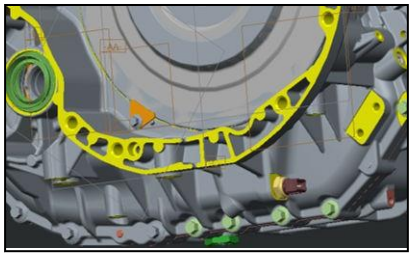
Function:

It is directly mounted on the transmission case, and the transmission fluid temperature signal is directly converted into electrical signal and transmitted to the TCU. TCU controls gearshift for oil temperature change.

Working principle:

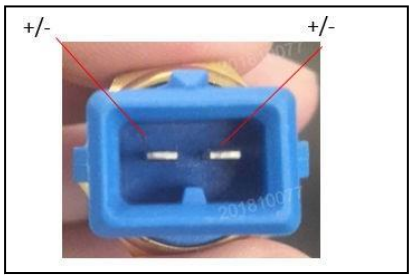
Based on the principle of NTC resistance change with temperature change, detect the resistance value between pin PIN to know the detected temperature. Product structure:

1 Layout structure:



2 Interface definition:

Where +/- interface can be interchanged



Features:

R-T Features:

R-T表

T (℃)	Rnom (Ω)	Rmin (Ω)	Rmax (Ω)	T (℃)	Rnom (Ω)	Rmin (Ω)	Rmax (Ω)
-50	1804913	1523663	2086164	55	9056	8445	9667
-45	1284382	1096929	1471835	60	7556	7018	8094
-40	925021	798884	1051157	65	6335	5862	6809
-35	673787	588184	759390	70	5337	4920	5753
-30	496051	437519	554584	75	4515	4149	4881
-25	368896	328615	409177	80	3837	3514	4159
-20	276959	249089	304829	85	3273	2989	3557
-15	209816	190452	229180	90	2804	2553	3054
-10	160313	146820	173806	95	2410	2189	2632
-5	123485	114070	132900	100	2080	1884	2276
0	95851	89283	102419	105	1801	1629	1972
5	74940	70219	79660	110	1564	1413	1715
10	59016	55611	62421	115	1363	1229	1496
15	46797	44333	49261	120	1191	1073	1309
20	37352	35566	39138	125	1044	939	1149
25	30000	28704	31296	130	917.7	824.6	1010.9
30	24239	23085	25394	135	808.9	725.8	892.1
35	19696	18675	20718	140	714.9	640.5	789.3
40	16092	15192	16992	145	633.5	566.7	700.2
45	13216	12426	14007	150	562.7	502.7	622.7
50	10908	10215	11602				

Product fault and troubleshooting:

Description Before performing product unit inspection, perform relevant inspection of harness link first, and then perform product unit inspection after confirming that there is no problem. Oil temperature sensor check:

1 Check whether the appearance of oil temperature sensor is damaged, whether the housing is cracked, whether the connector terminal is rusted, and whether there is water in the connector;

2 Use a multimeter to detect the resistance value of the sensor, search the characteristic R-T table according to the temperature, and confirm whether the resistance value is within the normal range. Description When there is a problem, ABA is recommended for interchangeability verification.

Common methods

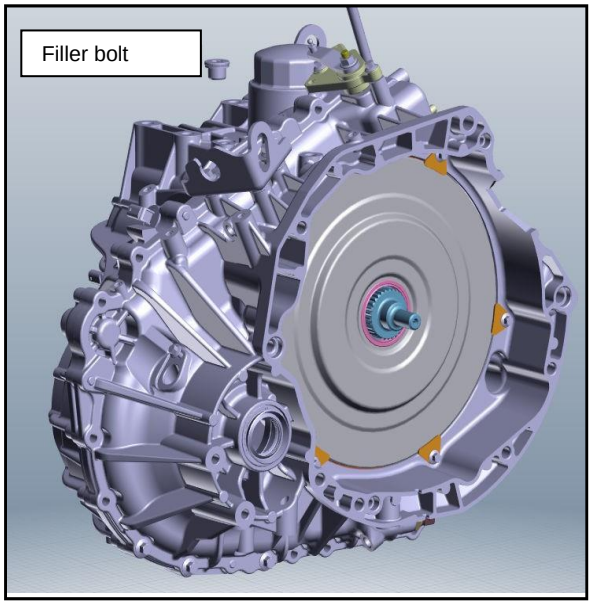
Transmission fluid level check

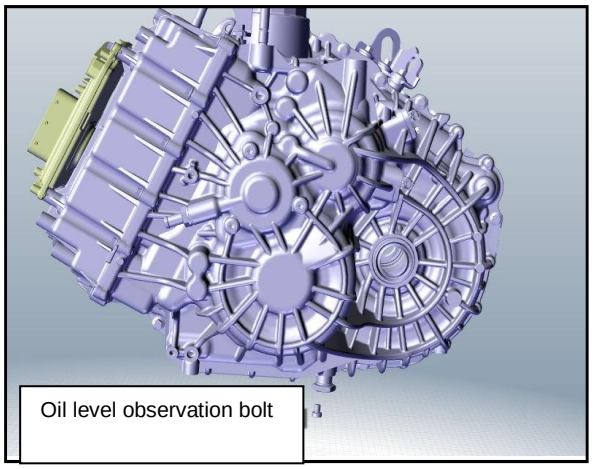
1 Park the vehicle in a horizontal trench (keep the body level), pull the hand brake, and shift the gearshift lever to "P" position.
2 Unscrew the oil filling bolt, add 200 ml transmission oil (brand: BOT351C4, Cassido) and sleeve specification: Hexagon socket.
3 Wait for about 5 minutes at rest, and then unscrew the oil level observation bolt. Connect the volume cup to the drain oil quantity. If there is transmission oil flowing out, tighten the oil level observation bolt. Specific situation:

(1) If the filling quantity is basically the same as the discharged oil quantity (error: ±20 ml), it indicates that the oil level is normal, and tighten the oil level bolt;

(2) If there is no transmission flowing out, it indicates that the oil quantity is small, continue the above operation until the transmission oil flows out, and tighten the observation oil level bolt;

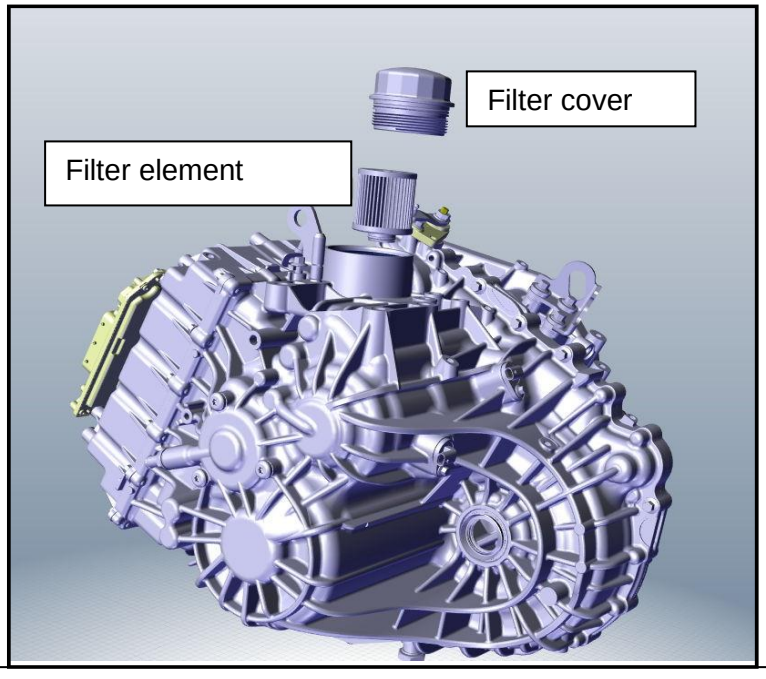
(3) If the outflow amount is greater or less than the filling amount (200 ml), it indicates that the oil amount is more or less. At this time, tighten the observation oil level bolt, but consult the user for other abnormalities.





DCT Transmission Fluid/Filter Replacement

1 Park the vehicle in the horizontal trench (keep the body level), pull the hand brake, shift the gear lever to "P" position, and wait for about 5 minutes at rest.
2 Remove the oil drain bolt. When the oil drips, it indicates that the oil drain is completed. Tighten the oil drain bolt (torque: 35±5N.m);
3 Twist the filter cover, replace the filter element, and tighten the filter cover (torque: 50±5N.m);



4 Use a clean measuring cup to measure 5.3±0.1 L transmission fluid (brand: BOT351C4, Cassido), unscrew the filling bolt, and tighten (40±2N.m) after filling.

Warning Always use the specified transmission fluid (BOT 351C4) when adding or completely changing the transmission fluid; If unqualified transmission fluid is used, it will cause transmission fault and failure.

Road test

Road tests are guaranteed under the following conditions:

- The engine has been checked and adjusted.
- The transmission fluid temperature is within the normal working range: 50-90 degrees Celsius.
- A/C, headlights, etc., are off.

1 Gearshift function (D gear): During normal driving, check whether the transmission can be upshifted from gear 1-7 and downshifted from gear 7-1.
2 Gear shift impact during driving: Check whether the gear shift is smooth during normal driving.
3 Manual shift control function: Check whether the gear can be shifted into the gear in gear 1-7 in manual mode. If the engine speed is lower than the anti-flameout speed or higher than the maximum engine speed, the instrument panel shall flash to remind the user when the manual shift is not satisfied.
4 Working state of gear P: Stop on the slope (greater than or equal to 5% gradient), engage gear P, release the brake, and check whether the vehicle will move.
5 Oil leakage: After road test, check each part to see whether there is oil leakage.

Harness inspection

Inspect the appearance: Whether the plug connection is reliable without loosening, falling off, dirt or damage.

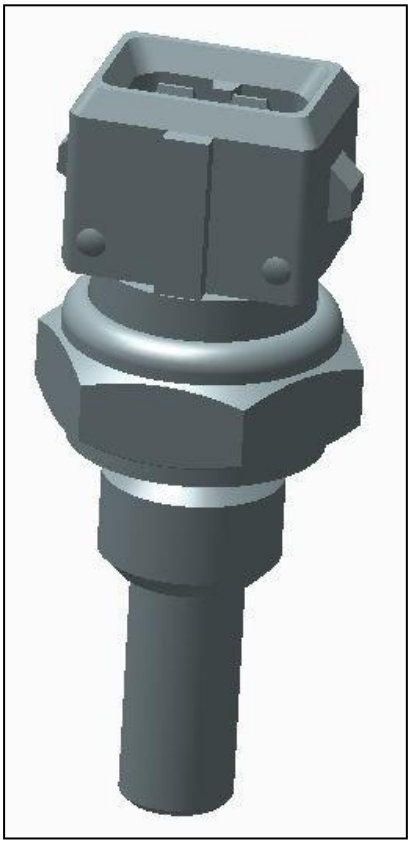
Sensor check

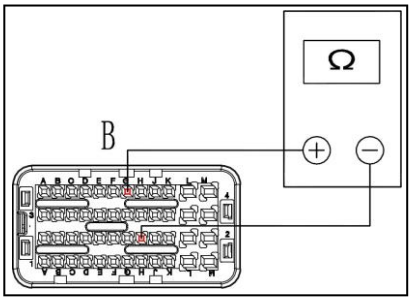
Inspection of oil temperature sensor

Temperature sensor for transmission, pins BG4, BH2; The following takes oil temperature sensor as an example:

1 Check the appearance: Whether the sensor is damaged, whether the connector is contaminated with oil or impurities, whether the terminal is broken, bent, corroded, etc.;

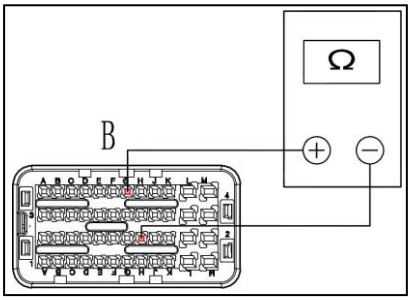
2 Check resistance: Refer to the following figure for detection





T (℃)	Rnom (Ω)	Rmin (Ω)	Rmax (Ω)	T (℃)	Rnom (Ω)	Rmin (Ω)	Rmax (Ω)
-50	1804913	1523663	2086164	55	9056	8445	9667
-45	1284382	1096929	1471835	60	7556	7018	8094
-40	925021	798884	1051157	65	6335	5862	6809
-35	672787	588184	759390	70	5337	4920	5753
-30	496051	437519	554584	75	4515	4149	4881
-25	368896	328615	409177	80	3837	3514	4159
-20	276959	249089	304829	85	3273	2989	3557
-15	209816	190452	229180	90	2804	2553	3054
-10	160313	146820	173806	95	2410	2189	2632
-5	123485	114070	132900	100	2080	1884	2276
0	95851	89283	102419	105	1801	1629	1972
5	74940	70219	79660	110	1564	1413	1715
10	59016	55611	62421	115	1363	1229	1496
15	46797	44333	49261	120	1191	1073	1309
20	37352	35566	39138	125	1044	939	1149
25	30000	28704	31296	130	917.7	824.6	1010.9
30	24239	23085	25394	135	808.9	725.8	892.1
35	19696	18675	20718	140	714.9	640.5	789.3
40	16092	15192	16992	145	633.5	566.7	700.2
45	13216	12426	14007	150	562.7	502.7	622.7
50	10908	10215	11602				

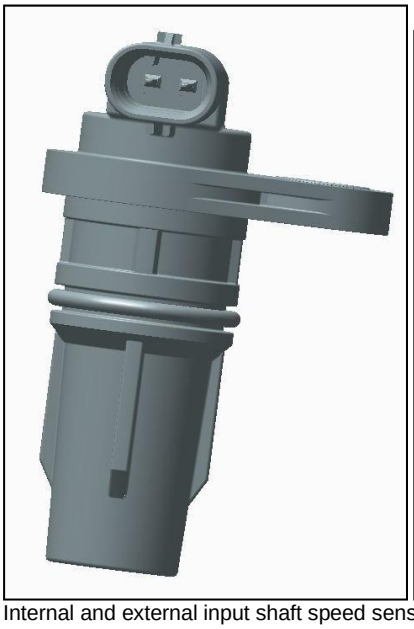
3 Detection ON/OFF: Disconnect the TCU connector, measure whether the sensor terminals BG4 and BH2 are short to ground at the TCU connector, and the reference resistance is greater than 500 V.
10 MΩ.

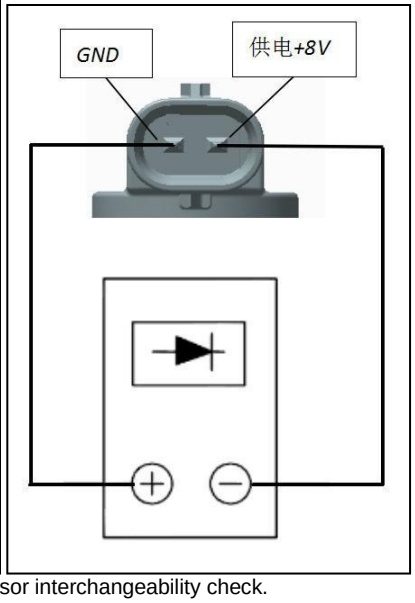


Note: Do not damage the sensor terminal. Input shaft speed sensor check

1 Appearance inspection: The appearance color of the sensor is gray. Check whether the sensor is damaged, whether the connector is contaminated with oil or impurities, and whether the terminal is broken, bent or corroded;

2 Short circuit check: Input shaft speed sensor, detect whether there is short circuit or open circuit between two terminals of sensor.



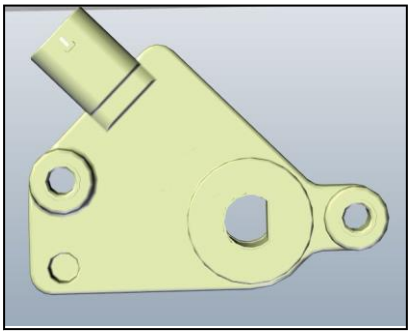


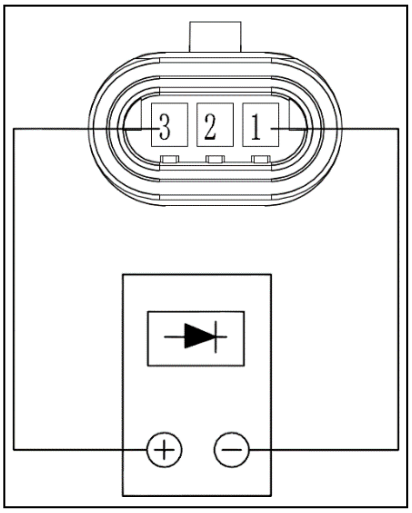
3 Internal and external input shaft speed sensor interchangeability check.

Note: Do not damage the sensor and the sensor terminals. Gear sensor check

1 Visual inspection: Whether the sensor is damaged, whether the connector has oil dirt or impurities, whether the terminal is broken, bent, corroded, and whether the pin of the TCU connector corresponding to the sensor is damaged or withdrawn, etc.

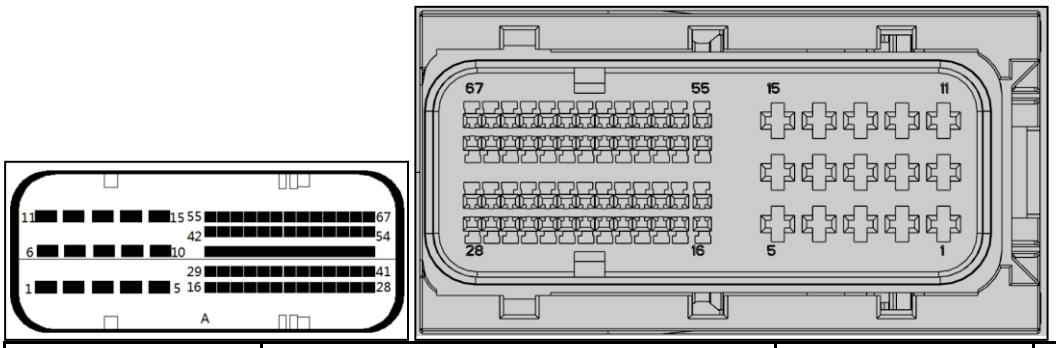
2 Short circuit check: Check whether there is short circuit between three terminals of sensor (the pins of three terminals corresponding to TCU connector are: Terminal 1 (signal) BE3; Terminal 2 (power supply) BE4; Terminal 3 (ground) BE2).





DTC Diagnostic and Test Connector Pin Definition

Fault code list



Fault code	Description		FTB	Is the fault lamp on
P2530	Key power-on signal	Power supply voltage too high	0x85	On
		Power supply voltage too low	0x84	On
P0705	PRND sensor	Voltage signal too low	0x16	On
		Voltage signal too high	0x17	On
P0666	PCB temperature sensor fault	Voltage signal too low	0x84	On
P0666		Voltage signal too high	0x85	On
P0710	Oil temperature sensor	Voltage signal too low	0x84	On
		Voltage signal too high	0x85	On
P12A6	Clutch temperature sensor	Voltage signal too low	0x84	On
		Voltage signal too high	0x85	On
P0840	Clutch 1 sensor	Voltage signal too low	0x16	On
		Voltage signal too high	0x17	On
P0845	Clutch 2 sensor	Voltage signal too low	0x16	On
		Voltage signal too high	0x17	On
P2831	Shift fork 1st (gear 5/7) displacement sensor	Voltage signal too low	0x16	On
P2831		Voltage signal too high	0x17	On
P2836	Shift fork 2 (gear 2/6) displacement sensor	Voltage signal too low	0x16	On
P2836		Voltage signal too high	0x17	On
P283B	Shift fork 3rd (gear 4/R) displacement sensor	Voltage signal too low	0x16	On
P283B		Voltage signal too high	0x17	On
P2840	Shift fork 4 (gear 1/3) displacement sensor	Voltage signal too low	0x16	On
P2840		Voltage signal too high	0x17	On
P0715	Inner input shaft speed sensor	Short circuit to power supply	0x12	On
P0715		Short circuit to ground	0x11	On
P0715		Internal input shaft speed change rate too high fault	0x27	On
P0715		Inner input shaft speed signal too high	0x85	On
P0715		Internal input shaft speed sensor open circuit	0x13	On

P2784		Internal input shaft speed calibration fault	0xF0	On
P2765	Outer input shaft speed sensor	Short circuit to power supply	0x12	On
P2765		Short circuit to ground	0x11	On
P2765		Outer input shaft speed change rate too high fault	0x27	On
P2765		Outer input shaft speed signal too high	0x85	On
P2765		Outer input shaft speed sensor open circuit	0x13	On
P2784		Outer input shaft speed calibration fault	0xF1	On
P0720	Output shaft speed sensor	Short circuit to power supply	0x12	On
P0720		Short circuit to ground	0x11	On
P0720		Output shaft speed change rate too high fault	0x27	On
P0720		Output shaft speed signal too high	0x85	On
P0720		Output shaft speed sensor open circuit	0x13	On
P077B		Output shaft speed sensor direction is 0 and speed too high	0x00	On
P0720		Output shaft speed calibration fault	0x00	On
P0720	Speed dependent fault	Fault of two or more speed signals	0x01	On
P0885	Starting allowable hardwire	Open circuit fault	0x13	On
P0885		Short circuit fault to power supply	0x12	On
P0885		Short circuit to ground fault	0x11	On
P0813	Reversing lamp relay	Open circuit	0x13	On
P0813		Short circuit to power supply	0x12	On
P0813		Short circuit to ground	0x11	On
P0960	Lubrication solenoid valve	Low end short circuit to power supply	0x12	On
P0960		Low-end open circuit	0x13	On
P0960		Low end short circuit to ground	0x11	On
P0960		Low-side current too high fault	0x18	On
P0960		Low-side current too low fault	0x19	On
P0960		Channel unexpected shutdown fault	0x07	On
P0960		MOS tube discharge current fault	0x00	On
P0964	Main pressure solenoid valve	Low end short circuit to power supply	0x12	On
P0964		Low-end open circuit	0x13	On
P0964		Low end short circuit to ground	0x11	On
P0964		Low-side current too high fault	0x18	On
P0964		Low-side current too low fault	0x19	On

P0964		Channel unexpected shutdown fault	0x07	On
P0964		MOS tube discharge current fault	0x00	On
P0968	Clutch 1 Solenoid	Low end short circuit to power supply	0x12	On
P0968		Low-end open circuit	0x13	On
P0968		Low end short circuit to ground	0x11	On
P0968		Low-side current too high fault	0x18	On
P0968		Low-side current too low fault	0x19	On
P0968		Channel unexpected shutdown fault	0x07	On
P0968		MOS tube discharge current fault	0x00	On
P2727	Clutch 2 solenoid valve	Low end short circuit to power supply	0x12	On
P2727		Low-end open circuit	0x13	On
P2727		Low end short circuit to ground	0x11	On
P2727		Low-side current too high fault	0x18	On
P2727		Low-side current too low fault	0x19	On
P2727		Channel unexpected shutdown fault	0x07	On
P2727		MOS tube discharge current fault	0x00	On
P285B	Shift solenoid valve 1 fault	Low end short circuit to power supply	0x12	On
P285B		Low-end open circuit	0x13	On
P285B		Low end short circuit to ground	0x11	On
P285B		Low-side current too high fault	0x18	On
P285B		Low-side current too low fault	0x19	On
P285B		Channel unexpected shutdown fault	0x07	On
P285B		MOS tube discharge current fault	0x00	On
P285F	Shift solenoid valve 2 fault	Low end short circuit to power supply	0x12	On
P285F		Low-end open circuit	0x13	On
P285F		Low end short circuit to ground	0x11	On
P285F		Low-side current too high fault	0x18	On
P285F		Low-side current too low fault	0x19	On
P285F		Channel unexpected shutdown fault	0x07	On
P285F		MOS tube discharge current fault	0x00	On
P0750	Switch valve 1 fault	Low end short circuit to power supply	0x12	On
P0750		Low-end open circuit	0x13	On
P0750		Low end short circuit to ground	0x11	On
P0750		Low-side current too high	0x18	On

		fault		
P0750		Low-side current too low fault	0x19	On
P0750		Channel unexpected shutdown fault	0x07	On
P0750		MOS tube discharge current fault	0x00	On
P0755	Switch valve 2 fault	Low end short circuit to power supply	0x12	On
P0755		Low-end open circuit	0x13	On
P0755		Low end short circuit to ground	0x11	On
P0755		Low-side current too high fault	0x18	On
P0755		Low-side current too low fault	0x19	On
P0755		Channel unexpected shutdown fault	0x07	On
P0755		MOS tube discharge current fault	0x00	On
P1245	Solenoid valve high end 1 fault	Short circuit fault to power supply	0x12	On
P1245		Open circuit fault	0x13	On
P1245		Short circuit to ground fault	0x11	On
P1246	Solenoid valve high end 2 fault	Short circuit fault to power supply	0x12	On
P1246		Open circuit fault	0x13	On
P1246		Short circuit to ground fault	0x11	On
P1247	Solenoid valve high end 3 fault	Short circuit fault to power supply	0x12	On
P1247		Open circuit fault	0x13	On
P1247		Short circuit to ground fault	0x11	On
U0129	ESP CAN signal fault	ESP data loss	0x87	On
U0073	Can bus off fault	Can bus off fault	0x88	On
U0100	ESM CAN signal fault	EMS data loss	0x87	On
U2081	Brake signal fault	Brake signal invalid	0x29	On
U2081		Brake signal unreliable	0x64	On
U2082	Driver expected torque fault	Driver expected torque signal invalid	0x29	On
U2082		Driver expected torque signal unreliable	0x64	On
U2083	Engine torque fault	Engine torque signal invalid	0x29	On
U2083		Engine torque signal unreliable	0x64	On
U2084	Friction torque fault	Friction torque signal invalid	0x29	Off
U2084		Friction torque signal unreliable	0x64	Off
U2085	Engine speed fault	Engine speed signal invalid	0x29	On
U2086	Engine target idle speed fault	Engine target idle signal invalid	0x29	On
U2087	Accelerator signal fault	Accelerator signal invalid	0x29	On
U2088	Engine coolant temperature fault	Engine coolant temperature is invalid	0x29	On

U2089	Plateau coefficient fault	Plateau coefficient signal invalid	0x29	On
U208A	ESP vehicle speed fault	ESP speed signal is invalid	0x29	Off
U208A		ESP speed signal is unreliable	0x64	Off
U208B	ESP rear left wheel fault	ESP RR LH wheel signal invalid	0x29	Off
U208B		ESP rear left wheel signal unreliable	0x64	Off
U208B		ESP rear left wheel signal unreliable	0x64	Off
U208C	ESP rear right wheel fault	ESP RR RH wheel signal invalid	0x29	Off
U208C		ESP RR RH wheel signal unreliable	0x64	Off
U208D	ESP front right wheel fault	ESP front right wheel signal invalid	0x29	Off
U208D		ESP front right wheel signal unreliable	0x64	Off
U208E	ESP front left wheel fault	ESP front left wheel signal invalid	0x29	Off
U208E		ESP front left wheel signal unreliable	0x64	Off
U208F	ESL CAN signal fault	ESL data loss	0x87	On
U2090	ACM CAN signal fault	ACM data loss	0x87	On
U2091	ESL DrivePark signal fault	Invalid ESL DrivePark signal	0x29	On
U2092	Gear ACM P signal fault	Gear ACM P signal invalid	0x29	On
U2093	ESL gear shifter status fault	ESL gear shifter fault	0x29	On
U2094	ESL mode signal fault	ESL mode signal is invalid	0x29	On
U2095	ESL shifter position fault	ESL gear shifter position is invalid	0x29	On
P1213	Sensor 5V power supply 1 fault	Short circuit to power supply	0x12	On
P1213		Voltage too high	0x17	On
P1213		High current	0x19	On
P1214	Sensor 5V power supply 2 fault	Short circuit to power supply	0x12	On
P1214		Voltage too high	0x17	On
P1214		High current	0x19	On
P1216	Sensor 8V power supply 1 fault	Short circuit to power supply	0x12	On
P1216		Voltage too high	0x17	On
P1216		High current	0x19	On
P1217	Sensor 8V power supply fault	Short circuit to power supply	0x12	On
P1217		Voltage too high	0x17	On
P1217		High current	0x19	On
P1218	Sensor 8V power supply fault	Sensor 8V voltage fault	0x00	On
P1251	NVM storage fault	NVM low level storage status fault	0x45	On
P1252		NVM Critical State Fault	0x45	On
P1253	Trim data fault	Trim inconsistent data	0x45	On
P287C	Clutch half-engagement	Signal too high	0x84	On

P287C	point adaptation	Signal too low	0x85	On
P287C		No adaptation for a long time	0x2A	On
P1250	Clutch PT curve adaptation	Signal too high	0x84	On
P1250		Signal too low	0x85	On
P1250		General fault	0x2A	On
P1205	Transmission fork position self-learning fault	Transmission fork position self-learning fault	0x54	On
P287C	Clutch half-engagement point self-learning fault	Clutch half-engagement point self-learning fault	0x54	On
P12A1	High oil temperature protection	Transmission fluid temperature too high	0x98	Off
P12A2	Clutch overheat protection	Clutch temperature too high	0x98	Off
P12A3	High oil temperature fault	High transmission fluid temperature	0x98	On
P1243	Clutch 1 overheating fault	Clutch 1 temperature too high	0x98	On
P1244	Clutch 2 overheating fault	Clutch 2 temperature too high	0x98	On
P2840	Gear 1 out of gear fault	Gear 1 out of gear fault	0x07	On
P2836	Gear 2 out of gear fault	Gear 2 out of gear fault	0x07	On
P285B	3rd gear out-of-gear fault	3rd gear out-of-gear fault	0x07	On
P283B	Gear 4 out of gear fault	Gear 4 out of gear fault	0x07	On
P2831	5th gear out-of-gear fault	5th gear out-of-gear fault	0x07	On
P285C	Gear 6 out of gear fault	Gear 6 out of gear fault	0x07	On
P285D	Gear 7 out of gear fault	Gear 7 out of gear fault	0x07	On
P285E	Gear R out of gear fault	Gear R out of gear fault	0x07	On
P2848	1st gear return to empty fault	1st gear return to empty fault	0x00	On
P2846	2nd gear air return fault	2nd gear air return fault	0x00	On
P2831	3rd gear idle return fault	3rd gear idle return fault	0x00	On
P2847	4th gear return to empty fault	4th gear return to empty fault	0x00	On
P2845	5th gear return to empty fault	5th gear return to empty fault	0x00	On
P2836	6th gear return to empty fault	6th gear return to empty fault	0x00	On
P283B	Idle return fault of gear 7	Idle return fault of gear 7	0x00	On
P2840	R gear return to empty fault	R gear return to empty fault	0x00	On
P2840	1st gear clamp fault	1st gear clamp fault	0x93	On
P2836	2nd gear clamp fault	2nd gear clamp fault	0x93	On
P2849	3rd gear clamp fault	3rd gear clamp fault	0x93	On
P283B	Gear 4 fault	Gear 4 fault	0x93	On
P2831	5th gear block fault	5th gear block fault	0x93	On
P284A	6-gear clamp fault	6-gear clamp fault	0x93	On
P284B	7-gear block fault	7-gear block fault	0x93	On
P284C	R block fault	R block fault	0x93	On
P2840	1st gear not requesting fault	1st gear not requesting fault	0x94	On

P2836	2nd gear not requesting fault	2nd gear not requesting fault	0x94	On
P284D	3rd gear not requesting fault	3rd gear not requesting fault	0x94	On
P283B	4th gear not requesting fault	4th gear not requesting fault	0x94	On
P2831	5th gear not requested fault	5th gear not requested fault	0x94	On
P284E	6th gear not requesting fault	6th gear not requesting fault	0x94	On
P284F	7th gear not requesting fault	7th gear not requesting fault	0x94	On
P2850	R gear not requesting fault	R gear not requesting fault	0x94	On
P1201	Fork 1 overspeed fault	Fork 1 overspeed fault	0x07	On
P1202	Fork 2 overspeed fault	Fork 2 overspeed fault	0x07	On
P1203	Fork 3 overspeed fault	Fork 3 overspeed fault	0x07	On
P1204	Fork 4 overspeed fault	Fork 4 overspeed fault	0x07	On
P2831	Fork 1 position out of range fault	Fork 1 position out of range fault	0x1C	On
P2836	Fork 2 position out of range fault	Fork 2 position out of range fault	0x1C	On
P283B	Fork 3 position out of range fault	Fork 3 position out of range fault	0x1C	On
P2840	Fork 4 position out of range fault	Fork 4 position out of range fault	0x1C	On
P1205	Shift fork adaptation fault	Shift fork adaptation fault	0x61	On
P0900	Clutch 1 closed loop control fault	Clutch 1 pressure high pressure closed loop control fault	0x62	On
P0900	Clutch 1 closed loop control fault	Clutch 1 pressure low pressure closed loop control fault	0x63	On
P090A	Clutch 2 closed loop control fault	Clutch 2 pressure high pressure closed loop control fault	0x62	On
P090A	Clutch 2 closed loop control fault	Clutch 2 pressure low pressure closed loop control fault	0x63	On
P2872	Clutch 1 engagement fault	Clutch 1 clamp fault	0x00	On
P287A	Clutch 2 engagement fault	Clutch 2 clamping gear fault	0x00	On
P0900	Clutch 1 request fault	Clutch 1 actual pressure is too low than target pressure	0x18	On
P0900		Clutch 1 actual pressure is too high than target pressure	0x19	On
P090A	Clutch 2 request fault	Clutch 2 actual pressure is too low than target pressure	0x18	On
P090A		Clutch 2 actual pressure is too high than target pressure	0x19	On
P12A2	ECU temperature sensor fault	TCU temperature sensor voltage signal too low	0x84	On

P12A2		TCU temperature sensor voltage signal too high	0x85	On
U3000	Controller fault	PLL error	0xF0	Off
U3000		ADC error	0xF1	
U3000		RAM error	0x44	
U3000		ROM error	0x45	
U3000		Closed loop test fault	0xF2	
U3000		Program cycle error	0x48	
U3000		Time slice test fault	0xF3	
U3000		Command test fault	0x06	
U3000		Monitoring error	0x47	
U3000		Unknown error	0x0	
U3000		ASW reset error	0x01	
P12A0	Safety fault	Safety fault	0x00	On
P1254	Clutch engagement fault	Clutch engagement fault	0x00	On
P2908	Handle mode fault	Handle position fault	0x00	On
P0942	Main pressure fault	Main pressure compensation fault	0x61	On
P2900	Gear 1 does not request fault	Gear 1 does not request fault	0x94	On
P2901	2nd gear does not request fault	2nd gear does not request fault	0x94	On
P2902	3rd gear does not request fault	3rd gear does not request fault	0x94	On
P2903	4th gear does not request fault	4th gear does not request fault	0x94	On
P2904	5th gear does not request fault	5th gear does not request fault	0x94	On
P2905	Gear 6 does not request fault	Gear 6 does not request fault	0x94	On
P2906	Gear 7 does not request fault	Gear 7 does not request fault	0x94	On
P2907	Gear R does not request fault	Gear R does not request fault	0x94	On
P2908	Odd number shaft gear shifting fault	Two gears on odd number shaft fault	0X94	On
P2909	Even shaft gear shifting fault	Fault of even shaft in two gears	0X94	On
P12AF	Bottom safety fault	Input fault	0x49	On
P12AF		Output fault	0x07	On
P12AE	Solenoid valve drive chip fault	Solenoid valve drive chip correlation fault	0x2A	On
P12AE		Solenoid valve drive chip communication fault	0x00	On
P12AE		Solenoid valve drive chip pin enable fault	0x07	On
P12AE		Solenoid valve drive chip enable fault	0x49	On
P12AE		Solenoid valve drive chip data processing fault	0x05	On
P12B1	Reset fault	Hardware reset fault	0x07	On
P12B1		Software reset fault	0x05	On
P12B1		Full reset fault	0x00	On

P0752	Gear shift lever fault	Short circuit to ground fault	0x11	Off
P0752		Short circuit fault to power supply	0x12	Off
P0752		Open circuit fault	0x13	Off
P0880	Key lock fault	Short circuit to ground fault	0x11	Off
P0880		Short circuit fault to power supply	0x12	Off
P0880		Open circuit fault	0x13	Off
P0715	Input shaft 1 direction fault	Input shaft 1 direction fault	0x00	On
P2765	Input shaft 2 direction fault	Input shaft 2 direction fault	0x00	On

Failure protection list

Fault code	Description		FTB	Failure protection operation	Failure protection release condition
P2530	Key power-on signal	Power supply voltage too high	0x85	Fault lamp is on	After the fault disappears, the failure protection is released immediately.
		Power supply voltage too low	0x84	Fault lamp is on	After the fault disappears, the failure protection is released immediately.
P0705	PRND sensor	Voltage signal too low	0x16	Fault lamp is on PRND replacement strategy	After the fault disappears, the failure protection is released immediately.
		Voltage signal too low	0x17	Fault lamp is on PRND replacement strategy	After the fault disappears, the failure protection is released immediately.
P0666	PCB temperature sensor fault	Voltage signal too low	0x84	Fault lamp is on	After the fault disappears, the failure protection is released immediately.
P0666		Voltage signal too high	0x85		
P0710	Oil temperature sensor	Voltage signal too low	0x84	Fault lamp is on Cancel crawling Cancel DCT shift	After the fault disappears, power on after power-off, and the failure protection is released.
		Voltage signal too high	0x85	Limp home	
Fault code	**Description**		**FTB**	**Failure protection operation**	**Failure protection release condition**
P12A6	Clutch temperature sensor	Voltage signal too low	0x84	Fault lamp is on Cancel crawling Cancel DCT shift	After the fault disappears, power on after power-off, and the failure protection is released.
		Voltage signal too high	0x85	Limp home	
P0840	Clutch 1 sensor	Voltage signal too low	0x16	Fault lamp is on Cancel crawling Cancel DCT shift	After the fault disappears, power on after power-off or when two clutches are turned on, the

				Cancel adaptation	failure protection is released.
		Voltage signal too high	0x17	All gears on shield shaft 1	
P0845	Clutch 2 sensor	Voltage signal too low	0x16	Fault lamp is on	After the fault disappears, power on after power-off or when two clutches are turned on, the failure protection is released.
				Cancel crawling	
				Cancel DCT shift	
				Cancel adaptation	
		Voltage signal too high	0x17	All gears on shield shaft 2	
P2831	Shift fork 1st (gear 5/7) displacement sensor	Voltage signal too low	0x16	Fault lamp is on	After the fault disappears, when the transmission mode is N gear or two clutches are opened, the failure protection is released.
				Cancel DCT shift	
P2831		Voltage signal too high	0x17	All gears on shield shaft 1	
P2836	Shift fork 2 (gear 2/6) displacement sensor	Voltage signal too low	0x16	Fault lamp is on	After the fault disappears, when the transmission mode is N gear or two clutches are opened, the failure protection is released.
				Cancel DCT shift	
P2836		Voltage signal too high	0x17	All gears on shield shaft 2	
P283B	Shift fork 3rd (gear 4/R) displacement sensor	Voltage signal too low	0x16	Fault lamp is on	After the fault disappears, when the transmission mode is N gear or two clutches are opened, the failure protection is released.
				Cancel DCT shift	
P283B		Voltage signal too high	0x17	All gears on shield shaft 2	
P2840	Shift fork 4 (gear 1/3) displacement sensor	Voltage signal too low	0x16	Fault lamp is on	After the fault disappears, when the transmission mode is N gear or two clutches are opened, the failure protection is released.
				Cancel DCT shift	
P2840		Voltage signal too high	0x17	All gears on shield shaft 1	
P0715	Inner input shaft speed sensor	Short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0715		Short circuit to ground	0x11	Cancel crawling	
P0715		Internal input shaft speed change rate too high fault	0x27	Cancel DCT shift	
P0715		Inner input shaft speed signal too high	0x85	All gears on shield shaft 1	
P0715		Internal input shaft speed sensor open circuit	0x13		
P2784		Internal input shaft speed calibration fault	0xF0		
P2765	Outer input shaft speed sensor	Short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P2765		Short circuit to ground	0x11	Cancel crawling	
P2765		Outer input shaft speed change rate too high fault	0x27	Cancel DCT shift	
Fault code	**Description**		**FTB**	**Failure protection operation**	**Failure protection release condition**

P2765		Outer input shaft speed signal too high	0x85	All gears on shield shaft 2	
P2765		Outer input shaft speed sensor open circuit	0x13		
P2784		Outer input shaft speed calibration fault	0xF1		
P0720	Output shaft speed sensor	Short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0720		Short circuit to ground	0x11		
P0720		Output shaft speed change rate too high fault	0x27		
P0720		Output shaft speed signal too high	0x85		
P0720		Output shaft speed sensor open circuit	0x13		
P077B		Output shaft speed sensor direction is 0 and speed is too high	0x00		
P0720		Output shaft speed calibration fault	0x00		
P0720	Speed dependent fault	Fault of two or more speed signals	0x01	Fault lamp is on Cancel crawling Frozen gear	After the fault disappears, power on after power-off, and the failure protection is released.
P0885	Starting allowable hardwire	Open circuit fault	0x13	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0885		Short circuit fault to power supply	0x12	Cancel crawling	
P0885		Short circuit to ground fault	0x11		
P0813	Reversing lamp relay	Open circuit	0x13	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0813		Short circuit to power supply	0x12		
P0813		Short circuit to ground	0x11		
P0960	Lubrication solenoid valve	Low end short circuit to power supply	0x12	Fault lamp is on Cut off LS3	After the fault disappears, power on after power-off, and the failure protection is released.
P0960		Low-end open circuit	0x13	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0960		Low end short circuit to ground	0x11		
P0960		Low-side current too high fault	0x18		
P0960		Low-side current too low fault	0x19		
P0960		Channel unexpected shutdown fault	0x07		
P0960		MOS tube discharge current fault	0x00		
P0964	Main pressure solenoid valve	Low end short circuit to power supply	0x12	Fault lamp is on Cut off LS3	After the fault disappears, power on after power-off, and the failure protection is released.
P0964		Low-end open circuit	0x13	Fault lamp is on	After the fault

P0964		Low end short circuit to ground	0x11		disappears, power on after power-off, and the failure protection is released.
P0964		Low-side current too high fault	0x18		
P0964		Low-side current too low fault	0x19		
P0964		Channel unexpected shutdown fault	0x07		
Fault code	**Description**		**FTB**	**Failure protection operation**	**Failure protection release condition**
P0964		MOS tube discharge current fault	0x00		
P0968	Clutch 1 Solenoid	Low end short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Cancel DCT shift	
				Cancel adaptation	
				All gears on shield shaft 1	
				Cut off LS1	
P0968		Low-end open circuit	0x13	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0968		Low end short circuit to ground	0x11	Cancel DCT shift	
P0968		Low-side current too high fault	0x18	Cancel adaptation	
P0968		Low-side current too low fault	0x19	All gears on shield shaft 1	
P0968		Channel unexpected shutdown fault	0x07		
P0968		MOS tube discharge current fault	0x00		
P2727	Clutch 2 solenoid valve	Low end short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Cancel DCT shift	
				Cancel adaptation	
				All gears on shield shaft 2	
				Cut off LS2	
P2727		Low-end open circuit	0x13	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P2727		Low end short circuit to ground	0x11	Cancel DCT shift	
P2727		Low-side current too high fault	0x18	Cancel adaptation	
P2727		Low-side current too low fault	0x19	All gears on shield shaft 2	
P2727		Channel unexpected shutdown fault	0x07		
P2727		MOS tube discharge current fault	0x00		
P285B	Shift solenoid valve 1 fault	Low end short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Frozen gear	
				Shield request for shift solenoid valve	
				Cut off LS1	
P285B		Low-end open circuit	0x13	Fault lamp is on	After the fault

P285B		Low end short circuit to ground	0x11	Shield request for shift solenoid valve	disappears, power on after power-off, and the failure protection is released.
P285B		Low-side current too high fault	0x18	Frozen gear	
P285B		Low-side current too low fault	0x19		
P285B		Channel unexpected shutdown fault	0x07		
P285B		MOS tube discharge current fault	0x00		
Fault code	**Description**		**FTB**	**Failure protection operation**	**Failure protection release condition**
P285F	Shift solenoid valve 2 fault	Low end short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Frozen gear	
				Shield request for shift solenoid valve	
				Cut off LS2	
P285F		Low-end open circuit	0x13	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P285F		Low end short circuit to ground	0x11	Shield request for shift solenoid valve	
P285F		Low-side current too high fault	0x18	Frozen gear	
P285F		Low-side current too low fault	0x19		
P285F		Channel unexpected shutdown fault	0x07		
P285F		MOS tube discharge current fault	0x00		
P0750	Switch valve 1 fault	Low end short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Frozen gear	
				Shield request for shift solenoid valve	
				Cut off LS1	
P0750		Low-end open circuit	0x13	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0750		Low end short circuit to ground	0x11	Shield request for shift solenoid valve	
P0750		Low-side current too high fault	0x18	Frozen gear	
P0750		Low-side current too low fault	0x19		
P0750		Channel unexpected shutdown fault	0x07		
P0750		MOS tube discharge current fault	0x00		
P0755	Switch valve 2 fault	Low end short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Frozen gear	
				Shield request for shift solenoid valve	
				Cut off LS2	
P0755		Low-end open circuit	0x13	Fault lamp is on	After the fault disappears, power on after power-off, and the failure
P0755		Low end short circuit to ground	0x11	Shield request for shift solenoid valve	

P0755		Low-side current too high fault	0x18	Frozen gear	protection is released.
P0755		Low-side current too low fault	0x19		
P0755		Channel unexpected shutdown fault	0x07		
P0755		MOS tube discharge current fault	0x00		
P1245	Solenoid valve high end 1 fault	Short circuit fault to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Frozen gear	
				Cancel DCT shift	
Fault code	**Description**		**FTB**	**Failure protection operation**	**Failure protection release condition**
				Cancel adaptation	
				All gears on shield shaft 1	
P1245		Open circuit fault	0x13	Shield request for shift solenoid valve	
P1245		Short circuit to ground fault	0x11	Cut off LS1	
P1246	Solenoid valve high end 2 fault	Short circuit fault to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Cancel crawling	
				Frozen gear	
				Cancel DCT shift	
				Cancel adaptation	
				All gears on shield shaft 2	
P1246		Open circuit fault	0x13	Shield request for shift solenoid valve	
P1246		Short circuit to ground fault	0x11	Cut off LS2	
P1247	Solenoid valve high end 3 fault	Short circuit fault to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P1247		Open circuit fault	0x13	Cut off LS3	
P1247		Short circuit to ground fault	0x11		
U0129	ESP CAN signal fault	ESP data loss	0x29	Fault lamp is on	After the fault disappears, the failure protection is released immediately.
U0073	Can bus off fault	Can bus off fault	0x88	Cancel crawling	After the fault disappears, the transmission mode enters the N gear mode, and the failure protection is released.
				Cancel adaptation	
				Cancel DCT shift	
				Cancel automatic shift	
U0100	EMS CAN signal fault	EMS data loss	0x87	Fault lamp is on	After the fault disappears, the failure protection is released immediately.
U2081	Brake signal fault	Brake signal invalid	0x29	Fault lamp is on	After the fault disappears, the transmission mode
				Cancel crawling	

U2081		Brake signal unreliable	0x64		enters the N gear mode or the two clutches open, and the failure protection is released.
U2082	Driver expected torque fault	Driver expected torque signal invalid	0x29	Fault lamp is on Cancel crawling	After the fault disappears, the transmission mode enters the N mode. Type, failure protection release
U2082		Driver expected torque signal unreliable	0x64	Cancel adaptation	
U2083	Engine torque fault	Engine torque signal invalid	0x29	Fault lamp is on Cancel crawling	After the fault disappears, power on after power-off, and the failure protection is released.
U2083		Engine torque signal unreliable	0x64	Cancel adaptation	
U2084	Friction torque fault	Friction torque signal invalid	0x29	Cancel crawling	After the fault disappears, power on after power-off, and the failure protection is released.
U2084		Friction torque signal unreliable	0x64	Cancel adaptation	
Fault code	**Description**		**FTB**	**Failure protection operation**	**Failure protection release condition**
U2085	Engine speed fault	Engine speed signal invalid	0x29	Fault lamp is on Cancel crawling Cancel adaptation	After the fault disappears, power on after power-off, and the failure protection is released.
U2086	Engine target idle speed fault	Engine target idle signal invalid	0x29	Cancel crawling	After the fault disappears, the transmission mode enters the N mode. Type, failure protection release
U2087	Accelerator signal fault	Accelerator signal invalid	0x29	None	None
U2088	Engine coolant temperature fault	Engine coolant temperature is invalid	0x29	None	None
U2089	Plateau coefficient fault	Plateau coefficient signal invalid	0x29	None	After the fault disappears, the transmission mode enters the N mode. Type, failure protection release
U208B	ESP rear left wheel fault	ESP RR LH wheel signal invalid	0x29	None	None
U208B		ESP rear left wheel signal unreliable	0x64		
U208C					
ESP rear right wheel fault	ESP RR RH wheel signal invalid	0x29	None	None	
	U208C	ESP RR RH wheel signal unreliable			0x64
U208D					
ESP front right wheel fault	ESP front right wheel signal invalid	0x29	None	None	
	U208D	ESP front right wheel signal unreliable			0x64
U208E					
ESP front left wheel fault	ESP front left wheel signal invalid	0x29	None	None	

	U208E	ESP front left wheel signal unreliable			0x64
U208F	ESL CAN signal fault	ESL data loss	0x87	None	After the fault disappears, power on after power-off, and the failure protection is released.
U2090	ACM CAN signal fault	ACM data loss	0x87	None	After the fault disappears, power on after power-off, and the failure protection is released.
U2091	ESL DrivePark signal fault	Invalid ESL DrivePark signal	0x29	None	After the fault disappears, power on after power-off, and the failure protection is released.
U2092	Gear ACM P signal fault	Gear ACM P signal invalid	0x29	None	After the fault disappears, power on after power-off, and the failure protection is released.
U2093	ESL gear shifter status fault	ESL gear shifter fault	0x29	None	After the fault disappears, power on after power-off, and the failure protection is released.
U2094	ESL mode signal fault	ESL mode signal is invalid	0x29	None	After the fault disappears, power on after power-off, and the failure protection is released.
Fault code	**Description**		**FTB**	**Failure protection operation**	**Failure protection release condition**
U2095	ESL shifter position fault	ESL gear shifter position is invalid	0x29	None	After the fault disappears, power on after power-off, and the failure protection is released.
P1213	Sensor 5V power supply 1 fault	Short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Cancel DCT shift	
P1213		Voltage too high	0x17	Cancel adaptation	
P1213		High current	0x19	All gears on shield shaft 2	
P1214	Sensor 5V power supply 2 fault	Short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Cancel DCT shift	
				Cancel adaptation	
P1214		Voltage too high	0x17	All gears on shield shaft 1	
P1214		High current	0x19	PRND replacement strategy	
P1216	Sensor 8V power supply 1 fault	Short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P1216		Voltage too high	0x17	Cancel crawling	
P1216		High current	0x19		
P1217	Sensor 8V power supply fault	Short circuit to power supply	0x12	Fault lamp is on	After the fault disappears, power

P1217		Voltage too high	0x17	Cancel crawling	on after power-off, and the failure protection is released.
P1217		High current	0x19		
P1218	Sensor 8V power supply fault	Sensor 8V voltage fault	0x00	Fault lamp is on Cancel crawling Frozen gear	After the fault disappears, power on after power-off, and the failure protection is released.
P1251	NVM storage fault	NVM low level storage status fault	0x45	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P1252		NVM Critical State Fault	0x45		
P1253	Trim data fault	Trim inconsistent data	0x45		After the fault disappears, power on after power-off, and the failure protection is released.
P287C	Clutch half-engagement point adaptation	Signal too high	0x84	Fault lamp is on Cancel crawling	After the fault disappears, the failure protection is released after the two clutches are opened.
P287C		Signal too low	0x85	Cancel adaptation	
P287C		No adaptation for a long time	0x2A	Cancel DCT shift	
P1250	Clutch PT curve adaptation	Signal too high	0x84	Fault lamp is on Cancel crawling	After the fault disappears, the failure protection is released after the two clutches are opened.
P1250		Signal too low	0x85	Cancel adaptation	
P1250		General fault	0x2A	Cancel DCT shift	
P1205	Transmission fork position self-learning fault	Transmission fork position self-learning fault	0x54	Fault lamp is on Open both clutches	After the fault disappears, power on after power-off, and the failure protection is released.
P7050	PRND Self-learning fault	PRND Self-learning fault	0x54	Fault lamp is on Open both clutches	After the fault disappears, power on after power-off, and the failure protection is released.

Fault code	Description		FTB	Failure protection operation	Failure protection release condition
P287C	Clutch half-engagement point self-learning fault	Clutch half-engagement point self-learning fault	0x54	Fault lamp is on Open both clutches	After the fault disappears, power on after power-off, and the failure protection is released.
P12A1	High oil temperature protection	Transmission fluid temperature too high	0x98	Clutch protection strategy	After the fault disappears, the failure protection is released immediately.
P12A2	Clutch overheat protection	Clutch temperature too high	0x98	Clutch protection strategy	After the fault disappears, the failure protection is released immediately.
P12A3	High oil temperature fault	High transmission fluid temperature	0x98	All gears on shield shaft 1 All gears on shield shaft 2	After the fault disappears, the transmission mode enters the N gear mode or the two clutches open, and the failure protection is released.
P1243	Clutch 1 overheating fault	Clutch 1 temperature too high	0x98	Cancel DCT shift All gears on shield shaft 1	After the fault disappears, the transmission mode enters the N gear mode or the two clutches open, and the failure protection is released.
P1244	Clutch 2 overheating fault	Clutch 2 temperature too high	0x98	Cancel DCT shift All gears on shield shaft 2	After the fault disappears, the transmission mode enters the N gear mode or the two clutches open, and the failure protection is released.
P2840	Gear 1 out of gear fault	Gear 1 out of gear fault	0x07	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, power on after power-off, and the failure protection is released.
P2836	Gear 2 out of gear fault	Gear 2 out of gear fault	0x07	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, power on after power-off, and the failure protection is released.
P285B	3rd gear out-of-gear fault	3rd gear out-of-gear fault	0x07	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, power on after power-off, and the failure protection is released.
P283B	Gear 4 out of gear fault	Gear 4 out of gear fault	0x07	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, power on after power-off, and the failure protection is released.
P2831	5th gear out-of-gear fault	5th gear out-of-gear fault	0x07	Fault lamp is on Cancel DCT shift	After the fault disappears, power on after power-off,

				All gears on shield shaft 1	and the failure protection is released.
P285C	Gear 6 out of gear fault	Gear 6 out of gear fault	0x07	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, power on after power-off, and the failure protection is released.
P285D	Gear 7 out of gear fault	Gear 7 out of gear fault	0x07	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, power on after power-off, and the failure protection is released.
P285E	Gear R out of gear fault	Gear R out of gear fault	0x07	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, power on after power-off, and the failure protection is released.

Fault code	Description		FTB	Failure protection operation	Failure protection release condition
P2848	1st gear return to empty fault	1st gear return to empty fault	0x00	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, the failure protection is released immediately.
P2846	2nd gear air return fault	2nd gear air return fault	0x00	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, the failure protection is released immediately.
P2831	3rd gear idle return fault	3rd gear idle return fault	0x00	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, the failure protection is released immediately.
P2847	4th gear return to empty fault	4th gear return to empty fault	0x00	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, the failure protection is released immediately.
P2845	5th gear return to empty fault	5th gear return to empty fault	0x00	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, the failure protection is released immediately.
P2836	6th gear return to empty fault	6th gear return to empty fault	0x00	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, the failure protection is released immediately.
P283B	Idle return fault of gear 7	Idle return fault of gear 7	0x00	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, the failure protection is released immediately.
P2840	R gear return to empty fault	R gear return to empty fault	0x00	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, the failure protection is released immediately.
P2840	1st gear clamp fault	1st gear clamp fault	0x93	None	After the fault disappears, the failure protection is released immediately.
P2836	2nd gear clamp fault	2nd gear clamp fault	0x93	None	After the fault disappears, the failure protection is released immediately.
P2849	3rd gear clamp fault	3rd gear clamp fault	0x93	None	After the fault disappears, the failure protection is released immediately.
P283B	Gear 4 fault	Gear 4 fault	0x93	None	After the fault disappears, the failure protection is released immediately.
P2831	5th gear block fault	5th gear block fault	0x93	None	After the fault disappears, the failure protection is released

					immediately.
P284A	6-gear clamp fault	6-gear clamp fault	0x93	None	After the fault disappears, the failure protection is released immediately.
P284B	7-gear block fault	7-gear block fault	0x93	None	After the fault disappears, the failure protection is released immediately.
P284C	R block fault	R block fault	0x93	None	After the fault disappears, the failure protection is released immediately.

Fault code	Description		FTB	Failure protection operation	Failure protection release condition
P2840	1st gear not requesting fault	1st gear not requesting fault	0x94	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P2836	2nd gear not requesting fault	2nd gear not requesting fault	0x94	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P284D	3rd gear not requesting fault	3rd gear not requesting fault	0x94	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P283B	4th gear not requesting fault	4th gear not requesting fault	0x94	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P2831	5th gear not requested fault	5th gear not requested fault	0x94	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P284E	6th gear not requesting fault	6th gear not requesting fault	0x94	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P284F	7th gear not requesting fault	7th gear not requesting fault	0x94	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P2850	R gear not requesting fault	R gear not requesting fault	0x94	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P1201	Fork 1 overspeed fault	Fork 1 overspeed fault	0x07	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P1202	Fork 2 overspeed fault	Fork 2 overspeed fault	0x07	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P1203	Fork 3 overspeed	Fork 3 overspeed	0x07	Fault lamp is on	After the fault

	fault	fault		Cancel DCT shift All gears on shield shaft 2	disappears, after power-on or transmission mode is N, the failure protection is released.
P1204	Fork 4 overspeed fault	Fork 4 overspeed fault	0x07	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P2831	Fork 1 position out of range fault	Fork 1 position out of range fault	0x1C	Fault lamp is on Cancel DCT shift	After the fault disappears, power on or shift after power-off.

Fault code	Description		FTB	Failure protection operation	Failure protection release condition
				All gears on shield shaft 1	The tank mode is N, and the failure protection is released.
P2836	Fork 2 position out of range fault	Fork 2 position out of range fault	0x1C	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P283B	Fork 3 position out of range fault	Fork 3 position out of range fault	0x1C	Fault lamp is on Cancel DCT shift All gears on shield shaft 2	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P2840	Fork 4 position out of range fault	Fork 4 position out of range fault	0x1C	Fault lamp is on Cancel DCT shift All gears on shield shaft 1	After the fault disappears, after power-on or transmission mode is N, the failure protection is released.
P1205	Shift fork adaptation fault	Shift fork adaptation fault	0x61	None	After the fault disappears, power on after power-off, and the failure protection is released.
P0900	Clutch 1 closed loop control fault	Clutch 1 pressure high pressure closed loop control fault	0x62	Fault lamp is on Clutch protection strategy	After the fault disappears, the two clutches are opened and the failure protection is released.
P0900	Clutch 1 closed loop control fault	Clutch 1 pressure low pressure closed loop control fault	0x63	Fault lamp is on	After the fault disappears, the two clutches are opened and the failure protection is released.
P090A	Clutch 2 closed loop control fault	Clutch 2 pressure low pressure closed loop control fault	0x62	Fault lamp is on Clutch protection strategy	After the fault disappears, the two clutches are opened and the failure protection is released.
P090A	Clutch 2 closed loop control fault	Clutch 2 pressure high pressure closed loop control fault	0x63	Fault lamp is on	After the fault disappears, the two clutches are opened and the failure protection is released.
P2872	Clutch 1 engagement fault	Clutch 1 clamp fault	0x00	Fault lamp is on Opening clutch All gears on shield shaft 1	After the fault disappears, power on or two of them after power-off, and the failure protection is released.
P287A	Clutch 2 engagement fault	Clutch 2 clamping gear fault	0x00	Fault lamp is on Opening clutch All gears on shield shaft 2	After the fault disappears, power on or two of them after power-off, and the failure protection is released.
P0900	Clutch 1 request fault	Clutch 1 actual	0x18	Fault lamp is on	After the fault

		pressure is too low than target pressure		Cancel DCT shift	disappears, power on after power-off, and the failure protection is released.
				Cancel crawling	
P0900		Clutch 1 actual pressure is too high than target pressure	0x19	All gears on shield shaft 1	
P090A	Clutch 2 request fault	Clutch 2 actual pressure is too low than target pressure	0x18	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Cancel DCT shift	
				Cancel crawling	
P090A		Clutch 2 actual pressure is too high than target pressure	0x19	All gears on shield shaft 2	

Fault code	Description		FTB	Failure protection operation	Failure protection release condition
P12A2	ECU temperature sensor fault	ECU temperature sensor voltage signal too low	0x84	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P12A2		ECU temperature sensor voltage signal too high	0x85	Open both clutches	
U3000	ErrController controller fault	PLL error	0xF0	None	None
U3000		ADC error	0xF1		
U3000		RAM error	0x44		
U3000		ROM error	0x45		
U3000		Closed loop test fault	0xF2		
U3000		Program cycle error	0x48		
U3000		Time slice test fault	0xF3		
U3000		Command test fault	0x06		
U3000		Monitoring error	0x47		
U3000		Unknown error	0x0		
U3000		ASW reset error	0x01		
P12A0	Safety fault	Safety fault	0x00	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Open both clutches	
P1254	Clutch engagement fault	Clutch engagement fault	0x00	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Open both clutches	
P2908	Handle mode fault	Handle position fault	0x00	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0942	Main pressure fault	Main pressure compensation fault	0x61	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P2900	Gear 1 does not request fault	Gear 1 does not request fault	0x94	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Solenoid valve request	
				Frozen gear	
P2901	2nd gear does not request fault	2nd gear does not request fault	0x94	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Solenoid valve request	
				Frozen gear	
P2902	3rd gear does not request fault	3rd gear does not request fault	0x94	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
				Solenoid valve request	
				Frozen gear	
P2903	4th gear does not request fault	4th gear does not request fault	0x94	Fault lamp is on	After the fault disappears, power on after power-off,
				Solenoid valve	

				request Frozen gear	and the failure protection is released.
P2904	5th gear does not request fault	5th gear does not request fault	0x94	Fault lamp is on Solenoid valve request Frozen gear	After the fault disappears, power on after power-off, and the failure protection is released.

Fault code	Description		FTB	Failure protection operation	Failure protection release condition
P2905	Gear 6 does not request fault	Gear 6 does not request fault	0x94	Fault lamp is on Solenoid valve request Frozen gear	After the fault disappears, power on after power-off, and the failure protection is released.
P2906	Gear 7 does not request fault	Gear 7 does not request fault	0x94	Fault lamp is on Solenoid valve request Frozen gear	After the fault disappears, power on after power-off, and the failure protection is released.
P2907	Gear R does not request fault	Gear R does not request fault	0x94	Fault lamp is on Solenoid valve request Frozen gear	After the fault disappears, power on after power-off, and the failure protection is released.
P2908	Odd number shaft gear shifting fault	Two gears on odd number shaft fault	0X94	Fault lamp is on Open both clutches	After the fault disappears, power on after power-off, and the failure protection is released.
P2909	Even shaft gear shifting fault	Fault of even shaft in two gears	0X94	Fault lamp is on Open both clutches	After the fault disappears, power on after power-off, and the failure protection is released.
P12AF	Bottom safety fault	Input fault	0x49	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P12AF		Output fault	0x07	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P12AE	Solenoid valve drive chip fault	Solenoid valve drive chip correlation fault	0x2A	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P12AE		Solenoid valve drive chip communication fault	0x00	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P12AE		Solenoid valve drive chip pin Pin enable fault	0x07	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P12AE		Solenoid valve drive chip enable fault	0x49	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P12AE		Solenoid valve drive chip data processing fault	0x05	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is

					released.
P12B1	Reset fault	Hardware reset fault	0x07	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P12B1		Software reset fault	0x05	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P12B1		Full reset fault	0x00	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0752	Gear shift lever fault	Short circuit to ground fault	0x11	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.

Fault code	Description		FTB	Failure protection operation	Failure protection release condition
P0752		Short circuit fault to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0752		Open circuit fault	0x13	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0880	Key lock fault	Short circuit to ground fault	0x11	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0880		Short circuit fault to power supply	0x12	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0880		Open circuit fault	0x13	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P0715	Input shaft 1 direction fault	Input shaft 1 direction fault	0x00	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.
P2765	Input shaft 2 direction fault	Input shaft 2 direction fault	0x00	Fault lamp is on	After the fault disappears, power on after power-off, and the failure protection is released.

DTC P2530

Fault detection description

Fault code	Description		FTB	Definition
P2530	Key power-on signal	Power supply voltage too high	0x85	Turn the key switch to "ON," and the ignition voltage signal shall be higher than 6.8 V.

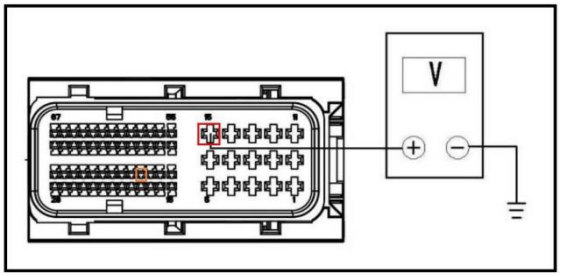
Possible causes

Fault code	Inspection strategy	Fault triggering conditions(Control strategy)	Faulty position
P2530	Hardware and circuit inspection	After ignition, the communication with TCU is normal, and the software detects that the power supply voltage is greater than 16 V.	· Ignition relay · Battery · TCU · Alternator

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	

	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Are there any DTCs other than P2530 DTCs? - > Yes Find the corresponding fault code - > No Go to step 2.

2. Check battery voltage data flow	
	A. Use diagnostic scanner to read automatic transmission data stream "battery voltage." Is the data flow normal -> Yes Reference: Troubleshooting according to DTC -> No Go to Step 3
3. Check battery	
	A. Measure battery voltage. Standard voltage: 11~14 V B. Start the engine. C. Measure the voltage between the positive and negative terminals of the battery. Standard voltage: 12~16v Is the voltage normal? - > Yes to step 3 - > No Overhaul charging system and battery
4. Check ignition relay	
	A. Check ignition relay. Check whether the ignition relay is short to ground and whether the ignition relay is normal. - > Yes to step 5 - > No Replace ignition relay
5. Check circuit between TCU and temperature sensor	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect the temperature sensor plug. C. Disconnect harness TCU plug D. Check the resistance of the circuit between T39 of the TCU plug and pin 1 of the temperature sensor plug, T24 of the TCU plug and plug of the oil temperature sensor, and check whether there is open circuit between the circuits. Standard resistance: Less than 5Ω E. Measure the resistance between pins 1 and 2 of the temperature sensor plug and reliable grounding, and check whether the circuit is short to ground. Standard resistance: Greater than 10 MΩ F. Measure the voltage between pins 1 and 2 of the temperature sensor plug and reliable grounding, and check whether the circuit is short to power supply. Standard voltage: 0 V Is the temperature sensor circuit normal - > Yes

	to step 6.

	- > No Repair circuit fault between T24 of automatic transmission harness plug and pin 1 of temperature sensor plug, T49 of TCU plug and pin 2 of temperature sensor plug.
6. Check TCU power supply circuit	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Connect the battery negative harness. D. Turn the ignition switch to "ON" position. E. Measure the voltage between T15 and T32 of TCU harness plug and reliable grounding point. Standard voltage: 11-- 14 V Is the circuit check normal? ? Yes Go to step 7. ? No Overhaul terminals T15 and T32 of TCU harness plug respectively to engine compartment electrical center. Open circuit fault between C01 and indoor electrical center P01.
7. Check grounding circuit of TCU	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point. Standard resistance: Less than 5Ω Is the resistance normal? ? Yes Go to Step 8 ? No Overhaul the open circuit fault between TCU harness plug terminal T5, T7 and ground. Confirm the system is normal.
8. Check TCU	
	.Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P0666

1.Fault code

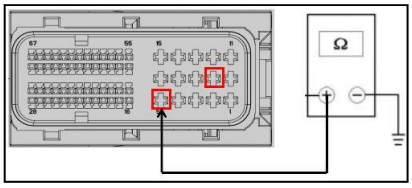
Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P0666	Hardware circuit check	After ignition, the TCU detects that the oil temperature sensor voltage is less than 0.15 V, the fault does not change for 1s or longer, and the software makes fault judgment.	· TCU

		After ignition, the TCU detects that the oil temperature sensor voltage is greater than 4.95 V, the fault does not change for 1s or longer, and the software makes fault judgment.	

2. Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P0666	Hardware circuit check	After ignition, the TCU detects that the oil temperature sensor voltage is less than 0.15 V, the fault does not change for 1s or longer, and the software makes fault judgment.	· TCU
		After ignition, the TCU detects that the oil temperature sensor voltage is greater than 4.95 V, the fault does not change for 1s or longer, and the software makes fault judgment.	

3. Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Are there DTCs other than P0666? - > Yes Reference: Fault code list - > No Go to step 2.
2. Check whether the fault persists.	
	A. After reading and clearing the DTC with the diagnostic scanner, the vehicle is ignited or the vehicle is driven for a period of time. Fault code P0666 Yes check whether it continues to appear -> Yes Go to Step 3 -> No Refer to troubleshooting procedure according to fault code.
Check power supply	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point. Standard resistance: Less than 5Ω Is the resistance normal? ? Yes Go to Step 5 ? No Overhaul open circuit fault between terminals B_L3 and B_M3 of TCU harness plug AB and grounding point.

	Confirm the system is normal.
5. Check TCU	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P0710

1.Fault code

Fault code	**Description**		**FTB**	Definition
P0710	Oil temperature sensor	Voltage signal too low	0x85	Connect the temperature sensor to terminals B_H2 and B_G4 of TCU connectors A and B through pin 1,2 of sensor harness connector..
		Voltage signal too high	0x84	

2.Possible causes

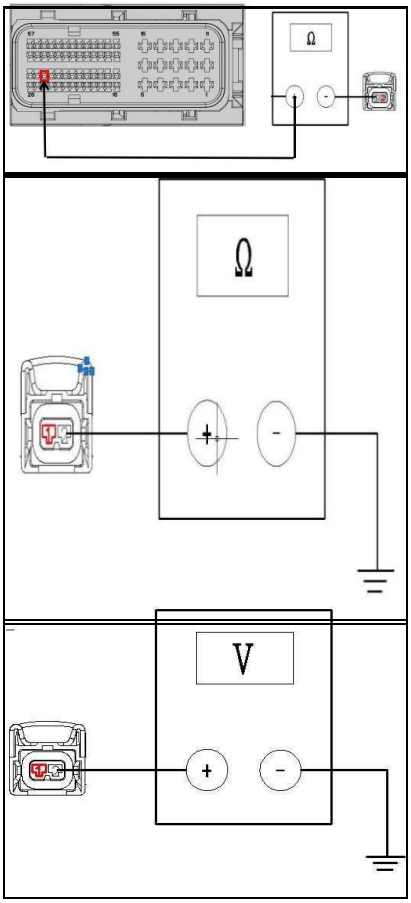
Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P0710	Hardware circuit check	After ignition, the software detects that the oil temperature sensor voltage is less than or equal to 0.01 V and the signal does not change for one minute or more, and the software makes fault judgment.	· Harness · Oil temperature sensor · TCU
		After ignition, the software detects that the oil temperature sensor voltage is greater than or equal to 0.495 V for more than 3s and the engine is running all the time, and the signal If there is no change for 1 second or longer, the software will make fault judgment.	

3.Diagnostic process

Test conditions	Details/Results/Measures
1. General inspection	
	A. Inspect whether the automatic transmission harness temperature sensor plug is reliable, free of falling off, damaged, poor connection, aging, loose and other signs. Is it normal? - > Yes Go to step 2. - > No Repair the fault point.
2. Check fault code	

	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner.

	Are there DTCs other than P0710? - > Yes Reference: Fault code list - > No Go to Step 3.
3. Check oil temperature sensor data flow	
	A. Use diagnostic scanner to read automatic transmission data stream "oil temperature." Is the data flow normal -> Yes Reference: Troubleshooting according to DTC -> No Go to Step 4
4. Check oil temperature sensor	
	A. Inspect the oil temperature sensor. Reference: Does the oil temperature sensor check (automatic transmission, general check) have normal resistance? - > Yes to step 5 - > No Replace oil temperature sensor
5. Check the circuit between oil temperature sensor and TCU.	



A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable.

B. Disconnect

temperature sensor

plug C.Disconnect

harness TCU plug

D. Check the resistance of the circuit between T24 of the TCU plug and pin 1 of the temperature sensor plug and between T39 of the TCU plug and plug 2 of the oil temperature sensor, and check whether there is open circuit between the circuits.

Standard resistance: Less than 5Ω

E. Measure the resistance between pins 1 and 2 of the temperature sensor plug and reliable grounding, and check whether the circuit is short to ground.

Standard resistance: Greater than 10 MΩ

F. Measure the voltage between pins 1 and 2 of the temperature sensor plug and reliable grounding, and check whether the circuit is short to power supply.

Standard voltage: 0 V

Is the temperature sensor circuit normal

- > Yes

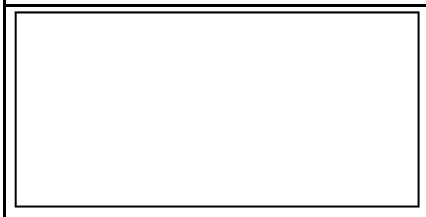
to step

6.

- > No

Repair circuit fault between T24 of automatic transmission harness plug and pin 1 of temperature sensor plug, and between T39 of TCU plug and pin 2 of temperature sensor plug.

6. Check TCU power supply circuit



A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable.

B. Disconnect TCU harness plug.

C. Connect the battery negative harness.

D. Turn the ignition switch to "ON" position.

E. Measure the voltage between T15 and T32 of TCU harness plug and reliable grounding point. Standard voltage: 11-- 14 V

Is the circuit check normal?

? Yes

Go to step 7.

? No

Overhaul terminals T15 and T32 of TCU harness plug respectively to engine compartment electrical center.
Open circuit fault between C01 and indoor electrical center P01.

7. Check grounding circuit of TCU

A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug.

C. Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point.

Standard resistance: Less than 5Ω

Is the resistance normal?

? Yes

	Go to Step 7 ? No Overhaul open circuit fault between terminal T5 and T7 of TCU harness plug and grounding point G 310. Confirm the system is normal.
8. Check TCU	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P0840

1. Fault code

Fault code	**Description**		**FTB**	Definition
P0840	Clutch 1 sensor	Voltage signal too low	0x16	Odd number pressure sensor is connected with terminals BE2, BE4 and BF2 of TCU connector through cylinder connector 36,37,40.

2. Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P0840	Hardware circuit check	After ignition, the software detects that the clutch pressure sensor voltage is less than 0.125 V, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· Harness · Clutch 1 pressure sensor · TCU
		After ignition, the software detects that the clutch pressure sensor voltage is greater than 4.875 V, and the above fault lasts for 0.1 s or longer. The software makes fault judgment.	

3. Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Is there any fault code other than P0840 fault code? - > Yes Reference: Fault code list - > No Go to step 2.
2. Check clutch 1 pressure data flow	
	A. Read automatic transmission data stream "clutch 1 pressure" with diagnostic scanner.

	Clutch 1 pressure data flow is normal -> Yes Go to Step 3 -> No Contact transmission after-sales technical support
3. Check TCU power supply circuit	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Connect the battery negative harness. D. Turn the ignition switch to "ON" position. E. Measure the voltage between T15 and T32 of TCU harness plug and reliable grounding point. **Standard voltage: 11--Whether 14 V circuit check is normal?** ? Yes Go to step 7. ? No Overhaul open circuit fault between terminals T15 and T32 of TCU harness plug and engine compartment electrical center C01 and indoor electrical center P01 respectively.
4. Check grounding circuit of TCU	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point. Standard resistance: Is the resistance less than 5Ω normal? ? Yes Go to Step 7 ? No Overhaul open circuit fault between terminal T5 and T7 of TCU harness plug and grounding point G 310. Confirm the system is normal.
5. Check TCU	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P0845

Fault code

Fault code	Description		FTB	Definition
P0845	Clutch 2 sensor	Voltage signal too low	0x16	Even pressure sensor is connected with terminals BC1, BD4 and BD2 of TCU connector through cylinder connector 18,19,20.
		Voltage signal too high	0x17	

2. Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P0845	Hardware circuit check	After ignition, the software detects that the voltage of even clutch pressure sensor is less than 0.125 V, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· Harness · Clutch 2 pressure sensor · TCU
		After ignition, the software detects that the voltage of even clutch pressure sensor is greater than 4.875 V, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Is there any fault code other than P0845 fault code? - > Yes Reference: Fault code list - > No Go to step 2.
2. Check clutch 2 pressure data flow	
	A. Read automatic transmission data stream "clutch 2 pressure" with diagnostic scanner. Is the data flow normal -> Yes Go to Step 3 -> No Contact transmission after-sales technical support
3. Check TCU power supply circuit	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Connect the battery negative harness. D. Turn the ignition switch to "ON" position. E. Measure the voltage between T15 and T32 of TCU harness plug and reliable grounding point. **Standard voltage: 11--Whether 14 V circuit check is normal?**

	? Yes Go to step 7. ? No Overhaul open circuit fault between terminals T15 and T32 of TCU harness plug and engine compartment electrical center C01 and indoor electrical center P01 respectively.
4. Check grounding circuit of TCU	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point. Standard resistance: Is the resistance less than 5Ω normal? ? Yes Go to Step 7 ? No Overhaul open circuit fault between terminal T5 and T7 of TCU harness plug and grounding point G 310. Confirm the system is normal.
5. Check TCU	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P2831 P2836 P283B P2840

Fault code

Fault code	Description		FTB	Definition
P2831	Shift fork 1st (gear 5/7) displacement sensor	Voltage signal too low	0x16	The fork position sensor passes through terminals 32,33,34,35 of cylinder connector and B_J1, B_J3, B_H1 of TCU harness plug AB. B_J2 terminal connection
P2831		Voltage signal too high	0x17	
P2836	Shift fork 2 (gear 2/6) displacement sensor	Voltage signal too low	0x16	
P2836		Voltage signal too high	0x17	
P283B	Shift fork 3rd (gear 4/R) displacement sensor	Voltage signal too low	0x16	
P283B		Voltage signal too high	0x17	
P2840	Shift fork 4 (gear 1/3) displacement sensor	Voltage signal too low	0x16	
P2840		Voltage signal too high	0x17	

Possible causes

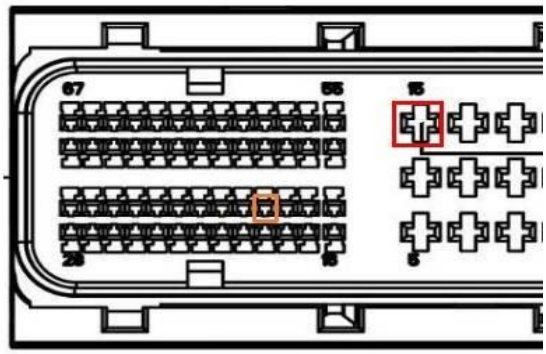
Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position

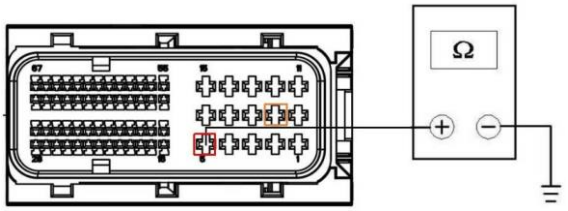
P2831	Hardware circuit check	After ignition, the software detects that the voltage of shift fork (gear 5/7) displacement sensor is less than 0.125 V, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· harness
		After ignition, the software detects that the displacement sensor of shift fork 5/7 (gear 5/7) is greater than 4.875 V, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
P2836		After ignition, the software detects that the voltage of shift fork 2-6 (gear 2-6) displacement sensor is less than 0.125 V, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· Fork displacement sensor
		After ignition, the software detects that the displacement sensor of shift fork 2-6 (gear 2-6) is greater than 4.875 V, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
P283B		After ignition, the software detects that the voltage of displacement sensor of shifting fork 4- R (gear 4- R) is less than 0.125 V, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· TCU
		After ignition, the software detects that the shifting fork (gear 4- R) displacement sensor is greater than 4.875 V, the above fault lasts for 0.1 s or longer, and the DTCs make fault judgment.	
P2840		After ignition, the software detects that the voltage of shift fork 1-3 (gear 1-3) displacement sensor is less than 0.125 V, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the software detects that the shift fork 1-3 (gear 1-3) displacement sensor is greater than 4.875 V, the above fault lasts for 0.1 s or longer, and the DTCs make fault judgment.	

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	

	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Is there P 2831, P 2836, P283B, P 2840 Fault code other than fault code - > Yes Reference: Fault code list - > No Go to step 2.
2. Check the position of shift fork 1, 2, 3 and 4.	
	A. Connect diagnostic scanner B. Turn ignition switch to "ON" position C. Read data stream "shift fork 1,2,3,4 position" with diagnostic scanner Whether the data flow is normal

	-> Yes Contact transmission after-sales technical support -> No Go to Step 3
	3. Check power supply circuit of TCU
 	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Connect the battery negative harness. D. Turn the ignition switch to "ON" position. E. Measure the voltage between T15 and T32 of TCU harness plug and reliable grounding point. **Standard voltage: 11--Whether 14 V** **circuit check is normal?** ? Yes Go to step 7. ? No Overhaul open circuit fault between terminals T15 and T32 of TCU harness plug and engine compartment electrical center C01 and indoor electrical center P01 respectively.
	4. Check grounding circuit of TCU



A.Turn the ignition switch to "LOCK" position and disconnect the battery negative cable.

B.Disconnect TCU harness plug.

C.Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point.

Standard resistance: Is the resistance less than 5Ω normal?

? Yes

Go to Step 7

? No

Overhaul open circuit fault between terminal T5 and T7 of TCU harness plug and grounding point G 310.

Confirm the system is normal.

5. Check TCU

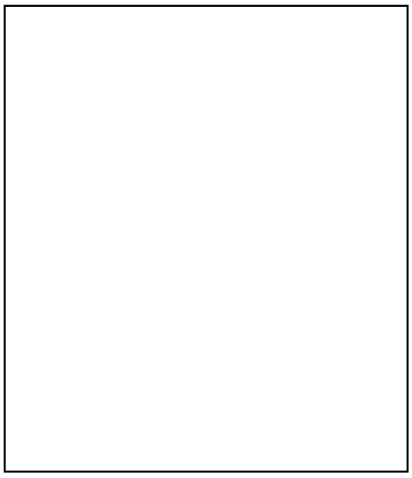
A.Dismantle TCU

B.Install the TCU of this vehicle on a vehicle in good condition.

Is the vehicle in normal state after installing TCU?

- > Yes

Reference: Troubleshooting according to DTC

	- > No replacing TCU
6. Check whether the circuit from fork position sensor to TCU is short circuit or open circuit.	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Measure the resistance between T64, T57, T58 and T65 of TCU harness plug. Standard resistance: Greater than 10 MΩ Measure the resistance between T61 of TCU harness plug and T57 and T58 respectively. Shift fork 2, 3 ground and signal **Standard resistance: 45Ω** Measure the resistance between T42 of TCU harness plug and T57 and T58 respectively. Fork 2, 3 power supply and signal **Standard resistance: 50Ω** Measure the resistance between T34 of TCU harness plug and T64 and T65 respectively. Shift fork 1, 4 ground and signal **Standard resistance: 45Ω** Measure the resistance between T54 of TCU harness plug and T64 and T65 respectively. Fork 1, 4 power supply and signal **Standard resistance: 50Ω** Measure the resistance between T61 and T42 of TCU harness plug. Fork 2/3 power supply and ground **Standard resistance: 50Ω** Measure the resistance between T34 and T54 of TCU harness plug. Fork 1/4 power supply and ground **Standard resistance: 50Ω** Is the resistance normal? ? Yes Contact after-sales personnel; ? No Replace the transmission assembly harness and confirm the system is normal. If the system is not normal, contact the after-sales personnel.

DTC P0715 P2784 P2765 P2784 P0720

Fault code

Fault code	Description		FTB	Definition
P0715	Inner input shaft speed sensor	Short circuit to power supply	0x12	Input shaft No.1 speed sensor is connected with terminals T60 and T43 of TCU harness plug through terminals No.1 and No.2 of automatic transmission harness plug;
P0715		Short circuit to ground	0x11	Input shaft2 speed sensor is connected with terminals T62 and T53 of TCU harness plug through terminals 1,2 of automatic transmission

				harness plug;
P0715		Internal input shaft speed change rate too high fault	0x27	.
P0715		Inner input shaft speed signal too high	0x85	
P0715		Internal input shaft speed sensor open circuit	0x13	
P2784		Internal input shaft speed calibration fault	0xF0	
P2765	Outer input shaft speed sensor	Short circuit to power supply	0x12	
P2765		Short circuit to ground	0x11	
P2765		Outer input shaft speed change rate too high fault	0x27	
P2765		Outer input shaft speed signal too high	0x85	
P2765		Outer input shaft speed sensor open circuit	0x13	
P2784		Outer input shaft speed calibration fault	0xF1	
P0720	Speed dependent fault	Fault of two or more speed signals	0x01	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P0715	Hardware circuit check	After ignition, the TCU detects that the input shaft1 speed sensor is shorted to the power supply for more than 0.05 s or longer, and the software makes fault judgment.	· Input shaft 1/2 speed sensor connector
		After ignition, the TCU detects that the speed sensor of input shaft1 is shorted to ground for more than 0.05 s or longer, and the software makes fault judgment.	
		After ignition, the software detects that the speed of input shaft1 changes by more than 800 rpm within 0.01 s, and the above fault phenomenon lasts for 0.05 s or longer. The software makes fault judgment.	· Input shaft 1/2 speed sensor and TCU Connecting harness
		After ignition, the software detects that the speed of input shaft1 is greater than 15000 rpm, the above fault phenomenon lasts for 0.05 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects the open circuit fault of the input shaft1 speed sensor, and the duration is more than 0.05 s or longer, and the software makes fault judgment.	· input shaft 1/2 speed sensor
P2784		After ignition, the software detects that the speed of input shaft1 does not match other speeds (input shaft2, output shaft2, engine, ESPspeed). The above fault phenomenon lasts for 0.05 s or longer, and the software makes fault judgment.	
P2765		After ignition, the TCU detects that the input shaft2 speed sensor is shorted to the power supply for more than 0.05 s or longer, and the software makes fault judgment.	· TCU
		After ignition, the TCU detects that the input shaft2 speed sensor is shorted to ground for more than 0.05 s or longer, and the software makes fault judgment.	
		After ignition, the software detects that the speed of input shaft2 changes by more than	

		After ignition, the software detects that the speed of input shaft2 is greater than 15000 rpm, the above fault phenomenon lasts for 0.05 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects the open circuit fault of the input shaft2 speed sensor, the duration is more than 0.05 s or longer, and the software makes fault judgment.	
P2784		After ignition, the software detects that the speed of input shaft2 does not match other speeds (input shaft1, output shaft1, engine, ESPspeed). The above fault phenomenon lasts for 0.05 s or longer, and the software makes fault judgment.	

Diagnostic process

Test conditions	Details/Results/Measures	
1. General inspection		
	A. Inspect whether the input shaft 1/2 speed sensor harness connector is reliably fixed, free of falling off and dirt.	
	Is the input shaft 1/2 speed sensor and output shaft harness plug connected normally?	
	- > Yes	
	Go to step 2.	
	- > No	
	Repair the input shaft 1/2 speed sensor and output shaft speed harness plug.	
2. Check fault code		
	A. Connect the diagnostic scanner.	
	B. Use diagnostic scanner to detect automatic transmission system.	
	Is there fault P0715, P 2784, P 2765, P0720, P077B Fault code other than the code?	
	- > Yes	
	Reference: Fault code list	
	- > No	
	Go to Step 3.	
3.Check input 1/2-axis speed in data flow		
	A. Clear DTC	
	B. Connect the fault diagnostic scanner. During vehicle driving, read whether the input 1/2-axis speed value in the data flow of the fault diagnostic scanner is normal.	
	- > Yes	
	Reference: Troubleshooting according to DTC.	
	- > No	
	Go to Step 3.	
3. Inspect the circuit between input shaft 1/2 speed sensor and TCU.		
Open circuit:	1. Check the circuit between inner input shaft speed sensor and TCU:	

	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable.	
	B. Disconnect the inner input shaft speed sensor harness plug.	
Short circuit to ground:	C. Disconnect the TCU harness plug.	
	D. Connect battery negative harness.	
	E. Measure the resistance between terminals -/+ and T43 of internal input shaft speed sensor harness plug and terminals T60 and T43 of TCU harness plug respectively, and check whether there is open circuit.	
Short circuit to power supply:	Standard resistance: Less than 5Ω.	
	F. Measure the resistance between terminal plus of internal input shaft speed sensor harness plug and reliable grounding, and check whether the circuit is short to ground.	
	Standard resistance: 10 MΩ or higher.	
	G. Measure the voltage between terminal - of internal input shaft speed sensor harness plug and reliable grounding, and check whether the circuit is short to power supply.	
	Standard voltage: 0V.	
	Is the circuit normal?	
	? Yes	
	Go to step 4.	
	? No	
	Repair the faulty position of the circuit between the inner input shaft speed sensor harness plug and TCU harness plug B.	
	2. Check the circuit between outer input shaft speed sensor and TCU:	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable.	
	B. Disconnect the outer input shaft speed sensor harness plug.	
	C. Disconnect harness plug of TCU AB.	
	D. Connect battery negative harness.	

	E. Measure the resistance between terminals plus and minus of outer input shaft speed sensor harness plug and terminals T60 and T43 of TCU harness plug respectively, and check whether there is open circuit.	
	Standard resistance: Less than 5Ω.	
	F. Measure the resistance between + terminal of outer input shaft speed sensor harness plug and reliable grounding, and check whether the circuit is short to ground.	
	Standard resistance: 10 MΩ or higher.	
	G. Measure the voltage between terminal - of outer input shaft speed sensor harness plug and reliable grounding, and check whether the circuit is short to power supply.	
	Standard voltage: 0V.	
	Is the circuit normal?	
	? Yes	
	Go to step 4.	
	? No	
	Repair the faulty position of the circuit between the inner input shaft speed sensor harness plug and the TCU harness plug.	
4.Check input shaft 1/2 speed sensor		
	A. Turn the ignition switch to "LOCK" position.	
	B. Remove the input or output shaft speed sensor.	
	C. Install corresponding sensors in good condition of the same model on this vehicle.	
	D. Vehicle running test.	
	Fault rule out?	
	- > Yes	
	Replace the sensor.	
	Reference: Input/output shaft speed sensor(Automatic transmission, removal and installation)	
	- > No	
	Go to Step 5.	
5. Check TCU power supply circuit		
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable.	
	B. Disconnect the TCU harness plug.	
	C. Connect battery negative harness.	
	D. Turn the ignition switch to "ON" position.	

	E. Measure the voltage between T15 and T32 of TCU harness plug and reliable grounding point.	
	Standard voltage: 11-- 14 V	
	Is the circuit check normal?	
	? Yes	
	Go to Step 4	
	? No	
	Overhaul open circuit fault between terminals T15 and T32 of TCU harness plug and engine compartment electrical center C01 and indoor electrical center P01 respectively.	
6. Check grounding circuit of TCU		
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable.	
	B. Disconnect the TCU harness plug.	
	C. Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point.	
	Standard resistance: Less than 5Ω	
	Is the resistance normal?	
	? Yes	
	Go to Step 5	
	? No	
	Overhaul open circuit fault of circuit between terminal T5 and T7 of TCU harness plug and grounding point.	
	Confirm the system is normal.	
7. Check TCU		
	A. Remove TCU	
	B. Install the TCU of this vehicle on a vehicle in good condition.	
	Is the vehicle in normal state after installing TCU?	
	- > Yes	
	Reference: Troubleshooting according to DTC.	
	- > No	
	Replace TCU	

DTC P0855

Fault code

Fault code	Description		FTB	Definition
P0885	Starting allowable hardwire	Open circuit fault	0x13	Connect ignition relay switch with complete vehicle through terminal A_A1 of plug of automatic transmission harness TCU. Terminal 8 of the device is connected.
		Short circuit fault to power supply	0x12	
		Short circuit to ground fault	0x11	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position

P0885	Hardware circuit check	After ignition, the TCU detects that the ignition relay is open, the above fault lasts for 0.1 s or longer, and the DTCs make fault judgment.	· Harness · Ignition relay · TCU
		After ignition, the TCU detects that the ignition relay is short to power supply, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects that the ignition relay is short to ground, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	

Diagnostic process

Test conditions	Details/Results/Measures
1. General inspection	
	A. Inspect whether ignition relay harness plug A is reliable, free from falling off, damaged, poor connection, aging, loose and other signs. Is it normal? - > Yes Go to step 2. - > No Repair the fault point.
2. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Are there any DTCs other than P0885 DTCs? - > Yes Reference: Fault code list - > No Go to Step 3.
3. Check ignition relay(Can the electrical supply be supplemented)	
4. Check TCU power supply circuit	

	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable.
	B. Disconnect TCU harness plug. C. Connect the battery negative harness. D. Turn the ignition switch to "ON" position. E. Measure the voltage between T15 and T32 of TCU harness plug and reliable grounding point. Standard voltage: 11-- 14 V Is the circuit check normal? ? Yes Go to Step 4 ? No Overhaul terminals T15 and T32 of TCU harness plug respectively to engine compartment electrical center C01 and indoor electrical center P01. Open circuit fault between circuits.
5. Check grounding circuit of TCU	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point. Standard resistance: Less than 5Ω Is the resistance normal? ? Yes Go to Step 5 ? No Overhaul open circuit fault of circuit between terminal T5 and T7 of TCU harness plug and grounding point. Confirm the system is normal.
6. Check TCU	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC. - > No replacing TCU

DTC P00813

Fault code

Fault code	Description		FTB	Definition
P0813	Reversing lamp relay	Open circuit fault	0x13	The reversing lamp relay switch is connected to terminal 15 of the vehicle connector through terminal A_B1 of plug of automatic transmission harness TCU.
		Short circuit fault to power supply	0x12	
		Short circuit to ground fault	0x11	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P0813	Hardware circuit check	After ignition, the TCU detects that the ignition relay is open, the above fault lasts for 0.1 s or longer, and the DTCs make fault judgment.	· Harness · Reversing relay · TCU
		After ignition, the TCU detects that the ignition relay is short to power supply, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects that the ignition relay is short to ground, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	

Diagnostic process

Test conditions	Details/Results/Measures
1. General inspection	
	A. Inspect whether reversing lamp relay harness plug A is reliable, free of falling off, damaged, poor connection, aging, loose and other signs. Is it normal? - > Yes Go to step 2. - > No Repair the fault point.

2. Check fault code	
	A. Connect the diagnostic scanner. B. Use diagnostic scanner to detect automatic transmission system. Are there any DTCs other than P0885 DTCs? - > Yes Reference: Fault code list - > No Go to Step 3.
3. Check reversing lamp relay(Can the electrical supply be supplemented)	
4. Check TCU power supply circuit	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Connect the battery negative harness. D. Turn the ignition switch to "ON" position. E. Measure the voltage between T15 and T32 of TCU harness plug and reliable grounding point. Standard voltage: 11-- 14 V Is the circuit check normal? ? Yes Go to Step 4 ? No Overhaul terminals T15 and T32 of TCU harness plug respectively to engine compartment electrical center C01 and indoor electrical center P01. Open circuit fault between circuits.
5. Check grounding circuit of TCU	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point. Standard resistance: Less than 5Ω Is the resistance normal? ? Yes Go to Step 5 ? No Overhaul open circuit fault of circuit between terminal T5 and T7 of TCU harness plug and grounding point. Confirm the system is normal.

6. Check TCU	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P0960

Fault code

Fault code	Description		FTB	Definition
P0960	Lubrication solenoid valve	Low end short circuit to power supply	0x04	Lubricate the solenoid valve through the automatic transmission wire TCU plug A. T45. T6 and through-cylinder connector 9/14. Terminal 15 is connected.
		Low-end open circuit	0x05	
		Low end short circuit to ground	0x03	
		Low-side current too high fault	0x01	
		Low-side current too low fault	0x02	
		Channel unexpected shutdown fault	0x48	
		MOS tube discharge current fault	0x49	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P0960	Hardware circuit check	After ignition, TCU detects short circuit fault of high end of lubrication solenoid valve to power supply, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· Harness · Lubrication solenoid valve · TCU
	After ignition, TCU detects high end open circuit fault of lubrication solenoid valve, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.		
	After ignition, the TCU detects the lubricating solenoid valve high end short circuit to ground fault, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.		

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner.
	B. Use diagnostic scanner to detect automatic transmission system.
	Are there DTCs other than P0960?
	- > Yes
	Reference: Fault code list
	- > No
	Go to step 2.
2. Check feedback current of lubrication solenoid valve	
	A. Connect diagnostic scanner
	B. Turn ignition switch to "ON" position
	C. Read data stream "Lubrication solenoid valve feedback current"
	Whether the data flow is normal
	-> Yes
	Go to Step 3
	-> No
	Contact transmission after-sales technical support
3. Check the circuit between each solenoid valve and TCU.	
Main pressure solenoid valve:	A. Turn the ignition switch to "LOCK" position.
	B. Disconnect the TCU connector.
	C. Check whether the resistance is normal.
	Main pressure solenoid valve: Measure the resistance between terminals T6/2 and T44 of automatic transmission harness TCU plug. Standard resistance: 15Ω≥ R≥4Ω
Lubrication solenoid valve:	Lubrication solenoid valve: Measure the resistance between terminals T45 and T6/1 of automatic transmission harness TCU plug. Standard resistance: 15Ω≥ R≥4Ω
Odd clutch solenoid:	Odd clutch solenoid valve: Measure the resistance between terminals T8 and T11/3 of automatic transmission harness TCU plug. Standard resistance: 15Ω≥ R≥4Ω
Even clutch solenoid:	Even clutch solenoid valve: Measure the resistance between terminals T12/3 and T47 of automatic transmission harness TCU plug. Standard resistance: 15Ω≥ R≥4Ω
Shift solenoid valve 1:	Shift solenoid valve 1: Measure the resistance between terminals T9 and T11/2 of automatic transmission harness TCU plug. Standard resistance: 15Ω≥ R≥4Ω
Shift solenoid valve 2:	Shift solenoid valve: Measure the resistance between terminals T48 and T11/3 of automatic transmission harness TCU plug. Standard resistance: 15Ω≥ R≥4Ω

Reversing solenoid valve 1:	Reversing solenoid valve: Measure the resistance between terminals T12/1 and T10 of automatic transmission harness TCU plug. Standard resistance: 30Ω≥ R≥10Ω
Reversing solenoid valve 2:	Reversing solenoid valve: Measure the resistance between terminals T33 and T12/2 of automatic transmission harness TCU plug. Standard resistance: 30Ω≥ R≥10Ω
	Whether the resistance is normal
	-> Yes
	Contact transmission after-sales technical support
	-> No
	Go to Step 4

4. Check TCU power supply circuit	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable.
	B. Disconnect the TCU harness plug.
	C. Connect battery negative harness.
	D. Turn the ignition switch to "ON" position.
	E. Measure the voltage between T15 and T32 of TCU harness plug and reliable grounding point.
	Standard voltage: 11-- 14 V
	Is the circuit check normal?
	? Yes
	Go to Step 4
	? No
	Overhaul terminals T15 and T32 of TCU harness plug respectively to engine compartment electrical center C01 and indoor electrical center P01. Open circuit fault between circuits.
5. Check grounding circuit of TCU	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable.
	B. Disconnect the TCU harness plug.
	C. Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point.
	Standard resistance: Less than 5Ω
	Is the resistance normal?
	? Yes
	Go to Step 5
	? No
	Overhaul open circuit fault of circuit between terminal T5 and T7 of TCU harness plug and grounding point.
	Confirm the system is normal.
6. Check TCU	
	A. Remove TCU
	B. Install the TCU of this vehicle on a vehicle in good condition.
	Is the vehicle in normal state after installing TCU?
	- > Yes
	Reference: Troubleshooting according to DTC.
	- > No
	Replace TCU

DTC P0964

Fault code

Fault code	**Description**		**FTB**	Definition
P0964	Main pressure solenoid valve	Low end short circuit to power supply	0x04	The main pressure solenoid valve is connected to terminals 10/14 and 15 of through-cylinder connector through T44 and T6 of automatic transmission
		Low-end open circuit	0x05	

				wire TCU plug.

		Low end short circuit to ground	0x03	
		Low-side current too high fault	0x01	
		Low-side current too low fault	0x02	
		Channel unexpected shutdown fault	0x48	
		MOS tube discharge current fault	0x49	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P0964	Hardware circuit check	After ignition, the TCU detects that the high end of the main pressure solenoid valve is short to power supply, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· Harness · Main pressure solenoid valve · TCU
		After ignition, the TCU detects high side open circuit fault of main pressure solenoid valve, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects short circuit fault of main pressure solenoid valve high end to ground, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Is there any fault code other than P0964 fault code? - > Yes Reference: Other DTCs refer to relevant contents of DTC diagnostic process index - > No Go to step 2.
2. Check feedback current of main pressure solenoid valve	

	A. Connect diagnostic scanner B. Turn ignition switch to "ON" position

	C. Read the data stream "main voltage solenoid valve feedback current" data stream whether it is normal -> Yes Go to Step 3 -> No Contact transmission after-sales technical support
3. Check the circuit between main pressure solenoid valve and TCU.	
4. Check TCU	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Intermittent fault diagnosis process (3.1.13 electronic control system -ME17, fault symptom diagnosis and test). - > No Replace TCU

DTC P0968

Fault code

Fault code	Description		FTB	Definition
P0968	Clutch 1 Solenoid	Low end short circuit to power supply	0x04	The clutch 1 solenoid valve is connected to terminals 19/22, 23 and 24 of through-cylinder connector through T8 and T11 of automatic transmission wire TCU plug.
		Low-end open circuit	0x05	
		Low end short circuit to ground	0x03	
		Low-side current too high fault	0x01	
		Low-side current too low fault	0x02	
		Channel unexpected shutdown fault	0x48	
		MOS tube discharge current fault	0x49	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position

P0968	Hardware circuit check	After ignition, the TCU detects the clutch 1 solenoid valve high side short circuit to power supply fault, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· Harness · Clutch 1 Solenoid · TCU
		After ignition, the TCU detects the high end open circuit fault of clutch 1solenoid valve, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects clutch 1 solenoid valve high end short circuit to ground fault, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Is there any fault code other than DTC P0968 fault code? - > Yes Reference: Fault code list - > No Go to step 2.
2. Check clutch 1 solenoid valve feedback current	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > is referenc e: Fault code list - > No replacing TCU

DTC P2727

Fault code

Fault code	Description		FTB	Definition
P2727	Clutch 2 solenoid valve	Low end short circuit to power supply	0x04	The clutch 2 solenoid valve is connected to the through-cylinder connector terminals 29 and 11/28 through the AH3 and AH4 of automatic transmission wire TCU plug A.
P2727		Low-end open circuit	0x05	.
P2727		Low end short circuit to ground	0x03	
P2727		Low-side current too high fault	0x01	
P2727		Low-side current too low fault	0x02	
P2727		Channel unexpected shutdown fault	0x48	
P2727		MOS tube discharge current fault	0x49	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P2727	Hardware circuit check	After ignition, the TCU detects the clutch 2 solenoid valve high side short circuit to power supply fault, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· Harness · Clutch 2 solenoid valve · TCU
		After ignition, the TCU detects the high end open circuit fault of clutch 2 solenoid valve, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects clutch 2 solenoid valve high end short circuit to ground fault, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	

	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner.

	Are there any DTCs other than DTCP 2727 DTCs? - > Yes Reference: Fault code list - > No Go to step 2.
2. Check clutch 2 solenoid valve feedback current	
	A. Connect diagnostic scanner B. Turn ignition switch to "ON" position C. Read data stream "Even clutch solenoid feedback current" Whether the data flow is normal -> Yes Go to Step 3 -> No Contact transmission after-sales technical support
3. Inspect the circuit between clutch 2 solenoid valve and TCU.	
4. Check TCU	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P285B

Fault code

Fault code	Description		FTB	Definition
P285B	Shift solenoid valve 1 fault	Low end short circuit to power supply	0x04	Shift solenoid valve 1 fault through automatic transmission wire TCU plug AB B_M1, A_G4 and through cylinder
		Low-end open circuit	0x05	
		Low end short circuit to ground	0x03	

		Low-side current too high fault	0x01	Connector terminals 14 and 13 are connected.
		Low-side current too low fault	0x02	
		Channel unexpected shutdown fault	0x48	
		MOS tube discharge current fault	0x49	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P285B	Hardware circuit check	After ignition, the TCU detects the short circuit fault of high end of shift solenoid valve 1 to power supply, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· Harness · Shift solenoid valve 1 · TCU
		After ignition, the TCU detects the high side open circuit fault of shift solenoid valve 1, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects the gear shift solenoid valve1 high end short circuit to ground fault, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner.Are there any DTCs other than P285B DTCs? - > Yes Reference: Fault code list - > No Go to step 2.
2. Check the feedback current of shift solenoid valve 1.	
3. Check TCU	

	A. Remove TCU

	B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P285F

Fault code

Fault code	Description		FTB	Definition
P285F	Shift solenoid valve 2 fault	Low end short circuit to power supply	0x04	Shift solenoid valve 2 through automatic transmission wire TCU plug T33. T12 and cylinder through connector Terminals 11/16, 17 and 18.
		Low-end open circuit	0x05	
		Low end short circuit to ground	0x03	
		Low-side current too high fault	0x01	
		Low-side current too low fault	0x02	
		Channel unexpected shutdown fault	0x48	
		MOS tube discharge current fault	0x49	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P285F	Hardware circuit check	After ignition, the TCU detects the short circuit fault of high end of shift solenoid valve 2 to power supply, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· Harness · Shift solenoid valve 2 · TCU
		After ignition, the TCU detects the high side open circuit fault of shift solenoid valve 2, the above fault lasts for 0.1 s or longer, and the DTCs make fault judgment.	
		After ignition, the TCU detects that the high end of shift solenoid valve 2 is short to ground, the above fault lasts for 0.1 s or longer, and the DTCs make fault judgment.	

Diagnostic process

1 Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner.
	B. Use diagnostic scanner to detect automatic transmission system.
	Are there DTCs other than P285F?
	- > Yes
	Reference: Fault code list
	- > No
	Go to step 2.
2. Check the feedback current of shift solenoid valve 2.	
	A. Connect diagnostic scanner
	B. Turn ignition switch to "ON" position
	C. Read data stream "shift solenoid valve 2 feedback current"
	Whether the data flow is normal
	-> Yes
	Go to Step 3
	-> No
	Contact transmission after-sales technical support
3. Check the circuit between shift solenoid valve 2 and TCU.	
Refer to 3.2.1-72 Solenoid Valve Test Mode	
6. Check TCU	
	A. Remove TCU
	B. Install the TCU of this vehicle on a vehicle in good condition.
	Is the vehicle in normal state after installing TCU?
	Reference: Troubleshooting according to DTC
	- > No
	Replace TCU

DTC P0750

Fault code

Fault code	Description		FTB	Definition
P0750	Switch valve 1 fault	Low end short circuit to power supply	0x04	Switch valve 1 is connected to terminals 20\22, 23 and 24 of cylinder connector through T9/T11 of automatic transmission wire TCU plug.
		Low-end open circuit	0x05	
		Low end short circuit to ground	0x03	
		Low-side current too high fault	0x01	
		Low-side current too low fault	0x02	
		Channel unexpected shutdown fault	0x48	
		MOS tube discharge current fault	0x49	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P0750	Hardware circuit check	After ignition, the TCU detects that the high side of on-off valve 1 is short to power supply, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· Harness · Switch valve 1 · TCU
		After ignition, the TCU detects high-side open circuit fault of on-off valve 1, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects the high-end short-circuit fault of on-off valve 1 to ground, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects open circuit fault of high-side power supply of on-off valve 1, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	

	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Are there any DTCs other than P0750 DTCs? - > Yes Reference: Fault code list - > No Go to step 2.
2. Check whether the switch solenoid valve 1 fault continues to occur.	
	A. Connect diagnostic scanner B. After clearing the fault code, fault P0750 continues to appear. -> Yes Contact transmission after-sales technical support -> No Step3
3. Check circuit between switch solenoid valve 1 and TCU.	
4. Check TCU	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P0755

Fault code

Fault code	Description		FTB	Definition
P0755	Switch valve 2 fault	Low end short circuit to power supply	0x04	Switch valve 2 is connected with cylinder connector 21/22, 23,24 terminals through T48/T12 of automatic transmission wire TCU plug.
		Low-end open circuit	0x05	
		Low end short circuit to ground	0x03	

		Low-side current too high fault	0x01	
		Low-side current too low fault	0x02	
		Channel unexpected shutdown fault	0x48	
		MOS tube discharge current fault	0x49	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P0755	Hardware circuit check	After ignition, the TCU detects that the high side of the on-off valve 2 is short to power supply, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· Harness · Switch valve 2 · TCU
		After ignition, the TCU detects high-side open circuit fault of on-off valve2, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects the high-end short-circuit fault of on-off valve2 to ground, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects open circuit fault of high-side power supply of on-off valve 2, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Is there any fault code other than P0755 fault code? - > Yes Reference: Fault code list

	- > No Go to step 2.
2. Check whether the switch solenoid valve 2 fault continues to occur.	
	A. Connect diagnostic scanner B. After clearing the fault code, fault P0755 continues to appear. -> Yes Contact transmission after-sales technical support -> No Step3
3. Check the circuit between switch solenoid valve 2 and TCU.	
3. Check TCU	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P 1245, P 1256, P 1247

Fault code

Fault code	**Description**		**FTB**	Definition
P1245	Solenoid valve high end 1 fault	Short circuit fault to power supply	0x04	Solenoid valve high side 1, 2, 3 fault through automatic transmission wire . High end of solenoid valve 1 is the high end of solenoid valve of shift solenoid valve 1/clutch 1/switch valve 1, and T10, T8 and T9 of TCU plug and through-cylinder connector 12,19,20 High end of solenoid valve 2 is the high end of solenoid valve of shift
		Open circuit fault	0x05	
		Short circuit to ground fault	0x03	
P1246	Solenoid valve high end 2 fault	Short circuit fault to power supply	0x04	
		Open circuit fault	0x05	
		Short circuit to ground fault	0x03	
P1247	Solenoid valve high end 3 fault	Short circuit fault to power supply	0x04	

				solenoid valve 2/clutch 2/switch valve 2, and TCU plug

		Open circuit fault	0x05	T33, T48, T47 and through-cylinder connector 11,21,13 Solenoid valve 3 high-end main pressure and lubricating High end of slide solenoid valve. T44, T45 of TCU plug and through-cylinder connector 10,9
		Short circuit to ground fault	0x03	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P1245	Hardware circuit check	After ignition, the TCU detects the short circuit fault of the high end of the solenoid valve to the power supply, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	· Harness · Solenoid Valve High Side 1, 2, 3 · TCU
		After ignition, the TCU detects the open circuit fault of solenoid valve high end 1, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects the fault of solenoid valve high end 1 short circuit to ground, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
P1246	Hardware circuit check	After ignition, the TCU detects the short circuit fault of the high end of the solenoid valve to the power supply, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects the open circuit fault of high end 2 of solenoid valve, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	

		After ignition, the TCU detects the fault of solenoid valve high end 2 short circuit to ground, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
P1247	Hardware circuit check	After ignition, the TCU detects the short circuit fault of the high end of the solenoid valve to the power supply, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	

		After ignition, the TCU detects the open circuit fault of high end 3 of solenoid valve, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	
		After ignition, the TCU detects the short circuit fault of solenoid valve high end 3 to ground, the above fault lasts for 0.1 s or longer, and the software makes fault judgment.	

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Are there any DTCs other than P 1245, P 1246, P 1247? - > Yes Reference: Fault code list - > No Go to step 2.
2. Check whether the feedback current of solenoid valve related to high-end 1,2,3,4 of solenoid valve is normal.	
	A. Connect diagnostic scanner B. Turn ignition switch to "ON" position C. Read data flow "main pressure, lubrication, gearshift 1/2, on-off valve 1/2, clutch 1/2 solenoid valve feedback current" according to solenoid valve low side shunt. Whether the data flow is normal -> Yes Go to Step 3 -> No Contact transmission after-sales technical support
3. Check the circuit between solenoid valve 1, 2, 3, 4 and TCU.	
4. Check TCU	
	A. Remove TCU

	B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P1213 P1214 P1216 P1217 P1218

Fault code

Fault code	Description		FTB	Definition
P1213	Sensor 5V power supply 1 fault	Short circuit to power supply	0x12	PRND sensor is 5 V Electrical, port connected BE2, BE4; Oil The sensor supplies TCU connection port is B; Input shaft 1/2 speed The supply voltage of the TCU connection ports are T43, T53
P1213		Voltage too high	0x17	
P1213		High current	0x19	
P1214	Sensor 5V power supply	Short circuit to power supply	0x12	
P1214		Voltage too high	0x17	
P1214		High current	0x19	
P1216	Sensor 8V power supply 1 fault	Short circuit to power supply	0x12	
P1216		Voltage too high	0x17	
P1216		High current	0x19	
P1217	Sensor 8V power supply fault	Short circuit to power supply	0x12	
P1217		Voltage too high	0x17	
P1217		High current	0x19	
P1218	Sensor 8V power supply fault	Sensor 8V voltage fault	0x0	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P1213	Hardware circuit check	After ignition, the TCU detects that the sensor 5V power supply 1 is shorted to the power supply, and the software makes fault judgment.	· Harness · TCU

		After ignition, TCU detects sensor 5V power supply 1 fault voltage is too high, and software makes fault judgment.	
		After ignition, TCU detects sensor 5V power supply 1 fault current is too high, and software makes fault judgment.	
P1214		After ignition, the TCU detects that the sensor 5V power supply 2 is short to power supply, and the software makes fault judgment.	
		After ignition, TCU detects sensor 5V power supply 2 fault voltage is too high, and software makes fault judgment.	
		After ignition, TCU detects sensor 5V power supply 2 fault current is too high, and software makes fault judgment.	
P1216		After ignition, the TCU detects that the power supply of sensor 8V is short to power supply, and the software makes fault judgment.	
		After ignition, the TCU detects that the fault voltage of sensor 8V is too high, and the software makes fault judgment.	
		After ignition, the TCU detects that the fault current of sensor 8V is too high, and the software makes fault judgment.	
P1217		After ignition, the TCU detects that the sensor 8V power supply is short to power supply, and the software makes fault judgment.	
		After ignition, the TCU detects that the fault voltage of sensor 8V power supply is too high, and the software makes fault judgment.	

		After ignition, the TCU detects that the fault current of sensor 8V is too high, and the software makes fault judgment.	
P1218		After ignition, the TCU detects sensor 8V. Power supply fault, software makes fault judgment	

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Is there any P 1213, P 1214, P 1216, P 1217, P 1218 DTC other than DTC? - > Yes Reference: Fault code list - > No Go to step 2.
2.Check whether the sensor power supply 5v and 8v related sensor values are normal.	
	A. Connect diagnostic scanner B. Turn the ignition switch to "ON" position C.Read data stream "related sensor value" data stream is normal -> Yes Go to Step 3 -> No Contact transmission after-sales technical support
3. Check the circuit between sensor power supply and TCU.	
	A. Turn the ignition switch to "LOCK" position. **B.**Disconnect TCU connector AB. **C.**Measure automatic transmission harness TCU plug AB BE2, BE4, BC4, BG1, BH2, BG4, BK4. Resistance between terminal BJ4 and battery. Standard resistance: Greater than 10 MΩ Whether the resistance is normal -> No Contact transmission after-sales technical support -> Yes Go to Step 4

4. Check TCU power supply circuit	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Connect the battery negative harness. D. Turn the ignition switch to "ON" position. E. Measure the voltage between T15, T32 of TCU harness plug B and reliable grounding point. Standard voltage: 11-- 14 V Is the circuit check normal? ? Yes Go to Step 5 ? No Overhaul terminals T15 and T32 of TCU harness plug respectively to engine compartment electrical center C01 and indoor electrical center P01. Open circuit fault between circuits.
5. Check grounding circuit of TCU	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point. Standard resistance: Less than 5Ω Is the resistance normal? ? Yes Go to Step 6 ? No Overhaul open circuit fault between terminal T5 and T7 of TCU harness plug and grounding point G 310. Confirm the system is normal.
6. Check TCU	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P1251 P1252 P1253

Fault code

Fault code	Description		FTB	Definition
P1251	NVM storage fault	NVM low level storage status fault	0x45	The software compares the parameters in reading NVM after TCU is powered on.
P1252		NVM Critical State Fault	0x45	
P1253	Trim data fault	Trim inconsistent data	0x45	The bottom BSW of the TCU will be Check Trim value

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position	
P1251	Software check	After the vehicle is powered on, NVM parameters Copy three times to NMV Where one of the data is different or The TCU checks that the NVM is written. Function error	· TCU	
		After the vehicle is powered on, NVM parameters Copy three times to NMV Where three data are different or The TCU checks that there is NVM.		
P1252				
P1253		After ignition, the bottom layer of TCU reads The Trim value is not satisfied. Seek, trigger the fault		

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Are there any DTCs other than P 1251, P 1252 and P 1253? - > Yes Reference: Fault code list - > No Go to step 2.
2. Check whether the fault code continues to appear.	
	A. Connect scan tool B. Clear DTC C.Does the fault code continue to appear after the vehicle is powered on -> No Go to Step 3 -> Yes Contact transmission after-sales technical support

3. Check TCU power supply circuit	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Connect the battery negative harness. D. Turn the ignition switch to "ON" position. E. Measure the voltage between T15, T32 of TCU harness plug B and reliable grounding point. Standard voltage: 11-- 14 V Is the circuit check normal? ? Yes Go to Step 5 ? No Overhaul terminals T15 and T32 of TCU harness plug respectively to engine compartment electrical center. Open circuit fault between C01 and indoor electrical center P01.
4. Check grounding circuit of TCU	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point. Standard resistance: Less than 5Ω Is the resistance normal? ? Yes Go to Step 6 ? No Overhaul open circuit fault between terminal T5 and T7 of TCU harness plug and grounding point G 310. Confirm the system is normal.
5. Check TCU	
	A. Dismantle TCU B. Install the TCU of this vehicle on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Reference: Troubleshooting according to DTC - > No replacing TCU

DTC P278C P1250

Fault code

Fault code	Description		FTB	Definition
P287C	Clutch half-engagement point adaptation	Signal too high	0x84	When vehicle is driving, software will automatically adapt clutch half joint point and judge the adaptive result
P287C		Signal too low	0x85	
P287C		No adaptation for a long time	0x2A	

P1250	Clutch PT curve adaptation	Signal too high	0x84	When vehicle is driving, software will automatically adapt clutch half joint point and judge the adaptive result
P1250		Signal too low	0x85	
P1250		General fault	0x2A	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P287C	Software check	Clutch half-engagement point adapts when odd clutch half-engagement point adapts TP <1.94	
		Or it is judged that the signal is too low when the even clutch half-engagement point adapts to TP <2.09 bars.	· automatic transmission
		Clutch half-engagement point adapts when odd clutch half-engagement point adapts TP > 3.06	
		Or the judgment signal is too high when the even clutch half-engagement point adapts to TP > 3.15.	· TCU
		Software recognizes that the clutch half-engagement point adaptation function is not on after 1000Km 's Start, no adaptive fault for a long time	
P1250		The clutch performs PT curve adaptation. When the adaptive point exceeds 30% of PT curve range point, the software judges that the adaptive signal is too high.	
		The clutch performs PT curve adaptation. When the adaptive point is 30% lower than the PT curve range point, the software judges that the adaptive signal is too low.	
		The software recognizes that the clutch PT curve adaptive function is not turned on after 1000Km 's, and no adaptive fault is performed for a long time.	

Diagnostic process

Test conditions	Details/Results/Measures
1. Check clutch half-joint point and PT curve data flow	
	A. Read automatic transmission data stream "clutch half-joint point" and "PT curve" with diagnostic scanner. Is the data flow normal -> Yes. Reference: Troubleshooting according to DTC -> No Replace TCU.

DTC P1205 P7050 P287C

Fault code

Fault code	Description		FTB	Definition
P1205	Transmission fork position self-learning fault	Transmission fork position self-learning fault	0x54	The software has transmission fork position, PRND position and clutch semi-engagement point self-learning function.
P7050	PRND Self-learning fault	PRND Self-learning fault	0x54	
P287C	Clutch half-engagement point self-learning fault	Clutch half-engagement point self-learning fault	0x54	

Possible causes

Fault code	Inspection strategy	Setting conditions(Control strategy)	Faulty position
P1205	Software check	In the process of transmission fork self-learning, the software does not meet the following conditions: Self-learning Learn timeout, software makes transmission fork self-learning fault	· automatic transmission · TCU
P7050		Software recognizes PRND position and learns from it. During the process, if the following conditions are not met: 1.Send Motor speed is less than 50 rpm; 3.Ignition letter Trigger the No. and release the foot brake; 4. Self-study Learn timeout, software make PRND self-learning Fault	
P287C		Software identification to clutch semi-engagement point self-learning In the learning process, if the following conditions are not met: 1. Driver mode is not in gear D; 2.Engine Engine speed is less than 50 rpm; 3.Complete vehicle speed Greater than 5 km/h; 4. Release the hand brake; 5. Influence clutch semi-engagement point self-learning Fault; 6. Self-learning timeout; 7	

		Inspection There is gear on the shaft; 8. The foot brake is released. Etc., the software makes the clutch semi-engagement point from Learning fault	

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Are there DTCs other than P 1205, P 7050 and P287C? - > Yes

	Reference: Fault code list - > No Go to step 2.
2.Check gears (transmission), PRND gears, clutch self-learning data flow	
	A. Read automatic transmission data stream "gear (transmission), PRND gear, clutch self-learning data stream" with diagnostic scanner. Is the data flow normal -> Yes Reference: Troubleshooting according to DTC -> No Go to Step 3
3. Re-self-learning	
	A. Connect scan tool B. Gears (transmission), PRND gears, clutch self-learning data flow into special train range C. Carry out self-learning according to the prompts, and do not violate the self-learning conditions whether the self-learning is normal. -> Yes Reference: Troubleshooting according to DTC -> No Replace TCU and re-learn.

DTC P2757

Fault detection conditions

Fault code	1 Condition 2 Fault symptom 3 Duration	Detection position
P2757	1 Vehicle ignition, SLU OK, SLU Open Request, Transmission Fluid 20 °C or higher, TCM Communication OK, Drive in D 2 Difference between engine speed and input speed sensor 100 r/min or less 3 The above fault phenomenon lasts for 2s or longer and occurs 6 times continuously.	• Lock control solenoid valve [SLU] • Shift solenoid valve [S1] • Hydraulic torque converter • Valve body(Locking control hydraulic system) • TCM

Diagnostic process

1 **Fill in the checklist**

Refer to fault check list

Fill in the inspection form: Including basic information, user description and phenomenon inspection results.

2 **Foundation inspection**

2.1 Use a multimeter to check the battery voltage;

2.2 Check whether the fuse is blown.

Fill in fault symptoms and inspection results in the inspection table.

Normal Perform step 3 check	Abnormal Repair corresponding components

3 Check frozen frame data

Check the freeze frame data when the fault occurs and record it.

4 Check and clear the fault code and repeat the test.

4.1 If the malfunction indicator lamp illuminates when the ignition key is in the ON position (check the engine malfunction lamp or read the malfunction lamp information through the diagnostic scanner), connect the diagnostic scanner and record the fault code. Clear the fault code, turn off the ignition key and power on again.

4.2 Check that the fault code is not stored and repeat the test based on the user description.

Fault code reappears Perform step 5 inspection	Fault code no longer appears Perform step 6 inspection

5 Check vehicle running data

5.1 Engine preheating(Water temperature: Over 60 °C)

5.2 Connect the diagnostic scanner and measure the vehicle status.(Vehicle speed, engine speed, A/T input speed)

5.3 Accelerate to 100Km/h

5.4 Depress the accelerator pedal in gear D, and check according to the following operations:

Warning

For safety, at least two people are on the vehicle during operation.

Vehicle status	Measure the difference between engine speed and A/T input speed
Test result	Does the speed difference exceed 100 r/min for less than 3s?
Within three seconds: Perform step 6 inspection	More than 3 seconds: Perform step 7 inspection

6 Check transmission oil

Normal Clean connector Fault still exists Replace TCM * Always ensure that all fault codes are cleared after replacing the TCM. Reference TCM	Abnormal Replace transmission fluid

7 Check whether solenoid valve [SLU] works normally

Refer to solenoid valve

Check solenoid valve

Warning

Always move the oil pan and valve body away from the valve body before inspecting the solenoid valve.

Normal Replace the hydraulic torque converter or A/T component.	Abnormal Replace Valve Body (Solenoid Fault) Reference TCM

DTC P2758

Fault detection conditions

Fault code	1 Condition 2 Fault symptom 3 Duration	Detection position
P2758	1 SLU OK, SLU Off, Transmission Fluid 20 °C or higher, TCM Communication OK, Driving in D Gear and Engine Speed Below 3000 r/min 2 Difference between engine speed and input speed sensor [NIN] 30 r/min or less 3 The above fault phenomenon lasts for 0.5 s or longer and occurs 8 times continuously.	• Lock control solenoid valve [SLU] • Hydraulic torque converter • Valve body(Locking control hydraulic system) • TCM

Diagnostic process

1 Fill in the checklist

Refer to fault check list

Fill in the inspection form: Including basic information, user description and phenomenon inspection results.

2 Foundation inspection

2.1 Use a multimeter to check the battery voltage;

2.2 Check whether the fuse is blown.

Fill in fault symptoms and inspection results in the inspection table.

Normal Perform step 3 check	Abnormal Repair corresponding components

3 Check frozen frame data

Check the freeze frame data when the fault occurs and record it.

4 Check and clear the fault code and repeat the test.

4.1 If the malfunction indicator lamp illuminates when the ignition key is in the ON position (check the engine malfunction lamp or read the malfunction lamp information through the diagnostic scanner), connect the diagnostic scanner and record the fault code. Clear the fault code, turn off the ignition key and power on again.

4.2 Check that the fault code is not stored and repeat the test based on the user description.

Fault code reappears	Fault code no longer appears

Perform step 5 inspection	Perform step 6 inspection

5 Check vehicle running data

5.1 Engine preheating(Water temperature: Over 60 °C)

5.2 Connect diagnostic scanner and measure 3 vehicle states.(Vehicle speed, engine speed, A/T input speed)

5.3 Accelerate to 40Km/h

5.4 Keep the second gear in manual mode, depress/release the accelerator pedal, and check the following operations:

Warning

For safety, at least two people are on the vehicle during operation.

Vehicle status	Measure the difference between engine speed and A/T input speed
Test result	Speed difference less than 500 r/min
Over 50 r/min: Perform step 6 inspection	Below 50 r/min: Perform step 7 inspection

6 Check transmission oil

Normal Clean connector Fault still exists Replace TCM * Always ensure that all fault codes are cleared after replacing the TCM. Reference TCM	Abnormal Replace valve body(Solenoid valve fault) Reference TCM

7 Check whether solenoid valve [SLU] works normally

Refer to solenoid valve

Check solenoid valve

Warning

Always move the oil pan and valve body away from the valve body before inspecting the solenoid valve.

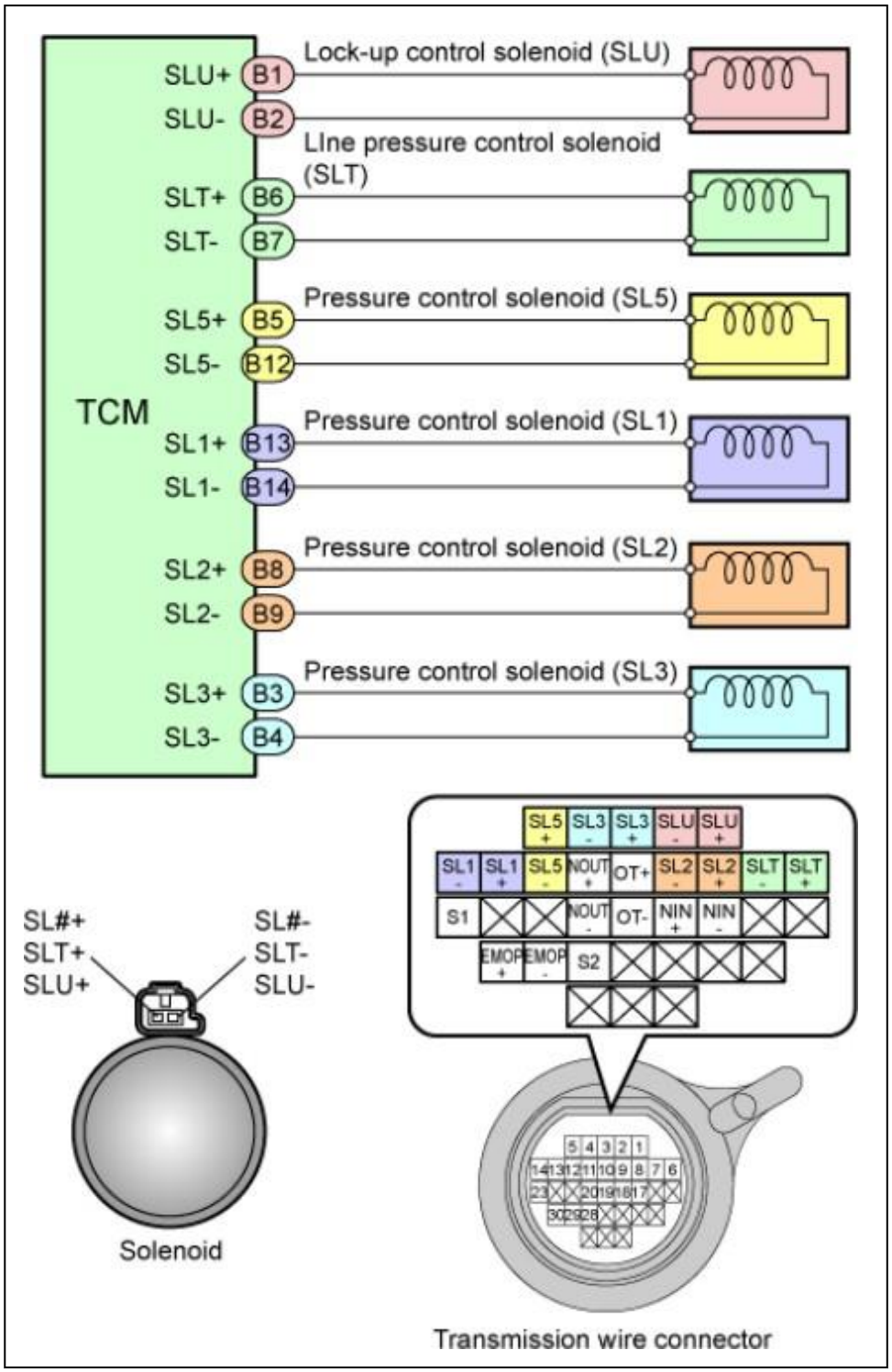
Normal Replace the hydraulic torque converter or A/T component.	Abnormal Replace Valve Body (Solenoid Fault) Reference TCM

DTC P 2762, p 2763, p 2764

Fault detection conditions

Fault code	1 2 3 Condition symptom duration	Detection position
P2762	**1** Engine running and TCM communication normal **2** Solenoid valve feedback current detected incorrect **3** The above symptom lasts for 2 seconds or more.	• Lockout control solenoid(SLU) • Transmission harness(Linear solenoid valve system) • TCM
P2763	**1** Engine running and TCM communication normal **2** Short circuit between SLU and power supply detected **3** The above symptom persists for 0.1 second or more and 5 consecutive occurrences	• Lockout control solenoid(SLU) • Transmission harness(Linear solenoid valve system) • TCM
P2764	**1** Engine running and TCM communication normal **2** SLU system disconnected or short to GND detected Road **3** The above symptom persists for 0.1 second or more and 5 consecutive occurrences	• Lockout control solenoid(SLU) • Transmission harness(Linear solenoid valve system) • TCM

Schematic diagram of external wiring



Diagnostic process

1 **Fill in the checklist**

Refer to fault check list

Fill in the inspection form: Including basic information, user description and phenomenon inspection results.

2 Foundation inspection

2.1 Use a multimeter to check the battery voltage;

2.2 Check whether the fuse is blown.

2.3 Fill in fault symptoms and inspection results in the inspection table.

Normal Perform step 3 check	Abnormal Repair corresponding components

3 Check frozen frame data

Check the freeze frame data when the fault occurs and record it.

4 Check and clear DTC

If the malfunction indicator lamp illuminates when the ignition key is in the ON position (check the engine malfunction lamp or read the malfunction lamp information through the diagnostic scanner), connect the diagnostic scanner and record the fault code. Clear the fault code, turn off the ignition key and power on again.

Fault code reappears Perform step 7 inspection	Fault code no longer appears Perform step 5 inspection

5 Inspect whether the vehicle harness and connector are loose and there is temporary fault. When power on, gently swing the harness and connector at the fault.

Fault code reappears Replace the faulty harness or connector. (Faulty harness or connector)	Fault code no longer appears. Check step 6.

6 Repeat test

Check that the fault code is not stored and repeat the test based on the user description.

Fault code reappears. Check step 7.	Fault code no longer appears Clean connector and check connector connection (Connector may not be well connected)

7 Check connector between transmission wiring harness and linear control solenoid for abnormal reference solenoid

⚠ **Warning**

When checking the transmission wiring harness, it must be removed from the TCM.

Normal Perform step 8 inspection	Abnormal Perform step 9 inspection

8 Inspect the vehicle harness terminal connector.

8.1 Check whether the harness is short circuit or open circuit;

8.2 Check whether the connector connection is normal.

Normal	Abnormal

Clean connector fault still exists Replace TCM * Always ensure that all fault codes are cleared after replacing the TCM. Reference TCM	Replace connector harness or adjust connector connection.

9 Check whether solenoid valve [SLU] works normally

Refer to solenoid valve

Check solenoid valve

Warning

Always move the oil pan and valve body away from the valve body before inspecting the solenoid valve.

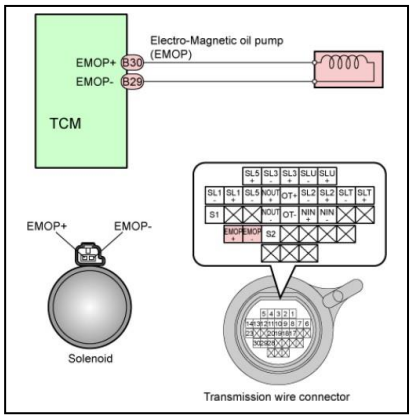
Normal Repair or replace transmission wiring harness	Abnormal Replace Valve Body (Solenoid Fault) Reference TCM

DTC P 2798, p 2799

Fault detection conditions

Fault code	1 Condition 2 Fault symptom 3 Duration	Detection position
P2798	1 TCM communication normal, EMOP drive output ON Signal 2 EMOP voltage detected as 0 V 3 The above symptom lasts for 0.5 s or longer and occurs once.	• Harness and connector(Electromagnetic oil pump) • Electromagnetic oil pump(EMOP) • TCM
P2799	1 TCM communication normal, EMOP drive output off Signal 2 EMOP voltage detected as 12 V 3 The above symptom lasts for 0.5 s or longer and occurs once.	• Harness and connector(Electromagnetic oil pump) • Electromagnetic oil pump(EMOP) • TCM

Schematic diagram of external wiring



Diagnostic process

1 Fill in the checklist

Refer to fault check list

Fill in the inspection form: Including basic information, user description and phenomenon inspection results.

2 Foundation inspection

2.1 Use a multimeter to check the battery voltage;

2.2 Check whether the fuse is blown.

Fill in fault symptoms and inspection results in the inspection table.

Normal Perform step 3 check	Abnormal Repair corresponding components

3 Check frozen frame data

Check the freeze frame data when the fault occurs and record it.

4 Check and clear DTC

If the malfunction indicator lamp illuminates when the ignition key is in the ON position (check the engine malfunction lamp or read the malfunction lamp information through the diagnostic scanner), connect the diagnostic scanner and record the fault code. Clear the fault code, turn off the ignition key and power on again.

Fault code reappears Perform step 7 inspection	Fault code no longer appears Perform step 5 inspection

5 Inspect whether the vehicle harness and connector are loose and there is temporary fault. When power on, gently swing the harness and connector at the fault.

Fault code reappears Replace the faulty harness or connector. (Faulty harness or connector)	Fault code no longer appears. Check step 6.

6 Repeat test

Check that the fault code is not stored and repeat the test based on the user description.

Fault code reappears. Check step 7.	Fault code no longer appears Clean connector and check connector connection (Connector may not be well connected)

7 Check connector between transmission wire harness and linear control solenoid for abnormality Reference transmission wire harness

Warning

When checking the transmission wiring harness, it must be removed from the TCM.

Normal Perform step 8 inspection	Abnormal Perform step 9 inspection

8 Inspect the vehicle harness terminal connector.

8.1 Check whether the harness is short circuit or open circuit;

8.2 Check whether the connector connection is normal.

Normal Clean connector Fault still exists Replace TCM * Always ensure that all fault codes are cleared after replacing the TCM. Reference TCM	Abnormal Replace connector harness or adjust connector connection.

9 Check whether solenoid valve [SLU] works normally

Refer to solenoid valve

Check solenoid valve

Warning

Always move the oil pan and valve body away from the valve body before inspecting the solenoid valve.

Normal Repair or replace transmission wiring harness	Abnormal Replace Valve Body (Solenoid Fault) Reference TCM

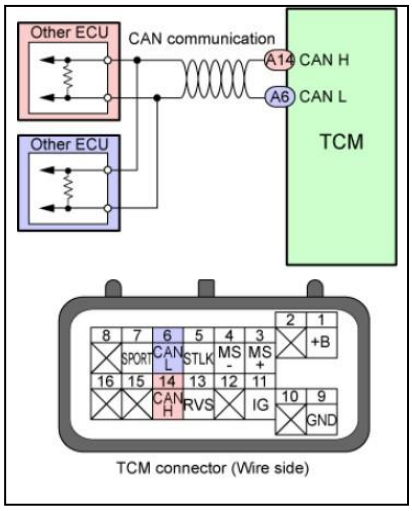
DTC U001

Fault detection conditions

Fault code	Condition/symptom/duration	Detection position
U0001	1 TCM communication normal 2 Can bus off abnormality detected	- Harness and connectors(Can communication system)

Fault code	Condition/symptom/duration	Detection position
	3 The above symptom lasts for 5s or longer and occurs once.	

Schematic diagram of external wiring



Diagnostic process

1 **Fill in the checklist**

Refer to fault check list

Fill in the inspection form: Including basic information, user description and phenomenon inspection results.

2 **Foundation inspection**

2.1 Use a multimeter to check the battery voltage;

2.2 Check whether the fuse is blown.

Fill in fault symptoms and inspection results in the inspection table.

Normal Perform step 3 check	Abnormal Repair corresponding components

3 **Check frozen frame data**

Check the freeze frame data when the fault occurs and record it.

4 **Check and clear DTC**

If the malfunction indicator lamp illuminates when the ignition key is in the ON position (check the engine malfunction lamp or read the malfunction lamp information through the diagnostic scanner), connect the diagnostic scanner and record the fault code. Clear the fault code, turn off the ignition key and power on again.

Fault code reappears Perform step 7 inspection	Fault code no longer appears Perform step 5 inspection

5 **Check whether the vehicle harness and connector are loose and have temporary fault.**

When powering on, gently swing the harness and connector at the faulty position.

Fault code reappears Replace the faulty harness or connector. (Faulty harness or connector)	Fault code no longer appears. Check step 6.

6 Repeat test

Check that the fault code is not stored and repeat the test based on the user description.

Fault code reappears. Check step 7.	Fault code no longer appears Clean connector and check connection point at connector (Connector may not be well connected)

7 Check connector between TCM and other ECM controllers for abnormal reference harness and connector Checking TCM connections

Normal Perform step 8 inspection	Abnormal Perform step 9 inspection

8 Check data

Use diagnostic scanner to check whether the input and output data are normal.

Normal Initializing the TCM Learning Reference TCM	Abnormal Check and replace TCM Reference TCM

9 Inspect the vehicle harness terminal connector.

9.1 Check whether the harness is short circuit or open circuit;

9.2 Check whether the connector connection is normal.

Normal Clean connector	Abnormal Replace connector harness or adjust connector connection.

DTC U0074, U0100

Fault detection conditions

Fault code	1 Condition 2 Fault symptom 3 Duration	Detection position
U0074	1 TCM communication normal 2 Abnormal ECM communication detected 3 The above fault phenomenon lasts for 0.2 seconds or longer and occurs twice in succession	• ECM • Harness and connector(Can communication system)

Fault code	1 Condition 2 Fault symptom 3 Duration	Detection position
U0100	1 TCM communication normal 2 EMS abnormality detected 3 The above fault phenomenon lasts for 0.2 seconds or longer and occurs twice in succession	• ECM • Harness and connector(Can communication system)

Diagnostic process

1 Fill in the checklist

Refer to fault check list

Fill in the inspection form: Including basic information, user description and phenomenon inspection results.

2 Foundation inspection

2.1 Use a multimeter to check the battery voltage;

2.2 Check whether the fuse is blown.

Fill in fault symptoms and inspection results in the inspection table.

Normal Perform step 3 check	Abnormal Repair corresponding components

3 Check frozen frame data

Check the freeze frame data when the fault occurs and record it.

4 Check and clear DTC

If the malfunction indicator lamp illuminates when the ignition key is in the ON position (check the engine malfunction lamp or read the malfunction lamp information through the diagnostic scanner), connect the diagnostic scanner and record the fault code. Clear the fault code, turn off the ignition key and power on again.

Fault code reappears Perform step 6 inspection	Fault code no longer appears Perform step 5 inspection

5 Repeat test

Check that the fault code is not stored and repeat the test based on the user description.

Fault code reappears. Check step 6.	Fault code no longer appears Clean connector and check connection point at connector (Connector may not be well connected)

6 Check corresponding components

Check the fault code and perform fault handling.

* For service steps, refer to the service manual for the appropriate component.

Normal Clean connector	Abnormal Repair corresponding components

Fault symptom diagnosis check and confirmation

1 View basic vehicle information including frame number, production date, mileage, transmission number and TCU software version, etc.
2 Confirm the problem:

- What is the specific problem
- Frequency
- What is the operating point, including road conditions, vehicle speed, engine speed, throttle opening, cold or hot and driving gear, etc.

3 Driver evaluation recurrence problem

Appearance check list

Serial number	Inspection items
1	Is the harness connector loose or loose
2	Whether the transmission oil cooler is damaged or bumped
3	Is the oil pipe and water pipe joint of transmission oil cooler loose
4	Is there any obvious oil stain around the transmission(Oil seal, LH/RH box closing surface, oil pan, filter cover, HCU connector, engine connecting surface, etc.)
5	Does the transmission have obvious bump damage

Fault symptom table

If the fault occurs but no DTCs are stored in the control module and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Malfunction indicator lamp works abnormally	· Instrument · Circuit · Bulb · Transmission control unit	Malfunction diagnosis process of malfunction indicator lamp
Abnormal static and driving shift impact	· Engine power · Pressure sensor · Odd, even clutch solenoid valve · Shift fork 1,2,3,4 displacement sensor	Refer to Static Drive Shift Impact Abnormal
Manual mode cannot be started	· Manual mode switch · Circuit · TCU	Reference manual mode cannot be activated

Malfunction diagnosis process of malfunction indicator lamp

Diagnostic process

Test conditions	Details/Results/Measures
1. Check the status of other warning lamps of instrument	
	A. Turn the ignition switch to "ON" position. B. Check the status of all warning lamps of instrument. Is there warning lamp other than "TCU automatic transmission" fault lamp on? - > Yes

	Go to step 2. - > No Go to Step 4.
2. Check combination instrument power supply circuit	
3. Check grounding circuit of combination instrument	
4. Replace combination instrument	
5. Overhaul CAN bus circuit	
	A. Overhaul CAN bus circuit. Reference: Can network check. Is the CAN bus line normal? - > Yes Go to Step 6. - > No Overhaul the faulty circuit.
6. Check ECM power supply circuit	
7. Check grounding circuit of ECM	

Abnormal diagnosis of static and driving shift impact

Abnormal diagnosis process of static and driving gear shift impact

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Is there a fault code in the automatic transmission system? - > Yes Reference: Relevant content of DTC diagnostic process index - > No Go to step 2.
2. Check harness plug	
	A. Check whether the automatic transmission harness plug is reliably connected and free from loosening, falling off, dirt or damage. Is the harness check normal? - > Yes to step 3 - > No Repair or replace TCU harness
3. Check the engine	
	A. Check whether the following engine works normally. · Intake pressure temperature sensor · Throttle position sensor

	· Camshaft position sensor · Crankshaft position sensor · High voltage damping wire · Ignition coil · Spark plug · Ignition timing · Idle speed · Intake leakage · Exhaust obstruction Is the engine normal? - > Yes to step 4 - > No Repair fault position
4. Check odd and even clutch solenoid valve	
	A. Check odd clutch solenoid valve Check solenoid valve using I/O control request service Is the feedback current normal? Reference: Dark current test - > Yes to step 5 - > No Contact after-sales maintenance personnel for technical support
5. Check automatic transmission sensor	
	A. Check the following sensors of automatic transmission Inner and outer input shaft, output shaft reference: Sensor check pressure sensor Reference: Sensor Check Oil Temperature Sensor Reference: Does the sensor check whether the sensor is normal? - > Yes to step 6 - > No Replace fault sensor
6. Check TCU power supply and grounding circuit	

	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug. C. Measure the resistance between T5 and T7 of TCU harness plug and reliable grounding point. Standard resistance: Less than 5Ω Is the resistance normal? ? Yes Go to Step 7 ? No

	Overhaul open circuit fault between terminal B_L3, B_M3 of TCU harness plug AB and grounding point G 310. Confirm the system is normal.
7. Check TCU	
	A. Dismantle TCU B. Install TCU on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Replace automatic transmission assembly. - > No replacing TCU

Manual mode cannot start diagnostic process

Diagnostic process

Test conditions	Details/Results/Measures
1. Check fault code	
	A. Connect the diagnostic scanner. B. Test the automatic transmission system with a diagnostic scanner. Is there a fault code in the automatic transmission system? - > Yes Reference: DTC diagnostic process - > No Go to step 2.
2. Check manual mode switch	
	A. Check manual mode switch Reference: Does the manual mode switch check switch check normal? - > Yes to step 3 - > No Replace manual mode switch
3. Check grounding circuit of manual mode switch	
4. Check the circuit between manual mode switch and TCU.	
5. Check TCU power supply and grounding circuit	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative cable. B. Disconnect TCU harness plug AB. C. Measure the resistance between B_L3 and B_M3 of TCU harness plug AB and reliable grounding point. Standard resistance: Less than 5Ω Is the resistance normal? ? Yes

	Go to Step 6

	? No Overhaul open circuit fault between terminal B_L3, B_M3 of TCU harness plug AB and grounding point G 310. Confirm the system is normal.
6. Check TCU	
	A. Dismantle TCU B. Install TCU on a vehicle in good condition. Is the vehicle in normal state after installing TCU? - > Yes Confirm the system is normal. - > No replacing TCU

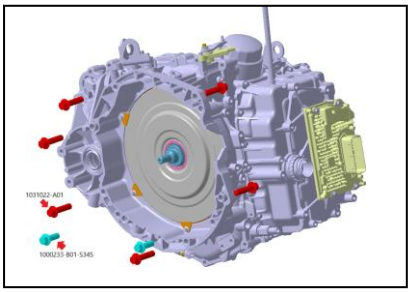
Removal and installation

Removal and installation of DCT transmission assembly

1. DCT transmission assembly removal

1 Remove the powertrain (engine + transmission) from the vehicle.

2



Remove the transmission and engine connecting bolts.

	Part number	Name	Quantity
1	1031022-A01	Bolt	6
2	1000233-B01-S345	Bolt	2

3 Move the transmission out axially to complete the transmission removal.

2. DCT transmission assembly

1 Fitting locating pin on engine block side

Serial number	Part number	Name	Quantity
1	1000013-A01	Connecting locating pin between crankcase and transmission	2

2 Install the DCT transmission assembly to the engine and tighten the eight bolts to a torque of 80±5 N.m.

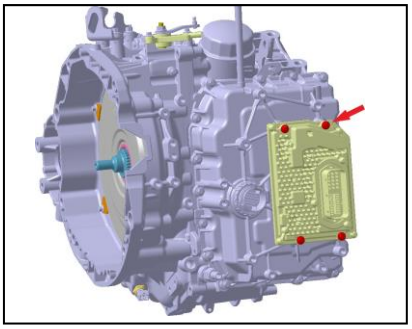
	Part number	Name	Quantity
1	1031022-A01	Bolt	6
2	1000233-B01-S345	Bolt	2

Caution When assembling the DCT assembly, check whether there are bolts, locating pins and other components left at the connection between the transmission and the crankcase to avoid improper assembly or damage to the transmission.

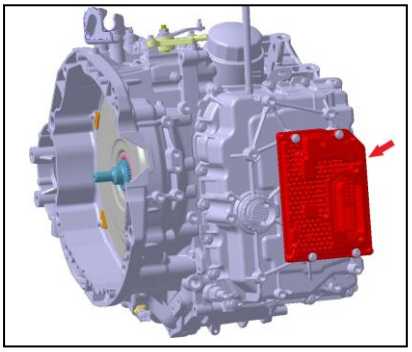
Removal and installation of automatic transmission control unit (TCU)

1. Removal

1 Remove four retaining bolts of automatic transmission control unit (TCU), torque: 10~12N.m.



2 Remove automatic transmission control unit (TCU).



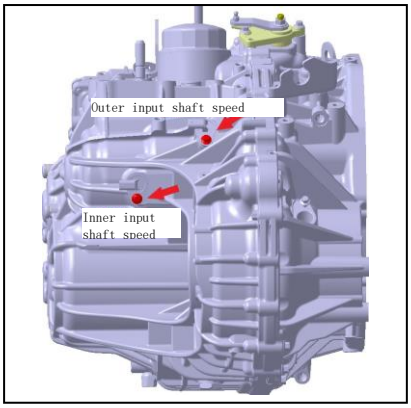
2. Installation

The installation sequence is the reverse of the removal sequence.

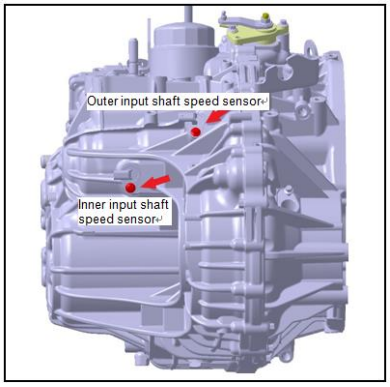
Input shaft sensor

Removal

1 Disconnect the input shaft speed sensor harness plug.
2 Remove the retaining bolts of input shaft speed sensor, torque: 11±1N.m.



3 Remove the input shaft speed sensor.



Installation

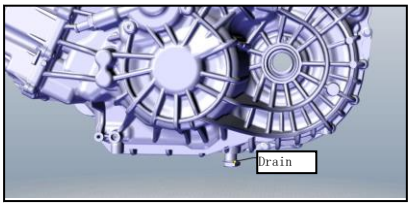
The installation sequence is the reverse of the removal sequence.

Warning Check "O" type sealing ring and replace it if necessary. Apply a coat of grease to the "O" type sealing ring before installation.Internal and external input shaft speed sensors can be interchanged.

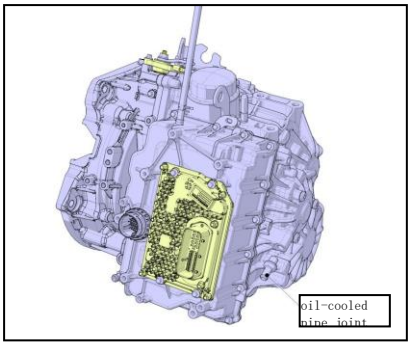
Oil cooling pipe joint

Removal

1 Lift the vehicle.
2 Loosen and remove the drain bolt and drain the transmission fluid. Torque: 35±5Nm



3 Remove the oil pipe clamp with pointed-nose pliers (or screwdriver).
4 Unscrew oil-cooled pipe joint with a torque wrench and special socket.Torque: 45±2Nm



Installation

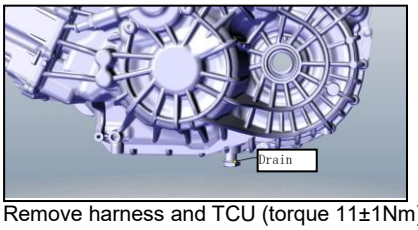
1 Tighten oil-cooled pipe joint with torque wrench and special socket Torque: 45±2Nm
2 Install clamp and tighten with pliers (or screwdriver)
3 Screw on oil drain bolt. Torque: 35±5Nm
4 Add BOT 351 C4transmission fluid approx. 5.3±0.1 L from the filler hole.

Warning If gasket damage is found, gasket must be replaced to prevent oil leakage.

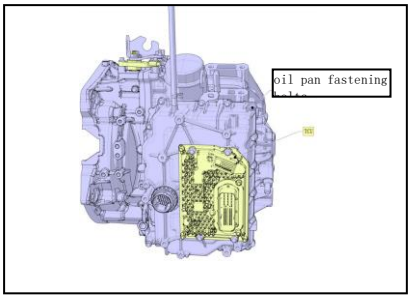
Oil pan

Removal

1 Lifting the vehicle
2 Loosen and remove the drain bolt, then drain the automatic transmission fluid, torque: 35±5Nm.



3 Remove harness and TCU (torque 11±1Nm) in sequence.
4 Rotate counterclockwise, and take down the cylinder parts circlip.
5 Remove 17 oil pan fastening bolts (torque 11±1Nm) in sequence.



6 Remove the automatic transmission oil pan and discard the sealing gasket, and replace it with a new one.
7 Clean the contact surface between

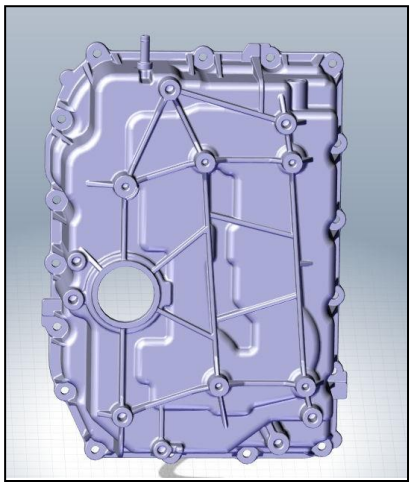
automatic transmission and oil pan sealing

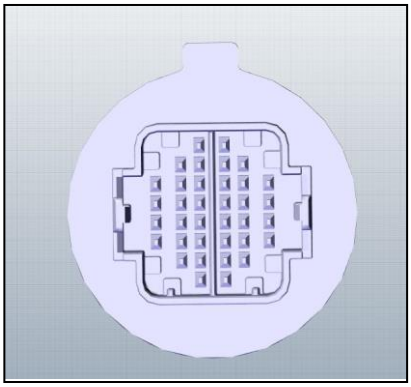
gasket. Installation

1 Install in the reverse order of removal.
2 Use a new automatic transmission sealing gasket.
3 Road test vehicle check automatic transmission for oil leakage.

Warning 1 When assembling cylinder parts, the boss of cylinder parts shall be aligned with the groove of oil pan.

2 Check whether the oil pan locating pin falls when removing and assembling the oil pan.(2 ea.)

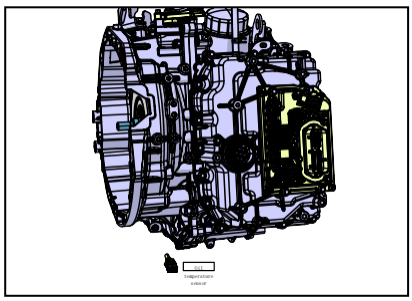




Oil temperature sensor

Removal

Disconnect the oil temperature sensor and wire speed connector. The installation torque of the oil temperature sensor is 28±2 Nm. Remove the oil temperature sensor.



Installation

Installation sequence is reverse to removal sequence

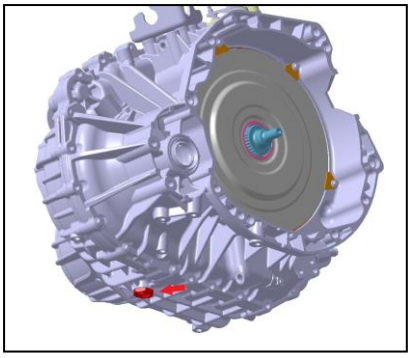
Warning Check O-ring and copper gasket and replace if necessary.

Differential oil seal

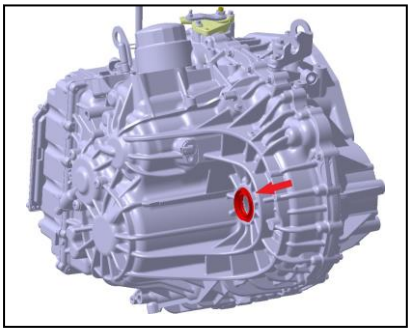
1. Removal

1 Lift the vehicle.

2 Remove the drain bolt and drain the transmission fluid. Torque: 35±5N.m

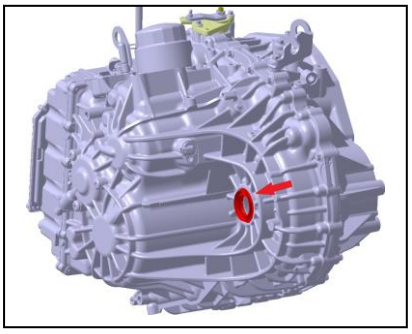


3 Use a special tool to remove the differential oil seal.

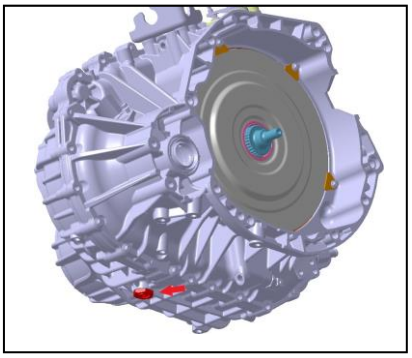


2. Installation

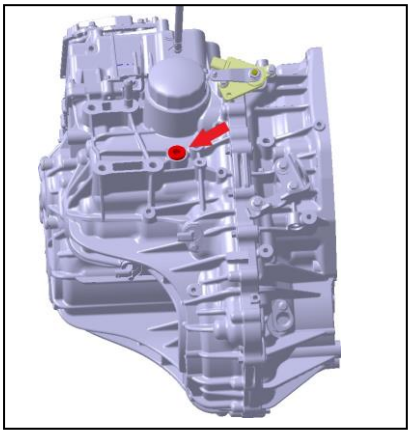
1 Use special tooling to install differential oil seal.



2 Install oil drain bolt.Torque: 35±5N.m



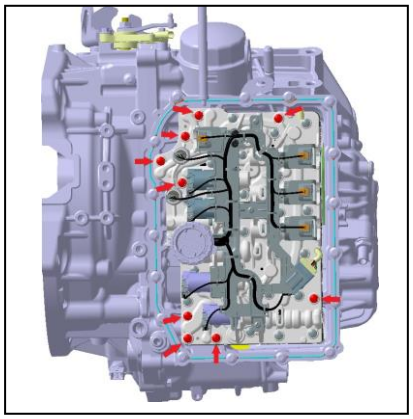
3 Fill BOT 351 C4 transmission fluid 4.8±0.1 L from the fill hole, fill plug torque: 30±3N.m.



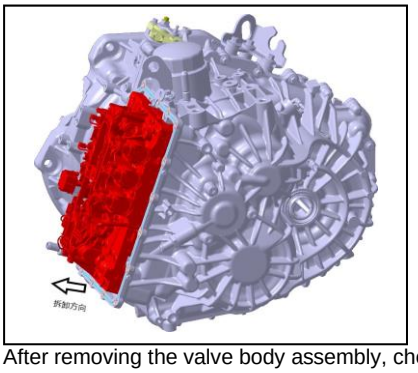
Valve body assembly

Removal

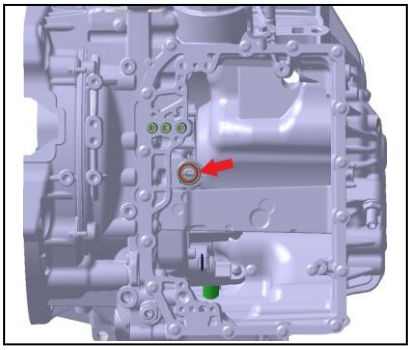
1 Remove oil pan. Refer to Oil Pan
2 Remove 9 retaining bolts of valve body. Torque: 11±1N.m



3 Grasp the valve body assembly, shake slightly left and right, and take out the valve body assembly.



4 After removing the valve body assembly, check whether the oil nozzle sealing ring falls off. If so, install the sealing ring back.



Installation

Installation sequence is reverse to removal sequence

Warning

1 For oil pan attention, refer to oil pan.

2 Do not damage the valve body harness when removing the grasping valve body.

3 Use a new automatic transmission sealing gasket when fitting the valve body.

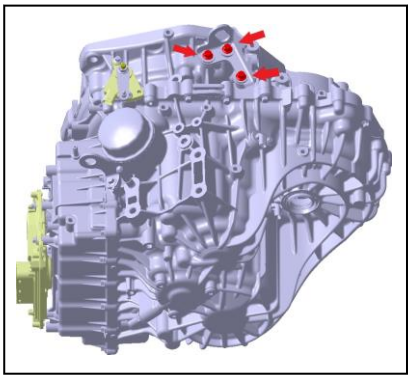
4 Tighten the fixing valve body assembly screws diagonally, and check the torque.

5 Road test vehicle check automatic transmission for oil leakage.

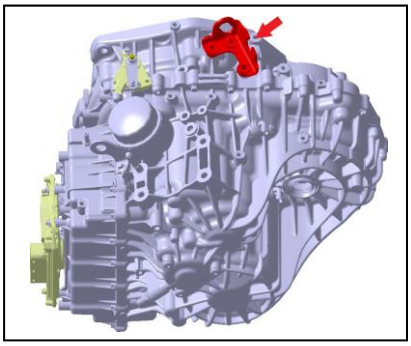
Zipper bracket assembly

Removal

1 Remove 3 retaining bolts of cable bracket. Torque: 22±2N.m.



2 Remove the zipper bracket assembly.



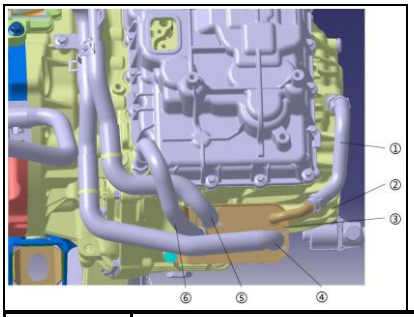
Installation

The installation sequence is the reverse of the removal sequence.

Warning The fastener bracket assembly and gasket must not be missing.

Transmission oil cooler

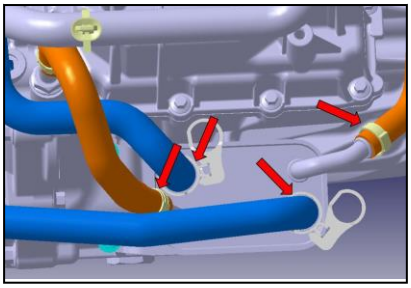
Removal



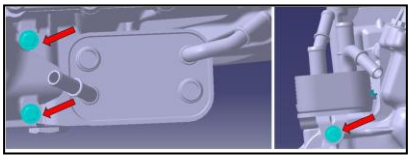
Serial number	Name
1	Oil cooler oil outlet pipe
2	Transmission assembly
3	Transmission oil cooler assembly
4	Oil cooler water outlet pipe
5	Oil cooler water inlet pipe
6	Oil cooler inlet pipe

1 Lift the vehicle.Lifting

2 Loosen the clamps of water pipe (4), (5) and oil pipe (1), (6), and remove the hose. Tools: Pipe clamp removal pliers



3 Remove the transmission oil cooler bolt, and remove the transmission oil cooler. Tool: Sleeve (8), torque: 9±1N.m



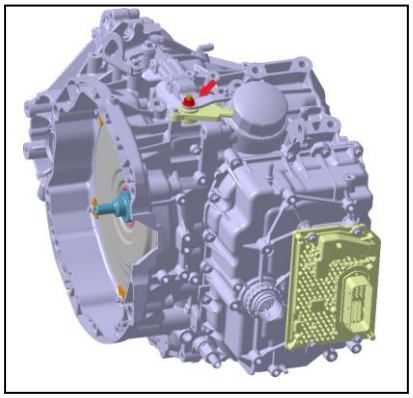
Installation

The installation sequence is the reverse of the removal sequence.

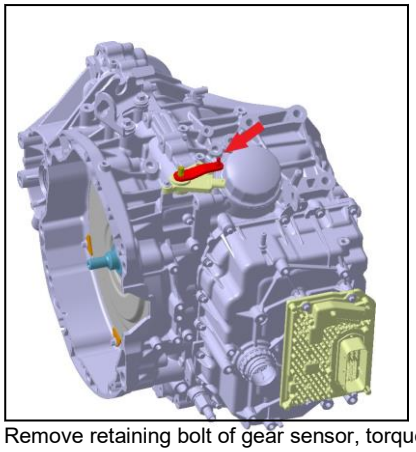
Gear sensor

Removal

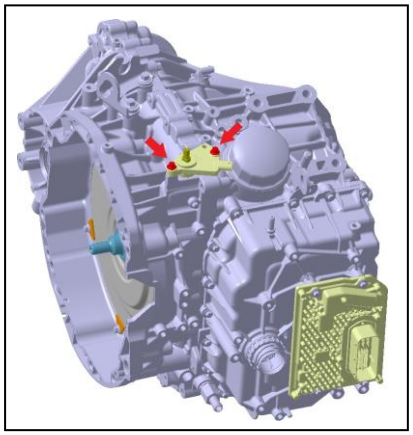
1 Remove retaining nut, torque: 22±2N.m.



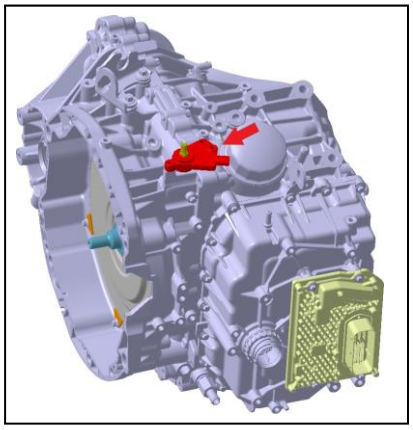
2 Remove shift rocker arm assembly.



3 Remove retaining bolt of gear sensor, torque: 11±1N.m.



4 Remove the gear sensor.



Installation

The installation sequence is the reverse of the removal sequence.

Warning 1 Do not install the sensor retaining bolt and bolt reversely. The sensor retaining bolt is close to the engine joint surface.

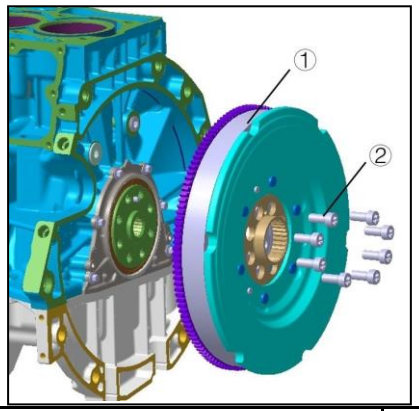
2 When assembling the gear sensor, pay attention to the limiting direction.

Removal and installation of dual-mass flywheel assembly

1. General

The dual-mass flywheel assembly is installed on the crankshaft, which can store energy for power stroke, overcome resistance of auxiliary stroke and other functions, absorb or release kinetic energy during crankshaft acceleration and deceleration, stabilize the change of crankshaft acceleration and speed, so that the engine works smoothly.

Component Disassembly Diagram and Torque Requirements



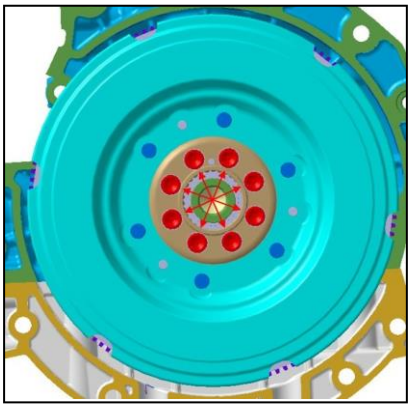
Serial number	Component name	Quantity
1	Double-mass flywheel assy.	1
2	Flywheel bolt	8

Torque specification

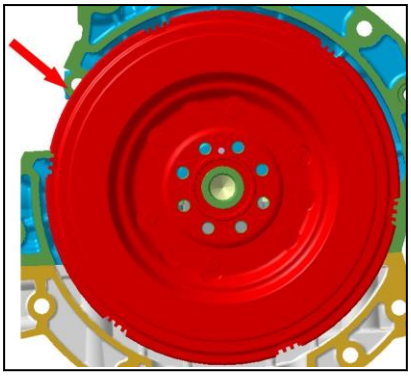
Name	Torque(N.m)
Flywheel bolt	40N.m+45°, monitoring 60~115N.m

2. Removal

1.Diagonally remove flywheel bolt, tool: Sleeve (T55), torque: Refer to torque specification parameter table.



2.Remove double-mass flywheel assembly



3. Installation

Install in reverse order to remove the dual-mass flywheel assembly.

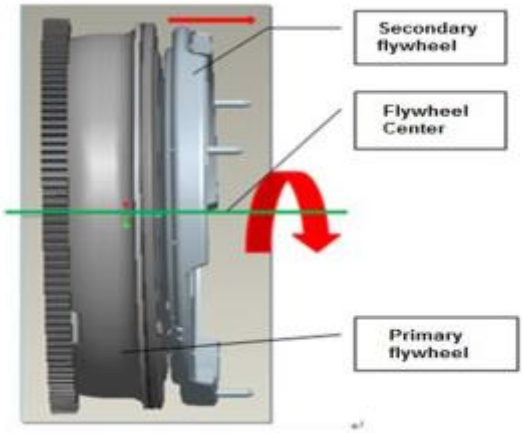
Caution The same flywheel bolt (with adhesive) can only be used once after dismantling, and it is not allowed to be used again.

Caution If the flywheel is soaked, damaged, broken or worn, replace the double-mass flywheel assembly.

Caution Double-mass flywheel is composed of primary flywheel and secondary flywheel (as shown in the following figure). In static state, secondary flywheel can rotate clockwise and counterclockwise around the flywheel center (design angle

6.5°~15.5°), and the secondary flywheel can move in the central axial direction of the flywheel (maximum of 1.5 mm on one side), and the secondary flywheel can move in the radial direction (design centring amount

0.6~1 mm). The above sports are inherent characteristics of dual-mass flywheel and are not faults.



Spare parts atlas

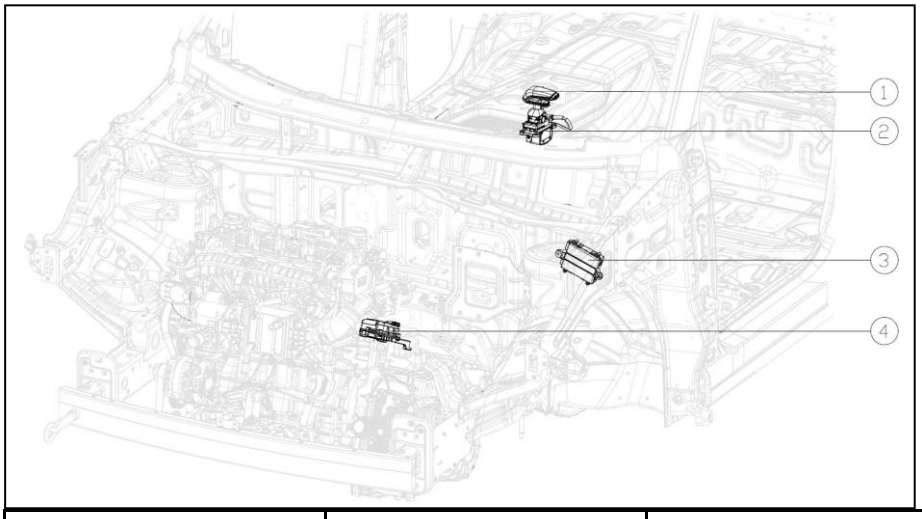
F230101

F230104

Electronic shift control assembly torque specification

Name	N. M	lb-ft	lb-in
Handle ball assembly	/	/	/
Gearshift base assembly	4.5±0.5	/	/
Electronic shift actuator controller assembly retaining nut(M6)	10±1	/	/
Electronic gearshift actuator assembly retaining bolt (M8)	23±2	/	/
Electronic gearshift actuator assembly retaining bolt (M6)	10±1	/	/

Composition and position distribution



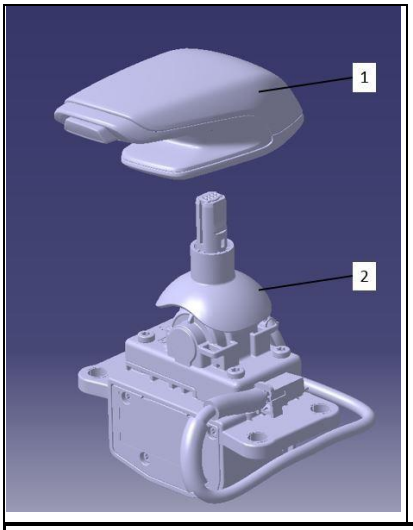
Serial number	Part number	Name	Remarks
1	1703120 -AW32(Dark) 1703120 -AW34(Light)	Handle ball assembly	Power
2	1703110-AW34	Gearshift base assembly	Power
3	3621020-CR10	Electronic gear shift actuator controller assembly	Power
4	3621020-CR10	Electronic gearshift actuator assembly	Power

System overview

Gearshift control assembly (hereinafter referred to as ESL): It is a handle type electronic gearshift. It adopts position Hall sensor element. When the gearshift lever moves to different positions, it realizes the ON/OFF signals of different position Hall sensor elements. Then the single-chip microcomputer judges the current position of gearshift lever according to the activated sensor element, and finally converts it into CAN signal, which is input into TCU. TCU makes logical judgment according to the current state of the vehicle to realize gearshift. Electronic gearshift actuator controller assembly (hereinafter referred to as ACM) and electronic gearshift actuator assembly (hereinafter referred to as ARC): ACM is located at the original clutch pedal bracket in the cab, responsible for vehicle communication and ARC control; ARC is located on the transmission case (directly below the engine thermostat). Its torque output hole fits with the gearbox gearshift shaft in a clearance manner. The motor drives to achieve torque output and complete gear switching. Position sensor is set in ARC to feed back gear information.

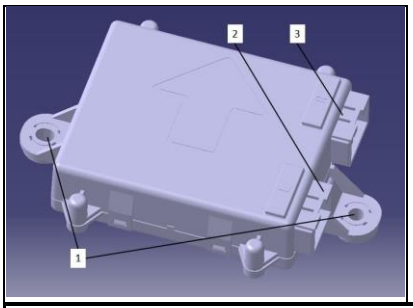
Inspection of part structure principle

Electronic shift control assembly ESL



Serial number	Name	Quantity
1	Gearshift base assembly	1
2	Handle ball assembly	1

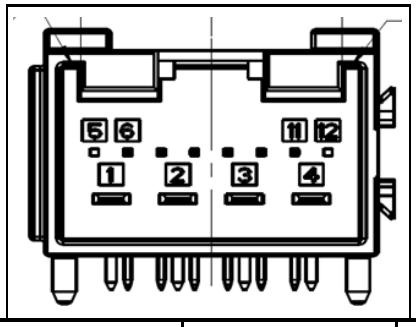
Electronic shift actuator controller assembly ACM



Serial number	Name	Part
1	Fixing hole	Electronic gear shift actuator controller assembly(ACM)
2	Complete vehicle harness interface	Electronic gear shift actuator controller assembly(ACM)
3	ARC harness interface	Electronic gear shift actuator controller assembly(ACM)

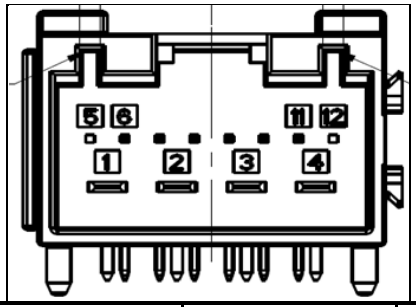
Interface definition

- Complete vehicle harness interface



Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
1	KL30	-	12V	-	-
2	KL30	-	12V	-	-
3	GND	-	0V	-	-
4	GND	-	0V	-	-
5	NC	-	-	-	-
6	NC	-	-	-	-
7	KL15	-	12V	-	-
8	NC	-	-	-	-
9	CAN_L	Bus	-	-	-
10	CAN_H	Bus	-	-	-
11	NC	-	-	-	-
12	NC	-	-	-	-

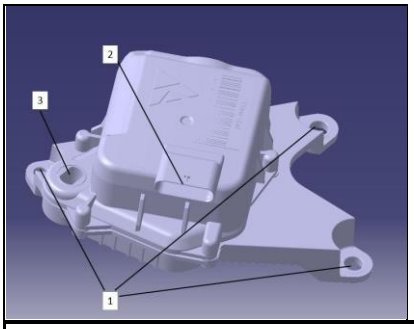
- ARC harness interface



Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
1	Motor+	PWM	12V	-	-
2	NC	-	-	-	-
3	NC	-	-	-	-
4	Motor-	PWM	12V	-	
5	NC	-	-	-	-
6	5V_Sensor	-	5V	-	-

7	GND	-	0V	-	-
8	Position_Sensor1	PWM	5V	-	-
9	NC	-	-	-	-
10	NC	-	-	-	-
11	NC	-	-	-	-
12	NC	-	-	-	-

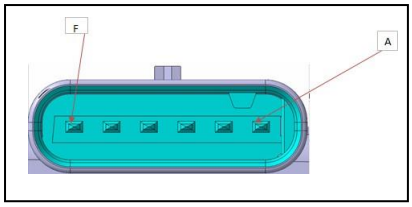
Electronic gearshift actuator assembly ARC



Serial number	Name	Part
1	Fixing hole	Electronic gearshift actuator assembly(ARC)
2	ACM harness interface	Electronic gearshift actuator assembly(ARC)
3	Gear shift shaft mating hole	Electronic gearshift actuator assembly(ARC)

Interface definition

- ACM harness interface



Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
F	NC	-	-	-	-
E	Motor-	Power PWM	12V	-	-
D	Motor+	Power PWM	12V	-	-
C	GND	-	0V	-	-
B	Position_Sensor	PWM	5V	-	-
A	5V_Sensor	-	5V	-	-

Common methods

Calibration procedure of electronic gear shift actuator controller (ACM) self-learning diagnostic scanner

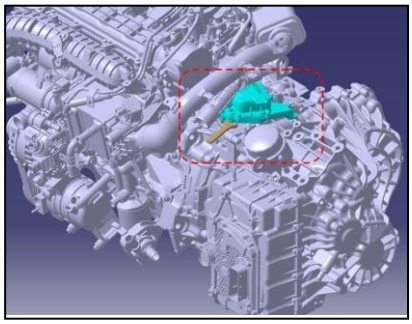
Warning Please put the vehicle into P gear during self-learning, keep the vehicle level during the whole process, and do not start the engine.

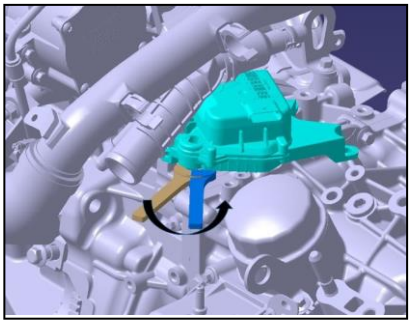
1. 1. Connect diagnostic scanner in power-off state.
2. 2.Power on the complete vehicle (Ignition on).
3. 3.Turn on the diagnostic scanner, enter the current model catalog, and select: Shift gear execution control module ACM→ diagnostic data version? Special function →ACM self-learning.
4. 4. The diagnostic scanner interface displays "Do you enter into ACM self-learning?" , click "Yes."
5. 5. Wait for "P gear calibration succeeds" in the diagnostic scanner interface, and click "OK."
6. 6. Wait until "ACM self-learning ends" appears on the diagnostic scanner interface, and click "Exit."
7. Self-learning completed.

Manual unlocking P gear

If the transmission cannot shift out of P gear due to ACM fault and trailer or other operation is required by unlocking front wheels, you can manually unlock P gear as follows:

1 Pull up the handbrake, keep the vehicle level, and power off the complete vehicle;
2 Use an 8 mm open-end wrench to clamp the transmission shift shaft between the ARC shift shaft fitting hole 3 and the transmission case, and rotate it clockwise (top view) by about 18° (from gray position to blue position in the following figure) to realize manual unlocking.





Warning

1 If the hand brake fails, use a wedge block to fix the tire when unlocking gear P to prevent the vehicle from slipping.
2 ARC internal resistance is large, and manual unlocking process requires a little force.
3 When there is no ARC/ACM fault, the complete vehicle will be powered on or powered off to automatically shift the transmission into P gear.

DTC Diagnostic

Electronic shift control assembly ESL

P 119216: Low KL30 voltage

1 Fault triggering conditions

- The shifter is not in sleep mode.
- KL30 supply voltage < 6.0 V is detected.

2 Possible fault causes

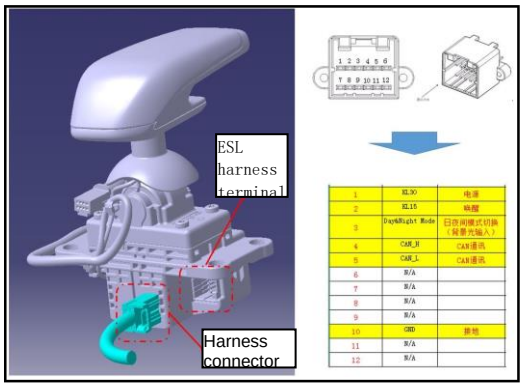
- Battery voltage is below the limit.
- The power supply harness is disconnected or in poor contact.

3 Failure mode

- Respond according to 4.2.1 Product Function Definition.

4 Diagnostic process

- Check whether the battery voltage is lower than the limit value.
- Check whether the voltage at the ESL harness terminal is lower than the limit value.



P 119217: High KL30 voltage

1 Fault triggering conditions

- The shifter is not in sleep mode.
- KL30 supply voltage > 18 V is detected.

2 Possible fault causes

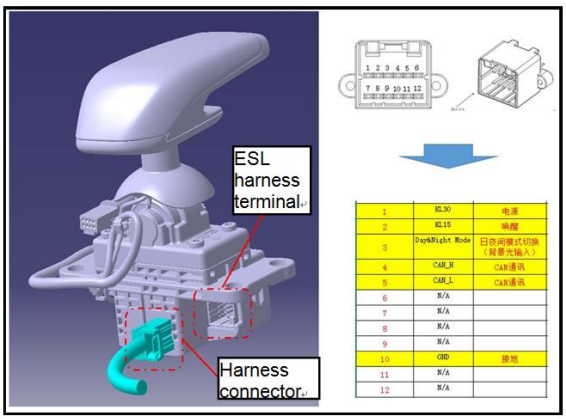
- Battery voltage is higher than the limit.
- The power supply harness is disconnected or in poor contact.

3 Failure mode

- Respond according to 4.2.1 Product Function Definition.

4 Diagnostic process

- Check whether the battery voltage is higher than the limit value.
- Check whether the voltage at the ESL harness terminal is higher than the limit value.



U007388: Bus off

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- Bus-Off counter reaches NBusOffCount=5.

2 Possible fault causes

- Can network fault.

3 Failure mode

- Shift request cannot be issued.
- ESL gear indicator lamp goes out.

4 Diagnostic process

- Check CAN interface connector.
- Check CAN network terminal resistance.
- After the above inspection, CAN communication fault still exists, and replace ESL. After replacement, clear the fault code, read it again, and check whether the fault code reappears.

U010187: Lost communication with TCUs

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- CAN Bus-Off not detected.
- Id=0x 338 > 1s detected.

2 Possible fault causes

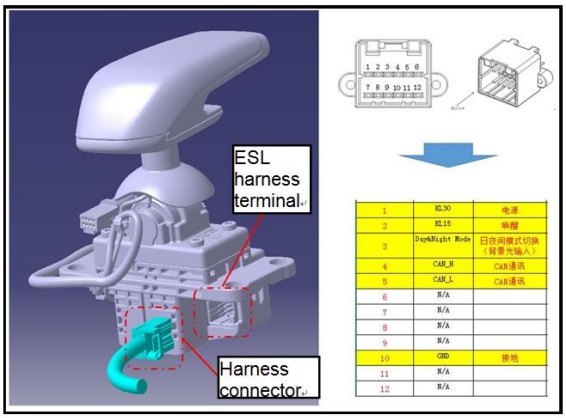
- The ESL harness end is disconnected or in poor contact.
- TCU fault.

3 Failure mode

- When the duration is ≤1s, the ESL gear indicator lamp remains in the front gear state when the TCU message is lost.
- When the duration is > 1s, the ESL gear indicator lamp goes out.

4 Diagnostic process

- Inspect whether the ESL harness end is disconnected or in poor contact.



- Check whether the TCU_ 338 message on the CAN line is sent normally.

U2F3A86: Unreliable data received from TCUs

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- CAN Bus-Off not detected.
- TCU_GearForDisplay= 0xE=Unreliable or TCU_GearForDisplay=0xF =Invalid detected.

2 Possible fault causes

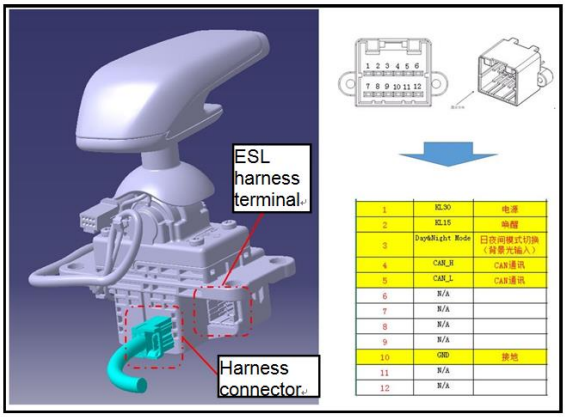
- Can line is disturbed.
- TCU fault.

3 Failure mode

- When the duration is ≤1s, the ESL gear indicator lamp remains in the gear state when the TCU message is reliable.
- When the duration is > 1s, the ESL gear indicator lamp goes out.

4 Diagnostic process

- Inspect whether the ESL harness end is disconnected or in poor contact.



- Check whether TCU_ 338 message on can line sends TCU_GearForDisplay= 0xE=Unreliable or TCU_GearForDisplay=0xF =Invalid.

U2F 3308: Invalid data received

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- KL15 1s after power-on.
- CAN Bus-Off not detected.
- Three consecutive TCU_CRCCheck_ 338 errors || are detected (TCU_CRCCheck_ 338 correct&&ten consecutive TCU_RollingCounter_ 338 remain unchanged are detected).

2 Possible fault causes

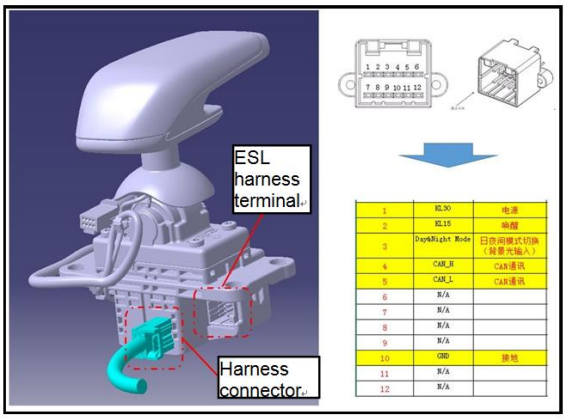
- Can line is disturbed.
- The CAN wire terminal resistance is faulty.
- TCU fault.

3 Failure mode

- ESL gear indicator lamp goes out.

4 Diagnostic process

- Inspect whether the ESL harness end is disconnected or in poor contact.



- Check whether the CAN wire terminal resistance is normal.
- Check whether the TCU_ 338 message on the CAN line sends three consecutive TCU_CRCCheck_ 338 errors || (TCU_CRCCheck_ 338 correct&&detects ten consecutive TCU_CRCCheck_ 338 errors. TCU_RollingCounter_ 338 remains unchanged).

U2F0287: Lost communication with ACM

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- CAN Bus-Off not detected.
- Id=0x 249 > 1s detected.

2 Possible fault causes

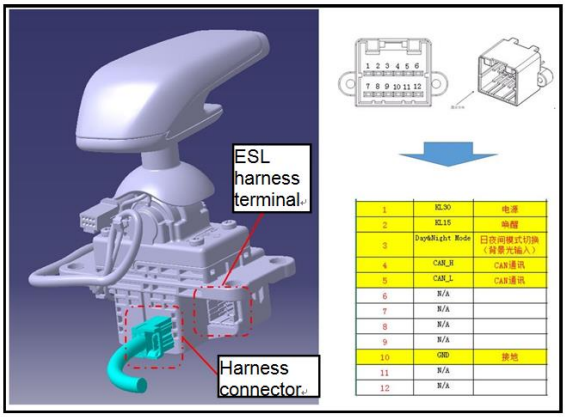
- The ESL harness end is disconnected or in poor contact.
- ACM fault.

3 Failure mode

- The gear indicator lamp is displayed according to the received TCU_GearForDisplay signal.

4 Diagnostic process

- Inspect whether the ESL harness end is disconnected or in poor contact.



- Check whether the ACM_ 249 signal on the CAN line is sent normally.

U2F 3986: Unreliable ACM data received

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- CAN Bus-Off not detected.
- ACM_ACMActuatorStatus=0x1=Fault or ACM_ActuatorPRNDStatus=0xF= Invalid detected.

2 Possible fault causes

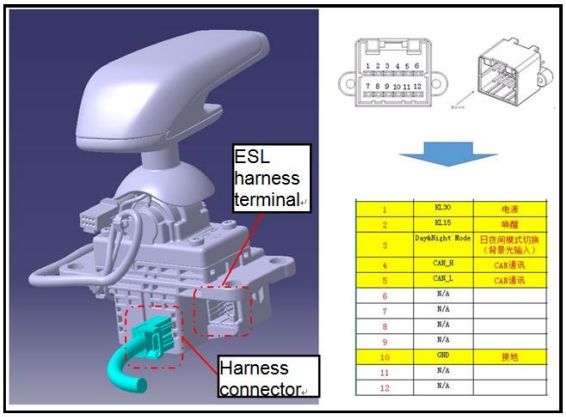
- Can line is disturbed.
- ACM fault.

3 Failure mode

- The gear indicator lamp is displayed according to the received TCU_GearForDisplay signal.

4 Diagnostic process

- Inspect whether the ESL harness end is disconnected or in poor contact.



- Check whether ACM_ 249 on the CAN line sends ACM_ACMActuatorStatus=0x1=Fault or ACM_ActuatorPRNDStatus=0xF= Invalid.

U2F 3208: Invalid ACM data received

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- CAN Bus-Off not detected.
- Three consecutive ACM_CRCCheck_ 249 errors are detected || (ACM_CRCCheck_ 249 correct&&ten consecutive ACM_RollingCounter_ 249 remains unchanged).

2 Possible fault causes

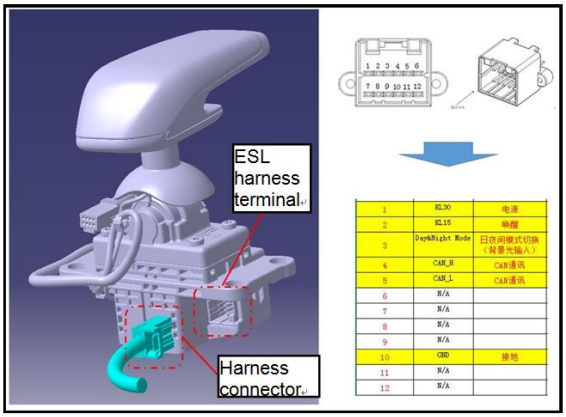
- Can line is disturbed.
- The CAN wire terminal resistance is faulty.
- ACM fault.

3 Failure mode

- The gear indicator lamp is displayed according to the received TCU_GearForDisplay signal.

4 Diagnostic process

- Inspect whether the ESL harness end is disconnected or in poor contact.



1	KL30	电源
2	KL15	唤醒
3	DayNight Mode	日夜间模式切换（背景光输入）
4	CAN_H	CAN通讯
5	CAN_L	CAN通讯
6	N/A	
7	N/A	
8	N/A	
9	N/A	
10	GND	接地
11	N/A	
12	N/A	

- Check whether the CAN wire terminal resistance is normal.
- Check whether the ACM_ 249 on the CAN line sends three consecutive ACM_CRCCheck_ 249 errors || (ACM_CRCCheck_ 249 correct&&detects ten consecutive ACM_CRCCheck_ 249 errors.
  ACM_RollingCounter_ 249 remains unchanged)

U014087: Lost communication with GW_BCM

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- CAN Bus-Off not detected.
- Loss of id=0x28B or id=0x3FD is detected.

2 Possible fault causes

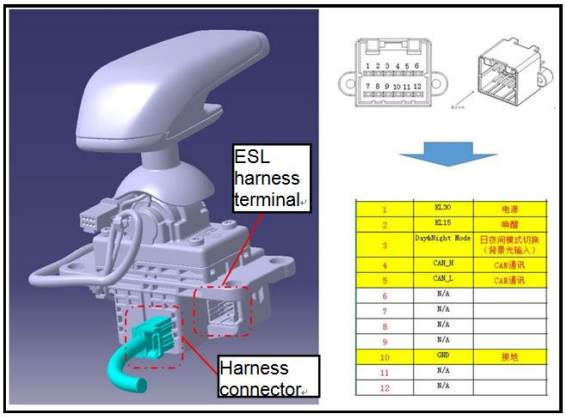
- The ESL harness end is disconnected or in poor contact.
- BCM fault.
- GW fault.

3 Failure mode

- Keep the ESLs awake until the KL15 hard wire is powered off and the ESLs sleep.
- a. Id=0x3FD signal received by ESL: Gear indicator lamp and background brightness are displayed in the last received brightness mode before signal interruption b.ESL no id=0x3FD signal received. Gear indicator lamp and background brightness are displayed in the default: Night mode level 14 (with brightness adjustment function)/night mode brightness. (No brightness adjustment function ESL).

4 Diagnostic process

- Inspect whether the ESL harness end is disconnected or in poor contact.



1	KL30	电源
2	KL15	唤醒
3	DayNight Mode	日夜间模式切换（背景光输入）
4	CAN_H	CAN通讯
5	CAN_L	CAN通讯
6	N/A	
7	N/A	
8	N/A	
9	N/A	
10	GND	接地
11	N/A	
12	N/A	

- Check whether the id=0x28B signal and id=0x3FD signal on the CAN line are sent normally.

U2F3B86: Unreliable GW_BCM data received

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- CAN Bus-Off not detected.
- GW_BCM id=0x3FD = 0x1F=invalid detected.

2 Possible fault causes

- Can line is disturbed.
- BCM fault.
- GW fault.

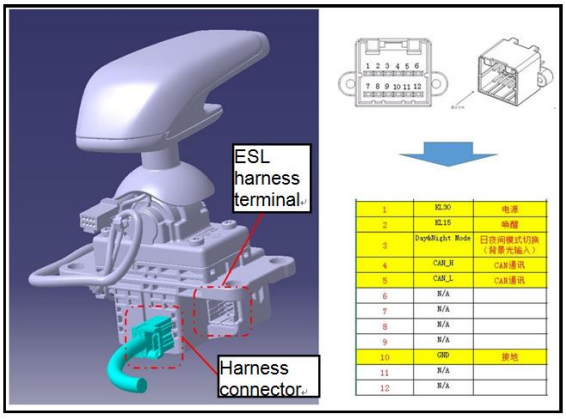
3 Failure mode

- .ESL has received GW_BCM message id=0x3FD reliable signal: Gear indicator lamp and background brightness are displayed according to the last received reliable signal brightness mode.

- .ESLs have not received id=0x3FD reliable signal, gear indicator lamp and background brightness as per default: Night mode level 14 (with brightness adjustment function)
  ESL)/night mode brightness (no brightness adjustment function ESL).

4 Diagnostic process

- Inspect whether the ESL harness end is disconnected or in poor contact.



1	KL30	电源
2	KL15	唤醒
3	Day&Night Mode	日夜间模式切换（背景光输入）
4	CAN_H	CAN通讯
5	CAN_L	CAN通讯
6	N/A	
7	N/A	
8	N/A	
9	N/A	
10	GND	接地
11	N/A	
12	N/A	

- Check whether GW_BCM message id=0x3FD = 0x1F=invalid is sent on the CAN line.

U2F 3408: Invalid GW_BCM data received

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- CAN Bus-Off not detected.
- Detection of Ⓒ three consecutive BCM_CRCCheck_28B errors || (BCM_CRCCheck_28B correct&&detection of ten consecutive BCM_RollingCounter_28B remains unchanged); Or Ⓒ three consecutive BCM_CRCCheck_3FD errors || (BCM_CRCCheck_3FD correct&&detects ten consecutive BCM_RollingCounter_3FD remains unchanged).

2 Possible fault causes

- Can line is disturbed.
- BCM fault.
- GW fault.

3 Failure mode

- Keep the ESLs awake until the KL15 hard wire is powered off and the ESLs sleep.
- a. Id=0x3FD correct signal received by ESLs: Gear indicator lamp and background brightness are displayed according to the brightness mode of the last received correct signal b.ESL id=0x3FD correct signal is not received; gear indicator lamp and background brightness are displayed according to the default: Night mode level 14 (with brightness adjustment function)/night mode brightness (without brightness adjustment function).

4 Diagnostic process

- Check whether the CAN wire terminal resistance is normal.
- Check whether the BCMs issue three consecutive BCM_CRCCheck_28B errors || (BCM_CRCCheck_28B correct&&detects ten consecutive BCM_RollingCounter_28B remain unchanged); Or Ⓒ three consecutive BCM_CRCCheck_3FD errors || (BCM_CRCCheck_3FD correct&&detects ten consecutive BCM_RollingCounter_3FD remains unchanged).
- Check whether GWs forward three consecutive BCM_CRCCheck_28B errors || (BCM_CRCCheck_28B correct&&detects ten consecutive BCM_RollingCounter_28B remains unchanged); Or Ⓒ Three consecutive BCM_CRCCheck_3FD errors || (BCM_CRCCheck_3FD correct&&detects ten consecutive BCM_RollingCounter_3FD remains unchanged).

P 117496: Driving mode&gear shift lever position sensor fault

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- MCU detects hall sensor signal fault for more than 100 ms (Note: Rotating hall/3D hall data fault for more than 1000 ms).
- Hall adopts dual chip, in case of one chip failure or internal fault, in case of both chips failure or internal fault, or in case of data fault (the data sent by two chips are inconsistent).

2 Possible fault causes

- Mechanical error or tolerance error between sensor and magnet
- Hall sensor internal error.

3 Failure mode

- In case of one chip failure or internal fault, ESL_ShiftLeverPositionFaultSts sends 0X1= Degraded signal and counts it as DTC, but does not send fault to instrument; ESL_ShiftLeverPositonrequest Read the position signal normally and send the corresponding position signal to the outside.

- In case of failure of both chips or internal fault, ESL_ShiftLeverPositionFaultSts sends 0X3= Fault signal, counts DTCs and sends fault to instrument at the same time.
  (Forwarded by TCU or ACM); ESL_ShiftLeverPositonrequest sends 0xF=Invalid signal.
- In case of data fault (data sent by two chips are inconsistent), ESL_ShiftLeverPositionFaultSts sends 0X1= Degraded signal and counts it as DTC, but does not send fault to instrument; ESL_ShiftLeverPositonrequest adopts one channel data to read position signal normally and send corresponding position signal to the outside.

4 Diagnostic process

- Replace the shifter when a DTC is detected.

P 119563: P gear button is stuck

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- Continuous ON time ≥300S for any one of/2 circuits in the double circuit.

2 Possible fault causes

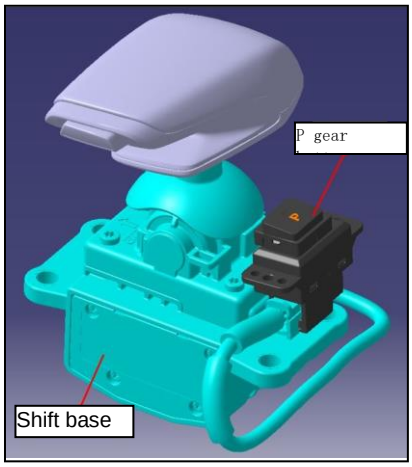
- P gear key is physically blocked.
- P gear button internal short circuit fault.
- Gear shift base internal short circuit fault.

3 Failure mode

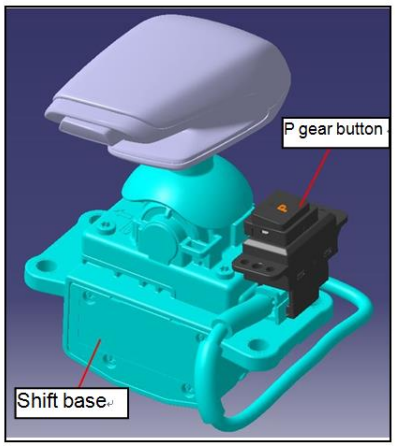
- Press P gear button to enter P gear.

4 Diagnostic process

- Replace P gear key assembly.



- If the fault is not resolved after replacing the P gear button, replace the gear shift base assembly.



P 119663: Unlock button stuck

1 Fault triggering conditions

- ESL is not in sleep mode.

- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- Continuous ON time ≥300S for any one of/2 circuits in the double circuit.

2 Possible fault causes

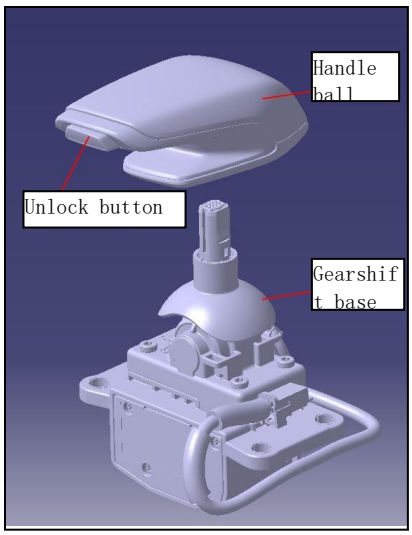
- The unlock button is physically stuck.
- Unlock key internal short circuit fault.
- Gear shift base internal short circuit fault.

3 Failure mode

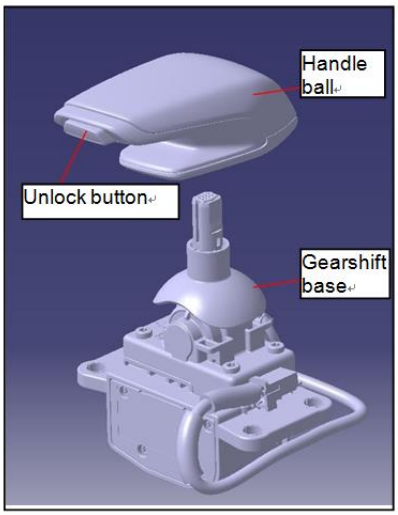
- You can exit P gear or enter R gear without pressing the unlock button.

4 Diagnostic process

- Replace the handle ball assembly.



- Replace the handle ball assembly fault, and replace the gearshift base assembly.



P 119323: KL15 disconnection signal conflict

1 Fault triggering conditions

- ESL is not in sleep mode.
- Power supply voltage: 6.5 V-18 V.
- KL15 hard wire signal power-down is detected.
- BCM_PowerStatusFeedback=0x2/0x3=ON/Start detected.

2 Possible fault causes

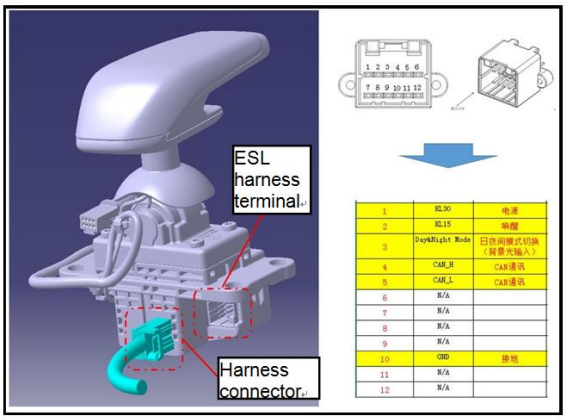
- The ESL harness end is disconnected or in poor contact.
- BCM fault.

3 Failure mode

- Keep the ESLs awake until BCM_PowerStatusFeedback= 0x1/0x0=ACC/OFF.
- Lose communication with BCMs > 1SESL enter into sleep state.

4 Diagnostic process

- Inspect whether the ESL harness end is disconnected or in poor contact.



- Check whether BCMs send BCM_PowerStatusFeedback=0x2/0x3=ON/Start in case of power-off.

P 119324: KL15 conduction signal conflict

1 Fault triggering conditions

- ESL is not in sleep mode.
- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- Loss of BCM_PowerStatusFeedback= 0x0/0x1=OFF/ACC status or communication detected.

2 Possible fault causes

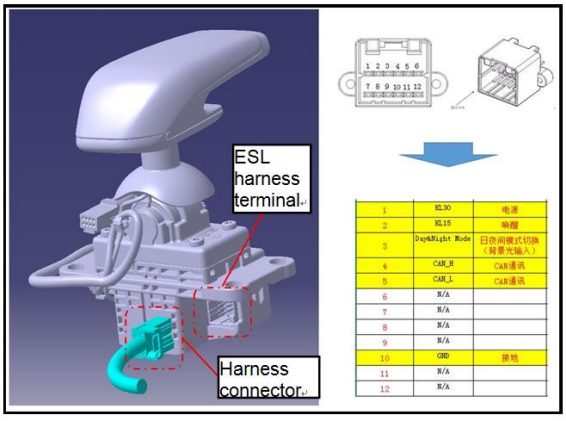
- Complete vehicle KL15 voltage is long connected.
- ESL internal KL30 circuit and KL15 circuit are connected abnormally, resulting in KL15 long-term connection.

3 Failure mode

- The ESL is always awake.

4 Diagnostic process

- Check whether the vehicle KL15 is tampered with electricity.
- If the complete vehicle KL15 is not tampered, check whether the internal KL15 is tampered.



- If it is detected that the internal KL15 of the ESL is tampered, replace the gearshift base assembly.

Electronic shift controller ACM and actuator ARC

P 1500: Low supply voltage

1 Fault triggering conditions

- ACM is not in sleep mode.
- KL30<8V is more than 1000 ms.

2 Possible fault causes

- Battery voltage is below the limit.
- The power supply harness is disconnected or in poor contact.

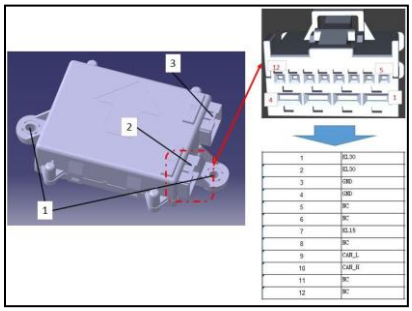
3 Failure mode

- ACM does not respond to TCU shift request.

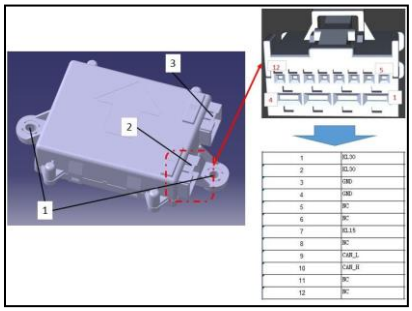
4 Diagnostic process

- Check whether the battery voltage is lower than the limit value.

- Check whether the voltage of ACM harness terminal is lower than the limit value.



- Inspect the ACM power supply harness for disconnection or poor connection.



P 1501: High supply voltage

1 Fault triggering conditions

- ACM is not in sleep mode.
- KL30>17 V is more than 1000 ms.

2 Possible fault causes

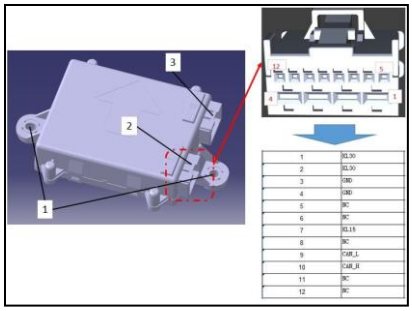
- Battery voltage is higher than the limit.

3 Failure mode

- ACM does not respond to TCU shift request.

4 Diagnostic process

- Check whether the battery voltage is higher than the limit value.
- Check whether the voltage of ACM harness terminal is higher than the limit value.



P 1503: Position sensor supply voltage is high

1 Fault triggering conditions

- ACM is not in sleep mode.
- No KL30 fault occurs.
- 5V_Sensor>5.5 V over 500 ms.

2 Possible fault causes

- ACM internal failure.

3 Failure mode

- ACM implements limp strategy.
- ACM sends limp status to TCU.

4 Diagnostic process

- Replace ACM, and use diagnostic scanner to perform ACM self-learning after completion.

P 1504: Position sensor supply voltage is low

1 Fault triggering conditions

- ACM is not in sleep mode.
- No KL30 fault occurs.
- 5V_Sensor<4.5 V exceeds 500 ms.

2 Possible fault causes

- ACM internal failure.

3 Failure mode

- ACM implements limp strategy.
- ACM sends limp status to TCU.

4 Diagnostic process

- Replace ACM, and use diagnostic scanner to perform ACM self-learning after completion.
- Clear the fault code, read it again, and check whether the fault code reappears.

P150C: Calibration error(Quantity product is applicable)

1 Fault triggering conditions

- ACM is not in sleep mode.
- Can communication is normal.
- No calibration data or calibration data error is detected after receiving TCU request signal.

2 Possible fault causes

- Calibration data is erroneously deleted or modified.

3 Failure mode

- ACM does not respond to TCU shift request.

4 Diagnostic process

- Replace ACM, and use diagnostic scanner to perform ACM self-learning after completion.
- Clear the fault code, read it again, and check whether the fault code reappears.

P 1505: Position sensor frequency error

1 Fault triggering conditions

- ACM is not in sleep mode.
- There is no KL30 voltage fault.
- Sensor voltage is normal.
- Sensor frequency error.

2 Possible fault causes

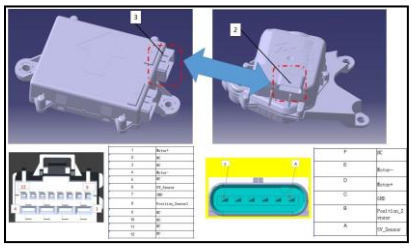
- ACM and ARC connecting harness are disconnected or in poor contact.
- Hall sensor fails.

3 Failure mode

- ACM implements limp strategy.
- ACM sends limp status to TCU.

4 Diagnostic process

- Inspect whether ACM and ARC connecting harness are disconnected or in poor contact.



- Replace ARC and use diagnostic scanner to perform ACM self-learning after completion.
- Clear the fault code, read it again, and check whether the fault code reappears.

P 1506: Sensor signal out of range

1 Fault triggering conditions

- ACM is not in sleep mode.
- No KL30 fault.
- Position sensor voltage is normal.
- ACM receives position sensor out of range.

2 Possible fault causes

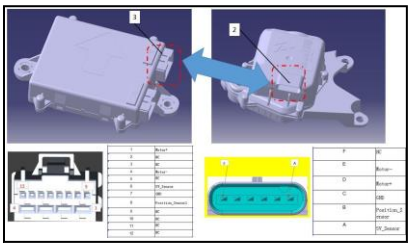
- ACM and ARC connecting harness are disconnected or in poor contact.
- Hall sensor fails.

3 Failure mode

- ACM implements limp strategy.
- ACM sends limp status to TCU.

4 Diagnostic process

- Inspect whether ACM and ARC connecting harness are disconnected or in poor contact.



- Replace ARC and use diagnostic scanner to perform ACM self-learning after completion.
- Clear the fault code, read it again, and check whether the fault code reappears.

P 1509: H axle overcurrent

1 Fault triggering conditions

- ACM in sleep mode.
- No KL30 fault.
- H-bridge error cannot be detected.
- H axle current is greater than 20 A for more than 10 ms.

2 Possible fault causes

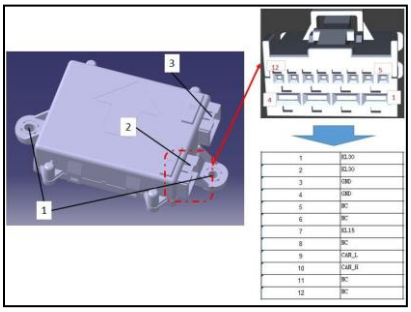
- ACM terminal connecting harness is short circuit.
- ACM internal error.

3 Failure mode

- ACM cuts off motor drive and does not respond to TCU gear shift request.

4 Diagnostic process

- Inspect whether the ACM harness end is short circuit.



- Replace ACM, and use diagnostic scanner to perform ACM self-learning after completion.
- Clear the fault code, read it again, and check whether the fault code reappears.

P150A: H axle error

1 Fault triggering conditions

- ACM is not in sleep mode.
- No KL30 fault.
- H axle reports error to MCU for more than 10 ms.

2 Possible fault causes

- ACM terminal connecting harness is short circuit.

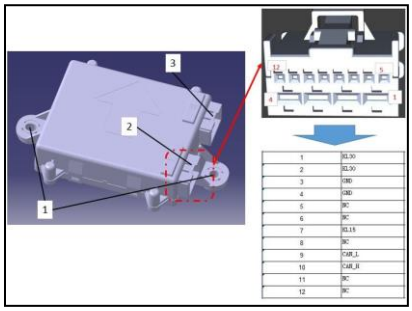
- ACM internal error.

3 Failure mode

- ACM cuts off motor drive and does not respond to TCU gear shift request.

4 Diagnostic process

- Inspect whether the ACM harness end is short circuit.



- Replace ACM, and use diagnostic scanner to perform ACM self-learning after completion.
- Clear the fault code, read it again, and check whether the fault code reappears.

P150E: H axle current low

1 Fault triggering conditions

- Fault triggering conditions.
- No KL30 fault.
- There is no H axle fault.
- Arc rotates less than 3.6degree within 100 ms.
- H-axle current is less than 1.0 A when ACMs drive ARCs.

2 Possible fault causes

- Current sensor of H-Bridge is faulty.

3 Failure mode

- The ACM performs a degradation strategy.
- ACM sends degraded status to TCU.

4 Diagnostic process

- Replace ACM, and use diagnostic scanner to perform ACM self-learning after completion.
- Clear the fault code, read it again, and check whether the fault code reappears.

P 1507: Arc stagnation

1 Fault triggering conditions

- ACM is not in sleep mode.
- No KL30 fault.
- Position sensor is normal.
- H-bridge works normally.
- An open wiring harness fault cannot be detected.
- ARC rotation is less than 1% within 200 ms.
- Arc current is greater than 5.5 A.

2 Possible fault causes

- ARC internal error.
- Transmission internal error.

3 Failure mode

- ACM cuts off the motor drive and cannot respond to TCU gear shift request.
- When the KL15 is powered off, the ACM will attempt to return to the P position if the return P condition is met.

4 Diagnostic process

- Replace ARC and use diagnostic scanner to perform ACM self-learning after completion.
- Replace the transmission, and then use diagnostic scanner to perform ACM self-learning.
- Clear the fault code, read it again, and check whether the fault code reappears.

P 1508: Gear shift timeout

1 Fault triggering conditions

- ACM is not in sleep mode.
- No KL30 fault.
- The sensor can work normally.
- H-bridge error cannot be detected.
- An open circuit in the wiring harness cannot be detected.
- ARC is not stuck.
- The ARC cannot reach the specified position within 2s.

2 Cause of fault

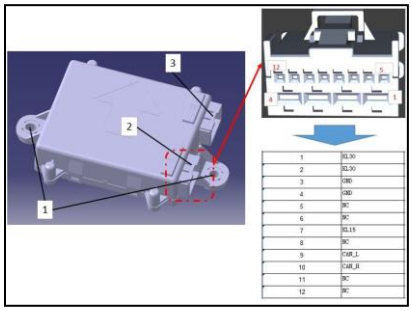
- ACM terminal connecting harness is short circuit.
- ACM internal error.

3 Failure mode

- ACM cuts off the motor drive and cannot respond to TCU gear shift request.

4 Diagnostic process

- Inspect whether the ACM harness end is short circuit.



- Replace ACM, and use diagnostic scanner to perform ACM self-learning after completion.
- Clear the fault code, read it again, and check whether the fault code reappears.

P150B: Arc harness open circuit(PWM+/-)

1 Fault triggering conditions

- ACM is not in sleep mode.
- No KL30 fault occurs.
- The position change of ARC within 10 ms is less than 3.6degree.
- When ACM drives ARC, the current of H axle is less than 0.2 A within 100 ms.

2 Possible fault causes

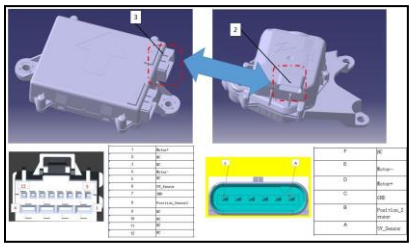
- ACM and ARC connecting harness are disconnected or in poor contact.
- ACM internal error.

3 Failure mode

- Disable H axle and report error to TCU.
- In case of Motor fault, KL15 off calls back P. If the vehicle speed meets the condition of P return, the first P return also needs to be tried.

4 Diagnostic process

- Inspect whether ACM and ARC connecting harness are disconnected or in poor contact.



- Replace ACM, and use diagnostic scanner to perform ACM self-learning after completion.
- Clear the fault code, read it again, and check whether the fault code reappears.

P 1502: KL15 failure

1 Fault triggering conditions

- ACM is not in sleep mode.
- ACM is not in sleep mode.

- KL15 Low voltage for 500 ms.
- KL15 power on 1000 ms.
- KL15 after power-down 500 ms, ACM receives BCM IG status as ON or Start.

2 Possible fault causes

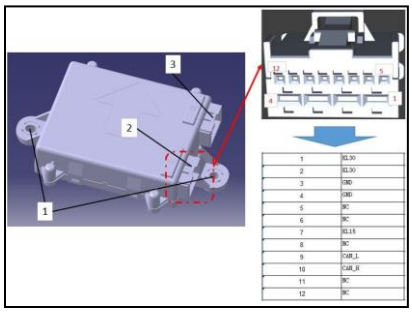
- ACM harness end is disconnected or poor contact.

3 Failure mode

- ACM works normally until BCM IG status is OFF or ACC.
- ACM sends degraded mode to TCU.

4 Diagnostic process

- Inspect whether the ACM harness end is disconnected or in poor contact.



U2F47: TCU_1B6 message missing or TCU_1B6 message error

1 Fault triggering conditions

- ACM is not in sleep mode.
- KL30 voltage is between 6.5~18 V.
- Can bus is normal.
- Can bus is normal.
- TCU_1B6 message cannot be received for more than 1s; Or communication with TCUs is normal but (three consecutive frame checksum errors) || (checksum correct&&counter has no change for ten consecutive cycles).

2 Possible fault causes

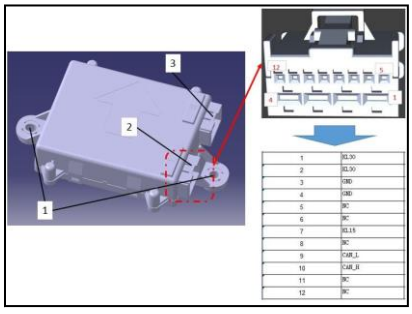
- ACM harness end is disconnected or poor contact.
- TCU fault.

3 Failure mode

- ACM remains in the previous position of ARC.

4 Diagnostic process

- Inspect whether the ACM harness end is disconnected or in poor contact.



- Check whether the TCU_1B6 message on the CAN line is sent normally.

U2F41: EPBi_ 187 message missing or EPBi_ 187 message error

1 Fault triggering conditions

- ACM is not in sleep mode.
- KL30 voltage is between 6.5~18 V.
- Can bus is normal.
- KL15 power on 1000 ms.
- ACMs cannot receive EPBi_ 187 messages for more than 1s; Or (three consecutive frame checksum errors) || (checksum correct&&counter does not change for ten consecutive cycles).

2 Possible fault causes

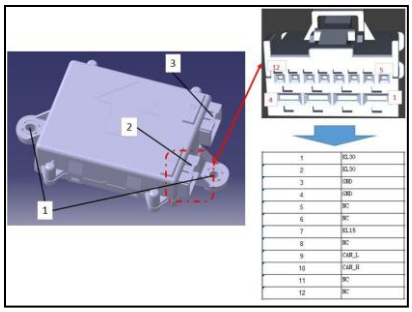
- ACM harness end is disconnected or poor contact.
- EPBi fault.

3 Failure mode

- The vehicle speed is replaced by 1FFF, and degraded is sent to the TCU. The power-off cannot automatically return to P gear (the signal will be detected again after 60 S, and the signal is restored, and then the attempt is executed to return to P. Gear).

4 Diagnostic process

- Inspect whether the ACM harness end is disconnected or in poor contact.



- Check whether the EPBi_ 187 message on the CAN line is sent normally.

U2F43: EMS_1A6 message missing or message EMS_1A6 error

1 Fault triggering conditions

- ACM is not in sleep mode.
- KL30 voltage is between 6.5~18 V.
- Can bus is normal.
- KL15 power on 1000 ms.
- No EMS_1A6 message can be received for more than 1s; Or (three consecutive frame checksum errors) || (the checksum correct&&counter does not change for ten consecutive cycles).

2 Possible fault causes

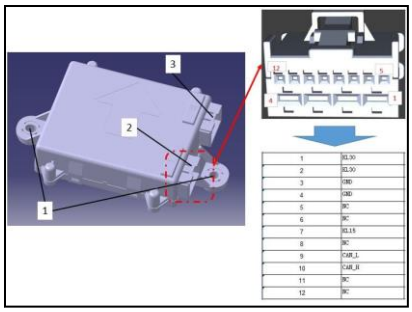
- ACM harness end is disconnected or poor contact.
- EMS fault.

3 Failure mode

- If the EMS_1A6 signal is lost, the ACMs perform EMS_EngineStatus to crank processing to ensure that the ACMs perform the P-gear self-learning function in the Engine stop state.
- The self-learning command ACM gives a negative response.
- Continuously send degraded signal to TCU.

4 Diagnostic process

- Inspect whether the ACM harness end is disconnected or in poor contact.



- Check whether EMS_1A6 message on can line is sent normally.

U2F45: GW_28B message missing

1 Fault triggering conditions

- ACM is not in sleep mode.
- KL30 voltage is between 6.5~18 V.
- KL15 power on 1000 ms.
- GW_28B message cannot be received for more than 1s.

2 Possible fault causes

- ACM harness end is disconnected or poor contact.
- BCM fault.

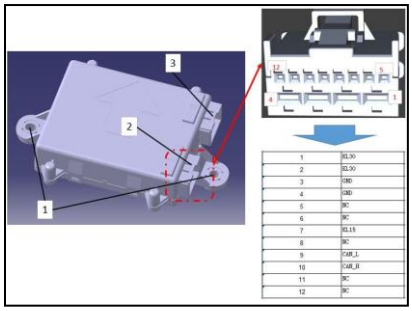
- GW fault.

3 Failure mode

- If the BCM signal is lost, IG OFF the ACMs to ensure that the power-off of the ACMs has no effect.
- Maintain signal PEPS_ShiftForbidRq unchanged.
- Continuously send degraded signal to TCU.

4 Diagnostic process

- Inspect whether the ACM harness end is disconnected or in poor contact.



- Check whether GW_28B message on can line is sent normally.
- Check whether GWs forward GW_28B messages normally.

U2F46: Can bus off

1 Fault triggering conditions

- KL30 voltage is between 6.5~18 V.
- Bus off calculator value NBusOffCount>=5.

2 Possible fault causes

- Can network fault.

3 Failure mode

- ACM does not respond to TCU shift request.

4 Diagnostic process

- Check CAN interface connector.
- Check CAN network terminal resistance.
- After the above inspection is completed, CAN communication fault still exists. Replace ACM, and use diagnostic scanner to perform ACM self-learning after replacement.
- Clear the fault code, read it again, and check whether the fault code reappears.

P150F: Arc motor periodic jitter(Motor unstable)

1 Fault triggering conditions

- ACM is not in sleep mode.
- No KL30 fault occurs.
- Position sensor works normally.
- H axle works normally.
- No overcurrent fault occurs.
- No open circuit occurs.
- No motor jamming occurs.
- Periodic jitter more than 10 times.

2 Possible fault causes

- ARC does not match the transmission gear position.

3 Failure mode

- ACM sends error status to TCU. ACM cuts off motor drive and does not respond to TCU gearshift request.
- When the KL15 is powered off, the ACM will attempt to return to the P position if the return P condition is met.

4 Diagnostic process

- Use diagnostic scanner to carry out ACM self-learning.
- Clear the fault code, read it again, and check whether the fault code reappears.

Fault symptom diagnosis check and confirmation

1 Confirm the fault stated by the customer and reset the fault if necessary.
2 If the customer statement is not found to be faulty, perform a test drive or visual inspection according to the table below.
3 If the fault can be clearly identified, repair it.
4 If the fault cannot be identified obviously, please use diagnostic scanner to read and analyze the vehicle signal and fault record code, and check whether there is fault code of gear shift handle. If yes, please check accurately according to the following fault symptom table. If the signal of gear shift lever is normal, then rule out gear shift control assembly can be faulty; If the instrument panel displays "P gear fault, please check and repair," please use diagnostic scanner to read and analyze vehicle signal and fault record code, and check whether there is fault code of ACM or ARC fault. If yes, please check accurately according to the fault symptom table. If the signals of ACM and ARC are normal, then the rule out electronic gearshift actuator and its controller assembly can be faulty. Please check TCUs or other system components.

Appearance check list

Mechanical component	
1. Components significantly damaged or worn	2. Loose or missing components, harness damage or falling off

Fault symptom table

Symptoms	Possible causes	Measures
The instrument prompts "Gear shifter fault, please check and repair."	1. The vehicle input power supply voltage is abnormal.	A. Repair or replace battery
	2. Signal input and output harness fault	B. Check and replace harness assembly
	3. Gearshift base assembly components are damaged.	C. Replace gearshift base assembly parts
The vehicle cannot be started, and the instrument prompts "Please engage gear P."	1. The vehicle is not in gear P.	A. Put the vehicle into gear P.
	2. Transmission grounding wire is loose or off.	B. Check whether the transmission grounding wire is well connected.
	Power supply of 3.ECU, TCU, ACM, ESL and other components is abnormal.	C. Check whether relevant harness assembly is well connected.
	4 .ECU, TCU, ACM, ESL and other components work abnormally.	D .Check whether the corresponding fuses of the components in the fuse box are normal.
When pressing the unlocking button on the left side of the handle ball for gear shifting, the instrument still prompts "Please press the unlocking button to shift into the gear," and this phenomenon occurs repeatedly after multiple operations.	1. Handle ball and gear shift base are not connected in place.	A .Reseat the insertion handle ball.
	2. Handle ball assembly components are damaged.	B .Replace the handle ball assembly.
	3. Gearshift base assembly is damaged.	C .Replace the gearshift base assembly.
Press P button on the panel, the vehicle does not respond, and does not enter P Gears, but RND+- gears can be switched normally.	Poor connection of 1.P gear button harness.	A .Inspect P gear button harness connection.
	1 .P gear key is damaged.	B .Replace P gear button.

The gear shift lever cannot be operated.

When operating the gearshift lever, the instrument prompts "Please depress the brake pedal to switch gear."

1 If there is no fault, please operate the gear shift according to the instrument prompt.

When operating the gearshift lever, the instrument prompts "Please press the unlock button to switch gear."

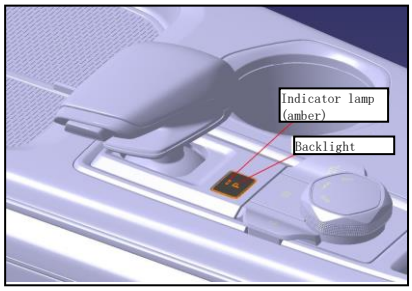
1 If there is no fault, please operate the gear shift according to the instrument prompt. When operating the gearshift lever, the instrument has no prompt.

1 Confirm the gearshift lever is in right AUTO mode.
2 Whether the instrument prompts "Shifter fault, please check and repair" in case of fault. If yes, please refer to "Fault symptom table" for troubleshooting. If not prompted, skip to step 3.
3 The diagnostic scanner reads the gearshift base assembly (ESL) DTC and troubleshoots with reference to "DTC Diagnosis." If the fault is still not confirmed, continue with Step 4.
4 Replace the gearshift base assembly, and confirm whether the fault is eliminated after replacement.

P gear button display is abnormal

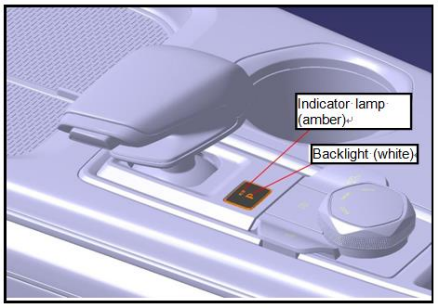
P-gear button backlight (white) flashes continuously

1 Check whether the gearshift function is normal at this time. If normal, skip to step 2; If not, skip to step 3.
2 If the gearshift base is faulty, replace the gearshift base assembly, and confirm whether the fault is eliminated after replacement.
3 The CAN communication is abnormal. Check whether the complete vehicle CAN communication is normal.



When the vehicle is in P gear, P gear button indicator lamp (amber) does not light up.

1 Check whether the gearshift function is normal at this time. If normal, skip to step 2; If not, skip to step 3.
2 When the vehicle is stationary, exit P gear and press P gear button to check whether the vehicle can enter P gear. If you can enter P gear, jump to step 4; If you cannot enter P gear, jump to step.
5.
3 If the gearshift base is faulty, replace the gearshift base assembly, and confirm whether the fault is eliminated after replacement.
4 If P gear switch harness is faulty, replace gear shift base assembly, and confirm whether the fault is eliminated after replacement.
5 P gear switch fault, replace P gear switch, and confirm whether the fault is eliminated after replacement.



Removal and installation

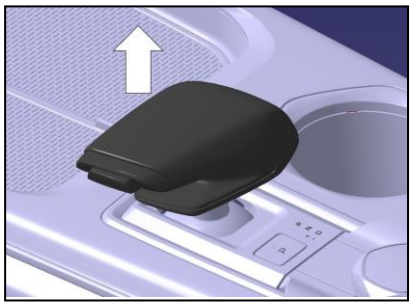
Removal and installation of electronic gear shift handle ball assembly

Removal method

1 Hold the lower part of the handle ball assembly with both hands, and pull the handle ball assembly upward along the shift lever axis direction until the handle ball assembly is pulled out from the shift lever.

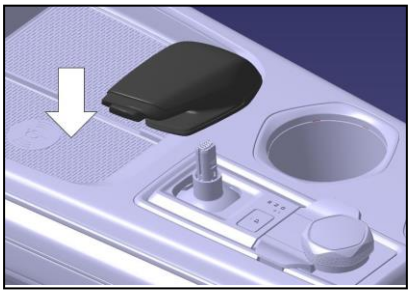
2 After removing the handle ball assembly, check the appearance of the handle ball and the internal pins for skew and damage.

Warning The required pulling-out force is greater than 300N, and the handle ball cannot be rotated left and right during pulling-out. Otherwise, the connecting part will be damaged.



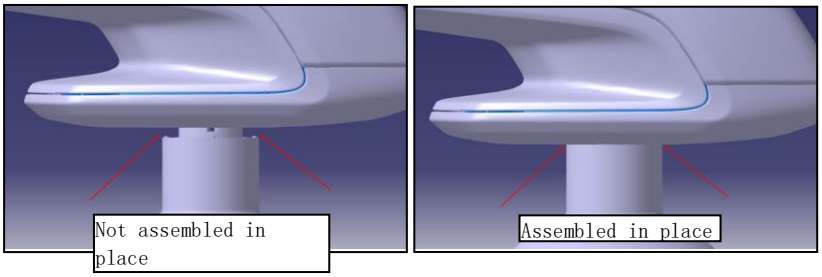
Installation method

1 After checking and confirming that the handle ball assembly is correct, align the handle ball assembly in the direction shown in the figure below, align the lower end hole of the handle ball assembly with the gear shift lever, and then slowly insert the handle ball assembly into the gear shift lever. When in place, there will be "click."



2 After inserting, hold the handle ball assembly and pull it upward with proper force to judge whether the handle ball will come out.

3 Observe whether the lower edge of the handle ball assembly fits with the gearshift lever (as shown in the figure below), and check whether the handle ball is assembled in place.



Warning 1 When removing or installing the gearshift handle ball assembly, be sure to protect the surrounding parts and not scratch or damage the central control panel and other related parts.

2 When installing the handle ball assembly, observe whether the lower edge of the handle ball assembly fits the gearshift lever. If there is obvious clearance or not, pull out the handle ball assembly, and check whether the handle ball assembly is in good condition again. If it is in good condition, re-assemble according to the above steps. If it is damaged, replace with new parts for assembly.

Removal and installation of electronic gearshift base assembly

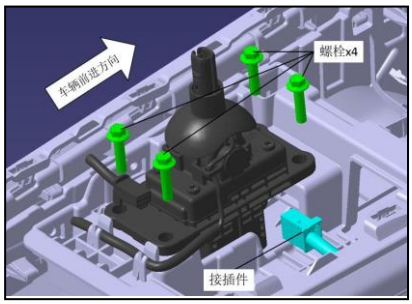
Removal method

1 Refer to the removal method of handle ball assembly to remove the handle ball assembly.

2 Refer to Removal and Installation to remove the centre compartment panel. After removing the handle ball assembly, inspect the appearance of the assembly and the internal pins for skew and damage.

3 Remove the gearshift base mounting bolts, and remove the four bolts with 8 mm sleeve.

4 Take out the gearshift base assembly from the control box, and press the gearshift base assembly connector to unlock and pull out the connector.

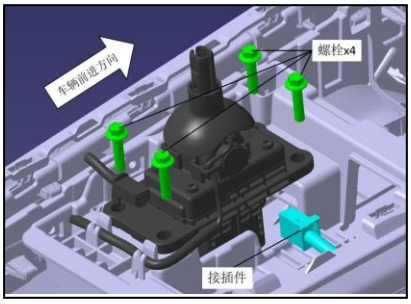


Installation method

1 After checking and confirming that the gearshift base assembly is correct, first insert the connector into the gearshift base assembly connector, there will be a "click" sound when it is inserted into position, and then pull it out with a little force to check whether it is inserted in place.

2 Put the gearshift base assembly of the harness into the installation position of the central control box, fix the assembly with four hexagon flange bolts (09103-06012-S 112), and tighten the bolts.

(4.5±0.5) N.m. Apply yellow mark on the bolt.



Warning 1 When removing or installing the gearshift base assembly, be sure to protect the surrounding parts and not scratch or damage the central control panel and other related parts.

2 When removing or installing the gearshift base assembly, pay attention to the removal or plugging of its harness, and be sure to plug it into position (there will be "click" sound when it is in place), so as to avoid abnormal signal transmission caused by poor plugging.

3 When installing the gearshift panel, pay attention to check whether the two connectors are inserted in position (there will be a "click" sound when in place).

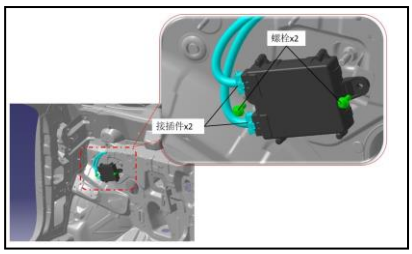
Removal and installation of electronic gear shift actuator controller assembly ACM

Removal method

1 Unplug two ACM connectors.

2 Remove 2 ACM mounting bolts. Use 8 mm sleeve, torque: 10±1N.m.

3 Removal is complete.



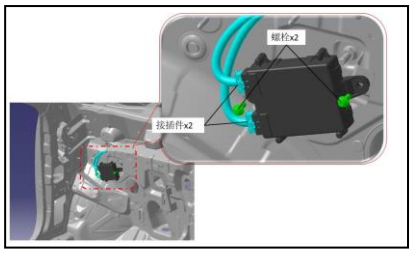
Installation method

1 Check and confirm that the electronic gear shift actuator controller assembly ACM is correct, put it into the front wall plate installation position, fix the assembly with two bolts, and the bolt tightening torque is 10±1N.m.

Apply yellow color mark on the bolt.

2 Insert the 2 connectors into the ACM interface of the electronic gear shift actuator controller assembly, and there will be a "click" sound after being inserted into position. After being inserted, pull out with a little force to check whether it is inserted in place.

3 Installation is completed.



Removal and installation of electronic gearshift actuator assembly ARC

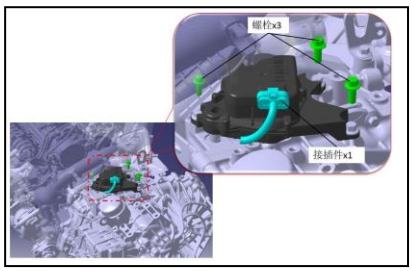
Removal method

Warning In the process of assembling and disassembling ARC, keep the vehicle level, turn back the direction, power off the complete vehicle, and fix the four wheels with wedge block at the same time to prevent the vehicle from sliding accidentally.

1 Unplug 1 ARC harness connector in total.

2 Dismantle three ARC mounting bolts in total: Dismantle one M6 bolt and two M8 bolts with 8 mm sleeve and 10 mm sleeve, corresponding to torques 10±1N.m and 23±2N.m.

3 Removal is complete.



Installation method

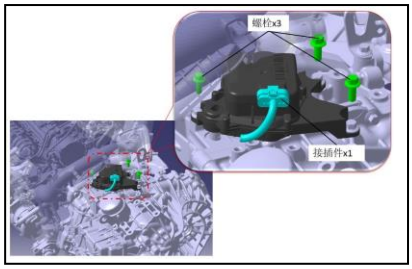
1 If the original parts are directly installed, go to step 2; If new parts are installed, make sure the gearbox shift shaft is in P gear position (the drive wheel cannot rotate during P gear).

2 After checking and confirming that the electronic gear shift actuator assembly ARC is correct, snap the gear shift shaft mating hole 3 of ARC and the gearbox gear shift shaft to ensure that the mounting holes are aligned.

3 Tighten three ARCs mounting bolts in total: Tighten one M6 bolt and two M8 bolts with 8 mm sleeve and 10 mm sleeve, corresponding to torque 10±1N.m and 23±2N.m.

4 Insert connector into ARC connector 2 of electronic gearshift actuator assembly, and there will be "click and rub" sound when it is inserted into position, and then pull it out with a little force to check whether it is inserted in place.

5 Installation is completed.



Spare parts atlas

F230103

F230203

F230204

F230205

Mechanical shift control system torque specification

Name	Nm
Gear shift base bracket assembly fastening nut(M8)	23±3
Gear shift control cable assembly fastening nut(M6)	9±3

Composition and position distribution

Automatic transmission mechanical shift control system consists of shift control assembly (including handle ball assembly, shift dust cover assembly, shift base assembly and shift base bracket assembly) and shift control cable assembly. The gearshift control cable assembly transmits the gearshift motion of the gearshift control assembly to the transmission gearshift mechanism to realize the gearshift of gear PRNDM. Exploded view:

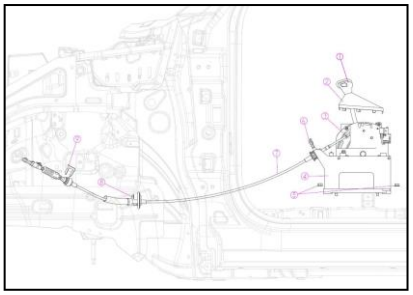


Figure 33:

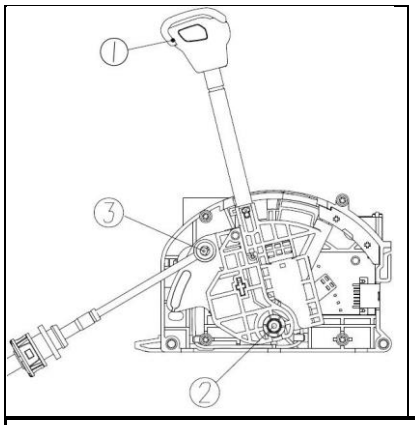
Serial number	Component name	Quantity
1	Handle ball assembly	1
2	Gearshift dust cover assembly	1
3	Gearshift base assembly	1
4	Gear shift base bracket assembly	1
5	Hexagon head flange bearing surface toothed nut	4
6	Cable mounting clamp	1
7	Shift control cable assembly	1
8	Hexagon flange bearing surface toothed nut	2
9	E-type elastic clip	1

System functional principle introduction

The system consists of an electronic shift actuator controller assembly (hereinafter referred to as ACM) and an electronic shift actuator assembly (hereinafter referred to as ARC) in quantities of 1. ACM is located in the cockpit and is responsible for vehicle communication and ARC control; ARC is fixed on the gearbox body, and its torque output hole is in clearance fit with the gearbox gearshift shaft, so as to realize torque output through motor drive and complete gear switching action. ARC is equipped with two position sensors to feed back gear information.

Structural principle of parts Check gearshift mechanism base

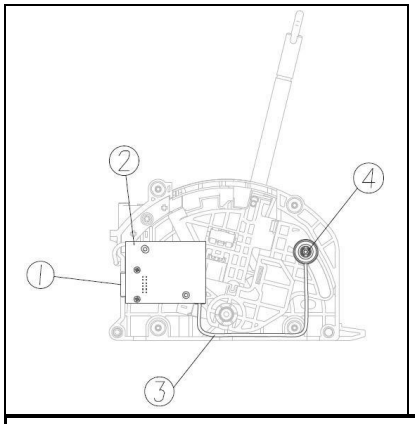
The control lever ball assembly moves forward and backward, and the gearshift lever rotates the fixed angle around the rotating shaft, so as to drive the gearshift pin to rotate the fixed angle, and the gearshift pin rotates to cause the cable to move, so as to drive the transmission rocker arm to rotate, so as to realize gearshift.



Serial number	Part name
1	Handle ball assembly
2	Rotary shaft
3	Gearshift pin

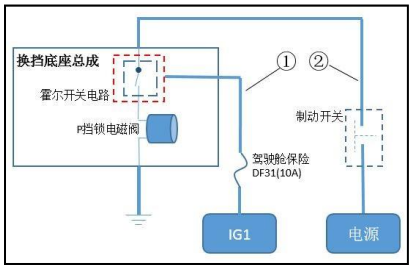
P gear lock solenoid valve

The P gear lock solenoid valve is inserted into the gear shift arm through the solenoid valve pin to realize P gear mechanical lock, so as to prevent the transmission from being shifted out of P gear by mistake in case of power-off or brake depression.



Serial number	Part name
1	Complete vehicle connector
2	Gearshift base assembly circuit board
3	Gearshift base assembly circuit board harness
4	P gear lock solenoid valve

After the vehicle is powered on, if the gear shift lever is located in P gear, the Hall sensor on the gear shift base circuit board is turned on. At this time, step on the brake pedal, and the brake signal is transmitted to the gear shift base circuit board through the vehicle connector. The circuit board receives the Hall switch signal and brake signal at the same time, then the P gear lock solenoid valve is controlled to actuate, the solenoid valve pin is pulled out, and the gear shift lever mechanical lock is released. When any one of the two signals has poor continuity, there will be failure of P. Due to high reliability of Hall switch, it is recommended to check whether brake switch and circuit between switch and gear shift control assembly are normal in case of P problem.

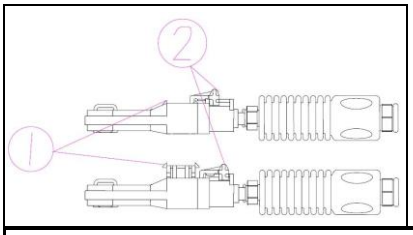

换挡底座总成
霍尔开关电路
P挡锁电磁阀
① ②
制动开关
驾驶舱保险
DF31(10A)
IG1
电源

Common methods

Cable adjustment method

After the replacement, if there is poor gearshift feeling, it can be solved by adjusting the cable buckle. The adjustment method is as follows:

- Shift gearshift lever to M gear
- Disengage the stop block, jack up the cable buckle, and place the transmission rocker arm in gear D.
- Shift the gearshift lever to gear P and then to gear M.
- Press buckle and lock stopper



Serial number	Part name	Remarks
1	Cable buckle	The parts are located at the transmission end and adjusted in the engine compartment.
2	Stop	

Fault symptom diagnosis check and confirmation

1 Confirm the fault stated by the customer and reset the fault if necessary
2 If the customer statement is not found to be faulty, perform a test drive or visual inspection according to the table below.
3 If the fault can be clearly identified, repair it.
4 If the fault cannot be clearly identified, please check it
accurately according to the fault symptom table below. Appearance
check list

Mechanical component	
1. Components significantly damaged or worn	2. Loose or missing nuts or bolts

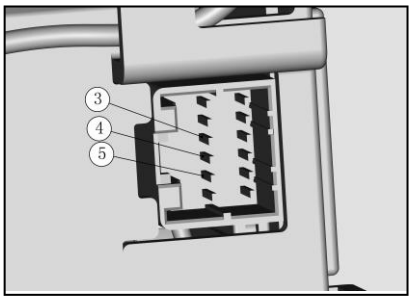
Fault symptom table

Symptoms	Possible causes	Measures
Shift lever cannot be pulled out from P position	1. Interference between other parts or foreign matter and shift control cable assembly or shift control assembly	A. rule out Interference
	2. P gear torque lock	B. Gear shift lever cannot be pulled out of P gear diagnostic process
	3. Handle ball assembly is damaged	
	4. abnormal external power supply	
	5. Gear shift base assembly fault	
Difficult gearshift	Poor adjustment or assembly of 1. shift control cable assembly	A. Readjust gearshift cable transmission end connector B.Reassemble shift control cable assembly
	2. External gearshift mechanism connection deformation	C. Adjust external gear shifting mechanism
	3. Gear shift base assembly is damaged	D. Diagnostic process of difficult operation of gearshift mechanism
	4. Handle ball assembly is damaged	
	5. Gear shift control cable assembly is damaged	

Manual mode failure

Test conditions	Results\ Details\ Measures
1. Check whether the gear shift control assembly is faulty.	When the vehicle is started or powered on, operate the gear shift lever according to the following steps until the fault occurs again, and check the pin voltage of the gear shift control assembly connector. If the voltage meets the following conditions, it is determined that the shift control assembly has no fault, and the harness or TCU fault needs to be checked; If any of the following items is not satisfied, it is determined that the shift control assembly is caused. Obstacle, replace shift control assembly. Place the gear shift lever on gear D side, and check that the voltage of pin 3\4\5 of the gear shift control assembly connector is 12 V; Shift the gearshift lever from gear D side to gear M side, and check that pin 4 is lowered from 12 V to 0V, pin 3\5 remains unchanged at 12 V; When the shift lever is pushed forward from the M gear side, pin 5 changes from 12 V to 0V, and pin 4 changes from 0V changes to 12 V, and pin 3 keeps 12 V unchanged; When the gear shift lever is pulled back from the M gear side, pin 3 changes from 12 V to 0V, and pin 4 changes from 0V changes to 12 V, and pin 5 keeps 12 V unchanged.

2. Check whether the harness or TCU is faulty.	After the first step of detection, after the rule out shift control assembly is faulty, it is necessary to check whether the harness and fuse between TCU and shift control assembly are normal and whether the TCU connector is normal according to the complete vehicle harness principle.



Pin number	Definition
3	M- signal, the voltage value decreases from 12 V to 0 V when triggering.
4	M signal, the voltage value decreases from 12 V to 0V when triggering.
5	M+ signal, the voltage value decreases from 12 V to 0 V when triggering.

Shift lever cannot be pulled out of gear p

Test conditions	Results\ Details\ Measures
1. Check whether the torque of gear P is locked.	Move the vehicle to the level ground, first engage gear P according to the method specified in the instruction manual (i.e. apply parking brake, engage gear N and stay for 3s, release the brake pedal, and quickly engage gear P Gear), and then gear P. Is the gearshift lever pulled out of gear P? Yes: Go to Step 2 No: Explain to the user the method of correctly shifting in and out of gear P.
2. Check whether the handle ball is faulty.	A. Check whether the connection between handle ball assembly and gearshift lever is stable. Yes: Skip to 2-B No: Repair connection fault B. Check whether the handle ball button is pressed and rebounded smoothly. Yes: Skip to step 3 No: Repair handle ball fault
3. Check whether the external power supply is abnormal. If it is an occasional fault, it is necessary to perform gear P operation repeatedly until the fault recurs.	A. Depress the brake pedal and observe whether the brake lamp is on. Yes: Skip to 3-B No: Troubleshoot the vehicle brake switch and harness faults. B. Press the gearshift base assembly emergency unlock button to confirm whether it can be pulled out from P gear position. Yes: Skip to step 3-C No: Go to step 1 again, if still unable to pull out, contact Chang'an technical personnel C. Check the external supply voltage. Use a multimeter to check No. 1 pin of gear shifting base assembly connector. Voltage with pin 2; Use a multimeter to check the voltage of pin 8 and pin 7. Confirm whether it is greater than 10 V Yes: Replace gearshift base assembly No: Troubleshoot vehicle harness and brake switch faults.

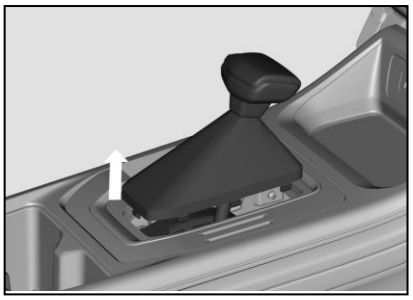
Removing and installing shift control assembly

1. Removal

1 Disconnect the negative battery harness.

Reference battery assembly

2 Remove the gearshift dust cover assembly.

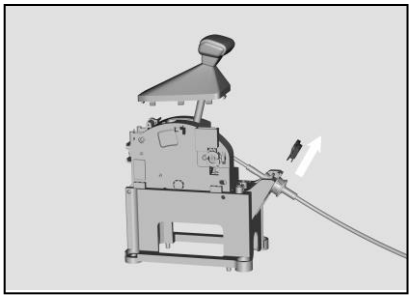


3 Remove centre compartment.

Refer to Removal and Installation

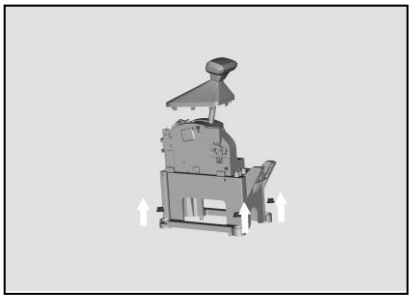
4 Remove the gear shift cable assembly joint.

Take down the cable mounting clamp in the direction of arrow, take down the cable joint from the gear shift base assembly, and separate the gear shift cable sleeve cap from the gear shift base assembly bracket.

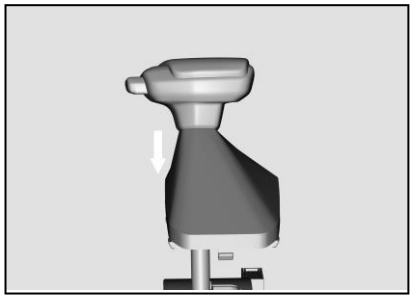


5 Remove the connecting nuts between the base and the body.

Remove four M8 fastening nuts successively with sleeve, and the torque is 23±3N.m.

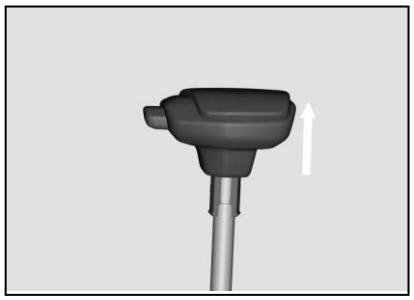


6 The connecting position of gearshift dust cover assembly and handle ball assembly is a clamping structure. If it is necessary to replace the dust cover, pull down the dust cover from the handle ball, remove the handle ball according to step 7, and then remove the dust cover from above the gearshift lever.



7 Remove handle ball assembly

If it is necessary to replace the handle ball assembly, first complete step 6 above, and then pull out the handle ball assembly forcibly in the direction of the gear shift lever. During the period, the handle ball cannot be rotated left and right to avoid damaging the internal structure of the handle ball.



2. Installation

The installation sequence is the reverse of the removal sequence.

Shift control cable assembly

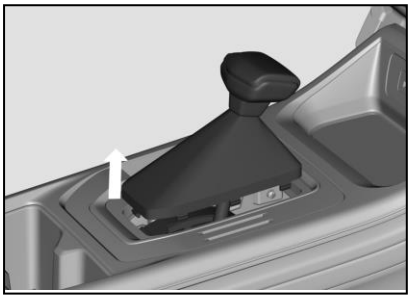
1. Removal

1 Disconnect the negative battery harness.

Reference battery assembly

2 Remove the gearshift dust cover assembly.

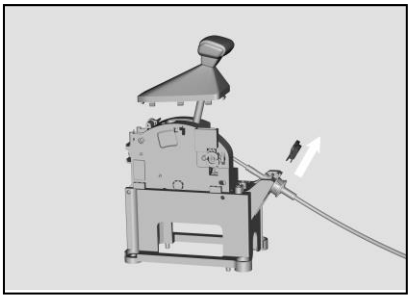
Pull the inner circlip of the dust cover assembly upwards in the direction of arrow to disengage the clip structure between the inner circlip and the central control box.



3 Remove centre compartment.

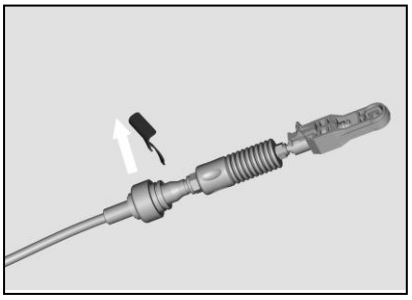
Refer to Removal and Installation

4 Remove the shift cable joint from the shift control assembly.

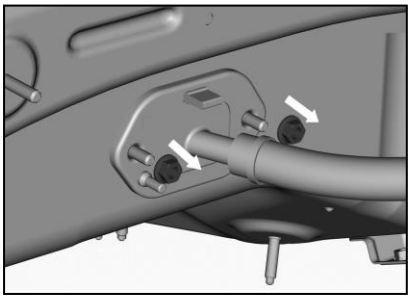


5 Detach the shift cable from the transmission.

Pull off the cable connector on the transmission gear rocker arm, and remove the cable clamping E-shaped clip on the transmission support.



6 Remove the two M6 nuts connecting the shift control cable assembly and the body front wall panel with the sleeve.



2. Installation

The installation sequence is the reverse of the removal sequence.

Spare parts atlas

F230201

F230202

Drive shaft specification

Material specification

Name	Model
High performance grease (color: Black), inner constant velocity universal joint	TSCT-1
High performance grease (color: Black), outer constant velocity universal joint	TSCB-1

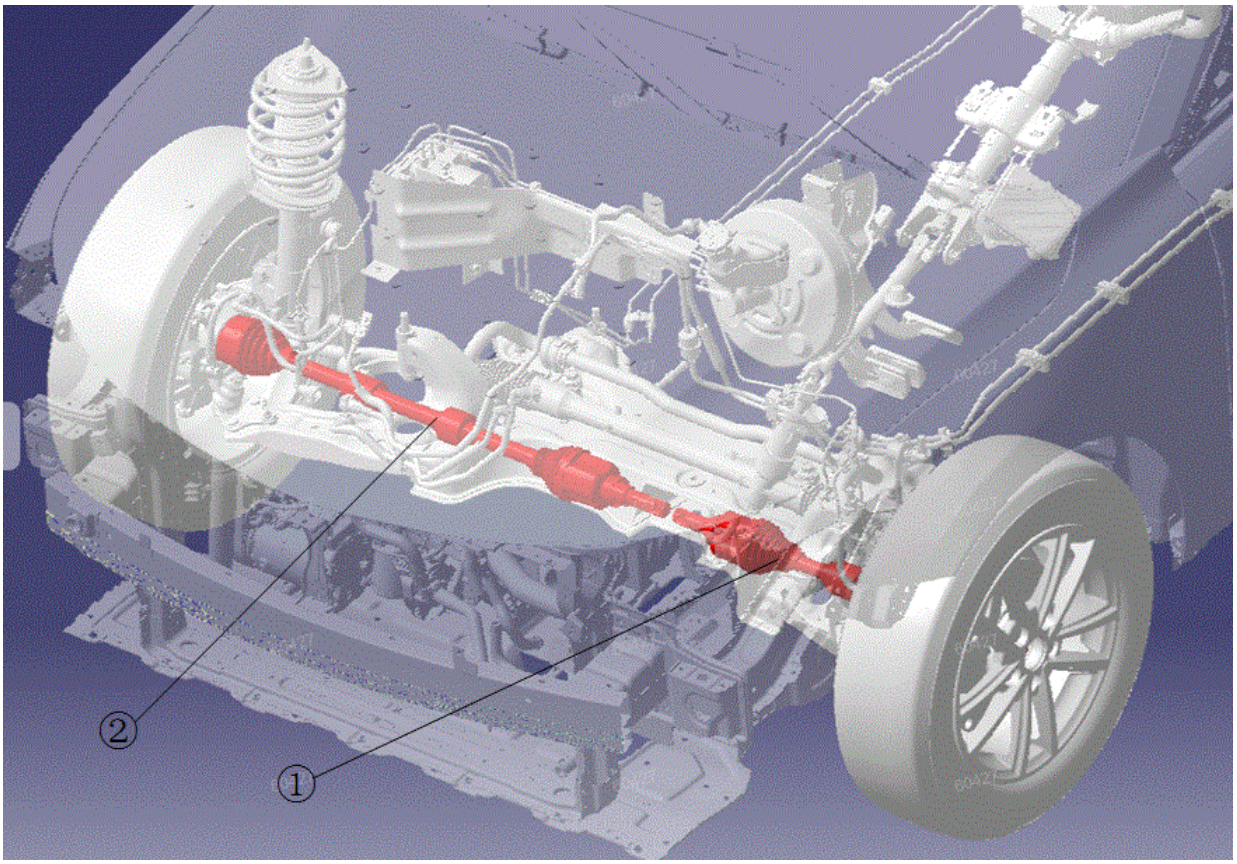
Capacity specification

Name	Weight
High performance grease, outer constant velocity universal joint	110 ± 10 g
High performance grease, internal constant velocity universal joint	162 ± 10 g

Torque specification

Name	Nm
Lock nut	270±10

Composition and position distribution



Serial number	Component name	Quantity	Remarks
1	Drive shaft assembly(Left)	1	Power
2	Drive shaft assembly(Right)	1	Power

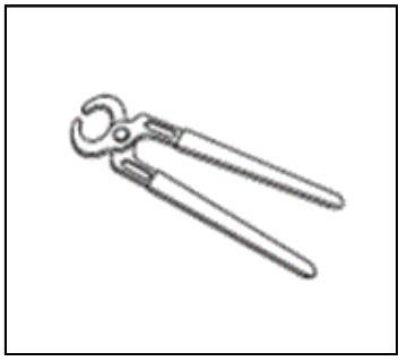
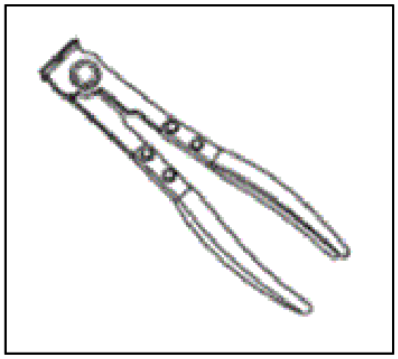
System functional principle introduction

The drive system adopts front-drive mode, and the differential is located inside the transmission assembly. The drive shaft transfers power from the transmission to the wheel assembly. Each drive shaft contains an inner constant velocity joint and an outer constant velocity joint connected to the shaft rod. The inner constant velocity joint is fully flexible and axially telescopic. The outer constant velocity joint is also flexible but cannot be axially telescoped. There is an external spline at the inner end of the left and right drive shafts, and the left drive shaft interlocks with the differential gear through the differential spring retaining ring at the spline end; The right drive shaft is mounted on the engine cylinder block through the bracket to achieve axial positioning.

Structural principle of parts Check drive shaft

Inner constant velocity universal joint and dust cover decomposition

Special tool

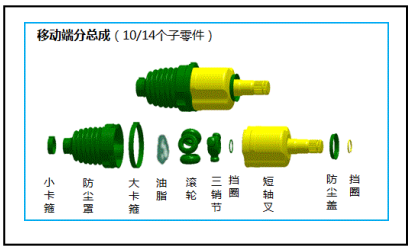
	Drive shaft dust cover clamp removal pliers
	Drive shaft dust cover clamp mounting pliers

Material

Name	Model
High performance grease	TSCB-1(Fixed end) TSCT-1(Moving end)

1 Remove drive shaft.Refer to Removal and Installation.

2 Remove the moving end assembly.



Remove the large and small dust cover clamps using the dust cover clamp removal pliers. Disassemble the moving end assembly.

Remove grease in constant velocity universal joint

3 Using a suitable tool, remove the tripod retaining ring.

4 Dismantle dust cover assembly of moving end sub-assembly

1 Installing dust cover/and three ball pins

Installing dust cover Installing three-pin section

Install three-pin retaining ring

2 Fill grease in stub shaft fork
3 Install moving end sub-assembly
4 Installing dust cover
5 Installing large and small clamps for dust cover
6 Installing drive shaft

Fault symptom diagnosis check and confirmation

General inspection

1 Inspect the drive shaft dust cover for obvious cracks or cracks.

Note: Check the dust cover of the drive shaft, and observe whether there is dent (dent) in the rotation of the dust cover. If a dent is found, it must be replaced.

2 Inspect whether there is grease splash mark around the periphery and inner part of the drive shaft dust cover. It may be that the drive shaft dust cover or the fixing clamp of the drive shaft dust cover is damaged.

3 Confirm that the drive shaft lock nut is the correct locking torque.

4 Check and confirm that the inner constant velocity universal joint slides smoothly in the thrust direction.

5 Check whether the clearance of outer constant velocity universal joint is normal.

6 If the problem persists after inspection, perform troubleshooting according to the symptom table.

Appearance check list

Visual inspection items	Requirements
Fixed end thread root back slot and fillet	Observe whether the fillet has burrs.
Fixed end ball cage end face antifriction coating/antifriction agent	No scratch, no dirt, smooth, clean and flat surface, no bubbles
Shaft surface	No bump, no deformation
Vibration absorber	Confirm whether there is shock absorber
Oil seal dust cover	No collision and deformation, no burr and burr, correct assembly position, no scratch and burr on the journal/bushing surface
Movable joint snap spring(Retaining ring)	The retaining ring is free of abnormal deformation, can be moved flexibly in the snap spring groove, the end of the retaining ring is free of burr, and the end is collapsed.
Whether the dust cover at the moving end is scratched.	No bump damage
Movable end dust cover clamp	No pinch
Movable end dust cover external lubricating oil	Apply evenly without dripping
Whether the fixed end dust cover is scratched.	No bump damage
Fixed end dust cover clamp	No pinch
Fixed end dust cover external lubricating oil	Apply evenly
Whether the spraying surface of shaft rod, alien wheel, shaft fork and long handle has bump and rust	No bump and rust

Fault symptom table

Symptoms	Possible causes	Measures
Abnormal sound of drive shaft(Including abnormal sound when starting)	1. Insufficient lubrication or contamination of drive shaft constant velocity universal joint	Reference: Abnormal sound diagnosis process of drive shaft
	2. Drive shaft in contact with other components	
	3. Drive shaft anti-friction gasket wear or anti-friction agent wear	
There is dull metal sound when sliding in neutral and then accelerating	1. Constant speed universal joint dust cover cracking or damage	Reference: There is a dull metal sound diagnostic process after sliding in neutral gear and then accelerating.
	2. The constant velocity universal joint is worn or damaged.	
Vibration at high speed	1. Wheel out of balance	A. Wheel balancing
	2. Front wheel radial runout is too large	B. See drive shaft removal and installation instructions
	3. Incorrect drive shaft installation	

If the fault occurs but no DTCs are stored in the control module and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the

sequence listed in the following table.

Jitter or vibration during acceleration	Improper load height of 1. causes excessive angle of triple ball pin constant velocity universal joint.	Reference: Jitter or vibration diagnosis process during acceleration
	2. Excessive wear or damage of drive shaft	
There is cracking, knocking or friction sound when driving.	1. Insufficient lubrication or contamination of drive shaft constant velocity universal joint	A. Check, clean and replace grease if necessary
	2. Drive shaft in contact with other components	B. Check and repair if necessary
	3. Wear or damage of wheel bearing, brake component, suspension component or steering component	C. Check and repair if necessary
Complete vehicle low speed shimmy	1. Tire dynamic balance error 2. Incorrect tire positioning 3. Hub bearing damage 4. Drive shaft damage 5. Strut damage 6. Wear or damage of stabilizer bar and bushing	Reference: Low speed shimmy of complete vehicle
Drive shaft falls off	1. Deformation of spring retainer at connecting end of drive shaft and transmission 2. Drive shaft deformation 3. Front pillar deformation, suspension fracture or falling off, brake angle fracture or swing arm falling off 4. Drive shaft lock nut is damaged	Reference: Drive shaft off diagnosis process

Abnormal sound diagnosis process of drive shaft

Test conditions	Details/Results/Measures
1. Check whether the drive shaft is in contact with other objects.	
	A. Lift the vehicle. B. Check whether the drive shaft is wrapped by other sundrives. C. Check whether the drive shaft is in contact with other parts. Is it normal? ? Yes Go to step 2. ? No Handle the faulty position.
2. Inspect the drive shaft dust cover.	
	A. Inspect the drive shaft dust cover for damage. B. Check whether the drive shaft dust cover is installed correctly. C. Inspect the drive shaft constant velocity joint lubricating oil for leakage. Check whether it is normal? ? Yes Go to Step 3. ? No Handle the faulty position.
3. Check drive shaft	
	A. Remove drive shaft. B. Check drive shaft. Check whether it is normal? ? Yes

	Check whether the anti-friction gasket is seriously worn.? Yes Replace anti-friction washer? No Analyze drive shaft for internal conditions ? No Replace drive shaft assembly.

There is a dull metal sound diagnostic process after neutral coasting and then acceleration.

Test conditions	Details/Results/Measures
1. Inspect the drive shaft dust cover.	
	A. Inspect the drive shaft dust cover for damage. B. Check whether the drive shaft dust cover is installed correctly. C. Inspect the drive shaft constant velocity joint lubricating oil for leakage. Check whether it is normal? ? Yes Go to step 2. ? No Handle the faulty position.
2. Check drive shaft	
	A. Remove drive shaft. B. Check drive shaft. C. Any stuck or blocked movement of the constant velocity joint indicates possible damage to the fault. Check whether it is normal? ? Yes Analysis of drive shaft Analysis of internal conditions ? No Replace drive shaft assembly.

Jitter or vibration diagnosis process during acceleration

Test conditions	Details/Results/Measures
1. Check height of front pillar assembly	
	A. Check whether the front pillar assembly is deformed.Check whether it is normal? ? Yes to step 2. ? No Handle the faulty part and replace the front strut assembly if necessary.
2. Check swing arm ball joint	
	A. Inspect whether there is clearance, damage and other abnormalities on swing arm ball joint. Check whether it is normal? ? Yes to step 3. ? No Replace lower swing arm ball joint.
3. Check swing arm and mounting bolts	
	A. Remove all mounting bolts of swing arm for loosening and other abnormal conditions. Check whether each sleeve of swing arm is damaged or not. Check whether it is normal? ? Yes to step 4. ? Yes Handle the faulty position. ? No Handle the faulty position and replace the swing arm assembly if necessary.

4. Inspect the drive shaft dust cover.	
	A. Inspect the drive shaft dust cover for damage. B. Check whether the drive shaft dust cover is installed correctly. C. Inspect the drive shaft constant velocity joint lubricating oil for leakage. Check whether it is normal? ? Yes to step 5. ? No Handle the faulty position.
5. Check drive shaft	
	A. Remove drive shaft. B. Check drive shaft. Check whether it is normal? ? Yes Analysis of drive shaft Analysis of internal conditions ? No Replace drive shaft assembly.

Drive shaft falls off

Test conditions	Details/Results/Measures
1. Check drive shaft	
	A. Inspect the drive shaft dust cover for damage. B. Check whether the drive shaft dust cover is installed correctly. Check whether it is normal? ? Yes Go to step 2. ? No Handle the faulty position.
2. Check front pillar, suspension, brake and swing arm	
	A. Inspect whether the front pillar assembly is deformed. Check whether the suspension is broken or off, and whether the brake angle is broken or the swing arm is off. Check whether it is normal? ? Yes Go to Step 3. ? No Replace faulty part.
3. Inspect the drive shaft lock nut.	
	A. Inspect whether the lock nut of drive shaft is damaged. Check whether it is normal? ? Yes Go to Step 4. ? No Replace lock nut.
4. Check spring retaining ring on drive shaft and transmission side	
	A. Remove drive shaft. B. Check spring retaining ring on transmission side of drive shaft. Check whether it is normal? ? Yes Check interface dimension between transmission and drive shaft

	? No Replace drive shaft assembly.

Complete vehicle low speed shimmy

Test conditions	Details/Results/Measures
1. Check wheels	
	A. Check whether the tire runout is normal. Check whether it is normal? ? Yes Go to step 2. ? No Handle the faulty position.
2. Check wheel alignment	
	A. Inspect whether the wheel alignment is normal. Check whether it is normal? ? Yes Go to Step 3. ? No Handle the faulty position.
3. Check suspension system	
	A. Check suspension system. Check whether it is normal? ? Yes to Step 4 ? No Handle the faulty position.
3. Check drive shaft	
	A. Inspect the drive shaft dust cover for damage. B. Check whether the drive shaft dust cover is installed correctly. C. Check whether the drive shaft is bent or deformed. Check whether it is normal? ? Yes Analysis of drive shaft Analysis of internal conditions ? No Handle the faulty position.

Drive shaft swing

Test conditions	Details/Results/Measures
1. Check drive shaft	
	A. Inspect the drive shaft dust cover for damage. B. Check whether the drive shaft dust cover is installed correctly. Check whether it is normal? ? Yes Go to step 2. ? No Handle the faulty position.
2. Check spring retaining ring on drive shaft and transmission side	
	A. Remove drive shaft. B. Check spring retaining ring on transmission side of drive shaft.

	Check whether it is normal? ? Yes Analyze the drive shaft to analyze the internal situation. ? No Replace drive shaft assembly.

Abnormal sound diagnosis process of drive shaft

Test conditions	Details/Results/Measures
1. Check whether the drive shaft is in contact with other objects.	
	A. Lift the vehicle. B. Check whether the drive shaft is wrapped by other sundrives. C. Check whether the drive shaft is in contact with other parts. Is it normal? ? Yes Go to step 2. ? No Handle the faulty position.
2. Inspect the drive shaft dust cover.	
	A. Inspect the drive shaft dust cover for damage. B. Check whether the drive shaft dust cover is installed correctly. C. Inspect the drive shaft constant velocity joint lubricating oil for leakage. Check whether it is normal? ? Yes Go to Step 3. ? No Handle the faulty position.
3. Check drive shaft	
	A. Remove drive shaft.Refer to Drive Shaft B. Check drive shaft. See Appearance Checklist Check whether it is normal? ? Yes Check whether the anti-friction gasket is seriously worn.? Yes Replace anti-friction washer? No Analyze drive shaft for internal conditions ? No Replace drive shaft assembly.

There is a dull metal sound diagnostic process after neutral coasting and then acceleration.

Coasting acceleration or dull metal sound from stationary start may be caused by wear or damage to the constant velocity universal joint inside the wheel drive shaft. Damage to the inner constant velocity joint of the wheel drive shaft is usually caused by insufficient grease or foreign matter and dirt in the constant velocity joint. This is usually caused by cracking or damage of inner constant velocity joint sealing sleeve.

Test conditions	Details/Results/Measures
1. Inspect the drive shaft dust cover.	
	A. Inspect the drive shaft dust cover for damage. B. Check whether the drive shaft dust cover is installed correctly.

	C. Inspect whether the drive shaft constant velocity universal joint lubricating oil leaks. Check whether it is normal? ? Yes Go to step 2. ? No Handle the faulty position.
2. Check drive shaft	
	A. Remove drive shaft. B. Check drive shaft.Reference: Inspection and confirmation C. Any stuck or blocked movement of the constant velocity joint indicates possible damage to the fault. Check whether it is normal? ? Yes Analysis of drive shaft Analysis of internal conditions ? No Replace drive shaft assembly.

Jitter or vibration diagnosis process during acceleration

Test conditions	Details/Results/Measures
1. Check height of front pillar assembly	
	A. Check whether the front pillar assembly is deformed.Check whether it is normal? ? Yes to step 2. ? No Handle the faulty part and replace the front strut assembly if necessary.
2. Check swing arm ball joint	
	A. Inspect whether there is clearance, damage and other abnormalities on swing arm ball joint. Check whether it is normal? ? Yes to step 3. ? No Replace lower swing arm ball joint.
3. Check swing arm and mounting bolts	
	A. Remove all mounting bolts of swing arm for loosening and other abnormal conditions. Check whether each sleeve of swing arm is damaged or not. Check whether it is normal? ? Yes to step 4. ? Yes Handle the faulty position. ? No Handle the faulty position and replace the swing arm assembly if necessary.
4. Inspect the drive shaft dust cover.	
	A. Inspect the drive shaft dust cover for damage. B. Check whether the drive shaft dust cover is installed correctly. C. Inspect the drive shaft constant velocity joint lubricating oil for leakage. Check whether it is normal? ? Yes to step 5. ? No Handle the faulty position.

5. Check drive shaft	
	A. Remove drive shaft. B. Check drive shaft. Check whether it is normal? ? Yes Analysis of drive shaft Analysis of internal conditions ? No Replace drive shaft assembly.

Drive shaft falls off

Test conditions	Details/Results/Measures
1. Check drive shaft	
	A. Inspect the drive shaft dust cover for damage. B. Check whether the drive shaft dust cover is installed correctly. Check whether it is normal? ? Yes Go to step 2. ? No Handle the faulty position.
2. Check front pillar, suspension, brake and swing arm	
	A. Inspect whether the front pillar assembly is deformed. Check whether the suspension is broken or off, and whether the brake angle is broken or the swing arm is off. Check whether it is normal? ? Yes Go to Step 3. ? No Replace faulty part.
3. Inspect the drive shaft lock nut.	
	A. Inspect whether the lock nut of drive shaft is damaged. Check whether it is normal? ? Yes Go to Step 4. ? No Replace lock nut.
4. Check spring retaining ring on drive shaft and transmission side	
	A. Remove drive shaft. B. Check spring retaining ring on transmission side of drive shaft. Reference: Inspection and confirmation Check whether it is normal? ? Yes Check interface dimension between transmission and drive shaft ? No Replace drive shaft assembly.

Complete vehicle low speed shimmy

Test conditions	Details/Results/Measures
1. Check wheels	

	A. Check whether the tire wear is normal. Reference: Check whether the tire abnormal wear diagnosis process is normal? ? Yes Go to step 2. ? No Handle the faulty position.
2. Check wheel alignment	
	A. Inspect whether the wheel alignment is normal. Check whether it is normal? ? Yes Go to Step 3. ? No Handle the faulty position.
3. Check suspension system	
	A. Check suspension system. Check whether it is normal? ? Yes to Step 4 ? No Handle the faulty position.
4. Check drive shaft	
	A. Inspect the drive shaft dust cover for damage. B. Check whether the drive shaft dust cover is installed correctly. C. Check whether the drive shaft is bent or deformed. Check whether it is normal? ? Yes Analysis of drive shaft Analysis of internal conditions ? No Handle the faulty position.

Drive shaft swing

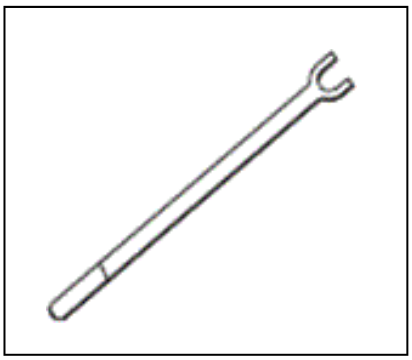
Test conditions	Details/Results/Measures
1. Check drive shaft	
	A. Inspect the drive shaft dust cover for damage. B. Check whether the drive shaft dust cover is installed correctly. Check whether it is normal? ? Yes Go to step 2. ? No Handle the faulty position.
2. Check spring retaining ring on drive shaft and transmission side	
	A. Remove drive shaft. B. Check spring retaining ring on transmission side of drive shaft. Check whether it is normal? ? Yes Analyze the drive shaft to analyze the internal situation.

	? No Replace drive shaft assembly.

Removing and installing drive shaft

Left drive shaft removal

Special tool

	Drive shaft

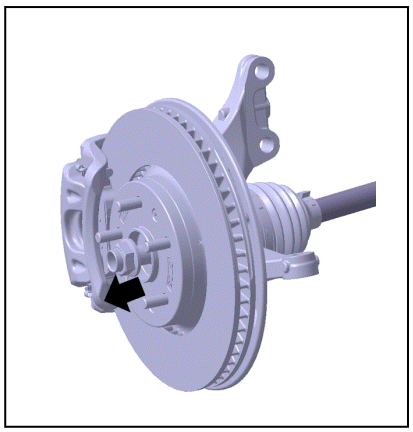
1 Disconnect battery negative harness
2 Removing wheel
3 Lifting the vehicle

Warning

Note: When lifting the vehicle with a two-pillar lift, the horizontal pad must be used in the lifting position.

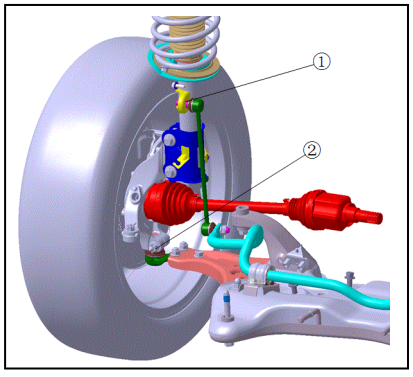
4 Removing lock nut

Removing lock nut(Not reusable)

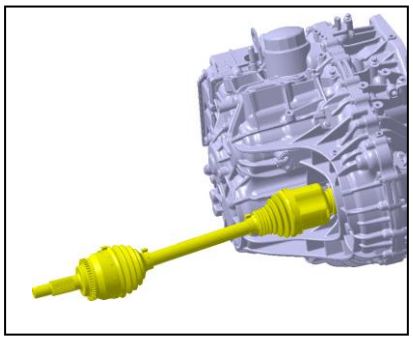


5 Take out fixed end of drive shaft from brake end

Remove front swing arm ball joint cotter pin and slotted nut and bolt, straighten and remove locking pin Ⓒ Remove connecting rod mounting nut Ⓒ



6 Removing drive shaft from transmission using a suitable tool

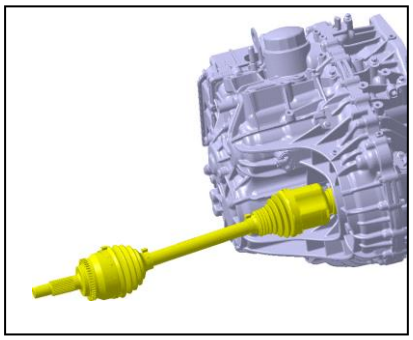


Installation

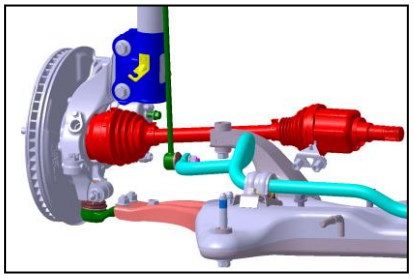
1 Inserting drive shaft into transmission

Protect the drive shaft from damage to the constant velocity universal joint. The working angle of the inner constant velocity universal joint shall not exceed 23 degrees. When outer constant velocity universal joint working angle does not exceed 45 ° and inserted into drive shaft, use oil seal protective sleeve (supplied with oil seal) to protect transmission oil seal.

Make sure that the retaining ring is fitted into the groove when installing a new retaining ring



2 Install fixed end of drive shaft to brake hub bearing

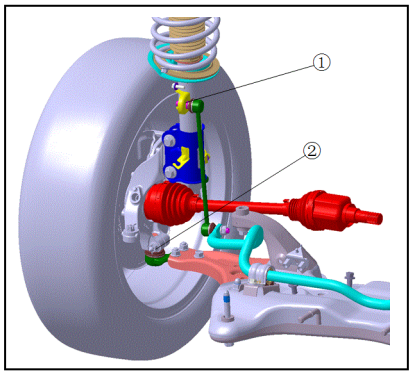


3 Install connecting rod

mounting nut Ⓒ

Torque: 90±5N.m

Install front swing arm ball joint cotter pin and



slotted nut and bolt to straighten and install

locking pin Ⓒ torque: 120 ±10N.m

4 Installing lock nut for drive shaft

5 Installing wheel

6 Connect right drive shaft of battery negative harness

Same as removal and installation of left drive shaft

Spare parts atlas

F250101

Chassis

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Suspension system

General specifications

Name		Specifications
Front wheel alignment parameters	Front wheel toe-in(Unilateral)	0°±0.1°
	Front camber	-0.5°±0.5°
	Kingpin inclination	12.58°±0.75°
	Caster angle of kingpin	4.35°±0.75°
Rear wheel alignment parameters	Rear wheel toe-in(Unilateral)	0°±0.1°(Independent suspension)
	Rear camber	-1°±0.5°

Tire size	Front tire pressure(KPa, cold)		Rear tire pressure(KPa, cold)	
	No load	Full load	No load	Full load
225/60R17*	220	220	220	220
225/60R18	220	220	220	220
225/55R19	220	220	220	220
T125/80R17	420	420	420	420

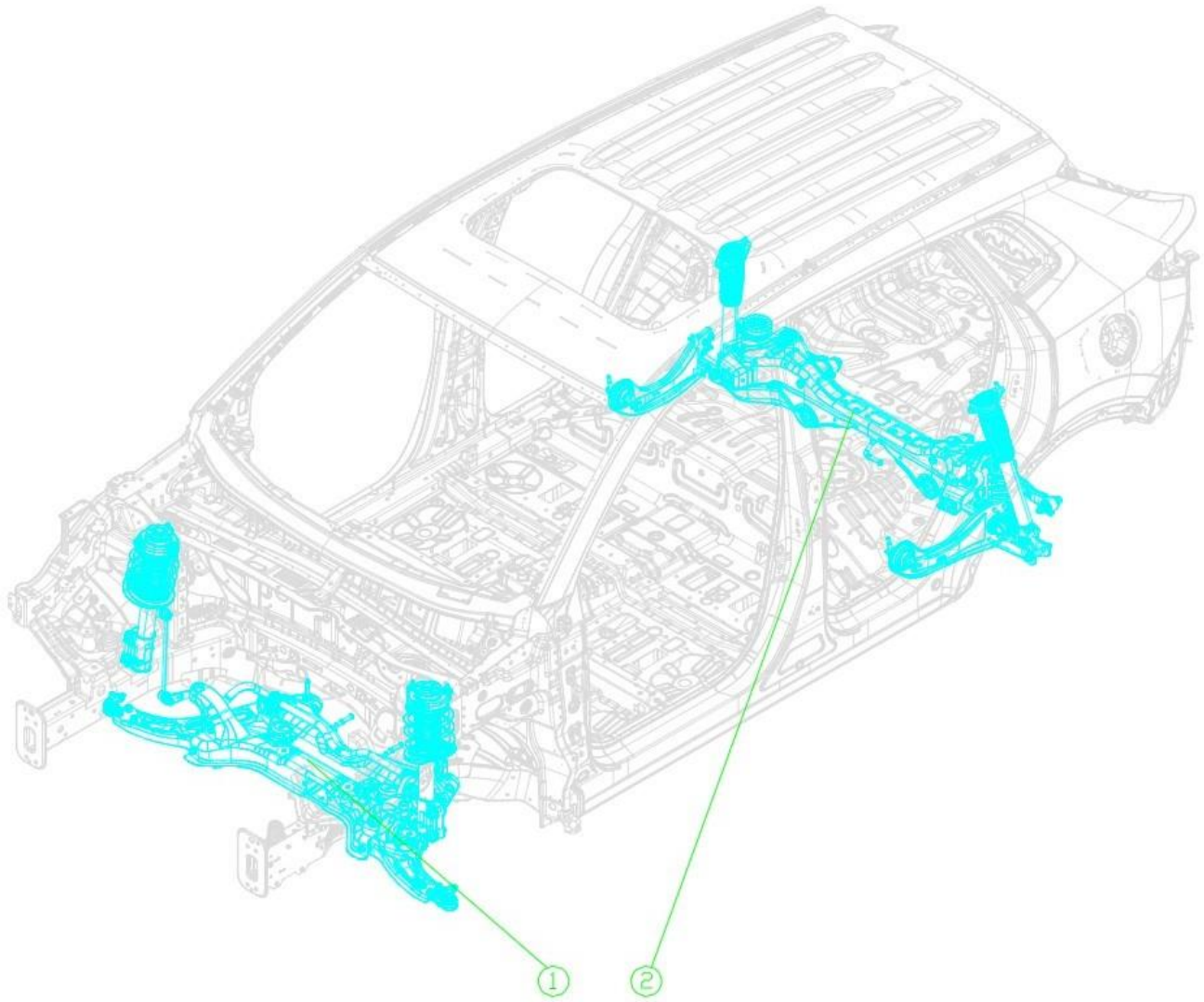
* Snow chains can only be fitted on specified tyres

Composition and position distribution

Front suspension system overview: Front suspension is McPherson independent suspension type. Front suspension is composed of two front strut assemblies (including damper and spring), front subframe assembly (or engine carrier assembly).
), front swing arm assembly, front stabilizer bar assembly, connecting bar assembly and other accessories. The front swing arm assembly is formed by stamping and welding the steel plate. Each piece is connected with the front subframe assembly (or engine carrier assembly) by two vertical and horizontal bolts passing through the bushing vertically. Front swing arm assembly is connected with steering knuckle through ball pin. The steering knuckle is connected to the front strut assembly and the steering tie rod ball joint. The damping device is mounted on the body with a damping seat mounted on the top of the strut. Install the coil spring between the spring seats of the strut. The piston rod is equipped with dust cover to prevent dirt or water. In order to protect the shock absorber in the fully compressed state, the anti-collision rubber pad is also installed. Front subframe assembly (or engine carrier assembly) is welded by several stamped steel plates. The front and rear are connected to the vehicle body through bolts of different specifications. The middle of the front stabilizer bar assembly is connected with the front subframe assembly (or engine carrier assembly) through two nuts and two bolts, and the earrings at both ends are connected with the connecting bar assembly through nuts.

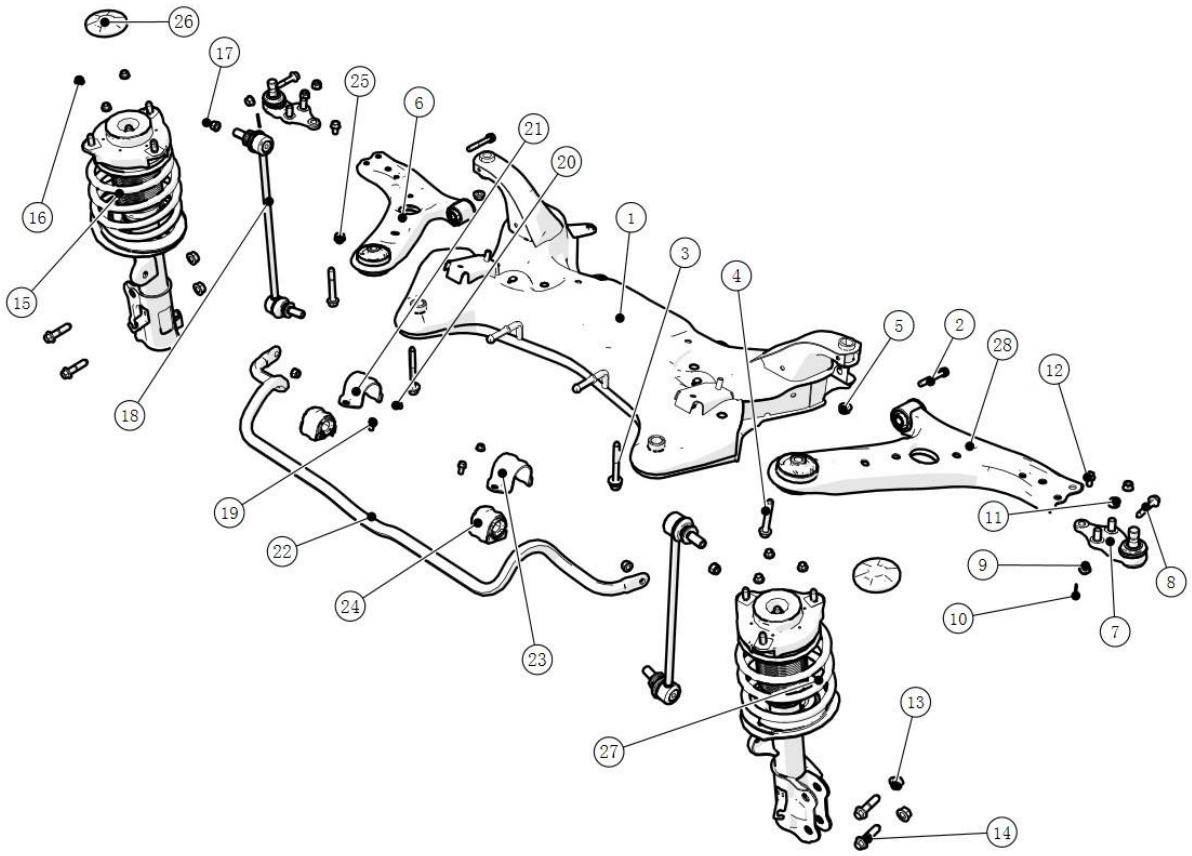
Overview of rear suspension system: Rear suspension structure is multi-link independent suspension, which is composed of rear subframe assembly, rear coil spring, rear trailing arm assembly, rear shock absorber assembly, rear suspension link system assembly, etc. The wheels are connected with rear suspension through rear brake assembly. The rear wheel toe-in and camber can be adjusted, and the positioning parameters of the rear wheel shall be adjusted after maintenance.

Front and rear suspension assembly position diagram:


1
2

Serial number	Component name	Quantity
1	Front suspension assembly	1
2	Rear suspension assembly	1

Front suspension assembly exploded view:


26
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13
14

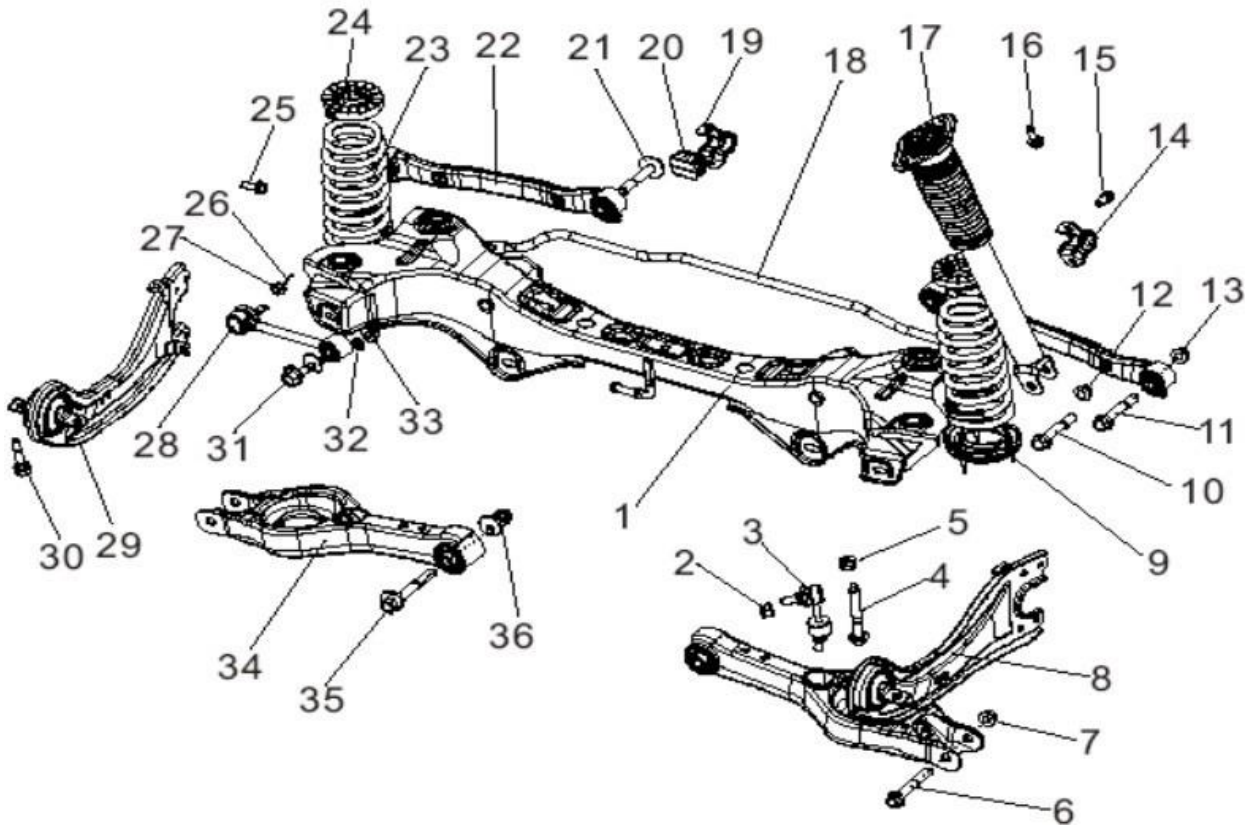
Serial number	Component name	Quantity
1	Front subframe assembly	1
2	Hexagon bolt spring washer and plain washer assembly -M12× 1.25×85	2
3	Hexagon flange bolt and plain washer assembly -M14×1.5× 120	2
4	Hexagon flange bolt -M14×1.5×90	2
5	Hexagon flange nut -M14×1.5	2
6	Front swing arm assembly(Left)	1
7	Front swing arm ball pin assembly	2
8	Hexagon flange hole bolt -M12×1.25×65	2
9	Hexagon flange nut -M12×1.25	2
10	Cotter pin	2
11	Non-metallic insert hexagon flange lock nut -M12×1.25	4
12	Hexagon flange bolt -M12×1.25×20	2
13	Hexagon flange nut -M16×1.5	4
14	Hexagon flange bolt -M16×1.5×60	4
15	Front pillar assembly(Left)	1
16	Hexagon flange nut -M10×1.25	6
17	Non-metallic insert hexagon flange lock nut -M12×1.25	4
18	Front connecting rod assembly	2
19	Hexagon flange bolt -M10×1.25×18	2
20	Hexagon flange nut -M10×1.25	2
21	Front stabilizer bar bracket(Left)	1
22	Front stabilizer bar assembly	1
23	Front stabilizer bar bracket(Right)	1
24	Front stabilizer bar bushing	2
25	Hexagon flange nut -M14×1.5	2
26	Front pillar assembly dust cover	2
27	Front pillar assembly(Right)	1
28	Front swing arm assembly(Right)	1

Specifications

Torque specification

Name	N. M	Remarks
Small bushing end bolt of swing arm and FRT subframe mounting point	120±10N.m	
Swing arm and front subframe mounting point big bushing end bolt	150±10N.m	
Front subframe and body front mounting nut	200±10N.m	
Front subframe and body rear mounting bolts	200±10N.m	
Tighten nuts between front pillar assembly and body	68±5N.m	
Front strut and steering knuckle nut	220±10N.m	
Front stabilizer bar bracket and subframe mounting bolt	65±5N.m	
Front stabilizer bar bracket and subframe mounting nut	65±5N.m	
Connecting nuts of front connecting rod assembly, front strut assembly and front stabilizer bar	90±5N.m	
Connecting nut of front swing arm ball pin assembly and brake	120±10N.m	
Connecting nut of front swing arm ball pin assembly and front swing arm assembly	90±5N.m	
Connecting bolt of front swing arm ball pin assembly and front swing arm assembly	120±10N.m	

Exploded view of rear suspension assembly



Serial number	Component name	Quantity
1	Rear subframe assembly	1
2	Non-metallic insert hexagon flange lock nut	4
3	Rear connecting rod assembly	2
4	Hexagon flange bolt -M14×1.5× 110	2
5	Hexagon flange nut -M14×1.5	2
6	Hexagon flange bolt	2
7	Hexagon flange nut	4
8	Rear trailing arm assembly(Left)	1
9	Rear coil spring lower pad	2
10	Hexagon flange bolt -M14×1.5×70	2

Serial number	Component name	Quantity
11	Hexagon flange bolt -M14×1.5×83	4
12	Hexagon flange nut -M14×1.5	2
13	Hexagon flange nut -M14×1.5	4
14	Rear stabilizer bar bracket(Left)	1
15	Hexagon flange bolt -M10×1.25×18	4
16	Hexagon bolt spring washer and plain washer assembly -M10× 1.25×36	4
17	Rear shock absorber assembly	2
18	Rear stabilizer bar	1
19	Rear stabilizer bar bracket(Right)	1
20	Rear stabilizer bar bushing	2
21	Plain washer -φ40	2
22	Rear lateral control arm assembly	2
23	Rear coil spring	2
24	Rear coil spring upper pad	2
25	Hexagon bolt spring washer and plain washer assembly - M10×1.25×30	8
26	Cotter pin	2
27	Hexagon slotted lock nut	2
28	Rear suspension toe-in adjusting rod assembly	2
29	Rear trailing arm assembly(Right)	1
30	Hexagon flange bolt -M12×1.25×65	4
31	Eccentric bolt and plain washer assembly	2
32	Spring washer	2
33	Hexagon flange nut	4
34	Rear swing arm assembly	2
35	Eccentric bolt and plain washer assembly	2
36	Spring washer	2

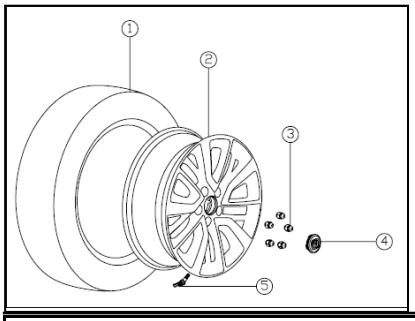
Specifications

Torque specification

Name	N. M	Remarks
Connecting bolt between rear suspension transverse control arm assembly and rear subframe	200±20Nm	
Connecting bolt between rear suspension transverse control arm assembly and steering knuckle	200±20Nm	

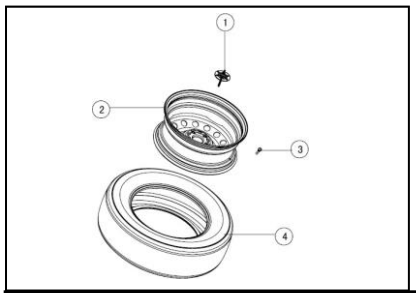
Name	N. M	Remarks
Connecting nut between rear suspension toe-in adjustment rod assembly and steering knuckle	70±5Nm	
Connecting bolt between rear suspension toe-in adjustment rod assembly and rear subframe	90±5Nm	
Connecting nut of rear shock absorber and vehicle body	68±5Nm	
Rear shock absorber and steering knuckle nut	150±10Nm	
Rear connecting rod and rear stabilizer bar mounting nut	90±5	
Rear connecting rod and rear swing arm mounting nut	90±5	
Rear subframe and body front mounting nut	200±10	
Rear subframe and body rear mounting bolts	200±10	
Rear swing arm assembly and rear subframe mounting eccentric bolt	150±10	
Rear swing arm and rear brake mounting bolt	150±10	
Rear trailing arm and rear brake mounting bolt, spring washer and plain washer assembly	70±5	
Connecting bolt between rear trailing arm assembly and vehicle body	120±10	
Rear stabilizer bar bracket and rear subframe mounting nuts and bolts	65±5	

Exploded view of wheel and tire



Serial number	Component name	Quantity
1	Tire	1
2	Aluminum alloy wheel	1
3	Wheel nut	5
4	Aluminum wheel trim cover assembly	1
5	Tire pressure monitoring device	1

Spare tire exploded view



Serial number	Component name	Quantity
1	Spare tire pressure plate assembly	1
2	Wheel assembly(Steel wheel 17x4T)	1
3	Valve	1
4	Tire(T 125/80R17)	1

Specifications

General specifications

Name	N. M
Wheel nut	110±5
Spare tire pressure plate assembly	5(Fixed value motor)

System functional principle introduction

The primary objective of vehicle engineering is to ensure the safety and reliability of steering and suspension systems. Each component must have sufficient strength to withstand and absorb extreme impacts. The steering system and front and rear suspension systems must have a certain geometric relationship with the body.

The steering and suspension system requires the front wheels to automatically return, keeping the front wheel rolling resistance and road friction to a minimum, allowing the user to easily and comfortably control the direction of the vehicle.

A full wheel alignment check shall include measuring the rear wheel toe and camber. Four-wheel alignment ensures that all four wheels rotate precisely in the specified direction. After geometric positioning, the vehicle can achieve optimum fuel economy and tire life and optimize steering performance.

1 Caster angle of kingpin

The kingpin caster angle is the forward or backward inclination of the highest point of the steering axis from the vertical as viewed from the side of the vehicle. Backward tilt is positive, forward tilt is negative. Caster angle of kingpin affects direction control when steering, but does not affect tire wear. If the spring is too soft or the vehicle is overloaded, the caster angle will be affected. When the caster angle of one wheel is positive, pull the vehicle toward the center of the vehicle. Even the smallest positive kingpin caster will cause the vehicle to side or roll. The kingpin caster is measured in degrees and is not adjustable.

2 Wheel camber

Camber is the angle at which the top of the tire deviates from the vertical when viewed from the front of the vehicle. When the tire is camber, the camber angle is positive. When the tire is tilted inward, the camber is negative. Camber is a number of degrees away from the vertical. Camber affects direction control and tire wear. If the positive camber angle of the vehicle is too large, the outer shoulder of the tire may be worn. If the negative camber angle of the vehicle is too large, the inner shoulder of the tire may be worn. Camber is not adjustable.

3 Wheel toe-in

Toe-in means that the tire deviates inward from the geometric centerline or thrust line, and negative toe-in means that the tire deviates outward from the geometric centerline or thrust line. The toe-in ensures that the wheels roll in parallel. The toe-in counteracts minor deviations from the wheel support system as the vehicle rolls forward.

Incorrect toe-in or negative toe-in will cause tire wear and reduce fuel economy. Since each steering and suspension system component is worn with increasing mileage, toe-in needs to be increased to compensate for wear of these components. Always correct the toe angle last.

4 Kingpin inclination

Kingpin inclination refers to the inclination of the top of the steering knuckle from the vertical. As seen from the front of the vehicle, the kingpin inclination is the angle between the vertical plane and a straight line through the center of the strut and the lower ball joint. The inclination of the kingpin helps to keep the vehicle running straight and the auxiliary wheels return to the front position.

5 Wrap angle

From the front of the vehicle, the wrap angle is the angle between the camber and a straight line through the center of the strut and the lower ball joint. The angle is calculated according to the angle value. Many positioning platforms do not directly measure the wrap angle. In determining the wrap angle, simply subtract the negative camber or plus the positive camber from the steering axis tilt angle.

6 Tire grinding radius

The tire radius is the distance between the vertical plane and a straight line through the center of the strut and the lower ball joint. Tire radius is the design feature of the vehicle. Tire grinding radius is not adjustable.

7 Wheel misalignment

Misalignment is the distance between one front hub and bearing assembly and the other front hub and bearing assembly. The fault is mainly caused by road obstacle or vehicle collision.

8 Steering angle

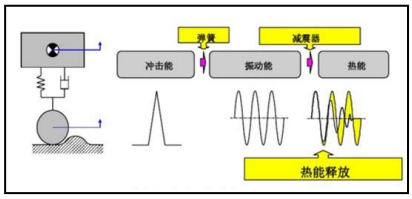
Steering angle is the angle of each front wheel relative to the vertical direction when the vehicle turns.

Structural principle of parts Check front pillar assembly

Function

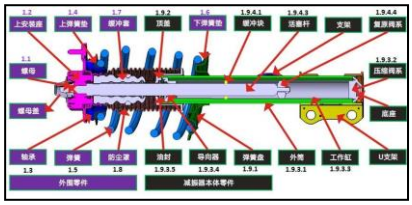
Supports the vehicle, attenuates road vibration and shock, and provides wheel control. Working principle

When the vehicle encounters impact during driving, the spring absorbs its energy and temporarily stores it with potential energy, releases its energy in the form of kinetic energy after impact, and the body vibrates reciprocally on the spring. The damper adds a certain damping force during the reciprocating motion of the spring to rapidly damp the vibration of the spring. Due to damping force of damper, vibration of vehicle will be rapidly attenuated. The shock absorber converts the vibration kinetic energy of the body into thermal energy, which is absorbed by the oil and then dispersed into the atmosphere through the housing.



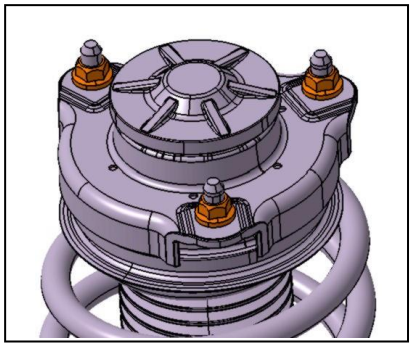
Product structure

Front strut damper is composed of damper body, lower spring washer, buffer block, upper spring washer, coil spring, rotating bearing, dust cover, upper mounting seat, nut, etc. The damper body is composed of outer cylinder, working cylinder, U-shaped mounting bracket, base, compression valve system, recovery valve system, welding bracket, piston rod, top cover, oil seal, guide and spring disc. Detailed structure as shown in the figure

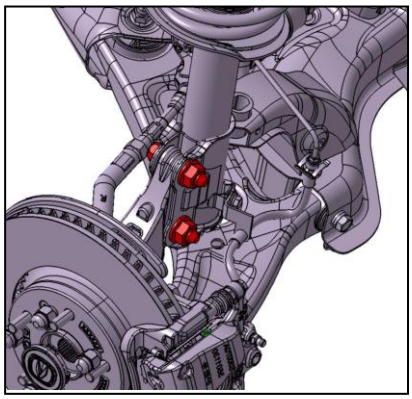


Interface definition

The upper end of the strut assembly is connected to the body through three bolts of the upper mounting seat, and the nut mounting torque is 68±5N.m.



The lower end of the strut assembly is connected with the brake angle through bolts and nuts through the shock absorber U-shaped bracket, and the nut installation torque is 220 ±20N.m.



Product fault and troubleshooting

First, inspect the appearance of the front pillar to confirm whether there is oil leakage in the front pillar. For specific oil leakage judgment of the shock absorber, please refer to the oil leakage inspection of the front pillar. Oil leakage of the shock absorber will not cause abnormal sound. "Knock" abnormal sound will occur only when serious oil leakage occurs and most of the oil in the shock absorber is missing.

Then check whether the upper and lower mounting bolts and nuts of the front pillar are loose. If not, check whether the front pillar interferes with the surrounding parts. Check whether the inner peripheral parts of the front pillar have interference friction and trace. If no abnormality has been found, ABA interchangeability verification can be used to confirm that the front pillar is faulty.

Common methods

Check of front wheel alignment parameters

Check the front wheel alignment parameters according to the attached parameters.

四轮定位参数			设计值
前悬	外倾角（°）	左	-30′ ±30′
		右	
	主销后倾角（°）	左	4° 21′ ±45′
		右	
	主销内倾角（°）	左	12° 35′ ±45′
		右	
	前轮前束(°)	左	5±3′
		右	
后悬	外倾角（°）	左	-1° ±45′
		右	
	后轮前束(°)	左	0±6′
		右	

Check of rear wheel alignment parameters

Check the front wheel alignment parameters according to the attached parameters.

四轮定位参数			设计值
前悬	外倾角（°）	左	-30′ ±30′
		右	
	主销后倾角（°）	左	4° 21′ ±45′
		右	
	主销内倾角（°）	左	12° 35′ ±45′
		右	
	前轮前束(°)	左	5±3′
		右	
后悬	外倾角（°）	左	-1° ±45′
		右	
	后轮前束(°)	左	0±6′
		右	

Front swing arm ball joint inspection

1 Lift the vehicle and remove the ball pin of the front swing arm. Reference: Lifting, front swing arm assembly(Bushing)
2 Hold the ball pin end and housing end of front swing arm ball pin with two hands, try to move up and down, and observe whether there is movement. Free movement is usually accompanied by a click, and free movement is damaged. If free to move, replace the front swing arm ball pin assembly.
3 Fix the ball pin of the front swing arm, use a torque wrench to rotate the ball pin continuously at a speed of one turn every 3 to 5 seconds, and read the torque value of the fifth turn. Rotational torque: 0.5~3.0Nm. If not, replace the front swing arm ball pin assembly.
4 After replacing the ball pin assembly of the front swing arm, align the front wheels. Reference: Front wheel alignment parameter check

Inspection of oil leakage of front pillar

The working principle of the damper is that the damper fluid converts kinetic energy into thermal energy and releases it to the atmosphere. With the increase of the product use time or mileage, the surface of the oil reservoir of the shock absorber may have oil traces during use. In this case, it is necessary to correctly judge whether it is "oil leakage" or "oil leakage." If it is "oil leakage," it is a normal phenomenon. If it is "oil leakage," it is necessary to replace the shock absorber unit.

Oil leakage: When the shock absorber works, the lubricating oil on the piston rod surface is scraped off by the oil seal. Oil leakage mechanism:

In order to improve the service life of the shock absorber parts, the surface of the shock absorber piston rod is usually treated with chromium plating, and the piston rod is ground to form a net-shaped "micro-crack" on the surface of the piston rod. A small amount of shock absorber oil will adhere to the net-shaped micro-crack on the surface of the piston rod to form an oil film, so that the friction between the piston rod and the oil seal is wet friction, reducing the friction between the piston rod and the oil seal, and improving the reliability and NVH performance of the shock absorber; As the piston rod reciprocates up and down, the temperature of the shock absorber will rise, and a small amount of oil will form oil mist, which will be adsorbed on the surface of the oil reservoir, resulting in "oil leakage."

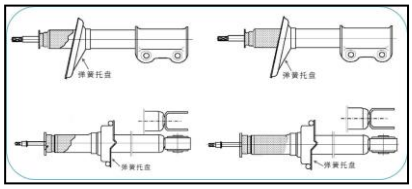
Oil leakage: The outer surface of the shock absorber has oil leakage from the inside in the stationary or working state.
False oil leakage: External oil contamination.

Because the working environment of the shock absorber is relatively bad, water stain or oil on the road surface may splash onto the shock absorber cylinder, causing false oil leakage. It is necessary to carefully confirm the oil trace phenomenon for oil leakage judgment in the test. The shock absorber barrel or some parts have oil traces, the oil traces are discontinuous and there is no obvious leakage source, which can be determined as foreign oil pollution during driving.

Warning Oil leakage is a normal phenomenon. It is not a fault. It will not affect the performance of the shock absorber. It is not necessary to replace the shock absorber. Oil leakage judgment: For spring tray shock absorber

Oil trace is visible, but no luster or relatively dry oil trace formed after mixing with dust, touch the surface of oil trace with hands, and there is no obvious oil trace in the fingerprint;

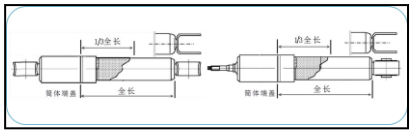
The oil traces are uniformly distributed on the cylinder surface in the circumferential direction, without "stranded" or "liquid flow" shaped traces. The oil traces are distributed on the shock absorber cylinder end cover surface to the spring tray.



Oil leakage judgment: For non-spring tray shock absorber

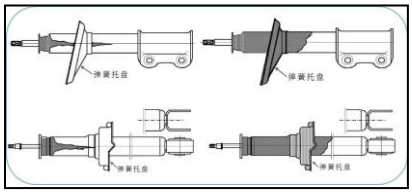
Ü The oil trace is visible, but no luster or relatively dry oil trace formed after mixing with dust. Touch the oil trace surface with your hand, and there is no obvious oil trace in the fingerprint;

The oil trace is uniformly distributed on the surface of the cylinder in the circumferential direction, without "stranded" or "liquid flow" trace, and the length of the oil trace in the axial direction is 1/3 (inclusive) not exceeding the length of the cylinder.



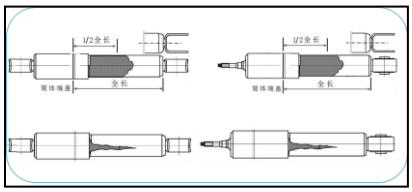
Oil leakage judgment: For spring tray shock absorber

There are lots of oil traces on the surface of the barrel and even on the barrel. Touch the surface of the oil traces with your hand, and there are oil traces visible to the naked eye in the fingerprint; The distribution of oil traces is uneven, and the oil traces are "stranded" or "liquid flow" to the position below the spring tray.



Oil leakage judgment: For non-spring tray shock absorber

There are lots of oil traces on the surface of the barrel and even on the barrel. Touch the surface of the oil traces with your hand, and there are oil traces visible to the naked eye in the fingerprint; The distribution of oil traces is uneven, and the oil traces are "stranded" or "liquid flow" to the position 1/2 beyond the full length of the cylinder.



Warning **After-sales treatment for oil leakage or leakage:**

It is forbidden to replace parts that are judged to be contaminated by external oil or leaking oil, and they can be used after wiping;

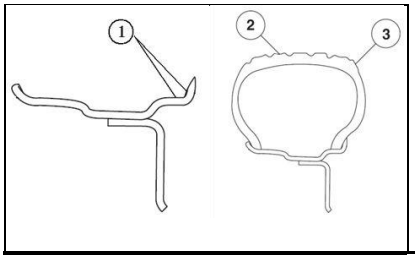
Parts judged as leaking oil can be replaced with shock absorber unit (it is forbidden to replace front pillar assembly), and upload maintenance information according to corresponding requirements of Chang'an;

As far as possible, do not select rain or snow weather to judge the oil leakage of the shock absorber. If it is necessary to judge, wipe the traces of oil and water on the shock absorber, clean them up, and then re-judge the vehicle;

For vehicles with unilateral shock absorber leakage, repair of single shock absorber is not allowed in pairs.

Wheel runout check

Measure wheel runout with a dial indicator. When measuring, remove the tire, and measure radial and end runout at two inner rims of the rim. (As shown in the figure (1), fix the dial indicator beside the wheel and tire assembly, slowly rotate the wheel for one turn and record the dial indicator reading. If the measured value exceeds the following value and the wheel balance cannot eliminate vibration, replace the wheel. Measure the free radial runout of the tread center (Figure 2). Apply a tape on the tread to form a smooth surface. Measure the free face runout on the outside of the tire closest to the tread (Figure 3).



Wheel type	Radial runout	Face runout	Tire	Radial runout	Face runout
Aluminium	0.3mm	0.3mm		1.0mm	1.0mm
Steel	1.0mm	1.0mm		1.0mm	1.0mm

Fault symptom diagnosis check and confirmation

1 Confirm the customer's problem.
2 Visually inspect for visible mechanical damage. Visual Check List

Tire pressure
Wheels and tires
Wheel knuckle
Tie rod ball joint
Front subframe and bushing
Front swing arm and swing arm ball pin
Front swing arm bushing and fastener
Front pillar assembly
Front stabilizer bar and connecting rod
Rear subframe and bushing
Rear pillar assembly
Rear transverse control arm and bushing
Rear suspension toe-in adjusting rod and bushing
Rear stabilizer bar and connecting rod
Rear trailing arm and bushing

3 If the observation or reaction is obvious, the rule out fault must occur before the next step.
4 If the visual inspection is passed, confirm the fault and refer to the fault symptom table.

Fault symptom table

If the fault occurs but no DTCs are stored in the control module and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Vehicle deviation	Misalignment of wheel and tire wheel Driving height wheel bearing ball joint Brake drag steering tie rod Rear suspension	Please refer to the following: Vehicle deviation diagnosis process
Abnormal driving track(Vehicle cannot stay straight)	Wheel and tire wheel alignment Wheel bearing Ball joint	Refer to Diagnostic Procedure for Travel Trajectory Anomaly (Vehicle Cannot Keep Travelling)

	Control arm bushing steering tie rod clearance steering gear clearance rear suspension	
Vehicle running swing	Tire out of balance, excessive wear Front wheel drive shaft wear Wheel bearing wear Steering system wear Suspension assembly is loose and worn FRT swing arm ball joint is worn Front suspension front swing arm bushing wear, loose horizontal stabilizer bar bushing wear Rear suspension bushing is worn or loose Abnormal wheel alignment	Please refer to the vehicle running swing diagnosis process.

Symptoms	Possible causes	Measures
Jitter when driving	Tire out of balance, excessive wear	Check tires Refer to wheels and tyres
	Front wheel drive shaft wear	Checking front wheel drive shaft Reference: Drive shaft fault symptom table
	Wheel bearing wear	Replace wheel bearing
	Steering system wear	Replace steering system wear parts
	Suspension assembly is loose and worn	Check suspension assembly Refer to: Torque Specifications General Specifications
	Suspension assembly bracket is loose	Tighten according to torque requirements Reference: Torque specifications General specifications
	Front swing arm ball joint wear	Replace front swing arm ball joint Reference: Front swing arm assembly(Bushing)
	Front suspension front swing arm bushing is worn and loose	Replace front suspension front swing arm bushing Reference: Front swing arm assembly(Bushing)
	Stabilizer bar bushing wear	Replace stabilizer bar bushing or connecting rod Reference: Front stabilizer bar assembly

	Rear trailing arm bushing is worn or loose	Replace rear trailing arm bushing if necessary Reference: Rear trailing arm
	Rear suspension rod bushing is worn or loose	Replace rear upper swing arm or rear lower swing arm Reference: Rear swing arm
	Abnormal wheel alignment	Wheel alignment reference: General specifications
Steering wheel out of center position	Wheel alignment Steering system components	Reference: Steering Wheel Out of Center Diagnostic Procedure

Symptoms	Possible causes	Measures
Excessive noise	Suspension assembly bracket is loose or worn Wheel bearing is worn Front swing arm bushing damping spring tire Front swing arm ball joint	Refer to the following: Excessive noise diagnosis process
Abnormal tire wear	Tire transpositi on tire pressure wheel deformatio n tire unbalance wheel positioning suspensio n component driving speed Rear subframe overload Bad operation habits	Reference: Abnormal tire wear diagnosis process
Heavy steering	Excessive positive caster	Wheel alignment reference: General specifications
	Worn or damaged front strut upper rotary bearing	Replace the front pillar assembly with a new one. Refer to the front pillar assembly.
	Steering mechanism or tie rod wear	Refer to Mechanical Steering Gear Assembly to replace the worn parts of steering system.
	Front suspension front swing arm ball joint wear	Replace front swing arm ball joint Reference: Front swing arm assembly(Bushing)
	Tire is worn or out of balance	Check tires Reference: Wheels and tyres
	Insufficient power steering	Refer to Steering System: Direction Weight

Symptoms	Possible causes	Measures

Unstable direction	Tire loss of balance, damage or excessive runout	Check tires Refer to: Wheels and tyres
	Toe-in value out of the specified range	Wheel alignment reference: General specifications
	Steering system wear	Refer to steering system fault symptom list
	Front suspension front swing arm ball joint is damaged	Replace front suspension front swing arm ball joint reference: Front swing arm assembly(Bushing)
	Front or rear damping spring becomes soft	Check damping spring Replace if necessary Refer to: Front Pillar Assembly Rear Coil Spring
	Front or rear suspension assembly wear	Replace worn parts of suspension assembly
	Loose and worn rear suspension, bushing or bolt	Replace rear suspension wear components

	Front stabilizer bar bushing or connecting rod wear	Replace stabilizer bar bushing or connecting rod Reference: Front stabilizer bar assembly
Steering wheel cannot return normally	Abnormal wheel alignment	Wheel alignment Reference: Suspension general specifications
	Steering system wear	Check steering system Reference: Steering does not return
	Front suspension front swing arm ball joint wear	Replace front suspension front swing arm ball joint reference: Front swing arm assembly(Bushing)
Body shake	Front stabilizer bar connecting rod or bearing wear	Replace FRT stabilizer bar connecting rod or bushing Reference: FRT stabilizer bar assembly RR stabilizer bar
	Front suspension front swing arm bushing is loose or worn	Repair or replace front suspension front swing arm bushing Reference: Front swing arm assembly(Bushing)
	Suspension assembly is loose or worn	Inspect the suspension assembly and replace the worn parts.

Symptoms	Possible causes	Measures
Body tilt	Front or rear damping spring becomes soft or damaged	Check damping spring and replace if necessary Reference: Front strut assembly rear coil spring
	Improper tire pressure	Adjust tire pressure
Poor driving comfort	Front or rear damping spring becomes soft	Check damping spring Replace if necessary Reference: Front strut assembly rear coil spring
	Front or rear suspension assembly wear	Replace worn parts of suspension assembly
Driving vibration	Tire Front wheel bearing Rear wheel bearing Front hub Rear hub	Refer to the following: Vibration diagnosis process

Wheel deviation diagnosis process

Test conditions	Details/Results/Measures
1. Check left and right deviation	

Description In order to avoid personal injury caused by out-of-control operation, road test inspection shall be conducted by two persons together to maintain safe driving conditions. Always maintain proper steering wheel control. Failure to follow these instructions may result in personal injury.	
	A. Drive the vehicle on a straight road at 80 km/h. B. Confirm that there is no side wind or strong wind when driving. C. Drive back and forth at least twice. D. If the vehicle is within 8s, its trajectory deviates more than 4.5 m, indicating that the vehicle is running off. Does the car run off? ? Yes to step 2. ? No Adjust the steering wheel to align it.
2. Steering system EPS inspection	

	A. Check whether the angle sensor is calibrated; B. Check the steering wheel deflection angle when the vehicle travels straight; C. Recalibrate the EPS according to the standard operation method, and check the deviation again. Does the car run off? ? Yes to step 3. ? No Recalibrate angle sensor.
3. Check tire	
	A. Check all wheels and tyres for consistency. B. Check all tires for close wear. C. Check whether the tire is packed or cracked. D. Check tire pressure. Is tire check normal? ? Yes to step 4. ? No Adjust or replace tires.
4. Check the effect of tire on the fault	
	A. Interchange the front suspension tires on the left and right. B. Check whether the unilateral residual dynamic balance of wheel and tire assembly is below 10 g, and re-dynamic balance. Is the vehicle still running off? ? Yes to step 5. ? No Finish the troubleshooting.
5. Check left and right wheelbase	
	A. Check left and right wheelbase. Whether the left and right wheelbases are consistent? ? Yes to step 6. ? No Correct left and right wheelbase.
6. Check steering connecting rod	
	A. Lift the vehicle. Reference: Lifting B. Inspect the steering connecting rod for excessive wear. Is the steering connecting rod excessively worn? ? Yes Replace or repair damaged components. ? No to step 7.
7. Check driving height	
	A. Check the driving height. Check whether the driving height is normal? ? Yes to step 8. ? No Repair driving height inconsistent fault.
8. Check wheel alignment	

	A. Check wheel alignment. Is the steering wheel in the center position and wheel alignment data within the specified range?

	? Yes to step 9. ? No Wheel alignment if necessary.
9. Check brake drag	
	A. Lift the vehicle. Reference: Lifting B. Check wheels for brake drag. Is there braking delay? ? Yes Repair brake drag fault. Reference: ? No to step 10.
10. Check rear suspension	
	A. Inspect the rear suspension positioning parameters. Is the rear suspension positioning normal? ? Yes Check the suspension parts for wear. If necessary, replace or repair damaged parts. Reference: Suspension system general specifications ? No Adjust or repair the rear suspension alignment error.

Excessive noise diagnosis process

Test conditions	Details/Results/Measures
1. Check suspension	
	A. Lift the vehicle. Reference: Lifting B. Inspect whether the suspension component mounting bolts are loose or broken. ? Yes Tighten or replace bolts. ? No to step 2.
2. Check damping spring	
	A. Inspect the damper spring for damage. Is the damping spring damaged? ? Yes Replace damping spring. ? No to step 3.
3. Check front suspension front swing arm	
	A. Inspect the front suspension front swing arm bushing for excessive wear or damage. Is the front suspension front swing arm bushing worn? ? Yes Replace front suspension front swing arm bushing. Reference: Front swing arm

	assembly(Bushing) ? No to Step 4.
4. Check ball joint	
	A. Lifting the vehicle. Reference: Lifting

	B. Grasp the ball pin end of the ball head pin of the front swing arm and the housing end, try to move up and down, and observe whether there is movement. Note that free movement is not allowed. Is there free movement? ? Yes Replace the front swing arm and swing arm ball pin. Reference: Front swing arm assembly(Bushing) ? No to step 5.
5. Check tire	
	A. Check the uneven tire wear. Is tire wear uneven? ? Yes Replace tires. Carry out wheel alignment. ? No to step 6.
6. Check hub bearing	
	A. Check hub bearing. B. Grasp the bottom and top of the wheel and shake firmly. Check whether the bearing is excessively loose. C. Rotate the front wheel and check the working condition. Is the bearing loose or noisy? ? Yes Replace front wheel bearing if necessary. ? No Confirm the fault described by the customer.

Vibration diagnosis process

Test conditions	Details/Results/Measures
1. Check tire	
	A. Lift the vehicle. Reference: Lifting B. Inspect the tire for damage or excessive wear. Is the tire damaged or worn? ? Yes Replace tires. ? No to step 2.
2. Check front wheel bearing	
	A. Check front wheel bearing. B. Grasp the bottom and top of the wheel and shake firmly. Check whether the bearing is excessively loose. C. Rotate the front wheels. Check front wheel working condition. Is the bearing loose or noisy? ? Yes to step 3. ? No to Step 4.
3. Measure axial clearance of front wheel bearing	

	A. Remove the wheel, caliper and brake disc. B. Install the dial indicator with mounting bracket and close to the front hub. C. Axially push and pull the hub, and check the axial clearance between the hub and front wheel bearing. Is the axial clearance of front wheel bearing within the specified value? ? Yes Check ball joint. Go to Step 4. ? No Replacing hub and bearing assembly.

4. Check rear wheel bearing	
	A. Check rear wheel bearing. B. Grasp the bottom and top of the wheel and shake firmly. Check whether the bearing is excessively loose. C. Rotate the rear wheels. Check rear wheel working condition. Is the bearing loose or noisy? ? Yes to step 5. ? No to step 6.
5. Measure axial clearance of rear wheel bearing	
	A. Remove rear wheels. B. Install the dial indicator with mounting bracket and close to the rear brake drum. C. Axially push and pull the wheel hub, and check the axial clearance of rear wheel bearing. Is the rear wheel axial clearance within the specified value? ? Yes to step 6. ? No Replace rear wheel bearing if necessary.
6. Check wheel/tire runout on the vehicle	
	A. Use radial runout meter to measure wheel and tire radial runout. The lateral and radial runout of assembly is less than 1.14 mm. Is the measured value within the specified range? ? Yes to step 12. ? No to step 7.
Measuring wheel/tire runout under 7.	
	A. Measure the wheel with radial or lateral runout more than 1.14 mm. Before removing the wheel, mark the position of the tire bolt and corresponding bolt hole so that the wheel can be installed in the original position. Remove the wheel and install it on the tire balancer and measure the runout. Radial and lateral runout of wheel and tire assembly must be less than 1.14 mm. Is the measured value within the specified range? ? Yes to step 10. ? No to step 8.
8. matching installation position	
	A. Mark the highest runout position of the tires and wheels. Release the air from the tire and rotate it 180 degrees. Inflate the tire and measure runout. Does the wheel and tire runout position coincide? ? Yes Dynamic tire balancing. ? No If the highest point of the two tests is more than 101.6 mm apart, replace the tire. If within 101.6 mm, go to step 9.
9. Measurement of wheel runout	
	A. Remove the wheel outer tire and install the wheel on the tire balancer. Measure runout of wheel inner and outer edges. Lateral and radial runout shall be less than 0.3 mm. Is the runout normal? ? Yes to step 10. ? No Replace the wheels. Check the runout of the new wheel. If the new wheel is within the specified range. Find and mark the lowest runout point. Install the tire so that the highest runout point of the tire matches the lowest runout point of the wheel for balancing.

10. Radial runout of rear hub and tire bolt	
	A. Measure wheel hub flange runout (greater than 0.254 mm), wheel bolt circumferential runout (greater than 0.08 mm). Is the measured value within the normal range? ? Yes to step 11. ? No Replace rear wheel hub.
11. Front hub and tire bolt circumferential runout	
	A. Remove front wheels. B. Remove brake disc. C. Measure tire bolt circumferential radial runout (greater than 0.06 mm). Is the measured value within the normal range? ? Yes Check brake disc runout. Reference: Brake disc runout check (2.3.1 Brake system overview, general check). ? No Replacing wheel hub.
12. Wheel balance	
	A. Tire balance. Perform a test drive. Do you feel the car vibrate? ? Yes Service. Reference: (1.1.5 Noise, Vibration and Irregularity). ? No Confirm repair is complete.

Vehicle running swing diagnosis process

Warning

In order to avoid personal injury caused by out-of-control operation, road test inspection shall be conducted by two persons together to maintain safe driving conditions. Always maintain proper steering wheel control. Failure to follow these instructions may result in personal injury.

Test conditions	Details/Results/Measures
1. Check tire	
	A. Check all wheels and tyres for consistency. B. Check all tires for close wear. C. Check whether the tire is packed or cracked. D. Check tire pressure. Is tire check normal? ? Yes, go to step 2. ? No, adjust or replace tires.
2. Check the effect of tire on the fault	
	A. Exchange front and rear tires. B. If necessary, install four tires in good condition.

	Does the vehicle still swing? ? Yes, go to step 3. ? No, replace tires.
3. Check front swing arm bushing	
	A. Inspect whether the front swing arm bushing is cracked, loose and loose. Check whether the front swing arm is normal? ? Yes, go to step 4. ? No, replace front swing arm bushing. Reference: Front swing arm assembly(Bushing)
4. Check wheel bearing	
	A. Lift the vehicle. B. Check wheel bearings. Is the wheel bearing normal? ? Yes, go to step 5. ? No, replace wheel bearing.
5. Check front stabilizer bar and connecting rod	
	A. Check whether the front stabilizer bushing is cracked and whether the connecting rod is loose. B. Inspect the front stabilizer bar for damage. Check whether the front stabilizer bar and connecting rod are normal? ? Yes, go to step 6. ? No, repair or replace front stabilizer bushing and connecting rod.
6. Check wheel alignment	
	A. Check wheel alignment. Is the steering wheel in the center position and wheel alignment data within the specified range? ? Yes, go to step 7. ? No, if necessary, carry out wheel alignment.
7. Check the clearance of steering mechanism	

	A. Lift the vehicle. B. Check the steering clearance. Reference: Steering system steering clearance check

	Is the clearance of steering mechanism normal? ? Yes, go to step 8. ? No, repair or replace the faulty component.
8. Check rear suspension	
	A. Inspect the rear suspension positioning parameters. Is the rear suspension positioning normal? ? Yes, check suspension parts for wear. If necessary, replace or repair damaged parts. Reference: Front pillar assembly Front subframe assembly Rear shock absorber assembly Rear subframe assembly ? No, adjust or repair the rear suspension positioning abnormal fault.

Steering Wheel Out of Center Diagnostic Process

Test conditions	Details/Results/Measures
1. Check steering wheel deviation	
2. Check steering components	
	A. Lift the vehicle. Reference: Lifting. B. Inspect the steering components for excessive wear. Are steering components excessively worn? ? Yes Replace or repair worn parts. ? No to step 3.
3. Check wheel alignment	
	A. Check wheel alignment. Is the steering wheel in the center position and wheel alignment data within the specified range? ? Yes Reference: Suspension system overview ? No Wheel alignment.

Abnormal tire wear diagnosis process

Test conditions	Details/Results/Measures
1. Check tire wear	

	A. Lift the vehicle. Reference: Lifting B. Check tire wear. Are the front two wheels excessively worn? ? Yes Tire transposition, replace tires if necessary. ? No to step 2.
2. Check tire	
	A. Check tire pressure and tire type. Is the tire pressure normal and the tire type consistent? ? Yes to step 3. ? No Replace the inconsistent tyres and adjust the tyre pressure. Reference:
3. Check wheels	
	A. Check wheels for distortion. B. Check wheel runout. Reference: General specifications Is the wheel check normal? ? Yes to step 4. ? No Adjust or replace wheel.
4. Check tire balance	
	A. Lift the vehicle. Reference: Lifting B. Remove tyre. C. Check the tire balance on the balancer. Is tire balance check normal? ? Yes to step 5. ? No Balance tires, replace tires if necessary.
5. Check wheel alignment	

	A. Check wheel alignment. Do wheel alignment parameters meet specifications? ? Yes to step 6.

	? No Adjust wheel alignment parameters.
6. Check front and rear suspension components	
	A. Check whether the front suspension component fastening bolt reaches the torque value. B. Inspect the front swing arm bushing and front stabilizer bar bushing for cracks. C. Check whether the front suspension ball joint is loose. D. Check whether the front suspension component fastening bolts are tightened. E. Check whether the bushing of rear suspension rod is cracked or loose. Check whether the front and rear suspension components are normal? ? Yes to step 7. ? No Repair front and rear suspension faults.
7. Check wheelbase	
	A. Check the wheelbase at the left and right sides of the vehicle. Whether the left and right wheelbases are consistent? ? Check the vehicle load status, driver's operation habits, and correct overload or incorrect operation habits. ? No Correct left and right wheelbase.

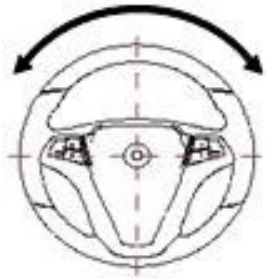
Check of high-speed steering wheel oscillation

Determination method

1 Inquire about the driving speed of the vehicle to be checked when the problem occurs, which is represented by V subsequently.

2 Ask the range of the speed V above. If the problem is found only near the specific speed, and the problem above or below this speed disappears, it is determined that the problem is sensitive to speed.

3 Ask whether the position is steering wheel or other. If the position is steering wheel, it is high-frequency swing back and forth along the circumferential direction of steering wheel (see the figure below) or jitter in other directions.



4 If the driving speed when the problem occurs is V≥80 km/h and is sensitive to the speed, and the steering wheel swings back and forth in the circumferential direction at a high frequency, the problem of high-speed steering wheel swings is suspected, and the corresponding troubleshooting steps in this guide are performed; otherwise, the problem of high-speed steering wheel swings is not classified as a problem.

Operating specifications	Judgment criteria

Operation essentials: 1) Identify a high-speed road that is straight and free from significant bumps or undulations for inspection, The maximum allowable speed on the road shall be higher than the speed at which the problem is fed back by the user. 2) Drive in a straight line at 60 km/h speed, hold the steering wheel stably to avoid significant correction, slowly increase the vehicle speed to exceed the problem occurrence speed V until reaching the road speed limit or 140 km/h, and check whether the problem recurs. 3) If possible, slowly reduce the vehicle to 60 km/h and check whether the problem is repeated. 4) Pay attention to the safety of the vehicle during the above process to avoid driving risks. 5) Drive along the same lane, repeat step 2-4 three times	For more than 80 KM/h, gently hold the steering wheel, and the hand can obviously perceive the steering wheel swinging in the circumferential direction, which can be seen by the naked eye, and it can be considered as shimmy and need to be repaired.

If it is checked according to the above method, it is not judged that the high-speed driving steering wheel is shimmy, but the treatment method is as follows:

1 During acceleration, the vehicle swings abnormally, and the larger the acceleration, the larger the swing. Check whether the parts involved in power transmission to the drive wheels are deformed, or whether the spring length is too long/the vehicle attitude is too high.

2 During braking, the steering wheel swings abnormally. Check whether the left and right brake systems are abnormal, or the steering knuckle, swing arm and other rubber bushings are abnormally cracked and deformed.

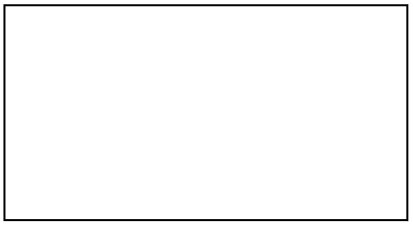
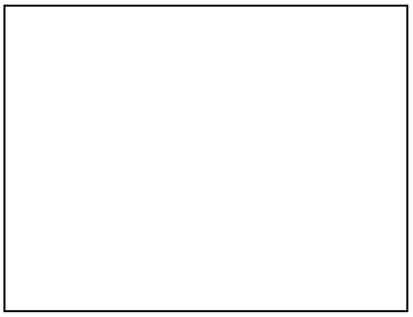
3 Abnormal jitter of low/idle steering wheel: Check whether the engine,

transmission and suspension are abnormal. Maintenance steps

For vehicles identified for high-speed steering wheel swing, the possible causes of failure are:

Check items			Inspection and maintenance methods
A	Basic driving state		
	A.1	Tire pressure	All tire pressures shall meet the full-load pressure requirements of the corresponding specifications on the tire pressure indication plate, and the difference shall be less than 10kpa or 0.1 bar. If not, re-inflate.
	A.2	Wheel dynamic balance and runout	A.2.1 Before wheel dynamic balancing, clean the embedded sand and stone on the tire, and remove all installed balance weights. A.2.2 Operate the equipment correctly, measure the wheel size, and select the balance weight installer. Type: Paste/hitch the balance weight according to the position and grams indicated by the equipment. The actual weight of assembled balance weight and the indicated value shall be ≤5g. The total number of one-side hanging counterweights shall not exceed two, the total weight shall not exceed 60 g, and the total weight of one-side sticking counterweights shall not exceed 100 g; A.2.3 After installing the balance weight, re-check the dynamic balance result to ensure the dynamic balance residual amount < 10 g; otherwise, repeat the above steps again until the dynamic balance residual amount meets the requirements. If the adjustment still fails to meet the

			requirements for several times, press again as next step. Check and sub-assemble the tire, and then adjust the dynamic balance. The method is as follows: 1) Check the wheel and tire assembly, if there is a light mark on the tire, Align with the key points of the corresponding wheels (if not, select the valve) and subassemble them.

			The distance between them is within ±50 mm in the circumferential direction. If the requirements are not met, repack them. 2) Before subassembly, check that there is no foreign matter between the rim and the tire, and it is on both sides of the tire. Apply special lubricant evenly along the circumference 360? Of the bead. 3) After subassembly, inflate according to standard air pressure requirements, check the appearance, and confirm that the tire and rim have fully sprung up.
	A.3	Model, brand and pattern of left and right wheels	A.3.1 If a single guide tire is used, first check and adjust the outer side of the tire toward the outer side of the vehicle.A.3.2 Replace the front and rear wheels. When changing the rear wheels to the front wheels, exchange the left and right positions at the same time, that is, change the rear left wheels to the front right wheels, and change the rear right wheels to the rear left wheels.A.3.3 If the left and right wheels are inconsistent, replace the tire and wheel with the same state on the left and right sides.
	A.4	Four-wheel alignment, EPS neutral	  A.4.1 If the steering wheel rotates to the left and right respectively, the angle difference is large. (≥12°) Reinstall the steering wheel to the correct position, as shown in Fig.1. A.4.2 Check four-wheel alignment: 1) Correctly park the vehicle on the special four-wheel alignment equipment, and straighten the vehicle and Tires, avoid tilting or parking away from the center of the equipment; 2) During the test, only the tires come into contact with the plane of the equipment, and other tires shall not be lifted. Vehicle position; 3) Follow the equipment instructions correctly; 4) When turning the steering wheel, ensure that the front and rear wheels are self- Movement without tire deformation.

			A.4.3 Adjust four-wheel alignment: 1) The adjustment objective is to meet the design criteria and to be substantially symmetrical between the left and right. 2) Lock the steering wheel in the center position, as shown in Figure 2; Adjust the front and rear wheel alignment parameters before unlocking the steering wheel.

				3) If the camber is adjustable, adjust the camber before adjusting the toe-in; If the front wheel camber is non-adjustable design, adjust according to the method in Schedule 3.2. 4) When adjusting toe-in, use two wrenches to clamp the two ends of the threaded fitting pair respectively. While rotating near the tire end, keep the other end in a fixed position to avoid being rotated at the same time. 5) Unlock the steering wheel and re-test to ensure that the adjusted four-wheel alignment parameters adjust the target. A.4.4 Dynamic inspection, determine the steering wheel angle to keep the vehicle running straight at a constant speed, and calibrate the EPS angle sensor at this angle after the vehicle is stopped stably (except for vehicles with HPS configuration).
B	Component status			
	B.1	Wheels		
		B.1. 1	Tire wear transition or abnormal wear,	Tire verification for right and left replacement status
		B.1. 2	Wheel deformation	Verification of wheels with consistent replacement status on the left and right sides
		B. 13	Tire bulging and cracking	Tire verification for right and left replacement status
		B.1. 4	Restricted rotation	B.1.4.1 Check hub bearing; if there is abnormality, replace and check B.1.4.2 Check whether the brake caliper is fitted to the brake disc in the non-brake state; if there is any abnormality, replace and check.
	B.2	Drive shaft		
		B.2. 1	Deformation	If there is abnormality visible to the naked eye, replace and check.
		B.2. 2	Loose and stagnant splines, bearings, etc.	If there is obvious blocking abnormality, replace and check.
	B.3	Swing arm		
		B.3. 1	Deformation	Replace and troubleshoot any visible abnormality.
		B.3. 2	Loose or stuck ball joint	Shake the ball joint at the joint between swing arm and steering knuckle forcefully. Compare the left and right sides. If one side is obviously stuck, abnormal sound or loose, replace and check.
		B.3. 3	Rubber bushing cracking and deformation	Replace and troubleshoot any visible abnormality.
		B.3. 4	Hydraulic bushing cracking and oil leakage	If the hydraulic bushing function fails due to visual abnormality, replace and check.

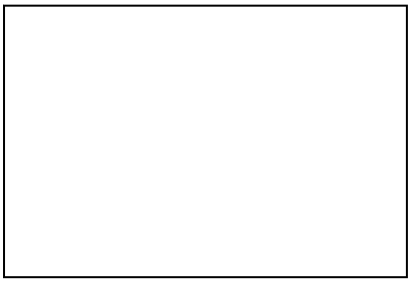
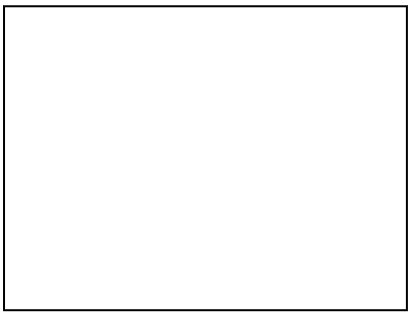
	B.4	Steering gear	

		B.4. 1	Deformation	If there is abnormality visible to the naked eye, replace and check.
		B.4. 2	Loose or stuck ball joint	Shake the ball joint at the joint between swing arm and steering knuckle forcefully. Compare the left and right sides. If one side is obviously stuck, abnormal sound or loose, replace and check.
		B.4. 3	HPS oil circuit is blocked	For the model equipped with hydraulic power steering gear, if there is great difference between the left and right steering hand forces when the vehicle is in lifting state, i.e. the wheels are off the ground, check the following sequence: B.4.3.1 Replace the steering oil and clean the oil circuit.B.4.3.2 If not, replace the steering gear.B.4.3.3 If not, replace the steering pump.
	B. 5	Spring		
			Deformation	Measure the height of the wheel cover from the wheel or the ground with a ruler, if the difference between the left and right exceeds For 20 mm, replace the spring from the lower side.
	B. 6	Damper		
		B.6. 1	Deformation	Inspect the bracket, piston rod and oil storage barrel at the joint with steering knuckle. If there is any visible abnormality, replace it.
		B.6. 2	Abnormal damping force	Dynamic inspection, left and right side comparison, if the damping force on one side is obviously too small or too large, or the movement jamming is abnormal, replace and inspect.
		B.6. 3	Upper mounting seat bearing rotation stagnation	Fix one end of the shock absorber and the mounting seat, rotate the other end, compare the left and right sides, if one side is obviously stuck, replace and check.
		B.6. 4	Upper mounting seat rubber bushing cracking deformation	Replace and troubleshoot any visible abnormality.

Attached table

Camber adjustment method of front wheel

A	Operating procedures: 1) Lifting the vehicle 2) Removing front wheel 3) Loosen but do not remove the connecting bolts between the steering knuckle and the brake until the brake can shake relative to the strut.

B. 1	Reducing front camber: 1) Apply the upper end of the brake to the inner side, and apply the lower end of the brake to the outer side, as shown in the figure; 2) While keeping the upper end of the brake rotating inwards, tighten the mounting bolts according to the sequence of first one and then two, tighten the torque to the design value of ±5N.m, and color code.	
B. 2	Increase front camber: 1) The upper end of the brake applies thrust to the outside, and the lower end of the brake applies thrust to the inside, as shown in the figure; 2) While keeping the upper end of the brake rotating outward, tighten the mounting bolts according to the sequence of first one and then two, tighten the torque to the design value of ±5N.m, and color code.	

Abnormal sound diagnosis process

Due to various driving abnormal sound failure modes and many factors (road surface, vehicle speed, engine speed, gear, temperature, etc.) causing abnormal sound at the same time, it is preferable to confirm the main factors and sound type causing abnormal sound for driving abnormal sound. Generally, the abnormal sound on good road surface such as high speed is mainly related to power and transmission system. Sound type: Continuous "buzzing" sound; The bumpy road is mainly related to the chassis parts, and the sound type: Random "knock," "click," "click" sound.

Diagnostic process of driving "buzzing" sound

Test conditions	Details/Results/Measures
1. Chassis inspection	
	A. Lift the vehicle. Reference lift B. Check chassis Is chassis armor installed? ? Yes Tighten or remove. ? No to step 2.
2. Check A/C pipeline	
	A. Check A/C pipeline Is it not firmly fixed or interfered? ? Yes Re-fixing or bandaging. ? No to step 3.
3. Check fuel pipeline	

Test conditions	Details/Results/Measures
	A. Check fuel pipeline Is it not firmly fixed or interfered? ? Yes Re-fixing or bandaging. ? No to Step 4.
4. Check gearshift cable	
	A. Check gearshift cable Is it not firmly fixed or interfered with the periphery? ? Yes Re-fixing or bandaging. ? No to step 5.
5. Check tire	
	A. Check tire Is there damage, wear, bulging or stone? ? Yes Pick out stones or replace tires. ? No to step 6.
6. Check brake disc	
	A. Check brake disc Turn the tyre, check: Does the dust cover interfere with the brake disc or is there any stone?Is there obvious brake disc wear? ? Pry off the dust cover, pick out the stone or replace with a new brake disc. ? No to Step 7
7. Check hub bearing	
	A. Check bearing Rotate the tire and check whether the bearing is obviously loose. ? Yes Replace hub bearing. ? No to step 8.
8. Check drive shaft	
	A. Check drive shaft

Test conditions	Details/Results/Measures
	Is the drive shaft worn or deformed? ? Yes Replace drive shaft.

"Knock" sound on bumpy road

Test conditions	Details/Results/Measures
1. Chassis inspection	
	A. Lift the vehicle. Reference: Lifting B. Check chassis Is there chassis bolt torque attenuation? ? Yes Tighten or replace bolts. ? No to step 2.
2. Check damper	
	A. Check damper Is it loose, damaged or leaking? ? Yes Fastening or replacing spring strut. ? No to step 3.
3. Check connecting rod	
	A. Check connecting rod Is it loose, damaged or leaking? ? Yes Tighten or replace connecting rod. ? No to Step 4.
4. Check rear suspension	
	A. Check rear suspension Is it loose, damaged or leaking? ? Yes Fastening or replacing rear suspension.

"Click" sound on bumpy road

Test conditions	Details/Results/Measures
1. Chassis inspection	
	A. Lift the vehicle. Reference: Lifting B. Check chassis Is there chassis bolt torque attenuation? ? Yes Tighten or replace bolts. ? No to step 2.
2. Check steering column	
	A. Check steering column Are the connecting bolts loose? ? Yes Tighten or replace steering column. ? No to step 3.
3. Check steering tie rod	
	A. Check steering tie rod Is it loose, damaged or leaking? ? Yes Tighten or replace steering tie rod. ? No to Step 4.
4. Check steering gear	
	A. Check steering gear Is it loose, damaged or leaking? ? Yes Tighten or replace steering gear.

Bumpy road "Bang Bang" sound

Test conditions	Details/Results/Measures
1. Chassis inspection	
	A. Lift the vehicle. Reference: Lifting B. Check chassis Is there chassis bolt torque attenuation?

Test conditions	Details/Results/Measures
	? Yes Tighten or replace bolts. ? No to step 2.
2. Check front cover	
	A. Check front cover Is the front cover not firmly fixed or the cushion cannot be supported? ? Yes Tighten or rotate the cushion. ? No to step 3.
3. Check brake caliper	
	A. Check brake caliper Is the friction block loose? ? Yes Spray lubricating oil or replace friction block. ? No to Step 4.
4. Check rear suspension	
	A. Check rear suspension Is the rear suspension loose or interfering? ? Yes Fastening or rear suspension. ? No to step 5.
5. Check swing arm	
	A. Check swing arm Are the connecting bolts loose? ? Yes Tighten or replace swing arm. ? No to step 6.
6. Check subframe	
	A. Check subframe Is the subframe mounting plane loose and uneven? ? Yes Tighten or replace subframe.

Check the running deviation

Determination method

Operating specifications	Judgment criteria
1) Determine a straight, dry, hard road with no obvious bumps or undulations for inspection, and the number of driving lanes in the same direction is ≥2, so as to ensure that the vehicle can still drive safely in case of deviation. 2) The speed reaches and maintains the speed ±2 km/h in the judgment standard, and the steering wheel angle is adjusted so that the vehicle is aligned with the reference line (such as the lane separation marking). Note that the steering wheel should not be driven in the center position by naked eyes. 3) Hold the steering wheel lightly with both hands to keep the speed stable, fine adjust the steering wheel to avoid large angle correction of the steering wheel, find the steering wheel angle that makes the vehicle travel straight, and stabilize the steering wheel angle and drive at a constant speed. 4) Pay attention to safe driving until the vehicle runs more than the standard or the distance required by the standard. 5) Repeat step 2-4 three times along the same lane. 6) If the driving conditions permit, repeat the steps in the opposite direction of the same lane. 2-5 If the running direction is opposite to the aforesaid direction, it indicates that the inspection is disturbed by the inclination of the left and right directions of the road, and the road inspection shall be re-selected.	80 KM/h Drive 7s, the left and right offset exceeds one lane (approx. 3.7 m), and the vehicle is always offset to the left (or to the right), it is considered as running deviation and needs to be repaired.

If it is not judged as deviation according to the above method, but the following phenomena exist, the treatment method is:

1 The acceleration driving vehicle deviates from the driving path abnormally, and check whether the parts involved in the power transmission to the drive wheels are deformed and other problems, resulting in the difference of torque between the left and right drive wheels.

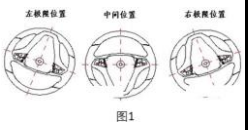
2 The vehicle deviates from the driving track abnormally during braking. Check whether there is abnormality in the left and right brake systems, resulting in difference in the brake torque of the left and right wheels.

3 After the steering wheel is centered, the vehicle deviates from the driving path, readjust the four-

wheel alignment and calibrate the EPS angle sensor. Refer to A.3. Maintenance steps

The possible cause of the fault is:

Check items			Inspection and maintenance methods
A	Basic driving state		
	A. 1	Tire pressure	All tire pressures shall meet the full-load pressure requirements of the corresponding specifications on the tire pressure indication plate, and the difference shall be less than 10kpa or 0.1 bar. If not, re-inflate.
	A. 2	Model, brand and pattern of left and right wheels	A.2.1 If a single-guide tyre is used, first check and adjust the outside of the tyre towards the outside of the vehicle. A.2.2 Replace left and right wheels A.2.3 If the left and right wheels are inconsistent, replace the tire and wheel with the same state on the left and right sides.

	A. 3	Four-wheel alignment, EPS neutral	 图1	
			A.3.1 If the steering wheel has large angle difference (≥12°) at the left and right rotation limit positions, reinstall the steering wheel to the correct position first, as shown in Fig.1. A.3.2 Check four-wheel alignment: 1) Correctly park the vehicle on the special four-wheel positioning equipment, straighten the vehicle and tires, and avoid tilting or parking away from the equipment center; 2) During the test, only the tires are in contact with the plane of the equipment, and other vehicle parts shall not be lifted; 3) Follow the equipment instructions correctly; 4) When turning the steering wheel, ensure that the front and rear wheels can move freely relative to the equipment plane without tire deformation. A.3.3 Adjust four-wheel alignment: 1) The adjustment objective is to meet the design criteria and to be substantially symmetrical between the left and right. 2) Lock the steering wheel in the center	

				Both ends of the auxiliary shall keep fixed position while rotating near the tire end to avoid being rotated at the same time. 5) Unlock the steering wheel and re-test to ensure that the adjusted four-wheel alignment parameters adjust the target. A.3.4 Re-check the deviation, determine the steering wheel angle to keep the vehicle running straight, and calibrate the EPS angle sensor at this angle after the vehicle is stopped stably (except for vehicles with HPS configuration).
B	Component status			
	B. 1	Wheels		
		B.1. 1	Tire wear transition or abnormal wear,	Tire verification for right and left replacement status
		B.1. 2	Wheel deformation	Verification of wheels with consistent replacement status on the left and right sides
		B. 13	Tire bulging and cracking	Tire verification for right and left replacement status
		B.1. 4	Restricted rotation	B.1.4.1 Check hub bearing; if there is abnormality, replace and check B.1.4.2 Check whether the brake caliper is fitted to the brake disc in the non-brake state; if there is any abnormality, replace and check.
	B. 2	Drive shaft		
		B.2. 1	Deformation	If there is abnormality visible to the naked eye, replace and check.
		B.2. 2	Loose and stagnant splines, bearings, etc.	If there is obvious blocking abnormality, replace and check.
	B. 3	Swing arm		
		B.3. 1	Deformation	Replace and troubleshoot any visible abnormality.
		B.3. 2	Loose or stuck ball joint	Shake the ball joint at the joint between swing arm and steering knuckle forcefully. Compare the left and right sides. If one side is obviously stuck, abnormal sound or loose, replace and check.
		B.3. 3	Rubber bushing cracking and deformation	Replace and troubleshoot any visible abnormality.

		B.3. 4	Hydraulic bushing cracking and oil leakage	If the hydraulic bushing function fails due to visual abnormality, replace and check.
	B. 4	Steering gear		
		B.4. 1	Deformation	If there is abnormality visible to the naked eye, replace and check.
		B.4. 2	Loose or stuck ball joint	Shake the ball joint at the joint between steering gear and steering knuckle and the side tie rod and teeth

				The ball joint at the strip connection is compared at the left and right sides. If one side is obviously stuck, abnormal sound or loose, replace and check.
		B.4. 3	HPS oil circuit is blocked	For the model equipped with hydraulic power steering gear, if there is great difference between the left and right steering hand forces when the vehicle is in lifting state, i.e. the wheels are off the ground, check it in the following order: B.4.3.1 Replace the steering oil and clean the oil circuit.B. 4.3.2 If not, replace the steering gear.B.4.3.3 If not, replace the steering pump.
	B. 5	Spring		
			Deformation	Use a ruler to measure the height of the wheel cover from the wheel or the ground. If the difference between the left side and the right side exceeds 20 mm, replace the spring from the lower side.
	B. 6	Damper		
		B.6. 1	Deformation	Inspect the bracket, piston rod and oil storage barrel at the joint with steering knuckle. If there is any visible abnormality, replace it.
		B.6. 2	Abnormal damping force	Dynamic inspection, left and right side comparison, if the damping force on one side is obviously too small or too large, or sports jamming and other abnormalities, replace and inspect.
		B.6. 3	Upper mounting seat bearing rotation stagnation	Fix one end of the shock absorber and the mounting seat, rotate the other end, compare the left and right sides, if one side is obviously stuck, replace and check.
		B.6. 4	Upper mounting seat rubber bushing cracking deformation	Replace and troubleshoot any visible abnormality.
Camber adjustment method of front wheel				

A	Operating procedures: 1) Lifting the vehicle 2) Removing front wheel 3) Loosen but do not remove the connecting bolts between the steering knuckle and the brake until the brake can shake relative to the strut. 4) For reduced camber, refer to B.1; For increased camber, refer to B.2; 5) Install the front wheels. Install the tyre nuts with small torque evenly and gradually, so as to avoid the tyre and brake mounting surface from not fitting due to complete tightening of individual nuts before tightening other nuts. After confirming the wheel and brake plane are fitted, tighten the torque to the design value of ±10N.m.

B. 1	Reducing front camber: 1) Apply the upper end of the brake to the inner side, and apply the lower end of the brake to the outer side, as shown in the figure; 2) While keeping the upper end of the brake rotating inwards, tighten the mounting bolts according to the sequence of first one and then two, tighten the torque to the design value of ±5N.m, and color code.	
B. 2	Increase front camber: 1) The upper end of the brake applies thrust to the outside, and the lower end of the brake applies thrust to the inside, as shown in the figure; 2) While keeping the upper end of the brake rotating outward, tighten the mounting bolts according to the sequence of first one and then two, tighten the torque to the design value of ±5N.m, and color code.	

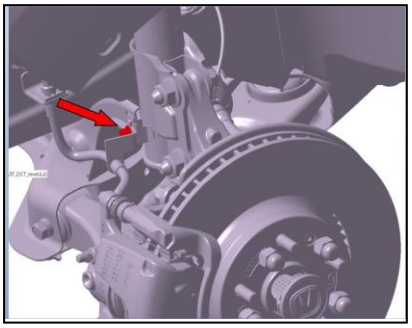
Removing and installing front pillar assembly

1. Removal

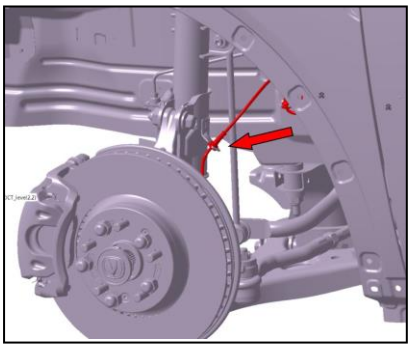
   1 Remove wheel. Reference: Wheels and tyres

   2 Lift the vehicle. Reference: Lifting

   3 Remove retaining bolts of brake oil pipe bracket on front pillar. Tool: Sleeve (1 3), torque: 22±2N.m.

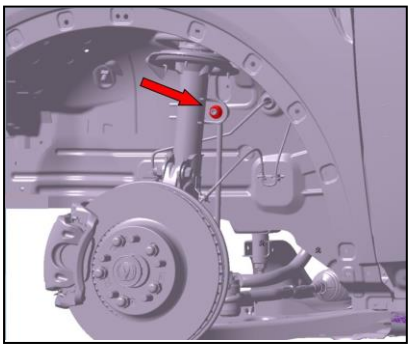


   4 Remove FRT strut UPR wheel speed sensor harness clamp

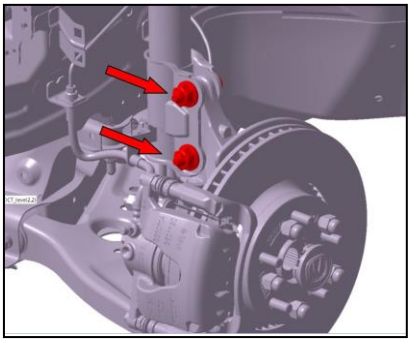


   5 Remove the connecting rod ball joint on the front strut. Tool: Sleeve (1 9), torque: 90±5N.m

   Warning Use cotton cloth to protect the ball joint from damage during removal. Do not clamp the dust cover side with a tool when removing the nut to avoid dust cover damage.



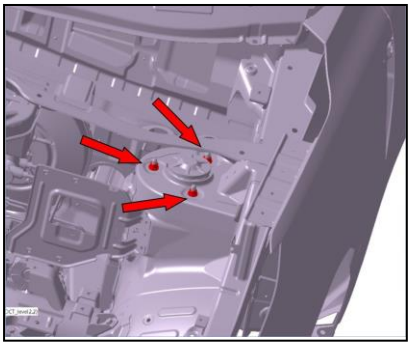
   6 Remove each 2 front strut steering knuckle connecting bolts and nuts. Tool: Sleeve (2 1), torque: (220 ±10) N.m



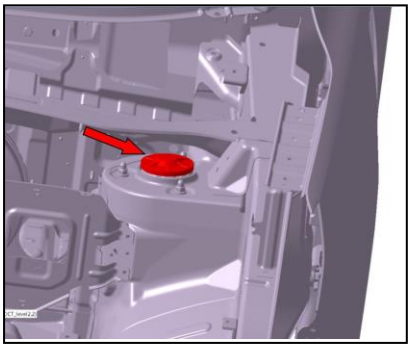
7 Separate the steering knuckle from the front strut assembly.

8 Remove front cover trim, refer to: Removing and installing front cover

9 Loosen the three retaining nuts at the upper part of the front pillar assembly, and take out the front pillar assembly. Tool: Sleeve (2 2), torque: 68 ±5 N.m



10 Remove the front pillar assembly, and remove the rubber dust cover on the pillar.



2. Installation

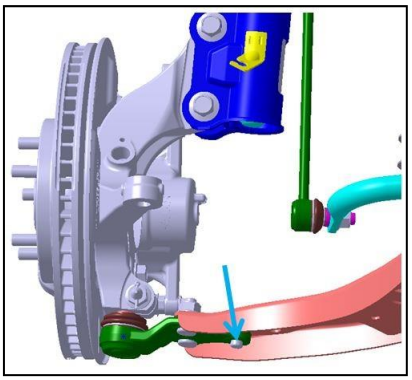
Installation sequence is reverse to removal sequence

Front swing arm assembly(Bushing)

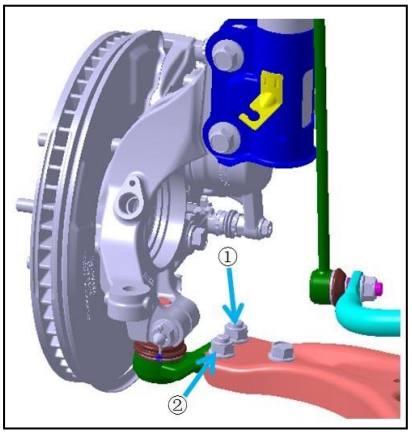
1. Removal

1 Lift the vehicle and remove the front wheels. Reference: Lifting, wheels and tires

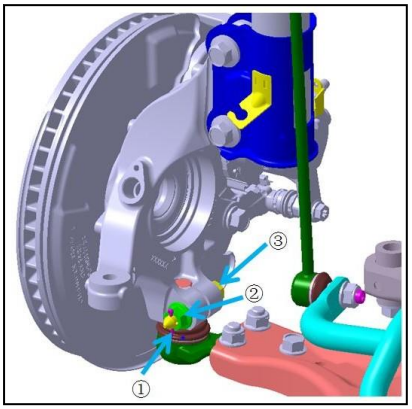
2 Remove retaining bolts of front swing arm and ball pin of front swing arm, torque 120 ±10N.m.



3 Remove the retaining nuts of front swing arm and ball pin of front swing arm, with torque of 90±5N.m.



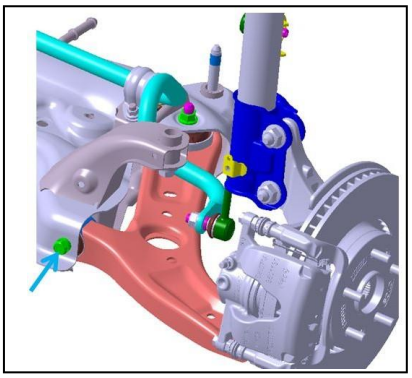
4 Remove the cotter pin, nut and bolt connecting the front swing arm ball pin and brake, torque 120 ±10N.m.



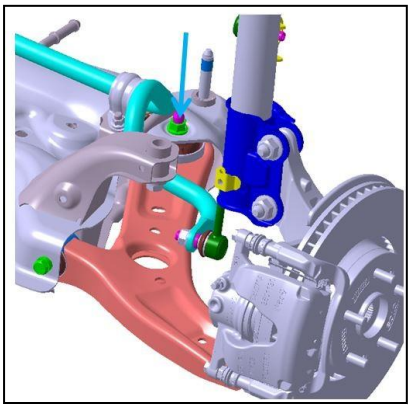
5 Remove the front swing arm ball pin assembly. Special tool: Tie rod ball joint lock nut removing tool

Warning **Use cotton cloth to protect the ball joint from damage during removal.**

6 Remove the front swing arm assembly and front subframe front bushing mounting bolts, torque 120 ±10N.m.



7 Remove the front swing arm assembly and front subframe rear bushing mounting nuts and bolts, torque 150 ±10N.m.



8 Lift the stabilizer bar, and then remove the front swing arm assembly.

2. Installation

1 **The installation process is the reverse of the removal sequence.**

Warning During installation, pay attention to the torque of all bolts during tightening.Warning Be careful not to break the dust cover of the ball pin of the front swing arm when installing the front brake and the ball pin of the front swing arm.

Warning Parts with dust cover shall be inspected for scratches and damages (visual inspection) after assembly.

Front stabilizer assembly

1. Disassembling

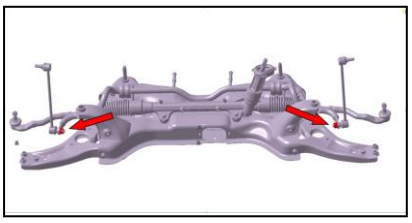
1 Remove wheel. Refer to: Wheels and tyres

2 Lifting the vehicle, refer to: Lifting

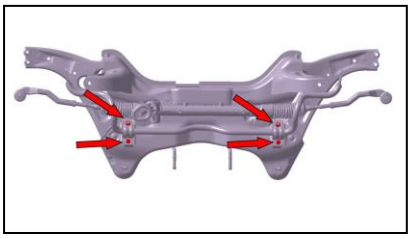
3 Remove the front swing arm assembly and subframe assembly, and remove the front subframe assembly from the vehicle body as a whole. Refer to: Front swing arm assembly (bushing) Front subframe assembly

4 Remove the front stabilizer bar and connecting rod ball pin nuts at both ends. Torque: 90±5N.m.

Caution Use cotton cloth to protect the ball joint from damage. Do not clamp the dust cover side with a tool when removing the nut to avoid dust cover damage.

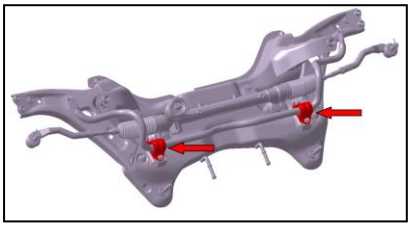


5 Dismantle two mounting bolts and nuts of front stabilizer bar assembly respectively. Torque: 65 ±5N.m



6 Remove front stabilizer bar assembly (includes stabilizer bar bracket and stabilizer bar bushing).

7 Removing front stabilizer bar bushing, bracket



2. Installation

The installation sequence is the reverse of the removal sequence.

Front subframe assembly

Removal

1. Remove wheel.Wheels and tyres

2. Lift the vehicle.Lifting

3. Remove front

stabilizer bar and front

connecting rod nut a.

Torque: (65±5) N.m

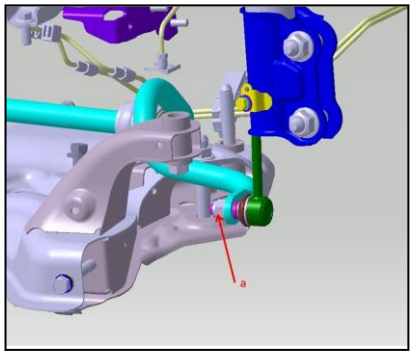


Figure 34:

4. Remove connecting nut

b between steering tie rod

and steering knuckle.

Torque: (45±5) N.m

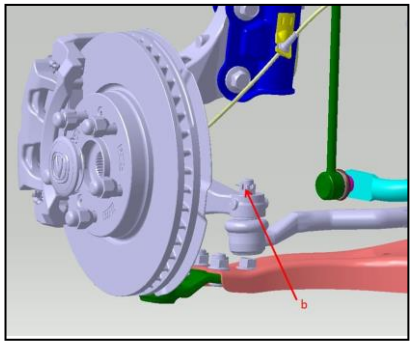


Figure 35:

5. Remove the nut attaching the swing arm ball pin

to the steering knuckle and cotter pin c. Torque:

(120 ±10) N.m

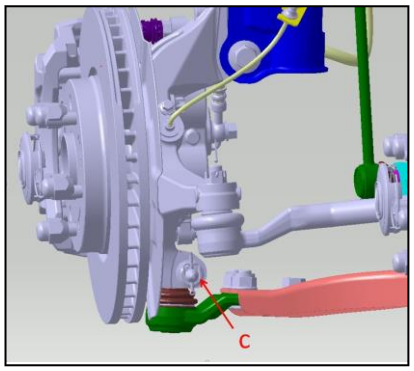


Figure 36:

6. Remove the rear suspension and

engine carrier attachment bolts d.

Torque: (65±3.3) N.m

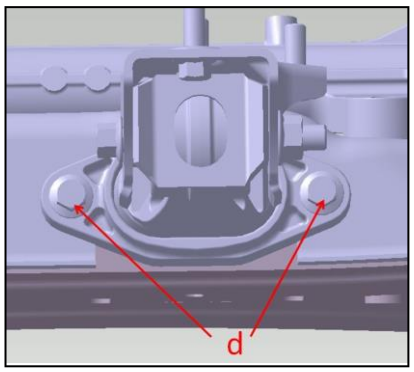


Figure 37:

7. Support the engine carrier assembly with a lifting device that moves up and down.

8. Remove the engine carrier to body rail

attachment bolts nuts f and g. Torque: F: (220 ±22)

N.m

G: (220 ±22) N.m

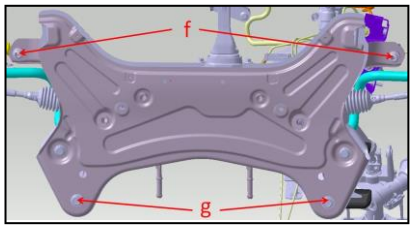


Figure 38:

9. Remove the engine carrier assembly and its components.

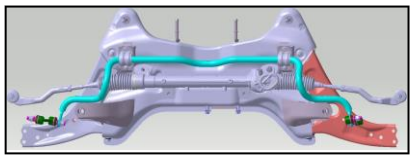


Figure 39:

10. Remove the steering gear assembly. Mechanical steering gear assembly

11. Remove the front stabilizer bar assembly and its accessories.

12. Remove the front swing arm assembly. Front swing arm assembly(Bushing)

13. Remove the rear suspension cushion

assembly and be the engine carrier assembly.

Installation

The installation sequence is the reverse of the removal sequence. Note: The relevant torque value must comply with the regulations.

Rear Damper Assembly

1. Disassembly

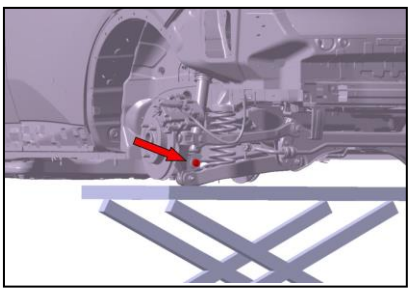
1 Remove the wheels.

Reference: Wheels and tyres

2 Lift the vehicle.

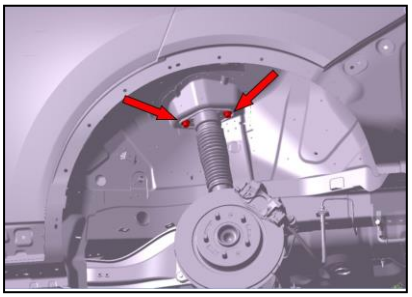
Reference: Lifting

3 Use a flat-panel jack to support the rear brake assembly and remove the rear shock absorber assembly lower and rear brake assembly attachment bolts. Torque: (150 ±10) N.m



4 Remove the 2 attaching bolts on the rear shock absorber assembly and body.

Torque: (68±5) N.m



5 Remove the rear damper assembly.

2. Installation

Installation order is reverse to removal order

Rear coil spring

1. Disassembly

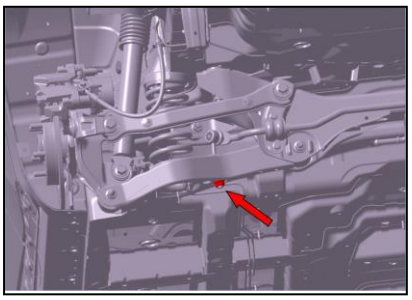
1 Remove the wheels.

Refer to: Wheels and tyres

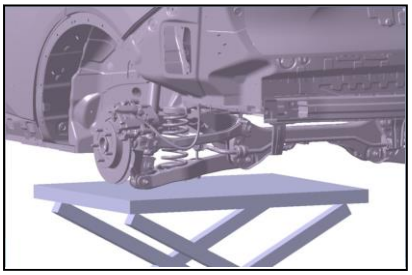
2 Lift the vehicle.

Refer to: Lifting

3 First remove the connecting rod and rear swing arm mounting nuts; Torque: (90±5) N.m.

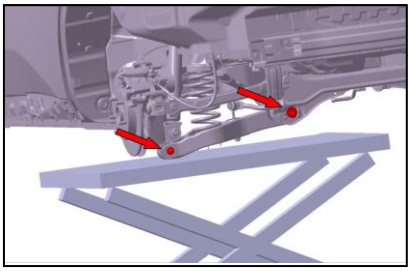


4 Use a flat jack to support the rear lower swing arm assembly.



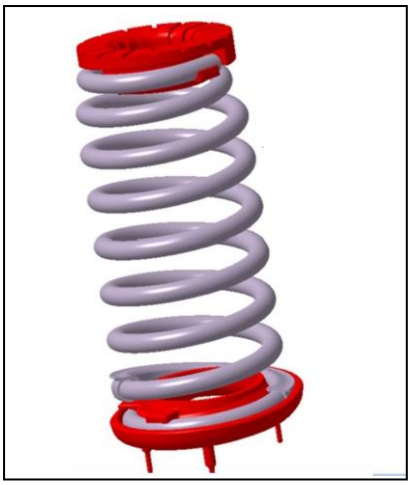
5 First remove the rear swing arm and rear brake mounting bolts and nuts; Torque: (150 ±10) N.m;

Secondly, loosen the rear swing arm and rear subcar mounting bolts (loosening is enough without removing), torque: (150 ±10) N.m.

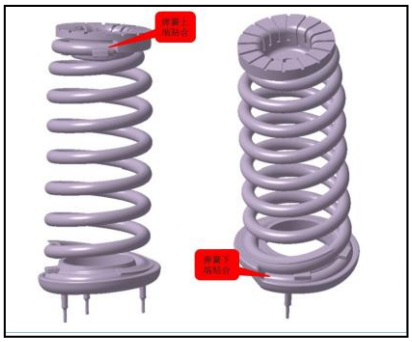


The pre-tensioning force (rebound force) of the Caution rear coil spring in the installed state is large, and it must be supported by the tool before operation, otherwise it may cause personal injury.

6 Slowly lower the hoist and remove the rear coil spring and rear coil spring upper and lower pads. Remove the upper and lower spring pads.



Caution 1. When fitting the upper and lower spring pads on the rear coil spring, be sure to close the spring end to the stop boss of the spring pad.



1. After maintenance is completed due to loosening of the rear swing arm and rear subframe mounting bolts, check and confirm the positioning parameters of the rear wheels.

1. Installation

Installation order is reverse to removal order

Rear subframe assembly

Disassembly

1 Remove the wheels.

Reference: Wheels and tyres

2 Lift the

vehicle.

Reference:

Lifting

3 Remove the rear suspension toe assembly attaching bolts to the rear subframe.

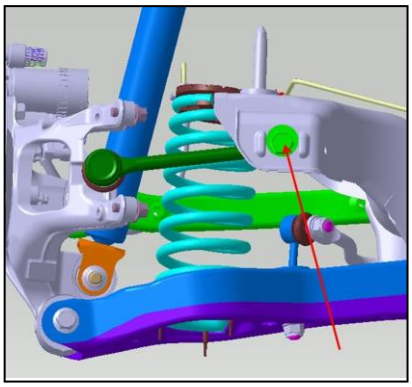


Figure 40:

4 Remove the rear transverse control arm and rear subframe attachment bolts.

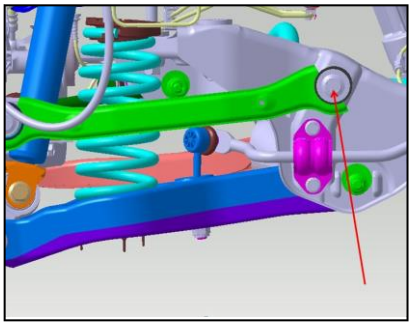


Figure 41:

5 Remove the rear coil spring and rear swing arm assembly. Rear coil spring

6 Remove the rear stabilizer bar. Rear stabilizer bar

7 Support the rear subframe assembly with a flat jack (or a lifting support device such as a horizontal roof support), and remove the connecting bolts and nuts between the rear subframe and the vehicle body.

Torque: (200 ±10) N.m

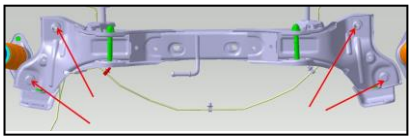


Figure 42:

8 Lower the top support height and remove the rear subframe assembly.

Installation

Caution The final fastening of the rear suspension parts shall not be carried out until the full mass of the vehicle is carried by the wheels.

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

2 Brake system exhaust.

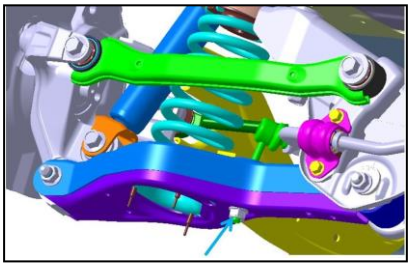
Reference: Brake System Exhaust

Rear swing arm

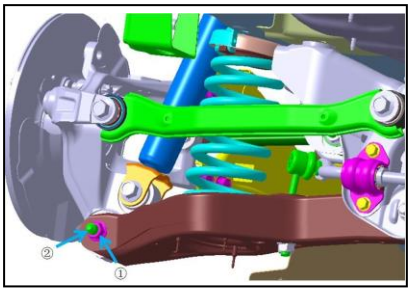
Disassembly

1 Remove the rear wheels, lift the vehicle, and support the rear lower swing arm assembly with a flat panel jack. Reference: Rear coil spring

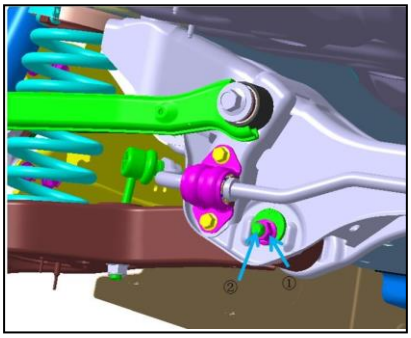
2 Remove rear connecting rod and rear swing arm mounting nut, torque 90N.m.



3 Remove rear swing arm and rear brake mounting bolts, nuts, torque 150 ±10N.m.



4 Remove the rear swing arm and rear subcar mounting eccentric bolts, nuts, torque 150 ±10N.m.



5 Slowly lower the lift and remove the

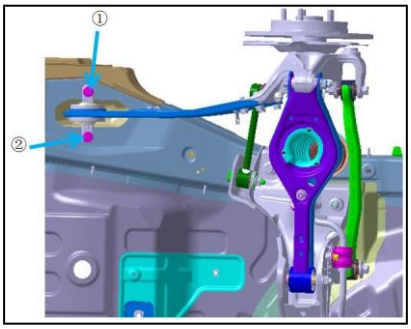
rear swing arm assembly. Installation

1 The installation sequence is the reverse of the removal sequence.
2 Check and confirm the positioning parameters of the rear wheels. Reference: Rear wheel alignment parameter check

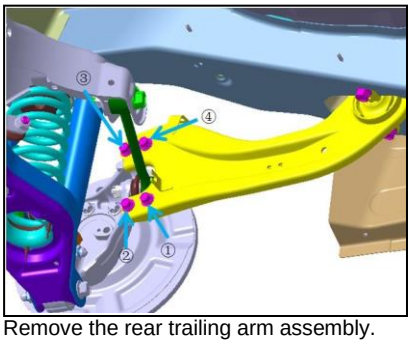
Rear trailing arm

Disassembly

1 Lift the vehicle and remove the rear wheels. Reference: Lifting, wheels and tires
2 Remove the rear trailing arm to body attaching bolts, x2, torque 120 ±10N.m.



3 Remove the four rear trailing arm and rear horn attaching bolts, torque 70±5N.m.



4 Remove the rear trailing arm assembly.

Installation

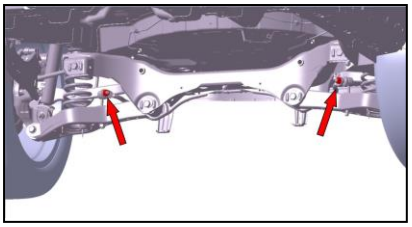
1 **The installation sequence is the reverse of the removal sequence.**

Rear stabilizer bar

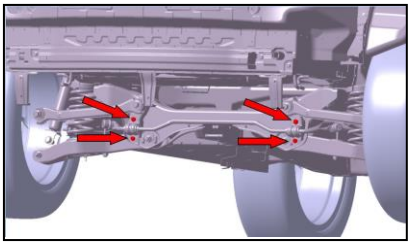
1. Disassembly

1 Remove the connecting nuts of the rear connecting rod and the rear stabilizer.

Warning Do not use the tool on the dust cover side during disassembly to prevent damage to the ball pin dust cover, resulting in grease leakage. Torque: (90±5) N.m

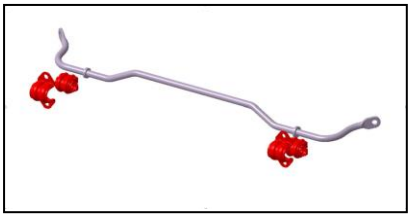


2 Remove the 4 rear stabilizer bar bracket and subframe mounting bolts. Torque: (65±5) N.m



3 Remove the rear stabilizer assembly (with stabilizer bracket and stabilizer bushing).

4 Remove stabilizer bushing, stabilizer bracket from rear stabilizer.



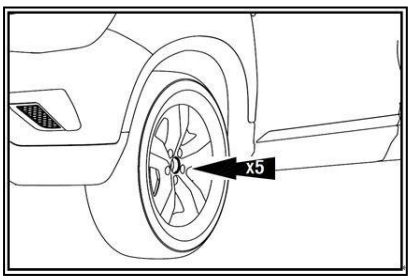
2. Installation

The installation sequence is the reverse of the removal sequence.

Wheels and tyres

1. Disassembly

   1 Loosen wheel retaining nut counterclockwise



   Torque: 110 ±5N.m

   2 Lifting the vehicle

   Lifting

   3 Remove wheel retaining nuts, wheel and tire

   Warning Do not use heating to loosen stuck wheel nuts. Heating can damage wheels and hubs

   Warning Remove rust and dust from wheel, hub or brake disc mounting surfaces. These may cause loosening of wheel bolts or loosening of wheels while driving, and failure to follow the above instructions may result in personal injury.

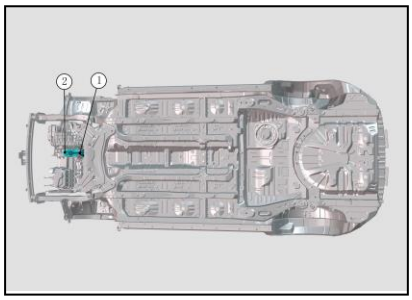
2. Installation

   The installation sequence is the reverse of the removal sequence.

Rear Mount Module

1. **Description**

   Rear suspension cushion assembly 1 and rear suspension bracket 2 are located under the engine compartment, as shown in the following figure:

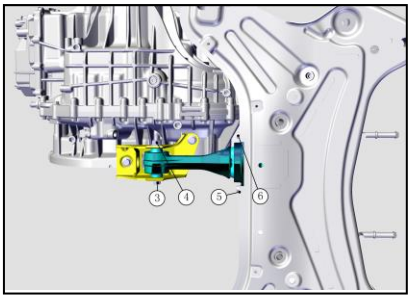


2. **Disassembly**

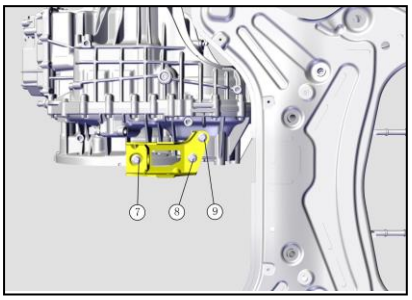
   1 Park the vehicle where it is convenient for the maintenance personnel to operate from the bottom of the vehicle. If the vehicle is lifted to the hoist or trench, the maintenance personnel shall wear protective articles and enter the bottom of the powertrain to prepare to dismantle the rear suspension cushion assembly 1 and rear suspension bracket 2;

   2 Remove bottom guard, see bottom guard chapter

   3 Remove the connecting bolt 3 and nut 4 with a wrench and a 15 mm socket, and remove the connecting bolts 5 and 6 with a 13 mm socket, and remove the rear suspension cushion assembly;



4 Remove the connecting bolts 7, 8 and 9 with a wrench and 13 mm socket, and remove the rear suspension bracket;



3. Installation

1 Align the rear suspension bracket 6 with the transmission mounting hole, install the bolts 7, 8 and 9, and tighten the corresponding socket in sequence with a wrench;

2 Then align the rear suspension cushion assembly 1 with the mounting hole on the chassis subframe, bring in the bolts 4 and 5, and tighten them with the corresponding socket with a wrench;

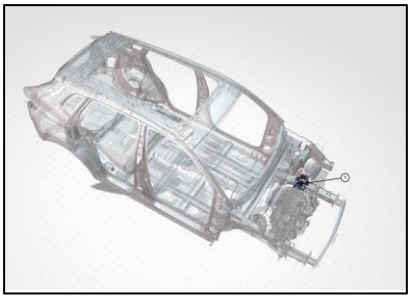
3 Then align the rear suspension cushion assembly 1 with the rear suspension 6 mounting hole, bring in the bolt 2 and nut 3, and tighten with the wrench with the corresponding socket;

4 Finally, use a torque wrench to match the corresponding socket to strike the torque. The torque of bolt 2 is 110 ±6N.m, and the torque of bolts 4,5,7,8,9 is 65±4N.m.

Left suspension module

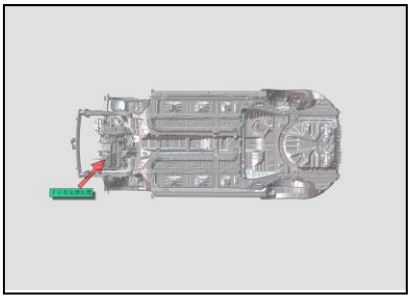
1. Description

The left suspension cushion assembly 8 is located on the left side of the engine compartment, as shown in the following figure:



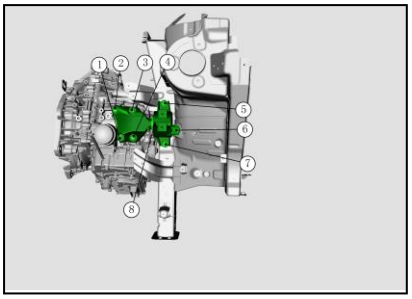
2. Disassembly

1 Prepare soft objects such as jacks and rubber pads, place the jacks on the bottom surface of the engine oil pan, place the soft objects such as rubber pads between the jacks and the oil pan to avoid damage to the oil pan, then support the bottom surface of the engine oil pan with the jacks (see the following figure), and jack up the engine as shown in the following figure:



2 Remove the battery and battery bracket;

3 Use a wrench with an 18 mm socket to remove the left suspension cushion assembly and transmission attaching nut 1, a 15 mm socket to remove bolts 2, 3, 4, and a 13 mm socket to remove the left suspension cushion assembly and body attaching bolts to remove the left suspension cushion assembly 8.



3. Installation

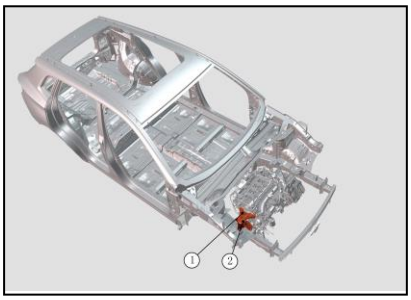
1 First place the left suspension cushion assembly on the corresponding mounting holes of the vehicle body and transmission, then tie the No. 1-7 bolts and nuts in sequence, then tighten them with a wrench, finally finish the torque in sequence, where No. 1-4 torque is 110 ±6N.m and No. 5-7 bolt torque is 65±4N.m, complete the assembly of the left suspension cushion assembly;

2 Install the battery bracket and battery in turn.

Right suspension module

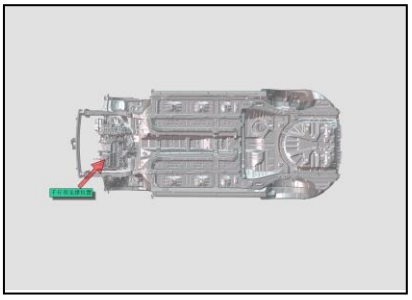
1. Description

The right suspension module contains a right suspension cushion assembly 1 and a right suspension bracket 2 located on the right side of the engine compartment, as shown:

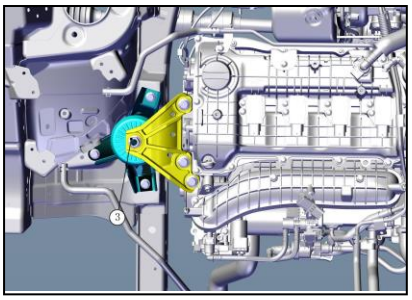


2. Disassembly

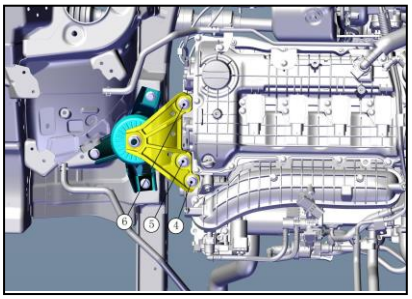
1 Prepare soft objects such as jacks and rubber pads, place the jacks on the bottom surface of the engine oil pan, place the soft objects such as rubber pads between the jacks and the oil pan to avoid damage to the oil pan, and then use the jacks to jack the engine at the bottom surface of the engine oil pan, as shown in the following figure:



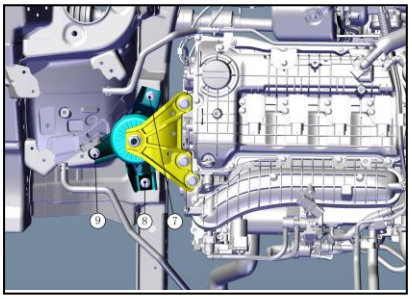
2 Remove right suspension bracket and right suspension cushion assembly attachment nut 3;



3 Remove the right suspension bracket and engine attachment bolts 4, 5, 6 with a wrench and 15 mm socket to complete the removal of the right suspension bracket;



4 Finally, use a wrench with a 13 mm socket to remove the right suspension cushion assembly and body attaching bolts 7, 8, 9 to complete the removal of the right suspension cushion assembly 2.



3. Installation

1 Put the right suspension cushion assembly 2 into the corresponding mounting holes on the vehicle body, install the No. 7, No. 8 and No. 9 bolts, and then tighten them with wrench in sequence with corresponding sleeve;

2 Then put the right suspension bracket 1 to the right suspension cushion assembly 2 and the engine, install the nuts 3 and bolts 4, 5 and 6, tighten the bolts 4, 5 and 6 with a wrench, and tighten the nuts 3;

3 Finally, use a torque wrench to match the corresponding sleeve and torque; The torque of nut 3, bolt 4,5,6 is 110 ±6N.m, and the torque of bolt 7,8,9 is 65±4N.m.

Spare parts atlas

F260202 F260203 F260204

F260205 F260206 F260502

F260503 F260504

Brake system

Hydraulic Mechanical Braking System Specifications

Material Specification

Project	Specifications
Brake fluid	HZY4/DOT4

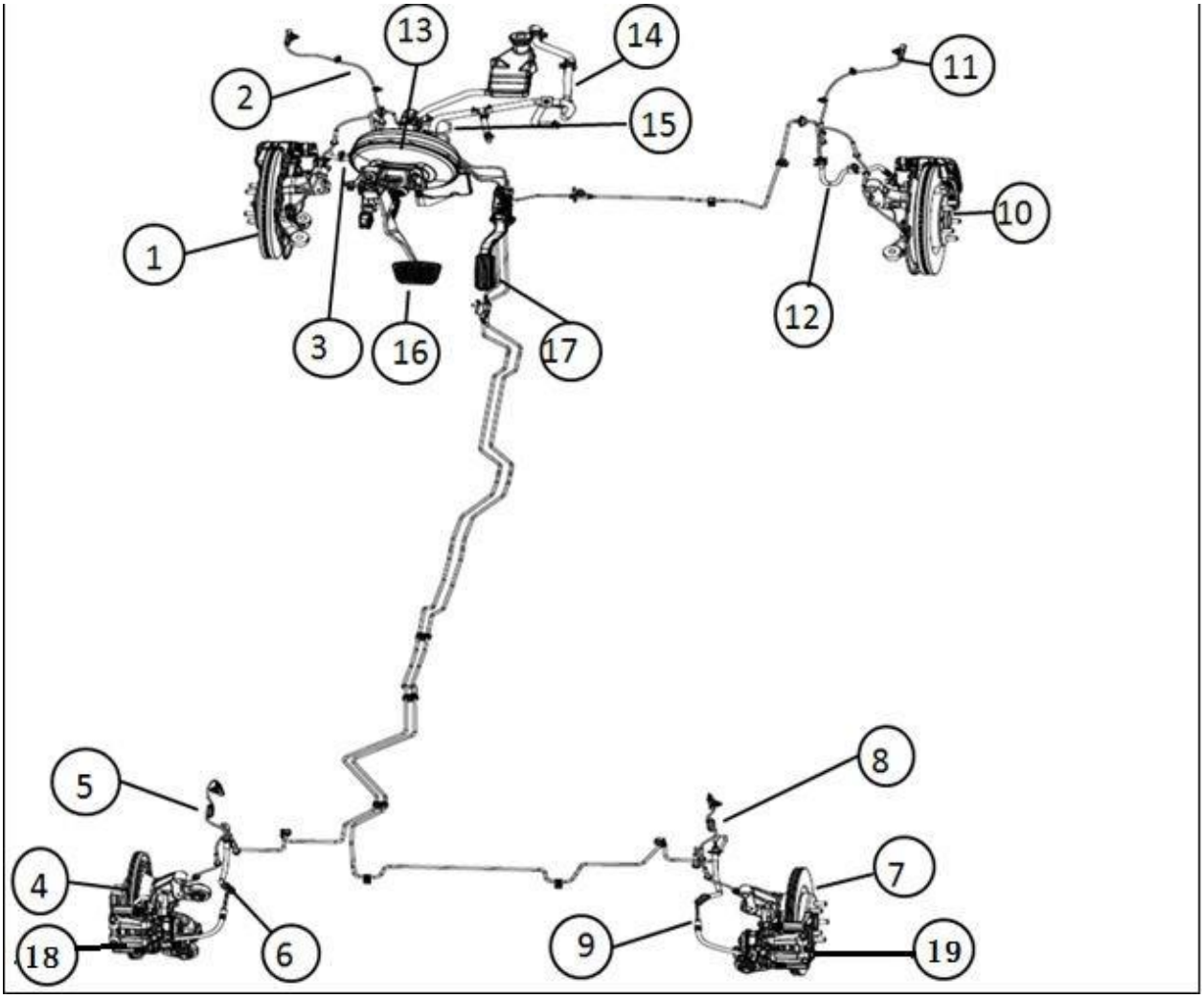
General Specifications

Front disc brake	Specifications(Mm)
Brake disc diameter	310
New brake disc normal thickness	26
Brake disc scrap thickness	24
New brake disc maximum runout	0.025
Caliper piston diameter	60
Brake Block Friction Material Minimum Thickness	3
Rear disc brake(Electronic parking)	Specifications(Mm)
Brake disc diameter	283
New brake disc normal thickness	9. 4
Brake disc scrap thickness	7. 4
New brake disc maximum runout	0.025
Caliper piston diameter	38
Brake Block Friction Material Minimum Thickness	2

Warning: Brake discs must be replaced when they reach scrap thickness. Special care should be taken when polishing discs that do not reach scrap thickness.

Composition and Location Distribution

Component Location Diagram


13
14
11
2
15
10
1
12
3
16
17
5
8
4
7
18
6
9
19

Serial Number	Part Name	Quantity
1	Front brake assembly(Left)	1
2	Front Wheel Speed Sensor Assembly(Left)	1
3	Front brake hose assembly(Left)	1
4	Rear horn assembly(Left)	1
5	Rear Wheel Speed Sensor Assembly(Left)	1
6	Rear brake hose assembly(Left)	1
7	Rear horn assembly(Right)	1
8	Rear Wheel Speed Sensor Assembly(Right)	1
9	Rear brake hose assembly(Right)	1
10	Front brake assembly(Right)	1
11	Front Wheel Sensor Assembly(Right)	1
12	Front brake hose assembly(Right)	1
13	Brake master cylinder with vacuum booster assembly	1
14	Brake Vacuum Tube Assembly	1
15	EPBi Actuator Assembly	1
16	Brake pedal assembly	1
17	Electronic accelerator pedal assembly	1
18	Electronic Park Actuator Assembly(Left)	1
19	Electronic Park Actuator Assembly(Right)	1

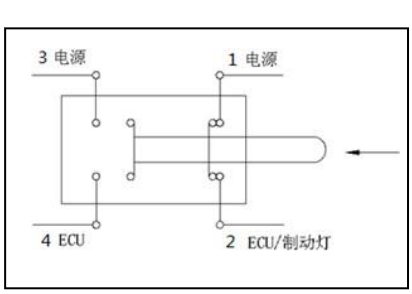
Introduction to System Functional Principle

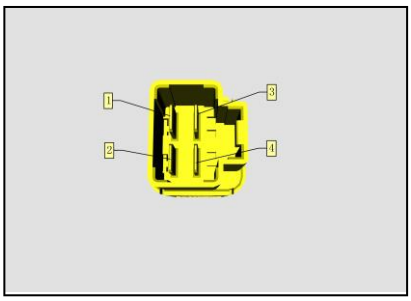
The foundation brake system adopts double circuit, diagonally arranged (front left and rear right; Right front, left rear), front and rear are disc hydraulic brakes. The front and rear disc brake calipers are mounted on the steering knuckle and are floating calipers. The front and rear service brakes can automatically adjust the brake clearance, and the rear electronic parking brake system can adjust the clearance between the brake disc and the friction plate through the clearance self-adjustment function. The brake master cylinder is designed in longitudinal series and is directly connected to the booster, which increases the braking force and reduces the force applied by the driver to the brake pedal. The longitudinal series design ensures that when one brake circuit fails, the other brake circuit remains intact. Anti-lock control system (including ESC) with the addition of an electronic hydraulic control unit and wheel speed sensors based on basic braking, each wheel equipped with a hydraulic system with an independent circuit; The electronic control unit collects wheel speed signals of four wheels by wheel speed sensors mounted on the wheels, and adjusts the braking pressure in the braking process through the hydraulic control unit to achieve the purposes of preventing wheel lock-up and controlling body stability; When the ABS does not function, the electronic brake force distribution system can still adjust the rear wheel brake force to ensure that the rear wheel does not lock up before the front wheel to ensure the safety of the vehicle. The electronic parking brake system is a mechanical and electronic system that operates the rear disc electronic parking actuator through an electronic parking brake button located between two front seats, and the parking is achieved by pulling the electronic parking brake button; The parking is released by pressing the brake pedal and simultaneously pressing the electronic parking brake button.

Inspection of part structure principle

Brake light switch

The brake lamp switch is a double circuit switch, the brake pedal is in the initial position, the pedal is pressed against the push rod of the switch, and 3, 4 circuits are connected to the power supply. After the pedal is depressed, the brake lamp switch pushrod pops up, the 1 and 2 paths are turned on, the rear brake lamp is turned on, and the brake pedal depression signal is sent.



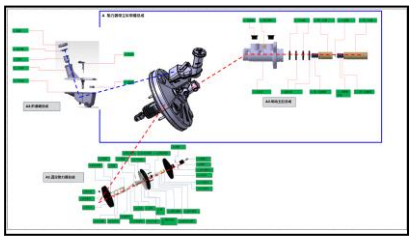


Brake master cylinder with vacuum booster assembly

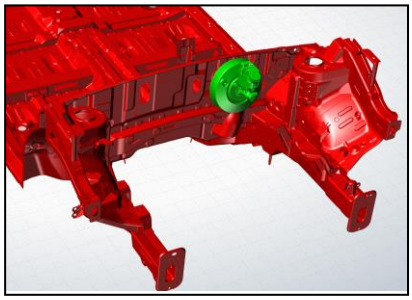
Function: Convert the brake pedal force to the hydraulic pressure required by the brake system; provide the amount of brake fluid required by the brake system; Provide the maximum brake operating fluid pressure required for the braking system; After the brake is released, the brake system is automatically relieved or compensated.

Working principle: In the braking process, when the driver's braking force acts on the foot pedal, it is transmitted to the booster according to a certain lever ratio through the pedal lever. As the braking force reaches the initial power of the booster, the booster transmits the driver's pedal braking force to the brake master cylinder proportionally according to the design requirements by using the internal front and rear chamber pressure difference, so as to provide the required output hydraulic pressure for the vehicle brake master cylinder and meet the requirements of the brake hydraulic pressure required by the vehicle brake system.

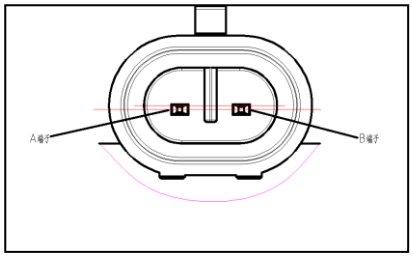
The parts are structured as follows:



Placement:



Interface definition: Terminal A is connected to instrument alarm lamp, and terminal B is grounded.



Front brake caliper

The front calipers are single piston type and are mounted on the steering knuckle with two mounting bolts. When the brake pedal is depressed, the brake caliper moves outward under the action of the liquid pressure, and the brake pressure forces the brake pad onto the brake disc, resulting in friction force that slows the speed of the tire and wheel assembly and brakes the vehicle. When the brake pad is worn, the piston moves further to fill the gap. When the pressure on the brake pedal is removed and the hydraulic pressure on the piston is released, the piston rubber seal restores its original shape, keeping the gap between the brake disc and the brake pad at the original level.

Rear brake caliper

The rear disc EPB brake assembly brake cylinder is a single cylinder construction. The service brake adopts disc structure, the parking brake adopts electronic parking brake system, the rear wheel disc electronic parking actuator is operated through the electronic parking brake button to realize parking brake, the parking brake button is located between two front seats, and the parking brake can be realized by pulling up the electronic parking brake button; The parking brake is released by pressing the brake pedal and simultaneously pressing the electronic parking brake button.

Common methods

Hydraulic Leak Check

Caution Under normal conditions, the brake fluid level will gradually decrease as the brake pads wear. Brake fluid level may be too low if brake pad wear exceeds specifications. If the brake pad is worn within specification, if the brake fluid level is too low, the system is leaking.

Caution Since the brake and clutch share a brake reservoir, it is possible that the brake fluid in the brake reservoir will be reduced due to clutch leakage. Caution If the car is driven in rain or snow, traces of leaks may be flushed out because the brake fluid is water soluble.

Please check as follows:

1 Confirm brake fluid level is too low or drops too quickly.

2 Visually check for signs of brake fluid leakage.

Caution Because the brake caliper piston boot is greased during assembly, the grease may melt and flow out of the appearance of the wet caliper (there may be a ring of brake fluid contamination near the caliper cylinder bore) during use of the vehicle, resulting in the false appearance of the caliper leaking. Wipe the traces clean first, then check for oil leaks by pressing the brake pedal several times.

3 Remove the front wheels. Wheels and tyres

Inspect the front brake cylinder for leakage and brake block wear.

4 Remove the rear wheels. Wheels and tyres

Inspect the rear brake cylinder for leakage and brake block wear.

5 Remove brake master cylinder. Brake master cylinder with vacuum booster assembly

Check the piston seal of the brake master cylinder for leaks.

6 Repair the above possible fault points and exhaust the brake system. Brake system exhaust

Vacuum booster inspection

1 Check that the brake fluid level is between the "MIN" line and the "" MAX "line.
2 Start the engine, place the transmission gear in neutral and the engine idling, confirm that the EPB button is pulled up.
3 Turn off the engine, depress the release brake pedal several times to remove the vacuum in the system, then depress the brake pedal and hold.
4 Start the engine. If the vacuum system is active, the brake pedal will move downward. If the pedal is not felt to move down, the vacuum booster system does not work.
5 Remove the brake vacuum pipe quick-insert connector on the vacuum booster side. When the engine is idling in neutral, the vacuum of the engine mechanical vacuum pump acts on the end of the vacuum booster and is sensed by hand or measured with a vacuum meter. If there is no vacuum or the vacuum is very small, check that the brake vacuum pipe is plugged, sealed and leaked and the vacuum pipe joint is in good condition to ensure that the vacuum of the mechanical vacuum pump is working. Reconnect the brake vacuum line to the vacuum booster and repeat step 3. If the brake pedal cannot be felt to move downward, replace the vacuum booster.
6 Run engine 10 s at 1000 rpm. Ten minutes after shutting down the engine, apply approximately 500 20 lb of force to the brake pedal, which should feel the same as when the engine is running (normal boost).

If the brake pedal feels hard, check and confirm that the check valve of the brake vacuum line is normal (replace the vacuum line with the normal vehicle), test again and replace the vacuum booster if the fault persists.

Brake master cylinder check

Caution Before performing a diagnosis, ensure that the brake fluid level and warning indicator are operating properly and that the brake system does not have any fault codes. Normal

Typically, a change in brake pedal feel or stroke indicates a possible problem in the brake system. However, the following conditions are normal and do not indicate that the brake master cylinder requires maintenance:

1 The new brake system design differs from previous designs in that it requires less force to depress the brake pedal.
2 When the brake is operating normally, the brake fluid level should drop and rise when released, but the total amount of brake fluid should not change.
3 The brake fluid level decreases as the brake

linings wear. Abnormal

A change in brake pedal feel or travel indicates a possible problem in the brake system. The following conditions are not normal and indicate that the brake master cylinder may require maintenance:

Symptoms	Brake master cylinder
Press the brake pedal and the brake pedal drops quickly	External leakage(Cracking, joint, seal failure)
Depress and hold the brake pedal, the brake pedal drops slowly	External leakage; Internal leakage (aging of master cylinder seal);
Press the brake pedal, the brake pedal is too low or feels soft	The oil inlet hole or the oil tank vent hole is blocked; Air in hydraulic system
Brake pedal return too slow	The compensation port is blocked; Master cylinder spring break (fatigue);
Brake pedal travel is too large	Internal leakage

Bypass Condition Test

Observe the brake master cylinder reservoir level. If the brake fluid level remains the same after several depressions of the brake pedal, measure the torque required for the wheel to rotate rearward when braking as described below.

1 Put the transmission in neutral

and lift the car. See Lifting

2 Depress the brake pedal at 445 N and maintain approx. 15 s. Apply 10.1 N.m of torque to the wheels while braking is still active. If any of the wheels rotates, replace the brake master cylinder.

Brake system exhaust

Warning

Brake fluid contains polyethylene glycol ether and polyethylene glycol to avoid contact with eyes and skin.

If the brake fluid touches the eye, rinse the eye with cold water from the tap for 15 minutes. If pain persists, seek medical advice promptly.

In case of contact with skin, wash thoroughly.

If inadvertently swallowed, drink water and

induce vomiting, and send to the doctor

immediately. Wear safety glasses.

Caution If brake fluid splashes on the paint surface, immediately rinse with clean water. Ensure the car is parked on a level road surface.

Exhaust in the following order: Rear right, front left, rear left and front right.

When the ignition switch is in the "LOCK" position and the brake is cold, depress the brake 3~5 times, or until the brake pedal force increases significantly to eliminate residual vacuum from the vacuum booster.

When venting, the brake fluid reservoir must be kept refilled with new, clean brake fluid to ensure that the

brake fluid level is maintained in the middle of the scale. If air is known or suspected in the master cylinder

bore, the air in the master cylinder must be drained before the brake cylinder is drained.

Step

1 Place a rag under the master cylinder to prevent brake fluid from flowing to other parts.
2 Ask the assistant to slowly press the brake pedal to the bottom and hold it with steady force.
3 Release one of the main brake lines from the master cylinder and bleed the air from the master cylinder.
4 Tighten the brake lines and ask the assistant to slowly release the brake pedal.
5 Repeat step 2~4 until all the air in one brake master cylinder is exhausted.
6 Exhaust all air from the other brake master cylinder from the other master line connector in the same way.
7 Lift the car. Lifting
8 Connect the open end of the clear exhaust pipe to the right rear slave cylinder exhaust port.
9 Dip the other end of the exhaust pipe into the brake fluid in the clear exhaust cylinder.
10 Place the bleeder cylinder at the bottom at least 300 mm above the vent hole to maintain hydraulic pressure and prevent air from entering the system through the threads of the vent hole.
11 Ask the assistant to slowly press the brake pedal to the bottom and hold it with steady force.
12 Using a 10# wrench, loosen the purge screw and purge the air from the wheel hydraulic oil circuit.
13 Using a 10# wrench, tighten the exhaust screw, torque 8±1N.m, and allow the assistant to slowly release the brake pedal.
14 Add brake fluid to the brake reservoir.
15 Continue pressing the brake pedal and repeat step 11~13 until air-free brake fluid flows into the exhaust cylinder.
16 Always install the vent cap after draining the brake lines. Failure to do so may result in blockage of the vent.
17 Repeat this procedure for other

brake lines. Brake disc runout and

thickness check

Warning

Wear safety glasses for

safety. General equipment

Dial indicator mount
Dial indicator
Micrometer

1 Lift the car. Lifting
2 Remove the front wheels. Wheels and tyres
3 Remove the brake pads. Front brake pad Rear brake pad
4 Install the tyre nuts in the reverse order to hold the brake discs in place.
5 Install the dial indicator and mounting bracket on the suspension strut.
6 Install the dial indicator 10 mm from the brake rim so that it contacts the brake disc friction surface and is 90°.
7 Turn the brake disc until the dial indicator reading is minimum, then zero the dial indicator.
8 Slowly rotate the brake disc until the dial indicator reads maximum.

Mark and record face runout. New Standard Value: 0.055 mm (Front

Brake Assembly)/0.060 mm (Rear Brake Assembly)

If the brake disc face runout exceeds the specified range, check the wheel hub runout according to the same method, and replace the brake disc if the axle hub runout is normal.

9 Slowly rotate the hub to check the runout, if it is out of the specified range: 0.025 mm, make sure the bearing clearance is normal, the front axle replaces the steering knuckle assembly, and the rear axle replaces the bearing. Front Knuckle Assembly Rear Angle Assembly and Rear Hub Bearing Assembly

Brake lining replacement

The friction plate is equipped with an alarm device, and when the minimum thickness is used (3 mm for the front plate and 2

mm for the rear plate), a "cough" sound occurs when braking. The friction plate must be replaced at this time. Front friction

plate replacement. Front brake pad

Replace the rear friction plate. Rear brake pad

Fault symptom diagnosis

Inspection and confirmation

Verify that the brake system warning indicator is OK before Caution diagnosis. General equipment

Digital multimeter
Diagnostic scanner

Step

1 Confirm the customer's problem.

2 Visual inspection of obvious

mechanical, hydraulic faults.

Visual Checklist(Machinery)

Tire pressure
Wheels and tyres
Brake fluid level
Brake line leakage

3 Resolve the found issue before proceeding to the next check.

4 If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step.

5 If the visual inspection passes, confirm the fault and refer to the fault symptom table.

Malfunction Symptom Chart

Caution 1 Care should be taken when replacing individual components, which may affect the performance of the braking system and result in driving hazards, using standard parts from Chang'an Motor Company.

2 It is important to keep components and the field clean when servicing the brake system.

3 If brake fluid leakage is found, the components must be disassembled and if any abnormalities are found, new components should be replaced.

4 When removing the brake assembly, wrap the connecting part of the brake pipeline to prevent dirt, dirt and other impurities from entering the pipeline.

5 Do not damage or deform the brake lines when removing or installing them.

6 When installing brake lines or brake hoses, ensure that they are not twisted or bent.

7 Brake hose must be away from damper oil, grease, etc.

8 After installing brake hoses and brake hoses, ensure that they do not interfere with other components.

9 Do not allow brake fluid to adhere to painted surfaces such as the body, and remove brake fluid immediately if it leaks onto the painted surface.

If a fault occurs, but the brake system operation indicator is operating properly, no DTC is stored in the control module, and the cause of the fault cannot be identified in the basic check, troubleshooting shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
1. Trembling when braking\ Shock	A. Brake pad is worn, damaged or oiled	Replace brake pad
		Brake lining replacement
	B. Abnormal wear and distortion of front brake discs	Replacing front brake discs
		Front brake discs
	C. Abnormal wear, out of circle, deformation of rear brake disc	Replacing rear brake discs
		Rear brake disc
	D. Brake caliper mounting bolts loose	Replacing brake caliper mounting bolts Front brake caliper
	E. Caliper sliding resistance too large	Replace caliper front brake caliper rear brake caliper if necessary

	F. Loose or missing wheel mounting bolts	Tighten or replace wheel mounting bolts Wheels and tyres

2. Uneven braking/deviation	A. Tyre pattern, inconsistent pressure	Changing tyres and adjusting tyre pressure Wheels and tyres
	B. Brake pipe, hose(Distortion)	Replace brake hose and hose front and rear brake hose assemblies
	C. Brake Block(Broken, twisted or greased)	Clean or replace brake blocks
	D. Damaged liner	Brake lining replacement
	E. Abnormal wear and distortion of front brake discs	Replacing front brake discs Front brake discs
	F. Abnormal wear and deformation of rear brake disc	Replacing rear brake discs
		Rear brake disc
	G. Caliper stuck	Repair or replace caliper
		Front caliper Rear caliper
	H. Incorrect wheel alignment	Wheel alignment front wheel alignment parameter check rear wheel alignment parameter check
3. Brake pedal sink quickly	A. Hydraulic system leakage	Repair leaks, fill with brake fluid and exhaust
		Brake system exhaust
	B. Air in system	Refilling brake fluid and venting
		Brake system exhaust
	C. Wear of piston seal ring of brake master cylinder or cylinder block crack	Replace brake master cylinder
		Brake master cylinder check
	D. Brake Block Excessive Wear	Replace brake pad
		Brake lining replacement
4. Brake pedal position is low or feels soft	A. The vent on the reservoir cover is blocked or dirty	Clean vent
	B. Air in system	Refilling brake fluid and venting
		Brake system exhaust
5. Brake lock occurs when braking is lightly applied	A. Incorrect tire pressure	Adjust tire pressure
	B. Tire wear	Changing tyres Wheels and tyres
	C. Incorrect brake pad installation	Reinstalling the brake block
		Brake lining replacement
6. Press and hold the pedal, the pedal sink slowly	A. Leakage or air in the system	Repair leaks, fill with brake fluid and exhaust
		Brake system exhaust
	B. Brake master cylinder failure	Check brake master cylinder, replace brake master cylinder if there is fault
		Brake master cylinder check

7. Brake pedal travel is too large	A. Excessive brake block wear	Replace brake pad

		Brake lining replacement
8. Brake drag	A. Electronic parking brake is not released	Release the electronic parking brake
	B. Caliper stuck	Repair or replace caliper
		Front caliper Rear caliper
	C. Brake block stuck	Repair or replace brake blocks
		Brake lining replacement
	D. Vacuum booster stuck E. Brake pedal has no free stroke	Repair or replace brake pedal or brake master cylinder with booster assembly
		Brake master cylinder check
9. Poor brake boost	A. Intake system leakage	Check intake system vacuum and repair if necessary
		Malfunction Symptom Chart
	B. Vacuum booster hose leaks	Brake master cylinder check
	C. Vacuum booster hose check valve failure	
10. Brake system has abnormal sound	A. Brake pad(Excessive wear, rupture, distortion, soiling, smoothness)	Replace brake pad
		Brake lining replacement
	B. Spring leaf(Loose or abnormal deformation)	Replace spring plate
	C. Caliper bracket retaining bolts(Loose)	Tighten or replace
	D. Caliper retaining bolts(Loose)	Replace bolts
	E. Brake caliper pin(Severe wear)	Replace caliper
	F. Abnormal wear, cracking, twisting of front brake discs	Replacing front brake discs
		Front brake discs
	G. Abnormal wear, out-of-round, broken, twisted rear brake discs	Replacing rear brake discs
		Rear brake disc
	H. Brake pedal return spring fatigue	Replace return spring
	I. Brake pedal push rod bending, deformation	Replacing brake pedal Brake pedal
	J. Vacuum booster	Inspect the vacuum booster and replace the brake master cylinder with vacuum booster assembly if necessary.
		Brake master cylinder with vacuum booster assembly
	K. Brake master cylinder	Check brake master cylinder and replace brake master cylinder with vacuum booster assembly if necessary.
		Brake master cylinder with vacuum booster assembly

Braking weakness

The vehicle complains of braking weakness and can be tested and judged in addition to subjective evaluation.

After the ignition of the vehicle is started, shift to "N" or "P," release the hand brake, and check whether the idle stroke of the pedal is too long. Read the master cylinder pressure signal with a diagnostic scanner, and measure the stroke of the pedal when the brake master cylinder pressure is 2Mpa with a tape measure. If the stroke is greater than 30 mm, it is obviously out of tolerance.

Please check as follows

1.Check the hydraulic system 1.1 Hydraulic system leakage brake master cylinder piston sealing ring wear, cylinder block crack, brake hose damage or packaging and other treatment: Fill the brake fluid to exhaust, check the leakage point, repair the leakage.

1.2 The hydraulic system has the air to press the brake pedal several times more in the flameout state until the brake is hard, and keep the brake pedal. If the pedal remains hard all the time, it indicates the vehicle; If the pedal sinks slowly, the brake system is already in. Handling: Fill brake fluid and vent. Brake system exhaust

1.3 Excessive wear treatment of friction

discs: Replace friction discs. Refer to

Brake Pad Replacement

1.4 Brake oil check detects impurities and moisture content in

brake oil. Handling: Change brake oil. Abnormal sound when

braking

Brake noise is a scream or friction sound generated by the brake when the friction

plate comes into contact with the brake disc during braking. Common brake noises

are:

1 Squeal: High frequency screaming during braking or non-braking

2 Wire brush: Constantly changing hiss

3 Moan: Low-frequency noise, low-frequency sound and vibration caused by body resonance during braking or non-braking process, prone to occur during forward, backward and cornering, low speed and low brake pressure.

4 Groan: Low-frequency low-pressure noise occurs after the heating and cooling cycle, the vehicle speed is about 25 km/h, and the vehicle stops.

5 Creep groan: Peristaltic noise, mainly occurring in automatic transmission models; Low frequency noise when starting at an

intersection or ramp with braking and vehicle speed less than 2kph. Please check as follows:

Brake Noise Problem Confirmation

1.1 The braking noise shall be repeated through different braking pressure, brake temperature range and vehicle speed conditions, etc., the braking noise of the vehicle shall be repeated, and the noise source, occurrence condition and occurrence frequency shall be determined.

1.2 Driving noise troubleshooting to see if the same noise occurs when there is no braking (the remaining operating conditions remain the same).

2. Troubleshooting of brake noise (including abnormal braking noise).

2.1 Brake assembly Check whether the vehicle is suspended from the hoist, idle wheel assembly, and whether the brake has interference, abnormal sound, etc.

2.2 Brake discs Check brake discs for out-of-round or twisted discs, abnormal wear (rust or severe groove), etc. Handling: Polishing the brake discs with a CD player; Replace brake discs when severe. Front brake disc Rear brake disc

2.3 Tightening bolts Check whether the caliper bracket and clamp body retaining bolts are loose: Tighten or replace the bolts. Front caliper Rear caliper

2.4 The friction plates shall be inspected for excessive wear (partial wear), breakage (chipping), surface deposits (metal aggregates), warping or breakdown of the muffler plates, accumulation of foreign matter in the contact position between the lugs and the caliper, etc. Treatment: Grinding the friction plate surface; Replace friction plates when severe. Front brake pad Rear brake pad

2.5 Check the spring plate for loose or abnormal deformation.

Handling: Replace the leaf spring. Front brake pad Rear brake pad

2.6 Check the caliper pin for severe wear or bending deformation. Handling: Replace calipers. Front caliper Rear caliper

2.7 If other brake abnormal sound problems are not caused by the friction pair, the brake master cylinder, brake pedal, vacuum booster and wheel bearing shall be inspected.

Brake pedal does not return

1 Check vacuum booster, reference: Vacuum booster check. Shake or push the booster push rod several times, and compare with the normal vehicle for confirmation. If there is jamming inside the booster, replace the brake master cylinder with vacuum booster assembly. For operation method, refer to: Brake master cylinder with vacuum booster assembly

2 Check brake master cylinder, reference: Brake master cylinder check. If the compensation port is blocked or the master cylinder spring is broken, replace the brake master cylinder with vacuum booster assembly. Refer to: Brake master cylinder with vacuum booster assembly

3 Check the brake pedal to see if the return spring is stuck and if the lubrication at the shaft is good. If the above conditions exist at the return spring and the rotating shaft, repeat the test several times after handling, and replace the brake pedal if the fault still exists.

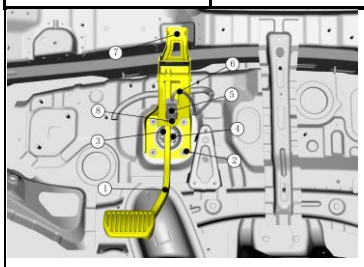
Removal and installation

Brake pedal

Serial Number	Part Name

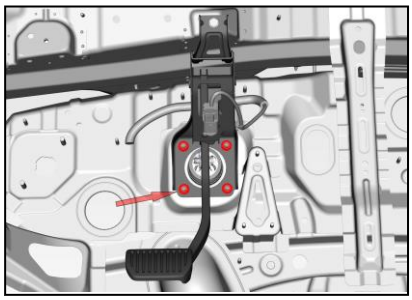
1	Brake pedal assembly

2	Nut
3	Locking pin
4	Rod
5	Brake light switch assembly
6	Brake light switch harness
7	Bolt
8	Brake light switch mounting clip

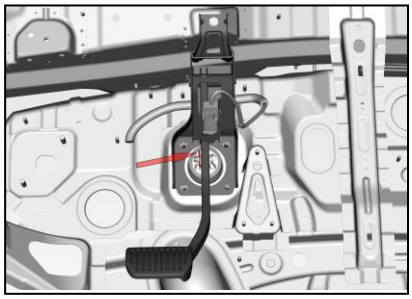


Disassembly

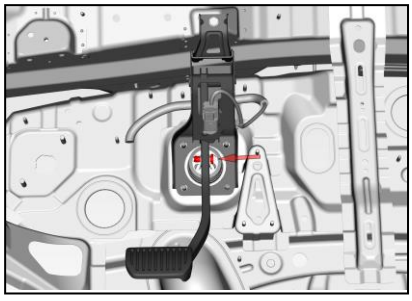
1. Remove the 4 retaining nuts. Disassembly tool: Sleeve (13); Torque: 22±3Nm.



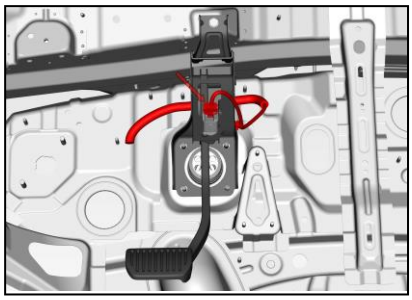
2. Pull out the lock pin connecting the booster and brake pedal.



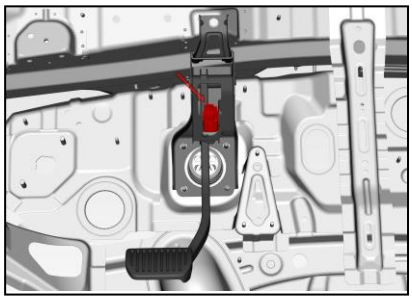
3. Remove the booster and brake pedal connection latch.



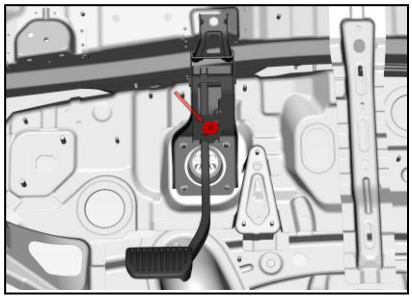
4. Remove the brake light switch harness connector.



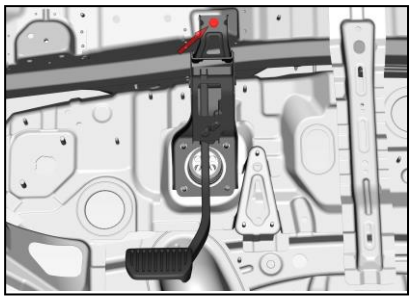
5. Hold the brake lamp switch by hand, rotate 45° counterclockwise, and take out the brake lamp switch in the axial direction of the brake lamp switch.



6. Hold the brake lamp switch mounting clip and brake pedal by hand and remove the brake lamp switch mounting clip upward.



7. Remove the fixing bolt on the brake pedal, removing tool: Sleeve (13); Torque: 22±3Nm, after this step, brake pedal removal is complete.



Installation

The brake pedal is installed in the reverse order of removal. Brake master cylinder with vacuum booster assembly

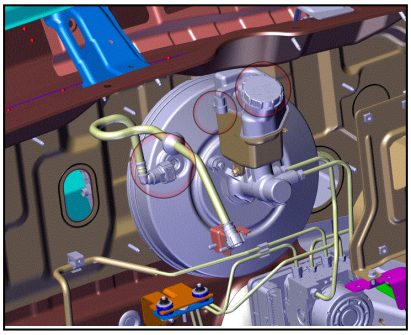
Materials

Name	Model
Brake fluid	HZY4/DOT4(Or DOT4)

Warning **If brake fluid is accidentally splashed onto the paint surface, flush immediately with clean water.**
Warning **The reservoir cover must not be contaminated.**

Disassembly

1 Remove the brake level sensor switch plug and brake vacuum line quick-connect and remove the reservoir cover. Position as shown.

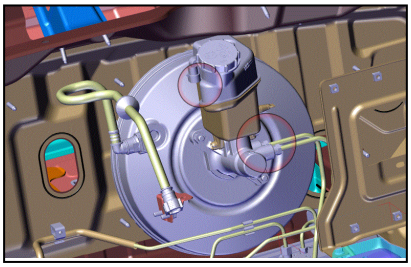


2 Drain the brake fluid from the reservoir.

1 Use a suitable clean plastic pipe with one end attached to the system vent and the other end passed into a suitable container.
2 Unscrew the exhaust nozzle.
3 Press the brake pedal repeatedly until all brake fluid in the reservoir is drained.
4 Tighten the exhaust nozzle.

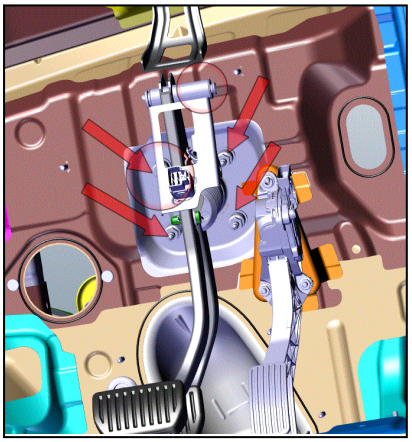
Warning This step must be performed on both circuits in order to completely drain all brake fluid from the reservoir.

3 Using an M13open-ended wrench, remove the brake tubing from the brake master cylinder, torque 18±2N.m.

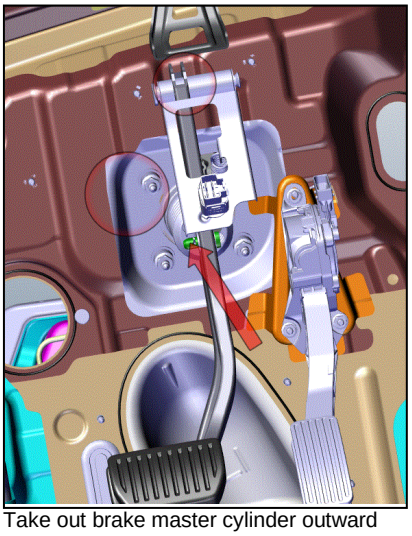


4 Remove the brake master cylinder and brake reservoir assembly.

1 Remove the brake master cylinder with vacuum booster assembly and brake pedal retaining nut with M13 hexagon socket socket, torque 23±2.5N.m.



2 Remove the pin and latch connecting the booster and brake pedal arm using a flat head or other tool.



3 Take out brake master cylinder outward

Installation

Warning **Make sure the brake booster push rod is in the correct position before installation.**

Warning **Make sure the brake master cylinder vacuum seal is in the correct position before installation.**

1 Place the brake master cylinder with vacuum booster assembly into the front wall plate mounting hole, pre-load the nuts, and tighten. Torque 23±2.5N.m.
2 Align the mounting holes on the booster push rod with the mounting holes on the brake pedal arm through the connecting pins and insert the locking pins.
3 Tighten the brake oil pipe joint to the brake master cylinder by hand, and then tighten it with an M13open-end wrench, torque 18±2N.m.
4 Connect the brake level sensor switch plug, insert the brake vacuum line quick-plug connector onto the vacuum pressure sensor, and insert the vacuum pressure sensor into the booster connector.
5 Perform brake system exhaust.
6 Cover the

reservoir. Front

brake caliper

Disassembly

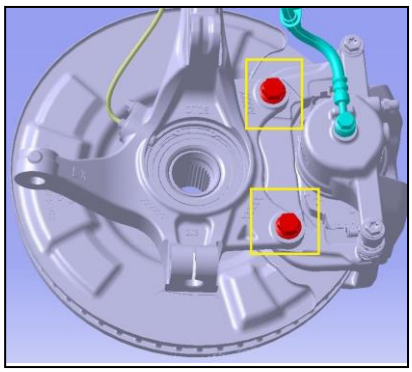
Vehicle flameout

1. Lift the vehicle. Reference lift

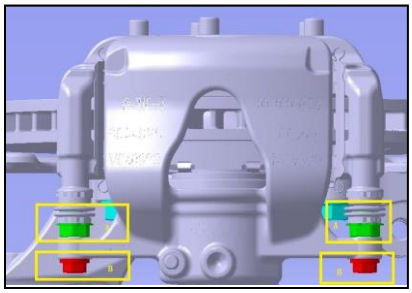
2. Remove the front wheels. Reference wheels and tires

3.Remove the front brake hose with 13# sleeve. Torque 30±2N.m.

4.Remove the front caliper assembly, using a 17# hexagon socket, remove the caliper bracket bolts, torque 150 -170N.m. As shown below



5.Remove the caliper body, use a 17# wrench to secure the area A nut, use a 13# sleeve in area B, remove the pin bolt, torque 31-38N.m, and remove the caliper body. As shown below



The installation sequence is the reverse of the removal sequence.

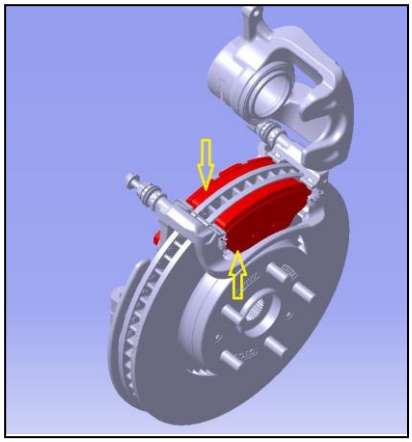
Replace the caliper body, which must be vented. Brake system exhaust

Front brake

pad removal

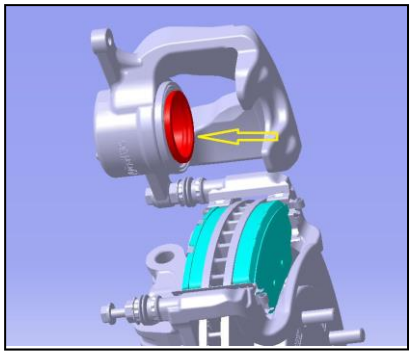
1. Remove the front caliper body. Reference: Front brake caliper

2. Remove the brake friction block.



Installation

1. Use the piston head-back tool to compress the brake cylinder piston.



2. Install brake friction block.

Warning The friction pads must be replaced in pairs when they are replaced (i.e. the inner and outer friction pads are replaced at the same time). The friction pads must be replaced at the same time.

3.Install a new brake caliper pin retaining bolt, torque: 31-38N.m.

4. Press the brake pedal firmly for more than two times.

5. Check the brake fluid level and add it if necessary.

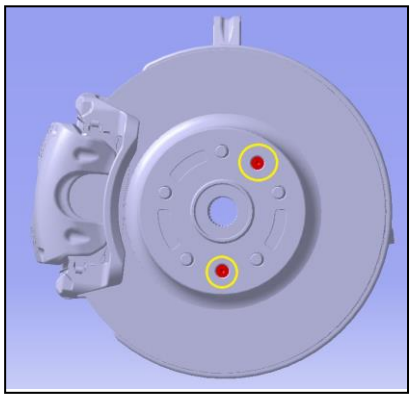
Warning The disc thickness must be checked to ensure that the brake disc thickness is acceptable.

Front brake disc removal

1. Remove the front brake caliper, refer to the front brake caliper warningThe removal of the brake hose can be ignored.
2. Hang brake caliper.

Warning Hang the caliper to prevent stretching the brake hose.

3. Remove the brake disc. Remove brake disc mounting screw using hexagon socket 6#, torque 5-8N.m.



Installation

The installation sequence is the reverse of the removal sequence. Brake disc mounting screw torque 5-8N.m.

Warning When replacing the brake discs, if the original brake discs are worn out, use the piston top-back tool to top-back the piston before installing the caliper. Brake Pad Replacement Front Knuckle Assembly

Disassembly

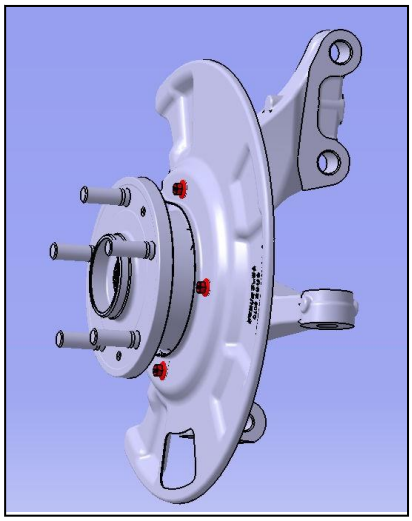
1. Vehicle flameout.
2. Remove the wheels. Reference wheels and tires
3. Remove the front brake caliper.

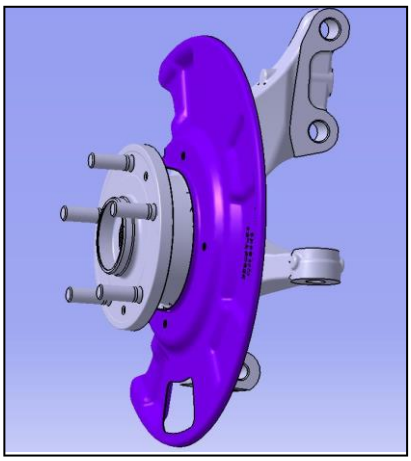
Reference front caliper warning
Ignoring removal of brake hose.

4. Remove the front wheel sensor. Reference Front Wheel Speed Sensor Assembly
5. Remove the big nut of the drive shaft. Reference drive shaft

Warning When the lock nuts are tightened, the brake disc anti-rotation pins are inserted on both sides of the caliper bracket (i.e. the right front brake is inserted on the upper side of the caliper bracket and the left front brake is inserted on the lower side of the caliper bracket).

6. Remove the front brake disc. Refer to front brake disc
7. Remove the front dust cover. Use a 8# wrench to remove the three mounting bolts. Torque 14-16N.m. Remove the dust cover.





8. Remove the steering tie rod nuts. Reference Mechanical Steering Gear Assembly

9. Remove the connecting bolts between the lower swing arm and the steering knuckle. Reference Front Swing Arm Assembly(Bushing)

10. Remove the front shock absorber and steering knuckle mounting bolts. Reference Front Pillar Assembly

11. Remove the steering knuckle assembly after removing the above parts.

Warning The front bearing is a generation bearing, and the hub and bearing are not allowed to be removed.

Installation

1. The installation sequence is reverse to the removal sequence.

2. Four-wheel alignment. Check with reference to front wheel alignment parameters

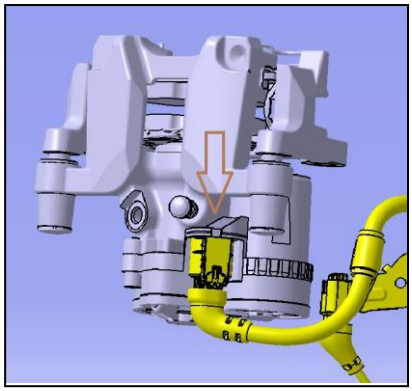
Rear brake caliper removal

1. Use the diagnostic scanner to execute the "Maintenance On" action.

2. Remove the wheels. Wheels and tyres

3. Remove the rear lateral control arm. Rear subframe assembly

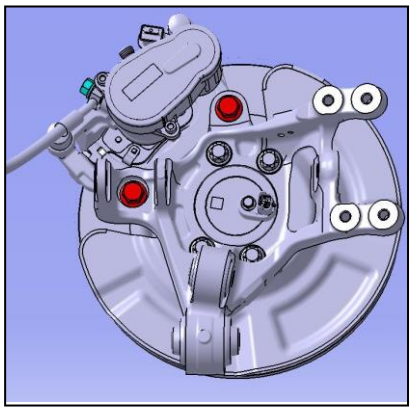
4. Remove the caliper motor harness connector.



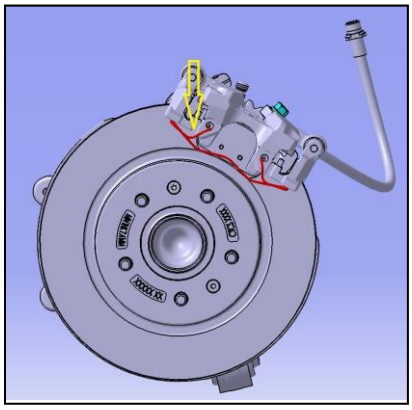
5. Remove the rear brake hose. Front and rear brake hose assemblies

Warning Seal the brake hose to prevent fluid loss and dirt ingress.

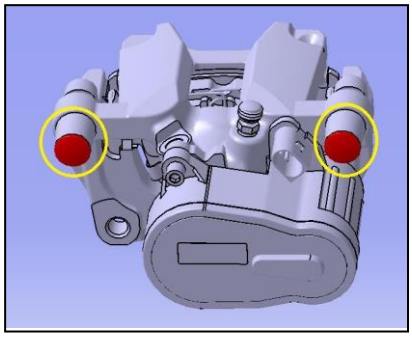
6. Remove the rear caliper assembly (caliper bracket). Using the 17# sleeve, remove the two caliper mounting bolts. Torque 110 ±10N.m.



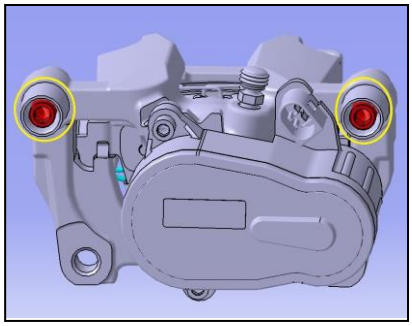
7. Remove the rear caliper body. Use a flat screwdriver to remove the caliper spring.



8. Remove the dust cap of the caliper shaft pin.



9.Remove the caliper body and remove the two pin mounting bolts using the hexagon socket 7# sleeve. Torque 25-30N.m.



Installation

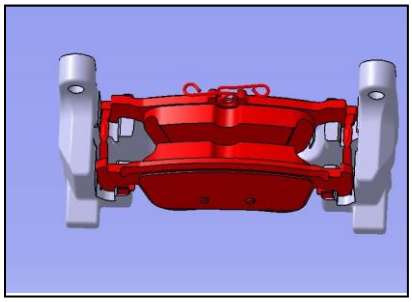
1. The installation sequence is reverse to the removal sequence.

2. Use the diagnostic scanner to execute the "Maintenance Off" action.

3. Brake system exhaust. Brake system exhaust

Rear brake pad removal

1. Remove the rear caliper.
Reference rear caliper warning
Ignoring removal of
brake hose.
2. Remove the rear friction block.



Warning **The friction pads must be replaced in pairs when they are replaced (i.e. the inner and outer friction pads are replaced at the same time). When replacing the friction block, the friction block circlip must be replaced at the same time.**

The brake disc thickness must be checked when replacing the friction pads. Ensure that the brake disc thickness is acceptable.

Installation

The installation sequence is exactly the reverse of the removal sequence. Rear

brake disc

Disassembly

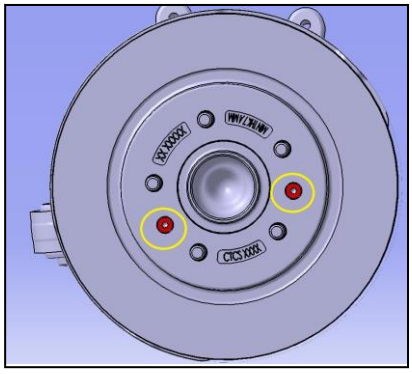
1. Remove the rear caliper.

Reference rear caliper warning

Ignoring removal of

brake hose.

2. Remove the rear brake disc. Using the 6# Torx sleeve, remove the two brake disc mounting screws. Torque 5-8N.m.



Installation

The installation sequence is the reverse of the removal sequence. Rear Angle Assembly and Rear Hub

Bearing Assembly Removal

1. Use the diagnostic scanner to execute the "Maintenance On" action.

2. Remove the wheels. Reference wheels and tires

3. Vehicle lifting. Reference lift

4. Remove the rear lateral control arm. Reference rear stabilizer bar

5. Remove the rear caliper.

Reference rear caliper warning

Ignoring removal of

brake hose.

6. Remove the rear wheel sensor. Reference rear wheel speed sensor assembly

7. Remove the rear brake disc. Reference rear brake disc

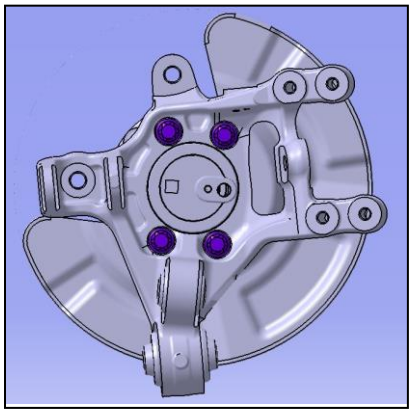
8. Remove the rear trailing arm. Reference rear trailing arm

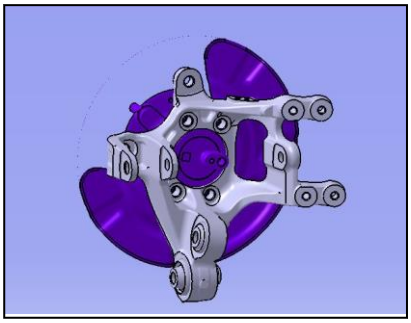
9. Remove the rear swing arm. Reference rear swing arm

10. Remove the rear shock absorber assembly. Reference rear damper assembly

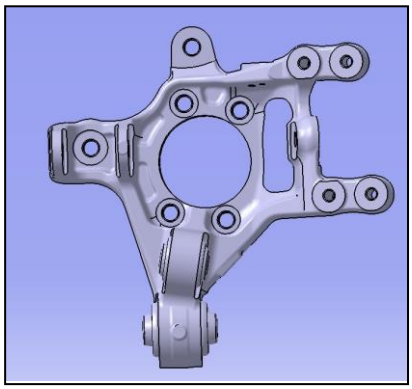
11. Remove the rear suspension toe adjustment lever. Refer to Rear Subframe Assembly

12. Remove the rear hub bearing assembly. Rear dust cover and bearings share mounting bolts. Use the Torx sleeve E18 to remove the bearing bolts. Torque 90-110N.m.





13. After removing the above parts, remove the rear horn assembly.



Installation

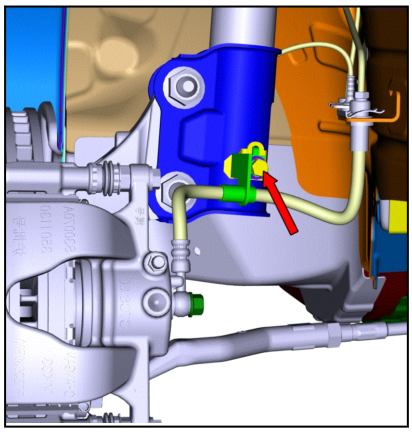
1. The installation sequence is the reverse of the removal sequence.

2. Use the diagnostic scanner to execute the "Maintenance Off" action.

Front and rear brake hose assembly removal

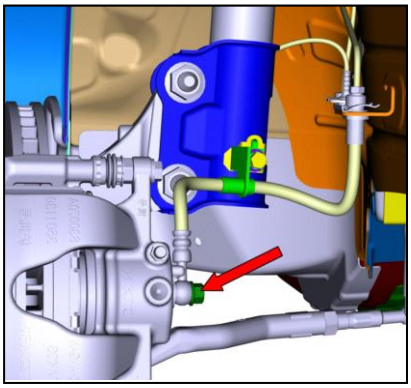
1 Lift the vehicle to a suitable height, reference: Lifting

2 Remove the hexagon-head bolt spring washer and plain washer assembly connecting the brake hose to the front strut assembly, Tool: M13Hexagon socket, torque 23±2.5N.m. (Only for front brake hose disassembly and assembly, rear brake hose without this procedure)

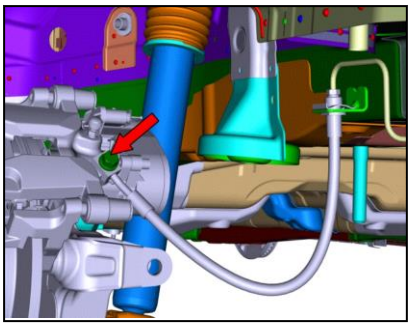


3 Clamp the brake hose with a suitable brake hose clamp and remove the bolt connecting the brake hose to the brake calliper and 2 copper washers, tool: M13 hexagon socket, torque
30±2N.m.

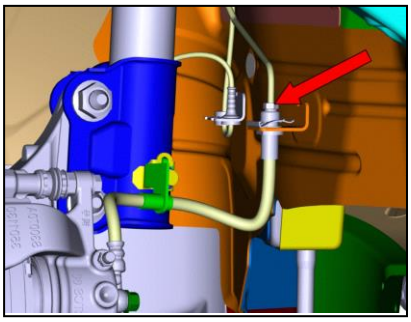
The front brake hose is shown below:



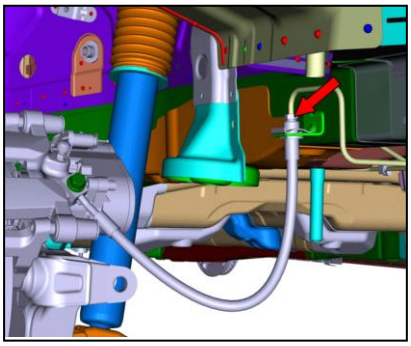
Rear brake hose as shown below:



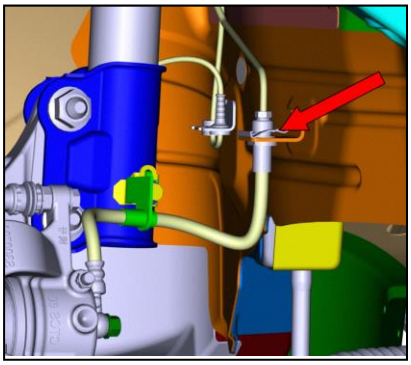
4 Disassemble brake pipe and brake hose connection fitting, tool: M10Open-end wrench, torque 16±2N.m. The front brake hose is shown below:



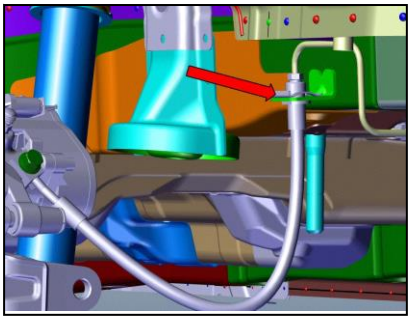
Rear brake hose as shown below:



5 Remove the E-type elastic clip, the brake hose is removed and the tool is flat. The front brake hose is shown below:



Rear brake hose as shown below:



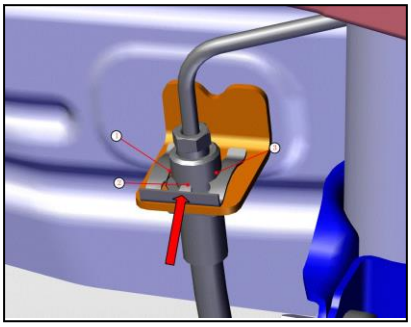
Assembly

1 Using a hexagon-head bolt spring washer and plain washer assembly, attach the brake hose center bracket to the front strut and tighten with an M13 hexagon socket socket, torque 23±2.5N.m. (Only for front brake hose disassembly and assembly, rear brake hose without this procedure)

2 Connect the brake hose to the brake calliper with the removed bolt and replace with a new copper gasket and tighten with a torque wrench, tool: M13 hexagon socket, torque 30±2N.m.

3 Place the joint connecting the brake hose to the brake pipe end into the body bracket hole, keep the upper surface close to the lower surface of the body bracket, and then place the E-type elastic card on it (E-type elastic card as shown in the figure

Three points (1), (2) and (3) must be clamped into the brake hose clamping groove, and then tap E-type elastic clamp gently with a hammer along the direction of the arrow shown in the figure to clamp.



4 Align brake hose connector with brake hose connector and tighten with tool: M10Open-end wrench, torque 16±2N.m.

5 Perform brake system exhaust,

reference: Brake system exhaust brake light

switch

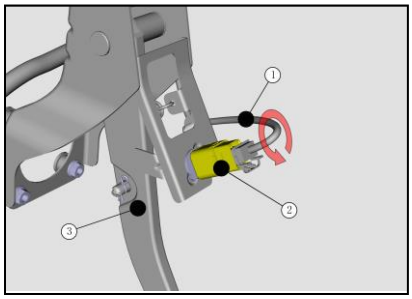
Remove the brake light switch as follows:

Serial Number	Part Name
1	Brake light switch harness
2	Brake light switch assembly
3	Brake pedal assembly

Step 1: Pull off the brake light switch harness connector.

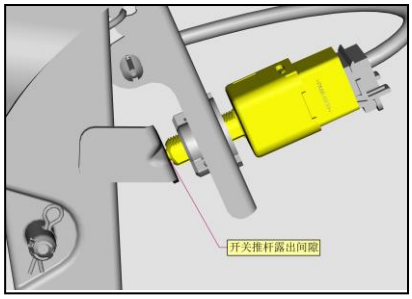
Step 2: Hold the brake light switch with your hand and rotate 45° counterclockwise. The switch can be removed axially after an audible click.

~~Disassembly complete.~~



The assembly procedure of the brake light switch is the reverse of the removal procedure.

Note: When the brake light switch is fitted to the brake pedal, make sure that the brake light switch push rod is exposed for less than 1 mm.



Spare parts atlas

F260301

F260303

F260304

Electronic Body Stability Control Specifications

Material Specification

Project	Specifications
Brake fluid	HZY4/DOT4(Or DOT4)

Torque specification

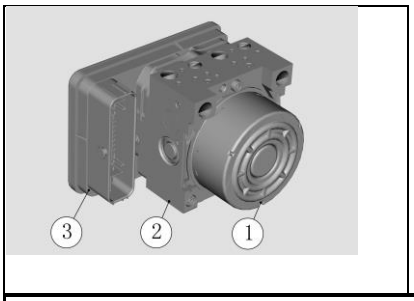
Name	Nm
EPBi system retaining bolts	8+2
Brake tubing to EPBi system connection lock bolt	13-20

Composition and Location Distribution

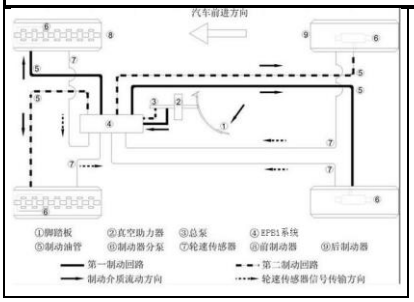
Note: There are two types of electronic body stability control systems: EPBi system and ESC system. The EPBi system provides the functionality of an ESC system and also integrates the functionality of an electronic hand brake control system. The body stability control system of this model is EPBi system.

Note: There is a rubber damper between the mounting bolts of the EPBi system and the bracket. The rubber damping pad protects the EPBi system from vehicle vibration. The EPBi system cannot be disassembled and replaced as an assembly.

The main components of the EPBi system include an electronic control unit, a hydraulic control module, and a motor.



Serial Number	Components	Quantity
1	Motor	1
2	Hydraulic control module	1
3	Electronic control unit	1



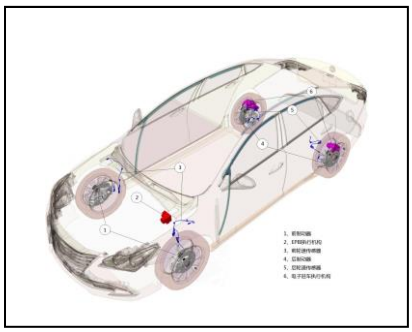
The electronic control unit constantly detects the state of the wheel through the wheel speed sensor, and controls the wheel slip rate to be kept within a certain range through the coordination of the motor and the solenoid valve, so as to maintain the stability of the vehicle. The EPBi control module constantly compares its own stored slip limit value with the deceleration value detected by the wheel speed sensor so that the lockup tilt of each wheel can be detected
To. If it is detected that a wheel tends to lock up, the EPBi system independently controls the four-wheel cylinder pressure by opening or closing the corresponding hydraulic valve in the control valve to avoid wheel lock up. When the ABS function does not work, the EBD function still adjusts the rear wheel braking force to ensure that the rear wheel does not lock prior to the front wheel to ensure vehicle safety.

When the ignition switch is turned on, the instrument control ABS/ESC warning lamp lights up after self-check. If the system is normal, it goes out after 3s. The module notifies the instrument that the indicator is illuminated in the event of a system failure to indicate a warning.

The EPBi control module constantly monitors the system for any possible malfunctions and stores them automatically once they occur. The EPBi control module can be accessed via the OBD interface using the diagnostic scanner.

The EPBi Hydraulic Control Module has four inlet valves, normally open solenoids, which control each wheel. 4 drain valves, normally closed solenoid valves for each wheel. Two low pressure accumulators and hydraulic lines. The motor works during self-test and ESC operation and can also be driven by the diagnostic scanner.

Component Description



1. EPBi control module

The operation mode of EPBi system is the same as that of EPBi system. However, the EPBi system also detects the attitude and angle of the body through the yaw rate, lateral acceleration sensor, and angle sensor in the ECU, and compares it with the excitation conditions stored in the control module, and so on.

When the ignition is turned on, the EPBi control module informs the instrument to turn on the ESCs located in the instrument panel, which will not turn off until the ESCs complete the system self-test. The module notifies the instrument to illuminate the corresponding indicator in case of a system failure to indicate a warning.

The EPBi control module constantly monitors the system for any possible malfunctions and stores them automatically once they occur. The EPBi control module can be accessed via the OBD interface using the diagnostic scanner.

2.Wheel speed sensor

The wheel speed sensor is a two-wire electromagnetic speed sensor that uses the wheel speed signal to calculate the wheel speed and vehicle speed as the wheel rotates. The sensor obtains the pulse signal from the ring gear, and the signal is converted into a digital signal through the integrated circuit in the sensor and then transmitted to the EPBi control module. The front gear ring is fixed to and integral with the drive shaft. The rear wheel sensor is fixed to the rear wheel hub bearing.

3.Brake light switch

When the brake pedal is pressed, the brake lamp switch will work and the brake lamp will be lit. Meanwhile, the EFI control system will send the collected status information of the brake lamp switch to the CAN network of the whole vehicle for receiving and processing by the EPBi control module.

4.ABS indicator

ABS indicator Located on the instrument cluster and lit to notify the driver of a malfunction in the ABS system. In normal operation, the ignition switch is turned from "LOCK" to "ON."
ABS system self-test, the indicator lights up for about 3s, then goes off and stays off. The instrument cluster illuminates the ABS indicator when the following events occur:

- The ABS system detects a malfunction in the ABS function.
- ABS performs a self-test test at the beginning of each ignition cycle. The LED illuminates approx. 3 s.
- The instrument cluster detects a loss of communication with the ABS system.

5.EBD Indicator

On the instrument cluster by lighting To notify the driver that the EBD has failed. When the EBD LED is on but the EBD LED is off, the system still has the EBD function. When ABS indicates
Both the ABS and EBD functions fail when both the lights and the EBD indicator are on.

6.ESC indicator

On the instrument cluster by lighting To notify the driver that the ESC has failed. When the ESCs are lit but the ABS and EBD are not lit, only the ESCs are malfunctioning. When
When the ESC indicator strobes, the ESC function is triggered.

Introduction to System Functional Principle

System overview

The Anti-Lock Braking System (ABS) is an electronic brake control system that prevents wheels from locking, shortens braking distances, and improves stability during braking. The system incorporates an electronic hydraulic control unit and wheel speed sensors based on basic braking, each wheel having a hydraulic system with an independent circuit; The ECU collects the speed signals of the four wheels and adjusts the brake pressure during the braking process through the hydraulic control unit to prevent the wheels from locking. The Electronic Brake Force Distribution System (EBD) still adjusts the rear wheel braking force to ensure that the rear wheel does not lock prior to the front wheel when the ABS does not function to ensure vehicle safety. In the event of an ABS or EBD malfunction, the ESC unit informs the instrument that the appropriate indicator is illuminated.

Electronic Stability Control (ESC) is an active safety control system with full ABS and EBD functionality. There are also the following functions:

1. Traction Control (TCS):

TCS, Traction Control System (Traction Control System), is a control system that controls the dynamic performance of the vehicle by intervening in the braking force and engine system of the vehicle, improves the handling performance under driving conditions of the vehicle, and prevents unacceptable slippage (idling) of the drive wheels (at least one drive wheel) when the vehicle reaches the adhesion limit at high driving torque, so as to avoid the reduction of the vehicle traction and driving stability.

2. Body Stability Control (ESC):

The driver's driving intention is judged by the steering wheel angle signal, and the current vehicle motion state is known through four wheel speed sensors, as well as the lateral acceleration sensor and yaw rate sensor integrated in the ESC, and the two states are compared. If the actual motion state does not conform to the driver's driving intention, a certain (or two) specific wheel is braked separately to apply a correction torque to the vehicle, so that the vehicle returns to the driving state required by the driver.

3. Electronic drag force control (EDC):

Under certain operating conditions, when the engine torque output is greater than the force required by the vehicle, excessive torque may cause inconvenience to the vehicle motion state control, and the ESC notifies the engine to reduce torque through the CAN communication system.

4. Hydraulic brake assist (HBA):

The Emergency Brake Assist Function (Hydraulic Brake Assist hereinafter referred to as HBA) is a condition in which the driver quickly depresses the brake pedal in case of emergency braking, but the maximum possible deceleration of the vehicle is often not achieved due to insufficient force or travel of depressing the brake pedal. The function of the HBAs is to provide the driver with additional braking force and deceleration through the active build-up of the ESC/EPBi solenoid/motor in this case to reduce the braking distance and reduce the accident loss.

5.Auxiliary function (HHC):

Release the brake pedal when the driver starts on an uphill slope and keep the brake pressure at about 1.5 s before releasing it to prevent it from slipping back.

6. Automatic parking(AUTOHOLD)

When the brake pedal is stopped, the brake pedal can be released, parking is automatic, and there is a working time limit, which needs to be used with the EPB.

7. Slope slowing down(HDC)

Use the brake pedal to automatically control the vehicle downhill speed to the set value.

8. Starting auxiliary function(VGH)

Prevent the vehicle from jumping forward during engine start-up after idling shutdown.

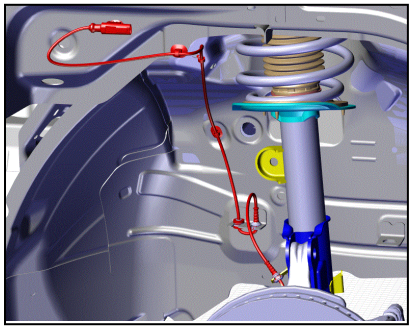
Inspection of part structure principle

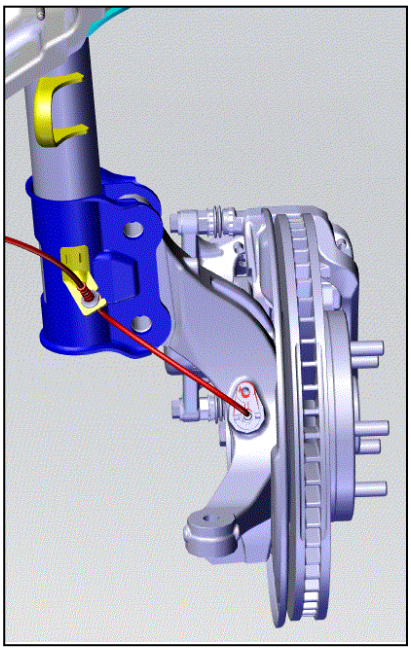
Front Wheel Speed Sensor Assembly

Function: It is mainly used for ABS (Anti-lock Brake) system and ESP (also known as ESC (Body Stability Control)) system, which is used to measure the speed of automobile wheels.

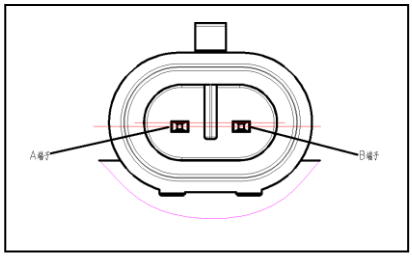
Working principle: Using the phenomenon that the resistance value of some metals or semiconductors changes with the applied magnetic field, this phenomenon is the magnetoresistive effect, under the application of a certain working voltage, so as to output the changing current signal.

:





Interface definition:

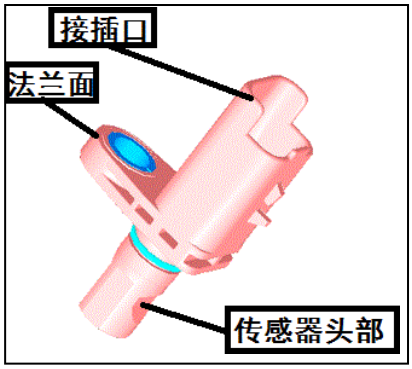


Rear Wheel Speed Sensor Assembly

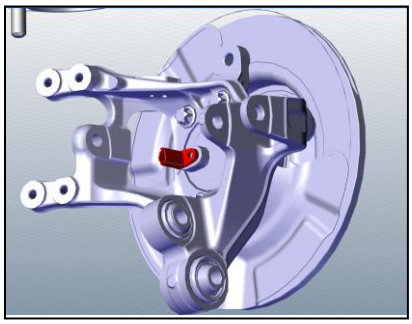
Function: It is mainly used for ABS (Anti-lock Brake) system and ESP (also known as ESC (Body Stability Control)) system, which is used to measure the speed of automobile wheels.

Working principle: Using the phenomenon that the resistance value of some metals or semiconductors changes with the applied magnetic field, this phenomenon is the magnetoresistive effect, under the application of a certain working voltage, output the changing current.

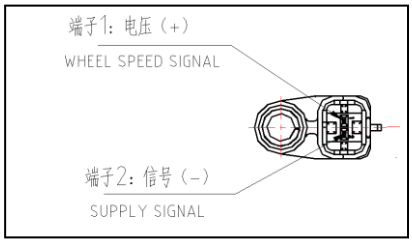
Product Structure:



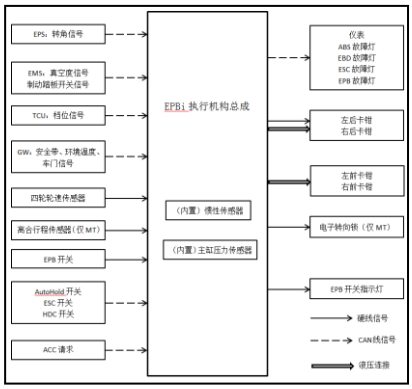
Layout:



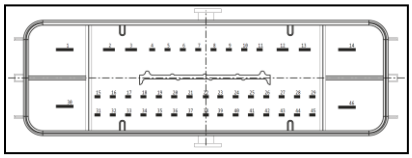
Interface definition:



Hydraulic Control Mechanism Assembly (HCU) System Schematic



Connector Section



Terminal definition

Pin	Function Abbreviation	Function Description
1	KL30_P	EPBi Motor power supply
2	MOT_R_A	Rear right caliper motor positive
3	MOT_R_B	Rear right caliper motor negative
4	FR_GND	Front right wheel speed sensor ground
5	FR_SIG	Right Front Wheel Speed Sensor Signal Input
6	RL_GND	Left rear wheel speed sensor ground
7	RL_SIG	Rear left wheel speed sensor signal input
8	FL_GND	Front left wheel speed sensor ground

9	FL_SIG	Front left wheel speed sensor signal input
10	RR_GND	Rear right wheel speed sensor ground
11	RR_SIG	Right rear wheel speed sensor signal input
12	MOT_L_B	Left rear caliper motor negative
13	MOT_L_A	Left rear caliper motor positive
14	GND	EPBi Ground for motors, valves and ECUs
17	EPB_SW1	EPB switch wire1
18	EPB_SW2	EPB switch wire2
19	EPB_SW3	EPB switch wire3
24	EPB_SW4	EPB switch wire4
25	VEHICLE_SPEED	Hardwire Speed Output
27	EPB_LED	EPB Switch LEDs
28	FL_OUT	Hard Wire Left Front Wheel Speed Output
30	KL30_V	EPBi valve and ECU power supply
35	IGN	Hardwire ignition
42	CAN_H	Can High
43	CAN_L	Can Low

Common methods

Hydraulic control mechanism assembly (HCU) exhaust

Use the scan tool Fill Exhaust operation to control the EPBi system pump valve action to purge air from the auxiliary oil circuit. These lines are normally closed and only open during system initialization at vehicle start-up and during ESC operation. “The Refill Exhaust procedure opens these auxiliary oil paths to allow air trapped in them to flow to the brake cylinder.

Note: Before performing the Refill Exhaust procedure, perform the

Exhaust on the conventional brake system first. Note: When any of

the following conditions occur, it is recommended to perform the

"Filling and Exhausting" procedure:

1. Conventional brake system exhaust does not achieve the correct pedal height or pedal feel.
2. The auxiliary oil circuit of the EPBi

system is suspected to be airtight.

Note: Make sure the car is parked on

a flat surface.

Note: When the ignition switch is in the "LOCK" position and the brake is cold, depress the brake pedal 3~5 times, or until the brake pedal force increases significantly. The purpose of this operation is to eliminate residual vacuum from the vacuum booster.

Note: When venting, the brake fluid reservoir must remain filled with new, clean brake fluid to ensure that the brake fluid level is close to the MAX-ray position.

1. With the engine off, place the ignition switch in the ON position.
2. Connect the scan tool to the vehicle diagnostic OBD port.
3. Establish communication with the EPBi system system via the scan tool. Select the Fill Exhaust procedure.
4. Lift the car.
5. Follow the scan tool instructions until the correct brake pedal height is reached.
6. If the exhaust procedure aborts abnormally, there is a fault. Read out the DTC and repair it if there is a DTC.
7. If the brake pedal reaches the correct height, depress the pedal and feel the appropriate pedal force. If the brake pedal feels soft, repeat the exhaust procedure.
8. Lower the vehicle.
9. Remove the scan tool.
10. Road test vehicle. Also check whether the pedal maintains the correct height and proper pedal feel.

Fault symptom diagnosis

Inspection and confirmation

1. Confirm the customer's problem.

2. Visually inspect for obvious mechanical or electrical faults.

Visual Checklist

Machinery	Electrical
Wheel speed sensor, wheel speed sensor ring gear	Fuse, connector, harness

3. Resolve the found issue before proceeding to the next check.

4. If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step.

5. If the visual inspection passes, confirm the fault and refer to the fault symptom table. General equipment

Digital multimeter
Diagnostic scanner

Fault phenomenon diagnosis and test intermittent fault diagnosis process

- Note:

  1. Clear DTC.

  2. Perform simulation tests.

  3. Check and swing harness, connectors and terminals

When the fault cannot be confirmed by DTC check, the fault phenomenon only occurs occasionally in use. All circuits and components that may cause malfunction should be identified at this time. In many cases, by performing the basic checks shown in the flow chart below, the location of the fault can be quickly and effectively identified, particularly for malfunctioning harness connectors, etc.

Fault Definition: This fault does not currently occur, but a history DTC record indicates that the fault has occurred. Or the customer reported the fault, but because the fault is not related to the DTC, the fault symptom cannot be reproduced currently.

Test conditions	**Details/Results/Actions**
1. Vibration method	
	If a malfunction or more severe malfunction occurs while driving on an uneven road, or if the engine is vibrating, go to step 2 or 3. Note: There are several reasons that may cause electrical failure due to vibration of the car or engine. Check the following: • Connector is not fully in place. • The harness does not have sufficient clearance. • The harness is routed across the bracket or moving parts. • The harness is routed too close to the hot parts. Note: Improper wiring, improper clamping, or loose harnesses can cause the wiring to squeeze between parts. Note: The joints of the connectors, the vibrations, and the locations where the harnesses pass through are all areas to be inspected, e.g. the harnesses pass through the firewall and body panels.
2. Check method of switch connector or wire harness	
	A. Connect the diagnostic scanner to the diagnostic interface (OBD). B. Turn the ignition switch to the ON position (engine not starting). C. Access the data flow of the switch you are checking. D. Open the switch manually. E. While monitoring the data flow, gently shake each connector or harness vertically and horizontally. If the data flow value is unstable, check for poor connectivity.

3. Check method of sensor connector or wire harness	
	A. Connect the diagnostic scanner to the diagnostic interface (OBD). B. Turn the ignition switch to the ON position (engine off). C. Access the data flow of the switch you are checking. D. While monitoring the data flow, gently shake each connector or harness vertically and horizontally. If the data flow value is unstable, check for poor connectivity.
4. Inspection Method of Actuator or Relay	
	A. Connect the diagnostic scanner to the diagnostic interface (OBD). B. Ignition switch to "ON" position (engine off). C. Actively test the actuator or relay you inspected.
5. Test Drive Simulation Fault, Read Data Stream	
	A. Connect the diagnostic scanner to the diagnostic interface (OBD). B. Perform a test drive to simulate a fault while reading the data stream. If the data flow value is erratic or malfunctioning, repair or replace the part.

ABS Warning Lamp Keep On Diagnostic Flow

Test conditions	**Details/Results/Actions**
1. Access the EPBi control module with the diagnostic scanner	
	A. Check if DTC is output? ? Is repaired according to the output DTC. ? No to step 2.
2. Access the Gateway Control Module with the diagnostic scanner	
	A. Check if DTC is output? ? Is repaired according to the output DTC. ? No to step 3.
3. Access the instrument cluster control unit with the diagnostic scanner	
	A. Check if DTC is output? ? Is repaired according to the output DTC. ? No to step 4.
4. Replacing instrument cluster control unit	
	A. Turn the ignition switch to the "LOCK" position and disconnect the negative battery harness B. Replace the instrument cluster. Confirm the system is normal.

ECU Diagnostic Flow

Test conditions	Details/Results/Actions
1. Check battery voltage	
	A. Switch on the ignition and run the engine. B. Is the battery voltage measured with a multimeter normal? (Standard value: 10~16 V) Yes to step 2. ? No
2. Power and ground for EPBi control module	

	A. Remove the EPBi control module connector; B. Locate the corresponding connector harness for pins 1, 14 and 30; C. Install the connector and use a multimeter to check whether the voltage output of the harness is normal (standard value: 10~18 V); Yes Power supply is normal. ? No to step 3.
3.Using the diagnostic scanner to access the EPBi control module	
	A. Use the diagnostic scanner to access the EPBi control module and actively test the pump to see if the pump is audible. Yes System OK. ? No Replace EPBi control module.

Wheel Speed Sensor Diagnostic Process

Test conditions	**Details/Results/Actions**
1. Check installation of wheel speed sensor	
	A. Check Wheel Speed Sensor for loose installation? Yes to step 2. ? No Tighten.
2. Measuring wheel speed sensor resistance	
	A. Remove the wheel speed sensor harness and measure whether the resistance of the sensor is normal? (Standard Value: 1.0~1.3kΩ) Yes to step 3. ? No Replacing front left wheel speed sensor.
3. Check wheel speed sensor	
	A. Remove wheel speed sensor. Check sensor head and connector for scratches, foreign matter, dirt. Check whether the wheel speed sensor clearance is normal? (Standard value: 0.3~0.8 mm) ? Yes Clean or replace the sensor. ? No to step 4.
4. Check wiring harness between wheel speed sensor and EPBi control module	
	A. Remove the EPBi control module connector; B. Check whether the EPBi system supplies power to the wheel speed sensor normally, and check pins 5,7,9,11 of the EPBi system; C. Install the connector and use a multimeter to check whether the voltage output of the harness is normal (standard value: 10~18 V); Yes to step 5. ? No to step 8.
5. Check wheel speed sensor harness	
	A. Check Wheel Speed Sensor Wiring OK? Yes to step 6. ? No Replacing wheel speed sensor.
6. Check front wheel speed sensor ring gear	

	A. Check whether the front wheel speed sensor gear ring is deformed or missing? ? Yes Replace front wheel speed sensor ring gear. ? No to step 7.
7. Check rear wheel bearing clearance	
	A. Check whether the wheel bearing clearance is normal? Yes to step 8. ? No Repair or replace wheel bearings.
8. Replace EPBi Control Module	
	A. Replace the EPBi control module.

DTC Diagnosis and Testing

DTC Diagnostic and Test Data Flow List

By reading the Data Flow List on the scan tool, you can check the operating status of the switches, sensors, and actuators without removing any components. Prior to troubleshooting the engine electronic control system, observation and analysis of the data is the first step in troubleshooting, which can shorten the troubleshooting time.

Description Data under normal conditions are listed in the table below for reference only. Do not judge whether a part is faulty based solely on these reference values. Normally, a normally functioning vehicle can be compared with a suspected malfunctioning vehicle in the same state to determine whether the data of the diagnosed vehicle is normal in the current state.

1. Bring the engine to normal operating temperature.
2. Turn the ignition switch to the "LOCK" position.
3. Connect the scan tool.
4. Turn the ignition switch to the ON position.
5. Select "Chang'an Car"/"CS55"/Continental EPBi/Read Stream.
6. Refer to the table below (example table menu in the diagnostic scanner, here is an example) to check the data.

Diagnostic scanner display items	Components	Control range	Diagnostic Instructions
Front left wheel speed	Signal from Left Front Wheel Speed Sensor	Front left wheel speed varies with vehicle speed	Observe wheel speed change
Right Front Wheel Speed	Signal from right front wheel speed sensor	Right front wheel speed varies with vehicle speed	Observe wheel speed change
Rear left wheel speed	Signal from rear left wheel speed sensor	Left rear wheel speed varies with vehicle speed	Observe wheel speed change
Right rear wheel speed	Signal from right rear wheel speed sensor	Right rear wheel speed varies with vehicle speed	Observe wheel speed change
EBD Warning lamp status	Signal from EPBi control module	Controlled by EPBi control module	Using the diagnostic scanner can control the turning on and off of the
ABS Warning Light Status	Signal from EPBi control module	Controlled by EPBi control module	Using the diagnostic scanner can control the turning on and off of the
ESC Warning Light Status	Signal from EPBi control module	Controlled by EPBi control module	Lights when communicating with the EPBi control module using the diagnostic scanner

Action Test

Using a scan tool to perform an action test, you can test the operating status of the EPBi actuator without removing any components. Action testing is an effective means of troubleshooting the EPBi system prior to troubleshooting, which reduces the time required for troubleshooting.

1. Bring the engine to normal operating temperature.
2. Turn the ignition switch to the "LOCK" position.
3. Connect the scan tool.
4. Turn the ignition switch to the ON position.
5. Select "Chang'an Car"/"CS55"/Continental EPBi. Test conditions:
1. Cannot be tested under voltage.
2. Vehicle speed cannot exceed 3 km/h. Test

Procedure:

Special features

When the EPBi actuator assembly parts are replaced after sale, the EPBi actuator assembly must be calibrated for vehicle configuration and yaw rate sensors using a scan tool.

1. Bring the engine to normal operating temperature.

2. Ignition switch to "LOCK" position.

3. Connect the scan tool.

4. Ignition switch to ON position.

5. Select "Chang'an Car"/"CS55"/Continental EPBi/Special Function Path to park the vehicle correctly according to the selection and prompts displayed on the diagnostic scanner screen. Vehicle Assignment

Set and then perform Yaw Rate Sensor Calibration. If the calibration is not successful, repeat the above operation after the vehicle is powered on again. If it is not successful, use the diagnostic scanner to read the fault code and judge the fault or perform replacement treatment.

Scan tool does not communicate with vehicle diagnostic process

1. Bring the engine to normal operating temperature.

2. Ignition switch to "LOCK" position.

3. Connect the scan tool.

4. Troubleshoot line faults and control module faults

based on fault diagnosis. Description A short circuit

inside the module also causes this fault.

Appearance Checklist

Visual inspection of EPBi actuator assembly mainly includes the following parts:

Serial Number	Inspection
1	Inspect the EPBi actuator assembly for visible dents
2	Check the ECU housing of the EPBi actuator assembly for damage
3	Check the ECU connector of the EPBi actuator assembly for looseness
4	Check whether the harness connection line of the EPBi actuator assembly has fallen off
5	Check EPBi actuator assembly brake oil pipe connection joint for oil leakage
6	Check for loose installation between EPBi actuator assembly and bracket

Brake pedal spring foot

If brake pedal spring feet appear, they may be caused by the following reasons, please check and confirm one by one.

1. ABS function work;

2. ESC function work;

3. HDC function work;

4. ACC function;

When the above functions are triggered, the pedal will feel like a spring foot and the EPBi system motor and electronic valve may operate and generate an operating sound.

If there is an unexpected function trigger, park the vehicle on a flat ground, turn the steering wheel straight, and then use the diagnostic scanner to calibrate the lateral and longitudinal acceleration sensors and the angle sensors.

DTC Diagnostic

Communication fault of electronic body stability control system

U0001-88: Can communication interruption

1.Fault Trigger Condition

Abnormal ⓒCan bus communication, loss of CAN signal, or interference. Duration more than 50 ms.

2.Possible causes

The Can-H and Can-L harnesses of the segment where the ⓒEPBi is located are open.

Can line of ②EPBi network segment is shorted to ground or to power supply.

3.Failure Mode

ⓒESC, HHC, HDC function failure, ESC fault light on.

4.Diagnostic process

Ⓒ Check if the voltage of the harness corresponding to pin EPBi 42 and pin 43 is within the specified range. Signal error type faults

Fault Code	U0401-86	U0401-87	U0401-88	U0402-86	U0402-87	U0402-88	U0402-89	U0403-86	U0404-86	U0405-86	U0406-86	U0406-87	U0406-88	U0407-86	U0408-87	U0409-86	U040A-86	U040B-86	U040B-87	U040C-86	U040D-86
Fault Description	EMS184_driver expected combustion torque signal error	EMS184_Friction torque signal error	EMS184_engine torque signal error	EMS196_brake pedal status signal error	EMS196_Engine speed signal error	EMS196_Accelerator pedal position signal error	EMS196_True Accelerator Pedal Position Signal Error	EMS1A6_Engine running status signal error	EMS26A_vacuum pressure signal error	TCU188_shift process status signal error	TC U1A8_TargetGearSignalError	TC U1A8_Actual gear signal error	TCU1A8_Shifter position signal error	ACC24E_ACC Target acceleration value signal error	ACC24E_RWUBrake request signal error	ACC25E_AEB Target deceleration signal error	SRS50_Main drive seat belt buckle status signal error	GW28B_Left front door status signal error	GW28B_Engine compartment cover status signal error	GW266_External temperature signal error	APA26C_Electronic handbrake request signal error

1.Fault Trigger Condition

The Ⓒ signal is invalid and the cumulative maximum length exceeds 1500 ms.

2.Possible causes

The corresponding controller in the Ⓒ fault description fails to send the corresponding signal (EMS: engine, TCU transmission, ACC adaptive cruise control, etc.).

(2) The corresponding controller in the fault description is not connected to the Can network.

The ③can bus is faulty.

Signal interference on ④can bus

3.Failure Mode

ⒸEPBi Functional Degradation

4.Diagnostic process

Ⓒ Check whether each controller is connected to the can network normally

(2) Check if the can line is abnormal.

(3) Check whether the error signal controller is abnormal.

Communication timeout fault code

Fault Code	U2100-87	U2101-87	U2102-87	U2103-87	U2104-87	U2105-87	U2106-87	U2107-87	U2108-87	U2109-87	U210A-87	U210B-87	U210C-87	U210D-87	U210E-87	U210F-87	U2110-87	U2111-87	U2112-87	U2113-87

Fault Description	EMS184 Message Timeout	EMS196 Message Timeout	EMS1A6 Message Timeout	EMS26A Message Timeout	EMS308 Message Timeout	EMS355 Message timeout	TCU188 Message Timeout	TCU1A8 Message Timeout	SAS180 Message Timeout	ACC24E Message Timeout	ACC25E Message Timeout	ACC35E Message Timeout	SRS050 Message Timeout	GW28BM essage Timeout	GW366 Message Timeout	GW3AB Message Timeout	GW530 Message Timeout	GW2D4 Message Timeout	APA264 Message Timeout	APA26C Message Timeout

1.Fault Trigger Condition

The frame message was not received by Ⓒ over 1000msEPBi.

2.Possible causes

Ⓒ The controller corresponding to the message timeout fault is damaged

The CAN line corresponding to the controller is damaged

Signal interference on ③can bus

3.Failure Mode

EPBi Functional Degradation

4.Diagnostic process

Ⓒ Check whether the IGN is abnormal and whether the vehicle is powered on or off normally.

Ⓒ Check if the can network voltage is normal.

(3) Check whether the corresponding controller sleeps and whether the can network is in the sleep state.

(4) Check whether the CAN harness is on/off
normally and whether the network is normal.
General fault codes

U3003-16: voltage too low

1.Fault Trigger Condition

ⒸEPBi supply voltage is less than 8.85 V±0.015 V and duration is more than 550 ms

2.Possible causes

ⒸEPBi Fuse blown.

Ⓒ Battery is damaged.

(3) If the whole vehicle has other loads, the voltage of the whole vehicle shall be pulled down below 8.85 V.

The generator is faulty and cannot charge the battery normally.

(5) The power supply line of the complete vehicle is damaged, and corrosion leads to abnormal power supply of EPBi.

3.Failure Mode

ⒸEPBi Functional Degradation

ⒸESC, ABS, EPB fault lights on

4.Diagnostic process

Ⓒ Check fuse

Ⓒ Check battery

(3) Check the power supply line

Check whether the generator is faulty

U3003-17:
voltage too high
1.Fault Trigger
Condition

The ⒸEPBi supply voltage is above 19±0.5 V for more than 10 ms.

2.Possible causes

When the Ⓒ generator is operating, the negative battery is disconnected.

Ⓒ Generator voltage regulator failed.

③EPBi Hardware circuit failure.

3.Failure Mode

ⒸEPBI Functional Degradation

ⒸESC, ABS, EPB fault light on

4.Diagnostic process

Ⓒ Check battery cable

Ⓒ Check generator for damage

(3) Check whether
the EPBi damages
the internal error of
the valve

Fault Code	C0010-01	C0011-01	C0014-01	C0015-01	C0018-01	C0019-01	C001C-01	C001D-01
Code Description	Left Front Normally Open Valve Error	Left Front Normally Closed Valve Error	Right Front Normally Open Valve Error	Right Front Normally Closed Valve Error	Rear left normally open valve error	Rear left normally closed valve error	Right rear normally open valve error	Rear right normally closed valve error

1.Fault Trigger Condition

Ⓒ valve supply side short circuit to ground.

Ⓒ valve ground side short to power.

2.Possible causes

Ⓒ valve supply side short circuit to ground.

Ⓒ valve ground side short to power.

3.Failure Mode

ⒸEPBi Functional Failure

4.Diagnostic process

Ⓒ Check the normally open valve and normally closed valve circuits.

C0020-11: Pump circuit short circuit1.Fault Trigger Condition

Switching circuit interference caused by improper Ⓒ supply voltage.

Ⓒ pump motor short circuit, bypass.

2.Possible causes

Switching circuit interference caused by improper Ⓒ supply voltage

Ⓒ pump motor short circuit bypass

3.Failure Mode

ⒸEPBi Functional Degradation

4.Diagnostic process

Ⓒ Check pump motor power supply C0020-12: Pump circuit open circuit1.Fault Trigger Condition

ⒸEPBi Motor voltage too high.

2.Possible causes

The Ⓒ connector is damaged or contaminated, and the grounding wire is interrupted

Ⓒ Solid State Pump Switch Short Circuit Bypass to Pump Motor

Power supply voltage or other voltage, parasitic voltage caused by disconnection of pump motor plug

Short circuit to power cord

3.Failure Mode

ⒸEPBi Functional Degradation

4.Diagnostic process

Ⓒ Check EPBi ground wire and ground point for abnormalities.

Ⓒ Check the pump motor power supply.

C0020-13: Supply voltage of pump motor is too low.Fault Trigger Condition

ⒸEPBi Motor supply voltage too low

2.Possible causes

Ⓒ pump motor power missing

Ⓒ pump motor power too low

Pump motor short circuit bypass

3.Failure Mode

ⒸEPBi malfunction, ESCs, ABSs, EPB malfunction lights up.

4.Diagnostic process

Ⓒ Check EPBi motor power supply

C0020-16: Pump status abnormal (when idle) 1.Fault Trigger Condition

Electrical failure of Ⓒ low side drive or valve solenoid

2. **Possible causes**

Ⓒ pump motor disabled

Ⓒ Reverse power FETs damaged

Electrical fault of low-side driver or valve solenoid valve

3. **Failure Mode**

ⒸEPBi Functional Failure

4. **Diagnostic process**

Ⓒ Check PCB version for malfunction, damage.

C0020-71: Pump motor generator voltage too low 1.Fault Trigger Condition

The Ⓒ detects that the pump motor voltage is not in the normal operating unit.

2. **Possible causes**

Ⓒ pump motor power missing

Ⓒ pump motor power too low

Fuse failure

3. **Failure Mode**

ⒸEPBi Functional Degradation

4. **Diagnostic process**

Ⓒ Check pump motor power supply and power supply circuit wheel speed sensor type fault code

Fault Code	C0030-29	C0033-29	C0036-29	C0039-29
Code Description	Front left wheel speed sensor fault (Interference)	Front right wheel speed sensor fault (Interference)	Left rear wheel speed sensor fault (Interference)	Rear right wheel speed sensor fault (Interference)

1. **Fault Trigger Condition**

A comparison between the number of pulses detected by the Ⓒ and the expected number of pulses shows at least one missing pulse.

2. **Possible causes**

Ⓒ Pulse deformation of the speed due to debris or contaminants on the ring gear bearing seal surface or wheel speed sensor surface.

3. **Failure Mode**

ⒸABS. ESC fault light is on and EPBi function is degraded.

4. **Diagnostic process**

Ⓒ Check wheel speed sensor surface, ring gear surface, for foreign matter, debris, and defects.

Fault Code	C0031-18	C0034-18	C0037-18	C003A-18
Code Description	Front left wheel sensor signal current exceeds threshold(Lower Limit)	Front right wheel speed sensor fault (Open circuit)	Left rear wheel speed sensor fault (Open circuit)	Rear right wheel speed sensor fault (Open circuit)

1. **Fault Trigger Condition**

Ⓒ Left front wheel sensor signal current is less than 4.5 mA continuous 140 ms.

2. **Possible causes**

Ⓒ Wheel speed sensor fault

Ⓒ Wheel speed sensor line fault

3. **Failure Mode**

The ⒸEPBi function fails and the ABS and ESC fault lights are on.

4. **Diagnostic process**

Ⓒ Check Wheel Speed Wheel Speed Sensor Fault

Ⓒ Check wheel speed sensor circuit fault

Fault code	C0031-19	C0034-19	C0037-19	C003A-19
Code description	Front left wheel speed sensor overcurrent	Front right wheel speed sensor overcurrent	Rear left speed wheel sensor overcurrent	Rear right wheel speed sensor overcurrent

1.Fault triggering conditions

Ⓒ sensor signal current continuously out of range

2.Possible causes

Ⓒ Wheel speed sensor fault

(2) Wheel speed sensor circuit fault

3.Failure mode

ⒸEPBi function fails, and ABS and ESC fault lamps are on.

4.Diagnostic process

Ⓒ Inspect wheel speed sensor fault

Check wheel speed sensor circuit fault

Removal and installation

Front wheel speed sensor assembly

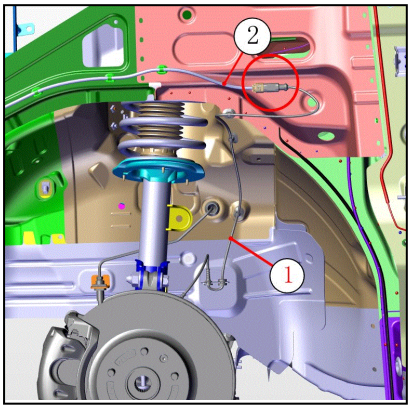
1. Removal

1 Disconnect the negative battery harness. Refer to: Battery Assembly

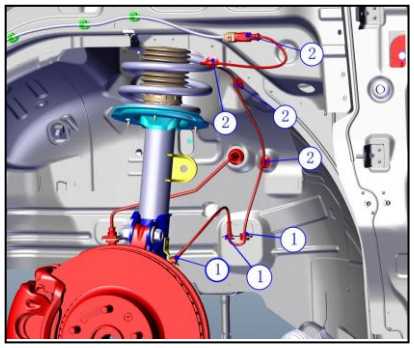
2 Lifting the vehicle, reference: Lifting

3 Remove wheel housing and engine side guard, reference: Removing and installing wheel housing and engine side guard

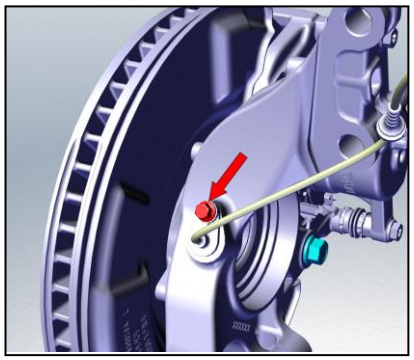
4 Disconnect the front wheel speed sensor and harness, as shown in the figure below Ⓒ is the front wheel speed sensor, (2) is the power supply harness, and the red ring is the connection point.



5 Take out the Ⓒ clip from the body sheet metal, and gently pull out the harness rubber bushing from the body bracket and FRT pillar mounting bracket.



6 Remove the connecting bolt between wheel speed sensor and front brake steering knuckle, tool: M8 hexagon socket, torque: 8±1N.m.



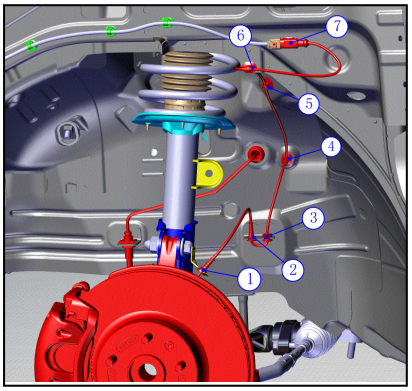
7 Remove the front wheel speed sensor assembly.

2. Installation

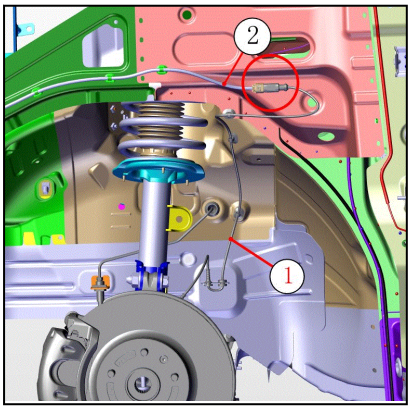
1 Put the wheel speed sensor head into the front brake steering knuckle circular hole, tighten the connecting bolt between the wheel speed sensor and front brake steering knuckle, tool: M8 hexagon socket, torque

8±1N.m.

2 Assemble the harness clips to the vehicle body and bracket in the following order: Ⓒ②③④⑤⑥⑦. During assembly, pay attention to straighten the wheel speed sensor harness, and do not twist or twist.



3 Connect the wheel speed sensor connector to the power supply harness.



4 Assemble wheel housing and engine side guard, reference: Removing and installing wheel housing and engine side guard

5 Lower the vehicle

6 Connect the battery negative harness,

refer to: Battery Assembly Rear Wheel Speed

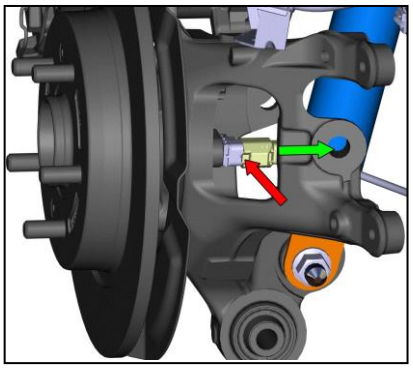
Sensor Assembly

1. Removal

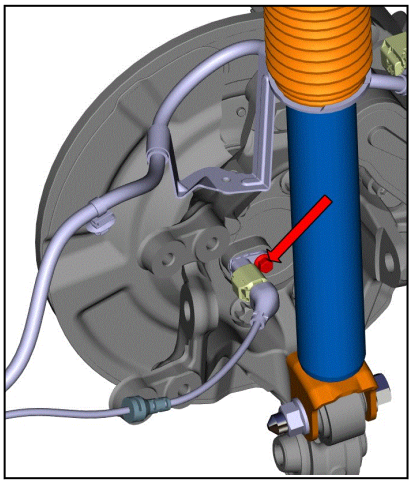
1 Disconnect the negative battery harness. Reference: Battery assembly

2 Lift the vehicle. Reference: Lifting

3 Gently pull up the spring piece of harness connector shown by the red arrow, pull out the connector along the direction of the wheel speed sensor axis (green arrow), so as to disconnect the wheel speed sensor and the harness.



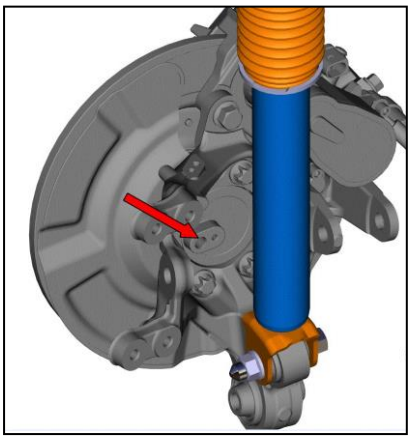
4 Remove connecting bolt between rear wheel speed sensor and rear horn bearing end cover, tool: M8 hexagon socket, torque: 8±1N.m



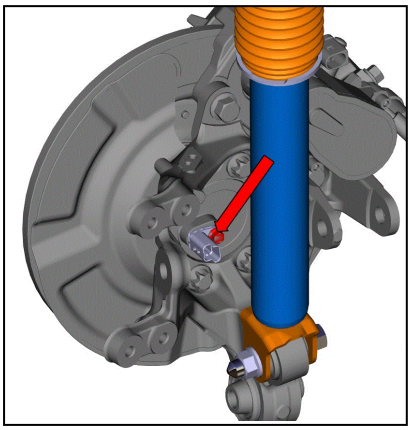
5 Take out rear wheel speed sensor assembly.

2. Installation

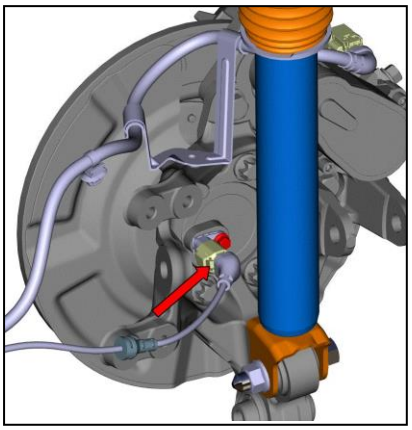
1 Insert rear wheel speed sensor assembly into corresponding mounting hole of rear horn bearing end cover



2 Use M8 hexagon sleeve to tighten connecting bolts between rear wheel speed sensor and rear horn bearing end cover. Torque: 8±1N.m



3 Align the rear wheel speed sensor connector with the harness connector, and firmly insert it along its axis until "click" is heard, i.e. the spring piece on the connector is clamped in place.



4 Lower the vehicle

5 Connect battery negative harness, reference: Battery assembly

Hydraulic control mechanism assembly(HCU)

Caution If brake fluid is accidentally splashed on the paint surface, flush it with clean water immediately.

The reservoir cap must not be contaminated.

1. Removing material

Name	Model
Brake fluid	HZY4/DOT4

1 Disconnect the negative battery harness. Reference battery assembly

2 Remove reservoir cover.

2.1 Remove plug connection for low brake oil level indicator switch.

2.2 Remove reservoir cover.

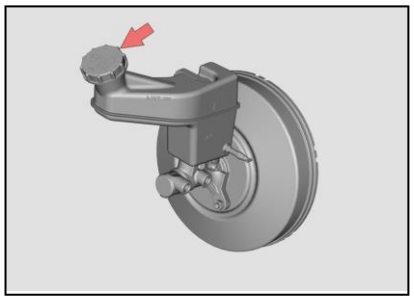


Figure 43:

3 Drain brake fluid from the reservoir.

3.1 Use a suitable clean plastic pipe with one end connected to the system exhaust nozzle and the other end connected to a suitable container.

3.2 Unscrew the exhaust nozzle.

3.3 Press the brake pedal repeatedly until all brake fluid in the reservoir is drained.

3.4 Tighten the exhaust nozzle.

Caution This step must be performed on both sides in order to completely drain all brake fluid from the reservoir.

4 Disconnect the EPBi control module harness connector.

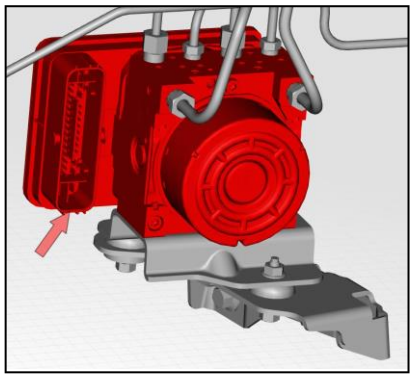


Figure 44:

5 Unscrew the brake oil pipe connector from the hydraulic control module oil port with a wrench and pull out the 6 brake oil pipes. Torque: 16N.m

Caution Block the hydraulic control mechanism (HCU) to prevent brake fluid from flowing out or entering

dirt. Cover the brake oil pipe to prevent brake fluid from flowing out or entering dirt.

Note the position of each brake oil pipe for installation.

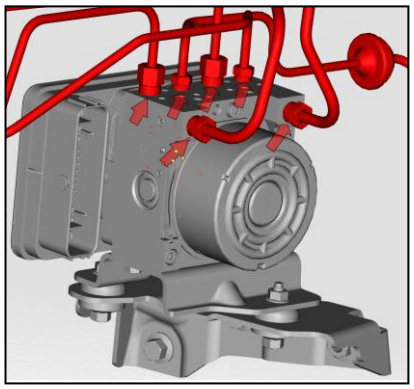


Figure 45:

6 Remove two retaining bolts and one nut of hydraulic control module mounting bracket, torque: 23N.m.

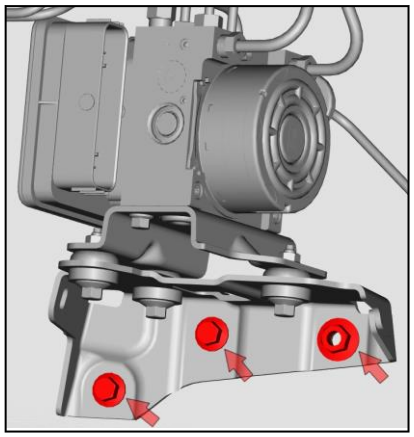


Figure 46:

7 Remove two connecting bolts between hydraulic control module assembly and mounting bracket, torque: 8N.m.

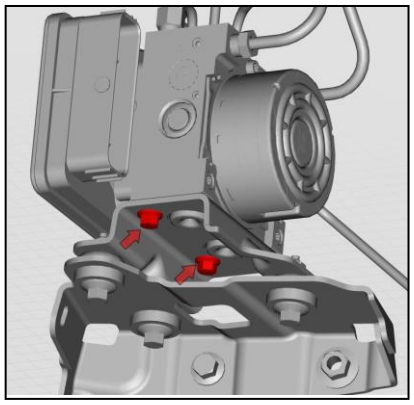


Figure 47:

Caution Please confirm the brake booster push rod is in the correct position before installation.

Make sure that the brake master cylinder vacuum seal is in the correct position before installation. After installation, please confirm to use diagnostic scanner to write configuration information.

The steering wheel steering angle sensor, yaw rate sensor (integrated sensor) must be calibrated after installation.

2. Installation

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

2 Brake system exhaust. Refer to Brake System Exhaust

Spare parts atlas

F260306

Electronic Parking Control System

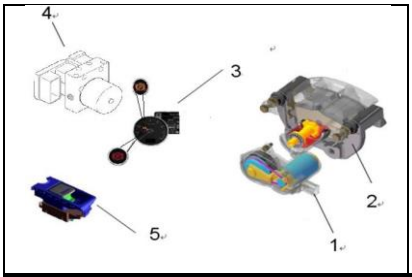
Specifications

Torque specification

Name	Nm
Parking brake mounting bolt	23±2

Composition and position distribution

Component of EPB system



Serial number	Description
1	Actuator
2	Caliper
3	Indicator light
4	EPBi control module ECU
5	EPB switch lamp

System functional principle introduction

System overview

Electronic parking brake system is abbreviated as EPB system. The EPB system removes the traditional hand-pull or foot-step parking control mechanism and uses an electronic control button to control the parking brake. Therefore, for the driver, the biggest advantage of this new parking brake system is convenient and comfortable operation.

From the control function point of view, the parking brake system can be jointly controlled with other control systems such as electronic stability control system (ESC) due to the overall electrification modification of the parking brake system. Therefore, the vehicle safety performance is greatly improved, and various control functions within the brake system are realized by electronic control. These advantages are beyond the comparison of traditional mechanical parking control system.

Basic control energy

Depending on the vehicle configuration and operating conditions, the EPB system can perform the following functions:

1. Static clamping and releasing function

When the vehicle is stationary, the traditional parking function can be realized by pulling up the EPB switch; When the vehicle is stationary, the parking brake release function can be realized by pressing the brake pedal and pressing the EPB switch. (If the brake pedal is not depressed, the instrument with text information display function will prompt you to depress the brake pedal).

2. Auxiliary exit function(DAA)

Use this function to release the EPB parking brake when the EPB system detects that the driver wishes to drive away. However, when the vehicle is parked on a ramp, sufficient drive torque is required to function in order to prevent the vehicle from rolling.

The Auxiliary Drive-Out function can be used for ramp start and ordinary road start, especially for ramp start, so as to avoid the problem of vehicle slipping after parking ramp start. Hill start must meet several preconditions:

The driver fastens the seat belt, the gear is in forward or reverse gear, depresses the accelerator, and the engine continuously outputs torque (if MT vehicle, it is necessary to release the clutch pedal and depress the accelerator pedal) EPB system will automatically release.

3. Dynamic deceleration function(ECD)

ECD function enables the driver to achieve dynamic deceleration in case of emergency. (For example, brake pedal and brake master cylinder fall off, vacuum booster leakage failure, etc.) When the driver pulls up EPB switch for deceleration, ECD function will send deceleration request (deceleration 6m/s^2), and send a valid flag on CAN line. This deceleration request will require the ESC system to actively build up pressure to apply wheel braking force to achieve the purpose of decelerating the vehicle. The ESC system will send a valid flag confirmation deceleration request within 300 ms.

The ESC system sends a signal to confirm whether the ECD function can be responded to, and then confirm whether the EPB deceleration request is executed.

When the system detects that the deceleration makes the vehicle stationary, the deceleration request will immediately exit to ensure the vehicle deceleration comfort. When the driver performs dynamic deceleration through the EPB switch, this command is executed but there is a request that will interrupt the ECD function, that is, when the ECD function is activated and the accelerator pedal is depressed, the ECD function will be interrupted immediately.

If the EPB sends a deceleration request, the EPB system detects that it is unable to perform the ECD function (when there is no response or the deceleration does not reach the defined minimum) EPB will return and start RWU
Function, anti-lock braking deceleration of rear wheels is realized by electro-mechanical on rear wheels.

4. Rear wheel anti-lock brake function(RWU)

RWU function is "electronic plus mechanical" dynamic deceleration function through EPB system. RWU The anti-lock braking of rear wheels can be carried out separately to realize vehicle stability of rear wheels. In case of service brake system failure, if the vehicle needs to decelerate and continuously pull the EPB switch, the RWU function will work.

5. Service function

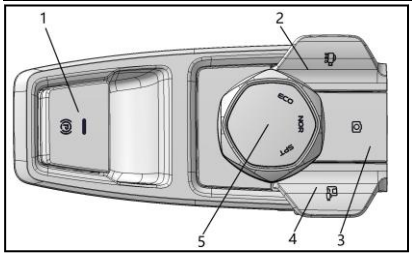
When driving a certain mileage, it is necessary to replace the friction block of rear brake caliper, which shall be completed by the diagnostic scanner. First connect the diagnostic scanner through the OBD port, select the electronic handbrake system to enter the maintenance mode in special service, and operate according to the prompt of the diagnostic scanner. Then replace the friction plate according to the procedure for replacing the friction plate.

Inspection of part structure principle

Electronic hand brake switch

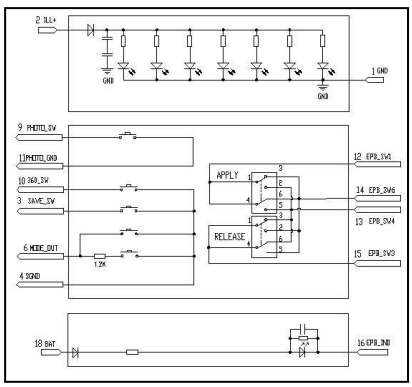
Electronic hand brake switch structure function of electronic gearshift model

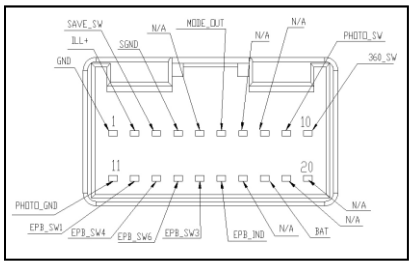
Serial number	Name



1	EPB switch
2	360 Panoramic switch
3	Photographing switch
4	Emergency recording switch
5	Driving mode switch

Schematic diagram and pin definition of PIN

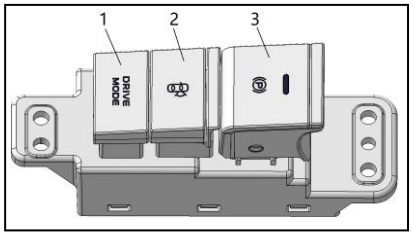




Mechanical gearshift

electronic hand

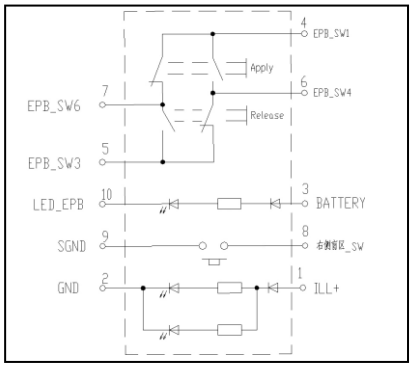
brake switch

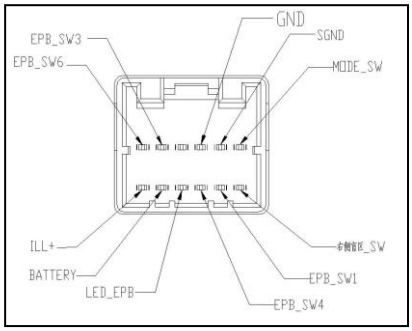


structure function

Serial number	Name
1	Driving mode switch
2	Right blind area detection switch
3	EPB switch

Schematic diagram and pin definition of PIN





Rear brake motor

Implement the parking brake and release the parking brake according to the electrical signal from the electronic parking button.

Fault symptom diagnosis

Inspection and confirmation

Note: Before diagnosis, confirm the brake system warning indicator is normal.

1. Verify the customer's problem.

2. Visually inspect obvious

mechanical and hydraulic faults.

Visual inspection items

Tire pressure, wheels and tires, brake fluid level, brake line leakage.

3. Solve the problems found before the next inspection.

4. If the obvious cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step.

5. If the visual inspection is passed, confirm the fault

and refer to the fault symptom table. General

equipment

Digital multimeter
Diagnostic scanner

Appearance check list

1. Check whether the connector is loose.

2. Whether the appearance is damaged.

Hand brake can not be pulled

1. Check whether the connector is loose.

2.Read EPBI fault code with diagnostic scanner. Reading path: Chang'an Automobile > Chang'an Passenger Car >CS55> Continental EPBi> Diagnostic Data Version > Reading DTC > Reading Current DTC.Fault code analysis: Fault symptom table

3. If necessary, replace the electronic handbrake motor. Reference: Rear brake motor

Abnormal sound when the hand brake is pulled up

1.Use diagnostic scanner to enter\ Chang'an Passenger Car\ Fuel Vehicle \CS55PLUS\ Continental Electronic Handbrake Integration EPBI\ Continental Electronic Handbrake Integration EPBI\ Diagnostic Data Version\ Special Function.

2. Operate "Diagnostic release calipers on both sides." Confirm whether there is abnormal sound.

3. Operate "Diagnostic clamp rear left caliper" and "Diagnostic release rear left caliper." Confirm whether there is abnormal sound.

4. Operate "Diagnostic clamp RR RH caliper" and "Diagnostic release RR

RH caliper." Confirm whether there is abnormal sound. If abnormal sound

occurs during the above operation, replace the caliper motor with abnormal

sound.Rear brake motor

DTC Diagnostic

Electronic parking control system

C1400-16: Brake caliper control unit undervoltage failureFault triggering conditions

When the Ⓒ power supply voltage is too small (less than 7.9 V) in the action process and exceeds a certain period of time when the power supply voltage is too small, there is a new action request.

2.Possible fault causes

Ⓒ Vehicle power supply voltage too low(Below 7.9 V)

(2) Caliper power supply line fault

3.Failure mode

The ⒸEPB function fails to execute the EPB switch command.

4.Diagnostic process

Ⓒ Detect the power supply of complete vehicle and its input terminal to ESCs.

C1401-16: Brake caliper control unit low voltage failure

1.Fault triggering conditions

Ⓒ Low voltage detected during caliper execution

(2) Supply voltage between 7.9 [V] and 8.85 [V] exceeds 210 [ms]

(New) clamping request detected

2.Possible fault causes

Ⓒ The power supply voltage of the complete vehicle is unstable, or the voltage is low.

3.Failure mode

The ⒸEPB function fails and the caliper does not respond to the command of the EPB switch.

4.Diagnostic process

Ⓒ check the power supply of the complete vehicle and its input terminal C1402-17: Brake caliper control unit overvoltage failure.Fault triggering conditions

Ⓒ During the operation of caliper, it is detected that the supply voltage of caliper is higher than 17.2 [V] more than 50 [ms]).

2.Possible fault causes

Ⓒ Caliper supply voltage too high

②ESC Output fault supplying power to caliper

3.Failure mode

Ⓒ Left and right calipers will interrupt execution.

(2) The caliper does not respond to the command of EPB switch.

4.Diagnostic process

Ⓒ Detect the power supply of the complete vehicle and its input to the ESCs.

C 1403 -4B: Brake caliper control unit too high temperature fails with functional limit1.Fault triggering conditions

Ⓒ If the calculated motor temperature is higher than 110 [°C] and the new clamping command is degraded, the fault code will be set.

2.Possible fault causes

Ⓒ Motor locked, motor overloaded, motor short circuit, frequent actions

3.Failure mode

Ⓒ The caliper does not respond to the command of the EPB switch, and the EPB function fails.

4.Diagnostic process

Ⓒ Check if there are other failures associated with the caliper according to the repair instructions of the caliper; Also check the PBC for other caliper-associated failures.

(2) Warning driver: EPB is used too frequently

C1406-54: Brake caliper control unit does not complete offline detection promptFault triggering conditions

Ⓒ Caliper initialization test not completed.

2.Possible fault causes

Ⓒ Caliper initialization test not completed

3.Failure mode

Ⓒ has no effect on the function, and initialization can be completed.

4.Diagnostic process

Ⓒ Depress the brake pedal, perform three operations of release-clamp-release statically, and then perform the next operation more than 5s after each operation is completed. If the fault code still exists after the operation, please go to Step 2.

(2) When the electronic hand brake is released, use the fault diagnostic scanner to complete the caliper diagnostic assembly inspection operation.

C1407-68: HSPs (hydraulic auxiliary) function in brake caliper control unit (PBCs) failsFault triggering conditions

Ⓒ If HSPs are requested, HSPs are not available greater than 2 [s] and the voltage is within the normal voltage range (9-16 V), the failure will be set.

2.Possible fault causes

Ⓒ failure occurs in EPBi internal software and hardware module.

3.Failure mode

Ⓒ Hydraulic auxiliary function failure

4.Diagnostic process

Ⓒ Inspect EPBi internal fault code and troubleshoot

EPBi internal fault. C1408-68: brake caliper control unit detects abnormal power outage.Fault triggering conditions

ⒸEPBi is abnormal power-off, and the power-off fault is not written into the caliper controller memory.

2.Possible fault causes

Ⓒ Abnormal power-off occurs during EPB operation

3.Failure mode

Ⓒ Although the failure is detected as a failure, normal static clamping or release will be performed normally.

4.Diagnostic process

Ⓒ Check complete vehicle power supply

Ⓒ Check EPBi supply voltage

C1409-49: Wrong vehicle status variable in brake caliper control unitFault triggering conditions

Ⓒ If there is obvious wrong or damaged model configuration data.

Ⓒ If any PbcInVariantItem value is illegal or exceeds the definition

2.Possible fault causes

Ⓒ Illegal vehicle variable information, EEPROM defective

3.Failure mode

ⒸPBC will use default parameter set action

4.Diagnostic process

Ⓒ Check whether the configuration variable of EPBi model is consistent with the configuration variable of model.

Removal and installation

Electronic hand brake switch

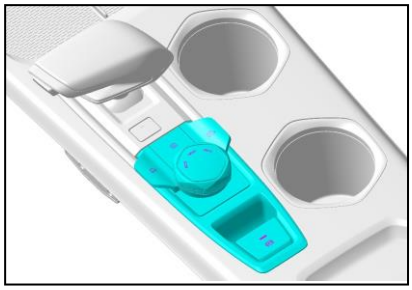
Electronic gearshift model removal and installation

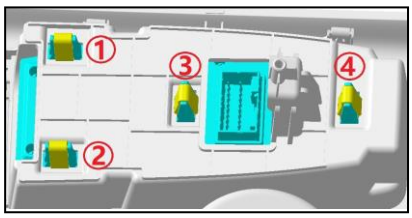
1 When removing the electronic handbrake switch, first remove the central control panel. Refer to Removing and installing central control box for details.

2 After removing the central control panel, use pliers to hold the four mounting buckles as shown in the figure, and remove the electronic hand brake switch;

3 Pull out connector;

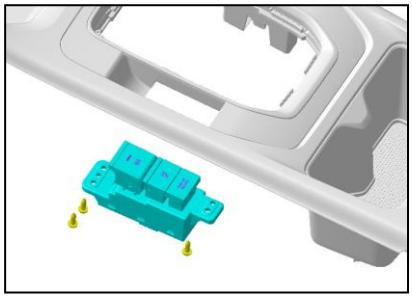
4 The installation sequence is the reverse of the removal sequence.





Mechanical gearshift model removal and installation

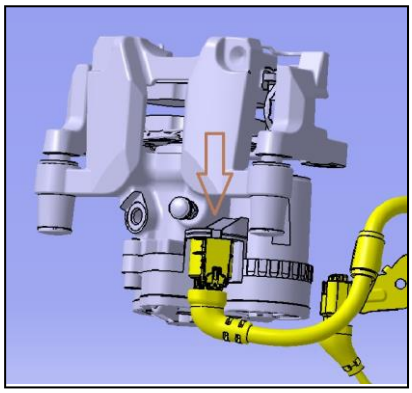
1 When removing the electronic handbrake switch, first remove the central control panel. Refer to Removing and installing central control box for details.
2 After removing the central control panel, unscrew the three mounting screws with cross opening, and remove the electronic hand brake switch;
3 Pull out connector;
4 The installation sequence is the reverse of the removal sequence.



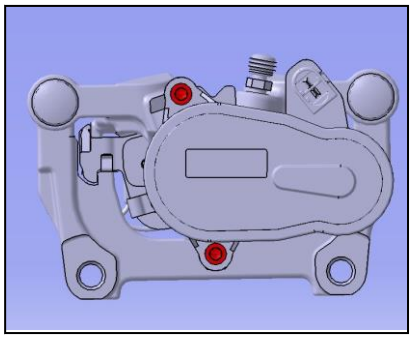
Rear brake motor

1.Use diagnostic scanner to enter: Changan Passenger Car\ Fuel Model \CS55plus\ Continental Electronic Handbrake Integration EPBI\ Continental Electronic Handbrake Integration EPBI\ Diagnostic Data Version\ Special Function\ Diagnostic Enter Maintenance Mode

2. Remove the caliper motor harness connector.



3. Remove the two screws with No. 5 Allen key. Torque 8±1N.m



Installation

The installation sequence is exactly the reverse of the removal sequence.Use the diagnostic scanner to exit the diagnostic service mode. Restart the vehicle.

Warning **You must restart the vehicle after replacing the motor, or the brake system fault lamp will light up.**

Spare parts atlas

F260305

Steering system specifications

General specifications

Name	Specifications
Minimum turning diameter	Approx. 11.2 m
Steering wheel turns	Approx. 2.78 turns

System overview

C-EPS-type steering electric power system of this model, whose power is provided by the motor on the steering column (abbreviated as pipe column or C-EPS); After the engine is started, when the engine signal and vehicle speed signal are normal, the EPS system can work normally and provide assistance after the complete vehicle self-inspection is completed, otherwise, it is abnormal or not working.

Steering system consists of steering wheel, steering column, mechanical steering gear (steering gear or steering gear for short).

The steering wheel rotates through the steering column to the pinion in the steering gear. The pinion rotates with the steering wheel. The gear teeth on the pinion mesh with the gear teeth on the rack, and drive the rack to move back and forth when the pinion rotates. The lateral movement of the rack is transmitted to the wheel steering knuckle through the steering inner tie rod and the left and right outer tie rods to change the direction of the front wheels of the vehicle.

Steering wheel and steering column

The steering wheel is fixed to the steering shaft in the steering column. At the lower end of the steering column, the steering column is connected to the steering gear by a lower steering shaft (or universal shaft). The steering column can be adjusted in the axial direction for height adjustment and in the forward direction for angle adjustment.

Some driver control switches may also be installed on the steering wheel to make driving operation more convenient and comfortable. The following control switches can be mounted on the steering wheel or steering column:

- Turn signal switch
- Headlamp dimmer switch
- Wiper washer switch
- Entertainment system control switch

The steering wheel and steering column have a safety function to protect the driver. The following components may be mounted on or near the steering column:

Collapsing mechanism: The energy-absorbing steering column shrinks when it collides at the front end, reducing the risk of injury to the driver. Energy absorption, collapsible steering lower shaft and break cushioning help reduce injury in accidents.

Rotate the connector and

airbag module. Mechanical

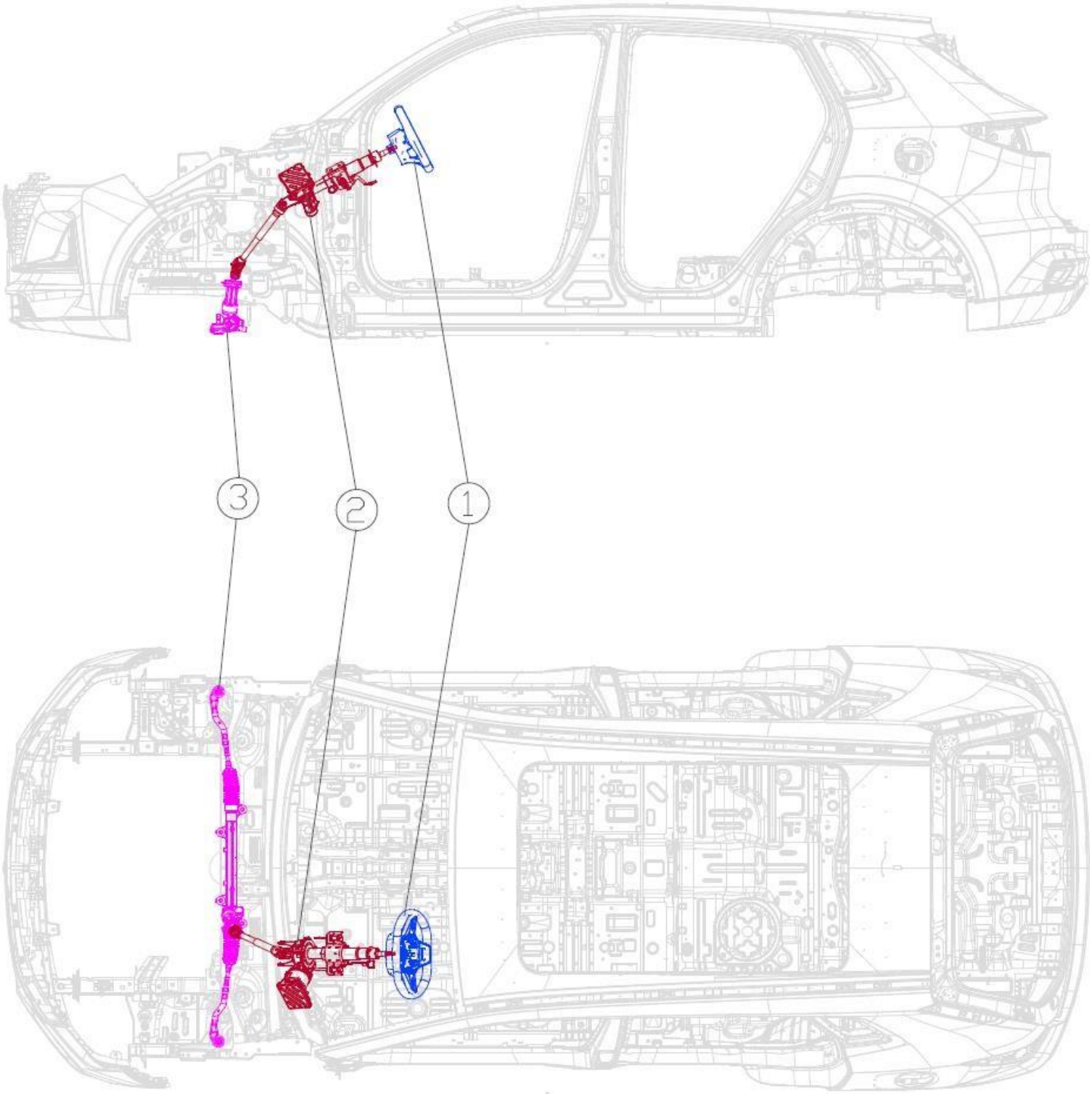
steering gear

Mechanical steering gear is rack and pinion type.

The steering inner tie rod is connected to the steering mechanism, and the movement of the steering mechanism is transmitted to the wheel through the steering inner tie rod, outer tie rod assembly and steering knuckle;

The steering inner tie rod ball joint and the outer tie rod are tightly connected through threads and lock nuts. The connection between the steering inner tie rod and the steering mechanism is protected with a rubber dust cover to prevent dust from entering the inner ball joint of the inner tie rod.

Component position diagram



Serial number	Component name	Quantity	Serial number	Component name	Quantity
1	Steering wheel assembly	1	3	Mechanical steering gear assembly	1
2	Steering column assembly	1			

Structural principle of parts Check steering wheel

1.Specifications

Name	Material
Steering wheel assembly	PU+ super fiber
Steering wheel diameter	370±2.5mm

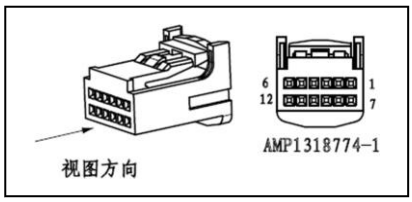
2.Torque specification

Description	Value
Steering wheel and steering column mounting nut M12x1.25	33±4(N.m)

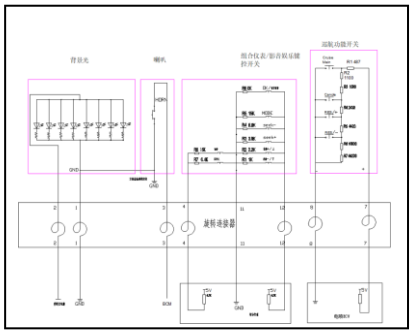
3.System overview

The steering wheel is located between the cab seat and the instrument panel and installed on the steering column assembly. The driver controls the vehicle to travel straight or change direction through the steering wheel. The steering wheel is equipped with airbag module with safety function to protect the driver.

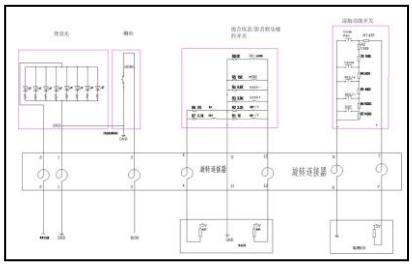
4.Schematic diagram of connector pin assignment



5.Circuit diagram(Analog signal: Constant speed cruise)



6.Circuit diagram(Analog signal: Adaptive cruise control)

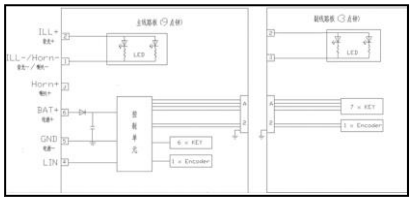


7.Pin function definition(Analog signal)

Pin	Pin function definition	Rated current
1	Grounding(Background light, horn)	Less than 350 mA
2	Backlight positive	Less than 350 mA
3	Horn positive	Less than 350 mA

4	Instrument/entertainment display signal	Less than 350 mA
5	/	/
6	/	/
7	Cruise positive	Less than 350 mA
8	Cruise ground	Less than 350 mA
9	/	/
10	/	/
11	Instrument/entertainment display ground	Less than 350 mA
12	Instrument/entertainment display signal	Less than 350 mA

8. Circuit diagram(Lin signal)



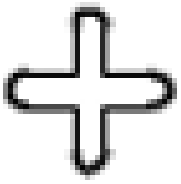
9. Lin pin function definition

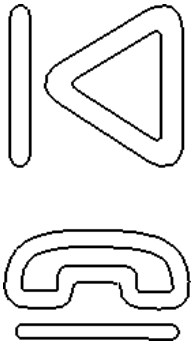
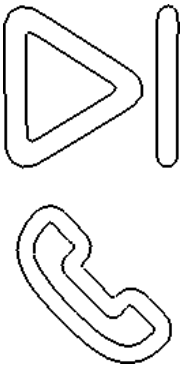
Pin	Function abbreviation	Rated current	Rated current	Input/output	Function description	Remarks
1	ILL-(HORN GND)	250mA	1	Output	Backlight power supply -/horn-	/
2	ILL+	250mA	1	Input	Backlight power supply +	/
3	HORN	200mA	/	Input	Horn +	/
4	LIN	20mA	0.05	Communication	Lin signal	/
5	GND	200mA	1	Output	Power supply -	/
6	BAT+	200mA	1	Input	Power supply +	/
7	/	/	/	/	/	/
8	/	/	/	/	/	/
9	/	/	/	/	/	/
10	/	/	/	/	/	/
11	/	/	/	/	/	/
12	/	/	/	/	/	/

10. Fault diagnosis

In case of key failure or key uncontrollable system, the resistance value can be tested according to the test pin of corresponding function in the following figure. Please power off when measuring. If the resistance is not correct, replace the steering wheel.

Test pin	Character	Key definition	Key resistance	Tolerance

4 11		Sound control		15K	1%
		Custom		6.8K	1%
11 12		Five-way key: Volume plus pa turning	/instrum ent	2.2K	1%
		Five-way key lower (steering wheel reduction/instru ment lower pag turning)	Right): Tone	1K	1%

		Previous/Phone		6.8K	1%
		Next/Phone		3.9K	1%
		Menu		15K	1%

		Confirm		0K	1%
7 8		Activate ACC		0.487K	1%
		Cancel ACC/CC		3.167K	1%
		Resume ACC/and improve patrol	Speed	5.597K	1%
		Five-way key lower (steering wheel setting ACC/lowering patrol	Left): Speed	10.017K	1%

		Adjust following distance		20.017K	1%

Refer to the following table for other faults.

Fault symptom	Measures
Key jamming	Replacing steering wheel
Key/trim paint drop	Replacing steering wheel
Trim deformation	Replacing steering wheel
Coating degumming/damage	Replacing steering wheel
Button loose	Replacing steering wheel
Horn pressing force is too large	Check whether the airbag interferes with the periphery, resulting in excessive pressing force. If interference occurs, replace the airbag. And check whether the pressing force is normal. If the airbag pressing force is still too large without interference or replacement, replace the steering wheel.
Bumpy road horn self-sounds	Check whether the harness connection is normal. If yes, replace the airbag.
Steering wheel skew	1. Re-perform four-wheel alignment; 2.Refit steering wheel.

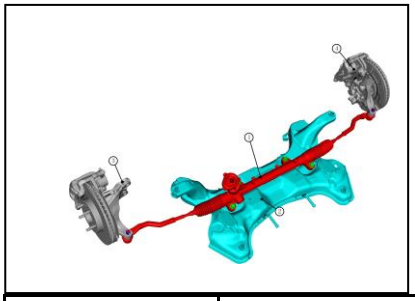
The steering wheel deviation is different from the vehicle running deviation. The vehicle running deviation is executed according to the troubleshooting method of vehicle running deviation diagnosis process in running deviation inspection. Judgment standard of steering wheel skew: First check the tire pressure, use the manufacturer's recommended value, check the left and right limit turns of steering wheel to ensure that the difference between the left and right limit turns is less than 12°, then select a flat straight road section, adjust the direction so that the vehicle stably runs straight for more than 3s at a speed of less than 30Km/h, and finally loosen the steering wheel to make subjective evaluation on the skew degree of steering wheel at this time. If the steering wheel deflection angle is greater than 3°, it can be determined that the steering wheel is not correct.

Mechanical steering gear assembly

Brief description

The driver's steering intention is transmitted from the steering wheel to the steering column. After the steering column is identified, the motor works to provide steering assistance and transmit it to the pinion shaft of the steering gear through the lower steering shaft (universal shaft), and transmit it to the left and right tie rods of the steering gear through rack and pinion engagement, and then transmit it to the steering knuckle through the left and right tie rods to realize wheel rotation.

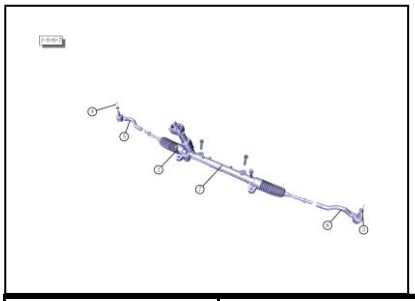
Position diagram



Serial number	Component name	Quantity	Serial number	Component name	Quantity
1	Mechanical steering gear assembly	1	13	Left brake assembly	1

2	Front subframe assembly	2	1	Right brake assembly	1

Mechanical steering gear structure



Serial number	Name	Quantity	Serial number	Name	Quantity
1=5+6+7	Mechanical steering gear assembly	1	5	Left outer tie rod assembly	1
2	Hexagon bolt, spring washer and plain washer assembly	4	6	Right outer tie rod assembly	1
3	Hexagon slotted nut	2	7	Steering gear with inner tie rod	1
4	Cotter pin	2			

EPS steering column

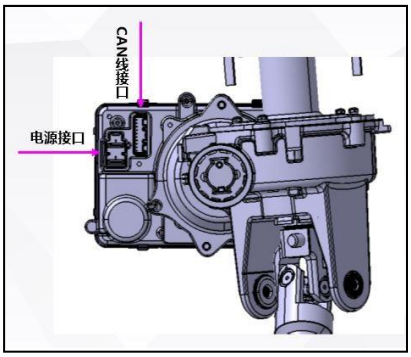
Function

To assist the driver in steering during driving; It makes the vehicle easy to steer at low speed and stable at high speed, improving driving comfort and handling stability. Working principle

The torque sensor and angle sensor are used to identify the current steering wheel torque of the driver and the steering wheel angle of the current vehicle, and calculate and output the power according to the vehicle speed signal. Product structure

1 Single structure

2 Interface definition



Product fault and troubleshooting

1 Mechanical troubleshooting: Before single-room troubleshooting, first check the torque of each mounting point, and confirm that there is no problem during single-room troubleshooting; ABA is recommended for interchangeability verification.

2 Electrical fault troubleshooting: Before single product troubleshooting, first check the harness connection, and confirm that there is no problem during single product troubleshooting; Connect diagnostic scanner to EPS to enter diagnostic system to read DTC, and carry out diagnosis and troubleshooting according to DTC.

Common methods

Direction reversibility check

1 Start the vehicle and accelerate straight to 30 km/h on a straight road.
2 Turn steering wheel 90° to the left or right to release the steering wheel.
3 If the steering wheel rotates smoothly without jamming, the residual angle is less than 20°, and the vehicle is normal.

Suggestion: If the return is bad, check the following items: EPS median calibration, tire pressure check, four-wheel alignment parameters, suspension system related components.

Steering system steering clearance check

The steering system clearance always exists, which cannot be completely eliminated. Even if the new vehicle has a certain clearance, the clearance value can meet the requirements.

1 Park the vehicle on a flat ground, so that the wheels of the vehicle are straight. Shut down the engine, hold the steering wheel firmly with both hands, shake the steering wheel up and down and left and right with force (do not rotate the steering wheel), and check whether there is looseness; If loose occurs, check whether the steering column, steering intermediate shaft, steering gear and steering wheel are loose; If steering column, steering intermediate shaft and steering gear are damaged and cannot be repaired, they must be replaced;
2 Park the vehicle on a flat ground, so that the wheels of the vehicle are in straight running state. Slightly rotate the steering wheel rightward or leftward with your hand until you feel resistance. Measure the angle at which the steering wheel has rotated. The required angle is ≤6°.

DTC Diagnostic

EPS steering column

The EPS fault light located on the instrument panel can indicate whether the EPS system is working properly. EPS will request the instrument panel EPS fault lamp for self-check every time the system is powered on: Turn the ignition switch from "OFF" to "ON," EPS system self-check, and the fault lamp goes out after being on for 3 seconds. If it does not conform to the above conditions, it indicates that the system detects a fault, and can check with the fault diagnostic scanner and refer to the corresponding fault code. Two states after EPS fault lamp self-check: 1. The fault lamp goes out, indicating that the system can work normally; 2. The fault lamp is always on, indicating that the system is faulty;

EPS DTC diagnosis

Diagnostic scanner can be used for fault diagnosis of EPS system. Specific applications are as follows:

- Read fault code
- Connect the fault diagnostic scanner and diagnostic port in case of power failure, and then turn on the ignition switch; Diagnostic scanner selects EPS diagnostic function; Start the DTC diagnostic service and read the DTC.
- Clear fault code

Connect the fault diagnostic scanner and diagnostic port in case of power failure, and then turn on the ignition switch; Diagnostic scanner selects EPS diagnostic function; Start the DTC reading diagnostic service and clear the DTC. Diagnostic steps

Step	Operation	Yes	No
1	1、 Connect fault diagnostic scanner in power-off state; 2、 Key switch to "ON" position Does the 3、 fault diagnostic scanner enter the EPSdiagnostic mode, and check whether the fault diagnostic scanner communicates with the EPSsystem normally.	Go to step 2	Inspect whether the harness connection from complete vehicle to EPS terminal is normal.
2	Start "Read DTC" function, read DTC, whether there is current DTC	Check and repair according to fault code	End
3	Start "Read DTC" function, read DTC, whether there is history DTC	Record history fault code	End

Fault code table and fault code analysis

Fault code	Fault type and description	Possible fault causes	Maintenance advice
C1600	EPS power supply overvoltage	1. Generator fault 2.Vehicle starts abnormally	Check the voltage from the alternator. If it is out of range, replace it.
C1601	EPS power supply undervoltage	Poor connection between 1. battery and EPS2.Battery is dead	1. Inspect and repair the harness (loose or corroded) connecting the EPSs and the power supply.Check battery voltage
C1602	EPS abnormal power failure	1. Battery voltage abnormality 2.EPS restart	1. Inspect and repair the harness (loose or corroded) connecting the EPSs and the power supply.Check battery voltage
U2200	Vehicle speed signal $187 is invalid	Abnormal 1. signal2.Can is disturbed	1. Confirm the vehicle speed module sends valid messages in time2.Confirm whether the harness is faulty.
U2201	Vehicle speed signal $187 missing	Abnormal 1. signal2.Can is disturbed	1. Confirm the vehicle speed module sends valid messages in time2.Confirm whether the harness is faulty.
U2202	Vehicle speed signal $187CRC error	Abnormal 1. signal2.Can is disturbed	1. Confirm the vehicle speed module sends valid messages in time2.Confirm whether the harness is faulty.
U2203	Vehicle speed signal $187Rolling Counter error	Abnormal 1. signal2.Can is disturbed	1. Confirm the vehicle speed module sends valid messages in time2.Confirm whether the

			harness is faulty.
U2204	Engine message $26 A invalid	Abnormal 1. signal2.Can is disturbed	1. Confirm the engine module sends valid message in time2.Confirm whether the harness is faulty.
U2205	Engine message $26 A missing	Abnormal 1. signal2.Can is disturbed	1. Confirm the engine module sends valid message in time2.Confirm whether the harness is faulty.

U2206	Engine message $26ACRC error	Abnormal 1. signal2.Can is disturbed	1. Confirm the engine module sends valid message in time2.Confirm whether the harness is faulty.
U2207	Engine message $26ARolling Counter error	Abnormal 1. signal2.Can is disturbed	1. Confirm the engine module sends valid message in time2.Confirm whether the harness is faulty.
U2208	Engine message $1A6 invalid	Abnormal 1. signal2.Can is disturbed	1. Confirm the engine module sends valid message in time2.Confirm whether the harness is faulty.
U2209	Engine message $1A6 missing	Abnormal 1. signal2.Can is disturbed	1. Confirm the engine module sends valid message in time2.Confirm whether the harness is faulty.
U220A	Engine message $1A6CRC error	Abnormal 1. signal2.Can is disturbed	1. Confirm the engine module sends valid message in time2.Confirm whether the harness is faulty.
U220B	Engine message $1A6Rolling Counter Error	Abnormal 1. signal2.Can is disturbed	1. Confirm the engine module sends valid message in time2.Confirm whether the harness is faulty.
U220C	Invalid wheel speed pulse $258	Abnormal 1. signal2.Can is disturbed	1. Confirm wheel speed pulse module sends valid message in time.Confirm whether the harness is faulty.
U220D	Wheel speed pulse $258 missing	Abnormal 1. signal2.Can is disturbed	1. Confirm wheel speed pulse module sends valid message in time.Confirm whether the harness is faulty.
U220E	Wheel speed pulse $258CRC error	Abnormal 1. signal2.Can is disturbed	1. Confirm wheel speed pulse module sends valid message in time.Confirm whether the harness is faulty.
U220F	Wheel speed pulse $258Rolling Counter error	Abnormal 1. signal2.Can is disturbed	1. Confirm wheel speed pulse module sends valid message in time.Confirm whether the harness is faulty.
U2210	Lateral acceleration $278 is invalid	Abnormal 1. signal2.Can is disturbed	1. Confirm that the lateral acceleration module sends valid messages in time2.Confirm whether the harness is faulty.
U2211	Lateral acceleration $278 missing	Abnormal 1. signal2.Can is disturbed	1. Confirm that the lateral acceleration module sends valid messages in time2.Confirm whether the harness is faulty.
U2212	Multi-mode switch $3FD missing	Abnormal 1. signal2.Can is disturbed	1. Confirm that the multi-mode module sends valid messages in time2.Confirm whether the harness is faulty.
U2213	Multimode switch $2DE missing	Abnormal 1. signal2.Can is disturbed	1. Confirm that the multi-mode module sends valid messages in time2.Confirm whether the harness is faulty.
U2214	APA message $264 is invalid	Abnormal 1. signal2.Can is disturbed	1. Confirm APAmodule sends valid message in time2.Confirm whether the harness is faulty.
U2215	APA message $264 missing	Abnormal 1. signal2.Can is disturbed	1. Confirm APAmodule sends valid message in time2.Confirm whether the harness is faulty.
U2216	APA message $264CRC error	Abnormal 1. signal2.Can is disturbed	1. Confirm APAmodule sends valid message in time2.Confirm whether the harness is faulty.

U2217	APA message $264Rolling Counter error	Abnormal 1. signal2.Can is disturbed	1. Confirm APAmodule sends valid message in time2.Confirm whether the harness is faulty.
U2218	ADAS message $1C0 is invalid	Abnormal 1. signal2.Can is disturbed	1. Confirm ADAS module sends valid message in time2.Confirm whether the harness is faulty.
U2219	ADAS message $1C0 missing	Abnormal 1. signal2.Can is disturbed	1. Confirm ADAS module sends valid message in time2.Confirm whether the harness is faulty.
U221A	ADAS message $1C0CRC error	Abnormal 1. signal2.Can is disturbed	1. Confirm ADAS module sends valid message in time2.Confirm whether the harness is faulty.

U221B	ADAS message $1C0Rolling Counter Error	Abnormal 1. signal2.Can is disturbed	1. Confirm ADAS module sends valid message in time2.Confirm whether the harness is faulty.
U221C	ADAS interrupt feedback(Status mismatch)	Abnormal 1. signal2.Can is disturbed	1. Confirm ADAS module sends valid message in time2.Confirm whether the harness is faulty.
U221D	ADAS interrupt feedback(Request out of range)	Abnormal 1. signal2.Can is disturbed	1. Confirm ADAS module sends valid message in time2.Confirm whether the harness is faulty.
U221E	ADAS interrupt feedback(Exceeding allowable speed)	Abnormal 1. signal2.Can is disturbed	1. Confirm ADAS module sends valid message in time2.Confirm whether the harness is faulty.
U221F	LDW status message $24E is invalid	Abnormal 1. signal2.Can is disturbed	1. Confirm LDW module sends valid message in time2.Confirm whether the harness is faulty.
U2220	LDW status message $24E missing	Abnormal 1. signal2.Can is disturbed	1. Confirm LDW module sends valid message in time2.Confirm whether the harness is faulty.
U2221	LDW status message $24ECRC error	Abnormal 1. signal2.Can is disturbed	1. Confirm LDW module sends valid message in time2.Confirm whether the harness is faulty.
U2222	LDW status message $24ERolling Counter error	Abnormal 1. signal2.Can is disturbed	1. Confirm LDW module sends valid message in time2.Confirm whether the harness is faulty.
U2223	LDW vibration level message $30 A is invalid	Abnormal 1. signal2.Can is disturbed	1. Confirm LDW module sends valid message in time2.Confirm whether the harness is faulty.
U2224	LDW vibration level message $30 A missing	Abnormal 1. signal2.Can is disturbed	1. Confirm LDW module sends valid message in time2.Confirm whether the harness is faulty.
U2225	LDW vibration level message $30ACRC error	Abnormal 1. signal2.Can is disturbed	1. Confirm LDW module sends valid message in time2.Confirm whether the harness is faulty.
U2226	LDW vibration level message $30ARolling Counter error	Abnormal 1. signal2.Can is disturbed	1. Confirm LDW module sends valid message in time2.Confirm whether the harness is faulty.
U2227	Can bus BUS OFF	Abnormal 1. signal2.Can is disturbed	1. can low to ground short circuit2.Can low to CAN high short circuit 3.Can high short circuit to 5V
C1603	Abnormal torque/angle sensor power supply	1. V5/3V3 equal voltage overvoltage or undervoltage 2. Short circuit to ground or VCC 3.Voltage overload 4.Component fault 5.Other	Return to EPS, after-sales analysis
C1604	Torque output 1 fault	1. sensor power supply abnormality 2.Harness fault 3. control circuit fault4.Other	Return to EPS, after-sales analysis
C1605	Torque output 2 fault	1. sensor power supply abnormality 2.Harness fault 3. control circuit fault4.Other	Return to EPS, after-sales analysis
C1606	Torque output 1 and 2 correlation fault	T1/T2 Torque sensor differs greatly	Return to EPS, after-sales analysis
C1607	Torque sensor calibration error/not calibrated	Torque not calibrated	Return to EPS, Chongqing factory re-calibration

C1608	Motor rotor position sensor power supply/excitation fault	Motor voltage supply is too low/too high	Return to EPS, after-sales analysis
C1609	Motor rotor position signal fault	1. sensor open circuit2.ADC signal invalid 3. Other	Return to EPS, after-sales analysis
C160A	Motor rotor position signal correlation fault	Die1/DIe2 is quite different	Return to EPS, after-sales analysis
C160B	Steering wheel angle and motor rotor position correlation fault	1. sensor short circuit or open circuit 2.Motor coupling or bearing damage 3.Other	Return to EPS, after-sales analysis

C160C	EPS corner signal fault	1. sensor power supply abnormality 2.Harness fault 3. sensor fault 4.Other	Return to EPS, after-sales analysis
C160D	EPS corner signal correlation fault	1. sensor power supply abnormality 2.Harness fault 3. sensor fault 4.Other	Return to EPS, after-sales analysis
C160E	EPS angle median not calibrated	1. No angular median calibration2.Angle center storage fault	Re-perform angular neutral calibration
C160F	Motor circuit fault - phase current	Three-phase voltage difference exceeds calibration value	Return to EPS, after-sales analysis
C1610	Motor circuit fault - current deviation	ADC fault	Return to EPS, after-sales analysis
C1611	Motor circuit fault - door drive	1. door drive chip faulty 2.FET open circuit 3. door drive chip monitoring fault 4.Other	Return to EPS, after-sales analysis
C1612	ECU fault - unexpected interrupt	1. program execution interrupted 2.Debugging tool connection exists	Return to EPS, after-sales analysis
C1613	ECU fault -CPU	1. Incorrect hardware configuration	Return to EPS, after-sales analysis
C1614	ECU fault - clock	1. CLMA Hardware configuration incorrect2.Internal oscillator interference normal timing	Return to EPS, after-sales analysis
C1615	ECU fault - program execution	1. program execution interrupted 2.Debugging tool connection exists	Return to EPS, after-sales analysis
C1616	ECU fault - memory	1. Memory corruption2.Incorrect parameter configuration 3. Other	Return to EPS, after-sales analysis
C1617	Commissioning calibration not selected	Configuration code not written	Rewrite configuration code
C1618	EPS thermal protection triggering	Too many cycles, touch fever protection	After EPS temperature decreases, the fault disappears.
C1619	System fault	Abnormal current torque	Return to EPS, after-sales analysis

Fault symptom diagnosis check and confirmation

1 Confirm the user problem.
2 Visually inspect for visible signs of mechanical or electrical damage.
3 If the cause of the problem is obvious, fix it before proceeding to the next step.
4 If the visual inspection is passed, the cause shall be identified according to the fault symptom table.

Appearance check list

Mechanical part	Electrical part
1 Tire pressure 2 Outer tie rod assembly 3 Front pillar assembly 4 Front swing arm ball pin 5 Front swing arm bushing 6 Connecting bolt between steering gear and steering intermediate shaft assembly 7 Wheels and tires 8 Steering gear housing	1 Electric power steering column 2 EPS control module 3 Circuit 4 Harness connector

Fault symptom table

Fault symptom	Possible causes	Measures
Heavy steering	Vehicle speed signal loss, interference or other abnormality	Check vehicle speed signal
	Engine signal loss or interference	Check engine signal
	EPS helpless	Check the voltage from battery to EPS terminal to meet the normal working voltage 12-16 V Check engine signal and vehicle speed signal
	EPS motor overheat protection	Keep away from high temperature environment, clear the fault code, shut down the vehicle, wait for about 30 minutes, cool the EPS system to normal operating temperature, re-ignite and start the engine, check whether the fault exists and whether the steering is abnormal heavy. If the fault does not resume, replace the steering column assembly.
	EPS lamp is always on, power supply circuit is faulty or vehicle battery voltage is abnormal.	Check circuit
	EPS lamp is always on, EPS torque sensor fails, and the connection circuit between sensor and ECU is faulty.	Replace steering column assembly
	EPS lamp is always on, motor fails to work, motor and ECU Wiring fault of	Replace steering column assembly
	Front strut damaged	Visual inspection, replace if necessary
	Steering gear damage	Replace steering gear
	Steering column damage	Replace steering column assembly
	Steering tie rod ball joint is damaged	Replace tie rod
	Front swing arm bushing damage	Check or replace
	Front swing arm ball pin is damaged	Perform suspension ball joint element inspection
Poor reversibility	EPS is powered off, missing angle center	Recalibrate median
	Steering tie rod inner/outer ball joint swing/rotational torque is too large	Replace steering gear assembly

Fault symptom	Possible causes	Measures
	Front swing arm ball joint swing torque is too large	Replace steering gear assembly
	Four-wheel alignment parameter out of tolerance	Detect and adjust four-wheel alignment parameters
	Tire pressure too low	Inflation
	Rack bending	Replace steering gear
	Gear bearing damage	Replace steering gear
Steering abnormal sound	Steering gear mounting bolt is loose	Check and tighten to the specified torque or replace the retaining bolts.
	Steering tie rod ball joint is loose	Replace tie rod
	Rack clearance increases	Replace steering gear assembly
	Connect steering column and steering gear pinion shaft fastening bolt (point C bolt) is loose	After inspection, tighten or replace retaining bolts.
	Connecting bolt (point B bolt) of upper universal joint of lower shaft is loose	After inspection, tighten or replace retaining bolts.
	Interference abnormal sound	Check the interference between peripheral trim parts such as foot pad and steering lower shaft.
	Motor fault	Replace steering column assembly
Large free stroke of steering wheel	Check tire pressure	Check the tire pressure, and fill the tire pressure to the specified value.
	Check the match between steering wheel and steering column	Check the steering wheel lock nut torque and tighten again; Inspect the steering wheel and steering column mating splines for abnormal wear, and replace the steering wheel assembly or steering upper shaft assembly.
	Check the match between steering column and steering gear	Check the torque of connecting bolts between steering lower shaft and steering gear input shaft, and tighten
	Check whether the steering gear retaining bolts are loose.	Check steering gear retaining bolt torque and tighten
	C point bolt connection is loose	Check bolt torque and re-tighten
	Steering gear upper bolt is loose	After inspection, tighten or replace retaining bolts.
	Outer ball pin of steering tie rod is worn or loose	After inspection, tighten or replace retaining bolts.

Steering does not return

Refer to the following table for diagnosis and maintenance if steering does not return or return is poor.

Steering does not return or return is poor	EPS is powered off, missing angle center	Refer to EPS Angle Calibration
	Steering tie rod inner/outer ball joint swing/rotational torque is too large	Replace steering gear
	Front swing arm ball joint swing torque is too large	Replace steering gear
	Four-wheel alignment parameter out of tolerance	Detect and adjust four-wheel alignment parameters
	Tire pressure too low	Inflation

Direction weight

Direction weight can be diagnosed and repaired according to the following table.

Fault symptom	Possible causes	Measures
Heavy steering	Vehicle speed signal loss, interference or other abnormality	Check vehicle speed signal, or refer to fault diagnosis mode for troubleshooting.
	Engine signal loss or interference	Check engine signal
	Bus fault BusOff	Check harness or bus
	Loose connector contact	Check connector
	EPS motor overheat protection	Refer to Fault Diagnosis Mode for troubleshooting.
	The power supply circuit is faulty or the vehicle battery voltage is abnormal.	Check battery and circuit
	EPS lamp is always on, EPS internal fault	Refer to Fault Diagnosis Mode for troubleshooting.
	Front strut damaged	Visual inspection, replace if necessary
	Steering gear damage	Replace steering gear
	Steering column damage	Replace steering column assembly
	Steering outer tie rod ball joint is damaged	Replace steering gear assembly
	Front swing arm bushing damage	Check or replace
	Front swing arm ball pin is damaged	Perform suspension ball joint element inspection

One side of the direction is heavy and the other side is light.

1. Check whether the friction force of the complete vehicle system is consistent, let the vehicle hang through the lift, shut down the engine, move the steering wheel, check whether there is obvious difference between the left and right torque of the steering wheel, if yes,

The problem of left and right torque inconsistency is caused by complete vehicle system friction. The steering gear can be replaced for inspection.

2. If the steering wheel is naturally placed in the middle position, read the left and right torque difference with the diagnostic scanner. If the torque difference exceeds 0.5Nm, it indicates that the internal torque sensor is faulty. Replace the steering column assembly.

Steering abnormal sound

Troubleshooting overview

Judge abnormal sound during steering as steering abnormal sound is a misunderstanding, and the parts involved in steering process also include airbag, rotary connector, front stabilizer bar, stabilizer bar link, front pillar, brake, etc. Similarly, even if there is no abnormal sound of steering action, it may be abnormal sound of steering system. In the process of troubleshooting abnormal sound of steering, reasonable use of experience shall not depend on experience blindly, nor blindly judge parts of abnormal sound subjectively only by ear. All shall be assisted by experience, and diagnosis and maintenance shall be carried out in combination with actual verification and locking.

Recommended procedures for troubleshooting abnormal sound

1 After subjective evaluation locks rough abnormal sound area and parts with abnormal sound, try to confirm whether the parts have abnormal vibration, deformation and other information when abnormal sound occurs under the premise of safety;

2 Re-confirm whether the installation torque of the suspected parts is normal, and it is necessary to check, loosen and re-tighten the torque of the mounting point to prevent abnormal noise caused by the assembly factors and unnecessary maintenance and compensation rejection;

3 Remove the accessories around the suspected parts, such as lock housing and guard plate, to avoid interference judgment;

4 After replacing the parts, if the abnormal sound is eliminated, it is necessary to install the original parts back to the original vehicle (the process of replacing the parts of the customer with the parts without the abnormal sound is called AB; the process of replacing the parts without the abnormal sound on the customer's vehicle with the parts without the abnormal sound is called BA after the abnormal sound is eliminated; the abnormal sound can be finally confirmed to be transferred with the original parts of the customer through the replacement of ABA), and the abnormal sound is locked and disappeared and reproduced with the replacement of the parts;

Typical abnormal sound troubleshooting guide list

Abnormal sound type	Abnormal sound performance		Suspect parts	Possible causes	Inspection steps	Recommended measures
	Abnormal sound position	Performance				
Other confusing abnormal sound	Outside the cockpit	After hot vehicle (or water temperature Expression Median 10 min Above) straight No steering	Front stabilizer bar connecting rod	Abnormal sound of connecting rod	1. Hot state excitation In trench after abnormal sound Or flat lift Up, vehicle in	Replace connecting rod

		operation, road Slight fluctuation or brake All brakes are sunk "Knock, knock" difference Sound			place Connecting rod exists when facing Jitter; 2. Connect Connecting rod and front stabilizer bar	

					After disconnection, the abnormal sound of commissioning according to the original road conditions is eliminated; 3. The abnormal sound is eliminated after replacing the connecting rod with the vehicle without abnormal sound, and the connecting rod is replaced with the original vehicle abnormal sound;	
	Outside the cockpit	Clear and large "click" sound from the direction of subframe and steering gear during slow steering	Front subframe	Steering gear housing distortion due to abnormal steering gear mounting surface difference	1. The vehicle is in place, cold/hot, and sends out abnormal sound during slow turning or sudden pause; 2. Turn Remove the device and place it for more than 24 hours, and then install it back to the original vehicle. Abnormal sound is eliminated or obviously weakened; 3. The abnormal sound after exchanging the front subframe with the vehicle without abnormal sound is eliminated, and the abnormal sound after replacing the original front subframe with the original vehicle is reproduced;	Replace subframe
	In the cab	No steering action during driving on bumpy road, clear and crisp plastic "click, click" sound from near steering wheel	Rotary connector(Or clock spring)	Abnormal rotary connector	The abnormal sound is eliminated after removing the rotary connector, and reproduced after reinstalling the rotary connector;	Replace rotary connector

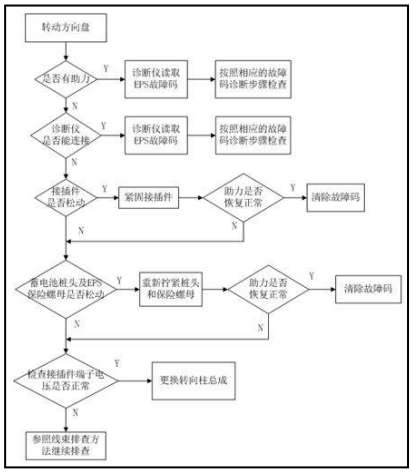
Steering abnormal sound	Passenger side outside the cab	Dull "knock, knock" sound in straight and steering on bumpy road	Mechanical steering gear assembly	Rack bushing abnormal sound	1. On the ground groove or flat lift, shake the right steering inner tie rod by hand, and it can easily shake the clearance; 2. The abnormal sound after switching steering gear with the vehicle without abnormal sound is eliminated, and the abnormal sound after the original vehicle steering gear is switched back to the original vehicle is reproduced;	Replace mechanical steering gear assembly
Steering abnormal sound	Driver's side outside the cockpit	Similar metal hitting "click, click" sound under the driver's foot when the bumpy road runs straight and turns	Mechanical steering gear assembly	Abnormal sound of engagement clearance	1.On the groove or flat lift, rotate the steering wheel left and right within the range of left and right 90° with the wheels running straight, and there is similar metal knocking under the driver's foot. ,"" sound; 2. The abnormal sound after switching steering gear with the vehicle without abnormal sound is eliminated, and the abnormal sound after the original vehicle steering gear is switched back to the original vehicle is reproduced;	Replace mechanical steering gear assembly
Steering abnormal sound	Outside the cockpit main/front passenger	"Knock, knock" sound of metal knocking from outside the vehicle at the moment of turning	Mechanical steering gear assembly	Toe-in adjusting nut is not tightened	1.On the ground groove or flat lifting machine, rotate the steering wheel left and right within the range of left and right 90° while the wheels are running straight, and there is impact on the toe-in adjusting nut in case of abnormal sound. Strike, continuous "Knock, knock" sound; 2. After tightening, abnormal sound is eliminated;	Tightening toe-in adjusting nut

Steering abnormal sound	Outside the cockpit main/front passenger	When the vehicle runs straight on bumpy road or turns in place, there is a continuous click of similar metal in the cockpit;	Mechanical steering gear assembly	Loose mounting bolt of mechanical steering gear	1.On the ground groove or flat lift, rotate the steering wheel left and right within the range of left and right 90° while the wheels are running straight. In case of abnormal sound, the steering gear housing will shake and the mounting nut will strike; 2. The vehicle is lifted, the wheels are lifted from the ground, the steering tie rod is manually rotated, and the housing is shaken;	Tightening steering gear mounting nut
Steering abnormal sound	Near the driver's foot in the cockpit	There is dull "knock, knock" sound under the main driver's foot when the bumpy road is straight and the steering is normal.	Steering column lower shaft	Lower shaft loose	1. Assemble and disassemble connecting bolts between steering lower shaft and steering gear. If abnormal sound is eliminated, it is caused by torque attenuation of bolt; 2.When the removal and assembly of bolts are invalid, rotate the steering wheel left and right within the range of left and right 90° when the wheels are in straight running state on the ground ditch or flat lifting machine, the steering lower shaft shakes in case of abnormal sound, the abnormal sound is eliminated when external force is applied to pull down the shaft, and the external force abnormal sound is released again; 3. The abnormal sound is eliminated after rotating the lower axle with the vehicle without abnormal sound, and the abnormal sound appears after the original steering lower	Replace steering column

					axle is replaced with the original vehicle;	
Steering abnormal sound	Close to steering column motor in the cab	There is continuous and large similar plastic knock "click" sound in steering process.	Steering column	Internal abnormal sound	The abnormal sound is eliminated after the steering column is replaced with the vehicle without abnormal sound, and the abnormal sound appears after the steering column is replaced with the original vehicle;	Replace steering column

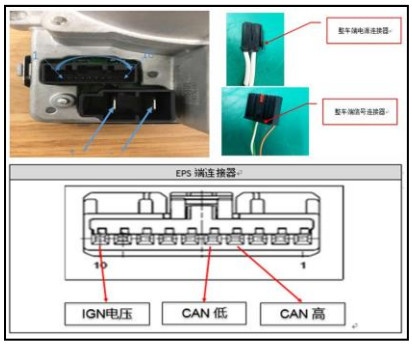
Directional helpless

Steering helpless troubleshooting idea is as follows



Direction is helpless. First check whether EPS fault lamp is on. If it is on, read EPS fault code with diagnostic scanner and troubleshoot according to corresponding fault code diagnostic steps;

If the EPSfault lamp is not on, use a multimeter to check whether the EPSvoltage and IGvoltage are within the standard working voltage range (12 V~16 V). The connector schematic diagram and interface definitions are as follows:



Pin number	Pin definition	Signal type	Signal range	Test conditions	Remarks
+	Voltage positive	BAT electric	12~16V	Always ground the body;	
-	Negative pole of power supply	Power ground	0V		
4	CANH	Signal high			
5	CANL	Signal low			
10	IG signal	IGN Electrical(Ignition signal electricity)	12~16V	Ignition switch on, body ground	

Removing and installing steering wheel

1. Removal

Warning

When removing or performing airbag system repair, the system must be powered off and remain powered off for more than 60 s.

Caution Before removing the steering wheel, make sure that the steering wheel is in the middle position and the wheel is in the front position, and then lock the steering wheel.

Caution When removing the steering wheel, pay attention to the marks of steering column and steering wheel. If there is no mark on the steering column, mark the steering column with a marking pen before removing the steering wheel.

Caution Do not attempt to remove the steering wheel by striking the shaft with a hammer. This will damage the steering column.

1 Disconnect the negative battery harness.

Reference: Battery assembly

2 Remove driver's airbag.

Reference: Driver front airbag

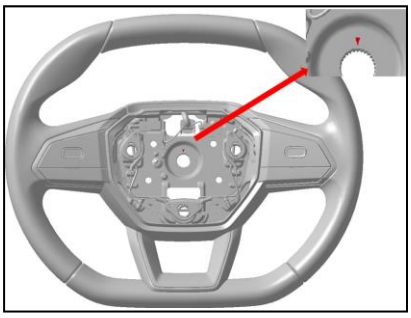
3 Pull connector on steering wheel that fits the rotary connector out.

4 Loosen the steering wheel lock nut until 2-3 threads remain. Tool: Sleeve (13).

5 Shake the steering wheel front, rear, left and right until it disengages completely.

2. Installation

Caution Before installing the steering wheel, make sure the wheel is in the right front position. When installing the steering wheel, ensure that the steering wheel triangular mark points to the marked position on the steering column.

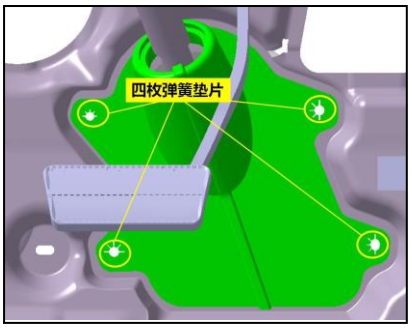


The installation sequence is the reverse of the removal sequence. Tool: Sleeve (1 3), torque: 33±4N.m.

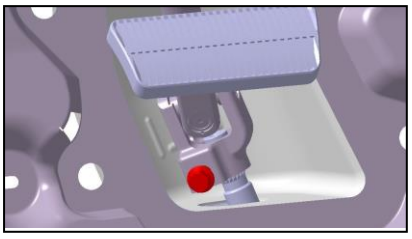
Mechanical steering gear assembly

1. Removal

1 Turn the front wheels of the vehicle to the front, turn off the fire, adjust the driver's table and chair backward, use a flat screwdriver to remove the four spring plates that are located behind the brake pedal and fix the dust cover of the steering lower shaft (the dust cover of the steering lower shaft is as shown in the figure below), and take out the dust cover of the steering lower shaft.

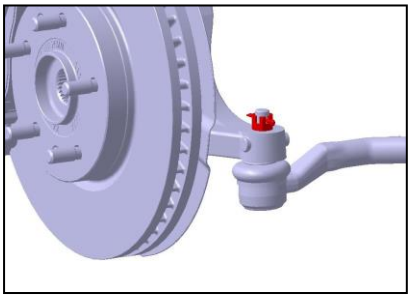


2 Use 11 mm sleeve to remove the bolt connecting the steering lower shaft and steering gear pinion shaft (the bolt is red as shown in the figure below). The bolt is provided with locking glue and cannot be reused after removal.

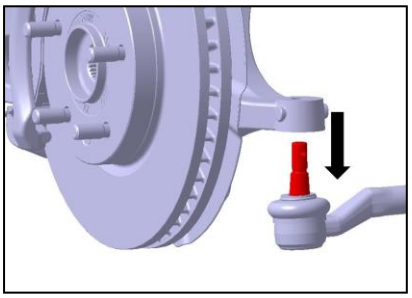


3 Lifting and supporting vehicle, removing front left and right wheels, reference wheel and tyre

4 Remove cotter pin, remove hexagon slotted nut with 17 mm sleeve(The cotter pin and hexagon slotted nut are shown in red in the figure below.)



5 Use the tie rod ball joint removal tool (contact Bosch for scattered tool purchase Wang Sijue telephone 02122188875 after-sales service telephone 8008200677) to take out the ball joint pin of left and right outer tie rod assembly from the steering knuckle mounting hole along the arrow direction in the following figure. The ball joint pin is shown in red in the following figure.

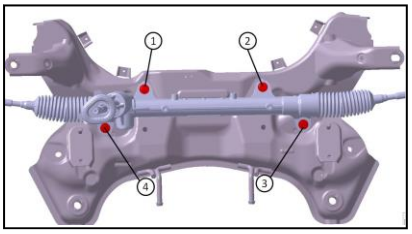


Caution Do not damage the outer tie rod assembly ball pin dust cover when removing. If damaged, replace the outer tie rod assembly.

6 Remove the front subframe assembly.

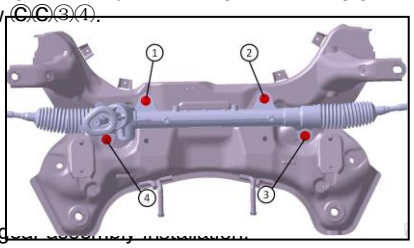
Refer to front subframe assembly

7 Use 17 mm sleeve to dismantle the four bolts (the bolts are red parts as shown in the figure below) connecting the steering gear and the sub-frame, so far the mechanical steering gear assembly is dismantled.



2. Installation

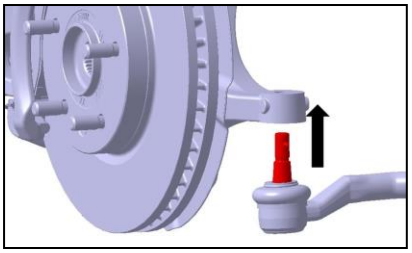
1 Install the four bolts (red parts as shown in the figure below) connecting the steering gear and subframe with 17 mm sleeve, and install them in sequence as shown in the figure below ①②③④.



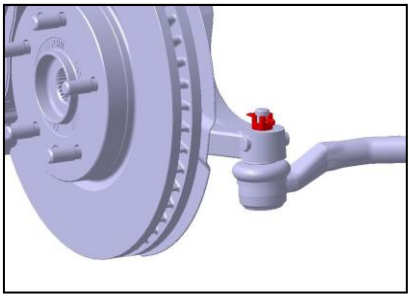
Install torque 115 ±5N·m to complete steering gear assembly installation.

2 Lift the front subframe (with mechanical steering gear assembly) to a proper height to facilitate insertion of the outer tie rod ball pin into the steering knuckle;

3 Insert the ball pin of LH and RH outer tie rod assembly into the steering knuckle mounting hole in the direction of arrow in the following figure. The ball pin is shown in red in the following figure.

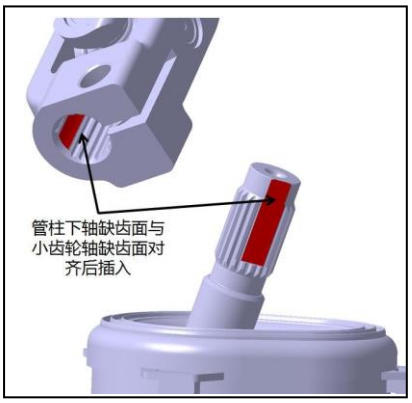


4 Use 17 mm sleeve to tighten hexagon slotted nut (cotter pin and hexagon slotted nut are shown in red below), and tighten torque 45±5N·m



5 Install the front subframe (with mechanical steering gear assembly), and refer to the front subframe assembly.

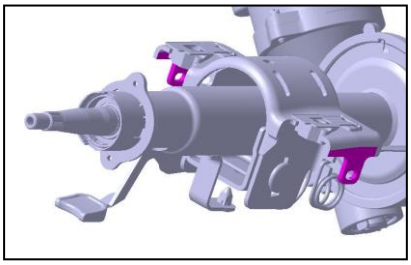
6 Connect steering gear pinion shaft and steering column lower shaft, align the lower shaft and pinion shaft missing tooth plane (as shown in the figure below), insert, then tighten with new lower shaft connecting bolt, tightening torque 56±3N·m



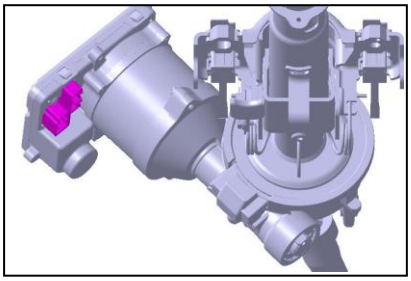
Steering column assembly

Removal

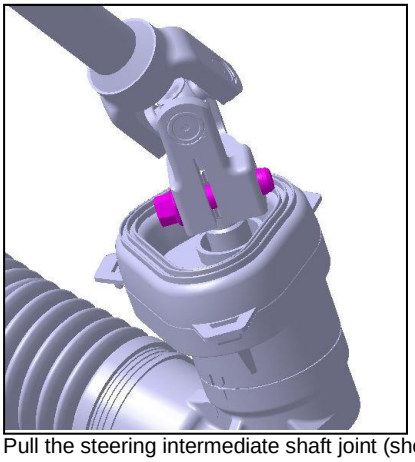
1 Disconnect the negative battery harness. Refer to: Battery assembly
2 Remove the driver's airbag and steering wheel. Refer to: Driver front airbag steering wheel
3 Remove steering lock housing (upper) and steering lock housing (lower). Refer to Removal and Installation.
4 Remove combination switch assembly and rotary connector. Refer to: Combination switch
5 Remove the driver's lower guard. Refer to Removal and Installation.
6 Disconnect the 2 wire harness clips on the steering column (pink position shown below).



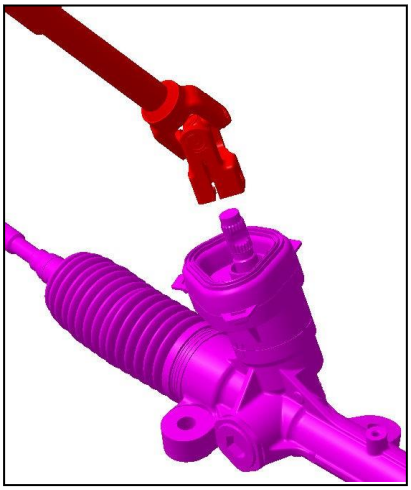
7 Disconnect the vehicle power supply harness and signal harness connected to EPS controller (pink position in the following figure).



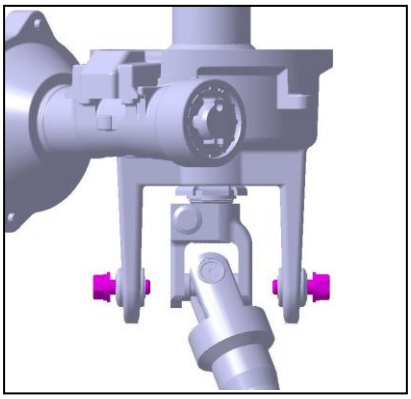
8 Remove the connecting bolts between the steering intermediate shaft and steering gear (shown in pink below). Torque: 56±3N.m



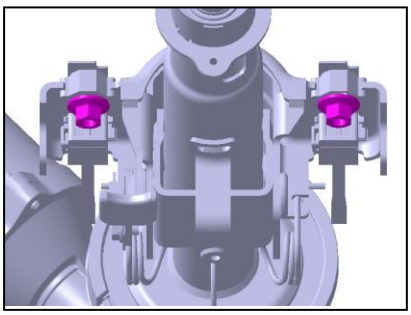
9 Pull the steering intermediate shaft joint (shown in red below) fork out of the steering gear (shown in pink below).



10 Remove the steering upper shaft lower mounting point retaining bolts (shown in pink below). Torque: 24±3N.m



11 Remove the two retaining nuts on the mounting point on the steering upper shaft (shown in pink below). Torque: 24±3N.m



12 Remove the steering column assembly from the steering support.

Installation

The installation sequence is the reverse of the removal sequence. After installation, four-wheel alignment is required and the EPS is "neutral calibration" and "offline configuration." Refer to Calibration Requirements Calibration Method

Spare parts atlas

F260401 F260402 F260403

Electrical system

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A/C system specifications

Specifications

General specifications

Name	A/C compressor	Compressor lubricating oil model	Compressor lubricating oil filling amount	Refrigerant model	Refrigerant filling amount
Model	6PV14	SP10	100ml	R134a	600g

Compressor lubricating oil filling amount

Replacing parts	Condenser assembly	Evaporator	Expansion valve	A/C pipeline
Filling amount(Ml)	30	35	30	20

Torque specification

Fastening position	Specifications	Quantity	Tightening torque(Nm)
Compressor assembly(Fixed to engine)	Hexagon flange bolt M8×1.25×100	4	23±2
HVAC assembly(Securing to CCB cross member)	Hexagon flange nut M8×1.25×8	2	8±1
HVAC assembly(Fastening to CCB rail)	Cross recessed hexagon-head screw M6×1.0×16	2	8±1
HVAC assembly(Fastening to body)	Hexagon flange bolt and plain washer assembly M8×1.25×25	2	5±1
Condenser assembly(Fixed to radiator)	Hexagon bolt and plain washer assembly M6 ×1.0×14	3	6±1
Compressor suction pipe assembly(Connect to compressor)	Hexagon flange bolt M6×1.0×25	1	10±1
Compressor suction pipe assembly(Connect to evaporator connecting pipe)	Hexagon flange nut M6×1.0×6	1	10±1
Compressor discharge pipe assembly(Connect to compressor)	Hexagon flange bolt M6×1.0×25	1	10±1
Compressor discharge pipe assembly(Connect to condenser)	Hexagon flange nut M6×1.0×6	1	10±1
Evaporator connecting pipe assembly(Connection to expansion valve)	Hexagon flange nut M6×1.0×6	1	10±1
Evaporator connecting pipe assembly(Fastening to body)	Hexagon flange bolt M6×1.0×25	2	10±1

Compressor lubricating oil

Name	A/C compressor	Compressor lubricating oil model	Compressor lubricating oil filling amount
Model	6PV14	SP10	100ml

Recovering/filling compressor lubricating oil

Caution • After the refrigerant is recovered, discharge the A/C compressor lubricating oil.

- Recycle waste lubricating oil and refrigerant according to relevant regulations.
- Empty the filler drain collection bottle.

1. Connect high and low pressure pipes of refrigeration circuit.
2. Open the low-pressure valve switch (1) and high-pressure valve switch (2) of the equipment.
3. Open the oil drain valve on the A/C refrigerant filling machine control panel, start the equipment, and check whether the A/C compressor lubricating oil drains into the collection bottle.
4. After the lubricating oil of A/C compressor is drained, stop the oil draining and close the oil draining valve.
5. Check the collection bottle and record the oil quantity.

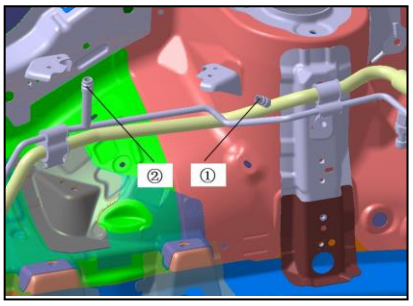


Figure 49:

Replenish compressor lubricating oil

1. Add new lubricating oil according to the amount of lubricating oil in the collection bottle.
2. If the following components are replaced separately, supplement the A/C compressor lubricating oil according to the standard.

Component	Filling amount: Ml
Condenser	30
Evaporator	35
Expansion valve	30
A/C pipe	20

Filling compressor lubricating oil

Caution The compressor lubricating oil

can be added only after vacuum is pumped.

1.Install filling bottle and add compressor

lubricating oil according to standard.

2. Connect refrigeration circuit high and low pressure pipelines, open equipment high pressure valve and compressor lubricating oil filling switch.
3. Start the A/C refrigerant filling machine and observe the right side height in the filling bottle until the required oil quantity.
4. Close the high pressure valve.

Compressor lubricating oil instructions

Compressor lubricating oil is the special lubricating oil of A/C compressor, which can ensure normal operation of compressor. Be sure to follow the instructions for maintenance;

Caution Precautions for compressor lubricating oil:

- The grade of compressor lubricating oil specified in the original A/C compressor must be strictly used, and different types and brands of compressor grade lubricating oil are prohibited.
- The compressor lubricating oil has strong water absorption capacity. When filling or replacing, the operation must be rapid. After filling, the oil tank cover should be sealed and stored immediately.
- It is only allowed to add to the specified amount, and it is not allowed to overfill to avoid reducing the cooling effect.
- Slowly discharge the refrigerant to avoid draining the compressor lubricating oil and refrigerant together.

Refrigerant

Name	Refrigerant model	Refrigerant filling amount

Model	R134a	600g

R134a refrigerant instructions

Refrigerant has the following functions in A/C system:

- Heat absorption
- Carry heat
- Release heat

The vehicle uses R-134a refrigerant, which is non-toxic, flame-retardant, transparent and colorless liquefied gas. Be sure to follow the instructions for the following repairs:

- Refrigerant recovery and regeneration
- Add refrigerant oil
- Emptying cooling system
- Refilling refrigerant

Precautions:

- The refrigerant will not burn or explode, but it will decompose the gas harmful to human body when in contact with the open flame, so avoid the open flame.
- Refrigerant will evaporate rapidly under atmospheric environment. When its liquid adheres to the skin, it will absorb heat from the skin and evaporate, resulting in local frostbite and avoiding contact with the skin as far as possible.

Refrigeration system cycle circuit diagram

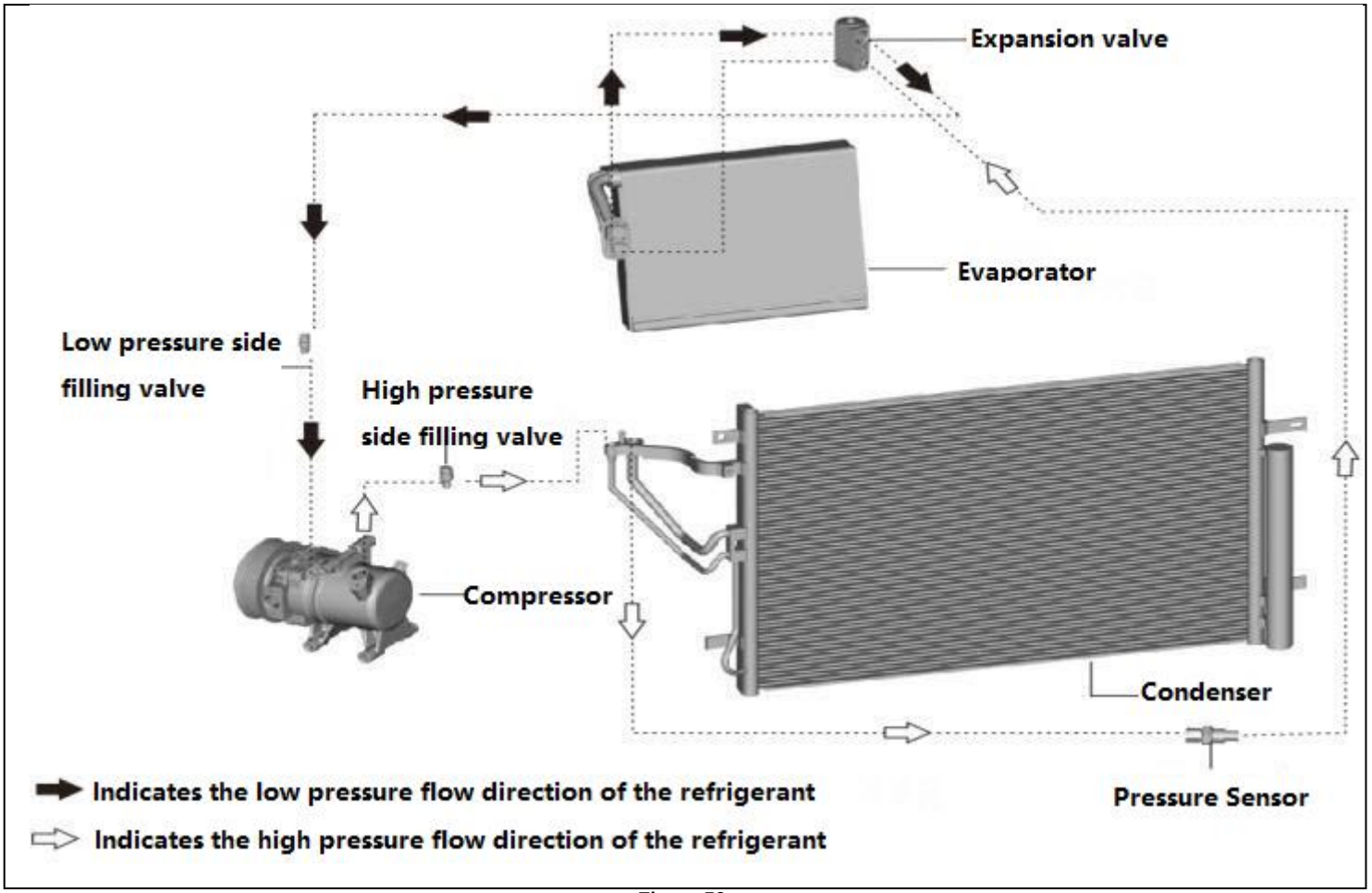


Figure 50:

Recovering and filling A/C refrigerant

Common tools and maintenance equipment: Refrigerant recovery filling machine, which can complete the air conditioning system discharging, emptying and refilling procedures in one connection. The refrigerant shall be filtered during recovery and evacuation to ensure that the refrigerant filled into the A/C system is clean and dry.

Figure 51:

Warning

Refrigerant-related work should be carried out in a well-ventilated environment and refrigerant vapor should not be sucked. Air conditioning refrigerant 134a and lubricating oil vapor or mist should be avoided. Contact will irritate the eyes, nose and pharynx. Work in well-ventilated areas. When removing the R-134a from the air conditioning system, use certified service equipment that meets the J 2210 requirements of SAEs. If the system is accidentally drained, the working area must be vented before proceeding with the repair. Other health and safety information is available from refrigerant and lubricant manufacturers.

Recovering refrigerant

1. Turn off all appliances and start switch.
2. Disconnect the negative battery harness.
3. Connect the power supply equipment.
4. Connect high and low pressure pipes of refrigeration circuit.
5. Open the low pressure valve switch (1) and high pressure valve switch (2) of the equipment.
6. Select the equipment "Refrigerant Recovery" option to start the equipment and start the recovery work.
7. Check the low pressure gauge pressure of the equipment. When the pressure gauge reaches -34kPa vacuum degree, close the equipment and stop recycling.

A/C system vacuum

1. Connect high and low pressure pipes of refrigeration circuit.
2. Open the high-pressure valve (2) of the equipment, select the "Vacuum" option, and set the time as 15 minutes. Start the device to vacuumize. When the time reaches the set value, the device automatically stops working.
3. Close the high-pressure valve and check the low-pressure gauge pressure.
4. If the pressure reaches the set value and does not rise again, confirm that the refrigeration circuit does not leak, and add the compressor lubricating oil and refrigerant.
5. If the pressure rises, check the refrigeration circuit for leakage.

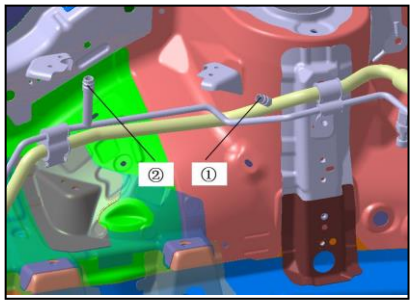


Figure 52:

Filling refrigerant

Fill refrigerant according to the following standards.

Refrigerant model	Refrigerant filling amount
R134a	600±20g

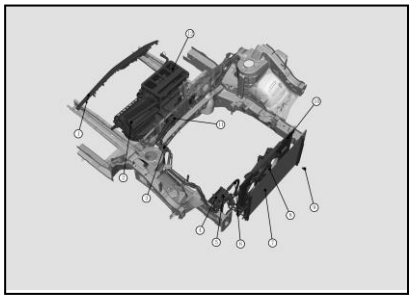
Caution Refrigerant should be filled after replenishing the A/C compressor lubricating oil.

1. Connect high and low pressure pipes of refrigeration circuit

2. Select the equipment "Refrigerant replenishment" option to adjust the filling amount.
3. Open the low-pressure valve switch and start the device for filling.
4. Observe the device display, and when the filling amount reaches the set value, the screen displays that the filling is completed.
5. Close the valve.
6. If the device shows the filling speed is too slow, refer to the following filling methods:

- Disconnect the refrigeration circuit high pressure connector and connect only the low pressure end.
- Close the high and low pressure valves of the equipment.
- Set the vehicle to parking position, start the vehicle, turn on the air conditioner, and set it to low temperature mode.
- Open the equipment mortgage valve and refrigerant will be injected into the refrigeration pipeline from the low pressure end.
- When the pressure gauge shows the low pressure standard value, disconnect the low pressure end connector.
- Refrigerant filling is completed.

Composition and position distribution



Serial number	Name	Serial number	Name
1	Front A/C control panel assembly	7	Condenser with accessory assembly
2	HVAC assembly	8	Refrigerant label
3	Evaporator connecting pipe assembly	9	Outside temperature sensor assembly
4	Compressor assembly	10	Cooling fan assembly
5	Compressor suction pipe assembly	11	Expansion valve heat shield assy.
6	Compressor discharge pipe assembly	12	Sunlight intensity sensor assembly

Overview of system function principle

The air conditioning system is designed to provide a comfortable seating environment for the passenger compartment regardless of the external weather conditions of the vehicle. The system controls the air entering the passenger compartment by performing the following functions:

• Cooling • Drying • Heating • Cycle

Fresh air starts from A/C air inlet hood, passes through A/C filter screen, HVAC assembly and air duct, and then reaches each air outlet to enter the interior space. The A/C system consists of the following main components:

• The cooling system • heating system • air

ventilation system • air conditioning control system

A/C system has the following characteristics:

Adjust temperature, humidity, cleanliness,

front and rear windshield defrosting The

driver can select any of the following

functions from the A/C control panel:

• Interior Temperature • HVAC Blower Speed • Outlet Mode • Inner and Outer Circulation

• dryerdryer

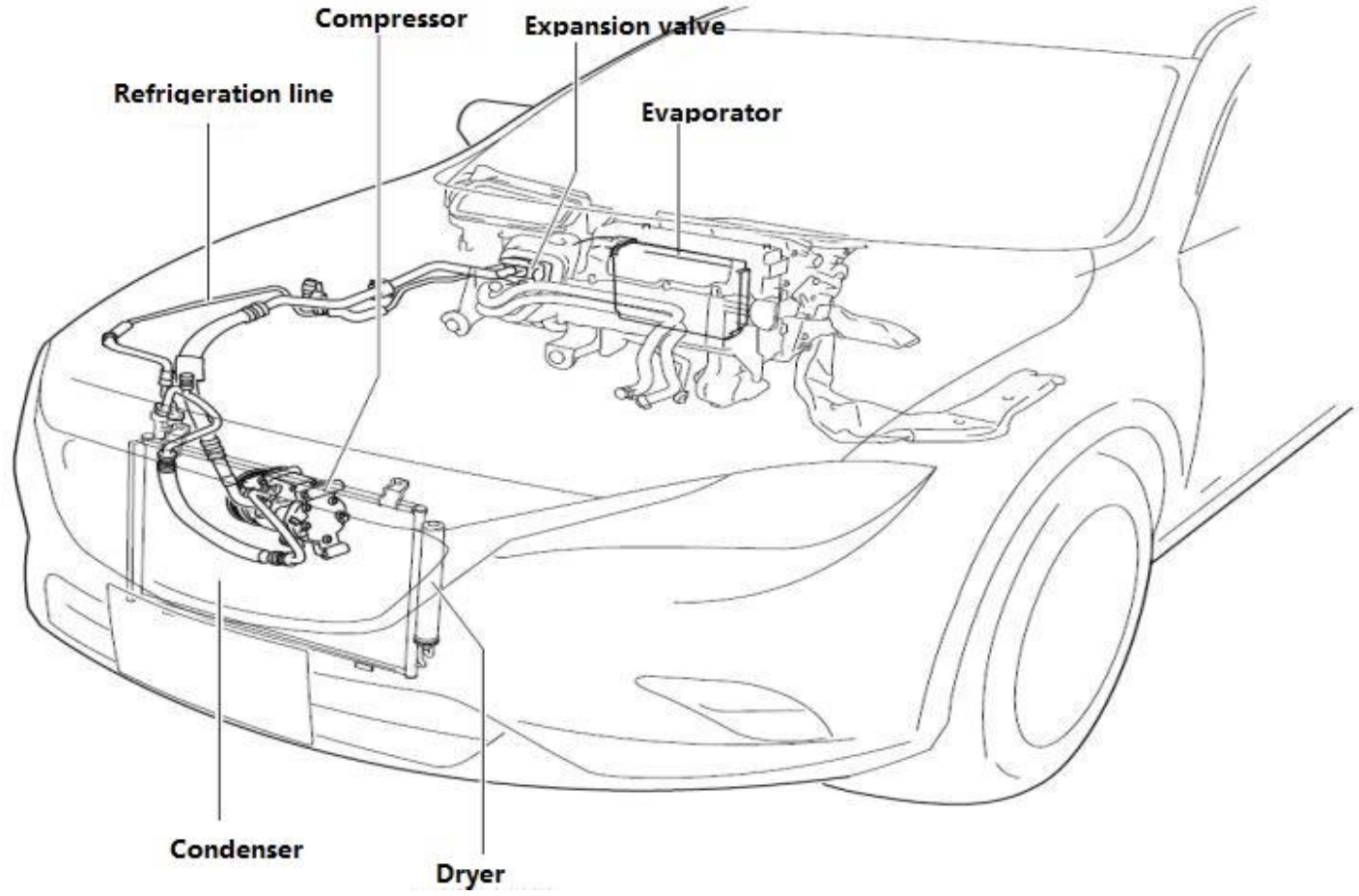


Figure 53: General

A/C cooling system

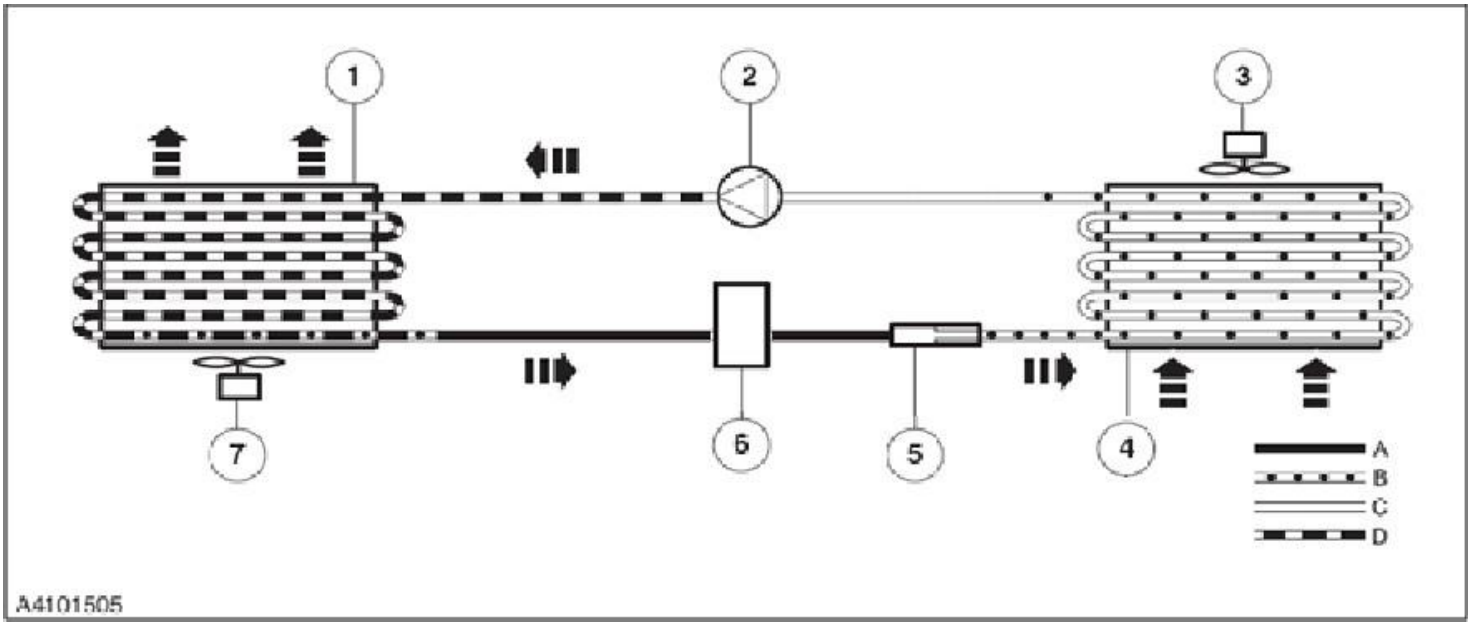


Figure 54: A/C Cooling System

Serial number	Name	Serial number	Name
1	Chiller	7	Condenser fan
2	Compressor	A	High pressure, liquid and high temperature state
3	Blower	B	Low pressure, liquid and low temperature
4	Evaporator	C	Low pressure, gaseous and low temperature
5	Expansion valve	D	High pressure, gaseous and high temperature
6	Drying bottle		

Gaseous refrigerant is sucked from the compressor inlet and compressed. The refrigerant is thus heated to between 70 °C ~ 110 °C. The compressed gas is then pumped into the condenser. The condenser is composed of many radiators for air to flow through, so that the compressed gas can be fully cooled by the outside wind and the air sucked from the condenser fan. The cooled refrigerant is stored in the drying bottle, and then the concentrated liquid refrigerant passes through the expansion valve, the pressure and temperature drop rapidly, and a part of the refrigerant is evaporated. The expansion valve is just in the front part of the evaporator in the refrigeration pipeline, and the refrigerant is completely evaporated in the evaporator. Because the evaporator is cold, the air passing through it will also be cooled.

Basic conditions for normal operation of A/C cooling system:

A. Outdoor temperature is greater than 0 degrees; B. The evaporator temperature is greater than the frosting protection value; C. A/C system pressure is normal; D. A/C blower starts normally; E. The engine control unit works normally; F. The control circuit is normal.

A/C heating system

1 Run by water pump, engine coolant flows into heating core.
2 When the heated engine coolant circulates in the heater core, the heater core will become hot.
3 The air flow through the heating core is heated.

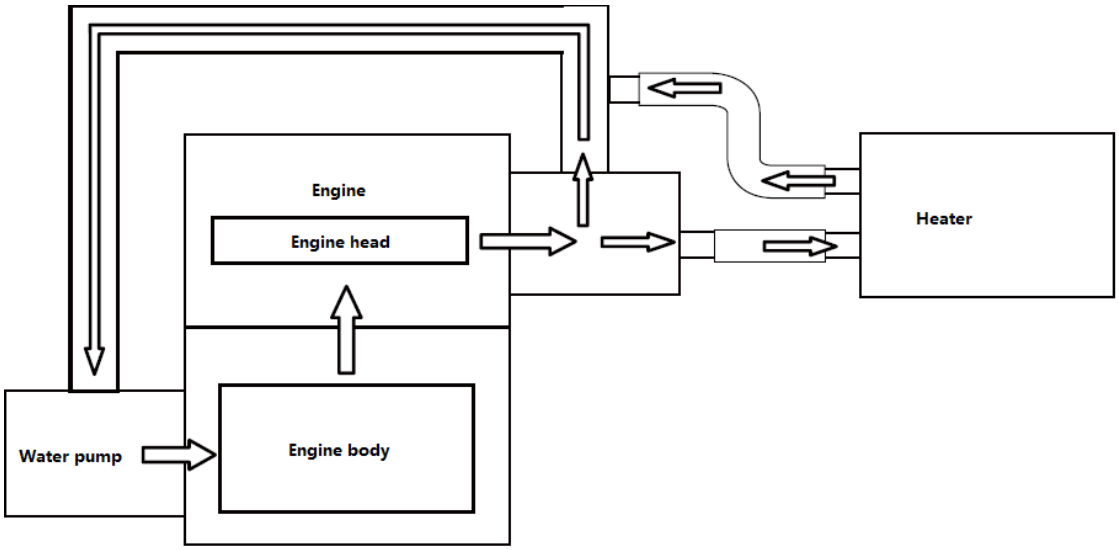


Figure 55:

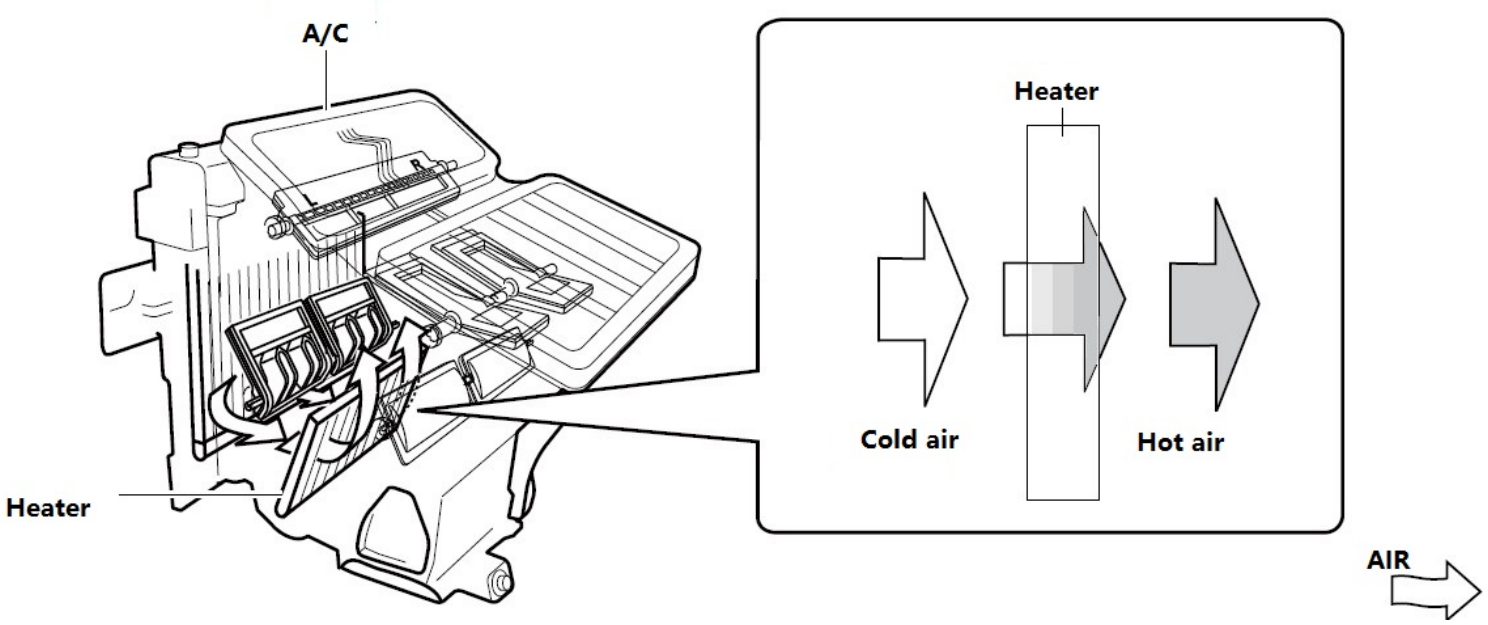


Figure 56:

A/C ventilation system

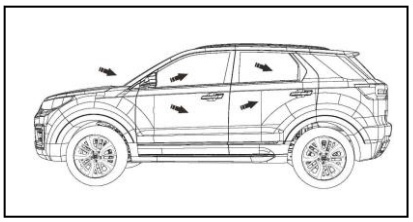


Figure 57:

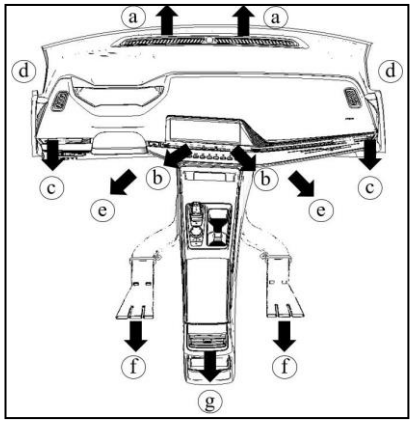
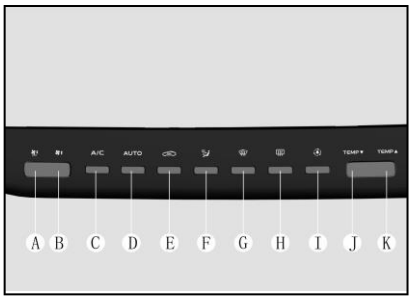


Figure 58:

Project	Description	Project	Description	Project	Description
a	Windshield defrosting outlet	b	Central air outlet	c	Side air outlet
d	Side defrosting air outlet	e	Front foot air outlet	f	Rear foot air outlet
g	Rear face blowing air outlet				

Check automatic A/C control panel based on



Structure principle of parts

Figure 59

Project	Description	Project	Description
A	Air volume - switch	G	Windshield defrosting and defogging switch
B	Air volume + switch	H	Rear window heating switch
C	Cooling switch	I	Air purification switch
D	Automatic mode switch	J	Temperature-switch
E	Inner and outer air circulation switch	K	Temperature + switch
F	Mode adjustment switch		

Air volume adjustment function

The air volume switch is used to manually set the air volume. There are eight gears in total. The air volume - switch can reduce the air volume to OFF gear, and the air volume + switch can be increased to 8 gear. On/Off A/C cooling function

The refrigeration switch can turn on or off the refrigeration function of the A/C. After the A/C is turned off, the refrigeration function will be turned off. Automatic A/C control function

Press the AUTO switch, the switch indicator lights up, and the A/C system enters into the automatic mode. According to the user setting temperature, interior temperature, exterior temperature, sunlight intensity and engine water temperature, the A/C air supply temperature, air speed and air blowing direction are automatically controlled to keep the interior temperature relatively constant.

Inner and outer air circulation control function

Internal and external circulation switch, which can select internal air circulation or external air circulation mode. When the working indicator on the interior circulation button is on, it indicates that the air conditioning system is in the interior air circulation state; When the indicator lamp goes out, it indicates that it is in the outside air intake state.

Mode adjustment function

The mode adjustment switch and the front defrosting switch can be set with four different blowing directions. The mode adjustment switch can be adjusted continuously to switch the following four air outlet directions in sequence: Blowing surface - blowing surface/blowing foot - blowing foot - blowing foot/defrosting - blowing surface.

Front windshield defrosting/defogging control function

The front defrost switch is used to activate the front windshield defrost/demist function. Press the switch, the refrigeration switch indicator lamp will be lit, the front windshield can be defrosted/defogged, and the outside air intake state will be switched; When the previous air volume gear is less than 5th gear, it will be increased to 5th gear. The user can also increase the defrosting/defogging rate by manually raising the temperature and increasing the air volume gear.

Rear windshield defrosting/defogging control function

The rear defrost switch is used to activate the rear windshield defrost/demist function. Press the switch, the working indicator lamp is on, and the electric heating defrosting of rear windshield is started; Press this button again, the working indicator lamp goes out, and the defrosting ends.

Air purification function

The air purification switch can enable the ion purification function to purify the interior air. Temperature regulation function

The temperature switch is used to set the interior temperature and control the temperature of the air flowing out of the vent. Temperature-switch

gradually increases cooling capacity channel, and temperature-switch gradually increases heating capacity channel.

Interior temperature sensor

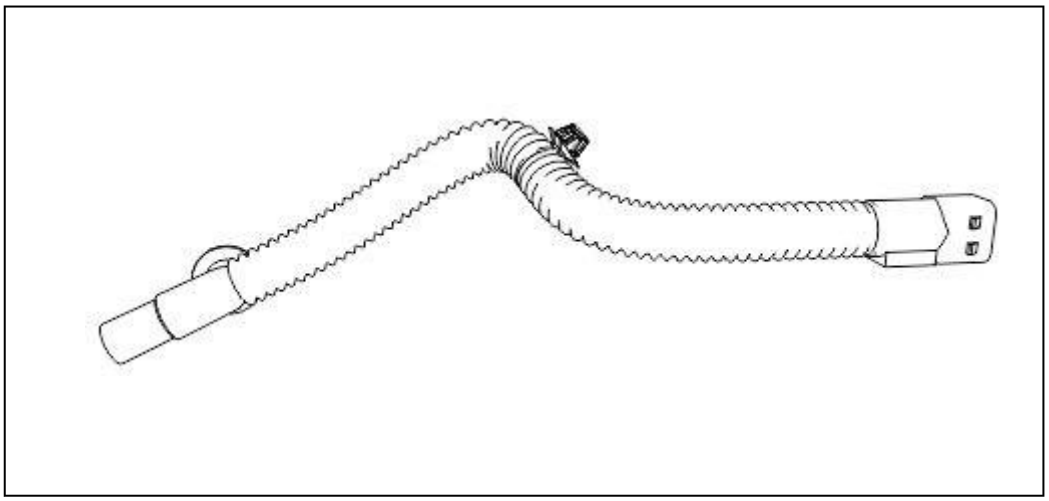


Figure 60:

It is used to detect the interior temperature of the vehicle. One end is connected to the HVAC assembly, and the other end is connected to the instrument panel trim panel. When the A/C blower operates, use the HVAC to draw air through the instrument panel trim panel grille to detect the air flow temperature in the vehicle. The resistance between the two terminals decreases as the temperature increases and increases as the ambient temperature decreases.

Resistance range under normal temperature (ambient temperature 10~25℃): 4.2 KΩ ~ 2.1 KΩ

Outside temperature sensor

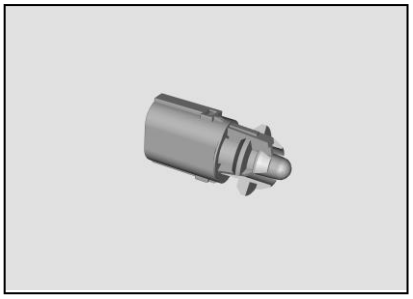
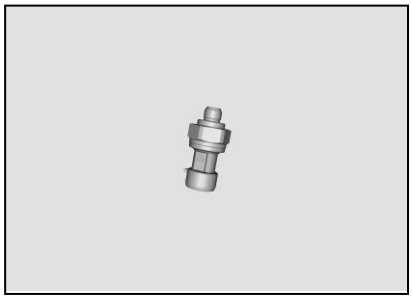


Figure 61:

It is used to detect the outside ambient temperature. The resistance between the two terminals decreases as the ambient temperature increases, and increases as the ambient temperature decreases. Normal temperature state (ambient temperature 10~25℃) Resistance range: 10 KΩ ~ 5 KΩ

Pressure sensor



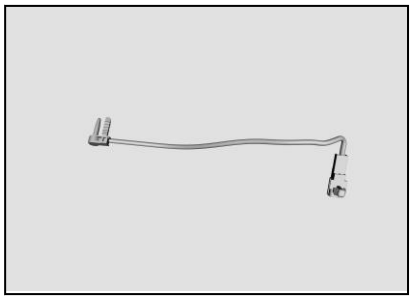
The A/C pressure sensor is used to transmit A/C pressure value signal.

Sunlight intensity sensor

Figure 62:

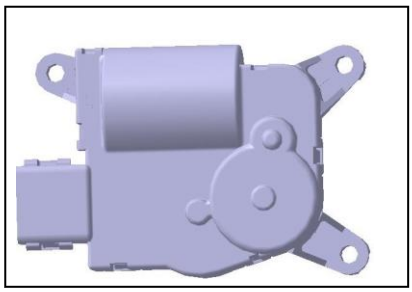
The sunlight intensity sensor is directly connected to the automatic A/C controller, and its output voltage changes according to the sunlight intensity. When the sunlight intensity increases, the output voltage decreases; When the sunlight intensity decreases, the output voltage rises.

Evaporator temperature sensor



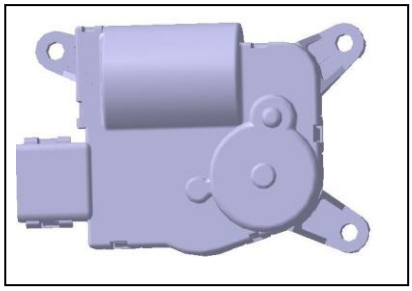
Detect the value of evaporator temperature.

Mode motor



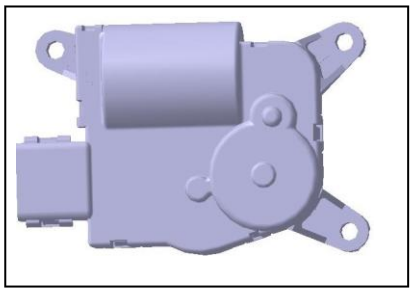
The mode motor is used to adjust the air outlet mode of air conditioning, including face blowing mode, face blowing foot mode, foot blowing mode, foot blowing defrosting mode and defrosting mode.

Cooling and heating motor



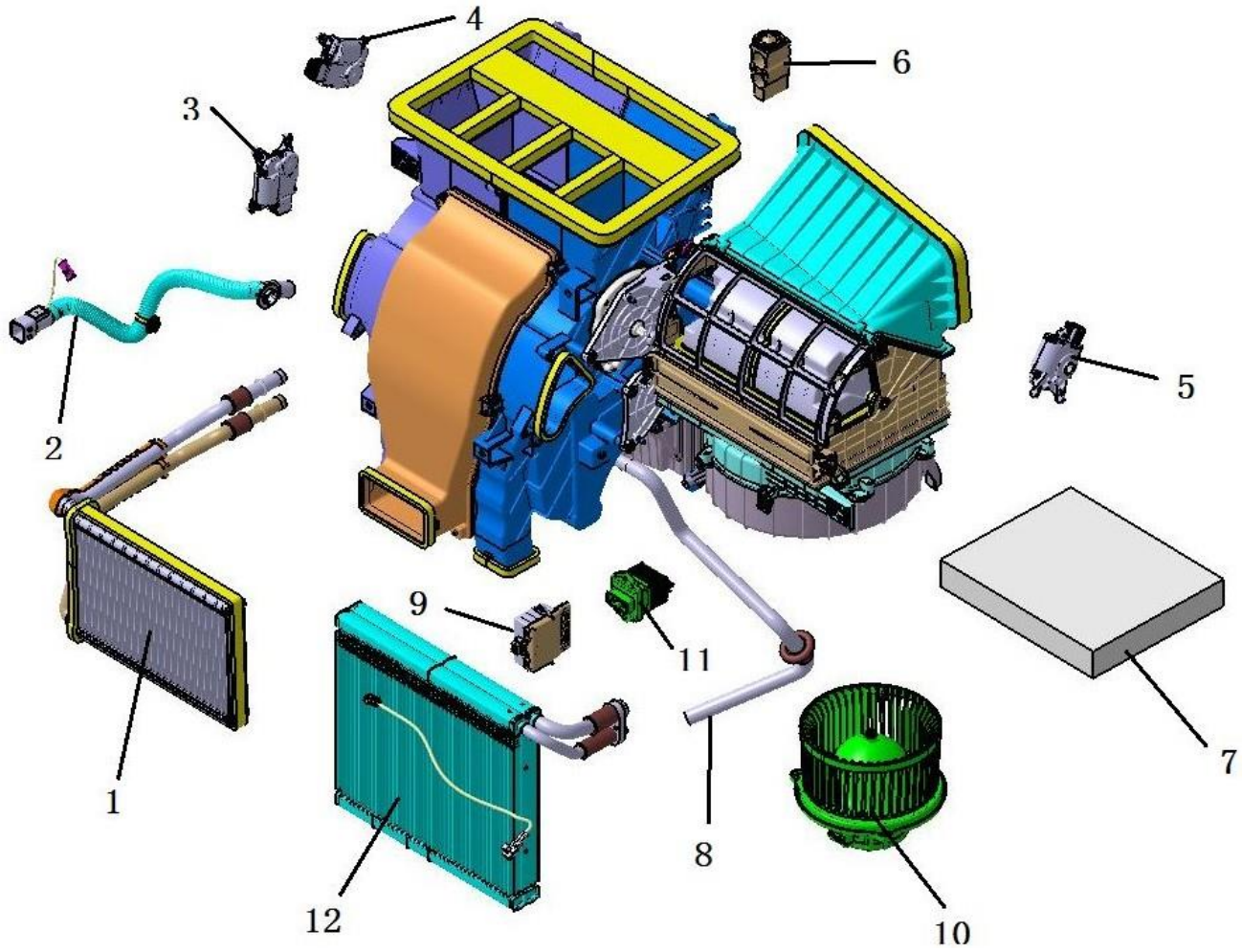
Cooling and heating motor, used to adjust the air outlet temperature.

Inner and outer circulation motor



The inner and outer circulation motor is used to adjust the inner and outer circulation mode of A/C. The inner circulation is the intake air inside the vehicle and the outer circulation is the intake air outside the vehicle.

HVAC assembly



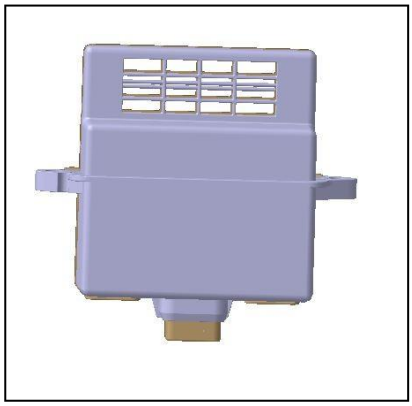
Serial number	Name	Serial number	Name
1	Heater core assembly	7	A/C strainer assembly
2	Interior temperature sensor assembly	8	A/C drain pipe assembly
3	Cold and warm air door actuator assembly	9	Plasma generator assembly(Partial configuration)
4	Mode damper actuator assembly	10	Blower assembly
5	Inner and outer circulation actuator assembly	11	Speed regulating module assembly
6	Expansion valve assembly	12	Evaporator core assembly

HVAC assembly is located in the instrument panel and consists of HVAC blower, HVAC blower motor speed regulation module, dust filter, heating core, evaporator, expansion valve, mixed air valve control motor, various air deflection damper and ventilation duct.

Speed control module

Speed regulating module, adjust A/C air volume gear by adjusting blower terminal voltage

Plasma generator



The plasma generator generates positive and negative ions to purify and fresh air.

Blower

Blower, power source for fresh and circulating air

Compressor

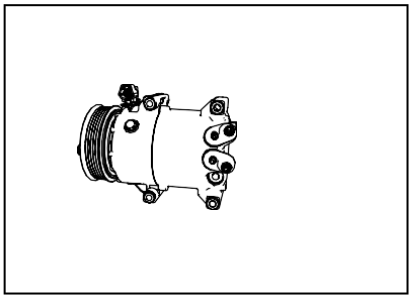


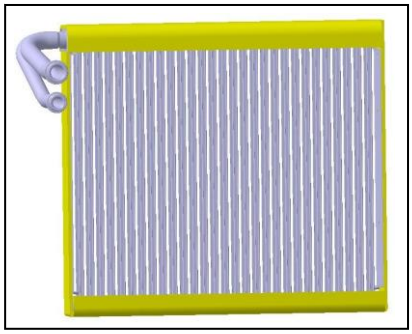
Figure 63:

The A/C compressor is driven by the compressor clutch pulley driven by the engine crankshaft through the belt. When the electromagnetic clutch coil is not energized, the compressor pulley rotates freely and does not drive the compressor shaft. When the clutch coil is energized with voltage, the clutch plate and hub are pushed toward the pulley. The magnetic force integrates the clutch plate and the pulley to drive the compressor shaft.

The compressor is shut down when:

1. Throttle valve fully open
2. Low idle speed
3. Low ambient temperature
4. Coolant temperature too high
5. Refrigerant pressure is higher than 3.2 ± 0.2 MPa or lower than 0.2 ± 0.02 MPa

Evaporator



Evaporator, refrigerant evaporates and absorbs heat in the evaporator, and changes from liquid to gas to realize A/C cooling function.

Condenser assembly

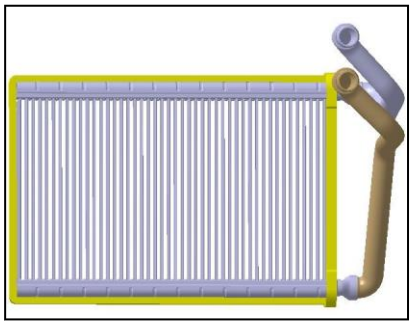
Figure 64:

The high-pressure and high-temperature refrigerant vapor from the A/C compressor flows into the condenser, which is made of aluminum pipe and cooling fins that allow rapid heat transfer of the high-pressure and high-temperature refrigerant vapor. The cooling fins condense the high-pressure and high-temperature refrigerant vapor into high-pressure and medium-temperature liquid through heat dissipation. The liquid storage drying bottle is located on the left side of the condenser. The internal structure design of the liquid storage drying bottle can ensure that the high-pressure, high-temperature gas-liquid mixture and refrigerant enter, while the liquid from the liquid storage drying bottle can only be the high-pressure, medium-temperature liquid refrigerant. There is desiccant adsorbing moisture of refrigeration system inside the liquid storage drying bottle, and the desiccant cannot be reused.

Expansion valve

Expansion valve is used to throttle and depressurize the air conditioning system and regulate the refrigerant flow.

HVAC small water tank



HVAC small water tank, using engine coolant to achieve A/C heating function.

Common methods

Refrigerant pressure test

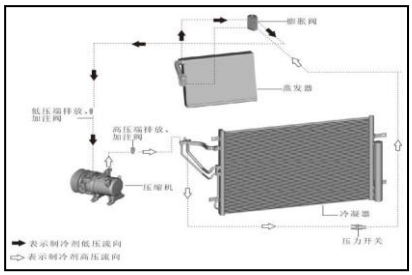
Connect the A/C pressure detection gauge group, start the engine, turn on the A/C, set the lowest temperature, adjust to the internal circulation, and measure the high and low pressure of the A/C system. Reference value (ambient temperature below 30℃):

High pressure 1.0 ~ 1.6 MPa

Low pressure 0.2 ~ 0.35 MPa

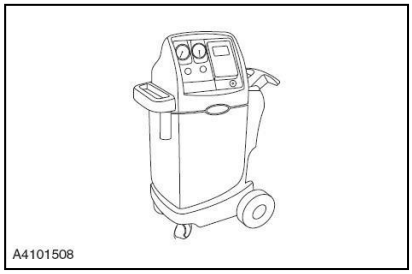
Refrigerant recovery and filling method

Refrigeration system cycle circuit diagram



Refrigerant recovery and filling method

Common tools and maintenance equipment: Refrigerant recovery filling machine, which can complete the air conditioning system discharging, emptying and refilling procedures in one connection. The refrigerant shall be filtered during recovery and evacuation to ensure that the refrigerant filled into the A/C system is clean and dry.

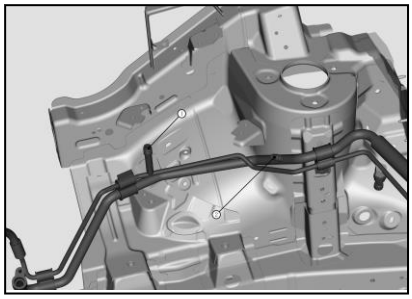


Warning

R-134a()R-134aSAE()J 2210(R-134a)

1 Turn off all appliances and start switch.
2 Disconnect the negative battery harness.
3 Connect the power supply equipment.
4 Connect high and low pressure pipes of refrigeration circuit.
5 Open the low pressure valve switch (2) and high pressure valve switch (1) of the equipment.
6 Select the equipment "Refrigerant Recovery" option to start the equipment and start the recovery work.
7 Check the low pressure gauge pressure of the equipment. When the pressure gauge reaches -34kPa vacuum degree, close the equipment and stop recycling. A/C system vacuum

1 Connect high and low pressure pipes of refrigeration circuit.
2 Open the high-pressure valve of the equipment, select the "Vacuum" option, and set the time to 15 minutes. Start the device to vacuumize. When the time reaches the set value, the device automatically stops working.
3 Close the high pressure valve (1) and check the low pressure gauge pressure.
4 If the pressure reaches the set value and does not rise again, confirm that the refrigeration circuit does not leak, and add the compressor lubricating oil and refrigerant.
5 If the pressure rises, check the refrigeration circuit for leakage.



Filling refrigerant

Fill refrigerant according to the following standard

Refrigerant model	Refrigerant filling amount
R134a	600±20g

Warning **Fill the refrigerant after replenishing the A/C compressor lubricating oil.**

1. Connect high and low pressure pipes of refrigeration circuit
2. Select the equipment "Refrigerant replenishment" option to adjust the filling amount.
3. Open the low-pressure valve switch and start the device for filling.
4. Observe the device display, and when the filling amount reaches the set value, the screen displays that the filling is completed.
5. Close the valve.
6. If the device shows the filling speed is too slow, refer to the following filling methods:
    1. Disconnect the refrigeration circuit high pressure connector and connect only the low pressure end.
    2. Close the high and low pressure valves of the equipment.
    3. Set the vehicle to parking position, start the vehicle, turn on the air conditioner, and set it to low temperature mode.
    4. Open the equipment mortgage valve and refrigerant will be injected into the refrigeration pipeline from the low pressure end.
    5. When the pressure gauge shows the low pressure standard value, disconnect the low pressure end connector.
    6. Refrigerant filling is completed.

Refrigeration system leakage check

Adopt refrigerant (R134a) leakage detection equipment, set the leakage amount as ≤1.5 g/years, the leakage detection probe at each leakage detection position needs to stay for more than 2s, and the movement speed of leakage detector probe at the leakage detection position is not higher than 2.5 cm/s.

Leak detection position: Expansion valve high and low pressure inlet and outlet, pipeline high and low pressure filler, low pressure pipe sectional connection interface, condenser high and low pressure inlet and outlet, compressor high and low pressure inlet and outlet, pressure sensor connection interface.

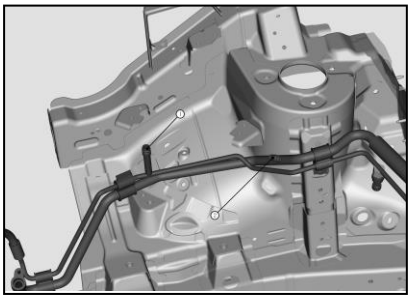
Recovery and replenishment of compressor oil

Recover compressor oil

Warning **• After the refrigerant is recovered, discharge the lubricating oil of A/C compressor.**

- Recycle waste lubricating oil and refrigerant according to relevant regulations.
- Empty the filler drain collection bottle.

1. Connect high and low pressure pipes of refrigeration circuit.
2. Open the low-pressure valve switch (2) and high-pressure valve switch (1) of the equipment.
3. Open the oil drain valve on the A/C refrigerant filling machine control panel, start the equipment, and check whether the A/C compressor lubricating oil drains into the collection bottle.
4. After the lubricating oil of A/C compressor is drained, stop the oil draining and close the oil draining valve.
5. Check the collection bottle and record the oil quantity.



Replenish compressor lubricating oil

1. Add new lubricating oil according to the amount of lubricating oil in the collection bottle.
2. If the following components are replaced separately, supplement the A/C compressor lubricating oil according to the standard.

Component	Filling amount: Ml
Condenser	30
Evaporator	35
Expansion valve	30

A/C pipe	20

Filling in compressor oil

Warning Add the compressor lubricating oil after vacuum extraction.

1 Install filling bottle and add compressor lubricating oil according to standard.
2 Connect refrigeration circuit high and low pressure pipelines, open equipment high pressure valve and compressor lubricating oil filling switch.
3 Start the A/C refrigerant filling machine and observe the right side height in the filling bottle until the required oil quantity. Close high pressure valve

Air outlet temperature check

Hold the temperature detection device, place the temperature probe in the ventilation position in the middle of the face air outlet grille, start the vehicle, turn on the AC, and detect the air outlet temperature.

The reference of A/C system complete vehicle operation test standard is as follows:

Ambient temperature ° C	Central air outlet temperature?	Vehicle working condition	Test conditions	Test time
10	6	Idle speed	Door closed, window fully open, ACON, internal circulation, full cooling, maximum air volume 1/2	1min
13	7			1min
16	8			1min
19	9			1min
21	10			1min
25	11.5			1min
28	13			1min
31	14.5			1min
34	16.5			1min
37	18.5			1min

DTC diagnostic
A/C system

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance advice
B1400	Evaporator temperature sensor fault	1. Two seconds after the system wakes up, or IGN ON 2 seconds later 2. Sensor acquisition voltage detected >4.9 V for 2s, it is judged that the sensor is open or short to battery. 3. Sensor acquisition voltage detected <0.1 V for 2s, it is judged that the sensor is short to ground.	Poor connection of sensor interface or sensor failure	Check harness or replace sensor
B1401	Interior temperature sensor fault	1. Two seconds after the system wakes up, or IGN ON 2 seconds later 2. Sensor acquisition voltage detected >4.9 V for 2s, it is judged that the sensor is open or short to battery. 3. Sensor acquisition voltage detected <0.1 V for 2s, it is judged that the sensor is short to ground.	Poor connection of sensor interface or sensor failure	Check harness or replace sensor
B1402	Sunlight sensor fault	1. Two seconds after the system wakes up, or IGN ON 2 seconds later 2. Sensor acquisition voltage detected >4.95 V for 2s, it is judged that the sensor is open or short to battery. 3. Sensor acquisition voltage detected <0.1 V for 2s, it is judged that the sensor is short to ground.	Poor connection of sensor interface or sensor failure	Check harness or replace sensor
B1403	Outside temperature sensor fault	1. Two seconds after the system wakes up, or IGN ON 2 seconds later 2. Sensor acquisition voltage detected >4.9 V for 2s, it is judged that the sensor is open or short to battery. 3. Sensor acquisition voltage detected <0.1 V for 2s, it is judged that the sensor is short to ground.	Poor connection of sensor interface or sensor failure	Check harness or replace sensor
B1404	The mode damper actuator is blocked or the drive circuit is blocked.	1. Two seconds after the system wakes up, or IGN ON 2 seconds later 2. When the feedback voltage of the actuator is normal, the actuator cannot reach the target position ±0.1 V tolerance range within 10 s. 3. Or read drive chip fault	Poor connector or bad actuator or drive circuit fault	Check wiring harness or replace actuator

B1405	The driver cooling and heating door actuator is blocked or the drive circuit is blocked.	1. Two seconds after the system wakes up, or IGN ON 2 seconds later 2. When the feedback voltage of the actuator is normal, the actuator cannot reach the target position ±0.1 V tolerance range within 10 s.	Poor connector or bad actuator or drive circuit fault	Check wiring harness or replace actuator

		3. Or read drive chip fault		
B1406	The inner and outer circulation damper actuator is blocked or the drive circuit is blocked.	1. Two seconds after the system wakes up, or IGN ON 2 seconds later 2. When the feedback voltage of the actuator is normal, the actuator cannot reach the target position ±0.1 V tolerance range within 10 s. 3. Or read drive chip fault	Poor connector or bad actuator or drive circuit fault	Check wiring harness or replace actuator
B1407	Mode damper actuator feedback fault	1. Two seconds after the system wakes up, or IGN ON 2 seconds later 2. Actuator feedback voltage detected >4.9 V, for 3s, it is judged that the sensor is open or short to battery. 3. Sensor acquisition voltage detected <0.1 V for 3s, it is judged that the sensor is short to ground.	Poor connector or bad actuator or drive circuit fault	Check wiring harness or replace actuator
B1408	Driver cooling and heating door actuator feedback fault	1. Two seconds after the system wakes up, or IGN ON 2 seconds later 2. Actuator feedback voltage detected >4.9 V, for 3s, it is judged that the sensor is open or short to battery. 3. Sensor acquisition voltage detected <0.1 V for 3s, it is judged that the sensor is short to ground.	Poor connector or bad actuator or drive circuit fault	Check wiring harness or replace actuator
B1409	Inner and outer circulation damper actuator feedback fault	1. Two seconds after the system wakes up, or IGN ON 2 seconds later 2. Actuator feedback voltage detected >4.9 V, for 3s, it is judged that the sensor is open or short to battery. 3. Sensor acquisition voltage detected <0.1 V for 3s, it is judged that the sensor is short to ground.	Poor connector or bad actuator or drive circuit fault	Check harness or replace sensor
B140A	Fan terminal voltage control is inaccurate	1. IGN ON power on 2000 ms 2. Power supply voltage is greater than target voltage 1V 3. The fan cannot reach the target voltage within 10 s within the ±0.5 V tolerance range.	Poor connection of fan interface, fan fault or speed control module fault	Check battery voltage, harness, fan and speed regulation module

B1411	Sensor reference voltage fault	1. Two seconds after the system wakes up, or IGN ON 2 seconds later 2. Sensor reference voltage detected >5.3 V for 2s 3. Sensor reference voltage detected <0.3 V for 2s	Refer to 5V reference voltage circuit or connector harness short circuit to battery or ground.	Check reference 5V reference voltage circuit or connector harness
B1414	Pressure sensor fault, A/C system pressure too high or too low	1. Two seconds after the system wakes up, or IGN ON 2 seconds later 2. Sensor acquisition voltage detected >4.8 V for 2s, judgment	Open circuit of pressure sensor or short circuit to battery and ground; A/C system pressure too high or too low	Check harness or replace sensor Check whether the A/C system has refrigerant and whether the A/C refrigeration cycle works normally.

		Open circuit for sensor or short circuit to battery 3. Sensor acquisition voltage detected <0.1 V for 2s, it is judged that the sensor is short to ground. 4. The pressure sensor acquired for 1s is higher than 3.0MPa. (Feedback voltage is greater than 4.25 V) 5. The value of pressure sensor acquired for continuous 1s is lower than 0.2MPa. (Feedback voltage is less than 0.8 V)		

Fault symptom diagnosis check and confirmation

General equipment

Digital multimeter
Hand-held diagnostic scanner KT 400/KT 700, etc.

Inspection and confirmation

1. Confirm the customer's A/C problem.

2. Visually inspect for visible signs of mechanical

or electrical damage. Visual Check List

Mechanical part	Electrical part
Fan hood	Circuit
Compressor	Refrigerant pressure switch
A/C high/low pressure pipe	Electronic fan
Pipeline connection position	Blower and speed regulation module
Condenser	Cooling and heating door motor
Expansion valve	Mode damper motor
Air supply port	Inner and outer circulation damper motor
	A/C control module
	Temperature sensor

3. Check the air-conditioning system lines that are easy to see or can be seen to find out if there is a leak in the air-conditioning system.

4. If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step.

5. If the visual inspection is passed, confirm the fault

and refer to the fault symptom table. Reference: Air

conditioning system complete vehicle operation test standard.

Ambient temperature	Central vent temperature	Vehicle working conditions	Test conditions	Test time
10	6	Idle speed	Door closed, window fully open, ACON, internal circulation, full cooling, maximum air volume 1/2	1min
13	7			1min
16	8			1min

Ambient temperature	Central vent temperature	Vehicle working conditions	Test conditions	Test time
19	9			1min
21	10			1min
25	11.5			1min
28	13			1min
31	14.5			1min
34	16.5			1min
37	18.5			1min

Fault symptom table

If the fault occurs but no DTCs are stored in the control module and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
A/C cooling insufficient/uncooled	Insufficient refrigerant filling amount	Reference: Diagnosis process of insufficient cooling capacity of A/C
	Accessory drive belt slip	
	Compressor clutch slip	
	Pipeline leakage	
	Blower fault	
	Mixed damper fault	
	Air duct blocked or leaking	
	Compressor wear	
A/C heating is insufficient	Insufficient antifreeze	Reference: Air conditioning heating insufficient diagnosis process
	Heater water pipe fault	
	Heater tank fault	
	Blower fault	
	Mixed damper fault	
	Air duct blocked or leaking	
	Engine fault	
Blower does not work	Circuit	Reference: Blower inoperation diagnostic process
	Fuse	
	Blower speed regulation module	
	Blower relay	

Symptoms	Possible causes	Measures
	Blower fault	
A/C compressor clutch does not work	Fuse	Reference: A/C Compressor Clutch Inoperative Diagnostic Procedure
	Compressor relay	
	Circuit	
	Pipeline	
	Compressor clutch fault	
	Refrigerant pressure switch fault	
	Engine control module fault	
Abnormal refrigerant pressure	• A/C high pressure exceeds 3.2 MPa	Recover excess refrigerant and refill
		Repair vehicle poor heat dissipation
		Repair engine malfunction
		Overhaul A/C system pipeline internal blockage fault
	• A/C low pressure below 0.2 Mpa	Vacuum again and fill refrigerant
		Overhaul A/C system leakage fault
		Overhaul A/C system pipeline internal blockage fault
A/C water leakage	Torsion of drain pipe and body	Overhaul drain pipe
	Drain pipe is blocked	Replace drain pipe
	Poor assembly of drain pipe and HVAC	
Turn on A/C fan with great jitter and noise	A/C pressure high	Detect A/C pressure. If the high pressure exceeds 1.52MPa, the cooling fan is running at high speed. Compared with cooling fan running at low speed, excessive jitter and noise is normal.
	The cooling fan is attached with mud.	If mud is attached to the fan blade, clean the scattered blade.
	Balance weight on cooling fan blade falls off	If the balance weight is found to fall off, replace the cooling fan.
Under high temperature, the blower is not ventilated, and the temperature decreases and restarts and recovers.	Speed control module thermal protection	Replace blower speed regulation module

A/C Compressor Clutch Inoperative Diagnostic Procedure

Test conditions	Details/fruit bearing/measures
1. General inspection	
	A. Check front end gear train and belt; B. Inspect the refrigerant pressure sensor and compressor clutch harness plug for signs of damage, aging, poor contact and loosening; Is it normal? ? Yes to step 2. ? No Repair fault point.

2. Check fuse	
	A. Inspect the compressor clutch fuse. Rated capacity of fuse: 15a Is the fuse normal? ? Yes to step 3. ? No Overhaul the circuit and replace the rated capacity fuse.
3. Check refrigerant pressure of A/C system	
	A. Connect A/C pressure detection gauge set to A/C high/low pressure pipeline to detect A/C system refrigerant pressure under normal temperature and normal state. Reference pressure value: 0.5 ~ 0.8 MPa Is the pressure normal? ? Yes to step 4. ? No Check refrigerant pressure line of air-conditioning system and fill refrigerant according to standard. Reference: Refrigeration system pressure check
4. Inspect whether the A/C controller reports abnormal fault of pressure sensor detection.	
	A. Power on the vehicle to ON gear; B. Connect the hand-held diagnostic scanner, enter the A/C controller panel, and read the current DTC. Does the A/C controller report a fault about abnormal pressure sensor detection? ? Check the connection between the pressure sensor and the harness plug, and replace the pressure sensor if necessary. ? No to step 5.
5. Check whether compressor on request of A/C controller is issued	
	A. Power on the vehicle to ON gear; B. Enter the A/C control data flow reading function through the diagnostic scanner and turn on the A/C refrigeration switch to light the indicator. Read whether A/C controller sends open request normally? ? Yes to step 6. ? No Check the CAN network status and replace the A/C controller if necessary.
6. Inspect the compressor clutch relay supply circuit.	
	A. Power off the vehicle to OFF gear; B. Remove the compressor clutch relay; C. Power on the vehicle to ON gear; D. Measure the voltage between the supply end of the compressor clutch relay in the engine compartment fuse box and a reliable ground. Standard voltage: 11 ~ 14 V Is the voltage normal? ? Yes to step 7. ? No Overhaul the open circuit of the compressor clutch relay supply circuit and repair it.
7. Inspect the compressor clutch relay coil control circuit.	
	A. Power off the vehicle to OFF gear; B. Remove the compressor clutch relay; C. Power on the vehicle to ON gear;

	D. Measure whether the coil end of the compressor clutch relay in the engine compartment fuse box is connected to the corresponding pin of the engine control module. ? Yes Troubleshooting engine control module control problems. ? No Overhaul the open circuit problem of the compressor clutch relay control circuit and repair it.

A/C cooling insufficient diagnosis process

Test conditions	**Details/Results/Measures**
1. Check temperature of A/C central air outlet	
	A. Start the engine, turn on the A/C, set the lowest temperature, adjust to the internal circulation, measure the temperature of the A/C central air outlet: Is the air outlet temperature still high? ? Yes Perform the following repair and adjustment and confirm whether it is normal: • Diagnose whether the A/C controller reports fault codes; if yes, refer to troubleshooting suggestions in the fault code table; • Overhaul whether the hybrid damper control motor acts; • Check the surface of condenser for dirt blockage and dust accumulation; • Inspect whether there is oil stain or leakage mark at the pipeline connection parts; ? No to step 2.
2. Check air volume of A/C central air outlet	
	A. Check the air output status of A/C central air outlet: Judge whether the air output is too small? ? Yes Perform the following repair and adjustment and confirm whether it is normal: • Check whether the outlet air direction can be adjusted normally; • Inspect the air outlet and air duct for blockage and poor assembly; • Check whether the A/C filter screen is dirty and blocked; ? No to step 3.
3. Check refrigerant pressure	
	A. Connect the A/C pressure detection gauge set, start the engine, turn on the A/C, set the lowest temperature, adjust to the internal circulation, and measure the high and low pressure of the A/C system: **Reference value (ambient temperature below 30℃):** **High pressure 1.0 ~ 1.6 MPa** **Low pressure 0.2 ~ 0.35 MPa** Does the refrigerant pressure meet the reference value? ? Yes to step 4. ? No Perform the following repairs and adjustments and confirm that they are normal:

	• Check whether the refrigerant is excessive or missing; • Re-vacuumize and maintain pressure to further confirm the air conditioning system tightness; • Fill refrigerant according to standard; • Check whether the expansion valve is blocked; • Check whether the radiator fan rotates abnormally or is damaged;
4. Check A/C compressor working status	
	A. Check the following: • Compressor belt working state; • Compressor clutch working state; • Compressor working state; Is it working properly? ? Yes Find the cause of the fault from other symptoms. ? No Perform the following repairs and adjustments and confirm the system is normal: • Check whether the engine control module reports fault codes; • Adjust the compressor belt and replace it if necessary; • Check the amount of refrigerant and lubricating oil, and supplement if necessary; • Overhaul compressor clutch circuit; • Overhaul the compressor clutch and replace it if necessary; • Overhaul the compressor and replace it if necessary;

A/C heating insufficient diagnosis process

Test conditions	Details/Results/Measures
1. Check engine coolant temperature	
	A. Check engine water temperature. Does the engine water temperature reach 82 ℃? ? Yes to step 2. ? No Perform the following repairs and adjustments and confirm that they are normal: • Diagnose whether the A/C controller reports fault codes. If yes, refer to troubleshooting suggestions in 4.1.1 Fault Code Table; Check whether the engine control module reports fault codes, overhauls and adjusts engine working conditions; Extend the engine running time; Empty the engine cooling system;

Test conditions	Details/Results/Measures
2. Check the working status of mixing damper	
	A. Check the working status of mixing damper. Is the mixed damper working normally? ? Yes Find the cause of the fault from other symptoms. ? No Perform the following repairs and adjustments and confirm that they are normal: • Check whether the mixing damper mechanism can rotate normally; • Check the air duct for air leakage;

Blower does not work diagnostic process

Test conditions	Details/Results/ Measures
1. General inspection	
	A. Inspect the HVAC blower assembly harness and HVAC blower harness plug for damage, poor contact, aging and loosening. Is it normal? ? Yes to step 2. ? No Repair fault point.
2. Check fuse	
	A. Inspect the blower and blower relay fuse. Rated capacity of fuse: 30a, 10 A Is the fuse normal? ? Yes to step 3. ? No Overhaul the circuit and replace the rated capacity fuse.
3. Check blower relay	
	A. Replace a new relay, power on to ON position, and turn on the air volume switch. Does the blower work normally? ? Yes Replace the blower relay. ? No to Step 4
4. Inspect the blower and blower relay coil power supply circuit.	
	A. Power off the vehicle to off gear;

Test conditions	Details/Results/ Measures
	B. Remove the blower relay; C. Power on the vehicle to ON gear; D. Use a multimeter to measure the voltage between the blower relay coil on the engine compartment relay fuse box and the supply terminal, the switch and the reliable grounding point. Standard voltage: 11 ~ 14 V Is the voltage normal? ? Yes to step 5. ? No Overhaul the open circuit problem of blower relay switch terminal and blower relay coil terminal power supply circuit and repair.
5. Check blower relay coil control circuit	
	A. Power off the vehicle to OFF gear; B. Remove the blower relay; C. Power on the vehicle to ON position, and turn on the air volume switch; D. Measure the voltage between the blower relay coil control terminal on the engine compartment relay fuse box and reliable grounding point with a multimeter. Standard voltage: 0 ~ 1 V Is the voltage normal? ? Yes to step 6. ? No Overhaul the open circuit problem from the blower relay coil control end to the A/C controller and fix it.
6. Check blower status	
	A. Power off the vehicle to OFF gear; B. Remove the blower connector; Measure whether the resistance between the two terminals of the blower is less than 100 ohms. ? Yes to step 7. ? No Replace blower.
7. Check grounding circuit of blower	
	A. Power off the vehicle to OFF gear; B. Disconnect the blower harness plug; C. Use a multimeter to measure whether the circuit between the blower harness plug and reliable grounding point is connected? ? Yes to step 8. ? No Overhaul the open circuit fault between HVAC assembly harness plug and grounding.

Test conditions	Details/Results/ Measures
8. Check circuit between A/C controller of blower speed regulation module	
	A. Power off the vehicle to OFF gear; B. Disconnect the blower speed regulation module harness plug and A/C controller harness plug; C. Measure whether blower assembly harness blower control voltage pin and speed control module control pin are connected? ? Yes to step 9. ? No Overhaul open circuit problem between A/C controller and blower speed regulating module.
9. Check blower speed regulation module	
	A. Replace HVAC blower speed regulation module. Yes Replace the HVAC blower speed regulation module and confirm the system is normal. ? No Find the cause of the fault from other symptoms.

Big noise after turning on A/C

Test conditions	Details/Results/Measures
1. Check cooling fan	
	A. Check the appearance of cooling fan for mud or foreign matter? ? Yes Cleaning mud and foreign matter: ? No to step 2. B. Check whether the cooling fan blade balance weight falls off. ? Yes Replace fan: ? No to step 2.
2. Check blower	
	A. Check whether the blower impeller is damaged. ? Yes Replace blower. ? No to step 3: B: Check whether the blower impeller balance weight falls off. ? Yes Replace blower. ? No to step 3: C: Is there any obvious abnormal sound in the single blower? ? Yes Replace blower. ? No to step 3.
3. Check compressor	
	A. Start the engine, turn on the A/C, set the lowest temperature, adjust to the external circulation, and the air volume is 8. Gear, open the engine compartment cover, and stand right in front of the engine compartment cover to identify whether the compressor has obvious abnormal sound. ? Yes • Check belt tension; • Check compressor;

	? No to Step 4.
4. Check refrigerant pressure	
	A. Connect the A/C pressure detection gauge set, start the engine, turn on the A/C, set the lowest temperature, adjust to the internal circulation, and measure the high and low pressure of the A/C system: **Reference value (ambient temperature below 30℃):** **High pressure 1.0 ~ 1.6 MPa** **Low pressure 0.2 ~ 0.35 MPa** Does the refrigerant pressure meet the reference value? ? Yes ? No Perform the following repairs and adjustments and confirm that they are normal: • Check whether the refrigerant is excessive or missing; • Re-vacuumize and maintain pressure, and confirm the air conditioning system tightness; • Fill refrigerant according to standard. Note: If the pressure is normal and there is continuous obvious "silk" or "goo" sound, please vacuumize and maintain the pressure again to confirm the airtightness of the air conditioning system and fill refrigerant according to the standard.

A/C icing

Test conditions	Details/Results /Measures
1. Check A/C filter element	
	A. Remove the A/C filter element and check the dirt blockage. ? Yes Replace the A/C filter element; ? No to step 2.
2. Check refrigerant pressure	
	A. Connect the A/C pressure detection gauge set, start the engine, turn on the A/C, set the lowest temperature, adjust to the internal circulation, and measure the high and low pressure of the A/C system: **Reference value (ambient temperature below 30℃):** **High pressure 1.0 ~ 1.6 MPa** **Low pressure 0.2 ~ 0.35 MPa** Does the refrigerant pressure meet the reference value? ? Yes to step 3. ? No Perform the following repairs and adjustments and confirm that they are normal:

	• Check whether the refrigerant is excessive or missing; • Re-vacuumize and maintain pressure, and confirm the air conditioning system tightness; • Fill refrigerant according to standard.
3. Check A/C drainage	
	A. Start the engine, turn on the A/C, set the lowest temperature, adjust to the external circulation, and the air volume is 8. Gear: Observe whether the A/C drain pipe drains normally. ? No Perform the following repair and adjustment and confirm whether it is normal • Check whether the drain pipe is twisted or blocked by foreign matter; • Replace the drain pipe or HVAC;
4. Check ECU signal	
	A. Start the engine, turn on the A/C, set the lowest temperature, adjust to the internal circulation, and the air volume is 1. Gear, connected to diagnostic scanner: Check whether the compressor cut-off is controlled according to AC request signal demand? ? No Updating ECU data/replacing ECU; ? Yes to step 5.
5. Inspect evaporator temperature sensor	
	A. Start the engine, turn on the A/C, set the lowest temperature, adjust to the internal circulation, and the air volume is 1. Gear: Connect the evaporator temperature sensor externally with a multimeter, and read whether the evaporator temperature sensor resistance changes with the evaporator temperature. ? Yes Find the cause of the fault from other symptoms. ? No Perform the following repairs and adjustments and confirm the system is normal: • Replace evaporator temperature sensor; • Overhaul whether the circuit from evaporator temperature sensor to A/C controller end is normal.

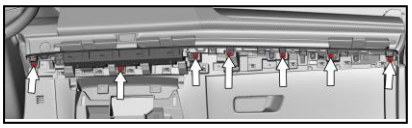
Removing and installing A/C control panel

1. Removal

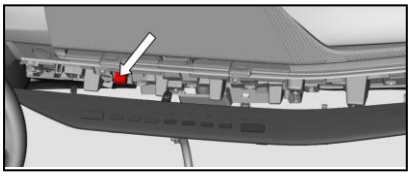
   1 Disconnect the negative battery harness.Reference: Battery assembly

   2 Remove the air conditioning panel bottom trim. Reference: Removing and installing dashboard

   3 Remove the air-conditioning panel fastening screws. Tool: Screwdriver (Allen No. 20), torque: 2±0.5Nm.



   4 Take out A/C control panel and disconnect wire harness plug connection.



2. Installation

   The installation sequence is the reverse of the removal sequence.

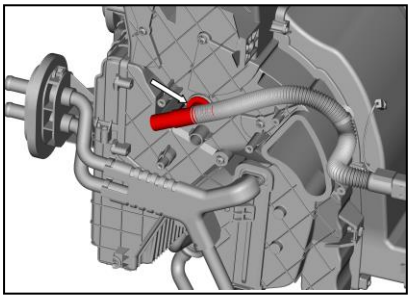
Interior temperature sensor

1. Removal

   1 Disconnect the negative battery harness. Reference: Battery assembly

   2 Remove the driver side lower guard assembly. Reference: Removing and installing dashboard

   3 Rotate the interior temperature sensor counterclockwise.



2. Installation

   Installation sequence is reverse to removal sequence

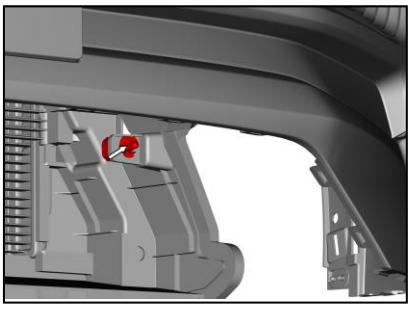
Outside temperature sensor

1. Removal

   1 Disconnect the negative battery harness. Reference: Battery assembly

   2 Remove the front bumper assembly. Reference: Removing and installing dashboard

   3 Remove outside temperature sensor. Tools: Vice.

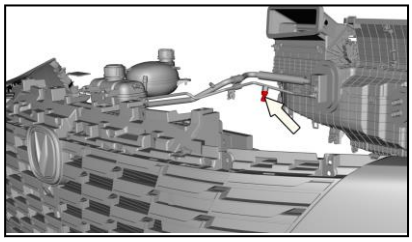


2. Installation

The installation sequence is the reverse of the removal sequence.

Pressure sensor

1. Disconnect the battery negative harness. Reference: Battery assembly
2. Remove the pressure sensor. Tool: Wrench.

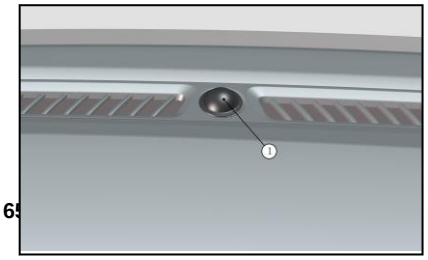


Sunlight intensity sensor

Removal

1. Disconnect the negative battery harness.
2. Use a flat screwdriver to pry the edge of sunlight intensity sensor, and take out the sunlight intensity sensor.

Figure 6



Installation

1. The installation sequence is reverse to the removal sequence.

Evaporator temperature sensor

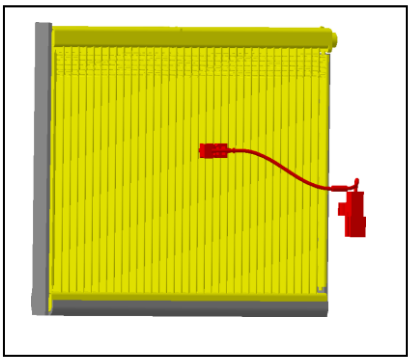
1. Removal

1 Disconnect the negative battery harness.Reference: Battery assembly

2 Remove HVAC assembly. Reference: HVAC assembly

3 Remove evaporator. Reference: Evaporator

4 Remove clip of evaporator temperature sensor from evaporator fins.



2. Installation

The installation sequence is the reverse of the removal sequence, noting the following:

- Do not damage the evaporator sealing strip and heat sink.
- When installing the housing, the sealing strip must be close to the housing.

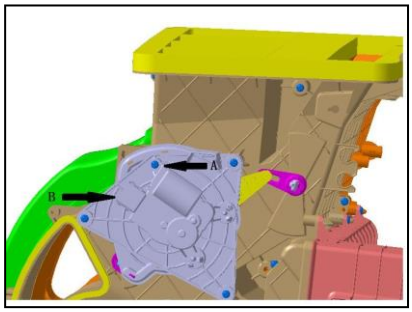
Mode motor

Removal

1. Remove HVAC assembly

Reference: HVAC assembly

2. Disconnect connector B and loosen mode motor retaining screw A.
3. Take out mode motor



Installation

1. The installation sequence is reverse to the removal sequence, and pay attention to the following items:

The function of the mode motor must be checked after installation

Cooling and heating motor

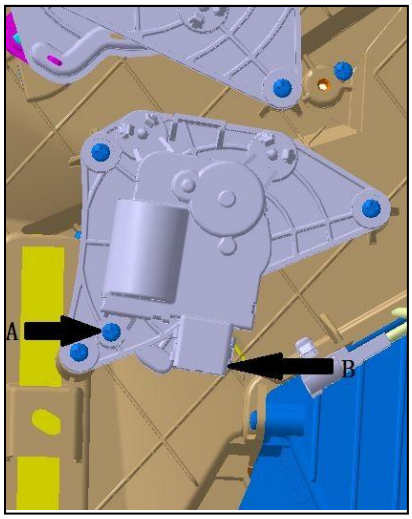
Removal

1. Removing HVAC

Assembly Reference:

HVAC Assembly

2. Disconnect connector B and loosen fixing screw A of cooling and heating motor.
3. Take out cooling and heating motor



Installation

1. The installation sequence is reverse to the removal sequence, and pay attention to the following items:

The function of cooling and heating motor must be checked after installation.

Inner and outer circulation damper actuator

Removal

1. Removing HVAC

Assembly Reference:

HVAC Assembly

2. Disconnect connector B and loosen inner and outer circulation damper actuator attaching screws A.

3. Take out actuator of inner and outer circulation damper.

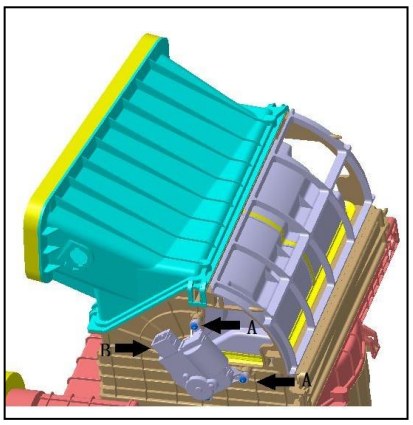


Figure 66:

Installation

The installation sequence is reverse to the

removal sequence, while noting the following:

After installation, the function of the inner and

outer circulation damper actuator must be

checked.

HVAC assembly

Removal

1. Recovering refrigerant

Reference: Recovering and filling A/C refrigerant

2. Drain engine coolant

Reference: Draining and filling of coolant

3. Disconnect battery

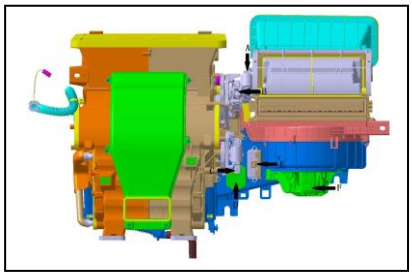
negative harness

Reference: Battery

4. Removing dashboard

Refer to: Removal and Installation

5. Disconnect A/C box connector A, B, C, D, E, F



6. Removing interior

temperature sensor

Reference: Interior

temperature sensor

7. Remove A/C line and

expansion valve connecting nut

Reference: A/C line

8. Removing front HVAC

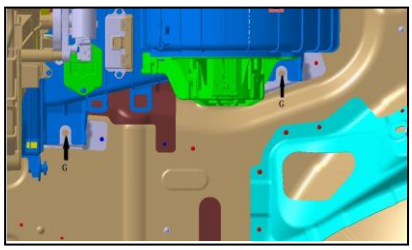
pipe of firewall Reference:

HVAC inlet/outlet pipe

9. Removing steering support

Reference: Steering column assembly

10. Remove 2 retaining bolts G at the lower part of A/C box assembly blower



11. Take out A/C

box assembly for

installation

The installation process is the reverse of the removal process.

Speed control module

Removal

1. Removing HVAC

assembly

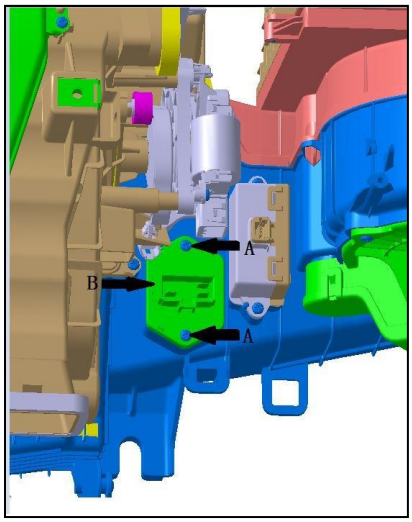
Reference: Air

conditioning box

assembly

2. Disconnect connector B and loosen fastening screw A of speed regulating module.

3. Take out speed regulating module



Installation

1. The installation sequence is reverse to the removal sequence, and pay attention to the following items:

The function of the speed control module must be checked after installation.

Plasma generator

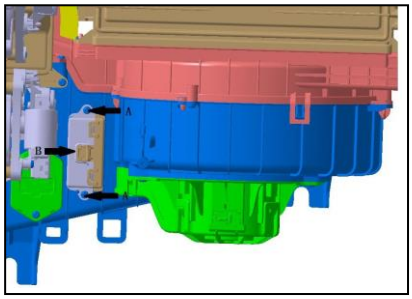
Removal

1. Remove HVAC assembly

Reference: A/C box assembly

2. Disconnect connector B and loosen plasma generator retaining screw A

3. Take out plasma generator



Installation

1. The installation sequence is opposite to the removal sequence.

Blower

Removal

1. Disconnect the negative battery harness.

2. Disconnect wire harness plug connection for blower motor.

3. Remove the three retaining screws of the blower motor, and take out the blower motor.

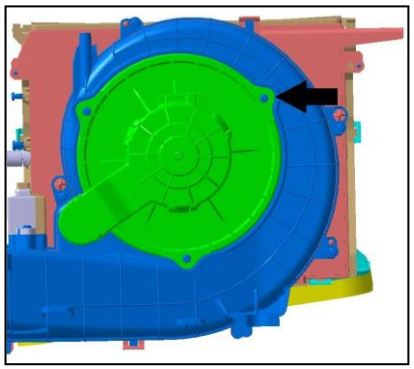


Figure 67:

Installation

1. The installation sequence is reverse to the removal sequence.

A/C compressor

Removal

1. Disconnect the battery negative harness connector.

2. Disconnect the compressor harness connector.

3. Recover refrigerant.

Refer to: Recovering and Filling A/C Refrigerant

4. Remove the

compressor drive belt.

Refer to: Front gear

train

5. Remove compressor high and low pressure connecting pipe.

1. Remove the compressor high-pressure pipe connecting bolt (1).

2. Remove the compressor low-

pressure pipe connecting bolt.

Torque: 10 ±1N.m

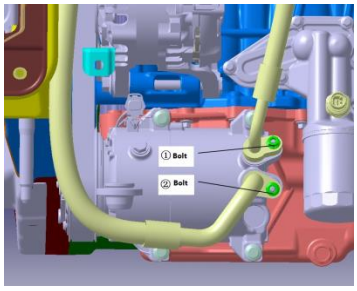


Figure 68:

Caution All O-rings involved in the installation process must be replaced with new parts.

6. Remove the compressor retaining bolt 3, and take out the compressor from the vehicle bottom. Torque: 23 ±2N.m

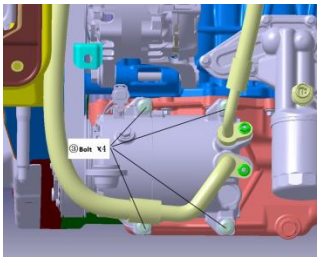


Figure 69:

Installation

1. The installation sequence is reverse to the removal sequence, and pay attention to the following items:

- The new A/C compressor already has a standard capacity compressor lubricant.
- To install the old A/C compressor, first draw the compressor lubricating oil, and then add about 100 ml lubricating oil.
- The A/C compressor itself contains lubricating oil. If there is no refrigerant leakage in the A/C system, just replace it with a new compressor and proceed as follows:
- Drain removed compressor lubricant and measure the amount of oil drained.
- Before installing a new compressor, part of the lubricating oil must be drained by the difference between the removed compressor drained oil and 100 ml.

2. After installation, please refer

to: Recovering and filling A/C

refrigerant 3.Fill refrigerant.

Refer to: Recovering and Filling A/C Refrigerant

4. After filling the A/C refrigerant, start the A/C compressor in the following way:

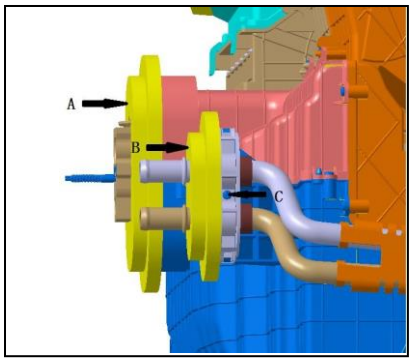
1. Turn on A/C switch and set A/C temperature to low temperature mode;
2. Turn on the A/C cooling mode, and make the A/C compressor run at idle speed for at least 5 minutes.

Caution Only when the compressor lubricating oil is evenly distributed into the refrigeration system, the compressor can work under full load.

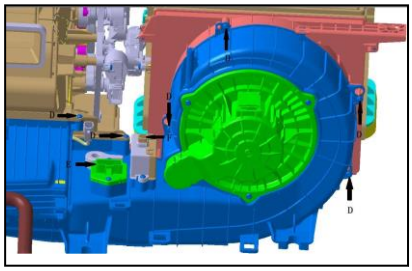
Evaporator

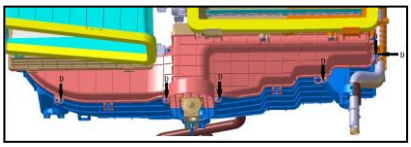
Removal

1. Removing HVAC assembly Reference: Air conditioning box assembly
2. Remove the foam A and B, loosen the retaining screwsC and remove the retaining pressure plate.



3. Disconnect connectors E and F and loosen retaining screws D





4. Take out
evaporator
and install
Installation process is reverse to removal process

Condenser assembly

The Caution condenser and dry reservoir are integral

and cannot be replaced separately. Removal

1. Disconnect the negative battery harness.

2. Recover refrigerant.

Reference: Recovering and filling A/C refrigerant

3. Remove front bumper. Reference: Front bumper

4. Remove the condenser A/C connecting line retaining nuts.Torque: 10±1 N.m

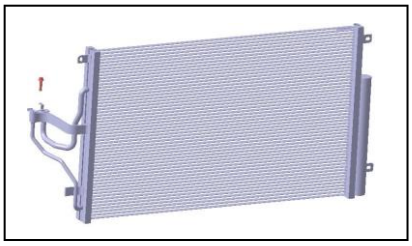


Figure 70:

5. Remove the 3 retaining bolts of the condenser on the radiator. Torque: 6 ±1N.m

Figure 71:

6. Remove condenser downwards.

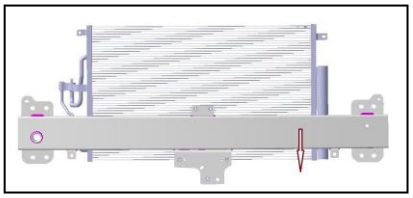


Figure 72:

Installation

1. The installation sequence is the reverse of the removal sequence, noting the following:

• Replace the O-ring with a new one and coat the O-ring with A/C compressor lubricant.

2. After installation, vacuumize the air conditioning system. Reference: Refrigerant recovery and filling method

3. Fill refrigerant.

Reference: Refrigerant recovery and filling method

Expansion valve

Removal

1. Disconnect the negative battery harness.

2. Recover refrigerant.

Refer to Refrigerant Recovery and Filling Method

3. Remove the retaining bolt - arrow, disconnect the evaporator connecting pipe assembly from the expansion valve, and seal the pipe joint. Torque: 10±1 Nm

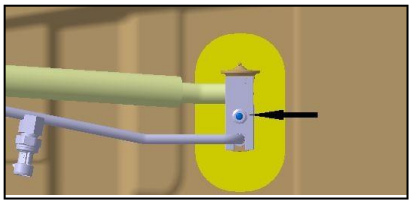


Figure 73:

4. Dismantle fixing bolt-arrow of expansion valve and evaporator connecting pipe, take out expansion valve and seal evaporator interface. Torque: 8±1 Nm

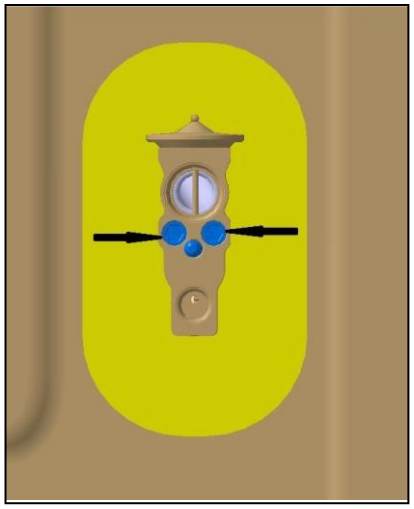


Figure 74:

Installation

1. The installation sequence is the reverse of the removal sequence, noting the following:

Replace the O-ring with a new one and grease the O-ring with air-conditioning compressor lubricant.

2. After installation, vacuumize the

air conditioning system. Reference:

Recovering and filling A/C

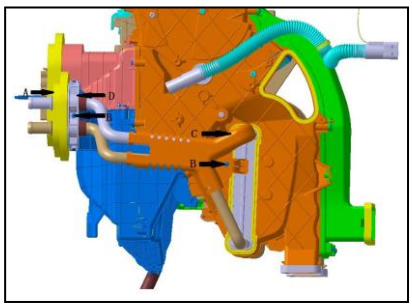
refrigerant

3. Fill refrigerant.

HVAC small water tank

Removal

1. Removing HVAC assembly Reference: Air conditioning box assembly
2. Remove foam A and loosen retaining screws B
3. Remove pressure plate D and cover plate C
4. Draw out HVAC small water tank



Installation

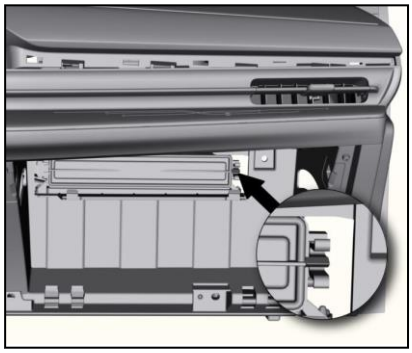
Installation process is reverse to removal process

A/C filter element

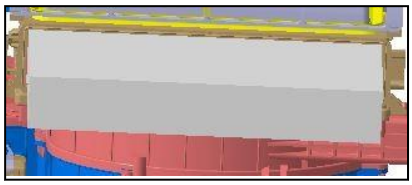
Removal

1. Removing glovebox Reference: Glovebox

2. Press and hold the right clip, and remove the filter element cover.



3. Take out filter



Installation

1. The installation sequence is reverse to the removal sequence.

A/C pipeline

Removal

1. Disconnect the negative battery harness.

2. Recover refrigerant.

Refer to: Recovering and Filling A/C Refrigerant

3. Remove A/C pressure

sensor. Refer to:

Pressure sensor

4. Remove retaining bolts of high and low pressure pipes at front right pillar. Torque: 10 ±1N.m

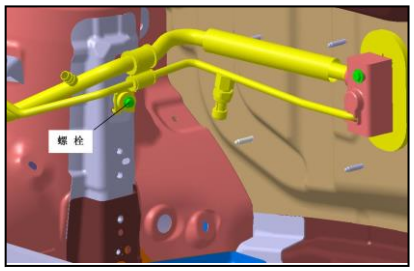


Figure 75:

5. Remove retaining bolts of high and low pressure pipes at engine compartment longitudinal beam (right). Torque: 10±1 N.m

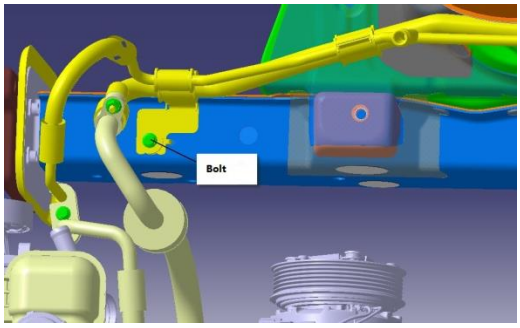


Figure 76:

6. Remove the connecting nuts between the high/low pressure pipe and the expansion valve, separate the high/low pressure pipe, and seal the joint. Torque: 10 ±1N.m

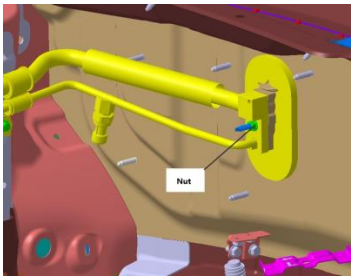


Figure 77:

7. Remove front

bumper. Refer to:

Front bumper

8. Remove the condenser high and low pressure pipe retaining nut, disconnect the pipe connection, and seal the joint. Torque: 10±1 N.m

9. Remove the compressor high and low pressure pipe retaining bolts, disconnect the pipe connection, and seal the joint. Torque: 10±1 N.m

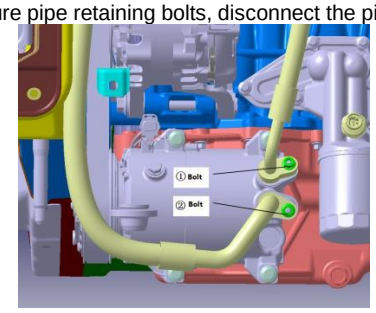


Figure 78:

Installation

1. The installation sequence is the reverse of the removal sequence, noting the following:

• Replace the O-ring with a new one and coat the O-ring with A/C compressor lubricant.

2. After installation, vacuumize the air conditioning system. Refer to: Recovering and

Filling A/C Refrigerant

3. Fill refrigerant.

Refer to: Recovering and Filling A/C Refrigerant

Spare parts atlas

F280101

F280103

F280105

Body electrical instrument

Specifications

General specifications

Name	Rated voltage	Maximum voltage
Combination instrument power supply	12 V(DC)	-

Torque specification

Name	Nm	Kg cm	Kg in
Combination instrument retaining screw	3±0.5	-	27

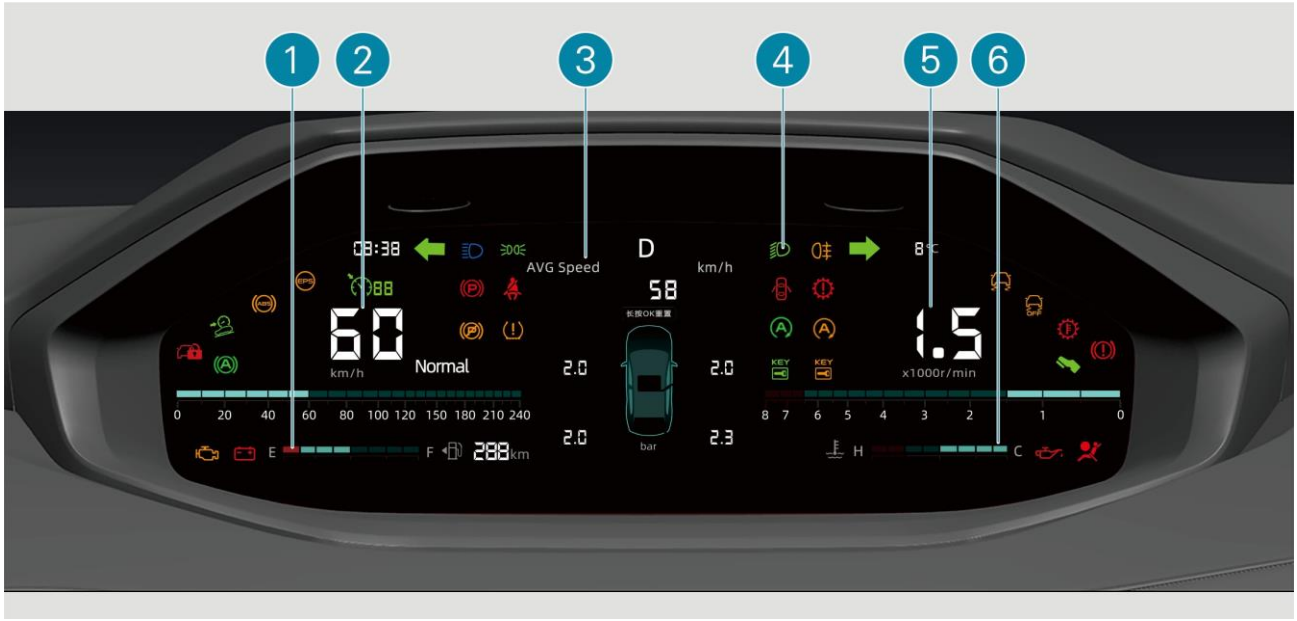
Composition and position distribution

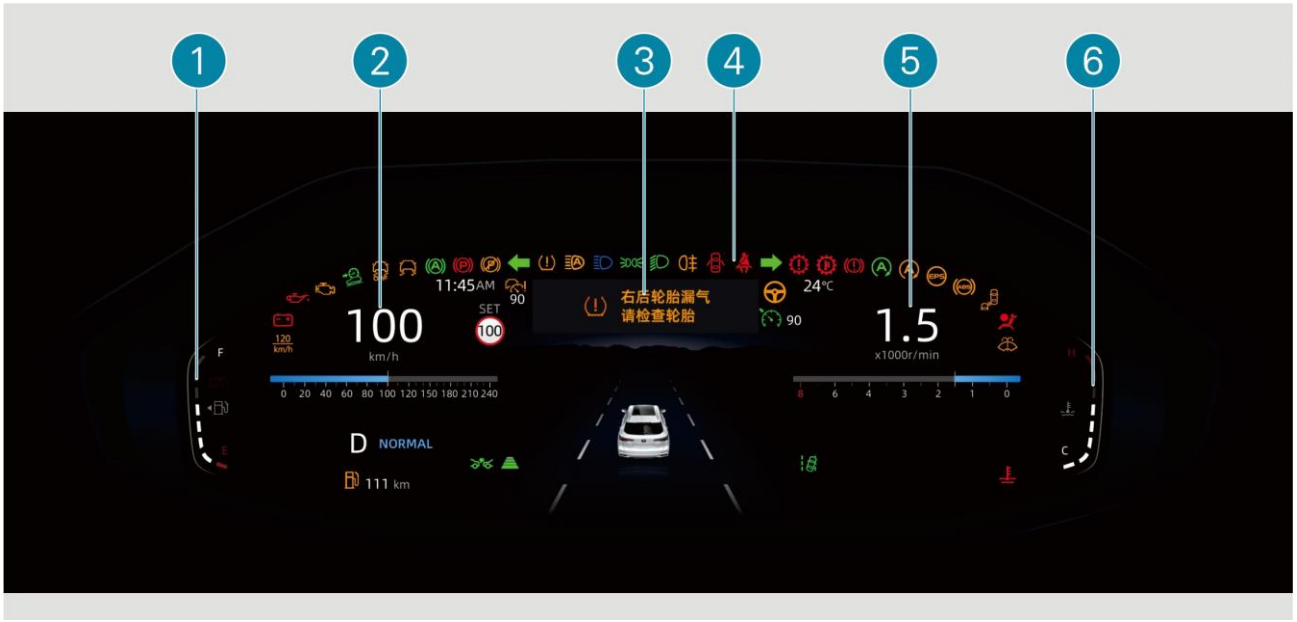
The instrument cluster is located on the left side of the instrument panel, above the steering column, and provides vehicle performance information to the driver.

System functional principle introduction

The instrument cluster includes water thermometer, fuel gauge, speedometer, tachometer, indicator and LCD information display.

- **Water temperature gauge: It is used to indicate the current temperature of vehicle engine coolant. It is displayed in eight sections. The temperature of cooling water during driving shall be kept in four sections. When the water temperature meter displays that the segment code is 7 or above and the water temperature high alarm indicator is on, it indicates that the current water temperature is high, and the fire shall be stopped immediately. Please contact the authorized service center of Chang'an Automobile for overhaul.**
- **Fuel gauge: It is used to indicate the current fuel quantity in the vehicle fuel tank. The fuel gauge is displayed in 8 sections. Paragraph 8, in the "F" position, indicates that the fuel tank is full of fuel. Paragraph 1, "E," indicates that the fuel tank is low and the fuel low indicator is constantly on. In section 0, it indicates that the fuel quantity is nearly exhausted, and the fuel low indicator flashes with 500 ms once.**
- **Speedometer: Used to indicate the current speed of the vehicle, km/h indicates the vehicle speed, the index value is 10 km/h, and the maximum display speed is 240 km/h.**
- **Tachometer: Used to indicate the current speed of the vehicle engine, and r/min indicates the speed of the engine. The indication value x 1000 indicates the engine speed at this time.**
- **Indicator lamp: Indicates the operation status or fault status of each subsystem of the vehicle through the indicator lamp.**
- **LCD information display: Display vehicle driving information, such as gear, driving mode, mileage, total mileage, subtotal mileage, average speed, average fuel consumption, tire pressure and alarm information prompt, etc. The total maximum value is 999, 999 km and the minimum unit is 1 km; The maximum subtotal mileage is 999 .9 km and the minimum unit is 0.1 km. Range less than 50 km will display ---. The driving information menu can be switched through the steering wheel keys.**


1
2
3
4
5
6
08:38
AVG Speed
D
km/h
58
8℃
60
km/h
Normal
2.0
2.0
1.5
x1000r/min
0 20 40 60 80 100 120 150 180 210 240
8 7 6 5 4 3 2 1 0
E
F
288km
2.0
2.3
bar
H
C


1
2
3
4
5
6
11:45AM
90
SET
100
100
km/h
右后轮胎漏气
请检查轮胎
24℃
90
1.5
x1000r/min
0 20 40 60 80 100 120 150 180 210 240
8 6 4 3 2 1 0
D NORMAL
111 km

Steering wheel button

The instrument menu can be switched through the key switch on the steering wheel. The low-configuration instrument adopts two keys. The middle-configuration instrument adopts 4-way key switch. The key functions are as follows:

- **Menu key**

Short press: Open or exit the instrument

menu; Return to previous menu Long press:

Return to initial page

- **Page up and page down**

Instrument menu page up

- **Page down**

Instrument menu page down

- **Confirm**

Menu item

Confirm

music

pause/play

drive

message

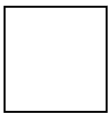
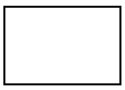
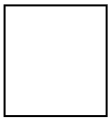
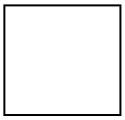
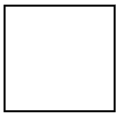
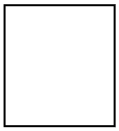
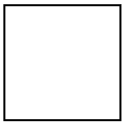
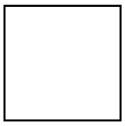
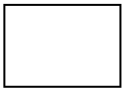
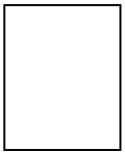
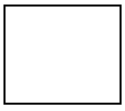
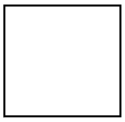
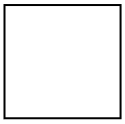
reset

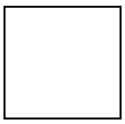
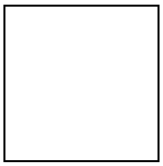
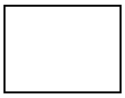
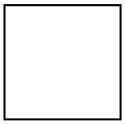
Instrument indicator lamp

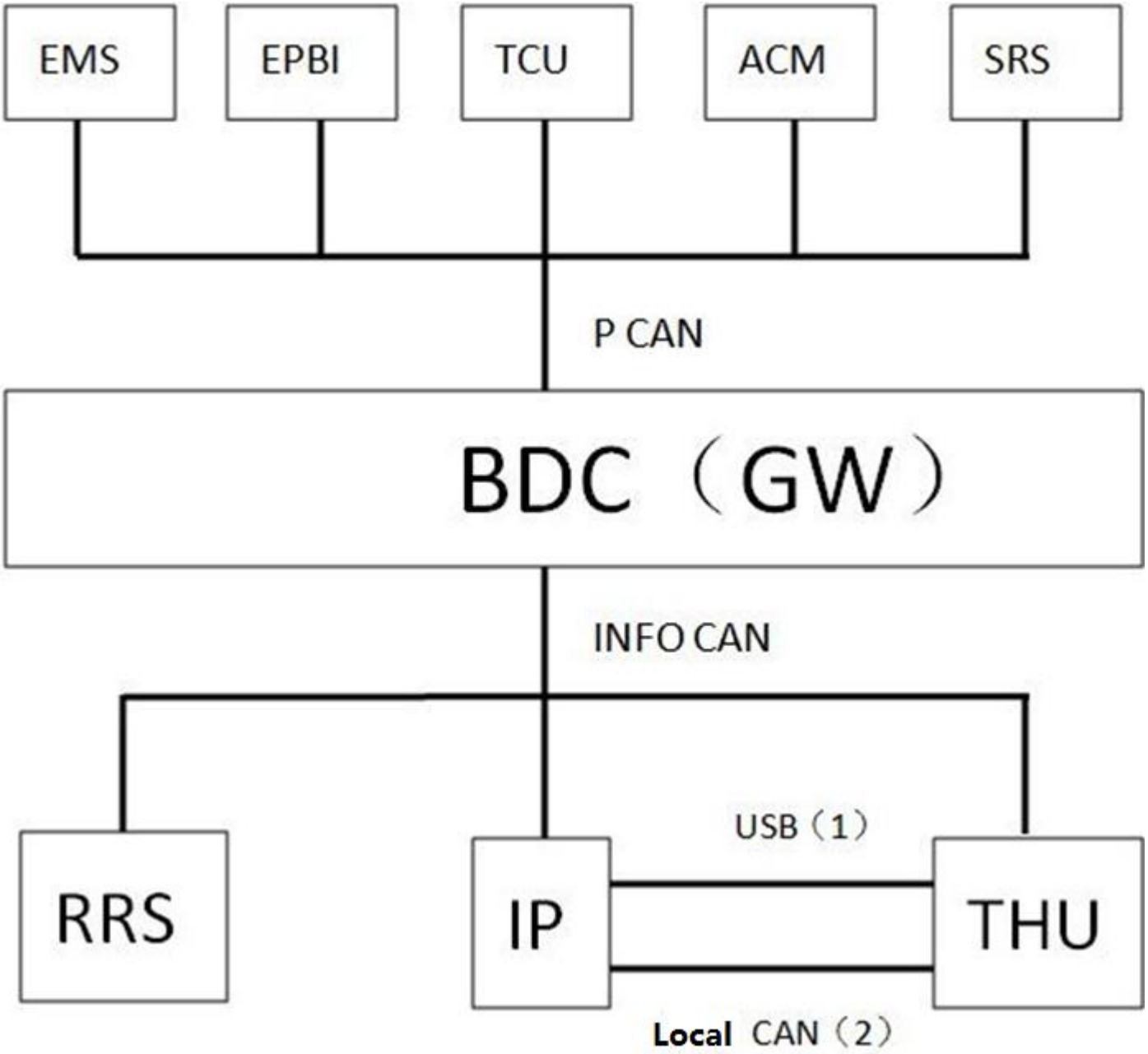
The indicator light in the instrument cluster is used to indicate the function or possible malfunction of a particular system while the vehicle is operating. The indicator light on the combination instrument provides warning or indication information to the user. The indicators on the instrument cluster are of the following types:

Lamp symbol	Indicator light	Color	Lamp symbol	Indicator light	Color
Figure 79:	Automatic parking indicator	Green	**Figure 80:**	Integrated adaptive cruise malfunction indicator	Yellow
Figure 81:	Lane assist system fault prompt	Yellow	**Figure 82:**	Parallel auxiliary system malfunction indicator lamp	Yellow
Figure 83:	Automatic high and low beam malfunction indicator lamp	Yellow	57 **Figure 84:**	Keyless system start malfunction indicator	Yellow
Figure 85:	Position indicator light	Green	**Figure 86:**	Oil pressure warning lamp	Red

Figure 87:	Engine anti-theft indicator	Red	**Figure 88:**	Alternator charging indicator	Red

Lamp symbol	Indicator light	Color	Lamp symbol	Indicator light	Color
 **Figure 89:**	ESP Multifunction Indicator	Yellow	 **Figure 90:**	Engine emission malfunction indicator	Yellow
 **Figure 91:**	ESC_OFF indicator lamp	Yellow	 **Figure 92:**	Driver seat belt unfastened indicator	Red
 **Figure 93:**	Constant speed cruise indicator	Green	**Figure 94:**	EPS indicator lamp	Yellow
 **Figure 95:**	Tire pressure warning indicator	Yellow	 **Figure 96:**	Airbag malfunction indicator	Red
 **Figure 97:**	Idle start/stop fault indicator	Yellow	 **Figure 98:**	High beam indicator	Blue
Figure 99:	Electronic parking	Red	 **Figure 100:**	Low fuel level indicator	Yellow
 **Figure 101:**	Electronic parking fault	Yellow	 **Figure 102:**	Engine overheating indicator	Red
 **Figure 103:**	HDC working indicator	Green	**Figure 104:**	ABS malfunction indicator lamp	Yellow

Lamp symbol	Indicator light	Color	Lamp symbol	Indicator light	Color
 **Figure 105:**	Transmission fluid temperature high indicator	Yellow	**Figure 106:**	Brake fault/brake fluid low indicator	Red
Figure 107:	Automatic emergency brake system AEB Malfunction indicator lamp	Yellow	**Figure 108:**	Left steering indicator	Green
Figure 109:	Automatic emergency brake system AEB. Close indicator lamp	Yellow	57  **Figure 110:**	Idle start/stop working indicator lamp	Green
 **Figure 111:**	ACC Adaptive Cruise Control Fault Lamp	Yellow	**Figure 112:**	Right steering indicator	Green
 **Figure 113:**	Rear fog lamp indicator	Yellow	**Figure 114:**	Low beam indicator	Green

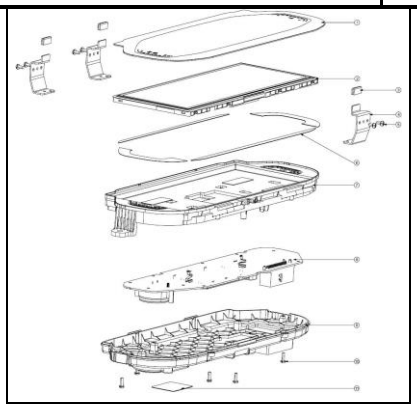

EMS
EPBI
TCU
ACM
SRS
P CAN
BDC（GW）
INFO CAN
RRS
IP
USB（1）
THU
Local CAN（2）

Inspection of part structure principle

Instrument assembly product structure

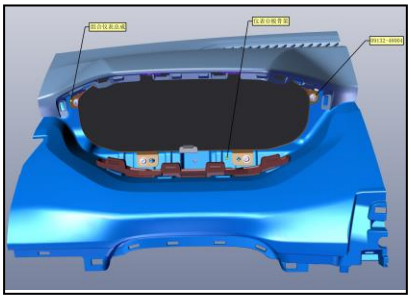
1 Single structure

Serial number	Quantity	Part name
1	1	Glass cover plate
2	1	10.25inch TFT
3	3	Sponge strip
4	3	Limit post
5	6	Screw ST2.9*6.5
6	4	3m tape
7	1	LCD bracket
8	1	Circuit board assembly
9	1	Rear lid
10	17	Screw ST2.9*9.5
11	1	Label

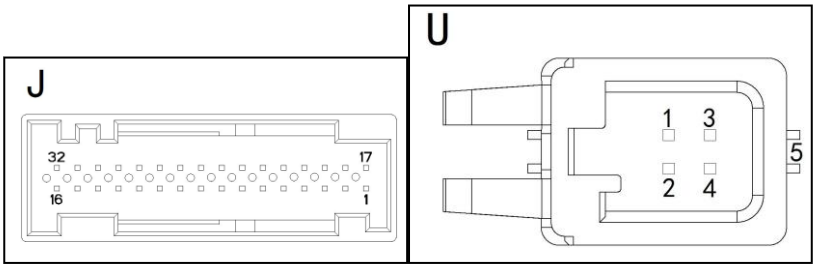


2 Layout structure

The combination instrument is fixed on the instrument panel frame and fixed by screws (09132-48004).



Interface definition



Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
J1	Battery power supply	Positive pole of power supply	9V~16V	Any power supply gear, multimeter test harness J1 and body grounding point voltage	
J2	Ignition power supply	Positive pole of power supply	9V~16V	On power supply gear, multimeter test harness J2 and body grounding point voltage	
J3	NC	-	-	-	
J4	Instrument ground	Negative pole of power supply	–0.1V~0.1V	Any power supply gear, multimeter test harness J4 and body ground point voltage	
J5	Fuel sensor ground	Signal ground	–0.1V~0.1V	Connect the instrument and test the voltage between harness J5 and J4 with a multimeter.	
J6	NC	-	-	-	
J7	NC	-	-	-	
J8	Fuel signal	Analog signal	10-310 Ohms	Switch on the power supply, disconnect the instrument, and test the resistance between harness J5 and J8.	
J9※	Left blind area indicator lamp output	Analog signal, duty cycle output	4.5-7.5V	Switch on the power supply and connect the instrument. The background light of the instrument is in daytime mode. Use a multimeter to test the harness J9 voltage output.	High configuration
J10※	Right blind area indicator lamp output	Analog signal, duty cycle output	4.5-7.5V	Switch on the power supply and connect the instrument. The background light of the instrument is in daytime mode. Use a multimeter to test the harness J10 voltage output.	High configuration

J11	Anti-theft indicator	Digital signal, low level input	0-2V	1. Connect the instrument. When the anti-theft indicator is not on, measure the J11 voltage of the harness with a multimeter. The normal range is 9-16 V. Connect the instrument, and lead the harness No.11. The pin is shorted to pin 4. Check whether the anti-theft indicator is on normally.	

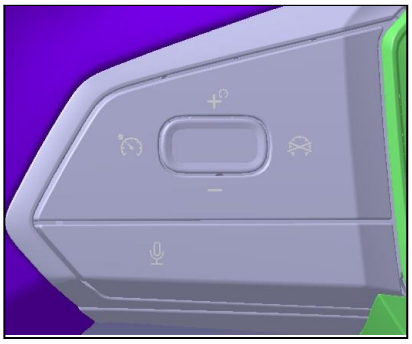
Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
J12	Oil pressure alarm	Digital signal, low level input	0-2V	When the power supply is ON and the instrument is connected, use a multimeter to measure the J12 voltage of the harness when the oil pressure warning lamp is not on. The normal range is 9-16 V; When the engine oil pressure alarm lamp is on, measure the J12 voltage of the harness with a multimeter. The normal range is 0-2V	
J13	Low brake fluid level	Digital signal, low level input	0-2V	When the power supply is ON and the instrument is connected, use a multimeter to measure the J13 voltage of the harness when the oil pressure warning lamp is not on. The normal range is 9-16 V; When the engine oil pressure alarm lamp is on, measure the J13 voltage of the harness with a multimeter. The normal range is 0-2V	
J14	NC	-	-	-	
J15	NC	-	-	-	
J16	Alternator charging indication(Reserved)	-	-	-	
J17	Low washer fluid level alarm(Reserved)	-	-	-	
J18	NC	-	-	-	
J19	CAN-H (InfoCAN High)	Differential signal, CAN bus	0-5V	When the power supply is on, connect the KT 300 diagnostic scanner to the diagnostic port and confirm whether it can communicate with the instrument.	
J20	CAN-L (INFOCAN Low)	Differential signal, CAN bus	0-5V		
J21	NC	-	-	-	
J22※	CAN2_H(Private CAN High)	Differential signal, CAN bus	0-5V	Power ON gear, confirm whether dual screen interaction works normally	Medium configuration
J23※	CAN2_L (private can Low)	Differential signal, CAN bus	0-5V		Medium configuration

J24	NC	-	-	-	
J25	NC	-	-	-	
J26※	Party control key signal 1(Signal terminal)	Analog signal, resistance input	0-15K	Switch on the power supply and disconnect the instrument. Use a multimeter to test whether the resistance of each key between harness J26 and J30 is normal. +:2.2KΩ, SEEK+: 3.9KΩ, SEEK-:	Medium and low configuration

Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
				6.8KΩ, MODE: 15KΩ)	
J27	NC	-	-	-	
J28	NC	-	-	-	
J29	NC	-	-	-	
J30※	Party control button signal 2 (GND end)	Analog signal, resistance input	±0.1V	Switch on the power supply, disconnect the instrument, and test the voltage between the harness J30 and the body grounding point with a multimeter.	Medium and low configuration
J31	Dimming signal(Reserved)	-		-	
J32※	Party control key signal 3(Signal terminal)	Analog signal, resistance input	6.8-15K	Switch on the power supply, disconnect the instrument, and use a multimeter to test whether the resistance of each key between harness J32 and J30 is normal (user-defined: 6.8 KΩ, voice: 15 KΩ)	Medium and low configuration
U-1 ※	NC	-	-	-	
U-2 ※	NC	-	-	-	
U-3 ※	USB_DATA+ Positive pole of data interface)	Differential signal	0-5V	When the power supply is in ON position, confirm whether the dual-screen interaction works normally.	High configuration
U-4 ※	USB_DATA- Data interface negative)	Differential signal	0-5V		High configuration
U-5 ※	SHIELD GND (housing Ground)	Shielding ground	–0.1V~0.1V	Power ON gear, multimeter test whether the USB plug-in housing is short-circuited with J4.	High configuration

Steering wheel button

3402100-MK03-AW23/AW26	

3402100-MK03-AW22/AW25	
3402100-MK03-AW21/AW26	

Common methods

Short range and fuel consumption reset

1. Short-term mileage and subtotal mileage exceed the maximum display value 9999 .9 km or short-term driving time exceeds the maximum display value 999 h: 59 min, short-term driving information will automatically clear all items
2. After battery power-down, short-term driving information will automatically clear all items.
3. Press long or short OK button to reset subtotal mileage and average fuel consumption.
4. Start the engine again 2 hours after power-off and sleep, and the short-term driving information will automatically clear all items.

Figure 116 Short-Term Driving Information(Medium and high configuration)

Figure 117 Trip Sub-Total Mileage(Low configuration)

Figure 118 Subtotal Mileage(Medium and high configuration)

Figure 119 AVG Average Fuel Consumption(Low configuration)

DTC Diagnostic

Instrument

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
U10A1	Bus communication fault	1.Complete vehicle power supply 6.5 V-18 V; 2. Power supply gear is ON gear 3S; 3. Can bus entry detected BUSOFF status, and BUS-OFF Counter>=5	1. Other controller faults 2. Harness fault	1. Plug fuse or controller connector one by one, observe whether the fault is eliminated, if it is eliminated, locate the corresponding controller, replace the controller, and then contact Chang'an technician to troubleshoot the single controller problem. 2. If the plugging and unplugging of the controller fails, check whether the connectors of the controllers are in good contact and whether the terminals are pin-out. 3. Check whether the terminal resistance is 60 ohms. Left and right, if resistance is less than 40 or If it is greater than 70, there is abnormality. Check whether the terminal resistance controller is abnormal;

				4. Plug and unplug all controllers on CAN wire of terminal resistance, and test terminal resistance.

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
				If the controller is removed and restored to normal, the controller is faulty. After replacing the controller, contact the Chang'an technician to troubleshoot the controller.
B1104	Fuel input signal invalid(Below normal)	1.Working voltage 6.5-18 V; 2.Power on to ON gear for 1s; 3.Fuel input resistance < 10Ω for more than 20 s	1.Fuel sensor fault 2.Harness fault	1.Contact Chang'an personnel to enter instrument debugging mode to check the sensor resistance, and take pictures and feed back the information to Chang'an technical personnel. 2.If the resistance is > 10Ω, replace the instrument. If the fault disappears, contact Chang'an technical personnel for fault parts analysis. 3.If the resistance is < 10Ω, test whether the resistance between pin 5 and pin 8 of the harness is short circuit. If so, contact the harness for troubleshooting. 4. If instrument harness resistance < 10Ω. Test instrument harness end No.5 Pin and No. 8 pin resistance 5.If the resistance is < 10Ω, test the resistance output by the fuel pump pin. If it conforms to the fault code, it belongs to fuel pump fault, and contact the corresponding technician for analysis.
B1103	Fuel input signal invalid(Above normal)	1.Working voltage 6.5-18 V; 2.Power on to ON gear for 1s; 3.Fuel input resistance greater than 300 ohms for more than 20 s	1.Fuel sensor fault 2.Harness fault	1.Contact Chang'an personnel to enter instrument debugging mode to check the sensor resistance, and take pictures and feed back the information to Chang'an technical personnel. 2.If the resistance is less than 300 Ohm, replace the instrument. If the fault disappears, contact Chang'an technical personnel for fault parts analysis. 3.If the resistance is greater than 300 ohm, test whether the resistance of pin 5 and pin 8 of the harness is open. If so, contact the harness for troubleshooting. 4. If instrument harness resistance 300 Ohm, test instrument harness terminal5 Pin # and pin # 8 resistance

				5.If the resistance is greater than 300 ohm, test the resistance of fuel pump pin output, which is in accordance with the fault code and belongs to fuel pump fault. Contact the corresponding technician for analysis.
B1105	Battery voltage is lower than normal range	1. Power supply status is IGN ON rear 3s; 2. Detect that the power supply voltage is lower than 8.5 V for more than 1s, and the DTCs are satisfied.	1. Battery power loss 2. Generator fault	1.The vehicle ignites to charge the battery, check whether the voltage between pins 1,2 and 4 of the harness is within the range of normal working voltage 9-16 V, replace the instrument within the range, and then contact Chang'an technician to analyze the single fault. If not, perform the following steps; 2. Test whether the dark current of the complete vehicle exceeds the standard to judge whether it is the battery power loss caused by the quiescent current exceeding the standard; Continuously greater than 20 mA without falling is considered abnormal

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
				3. If the dark current meets the requirements, check whether the generator has fault, and contact the charging system responsible person for troubleshooting.
B1106	Battery voltage is higher than normal range	1. 3s after power supply status is IGN ON 2. The power supply voltage is detected to be higher than 17 V for more than one second, and the conditions are satisfied.	1. Battery fault 2. Generator fault	1. Ignite the vehicle to charge the battery, check whether the voltage between pins 1,2 and 4 of the harness is within the range of normal working voltage 9-16 V, replace the instrument within the range, and then contact Chang'an technician to analyze the single fault. If not, perform the following steps; 2. Check the generator for faults and contact the charging system responsible person for troubleshooting.
B1107	Abnormal ignition signal	1. Within the wake-up period; 2. Ignition hard wire signal is not equal to ignition CAN signal, and duration is greater than or equal to 1s.(The hardwired signal is in gear IGN OFF and BCM_PowerStatusFeedbac=0x2 or 0x3, greater than or equal to 1s; Hardwired signal is IGN ON gear and BCM_PowerStatusFeedbac=0x0 or 0x1, greater than or equal to 1s)	1. Can not connected 2. Ignition signal is not connected. The ignition signal is different from CAN signal.	1. Complete vehicle ignition, check harness No.2 Whether the voltage between pin and pin 4 is within the range of normal working voltage 9-16 V; if there is no voltage value, check whether pin 2 of harness is connected with ignition power supply; If there is normal voltage, replace the instrument and perform test; 2. After replacing the instrument, the ignition signal is still abnormal, so it is necessary to check whether the ignition CAN signal is normal.
B1110	Steering wheel button stuck	1. Working voltage 9-16 V; 2.After power supply status is IGN ON 3s3.If the GW_MFS_Left_switch or GW_MFS_Right_switch or GW_MFS_UP_switch or GW_MFS_Down_switch or GW_MFS_OK_switch of the instrument in CAN 0x38A is 0x1 for more than 90 s, the DTC is triggered.	Check steering wheel key	1. Measure the resistance between pin 26 and pin 30 of the harness to see which key is pressed to judge which key is stuck. 2. Measure the resistance between pin 30 and pin 30 of harness to see which key is pressed to judge which key is stuck.
U1080	BCM_ 288 node missing	1. working voltage 6.5 V-18 V; 2. Bus not closed and 1s after IGN ON; 3. BCM_28B message reception timeout, time 1s; 4. The DTC is triggered if the condition is met more than 1s after IGN ON.	Receiving timeout	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. . Check whether the terminal resistance is 60 ohms Left and right, if obvious deviation is 40 Below or above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.

U1083	AC node lost	1. working voltage 6.5 V-18 V; 2. After the bus is not closed and the bus is restored for 1s, the AC_ 366 message reception times out; Time 1s; 3. The DTCs are triggered if the conditions are met more than 3s after the power supply status is IGN ON.	Receiving timeout	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. . Check whether the terminal resistance is 60 ohms Left and right, if obvious deviation is 40 Below or above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U108A	RRS node missing	1. working voltage 6.5 V-18 V;	Receiving timeout	1..Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is 60 ohms. Left and right, if obvious deviation is 40

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
		2. After the bus is not closed and the bus is restored for 1s, RRS_2E0 message reception times out; Time 1s; 3. The function is configured with RRS function; 4. The DTCs are triggered if the conditions are met more than 3s after the power supply status is IGN ON.		Below or above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U1082	Hu node lost	1. working voltage 6.5 V-18 V; 2. After the bus is not closed and the bus is restored for 1s, the HU_51A message reception times out; Time 1s; 3. The function is configured with HU function; 4. The DTC is triggered if the condition is met more than 1s after IGN ON.	Receiving timeout	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. . Check whether the terminal resistance is 60 ohms Left and right, if obvious deviation is 40 Below or above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U1090	EMS node missing	1. working voltage 6.5 V-18 V; 2. Bus not closed and bus restored 1S After, EMS_ 355 message reception timeout; Time 1s; 3. The DTCs are triggered if the conditions are met more than 3s after the power supply status is IGN ON.	Receiving timeout	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. . Check whether the terminal resistance is 60 ohms Left and right, if obvious deviation is 40 Below or above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U1091	EPBi/ESP/ABS node missing	1. working voltage 6.5 V-18 V; 2. The EPBi_ 187 message reception times out after the bus is not closed and the bus is restored for 1s; Time 1s; 3. The DTCs are triggered if the conditions are met more than 3s after the power supply status is IGN ON.	Receiving timeout	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. . Check whether the terminal resistance is 60 ohms Left and right, if obvious deviation is 40 Below or above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U1092	EPS node lost	1. working voltage 6.5 V-18 V; 2. After the bus is not closed and the bus is restored for 1s, EPS_24F message receiving times out; Time 1s; 3. The DTCs are triggered if the conditions are met more than 3s after the power supply status is IGN ON.	Receiving timeout	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. . Check whether the terminal resistance is 60 ohms Left and right, if obvious deviation is 40 Below or above 80, check whether the terminal resistance controller is

				damaged, and observe whether the fault is eliminated after replacing the controller.
U1093	SRS node missing	1. working voltage 6.5 V-18 V; 2.After the bus is not closed and the bus resumes for 1s, SRS_50 message receiving times out; Time 2.5 seconds; 4.If the condition is satisfied more than 3s after the power supply status is IGN ON, the DTC will be triggered.	Receiving timeout	1.Check whether all controller connectors are in good contact and whether the terminals are pin-out. .Check whether the terminal resistance is 60 ohms Left and right, if obvious deviation is 40 Below or above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U1094	TCU node lost	1. working voltage 6.5 V-18 V; 2.After the bus is not closed and the bus is restored for 1s, TCU_ 338 message reception times out; Time 1s 3.The function is configured with TCU function;	Receiving timeout	1..Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is 60 ohms. Left and right, if obvious deviation is 40 If it is below or above 80, check whether the terminal resistance controller is damaged.

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
		4.If the condition is satisfied more than 3s after the power supply status is IGN ON, the DTC will be triggered.		Observe whether the fault is eliminated after replacing the controller.
U1096	ACC_35E node missing	1. working voltage 6.5 V-18 V; 2. After the bus is not closed and the bus is restored for 1s, ACC_35E message reception times out; Time 1s 3. The function is configured with ACC function; 4. The DTCs are triggered if the conditions are met more than 3s after the power supply status is IGN ON.	Receiving timeout	1..Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is 60 ohm left Right, if the apparent deviation is 40 to If it is lower or higher than 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U1097	LAS_ 332 node missing	1. working voltage 6.5-18 V; 2. After the bus is not closed and the bus is restored for 1s, LAS_ 332 message reception times out; Time 1s 3. Function is configured with LAS function 4. The DTCs are triggered if the conditions are met more than 3s after the power supply status is IGN ON.	Receiving timeout	1..Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is 60 ohms. Left and right, if obvious deviation is 40 Below or above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U1098	LCDAL_ 2AE node missing	1. working voltage 6.5 V-18 V; 2. The LCDAR_2AF message reception times out after the bus is not closed and the bus is restored for 1s; Time 1s 3. The function is configured with LCDAR function; 4. The DTCs are triggered if the conditions are met more than 3s after the power supply status is IGN ON.	Receiving timeout	1..Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is 60 ohms. Left and right, if obvious deviation is 40 Below or above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U1099	LCDAR_ 2 AF node missing	1. working voltage 6.5 V-18 V; 2. The LCDAR_2AF message reception times out after the bus is not closed and the bus is restored for 1s; Time 1s 3. The function is configured with LCDAR function4.The DTCs are triggered if the conditions are met more than 3s after the power supply status is IGN ON.	Receiving timeout	1..Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is 60 ohms. Left and right, if obvious deviation is 40 Below or above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing

				the controller.
U1081	Lost communication with GW	1. After Bus off fault code does not exist and Bus off resumes normal communication 1s; 2. IGN ON rear 1s; 3.6. 5v< complete vehicle system voltage <18v; 4. CAN 0x38A loss greater than 1s	Receiving timeout	1..Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is 60 ohms. Left and right, if obvious deviation is 40 Below or above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U1097	SAS node missing	1. working voltage 6.5-18 V; 2. The SAS_ 180 message reception times out after the bus is not closed and the bus is restored for 1s; Time 1s 3. Function is configured with SAS_ 180 function 4. The DTCs are triggered if the conditions are met more than 3s after the power supply status is IGN ON.	Receiving timeout	1..Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is 60 ohms. Left and right, if obvious deviation is 40 Below or above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
B1108	Display screen fault	1. Working voltage 9-16 V; 2.Power supply status is IGN ON back3.Display screen cannot display normally	Display screen fault	1.Check whether the voltage of pin 1 and pin 4 of harness is under normal working voltage 9-16 V;

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
				2. Whether the voltage of pin 12 and pin 4 of harness is normal working voltage 9-16 V; 3. After the above two points are in normal state, replace the combination instrument.

Fault symptom diagnosis

Inspection and confirmation General inspection

1 Check whether the combination instrument part number, software and hardware version match the vehicle model configuration, and read relevant information of parts through diagnosis.

2 Use diagnostic scanner to confirm whether there is current fault or history fault code in combination instrument. If

yes, check the fault information according to DTC fault code table. Appearance check list

Inspection items	Evaluation criteria
Housing	There is no obvious shrinkage mark, no burr, no crack, and the surface shall be extinguished without dazzling luster.
Visible surface	There shall be no obvious bubbles, inclusions, ripples, spots, scratches and cracks, and the numbers, characters and symbols shall be clear and complete. There shall be no refraction and reading distortion. The exposed part shall be free of dazzling luster and defects affecting appearance.
Indicator light	When the signal indicator is on, various indication signals, symbols, patterns and colors on the combination instrument shall be clear and complete without light channeling. When the signal indicator is off, the signal status shall be significantly different from that when it is on, that is, there is good contrast.
Lighting effect	The numbers and text symbols of various instruments can be seen clearly, but there shall be no bright and dazzling phenomenon.

Fault symptom table display type fault

Symptoms	Possible causes	Maintenance method
Instrument not powered on, black screen	Battery voltage is lower than 8V or higher than 16 V	Use a multimeter to check whether the battery voltage is lower than 8V or higher than 16 V. If yes, repair the battery.(The instrument will enter the self-protection state and stop working when it exceeds this voltage range.)
	Poor contact of harness connector	Replace the corresponding connector or harness.
	Fuse damage	Replace the corresponding fuse.
	Instrument unit fault	Exchange the test instrument cluster and test whether the fault performance follows the instrument. If yes, replace the instrument.
Instrument flower screen, grey screen, white screen	Instrument fault	Replace instrument
Instrument splash screen	Instrument fault	Replace the test instrument. If the fault follows the instrument, replace the instrument.
	Dimmer fault	Switch the test dimmer. If the fault follows the dimmer, replace the dimmer.

Indicator lamp type fault

Symptoms	Possible causes	Measures
Multiple fault lamps are on abnormally.	Fault indication part really has fault	Inspect the faulty parts of the maintenance prompt, and do not handle the instrument.
	Instrument fault	Replace the test instrument. If the fault follows the instrument, replace the instrument.

Instrument black screen

1 Confirm whether the harness has poor contact caused by looseness, remove the instrument cover and instrument screws, and confirm whether the connector is in place.
2 Confirm whether the instrument fuse is burnt, and check whether there is charring mark on the surface.
3 If the harness and fuse are normal, measure the battery voltage with a multimeter. If less than 8.5 V enters undervoltage protection or greater than 17 V enters overvoltage protection, the instrument will not start, as shown in black screen.
4 If there is no problem above, it can be basically confirmed that there is a problem in the instrument monomer. It is recommended to record the fault conditions and phenomena before feedback.

Instrument panel

1. Observe whether the instrument panel is the whole panel or the local panel.

2. If the instrument is a full-scale display, the approximate rate is LCD screen fault, it is recommended to replace the instrument and send it back to the supplier for analysis.

3. If the instrument is a local splash screen, switch the instrument display interface, observe whether the splash screen is fixed on all interfaces or single interface splash screen, and send the collected information and faulty instrument to the supplier for analysis.

All indicators on instrument flash

1 Observe whether the instrument indicator flashes as a single indicator or multiple indicators flashing at the same time.
2 If multiple indicator lamps flicker at the same time, read the instrument fault code through the diagnostic scanner to see whether there is CAN BUSOFF related fault code or other node timeout fault code, and judge whether it is caused by CAN signal node loss or CAN network instability.
3 In case of single indicator lamp flashing, it is also necessary to read whether there is fault code of individual node timeout with diagnostic scanner.
4 If there is no fault code, replace the instrument and observe whether the fault is maintained. If the fault is maintained, it is recommended to check whether the relevant controller corresponding to the indicator lamp is faulty; If the fault phenomenon disappears, feed back the information collected on site to the supplier, and send the fault table back to the supplier for analysis.

Three-finger flying screen instrument display is abnormal

1 Contact Chang'an technical personnel for troubleshooting, pour out log log under the guidance of engineers, and feed back to technical personnel for auxiliary troubleshooting.
2 Press and hold the "Volume -" button to restart the host or disconnect the vehicle battery to observe whether the fault persists. If the fault disappears, observe continuously.
3 If the fault still remains after restart or power-off, check whether the USB cable between the instrument and the host is stable. If the harness is stable, it is recommended to replace the USB cable, power on the vehicle after power-off, and observe whether the fault disappears.

Removal and installation

Combination instrument assembly

1. Removal

1 Disconnect the negative battery harness. Reference battery assembly

2 Remove instrument cluster cover (1). Refer to Instrument Panel Removal and Installation

3 Remove the four screws (3) fixing the instrument cluster with hexagon socket torque wrench, and the torque is 3±0.5. Remove instrument cluster (2) rear connector harness

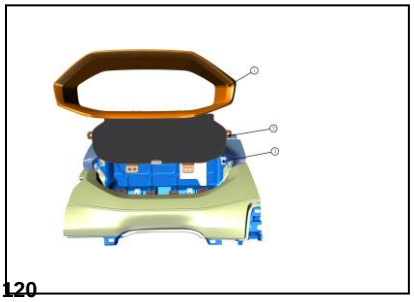


Figure 120

2. Installation

1 Assemble instrument cluster (2) and butt wiring harness

2 Place the instrument cluster according to the positioning pillar and screw hole of instrument panel frame.

3 Fix the four screws (3) of instrument cluster with hexagon socket torque wrench and torque 3±0.5. If there is protective film, tear it off.

4 Install the instrument cluster cover in place,

refer to Removing and installing steering wheel key.

3402100-MK03-AW21/AW22/AW23/AW24/AW25/AW26 **Spare parts atlas** **F280201**	

Charging interface specification

Name	Project	Parameters
Power socket	Rated voltage	12 V(DC)
	Maximum current	10A
	Durability	10,000 times
USB interface	Rated voltage	12 V(DC)
	Maximum current	2.1A
	Durability	5,000 times
Wireless charging	Rated voltage	12 V(DC)
	Working current	≤3A@12V
	Standby current	≤100mA
	Quiescent current	≤ 100 μA(Battery constant power supply)
	Maximum transmit power	≤30W
	Supported receiver power	15W
	Working frequency	120±10kHz
	Charging conversion efficiency	≥70%

Component position diagram

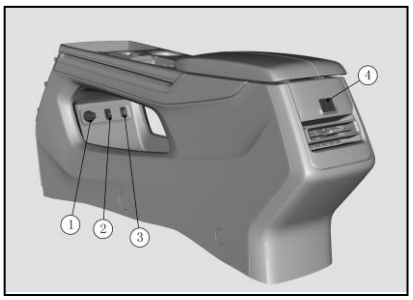
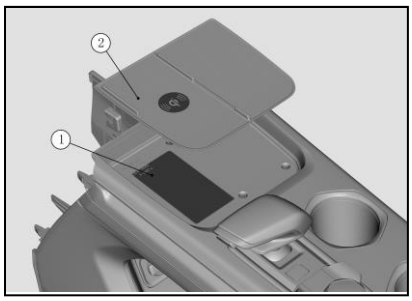


Figure 121: USB And Power Outlet

Power socket, TF slot and front row USB interface are arranged on the front panel of central control box. Rear charging USB is arranged on the rear panel of auxiliary instrument panel.

Project	Description
1	Power socket
2	TF card slot
3	Front USB
4	Rear charging USB

Figure 122: Wireless Charging



Wireless charging is arranged under the non-slip mat of the auxiliary instrument panel storage box, close to the bottom of the storage box.

Project	Description
1	Wireless charging assembly
2	Auxiliary instrument panel storage box pad

System overview

The power socket is installed under the instrument panel central control panel. Through this socket, 12 V DC power output can be obtained. TF slot is next to the power socket. TF slot is connected to the vehicle machine system for reading panoramic controller data.

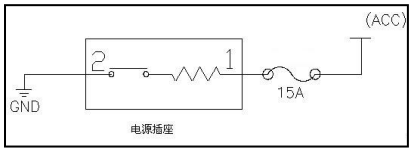
Next to the TF card slot is the front row USB interface, which can be used for data transmission with the external device or for charging the mobile device. The rear charge USB is mounted on the rear panel of the auxiliary instrument panel and can only charge the mobile device.

Wireless charging is installed under the anti-slip mat of the front storage box, close to the left bottom of the storage box, so that the phone can be wirelessly charged.

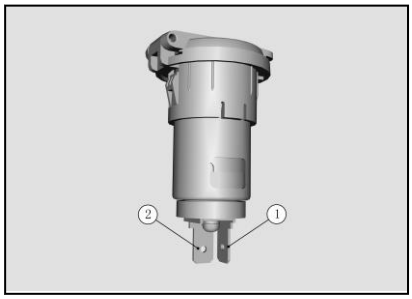
Inspection of part structure principle

12 V power socket

The power socket is installed on the panel under the instrument panel central control panel.
Through this socket, 12 V DC power output can be obtained. System circuit diagram



Pin definition

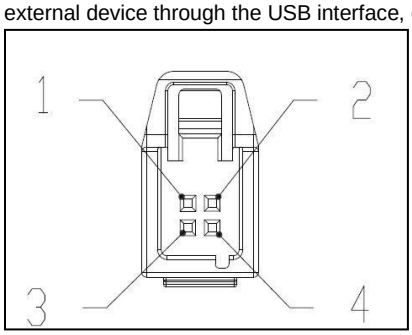


Pin	Function
1	Power supply
2	Ground

USB interface

Figure 123 Front USB Interface

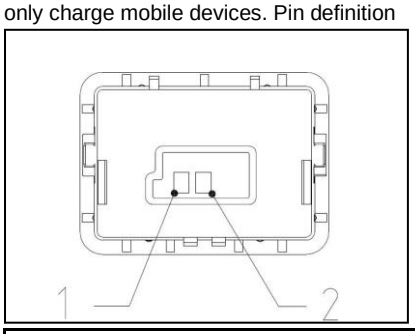
The front USB interface is connected to the vehicle machine system, and it can transmit data to the external device through the USB interface, or charge the mobile device. Pin definition



Pin	Function
1	Power supply +
2	Signal -
3	Signal +
4	Power supply -

Figure 124 Rear Row USB Interface

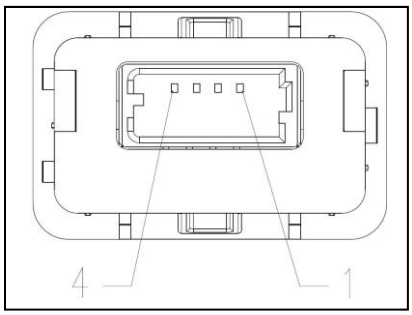
The rear dual port USB connector can only charge mobile devices. Pin definition



Pin	Function
1	Power supply +
2	Power supply -

Figure 125 TF Slot

TF card slot is connected to vehicle machine system for panoramic controller to read data. Pin definition

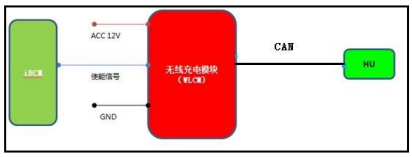


Pin	Function
1	Power supply +
2	Power supply -
3	Signal +
4	Signal -

Wireless charging module

Figure 126 Description And Operation

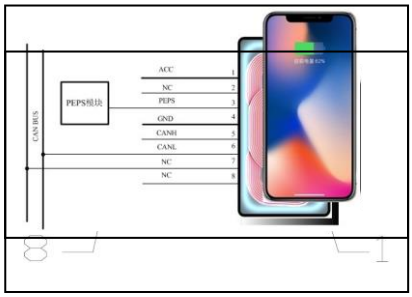
System introduction



Function description

When the vehicle power supply gear is ACC or ON, the wireless charger can charge the mobile phone with Qi-compliant receiver. Switch the wireless charging function through the drop-down menu of HU; And HU can prompt the working state of wireless charging; When the iBCM sends the enable signal low, the wireless charger stops charging.

System circuit diagram



Pin definition

Pin	Pin definition
1	ACC

2	/
3	PEPS
4	GND
5	CAN-H
6	CAN-L
7	/
8	/

DTC
Diagnostics
Symptoms
Diagnosis

Inspection and confirmation

1. Confirm the customer's problem.
2. Visually inspect for visible signs of mechanical or electrical damage and signs of impact deformation. Wireless charging needs to confirm whether the mobile phone has wireless charging function.

3. Check system lines that are easy to see or can be seen.
4. If the observed or raised problem is obvious and the cause has been found, the cause must be corrected before proceeding to the next step.
5. If the visual inspection is passed, confirm the fault

and refer to the fault symptom table. Appearance

check list

Mechanical part	Electrical part
● Power socket ● USB interface ● Wireless charging assembly	● Fuse ● Circuit ● Power socket ● USB interface ● Wireless charging assembly

Fault symptom table

If the fault occurs but no DTCs are stored in the control module and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Power outlet does not work	Fuse and circuit	See power outlet inoperation section
	Power socket	

Power outlet does not work

Test conditions	Details/Results/Measures
1. Check battery voltage	
	A. Check whether the battery voltage is normal. ? Yes Go to step 2. ? No

	Check the battery.
2. Check power supply gear	
	A. Confirm the ignition switch is turned to ACC or ON position. ? Yes Go to Step 3. ? No Turn the ignition switch to gear ACC/ON and check the working status of the power socket again.
3. Check fuse	
	A. Inspect whether fuse DF31 (15 A) in fuse box of instrument panel is broken. ? Yes Replace the fuse. ? No Go to Step 4.
4. Check power socket circuit	
	A. In the state of gear ACCor ON, check the power terminal and grounding terminal of the instrument panel harness connected to the power socket. The power supply terminal shall have at least 9v voltage output, and the grounding terminal shall be well grounded. ? Yes Replace the power outlet. ? No Check the connection circuit between the power supply terminal and the battery and the connection circuit from the grounding terminal to the ground.

Removal and installation

Front power socket removal

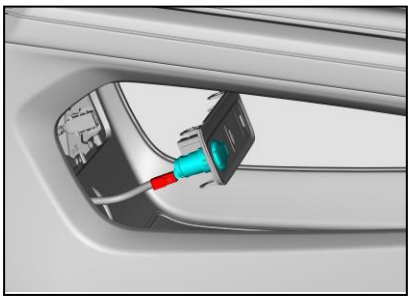
1 Disconnect the negative battery harness.

Refer to Battery Assembly chapter.

2 Use the inner trim panel to remove the cigarette lighter panel.

Refer to Section 11, Removing and installing centre compartment.

3 Remove the harness connector and take out the power socket.



Installation

The installation sequence is the reverse of the removal sequence.

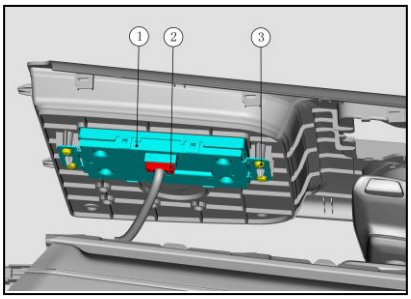
Wireless charging module removal

1 Disconnect the negative battery harness.

Refer to Battery Assembly Chapter

2 Remove the central control trim panel, see Article 4: Removing and installing central control box: Electronic gear shift configuration - Removing central control trim panel.

3 Disconnect the harness connector (2), remove the four retaining screws (3) of the wireless charging assembly, and take out the wireless charging assembly (1).



Installation

The installation sequence

is the reverse of the

removal sequence. Front

USB interface

Removal

1 Disconnect the negative

battery harness.Refer to

Battery Assembly

chapter.

2 Use the inner trim panel to remove the cigarette lighter panel.

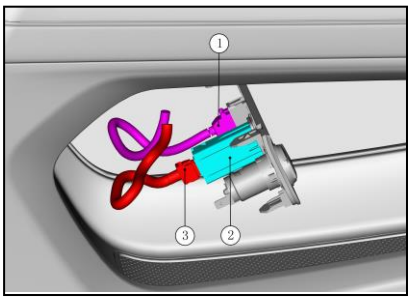
Refer to Section 11, Removing and installing centre compartment.

3 After removing the adapter assembly, take

out the front USB interface. Remove

harness connector (3) and take out TF slot

(2).



Installation

The installation sequence

is the reverse of the

removal sequence. Rear

USB charging interface

Removal

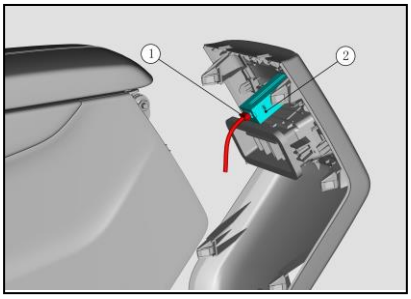
1 Disconnect the negative battery harness.

Refer to Battery Assembly chapter.

2 Remove rear centre control panel.

See Removing and installing centre compartment chapter, paragraph 10: Removing rear panel for centre control.

3 Remove the harness connector (1) and take out the rear charging USB interface (2).



Installation

The installation sequence is the reverse of the removal sequence.

Spare parts atlas

Horn specification

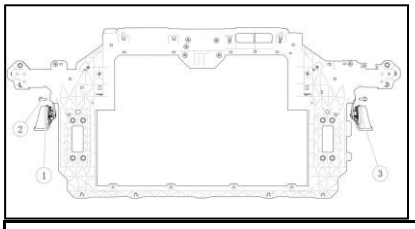
Torque specification

Name	N. M	lb-ft	lb-in
Horn retaining bolt	23	17	-

Component specification

Name	Specifications
Horn type	Spiral
Horn structure	Mechanical
Horn model	DL138
Horn sound pressure level	105 dB (A) ~118db (A)

Composition and position distribution



Project	Description
1	Tweeter horn assembly
2	Hexagon flange bolt
3	Bass electric horn assembly

System functional principle introduction

Warning

The vehicle is equipped with airbag system, and failure to follow the correct operation procedure will result in the following conditions: A.The airbag system turns on unexpectedly.b.Airbag system does not work when required
For.

Warning

The following guidelines must be strictly observed to avoid the above conditions: A.Before working, determine if you are performing a service operation around the inflatable restraint system components or on their wiring.b.E.g.
If you are performing maintenance operations on airbag system components, surroundings or their circuits, you should release the airbag system.

The horn is arranged on both sides of the front frame. The horn is connected to the horn circuit through the horn relay contact by the power supply, and energizes the coil through the contact to generate a magnetic field. Under the electromagnetic force generated by the magnetic field, the armature is attracted, and the armature drives the diaphragm and resonance plate to move downward. At the same time, the armature also pulls down the lower contact arm to open the upper and lower contacts and cut off the circuit. Coil power off
After that, the electromagnetic force disappears, the armature is released, and the diaphragm and lower contact arm are reset. At this time, the upper and lower contacts are closed, and the power supply energizes the coil through the contacts to generate a magnetic field. Repeat the above process. The vibration system vibrates the air to generate sound.

Inspection of part structure principle

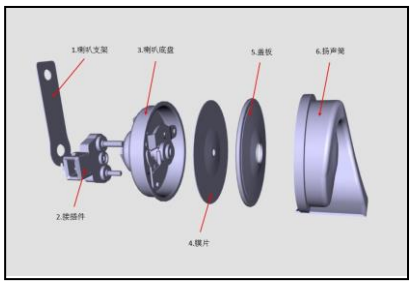
Horn function

Horn: Generally installed on the front upper member or front end module to warn pedestrians and
other vehicles to draw attention and ensure driving safety. Working principle
The horn uses its own mechanical structure (upper and lower contact arm structure) to convert DC power into pulse power, then drives the internal diaphragm to generate sound by reciprocating vibration through electromagnet, and expands along a certain rule in the

spiral loudspeaker channel to radiate sound at the horn mouth.

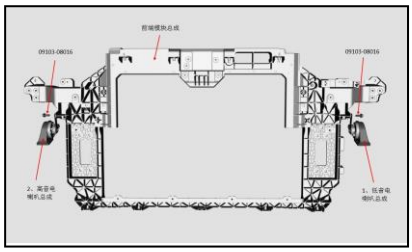
Product structure

1. Monomer and structure

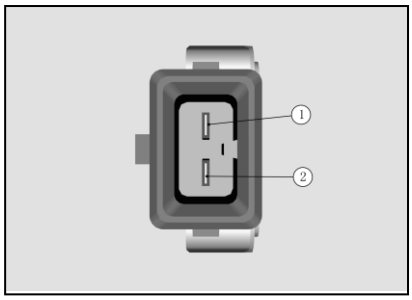


2. Layout structure

The horn is arranged on both sides of the front end module.



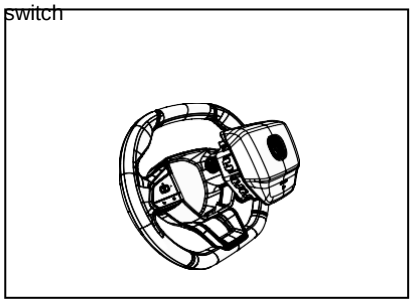
3. Interface definition



Remarks: 1- positive terminal,

2- negative terminal horn

switch



The horn switch is composed of steering wheel and airbag module: The steering wheel is located between the cab seat and the instrument panel and installed on the steering column assembly. The steering wheel has 3 contacts connected to the body grounding point. The airbag module is mounted on the steering wheel, and there are 3 contacts on the 3 supports, corresponding to the contacts on the steering wheel. When the airbag module is pressed, the contact point on the airbag contacts the contact point on the steering wheel, the horn circuit is on, and the horn works.

Common methods

Fault symptom diagnosis

Inspection and confirmation

1. Confirm the customer's problem.

2. Visually inspect for visible signs of mechanical or electrical damage and visible signs of impact.

Visual Check List

Mechanical part	Electrical part
• Steering wheel • Horn	• Circuit • Clock spring • Steering wheel horn switch • Body control module

3. Check system lines that are easy to see or can be seen.
4. If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step.
5. If the visual inspection is passed, confirm the fault

and refer to the fault symptom table. Appearance

check list

Mechanical part	Electrical part
• Steering wheel • Horn	• Circuit • Clock spring • Steering wheel horn switch • Body control module

Fault symptom table

If the fault occurs but no DTCs are stored in the control module and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Horn normally sounds	• Circuit • Clock spring • Horn • Horn switch • Body control module	Refer to horn normal sound section
Horn does not sound	• Circuit • Clock spring • Horn • Horn switch • Body control module	Refer to section No Horn
Abnormal horn sound	• Horn	See horn sound abnormality section

Horn does not sound

Test conditions	Details/Results/Measures
1. General inspection	
	A. Inspect the clock spring and horn harness plug for signs of damage, poor contact, aging and loosening. Is it normal? ? Yes Go to step 2.

	? No Repair the fault point.
2. Check fuse	
	A. Inspect the horn fuse. Rated capacity of insurance: Is 15 A normal? ? Yes Go to Step 3. ? No Overhaul the fuse circuit and replace the fuse of rated capacity.
3. Check horn switch	
	A. Disconnect harness plug of horn switch, and use harness service tool to ground horn terminal of harness plug. Does the horn sound? ? Yes Overhaul the horn switch, and replace the horn switch if necessary. Reference: 5.4.1 Safety Restraint System ? No Go to Step 4.
4. Check horn relay	
	A. Replace with a new horn relay. B. Horn relay. Is the horn normal? ? Yes Confirm the system is normal. ? No Step 5.
5. Check horn switch control circuit	
	A. Disconnect the horn switch harness plug. B. Measure the voltage at the horn terminal of the horn switch harness plug. Standard voltage: Is 11 ~ 14 V resistance normal? ? Yes Go to Step 6. ? No Overhaul open circuit fault between horn terminal of horn harness plug and horn terminal of horn relay on engine compartment electrical center.
Test conditions	Details/Results/Measures
6. Check horn power circuit	
	A. Press the horn switch and use a multimeter to measure the horn terminal voltage of the horn harness plug. Standard voltage: 11 ~ 14 V Is the voltage normal?

	? Yes Go to Step 7. ? No Overhaul open circuit fault between horn terminal of horn harness plug and horn terminal of horn relay on engine compartment electrical center.
7. Inspect the horn grounding circuit.	
	A. Disconnect wire harness plug connection for horn. B. Measure the resistance between horn terminal of horn harness plug and reliable grounding. Standard resistance: Less than 5 Ω Is the resistance normal? ? Yes Go to Step 8. ? No Overhaul open circuit fault between horn terminal of horn harness plug and grounding point.
8. Replace horn	
	A. Replace horn. Confirm whether the system is normal?

Horn normally sounds

Test conditions	Details/Results/Measures
1. General inspection	
	A. Inspect the clock spring and horn harness plug for signs of damage, poor contact, aging and loosening. Is it normal? ? Yes Go to step 2. ? No Repair the fault point.
2. Check horn switch	
	A. Disconnect harness plug P09 of horn switch. Does the horn still ring frequently? ? Yes Go to Step 3. ? No Overhaul the horn switch, and replace the horn switch if necessary. Reference: 5.4.1 Safety Restraint System
3. Check horn switch control circuit	
	A. Disconnect the horn switch harness plug. B. Measure the resistance between horn terminal of horn switch harness plug and reliable grounding. Standard resistance: 10 MΩ or higher Is the resistance normal?

	? Yes Go to Step 4. ? No Overhaul the circuit between horn terminal of horn switch harness plug and horn terminal of horn relay on engine compartment electrical center or short circuit to ground to horn terminal of BCM harness plug.
4. Check horn relay	
	A. Replace with a new horn relay. B. Horn relay. Does the horn still ring? ? Yes Go to Step 5. ? No Confirm the system is normal.
5. Check horn power circuit	
	A. Disconnect terminal 1 of horn harness plug connector C11. B. Measure the voltage at terminal 1 of horn harness plug C11. Standard voltage: 0 V Is the voltage normal? ? Yes Go to Step 6. ? No Overhaul short circuit to power between horn harness plug C11 terminal 1 and horn terminal of horn relay.
6. Check power circuit of body control module	
	A. Turn the ignition switch to the "ON" position. B. Measure the voltage between the horn terminal of the BCM harness connector and a reliable ground. Standard voltage: 11 ~ 14 V Is the voltage normal? ? Yes Go to Step 7. ? No Repair the BCM power supply circuit.
7. Check grounding circuit of body control module	
	A. Turn the ignition switch to the "LOCK" position and measure the resistance between the horn terminal of the BCM harness connector and the ground harness. B. Turn the ignition switch to the "LOCK" position and measure the resistance between the horn terminal of the BCM harness connector and the ground harness. Standard resistance: Is the resistance less than 5 Ω normal? ? Yes Go to Step 8. ? No

	Repair the BCM ground circuit.
8. Check circuit between body control module and horn relay	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative harness. B. Disconnect the BCM harness plug connection. C. Connect negative battery harness, and measure the resistance between horn terminal of body control module harness plug and reliable grounding point. Standard resistance: Is the resistance 10 MΩ or higher normal? ? Yes Go to step 9. ? No Overhaul short circuit to ground between horn terminal of body control module harness plug and horn terminal of horn relay.
9. Replace body control module	
	A. Turn the ignition switch to "LOCK" position and disconnect the battery negative harness. B. Replace the body control module. Confirm repair is complete.

Abnormal horn sound

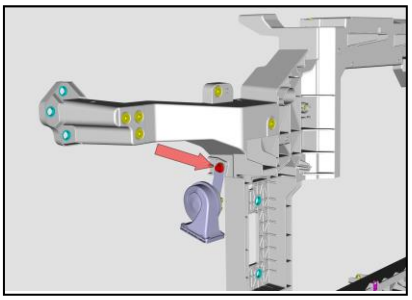
Test conditions	Details/Results/Measures
1. General inspection	
	A. Check whether the horn interferes with the harness and surrounding parts. Is it normal? ? Yes Go to step 2. ? No Repair the fault point.
2. Replace horn	
	A. Replace horn. Confirm whether the system is normal?

Removal and installation

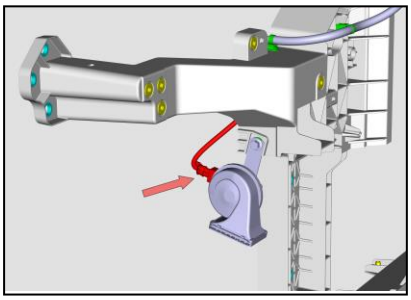
Horn removal

1. Disconnect the negative battery harness.
2. Remove horn.

   2. 1Remove the retaining bolts of horn. Tool: Sleeve (10 mm), torque: 22±2N.m.



2. 2 Remove the horn harness connector and take out the horn.



3. Installation

3. 1Installation sequence is reverse to removal sequence.

Spare parts atlas

F280207

Wiper and washer system specifications

Front wiper specification

Part name	Name	Parameters
Front wiper motor	Nominal voltage	12V
	Test voltage	13.5V
	Working voltage range	9V～16V
	Brake torque(Low speed)	≥34.5N.m
	No-load current	Low speed: ≤3A
	Brake current	≤30A
	Motor noise	≤46 dB at low speed, ≤52 dB at high speed
	Speed	Under normal load conditions (load of 1.9N.m), low speed 44±4/min, high speed 66±6r/min
Main wiper brush assembly	Wiper length	600mm
Auxiliary wiper brush assembly	Wiper length	425mm

Rear wiper specification

Part name	Name	Parameters
Rear wiper motor	Nominal voltage	12V
	Test voltage	13.5V
	Working voltage range	9V～16V
	Load	Load torque 0.6N.m, speed 35±5r/min
	No load	Current ≤2A, speed 38±5r/min
	Brake	Brake torque ≥7 N.m
	Motor noise	≤45 dB(A)
Rear wiper brush assembly	Wiper length	225mm

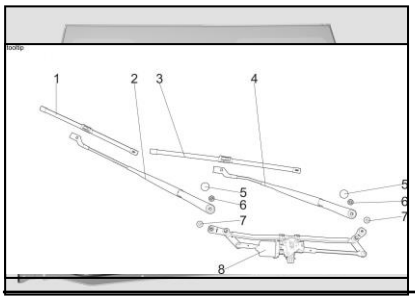
Torque specification

Name	**Nm**	**lb-ft**	**lb-in**
Front wiper arm retaining nut	20	15	-
Front wiper motor and drive arm assembly mounting bolts	11	8	-
Rear wiper arm retaining nut	11	8	-
Retaining bolt of rear window wiper motor assembly	8	6	-

Composition and position distribution

Figure 127 Front Wiper System Composition And Position Distribution

Front wiper system position diagram

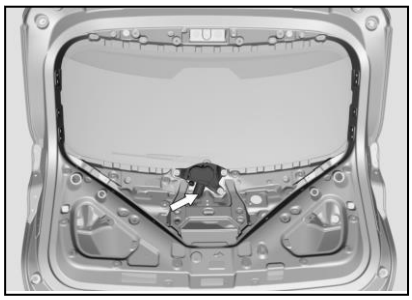


Front wiper system component

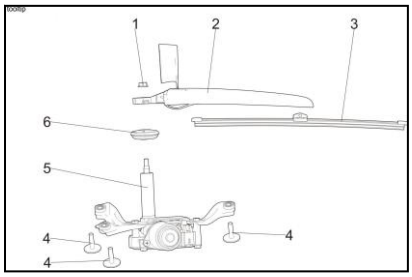
Project	Description	Project	Description
1	Auxiliary wiper brush assembly	5	Wiper arm hole cover
2	Auxiliary wiper arm assembly	6	Hexagon flange nut
3	Main wiper brush assembly	7	Hexagon bolt and plain washer assembly
4	Main wiper arm assembly	8	Wiper motor and drive arm assembly

Figure 128 Composition And Position Distribution Of Rear Wiper System

Rear Wiper System Location Diagram



Component composition of rear wiper system



Serial number	Component	Serial number	Component
1	Hexagon flange nut	4	Hexagon bolt and plain washer assembly
2	Rear wiper arm assembly	5	Rear window wiper motor assembly
3	Rear wiper brush assembly	6	Rear wiper waterproof sleeve

System functional principle introduction

Figure 129 Introduction Of System

Front wiper system

Front wiper system consists of wiper motor, drive arm, wiper arm and blade and wiper combination switch. The wiper circuit has an automatic stop. Wiper system is driven by permanent magnet motor. The wiper motor is installed on the heater pressure chamber plate assembly and directly connected to the wiper drive arm. All wiper functions must be in ON position in order to be valid.The judgment condition of the cycle described in the wiper washing function is that the return signal is from invalid to valid.

1 Front wiper high speed operation: If the front wiper switch is turned to high speed, the front wiper will run at high speed. If it is turned to OFF from high speed, the front wiper must return at low speed.
2 Front wiper low speed operation: If the front wiper switch is turned to low speed, the front wiper will operate at low speed.
3 Front wiper short-term operation: If the front wiper switch is turned to gear mist, the front wiper will operate at low speed for a period.

The current wiper is in intermittent movement state. If you turn the gear to the front wiper low gear or front

wiper high gear, the wiper shall switch to the corresponding movement state immediately. If the resistance of

the variable resistor is not adjusted, the wiper will operate at the last set valid time.

Automatic wiper

The vehicle power supply is in the ON position, the current wiper combination switch assembly is in the AUTO position, the wiper is in the return position, and the rainfall ambient light sensor has no fault: The rainfall ambient light sensor outputs the corresponding wiper brush request to BDC according to the change of external rainfall, so as to realize automatic wiper.

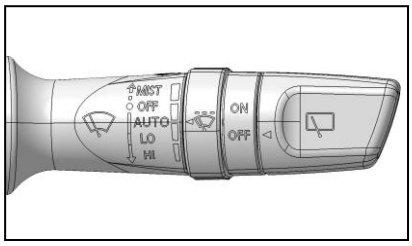
When BDC receives rain ambient light sensor fault or node is lost, in case of rain sensor fault at this time, BDC shall drive wiper to operate at low speed, and forward this signal to instrument, and give text prompt on instrument, body controller will record the fault information sent by rain ambient light sensor through LIN bus in the form of DTC.

Rear wiper clearance operation

If the rear wiper switch is turned to "ON" position, the rear wiper will run intermittently at low speed, once every six seconds.

Inspection of part structure principle

Combination switch wiper handle



The switch control lever is on the right side of the steering column. The control lever has five gears, one wiper automatic gear sensitivity adjustment knob switch and one rear wiper switch.

MIST: Wiper scraping once, this gear is

suitable for defogging. Off: Wiper stops

running.

AUTO: Wiper is in automatic gear.

LO: Wiper will operate at a stable low

speed. HIGH: Wiper will operate at a

stable high speed.

Sensitivity adjustment knob switch of wiper automatic gear: Adjust the sensitivity of wiper

automatic gear, and the trapezoidal width means that the sensitivity of wiper is higher. Glass

washer switch

Lift the switch control lever up slightly, spray the washer liquid to the front windshield, wipe it once, and reset it immediately after loosening; Press the switch control lever downwards to spray the washer fluid to the rear windshield, wipe it for three times, and reset it immediately after loosening.

On: The rear wiper is opened

and the clearance runs. Off:

Rear wiper function is off.

Automatic wiper function

The vehicle power supply is in ON position, the wiper handle is in AUTO position, and the automatic wiper function is activated. According to the amount of rainfall, the wiper shall act accordingly. The automatic wiper sensitivity can be adjusted by adjusting the "intermittent time adjusting ratchet." If the ratchet is rotated from narrow width to wide width, the automatic wiper sensitivity is increased by one level, which is more sensitive to rainfall, and the primary feedback sensitivity of wiper blade is increased.

Activate automatic wiper function

If the power gear is in the ON position, the wiper handle is turned to the AUTO position, and the wiper blade wipers once to remind the user that the automatic wiper function is activated.

Wiper motor

Wiper system consists of wiper motor, drive arm, wiper arm and wiper blade. The wiper circuit has an automatic stop. Wiper system is driven by permanent magnet motor. The wiper motor is installed on the heater pressure chamber plate assembly and directly connected to the wiper drive arm.

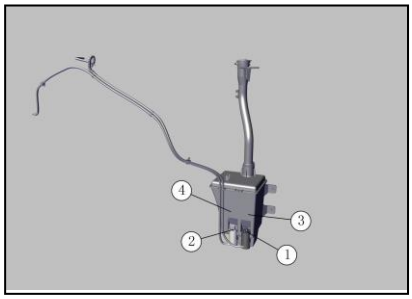
Wiper connecting rod

Wiper connecting rod connects wiper motor and output shaft, transfers torque output by wiper motor to output shaft, and drives wiper arm to move periodically.

Water jet motor

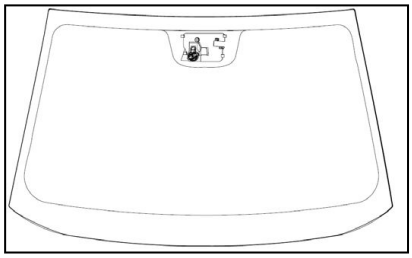
The appearance of the front water jet motor (1) is black and the appearance of the rear water jet motor (2) is white.

In position (3), the letter "F" indicates that the corresponding motor position should be equipped with front water spraying motor. The letter "R" in position (4) indicates that the corresponding motor position should be equipped with rear water jet motor.



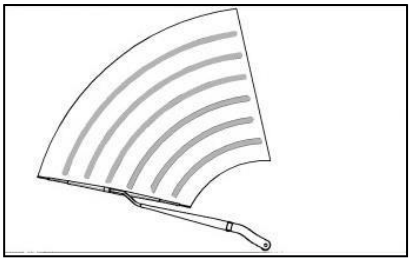
Rain sensor

The installation position of rain ambient light sensor is above the front windshield, close to the windshield.



Common methods

Determination method of wiper blade scratch

Common faults	Fault diagram	Possible causes
Slender curved stripes that affect the line of sight.		There is foreign matter on the wiper rubber strip, or the edge of the rubber strip is damaged.

The wiper blade sends out abnormal sound and shakes, and the rubber strip cannot reverse smoothly, and vertical stripes appear.		There is oil or wax on the glass, or the rubber strip is deformed or the wiper arm is unqualified.
After scraping, the scraper leaves spots of water.		The rubber strip is deformed or aged.
The glue strip is not attached to the glass surface and cannot be scraped evenly to form a sheet-like or strip-like area.		The rubber strip is deformed, or the scraper frame is deformed, resulting in insufficient pressure.

Wiper maintenance mode

When the vehicle power supply gear is ON, quickly operate the wiper switch from OFF→HIGH→OFF within 2s, and set it to the maintenance mode. After the wiper returns, it will automatically wiper 800 ms to the maintenance mode (this function is invalid when the vehicle speed is greater than 3 km/h, so as to prevent the user from operating incorrectly during driving).

a) During the execution of maintenance mode, wiper switch inputs any signal (short time, high speed, low speed, intermittent, front washing > 400 ms), and wiper shall be maintained in maintenance mode.

b) After the maintenance mode is executed, the wiper switch inputs any signal (short time, high speed, low speed, intermittent, front washing is greater than 400 ms), and the wiper exits the maintenance mode and works according to the input signal.

c) In maintenance mode, the wiper operates at low speed during operation.

Fault symptom diagnosis

Inspection and confirmation

1. Confirm the customer's problem.

2. Visually inspect for visible signs of mechanical or electrical damage and signs of impact deformation.

3. Check system lines that are easy to see or can be seen.

4. If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step.

5. If the visual inspection is passed, confirm the fault

and refer to the fault symptom table. Appearance

check list

Mechanical part	Electrical part
● Front windshield ● Rear windshield ● Nozzle	● Fuse ● Circuit ● Wiper combination switch ● Wiper motor ● Washer motor

● Washer fluid line ● Washer pot ● Wiper blade ● Wiper arm ● Wiper drive arm	● Body intelligent controller BDC

Fault symptom table

If the fault occurs but no DTCs are stored in the control module and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Wiper motor does not work(The motor has no low gear and high gear.)	1. Battery voltage too low 2. Front wiper motor fuse EF15 in engine compartment fuse box Broken 3. Engine compartment harness connecting wiper motor ground strap GD 303 poor grounding 4. Open circuit in engine compartment harness BCB17 or BCB06 connecting wiper motor and BDC 5. BDC or combination switch wiper handle fault 6. BDC port harness to combination switch is not connected. 7. Wiper motor fault	Refer to Wipe Wipe Wipe Wobble Abnormal Sound section
Wiper motor cannot reset	1. BCC20 voltage between BDC and engine compartment harness of wiper motor reset end is abnormal. 2. Harness connected to wiper motor terminal voltage is abnormal 3. Wiper motor harness port to BDC BCC20 port is not connected	
Wiper constant rotation(When the switch is in OFF position, the wiper still works.)	1. BDC or combination switch fault 2. The harness connecting BDC and combination switch is not connected.	
Occasionally the wiper turns	1. Wrong judgment by user: The combination switch is set to the clearance gear, and the wiper clearance gear time is set to the maximum. 2. Combination switch internal contact is poor, send error signal to BDC to make wiper work.	
Unclean wiper, shaking abnormal sound	1. The windshield or rubber strip is not clean and there are foreign matters. 2. Assembly problem: Insufficient torque of wiper arm mounting nut or insufficient torque of motor mounting bolt 3. The wiper blade is not qualified, and the edge of rubber strip is defective. 4. Unqualified wiper arm, deformed wiper arm, loose riveting, unqualified pressure	

Wiper combination switch inspection

Turn the ignition switch to ON position for the following check.

Phenomenon	Solution
Front wiper problem	
	A. Place the combination switch wiper switch in the following gears respectively, and check whether the corresponding pin is connected.

	Gear MIST: Whether combination switch pins 1 and 10 are connected Int gear (AUTO gear): Whether the combination switch pins 8 and 9 are connected, rotate the adjustment knob, and whether the resistance changes; Gear LOW: Whether combination switch pins 3 and 10 are connected Hi: Is pin 9 and pin 10 of combination switch connected Spray gear: Are pins 10 and 12, 6 and 12 of combination switch connected ? No Replace combination switch; ? Yes Please check the harness and wiper motor, water spray motor.

Diagnostic process of front wiper motor failure

Test conditions	**Details/Results/Measures**
Check battery voltage	
	A. Check whether the battery voltage is greater than 9V? ? Yes Perform step 2; ? No Please check the battery.
Check instrument fuse box wiper motor fuse	
	A. Check front wiper motor fuse of engine compartment fuse box EF15 (25a) Is it broken? ? Yes Replace fuse; ? No Step 3.
Inspect whether the engine compartment harness is connected to grounding of wiper motor end G 306.	
	A. Inspect whether the grounding of engine compartment harness to wiper motor end G 306 is in good condition. ? Yes Perform step 4; ? No Check wire harness.
Inspect whether the engine compartment harness is connected to wiper motor terminal BCC20B.	
	In A. ON position, check whether the engine compartment harness is connected to wiper motor terminal BCC20B is normal. ? Yes Next step; ? No Check wire harness.
5. Check whether wiper can work at high speed	
	A. In ON position, put the wiper control handle of combination switch in high speed (HI) position. Does the wiper work at high speed? Yes Step 6; ? No Perform step B; B. Check engine compartment harness end connecting wiper motor Is the BCB17B voltage normal? Yes Replace wiper motor; ? No Check whether this port harness is connected to the combination switch and whether the combination switch is connected to the fast gear.

6. Check whether the wiper can work at low speed.	
	A. In ON position, put the wiper control handle of combination switch in low speed (LOW) position. Does the wiper work at low speed? Yes Step 7; ? No Perform step B; B. Check engine compartment harness end connecting wiper motor Is the voltage of BCB06B terminal normal? Yes Replace wiper motor; ? No Check whether this port harness is connected to the combination switch and whether the combination switch is connected to the fast gear.
7. Check whether the wiper can work in clearance.	
	A. In ON position, put the wiper control handle of combination switch in INT position, and check whether the wiper is in INT position. Do? ? Yes Perform step 8; ? No Perform step B; B. Please check whether the clearance resistance of combination switch is within the fixed range. (Refer to clearance resistance range of combination switch for resistance value) Yes Please check the C8 port of BDC; ? No Replace combination switch.
8. Check whether wiper can achieve primary wiper	
	A. In ON position, put the wiper control handle of combination switch in primary wiper (MIST) position, and check whether the wiper can achieve primary wiper. The wiper motor can work normally; No Replace combination switch.

Front wiper motor cannot reset diagnostic process

Test conditions	**Details/Results/Measures**
1. Inspect whether the voltage is normal when the engine compartment harness is connected to the wiper motor BCB06B port.	
	Under A. ON state, measure whether the voltage of BCB06B port of engine compartment harness connecting wiper motor is normal? Yes Please perform step 2; No Please check the circuit.
2. Check the BCC20B port voltage between the harness and wiper motor.	
	In A. ON position, use a multimeter to measure the voltage of harness to wiper motor port BCC20B. First turn on the combination switch wiper gear, and then return. At this time, observe whether the voltage output of the multimeter is normal. Yes Please perform step 3; No Please replace wiper motor;
3. Check whether port BCC20B of wiper motor harness is connected to port C20 of BDC.	

	A. Check whether the BCC20 port of wiper motor harness is connected to the C20 port of BDC20. Is it conductive?

	Yes Check BDC; No Check the circuit.

Rear wiper does not work or does not return

Test conditions	Details/Results/Measures
1. Check battery voltage	
	A. Check whether the battery voltage is greater than 9V? ? Yes Perform step 2; ? No Please check the battery.
2. Inspect the instrument fuse box rear wiper motor fuse.	
	A. Inspect whether rear wiper motor fuse EF16 (20 A) of engine compartment fuse box is broken. ? Yes Replace fuse; ? No Step 3.
3. Inspect whether the rear wiper motor harness terminal connector is grounded.	
	A. Use a multimeter to check whether the rear wiper motor harness terminal connector is grounded properly. ? Yes Perform step 4; ? No Check wire harness.
Under 4. ON state, check whether the wiper can work.(Clearance work)	
	A. In ON position, check whether the voltage at harness end and hole 3 of rear wiper motor is greater than 9V? Yes Replace wiper motor; ? No Check according to step B; B. Check the port to rear wiper relay, rear wiper relay to BDC and BDC in sequence. Is the harness between the wiper handle of combination switch connected? ? Yes Check rear wiper relay, combination switch, BDC; ? No Check wire harness.
In 5. ON position, check whether the wiper can return.	
	A. In the ON position, put the wiper control handle of combination switch in the rear wiper working position, and check whether the wiper gap works. ? Yes Please check according to step B; ? No Please check according to step 4; B. Check whether the rear wiper motor harness end connector reset end is greater than 9V voltage and Jumping between two 0V voltages? ? Yes Replace BDC. ? No Replacing rear wiper motor

Wiper has no high gear

1. Check whether the harness is complete without obvious fracture;
2. Check whether the wiper switch contact is complete without obvious abnormality;
3. Check whether the appearance and connectors of BDC are in good condition without obvious abnormality;
4. Check whether the wiper motor functions normally and there is no obvious abnormality;
5. Read the complete vehicle fault code, and check whether there is wiper-related fault.

Wiper does not return

1. Check whether the harness is complete without obvious fracture;
2. Check whether the appearance and connector of BDC are in good condition without obvious abnormality;
3. Check whether wiper motor is in good condition and there is no obvious abnormality;
4. Read the complete vehicle fault code, and check whether there is wiper-related fault.

Occasionally the wiper turns

1. Check whether the harness is in good condition without obvious fracture;
2. Check whether the rain ambient light sensor is in good condition and there is no obvious abnormality;
3. Check whether wiper motor is in good condition and there is no obvious abnormality;
4. Check whether BDC is in good condition and there is no obvious abnormality;
5. Check whether the wiper switch is in good condition and there is no obvious abnormality;
6. Read the complete vehicle DTC, whether

there is wiper related DTC. Unclean shaking

abnormal sound of wiper

Test conditions	Details/Results/Measures
1. Inspect whether there is foreign matter on the windshield.	
	A. Check whether the vehicle windshield is clean and has foreign matter?Use cleaning agent to clean automobile windshield; No Please proceed to the next step.
2. Slide along the edge of rubber strip edge of wiper blade with finger tip, check its roughness, whether there are foreign matter and damage.	
	A. Check the adhesive strip for foreign matter?Clean rubber strips with cleaning agent; None Perform B; B. Is the edge of adhesive tape damaged or severely deformed?Please replace the rubber strip; None Please proceed to the next step
3. Install wiper brush on other vehicles and check whether the fault disappears.	
	Yes, the wiper blade is qualified, and perform step 4; No Replace wiper blade
4. Check whether there is abnormal sound when the rubber strip contacts the glass.	
	A. On the basis of passing the judgment in step 2, continuously scrape the wiper, and check whether there is "squeaking" and "gurgling" abnormal sound when the glue strip comes into contact with the glass with ears and ears. Yes B; No The wiper blade is qualified. B. Remove the wiper arm and reinstall it. The torque is required to be 18~22N·m. Check whether the abnormal sound and fault disappear. Yes, the fault has been solved No, replace wiper arm If there is abnormal sound, please confirm: (1) The glass is

	smooth without ripple; (2) The glass has been cleaned. If the above two points are confirmed to be correct, it is judged that the wiper blade is not qualified. Please replace the wiper blade.

Automatic wiper failure

1. Check whether the harness is in good condition without obvious fracture;
2. Check whether the rain ambient light sensor is in good condition and there is no obvious abnormality;
3. Check whether wiper motor is in good condition and there is no obvious abnormality;
4. Check whether BDC appearance and connector are in good condition, and no obvious abnormality;
5. Read the complete vehicle DTC, and check whether there is relevant DTC analysis.

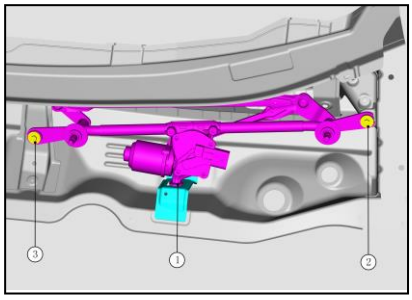
Removal and installation

Wiper switch

Refer to Combination Switch section

Front wiper installation

1. Wiper and drive arm assembly installation (in heater pressure chamber panel under front cover trim):



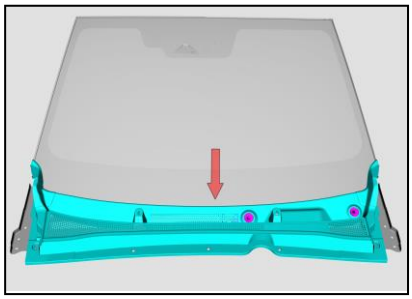
Serial number	Name
①	Mounting point of wiper motor and drive arm assembly
Ⓒ	Wiper round hole
③	Wiper strip hole

Mounting point of wiper motor and drive arm assembly is clamped in circular hole of heater pressure chamber plate. (It is designed as interference fit, and firmly clamped in place during installation.)

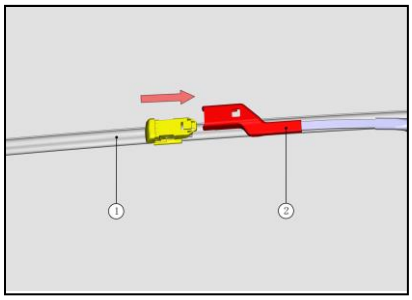
Round wiper hole Ⓒ Install M6 hexagon bolt and plain washer assembly with 10 mm sleeve, where the mounting point is main.

Install M6 hexagon bolt and plain washer assembly with 10 mm sleeve.

2.Install the front cover trim assembly, pay attention to the concentric opening of the front cover trim assembly and the output shaft of the wiper motor and drive arm assembly.

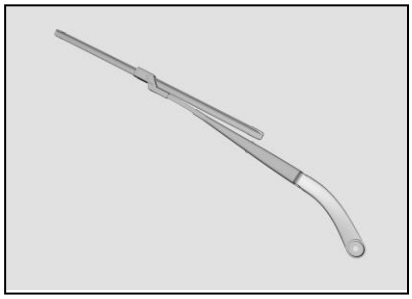


3.The main wiper arm and auxiliary wiper arm are separately assembled with the main wiper arm and auxiliary wiper brush.

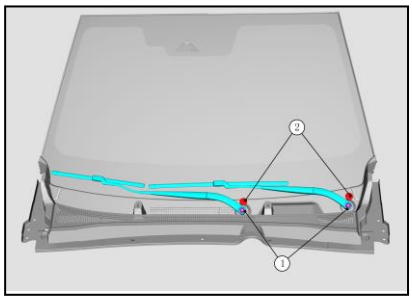


Assemble the connector of wiper brush (1) onto wiper arm (Ⓒ) in the direction of arrow shown in the figure.

Warning When the "click" sound appears at the connection between wiper arm and wiper brush, the assembly is in place.



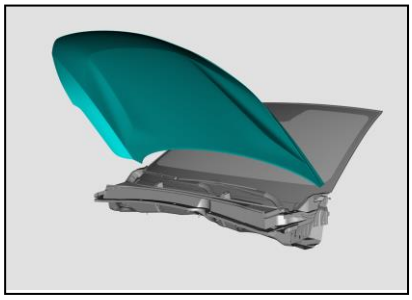
4. The sub-assembled wiper arm and wiper brush assembly are installed on the output shaft of the wiper motor and drive arm assembly. Use a 15 mm sleeve to tighten the two M10 nuts (1). Torque requirements
(20~24) N·m, and install two wiper arm hole covers Ⓒ.



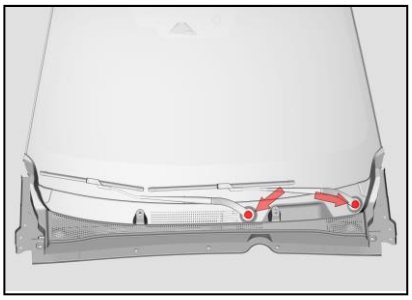
Warning During installation, it is necessary to ensure that the initial parking position of the main and auxiliary scraping brushes conform to the marking points on the front stop glass. Removal

Remove the front wiper system in the following order:

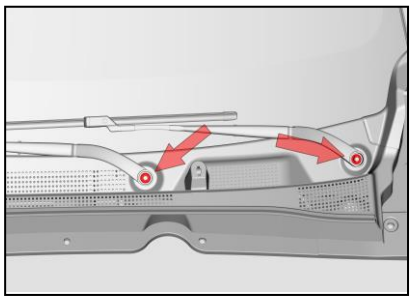
Lift and fix the engine hood;



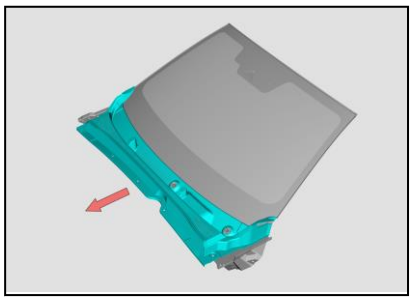
Start with a word and remove the wiper arm hole cover;



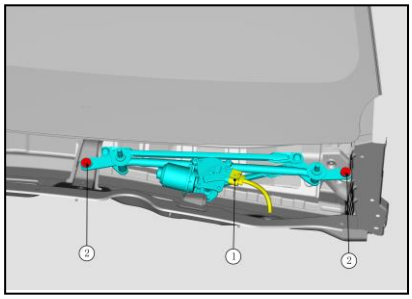
Loosen two mounting nuts of wiper arm with 15 mm sleeve, and remove wiper arm and wiper brush assembly;



Dismantle trim parts of front cover

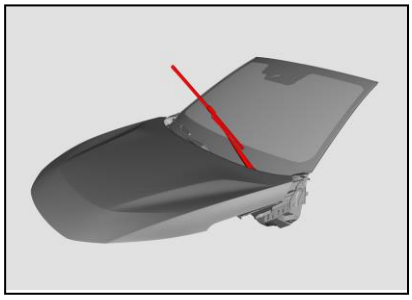


Dismantle wiper motor assembly: First remove wiper motor connector. Then loosen the two mounting bolts Ⓒ of the wiper motor with a 10 mm sleeve, and remove the wiper motor assembly.

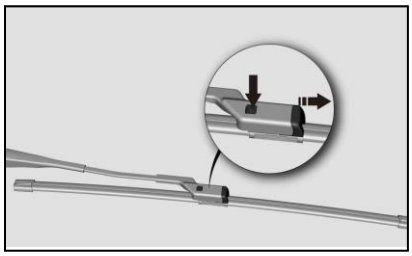


* Removal method of wiper brush:

1. First lift up the wiper arm;



2. At the connection between wiper arm and wiper brush, grip wiper arm rod, press wiper button firmly with finger (as shown in the figure), and keep it.

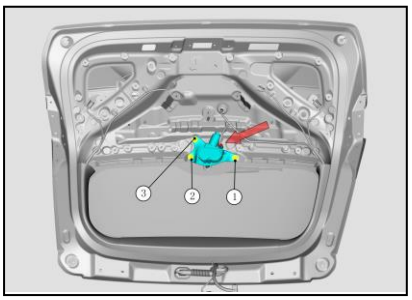


3. Pull out the wiper brush in the direction shown in the above figure to complete the removal of wiper brush. Rear wiper

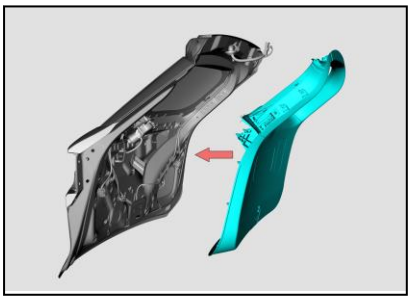
1. Installation

1 Pass the rear wiper motor output shaft through the tailgate glass hole, and install M6 hexagon-head bolt and plain washer assembly with 10 mm sleeve according to the order of mounting hole ①-②-③.

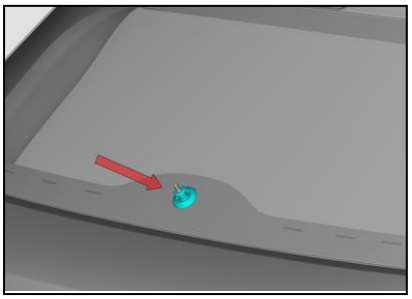
(See figure below), torque requirement (9~10) N·m. After the rear wiper motor assembly is installed, connect the harness connector.



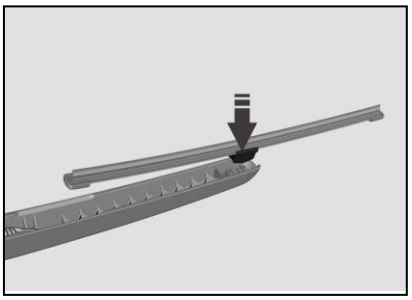
2 After the rear wiper motor is installed, install the tailgate interior trim panel to the body in the direction of arrow as shown in the figure.



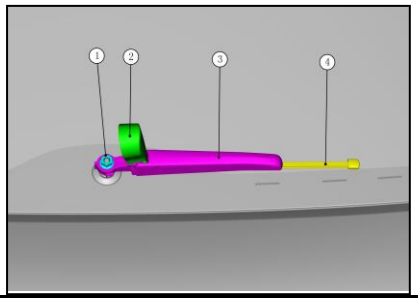
3 Fasten the waterproof sleeve with the tailgate glass along the motor output shaft direction, pay attention to the triangular mark point on the waterproof sleeve and point to the right above the glass.



4 Subassemble the rear wiper arm and wiper brush.

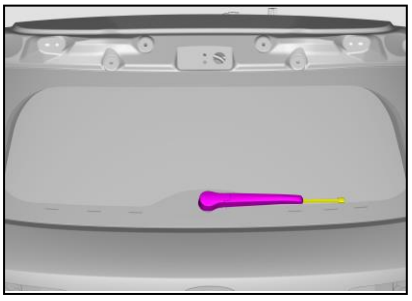


5 Rear window wiper arm and wiper brush assembly installation:



Serial number	Name
1	Hexagon flange nut
2	Wiper arm trim cover
3	Rear wiper arm assembly
4	Rear wiper brush assembly

Remove the wiper arm trim cover, install the rear wiper arm assembly on the wiper motor output shaft, and make the initial parking position of the rear wiper brush approximately flush with the lower edge of the glass black edge. Tighten hexagon flange nut with 10 mm sleeve, torque requirement (9~11) N·m.Install the wiper arm trim cover buckle back on the wiper arm. (It is required to fasten when installing back and hear "click"). The following figure shows the effect after the rear wiper is installed.



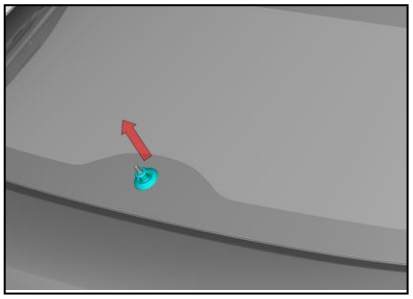
2. Removal

1 Rear window wiper arm and wiper brush assembly:

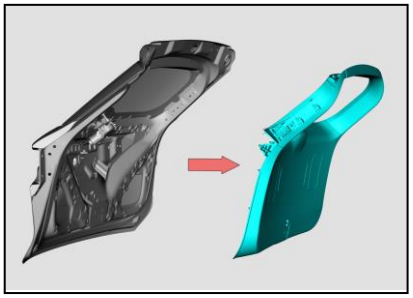
- The removal method is the reverse of the installation sequence.

2 Rear window wiper assembly

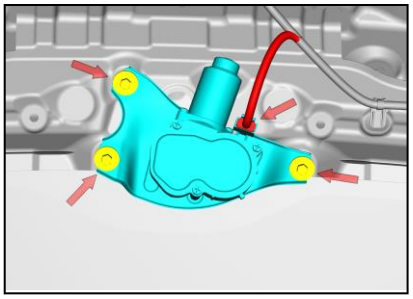
- Remove in the following order:
  - Remove the waterproof sleeve along the wiper motor output shaft direction.



  - Remove tailgate interior trim panel in the direction of arrow as shown in the figure;



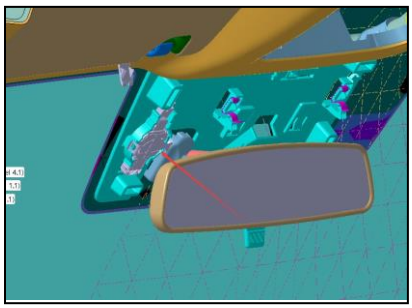
  - Remove connector of rear wiper motor, remove 3 hexagon flange bolts with 10 mm sleeve, and remove rear wiper motor assembly.



Rain Ambient Light Sensor

The installation position of rain ambient light sensor is above the front windshield, close to the windshield. (Preparation before removal:

Removing and installing trim cover for lane departure sensor) Installer: None



Installation:(Ensure that the silicone surface of glass and rain sensor is clean and smooth, and there is no foreign matter.)

（1） Buckle the spring arm of rainfall ambient light sensor to the bracket according to the position shown in the figure, and there is buckle sound.

（2） Connect the connector of rainfall ambient light sensor

（3） After installation, there is no foreign matter on the glass surface, and there is no

steam drum on the contact surface between rain sensor and glass. Removal:(When

replacing the windshield, it is also necessary to replace the rain ambient light sensor.)

（1） Removing protective cover at rearview mirror

（2） Locate mounting bracket for rain ambient light sensor, press bracket and take out sensor

（3） The system can be washed by

removing the connector of the rain

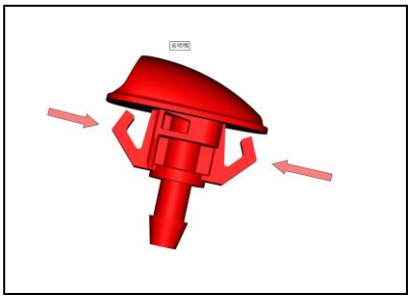
ambient light sensor

1. Removal

1 Remove the spray can, refer to the spray can.

2 Remove the front water spray pipe, refer to Water spray pipe.

3 Remove the front nozzle by lifting it in a straight line, and squeeze the clamping structure of the front nozzle in the direction of arrow to take out the front nozzle.



4 Remove the rear water spray pipe, refer to Water spray pipe.

2. Installation

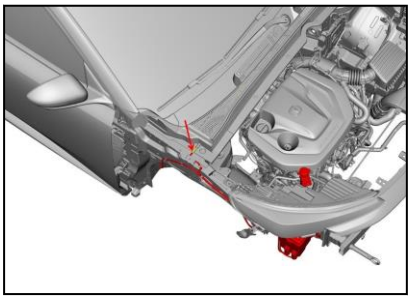
The installation sequence

is the reverse of the removal

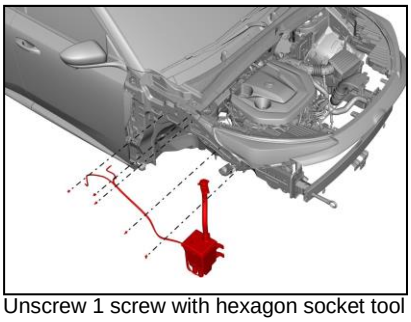
sequence. Spray pot

Removing spray can

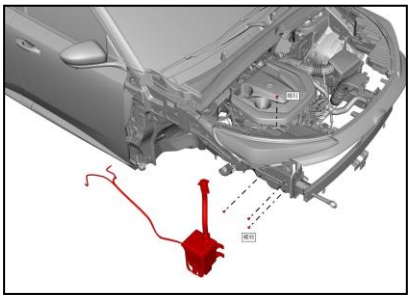
1 Remove front right tyre, refer to Wheels and Tyres.
2 Remove front right wheel housing panel, refer to Removing and installing wheel housing and engine side guard.
3 Remove upper fender trim, refer to Removing and installing upper fender trim assembly.
4 Remove front bumper and front right fender, refer to Removing and installing front bumper and Removing and installing.
5 Detach the hose on the spray can from the hose on the front cover trim.



6 Remove the 5 buckles of the spray kettle with a word.



7 Unscrew 1 screw with hexagon socket tool and 3 bolts with sleeve to remove the spray can.



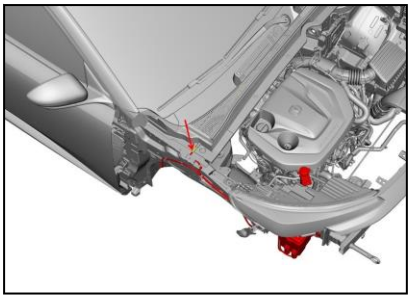
Water spray can installation

The installation sequence is the reverse of the removal sequence.

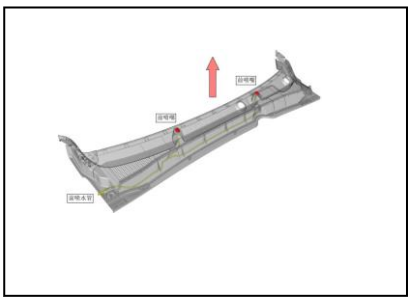
Water spray pipe

Removing front water spray pipe

1 Remove upper fender trim, refer to Removing and installing upper fender trim assembly.
2 Detach the hose on the spray can from the hose on the front cover trim.

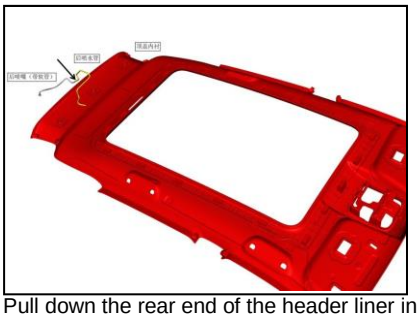


3 Remove front cover trim, refer to Removing and installing front cover trim assembly.
4 Take out the 2 front nozzles in the direction of the arrow. As the front nozzle is connected to the front water spray pipe, disassemble the front water spray pipe and the front nozzle directly.

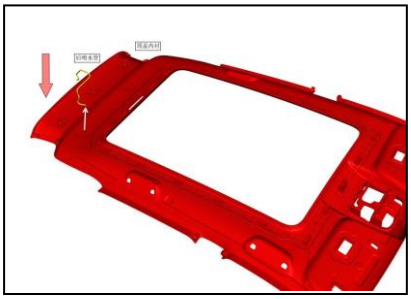


Removing rear water spray pipe

1 Remove spoiler, see Removing and installing spoiler.
2 Disengage rear spray nozzle with hose on the spoiler from the rear spray pipe.



3 Pull down the rear end of the header liner in the direction of arrow, disassemble the hose on the header liner and the rear water spray pipe, and then take out the rear water spray pipe.



Install front water spray pipe and rear water spray pipe

The installation sequence of the front water spray pipe and the rear water spray pipe is reverse to the removal sequence.

Spare parts atlas

F271801 F271806

F280704

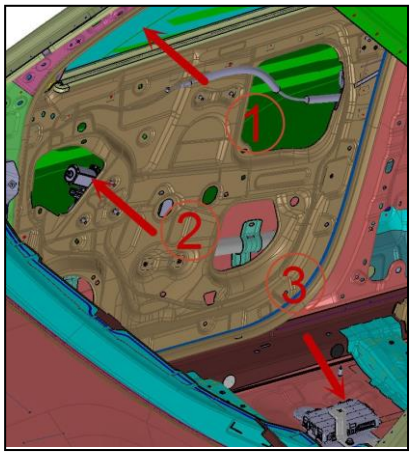
Window System Specifications

Window running time	Rising	>100 mm/s, 2.8<t<3.2
	Drop	<220mm/s
Remarks: 1." t "refers to the design movement time of glass from full opening to full closing or from full closing to full opening; 2. The minimum speed of ascending and descending shall not be less than 0.9 times of the respective average speed, i.e. the allowable fluctuation of the product tolerance is 10%;		
Noise	Background noise 30 dB, maximum impact and commutation noise less than 60 dB(A)	The maximum operating noise is less than 50 dB(A)
Anti-pinch force(Windows with anti-pinch function only)	Anti-pinch force: < 100N	
Anti-pinch area	Area 4 mm~200 mm from top of door window frame	

Composition and position distribution

Combination

Composition	Position
Door glass	Inside door, arrow 1 in figure
Window regulator assembly	Inside door, arrow 2 in figure
Ripple anti-pinch controller	Body floor, arrow 3 in figure

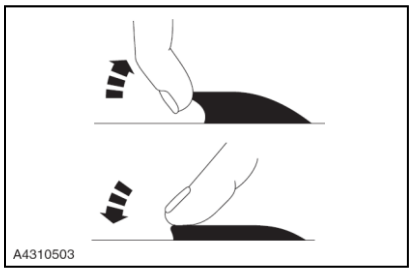


System functional principle introduction

The whole window glass of the vehicle adopts the power lifting mode. When the door glass needs to be lifted, just press the window regulator button. The driver door is equipped with the door window regulator button on the inner side of the vehicle, and the buttons on other doors control the corresponding door window. Button 3 is the window locking button. Pressing the locking button can lock and unlock the other three doors except the driver's door. Button 4 is a door lock switch. When the door is in closed state, press the right end of the button to lock the door, and press the left end of the button to unlock the door.

Key operation diagram

The driver anti-pinch glass lifter switch has two gears: Lowering and lifting on the driver side. The first gear is manual lifting, and the second gear is automatic lifting. The remaining buttons have only one gear and can only be lifted or lowered manually (only for some models).



Window enable signal:

When the power supply gear is in ON position or ON to OFF position, BCM

outputs window enable signal and the low level is valid. Manual remote

control window rising:

When the ignition switch is OFF, the key is removed and the four doors are closed, if the key "Lock" key is pressed for a long time, the BCM outputs the remote control window rising signal until the remote control key is released (RF signal is closed by

Lock changes to None), remote control window rising function stops. (When there is one key for window lifting, remote control window lifting is executed by anti-pinch module).

The front right window, rear right window, front left window and rear left window ascend in sequence.

(This function is reserved and defaults to function off at delivery). Manual remote control window

lowering:

When the ignition switch is off, the key is removed and the four doors are closed, if the key "unlock" key >2s is pressed for a long time, the BCM outputs the remote control window lowering signal until the remote control key is released (RF signal

The number changes from unlock to none). The remote control window lowering function stops (this function is reserved, and the function is turned off by default at delivery) (the remote control window lowering function is executed by the anti-pinch module when there is window one-button lifting).

The window descends in the order of FRT RH window, RR RH window, FRT LH window and RR LH window, and the ascending

interval between windows is 200 ms. (This function is reserved, and the function is turned off by default at delivery)

Anti-pinch alarm:

The power supply is in OFF position. When BCM receives sunroof/FRT LH/FRT RH/RR LH/RR RH anti-pinch signal is set to "Active," BCM outputs a low level control horn sound.

Note: Automatic remote control lifting window (long press the subsequent release hand) is only for windows or sunroof with anti-pinch

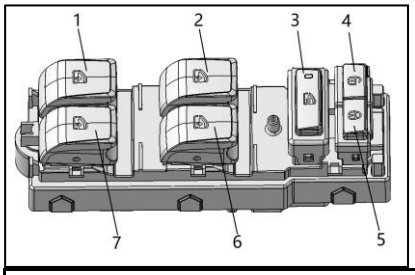
function. Windows and sunroof without anti-pinch function can only be controlled by manual remote control lifting window (long press

the key until lifting is completed).

Inspection of part structure principle

Window switch

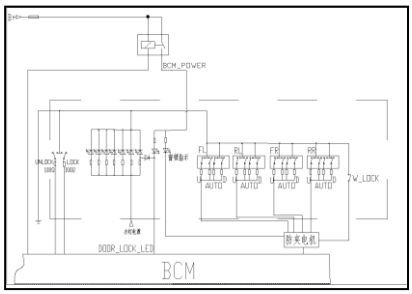
Functional structure of driver window switch

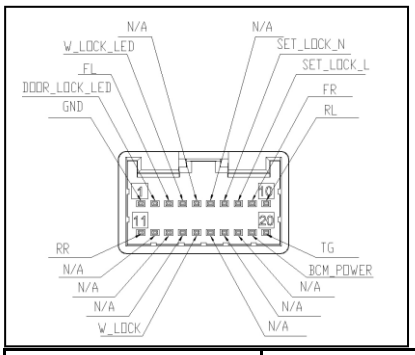


Serial number	Name
1	RR LH door window regulator button
2	Driver door window regulator button
3	Locking door button
4	Unlock door button

5	Lock window button
6	F.R. door window regulator button
7	Right rear door window regulator button

Schematic diagram of driver window switch and pin definition of PIN

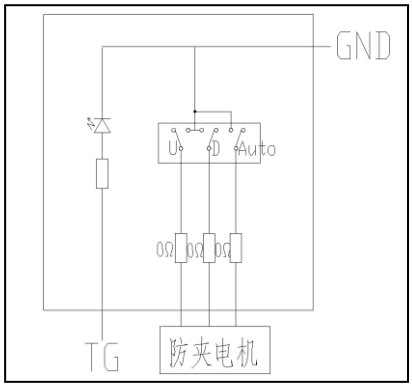


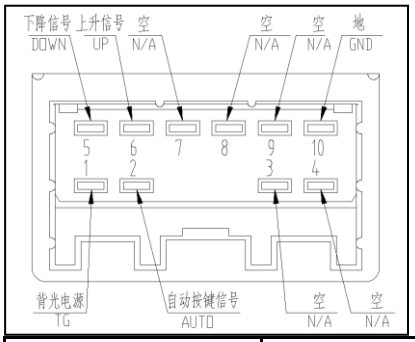


Pin pin	Function abbreviation	Input/output	Function description	Signal type
1	GND	Input	Ground/GROUND	To ripple anti-pinch motor controller ground
2	DOOR_LOCK_LED	Input	Door lock indication signal	Low level active(To BCM)
3	FL	Output	Front left door button signal/FRONT LEFT SIGNAL	
4	W_LOCK_LED	Input	Window lock indication input	High level valid(Connect ripple anti-pinch controller)
5	N/A		/	
6	N/A		/	
7	SET_LOCK_N	Output	Central locking signal (unlocking)/SET_LOCK NO LOCK	
8	SET_LOCK_L	Output	Central locking signal (locking)/SET_LOCK LOCK	
9	FR	Output	Front right door button signal/FRONT RIGHT SIGNAL	
10	RL	Output	RR LH door button signal/REAR LEFT SIGNAL	
11	RR	Output	RR RH door button signal/REAR RIGHT SIGNAL	
12	N/A		/	
13	N/A		/	
14	N/A		/	

15	W_LOCK	Output	Lock window/WINDOW LOCK	Low level(Connect ripple anti-pinch controller)
16	N/A		/	
17	N/A		/	
18				
19	IGN	Input	Power supply	
20	TG	Input	Backlight power supply/BACKGROUND LIGHT	PWM

Front passenger window switch schematic diagram and pin definition

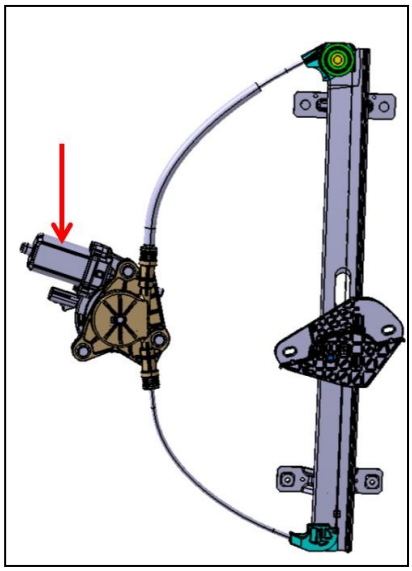




Pin pin	Function abbreviation	Input/output	Function description	Signal type
1	TG	Input	Background light power supply/BACKGROUND LIGHT	PWM
2	AUTO	Output	Automatic key signal/AUTO SIGNAL	
3	NC		/	
4	NC		/	
5	DOWN	Output	Drop signal/DOWN SIGNAL	
6	UP	Output	Rising signal/UP SIGNAL	
7	NC		/	
8	NC		/	
9	NC		/	
10	GND	Output	Ground/GROUND	

Lifting motor

The lifting motor is located on the window regulator assembly, see the arrow in the figure.

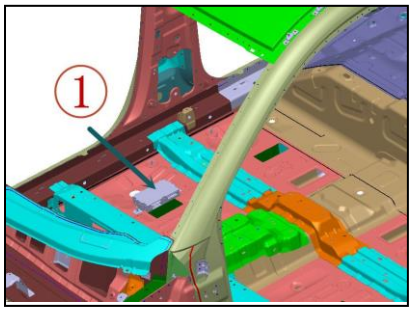


Service conditions

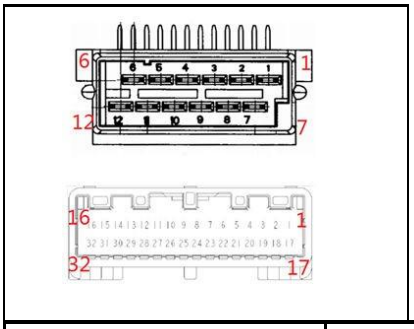
Nominal voltage	12.5V
Working voltage	9V～16V
Normal working current	3A～8A
Quiescent current	≤0.5mA
Half sleep current	≤1mA
Electrical power consumption	≤600mW

Ripple anti-pinch controller

The ripple anti-pinch controller assembly is located under the passenger seat and fixed by two nuts, as shown in the figure at arrow 1. Ripple anti-pinch controller is mainly used to control window anti-pinch function, using voltage is 9~16 V.



Interface definition



Pin	Rated current	Function description	Signal type
1	16A	Positive pole of power supply	High level
2	16A	Positive pole of power supply	High level
3	16A	Negative pole of power supply	Low level
4	16A	Negative pole of power supply	Low level
5	8A	Rear right descent	High level
6	8A	Right rear rise	High level
7	8A	Front left ascending	High level
8	8A	Front left lowering	High level
9	8A	Right front rise	High level
10	8A	Front right descent	High level
11	8A	Rear left rising	High level
12	8A	Rear left downward	High level
1	-	Power supply	High level
2	-	Switch ground	Low level
3	-	-	-
4	6mA	Driver window front left lift input	Analog signal
5	-	-	-
6	6mA	Driver window FRT RH lift input	Analog signal
7	6mA	Right front window lowering input	Low level
8	6mA	Driver window rear left lift input	Analog signal
9	6mA	Rear left window down input	Low level
10	6mA	Driver window RR RH lift input	Analog signal
11	6mA	Right rear window down input	Low level
12	6mA	Occupant suppression input(W_lock)	Low level
13	6mA	Right front window rising input	Low level
14	-	-	-

15	70mA	CAN_L	Communication signal
16	70mA	CAN_H	Communication signal
17	6mA	Right front window Auto input	Low level
18	-	-	-
19	0.048mA	IGN signal input	High level
20	6mA	Rear left window Auto input	Low level
21	6mA	Right rear window Auto input	Low level
22	30mA	OID lamp output	High level
23	6mA	Rear left window up input	Low level
24	6mA	Rear right window up input	Low level
25	-	-	-
26	-	-	-
27	-	-	-
28	-	-	-
29	-	-	-
30	-	-	-
31	-	-	-
32	-	-	-

Common methods

Remote window up start method Manual remote window up:

When the ignition switch is off, the key is removed and the four doors are closed, if the key "lock" key >2s is long pressed, the BCM outputs the remote control window rising signal until the remote control key is released (the RF signal changes from lock to no), the remote control window rising function stops. (When there is one key for window lifting, remote control window lifting is executed by anti-pinch module)

The window ascends successively in the order of FRT RH window, RR RH window, FRT LH window and RR LH window, and the ascending interval between windows is 200 ms. (This function is reserved, and the function is turned off by default at delivery)

Manual remote control window lowering:

When the ignition switch is off, the key is removed and the four doors are closed, if the key "unlock" key >2s is pressed for a long time, the BCM outputs the remote control window lowering signal until the remote control key is released (the RF signal changes from unlock to none). The remote control window lowering function stops (this function is reserved, and the function is turned off by default at delivery) (the remote control window lowering function is executed by the anti-pinch module when there is window one-button lifting).

The window descends in the order of FRT RH window, RR RH window, FRT LH window and RR LH window, and the ascending interval between windows is 200 ms. (This function is reserved, and the function is turned off by default at delivery)

Anti-pinch lifter self-learning method manual learning

Operate the window (FL/FR/RL/RR) to ascend so that the window is completely closed, release the switch and then operate the window switch up key so that the window glass is locked up for 2s at the top position, operate the window glass to descend to the bottom position to complete the manual learning process; The lifter needs to be manually learned again to restore the anti-pinch function under the following conditions 1.Trigger the anti-pinch function at the same position for 2 consecutive times, and the anti-pinch function cannot be restored; 2.Disconnect the battery power supply or the power supply is lower than 6V;

Adaptive learning

As the use time increases, the window resistance and window position will change due to aging, deformation, wear and other factors. Every time the window is lifted or lowered, the window anti-pinch controller shall detect and record the change of the door system. The self-adaptive learning function will make corresponding parameter trimming according to the actual working condition.

DTC Diagnostic

Ripple anti-pinch controller

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
B1E4000	Battery voltage too high	1. The controller is in non-dormant state, independent of the vehicle ignition gear; 2. Detect the power supply voltage is greater than 16.5 V continuously. 1000ms	Unstable power supply	Check whether the power supply is normal
B1E4100	Battery voltage too low	1. The controller is in non-dormant state, independent of the vehicle ignition gear; 2.Detect the power supply voltage is less than 8.5 V continuously. 1000ms	Unstable power supply	Check whether the power supply is normal
U1F6000	Loss of communication with body controller	1. working voltage 6.5-18 V; 2. 1s after sleep wakeup; 3. After the bus is not closed or the bus is restored for 1S; 4. BCM_28B message reception timeout, duration more than 1s; If the above conditions are met, the DTC is triggered.	Node module CAN signal loss	Check whether the node module is installed
U1F6100	Loss of communication with body controller 2	1. working voltage 6.5-18 V; 2. 1s after sleep wakeup; 3. After the bus is not closed or the bus is restored for 1S; 4. BCM_ 396 Message reception timeout, duration more than 1s; If the above conditions are met, the DTC is triggered.	Node module CAN signal loss	Check whether the node module is installed
U1F6200	Loss of communication with HU	1. working voltage 6.5-18 V; 2. 1s after sleep wakeup; 3. After the bus is not closed or the bus is restored for 5S; 4. HU_0x 501 Message reception timeout for more than one second; If the above conditions are met, the DTC is triggered.	Node module CAN signal loss	Check whether the node module is installed
U1F6400	Loss of communication with ESP	1. working voltage 6.5-18 V; 2. 1s after ON gear; 3. After the bus is not closed or the bus is restored for 1S; 4.ESP_ 187 Message reception timeout for more than one second; If the above conditions are met, the DTC is triggered.	Node module CAN signal loss	Check whether the node module is installed
U1F6700	Lose communication with IP	1. working voltage 6.5-18 V; 2. 1s after ON gear; 3. After the bus is not closed or the bus is restored for 1S; 4. IP_0x 530 Message reception timeout, lasting more than 2.5 seconds; If the above conditions are met, the DTC is triggered.	Node module CAN signal loss	Check whether the node module is installed

U1F6500	Can bus BUSOFF fault	1. Complete vehicle power supply 6.5 V-18 V; And 2. 1s after sleep wakeup; And	Can bus abnormal	Check whether the node module is installed

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
		3. detects can bus entering BUSOFF Status, and BUS-OFF Counter>=5		
U1F6600	Receiving or sending signal fault	Controller network management enters LimpHome state for more than 2s	Can bus abnormal	Check whether the node module is installed
B1E4200	Front left door window manual up button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4300	Front right door window manual up button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4400	Rear left door window manual up button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4500	Rear right door window manual up button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4600	Front left door window manual down button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4700	Front right door window manual down button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4800	Rear left door window manual down button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4900	Rear right door window manual down button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4A00	Front left door window auto up button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4B00	Front right door window auto up button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4C00	Rear left door window auto up button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4D00	Rear right door window auto up button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4E00	Front left door window automatic lowering button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E4F00	Front right door window automatic lowering button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E5000	Rear left door window automatic lowering button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E5100	Rear right door window automatic lowering button short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E5200	Front left door motor output current is too small	Current is less than 1A when the window operates.	Open circuit of motor connecting wire	Detection motor connecting harness
B1E5300	Front right door motor output current is too small	Current is less than 1A when the window operates.	Open circuit of motor connecting wire	Detection motor connecting harness
B1E5400	Rear left door motor output current is too small	Current is less than 1A when the window operates.	Open circuit of motor connecting wire	Detection motor connecting harness

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
B1E5500	Rear right door motor output current is too small	Current is less than 1A when the window operates.	Open circuit of motor connecting wire	Detection motor connecting harness
B1E5600	Front left door motor output current is too high	Current is greater than 28 A when the window is operating	Open circuit of positive and negative motor connecting wires	Detection motor connecting harness
B1E5700	Front right door motor output current is too high	Current is greater than 28 A when the window is operating	Open circuit of positive and negative motor connecting wires	Detection motor connecting harness
B1E5800	Rear left door motor output current is too high	Current is greater than 28 A when the window is operating	Open circuit of positive and negative motor connecting wires	Detection motor connecting harness
B1E5900	Rear right door motor output current is too high	Current is greater than 28 A when the window is operating	Open circuit of positive and negative motor connecting wires	Detection motor connecting harness
B1E6400	Front left motor position signal error	The deviation between the two blocked top revolutions of the window is greater than 4cm	Motor ripple does not meet requirements	Check whether the motor is normal
B1E6500	Front right motor position signal error	The deviation between the two blocked top revolutions of the window is greater than 4cm	Motor ripple does not meet requirements	Check whether the motor is normal
B1E6600	Rear left motor position signal error	The deviation between the two blocked top revolutions of the window is greater than 4cm	Motor ripple does not meet requirements	Check whether the motor is normal
B1E6700	Rear right motor position signal error	The deviation between the two blocked top revolutions of the window is greater than 4cm	Motor ripple does not meet requirements	Check whether the motor is normal
B1E6800	Passenger front right up manual key short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E6900	Passenger rear left up manual key short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E6A00	Passenger rear right up manual key short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E6B00	Passenger front right down manual key short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E6C00	Passenger rear left down manual key short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E6D00	Passenger rear right down manual key short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E6E00	Passenger front right automatic key short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E6F00	Passenger rear left automatic key short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch
B1E7000	Passenger rear right automatic key short circuit	Button grounding is greater than 30 s	Short circuit or intermittent short circuit	Detection button switch

Fault symptom diagnosis

Inspection and maintenance

Phenomenon	Solution

1、 All power window switches are inoperative	A. Check whether the ignition switch is turned to ON position: No, please turn the ignition switch to ON position; Yes, go to the second step;

	B. Inspect whether the fuse of the control window motor in the instrument panel central control box assembly is blown: Yes, replace the fuse; No, measure the switch with a multimeter.
2. lock switch on/off	A. Button locking: Pin W-Lock and or pin ECU-GND of main power window switch connector are connected. B. Button not locked: Main power window switch connector W-Lock pin and or ECU-GND Not connected. C. After the above inspection is completed normally, if the other three window switches cannot work, please check the harness connection between the main power window switch and the other three window switches.
3. Door lock switch on/off	A. Press and hold the button to lock the door end, and the main power window switch connects to pin SET-LOCK and/or pin ECU- GND with resistance. B. Press and hold the button unlocking end, main power window switch connector SET-LOCK pin and or Pin ECU-GND is connected without resistance. C. After the above inspection is completed normally, if the door lock switch still fails, please check whether the central control lock works normally, or check whether the main power window switch is connected with the central control lock harness.

Appearance check list

1. The plating layer or chemical treatment layer of glass lifter metal shall be uniform, and there shall be no defects such as underplating, crack, rust, scratch and deformation on the surface.
The surface of glass lifter plastic parts shall be flat and free of air bubbles, without obvious deformation affecting use.
The characters of trademark and pattern (part identification, etc.) shall be clear and complete.
The inner part of sheave seat, sheave and friction parts shall be evenly coated with lubricating grease. The position and amount of lubricating grease must meet the drawing requirements. The selected type of lubricating grease shall be approved by the product department of Chang'an Company.

Fault symptom table

Phenomenon	Solution
1. All power window switches do not work.	A. Check whether the ignition switch is turned to ON position: No, please turn the ignition switch to ON position; Yes, go to the second step; B. Check whether the fuse of the control window motor in the instrument panel central control box assembly is blown: Yes, replace the fuse; No, measure the switch with a multimeter.
2. Lock switch on/off	A. Button locking: Pin W-Lock and or pin ECU-GND of main power window switch connector are connected. B. Button not locked: Main power window switch connector W-Lock pin and or ECU-GND Not connected. C. After the above inspection is completed normally, if the other three window switches cannot work, please check the harness connection between the main power window switch and the other three window switches.
3. Lock door switch on/off	A. Press and hold the button to lock the door end, and the main power window switch connects to pin SET-LOCK and/or pin ECU- GND with resistance. B. Press and hold the button unlocking end, main power window switch connector SET-LOCK pin and or Pin ECU-GND is connected without resistance. C. After the above inspection is completed normally, if the door

	lock switch still fails, please check whether the central control lock works normally, or check whether the main power window switch is connected with the central control lock harness.

Only the driver's door can be lifted and lowered, and none of the other three doors

Check the harness connection between main power window switch and other three window switches. If the harness is disconnected, connect the harness.

Other three doors cannot control themselves

1. Check and confirm whether the harness is connected incorrectly; if so, re-connect correctly.
2. Check whether other three door switches are normal. If the switch is abnormal, replace and re-test.

Slow lifting speed

1. Check whether the power supply is in normal working conditions.
2. Check whether there is foreign matter or deformation in the guide rail and groove of the lifter, and lift again after cleaning.
3. After completing the above steps in sequence, check the lifter motor.

Remote control window rising failure

1. Manually lift the door glass to confirm whether it can be lifted or lowered normally.
2. Check that the key remote control function is enough for normal use.
3. Check whether the harness connector is correctly connected.

Abnormal sound during lifting

Confirm abnormal sound position of lifting

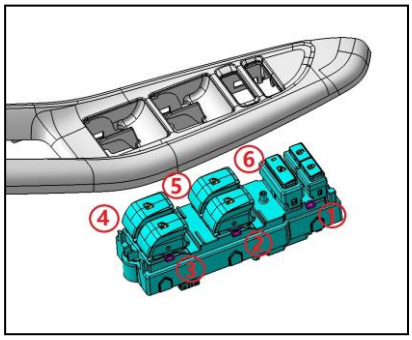
1. Remove the outer clamping strip, inner clamping strip and groove in sequence. Check abnormal sound positions in turn.
2. If the regulator has abnormal sound, check whether the grease quantity at the guide rail is normal. If the grease is too small, replenish grease.

Removal and installation

Window Switch Removal and Installation

The removal and installation methods of driver's window switch and passenger's window switch are the same.

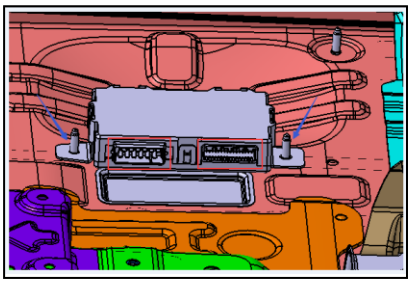
1 Before removing the window switch, remove the armrest panel. Refer to Removing and installing front door interior trim panel.
2 Pry open the 6 mounting clips as shown in the figure, and remove the window switch;
3 Pull out connector;
4 The installation sequence is the reverse of the removal sequence.



Ripple anti-pinch controller removal

1 Remove the passenger seat and unclip the carpet under the seat.

2 Unplug the connector of ripple anti-pinch controller "in red frame," and then remove the nut at "blue arrow" with 10 # sleeve.



Installation

The installation sequence is in reverse order of removal.

Spare parts atlas

F28060

2

F27050

2

Lighting system specifications

Component specification

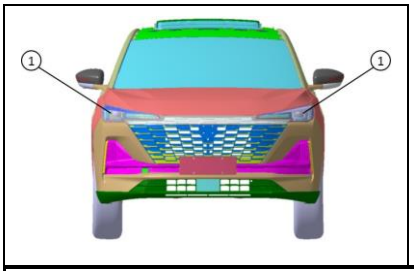
Component name	Power	Model
Combination headlamp assy. Ⅰ- low beam/high beam	35W	LED
Combination front lamp assembly Ⅰ- steering lamp	12.25W	LED
Combination front lamp assembly Ⅰ- daytime running lamp	24.5W	LED
Combination headlamp assembly Ⅰ-- front position lamp	2.5W	LED
Combination rear lamp assembly Ⅰ- rear position lamp	4 W	LED
Combined rear lamp assembly Ⅰ- rear turn signal lamp	21 W	PY21W
Combination rear lamp assembly Ⅱ- rear position lamp	9W	LED
Combination rear lamp assembly Ⅱ- brake lamp	18W	LED
Combination rear lamp assembly Ⅱ- reverse lamp	16W	W16W
High-mounted brake lamp assembly	1.5W	LED
Rear fog lamp assembly	16W	W16W
Trunk lamp	5W	W5W
Make-up lamp assembly	5W	W5W
License plate lamp and switch assembly	1W	LED

Warning **All bulbs shall comply with GB/T 15766.1 -2008 for dimensions and photoelectric performance.**

- Combination headlamp assembly I Combination headlamp assembly I Middle and high beam, low beam, front turn signal lamp, front position lamp and daytime running lamp are all LED.
- Combination rear lamp assembly I Combination rear lamp assembly I Middle rear position lamp light source is LED. The rear turn signal lamp light source is a bulb.
- Combination rear lamp assembly II Combination rear lamp assembly II Middle brake lamp/position lamp light source is LED, reversing lamp light source is bulb.
- High-mounted brake lamp assembly High-mounted brake lamp assembly light source is LED.
- Rear fog lamp assembly Rear fog lamp assembly light source is bulb.
- Trunk lamp assembly Trunk lamp assembly light source is bulb.
- Make-up lamp assembly The light source of make-up lamp assembly is bulb.
- License plate lamp and switch assembly license plate lamp and switch assembly light source are LED.

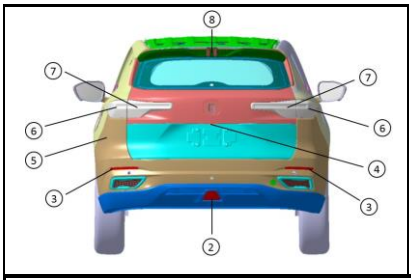
Composition and position distribution

Front light position diagram



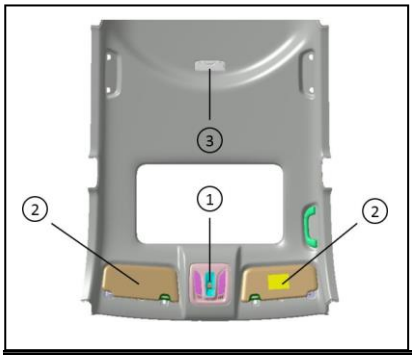
Project	Description	Remarks
1	Combination front lamp assy. I	

Rear light position diagram



Project	Description	Remarks
2	Rear fog lamp assembly	
3	Reflex reflector assembly	
4	License plate lamp and switch assembly	
5	Trunk lamp assembly	
6	Combination rear lamp assembly I	
7	Combination rear lamp assy. II	
8	High-mounted brake lamp assembly	

Interior light position diagram



Project	Description	Remarks
1	Ceiling switch assembly(With front dome lamp)	
2	Make-up lamp assembly	
3	Ceiling switch assembly(With rear dome lamp)	

System functional principle introduction

Headlamp Control Low Beam Control

The power supply gear is in ON and START state. If the position lamp switch and low beam switch are turned on, the IBCM illuminates low beam. If the position lamp switch or low beam switch is turned off or the ignition switch is in the ACC/OFF state, the low beam lamp is turned off.

High beam control

In the power supply position in ON and START state, only when the low beam switch is closed and the high beam is on and off, the high beam is on; Only when the low beam switch is turned off or the high beam switch is turned off, the high beam lamp is turned off; When the high beam switch is open, if the low beam switch is still closed, the IBCM will continue to light the low beam.

Overtaking lamp control

The power supply gear is in any gear, turn to the overtaking

gear, and the IBCM control high beam lights up. Follow home

lighting

Follow home light power supply gear is in off state. If the low beam lamp switch is from OFF->POS (small lamp switch) -> low beam lamp ->POS->OFF within 2s, the low beam lamp will be on and at the same time.

The buzzer sounds a sound. If any door (including luggage compartment door) is not closed, the low beam delay 180s goes out. If all doors are closed, the low beam delay 60 s goes out. When the low beam lamp is on, if the power supply gear is turned from the OFF gear to the non-OFF gear state or the low beam lamp switch is in the non-OFF state, the low beam lamp goes out.

Position lamp control

If the power supply is in any gear, turn on the position lamp switch, and then turn on the position lamp, side marker lamp and interior background light; When the position lamp switch is off, turn off the position lamp, side marker lamp and background light. Automatic switch-off position lamp function

The automatic switch-off position lamp function is activated when all of the following conditions are met at the same time:

- Shift the power supply gear from non-OFF gear to OFF gear;
- Position lamp switch is on;
- The emergency light function is not active.

The position lamp is automatically switched off after a delay of 10 minutes after the automatic switching off position lamp function is activated. The automatic switch-off position lamp function exits when any of the following conditions are met:

- Power supply gear changes;
- Position lamp switch changes;
- Emergency warning light is activated.

Automatic light

When the power supply gear is ON or START and the automatic light switch is turned on, the low beam and position lamps are on immediately in the following conditions: The light switch request signal state output by the light sensor is light on; The low beam and position lamp are off under the following conditions: Stop the low beam relay and position lamp relay when the lighting switch request signal output by the lighting sensor is applied.

When BCM receives rain ambient light sensor fault or light sensor fault or rain ambient light sensor node is lost, it is light sensor fault at this time. BCM illuminates position lamp and low beam lamp, forwards the signal to instrument, and prompts driver with text on instrument. BCM needs to record the fault information sent by rain ambient light sensor through LIN bus in the form of DTC.

Automatic high beam

When the vehicle power supply gear is ON or START, BCM will automatically turn on the high beam lamp when the following conditions are met:

- The automatic high beam function sent by LAS is on;
- The automatic light controlled by BCM is active and the low beam is on;
- Overtaking lamp switch is in off state;
- After 3 seconds from activation to off of overtaking lamp;
- After 3s from non-AUTO to AUTO;
- Automatic headlamp status sent by LAS is valid.

Exit the automatic high beam function

when any of the above conditions are not

met. Brake lamp control

Bcm controls brake lamp lighting and off according to brake lamp lighting request signal from EPB on CAN bus or electronic control deceleration function status signal from ESP.

Rear fog lamp

When the power supply gear is in ON or START position, when the low beam lamp is on (not following home) or high beam lamp is on (not passing light) or front fog lamp is on, the rear fog lamp is on when the rear fog lamp switch is turned on for the first time (the rear fog lamp switch is active at this time);

When the position lamp goes out or the rear fog lamp switch is toggled again (the rear fog lamp switch is canceled at this time), or the gear is from ON→ACC to ON→OFF, the rear fog lamp goes out.

After the rear fog lamp goes out, the rear fog lamp switch is regarded as canceled. If it is necessary to turn on the rear fog lamp again, it is necessary to toggle the rear fog lamp switch again when the rear fog lamp is on. If the rear fog lamp switch is toggled without meeting the conditions for the rear fog lamp to illuminate, its status is deemed invalid.

Vehicle searching light

When the ignition key is removed and the four doors are locked, if the same remote control key is pressed continuously for two times within 2s, the left and right turn signals are activated and flashing, and the electric horn sounds twice. Turn signal lamp goes out after 10 s. If the unlock key is pressed or the door is opened or the power supply gear is ON during this period, the left and right turn signals are switched to the corresponding flashing function.

Steering and Danger Warning Lamp Left Turn Lamp

When the power supply position is in ON or START position, the left steering switch is activated, the left steering lamp is activated and flashes, and the flashing frequency is 360 ms-ON/360 ms-OFF; At the same time, the same frequency drives the external steering lamp sounding relay.

Right turn signal lamp

When the power supply position is in ON or START position, the right steering switch is activated, the right steering lamp is activated and flashes, and the flashing frequency is 360 ms-ON/360 ms-OFF; At the same time, the same frequency drives the external steering lamp sounding relay.

Steering lamp failure detection

In the event of a turn signal lamp failure, the flashing frequency is 2 times that of the normal. Flashing frequency is 180 ms-ON/180 ms-OFF; At the same time, the same frequency drives the external steering lamp sounding relay. The failure of the side steering lamps will not cause a change in frequency.

Lane change flash function

When the power supply gear is in ON or START position, if the steering switch is OFF->ON->OFF within 100 ms<t <700 ms, the steering lamp on the corresponding side flashes for three times; Meanwhile, if there is 100 ms<t<700 ms switch signal during three times of lamp flashing, BCM will not respond.

Hazard warning light

If the emergency alarm switch is activated, the left and right turn signals flicker and the flashing frequency is 360 ms-ON/360 ms-OFF; If the hazard alarm switch is activated and pressed again, the hazard alarm flashing function is turned off.

Activation of the emergency alarm

signal is not controlled by the ignition

switch. Emergency brake alarm

Definition of emergency brake alarm function:(This function is turned off by default at delivery, and can be turned on after sales through diagnostic scanner.)

1 Function activation

When the vehicle speed is greater than 96Km/h and less than or equal to 160 km/h, collect the vehicle speed at an interval of one second to calculate the deceleration. If the deceleration is greater than or equal to 6m/s2, activate the emergency brake alarm function, and the vehicle steering lamp flashes at the frequency of 160 ms on -160 ms off;

When the vehicle speed is greater than 160 km/h, collect the vehicle speed at an interval of one second to calculate the deceleration. If the deceleration is greater than or equal to 5m/s2, the emergency brake alarm function is activated, and the vehicle steering lamp flashes at the frequency of 160 ms on -160 ms off.

2 Function cancellation(Two ways)

1) After the function is activated, collect the vehicle speed at an interval of one second to calculate the deceleration, and if the deceleration is less than 2.5 m/s2, stop the emergency brake alarm function;

2) After this function is activated, the emergency brake alarm function can be stopped by pressing the emergency alarm switch. At

this time, the turn signal lamp will flash at the frequency defined by the emergency alarm function.

Collision alarm

When there is a collision signal (bus or hard wire), it is also necessary to activate the hazard alarm lamp. Press the emergency alarm switch 4 seconds after the signal is activated to terminate the hazard alarm lamp.

Turn signal activation priority

1 When the power supply position is in ON or START position, if the emergency alarm switch is activated first and then the left or right turn signal switch is activated, the turn signal is preferred; If the left or right turn signal switch is activated first and then the emergency alarm switch is activated, the emergency alarm signal is preferred.

2 When the left/right lane change flashing function is activated, if the emergency alarm switch is activated again, the alarm signal takes precedence, and after the alarm signal is canceled, the flashing function is not continued for three times until there is another activation signal.

3 When the left/right lane change flashing function is activated, if the right or left steering switch is also activated, the steering signal will take precedence, and the left and right lane change flashing functions will be canceled within 1 second, all of them will be viewed. 100 ms<t<700 ms steering lamp switch signal is used as

ordinary steering switch signal. Except for the above three

cases, the priority of turn signal is as follows:

1 Anti-theft alarm;

2 Emergency alarm;

3 Turn signal;

4 Unlocking/locking signal;

5 Central control mode change feedback signal;

6 Service mode(Learning key, etc.)

The frequency of each turn signal is 360 ms-ON/360 ms-OFF and the duty cycle is 50%.

Function	Frequency	Priority	Time	Duty cycle
Exit anti-theft prompt	360ms-ON/360ms-OFF	10	4 times	50%
Vehicle searching light	360ms-ON/360ms-OFF	9	10 seconds	50%
Locking prompt	360ms-ON/360ms-OFF	8	2 times	50%
Unlock prompt	360ms-ON/360ms-OFF	7	1 time	50%
Low battery alarm	360ms-ON/360ms-OFF	6	9 times	50%
Turn signal lamp	360ms-ON/360ms-OFF	5		50%
Crash emergency alarm	360ms-ON/360ms-OFF	4		50%
Brake emergency alarm	360ms-ON/360ms-OFF	3		50%
Emergency alarm switch	360ms-ON/360ms-OFF	2		50%
Anti-theft alarm	360ms-ON/360ms-OFF	1	5 min	50%

Dome lamp

Dome lamp fades on

If the dome lamp switch is in gear door, the dome lamp will be illuminated linearly within 1s under any of the following conditions.

1 Any door is opened (including tailgate);

2 The ignition switch is in the off state, and press the "unlock" button on the remote controller to unlock the door or use the mechanical key or central control lock switch or receive the PEPS on the bus.

The "unlock" signal is sent to unlock the door;

3 The power supply gear changes from

START/ON/ACC to OFF. Dome lamp fade out

When the dome lamp switch is in gear door under any of the following conditions, the dome lamp will extinguish linearly within one.

1 Without central locking, all doors (including tailgate) are closed for 25 seconds. If the DOOR gear switch is turned off within this time, the dome lamp immediately goes out, and then DOOR is turned on.

Gear switch, dome lamp is on immediately;

2 Power supply gear is OFF, all doors (including tailgate) are closed and the door is locked with central locking switch;

3 When the ignition switch is in OFF position, all doors (including tailgate) are closed, and then press the "lock" button on the remote control to lock the door;

4 The power supply position is in the off position, and the door is locked by receiving the "lock" signal from PEPS on the bus;

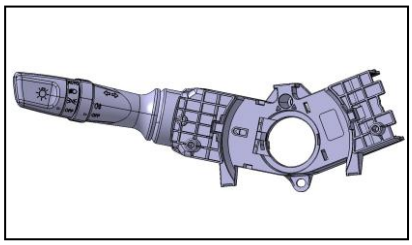
5 All doors are closed and the power supply position is in ON position/START.

Luggage compartment lamp

When the power supply is in any gear, open the luggage compartment, and the luggage compartment lamp illuminates.

Inspection of part structure principle

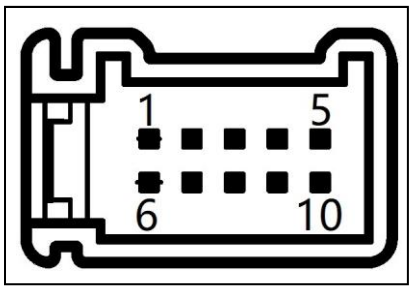
Lighting combination switch functional structure



- The switch control lever is arranged on the left side of the steering column. The high beam control lever has two gears: When the low beam is on, push the switch control lever forward, the high beam is on, and the indicator lamp on the instrument panel is on; After resetting, gently lift back to the dimming gear, and the high beam flashes. It is used during overtaking and reset immediately after releasing the hand.
- Rear fog lamp switch: When the low beam is turned on, turn the rear fog lamp switch to turn on the rear fog lamp. When the lamp handle is in the AUTO (*) position, after the headlamp is turned on, rotate the rear fog lamp switch, or turn on the rear fog lamp.
- When the ignition switch is in the ON position, turn the control lever upward and the right turn signal lamp

flashes; Turn the control lever downward and the left turn signal lamp flashes. Schematic diagram and pin

definition of PIN



Pin pin	Function abbreviation	Input/output	Signal type
1	Small lamp switch	Output	Level
2	Ground	Input	
3	AUTO switch	Output	Level
4	Headlamp switch	Output	Level
5	Left turn signal lamp switch	Output	Level
6	/	/	/
7	Rear fog lamp switch	Output	Level
8	High beam	Output	Level
9	Overtaking	Output	Pulse
10	Right turn signal lamp switch	Output	Level

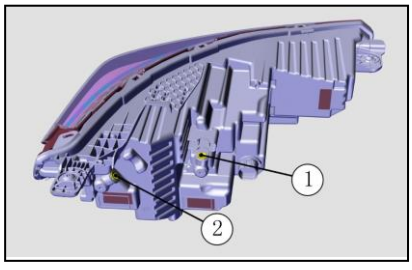
Light height adjustment switch

Refer to Instrument Panel
Switch Box Chapter
Combination
Headlamp(Headlamp
adjustment)

Equipment

General equipment or
Headlamp Tester, Allen screwdriver

Adjustment instructions



The figure above shows the left headlamp (symmetrical to it on the right), and the dimming point is:

Serial number	Name
1	Low beam vertical dimming point

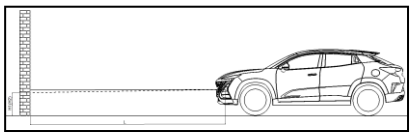
Serial number	Name
2	Low beam horizontal dimming point

1. In the figure, 1 is the vertical dimming point of the low beam. Rotate the low beam clockwise with a hexagon socket head screwdriver to move it downwards and vice versa;

2. In the figure, 2 is the horizontal dimming point of the low beam. Rotate the low beam clockwise with an Allen screwdriver to move to the left and vice versa;

3. The vehicle is parked on a level ground, and the distance between the headlamp reference center and the dimming screen (in the case of a headlamp tester, the distance required by the equipment shall prevail) is L according to the actual site conditions.

5 m or 10 m (preferably 10 m if possible), as shown in the figure below:



4. Check whether the headlamp works normally and replace the damaged parts if necessary;

5. Turn on the headlamp low beam, toggle the dimmer switch to check whether the low beam moves up and down, and finally turn the dimmer switch back to "0";

6. Check the tire pressure to make it under full load pressure;

7. Adjust the vertical and horizontal dimming points several times to check whether the dimming function is normal;

8. In the case of no load (dead weight of empty vehicle), seat one person in the driver's seat or place 75 kg's articles;

9. Check the load (fuel tank filled with not less than 90% of its volume); If the fuel content in the fuel tank does not reach 90%, increase the load as follows:

10. Read the filling level of the fuel tank on the fuel gauge, derive the weight of the additional weight according to the table below, and then place the additional weight in the trunk.

Fill level displayed on the fuel gauge	Weight of additional weight in kg
1/4	30
1/2	20
3/4	10
Full	0

Example: If the fuel tank is 1/2, the additional weight of 20 kg

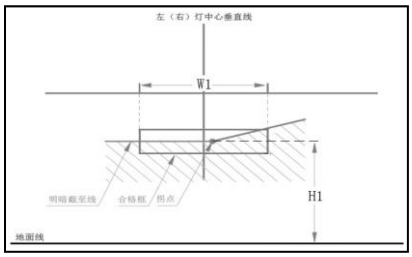
must be placed in the trunk. Lighting teaching

Low beam adjustment steps are as follows:

1 Turn on the headlamp low beam, rotate the low beam vertical dimming point 1, so that the ground height H1 of the low beam cut-off line turning point illuminated on the dimming screen is within the range required by the following table;

2 Rotate the low beam horizontal dimming point2 to offset the horizontal position W1 of the low beam cut-off line turning point illuminated on the dimming screen to the left or right within the range required by the following table, see the figure below.

Distance from low beam reference center to dimming screen L	5m	10m
Ground height H1 of low beam cut-off line turning point	911mm～926mm	876mm～846mm
Horizontal position of low beam cut-off line turning point	-25mm～25mm	-50mm～50mm



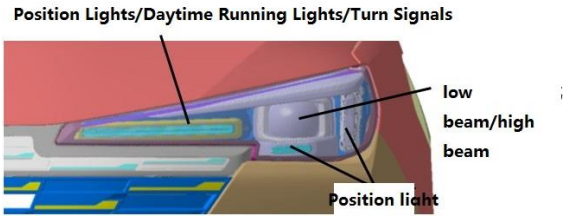
Note 1: Some astigmatism of low beam may be above the cut-off line;

Note 2: It may be necessary to perform vertical

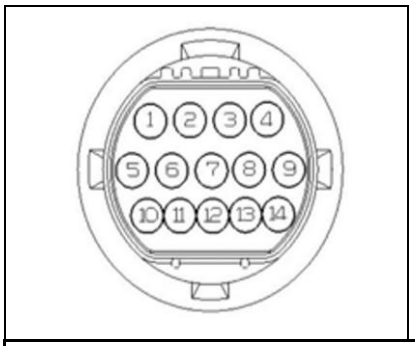
adjustment again after horizontal adjustment.

Combination headlamp principle

1. Functional diagram:



2. Interface definition:

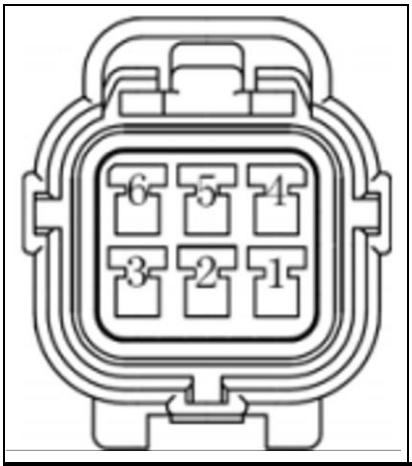


Pin	Function abbreviation	Function description
1	High beam	High beam signal
2	Low beam	Far and low beam power supply
3	High/low beam GND	Far and low beam ground
4	/	/
5	/	/
6	/	/
7	Day running lamp	Daily running lamp power supply
8	Front position lamp/day running lamp/front turn signal lamp GND	Day lamp/front position lamp/front steering lamp ground
9	Front position lamp	Position lamp power supply

10	Front turn signal lamp	Front turn signal lamp power supply
11	Front turn signal	Front turn signal
12	Motor	Motor power supply
13	Motor signal	Motor control signal
14	Motor GND	Motor ground

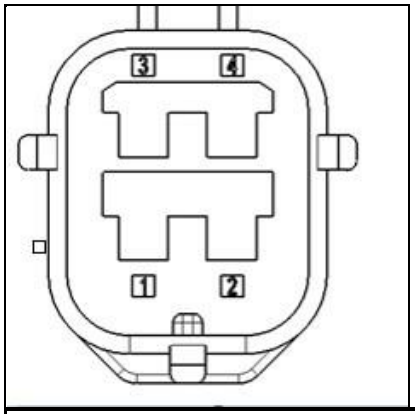
Functional definition of rear combination lamp (including reversing lamp and brake lamp)

Interface definition of combination rear lamp assembly I:



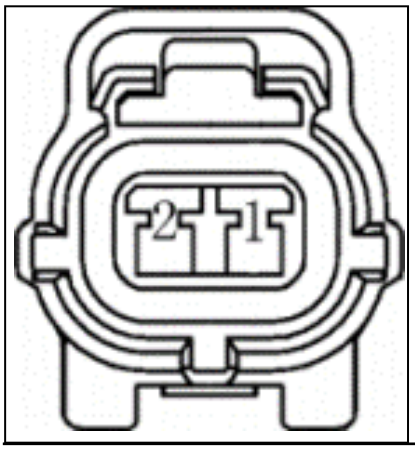
Pin	Function abbreviation	Function description
1	/	/
2	Rear position lamp	Rear position lamp positive
3	Rear turn signal lamp	Rear turn signal lamp positive
4	GND	Rear position lamp/rear turn signal lamp negative
5	/	/
6	/	/

Interface definition of combined rear lamp assembly II:



Pin	Function abbreviation	Function description
1	/	/
2	Brake lamp	Brake lamp positive
3	GND	Rear position lamp/brake lamp/reverse lamp negative
4	Reverse lamp	Reverse lamp positive

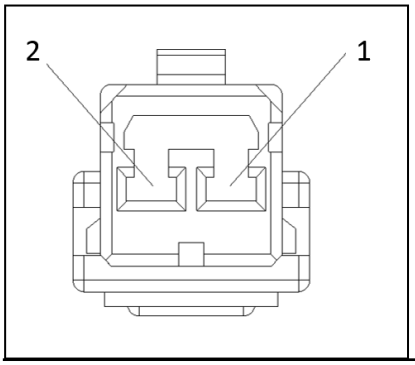
Rear fog lamp assembly and reflex reflector



Pin	Function abbreviation	Function description
1	Rear fog lamp	Rear fog lamp power supply
2	GND	Ground wire

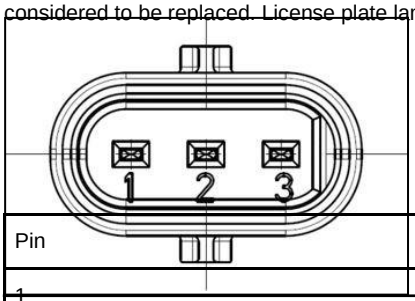
The above is the definition of rear fog lamp interface. If the rear fog lamp cannot be lit, first consider replacing the rear fog lamp bulb. The bulb model is W16W.

High-mounted brake lamp assembly



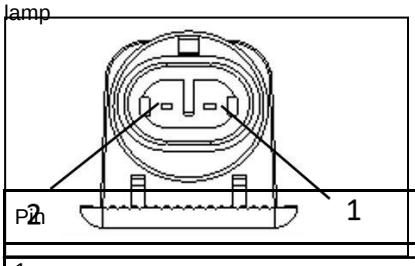
Pin	Function abbreviation	Function description
1	High-mounted brake lamp	High-mounted brake lamp power supply
2	GND	Ground wire

The high-mounted brake lamp is LED.During inspection, if the removed high-mounted brake lamp is connected to the 13.5 V power supply according to the interface definition and cannot be lit, the whole assembly shall be considered to be replaced. License plate lamp and switch assembly



Pin	Function abbreviation	Function description
1	Trunk switch	Trunk switch power supply
2	License plate lamp	License plate lamp power supply
3	GND	Ground wire

The license plate lamp power supply is LEDs. If there is a fault, connect the 13.5 V power supply according to the interface definition after removal. If it cannot be lit, consider replacing the entire license plate lamp assembly. Trunk lamp



Pin	Function abbreviation	Function description
1	Trunk lamp	Trunk lamp power supply
2	GND	Ground wire

The bulb model of trunk lamp is W5W. If it is damaged, it is

recommended to replace the bulb first. Interior front dome

lamp

Functional structure

Dome lamp fades on

If the dome lamp is in gear DOOR, it will be illuminated linearly within 1s under any of the following conditions:

1 Any door is opened (including trunk door);

2 The ignition switch is in the off state, and press the "unlock" button on the remote controller to unlock the door or use the mechanical key or central control lock switch or receive the PEPS on the bus.

The "unlock" signal is sent to unlock the door;

3 The power supply gear changes from

START/ON/ACC to OFF. Dome lamp fade out

If the dome lamp is in gear DOOR, it will extinguish linearly within one under any of the following conditions:

1 Without central locking, all doors (including trunk door) are closed for 25 seconds. If the DOOR gear switch is turned off within this time, the dome lamp immediately goes out and then is turned on.

DOOR gear switch, dome lamp is on immediately;

2 Power supply gear is OFF, all doors (including trunk door) are closed and the door is locked with central locking switch;

3 When the ignition switch is in the OFF position, all doors (including trunk door) are closed, and then press the "lock" button on the remote control to lock the door;

4 The power supply position is in the off position, and the door is locked by receiving the "lock" signal from PEPS on the bus;

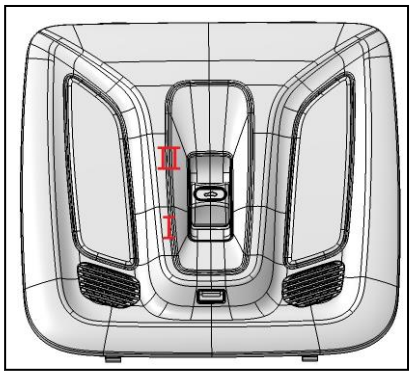
5 All doors are closed and the power supply position is in ON position/START.

Power saving function

1 The power supply gear is in the OFF state, and the dome lamp switch is in the non-OFF position. If the door is not related, the dome lamp will go out immediately after 10 minutes delay;

2 If the ignition key is removed (or the key is not detected), the dome lamp switch is in the ON position, and all

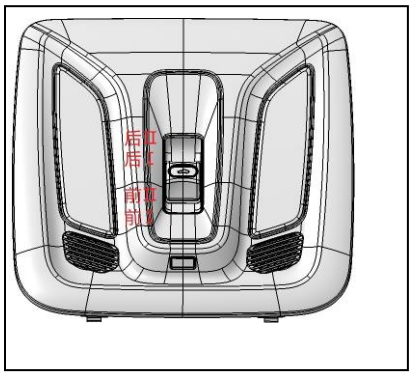
doors are closed, the dome lamp goes out immediately after 10 minutes delay. Non-panoramic roof configuration



Front dome lamps for non-panoramic sunroof configuration include: Sunroof switch, illumination lamp and illumination lamp switch, dual microphone, USB connector.

1 If you want to open the sunroof slightly, press the second end of the switch for a short time to stop the sunroof movement after a short distance.
2 If you want to close the sunroof slightly, press the switch end I briefly to stop the sunroof movement after a short distance.
3 Press switch end I and hold it for more than 0.4 seconds. The sunroof will move to full open state. In this case, only part of sunroof will be opened. Press switch end I or II.
4 When the sunroof is in a fully closed state, press end I of the switch, and the sunroof will tilt outwards. To

close the sunroof tilt, just press end II of the switch. Panoramic roof configuration



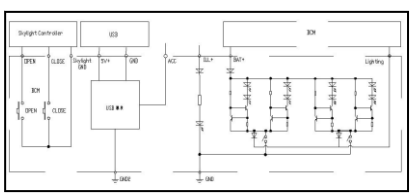
The front dome lamps for the panoramic roof include: Sunroof/sunshade switch, illumination lamp and illumination lamp switch, dual microphone.

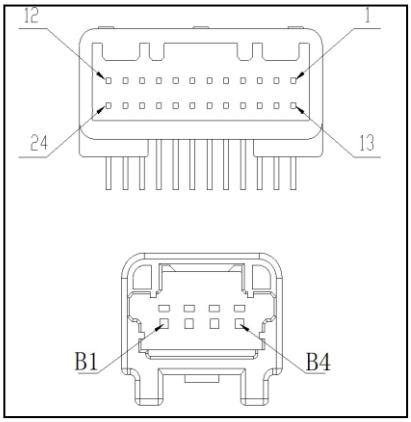
1 If you want the sunroof to open slightly, press the rear end II of the switch briefly, and the sunroof will stop moving after it starts to move for a short distance.
2 If you want to close the sunroof slightly, press the front end II of the switch for a short time to stop the sunroof movement after a short distance.
3 Press the rear end II of the switch and keep it for more than 0.4 s, and the sunroof moves to full open state.
4 When the sunroof is completely closed, press the sunroof switch, and the sunroof will tilt outwards. To close the sunroof tilt, just press the sunroof switch.
5 If you want the sunroof sunshade to open slightly, press the rear end I of the switch for a short time to stop the sunroof sunshade after it starts to move for a short distance.
6 If you want to close the sunroof slightly, press the front end I of the switch briefly to stop the sunroof movement after a short distance.
7 Press the rear end I of the sunroof switch and keep it for more than 0.4

s, and the sunroof sunshade will move to full open state. Schematic diagram

and pin definition of PIN

Non-panoramic roof configuration

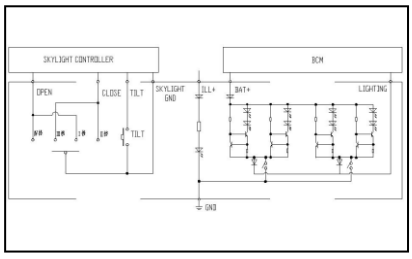


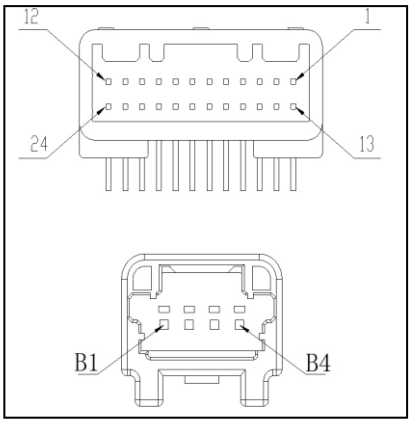


Pin pin	Function abbreviation	Input/output	Function description	Signal type
1	Energy-saving power supply	Input	Reading lamp power supply	Level
2	\	\	\	\
3	Button backlight power supply	Input	Button backlight power supply	Level
4	\	\	\	\
5	\	\	\	\
6	\	\	\	\
7	\	\	\	\
8	OPEN(Sunroof open)	Output	Sunroof opening signal output(Low efficiency)	Pulse

9	CLOSE(Sunroof closed)	Output	Sunroof close signal output(Low efficiency)	Pulse
10	\	\	\	\
11	GND	\	Power ground	Level
12	USB-	Input	USB ground	Level
13	USB+	Input	USB electric	Level
14	\	\	\	\
15	\	\	\	\
16	\	\	\	\
17	SKYLIGHT_GND		Sunroof key signal ground	Level
18	\	\	\	\
19	\	\	\	\
20	\	\	\	\
21	LIGHTING	Input	To BCM dome lamp output	\
22	\	\	\	\
23	\	\	\	\
24	\	\	\	\
B1	Microphone 1 (Passenger) -	Output	Microphone 1 negative	\
B2	Microphone 2 (driver) -	Output	Microphone 2 negative	\
B3	Microphone 1 (Passenger) +	Input	Microphone 1 positive	\
B4	Microphone 2 (driver) +	Input	Microphone 2 positive	\

Panoramic roof configuration





Pin pin	Function abbreviation	Input/output	Function description	Signal type
1	Energy-saving power supply	Input	Reading lamp power supply	Level
2	\	\	\	\
3	Button backlight power supply	Input	Button backlight power supply	Level
4	\	\	\	\
5	\	\	\	\
6	\	\	\	\
7	TILF	Output	Sunroof tilting output signal(Low efficiency)	\
8	OPEN	Output	Sunroof/sunshade opening signal (Low effective)	Pulse
9	CLOSE	Output	Sunroof/Sunshade Close Signal (Low effective)	Pulse
10	\	\	\	\
11	GND		Power ground	Level
12	USB-	\	\	\
13	USB+	\	\	\
14	\	\	\	\
15	\	\	\	\
16	\	\	\	\
17	SKYLIGHT_GND	Output	Sunroof key signal ground	Level
18	\	\	\	\
19	\	\	\	\
20	\	\	\	\
21	LIGHTING	Input	To BCM dome lamp output	\
22	\	\	\	\
23	\	\	\	\
24	\	\	\	\
B1	Microphone 1 (Passenger) -	Output	Microphone 1 negative	\
B2	Microphone 2 (driver) -	Output	Microphone 2 negative	\
B3	Microphone 1 (Passenger) +	Input	Microphone 1 positive	\

B4	Microphone 2 (driver) +	Input	Microphone 2 positive	\

Interior rear dome lamp component description dome lamp fades on

If the dome lamp is in gear DOOR, it will be illuminated linearly within 1s under any of the following conditions:

1 Any door is opened (including trunk door);

2 The ignition switch is in the off state, and press the "unlock" button on the remote controller to unlock the door or use the mechanical key or central control lock switch or receive the PEPS on the bus.

The "unlock" signal is sent to unlock the door;

3 The power supply gear changes from

START/ON/ACC to OFF. Dome lamp fade out

If the dome lamp is in gear DOOR, it will extinguish linearly within one under any of the following conditions:

1 Without central locking, all doors (including trunk door) are closed for 25 seconds. If the DOOR gear switch is turned off within this time, the dome lamp immediately goes out and then is turned on.

DOOR gear switch, dome lamp is on immediately;

2 Power supply gear is OFF, all doors (including trunk door) are closed and the door is locked with central locking switch;

3 When the ignition switch is in the OFF position, all doors (including trunk door) are closed, and then press the "lock" button on the remote control to lock the door;

4 The power supply position is in the off position, and the door is locked by receiving the "lock" signal from PEPS on the bus;

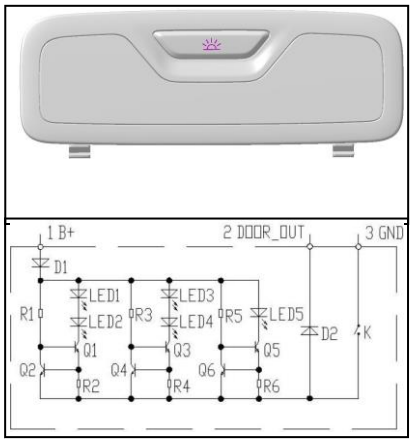
5 All doors are closed and the power supply position is in ON position/START.

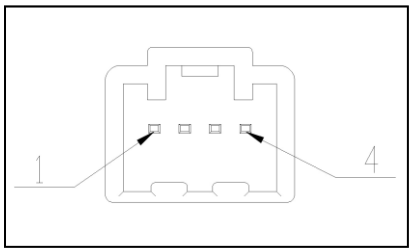
Power saving function

1 The power supply gear is in the OFF state, and the dome lamp switch is in the non-OFF position. If the door is not related, the dome lamp will go out immediately after 10 minutes delay;

2 If the ignition key is removed (or the key is not detected), the dome lamp switch is in the ON position, and all

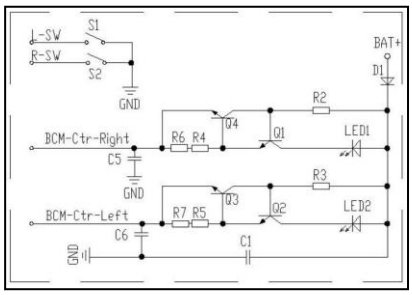
doors are closed, the dome lamp goes out immediately after 10 minutes delay. Non-panoramic roof configuration

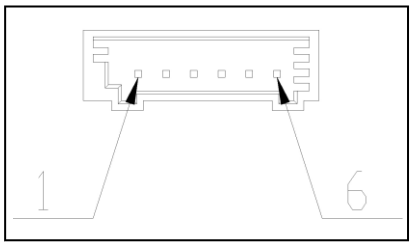




Pin pin	Function abbreviation	Input/output	Function description	Signal type
1	Energy-saving power supply	Input	Reading lamp power supply	Level signal
2	LIGHTING	Input	To BCM dome lamp output	Level signal
3	GND	Input	Grounding	Level signal
4	\	\	\	\

Panoramic roof configuration

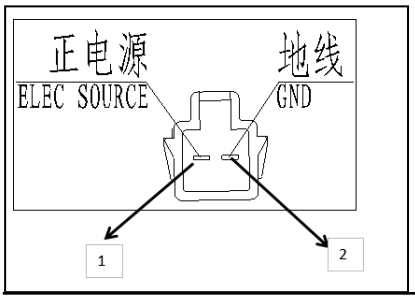




Pin pin	Function abbreviation	Input/output	Function description	Signal type
1	Power saving power supply	Input	Reading lamp power supply	Level signal
2	GND	Input	Grounding	Level signal
3	L-LED	Input	BCM left reading lamp input	Level signal

4	R-LED	Input	BCM right reading lamp input	Level signal
5	L-SW	Output	Left reading lamp signal output	Level signal
6	R-SW	Output	Right reading lamp signal output	Level signal

Makeup lamp



Pin	Function abbreviation	Function description
1	Makeup lamp	Make-up lamp positive
2	Makeup lamp GND	Makeup lamp GND

The make-up lamp adopts the bulb light source, and the bulb model is W5W. When the make-up lamp fails, first consider replacing the bulb.

Common methods

Manually adjust headlamp height and left/right

Refer to "Combination headlight (headlight adjustment)" chapter.

Determination method of water intake and fogging of lamps

- The exterior lamps adjust the internal pressure through the air vent when working. When moist air enters the interior of the lamps and the lens temperature of the lamps is relatively low, fog may be generated (frost may occur under extremely cold conditions). Lamp fogging is normal and has no effect on lamp service life.
- When normal fogging occurs, a layer of fog beads will form on the inner surface of the lamp lens, and this layer of fog beads will eventually dissipate, but may appear again under certain environment. Complete dissipation of the fogging may take 2~3 days or more depending on the ambient temperature, humidity, and the time the lights are used.
- When the above occurs, explain the principle to the customer.
- However, if the following conditions occur, it is recommended to consider replacing the lamp assembly.

1. There is a large area of water droplets or flow marks on the inside of the lamp lens.
2. There is obvious water accumulation inside the lamp.

Fault symptom diagnosis

Inspection and confirmation

The functions of lamps shall be all normal. Please refer to the introduction of system function principle for relevant functions.

Visual inspection table area division

According to the visibility of each area after loading, it can be divided into the following areas:

Zone A: Transparent protective screen area without any pattern and interior area or parts of the lamp clearly visible through this protective screen.

Zone B: Transparent protective screen area with slight pattern and interior area or parts of the lamp still visible through this area.

Zone C: Transparent protective screen area with heavy pattern, colored protective screen area and lamp interior area or parts that cannot be clearly visible through these areas.

Zone D: Non-trim surfaces that are visible only when the hood,

trunk lid or rear door is opened. Evaluation method

(1) In natural environment, observe the distance of 60-70 cm and look forward. The detection environment must meet the following conditions: (1) The interior must be equipped with necessary lighting devices, and the exterior must have sufficient lighting; (2) The fluorescent lamps used for lighting shall be equipped with reflector, which can be properly adjusted: The illuminance is about 500 - 1000lx, and the inspector shall not be dazzled.

(2)If the defect point is less than Φ0.3, it shall not be evaluated; if it is greater than Φ0.3 and less than or equal to Φ0.6, it shall be regarded as Φ0.6; if it is greater than Φ0.6 and less than or equal to Φ1.0, it shall be regarded as Φ1.0; if it is greater than Φ1.0 and less than or equal to Φ1.5, it shall be regarded as Φ1.5; if it is greater than Φ1.5 and less than or equal to Φ2.0, it shall In case of non-circular shape, it is regarded as circular shape with length as diameter.

(3)The distance between defect points is greater than 25㎜.

(4)Illuminate thick wall or light guide or other type of surface light source and observe lighting effect:

Evaluation criteria

Defect name	Evaluation area(Maximum number of defects allowed)				Evaluation range size
	Area A	Zone B	Zone C	Zone D	
Indentation	Not allowed	Not allowed	Conditional	Permitted	Entire area
Shrink pit	1×0.5 deep	1×0.5 deep	1×0.5 deep	Permitted	Diameter within 100 MM
Impurity/bubble/pitting/white spot	3×Φ0.6 or 2×Φ1.0	4×Φ0.6 or 3×Φ1.0 Or 2×Φ1.5	5×Φ0.6 or 4×Φ1.0 or 3×Φ1.5 or 2×Φ2.0	Permitted	Φ100 MM inner.Defect point spacing is greater than 25 MM.
Flow mark/weld line	* Conditional	* Conditional	* Conditional	Permitted	Entire area
Water ripple/large shrinkage pit	Not allowed	Not allowed	* Conditional	* Conditional	Entire area
Dirty spots/other spots	Not allowed	Not allowed	* Conditional	Permitted	Entire area
Surface blackening	Not allowed	Not allowed	* Conditional	Permitted	Entire area
Burrs/burrs	Not allowed	Not allowed	Not allowed	Max. 0.3 MM	Entire area
Crack/burst	Not allowed	Not allowed	Not allowed	* Conditional	Entire area
Handprint	Not allowed	Not allowed	* Conditional	Permitted	Entire area
Scratch	Not allowed	Not allowed	Not allowed	* Conditional	Entire area
Uneven brightness	Not allowed	Not allowed	* Conditional	Permitted	Entire area
Silver wire	Not allowed	Not allowed	* Conditional	Permitted	Entire area
Tandem color	Not allowed	Not allowed	* Conditional	Permitted	Entire area
Scorch mark	Not allowed	Not allowed	Not allowed	* Conditional	Entire area
Orange peel	* Conditional	* Conditional	* Conditional	Permitted	Entire area
Paint thin exposed bottom	Not allowed	Not allowed	* Conditional	Permitted	Entire area
Cloudy attachment	Not allowed	Not allowed	* Conditional	* Conditional	Entire area
Missing plating	Not allowed	Not allowed	* Conditional	Permitted	Entire area
Plating yellow	Not allowed	Not allowed	* Conditional	Permitted	Entire area
Adhesive leakage	Not allowed	Not allowed	* Conditional	* Conditional	Rubber distribution groove periphery
Welding edge	Not allowed	Not allowed	* Conditional	* Conditional	Entire area (Perimeter of weldment)
Color difference after lighting	Not allowed	Not allowed	* Conditional	Permitted	Entire area
Bright spot after lighting	Not allowed	Not allowed	* Conditional	Permitted	Entire area
Colored after lighting	Not allowed	Not allowed	* Conditional	Permitted	Entire area

Fault symptom table

Turn the ignition switch to ON position for the following check:

Phenomenon	Solution
1. Steering lamp switch problem	
	Turn the combination switch to left steering gear and right steering gear respectively, and check the combination switch pin 2 respectively. And 5, 2 and 10 are connected; ? No Replace combination switch; ? Yes Repair the turn signal lamp.
2. dimmer switch problem	
	Turn the combination switch to the high beam dimming position, and check whether the combination switch pins 2 and 9 are connected; Turn to overtaking gear and check whether combination switch 2 and 9 are connected; ? No Replace combination switch; ? Yes Repair the high beam.
3. position lamp switch problem	
	Turn the combination switch to the position lamp position. Check whether combination switch pins 1 and 2 are turned on; ? No Replace combination switch; ? Yes Service position lamp.
4. Low beam switch problem	
	Turn the combination switch to the low beam (headlamp) position. Check pins 1, 2 and 4 Whether it is connected; ? No Replace combination switch; ? Yes Repair the low beam.
5. Rear fog lamp switch problem	
	Turn the combination switch to the low beam position. Turn the knob rear fog lamp switch position, and check whether combination switch pins 2 and 7 are connected; ? No Replace combination switch; ? Yes Repair rear fog lamps.

Flashing frequency of steering lamp is high

1. Check whether the harness is in good condition without obvious fracture;
2. Check whether the steering lamp is in good condition and there is no obvious abnormality;
3. Check whether BDC is in good condition and there is no obvious abnormality;

4.Read whether there is fault code

Atmosphere lamp color does not change

If the ambient light does not come on, it may be the A/C panel LED or the circuit is damaged. Replace the A/C panel.

Lamp abnormal sound

Due to the electronic circuit structure inside the lamp, slight current sound is normal and does not affect normal use. If the user complains about the current sound, explain this to the customer as normal.

Automatic headlamp failure

1.Check whether the harness is in good condition and there is no obvious abnormality;

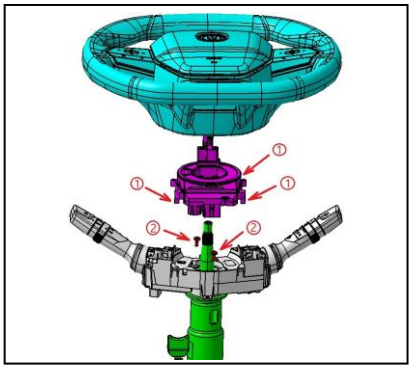
2.Check whether the rain ambient light sensor is in good condition and there is no obvious abnormality;

3.Check whether BDC is in good condition and there is no obvious abnormality;

4.Read the complete vehicle DTC.

Removal and installation

Removal and installation of combination switch



Figur e 130

1 Remove the steering wheel before removing the combination switch, refer to Steering Wheel Chapter

2 After removing the steering wheel, open the three buckles of arrow 1 shown in the figure by hand, remove the rotary connector, and pull out the rotary connector connector;

3 Unscrew the two screws of arrow 2 shown in the figure with cross start, remove the combination switch, and pull out the combination switch connector;

4 The installation sequence is the reverse of the removal sequence.

Light height adjustment switch

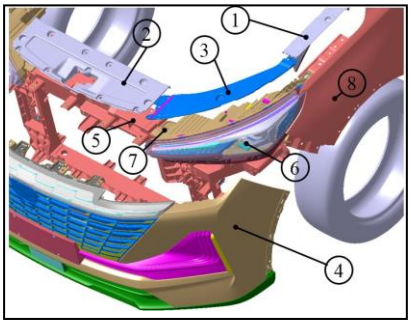
Refer to instrument panel

switch box chapter

combination headlamp

assembly I.

1.



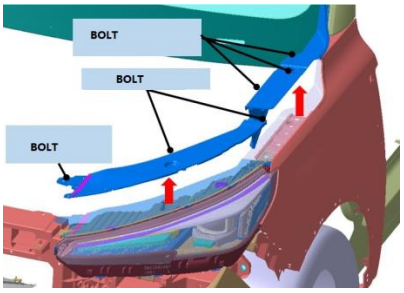
Serial number	Name	Quantity

1	Fender upper trim assembly	2
2	Front bumper upper trim cover plate assembly	1
3	Headlamp upper trim assembly	2
4	Front bumper assembly	1
5	Front end module assembly	1
6	Combination front lamp assy. I	2
7	Hexagon socket head bolt	8
8	Fender	2

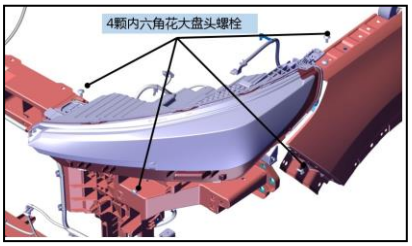
2. Removal

1 Remove front bumper, see Removing and installing front bumper

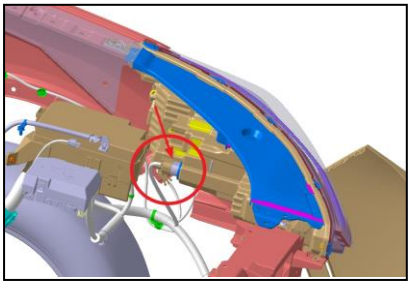
2 Use tools to remove headlamp upper cover plate trim assembly and fender upper trim assembly. Tool 1: Cross screwdriver torque: 1.5±0.5N.m Tool 2: 10 mm sleeve, torque: 3N±1N.m



3 Use T30 hexagon socket wrench to unscrew four hexagon socket pan head bolts of headlamp. Tool: T30 socket wrench, torque: 6±1N



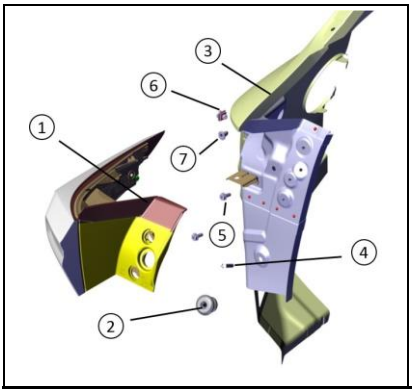
4 Unplug the connector connecting the headlamp and the body, and complete the removal.



3. Installation

Installation sequence is reverse to removal sequence(Take the left lamp as an example, and the right lamp is symmetrical with it.)

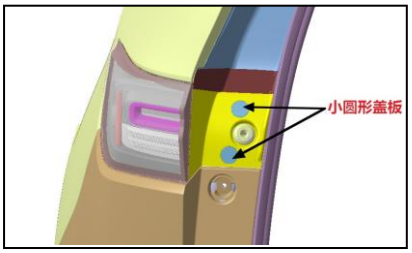
Combined rear lamp (including reverse lamp and brake lamp) combined rear lamp assembly I



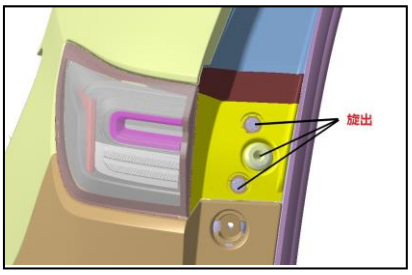
Serial number	Name	Quantity
1	Combination rear lamp assembly I	2
2	Cushion support assembly	2
3	Side wall welding assembly	2
4	Cross recessed countersunk head screw	2
5	Cross recessed hexagon-head screw	4
6	Buckle	2
7	Buckle	2

1. Removal

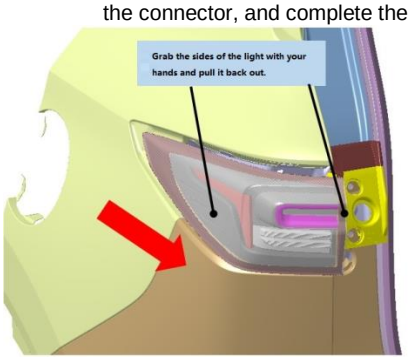
1 Remove the combination rear lamp assembly I, and gently unscrew the small round cover plate of cross recessed hexagon head screw on the trim panel with a flat screwdriver or hand;



2 Use a tool (cross screwdriver) to unscrew the hexagon head screws and cross recessed countersunk head screws installed on the body. Tool: Cross screwdriver, torque: 3.5N±1N.m;

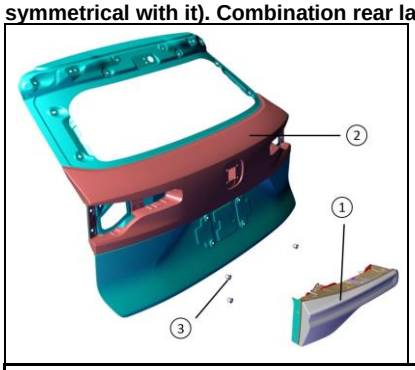


3 Hold the two sides of the lamp with both hands respectively, pull out forcefully towards X toward the rear of the vehicle, pull out the connector, and complete the removal.



Installation

1 The installation sequence is opposite to the removal sequence (take the left lamp as an example, and the right lamp is symmetrical with it). Combination rear lamp assy. II



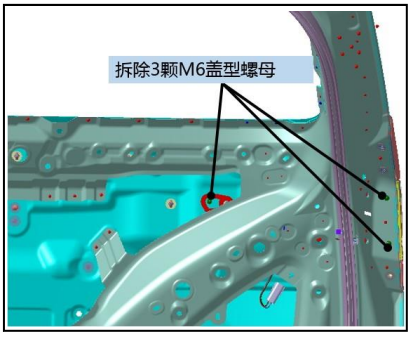
Serial number	Name	Quantity
1	Combination rear lamp assy. II	2
2	Tailgate outer trim assembly	1
3	Cap nut	6

1. Removal

1 Open tailgate, remove tailgate trim panel completely, refer to Removing and installing tailgate trim panel

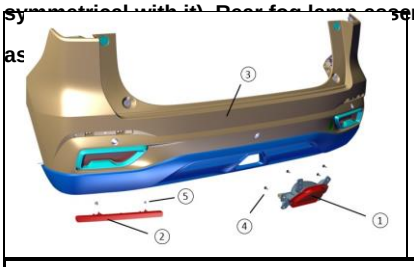
2 Use a tool (12 mm sleeve) to remove three M6 cover nuts 05145-06001 respectively, pull out the connector, and complete the removal.Tool: 12 mm sleeve, torque:

3±1N.m;



Installation

1 The installation sequence is opposite to the removal sequence (take the left lamp as an example, and the right lamp is symmetrical with it). Rear fog lamp assembly and reflex reflector assembly

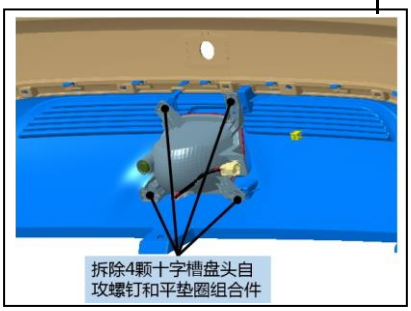


Serial number	Name	Quantity
1	Rear fog lamp assembly	1
2	Reflex reflector assembly	2
3	Rear bumper body and accessory assembly	1
4	Cross recessed pan head tapping screw and plain washer assembly	4
5	Cross recessed pan head tapping screw	4

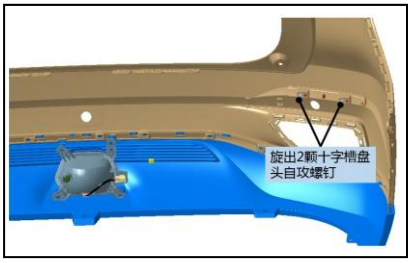
Removal

1 Refer to Removing and installing rear bumper to remove the rear bumper.

2 Use a cross screwdriver to separately unscrew 4 cross recessed pan head self-tapping screws and plain washer assemblies, unplug the connector, remove the rear fog lamp assembly, and complete the removal. Tool: Phillips screwdriver Torque: 1.5±0.5N.m

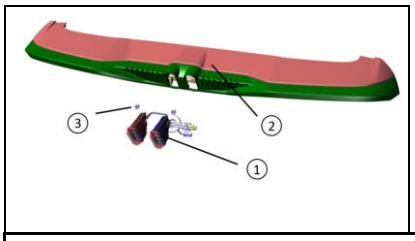


3 Unscrew the cross recessed pan head tapping screw on the reflex reflector with a cross screwdriver, remove the reflex reflector and complete the removal. Tool: Phillips screwdriver Torque: 1.5±0.5N.m



- **Installation**

1 The installation sequence is opposite to the removal sequence (take the left lamp as an example, and the right lamp is symmetrical with it). High-mounted brake lamp assembly

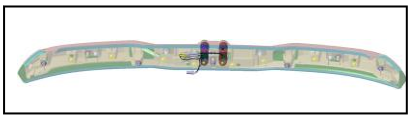


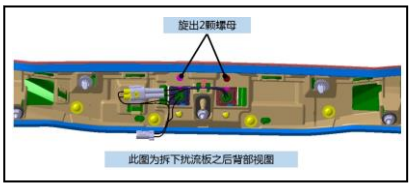
Serial number	Name	Quantity
1	High-mounted brake lamp assembly	1
2	Spoiler	1
3	Nut	2

1. Removal

1 Remove spoiler assembly, refer to Removing and installing spoiler,

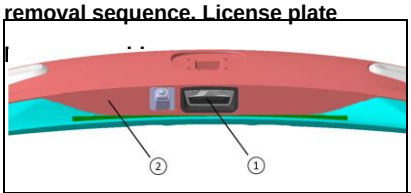
2 Unplug the connector connecting the high-mounted brake lamp and the body, unscrew the two nuts of the high-mounted brake lamp with a 10 mm sleeve, take down the high-mounted brake lamp assembly, and complete the removal.Tool: 10 mm Sleeve Torque: 3±1N.m





Installation

1 The installation sequence is the reverse of the removal sequence. License plate



Serial number	Name	Quantity

1	License plate lamp and switch assembly	1
2	License plate trim	1

1. Removal

   1 Remove tailgate exterior trim parts and handle box. Refer to Removing and Installing tailgate exterior trim parts and handle box.

   2 Unplug the connector connecting the license plate lamp and switch assembly and body, eject the license plate lamp and switch assembly from the inside with hand or flat screwdriver, and complete the removal.

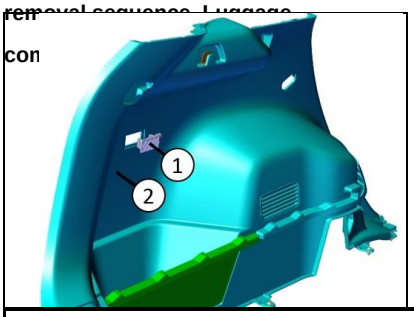
2. Installation

   1 The installation

sequence is the reverse of the

removal sequence. Luggage

compartment lamp assembly



Serial number	Name	Quantity
1	Trunk lamp assembly	1
2	**C Pillar lower trim panel assembly**	1

Removal

1 Use a flat screwdriver or hand to directly pull out the trunk lamp.Tool: Flat screwdriver Torque: 1±0.5N

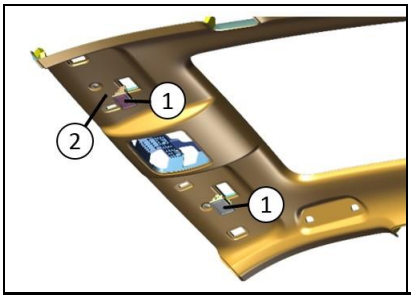
2 Unplug the connector, remove the trunk lamp, and complete the removal. Installation

1 The installation

sequence is the reverse of the

removal sequence. Make-up

lamp assembly



Serial number	Name	Quantity

1	Make-up lamp assembly	1
2	Headliner assy.	1

1. Removal

The flat screwdriver or hand shall directly pull out the makeup lamp assembly, pull out the connector and complete the removal. Tool: Flat screwdriver, torque: 1±0.5N

2. Installation

The installation sequence

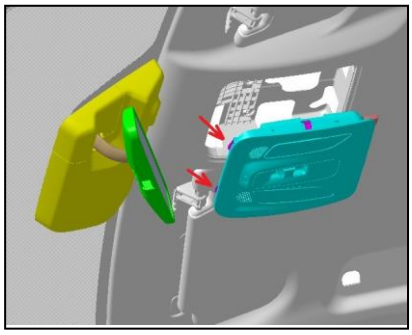
is the reverse of the removal

sequence. Interior front dome

lamp

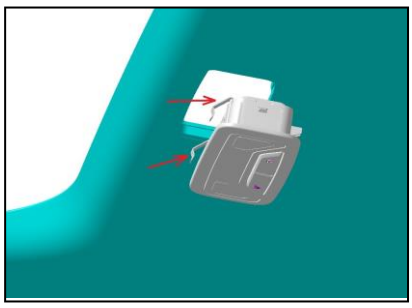
Removal and installation

1 Lift the two spring clips at the front end of the front dome lamp with a word, pop the spring clips out of the ceiling bracket, and remove the front dome lamp;
2 After removing the front dome lamp, remove the harness connector;
3 The installation sequence is the reverse of the removal sequence.

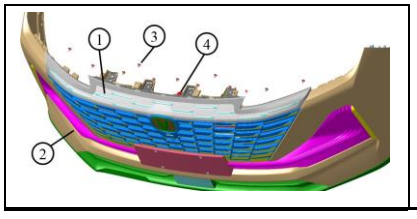


Removal and installation of interior rear dome lamp

1 When removing the rear dome lamp, open the two spring clips at the front end of the rear dome lamp with a word, as shown in the figure;
2 Remove the rear dome lamp, and then unplug the harness connector;
3 The installation sequence is the reverse of the removal sequence.



Front trim lamp



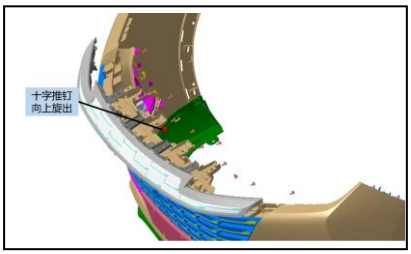
Serial number	Name	Quantity
1	Front trim lamp	1

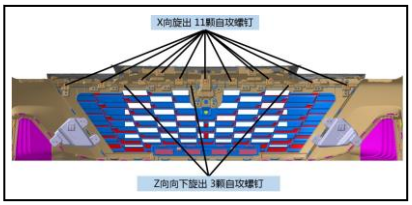
2	Front bumper assembly	1
3	Cross recessed pan head tapping screw and big washer combination	14
4	Cross push screw	1

Removal

1 Remove front bumper assembly, refer to Removing and installing front bumper

2 Use a tool to unscrew the cross screw, and unscrew 14 cross recessed pan head self-tapping screws (11 of which are located at the rear in X direction, and 3 at the bottom in Z direction). Tool: Cross screwdriver, torque: 1.5±0.5N.m.





3 Remove the front trim lamp assembly from the front bumper and complete the removal.

Installation

Installation is in reverse order of removal.

Spare parts atlas

F28050

1

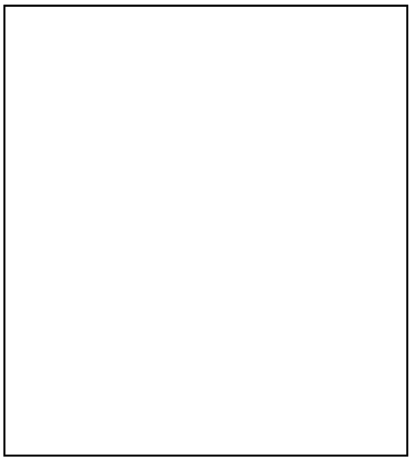
F28050

2

F28050

3

Composition and position distribution of body door lock and anti-theft system

Composition	Position
Front hood lock	Front end of front cover
Four door lock	
Tailgate lock	The tailgate opening button is located inside the vehicle.

System functional principle introduction

Note: This remote control anti-theft device adopts two-key type, locking

key is anti-theft device, and unlocking key is anti-theft release. Preset

protection status

（1） Enter the preset anti-theft state: When the vehicle power supply state is OFF and all doors are closed, the BDC bus sends "lock" signal, the four doors are locked and the vehicle enters the preset anti-theft state at the same time, and the anti-theft indicator changes to always on.

（2） Exit preset anti-theft: Enter preset anti-theft Tp (Tp can be configured as 15 s, 25 s, 35 s and 45 s). After any of the following conditions is met, the vehicle exits preset anti-theft state and enters the anti-theft state, and the anti-theft indicator goes out at the same time: A. Open any door; B. The power supply status changes to non-off gear (ACC, START or ON); C. Receive remote control unlocking signal; D. Receive the "IMMO certification succeeds" signal from the bus. e) Enter the preset anti-Tp, if the remote control opens the luggage compartment, the vehicle will remain in the preset anti-Tp state, and the vehicle will enter the anti-Tp state after closing the luggage compartment. f) If any of the above conditions does not occur, the complete vehicle after Tp enters the fortification state from the preset fortification state.

Fortification status

Entry fortification: The conditions for entry fortification are described in the exit preset fortification function. Refer to Exit Preset Prevention Function for details.Enter the condition of fortification in the secondary anti-theft function. Refer to secondary anti-theft function for details.The anti-theft indicator lamp flashes slowly after the vehicle enters the fortification.

Cancel fortification: No matter what state the vehicle is in, when the power state of the vehicle is OFF, the vehicle enters or remains in the cancel fortification state as long as the "unlock" signal is sent from BDC. When the power supply status of the complete vehicle is not OFF, as long as the BDC receives the "IMMO certification feedback" signal from the EMS bus and the value is "Successful," the complete vehicle enters or remains in the anti-theft state, and the anti-theft indicator goes out.

Anti-theft activation status

1.Anti-theft activation: A. Open any door when it is not unlocked by remote control or "unlocked" signal from PEPS bus is not received; B. When non-remote control trunk is unlocked or "trunk unlocking" signal or body sense signal is not received from PEPS bus is set (PEPS_LuggageUnlockSignal is set to 0x1 or 0x2; PEPS_Easy_open=0x1) Open the trunk door; C. Open the engine hood.

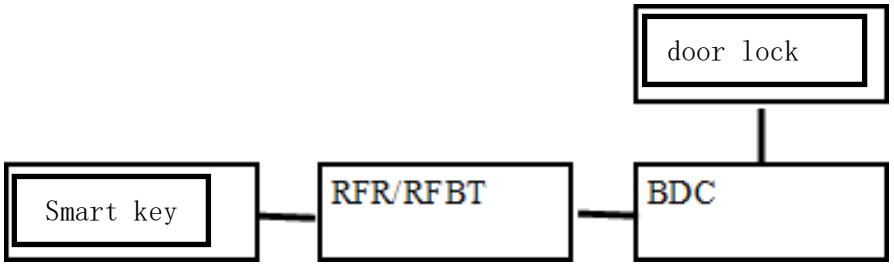
2、 anti-theft activation alarm logic. According to the configuration, the activation state logic is as follows: After entering the anti-theft activation state TW (TW can be configured as 5s, 10 s and 15 s), the turn signal lamp will give an alarm for 5 min, meanwhile the horn will sound 28 s and the anti-theft indicator lamp will flash quickly; If there is an intrusion signal 5 minutes after the turn signal alarm, the light alarm of 5 minutes and the audible alarm of 28 times are activated again.

3、 anti-theft release: When the vehicle is in the anti-theft activation state and receives the "unlock" signal from the PEPS bus, the anti-theft activation can be released, the vehicle enters the anti-theft state, the turn signal flashes four times, and the buzzer alarm mode is "Exit anti-theft activation state prompt." If the bus receives the IMMO certification success signal sent by EMS, anti-theft activation can also be canceled. The vehicle enters the anti-theft state, and the turn signal flashes for four times. The buzzer alarm mode is "Exit anti-theft activation state prompt," and the anti-theft indicator goes out.

4、 The factory state of BDCs is the initial state, and the initial password shall be set at the factory (see diagnostic file of BDCs for details). When BDC is in initial state, its vehicle anti-theft function is in fortified state. If the password of BDC is the initial password, when anti-theft is activated, there is no light and sound alarm, but the status signal sent on BDC bus is still fortified.
(I.e. arm state); If the password of the BDC is not the initial password, it shall be executed according to the normal

logic when anti-theft is activated (i.e. there shall be light and audible alarm). Secondary anti-theft

After the vehicle enters the defensive state from the defensive state or the preset defensive state, if the ignition switch is not opened within 30 seconds, BDC locks all the doors and the vehicle enters the defensive state. Meanwhile, anti-theft indicator flashes slowly.Note: The anti-theft status before power-off shall be maintained when the BDC is powered on again. At the same time, when factory configuration is delivered, the BDC status is fortified.



Inspection of part structure principle

RF receiver

RF receiver is a controller for receiving wireless high frequency signals of key and tire pressure, and forwards the key and tire pressure signals to BDC for execution.

J1-01	NA
J1-02	LIN
J1-03	POLLING
J1-04	GND
J1-05	Hard wire
J1-06	Power supply

F.L. door lock with locker F.L. door lock assy.

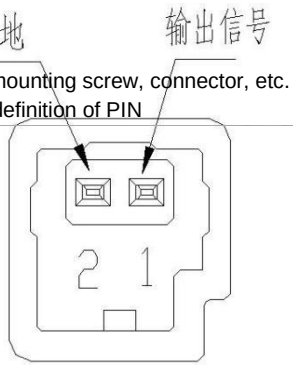
Other three door locks with locker FRT RH door lock assembly

R.L. door lock assy.

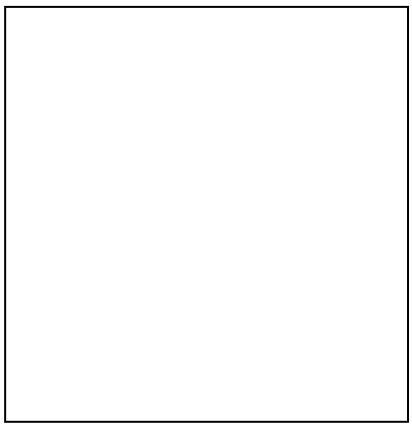
R.R. door lock assy.

Function structure of door signal lamp switch

Door signal lamp consists of switch button, waterproof



rubber, mounting screw, connector, etc. Schematic diagram and pin definition of PIN



Front hood lock and status switch

The front cover lock is located at the front end of the front cover, as shown in the figure.

When the front cover is closed, the lock pin of the front cover is hit against the lock bolt by the weight of the front cover. Unlock the front cover by pulling the front cover unlocking handle on the instrument panel to drive the unlocking cable and stop block to complete level 1 unlocking. Lift the front cover to expose the gap, extend the hand into it and toggle the secondary unlocking handle to unlock the front cover.

Common methods

Method of release after anti-theft triggering

1. Press the unlock button of the smart key;
2. Bring the smart key and press the PE switch.

Replacement method of key battery

1. Open the rear lid of the key;
2. Then open the upper battery cover.
3. Replace battery

Fault symptom diagnosis

IBCM Common fault diagnosis

Function	Fault symptom	Fault cause	Solution	Remarks
Remote control function	Failure of all functions of remote controller	1 No matching remote control 2 Too far from the vehicle, or Strong interference near the vehicle Source. (Transmitter, etc.) **3 The remote controller has no power, check** Battery in remote control Does the voltage >2.9 V **4 Contact between remote controller and battery** Bad	1 Re-online key configuration or diagnostic scanner manual key configuration 2 Enter the vehicle for operation or leave the area 3 Replace the battery for the key. 4 PCB in remote control Reinstall the plate once 5 Charge the battery 6 Replace the remote controller and re-learn the keyless system menu through the diagnostic scanner.	First note that the power supply must be OFF Status.

		5 Vehicle battery power Foot **6 Remote control damaged**		

Function	Fault symptom	Fault cause	Solution	Remarks
Keyless entry function	Keyless entry failure	1 Smart key has fault 2 Front left/right door handle Switch short or open **3 Front left/right door handle** Antenna short circuit or open circuit 4 Keyless control module damage 5 Vehicle battery power Foot 6 IBCM Problem 7 Keyless control module and BCM Direct CAN Bus short or open	**1 When pressing the door handle button, observe the** Does the indicator light flash, If there is flashing, confirm the key. Normal; If there is no flicker, please Handle according to remote control failure **2 Read with diagnostic scanner** IBCM fault code, Is there a problem with the watchman handle antenna **3 Read with diagnostic scanner** IBCM fault code, See if IBCM is present Fault 4 Charge the battery 5 Replace body intelligent control Device assembly Note: Replace body intelligent control The device needs to re-learn the smart key Key, re-match anti-theft.	
One-button start	Vehicle cannot be started	**1 First observe starter motor** Does it turn, if it starts Press the engine related fault block after rotating the motor. Except, keyless system positive Constant **2 Observe whether there is relevant fault prompt on the instrument.** If prompted, Please refer to diagnostic scanner fault Code handling method **3 Observe if the indicator on the key flashes, if any**	**1 Refer to diagnostic scanner fault generation** Code processing method 2 Check whether the key is normal 3 Check engine control module Whether the block has fault code 4 Check battery voltage and charge 5 Check whether the circuit is open Or short circuit **6 Replace body intelligent control** Device Note: To replace the body intelligent controller, it is necessary to re-learn the smart key and re-perform anti-theft	

		Flicker normally to confirm that the key is normal; If there is no flicker, please Handle according to remote control failure **4 Check start request signal** Normal **5 Vehicle battery power** Foot **6 Can bus short circuit or open** Road	matching.	

Inspection and maintenance

Test conditions	Maintenance method
1. Test steps and methods	
A. Check whether the resistance of start/stop switch is normal; B. Check whether both ends of harness are in normal contact; C. Check whether the appearance of BDC is normal.	A. Replace the start/stop switch and re-verify whether the function is normal; B. Reinsert connector harness; if the harness and connector are damaged, replace it; C. Replace BDC and re-verify whether the function is normal.

DTC Diagnostic

BDC

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
1	B104D17	Circuit voltage exceeds threshold	1. BCM is in wake-up mode or network sleep mode. 2.The engine is in non-CRANK 3.The actual voltage on the battery input pin is higher than the defined 16.5 V. 4.Duration 500 ms	Power supply 1 output voltage too high	1. Read DTC with diagnostic scanner 2.Check whether the battery is within the 9-16 V range. 3. Check connecting harness (J5-49) (9-16 V)	
2	B104D16	Circuit voltage below threshold	1. BCM is in wake-up mode or network sleep mode. 2.The engine is in non-CRANK 3.Actual voltage on battery input pin is lower than definition 8.5 V 4.Duration 500 ms	Power supply 1 output voltage too low	1. Read DTC with diagnostic scanner 2.Check whether the battery is within the 9-16 V range. 3. Check connecting harness (J5-49) (9-16 V)	
4	U101088	DiagCAN interface Bus-off	1. Battery voltage is 9-16 V, and BCMs Awake 2. After power-on for 1S 3. Bus off counter value NBusOffCount>=5	1. Harness/connector fault; 2. Controller fault; 3. External interference(Such as illegal peripherals)	1. Read DTC with diagnostic scanner 2. Check CAN line Connection (J2-39/ J2-40) (1.5-3.5 V) 3. Check whether there is exterior Set access OBD 4. Test terminal resistance Is 120 ohm left Right, if obvious 100 or less Above 140, check Check terminal resistance control Is the device damaged, more Observe after replacing controller Is the fault	

					eliminated	
5	U101288	PCAN interface Bus- off	1. Battery voltage is 9-16 V, and BCMs Awake 2. After power-on for 1S 3. Bus off counter Value NBusOffCount>=5	1. Harness/connector fault; 2. Controller fault; 3. External interference(Such as illegal peripherals)	1. Read DTC with diagnostic scanner 2. Check CAN line Connection(J5-2/J5-3) (1.5-3.5 V) 3. Check whether there is exterior Set access OBD 4. Test terminal resistance Is 120 ohm left Right, if obvious 100 or less Above 140, check	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
					Check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
6	U101988	BCAN Bus-off	1. Battery voltage is 9-16 V, and BCMs Awake 2, 1S after power-on 3. Bus off counter value NBusOffCount>=5	1. Harness/connector Fault; 2. Controller fault; 3. External interference(Such as illegal peripherals)	1. Read with diagnostic scanner Fault code 2. Check CAN line Connection (J3-63/ J3-64) (1.5-3.5 V) 3. Check whether there is exterior Set access OBD 4. Test terminal resistance Is 120 ohm left Right, if obvious 100 or less Above 140, check Check terminal resistance control Is the device damaged, more Observe after replacing controller Is the fault eliminated	
7	U101188	SCAN Bus-off	1. Battery voltage is 9-16 V, and BCMs Awake 2. After power-on for 1S 3. Bus off counter Value NBusOffCount>=5	1. Harness/connector Fault; 2. Controller fault; 3. External interference (such as Illegal peripheral)	1. Read with diagnostic scanner Fault code 2. Check whether there is exterior Set access OBD 3. Check CAN line Connection (J3-61/ J3-62) (1.5-3.5 V) 4. Test terminal resistance Is 120 ohm left Right, if obvious 100 or less	

					Above 140, check Check terminal resistance control Is the device damaged, more Observe after replacing controller Is the fault eliminated	
8	U101388	INFOCAN Bus- off	1. Battery voltage is 9-16 V, and BCMs Awake 2. After power-on for 1S 3. Bus off counter value NBusOffCount>=5	1. Harness/connector Fault; 2. Controller fault; 3. External interference(Such as illegal peripherals)	1. Read with diagnostic scanner Fault code 2. Check CAN line Connection (J2-37/ J2-38) (1.5-3.5 V) 3. Check whether there is exterior Set access OBD 4. Test terminal resistance Is 120 ohm left Right, if obvious 100 or less Above 140, check Check terminal resistance control Is the device damaged, more Observe after replacing controller Is the fault eliminated	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
9	U101588	EPSCAN Bus-off	1. Battery voltage is 9-16 V, and BCMs Awake 2. After power-on for 1S 3. Bus off counter Value NBusOffCount>=5	1. Harness/connector Fault; 2. Controller fault; 3. External interference(Such as illegal peripherals)	1. Read with diagnostic scanner Fault code 2. Check CAN line Connection(J5-4/J5-5) (1.5-3.5 V) 3. Check whether there is exterior Set access OBD 4. Test terminal resistance Is 120 ohm left Right, if obvious 100 or less Above 140, check Check terminal resistance control Is the device damaged, more Observe after replacing controller Is the fault eliminated	
11	U105087	BCAN Limphome	1. Battery voltage is 9-16 V, and BCMs Awake 2.Network management enters into Limphome state more than 2000 ms	1. Single-piece operation 2. Harness fault, 3. Connector fault	1. Read DTC with diagnostic scanner 2.Check can wire connection (J3-63/ J3-64) (1.5-3.5 V) 3.Check whether peripherals are connected to OBD. 4.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	

13	U105187	ICAN Limphome	1. Battery voltage is 9-16 V, and BCMs Awake 2.Network management enters into Limphome state more than 2000 ms	1. Single-piece operation 2. Harness fault, 3. Connector fault	1. Read DTC with diagnostic scanner 2.Check can wire connection (J2-37/ J2-38) (1.5-3.5 V) 3.Check whether peripherals are connected to OBD. 4.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
14	U105287	ACC node lost 0x31A (ADASCAN Extra Time 1000 ms)	If a particular monitoring message is lost (5x cycle, or 1s, choose the greater of the two	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check harness connection (J3-61/J3-62) (1.5-3.5 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			As a condition), the gateway needs to record the ECU lost DTC. Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V. 3. Power on the monitor one second later. 4, 4.GW not Bus_off one second after state&bus off is restored. 5. F1A1 Byte6=0x01. 6. engine 1s after non-Crank or CRANK		3. Check whether the ACC controller connector is in good contact and whether the terminal is pin-out. 4. Detect or replace ACC 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
15	U105387	EMS node missing 0x 196 (PCAN Extra Time 1000 ms)	Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V. 3. Power on the monitor one second later. 4.After GW non-Bus_off state&bus off recovers for 1s. 5.After the engine is not Crank or CRANK 1s6.Byte0=0x01 of F1A1.	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check harness connection (J5-2/J5-3) (1.5-3.5 V) 3. Check whether the EMS controller connector is in good contact and whether the terminal is pin-out. 4. Detect or replace EMS 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	

17	U105487	EPBi node missing 0x34F (PCAN super Time 1000 ms)	1. If the specific monitoring message is lost (5 times cycle, or 1s, the larger of them is selected as the condition), the gateway shall record the ECU lost DTC. Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V. 3. Power on the monitor one second later. 4. GW not Bus_off status&bus	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check harness connection (J5-2/J5-3) (1.5-3.5 V) 3.Check whether the EPBI controller connector is in good contact and whether the terminal is pin-out. 4.Test or replace EPBI 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			One second after off recovery. Byte2=0x01 of 1s6 and F1A1 after the engine is not Crank or CRANK.		Observe whether the fault is eliminated after replacing the controller.	
18	U105587	EPS node lost 0x24F (EPSCAN Timeout 1000 ms)	If a specific monitoring message is lost (5x cycle, or 1s, select Whichever is greater As a condition), net The ECU needs to be recorded. Missing DTC. Node Monitoring Enable Conditions: 1. Power supply status is ON. 2. Voltage range 9-16 V. 3. Power on for 1s and then switch on. Start monitoring. 4. GW not Bus_off status&bus Off recovery 1s Rear. 5. The engine is not Crank or CRANK Rear 1s6, F1A1 Byte5=0x01.	1. Harness fault, 2. Connector fault, 3. Relevant ECU Obstacle	1. Read DTC with diagnostic scanner 2. Check harness connection (J5-4/J5-5) (1.5-3.5 V) 3. Check whether the EPS controller connector is in good contact and whether the terminal is pin-out. 4. Detect or replace EPS 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
19	U105687	ESCL node missing 0x 276 (BCAN Over Time 1000 ms)	If a specific monitoring message is lost (5x cycle, or 1s, the greater of the two is selected as the condition), the gateway needs to record the ECU lost DTC. Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V.	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check harness connection (J5-2/J5-3) (1.5-3.5 V) 3.Check whether the ESCL controller connector is in good contact and whether the terminal is pin-out.	

			3. Power on the monitor one second later. 4.After GW non-Bus_off state&bus off recovers for 1s. 5.The byte11=0x01 of 1s6 and F1A1 after the engine is not Crank or CRANK.		4.Test or replace ESCL 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
20	U105787	Hu node lost 0x 580 (ICAN Extra Time 5000 ms)	Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V.	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check harness connection (J2-37/J2-38) (1.5-3.5 V) 3. Check whether the HU controller connector is connected.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			3. Power on the monitor one second later. 4.After GW non-Bus_off state&bus off recovers for 1s. 5.The byte16==0x01 of 1s6, F1A1 after the engine is not Crank or CRANK.		Contact is good, and the terminal has no pin back. 4. Detect or replace HU 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
21	U105887	IP node lost 0x 385 (ICAN Extra Time 1000 ms)	If a specific monitoring message is lost (5x cycle, or 1s, the greater of the two is selected as the condition), the gateway needs to record the ECU lost DTC. Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V. 3. Power on the monitor one second later. 4.After GW non-Bus_off state&bus off recovers for 1s. 5.The byte14=0x01 of 1s6, F1A1 after the engine is not Crank or CRANK.	1. Harness fault, 2. Connector fault 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check harness connection (J2-37/J2-38) (1.5-3.5 V) 3. Check whether the IP controller connector is in good contact and whether the terminal is pin-out. 4. Detect or replace IP 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	

22	U105987	SAS node missing (SCAN,0X180)	If a specific monitoring message is lost (5x cycle, or 1s, the greater of the two is selected as the condition), the gateway needs to record the ECU lost DTC. Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V. 3. Power on the monitor one second later. 4.After GW non-Bus_off state&bus off recovers for 1s. 5. F1A1Byte4 == 0X01	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check harness connection (J5-2/J5-3) (1.5-3.5 V) 3. Test or replace SAS 4. Check whether the SAS controller connector is in good contact and whether the terminal is pin-out. 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
23	U105A87	SRs node missing 0x50(PCAN timeout 2500 ms)	If a specific monitoring message is lost (5x cycle, or 1s, the greater of the two is selected as the condition), the gateway needs to record the ECU lost DTC. Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V. 3. Power on the monitor one second later. 4.After GW non-Bus_off state&bus off recovers for 1s. 1s6, F1A1 byte3=0x01 after engine is not Crank or CRANK.	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check whether the SRS controller connector is in good contact and whether the terminal is pin-out. 3. Check harness connection (J5-2/J5-3) (1.5-3.5 V) 4. Detect or replace SRS 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
25	U105B87	TBOX node missing(INFOCAN 0X38D)	If a specific monitoring message is lost (5x cycle, or 1s, the greater of the two is selected as the condition), the gateway needs to record the ECU lost DTC. Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V. 3. Power on the monitor one second later. 4.After GW non-Bus_off state&bus off recovers for 1s. 5. F1A1Byte10 == 0X01	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2.Check whether the TBOX controller connector is in good contact. Good, whether the terminal is retracted 3. Check harness connection (J2-37/J2-38) (1.5-3.5 V) 4. Detect or replace Hu controller 5. Test terminal resistance Whether it is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal	

					resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
26	U105C87	TCU node lost 0x 338 (PCAN Extra Time 1000 ms)	If a specific monitoring message is lost (5x cycle, or 1s, the greater of the two is selected as the condition), the gateway needs to record the ECU lost DTC. Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V. 3. Power on the monitor one second later.	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check whether the TCU controller connector is in good contact and whether the terminal is pin-out. 3. Check harness connection (J5-2/J5-3) (1.5-3.5 V) 4. Detect or replace TCU 5.Check whether the terminal resistance is about 120 ohms, if it is obviously deviated	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			4.After GW non-Bus_off state&bus off recovers for 1s. 5.The byte1=0x01 of 1s6, F1A1 after the engine is not Crank or CRANK.		100 or less Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
27	U105D87	APA node missing 0x247 (ADASCAN Extra Time 1000 ms)	If a specific monitoring message is lost (5x cycle, or 1s, the greater of the two is selected as the condition), the gateway needs to record the ECU lost DTC. Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V. 3. Power on the monitor one second later. 4.After GW non-Bus_off state&bus off recovers for 1s. 5.The byte7=0x01 of 1s6, F1A1 after the engine is not Crank or CRANK.	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check whether the APA controller connector is in good contact and whether the terminal is pin-out. 3. Check harness connection (/) 4. Detect or replace APA 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
28	U105E87	LAS node missing 0x39A (ADASCAN Extra Time 1000 ms)	If a specific monitoring message is lost (5x cycle, or 1s, the greater of the two is selected as the condition), the gateway needs to record the ECU lost DTC. Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V. 3. Power on the monitor one second later.	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check whether the LAS controller connector is in good contact and whether the terminal is pin-out. 3. Check harness connection (J3-61/J3-62) (1.5-3.5 V) 4. Detect or replace controller	

			4.After GW non-Bus_off state&bus off recovers for 1s. 5. F1A1 Byte8=0x01 LAS/FC node exists.		5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
29	U105F87	LCDAL node missing 0x2AD (ADASCAN Extra Time 1000 ms)	If a particular monitoring message is lost (5x cycle, or 1s, select the greater of the two as the condition), net	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check whether the controller connector is in good contact and whether the terminal is pin-out.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			It is necessary to record the ECU lost DTC. Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V. 3. Power on the monitor one second later. 4.After GW non-Bus_off state&bus off recovers for 1s. 5. F1A1 byte13=0x01 (LCDAL/RLC Node exists).		3. Check harness connection (J3-61/J3-62) (1.5-3.5 V) 4. Detect or replace controller 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
31	U106087	LCDAR node missing 0x2A4 (ADASCAN Extra Time 1000 ms)	If a specific monitoring message is lost (5x cycle, or 1s, the greater of the two is selected as the condition), the gateway needs to record the ECU lost DTC. Node monitoring enable condition: 1.Power supply status ON. 2. Voltage range 9-16 V. 3. Power on the monitor one second later. 4.After GW non-Bus_off state&bus off recovers for 1s. 5. F1A1 byte13=0x01 (LCDAL/RLC Node exists).	1. Harness fault, 2. Connector fault, 3. Relevant ECU fault	1. Read DTC with diagnostic scanner 2. Check whether the controller connector is in good contact and whether the terminal is pin-out. 3. Check harness connection (J3-61/J3-62) (1.5-3.5 V) 4. Detect or replace controller 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
33	U106187	AVM node missing 0x3E0 (ICAN super	Node monitoring enable condition: 1.Power supply	1. Harness fault, 2. Connector fault,	1. Read DTC with diagnostic scanner 2. Check	

		Time 1000 ms)	status On. 2. Voltage range 9-16 V. 3. Power on the monitor one second later. 4.After GW non-Bus_off state&bus off recovers for 1s. 1s6, byte17=0x01 of F1A1 after the engine is not Crank or CRANK.	3. Relevant ECU Obstacle	whether the controller connector is in good contact and whether the terminal is pin-out. 3. Check harness connection (J 2-37/J 2- 38) (1.5-3.5 V) 4. Detect or replace controller 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
					Check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
34	U106287	RRS node missing 0x69F (ICAN super Time 2500 ms)	Node monitoring enabling conditions: 1. Power supply status On. 2. Voltage range 9-16 V. 3. Power on the monitor one second later. 4.After GW non-Bus_off state&bus off recovers for 1s. 5. F1A1 Byte18=0x01.	1. Harness fault, 2. Connector fault 3. Relevant ECU Obstacle	1. Read DTC with diagnostic scanner 2. Check whether the RRS controller connector is in good contact and whether the terminal is pin-out. 3. Check harness connection (J2-37/J2-38) (1.5-3.5 V) 4. Detect or replace RRS controller 5.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
35	B108862	EMS certification failed	1.After MsgData0 receives the approval result sent by EMS, BCMs reply whether the approval result is Power signal.	Unlearned immobilizer	1. Read DTC with diagnostic scanner 2. Check whether anti-theft learning is successful.	

			2.The value is represented as: Verification succeeds: MsgData0 = 0x8C; verification fails: MsgData0 = 0x3A..		3. Check CAN line Connection(J5-2/J5-3) (1.5-3.5 V) 4.Check whether the terminal resistance is about 120 ohms, if obvious deviation is less than 100 or Above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.	
36	U100281	LIN2 DDCU Feedback Error	1. Battery voltage is 8-18 V, 2. BCM is called Awake state, 3. After LIN wakes up, delay 1S and start continuously. Received DDCU_Response_ Error =0x1 5 times	The number of consecutive errors returned exceeds the defined Maximum number of times	1. Read DTC with diagnostic scanner 2. Check BCM, DDCU module connector Parts and terminals No needle withdrawal 3. Check harness (J3-57) (9-11 V)	
37	U101C81	LIN2 PDCU Feedback Error	1. Battery voltage is 8-18 V, 2. BCM is in wake-up state,	The number of consecutive errors returned exceeds the defined maximum number of times	1. Read DTC with diagnostic scanner 2.Check whether the BCM and PDCU module connectors are connected and the terminals are pinned.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			3. After LIN wakes up, delay 1S and start continuously. Received PDCU_Response_ Error =0x1 5 times		3. Check harness (J3-57) (9-11 V)	
38	U101D81	LIN2 RLCU Feedback Error	1. Battery voltage is 8-18V 2. BCM is called Awake state, 3. After LIN wakes up, delay 1S and start continuously. Received RLDCU_WL_EC UError = 0x1 5 times	The number of consecutive errors returned exceeds the defined Maximum number of times	1. Read DTC with diagnostic scanner 2. Check BCM, RLCU module connector Parts and terminals No needle withdrawal 3 Check harness (J3-57 (9-11 V))	
39	U101E81	LIN2 RRCU Feedback Error	1. Battery voltage is 8-18 V, 2. BCM is called Awake state, 3. After LIN wakes up, delay 1S and start continuously. Received RRDCU_Respons E_Error =0x1 5 times	The number of consecutive errors returned exceeds the defined Maximum number of times	1. Read DTC with diagnostic scanner 2. Check BCM, RRCU module connector Parts and terminals No needle withdrawal 3. Check harness (J3-57) (9-11 V)	
40	U101F81	LIN2 Sunroof feedback error	1. Battery voltage is 8-18 V, 2. BCM is called Awake state, 3. After LIN wakes up, delay 1S and start continuously. Received reply error	The number of consecutive errors returned exceeds the defined Maximum number of times	1. Read DTC with diagnostic scanner 2. Check BCM, Sunroof module connector Connection and terminal Needle withdrawal 3. Check harness	

			Sunroof_ECUErro R =0x1 exceeds definition Maximum number of times (5 Secondary).		(J3-57) (9-11 V)	
41	U102181	LIN2 Sunvisor feedback error	1. Battery voltage is 8-18 V, 2. BCM is called Awake state, 3. After LIN wakes up, delay 1S and start continuously. Received reply error Sunshade_ECUErr Or =0x1 exceeds definition Maximum number of times (5 Secondary).	The number of consecutive errors returned exceeds the defined Maximum number of times	1. Read DTC with diagnostic scanner 2. Check sunroof control Module connector connection Whether the terminal is retracted Pin 3. Check harness (J3-57) (9-11 V)	
43	U100287	LIN2 DDCU Communication Time	1. Battery voltage is 8-18 V, 2. BCM is in wake-up state, 3. After LIN wakes up, delay 1S to start, and BCM cannot	BCM cannot communicate with DDCU in tTimeout time	1. Read DTC with diagnostic scanner 2.Check whether the BCM and DDCU module connectors are connected and the terminals are pinned. 3. Check harness (J3-57) (9-11 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			Communication with DDCU within tTimeout (1s) 4. and WindowAntiPinch _Cfg configuration exists, supporting four windows anti-pinch 5. and the window type is configured as Lin window, windowTypeCfg = 1			
44	U102887	LIN2 PDCU communication Time	1. Battery voltage is 8-18 V, 2.BCMs are in wakeup state, and LINs are delayed for 1s after wakeup. BCMs cannot communicate with PDCU within tTimeout (1s). 3.And WindowAntiPinch _Cfg=0x01. Four windows are supported for anti-pinch, and the window type is Lin. 4. and the window type is configured as Lin window, windowTypeCfg = 1	BCM cannot communicate with PDCU within tTimeout time	1. Read DTC with diagnostic scanner 2.Check whether the BCM and PDCU module connectors are connected and the terminals are pinned. 3. Check harness (J3-57) (9-11 V)	
45	U102987	LIN2 RLDCU-way Upon arrival	1. Battery voltage 8-18 V, 2.BCM is in wake-up state, and after LIN wakes up, it is delayed for 1s. BCM cannot communicate with RLDCU within tTimeout (1s). 3. Support RL node of four window anti-pinch or driver anti-pinch models; There are no separate WinSW nodes on the LINs, 4. and the	BCM cannot communicate with RLDCU within tTimeout time	1. Read DTC with diagnostic scanner 2.Check whether the BCM and RLDCU module connectors are connected and the terminals are pinned. 3. Check harness (J3-57) (9-11 V)	

			window type is configured as Lin window, windowTypeCfg = 1			
46	U102A87	LIN2 RRDCU-way Upon arrival	1. Battery voltage 8-18 V, 2. BCM is in wakeup state, and LIN is delayed by 1S after wakeup.	BCM cannot communicate with RRDCU in tTimeout time	1. Read DTC with diagnostic scanner 2. Check whether BCM and RRDCU module connector are connected and whether the terminal is pin-out.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			Start,.Bcm cannot be set in tTimeout. (1s) and RRDCU communication 3.And WindowAntiPinch _Cfg=0x01, supporting four windows anti-pinch, and the window type is configured as Lin window, windowTypeCfg = 1		3. Check harness (J3-57) (9-11 V)	
47	U102B87	LIN2 Sunroof communication arrives	1. Battery voltage 8-18 V, 2.Bcm is in wakeup state, and after LIN wakeup is delayed by 1s, BCM cannot communicate with Sunroof within tTimeout (1s). 3.And sunroof Sunroof_Cfg is configured to be present.	BCM cannot communicate with Sunroof within the time of tTimeout.	1. Read DTC with diagnostic scanner 2.Check whether BCM and sunroof module connector are connected and whether the terminal is pin-out. 3.Check harness (J3-57) (9-11 V)	
48	U102D87	LIN2 Sunvisor communication arrives	1. Battery voltage 8-18 V, 2.Bcm is in wakeup state, and after LIN wakeup is delayed by 1s, BCM cannot communicate with Sunshade within tTimeout (1s). 3.And sunroof shade Sunshade_Cfg exists	BCM cannot communicate with Sunshade within tTimeout time	1.Read DTC with diagnostic scanner 2.Check whether BCM and sunroof module connector are connected and whether the terminal is pin-out. 3.Check harness (J3-57) (9-11 V)	
49	U100381	LIN3 RLS feedback error	1. Battery voltage 8-18 V, 2.The BCM is awake, 3.Lin wakeup delay 1s start, RLS_Error_status_ rain_sensor = 0x1 5 consecutive times	BCM cannot communicate with Sunshade within tTimeout time	1.Read DTC with diagnostic scanner 2.Check whether BCM and RLS connector are connected and whether the terminal is pin-out. 3.Check harness (J3-32) (9-11 V)	

50	U100387	When LIN3 RLS communication arrives	1. Battery voltage 8-18 V, 2. Bcm is in wakeup state, and after LIN wakeup is delayed for 1s, BCM cannot be in tTimeout (1s).	Bcm cannot communicate with LINs within the time of tTimeout.	1. Read DTC with diagnostic scanner 2. Check whether BCM and rain sensor connector are connected and whether the terminal is pin-out. 3. Check harness (J3-32) (9-11 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			Communication with RLS within time 3.And automatic wiper AutoWiper_Cfg exists.			
51	U100701	Sunroof system failure	1. Battery voltage 8-18 V, 2. Bcm is in wakeup state, and Lin wakes up and delays 1s start. 3. One of the response errors Sunroof_ECUErro r=0x01, Sunroof_HallError=0x01 or Sunroof_RelayErr or=0x01 is received continuously more than the defined maximum number of times (five).	Any of the following errors detected, Sunroof_ECUErro r, Sunroof_Response _Error , Sunroof_HallError , and Sunroof_RelayErr orSignal	1. Read DTC with diagnostic scanner 2. Check whether BCM and sunroof module connector are connected and whether the terminal is pin-out. 3. Check harness (J3-57) (9-11 V)	
52	U100709	Sunroof switch failure	1. Battery voltage 8-18 V, 2. The BCM is awake and the LIN wakes up with a delay of 1S. 3. The error number of received Sunroof_Switch Er ror=0x01 error signal reaches five frames.	Receive Sunroof_Switch Er ror signal	1. Read DTC with diagnostic scanner 2.Check whether BCM and sunroof switch connector are connected and whether the terminal is pin-out. 3.Check harness (J3-57) (9-11 V)	
53	U100801	Sunroof curtain system failure	1. Battery voltage 8-18 V, 2. Bcm is in wakeup state, and Lin wakes up and delays 1s start. 3. Continuous response error Sunshade_ECU Err or=0x01, Sunshade Either _HallError=0x01 or Sunshade_Relay Er ror=0x01 signal exceeds the defined maximum number of times (5 times).	Any of the following signals are detected: Sunshade_ECU Err or, Sunshade_Respons e_Error, Sunshade_HallErr or, and Sunshade_Relay Er rorSignal	1. Read DTC with diagnostic scanner 2. Check whether BCM and sunroof curtain connector are connected and whether the terminal is pin-out. 3. Check harness (J3-57) (9-11 V)	

54	U100809	Sunroof curtain switch fails	1. Battery voltage 8-18 V,	Received Sunshade_SwitchE rror signal receives Sunshade_SwitchE rror signal	1. Read DTC with diagnostic scanner 2. Check whether BCM and sunroof curtain switch connector are connected and whether the terminal is pin-out.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			2.The BCM is awake and the LIN wakes up with a delay of 1S. 3.The error number of received Sunshade_SwitchE rror=0x01 error signal reaches five frames.		3. Check harness (J3-57) (9-11 V)	
55	U10004B	RLS overtemperature	1. Battery voltage 8-18 V, 2.Bcm is in wakeup state, and Lin wakes up and delays 1s start. 3.The error number of received RLS_Error_status_ over_temperature= 0x01 error signal reaches five frames.	Receive RLS_Error_status_ ove_temperature signal	1.Read DTC with diagnostic scanner 2.Check the connection of rain sensor connector and terminal for pin withdrawal. 3.Check harness (J3-32) (9-11 V)	
56	U100046	Rain sensor calibration error	1.Battery voltage 9~16 V, 2.The BCM is awake and the LIN wakes up with a delay of 1S. 3.The error number of received RLS_Error_calibra tion_rain_sensor =0 x01 error signal reaches five frames.	Received RLS_Error	1.Read DTC with diagnostic scanner 2.Check the connection of rain sensor connector and terminal for pin withdrawal. 3.Check harness (J3-32) (9-11 V)	
57	U100017	RLS overvoltage	1.Battery voltage 9~16 V, 2.The BCM is awake and the LIN wakes up with a delay of 1S. 3.Received RLS_Error_status_ over_voltage=0x0 1 error signal error Number of times reaches 5 frames	Receive RLS_Error_status_ over_voltage signal	1.Read DTC with diagnostic scanner 2.Check the connection of rain sensor connector and terminal for pin withdrawal. 3.Check harness (J3-32) (9-11 V)	

58	U101883	EMSImmo Verification Request	1. Battery voltage 6.5-18 V, 2. The BCM is awake, 3. The received EMS Immo calculation Checksum is inconsistent with the BCM calculation	Can bus transmission is abnormal	1. Read DTC with diagnostic scanner 2. Disconnect battery and power on again 3. Check whether the battery level is 9-16 V 4. Test harness connection (J3-63/J3-64) (1.5-3.5 V)	
59	U101987	No verification request received from EMSImmo	1. Battery voltage 6.5-18 V,	Configuration word error	1. Read DTC with diagnostic scanner 2. Check whether the configuration word is correct	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			2. After the BCM is awake and the power mode is On for 2 seconds, 3. No verification request received from EMSImmo		3. Disconnect battery and power on again 4. Check whether the battery level is 9-16 V 5. Test harness connection (J3-63/J3-64) (1.5-3.5 V)	
60	U101A87	No verification results received from EMSImmo	1. Battery voltage 6.5-18 V, 2. The BCM is awake and the power supply mode is On. 3. No verification result of EMSImmo is received within 3.5 seconds	Can bus transmission is abnormal	1. Read DTC with diagnostic scanner 2. Disconnect battery and power on again 3. Check whether the battery level is 9-16 V 4. Test harness connection (J3-63/J3-64) (1.5-3.5 V)	
61	U103D87	IBS communication loss	1. Battery voltage is 8-18 V, 2. The BCM is awake, 3. Lin wakeup delay After 1S, no message is received within 1s. 0x34 IBS_LIN_10x35 IBS_LIN_20x36 IBS_LIN_30x37 IBS_LIN_44. The vehicle is equipped with IBS node.(IBS_Cfg= 0x01)	LIN2 transmission error flag position bit	1. Read DTC with diagnostic scanner 2. Check LIN line connection(J3-32) (9-11 V)	
64	U100901	IBS system fault	1. Battery voltage is 8-18 V, 2. The BCM is awake, 3. Lin wakeup delay 1s starts, and the number of received signal errors reaches 5. Frame. IBS_LIN_1_ERROR_Calib =	IBS sensor fault.	1. Read DTC with diagnostic scanner 2.Replace IBS 3.Check LIN line connection(J3-32) (9-11 V)	

			0x01IBS_LIN_1_ ERROR_IDENT = 0x014.1s after power supply status is IGN ON			
65	U102F81	IBS feedback error	1. Battery voltage 8-18 V, 2. The BCM is awake, 3. Lin wakeup delay 1s start, continuous collection	The number of consecutive errors returned exceeds the defined maximum number of times	1. Read DTC with diagnostic scanner 2. Check whether the BCM and IBS module connectors are connected and the terminals are pinned.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			To Resp_Error =0x1 5 times		3. Check harness (J3-32) (9-11 V)	
66	U103881	Rain closing sunroof failure	1. Battery voltage is 8-18 V, 2. The BCM is awake, 3. Lin wakeup delay Starting from 1s, the number of consecutive RLS_SunRoofClos eReqReason received errors reaches five. Frame.	The number of consecutive errors returned exceeds the defined maximum number of times	1. Read DTC with diagnostic scanner 2. Check whether BCM and RLS module connector are connected and whether the terminal is pin-out. 3. Check harness (J3-32) (9-11 V)	
67	B100111	Start/stop switch _LED_R short circuit to ground	1. The battery voltage is 9-16V 2. And the BCM is in wakeup or CAN network sleep state, 3. And SSSW_LED_R input Output control open. Short circuit flag sent from SPI in 4.10 ms sampling period sampling tle 9263 register, continuously sampled to 20times short circuit flag 5, power supply is not crank or 1s after crank	One-key starter switch indicator lamp red short circuit to ground	1. Read DTC with diagnostic scanner 2. Check red indicator lamp of one-key starter switch 3. Check harness (J2-21) Circuit fault (9-16 V) 4. Supply voltage range 9-16V	
68	B100412	Rear side defrost _ relay battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. Rear defrosting relay output control ON 4. After power-on delay of 100 ms, it is judged that the output state is ON, and the sampling period of 10 ms is TLE 75008. Short circuit flag	Rear defrost relay short circuit to power supply	1. Read DTC with diagnostic scanner 2. Check whether the rear defrosting relay connector is connected and whether the terminal is pin-out. 3. Check harness (J5-31) (0-1V)	

			sent from SPI in the memory, continuously sampling to 20 times of short circuit flag			
69	B100413	Rear side defrost _ relay open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK	Rear defrosting relay open circuit	1. Read DTC with diagnostic scanner 2. Check whether the rear defrosting relay connector is connected and whether the terminal is pin-out.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			2.BCM wakeup or CAN network sleep status, 3.Rear defrosting relay output control off 4.After power-on delay of 100 ms, it is judged that the output state is off, and the sampling period of 10 ms is TLE 75008. Open circuit flag sent from SPI in the memory, continuously sampling to 20 times of open circuit flag		3..Check harness J5-31 (0-1V)	
70	B100612	Front wiper speed control _ relay battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2.BCM wakeup or CAN network sleep status, 3.Front_Wiper_Sp d_Rly output control ON 4.After the power-on delay is 100 ms, it is judged that the output state is ON, and the short circuit flag sent from SPI in the L 9026 register is sampled in the sampling period of 10 ms, and the short circuit flag is sampled for 20times continuously.	Front wiper speed regulating relay short circuit to power supply	1.Read DTC with diagnostic scanner 2.Inspect whether the front wiper speed regulating relay connector connector and terminal are pin-out. 3. Check harness(J5-38) (0-1V)	

71	B100613	Front wiper speed control _ relay open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. Front_Wiper_Sp d_Rly output control off 4. And the power supply is switched to ON. Rear 1S 5. After the power-on delay is 100 ms, it is judged that the output state is OFF, and the 10 ms sampling period samples the open circuit flag sent by SPI in the L 9026 register, and continuously samples the open circuit flag for 20times.	Front wiper speed regulating relay open circuit	1. Read DTC with diagnostic scanner 2. Inspect whether the front wiper speed regulating relay connector connector and terminal are pin-out. 3. Check harness(J5-38) (0-1V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
72	B100712	High beam relay battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. High_Beam_Rly Output control ON 4.After the power-on delay of 100 ms, judge the output state as ON, and sample the short circuit flag sent by SPI in the L 9026 register in the sampling period of 10 ms, and continuously sample the short circuit flag for 20times.	High beam relay short to power	1.Read DTC with diagnostic scanner 2.Check whether the high beam relay connector is connected and whether the terminal is pin-out. 3.Check harness (J 5-38 (0-1V)	
73	B100713	High beam relay open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. High_Beam_Rly Output control off 4.After the power-on delay of 100 ms, judge the output status as OFF, and sample the open circuit flag sent by SPI in the L 9026 register in the sampling period of 10 ms, and continuously sample the open circuit flag for 20times.	High beam relay open circuit	1.Read DTC with diagnostic scanner 2.Check whether the high beam relay connector is connected and whether the terminal is pin-out. 3. Check harness(J5-30) (0-1V)	

74	B100912	IGN1_ relay _ control battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. IGN1_Rly output control ON 4. After power-on delay of 100 ms, it is judged that the output state is ON, and the input AD value of sampling feedback pin in 10 ms sampling period is greater than 50 for 10 consecutive times.	IGN1 relay short circuit to power supply	1. Read DTC with diagnostic scanner 2. Check the IGN1 relay connector connection and terminal for pin withdrawal. 3..Check harness J5-30 (0-1V)	
75	B100913	IGN1_ relay _ control open loop	1. Voltage range 9-16 V, engine in	IGN1 relay open circuit	1. Read DTC with diagnostic scanner 2. Check the IGN1 relay connector connection and terminal for pin withdrawal.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			Not CRANK or 1s after CRANK 2. BCM wakeup or CAN network sleep status, 3. IGN1_Rly output control off 4. After power-on delay of 100 ms, it is judged that the output state is ON, and the input AD value of sampling feedback pin in 10 ms sampling period is less than 50 for 10 consecutive times.		3..Check harness J2-36 (0-1V)	
76	B100A12	ACC_ relay _ control battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. ACC_Rly output control ON 4. After power-on delay of 100 ms, it is judged that the output state is ON, and the sampling period of 10 ms is TLE 75008. Short circuit flag sent from SPI in the memory, continuously sampling 250 times of short circuit flag	ACC relay short circuit to power supply	1. Read DTC with diagnostic scanner 2. Inspect the ACC relay connector connection and terminal for pin withdrawal. 3. Check harness(J2-36) (0-1V)	
77	B100A13	ACC_ relay _ control open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. ACC_Rly output control off 4. After power-on delay of 100 ms, it is judged that the output state is off, and the sampling period of 10 ms is TLE 75008. Open circuit	ACC relay short open circuit	1. Read DTC with diagnostic scanner 2. Inspect the ACC relay connector connection and terminal for pin withdrawal. 3. Check harness (J 2-36 (0-1V)	

			flag sent from SPI in the memory, and continuously sampled to open circuit flag 250 times			
78	B103D12	Horn _ relay battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK	Horn relay short circuit to power supply	1. Read DTC with diagnostic scanner 2. Inspect whether the horn relay connector connector and terminal are pin-out.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			2.BCM wakeup or CAN network sleep status, 3.Horn_Rly output control ON 4.After power-on delay of 100 ms, it is judged that the output state is ON, and the sampling period of 10 ms is TLE 75008. Short circuit flag sent from SPI in the memory, continuously sampling to 20 times of short circuit flag		3. Check harness (J 5-37 (0-1V)	
80	B100B13	Horn _ relay open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2.BCM wakeup or CAN network sleep status, 3.Horn_Rly output control off 4.After power-on delay of 100 ms, it is judged that the output state is off, and the sampling period of 10 ms is TLE 75008. Open circuit flag sent from SPI in the memory, continuously sampling to 20 times of open circuit flag	Horn relay open circuit	1.Read DTC with diagnostic scanner 2.Inspect whether the horn relay connector connector and terminal are pin-out. 3. Check harness(J5-37) (0-1V)	
81	B100D12	ACC/IGN/ST relay Electrical feedback terminal is inconsistent with output terminal	1. Voltage range 9-16V 2.BCM wakeup or CAN network sleep status, 3.Application interface (PdmErr) value detected is error	ACC_Rly, IGN1_Rly, Start_Rly errorACC, IGN1, Start abnormal	1.Read DTC with diagnostic scanner 2.Check whether the connectors of ACCs, IGN1 and Start are connected and the terminals are withdrawn. 3.Check harness(J2-4/J2-35/J2-5/J2-36/J2-10/J2-20) (9-16 V)	

82	B101312	PW_Delay_ relay battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. PW_Delay_Rly output control is open and not configured as four door anti-pinch WindowAntiPinch _Cfg!=1	Window delay relay short circuit to power supply	1. Read DTC with diagnostic scanner 2. Check the window delay relay connector connection and terminal for pin withdrawal. 3. Check harness(J2-15) (0-1V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			4.After power-on delay of 100 ms, it is judged that the output state is ON, and the sampling period of 10 ms is TLE 75008. Short circuit flag sent from SPI in the memory, continuously sampling 250 times of short circuit flag			
83	B101313	PW_Delay_ relay open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. PW_Delay_Rly output control is closed and not configured as four door anti-pinch WindowAntiPinch_Cfg!=1 4.After power-on delay of 100 ms, it is judged that the output state is off, and the sampling period of 10 ms is TLE 75008. Open circuit flag sent from SPI in the memory, and continuously sampled to open circuit flag 250 times	Window delay relay open circuit	1. Read DTC with diagnostic scanner 2. Check the window delay relay connector connection and terminal for pin withdrawal. 3. Check harness(J2-15) (0-1V)	

84	B101412	Front wiper power supply _ relay battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. Front_Wiper_Pw r_Rly output control ON 4. After the power-on delay is 100 ms, it is judged that the output state is ON, and the short circuit flag sent from SPI in the L 9026 register is sampled in the sampling period of 10 ms, and the short circuit flag is sampled for 20times continuously.	Front wiper power supply control relay short circuit to power supply	1. Read DTC with diagnostic scanner 2. Inspect whether the front wiper power supply control relay connector connector and terminal are pin-out. 3. Check harness J5-27 (0-1V)	
85	B101413	Front wiper power supply _ relay open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK	Front wiper power supply control relay open circuit	1. Read DTC with diagnostic scanner 2. Inspect whether the front wiper power supply control relay connector connector and terminal are pin-out.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			2.Status of BCM wakeup or CAN network sleep 3.Front_Wiper_Pwr_Rly output control off, 4.After the power supply mode is switched to ON 1000 ms starting from 5. after the power-on delay is 100 ms, it is judged that the output state is OFF, and the open circuit flag sent by SPI in the L 9026 register is sampled in the sampling period of 10 ms, and the open circuit flag is continuously sampled for 20times.		3.Check harness J5-27 (0-1V)	
86	B101512	Rear wiper relay battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2.BCM wakeup or CAN network sleep status, 3.FDA0: RearWiper_Cfg =0 x01 and Rear_Wiper_Rly output control on 4.After the power-on delay is 100 ms, it is judged that the output state is ON, and the short circuit flag sent from SPI in the L 9026 register is sampled in the sampling period of 10 ms, and the short circuit flag is sampled for 20times continuously.	Rear wiper relay short circuit to power supply	1.Read DTC with diagnostic scanner 2.Check whether the rear wiper relay connector is connected and whether the terminal is pin-out. 3.Check harness J5-40 (0-1V)	

87	B101513	Rear wiper relay open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. FDA0: RearWiper_Cfg =0 x01 and Rear_Wiper_Rly output control off, 4. 1000 ms starts after power mode is switched to ON 5. Power-on delay 100 ms After that, judge the output state.	Rear wiper relay open circuit	1. Read DTC with diagnostic scanner 2. Check whether the rear wiper relay connector is connected and whether the terminal is pin-out. 3. Check harness J5-40	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			After the status is OFF, sample the open circuit flag sent by SPI in the L 9026 register for 10 ms sampling period, and continuously sample the open circuit flag for twenty times.			
88	B102112	Mirror folding battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. Mirror folding low drive output off, 100 ms cycle Sample: It is detected that the AD value acquired by diagnostic circuit is greater than the threshold value (170) 4 for ten consecutive times, FDA0byte27: MirrorFold_Cfg= 0 x01	Mirror folding output short circuit to power supply	1. Check harness J4-9 2. Read DTC with diagnostic scanner	
89	B102111	Mirror fold short circuit to ground	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. Rearview mirror folded high drive output, 100 ms periodic sampling, detect the AD value acquired by diagnostic circuit is greater than the threshold for 10 consecutive times. (170) 4, FDA0byte27: MirrorFold_Cfg= 0 x01	Mirror folding output short circuit to ground	1. Check harness J4-9 (9-16 V) 2. Read DTC with diagnostic scanner	

90	B102212	Mirror deployment battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. Rearview mirror deployment low drive output off, 100 ms cycle Sample, detected ten consecutive times that the AD value acquired by the diagnostic circuit is greater than the threshold value (170) 4, FDA0byte27:	Mirror deployment output short circuit to power supply	1. Check harness J4-18 (9-16 V) 2. Read DTC with diagnostic scanner	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			MirrorFold_Cfg= 0 x01			
91	B102211	Mirror deployment short circuit to ground	1. Voltage range 9-16 V. The engine is in the non-CRANK or CRANK rear 1s3, rearview mirror deployment high drive output, 100 ms periodic sampling, and it is detected that the AD value acquired by the diagnostic circuit is greater than the threshold for ten consecutive times. (170) 4, FDA0byte27: MirrorFold_Cfg= 0 x01 2. BCM wakeup or CAN network sleep status,	Mirror deployment output short circuit to ground	1. Check harness J4-18 (9-16 V) 2. Read DTC with diagnostic scanner	
92	B102411	Rear left _ fog lamp short circuit to ground	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. FDA0 Byte13 RearFog_Load_ Cf g=0x014. After the left rear fog lamp control output is turned on, delay 400 ms, and N9D7D20F register. The short circuit flag sent by SPI in the device is continuously sampled for 20 times to report the short circuit fault.	Rear left fog lamp short circuit to ground	1. Read DTC with diagnostic scanner 2. Check RR LH fog lamp connector connection and terminal for pin retraction. 3. Check harness J3-66 (9-16 V)	

93	B102413	Rear left _ fog lamp open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. RearFog_Load_Cfg=0x014. After the left rear fog lamp control output is turned on, delay 400 ms, and 100 ms periodic sampling VN9D7D20F register AD value sent from SPI in the device, and continuously sampled to 20 times, AD value is lower than the open circuit threshold.(3)	Seat rear fog lamp open circuit	1. Read DTC with diagnostic scanner 2. Check RR LH fog lamp connector connection and terminal for pin retraction. 3. Check harness J3-66 (9-16 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
94	B102A11	Start/stop switch _LED_G short circuit to ground	1. The battery voltage is 9-16V 2. And the BCM is in wakeup or CAN network sleep state, 3. And SSSW_LED_R input Output control open. Short circuit flag sent from SPI in 4.10 ms sampling period sampling tle 9263 register, continuously sampled to 20times short circuit flag 5, power supply is not crank or 1s after crank	One-key starter switch indicator lamp green short circuit to ground	1. Read DTC with diagnostic scanner 2. Check green indicator lamp of one-key starter switch 3. Check harness J2-22 (9-16 V)	
95	B102D11	Atmosphere lamp short circuit to ground	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. AmbientLight_Cfg=0x013. After the control output of the atmosphere lamp is turned on, after the delay of 400 ms, the sampling period is 100 ms VN9D7D20F The short circuit flag sent from SPI in the register is continuously sampled for 20 times to report the short circuit fault.	Atmosphere lamp short circuit to ground	1. Read DTC with diagnostic scanner 2. Check whether the air lamp connector is connected and whether the terminal is pin-out. 3. Check harness J3-68 (9-16 V)	

96	B102E11	Trunk lamp short circuit to ground	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. After the trunk lamp control output is turned on, delay 400 ms, periodic sampling VN9D7D20F The short circuit flag sent from SPI in the register is continuously sampled to report short circuit fault.	Trunk lamp short circuit to ground	1. Read DTC with diagnostic scanner 2. Check the luggage compartment lamp connector connection and terminal for pin withdrawal. 3. Check harness J3-67 (9-16 V)	
97	B102E13	Trunk lamp open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK	Trunk lamp open circuit	1. Read DTC with diagnostic scanner 2. Check the luggage compartment lamp connector connection and terminal for pin withdrawal. 3. Check harness J3-67 (9-16 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			2.BCM wakeup or CAN network sleep status, 3.After the trunk lamp control output is turned on, after the delay of 400 ms, 100 ms periodic sampling VN9D7D20F register AD value sent from SPI in the device, continuously sampled to 20 times AD value is lower than open circuit threshold (5) value			
98	B108011	Reverse lamp short circuit to ground	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. RevserseLight_Load_Cfg=0x014. After the reverse lamp control output is turned on, after 400 ms delay, 100 ms periodic sampling VN9D7D20F register The short circuit flag sent by SPI in the device is continuously sampled for 20 times to report the short circuit fault.	Reverse lamp short circuit to ground	1.Read DTC with diagnostic scanner 2.Check whether the reverse lamp connector is connected and whether the terminal is pinned back. 3.Check harness J4-14 (9-16 V)	
99	B103113	Reverse lamp open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. RevserseLight_Load_Cfg=0x014. After the reverse lamp control output is turned on, after 400 ms delay, 100 ms periodic sampling VN9D7D20F register AD value sent from SPI in the	Reverse lamp open circuit	1.Read DTC with diagnostic scanner 2.Check whether the reverse lamp connector is connected and whether the terminal is pinned back. 3.Check harness J4-14 (9-16 V)	

			device, and continuously sampled to 20 times, AD value is lower than the open circuit threshold.(3)			
100	B103118	Reverse lamp interrupted	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2. BCM wakeup or CAN network sleep status,	Reverse lamp open circuit	1. Read DTC with diagnostic scanner 2. Check whether the reverse lamp connector is connected and whether the terminal is pinned back. 3. Check harness J4-14 (9-16 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			3. RevserseLight_Load_Cfg=0x014. After the reverse lamp control output is turned on, after 400 ms delay, 100 ms periodic sampling VN9D7D20F register The AD value sent from SPI in the device is sampled for 20 consecutive times until the AD value is in the interrupt threshold range.(Tentative)			
101	B103211	Brake lamp short circuit to ground	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. BrakeLamp_Load_Cfg=0x024. After the brake lamp control output is turned on, after the delay of 400 ms, 10 ms periodic sampling VN9D7D20F register The short circuit flag sent by SPI in the device is continuously sampled for 20 times to report the short circuit fault.	Brake lamp short circuit to ground	1. Read DTC with diagnostic scanner 2. Check whether the brake lamp connector connector and terminal are pin-out. 3. Check harness J4-14 (9-16 V)	
102	B103311	Right turn signal lamp short circuit to ground	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2. BCM wakeup or CAN network sleep status, 3. TurnLight_Load_Cfg = 0x014. Turn lamp control output is turned on, after delay of 100 ms, 10 ms periodic sampling VN9D7D20F The short circuit flag sent from	Right steering lamp short circuit to ground	1. Read DTC with diagnostic scanner 2. Check the right steering lamp connector connection and terminal for pin retraction. 3. Check harness J4-15 (9-16 V)	

			SPI in the register is continuously sampled for 10 times to report the short circuit fault.			
104	B103313	Right turn signal lamp open loop	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2. BCM wakeup or CAN network sleep status,	Right turn signal lamp open circuit	1. Read DTC with diagnostic scanner 2. Check the right steering lamp connector connection and terminal for pin retraction. 3. Check harness J4-15 (9-16 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			3. TurnLight_Load_Cfg = 0x014. Turn lamp control output is turned on, after delay of 100 ms, 10 ms periodic sampling VN9D7D20F The AD value from SPI in the register is sampled 10 times in succession below the open circuit threshold(20)			
105	B103318	Right steering lamp interrupts operation	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2. BCM wakeup or CAN network sleep status, 3. TurnLight_Load_Cfg = 0x014. Turn lamp control output is turned on, after delay of 100 ms, 10 ms periodic sampling VN9D7D20F The AD value from the SPI in the register is sampled 10 times in succession above the open circuit threshold and below the interrupt threshold.(Tentative)	Right turn signal lamp open circuit	1. Read DTC with diagnostic scanner 2. Check the right steering lamp connector connection and terminal for pin retraction. 3. Check harness J4-15 (9-16 V)	
106	B103413	Trunk open loop (To battery 7)	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. After power-on delay of 100 ms, the trunk is opened and the output control is opened. The sampling period of 10 ms is 10 times, and the continuous sampling reaches the diagnosis feedback pin is	Trunk release output open circuit(Short circuit to power supply 7)	1. Read DTC with diagnostic scanner 2. Check whether the luggage compartment unlocking switch connector connector and terminal are pin-out. 3. Check harness J4-20	

			low.			
107	B103412	Trunk open battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. After power-on delay of 100 ms, the trunk is opened and the output control is closed.	Trunk release output short circuit to power supply	1. Read DTC with diagnostic scanner 2. Check whether the luggage compartment unlocking switch connector connector and terminal are pin-out. 3. Check harness J4-20 (9-16 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			10 ms sampling period sampling 10 times, continuous sampling to diagnosis feedback pin is high			
108	B103513	Driver _ Door _ Unlocked Open Loop(To battery 8)	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. After the power-on delay of 100 ms, the driver _ door _ unlocked output control is opened, the sampling period of 10 ms is 10 times, and the continuous sampling reaches the diagnostic feedback pin is low.	Driver door unlock output open circuit	1. Read DTC with diagnostic scanner 2. Check driver door lock 3. Check harness J4-21 (9-16 V)	
109	B103512	Driver _ Door _ Unlocked Battery Short	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. After the power-on delay of 100 ms, the driver _ door _ unlocked output control is closed, the sampling period of 10 ms is 10 times, and the continuous sampling reaches the diagnostic feedback pin is high.	Driver door unlock output short circuit to ground	1. Read DTC with diagnostic scanner 2. Inspect whether the driver door lock connector is connected and whether the terminal is retracted. 3. Check harness J4-21 (9-16 V)	
110	B103613	Passenger _ Door _ Unlocked Open Loop(To battery 8)	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. After power-on delay of 100 ms, other three doors are unlocked and output control is turned on. On, sample 10	Front passenger door unlocking open circuit	1. Read DTC with diagnostic scanner 2. Check the front passenger door lock connector connection and terminal for pin retraction. 3. Check harness J4-23 (9-16 V)	

			times in 10 ms sampling period, and continuously sample until the diagnostic feedback pin is low.			
111	B103612	Passenger _ Door _ Unlocked Battery Short	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status,	Front passenger door unlocking short circuit to power supply	1. Read DTC with diagnostic scanner 2. Check the front passenger door lock connector connection and terminal for pin retraction. 3. Check harness J4-23 (9-16 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			3. After power-on delay of 100 ms, other three doors are unlocked and output control is closed. Close, sample 10 times in 10 ms sampling period, and continuously sample until the diagnostic feedback pin is high.			
112	B103713	All doors _ lock open loop(To battery 8)	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. After power-on delay of 100 ms, the lock output control is turned on, and the sampling period of 10 ms is 10 ms. Once, continuously sample to the diagnosis feedback pin is low.	All door unlock outputs open	1. Read DTC with diagnostic scanner 2. Check whether all the door lock connectors are connected and the terminals are pin-out. 3. Check harness J4-22 (9-16 V)	
113	B103712	All doors _ lock battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. After the power-on delay of 100 ms, the lock output is closed, the 10 ms sampling period is 10 times, and the continuous sampling reaches the diagnosis feedback pin is high.	All door unlock outputs short circuit to power	1. Read DTC with diagnostic scanner 2. Check whether all the door lock connectors are connected and the terminals are pin-out. 3. Check harness J4-22 (9-16 V)	

114	B103813	Fuel pump pressure setting _ relay open loop(To Battery 7 or Battery 6, according to vehicle settings)	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. After the power-on delay of 100 ms, the oil pump pressure output control is turned on, the 10 ms sampling period is 10 times, and the continuous sampling reaches the diagnosis feedback pin is low.	Fuel pump pressure building relay open circuit	1. Read DTC with diagnostic scanner 2. Check whether the connector of the fuel pump pressure-building relay is connected and whether the terminal is pin-out. 3. Check harness J5-51 (9-16 V)	
115	B103911	Left steering lamp short circuit to ground	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear	Left steering lamp short circuit to ground	1. Read DTC with diagnostic scanner 2. Check the left steering lamp connector connection and terminal for pin retraction. 3. Check harness J4-16 (9-16 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			2.BCM wakeup or CAN network sleep status, 3.TurnLight_Load_Cfg = 0x014. Turn lamp control output is turned on, after delay of 100 ms, 10 ms periodic sampling VN9D7D20F The overcurrent flag bit sent from SPI in the register is valid after continuous sampling for 10 times.			
116	B103913	Left turn signal lamp open loop	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2.BCM wakeup or CAN network sleep status, 3.TurnLight_Load_Cfg = 0x014. Turn lamp control output is turned on, after delay of 100 ms, 10 ms periodic sampling VN9D7D20F AD value sent from SPI in register, continuously sampled to 10 times AD value is lower than open circuit threshold	Left turn signal lamp open circuit	1.Read DTC with diagnostic scanner 2.Check the left steering lamp connector connection and terminal for pin retraction. 3.Check harness J4-16 (9-16 V)	
117	B103918	Left turn signal lamp interrupted	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2.BCM wakeup or CAN network sleep status, 3.TurnLight_Load_Cfg = 0x014. Turn lamp control output is turned on, after delay of 100 ms, 10 ms periodic sampling VN9D7D20F AD value sent from SPI in the register, which is	Left turn signal lamp open circuit	1.Read DTC with diagnostic scanner 2.Check the left steering lamp connector connection and terminal for pin retraction. 3.Check harness J4-16 (9-16 V)	

			sampled 10 times continuously above the open circuit threshold and below the interrupt threshold.			
118	B103A11	Front left fog lamp short circuit to ground	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK	Front left fog lamp short circuit to ground	1. Read DTC with diagnostic scanner 2. Check the FRT LH fog lamp connector connection and terminal for pin retraction.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			2. BCM wakeup or CAN network sleep status, 3. FrontFog_Load_Cfg = 0x01&&FrontFog_Cfg == 0x014. Front left fog lamp control output is on. After a period of delay After 10 ms period sampling VN9D7D20F The short circuit flag sent from SPI in the register is continuously sampled to report short circuit fault.		3.Check harness J4-7 (9-16 V)	
119	B103A13	Front left fog lamp open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. FrontFog_Load_Cfg = 0x01&&FrontFog_Cfg == 0x014. Front left fog lamp control output is on. After, delay 400 ms After 100 ms periodic sampling VN9D7D20F AD value from SPI in the register, which is below the open circuit threshold for 20 consecutive times(3)	Front left fog lamp open circuit	1. Read DTC with diagnostic scanner 32. Check the front left fog lamp connector connection and terminal for pin retraction. 3.Check harness J4-7 (9-16 V)	

120	B103B11	High brake lamp short circuit to ground	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. CHMSL_Load_Cfg = 0x024. After the high-mounted brake lamp control output is turned on, after the delay of 400 ms, 100 ms periodic sampling VN9D7D20F register Short circuit flag sent from SPI in the device, continuously sampling for 20 times to short circuit flag to report short circuit fault	High brake lamp short circuit to ground	1. Read DTC with diagnostic scanner 2. Check the connection of high-mounted brake lamp connector and terminal for pin retraction. 3. Check harness J4-4 (9-16 V) (0-1V)	
121	B103D12	Interior lamp battery short circuit	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK	Inner lamp short circuit to power supply	1. Read DTC with diagnostic scanner 2. Check whether the inner lamp connector is connected and whether the terminal is pinned.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			2.BCM wakeup or CAN network sleep status, 3.The inner lamp output control is turned on, after delay of 100 ms, 10 ms periodic sampling for 10 times AD value is greater than 50		3.Check harness J4-24 (0-1V)	
122	B104111	Backlight short circuit to ground	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2.BCM wakeup or CAN network sleep status, 3.After the background lamp control output is turned on, after the delay of 400 ms, 100 ms periodic sampling VN9D7D20F register The short circuit flag sent by SPI in the device is continuously sampled for 20 times to report the short circuit fault.	Backlight short circuit to ground	1.Read DTC with diagnostic scanner 2.Check backlight output 3.Check harness J4-1 (9-16 V)	
123	B104113	Backlight open loop	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2.BCM wakeup or CAN network sleep status, 3.After the background lamp control output is turned on, after the delay of 400 ms, 100 ms periodic sampling VN9D7D20F register AD value sent from SPI in the device, and continuously sampled to 20 times, AD value is lower than the open circuit threshold.(5)	Backlight open circuit	1.Read DTC with diagnostic scanner 2.Check backlight output 3.Check harness J4-1 (9-16 V)	

124	B104311	Front right fog lamp short circuit to ground	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. FrontFog_Load_Cfg = 0x01&&FrontFog_Cfg == 0x014. After front right fog lamp control output is turned on, after delay of 400 ms, 100 ms periodic sampling VN9D7D20F	Front right fog lamp short circuit to ground	1. Read DTC with diagnostic scanner 2. Check the FRT RH fog lamp connector connection and terminal for pin retraction. 3. Check harness J4-3	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			Short circuit flag sent from SPI in register, continuously sampling for 20 times to short circuit flag to report short circuit fault			
125	B104313	Front right fog lamp open loop	1. Voltage range 9-16V 2. BCM wakeup or CAN network sleep status, 3. FrontFog_Load_Cfg = 0x01&&FrontFog_Cfg == 0x014. After front right fog lamp control output is turned on, after delay of 400 ms, 100 ms periodic sampling VN9D7D20F AD value from SPI in the register, continuously sampled 20 times until the AD value is below the open circuit threshold(3)	Front right fog lamp open circuit	1. Read DTC with diagnostic scanner 32. Check whether the front right fog lamp connector connector and terminal are pin-out. 3.Check harness J4-3 (9-16 V)	
126	B104413	Left low beam open loop	1. Voltage range 9-16V3. LowBeam_Load_Cfg = 0x024. After the LH low beam lamp control output is turned on, after delay of 400 ms, 100 ms periodic sampling VN9D7D20F register AD value sent from SPI in the device, continuously sampled 20 times until the AD value is lower than the open circuit threshold(3) 2. BCM wakeup or CAN network sleep status,	Left low beam short circuit to ground	1. Read DTC with diagnostic scanner 2. Check the LH low beam lamp connector connection and terminal for pin retraction. 3. Check harness J4-6 (9-16 V)	

127	B104411	Left low beam short circuit to ground	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2. BCM wakeup or CAN network sleep status, 3. LowBeam_Load _Cfg = 0x024. After the LH low beam lamp control output is turned on, after delay of 400 ms, 10 ms periodic sampling VN9D7D20F register Short circuit signs from SPI in the unit, continuous	Left low beam short circuit to ground	1. Read DTC with diagnostic scanner 2. Check the LH low beam lamp connector connection and terminal for pin retraction. 3. Check harness J4-6 (9-16 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			Report short circuit fault after 20 times of sampling to short circuit flag (About 10 A)			
128	B104513	Right low beam open circuit	1. Voltage range 9-16V 2. BCM wakeup or CAN network sleep status, 3. LowBeam_Load_Cfg = 0x024. After the RH low beam lamp control output is turned on, after the delay of 400 ms, 100 ms periodic sampling VN9D7D20F register AD value sent from SPI in the device, continuously sampled 20 times until the AD value is lower than the open circuit threshold(3)	Right low beam short circuit to ground	1. Read DTC with diagnostic scanner 2. Check the LH low beam lamp connector connection and terminal for pin retraction. 3. Check harness J4-2 (9-16 V)	
129	B104511	Right low beam short circuit to ground	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2. BCM wakeup or CAN network sleep status, 3. LowBeam_Load_Cfg = 0x024. After the RH low beam lamp control output is turned on, after the delay of 400 ms, 10 ms periodic sampling VN9D7D20F register Short circuit flag sent from SPI in the device, continuously sampling for 20 times to short circuit flag to report short circuit fault (About 10 A)	Right low beam short circuit to ground	1. Read DTC with diagnostic scanner 2. Inspect the right low beam lamp connector connection and terminal for pin retraction. 3. Check harness J4-2 (9-16 V)	

130	B105214	LF_ antenna _ rear short circuit to ground or open loop	1. Voltage range 9-16V 2. BCM wakeup or CAN network sleep status, 3. Antenna feedback short circuit or open circuit sign detected	Rear low frequency antenna short circuit to ground or open circuit	1. Read DTC with diagnostic scanner 2. Check the rear low frequency antenna connector connection and terminal for pin withdrawal. 3. Check harness J3-73/J3-74(9-16 V)	
131	B105314	LF_ antenna - right short circuit to ground or open loop	1. Voltage range 9-16V 2. BCM wakeup or CAN network sleep status,	Rear low frequency antenna short circuit to ground or open circuit	1. Read DTC with diagnostic scanner 2. Inspect the right low frequency antenna connector connection and terminal for pin withdrawal. 3. Check harness J3-22/J3-49(9-16 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			3. Antenna feedback short circuit or open circuit sign is detected.			
132	B105414	LF_ antenna _ front/Immo short circuit to ground or open loop	1. Voltage range 9-16V 2. BCM wakeup or CAN network sleep status, 3. Antenna feedback short circuit or open circuit sign detected	Front low frequency antenna/Immo short circuit to ground or open circuit	1. Read DTC with diagnostic scanner 2. Check the front low frequency antenna/Immo connector connection and terminal for pin withdrawal. 3. Check harness J3-24/J3-25(9-16 V)	
133	B105514	LF_ antenna left short circuit to ground or open loop	1. Voltage range 9-16V 2. BCM wakeup or CAN network sleep status, 3. Antenna feedback short circuit or open circuit sign detected	Front low frequency antenna/Immo short circuit to ground or open circuit	1. Read DTC with diagnostic scanner 2. Check the LH low frequency antenna connector connection and terminal for pin retraction. 3. Check harness J3-47/J3-48(9-16 V)	
134	B105624	Front water spray switch stuck	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. Power supply mode is on and the voltage on input pin remains high for more than 1 min	Front washer switch stuck	1. Read DTC with diagnostic scanner 2. Inspect whether the front washer switch connector connector and terminal are retracted. 3. Check harness J2-14 (9-16 V)	
135	B105823	Overtaking lamp switch stuck	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2. BCM wakeup or CAN network sleep status, 3. Voltage on input pin remains low for more than 1 min	Overtaking lamp switch stuck	1. Read DTC with diagnostic scanner 2. Check whether the overtaking lamp switch connector connector and terminal are pin-out. 3. Check harness J2-31 (9-16 V)	

136	B105924	Rear water injector switch stuck	1. Voltage range 9-16 V, engine in ON position or CRANK After 2s 2. BCM wakeup or CAN network sleep status, 3. Voltage on input pin remains high for more than 1 min	Rear washer switch stuck	1. Read DTC with diagnostic scanner 2. Inspect whether the rear washer switch connector connector and terminal are pin-out. 3. Check harness J2-18 (9-16 V) (9-16 V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
137	B105A29	Steering lamp switch status error	1.Voltage range 9-16V 2.BCM wakeup or CAN network sleep status, 3.Continuously detect that the left and right switch inputs are valid for 200 ms at the same time.	Steering lamp switch status error	1.Read DTC with diagnostic scanner 2.Inspect whether the steering lamp switch connector connector and terminal are pin-out. 3.Check harness J2-28/J2-29(0-1V)	
138	B105B29	Low beam and position lamp combination switch status error	1. Voltage range 9-16V, 2.BCM wakeup or CAN network sleep status, 3.Continuous detection 10 s input pin low beam lamp is valid, position lamp is invalid	Position lamp and low beam combination switch input voltage to BCM is incorrect.	1.Read DTC with diagnostic scanner 2.Check whether the light combination switch connector is connected and whether the terminal is pinned. 3.Check harness J2-8/J2-32(0-1V)	
139	B105C29	Fog lamp combination switch status error	1. Battery voltage 9-16 V, and BCMs In wake-up or network sleep mode. 2.Incorrect voltage on input pin 3.Front fog lamp configuration is valid	Incorrect voltage input from fog lamp switch to BCM	1.Read DTC with diagnostic scanner 2.Inspect whether the fog lamp switch connector connector and terminal are retracted. 3.Check harness J2-26/J2-27(0-1V)	
140	B105D23	Rear right side door switch button stuck	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2.BCM wakeup or CAN network sleep status, 3.Voltage on input pin remains low for more than 1 min	RR LH side door switch button stuck	1.Read DTC with diagnostic scanner 2.Check rear left side door switch button 3.Check harness J3-16 (0-1V)	
141	B105E23	Front right side door switch button stuck	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2.BCM wakeup or CAN network sleep status, 3.Voltage on input pin remains low for more than 1 min	Front left side door switch button stuck	1.Read DTC with diagnostic scanner 2.Check front left side door switch button 3.Check harness J3-40 (0-1V)	

142	B105F23	Trunk open switch stuck	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK	Rear trunk door switch button stuck	1. Read DTC with diagnostic scanner 2. Check rear trunk door switch button 3. Check harness J3-13 (0-1V)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			2.BCM wakeup or CAN network sleep status, 3.Voltage on input pin remains low for more than 1 min			
143	B106023	Start/stop switch _1 stuck	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2.BCM wakeup or CAN network sleep status, 3.SSSW_1 switch remains on for more than 1 min (55-148)	Start/stop switch 1 is stuck	1.Read DTC with diagnostic scanner 2.Inspect whether the connector of start/stop switch is connected and whether the terminal is pinned. 3.Check harness J2-2 (5 mA)	
144	B106029	Start/stop switch _1 short circuit to ground	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2. BCM wakeup or CAN network sleep status, 3.10 ms Sampling, 100 consecutive times of voltage acquisition on input pin exceeds the voltage definition range of less than 55203	Voltage on start/stop switch _1 input pin exceeds short circuit to battery voltage threshold	1.Read DTC with diagnostic scanner 2.Inspect whether the connector of start/stop switch is connected and whether the terminal is pinned. 3.Check harness J2-2 (5 mA)	
145	B106012	Start/stop switch _1 short circuit to battery	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2. BCM wakeup or CAN network sleep status, 3.10 ms Sampling, 100 consecutive times of voltage acquisition on input pin exceeds the voltage definition range greater than 203	Voltage on start/stop switch _1 input pin exceeds short circuit to battery voltage threshold	1.Read DTC with diagnostic scanner 2.Inspect whether the connector of start/stop switch is connected and whether the terminal is pinned. 3.Check harness J2-2 (5 mA)	

146	B106123	Start/stop switch _2 stuck	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2. BCM wakeup or CAN network sleep status,	SSSW_2 remains on for more than 1 min	1. Read DTC with diagnostic scanner 2. Inspect whether the connector of start/stop switch is connected and whether the terminal is pinned. 3. Check harness J2-3 (5 mA)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			3. The SSSW_2 switch remains on for more than 1 min. (55-148)			
147	B106129	Start/stop switch _2 short circuit to ground	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2. BCM wakeup or CAN network sleep status, 3.10 ms Sampling, 100 consecutive times of voltage acquisition on input pin exceeds the voltage definition range of less than 55	Voltage on SSSW_2 input pin exceeds short circuit to battery voltage threshold	1. Read DTC with diagnostic scanner 2. Inspect whether the connector of start/stop switch is connected and whether the terminal is pinned. 3. Check harness J2-3 (5 mA)	
148	B106112	Start/stop switch _2 short circuit to battery	1. Voltage range 9-16 V, engine in non-CRANK or CRANK becomes NOT Crank 1s rear 2. BCM wakeup or CAN network sleep status, 3.10 ms Sampling, 100 consecutive times of voltage acquisition on input pin exceeds the voltage definition range greater than 203	Voltage on SSSW_2 input pin exceeds short circuit to battery voltage threshold	1. Read DTC with diagnostic scanner 2. Inspect whether the connector of start/stop switch is connected and whether the terminal is pinned. 3. Check harness J2-3 (5 mA)	

149	B106211	Start/stop switch 1 and 2 are inconsistent.	If power supply voltage between 9 - 16 V and BCM is in AWAKE or CAN_SLEEP mode Type. 1.1: Any of the SSW_1 and SSW_2 states (SSW_1 and SSW_2) When SSW_1 and SSW2 In case of inconsistent state, when SSW_1 state and SSW2 state are any of SSW1 state and SSW_2 state (SSW_1 and SSW_2) Within 200 milliseconds after the state changes from inactive to active	The voltage on the SSSW_1 or SSSW_2 input pin exceeds the open circuit threshold but is lower than the short circuit to power supply threshold.	1. Read DTC with diagnostic scanner 2. Inspect whether the connector of start/stop switch is connected and whether the terminal is pinned. 3. Check harness J2-2/J2-3(5 mA)	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			Same and counter value is not equal to 5 Or 0, subtract 1 from this counter. This DTC sets when the counter value is equal to 5. 2.When the SSW_1 state is the same as the SSW2 state (SSW_1 and SSW_2) state changes from inactive state to active state and the DTCs have been set and the counter value is 5, then clear the DTCs and set the counter value to zero and go to OneStep. Counter values range from 0 to 5.			
150	B106311	Collision signal short circuit to ground	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2.BCM wakeup or CAN network sleep status, 3.Voltage on input pin remains low for more than 1 min	Voltage on crash signal input pin remains low for more than 1 min	1.Check harness J3-4 (10 mA) 2.Read DTC with diagnostic scanner	
151	B106523	Emergency switch stuck	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2.BCM wakeup or CAN network sleep status, 3.Voltage on input pin remains low for more than 1 min	Voltage on emergency switch input pin remains low for more than 1 min	1.Read DTC with diagnostic scanner 2.Inspect the emergency alarm lamp switch connector connection and terminal for pin withdrawal. 3.Check harness J2-33 (0-1V)	
152	B106623	Front left door switch button stuck	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2.BCM wakeup or CAN network sleep status, 3.Voltage on input pin remains low for more than 1 min	Voltage on front left door switch button input pin remains low for more than 1 min	1.Read DTC with diagnostic scanner 2.Check the FRT LH door key connector connection and terminal for pin withdrawal. 3.Check harness J3-15	

					(0-1V)	
153	B108923	Rear left door switch button stuck	1. Voltage range 9-16 V, engine in	Voltage on rear left door switch button input pin remains low for more than 1 min	1. Read DTC with diagnostic scanner 2. Check the RR LH door key connector connection and terminal for pin retraction.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			Not CRANK or 1s after CRANK 2.BCM wakeup or CAN network sleep status, 3.Voltage on input pin remains low for more than 1 min		3.Check harness J3-14 (0-1V)	
154	B106823	Drive mode switch stuck	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2.BCM wakeup or CAN network sleep status, 3.Voltage on input pin remains low for more than 1 min	Drive mode switch stuck	1.Read DTC with diagnostic scanner 2.Check whether the connector of driving mode switch status connector is connected and the terminal is pinned. 3.Check harness J3-28 (5 mA)	
155	B106723	Horn switch stuck	1. Voltage range 9-16 V, 1s after engine is not CRANK or CRANK 2.BCM wakeup or CAN network sleep status, 3.Voltage on input pin remains low for more than 1 min	Horn switch button input pin voltage remains low for more than 1 min	1.Read DTC with diagnostic scanner 2.Inspect whether the horn switch connector connector and terminal are retracted. 3.Check harness J2-30 (0-1V)	
156	B106929	Front wiper switch status error	1. Voltage range 9-16 V, engine in non-CRANK 2.BCM wakeup or CAN network sleep status, 3.Power mode is on, wiper automatic, wiper low speed, wiper high speed, wiper intermittent input any two pin valid for 10 s at the same time	Incorrect voltage on front wiper switch input pin	1.Read DTC with diagnostic scanner 2.Inspect the front wiper switch connector connection and terminal for pin withdrawal. 3.Check harness J2-12/J2-13/J2-16 (9-16 V)	
157	B106B23	Rear fog lamp switch stuck	1. Voltage range 9-16 V, engine in non-CRANK 2.BCM wakeup or CAN network sleep status, 3.Voltage on input pin remains low for more than 1 min	Voltage on rear fog lamp switch input pin remains low for more than 1 min	1.Read DTC with diagnostic scanner 2.Check whether the rear fog lamp switch connector connector and terminal are pin-out. 3.Check harness J2-27	

					(0-1V)	
158	B106F00	General failure of front wiper	1. Voltage range 9-16 V, engine in non-CRANK	Front wiper failure or harness failure	1. Read DTC with diagnostic scanner 2. Inspect whether the front wiper connector connector and terminal are retracted.	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			2.BCM wakeup or CAN network sleep status, 3.If the front wiper is turned on and the front wiper output is turned on, if no signal is detected for more than 6s, the front wiper is considered abnormal.		3.Check harness J5-14/J5-27(0-1V)	
159	B107102	Front left tire low pressure	At the same time, the following conditions are met to activate the corresponding tire low pressure alarm:(The following state diagram takes the front left tire as an example, and the logic of the other three tires is consistent with it.) E1: power supply ON gear or ST gear; E2: No sensor hardware fault; E3: Low voltage fault of sensorless battery; E4: Satisfy the low-pressure alarm threshold logic when any of the following conditions are met: E41: Pressure filter value is less than low-pressure alarm threshold value 3 and duration More than 480 seconds; E42: Pressure filter value is less than low-pressure alarm threshold value2 and duration More than 240 seconds; E43: Pressure filter value is less than low-pressure alarm	Alarm: E1: power supply on Gear or ST gear; E2: No sensor hardware fault; E3: Low voltage of sensorless battery E4: Satisfy the low-pressure alarm threshold logic when any of the following conditions are met: E41: Pressure filter value is less than low-pressure alarm threshold value 3 and duration More than 480 seconds; E42: Pressure filter value is less than low-pressure alarm threshold value2 and duration More than 240 seconds; E43: Pressure filter value is less than low-pressure alarm threshold value. E44: Pressure filter value is less than low-pressure alarm threshold value 4.	1.Read DTC with diagnostic scanner 2.Check corresponding tire pressure 3.Check tire pressure sensor	

			threshold value; E44: Pressure filter value is less than low-pressure alarm threshold value; E5: sensor exists.			
160	B107202	Front right tire low pressure	At the same time, the following conditions are met to activate the corresponding tire low pressure alarm:(The following state diagram takes the front left tire as an example, and the logic of the other three tires is consistent with it.) E1: power supply ON gear or ST gear; E2: No sensor hardware fault;	Logic of three tires is consistent with it) E1: power supply ON gear or ST gear; E2: No sensor hardware fault; E3: Low voltage of sensorless battery E4: Satisfy the low-pressure alarm threshold logic when any of the following conditions are met:	1. Read DTC with diagnostic scanner Check corresponding tire pressure Check tire pressure sensor	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			E3: Low voltage of sensorless battery E4: Satisfy the low-pressure alarm threshold logic when any of the following conditions are met: E41: Pressure filter value is less than low-pressure alarm threshold value 3 and duration More than 480 seconds; E42: Pressure filter value is less than low-pressure alarm threshold value2 and duration More than 240 seconds; E43: Pressure filter value is less than low-pressure alarm threshold value. E44: Pressure filter value is less than low-pressure alarm threshold value 4. E5: sensor exists;	E41: Pressure filter value is less than low-pressure alarm threshold value 3 and duration More than 480 seconds; E42: Pressure filter value is less than low-pressure alarm threshold value2 and duration More than 240 seconds; E43: Pressure filter value is less than low-pressure alarm threshold value. E44: Pressure filter value is less than low-pressure alarm threshold value 4.		

161	B107302	Rear left tire low pressure	Meet the following conditions at the same time to activate the corresponding tire low pressure alarm: (The following state diagram takes the front left tire as an example, the logic of the other three tires is consistent with it) E1: power supply ON gear or ST gear; E2: No sensor hardware fault; E3: Low voltage of sensorless battery E4: Satisfy the low-pressure alarm threshold logic when any of the following conditions are met: E41: Pressure filter value is less than low-pressure alarm threshold value 3 and duration More than 480 seconds; E42: Pressure filter value is less than low-pressure alarm threshold value2 and duration More than 240 seconds; E43: Pressure filter value is less than low-pressure alarm threshold value. E44: Pressure filter value is less than low-pressure alarm threshold value 4. E5: sensor exists;	E44: Pressure filter value is less than low-pressure alarm threshold value 4.	1. Read DTC with diagnostic scanner 2. Check corresponding tire pressure 3. Check tire pressure sensor	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
162	B107402	Rear right tire low pressure	Meet the following conditions at the same time to activate the corresponding tire low pressure alarm: (The following state diagram takes the front left tire as an example, the logic of the other three tires is consistent with it) E1: power supply ON gear or ST gear; E2: No sensor hardware fault; E3: Low voltage of sensorless battery E4: Satisfy the low-pressure alarm threshold logic when any of the following conditions are met: E41: Pressure filter value is less than low-pressure alarm threshold value 3 and duration More than 480 seconds; E42: Pressure filter value is less than low-pressure alarm threshold value2 and duration More than 240 seconds; E43: Pressure filter value is less than low-pressure alarm threshold value. E44: Pressure filter value is less than low-pressure alarm threshold value 4. E5: sensor exists;	44: Pressure filter value is less than low-pressure alarm threshold value 4.	1. Read DTC with diagnostic scanner 2. Check corresponding tire pressure 3. Check tire pressure sensor	
163	B107502	Tire pressure ID missing	Simultaneously meet the following conditions to activate alarm: E1: ignition switch is in ON position or ST position; E2: detects the loss of any tire	EEPROM is initialized EEPROM has been format	1. Read DTC with diagnostic scanner 2. Check tire pressure sensor 3. Check for interference around the vehicle	

			pressure sensor ID; E3: Sensor exists			
164	B107602	Tire pressure ID repeating	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST gear. E2: Two valid signals of the same sensor ID are detected. E3: Sensor exists	Incorrect Tire Pressure ID learned	1. Read DTC with diagnostic scanner 2. Check tire pressure sensor 3. Check for interference around the vehicle	
165	B107993	Front left tire sensor failure	At the same time, the sensor hardware fault alarm is activated if the following conditions are met:	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST gear.	1. Read DTC with diagnostic scanner 2. Check tire pressure sensor 3..Check for interference around the vehicle	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			E1: On gear or ST Gear E2: The corresponding tire loss counter is equal to 3 times (3 points for each time). Clock, total 9 minutes) E3: Sensor exists	E2: Valid sensor hardware fault signal received twice continuously E3: Sensor exists		
166	B107A93	Front right tire sensor failure	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST gear. E2: The corresponding tire loss counter is equal to 3 times (3 points for each time). Clock, total 9 minutes) E3: Sensor storage	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST gear. E2: Valid sensor hardware fault signal received twice continuously E3: Sensor exists	1. Read DTC with diagnostic scanner 2. Check tire pressure sensor 3. Check for interference around the vehicle	
167	B107B93	Rear left tire sensor failure	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST gear. E2: The corresponding tire loss counter is equal to 3 times (3 points for each time). Clock, total 9 minutes) E3: Sensor exists	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST gear. E2: Valid sensor hardware fault signal received twice continuously E3: Sensor exists	1. Read DTC with diagnostic scanner 2. Check tire pressure sensor 3. Check for interference around the vehicle	
168	B107C93	RR RH tire sensor failure	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST gear. E2: The corresponding tire loss counter is equal to 3 times (3 points for each time). Clock, total 9 minutes) E3: Sensor exists	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST gear. E2: Valid sensor hardware fault signal received twice continuously E3: Sensor exists	1. Read DTC with diagnostic scanner 2. Check tire pressure sensor 3. Check for interference around the vehicle	

169	B107D92	Front left tire pressure sensor low power	At the same time, the sensor battery voltage low alarm is activated if the following conditions are met: (The left front tire is taken as an example in the following state diagram, and the other three tires are consistent with its logic) E1: On gear or ST gear. E2: Valid low sensor battery voltage signal is continuously received twice. E3: Sensor exists E4: Sensor hardware is normal	Take front left tire as an example, the other three tires are consistent with its logic) E1: On gear or ST gear E2: Valid low sensor battery voltage signal is continuously received twice. E3: Sensor exists E4: Sensor hardware is normal	1. Replace tire pressure sensor 2. Read DTC with diagnostic scanner	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
170	B107E92	Front right tire pressure sensor low power	At the same time, the sensor battery voltage low alarm is activated if the following conditions are met: (The left front tire is taken as an example in the following state diagram, and the other three tires are consistent with its logic) E1: On gear or ST gear E2: Valid low sensor battery voltage signal is continuously received twice. E3: Sensor storage E4: Sensor hardware is normal	At the same time, the sensor battery voltage low alarm is activated if the following conditions are met: E1: On or ST E2: Valid low sensor battery voltage signal is continuously received twice. E3: Sensor exists E4: Sensor hardware is normal	3. Replace tire pressure sensor 4. Read DTC with diagnostic scanner	
17	B107F92	Rear left tire pressure sensor low power	At the same time, the sensor battery voltage low alarm is activated if the following conditions are met: (The left front tire is taken as an example in the following state diagram, and the other three tires are consistent with its logic) E1: On gear or ST gear E2: Valid low sensor battery voltage signal is continuously received twice. E3: Sensor exists E4: Sensor hardware is normal	At the same time, the sensor battery voltage low alarm is activated if the following conditions are met: E1: On or ST E2: Valid low sensor battery voltage signal is continuously received twice. E3: Sensor exists E4: Sensor hardware is normal	4. Replace tire pressure sensor 5. Read DTC with diagnostic scanner	
172	B108092	Rear right tire pressure sensor low power	At the same time, the sensor battery voltage low alarm is activated if the following conditions are met: E1: On or ST E2: Valid low sensor battery voltage signal is continuously received twice.	At the same time, the sensor battery voltage low alarm is activated if the following conditions are met: (The left front tire is taken as an example in the following state diagram, and the other three tires are consistent with its logic) E1: On	**3** Replace tire pressure sensor **4** Read DTC with diagnostic scanner	

			E3: Sensor exists E4: Sensor hardware is normal	gear or ST gear E2: Valid low sensor battery voltage signal is continuously received twice. E3: Sensor exists E4: Sensor hardware is normal		
173	B108196	Front left tire pressure sensor hardware fault	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST Gear E2: Valid sensor hardware fault signal received twice continuously E3: Sensor exists	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST Gear E2: Valid sensor hardware fault signal received twice continuously E3: Sensor exists	7 Read DTC with diagnostic scanner 8 Check tire pressure sensor 3. Check around the vehicle Is there interference	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
174	B108296	Front right tire pressure sensor hardware fault	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST Gear E2: Valid sensor hardware fault signal received twice continuously E3: Sensor exists	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST Gear E2: Valid sensor hardware fault signal received twice continuously E3: Sensor exists	**3** Read DTC with diagnostic scanner **4** Check tire pressure sensor 3. Check around the vehicle Is there interference	
175	B108396	Rear left tire pressure sensor hardware fault	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST Gear E2: Valid sensor hardware fault signal received twice continuously E3: Sensor exists	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST Gear E2: Valid sensor hardware fault signal received twice continuously E3: Sensor exists	**6** Read DTC with diagnostic scanner **7** Check tire pressure sensor 3. Check around the vehicle Is there interference	
176	B108496	Rear right tire pressure sensor hardware fault	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST Gear E2: Valid sensor hardware fault signal received twice continuously E3: Sensor exists	If the following conditions are met at the same time, the sensor hardware fault alarm is activated: E1: On gear or ST Gear E2: Valid sensor hardware fault signal received twice continuously E3: Sensor exists	**8** Read DTC with diagnostic scanner **9** Check tire pressure sensor 3. Check around the vehicle Is there interference	
177	U101B86	Remote access control key SI counter error	1. Voltage range 9-16 V, engine in non-CRANK 2. BCM wakeup or CAN network sleep status, 3.The difference between rollingcounter of remote control access key and BCM is more than 256.	Si value of RKE exceeds valid range	A "not synchronized" key can be resynchronized by the following methods: • 30 s receiving three frames continuously pressing the key key RKE message/3 s	

178	U101B85	Remote control access key low power	1. Voltage range 9-16 V, engine in non-CRANK 2. BCM wakeup or CAN network sleep status, 3. Low power mark of any remote control access key is 1.	Continuously detected RKE low power reaches the maximum number	Replace battery of key	
179	U101B44	Remote access control key eeprom error	1. Voltage range 9-16 V, engine in non-CRANK 2. BCM wakeup or CAN network sleep status,	Received RKE eeprom error signal	Check remote control key	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			3.Remote access control key eeprom error(Four keys Fixed code all 00 or FF)			
180	U101C00	RFR communication error	1. Voltage range 9-16 V, engine in non-CRANK 2. BCM wakeup or CAN network sleep status, 3.When BCMs are actively configured with RFR, if the maximum number of retransmissions is exceeded for three times or the response of RFR cannot be received, error will be reported.	RFR communication error flag position	**6** Read DTC with diagnostic scanner **7** Check whether the RFR connector is connected and whether the terminal is pinned. **8** Check LIN line connection J3-58 (9-11 V)	
181	U101D44	MK key reading failed	MK key reading failed	Hardware fault rate of ECU increases due to hardware defect or beyond service life	Replace controller	
182	U101E44	CK key read/write failure	CK key read/write failure	Hardware fault rate of ECU increases due to hardware defect or beyond service life	Replace controller	
183	U101F44	Synchronous counter 25C_TripCNT read/write failure	Synchronous counter 25C_TripCNT read/write failure	Hardware fault rate of ECU increases due to hardware defect or beyond service life	Replace controller	
184	U102044	RFBT_2CA message security check failed	1. Three consecutive frame security check fails	1. RFBT/BCM The general key learning process is not performed after replacement. 2. Can is disturbed.	**4** Read DTC with diagnostic scanner **5** Re-perform the overall key learning process. **6** Confirm whether the harness is faulty.	
185	B140015	Evaporator temperature sensor open circuit or short circuit to battery	**6** Two seconds after the system wakes up, or IGN ON 2 seconds later **7** It is detected that the sensor acquires voltage >4.9 V for 2s, and it is judged that the sensor is open circuit or short	Poor connection of sensor interface or sensor failure	D. Read DTC with diagnostic scanner E. Check harness J1-22 (0-5V) F. Replace sensor	

			to battery.			
186	B140011	Evaporator temperature sensor short circuit to ground	3. Two seconds after the system wakes up, or IGN ON 2 seconds later 4. Detect the sensor acquisition voltage <0.1 V for 2s, and judge that the sensor is short to ground.	Poor connection of sensor interface or sensor failure	4. Read DTC with diagnostic scanner 5. Check harness J1-22 (0-5V) 6. Replace sensor	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
187	B140115	Interior temperature sensor open or short to battery	4.Two seconds after the system wakes up, or IGN ON 2 seconds later 5.It is detected that the sensor acquires voltage >4.9 V for 2s, and it is judged that the sensor is open circuit or short to battery.	Poor connection of sensor interface or sensor failure	4.Read DTC with diagnostic scanner 5.Check harness J1-19 (0-5V) 6.Replace sensor	
188	B140111	Interior temperature sensor short circuit to ground	4.Two seconds after the system wakes up, or IGN ON 2 seconds later 5.Detect the sensor acquisition voltage <0.1 V for 2s, and judge that the sensor is short to ground.	Poor connection of sensor interface or sensor failure	4.Read DTC with diagnostic scanner 5.Check harness J1-19 (0-5V) 6.Replace sensor	
189	B140215	Driver sun sensor open or short to battery	4.Two seconds after the system wakes up, or IGN ON 2 seconds later 5.It is detected that the sensor acquires voltage >4.95 V for 2s, and it is judged that the sensor is open circuit or short to battery.	Poor connection of sensor interface or sensor failure	4.Read DTC with diagnostic scanner 5.Check harness J1-21 (0-5V) 6.Replace sensor	
190	B140211	Driver sun sensor short circuit to ground	4.Two seconds after the system wakes up, or IGN ON 2 seconds later 5.Detect the sensor acquisition voltage <0.1 V for 2s, and judge that the sensor is short to ground.	Poor connection of sensor interface or sensor failure	4.Read DTC with diagnostic scanner 5.Check harness J1-21 (0-5V) 6.Replace sensor	
191	B140315	Outside temperature sensor open or short to battery	4.Two seconds after the system wakes up, or IGN ON 2 seconds later 5.It is detected that the sensor acquires voltage >4.9 V for 2s, and it is judged that the sensor is open circuit or short to battery.	Poor connection of sensor interface or sensor failure	4.Read DTC with diagnostic scanner 5.Check harness J1-25 (0-5V) 6.Replace sensor	

192	B140311	Outside temperature sensor is short to ground.	4. Two seconds after the system wakes up, or IGN ON 2 seconds later 5. Detect the sensor acquisition voltage <0.1 V for 2s, and judge that the sensor is short to ground.	Poor connection of sensor interface or sensor failure	4. Read DTC with diagnostic scanner 5. Check harness J1-25 (0-5V) 6. Replace sensor	
193	B140400	The mode damper actuator is blocked or the drive circuit is blocked.	1.Two seconds after the system wakes up, or IGN ON 2 seconds later.	Poor connector or bad actuator or drive circuit fault	3. Read DTC with diagnostic scanner 4. Check harness J1-1 (0-5V) 5. Replace actuator	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			4. When the feedback voltage of the actuator is normal, the actuator cannot reach the target position ±0.1 V tolerance range within 10 s; 5. Or read drive chip fault;			
194	B140500	The driver cooling and heating door actuator is blocked or the drive circuit is blocked.	4. Two seconds after the system wakes up, or IGN ON 2 seconds later 5. When the feedback voltage of the actuator is normal, the actuator cannot reach the target position ±0.1 V tolerance range within 10 s; 6. Or read drive chip fault;	Poor connector or bad actuator or drive circuit fault	4. Read DTC with diagnostic scanner 5. Check harness J1-26 (0-5V) 6. Replace actuator	
195	B140600	The inner and outer circulation damper actuator is blocked or the drive circuit is blocked.	1.Two seconds after the system wakes up, or IGN ON 2 seconds later. 2..In case of normal feedback voltage of actuator, the inner and outer motors are installed. The walker does not reach the target position in 10 seconds ±0.1 V tolerance range; 3. Or read drive chip fault;	Poor connector or bad actuator or drive circuit fault	4. Read DTC with diagnostic scanner 5. Check harness J1-23 (0-5V) 6. Replace actuator	
196	B140715	Mode damper actuator feedback open or short to battery fault	4. Two seconds after the system wakes up, or IGN ON 2 seconds later 5. The actuator feedback voltage >4.9 V is detected for 3s, and it is determined that the sensor is open or short to battery.	Poor connector or bad actuator or drive circuit fault	4. Read DTC with diagnostic scanner 5. Check harness J1-1 (0-5V) 6. Replace actuator	

197	B140711	Mode damper actuator feedback short circuit to ground	4. Two seconds after the system wakes up, or IGN ON 2 seconds later 5. Detect the sensor acquisition voltage <0.1 V for 3s, and judge that the sensor is short to ground.	Poor connector or bad actuator or drive circuit fault	4. Read DTC with diagnostic scanner 5. Check harness J1-1 (0-5V) 6. Replace actuator	
198	B140815	Driver Heater Door Actuator Feedback Open or Short to Battery	5. Two seconds after the system wakes up, or IGN ON 2 seconds later 6. Sensor acquisition voltage >4.9 V detected	Poor connector or bad actuator or drive circuit fault	3. Read DTC with diagnostic scanner 4. Check harness J1-26 (0-5V) 5. Replace actuator	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			And for 3 seconds, it is judged that the sensor is open or short to battery.			
199	B140811	Driver cooling and heating door actuator feedback short circuit to ground	4. Two seconds after the system wakes up, or IGN ON 2 seconds later 5. Detect the sensor acquisition voltage <0.1 V for 3s, and judge that the sensor is short to ground.	Poor connector or bad actuator or drive circuit fault	6. Read DTC with diagnostic scanner 7. Check harness J1-26 (0-5V) 8. Replace actuator	
200	B140915	Internal and external circulation damper actuator feedback open circuit or short circuit to battery fault	4. Two seconds after the system wakes up, or IGN ON 2 seconds later 5. Detect sensor acquisition voltage >4.9 V for 3s, and judge as sensor open circuit or short circuit to battery	Poor connector or bad actuator or drive circuit fault	5. Read DTC with diagnostic scanner 6. Check harness J1-23 (0-5V) 7. Replace sensor	
201	B140911	Inner and outer circulation damper actuator feedback short circuit to ground	4. Two seconds after the system wakes up, or IGN ON 2 seconds later 5. Detect the sensor acquisition voltage <0.1 V for 3s, and judge that the sensor is short to ground.	Poor connector or bad actuator or drive circuit fault	3. Read DTC with diagnostic scanner 4. Check harness J1-23 (0-5V) 5. Replace sensor	
202	B140A13	Fan terminal voltage control is inaccurate	4. IGN ON Power on 2000 ms; 5. The power supply voltage is greater than the target voltage 1V;	Poor connection of fan interface, fan fault or speed control module fault	4.Read DTC with diagnostic scanner 5.Check battery voltage, harness J1-30 (0-5V) Fan and speed regulation module	
203	B141112	Sensor reference voltage short to battery	4. Two seconds after the system wakes up, or IGN ON 2 seconds later 5. Sensor reference voltage >5.3 V detected for 2s	Reference 5V reference voltage circuit or connector harness short circuit to ground	3. Read DTC with diagnostic scanner 4. Check reference 5V reference voltage circuit 5. Connector harness J1-27(0-5V)	

204	B141111	Sensor reference voltage short circuit to ground	4. Two seconds after the system wakes up, or IGN ON 2 seconds later 5. Sensor reference voltage <0.3 V detected for 2s	Reference 5V reference voltage circuit or connector harness short circuit to ground	4. Read DTC with diagnostic scanner 5. Check reference 5V reference voltage circuit 6. Connector harness J1-27(5V)	
205	B141415	Pressure sensor open or short to battery	4. Two seconds after the system wakes up, or IGN ON 2 seconds later 5. Sensor acquisition voltage >4.8 V detected	Poor connection of sensor interface or sensor failure	5. Read DTC with diagnostic scanner 6. Check harness J1-2 (0-5V) 7. Replace sensor	

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps	Remarks
			And for 2 seconds, it is judged that the sensor is open or short to battery. 3. Configuration of A/C system pressure sensor			
206	B141411	Pressure sensor short circuit to ground	5. Two seconds after the system wakes up, or IGN ON 2 seconds later 6. Detect the sensor acquisition voltage <0.1 V for 2s, and judge that the sensor is short to ground. 7. Air conditioning system standby pressure sensor configuration	Poor connection of sensor interface or sensor failure	4. Read DTC with diagnostic scanner 5. Check harness J1-2 (0-5V) 6. Replace sensor	
207	B141412	A/C system pressure too high	3. The engine status is running and the AC request is valid; 4. The pressure sensor acquired for 1s is higher than 3.0MPa.(Feedback voltage is greater than 4.25 V) 5. Air conditioning system standby pressure sensor configuration	A/C system fault or harness contact problem	5. Read DTC with diagnostic scanner 6. Check whether the A/C system has refrigerant and whether the A/C refrigeration cycle works normally.	
208	B141413	A/C system pressure too low	5. The engine status is running and the AC request is valid; 6. The value of pressure sensor acquired for continuous 1s is lower than 0.2MPa.(Feedback voltage is less than 0.8 V) 7. Air conditioning system standby pressure sensor configuration	A/C system fault or harness contact problem	3. Read DTC with diagnostic scanner 4. Check whether the A/C system has refrigerant and whether the A/C refrigeration cycle works normally.	

Removal and installation

RF receiver

Installation: The frequency receiver is arranged in the middle of the rear cross beam.

The mounting structure of RF receiver is snap-in type (no installation tool is required), that is, first butt-in the right hole position, and press firmly the left hole position to buckle it. Removal: Directly press the tail buckle of the RF receiver by hand to remove it. (To be prepared in advance: Removing and installing headliner)

Press and hold the RF receiver buckle at the left hole position, and pull out forcefully to remove it.

Removing and installing door signal lamp switch

6. Lift the waterproof rubber of the switch;
7. Unscrew the mounting screws with cross opening, and take out the door signal lamp switch;
8. Pull out connector;
9. The installation sequence is the reverse of the removal sequence.

Front hood lock and status switch

Front cover lock Removing refer to Removing and installing front cover lock

Front door lock cylinder

Removing and installing lock cylinder

for driver's door only. Removal

3. Remove front door lock cylinder bolt plug cover

4. Use a Phillips screwdriver to unscrew the front door lock cylinder retaining bolt, "arrow" indication Bolt Tightening torque: 5±1N.m (7.5 ftlb.)

5. Remove the lock cylinder connecting rod and take out the lock cylinder in the direction of "arrow."

Installation

Install generally in reverse order of removal. Front door lock assembly

4. Removal

Caution The removal and installation of front left door lock assembly is described here, and the removal and installation of front right door lock assembly is roughly the same.

- Remove the front door interior trim panel.Refer to Removal and Installation.
- Remove front door lock cylinder. Refer to Front Door Lock Cylinder
- Remove the front door glass rear lower guide rail. Refer to Removing and installing front door glass guide
- Unclip the front left door waterproof film.
- Unscrew retaining bolt of front left door lock assembly, "arrow" indicator. Bolt tightening torque: 9±1N.m (7.5 ftlb.)

- Disconnect the front left door lock assembly connecting plug, and take out the door lock.

- Take out front left door lock assembly.

5. Installation

The installation is generally carried out in reverse disassembly sequence, while paying attention to the following items:

Caution Test the lock body function, and install the front door trim panel after normal. Front door buckle

3. Removal

- Unscrew retaining bolt of front door lock catch at "arrow" indicator.
- Remove the front door buckle.

  Bolt tightening torque: 23±3N.m (7.5 ftlb.)

4. Installation

   Install generally in reverse order of removal.

Spare parts atlas

F270603

Keyless control system specifications

Name
Body intelligent controller assembly(BDC)
Low frequency antenna assembly
Smart key assembly
Door lock structure assembly
RF receiver assembly/Bluetooth RF receiver assembly

Composition and position distribution

Composition: Consists of body intelligent controller assembly, low frequency antenna assembly, smart key assembly and RF receiver assembly (Bluetooth RF receiver assembly).

Position distribution: Body intelligent controller assembly is located at right A-pillar side wall; The low frequency antenna assembly is arranged directly below the cup holder, in the middle of the left and right rear doors and trunk.

System functional principle introduction

System introduction:

When the key is in the vehicle, the starter switch can start and stop the engine, or select OFF, ACC and ON gear switch. When the brake pedal is not depressed, press the start switch to change the ignition switch mode. If it is OFF for the first time, press ACC mode; Press the second time to ON mode; Press the third time to return to OFF mode; Cycle by pressing the start switch again. When the brake pedal is depressed, the starter switch indicator lamp turns green. At this time, press the starter switch to start the engine.

Remote control unlocking: When the vehicle power status is in OFF position, press the unlocking button on the smart key, the body smart controller drives the door lock to complete unlocking, and the hazard warning lamp flashes once after successful unlocking.

Remote control locking: When the vehicle power supply is in OFF position and all four doors are closed, press the locking button on the smart key, BDC drives the door lock to complete the locking action, and the hazard warning lamp flashes twice after successful locking.

Remote control luggage compartment: The power supply status of the vehicle is in OFF gear, and within 3s, press the same remote control key to remotely control the luggage compartment unlocking key twice, and BDC drives the luggage compartment lock to complete unlocking.

Remote control vehicle searching: After the vehicle power supply is in OFF position and the doors are closed, press the lock button on the smart key twice within two seconds to activate the vehicle searching function, and the BDC will drive the horn to sound while the hazard warning lamp flashes to indicate the vehicle position.

Front left door keyless unlocking: After the vehicle power supply is in OFF position and the doors are closed, the user has the legal smart key in the left of area 2. Press the front left door handle button. If the front left door is locked, the BDC drives the door lock to complete the unlocking action. The hazard warning lamp flashes once after successful unlocking.

Front left door keyless lock: After the vehicle power supply is in OFF position and the doors are closed, the user holds the legal smart key in the left of area 2. Operate the button on the front left door handle. If the front left door is in the unlocked state, the BDC drives the door lock to complete the lock action. After the lock is successful, the hazard warning lamp flashes twice.

Luggage compartment keyless unlocking: After the luggage compartment is closed, the user holds the legal smart key in area C, and operates the switch button on the luggage compartment, then BDC drives the luggage compartment to complete the unlocking action.

One-button startup: When the user holds the legal smart key in area 1, shift the transmission to gear P or N, depress the brake and do not release it (depress the brake in the whole startup process), the working indicator on the startup switch turns green, and press the one-button startup switch to complete startup.

One-key flameout: When the vehicle speed is zero, press the one-key starter switch to finish flameout. If the transmission gear is in P gear, the power supply status will return to OFF; if the transmission gear is in non-P gear, the power supply status will return to ACC (non-OFF gear will cause remote control to be unavailable, please return to P gear).

Emergency flameout: When the vehicle speed is not zero but less than 40 KM/h, short press one-button starter switch cannot flameout. Long press for more than 5s to finish flameout. When the vehicle speed is greater than 40 KM/h, short press and long press cannot stop the fire. Please press the brake to lower the vehicle speed and stop the fire.

Standby startup: When the smart key has insufficient power, the IBCM may not detect the key. Put the smart key into the storage box in front of the gearshift lever, close to the inclined surface at the front of the storage box, and shift the transmission gear to gear P or N. Step on the brake and do not release (step on the brake in the whole startup process). The working indicator on the startup switch turns green. Press the one-button startup switch to finish startup.

Remote start: The power gear is in OFF position, and the command of remote start engine and A/C is sent through the mobile phone. If the vehicle is in anti-theft state, the door is opened and closed once after the last normal start and flameout; The number of successful remote starting times is <=1, the remote control key is not in the vehicle, and the emergency alarm light is not activated, the vehicle power supply is switched to ON gear. If the transmission gear is in P gear, the vehicle speed is zero, the fuel quantity indicator lamp is not on, the engine is in the shutdown state, and the ambient temperature is greater than 30 C below zero, the engine is started and the gear shift is prohibited; If any of the above conditions is not met, the engine will not be started, and the startup failure and cause will be fed back to the user's mobile phone.

Remote control start: The power gear is in OFF position, press the remote control start button ≥2s on the remote control key. If the vehicle is in anti-theft state, the door is opened and closed once after the last normal start and flameout; The number of successful remote starting times is <=1. The remote control key is not in the vehicle. If the emergency alarm light is not activated, the power supply of the vehicle is switched to ON gear. If the transmission gear is P at this time, the power supply of the vehicle is switched to ON gear.
Gear is zero, the vehicle speed is zero, the fuel quantity indicator lamp is not on, the engine is in the shutdown state, the ambient temperature is greater than 30 ° C below zero and shifting is prohibited, the engine is started; If any of the above conditions are not met, the engine will not start.

Remote or remote control startup and exit: In the process of remote or remote control startup or after successful startup, exit the startup under any of the following conditions, and switch the power supply gear to OFF gear. At the same time.(1)Press the "Remote start/stop engine" button on the remote control key again; (2) The user sends "Remote Start Stop" command through the mobile phone or the background. (3) The remote start is operated for 10 minutes (the time can be calibrated); (4) Anti-theft activation; (5) Emergency alarm light is activated; (6) Non-P gear (7) Vehicle speed is not zero (8) MIL indicator lamp is on (9) Engine coolant temperature is too high (10) Engine oil pressure is too low (11) EPB is released or hand brake is put down.

Remote or remote control start mode and normal mode switching logic: When the vehicle is in the remote or remote control start mode, press the remote control unlock button or the front left door PE (the key is in the front left door activation area), the following conditions are met at the same time, the engine can enter the normal start mode, (1) the key is in the vehicle (2) the brake is pressed (3) the start button is pressed.

Power supply switching function: When the user holds the legal smart key in area 1 and does not press the brake, short press the one-button start switch once, i.e. the power supply gear is switched to the next gear. Put the transmission in gear P, short press the one-button starter switch once, then the power supply will go from OFF to ACC and then to ON and then to OFF, so cycle. (Do not depress the brake) shift the transmission to non-P gear, short press the one-button starter switch once, then the power supply will go from ACC to ON to ACC, so the cycle. (Do not step on brake)

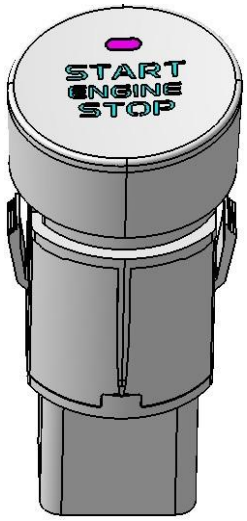
Prompt and alarm function: When the key is not detected, IBCM sends a signal to the instrument for prompt; When the startup fails, the IBCM sends a signal to the instrument to indicate the failure reason (see diagnosis and maintenance for details); When it is detected that the starting conditions are met, the working indicator on the one-button starter switch turns green; When the power supply is ACC or ON, but the brake is not pressed, the tooling indicator on the one-button starter switch changes to amber; When it is detected that IBCM itself has fault, send corresponding fault signal to instrument for prompt (see diagnosis and maintenance for details);

Inspection of part structure principle

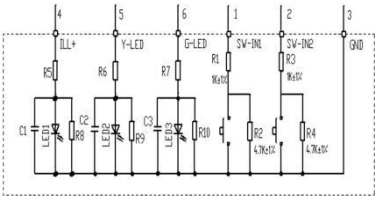
Remote control key

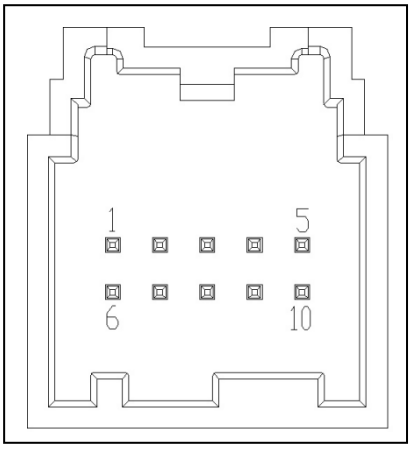
The remote control key is a transmitter for transmitting high-frequency wireless communication signals, and its structure is as shown in the figure:

One-key starter switch functional structure



One-key starter switch includes working indicator lamp, characters and background light, which is clamped and installed on the panel.
Schematic diagram and pin definition of PIN





Pin	Function abbreviation	Input/output	Function description
1	SW-IN1	Output	Output signal
2	SW-IN2	Output	Output signal
3	GND	Input	Ground signal
4	ILL+	Input	Background light power supply
5	Y-LED	Input	Yellow indicator light
6	G-LED	Input	Green indicator light
7	\	\	\

8	\	\	\
9	\	\	\
10	\	\	\

BDC body intelligent controller assembly

The structure of BDC body intelligent controller assembly is shown as follows:

The interface is shown in the following table:

Pin	Function abbreviation	Rated parameters	Signal type
J1-1	FR seat mode motor position input	0-5V	I-A
J1-2	Refrigerant pressure switch(High and low voltage circuit)	0-5V	I-A
J1-3	/	/	/
J1-4	SGND signal ground	500mA	AGND
J1-5	PWM fan	8-16V	O-PWM
J1-6	Externally controlled variable displacement compressor	0-2A	O-H
J1-7	FR seat blower relay control	150mA	O-L
J1-8	Ion generator	150mA	O-L
J1-9	Driver's seat temperature motor Hot side output	500mA	H-Bridge
J1-10	Passenger compartment temperature motor Cool side output	500mA	H-Bridge
J1-11	Inner and outer air motor inner side output	500mA	H-Bridge
J1-12	Output at outer side of inner and outer air motor	500mA	H-Bridge
J1-13	FR seat mode motor Face side output	500mA	H-Bridge
J1-14	Passenger compartment temperature motor Hot side output	500mA	H-Bridge
J1-15	FR seat mode motor DEF side output	500mA	H-Bridge
J1-16	Driver's seat temperature motor Cool side output	500mA	H-Bridge
J1-17	CANx terminal resistor(BCAN Terminal resistance)	/	COMM
J1-18	CANx terminal resistor(BCAN Terminal resistance)	/	COMM

J1-19	FR interior temperature sensor input	0-5V	I-A

J1-20	Sunlight sensor Pa side input	0-5V	I-A
J1-21	Sunlight sensor Da side input	0-5V	I-A
J1-22	FR seat evaporator temperature sensor input	0-5V	I-A
J1-23	Inner and outer air motor position input	0-5V	I-A
J1-24	Passenger compartment temperature motor position input	0-5V	I-A
J1-25	Outside air temperature sensor	0-5V	I-A
J1-26	Driver's seat temperature motor position input	0-5V	I-A
J1-27	5V power supply	5V	O-H_5V
J1-28	AQS sensor	0-5V	I-PWM
J1-29	SGND A/C sensor signal ground	500mA	AGND
J1-30	FR blower feedback signal input	0-5V	I-A
J1-31	FR blower motor drive output	0-12V	O-PWM
J1-32	Panel communication	30mA	Comm
J2-1	One-key starter switch assembly ground	30mA	AGND
J2-2	Start/stop switch 1	5mA	I-A
J2-3	Start/stop switch 2	5mA	I-A
J2-4	ACC relay feedback	5mA	I-D -H
J2-5	IG1 relay feedback	5mA	I-D -H
J2-6	LDW enable switch	5mA	I-D -L
J2-7	Automatic light switch	5mA	I-D -L
J2-8	Low beam switch	5mA	I-D -L
J2-9	High beam switch	5mA	I-D -L
J2-10	IG2 relay feedback	5mA	I-D -H
J2-11	Front wiper automatic/intermittent switch	5mA	I-D -H
J2-12	Front wiper low speed switch	5mA	I-D -H
J2-13	Front wiper high-speed switch	5mA	I-D -H
J2-14	Front washer switch	5mA	I-D -H
J2-15	Window delay relay	150mA	O-L
J2-16	Front wiper intermittent adjustment switch analog input	5mA	I-A
J2-17	Ambient light sensor	5mA	I-A
J2-18	Rear washer switch	5mA	I-D -H
J2-19	Rear wiper low speed switch	5mA	I-D -H
J2-20	IG2 relay	150mA	O-L
J2-21	One-key starter switch indicator lamp red	30mA	O-H
J2-22	One-key starter switch indicator lamp green	30mA	O-H
J2-23	Start/stop switch background lamp(PWM)	30mA	O-H
J2-24	LIN6, steering wheel	/	Comm
J2-25	Front wiper intermittent adjustment switch reference power supply	5mA	I-ABat

J2-26	Front fog lamp switch	5mA	I-D -L
J2-27	Rear fog lamp switch	5mA	I-D -L
J2-28	Right steering switch	5mA	I-D -L
J2-29	Left turn signal lamp switch	5mA	I-D -L
J2-30	Horn switch	5mA	I-D -L
J2-31	Overtaking lamp switch	5mA	I-D -L
J2-32	Position lamp switch	5mA	I-D -L
J2-33	Emergency alarm switch	5mA	I-D -L
J2-34	Anti-theft indicator	30mA	O-L
J2-35	ACC relay	150mA	O-L
J2-36	IG1 relay	150mA	O-L
J2-37	INFOCAN	/	COMM
J2-38	INFOCAN	/	COMM
J2-39	DiagCAN CANFD	/	COMM
J2-40	DiagCAN CANFD	/	COMM
J3-1	Front position lamp and license plate lamp output	2A	O-H -PWM
J3-2	Reserved AGND2	1A	GND
J3-3	Kick sensor	10mA	I-PWM
J3-4	Crash input	10mA	I-PWM
J3-5	Central locking switch	5mA	I-D -L
J3-6	Interior trunk switch	5mA	I-D -L
J3-7	Central control unlocking switch	5mA	I-D -L
J3-8	FRT RH door handle switch/FRT RH door unlock switch	5mA/10mA	I-D -L
J3-9	Right rear door handle switch	5mA	I-D -L
J3-10	Right rear dome lamp switch(Input)	5mA	I-D -L
J3-11	Reserved DI4	/	I-D -L
J3-12	FRT RH lock status	5mA	I-D -L
J3-13	Trunk status	5mA	I-D -L
J3-14	Rear left door status	5mA	I-D -L
J3-15	FRT LH door status	5mA	I-D -L
J3-16	Rear right door status	5mA	I-D -L
J3-17	Reserved DI3	5mA	I-D -L
J3-18	Rear wiper stop signal	30mA	I-D -L
J3-19	Wireless charging enable	5mA	O-L
J3-20	RR LH dome lamp output/RR dome lamp output	150mA	O-L
J3-21	RR RH dome lamp output	150mA	O-L
J3-22	Right door low frequency antenna +	1A	Ant+
J3-23	Rear low frequency antenna +	1A	Ant+

J3-24	Front low frequency antenna -/Immo	1A	Ant-
J3-25	Front low frequency antenna +/Immo	1A	Ant+
J3-26	Reserve analog switch reference ground	/	AGND
J3-27	Driving mode 2(I/O)	5mA	I-D -L
J3-28	Driving mode 1(AD)	5mA	I-A
J3-29	Mirror folding switch	5mA	I-D -L
J3-30	Dome lamp ON gear switch	5mA	I-D -L
J3-31	LIN4: Atmospheric lamp controller, etc.	30mA	Comm
J3-32	LIN3: rain sensor, battery sensor	/	Comm
J3-33	Trunk release switch	5mA	I-D -L
J3-34	Rear left door handle switch	5mA	I-D -L
J3-35	FRT LH door handle switch/FRT LH door unlock switch	5mA/10mA	I-D -L
J3-36	Reserved DI2	/	I-D -L
J3-37	Rear left dome lamp switch(Input)	5mA	I-D -L
J3-38	Front left lock status	5mA	I-D -L
J3-39	Dome lamp DOOR gear switch	5mA	I-D -L
J3-40	FRT RH door status	/	I-D -L
J3-41	Door handle signal ground	100mA	AGND
J3-42	Remote control lowering	30mA	O-L
J3-43	Dome lamp ON gear indicator lamp	30mA	O-H
J3-44	Dome lamp DOOR gear indicator lamp	30mA	O-H
J3-45	Front left door lamp	5W-bulb	O-H
J3-46	Rear left door lamp	5W-bulb	O-H
J3-47	Left door low frequency antenna -	1A	Ant-
J3-48	Left door low frequency antenna +	1A	Ant+
J3-49	Right door low frequency antenna -	1A	Ant-
J3-50	Rear low frequency antenna -	1A	Ant-
J3-51	Reserved analog input 2	/	I-A
J3-52	Rear steering lamp diagnostic feedback signal	5mA	I-D -L
J3-53	Rear position lamp	1A	O-H -PWM
J3-54	Locking indicator light	30mA	O-L
J3-55	SCANx terminal resistance H	/	Comm
J3-56	SCANx terminal resistance L	/	Comm
J3-57	LIN2: Window controller, sunroof controller, etc.	/	Comm
J3-58	LIN1: RFR(RF receiving module)	/	Comm
J3-59	BT CAN	/	Comm
J3-60	BT CAN	/	Comm

J3-61	ADASCAN CANFD	/	Comm
J3-62	ADASCAN CANFD	/	Comm
J3-63	BCAN	/	Comm
J3-64	BCAN	/	Comm
J3-65	Right Front Turn Lamp LED+ Right Rearview Mirror Turn Lamp LEDs	2A	O-H -PWM
J3-66	Rear left fog lamp output	2A	O-H -PWM
J3-67	Trunk lamp	5W-bulb	O-H
J3-68	Atmosphere lamp	10W	O-H -PWM
J3-69	Ground lamp output	0.87W	O-H
J3-70	Remote control rising	30mA	O-L
J3-71	Front right door lamp	5W-bulb	O-H
J3-72	R.R. door lamp	5W-bulb	O-H
J3-73	Reserved antenna +	1A	Ant+
J3-74	Reserved antenna -	1A	Ant-
J3-75	Reserved LSD1	150mA	O-L
J4-1	Background light	25W-2A	O-H -PWM
J4-2	Right low beam output	5A	O-H
J4-3	Right daytime running lamp	5A	O-H
J4-4	High-mounted brake lamp	2A	O-H -PWM
J4-5	Reserve high side 2	20W	O-H
J4-6	Left low beam output	5A	O-H
J4-7	Left daytime running lamp	5A	O-H
J4-8	Reserve high side 1	10W-bulb	O-H
J4-9	Mirror folding output	1A	O-H
J4-10	Reserved high side 3	42W-bulb/3.5A-LED	O-H -PWM
J4-11	Reserved LSD2	150mA	O-L
J4-12	Reserved LSD3	150mA	O-L
J4-13	Brake lamp	2x21W-bulb-3.5A	O-H -PWM
J4-14	Reverse lamp output	2x21W-3.5A	O-H
J4-15	Right rear turn signal lamp	5A	O-H
J4-16	Rear left turn signal lamp	5A	O-H
J4-17	Left Front Turn Lamp LED+ Left Rearview Mirror Turn Lamp LEDs	3.5A-bulb/42W-LED	O-H
J4-18	Mirror Deployment Output	1A	O-H
J4-19	Energy saving output	'50W-4.5A	O-H
J4-20	Trunk release output	3A	O-In-Relay
J4-21	Front left door unlock output	3A	O-In-Relay
J4-22	Locking output	12A	O-In-Relay

J4-23	Other three doors unlock output	9A	O-In-Relay
J4-24	Dome lamp output	/	O-L -PWM
J4-25	Internal relay	7A	O-In-Relay
J5-1	Starting relay	150mA	O-H
J5-2	PCAN	/	COMM
J5-3	PCAN	/	COMM
J5-4	NewPowerCAN(To EPS)	/	COMM
J5-5	NewPowerCAN(To EPS)	/	COMM
J5-6	DataCAN CANFD	/	COMM
J5-7	DataCAN CANFD	/	COMM
J5-8	Reserve analog input 1	/	I-A
J5-9	LIN5, atmosphere lamp controller, etc.	30mA	Comm
J5-10	LIN7, reserved	/	Comm
J5-11	Right daytime running lamp	1A	O-H -PWM
J5-12	Gear P/N switch	5mA	I-D -L
J5-13	Left daytime running lamp	1A	O-H -PWM
J5-14	Front wiper stop signal	5mA	I-D -L
J5-15	Reserved DI1	/	I-D -L
J5-16	Reserved analog input 4	/	I-A
J5-17	Reserved analog input 3	/	I-A
J5-18	Reserved antenna +	/	Ant+
J5-19	Reserved antenna -	/	Ant-
J5-20	LIN8, reserved	/	Comm
J5-21	Background brightness adjustment switch	5mA	I-A
J5-22	Background brightness adjustment switch reference ground	/	AGND
J5-23	Front steering lamp diagnostic feedback signal	5mA	I-D -L
J5-24	Starter relay feedback	5mA	I-D -H
J5-25	EPSCANx terminal resistor	/	COMM
J5-26	EPSCANx terminal resistor	/	COMM
J5-27	Front wiper power supply control	150mA	O-L
J5-28	Position lamp relay	150mA	O-L
J5-29	Left high beam auxiliary	150mA	O-L
J5-30	High beam relay	150mA	O-L
J5-31	Rear defrosting relay	150mA	O-L
J5-32	Gear shift enable relay	150mA	O-L
J5-33	Hood status	5mA	I-D -L
J5-34	Reverse gear switch	5mA	I-D-H /L
J5-35	Clutch switch	5mA	I-D -L

J5-36	Brake switch	5mA	I-D -H
J5-37	Horn relay	150mA	O-L
J5-38	Front wiper high/low speed control	150mA	O-L
J5-39	Right high beam auxiliary	150mA	O-L
J5-40	Rear wiper relay	150mA	O-L
J5-41	Power supply 2	7A	Power
J5-42	Power supply 8	15A	Power
J5-43	Power supply 4	10A	Power
J5-44	Power supply 5	11A	Power
J5-45	Power supply power ground 1	20A	GND
J5-46	Power supply power ground 2	20A	GND
J5-47	Power supply power ground 3	20A	GND
J5-48	Power supply 6	10A	Power
J5-49	Power supply 1	17A	Power
J5-50	Power supply 3	13.5A	Power
J5-51	Fuel pump pressure building relay output	5A	O-In-Relay
J5-52	Power supply 7	13A	Power

Low frequency antenna

Each antenna in the vehicle is used to scan the entire interior area to check whether the key is in the vehicle, and the trunk antenna is used to scan the trunk area. For specific scan area and antenna arrangement, refer to the description of keyless system control module antenna activation area. There are 4 antennas in the vehicle, which are respectively arranged under the left rear door panel, right rear door panel, cup holder and rear doorsill. The appearance is as shown in the following figure:

Pin pin definition:

End stage	Function description
Antenna +	Antenna positive
Antenna -	Antenna negative

Door handle PE switch

Only front left door with PE switch, PE switch in body color

(Bluetooth) RF receiver

(Bluetooth) RF receiver is a controller that receives and forwards RF signals (Bluetooth signals), involving remote control function and tire pressure function (mobile phone key function). Among them, Bluetooth RF receiver is used for high configuration vehicles, and RF receiver is used for other configurations.

Common methods

Emergency start method

Emergency start method: When the normal start mode fails, emergency start can be adopted. The operation is as follows: Put the key at the bottom of the cup holder, and then press the start/stop switch to finish the start.

DTC Diagnostics Symptoms Diagnosis

Inspection and confirmation

Check and confirm the interface and harness of body intelligent controller, and check the basic status of keyless function.

Appearance check list

Check whether the appearance interface and harness are damaged, corroded, water inlet and other fault symptoms.

Fault symptom	Fault cause	Solution
Remote control function failure	1. There is no matching remote controller. 2. It is too far from the vehicle, or there is strong interference source near the vehicle. (Transmitter, etc.) 3.The remote controller has no power. Check whether the voltage of battery in the remote controller is >2.9 V. 4. Remote controller and battery are in poor contact. 5. Vehicle battery is insufficient. 6. Remote controller is damaged.	1. Re-online key configuration or manual key configuration of diagnostic scanner 2. Enter the vehicle for operation, or leave the area. 3. Replace the battery for the key. 4. Reinstall the PCB board in the remote control once 5. Charge the battery 6. Replace the remote controller and re-learn the keyless system menu through the diagnostic scanner.
Keyless entry function fails	1. Smart key has fault 2. Front left/right door handle has short circuit or open circuit. 3. Front left/right door handle antenna short circuit or open circuit 4. Keyless control module is damaged. 5. Vehicle battery is insufficient. 6.Problems with IBCM 7. Keyless control module and BCM direct CAN bus short circuit or open circuit	1. When pressing the door handle button, observe whether the indicator light on the smart key flashes. If it flashes, confirm the key is normal; If there is no flicker, please press remote control failure treatment. 2.Read the fault code of IBCM with diagnostic scanner, and check whether there is problem with the antenna of the door handle. 3.Read the IBCM fault code with the diagnostic scanner, and look at it. IBCM Is there a fault 4. Charge the battery 5. Replace body intelligent controller assembly; Note: To replace the body intelligent controller, you need to re-learn the smart key and re-perform anti-theft matching.
Vehicle cannot be started	1.First observe whether the starter motor rotates. If the starter motor rotates, please press the engine related fault rule out, and the keyless system is normal. 2. Observe whether there is relevant fault prompt on the instrument. If yes, please refer to the troubleshooting method of diagnostic scanner fault code. 3. Observe whether the indicator lamp on the key flashes. If it flashes normally, confirm the key is normal; If there is no flicker, please press remote control failure treatment. 4. Check whether the start request signal is normal. 5. Vehicle battery is insufficient. 6. Short circuit or open circuit of CAN bus	1. Refer to troubleshooting method of diagnostic scanner fault code. 2. Check whether the key is normal. 3. Check whether the engine control module has fault code. 4. Check battery voltage and charge 5. Check whether the circuit is open or short. 6. Replace body intelligent controller; Note: To replace the body intelligent controller, you need to re-learn the smart key and re-perform anti-theft matching.
Smart key indicator lamp does not light up	Key battery low	Replace battery
Key not detected	1. The key is in the vehicle. 2. Insufficient power of key 3. Antenna fault	1. Confirm whether the key is in the vehicle. 2. Check whether the key is under-charged. Refer to the description of key under-charged fault. 3. Detect interior antenna fault

Interior antenna fault	Antenna fault	1. The instrument prompts "keyless system fault," read the fault code with the diagnostic scanner, whether it is antenna open circuit or short circuit fault, that is, check whether the relevant circuit is open circuit or short circuit. 2. Replace antenna assembly

Indicator flashing fault

5. PEPS fault will cause yellow indicator lamp of switch to flash;
6. ESCL fault will cause the green indicator of the switch to flash 15 times.

No response after pressing pe switch

3. The system does not find the key;
4. PE switch fault;
5. Low frequency antenna fault;
6. Harness connectivity test

Do not power off after pressing starter switch

3. Troubleshooting of TCU;
4. Troubleshooting of EPBI;
5. Troubleshooting of BDC;
6. Troubleshooting of switch and harness

After pressing the starter switch, the instrument prompts that the key cannot be detected.

5. Low frequency antenna fault;
6. Key fault;
7. BDC fault;
8. RFR fault;
9. Harness fault

The key is not detected during driving.

5. Whether RFR is faulty;
6. Whether the key is faulty;
7. Whether BDC is faulty;
8. Whether the low frequency antenna is faulty;
9. Is the harness faulty.

Removal and installation

One-button starter switch

3. **Removal and installation**

- Before removing the one-key starter switch, first remove the A/C outlet panel. Refer to Removing and installing instrument panel for details;
- After removing the A/C outlet panel, press and hold the two mounting buckles of one-key starter switch by hand, and take out the switch;
- Pull out connector;
- The installation sequence is the reverse of the removal sequence.

BDC body intelligent controller assembly

Installation position: On the A-pillar side wall of the passenger's side Mounting tool: M10 socket tool

Torque: 5±1N.m

Installation steps:

5. Find the three mounting hole dimensions of BDC in the side wall of A-pillar of copilot, all with cross recessed hexagon head screws.
6. First install the hole position at the uppermost end of BDC.
7. Secondly, install two at the lower end of BDC.

Removal steps: Use M10 sleeve tool to remove the three fixing screws of BDC in sequence to take out the product. (Prepare in advance: Remove and install A-pillar lower trim panel assembly) Smart key

4. **Remove mechanical key**

   Press the release rear lid in the direction of arrow in the figure and take out the mechanical key.

5. **Replace battery**

First remove the rear cover, then remove the battery cover to remove the battery in the key.

Left and right low frequency antenna

The LH and RH low frequency antennas are installed and arranged in the LH and RH doors. See the following figure for installation tools: M10 sleeve tool.

Torque: 5±1N.m

Installation: The left and right low frequency antennas are installed in the left and right door interior trim, and the mounting screws are hexagon socket pan head self-tapping screws and plain washer assemblies.

Removal: Take out the hexagon socket pan head self-tapping screws and plain washers at both ends of low frequency antenna. (Preparation in advance: Removing and installing rear door sill trim panel assembly)

Interior intermediate low frequency antenna

The middle low frequency antenna in the vehicle is installed and arranged in; Installation tool under cup holder of central control box:

M10 socket tool

Torque: 5±1N.m

Installation: The middle low frequency antenna in the vehicle is installed directly below the cup holder and fixed by two cross recessed pan head tapping screws and plain washer assemblies.

Removal: First remove the middle cup holder in the vehicle, and then take out the two cross recessed pan head self-tapping screws and plain washer assemblies. (To be prepared in advance: Removal and installation)

Rear bar low frequency antenna

Mounting tool for low frequency antenna of

rear bar is arranged in the middle of upper

cross beam of rear floor: M10 sleeve

Torque: 5±1N.m

Installation: Low-frequency antenna of rear bar is located in the middle of cross beam of rear floor, and both ends of antenna are fixed with cross recessed hexagon head screws.

Removal: First take out the inner panel of the rear floor cross beam, and then remove the cross recessed hexagon head screws at both ends of the low frequency antenna. (Preparation in advance: Removing and installing C-pillar trim panel)

(Bluetooth) RF receiver

Installation of (Bluetooth) RF receiver is

arranged in the middle of rear cross beam

Installation tool: None

Torque: None

Installation: It is installed in the middle of rear cross beam at the tail part, and two clips can be clamped.

Dismantle: First remove the interior trim panel at the rear cross beam, find the Bluetooth RF receiver assembly, and press and hold the buckle of the product to pull out. (To be prepared in advance: Removing and installing headliner)

Spare parts atlas

F28070

2

F28070

7

F28071

1

Panoramic system specifications

Name	Specifications
Panoramic camera	Working voltage: 7V-9V Rated current: 0.09 A@8V Operating temperature: -40℃- 75℃

Composition and position distribution

Serial number	Part number	Name	Remarks
1	7917110-AW04	Panoramic front camera assembly	Intelligent
2	7917120-AW04	Panoramic rear camera assembly	Intelligent
3	7917130-AW04	Panoramic left camera assembly	Intelligent
4	7917140-AW04	Panoramic right camera assembly	Intelligent

System functional principle introduction

The right blind area image is a parking aid that captures the image of the right blind area of the vehicle through the right exterior rearview mirror camera and displays the condition of the right blind area of the vehicle on the central control screen.

The reversing image is a parking aid that captures the image of the rear area of the vehicle through the camera at the rear of the vehicle, then superimposes the parking aid line processed by the DVD, and displays the traffic situation behind the vehicle on the central control screen.

The vehicle ignition switch is on. When the vehicle is in gear R or the vehicle speed is less than a certain value (27 km/h) and the video switch or 360 intelligent panoramic signal is valid (not zero), HU
(Vehicle entertainment base terminal) Collects video information through four cameras installed in front, rear, left and right directions of the vehicle, and sends the processed video information to the display screen for display.

Inspection of part structure principle

Functional structure

e of panoramic switch

Serial number	Name
1	EPB switch
2	360 Panoramic switch
3	Photographing switch
4	Emergency recording switch
5	Driving mode switch

Schematic diagram and pin definition of PIN

Video transmission line

Pin number	Pin definition	Signal type	Signal range	Test conditions	Remarks
1	Video Out	Video signal	7V-9V	Measure pin pin of power interface camera with multimeter	
2	Video_shield_gnd	Shielding ground	7V-9V	/	

Front and rear four camera functions

Collect image data around the body for real-time display and

video recording of external picture. Working principle

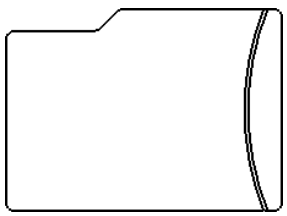
The scene is projected onto the surface of the image sensor through the optical image generated by the lens, converted into electrical signal, converted into digital signal after A/D conversion, sent to the digital signal processing chip for processing, and finally sent to the host for decoding display by the video transmission line.

Product structure

TF card funct ion

Store drive recorder video

data. Product structure



Common methods

Camera fog determination method Operation method

Power on the product for 15 min, then immerse the lens in 20℃ water for 20 s, and observe

whether there is water mist in the lens. Result inspection

If there is water mist in the lens, take out the camera and place it under normal temperature environment. If the water mist dissipates after 60 minutes, it is qualified, and if the water mist does not dissipate, it is not qualified.

DTC Diagnostic

Fault code table

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
B154133	AVM key fault	AVM key is detected to be continuously pressed for more than 20 s	AVM key damage	Press the key to check whether there is low level input on pin A18 of the vehicle. If not, please replace the AVM key.
B154200	Emergency recording button fault	Emergency recording button is detected to be continuously pressed for more than 20 s	Emergency recording button damage	Press the key and check whether the B10 pin of the vehicle has low level input. If not, please replace the emergency recording key.
B154578	Panoramic system not calibrated	System missing calibration data	Complete vehicle is not calibrated	Calibrate according to panoramic after-sales calibration process
B154693	DVR storage device fault	SD card or USB flash drive cannot be written or read	Harness or SD card damage or software fault	1. Plug and plug the SD card to observe whether the fault is eliminated; if not, replace the SD card with a new one; 2. If the fault cannot be eliminated by replacing the SD card, check whether the voltage at the harness end is 5V; 3. If the harness voltage is normal, please contact Chang'an technical personnel to check whether there is a vehicle software problem.

Fault symptom diagnosis

Inspection and confirmation

3. Confirm the customer's problem;
4. Visually inspect whether there is obvious mechanical or electrical damage mark, and whether the camera body is damaged, loose and water inflow;
5. Use a multimeter to troubleshoot system faults.

Visual inspection table is not available.

Fault symptom table

Fault 1	Panoramic display black screen
Fault 2	A camera black screen
Fault 3	Panoramic image distortion
Fault 4	Image flower screen

Panoramic display black screen

Fault symptom	Panoramic display black screen		
Possible causes	1. Camera fault; 2. There is open circuit or short circuit in harness from camera to HU; 3. HU fault		
Step	Test		Operation
1	Images are displayed in at least one direction in the panoramic image	Yes	Go to step 2
		No	Replace HU
2	Detect camera fault Measure the PIN1 pin of corresponding black screen camera with a multimeter. Check whether there is 5 V voltage, grounding	Yes	Replace the corresponding camera
		No	Troubleshoot harness problem from corresponding camera to

	wire and video wire are normal.		HU

A camera black screen

Fault symptom	A camera black screen		
Possible causes	1. Camera fault; 2. There is open circuit or short circuit in harness from camera to HU;		
Step	Test		Operation
1	Detect camera fault Measure the PIN1 pin of corresponding black screen camera with a multimeter. Check whether there is 5 V voltage, grounding wire and video wire are normal.	Yes	Replace the corresponding camera
		No	Troubleshoot harness problem from corresponding camera to HU

Panoramic image distortion

Fault symptom	The panoramic image is twisted, 5 cm wide adhesive tape is affixed to the front, rear and right of the vehicle at a distance of 1m, and the screen shows that the adhesive tape is staggered.		
Possible causes	1. Front grille or camera moves; 2. Exterior rearview mirror does not extend in place; 3. Unconsciously open the trunk by holding the camera in the middle of the trunk, the sheet metal is slightly changed, and the camera is tilted.		
Step	Test		Operation
1	Check whether the rearview mirror extends in place for rule out fault.	Yes	Confirm maintenance is completed
		No	Go to step 2
2	Whether rule out fault after after-sales calibration	Yes	Confirm maintenance is completed
		No	Check whether each camera is installed deformed

Image flower screen

Fault symptom	Image flower screen with abnormal color		
Possible causes	1. Camera fault; 2. HU fault		
Step	Test		Operation
1	Check whether it is full screen discoloration problem	Yes	Replace HU
		No	Replace the corresponding camera

Removal and installation

Panoramic switch removal and installation

Refer to Electronic Handbrake Switch section for details.

Front camera

Install the front camera on

the front bumper. Tool: Cross

screwdriver

Torque: 1.5±0.2 N·m

Removal

5. Remove the front bumper; See Removing and installing front bumper
6. Remove front camera.

Installation

5. Fix the front camera on the front bumper with screws;
6. Install the front

bumper. Left and right

camera

The left/right camera is installed on the left and right exterior rearview mirrors respectively, and supplied with the exterior rearview mirror assembly. If it is necessary to replace the left/right camera, directly replace the left/right exterior rearview mirror assembly. Removal

Refer to the outer rearview mirror assembly removal

procedure. Refer to Left/Right Rear View Mirror

Assembly Chapter Installation

Refer to the exterior rearview mirror assembly installation procedure. Refer to Left/Right Rear View Mirror Assembly Chapter

Rear camera

The rear camera is installed on the tailgate

trim in the form of buckle. Removal

3. Remove tailgate trim; Refer to Removing and installing tailgate outer trim and buckle box.
4. Remove rear camera.

Installation

4. Clamp the rear camera on the rear tailgate trim;
5. Install the tailgate trim.

Spare parts atlas

F280706

Reversing radar system specifications

Reversing radar system consists of reversing radar controller and reversing radar sensor.

Reversing radar controller assembly	Process data and send position signal
Reversing radar sensor assembly	Send radar signal

Composition and position distribution

Reversing radar system consists of reversing radar controller and reversing radar sensor. The reversing

radar controller is installed and arranged on the rear floor;

The reversing radar sensor is installed and arranged on the rear bumper.

System overview

S 203 Vehicle radar is arranged on the rear bumper, totally three, and connected to the system through the can line. Parking assist system (radar form) mainly consists of 3 radar sensors, which can assist the driver to park smoothly.

Inspection of part structure principle

Reversing radar controller

The structure of reversing radar controller is as follows:

Probe

The structure of reversing radar sensor is as follows:

Buzzer

S 203 reversing radar system has no buzzer, and its audible alarm is completed by instrument car, etc.

Common methods

Radar alarm inspection method

Common mode: 1.Judging alarm distance by reversing image

2. Judging alarm distance by alarm sound

DTC Diagnostic

Reversing radar controller

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
U148F00	Can bus off (BUSOFF)	1. Power mode ON gear >1000 ms; 2.The battery voltage is 6.5-18 V; 3. Bus off counter value NBusOffCount>=5	1. Harness/connector fault; 2. Controller fault; 3. External interference(Such as illegal peripherals)	1. Use diagnostic scanner to read DTC. 2. Check CAN wire connection (J5/J6) (voltage range 1.5-3.5 V). Check whether there are peripherals connected to OBD and check and control.

				Check whether the connector of the brake (BDC/RRS) is in good contact, and whether the terminal is retracted. 3.Check whether the terminal resistance of BDC is 116-128 ohm, if yes, The apparent deviation is less than 100 or If above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U148900	BCM node lost	1. Power supply mode ON gear >1000 ms; 2.After <18 V 3 and bus off of 6.5 V< power supply are restored for 1s; 4.Timeout diagnostic logic is activated. After the vehicle is in ON position for 1s, no LBCM_28B signal is received for 1s;	1. RRS/BCM connector or harness fault; 2. RRS/BCM fault;	1. Use diagnostic scanner to read DTC. 2. Check CAN wire connection (J5/J6) (voltage range 1.5-3.5 V), check whether there are peripherals connected to OBD, check the connector of controller (BDC/RRS) Check whether the parts are in good contact and whether the terminals are retracted. 3.Check whether the terminal resistance of BDC is 116-128 ohm, if yes, The apparent deviation is less than 100 or If above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U148800	AC node lost	1. Power supply mode ON gear >1000 ms; 2.After <18 V 3 and bus off of 6.5 V< power supply are restored for 1s; 4. Timeout diagnosis logic is activated, After 1s of ON gear (Or 1s after bus wake-up), no AC_ 366 signal is received for 1s;	1. RRS/AC connector or harness fault; 2. RRS/AC fault;	1. Use diagnostic scanner to read DTC. 2. Check CAN wire connection (J5/J6) (voltage range 1.5-3.5 V), check whether there are peripherals connected to OBD, check the connector of controller (BDC/RRS) Check whether the parts are in good contact and whether the terminals are retracted. 3.Check whether the terminal resistance of BDC is 116-128 ohm, if yes, The apparent deviation is less than 100 or If above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.

U148700	TCU node lost	1. Power supply mode ON gear >1000 ms; 2.After <18 V 3 and bus off of 6.5 V< power supply are restored for 1s; 4. Timeout diagnosis logic is activated, After 1s of ON gear (Or 1s after bus wake-up), no TCU_1A8 signal is received for 1s;	1.The RRS/TCU connector is faulty; 2. RRS/TCU fault;	1. Use diagnostic scanner to read DTC. 2. Check CAN wire connection (J5/J6 (voltage range 1.5-3.5 V)) Check whether there are peripherals connected to OBD, check whether the connector of controller (TCU/RRS) is in good contact, and whether the terminal is pin-out. 3.Check whether the terminal resistance of BDC is 116-128 ohm, if yes, The apparent deviation is less than 100 or If above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U148100	EPBi node missing	1. Power supply mode ON gear >1000 ms; 2.After <18 V 3 and bus off of 6.5 V< power supply are restored for 1s;	1.The RRS/ESP connector is faulty; 2. RRS/ESP fault;	1. Use diagnostic scanner to read DTC. 2. Check CAN wire connection (J5/J6) (voltage range 1.5-3.5 V). Check whether there are peripherals connected to OBD and check and control.

		4. Timeout diagnosis logic is activated, After 1s of ON gear (Or 1s after the bus wakes up), no GW -187 signal is received for 1s;		Check whether the connector of brake (ESP/RRS) is in good contact and whether the terminal is withdrawn. 3.Check whether the terminal resistance of BDC is 116-128 ohm, if yes, The apparent deviation is less than 100 or If above 140, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
B190D01	Complete vehicle power supply voltage is too low	1. IGN ON rear 3s; 2. Detect that the power supply voltage is lower than 8.5 V duration is greater than 1s	1. Battery fault 2. Harness fault	1. Use diagnostic scanner to read DTC. 2. Harness fault(J12/J15) (9-16 V) 3.Battery fault, check whether the power supply voltage is 9-16 V
B190D00	Complete vehicle power supply voltage is too high	1.The power supply status is IGN ON 3s after 2. Detect that the power supply voltage is higher than 16.5 V duration greater than 1s	1. Battery fault 2. Harness fault	1. Use diagnostic scanner to read DTC. 2. Harness fault(J12/J15) (9-16 V) 3.Battery fault, check whether the power supply voltage is 9-16 V
B190000	Component internal fault	1.Residual vibration < 0.7 ms or residual vibration > 3 ms, continuous 2.8-3.5 s 2. 9v< battery voltage <16v 3. gear N or gear R, speed less than 15 KM	SENSOR fault	1. Use diagnostic scanner to read DTC. 2. Replace normal sensor and re-test
B190001	Short circuit to ground or open circuit	1.The signal wire is short to ground and continuous 2.8-3.5 S 2. 9v< battery voltage <16v	Short circuit of Sensor signal wire to ground or open connection	1. Use diagnostic scanner to read DTC. 2. Check whether the sensor is connected correctly.(J9/J10/J22) (9-16 V) 3. Test after correct connection
B190002	Short circuit to power supply	1.The signal wire is short circuit to power supply or open circuit, and continuous 2.8-3.5 S 2. 9v< battery voltage <16v	Short circuit of Sensor signal wire to ground or open connection	1. Use diagnostic scanner to read DTC. 2. Check whether the sensor is connected correctly.(J9/J10/J22) (9-16 V) 3. Test after correct connection
B190200	Component internal fault	1.Residual vibration < 0.7 ms or residual vibration > 3 ms, continuous 2.8-	SENSOR fault	1. Use diagnostic scanner to read DTC.

		3.5 s 2. 9v< battery voltage <16v 3.When the speed of gear N or gear R is less than 15 KM, the aftershock time of right middle sensor is incorrect.		2. Replace normal sensor and re-test
B190201	Short circuit to ground or open circuit	1.The signal wire is short to ground and continuous 2.8-3.5 S 2. 9v< battery voltage <16v	Short circuit of Sensor signal wire to ground or open connection	1. Use diagnostic scanner to read DTC. 2. Check whether the sensor is connected correctly.(J9/J10/J22) (9－16 V) 3. Test after correct connection

B190202	Short circuit to power supply	1.The signal wire is short circuit to power supply or open circuit, and 2.8-3.53 S continuously 2. 9v< battery voltage <16v	Short circuit of Sensor signal wire to ground or open connection	1. 2. Check whether the sensor is connected correctly.(J9/J10/J22) (9-16 V) 3. Test after correct connection
B190300	Component internal fault	1.Residual vibration < 0.7 ms or residual vibration > 3 ms, continuous 2.8-3.5 s 2. 9v< battery voltage <16v 3. gear N or gear R, speed less than 15 KM	SENSOR fault	1. Use diagnostic scanner to read DTC. 2. Replace normal sensor and re-test
B190301	Short circuit to ground or open circuit	1.The signal wire is short to ground and continuous 2.8-3.5 S 2. 9v< battery voltage <16v	Short circuit of Sensor signal wire to ground or open connection	1. Use diagnostic scanner to read DTC. 2. Check whether the sensor is connected correctly.(J9/J10/J22) (9-16 V) 3. Test after correct connection
B190302	Short circuit to power supply	1.The signal wire is short circuit to power supply or open circuit, and continuous 2.8-3.5 S 2. 9v< battery voltage <16v	Short circuit of Sensor signal wire to ground or open connection	1. Use diagnostic scanner to read DTC. 2. Check whether the sensor is connected correctly.(J9/J10/J22) (9-16 V) 3. Test after correct connection

Fault symptom diagnosis

Inspection and confirmation

4. Check whether the harness connector is in good condition.

5. Check whether the structure and appearance of reversing radar controller and sensor are in good condition.

Appearance check list

3. Check whether the appearance of reversing radar sensor is damaged and intact.

4. Close to the sensor, listen for weak point

flow sound fault symptom table

Fault	Description
No reversing radar function	Instrument car without reversing image
False alarm of reversing function	If there is an obstacle, there is no alarm or alarm but no obvious obstacle.
Abnormal alarm distance of reversing function	The prompt alarm distance is obviously inconsistent with the actual situation.

Radar does not alarm

3. Check whether the harness connector is in good condition.

4. Check whether the appearance function of the reversing system is intact.

5. Check whether the gateway function of BDC is normal.

Radar random alarm

5. Confirm the software and hardware version of the system.

6. Re-calibrate the system: Use the radar calibration software and tools to re-calibrate the signal and strength of the reversing radar, so that the signal strength of the reversing radar directly behind the real vehicle (0.1-1.5 m) in the detection area is normal.

Removal and installation

Reversing radar

4. Installation tool: M10 sleeve tool; Torque requirement: 5±1N.m

5. Installation: The reversing radar controller is installed as shown below, near the trunk door; Use M10 hexagon screws to fix to the holes at both ends of the controller.

6. Dismantle: Use M10 sleeve tool to dismantle screws at both ends of controller.Preparation required: Removing and installing C-pillar trim panel)

4.

Rear probe

Tool: It can be installed directly by manual buckle

because it is equipped with buckle, without tool: It is

directly clamped in radar hole of rear bumper.

Dismantle: Press and hold the buckle to take out the sensor.(Preparation required: Removing and installing rear bumper)

Spare parts atlas

F280710

Tire Pressure Monitoring System Specifications

Tire pressure monitoring sensor assembly	Monitor and send tire pressure information
RF receiver	Retransmit tire pressure signal
BDC	Processing tire pressure information
Instrument	Display tire pressure value

Composition and position distribution

The TPMS sensor assembly is mounted in four wheels and the controller is integrated into the RF receiver.

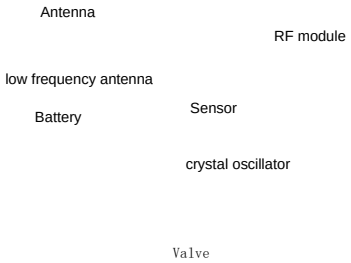
System functional principle introduction

The tire pressure monitoring system is as follows:

Inspection of part structure principle

Tire pressure sensor

Tire pressure sensor is used to monitor the sensor of wheel internal pressure and problem, and send real-time data to the instrument for display.



RF receiver

The RF receiver is used to receive and forward tire pressure signals. Convert high frequency signal sent by tire pressure into digital signal and transmit to BDC for processing and analysis.

Common methods

DTC

Diagnostics

Symptoms

Diagnosis

Inspection and confirmation

3. Confirm whether the tire pressure sensor is in good condition.

4. Confirm whether functions such as remote control start of complete vehicle are intact.

Appearance check list

Check whether the tire pressure sensor is installed. If there is a trigger tool,

you can confirm the function is normal by waking up. Fault symptom table

Tire pressure value alarm reminder	Check whether the tire is low pressure or leaks.
Tire pressure - alarm prompt	Check tire pressure sensor for damage

Tire pressure display "--"

The instrument displays "--" and detects whether the sensor at the relevant position is abnormal and the function fails.

Removal and installation

Tire pressure sensor

Tools: Special auxiliary tools for tire pressure

sensor installation (factory available) Torque: Non-

standard tools, no torque requirements

Installation: Use tire pressure sensor auxiliary tool to install the sensor on the wheel.

Removal: Because the valve is rubber, it will be damaged, so it can only be destroyed. (Requires advance preparation: Wheels and tyres)

Spare parts atlas

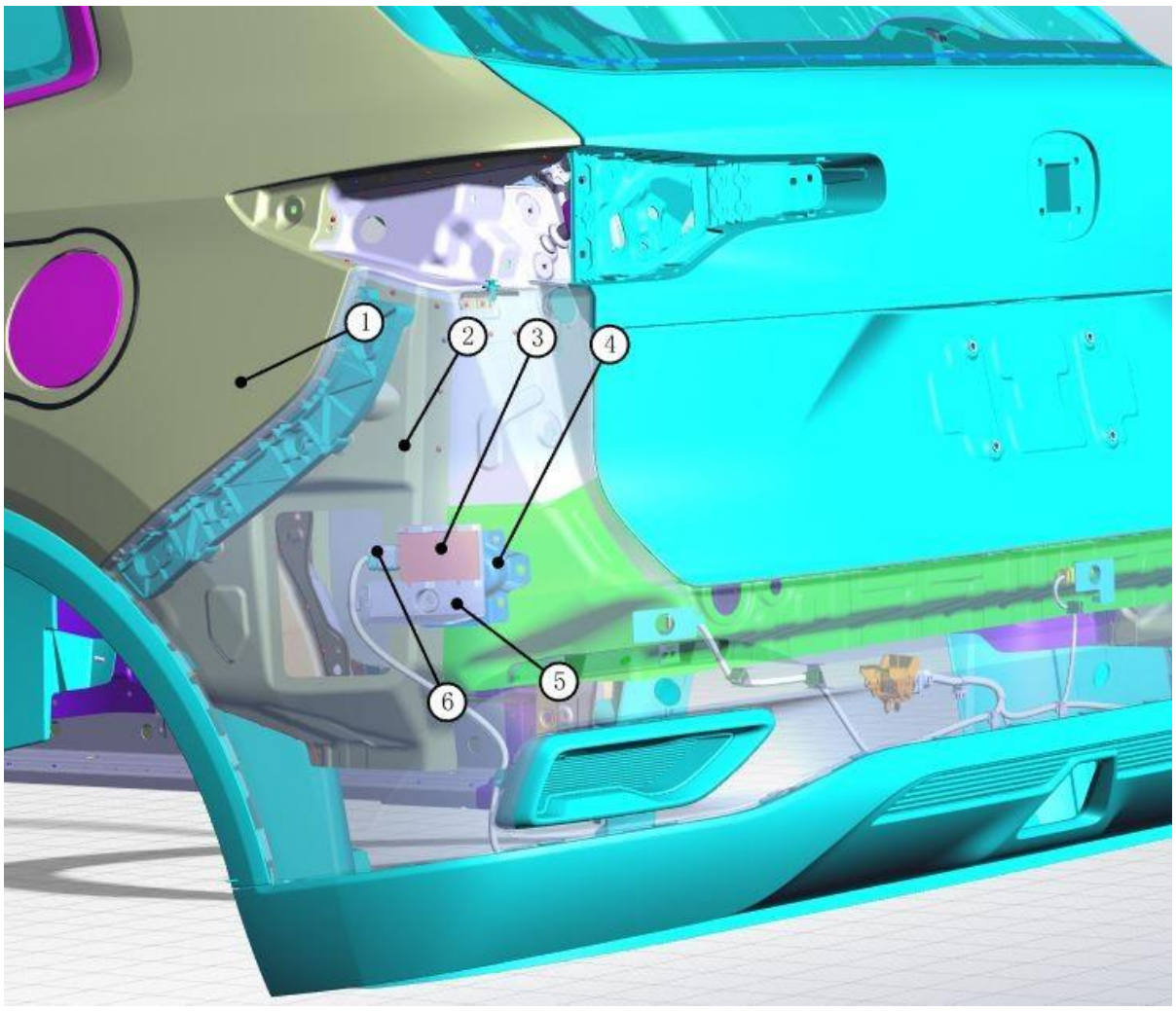
F280705

General specification of parallel auxiliary system

Name	Specifications
Parallel auxiliary controller	Working voltage: 9 V ~ 16 V Working current: ≤0.4 A Operating temperature: -40℃ ~ 75 ℃

Component position diagram

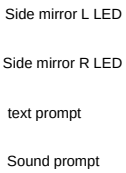
The parallel line auxiliary controller assembly is installed on the parallel line auxiliary controller bracket (the following figure is the schematic diagram of the left radar installation, and the right side is symmetrical with this). The bracket is installed on the body sheet metal bracket through bolts. When it is necessary to replace the hardware of the parallel line controller assembly, it is necessary to remove the bumper before replacing it.


1
2
3
4
5
6

Serial number	Component	Serial number	Component
1	Rear side wall(Left and right symmetry)	2	Rear bumper
3	Parallel auxiliary controller assembly	4	Connect wire auxiliary controller to install metal bracket
5	Connecting wire auxiliary controller mounting plastic bracket	6	Parallel auxiliary controller connector

System functional principle introduction

System principle block diagram



The system includes parallel line auxiliary system, reversing lateral warning system, rear rear warning system and door opening warning system. It detects the moving vehicle behind the side by the millimeter wave radar installed on the left and right sides inside the rear bumper. When the alarm conditions are met, it performs relevant alarm prompt through the alarm indicator light, instrument and vehicle-mounted audio and video entertainment system on the exterior rearview mirror. The main functions of the system are as follows:

Parallel auxiliary system

5. Blind area detection: When the vehicle exists in the blind area of the exterior rearview mirror during driving, the warning indicator on the exterior rearview mirror is on; At this time, turn on the corresponding side steering lamp, the alarm indicator flashes and the instrument drive buzzer gives an alarm.

6. Lane change assistance: When there is a fast approaching vehicle behind the side of the adjacent lane of the vehicle, the warning indicator on the exterior rearview mirror lights up to prompt the driver to pay attention to the vehicle behind the lane change; At this time, turn on the corresponding side steering lamp, and the alarm indicator flashes.

Reverse lateral warning system

7. Reversing lateral warning: When the vehicle is reversing, the warning indicator on the outside rearview mirror on the target side flashes when there is lateral fast approaching vehicle at the rear of the vehicle may collide with the vehicle, and the instrument drives the buzzer to alarm.

Rear tail warning system

8. Rear rear warning: When there is fast approaching vehicle and risk of collision at the rear of the vehicle, remind the driver through instrument picture and buzzer sound (sound reminds the user to set off), and automatically turn on the danger warning lamp to prompt the driver to keep it.

Door opening warning system

9. Door opening warning: When the vehicle stops, open the door or get off the vehicle and there is a collision risk with the side rear moving vehicle, the driver and occupant are reminded not to open the door or get off the vehicle through the exterior rearview mirror warning indicator light, instrument display screen and multimedia voice system.

Alarm function activation conditions

Blind area detection and channel change assistance (parallel line assistance) function activation conditions:

10. Power supply ON gear
11. InCall system parallel auxiliary function switch setting ON
12. No fault of left/right module
13. Traveling speed of the vehicle is greater than 15 km/h.

Activation conditions of reversing lateral warning function:

14. Power supply ON gear
15. Vehicle in R gear
16. Switch setting of reversing lateral warning function on inCall system is on.
17. No fault of left/right module

Rear tail warning function activation conditions:

18. Power supply ON gear
19. Vehicle in D gear

20. Rear rear warning function switch on inCall system is set to ON.

21. Activation

condition of door

opening warning

function of left/right

module without fault:

22. InCall system upper door opening warning function switch setting ON

23. No fault of left/right module

24. Absolute speed of the vehicle is less than 2 km/h

25. Function exit condition is not met

Note: For vehicle speed 0-2 km/h section, the priority of

door opening warning is higher than blind area detection.

Function setting

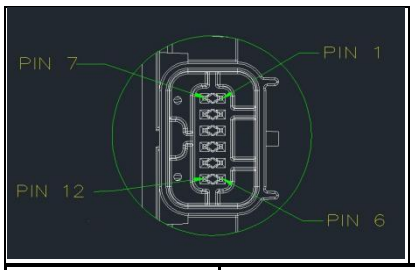
Parallel auxiliary system switch:

On the "Vehicle Center" - > "Safety" interface of the inCall system, enable or disable the system functions. The factory default is "On" status, and the system reuses it. The system remembers the previous user setting status.

Inspection of part structure principle

Interface definition of left and right parallel auxiliary controller

The parallel auxiliary controller assembly is supplied with power through the vehicle Battery and IG1. The terminal view and definition are as follows:



Pin number	Pin definition(Description)	Signal type	Signal range(12 V)	Test conditions	Remarks
1	KL30 Ignition signal	Power supply	500mA	Always ground the body	
2	Vehicle CAN/CANFD Bus low	CAN/CANFD bus	100mA	-	Bus signal, measured signal value has no fault diagnosis reference meaning
3	Vehicle CAN/CANFD Bus height	CAN/CANFD bus	100mA	-	Bus signal, measured signal value has no fault diagnosis reference meaning
4	Ground wire	Power supply, ground	500mA	Ignition switch ON, ground to body	
5	Left and right radar communication private CAN/CANFD Low	CAN/CANFD bus	100mA	-	Bus signal, measured signal value has no fault diagnosis reference meaning
6	Left and right radar communication private CAN/CANFD high	CAN/CANFD bus	100mA	-	Bus signal, measured signal value has no fault diagnosis reference meaning

7	-	-	-		-
8	Position recognition ground(The front radar is connected to this line, and the rear radar is not connected.)	Signal	20mA	-	Bus signal, measured signal value has no fault diagnosis reference meaning

9	Position recognition ground(The left radar is connected to this line, and the right radar is not connected.)	Signal	20mA	-	Bus signal, measured signal value has no fault diagnosis reference meaning
10	KL15 Ignition signal	Signal	50mA	Ignition switch ON, ground to body	
11	-	-	-	-	-
12	-	-	-	-	-

Mirror parallel auxiliary indicator

1. Power-on self-test: The alarm indicator lamp in the left/right rearview mirror driven by the instrument is on for 3s;

2. Fault lifting: The left/right module is faulty, and the corresponding side indicator lamp is on and always on;

3.Calibration prompt: After the left/right side calibration is turned on, the corresponding side indicator lamp flashes according to 4 Hz frequency;

4. Alarm prompt:

5. Monitor the first-level alarm on both sides of the parallel auxiliary/blind area, and the first-level alarm on both sides of the door opening warning, and light the corresponding side indicator light, which is always on;

6. Secondary alarm on both sides of parallel auxiliary/blind area monitoring, secondary alarm on both sides of door opening warning and alarm on both sides of reverse lateral warning, and corresponding side indicator flashes according to 4 Hz frequency;

Common methods

Alignment auxiliary radar mounting angle adjustment method

1. If radar calibration fails, read radar calibration angle value with diagnostic scanner and confirm whether it is between plus and minus 3 degrees. If it exceeds calibration angle, adjust metal bracket according to the following figure (adjust angle by adding gasket between metal bracket and body stud), and then perform after-sales calibration again.

2. If the angle adjustment through the gasket fails, confirm whether the metal bracket has serious deformation. If the deformation is serious, replace it with a new metal bracket;

DTC Diagnostic

Parallel auxiliary controller

DTC fault code list and simple troubleshooting method

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps

U1AA587	Vehicle communication Bus off	1.Working voltage 8.5-16.5 V; 4. Can network enters into Bus off, Bus-Off counter NBusOffCount reaches five times, each counting cycle is 50 ms. 5. After power supply status is IGN ON The conditions above 3s meet the DTC. Established	6. Other controller faults 7. Harness fault	4. Plug fuse or controller connector one by one, observe whether the fault is eliminated. If the fault is eliminated, locate the corresponding controller. After replacing the controller, contact Chang'an technician to troubleshoot the single controller problem. 5. If the plugging and unplugging of the controller fails, check whether the controller connectors are in good contact one by one, and whether the terminals are pin-out. 6. Check whether the terminal resistance is about 60 ohms. If the resistance is less than 40 or greater than 70, there is abnormality. Check whether the terminal resistance controller is abnormal. 7. Plug and unplug all controllers on the CAN wire of terminal resistance, test terminal resistance, remove the controller and recover from abnormality, then the controller has fault. After replacing the controller, contact Chang'an technician to troubleshoot the controller problem.
B256417	High supply voltage	3s after the power supply status is IGNON, check whether the power supply voltage is higher than 16.5 V duration for 3s. If it is higher than 16.5 V duration, the conditions for DTCs are met.	4. Battery fault 5. Harness fault	3. Use a multimeter to check whether the battery voltage in the engine compartment is normal. . According to the controller interface definition, Check whether the voltage at the harness terminal is normal. 5. Troubleshoot the controller associated harness for damage and short circuit according to the harness schematic diagram.
B256217	Low power supply voltage	3s after the power supply status is IGNON, check whether the power supply voltage is lower than 8.5 V for 3s. If it is lower than 8.5 V, it meets the conditions of DTCs.	4. Battery fault 5. Harness fault	3. Use a multimeter to check whether the battery voltage in the engine compartment is normal. . According to the controller interface definition, Check whether the voltage at the harness terminal is normal. 5. Troubleshoot controller associated harness for looseness, damage and poor contact according to harness schematic

				diagram.
U1AA781	LED lamp fault	1. working voltage 8.5-16.5 V 4. IP_DriverLCDALEDSts = Error OR IP_PassengerLCDALED St s = Error duration 1s 5. After power supply status is IGN ON 3s 6. If the above conditions of non-short path calibration mode are met, the DTC is triggered.	3. Abnormal battery voltage 4. Exterior rearview mirror LED lamp is damaged. 5. Exterior rearview mirror LED lamp voltage too high 6. Exterior rearview mirror LED lamp voltage too low	3. Use a multimeter to check whether the battery voltage is normal. 4. Check whether the voltage of connector of exterior rearview mirror is normal. If abnormal, check whether the connector harness is damaged, loose or short-circuited. 5. Check whether the exterior rearview mirror hardware number is configured for this vehicle. . Replace exterior rearview mirror
U1A8782	Message GW_ 180 reception timeout SAS_ 180 Receiving timeout	1. working voltage 8.5-16.5 V 4. Bus not closed and bus restored After 1s, GW_ 180 message reception timeout, 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Can line fault 5. Loose connector 6. Controller circuit fuse blown 7. BDC fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A8182	Message GW_ 187 reception timeout (ESP_ 187 Receive timeout)	1.Working voltage 8.5-16.5 V	4. Can line fault 5. Loose connector 6. Controller circuit fuse blown	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again

		4. Bus not closed and bus restored After 1s, GW_ 187 message reception timeout, 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered.	4. BDC fault	4. Check wiring harness, fuse and connector . Check CAN bus status . Check BDC . Replace ECU components
U1A8582	Message GW_1A8 reception timeout (TCU_1A8 reception timeout)	1.Working voltage 8.5-16.5 V 4. Bus not closed and bus restored After 1s, GW_1A8 message reception timeout; Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered.	4. Can line fault 5. Loose connector 6. Controller circuit fuse blown 7. BDC fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A8382	Message GW_ 278 reception timeout (ESP_ 278 Receive timeout)	1.Working voltage 8.5-16.5 V 4. Bus not closed and bus restored After 1s, GW_ 278 message reception timeout; Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered.	4. Can line fault 5. Loose connector 6. Controller circuit fuse blown 7. BDC fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A8987	Message GW_28B reception timeout (BCM_28B reception timeout)	1.Working voltage 8.5-16.5 V 4. Bus not closed and bus restored After 1s, GW_28B message reception timeout; Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered.	4. Can line fault 5. Loose connector 6. Controller circuit fuse blown 7. BDC fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A9187	Message GW_ 298 reception timeout BCM_ 298 Receiving timeout	1.Working voltage 8.5-16.5 V 4. Bus not closed and bus restored After 1s, GW_ 298 message reception timeout; Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s	4. Can line fault 5. Loose connector 6. Controller circuit fuse blown 7. BDC fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components

		are satisfied, DTC is triggered.		
U1A9387	Message GW_2DE reception timeout IP_2DE reception timeout	1.Working voltage 8.5-16.5 V 4. Bus not closed and bus restored After 1s, GW_2DE message reception timeout; Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered.	4. Can line fault 5. Loose connector 6. Controller circuit fuse blown 7. BDC fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components

U1A8781	GW_ 180 Corner signal failure SAS_ 180 Angle signal failure	1.Working voltage 8.5-16.5 V 4. Network node GW_ 180 receives invalid value SAS_SteeringAngleValid = "Invalid." Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Signal input error 5. Electromagnetic interference 6. Node fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A8381	GW_ 187 Vehicle speed signal invalid (ESP_ 187 Vehicle speed signal is invalid)	1.Working voltage 8.5-16.5 V 4. Network node GW_ 187 send invalid value ESP_VehicleSpeedValid = notvaild or ESP_VehicleSpeed=invaild). Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered 4.After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Signal input error 5. Electromagnetic interference 6. Node fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A8181	GW_1A8 gear position signal is invalid(TCU_1A8 gear position signal invalid)	1.Working voltage 8.5-16.5 V 4. Network node GW_1A8 sends TCU_ShiftPostionValid = invaild or TCU_GearShiftPosition= in vaild. Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered 4.After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Signal input error 5. Electromagnetic interference 6. Node fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A8184	GW_1A8 actual gear signal failure(TCU_1A8 actual gear signal failure)	1.Working voltage 8.5-16.5 V 4. Invalid value sent by network node GW_1A8 TCU_ActualGearValid = invaild or TCU_ActualGear= invaild. Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s	4. Signal input error 5. Electromagnetic interference 6. Node fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components

		are satisfied, DTC is triggered		
U1AA181	GW_ 278 Lateral acceleration failure (ESP_ 278 Lateral acceleration failure)	1.Working voltage 8.5-16.5 V 4. Network node GW_ 278 sends ESP_LatAccel=invalid. Time 1s 5. The system works in non-shutdown mode	4. Signal input error 5. Electromagnetic interference 6. Node fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status

		4.After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered		4. Check BDC 5. Replace ECU components
U1AA381	GW_ 278 Longitudinal acceleration failure(ESP_ 278 Longitudinal acceleration failure)	1.Working voltage 8.5-16.5 V 4. Network node GW_ 278 send invalid value(ESP_LongAccel=invalid) . Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Signal input error 5. Electromagnetic interference 6. Node fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A8581	GW_ 278 Yaw rate failure ESP_ 278 Yaw rate failure	1.Working voltage 8.5-16.5 V 4. Network node GW_ 278 sends ESP_YawRate=invaild or ESP_YawRateValid=invalid. Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	3. Signal input error 4. Electromagnetic interference 5. Node fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A8981	GW_28B steering lamp status signal is invalid	1.Working voltage 8.5-16.5 V 3. Invalid value sent by network node GW_28B (BCM_TurnLightSwitchSTs=invaild. Time 1s 4. The system works in non-shutdown mode 5. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Signal input error 5. Electromagnetic interference 6. Node fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A9381	GW_ 298 Invalid main driver door lock signal(BCM_ 298 Invalid main driver door lock signal)	1.Working voltage 8.5-16.5 V 4. Network node GW_ 298 send invalid value (BCM_DriverDoorLockSTatus=error. Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Signal input error 5. Electromagnetic interference 6. Node fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components

U1A9581	GW_ 298 Passenger door lock signal failure(PEPS_ 298 Passenger door lock signal failure)	1.Working voltage 8.5-16.5 V 4. Network node GW_ 298 send invalid value (BCM_PassengerDoorLoCkStatus=error. Time 1 Second 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Signal input error 5. Electromagnetic interference 6. Node fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components

U1A9781	GW_ 298 Rear left door lock signal failure(BCM_ 298 Rear left door lock signal failure)	1.Working voltage 8.5-16.5 V 4. Network node GW_ 298 send invalid value (BCM_LeftRearDoorStatUs=error. Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Signal input error 5. Electromagnetic interference 6. Node fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A9981	GW_ 298 Rear right door lock signal failure(BCM_ 298 Rear right door lock signal failure)	1.Working voltage 8.5-16.5 V 4. Network node GW_ 298 send invalid value (BCM_RightRearDoorStaTus=error. Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	3. Signal input error 4. Electromagnetic interference 5. Node fault	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A9782	GW_ 180 cycle count failure SAS_ 180 cycle count failure	1.Working voltage 8.5-16.5 V 4. Network node GW_ 180 cycle count error. Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Received message overload 5. Transmission line is subject to electromagnetic interference 6. Can bus arbitration error	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A8783	GW_ 180 CRCCheck value error(SAS_ 180 CRCCheck value error)	1.Working voltage 8.5-16.5 V 4. Wrong checksum value sent by network node GW_ 180 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Received message overload 5. Transmission line is subject to electromagnetic interference 6. Can bus arbitration error	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components
U1A9182	GW_ 187 cycle count failure ESP_ 187 cycle count failure	1.Working voltage 8.5-16.5 V 4. Network node GW_ 187 cycle count error. Time 1s 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Received message overload 5. Transmission line is subject to electromagnetic interference 6. Can bus arbitration error	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC 9. Replace ECU components

U1A8183	GW_ 187 CRCCheck value error(ESP_ 187 CRCCheck value error)	1.Working voltage 8.5-16.5 V 4. Wrong checksum value sent by network node GW_ 187 5. The system works in non-shutdown mode 6. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	4. Received message overload 5. Transmission line is subject to electromagnetic interference 6. Can bus arbitration error	4. Check whether the voltage is 8.5V-16.5V 5. Power on/off the vehicle again 6. Check wiring harness, fuse and connector 7. Check CAN bus status 8. Check BDC

				6. Replace ECU components
U1A9582	GW_1A8 cycle count failure (TCU_1A8 cycle count failure)	1.Working voltage 8.5-16.5 V 2.Network node GW_1A8 cycle count error. Time 1s The system works in non-shutdown mode After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	Received message overload Transmission line is subject to electromagnetic interference Can bus arbitration error	Check whether the voltage is 8.5V-16.5V Power on/off the vehicle again Check wiring harness, fuse and connector Check CAN bus status Check BDC 6. Replace ECU components
U1A8583	GW_1A8 CRCCheck value error(TCU_1A8 CRCCheck value error)	1.Working voltage 8.5-16.5 V 2.The checksum value sent by network node GW_1A8 is incorrect. The system works in non-shutdown mode After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	Received message overload Transmission line is subject to electromagnetic interference Can bus arbitration error	Check whether the voltage is 8.5V-16.5V Power on/off the vehicle again Check wiring harness, fuse and connector Check CAN bus status Check BDC 6. Replace ECU components
U1A9382	GW_ 278 cycle count failure ESP_ 278 cycle count failure	1.Working voltage 8.5-16.5 V 2.Network node GW_ 278 cycle count error. Time 1s The system works in non-shutdown mode After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	Received message overload Transmission line is subject to electromagnetic interference Can bus arbitration error	Check whether the voltage is 8.5V-16.5V Power on/off the vehicle again Check wiring harness, fuse and connector Check CAN bus status Check BDC 6. Replace ECU components
U1A8383	GW_ 278 CRCCheck value error(ESP_ 278 CRCCheck value error)	1.Working voltage 8.5-16.5 V 2.The checksum value sent by the network node GW_ 278 is incorrect. The system works in non-shutdown mode After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	Received message overload Transmission line is subject to electromagnetic interference Can bus arbitration error	Check whether the voltage is 8.5V-16.5V Power on/off the vehicle again Check wiring harness, fuse and connector Check CAN bus status Check BDC 6. Replace ECU components

U1A8982	GW_28B cycle count failure(BCM_28B cycle count failure)	1.Working voltage 8.5-16.5 V 2.Network node GW_28B cycle count error. Time 1s The system works in non-shutdown mode After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	Received message overload Transmission line is subject to electromagnetic interference Can bus arbitration error	Check whether the voltage is 8.5V-16.5V Power on/off the vehicle again Check wiring harness, fuse and connector Check CAN bus status Check BDC 6. Replace ECU components
U1A8983	GW_28B CRCCheck value error(BCM_28B CRCCheck value error)	1.Working voltage 8.5-16.5 V 2.The checksum value sent by network node GW_28B is incorrect. The system works in non-shutdown mode After power supply status is IGN ON	Received message overload Transmission line is subject to electromagnetic interference Can bus arbitration error	Check whether the voltage is 8.5V-16.5V Power on/off the vehicle again 3. Check harness, fuse and connector.

		If the conditions above 3s are satisfied, DTC is triggered		Check CAN bus status Check BDC Replace ECU components
B250001	Radar internal fault	1.After power supply status is IGN ON 3s, radar internal fault duration detected 200 ms	1. Radar internal fault detected	1. Replace radar, contact Chang'an technician for analysis
B250054	Offline not calibrated	1.Working voltage 8.5-16.5 V No offline calibration or change of model configuration parameters for 50 ms After power supply status is IGN ON The conditions above 3s meet the DTC. Established	1. No offline calibration	1. Perform after-sales calibration with diagnostic scanner
B250051	Radar software mismatch	1.Working voltage 8.5-16.5 V Inconsistent software version or radar model configuration, duration 450 ms After power supply status is IGN ON The conditions above 3s meet the DTC. Yes.	1. The left and right radar software versions are inconsistent.	1. Check the radar software version information with a diagnostic scanner. If it is inconsistent, please contact Chang'an technical personnel.
B254476	Radar installation failure	1. Mounting position of rear left/right radar Error, duration 50 ms	1. Radar mounting position moves	1. Dismantle rear bumper, disassembly and assembly method See: Rear bumper inspection radar Correct installation, clipped in Whether the bracket is damaged or changed Shape; And recalibrate
B254478	Radar calibration failure	1. working voltage 8.5-16.5 V 2. Side radar calibration or angle compensation calculation failure, duration 50 ms 3.After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	1. Radar calibration result exceeds the allowable calibration range.	1. Remove the rear bumper. The removal and assembly path is as above. Visually inspect the radar mounting bracket for deformation and damage, and re-calibrate.
B254498	Radar temperature out of range	1.Working voltage 8.5-16.5 V 2.The radar temperature monitoring is out of the specified range, and the duration is 500 ms. 3.After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered	1. Radar internal temperature is too high.	1. Replace radar, contact Chang'an technician for analysis

B254468	Radar is blocked	1.Working voltage 8.5-16.5 V The radar is blocked for 3s. After power supply status is IGN ON If the conditions above 3s are satisfied, DTC is triggered 4. Non-short path calibration mode	1.There is obstruction in front of radar, or there is no target within 100 meters of radar detection area.	Check whether there is sundries in rear bumper radar area, and clean it. Remove the rear bumper. The removal and assembly path is as above. Check whether there is sundries on the radar surface and clean it.

Fault symptom diagnosis

Inspection and confirmation

Confirm the user problem;

Visually inspect for visible signs of mechanical or electrical damage;

Visually inspect whether there is detailed collision deformation trace, whether the front of the controller is blocked by foreign matter, including surface icing, dust or dirt;

If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step;

If the visual inspection is passed, confirm the fault and

refer to the fault symptom table; Appearance check

list

Mechanical part	Electrical part
Parallel auxiliary controller assembly	Harness and connector
Mounting bracket	Fuse
Rear bumper	Parallel auxiliary controller assembly

Common troubleshooting of fault symptom table

The rearview mirror indicator is always on, and the instrument fault is displayed as "rear auxiliary radar shielding": First check whether there are additional parts or spraying at the rear radar position, and whether there is soil/snow coverage. If yes, remove the shielding, power off again and confirm whether the fault is eliminated;

The indicator lamp of rearview mirror is always on, and the instrument fault is displayed as "backward auxiliary radar fault": The diagnostic reading fault code is "radar installation position error"; firstly, visually inspect the rear radar position mechanical collision or deformation; whether the radar is correctly installed in the support limit; if yes, repair the deformation and confirm that the radar is correctly clamped in position, and then execute according to "7.3.2 LCDA parallel line auxiliary calibration method calibration method";

The rearview mirror indicator lamp is not always on, the instrument has no error and no function. At this time, the setting item of "Vehicle Center" - "Safety" interface of inCall system cannot be operated, and the left/right radar controller cannot be connected through the diagnostic scanner. Check whether the left/right radar controller fuse, connector and harness connection are normal;

Fault confirmation

Turn on each function switch, and the function is abnormal after actual vehicle test. It shall be considered as fault. At this time, the fault information can be displayed through the instrument, and the fault code can be read by the diagnostic scanner to further confirm the fault.

Warning

If the relevant systems such as EMS, EPBi and TCU replace parts or update software for some reasons, correct operation must be carried out according to the repair/maintenance methods of the corresponding system, and the parallel auxiliary control system shall be cleared.

Unify the fault code, and confirm on-line auxiliary

control system functional normal diagnostic scanner

can read the fault and its solutions as follows.

Fault symptom	Possible causes	Measures
The fault does exist, but the instrument does not display, and the rearview mirror alarm lamp does not light up.	Instrument configuration error	Reconfigure instrument according to model with diagnostic scanner
	Gateway configuration error	Reconfigure gateway according to vehicle model with diagnostic scanner
	Parallel auxiliary system has no power supply	Fuse burns, replace fuse; Harness or connector faulty, check connector or harness
The instrument displays "rear auxiliary radar shielding" fault, and the rearview mirror alarm lamp is always on.	If the instrument displays "rear auxiliary radar shielding," the radar surface of corresponding parallel auxiliary controller may be shielded by soil, harness or rear mounting materials.	1、 The additional parts at the controller assembly must be removed. 2、 Attempt to flush the rear bumper inner and outer surfaces and controller assembly surfaces at the controller 3、 Inspect whether the harness blocks the radar wave emitting surface. After checking, power off and restart and drive for 5 km. If the fault is still not relieved, troubleshoot according to the failure fault.
The instrument displays "Rearward	Battery voltage too high or too low	Check the battery voltage and replace the battery.
	Angle sensor not calibrated	Recalibrate angle sensor
	Backward auxiliary system is not calibrated	Recalibrate with diagnostic scanner(The appearance of parallel line system calibration when it is turned on is: Exterior rearview mirror indicator does not stop flashing, and

	Radar installation failure	The installation position is out of tolerance, re-check the radar installation, and re-calibrate after correction.
	LED lamp fault	Instrument or rearview mirror alarm lamp fault, replace instrument or rearview mirror

Parallel auxiliary indicator lamp does not light up

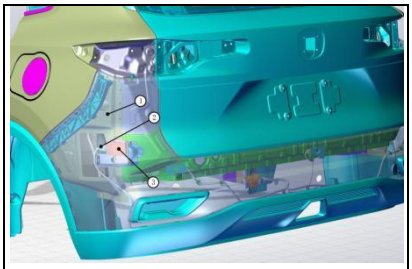
1.Read the fault code with the diagnostic scanner, and confirm whether there is fault code of LEDs: B2 A 9181;

2. If there is fault code of LED lamp, check whether LED lamp is damaged, connector is loose, and whether LED hardware number is configured for the vehicle;

3. If there is no LED lamp fault fault code, confirm whether the instrument is faulty. If necessary, replace the instrument for verification and confirmation;

Removal and installation

Removal and installation of left and right parallel line auxiliary controller



Tools required	Straight screwdriver, Phillips screwdriver, pattern screwdriver, socket, ratchet wrench(For assembling and disassembling rear bumper)
Auxiliary materials	None
Torque	6±1(Rear bumper mounting bolt/screw)

Removal

Dismantle rear bumper (refer to rear bumper disassembly and assembly for details) rear bumper;

Disconnect the connecting wire auxiliary controller assembly connector;

Clamp the auxiliary controller assembly along the parallel line in the opposite direction, and remove the controller (3).

Installation

The installation sequence is the reverse of the removal sequence. Clamp the parallel auxiliary controller to the mounting bracket, connect the connector, and then install the rear bumper.

Spare parts atlas

F280701

Lane Assist Specification

Name	Specifications
Lane departure controller	Working voltage 9v~16v
	Working current is less than 300 mA
	Operating temperature -40℃~80℃

Component position diagram

Serial number	Component
1	Beauty cover assy.
2	Front windshield assembly
3	Inner rearview mirror assembly
4	Lane departure controller assembly
5	Lane departure controller assembly connector
6	Lane departure controller mounting bracket

System introduction

System principle block diagram

Lane assist system realizes lane departure warning function through camera mounted on front windshield and inside rearview mirror. When the lane assist system is turned on, the status of the lane assist system is displayed on the trip computer interface of the instrument panel. Set the Lane Assist function on the Vehicle Setup screen of the Incall system? Vehicle Center? Drive Assist. If Lane Assist is not available, display the fault information in the instrument panel. The main functions of the system are as follows:

Lane departure warning

There is a lane line on the road surface, and the vehicle speed is greater than 60 km/h, the vehicle deviates from the lane, and when the wheel presses onto the lane marking, the instrument will give an alarm and the steering wheel vibration alarm. Lane keeping

There is a lane line on the road surface, and the speed is greater than 60 km/h, the vehicle deviates from the lane, and the steering wheel actively rectifies the deviation in the reverse direction when the wheel is about to press onto the lane marking, so that the vehicle drives in the lane. Automatic high beam control

In dark environment, and the vehicle speed is greater than 30 km/h, if there is no vehicle, street lamp and incoming vehicle in front, the system will automatically turn on the high beam; If street lamps, vehicles and incoming vehicles appear in front, the system automatically switches back to low beam lamps.

Speed limit sign recognition

During driving, the camera automatically recognizes the road speed limit sign and displays it on the instrument. If the vehicle speed exceeds the road speed limit value, the instrument will give an alarm.

Integrated Adaptive Cruise Control

Detect the front vehicle and lane line by using the radar (ACCS) used by the adaptive cruise control system and the camera (LDW) used by the lane assist system, keep the vehicle driving at the set cruise speed or the preset following time distance with the front vehicle by controlling the vehicle speed, and realize the vehicle driving in the lane by controlling the steering.

Use the radar (ACCS) used by the adaptive cruise control system and the camera (LDW) used by the lane assist system to detect the front vehicle and the moving track, maintain the preset following time distance with the front vehicle by controlling the vehicle speed, and follow the front vehicle track form by controlling the steering.

Function setting

Lane departure warning setting switch:

Set Lane Departure Assist Mode/Warning Mode etc. on the "Vehicle Center"? "Traffic Assistance" interface of the incall system

Speed limit sign recognition system setting switch:

Overspeed warning setting is performed on the "Vehicle Center" - "Driving Assistance" interface of the incall system.

Automatic high beam system setting switch:

Switch on/off the automatic high beam, etc. on the "Vehicle centre"? "Light" screen of the incall system.

Integrated Adaptive Cruise Control Steering Wheel Switch:

: Activate integrated adaptive cruise control

: Exit to Adaptive Cruise Control

: Cancel integrated adaptive cruise control

: Restore system or increase cruise speed

: Set system or reduce cruise speed

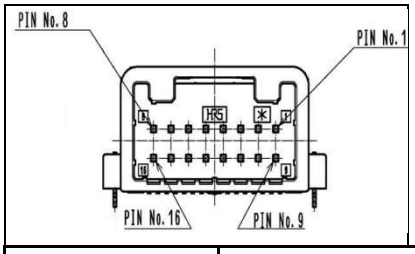
: Adjust following distance

Integrated Adaptive Cruise System Setup Switch:

Enable/disable integrated adaptive cruise control settings on the incall system "Settings"? "Vehicle centre"? "Vehicle assistance" screen.

Inspection of part structure principle

Lane assist control and lane assist camera interface definition



Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
1	IG1 power supply	Power supply, V_IG1	9V-16 V, rated current 0.58A	Ignition switch on, body ground	-
2	1st CAN bus, high	Can bus	-	-	And vehicle ADASCAN (2m) Connection
3	1st CAN bus, low	Can bus	-	-	And vehicle ADASCAN (2m) Connection
4	-	-	-	-	-
5	Power supply ground	Power supply, GND	0V, rated current 0.58 A	Always ground the body	-
6	-	-	-	-	-
7	-	-	-	-	-
8	-	-	-	-	-
9	-	-	-	-	-
10	2nd CAN bus, high	Can bus	-	-	Connected to adaptive cruise control
11	2nd CAN bus, low	Can bus	-	-	Connected to adaptive cruise control

12	-	-	-	-	-
13	-	-	-	-	-
14	-	-	-	-	-
15	-	-	-	-	-
16	-	-	-	-	-

Common methods

Lane Auxiliary Warning Mode Setting Lane Departure Warning Setting Switch:

Set the automatic high beam system setting switch in the "Vehicle centre"? "Traffic assist" interface of the incall system, such as lane departure assist mode/warning mode: Switch on/off the automatic high beam, etc. on the "Vehicle centre"? "Light" screen of the incall system. Integrated Adaptive Cruise Control Steering Wheel Switch:

: Activate integrated adaptive cruise control

: Exit to Adaptive Cruise Control

: Cancel integrated adaptive cruise control

: Restore system or increase cruise speed

: Set system or reduce cruise speed

: Adjust following distance

Integrated Adaptive Cruise System Setup Switch:

Switch on/off integrated adaptive cruise settings on the "Vehicle centre"? "Service assist" screen of the incall system.

DTC Diagnostic

Lane assist system controller

DTCs list and simple troubleshooting tools:

Diagnostic scanner KT 700, multimeter

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
B220016	LAS detects low battery voltage	The ignition switch is on ECU changes from normal voltage range to too low voltage(Less than 8.5v more than 500 ms)	Battery power loss Poor battery or line connection (3) Generator fault	(1) Ignite the vehicle to charge the battery, check whether the voltage between pin No.1 and pin No.5 of the Las harness is within the normal working voltage 9-16 V range, replace the Las within the range, and then contact Chang'an technician to analyze the single fault. If not, perform the following steps; (2) Test whether the dark current of the complete vehicle exceeds the standard to judge whether it is the battery power loss caused by the quiescent current exceeding the standard; Continuously greater than 20 mA without falling is considered abnormal. (3) If the dark current meets the requirements, check whether the alternator exists.

				Fault, contact charging system responsible person for troubleshooting
B220117	LAS detects high battery voltage	The ignition switch is on Voltage too high(Greater than or equal to 16.5v more than 500 ms)	Voltage regulator fault Poor battery or wiring (3) Controller wiring short circuit	(1) Ignite the vehicle to charge the battery, check whether the voltage between pin No.1 and pin No.5 of the Las harness is within the normal working voltage 9-16 V range, replace the Las within the range, and then contact Chang'an technician to analyze the single fault. If not, perform the following steps. Check whether the alternator is faulty, and contact the charging system responsible person for troubleshooting. Check the LAS power supply line for damage and short circuit according to the harness schematic diagram.
U178088	Las detects private CAN BUSOFF	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is in the On state (4) The continuous bus is turned off for 5 times (200 ms)	Can bus (private CAN) sending Short circuit or open circuit Can bus (private CAN) line The physical properties of the circuit have changed	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Check the LAS harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check whether the terminal resistance is about 60 ohms, if the resistance is small. If it is 40 or greater than 70, there is abnormality. Check whether the terminal resistance controller is abnormal. Check the functional status of the associated controller

U178188	Las detection public CAN BUSOFF	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on Continuous bus shutdown times up to 5 Secondary(200 ms)	Can bus (private CAN) sending Short circuit or open circuit Can bus (private CAN) line The physical properties of the circuit have changed	Plug fuse or controller connector one by one, observe whether the fault is eliminated; if the fault is eliminated, locate the corresponding controller, replace the controller, and then contact Chang'an technician to troubleshoot the single controller problem. If the plugging and unplugging of the controller fails, check whether the connectors of the controllers are in good contact one by one, and whether the terminals are retracted. Check whether the terminal resistance is about 60 ohms, if the resistance is small. If it is 40 or greater than 70, there is abnormality. Check whether the terminal resistance controller is abnormal. Plug and unplug all controllers on CAN wire of terminal resistance, test terminal resistance, remove the controller and recover to normal, then the controller is faulty. After replacing the controller, contact Chang'an technician to troubleshoot the controller problem.
U178287	LAS and SAS lost communication	(1) Can bus supply voltage is 8.5V-18.5V	Can line fault Controller harness fault, connector loose BDC fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V.

		Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s LAs and GW_ 180 missing Communication or DLC error more than 100 ms continuously(10x message cycle)	(4) Controller fault	Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178283	SAS_CRCCheck Error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off recovery exceeds 1s SAS_CRCCheck failure error exceeds 100 ms continuously	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller

U178282	SAS_RollingCounter Error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) SAS_RollingCounter failure error exceeds 100 ms continuously (10x message period)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178387	LAS and ESP lost communication	(1) Can bus supply voltage is 8.5V-18.5V	(1) Can wire fault (2) Controller harness fault, connector loose (3) BDC fault (4) Controller fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated.

		Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Las and GW_ 187/GW_ 206/GW_ 208/GW_ 258/GW_ 277/ GW_ 278 Loss of communication or DLC error for more than 100 ms continuously(10x message cycle)		Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178386	ESP DLC error fault	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Las and GW_ 187/ GW_ 278 Loss of communication or DLC error for more than 100 ms continuously(10x message cycle)	(1) Can wire fault (2) connector is loose (3) BDC fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller

U178383	ESP_CRCCheck Error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s ESP_CRCCheck_ 187/ESP_CRCCheck_ 206/ESP_CRCCheck_ 208/ESP_CRCCheck_ 258/ESP_CRCCheck_ 277/ESP_CRCCheck_ 278 failure error more than 100 ms continuously(10x message cycle)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178382	ESP_RollingCounter Error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Check the harness and connector, and confirm whether the controller connector is connected.

		(4) No Bus off or Bus Off Recovery more than 1s (5) ESP_RollingCounter_187/ESP_RollingCounter_206/ESP_RollingCounter_208/ESP_RollingCounter_258/ESP_RollingCounter_277/ESP_RollingCounter_ 278 failure error more than 100 ms continuously (10x message period)		Good contact, whether the terminal is retracted, whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178487	LAS and TCU lose communication or DLC error fault	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s LAs and GW_ 188/ GW_1A8 Lost communication or DLC error more than 100 ms continuously (10 times message cycle)	(1) Can wire fault (2) Controller harness fault, connector loose (3) BDC fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller

U178483	TCU_CRCCheck Error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) TCU_CRCCheck_ 188/TCU_CRCCheck_1 A8 failure Error more than 100 ms continuously (10x message period)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178482	TCU_RollingCounter error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		(5) TCU_RollingCounter_188/TCU_RollingCounter_1A8 failure error exceeds 100 ms continuously (10x message period)		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178587	Loss of communication between LAS and EMS or DLC error fault	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s LAs and GW_ 196/ GW_1A6 Lost communication or DLC error more than 100 ms continuously (10 times message cycle)	Can line fault Controller harness fault, connector loose BDC fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178583	EMS_CRCCheck Error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s EMS_CRCCheck_196/EMS_CRCCheck_1A6 failure Error more than 100 ms continuously(10x message cycle)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178582	EMS_RollingCounter Error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) EMS_RollingCounter_196/EMS_RollingCounter_1A6	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		Failure error continuously exceeds 100 ms(10x message cycle)		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178687	LAS and EPS lose communication	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s LAs and GW_24F missing Communication or DLCError more than 200 ms continuously (10x message period) Loss of communication or DLC error for more than 100 ms continuously(10x message cycle)	Can line fault Controller harness fault, connector loose BDC fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178683	EPS_CRCCheck Error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) EPS_CRCCheck_17E failure error exceeds 100 ms continuously (10x message period)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) EPS_CRCCheck_24F failure error exceeds 200 ms continuously (10x message period)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

				Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178682	EPS_RollingCounter Error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) EPS_RollingCounter_17E failure error exceeds 100 ms continuously (10x message period)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) EPS_RollingCounter_24F failure error exceeds 200 ms continuously (10x message period)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178787	Lost communication with HU	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s GW_3AF/GW_3B8/not received within 1000 milliseconds	Can line fault Controller harness fault, connector loose BDC fault Controller fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		GW_3BB message (cont. Message cycle)		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178783	HU_CRCCheck Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off recovery exceeds 1s HU_CRCCheck_3AF/HU_CRCCheck_3B8 error continuously exceeds 1000 ms(10x message cycle)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U178782	HU_RollingCounte Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) HU_RollingCounter_3AF/HU_RollingCounter_3B8 error 1000 ms (ten consecutive message cycles)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U179287	Lost communication with MFS	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Not received within 400 milliseconds GW_28C message (continuous) Message cycle)	Can line fault Controller harness fault, connector loose BDC fault Controller fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

				Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U179283	GW_MFS_CRCCheck Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) GW_MFS_CRCCheck_ 28 C error continuously exceeds 400 ms (10 times message cycle)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U179282	GW_MFS_RollingCounte r Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) GW_MFS_RollingCoun ter_28C Error 400 ms (10 consecutive message cycles)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U179387	LCDAR message communication timeout	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s LCDAR_2A4 message not received within 500 milliseconds(10 consecutive message cycles)	Can line fault Controller harness fault, connector loose BDC fault (4) Controller fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

				Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U179383	LCDAR_CRCCheck Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) LCDAR_CRCCheck_2AF error continues more than 500 ms (10 times message cycle)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U179382	LCDAR_RollingCounter Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) LCDAR_RollingCounter_2AF error 500 ms (ten consecutive message cycles)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U179487	Lost communication with SRS	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s No GW_50 message received within 5000 milliseconds(10 consecutive message cycles)	Can line fault Controller harness fault, connector loose BDC fault Controller fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

				Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U179587	Lost communication with BCM	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s No GW_ 387/3FF message received within 1000 milliseconds(10 consecutive message cycles)	Can line fault Controller harness fault, connector loose BDC fault Controller fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U179187	Lost communication with MRR (private CAN)	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s RDR_Status error 200 Millisecond	Can line fault Controller harness fault, connector loose BDC fault Controller fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U179186	MRR DLC fault	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s RDR_Status Loss of communication or DLC error for more than 200 ms continuously(5x message cycle)	Can line fault Controller harness fault, connector loose BDC fault Controller fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

				Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U179183	MRR CRC fault	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s RDR_Status_CRC Error 200 ms	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s OnComingObj0_CRC/OnComingObj1_CRC/OnComingObj2_CRC/OnComingObj3_CRC 5 signal errors	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s ACCObjInfo_CRC 5 signal errors	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

				Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s RDR1Header_CRC 5 signal errors	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s TrajACC_CRC 5 signal errors	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) TIPLCourseInfo0_CRC / TIPLCourseInfo1_CRC / TIPLCourseInfo2_CRC /	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		TIPLCourseInfo3_CRC/TIPLCourseInfo4_CRC5 signal errors		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s TIPLLaneInfo0_CRC/TIPLLaneInfo1_CRC/TIPLLaneInfo2_CRC/TIPLLaneInfo3_CRC 5 signal errors	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s TrajPointACCObj0_CRC/TrajPointACCObj1_CRC/TrajPointACCObj2_CRC/TrajPointACCObj3_CRC/TrajPointACCObj4_CRC/TrajPointACCObj5_CRC/TrajPointACCObj6_CRC/TrajPointACCObj7_CRC/TrajPointACCObj8_CRC/TrajPointACCObj9_CRC 5 signal errors	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s OnGoingObj0_CRC/OnGoingObj1_CRC 5 signal errors	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

				Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U179182	MRRRollingCounter fault	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s RDR_Status_BZ error 200 ms(5 consecutive cycles)	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s OnComingObj0_BZ/OnComingObj1_BZ/OnComingObj2_BZ/OnComingObj3_BZ 5 signal errors	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s ACCObjInfo_BZ 5 signal errors	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

				Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s RDR1Header_BZ 5 signal errors	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s TrajACC_BZ 5 signal errors	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1783F0	ESP speed is invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal ESP_VehicleSpeed==0 x1F	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		FF or ESP_VehicleSpeedValid== 0x1 continuously exceeds 100 ms(10x message cycle)		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1783F2	ESP indicates that the wheel speed direction signal is invalid.	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s 'Right rear wheel speed direction' signal from ESP == 0x3 or 'Left rear wheel speed direction' signal == 0x3 or 'Right front wheel speed direction' signal == 0x3 or 'Left front wheel speed direction' signal == 0x3) for seven consecutive cycles And ESP_VehicleSpeed is greater than 1kph If EMS_EngineStatus=stop orcrank, or changes from crank to running within 5s, this fault is not monitored.	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1783F3	ESP indicates that its wheel speed signal is invalid.	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s 'RR RH Wheel Speed Signal Invalid 'signal or Wh' RR LH Wheel Speed Signal None Effect 'signal or' Left front and rear wheel speed signal invalid 'signal or' Right front wheel speed signal invalid 'signal for seven consecutive cycles 140 ms!Zero and the vehicle speed is greater than 1kph if EMS_EngineStatus=stop orcrank, or within 5s from crank to running,	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

		the fault is not monitored.		controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1783F4	ESP indicates that the wheel speed pulse signal is invalid.	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		(5) The 'rear right wheel speed pulse' signal = 0xff or the 'front right wheel speed pulse' signal = 0xff or the 'front right wheel speed pulse' signal = 0xff or the 'front left wheel speed pulse' signal = 0xff issued by the ESP is 140 ms for seven consecutive cycles and the vehicle speed is greater than 1kph if EMS_EngineStatus=stop orcrank, or within 5s from crank to running, the fault is not monitored.		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1783F5	Yaw rate failure	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s The signal ESP_YawRateValid==0x1 is more than 200 ms continuously (10x message period) or Signal ESP_YawRate==0x3FFF continuously exceeds 200 ms(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1783F6	Master cylinder pressure invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal ESP_MasCylBrakePressure Valid==0x1 more than 200 ms continuously (10x message period) or Signal ESP_MasCylBrakePressure ==0xFFF more than 200 ms continuously (10 times message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is

				below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1783F7	ESP lateral acceleration signal invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		(5) Signal ESP_LatAccel==0xFF continuously exceeds 200 ms (10x message period)		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1783F8	Invalid ESP longitudinal acceleration signal	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal ESP_LongAccel==0x3FF continuously exceeds 200 ms(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1783F9	Invalid ESP_TCSFailStatus signal	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal ESP_TCSFailStatus==0x1 continuously exceeds 100 ms(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1785F0	Engine speed signal invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal EMS_EngineSpeed==0xFF	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		FF continuously exceeds 100 ms (10 Times message period)		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1785F1	Accelerator pedal position l signal invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal EMS_AccPedal==0xFF continuously exceeds 100 ms(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1785F2	Engine status signal is invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal EMS_EngineStatus==0x3 continuously exceeds 100 ms(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1784F0	Gear shift process status valid signal invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal TCU_ShiftinProgressValid	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		==0x1 more than 100 ms continuously (10 times message cycle)		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1784F1	Gear shifter position is invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s The signal TCU_GearShiftPosition == 0xF is more than 100 ms continuously (10x message period), or Signal TCU_ShiftPostionValid == 0x1 continuously exceeds 100 ms(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1784F2	Real gear is invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s The signal TCU_ActualGear==0xF is more than 100 ms continuously (10x message period), or Signal TCU_ActualGearValid==0 x1 continuously exceeds 100 ms(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1782F0	SAS invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal SAS_SASFailure==0x1 connection	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		Continued for more than 100 ms(10x message cycle)		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1782F1	Invalid steering wheel angle	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal SAS_SteeringAngleValid==0x1 more than 100 ms continuously (10x message cycle), or Signal SAS_SteeringAngle==0x7 FFF more than 100 ms continuously(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1782F2	SAS not calibrated	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal SAS_Calibrated==Last Val ue continuously exceeds 100 ms(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1782F4	Steering wheel angular speed is invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal SAS_SteeringAngleSpeed=	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		=0xFF more than 100 ms continuously (10 times message cycle)		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1787F0	Check HU_NavSpeedLimit Invalid signal	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal HU_NavSpeedLimit==0 xF F continuously exceeds 1000 ms(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1788F0	Low beam lamp working status is invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal BCM_LowBeamStatus==0 x3 continuously exceeds 400 ms(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1788F1	High beam working status is invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal BCM_HighBeamStatus==0	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		X3 continuously exceeds 400 ms Times message period)		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1788F2	Front fog lamp working status is invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal BCM_FrontFoglampStatus ==0x3 more than 1000 ms continuously (10 times message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1786F3	Driver hand torque failure	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal EPS_MeasuredTorsionBar Torque==0x7FF/EPS_MeasuredTorsionBar TorqValid==0x1 continuously exceeds 100 ms(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1786F5	EPS response lateral control not available	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal EPS_LatCtrlAvailabilitySta	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		Tus==0x2 more than 100 ms continuously (10 times message cycle)		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1786F7	EPS_ConcussAvailabilitySt atus state failure	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off recovery exceeds 1s5 signal EPS_ConcussAvailabilitySt atus==0x2//EPS_ConcussAvailabilitySt atus=0x3=reserved more than 200 ms continuously (10x message period)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1792F0	IACC switch is invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal GW_MFS_IACCenable_s witch_signal==0x3 continuously exceeds 400 ms(10x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1792F0	GW_MFS_DiagInfoSW_2 8C Invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal GW_MFS_DiagInfoSW_2	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		8C==0x7 more than 400 ms continuously (10 times message cycle)		Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
U1791F0	MRR data invalid (private Can)	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal RDR_Stat_Error==0x1 continues more than 200 ms(5x message cycle)	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
		Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal StatusACC== 0x8/0x9 5 times signal error	Signal input error Electromagnetic interference Controller harness fault Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance

				controller is damaged. Observe whether the fault is eliminated after replacing the controller. Check the functional status of the associated controller
B220297	LAS camera block	The ignition switch is on Loss of image detected 1800 Seconds later	Camera blocked Camera is subject to strong light interference	Check whether there is obstruction in front of the camera. Make the camera work under good lighting conditions
B220398	ECU temperature exceeds operating value fault	The ignition switch is on The system temperature is greater than 100 ° C for more than 2s, or	1. System temperature is too high (over 100 degrees Celsius for more than 2s) 2. Camera temperature is too high or too low (camera temperature exceeds Over --47 C to plus 108 C 150 ms	Check ECU and camera temperature Provide a good ambient temperature for ECU

		(3) Imaging system temperature exceeds (-49 C to + 108 C) range, Continuously exceeding 150 ms		
B220649	ECU internal hardware fault	Permanent circuit fault found during quality inspection or power-on	Circuit permanent fault	Replace camera
B220762	LAS matching parameter error	The ignition switch is on When ECU is started, the software detects the fault about matching parameters.	No matching parameters written Write matching parameters for wrong version	Check version number of matching parameters Add matching parameters for correct version
B220855	LAS check vehicle configuration information error	The ignition switch is on Vehicle information is incorrect or not defined.DID F1F0, F1F4 medium Invalid variable value written	Incorrect vehicle type information field for vehicle configuration information Vehicle configuration information not defined	Check vehicle configuration information Add correct vehicle configuration information
B220949	ECU self-test fault	The ignition switch is on ECU detects any internal circuit fault (e.g. ECU temperature sensor driver fault, imaging sensor driver fault, DMA, RAM, ROM, UART, CAN buffer error, parity error, watchdog error)	Any internal circuit fault occurs (E.g. ECU temperature sensor driver fault, imaging sensor driver fault, DMA, RAM, ROM, UART, C An buffer error, parity error, watchdog error)	Power on/off the vehicle again Check whether it returns to normal Check and repair possible internal circuit faults
B220A84	Online calibration out of range	The ignition switch is on When ECU software detects online calibration result out of range.	Online calibration result out of range	Power on/off the vehicle again Check whether it returns to normal Recalibrate the camera with a suitable method
B220A85	Initial calibration out of range	The ignition switch is on When ECU software detects after-sale to calibration result out of range (SCAL or iOCAL)	Dynamic calibration result out of range	Power on/off the vehicle again Check whether it returns to normal Recalibrate the camera with a suitable method
B220A63	Initial calibration timeout	The ignition switch is on When ECU software detects dynamic calibration timeout	Initial calibration timeout	Power on/off the vehicle again Check whether it returns to normal Recalibrate the camera with a suitable method
B220A54	Camera not calibrated	The ignition switch is on When ECU detects camera is not calibrated(SCALE or iOCAL)	Camera not calibrated	Power on/off the vehicle again Check whether it returns to normal Recalibrate the camera with a suitable method
B220B17	ECU internal voltage high fault	The ignition switch is on ECU internal voltage too high	Controller internal circuit abnormality	Turn off ignition switch Power on the vehicle again and wait for 5 Second Clear DTC Read DTC if not present DTC: MPC reusable If DTC still present/active: Replacing MPC

B220B16	ECU internal voltage low fault	(1) The ignition switch is on	Controller internal circuit abnormality	(1) Turn off ignition switch

		(2) ECU internal voltage too low		Power on the vehicle again and wait for 5 Second Clear DTC Read DTC if not present DTC: MPC reusable If DTC still present/active: Replacing MPC
B220C45	ECU software fault	The ignition switch is on ECU software abnormal	Abnormal operation of controller software	Turn off ignition switch Power on the vehicle again and wait for 5 Second Clear DTC Read DTC if not present DTC: MPC reusable If DTC still present/active: Replacing MPC
B220D54	ECU software temporary fault	The ignition switch is on ECU software abnormal	Abnormal operation of controller software	Turn off ignition switch Power on the vehicle again and wait for 5 Second Clear DTC Read DTC if not present DTC: MPC reusable If DTC still present/active: Replacing MPC
B220E60	ECU temperature exceeds maximum value fault	The ignition switch is on ECU internal temperature is too high	Controller temperature too high	Turn off ignition switch Take appropriate heat dissipation measures(If interior A/C is turned on) Power on the vehicle again and wait for 5 Second Clear DTC Read DTC if not present DTC: MPC reusable If DTC still present/active: Replacing MPC
B220F32	MPC calibration input parameter fault	The ignition switch is on Controller calibration error	Controller internal calibration parameter is abnormal.	Recalibrate Power on the vehicle again and wait for 5 Second Clear DTC Read DTC if not present DTC: MPC reusable If DTC still present/active: Replacing MPC

Fault symptom diagnosis

Check and confirm test equipment

Diagnostic scanner KT 700, multimeter

Confirm the user's problem and whether the instrument displays the lane assist system fault information.
Check whether the switch function is normal. Click the alarm mode of "Early Warning, Rectification, Early Warning + Rectification" in "Vehicle Center - Driving Assistance" of the host to confirm whether the switch can be normally switched. If it is not switched, the system has fault.
Read the version information of lane departure and current DTC with KT 700 diagnostic scanner.
Carry out corresponding troubleshooting according to the fault code prompt. If it is necessary to check the camera installation deviation, remove the inner rearview mirror and beauty cover, visually inspect the lane departure controller assembly for obvious mechanical or electrical damage and whether the front windshield camera installation position is broken.

There is strong correlation between lane departure controller assembly and adaptive cruise controller assembly, so special attention should be paid to the state of adaptive cruise controller.

Warning
If the relevant systems such as EMS, EPBi, TCU and EPS are replaced or the software is updated for some reasons, the correct operation must be carried out according to the repair/maintenance methods of the corresponding system, the fault code of the lane assist system shall be cleared, and the vehicle shall confirm that the function of the lane assist system is normal.

Appearance check list

Mechanical part	Electrical part
Lane departure controller assembly	Controller harness and connector
Lane departure controller mounting bracket	Fuse
Front gear glass	Lane departure controller assembly

Fault diagnosis table

Fault symptom	Fault cause	Solution
Three modes of "Warning, Rectification, Warning + Rectification" cannot be switched through the vehicle center of the vehicle machine - driving assistance -	1、 lane departure controller has fault 2. Lane departure controller is short-circuited or open-circuited with the CAN bus of the vehicle.	1. Use the diagnostic scanner to read the fault code and check the associated system according to the prompt. 2. If the diagnostic scanner cannot communicate with the controller, check whether the harness is normal or whether the BDC is correctly configured.
The instrument prompts that the camera is blocked and the lane departure fault lamp is yellow.	1. Lane deviation controller field of view is blocked by foreign objects. 2. The glass at the lane departure controller field of view is broken. 3. The camera of lane departure controller has dust.	1. Clean the front windshield. 2. Replace front windshield 3. Clean lens
Diagnostic scanner cannot connect lane departure controller	Fuse of 1、 lane departure controller blows; Poor contact of 2、 connector; 3. BDC configuration is incorrect.	1、 Replace fuse; 2、 Check connector 3. Reconfigure BDC or replace BDC
The instrument prompts lane assist system fault, and the lane departure fault lamp is yellow.	1、 associated system causes lane assist system fault; 2、 lane departure controller fault	1、 Maintenance association system according to diagnostic scanner DTC; 2. Replace lane departure controller assembly
The instrument prompts LAS is not calibrated, and the lane departure fault lamp is yellow.	1. Camera angle out of range 2. Bracket damage	1. Enter FC calibration lane deviation with diagnostic scanner 2. Reinstall and calibrate 3. If the above is not available, refer to after-sales calibration of lane assist system for calibration method of lane departure controller assembly.
The diagnostic scanner prompts to interrupt the contact with Private CAN.	Adaptive Cruise Control model is incorrectly configured	Re-model the adaptive cruise control

The instrument prompts that the camera is blocked.

The instrument prompts that the camera is blocked and the lane departure fault lamp is yellow. Fault cause

The lane deviation controller field of view is blocked by foreign objects.

Broken glass at lane departure controller field of view.

The camera of the lane departure controller has dust. Solution

Clean the front windscreen.

Replace the front windscreen.

Clean the lens.

Fault cause of steering wheel not vibrating during alarm

1.Enter the interface of incall System Setting - Vehicle Center - Train Assistance, and confirm whether the warning mode has selected the sound reminder mode; If yes, select Vibration Mode or Sound + Vibration Mode.

2. If the reminder mode has vibration, the steering wheel still does not vibrate during alarm. Use diagnostic scanner KT 700 to check whether the system has current fault:

With a diagnostic scanner, enter the S 203 front camera FC/LAS, read the current fault code, confirm whether there is fault, if there is fault, perform troubleshooting according to relevant troubleshooting methods of DTCs.

Use diagnostic scanner to enter S203EPS, read current fault code, confirm whether there is fault, if there is fault, perform troubleshooting according to relevant troubleshooting methods of DTCs.

Removal and installation

Lane assist control and lane assist camera

Disassembly and assembly tool

1	8 mm socket and ratchet wrench
2	Plastic skid

Removal

1. Use a pry piece to pry outwards along the edge of the beauty cover, and remove the partial plastic cover plate of the beauty cover shown in Figure 1.

2. Use 8 mm socket and ratchet wrench to remove the bolt shown in the figure and remove the inner rearview mirror;

3. Gently pry along the edge of the beauty cover with a pry piece, and remove the beauty cover after the peripheral buckle loosens.

4. Dismantle controller;

First remove the controller harness connector (5); Then remove the controller (4): Hold the two ends of the controller, first pull the controller downward to open the metal spring. When the metal spring is wide enough for the controller, pull the controller downward with a little force to release the controller. Be careful not to remove the bracket violently. Damage to the bracket may cause replacement of the whole glass.

Installation

The installation sequence is the reverse of the removal sequence. Put the two front clips into the bracket slots, and then push the two clips into the bracket clips. After installation, check that the beauty cover and front windshield are fitted.

Spare parts atlas

F280701

Adaptive Cruise Control Specification

Name	Specifications
Adaptive cruise control	Working voltage 9v~16v
	Working current is less than 300 mA
	Operating temperature -40℃~75℃

Component position diagram

Serial number	Component	Serial number	Component	Serial number	Component
1	Adaptive cruise control cover	2	Adaptive cruise control assembly	3	Adaptive cruise controller plastic mounting bracket
4	Front bumper assembly	5	Adaptive cruise controller metal mounting bracket	6	Adaptive cruise control harness connector

System introduction

System principle block diagram

The adaptive cruise control assembly is installed at the bottom of the front impact beam behind the lower grille of the front bumper, and detects the vehicle in front with an internally integrated millimeter wave radar, by decelerating or
(And) Acceleration control realizes adaptive cruise control and early warning auxiliary braking. The main functions of the system are as follows:

Adaptive Cruise Control

Constant speed cruise: When there is no target vehicle in front or the target vehicle speed is higher than the set cruise speed, control the vehicle to drive at the set cruise speed.

Following control: When there is a target vehicle in front and the target vehicle speed is lower than the set cruising speed, the control vehicle and the front vehicle keep the set following time distance.

Stop control: When the front target vehicle stops, follow the front vehicle to stop; The front vehicle starts within 3 seconds and automatically follows the start; Start after 3s, press to stop for more than 3 min, the adaptive cruise control system will exit, and the electronic hand brake will start to keep the vehicle still.

Or slightly press the accelerator pedal to start;

Early warning auxiliary brake system

Front collision warning: When the vehicle is too close to the vehicle during high-speed driving, the driver is reminded to pay attention to the distance through the image emitted by the instrument or the image + sound alarm; In case of collision danger, the image + sound or image + sound + brake) emitted by the instrument will remind the driver to take collision avoidance measures.

Automatic emergency braking: When collision is about to occur,
brake actively to slow down or avoid collision. Function setting
Adaptive Cruise Control Switch:

: Activate Adaptive Cruise

: Cancel adaptive cruise control

: Restore system or increase cruise speed

: Set system or reduce cruise speed

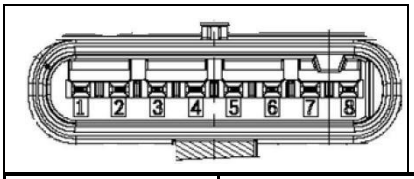
: Adjust the
following time interval
warning auxiliary
system switch:

Front collision warning and automatic emergency braking can be turned on and off in the "Setup" - "Vehicle Center" - "Safety" interface of the inCall system, and the front collision warning sensitivity can be set.

Inspection of part structure principle

Adaptive Cruise Control Interface Definition

The adaptive cruise control assembly is powered via the vehicle IG1, terminal views and definitions are as follows



Pin number	**Pin definition(Description)**	**Signal type**	**Signal range**	**Test conditions**	**Remarks**
1	-	-	-	-	Empty
2	-	-	-	-	Empty
3	Private CAN communication low level	CANFD signal	-	-	Private CAN, connected to lane departure controller assembly

4	Private CAN communication high level	CANFD signal	-	-	
5	Power supply ground	Power supply signal	9-16 V, rated current 0.29A	Always ground the body	-
6	Male CAN communication low level	CANFD signal	-	-	Common can, connected to complete vehicle PCAN
7	CAN1-H	CANFD signal	-	-	
8	Positive pole of power supply(KL15)	Power supply signal	9-16 V, rated current 0.08A	Ignition switch on, body ground	-

DTC Diagnostic

Adaptive cruise control

DTC fault code list and simple troubleshooting method

Inspection tool: Diagnostic scanner KT 700, multimeter. Find the clues according to the maintenance steps in turn, i.e. targeted maintenance. If there is no clues, finally try to replace ACC components and calibrate to see if the fault is eliminated.

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
U197300	Male CAN bus off	(1) Battery voltage continuous 500 ms Greater than 9V and less than 16 V;(2) Ignition timer exceeds 3000 ms; (3) Public CAN busoff failure exceeds five cycles	(1) Can bus (male CAN) Short circuit or open circuit Can bus (male CAN) line The physical properties of the circuit have changed Controller fault on bus	(1) Plug fuse or controller one by one Connector, observe whether the fault is eliminated Except, if the fault is eliminated, locate the corresponding controller, replace the controller, and then contact the Chang'an technician to troubleshoot the controller unit problem. (2) If the controller is plugged or unplugged, it is faulty. Not eliminated, check each control one by one Whether the brake connector is in good contact Good, whether the terminal is retracted (3) Check whether the terminal resistance is About 60 ohms, if the resistance is small Exists at 40 or greater than 70 Abnormal, terminal resistance needs to be checked Whether the controller is abnormal (4) Plug and unplug terminal resistance CAN cable All controllers on, test terminals Resistance, remove the controller and resume positive Normally, the controller is faulty, Contact Chang'an Technology after replacing controller Operator troubleshoots controller problem
U197388	Private CAN bus off	(1) Battery voltage continuous 500 ms	(1) Can bus (private CAN) sending	(1) Ignition switch ON, universal

		Greater than 9V and less than 16 V; (2) Ignition timer exceeds 3000 ms; The private CAN busoff fails for more than five cycles;	Short circuit or open circuit (2) Can bus (private CAN) line The physical properties of the circuit have changed (3) Controller fault on bus	Table Check Whether The Battery Voltage Is 8.5V-16.5V (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code and confirm whether the fault is eliminated. (3) Check LAS harness and connector Parts, confirm the controller connector is Whether the contact is good and whether the terminal is retracted Whether the pin and harness are damaged or broken (4) Check whether the terminal resistance is About 60 ohms, if the resistance is small Exists at 40 or greater than 70 Abnormal, terminal resistance needs to be checked Whether the controller is abnormal (5) Check power of associated controller Energy state

U170016	Supply voltage too low	3s after the power supply status is IGNON, check whether the power supply voltage is lower than 8.5 V for 3s. If it is lower than 8.5 V, it meets the conditions of DTCs.	Battery power loss Poor battery or line connection (3) Generator fault	(1) Ignite the vehicle to charge the battery. Check whether the voltage between pin No.5 and pin No.8 of the harness is within the range of normal working voltage 9-16 V. If the voltage is within the range, replace the LAS. contact Chang'an technician to analyze the single fault. If not, perform the following steps; (2) Test whether the dark current of the complete vehicle exceeds the standard to judge whether it is the battery power loss caused by the quiescent current exceeding the standard; Continuously greater than 20 mA without falling is considered abnormal. (3) If the dark current meets the requirements, check whether the generator is faulty, and contact the charging system responsible person for troubleshooting.
U170017	Supply voltage too high	3s after the power supply status is IGNON, check whether the power supply voltage is higher than 16.5 V duration for 3s. If it is higher than 16.5 V duration, the conditions for DTCs are met.	Voltage regulator fault Poor battery or wiring (3) Controller wiring short circuit	(1) Ignite the vehicle to charge the battery. Check whether the voltage between pin No.5 and pin No.8 of the harness is within the range of normal working voltage 9-16 V. If the voltage is within the range, replace the LAS. contact Chang'an technician to analyze the single fault. If not, perform the following steps; (2) Test whether the dark current of the complete vehicle exceeds the standard to judge whether it is the battery power loss caused by the quiescent current exceeding the standard; Continuously greater than 20 mA without falling is considered abnormal. (3) If the dark current meets the requirements, check whether the generator is faulty, and contact the charging system responsible person for troubleshooting.
U190F87	TCU message received by ACC times out	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on	Can line fault Controller harness fault, connector loose BDC fault Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the

		(4) No Bus off or Bus Off Recovery more than 1s (5) GW_0x188or0x1A8or0 X24C node lost 100 ms		tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U190E87	SRS message received by ACC timed out	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s	Can line fault Controller harness fault, connector loose (3) BDC fault (4) Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear

		The ignition switch is on No Bus off or Bus Off Recovery more than 1s (5) SRs node missing 2500 ms		(3) Check the harness and connector, confirm whether the controller connector is in good contact, and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (5) Check the functional status of the associated controller
U190D87	SAS message received by ACC timed out	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s (5) GW_0x 180 Missing 100 ms	Can line fault Controller harness fault, connector loose BDC fault Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U190487	The IP message received by ACC times out.	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s IP node lost 1000 ms	Can line fault Controller harness fault, connector loose BDC fault Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the

				controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U190787	IMS message received by ACC timed out	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on	Can line fault Controller harness fault, connector loose BDC fault Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code and confirm whether the fault is eliminated.

		No Bus off or Bus Off Recovery more than 1s MS node missing 1000 ms		(3) Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. (4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (5) Check the functional status of the associated controller
U190887	HU message received by ACC times out	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Hu node lost 1000 ms	Can line fault Controller harness fault, connector loose BDC fault Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U190C87	ACC receives GW_MFS message timeout	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s MFS node missing 1000	Can line fault Controller harness fault, connector loose BDC fault Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the

		ms		controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U190687	ESP message received by ACC timed out	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on	Can line fault Controller harness fault, connector loose BDC fault Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code and confirm whether the fault is eliminated.

		No Bus off or Bus Off Recovery more than 1s ESP node lost 100 ms		(3) Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. (4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (5) Check the functional status of the associated controller
U190987	EPS message received by ACC timed out	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s EPS node lost 100 ms	Can line fault Controller harness fault, connector loose BDC fault Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U190587	EPB message received by ACC times out	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s EPB node lost 100 ms	Can line fault Controller harness fault, connector loose BDC fault Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the

				controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U190087	EMS message received by ACC timed out	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on	Can line fault Controller harness fault, connector loose BDC fault Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code and confirm whether the fault is eliminated.

		No Bus off or Bus Off Recovery more than 1s EMS node lost 1000 ms		(3) Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. (4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (5) Check the functional status of the associated controller
U190A87	BCM message received by ACC timed out	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s BCM node lost 1000 ms	Can line fault Controller harness fault, connector loose BDC fault Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U190B87	LCDAR message timeout	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on	Can line fault Controller harness fault, connector loose (3) BDC fault (15) Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear

		No Bus off or Bus Off Recovery more than 1s LCDAR node missing 1000ms		(3) Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U191087	ACC message timeout diagnosis	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on	Can line fault Controller harness fault, connector loose (3) BDC fault (15) Controller fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code and confirm whether the fault is eliminated.

		No Bus off or Bus Off Recovery more than 1s ACC private CAN communication lost 250ms		(3) Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. (4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is less than 40 or more than 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (5) Check the functional status of the associated controller
U192082	EMS RollingCounter Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s EMS message RollingCounter>=5 times unchanged	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U192182	ESP RollingCounter error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis.

		(3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Unchanged ESP message RollingCounter>=5 times		Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U192282	SAS RollingCounter Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code and confirm whether the fault is eliminated. (3) Check wiring harness and connectors, Confirm whether the controller connector is connected

		(4) No Bus off or Bus Off Recovery more than 1s (5) RollingCounter of SASmessage unchanged >=5 times		Good contact, whether the terminal is retracted, whether the harness is damaged or broken. (4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (5) Check the functional status of the associated controller
U192382	TCU RollingCounter Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s TCU message RollingCounter unchanged >=5 Secondary	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U192482	SRS RollingCounter Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear

		No Bus off or Bus Off Recovery more than 1s SRS message RollingCounter unchanged >=5 Secondary		(3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U192682	HU RollingCounter error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, and confirm whether the controller connector is connected.

		(5) The RollingCounter of Hu message is unchanged for >=5 times.		Good contact, whether the terminal is retracted, whether the harness is damaged or broken. (4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (5) Check the functional status of the associated controller
U192782	GW_MFS_RollingCounter Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s MFS message RollingCounter unchanged >=5 Secondary	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U192882	EPS RollingCounter Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear

		No Bus off or Bus Off Recovery more than 1s EPS message RollingCounter unchanged >=5 Secondary		(3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U192982	EPB RollingCounter Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, and confirm whether the controller connector is connected.

		(5) RollingCounter of EPB message remains unchanged >=5 times		Good contact, whether the terminal is retracted, whether the harness is damaged or broken. (4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (5) Check the functional status of the associated controller
U194083	EMS CRCCheck Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s CRCC Check EMS message Is it correct >=5 times	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U194183	ESP CRCCheck Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear

		No Bus off or Bus Off Recovery more than 1s CRCC Check ESP message Is it correct >=5 times		(3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U194283	SAS CRCCheck Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, and confirm whether the controller connector is connected.

		(5) CRCC Check the sas message Is it correct >=5 times		Good contact, whether the terminal is retracted, whether the harness is damaged or broken. (4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (5) Check the functional status of the associated controller
U194383	TCU CRCCheck Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s CRCC Check TCU message Is it correct >=5 times	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U194583	HU CRCCheck Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear

		No Bus off or Bus Off Recovery more than 1s CRCC Check HU message is No correct >=5 times		(3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U194683	GW_MFS_CRCCheck Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, and confirm whether the controller connector is connected.

		(5) CRCC Check MFS message Is it correct >=5 times		Good contact, whether the terminal is retracted, whether the harness is damaged or broken. (4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (5) Check the functional status of the associated controller
U194783	EPS CRCCheck Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s CRCC Check EPS message Is it correct >=5 times	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
U194883	EPB CRCCheck Error	Can bus supply voltage is 8.5V-18.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear

		No Bus off or Bus Off Recovery more than 1s CRCC check EPB message Is it correct >=5 times		(3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
B213581	SRS issued main driving seat belt buckle status is invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, and confirm whether the controller connector is connected.

		(5) Signal SRS_DriverBuckleSwitchS tatus == 0x2 or ox3, 1500msec for three consecutive cycles.		Good contact, whether the terminal is retracted, whether the harness is damaged or broken. (4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (5) Check the functional status of the associated controller
B210754	SAS calibration fault diagnosis	Signal SAS_Calibrated == 0x1. 14 consecutive cycles(140 ms)	SAS fault	(1) Ignition switch ON, universal Table Check Whether The Battery Voltage Is 8.5V-16.5V (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is connected The contact is good, and the terminal has no pin back. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
B210881	SAS fault	SAS_SASFailure=0x1 Collection To 14 cycles(140msecs)	SAS fault	(1) Ignition switch ON, universal Table Check Whether The Battery Voltage Is 8.5V-16.5V (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is

				connected The contact is good, and the terminal has no pin back. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
B212881	SAS angular velocity signal error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, and confirm whether the controller connector is connected.

		(5) Received signal SAS_SteeringAngleSpeed= 0xFF, 140msecs		Good contact, whether the terminal is retracted, whether the harness is damaged or broken. (4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (5) Check the functional status of the associated controller
B210381	EMS torque signal error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal EMS_TorqFailure == 1, 14cycles (140msec)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
B212C81	EMS torque signal invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal EMS_MaxIndicatedTo	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, confirm whether the controller connector is in good contact, and whether the

		rq == 0xff for fourteen consecutive cycles. Or EMS_MinIndicatedTorq == 0xff for fourteen weeks Period. Or EMS_TorqueConstant == 0xff for fourteen weeks Period. Or EMS_IndicatedDriverReqT Orq == 0xffffff, continuous Cycles. Or EMS_FrictionalTorq == 0xffffff for fourteen weeks Period. Or EMS_IndicatedRealEngTor Q=0xffff for fourteen consecutive cycles		terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state

B212081	TCSVDC signal fault diagnosis	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s ESP_TCSFailStatus letter The number is out of range. (ESP_TCSFailStatus == 0x1) for 14 consecutive cycles	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state
B213481	ABS fault diagnosis sent by ESP	Can bus supply voltage is 8.5V-16.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal ESP_ABSFailStatus=0 x1 Error signal received in 140msec	ESP fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, confirm whether the controller connector is in good contact, and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (5) Check power of associated controller Energy state

B212B81	Fault Diagnosis of Invalid Shift Process Signal from TCU	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal TCU_ShiftinProgressValid == 1 for fourteen consecutive cycles (140msec)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, confirm whether the controller connector is in good contact, and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (6) Check power of associated controller Energy state

B213A81	Invalid diagnosis of ACC real accelerator pedal position signal sent by EMS	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Setting EMS_RealAccPedal =0xFF 14 cycles received 140msec time	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, confirm whether the controller connector is in good contact, and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (7) Check power of associated controller Energy state
B210181	Brake pedal status signal error diagnosis sent by EMS	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s (5) EMS_BrakePedalStatus = 0x3= Error or 0x2= Reserved 14 cycles(140msec)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (8) Check power of associated controller Energy state

B210081	Engine speed signal error diagnosis sent by EMS	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal EMS_EngineSpeedError != 0x0 14-Continuous cycle(140msec)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, confirm whether the controller connector is in good contact, and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (9) Check power of associated controller Energy state

B210277	Fault diagnosis of ACC accelerator pedal signal sent by EMS	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s (5) EMS_AccpedelError=0x 1 14 cycles received 140msec error	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (10) Check power of associated controller Energy state
B210681	EPB status signal fault diagnosis sent by EPB	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s (5) EPB_Status == Ox3 or Signal EPB_FailStatus!=0 14 consecutive cycles(140msec)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (11) Check power of associated controller

				Energy state
B210581	Invalid diagnosis of switch position status signal sent by EPB	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s EPB_SwitchPositionVali D =1. 14 consecutive cycles(140 ms)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (12) Check power of associated controller Energy state

B212D81	Invalid diagnosis of wheel speed direction signal sent by ESP	(1) Can bus supply voltage is 8.5V-16.5V (2) Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s (5) (Signal wheel _Speed_RR_Direction == 0x3 or Wheel speed _RL_ direction == 0x3 or Wheel speed _FR_ direction == 0x3 or Wheel_Speed_FL_Directi o n == 0x3 for 7cycle (140 ms). ESP_VehicleSpeed is greater than 1kph	Signal input error Electromagnetic interference (3) Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (13) Check the functional status of the associated controller
B211581	Invalid diagnosis of wheel speed signal sent by ESP	(1) Can bus supply voltage is 8.5V-16.5V (2) Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s (5) Signal wheel _ speed _RR_Val Id_Data =1 or Wheel speed _RL_Valid_Data =1 Or Wheel speed _FR_Valid_Data =1 or. Wheel speed _FL_Valid_Data =10 Or Wheel _ speed _FR_Data=0x1FFF or Wheel _ speed _FL_Data=0x1FFFor. Wheel speed _RR_Data=0x1FFF or Wheel speed _RL_Data=0x1FFF, 7 cycles(140msec) ESP_VehicleSpeed is greater than 1kph	Signal input error Electromagnetic interference (3) Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (14) Check the functional status of the associated controller

B211981	MasCylBrakePressureValid fault from ESPs	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken

		(5) ESP_MasCylBrakePressureValid!0xFFF for zero or ESP_MasCylBrakePressure for seven consecutive cycles(140msec)		(4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (15) Check the functional status of the associated controller
B211881	VAF function downgrade from ESPs	Signal ESP_AWBavailable! =1 for seven consecutive cycles. Or ESP_ABAavailable! =1 for seven consecutive cycles. Or ESP_PrefillAvailable! =1 0 for seven consecutive cycles. Or ESP_AEBAvailable!=1 0 for 7 consecutive cycles. (70 ms)	ESP fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (16) Check power of associated controller Energy state
B211708	QDC pressure signal fault	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal ESP_QDCACC! =0 5 cycles(100msec)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus

				status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (17) Check power of associated controller Energy state
B211477	Deceleration control issued by ESP is not available. For	ESP_CDD_Available= 0x0 (not available), 7 cycles (140msec)	ESP fault	(1) Ignition switch ON, universal Table Check Whether The Battery Voltage Is 8.5V-16.5V (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is connected The contact is good, and the terminal has no pin back. Whether the harness is damaged or broken

				(4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (18) Check the functional status of the associated controller
B211281	Invalid longitudinal acceleration signal from ESP	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal ESP_LongAccel == 0x3fff, seven cycles (140msec)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (19) Check power of associated controller Energy state
B211381	Invalid lateral acceleration signal from ESP	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s ESP_LatAccel=0xFF,	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out.

		7 consecutive cycles (140msec)		Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (20) Check power of associated controller Energy state
B211081	Invalid yaw rate signal from ESP	(1) Can bus supply voltage is 8.5V-16.5V (2) Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s (5) ESP_YawRate=0x3FFF Or ESP_YawRateValid=0x1	Signal input error Electromagnetic interference (3) Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		7 consecutive cycles (140msec)		(4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (21) Check the functional status of the associated controller
B213E08	Front wiper status signal error from BDC	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s BCM_FrontWiperStatus =0x3. Five 500msec received Information	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (22) Check power of associated controller Energy state
B213381	Engine status signal sent by EMS is invalid	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal EMS_EngineStatus == 0x3 for fourteen consecutive cycles	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, confirm whether the controller connector is in good contact, and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether

		(140msec)		terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (23) Check power of associated controller Energy state
B212181	Engine status signal fault sent by TCU	(1) Can bus supply voltage is 8.5V-16.5V (2) Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s (5) Signal TCU_TransFailureStatus	Signal input error Electromagnetic interference (3) Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		== 0x2 or TCU_TransFailureStatus == 0x3 for fourteen consecutive cycles (140msec)		(4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (24) Check the functional status of the associated controller
B212A77	Gear position signal sent by TCU is invalid.	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal TCU_ShiftPostionValid= 0x One or TCU_GearShiftPosition equals a value other than 0/1/2/3/4/5/6/7, received in 140msec	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, confirm whether the controller connector is in good contact, and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is about 60 ohms; if obvious deviation is below 40 or above 80, check whether terminal resistance controller is Damage, replace controller and observe Is the fault eliminated (25) Check power of associated controller Energy state
B212281	Real gear signal sent by TCU is invalid.	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s TCU_ActualGearValid= 0x1 or TCU_ActualGear=0xF 14cycles received(140msec)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is 60

				Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (26) Check power of associated controller Energy state
B212408	QEACC signal fault from EMS	(1) Can bus supply voltage is 8.5V-16.5V (2) Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s (5) When signal EMS_QECACC! "=0, 3 Set at 60 ms	Signal input error Electromagnetic interference (3) Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

				(4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (27) Check the functional status of the associated controller
B213881	Driver door status signal from BDC is invalid.	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal BCM_DriverDoorStatus ==0x2 or 0x3 for five consecutive cycles	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, confirm whether the controller connector is in good contact, and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (28) Check power of associated controller Energy state
B216981	RESPlus signal error from key	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal GW_MFS_RESPlus_switc H_signal==0x2 or 0x3 for five consecutive cycles(200msecs)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, confirm whether the controller connector is in good contact, and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is 60 Left and right, if obvious

				deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (29) Check power of associated controller Energy state
B217081	Diagnostic message signal error from key	(1) Can bus supply voltage is 8.5V-16.5V (2) Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s (5) Signal GW_MFS_DiagInfoSW_2	Signal input error Electromagnetic interference (3) Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken.

		8C !=0, five cycles (200msecs)		(4) Check CAN bus status: Check whether the terminal resistance is about 60 ohms. If the obvious deviation is below 40 or above 80, check whether the terminal resistance controller is damaged. Observe whether the fault is eliminated after replacing the controller. (30) Check the functional status of the associated controller
B216081	QDashACC signal fault	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal IP_QDashACCFail!=0x 0 5 cycles(250msecs)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check the harness and connector, confirm whether the controller connector is in good contact, and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (31) Check power of associated controller Energy state
B216181	IP_DIS signal fault from instrument	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Signal IP_DISFail ==0x1, five cycles (250msecs)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus

				status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (32) Check power of associated controller Energy state
B214381	Vehicle inactive signal from EPBi	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s ESP_VehicleStandstill The signal is out of range.	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60

		Except ESP_VehicleStandstill!! !!0x0 && ESP_VehicleStandstill ! ! Value other than 0x1) 5 cycles =100ms		If the obvious deviation is less than 40 or more than 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller. (33) Check the functional status of the associated controller
B214481	Invalid steering angle signal from SAS	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s SAS_SteeringAngleVali D=0x1 Number of five cycles received 50msecs or SAS_SteeringAngle=0x 7F 5 cycles received by FF (50msecs)	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is about 60 ohms. If obvious deviation is below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (34) Check power of associated controller Energy state
B214681	Camera vision error	VFC_SensorState_VisionF ault >7 || ((VFC_SensorState_Vision Fault <=7 && (VFC_SensorState_VisionF ault == 0x4 || VFC_SensorState_VisionF ault == 0x5 || VFC_SensorState_VisionF Ault 0x6 is three cycles	LDW fault	(1) Ignition switch ON, universal Table Check Whether The Battery Voltage Is 8.5V-16.5V (2) Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is

				Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (35) Check power of associated controller Energy state
U196808	Camera status check error	No change to RollingCounter or CRCCheck incorrect VFC_SensorState message Cycle >=3 times	LDW fault, E2E error	(1) Ignition switch ON, universal Table Check Whether The Battery Voltage Is 8.5V-16.5V (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is connected The contact is good, and the terminal has no pin back. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60

				If the obvious deviation is less than 40 or more than 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller. (36) Check the functional status of the associated controller
U196487	Camera communication timeout	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s ACC and VFC are lost. Letter, timeout detected.Camera Issued VFC_SensorState Message missing for 4 consecutive cycles	LDW fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (37) Check power of associated controller Energy state
U196908	Camera TSR, ASL check error Wrong	No change to RollingCounter or CRCCheck incorrect Week of VFC_TSR_ASL message Period >=3 times.	(1) Signal input error (2) Electromagnetic interference (3) Controller harness fault (4) Node fault	(1) Ignition switch ON, universal Table Check Whether The Battery Voltage Is 8.5V-16.5V (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is connected The contact is good, and the terminal has no pin back. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60

				Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (38) Check power of associated controller Energy state
U196587	Camera TSR, ASL timeout	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s VFC_TSR_ASL from camera Camera information for 4 consecutive cycles Lost	LDW fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60

				If the obvious deviation is less than 40 or more than 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller. (39) Check the functional status of the associated controller
U196987	Camera lateral control signal timeout	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s VFC_ Transverse from camera 5 consecutive cycles to control message Missing	LDW fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (40) Check power of associated controller Energy state
U196C08	Camera lateral control signal calibration error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s VFC_Lateral control information CRC error or 5 cycles ALC unchanged	Signal input error Electromagnetic interference Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60

				Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (41) Check power of associated controller Energy state
U1967008	Camera target signal timeout	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s VFC_ObjectInfo message CRC error or 3 cycles ALC unchanged	LDW fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60

				If the obvious deviation is less than 40 or more than 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller. (42) Check the functional status of the associated controller
U1967108	Camera lane signal timeout	Can bus supply voltage is 8.5V-18.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s VFC_LineInfo message Cycle CRC error or ALC Unchanged	LDW fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether the terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (43) Check power of associated controller Energy state
U1967068	Camera target counter lock error	Can bus supply voltage is 8.5V-16.5V Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s Settings for VFC_ObjectInfo message, when When the difference between the current blockcounter and the previous blockcounter value is greater than 3	LDW fault	(1) Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. (2) Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is about 60ohm, if obvious deviation is

				Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (44) Check power of associated controller Energy state
U1967168	Camera Lane Line Counter Lock Error	(1) Can bus supply voltage is 8.5V-16.5V (2) Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s (5) Settings for VFC_LineInfo message, when Current blockcounter and Front Between one blockcounter value When the difference is greater than 3	Signal input error Electromagnetic interference (3) Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether terminal resistance is 60

				If the obvious deviation is less than 40 or more than 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller. (45) Check the functional status of the associated controller
U192B82	IP RollingCounter error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s When a wrong crc override is received Set after 5 cycles. Message GW_2DE	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken (4) Check CAN bus status: Check whether terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (46) Check power of associated controller Energy state
U194A83	IP CRCCheck Error	Can bus supply voltage is 8.5V-16.5V Meet diagnostic requirements, i.e. 3s after low-voltage power-on (3) The ignition switch is on No Bus off or Bus Off Recovery more than 1s When a wrong crc override is received Set after 5 cycles.	(1) Received message overload (2) Transmission line is subject to electromagnetic interference (3) CAN bus arbitration error	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on/off the vehicle again, and make a diagnosis. Read the fault code of the tester and confirm the fault. Does the obstacle clear (3) Check wiring harness and connectors, Confirm whether the controller connector is in good contact and whether the terminal is pin-out. Whether the harness is damaged or broken

		Message GW_2DE		(4) Check CAN bus status: Check whether terminal resistance is 60 Left and right, if obvious deviation is Below 40 or above 80, then Check whether terminal resistance controller Damage, replace controller and observe Is the fault eliminated (47) Check power of associated controller Energy state
B211681	ESP Vehicle Speed Signal Invalid Diagnosis	(1) Can bus supply voltage is 8.5V-16.5V (2) Meets diagnostic requirements, i.e. low Press and power on for 3s (3) The ignition switch is on (4) No Bus off or Bus Off Recovery more than 1s (5) ESP_VehicleSpeedValid =0x1, when fourteen cycles are received 140msec signal, or ESP_VehicleSpeed=0x1 FF	Signal input error Electromagnetic interference (3) Controller harness fault (4) Node fault	Turn the ignition switch on, and use a multimeter to check whether the battery voltage is 8.5 V-16.5 V. Power on and off the vehicle again, read the fault code by the diagnostic scanner, and confirm whether the fault is eliminated. Inspect the harness and connector, confirm whether the controller connector is in good contact, whether the terminal is pin-out, and whether the harness is damaged or broken. Check CAN bus status: Check whether terminal resistance is 60

		F, 14 cycle times received 140msec signal		If the obvious deviation is less than 40 or more than 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller. (48) Check the functional status of the associated controller
B212F06	Production line mode activation	Production mode is ACTIVE	Production mode is not closed	Using a diagnostic scanner, diagnose 2E by Service shuts down production mode.
B213178	Radar never calibrated	Calibration not completed	Radar has not been calibrated	Power on/off the vehicle again SDA calibration with diagnostic scanner If the calibration still fails, read the data stream with a diagnostic scanner and check whether the angle and displacement are out of tolerance; Check whether the radar is blocked and whether the bracket is deformed or damaged. Replace radar and recalibrate
B213278	Abnormal radar calibration status	Calibration not completed	Calibration has been performed, but the calibration status is not normal.	Power on/off the vehicle again SDA calibration with diagnostic scanner If the calibration still fails, read the data stream with a diagnostic scanner and check whether the angle and displacement are out of tolerance; Check whether the radar is blocked and whether the bracket is deformed or damaged. Replace radar and recalibrate
B212578	Radar calibration error	Calibration error detected	Incorrect calibration	Power on/off the vehicle again SDA calibration with diagnostic scanner If the calibration still fails, read the data stream with a diagnostic scanner and check whether the angle and displacement are out of tolerance; Check whether the radar is blocked and whether the bracket is deformed or damaged. Replace radar and recalibrate
B212604	System internal error: Radar blinding detected	Blind spot detected	Radar is blocked	Power on/off the vehicle again Check whether the radar is covered by ice or other things.

B21a586	Radar DA_core abnormal	DA core does not meet specifications	Wheel speed, yaw rate signal, longitudinal acceleration, front wheel angle invalid. DAcore Unreliable tire size data detected DAcore detected unreliable yaw rate compensation data. If any value exceeds the allowable range Timer - Timer >1000 ms.	Power on/off the vehicle again Check whether the instrument fault is cleared (3) Check whether the vehicle is normal (4) Replace ECU

B212981	Radar VMC abnormal	The correlation signal detected by VMC is abnormal signal.	Received message overload Transmission line is affected by electromagnetic interference The variantcode read by the VMCs is empty or out of rangeThe corridor information received from the RPMs is unknown/incorrect	Power on/off the vehicle again Check whether the instrument fault is cleared (3) Check whether the vehicle is normal (4) Replace ECU
B213000	Radar internal fault	Driving test mode active	Bosch driving test mode is not disabled	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Replace ECU
B213100	Radar internal fault	MMIC plant data does not exist	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out

				fault memory If the DTC is still present/active.

				Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 12. Replace ECUs
B213200	Radar internal fault	MMIC (monolithic microwave integrated circuit) internal hardware fault	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 13. Replace ECUs
B213300	Radar internal fault	Application data integrity check failed	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active.

				Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 14. Replace ECUs
B213400	Radar ADC module self-test fault	Radar ADC module self-test fails	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power

				reset.

				Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 15. Replace ECUs
B213500	Radar internal power management fault	The ASIC watchdog is faulty, and the operating system 10 ms task is abnormal to give feedback to the watchdog.	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 16. Replace ECUs
B213600	Radar internal CPU fault	CPU external clock signal loss CPU core/peripheral bus communication fault	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active.

				Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 17. Replace ECUs
B213700	Radar MMIC overheating fault	MMIC temperature exceeds maximum overheating error(130 ℃)	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 18. Replace ECUs
B213800	Radar MMIC overheating fault	MMIC temperature exceeds operating value, overheating error(125 ℃)	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active.

				Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 19. Replace ECUs
B213900	Radar MMIC overvoltage fault	MMIC (monolithic microwave integrated circuit) overvoltage fault (3.465 V)	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power

				reset.

				Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 20. Replace ECUs
B214000	Radar MMIC undervoltage fault	MMIC undervoltage fault(3.135 V)	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 21. Replace ECUs
B214100	Radar internal module fault	Radar dual channel amplitude deviation exceeds threshold.	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active.

				Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 22. Replace ECUs
B214200	Radar software running fault	Software task running time exceeds threshold(10 ms/20 ms) The Security Management Unit Monitor (SMU) is turned off.	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 23. Replace ECUs
B214300	Radar chip voltage too low fault	Undervoltage fault of power management chip (3.135V)	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active.

				Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 24. Replace ECUs
B214400	Radar chip voltage too high fault	Power management chip overvoltage fault (3.465V)	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power

				reset.

				Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 25. Replace ECUs
B214500	Radar modulation configuration fault	Radar modulation configuration failure(MMIC register configuration)	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 26. Replace ECUs
B214600	Radar software fault	Signal processing module (SPU) data consistency error	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active.

				Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 27. Replace ECUs
B214700	Temporary fault of radar software	Unauthorized operation detected in current software operating mode (E.g. tampering with special registers).	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active. Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 28. Replace ECUs
B214800	Radar internal temperature is too high	(1) The temperature of the SCM exceeds the reasonable measurement range of the sensor (low	Internal accident/fault detected	Workflow of standard maintenance action for internal ECU occurrence/fault. DTC is present/active.

		On -44℃ or above +145.9℃-> unqualified		

		(2) The temperature of the main board exceeds the reasonable measurement range of the sensor. ADC0, channel 7 exceeds plus 128 ° C or is below -41℃ ->.		Perform SW update and new variable coding/calibration (if required Yes). Via diagnostic tester ECU hard reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Switch off ignition and wait ECU is off (sleep mode). Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. Unplug the ECU itself or the corresponding power fuse, and perform ECU power reset. Start the engine and wait for 5 seconds. Erasing and reading out fault memory If the DTC is still present/active. 29. Replace ECUs

Fault symptom diagnosis

Check and confirm general equipment

Warning

The adaptive cruise control assembly must be re-professionally calibrated after removing/reinstalling the adaptive cruise control assembly or the front impact cross member.

Warning

After a serious collision accident, the vehicle body is deformed, and the adaptive cruise control cannot be installed in the original design position. The mechanical structure must be corrected to ensure that the control is in the original installation position, and then perform professional calibration.

Confirm the user problem.

Time, place, weather, and vehicle configuration of the fault;

Vehicle status, such as instrument display fault information, audible alarm, abnormal sound, etc.

Ambient and road conditions(For example, whether there are obvious obstacles and road signs in front of the vehicle and near the road.)

Confirm

Visually inspect for visible signs of mechanical or electrical damage and whether the installation position is in the original design state.

Visually inspect whether there is obvious impact deformation mark, whether the front of the controller is blocked by foreign objects, including surface ice, dust or mud, and whether the front bumper sinks.

Check whether the adaptive cruise control is loosely installed, whether the plastic mounting bracket buckle is broken, and whether the controller and bracket are damaged and deformed by hand.

If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step.

If the visual inspection is passed, read the version information and fault of the adaptive cruise control system through the diagnostic scanner and refer to the fault symptom table for repair.

Always clear the adaptive cruise control DTCs after completing the repair.

Warning

If the relevant systems such as EMS, EPBi, TCU and EPS are replaced or the software is updated for some reasons, correct operation must be performed according to the repair/maintenance methods of the corresponding system, the fault code of the adaptive cruise control system shall be cleared, and the actual vehicle shall confirm that the function of the adaptive cruise control system is normal.

Appearance check list

Mechanical part	Electrical part
Adaptive cruise control assembly, mounting bracket	Harness and connector
Front bumper and front impact cross beam	Fuse
Steering wheel cruise switch	Adaptive cruise control assembly

Fault symptom table

Symptoms	Fault classification	Possible causes	Measures
ACC icon in lower left corner of instrument turns yellow, and instrument prompts "Early warning auxiliary brake system fault" or "adaptive cruise system fault."	ACC detects low/high supply voltage	Voltage is greater than 16 V or less than 9V	1. Use a multimeter to measure the voltage between pin "1" and pin "8" of harness terminal connector when the vehicle is in ON gear; 2. Measure battery voltage and stability 3. Check whether the harness has virtual connection, resulting in partial voltage.
	1. ACC is not calibrated or calibration deviation is too large; 2. Offline calibration is never done; 3. Offline calibration is not completed.	1. ACC controller angle is out of tolerance; 2. Replace ACC controller	Refer to ACC after-sales calibration method for calibration, and pay attention to operate according to the prompt of diagnostic scanner.
	EMS system fault	1. EMS fault 2. EMS model configuration error	Troubleshoot EMS-related faults with diagnostic scanner, including accelerator pedal, brake pedal, ACC switch, torque response, etc., respectively solve them, power on/off again, and clear ACC fault code.
	EPBi system fault	1.Fault of EPBi itself 2. EPBi model configuration error 3.Unsuccessful calibration of EPBi related sensors (yaw rate, acceleration, etc.)	Troubleshoot EPBi-related faults with diagnostic scanner, including wheel speed sensor, steering wheel angle sensor, yaw rate sensor, EPBi additional function, master cylinder pressure loss Effect, brake overheating, EPBi failure, ABS failure, TCS failure, etc., respectively resolve and then re-power on/off to clear the fault code.
	TCU system fault	1. Fault of TCU itself	Troubleshoot TCU-related faults with diagnostic scanner, including gear signal failure and transmission limp fault, and then power on and power off again to clear ACC fault code.
	EPS system fault	1. EPS fault 2. EPS angle is not calibrated successfully.	Check EPS harness and connector, and replace EPS controller; Recalibrate Angle Center
	Body communication fault	1. ACC connector is loose. 2. Associated system connector is loose.	1. Check vehicle network and harness connection; 2. Check ACC fuse to ensure normal connection;

		3. Bus abnormality(Overload, etc.)	3. Read ACC fault code, determine which controller node is lost through fault code, and then check corresponding controller harness and communication problems;

Symptoms	Fault classification	Possible causes	Measures
	Gauge display unit indicates an error	1. ACC communication is abnormal.(Such as loose connector, etc.) 2. Instrument fault	1.Carry out AB-BA with vehicle with normal function Interchangeability test; 2. Replace the parts after locking the problem target.
	Can bus Busoff (bus off) fault	Bus error	Check vehicle network and harness connection to ensure normal connection.
	Radar hardware fault	Radar hardware fault	Replace radar hardware and recalibrate
	ACC radar field of view is too narrow	1. The front bumper falls down to block the radar emission wave; 2. ACC cover plate is not installed in place. 3. ACC controller surface is blocked by dirt or how.	1. Refer to the bumper maintenance manual to adjust the front bumper. 2. Reinstall ACC cover plate 3. Remove foreign matter in front/surface of radar sensor. 4. Restart the vehicle
	Production mode (Production Line Mode) is not off	Production line mode is turned on	Enter the adaptive cruise control system/special function via diagnostic scanner KT 700 to close the production line mode.
	Camera error	1. Lane departure controller fault 2. Lane departure controller and ACC connection error	1. Refer to lane departure control maintenance plan and troubleshoot problems; 2. Refer to the harness schematic diagram and check the wiring.
	There is no fault code, the diagnostic scanner cannot enter the ACC library module, and the fault code of the gateway displays ACC node is lost.	1. ACC controller is damaged. 2. ACC controller fuse is blown. 3. Poor contact of ACC connector 4. ACC harness connection error	1.Replace AB-BA controller Test 2. Refer to harness schematic diagram and check whether ACC controller fuse is blown. If so, replace it. 3. Reseat ACC connector 4. Refer to harness schematic diagram and check ACC. Harness connection.
ACC icon in lower left corner of instrument turns yellow, and instrument prompts "Radar blocked."	Radar blinding	1. The front bumper falls down to block the radar emission wave; 2. ACC cover plate is not installed in place. 3. ACC controller surface is blocked by dirt or how.	1. Refer to the bumper maintenance manual to adjust the front bumper. 2. Reinstall ACC cover plate 3. Remove foreign matter in front/surface of radar sensor. 4. Restart the vehicle
Turn on ACC, increase the target speed, and the vehicle does not accelerate automatically or slowly.	No fault code	1. ACC module does not match the model. 2. Engine ECU does not respond to ACC torque or response abnormality: Vehicle model configuration error, software mismatch	1. Check whether the hardware number of ACC matches the vehicle; if not, replace ACC controller; 2. Refer to engine ECU maintenance method to overhaul engine ECU.
ACC indicator lamp on instrument is normal, and AEB fault lamp is on.	EPBi does not support AEB function	ACC controller is disturbed	1. Recalibrate radar 2. Power on/off again and clear the fault code;
		The wheel speed sensor is faulty and the assembly is not in place.	Refer to EPBi maintenance method and reinstall or replace wheel speed sensor.

		Master cylinder pressure signal invalid(Read ACCDTC as 211981)	1.Inspect the master cylinder signal, read the EPBi fault code, and repair according to the EPBi fault handling method;

Symptoms	Fault classification	Possible causes	Measures
			2. Power on and off again; 3. Clear ACC fault code
		EPBi function is degraded (read ACCDTC is 211881), and AEB deceleration request is not responded.	1. Check the vehicle voltage and replace the battery if it is abnormal; 2.Read EPBi fault code according to EPBi Troubleshooting methods for maintenance; 3. Power on and off again; 4. Clear ACC fault code
Press ACC button, ACC does not respond	No fault code	1. Steering wheel key fault; 2. The rotary connection sensor is damaged or in poor contact. 3. Harness wiring error 4. Engine ECU does not respond to ACC torque.	1. Refer to the disassembly and assembly of steering wheel, and replace with a new steering wheel; Steering wheel 2. Refer to engine ECU maintenance method to overhaul engine ECU.
		1. ACC controller power supply is abnormal. 2. ACC controller is damaged.	1. Check whether ACC controller fuse is loose or damaged; 2.Check whether the cruise and front impact auxiliary interface keys on inCall can be set; 3. The vehicle is in ON gear. Use a multimeter to read whether the voltage between radar connector power supply and ground is normal; 4. If the above two items are normal, replace ACC controller;
		Powertrain harness problem	Check whether the engine harness and steering wheel cruise button harness are short-circuited, and whether the voltage is normal;
		Damaged steering wheel harness	Power on the vehicle, press the steering wheel button, and measure the harness voltage and resistance of the steering wheel button on the EMS connector;
		EMS and BDC software mismatch	Update EMS software to support ACC function, update BDC software
Turn on ACC, and after a certain speed, ACC icon in the lower left corner turns yellow.	Wheel speed and pulse signal check mismatch	1. ACC module does not match the model. 2. Wheel speed sensor does not match the model.	1. Check whether the hardware number of ACC matches the vehicle; if not, replace ACC controller; 2. Check whether the wheel speed sensor matches the vehicle; if not, replace the wheel speed sensor;
ACC fault lamp on instrument is on and AEB indicator lamp is normal.		EMS does not respond to ACC torque request: Vehicle model configuration error, software mismatch	1. Check EMS software and model configuration; 2. Read EMS fault code according to EMS Troubleshooting methods for maintenance;

			3. Power on and off again; 4. Clear ACC fault code
		Abnormal electronic handbrake signal(Read 210581 or 210681)	1.Read EPBi fault code according to EPBi Troubleshooting methods for maintenance; 2. Power on and off again; 3. Clear ACC fault code

Symptoms	Fault classification	Possible causes	Measures
		Brake disc temperature too high	Inquire about vehicle usage when the fault occurs 1. If the road condition is long downhill, wait for the vehicle to stand for a period of time, power on and off again, and check whether the fault disappears; 2. If not for a long time, brake worker If yes, check whether there is refitting and rectification affecting the heat dissipation of brake disc.
		The EPBi function is degraded and does not respond to the deceleration request.(Read ACCDTC is 211477)	1.Read EPBi fault code according to EPBi Troubleshooting methods for maintenance; 2. Power on and off again; 3. Clear ACC fault code;
		Correlation system accepts ACC signal error	1.Check and update the status of EMSs, EPBi, EPSs, BDCs and instrument software; 2. Power on and off again; 3. Clear ACC fault code;

Removal and installation

Adaptive cruise control assembly

Removal

1. Dismantle cover plate of adaptive cruise control

Insert the skid plate into the upper and lower edges of the cover plate, loosen the inverted buckle, and remove the cover plate; Four mounting buckles of cover plate are shown in the figure below.

2. Take down the adaptive cruise control along the direction of arrow shown in the figure;

3. Disconnect the adaptive cruise controller harness connector, and remove the adaptive cruise controller;

Installation

Push the adaptive cruise controller from the right side of the bracket into the plastic bracket of the adaptive cruise controller and connect it until you hear a click. The subsequent installation sequence is the reverse of the corresponding removal sequence.

Spare parts atlas

F280701

Onboard network system specifications

Name	Specifications
Power CAN bus	Baud rate 500kbps Working voltage range 6.5 V-18 V
Chassis CAN bus	Baud rate 500kbpskbps Working voltage range 6.5 V-18 V
Body CAN bus	Baud rate 500kbpskbps Working voltage range 6.5 V-18 V
Entertainment CAN bus	Baud rate 500kbpskbps Working voltage range 6.5 V-18 V
Driving CANFD bus	Baud rate 2000kbps Working voltage range 6.5 V-18 V
Lin bus	Communication rate is 19.2kbps

Composition and position distribution

A resistance of 120 ohms at the power can bus terminals is arranged in the engine management unit and body domain controller. The nodes on the power can with diagnostic functions include engine management unit, transmission control unit, airbag controller, electronic integrated handbrake (EPBi), shift execution control module, electronic shift lever and smart body controller;

120 ohm resistance at chassis can bus terminals Both are arranged in intelligent body controllers (BDCs). Nodes with diagnostic function on chassis power can include electronic power steering
(EPS) and smart body controller interior (BDC);

The resistors of 120 ohms at the body can bus terminals are arranged in the intelligent body controller (BDC). The nodes with diagnostic functions on the body can include the intelligent body control module.
(BDC), Driving Seat Module (DSM), Tailgate Controller (PTS), Reverse Radar (RRS), Ripple Anti-Pinch Controller (SLCM), RF&Bluetooth Module
(RFBT);

A resistance of 120 Ohms at the entertainment can bus terminals is arranged in the vehicle entertainment base terminal (THU) engine management unit and smart body controller.
On the vehicle entertainment basic terminal (THU) with diagnostic function node (Note: Integrated TBOX, panoramic image controller AVM), instrument system (IP), reversing radar controller
(RRS), Wireless Charging Module (WLCM), Intelligent Body Controller (BDC);

Drive the 120 ohm resistor on the CANFD bus terminal. Both resistors are arranged in the intelligent body controller (BDC). Drive the diagnostic node lane assist system on the CANFD.
(LAs), Adaptive Cruise Control (ACC), Left Parallel Auxiliary Module (LCDAL), Right Parallel Auxiliary Module (LCDAR), Intelligent Body Controller (BDC)

System functional principle introduction

Can is the abbreviation of Controller Area Network, full name is controller local area network bus, that is, control devices are connected to each other for data exchange.

120 ohm resistance of power can bus terminal is arranged in engine management unit and gateway; Body CAN bus 120 ohm terminal resistor is arranged in gateway and body control module; Entertainment can bus 120 ohm terminal resistor is arranged in gateway and vehicle entertainment terminal module; The safe can bus 120 ohm termination resistors are arranged in the gateway and parking controller module.

Nodes with diagnostic function on power CAN include engine management unit (EMS), transmission control unit (TCU), airbag controller (SRS), angle sensor
(SAs), Electronic Integrated Handbrake (EPBi), Electronic Power Steering (EPS), Adaptive Cruise Control (ACC), Gateway System (GW).

The nodes with diagnostic functions on the body can include electronic steering lock (ESCL), light control module (LCM), body control module (BCM), air conditioning system (AC), instrument system (IP), panoramic image controller (AVM), reversing radar (RRS),

gateway system (GW).

The entertainment can has diagnostic function nodes such as vehicle entertainment basic terminal (HU), vehicle communication controller (TBOX) and gateway system (GW).

Diagnostic node Lane Assist System (LAS), Autopark Controller (APA), Parallel Assist Module (LCDA), Gateway System (GW)

diagnostic ports on the safety CAN are defined as follows:

Pin hole	description
	ground
	ground
	power

Common inspection methods for structural principle of parts DTC Diagnostics Symptoms Diagnosis

Fault symptom table

Can bus off 1.Check connector connection 2.Check harness;

If the fault occurs but no DTCs are stored in the control module and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Diagnostic scanner cannot communicate with EMS	Diagnostic scanner Circuit EMS	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with TCU	Diagnostic scanner Circuit TCU	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with ESP	Diagnostic scanner Circuit ESP	Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with SRS	Diagnostic scanner Circuit SRS	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with SAS	Diagnostic scanner Circuit SAS	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with EPB	Diagnostic scanner Circuit EPB	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with EPS.	Diagnostic scanner Circuit EPS	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with LAS	Diagnostic scanner Circuit LAS	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with ACC	Diagnostic scanner Circuit ACC	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process

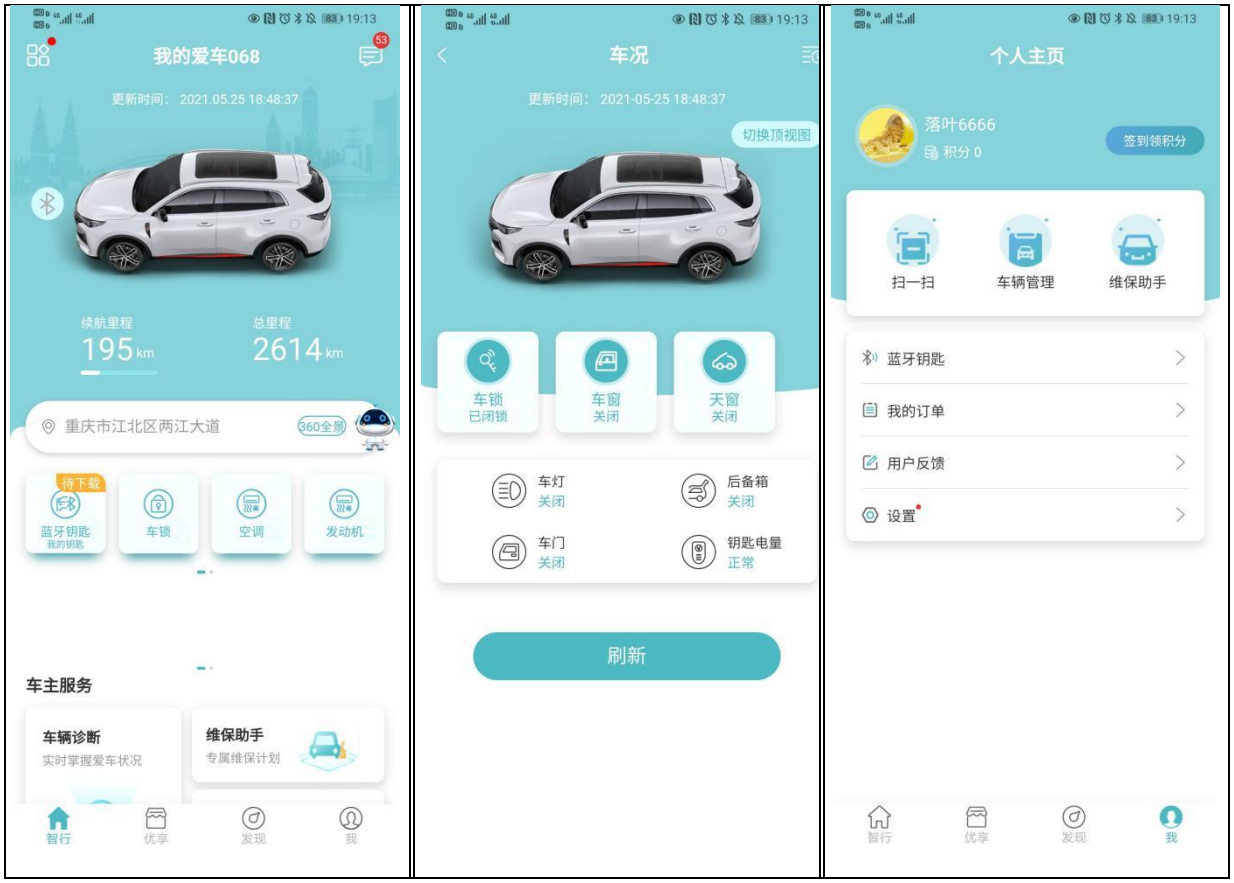
Sympto ms	Possible causes	Measure s
Diagnostic scanner cannot communicate with APA	Diagnostic scanner Circuit APA	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with LCDA	Diagnostic scanner Circuit LCDA	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with IP	Diagnostic scanner Circuit IP	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with BCM	Diagnostic scanner Circuit BCM	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with PEPS	Diagnostic scanner Circuit PEPS	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with ESCL	Diagnostic scanner Circuit ESCL	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with AC	Diagnostic scanner Circuit AC	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with HU	Diagnostic scanner Circuit HU	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with GW	Diagnostic scanner Circuit GW	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with LCM	Diagnostic scanner Circuit LCM	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with DVR	Diagnostic scanner Circuit DVR	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with RRS	Diagnostic scanner Circuit RRS	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with TBOX	Diagnostic scanner Circuit TBOX	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process
Diagnostic scanner cannot communicate with AVM	Diagnostic scanner Circuit AVM	Fault diagnosis process is similar to ESP. Reference: Diagnostic scanner cannot communicate with ESP for diagnosis process

Removal and installation spare parts atlas

Internet of Vehicles Service

Inspection of part structure principle

inCall App



About this application

The inCall Remote Assistant App is a smart connected mobile phone application launched by Chang'an Automotive to provide smart travel services for Chang'an Automotive users. When using the app you can:

Locate the vehicle position and query the vehicle status in real time.

Remote control the vehicle: Such as unlocking, flashing lights and whistling to find the vehicle, turning on/off the air conditioner, etc.

View driving data and reports.

Vehicle monitoring via electronic fence.

Note: This application requires the user to register the real name system and open the Internet of Vehicles service of Chang'an when purchasing the vehicle. Some functions are only available for vehicles carrying THU equipment.

Common methods

Internet of Vehicles registration method

Please scan QR code, download "InCall" APPs, or search for "InCall" in various mobile phone application markets to download mobile phone applications and complete the installation, you have two methods to bind the car.

I. You can initialize the account information and bind the vehicle with the help of the service personnel at the authorized service network of Chang'an Automobile. After binding is completed, remote vehicle condition inquiry or remote control can be performed on the vehicle.

II. You can also choose to self-bind the vehicle according to the

prompts in the "InCall" application. Binding steps are as follows:

Log in to the "InCall" application.

Register account number.

Click [Add Vehicle].

Enter the frame number and engine number for vehicle approval.

Enter owner name, gender, ID number, select ID type, upload clear vehicle purchase invoice according to photo example, ID card front photo, ID card back photo, bareheaded photo.

Click [Submit] to wait for review by Chang'an and Unicom. The specific review completion time shall be subject to APP interface display or mobile phone short message notification.

Note 1: If you have registered other APPs of Changan, you can log in directly. If the password error is prompted, please retrieve or reset the password through the [Forgot Password] function in the APP login page. After approval, the vehicle is displayed in the vehicle management interface. If the certification fails, the interface will prompt the failure reason. Please resubmit the materials for review as required.

Note2: At present, the mobile phone application markets are Meizu, Huawei, Lenovo, VIVO, OPPO, Xiaomi and Apple Store.

Value-added service receiving method

Value-added service will be presented automatically after real name certification is passed. After the real name is successful, the Internet of Vehicles traffic communication package system will automatically present to the account within 1-2 hours, including basic service traffic and value-added service traffic. Basic services are remote vehicle control/query, online navigation, online voice, system upgrade and other functions, and other value-added services (specifically subject to system account arrival, which can be viewed in "incall APP Premium Vehicle Service My"). Basic services are not displayed on the user terminal interface.

Vehicle transfer Internet of Vehicles transfer registration Internet of Vehicles service cancellation

If you need to cancel your account during use or transfer of ownership, you

have two methods to unbind your car. I. You can choose to unbind your car

according to the prompts in the "InCall" application.

Unbinding steps are as follows:

Log in to the "InCall" application.

Click [Me] > [Vehicle Management] in turn.

Click the vehicle to be unbound, click [Vehicle Unbound] and click [OK] in the pop-up dialog box.

Enter picture verification code, SMS verification code, select unbinding reason, and click [OK] to complete unbinding.

Note 1: In case of unbinding failure, please send the screenshot of failure prompt page and frame number to the staff of

authorized after-sales service outlet of Chang'an Automobile to assist you in unbinding. II. You can unbind account

information with the help of service personnel at authorized service network of Chang'an Automobile.

Note2: Your car will not be able to continue using Internet of Vehicles service after successfully unbinding.

Fault symptom diagnosis

Internet of Vehicles cannot be activated

When the vehicle-mounted infotainment terminal assembly (THU) is delivered from the factory, the software is set to the transportation mode. Before the 4S store is sold, it will guide the customer to make real name registration (the user downloads the in Call remote assistant APP to complete the self-registration process). After successful registration, the THU will be activated automatically, that is, the Internet of Vehicles service is activated. If the THU is not activated, the customer's mobile phone login APP will be seen (Incall Remote Assistant) After prompting "Be sure to perform the activation operation when the vehicle is in the ignition state and click to activate," start the vehicle for 5~10 minutes and perform the "click to activate" operation on the APP to activate the 4G function. If the device is in transport, the following operations need to be attempted on the device

a) Power off the THU and connect it after one minute.

b) If the mobile phone APP still cannot display the vehicle status after the above operation, repeat the above operation, and check whether the signal of mobile phone is good at the same time. If not, drive the vehicle to the open area with good signal and repeat step a once.

c) If the above methods fail to be activated successfully, please determine the mobile network condition of the vehicle location, determine that there is no problem, and contact the designated personnel of car pin for assistance.

Unable to connect

Under normal circumstances, THU cannot be connected means that the function that needs to be connected through 4G cannot be used. This includes but is not limited to the following:

Vehicle WIFI cannot be used

Vehicle machine system cannot use online map, online music and other network connection functions

When using the mobile app for remote operation, the app prompts network error ……In case of non-THU hardware damage, if it is found that the network cannot be connected, the following steps can be taken for troubleshooting:

Check whether the THU fuse is normal. If the fuse is blown, please replace the fuse. When the fuse is normal, unplug the THU connector, and measure the pin of THU harness end with a multimeter.

4 (battery supply pin) and 1 (GND). If the voltage is lower than 6V, please troubleshoot the vehicle harness and battery faults. If none of the above is correct, follow up.

Check whether the binding between the THU frame number and the owner is realized through real name registration and certification, and the detailed information can be inquired through the Chang'an background. In case of non-real name authentication, THU cannot realize networking. Ask the owner to bring relevant certificates to the 4S store or contact Chang'an customer service, and conduct real-name authentication through customer service guidance.

: If the THU has been authenticated and registered with the real name, it still cannot be connected, try to power on the whole vehicle again after power-off or wait for the whole vehicle to wake up after sleeping, and re-connect the network. There is an occasional situation (environmental impact) in which the THU cannot be connected, but the probability of this situation is extremely low. Unable to connect to the network after multiple attempts, perform d actions.

: If there is no abnormality according to the above steps, you can dial Chang'an Customer Service to inquire about the THU package information (flow information), and move the vehicle to the region with good signal to try again. According to the above steps, it is found that there is still a problem, which can be considered as THU hardware damage. You can apply for after-sales replacement.

Abnormal value-added service

1. Value-added service is not available

Check whether the value-added service expires in "incall APP Premium Vehicle Service My." Please renew the purchase in "incall APP Premium Vehicle Service Recommendation" upon expiration; If it does not expire, check whether the vehicle hard wire connection is normal, turn on the vehicle-mounted wifi, connect the vehicle machine to the vehicle-mounted wifi, and try again. If it returns to normal, it indicates that the connection between HU and TBOX hard wire is poor; If not, perform step b;

Check online map and voice online query function, and feed back the problem to Chang'an technician for handling if normal; If abnormal, power off and restart;

Press and hold the vehicle start key for about 10 s to restart the vehicle. If not, upgrade the latest vehicle system; If the above scheme is effective, feed back the problem to Chang'an technical personnel for handling;

2. Value-added service is not presented.

Wait for 2 hours and check again. If the gift is still successful, feed back the problem to Chang'an technician for handling.

InCall App Common abnormality troubleshooting

APP account cannot be logged in, and "account abnormal" is prompted.

In this case, it is recommended that you contact the local dealer or call the customer service telephone number 951999 to provide the frame number of your car, ID number of registration binding Internet of Vehicles and abnormal login account number. The dealer or customer service personnel will find a special person to check and handle for you.

What happens when you call the Internet of Vehicles hotline on the vehicle to prompt that your mobile number is disabled?

Literal understanding is that the flow card of your vehicle is "stopped." Generally, the cause is that the vehicle may pass through the area of unstable signal (poor signal). The SIM card initiates the networking request with high frequency, and the communication operator has problems with the default card, which is limited to use. Processing method: Generally, the traffic card will recover automatically in the early morning of the next day. If the traffic card cannot recover automatically, it needs to provide the frame number for the operator to verify and process.

What if the registration Internet of Vehicles shows "THU device information missing"?

In this case, you only need to send the THU equipment (car machine) number and frame number of your car to the authorized service network of Chang'an Automobile to the after-sales mailbox of Chang'an Internet of Vehicles by email, which will be handled by specially-assigned person, and the processing result will be replied by email after handling.

APP starts the engine remotely, and the APP always prompts that the network is abnormal. Other functions of remote control are normal

Use a diagnostic scanner to read the THU DTC. If the DTC shows that the PEPS

node is lost, please check the PEPS maintenance manual to find the vehicle remotely.

The app always prompts that the network is abnormal. Other functions of remote

control are normal

Read the THU DTC with a diagnostic scanner. If the DTC shows that the BCM node is lost, please check the maintenance manual.

APP can not register with real name Internet of Vehicles What is the problem?

It mainly looks at the prompt with no real name, such as the prompt "You love the car VINs do not exist." In this case, it needs to check whether the configuration of your love car has the Internet of Vehicles function. If there is no real name registration and there is "Loss of equipment information," it needs to provide information manufacturer's technical personnel for information maintenance, "Photo is too large" needs to compress the photo within 500Kb, etc. Corresponding treatment measures should be taken according to the specific failure prompt.

Real name certification has passed, login App Discovery homepage prompt "Please be sure to perform activation operation when the vehicle is on ignition"

At this time, start the vehicle for ignition for 5~10 minutes, "click to activate" on the

APP, and THU can be activated. If the equipment is in transport, the following

operations need to be attempted on the equipment:

a) Power off the THU and connect it after one minute.

Vehicle start ignition approx. 5~10 minutes.Click "Activate" on the mobile phone or computer, refresh the mobile phone APP interface, check whether the vehicle can be connected and display the vehicle status.

If the mobile phone APP still cannot display the vehicle status after the above operation, repeat the above operation, and check whether the signal of mobile phone is good at the same time. If not, please drive the vehicle to the open area with good signal and repeat step a, b).

d) If the above methods fail to be activated successfully, please determine the network condition of the vehicle location, determine that there is no problem, and contact the designated personnel of car pin for assistance.

When incall APP remote control, prompt "5 days without ignition," how to deal with it?

If the vehicle is not used for five days, the network module will shut down and sleep, causing remote control failure. Generally, the vehicle can be re-ignited once, which can be activated automatically. If it cannot be activated or the vehicle is used every day, the network module may work abnormally. It is recommended that you use a 10 mm wrench to disconnect the battery negative electrode for 10 minutes and then connect it, so that the network module can be reset and restarted once after power-off. Generally, it can be solved.

Multimedia control system specifications

General specifications

Name	Working voltage	Rated current
On-board communication controller assembly	9~16V	600mA

Torque specification

Name	Nm
Onboard infotainment terminal assembly main unit end retaining bolt	6
Onboard infotainment terminal assembly screen end retaining screws	1
Front speaker retaining screws	1. 5
Rear speaker retaining screw	1. 5
Front Tweeter Attaching Screw	1. 5
Shark fin antenna retaining screw	7

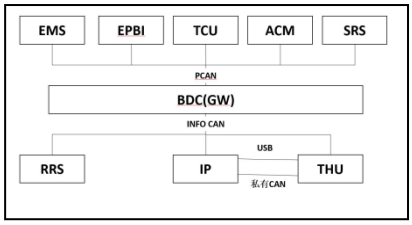
Composition and position distribution

The display screen assembly and vehicle-mounted infotainment terminal assembly are distributed in the middle of the instrument panel. The display screen is shown in Fig. 1, and the vehicle-mounted infotainment terminal assembly is shown in Fig. 2.

System functional principle introduction

Onboard infotainment terminal assembly(With navigation)

The vehicle is in ACC or ON position, and the onboard infotainment terminal assembly enters the standby state. Insert a USB flash drive, and the host can be controlled through the display screen or the touch button below the display screen. Read the data in the USB flash drive to the host of the vehicle-mounted infotainment terminal assembly, and finally output through the display screen and various speakers. The on-board infotainment terminal assembly (configuration with navigation) also features GPS navigation, which can receive 12 satellite signals. Generally, only 3-4 satellite signals need to be received to accurately calculate your exact position.



Speaker

The number of speakers is also different for different models:

1) 4 Speaker model: Two front speakers are arranged in the front door; 2 rear speakers are arranged on the rear door; The loudspeaker of this configuration model is driven by infotainment terminal assembly;

2) 6 Speaker model: 2 front speakers are arranged in the front door; 2 tweeters are arranged on the rear door; The other 2 tweeters are arranged on the left and right A-pillar; The loudspeakers of this configuration are driven by the infotainment terminal assembly.

Driver fatigue detection camera

The driver fatigue detection camera is connected with the vehicle infotainment assembly through the coaxial line, and the data collected by the camera is then used to determine whether the driver is in fatigue or inattention based on the face recognition detection technology. Once the system detects that the driver is fatigue or distracted, the driver will be reminded in the instrument or vehicle infotainment terminal through text, animation and TTS voice broadcast.

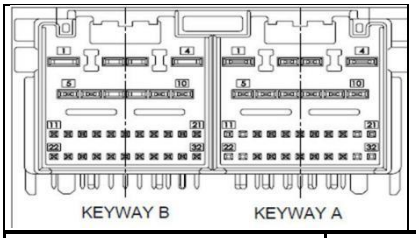
Interior HD camera

The high-definition camera in the vehicle and the infotainment assembly are connected through the coaxial line, the data collected through the camera, and then smoke detection, gesture recognition and photographing based on the algorithm.

Steering wheel volume control switch

The steering wheel has volume control button, voice button and telephone button, etc. When different control switches are pressed, the onboard infotainment terminal assembly will carry out corresponding function operation according to CAN signal. Interface definition

Main socket interface definition

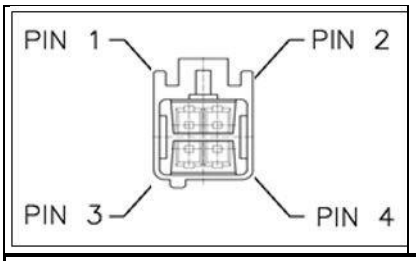


Pin	Function description	Signal type	Remarks
A1	Power supply GND	High level	
A2	FL+	Audio signal	Speaker
A3	FL-	Audio signal	
A4	B+	Low level	
A5	RL-	Audio signal	
A6	RL+	Audio signal	
A7	FR-	Audio signal	
A8	FR+	Audio signal	
A9	RR+	Audio signal	
A10	RR-	Audio signal	
A11	ACC	High level	Power supply
A12	/	/	
A13	Complete vehicle CAN_L	Communication signal	
A14	Complete vehicle CAN_H	Communication signal	
A15	Reverse triggering signal	High level	/
/	Private CAN_L	/	/
/	Private CAN_H	/	/
A18	Panoramic switch signal switching/blind area switching switch	Low level active	
A19	/	/	SD/AHD reversing camera, when the camera has only two wires of video signal and video ground signal, A21 is not connected.

A20	/	/	
A21	/	/	
A22	/	/	SD/HD AHD backup camera powered by terminal
A23	/	/	SD/AHD reversing camera is powered by terminal
A24	/	/	/
A25	/	/	/
A26	/	/	/
A27	/	/	
A28	/	/	
A29	Microphone 1 signal	Audio signal	1. Auxiliary microphone, close to the passenger; 2. Use this microphone channel for voice.
A30	Microphone 1 signal ground	Signal ground	
A31	Microphone 2 signal	Audio signal	1. Master MIC, close to the driver; 2. Bluetooth telephone function and voice use this microphone channel, and the terminal has noise reduction processing.
A32	Microphone 2 signal ground	Audio signal ground	
B1	AI IR lamp power supply	Power supply	
B2	CR-	Audio signal	Center speaker
B3	CR+	Audio signal	
B4	AI infrared lamp power supply ground	Low level	
B5	/	/	/
B6	/	/	/
B7	/	/	/
B8	/	/	/
B9	/	/	
B10	Emergency_Record_SW	/	
B11	/	/	
B12	/	/	
B13	/	/	
B14	CAN_FD_L	/	/
B15	CAN_FD_H	/	/
B16	/	/	
B17	/	/	
B18	/	/	/
B19	/	/	

B20	/	/	
B21	/	/	/
B22	/	/	/
B23	/	/	
B24	/	/	
B25	/	/	
B26	/	/	
B27	/	/	
B28	/	/	
B29	/	/	
B30	A2B_N	/	/
B31	A2B_P	/	
B32	A2B_SHIELD_GND	/	

USB interface definition



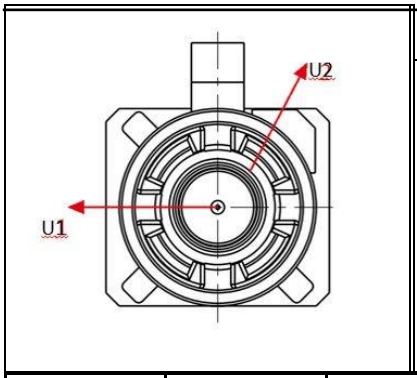
Pin	Pin function
1	USB_5V
2	GND
3	USB_DATA+
4	USB_DATA-
5	GND(Housing)

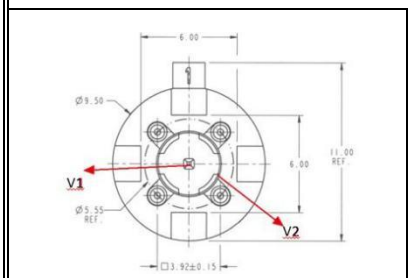
Built-in panoramic interface definition

Pin	Function abbreviation	Rated current (A)	I(A)	Peak duration (Ms)	Input/output	Function description	Signal type
T1	SPDIF IN 1	≤0.1	≤0.5	/	Input	Video signal, coaxial power supply +	Video signal
T2	SPDIF SHIELD_GND 1	≤0.1	≤0.5	/	Input	Video signal shielding ground	Low level active
T3	SPDIF IN 2	≤0.1	≤0.5	/	Input	Video signal, coaxial power supply +	Video signal

T4	SPDIF SHIELD_GND 2	≤0.1	≤0.5	/	Input	Video signal shielding ground	Low level active
T5	SPDIF IN 3	≤0.1	≤0.5	/	Input	Video signal, coaxial power supply +	Video signal
T6	SPDIF SHIELD_GND 3	≤0.1	≤0.5	/	Input	Video signal shielding ground	Low level active
T7	SPDIF IN 4	≤0.1	≤0.5	/	Input	Video signal, coaxial power supply +	Video signal
T8	SPDIF SHIELD_GND 4	≤0.1	≤0.5	/	Input	Video signal shielding ground	Low level active

Driver fatigue monitoring camera, in-vehicle HD camera interface definition





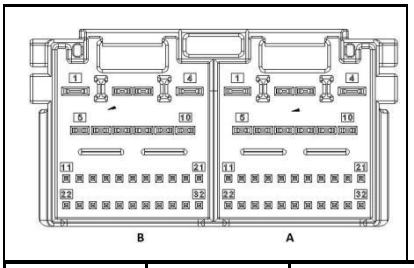
Pin	Function abbreviation	Rated current (A)	I(A)	Peak duration (Ms)	Input/output	Function description	Signal type
U1	CAM IN 5	≤0.1	≤0.5	/	Input	Video signal, coaxial power supply +	Video signal
U2	CAM SHIELD_GND 5	≤0.1	≤0.5	/	Input	Video signal shielding ground	Low level active
V1	CAM IN 6	≤0.1	≤0.5	/	Input	Video signal, coaxial power supply +	Video signal
V2	CAM SHIELD_GND 6	≤0.1	≤0.5	/	Input	Video signal shielding ground	Low level active

Inspection of part structure principle

Onboard infotainment terminal assembly

The vehicle is in ACC or ON position, and the onboard infotainment terminal assembly enters the standby state. Insert a USB flash drive, and the host can be controlled through the display screen or the touch button below the display screen. Read the data in the USB flash drive to the host of the vehicle-mounted infotainment terminal assembly, and finally output through the display screen and various speakers. The on-board infotainment terminal assembly (configuration with navigation) also features GPS navigation, which can receive 12 satellite signals. Generally, only 3-4 satellite signals need to be received to accurately calculate your exact position.

Main socket interface is defined as follows



Pin	Function abbreviation	Rated current	Current	Input/output	Function description	Signal type	Signal size or waveform diagram	Remarks
A1	GND	≤8.7	≤25	Input	Power supply GND	High level	9~18V	Battery ground
A2	FL+	≤5	≤10	Output	FL+	Audio signal	0~10Vpp	Front left door speaker + tweeter
A3	FL-	≤5	≤10	Output	FL-	Audio signal	0~10Vpp	
A4	B+	≤8.7	≤25	Input	B+	Low level	–0.1~0.1V	Battery power supply
A5	RL-	≤5	≤10	Output	RL-	Audio signal	0~10Vpp	Rear left door speaker
A6	RL+	≤5	≤10	Output	RL+	Audio signal	0~10Vpp	
A7	FR-	≤5	≤10	Output	FR-	Audio signal	0~10Vpp	Front right door speaker + tweeter
A8	FR+	≤5	≤10	Output	FR+	Audio signal	0~10Vpp	
A9	RR+	≤5	≤10	Output	RR+	Audio signal	0~10Vpp	RR RH door speaker
A10	RR-	≤5	≤10	Output	RR-	Audio signal	0~10Vpp	
A11	ACC	≤0.1	≤0.3	Input	ACC	High level	9~18V	ACC power supply
A12	/	/	/	/	/	/	/	Ignition power supply for integrated instrument
A13	CAN1_L	≤0.1	≤0.3	Input/output	Complete vehicle CAN_L	Communication signal	0~5V	Complete vehicle Info CAN
A14	CAN1_H	≤0.1	≤0.3	Input/output	Complete vehicle CAN_H	Communication signal	0~5V	
A16	CAN2_L	≤0.1	≤0.3	Input/output	Private CAN_L	Communication signal	0~5V	Private CAN
A17	CAN2_H	≤0.1	≤0.3	Input/output	Private CAN_H	Communication signal	0~5V	
A18	AVM_SW	≤0.1	≤0.3	/	Panoramic switch signal switching/blind area switching switch	Low level active	0V	
A31	MIC2_IN	≤0.1	≤0.3	Input	Microphone 2 signal	Audio signal	0.8~8V(Vpp)	1. Main MIC Close to the driver;
A32	MIC2_GND	≤0.1	≤0.3	Input	Microphone 2 signal ground	Audio signal ground	–0.1~0.1V	2. Bluetooth telephone function and voice use this microphone channel, and the terminal has

								noise reduction processing;
B1	IR_LED+	≤0.5	≤2A	Output	AI IR lamp power supply	Power supply	10V±0.5V	
B4	IR_LED_GND	≤0.5	≤2A	Output	AI infrared lamp power supply ground	Low level	–0.1~0.1V	

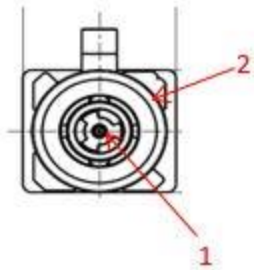
B10	Emergency_ R ecord_SW	≤0.1	≤0.3	Input	Emergenc y recording switch level signal	/	Low level	For built-in trip recorder emergency recording switch
B12	SWC_GND	≤0.1	≤0.3	Input	Wired ground	Low level	–0.1~0.1V	One-key photograph ing SWC2 connected to remote control AD2, one-key photograph ing button with this pin
B13	SWC2	≤0.1	≤0.3	Input	Wired control 2	Detection signal	0~3.3V	
B14	CAN_FD_L	≤0.1	≤0.3	Input/output	High speed can bus CAN_FD_L	High level/PWM /communic ation signal	0~5V	High speed can bus CAN_FD_L
B15	CAN_FD_H	≤0.1	≤0.3	Input/output	High speed can bus CAN_FD_H	Communicati on signal	0~5V	High speed can bus CAN_FD_H
U1	CAM IN 5	≤0.1	≤0.5	Input	Video signal, coaxial power supply +	Video signal	8±1V	Interior RGB camera, coaxial power supply 8V
U2	CAM SHIELD_G N D 5	≤0.1	≤0.5	Input	Video signal shielding ground	Low level active	–0.1~0.1V	
V1	CAM IN 6	≤0.1	≤0.5	Input	Video signal, coaxial power supply +	Video signal	8±1V	Night vision camera, coaxial power supply 8V
V2	CAM SHIELD_G N D 6	≤0.1	≤0.5	Input	Video signal shielding ground	Low level active	–0.1~0.1V	
L1	USB_5V	≤2.1	≤2.1	Output	USB power supply	High level	4.9~5.2V	User USB1
L2	GND	≤0.1	≤0.3	Output	USB power supply ground	Low level	–0.1~0.1V	
L3	USB_DATA+	≤0.1	≤0.3	Input/output	USB data signal	Data signal	0~5V	
L4	USB_DATA-	≤0.1	≤0.3	Input/output	USB data signal	Data signal	0~5V	
L5	GND(Housin g)	≤1	≤1.5	Output	USB shield ground wire	Low level	–0.1~0.1V	
M1	USB_5V	≤0.5	≤0.5	Output	USB power supply	High level	4.9~5.2V	Drive recorder USB
M2	GND	≤0.1	≤0.3	Output	USB power supply ground	Low level	–0.1~0.1V	
M3	USB_DATA+	≤0.1	≤0.3	Input/output	USB data signal	Data signal	0~5V	
M4	USB_DATA-	≤0.1	≤0.3	Input/output	USB data signal	Data signal	0~5V	

M5	GND(Housing)	≤1	≤1.5	Output	USB shield ground wire	Low level	–0.1~0.1V	
O3	USB_DATA+	≤0.1	≤0.3	Input/output	USB data signal	Data signal	0~5V	
O4	USB_DATA-	≤0.1	≤0.3	Input/output	USB data signal	Data signal	0~5V	

O5	GND(Housing)	≤1	≤1.5	Output	USB shield ground wire	Low level	–0.1~0.1V	
Q1	GPS+	≤0.3	≤0.5	Input	GPS signal, coaxial power supply +	RF signal/high level	3.3V	GPS antenna
Q2	GPS_GND	≤0.3	≤0.5	Input	GPS signal ground	RF signal ground	–0.1~0.1V	
T1	SPDIF IN 1	≤0.1	≤0.5	Input	Video signal, coaxial power supply +	Video signal	8±1V	Built-in AVMs coaxial HD/AHD video input/HD reverse/HD blind(1) (Front)
T2	SPDIF SHIELD_GND 1	≤0.1	≤0.5	Input	Video signal shielding ground	Low level active	–0.1~0.1V	
T3	SPDIF IN 2	≤0.1	≤0.5	Input	Video signal, coaxial power supply +	Video signal	8±1V	Built-in AVMs coaxial HD/AHD video input/HD reverse/HD blind(2) (Rear)
T4	SPDIF SHIELD_GND 2	≤0.1	≤0.5	Input	Video signal shielding ground	Low level active	–0.1~0.1V	
T5	SPDIF IN 3	≤0.1	≤0.5	Input	Video signal, coaxial power supply +	Video signal	8±1V	Built-in AVMs coaxial HD/AHD video input/HD reverse/HD blind(3) (Left)
T6	SPDIF SHIELD_GND 3	≤0.1	≤0.5	Input	Video signal shielding ground	Low level active	–0.1~0.1V	
T7	SPDIF IN 4	≤0.1	≤0.5	Input	Video signal, coaxial power supply +	Video signal	8±1V	Built-in AVMs coaxial HD/AHD video input/HD reverse/HD blind(4) (Right)
T8	SPDIF SHIELD_GND 4	≤0.1	≤0.5	Input	Video signal shielding ground	Low level active	–0.1~0.1V	

Shark fin antenna

Located on the roof near the rear, the interface for implementing the navigation function is defined as follows:



Pin	Pin abbreviation (Both Chinese and English Yes)	Function description (Pin power Can expand Clear, and must For Chinese Clear)	Rated current (A) 13.5 V	Peak current Imax 13.5 V	Ms 13.5 V	Input/output (Description pin Input and output of Relationship)	Pin type (Description pin Type)	Pin signal valid value

A1	GPS+	GPS signal, coaxial power supply +	≤0.3	≤0.5	/	Input	RF signal/high level	3.3V
A2	GPS_GND	GPS signal ground	≤0.3	≤0.5	/	Input	RF signal ground	–0.1~0.1V

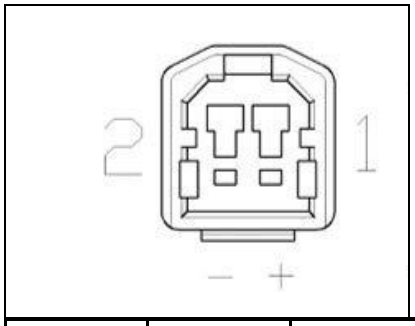
Feeder

Fault and troubleshooting method

Symptoms	Possible causes	Maintenance method
Navigation cannot be positioned	GPS feeder body section fault	Replace the test feeder. If the fault follows the feeder, replace the feeder.
	GPS feeder instrument panel section fault	Replace the test feeder. If the fault follows the feeder, replace the feeder.

Tweeter

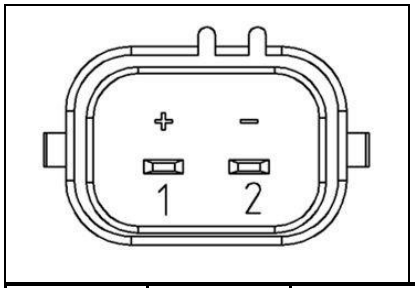
The functional interfaces arranged at the left and right A-pillar are defined as follows:



Pin	Function abbreviation	Rated current	Maximum current	Peak duration(Ms)	Input/output	Function description	Signal type	Signal size or waveform diagram
1	Positive pole	2.25A	3.2A	30ms	Input	Positive pole	AC signal	Sine wave
2	Negative pole	2.25A	3.2A	30ms	Output	Negative pole	AC signal	Sine wave

Woofer

There are 4 woofer speakers in total, 1 left and 1 right at the front door and 1 left and 1 right at the rear to realize sound transmission. Interfaces are defined as follows:



Pin	Function abbreviation	Rated current	Maximum current	Peak duration(Ms)	Input/output	Function description		Signal size or waveform diagram
1	Positive pole	2.5A	4A	30ms	Input	Positive pole	AC signal	Sine wave
2	Negative pole	2.5A	4A	30ms	Output	Negative pole	AC signal	Sine wave

DTC Diagnostic

Fault code table

DTC display code		DTC Meaning	Fault attribute	Fault recovery conditions	Possible fault causes	Maintenance advice
Display code	High and medium bytes					
B150016	9500	When the THU voltage is lower than the specified threshold, record the fault.	Network wake-up time ≥1s&& Voltage <8.5 V, time > 500 ms&& Non-Crank state lasts more than 500 ms	Network wake-up time ≥1s voltage ≥9V, time greater than 500 ms	Vehicle voltage too low	1. Ignite the vehicle to charge the battery, and check whether the voltage between pins A4 and A11 of the power supply harness is normal working voltage. In the 9-16 V range, replace the vehicle, and contact Chang'an technician to analyze the single fault. If not, perform the following steps. 2. Test whether the dark current of the complete vehicle exceeds the standard to judge whether it is the battery power loss caused by the quiescent current exceeding the standard; Continuously greater than 20 mA without falling is considered abnormal 3. If the dark current meets the requirements, check whether the generator is faulty, and contact the charging system responsible person for troubleshooting.
B150017	9500	When the THU voltage is higher than the specified threshold, record the fault.	1. Network wake-up time ≥1s&& 2.When the voltage is >16.5 V, Between 500 ms&& 3.The non-Crank state lasts for more than 500 ms	Network wake-up time ≥1s voltage ≤16 V, time > 500 ms	Vehicle voltage too high	1. Ignite the vehicle to charge the battery, and check whether the voltage between pins A4 and A11 of the power supply harness is normal working voltage. In the 9-16 V range, replace the vehicle, and contact Chang'an technician to analyze the single fault. If

						not, perform the following steps. 2. Check whether the alternator is faulty, and contact the charging system responsible person for troubleshooting.
U128088	D280	When the CAN network is disconnected, record the fault.	Network wake-up time ≥1s&& Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& After the node enters the bus-off state, the bus is closed for five times;	After entering the Bus-Off state for 50 ms, ECUs attempt to start sending messages. If the message is successfully sent and no longer enters the Bus-Off within 50 ms, the node completes the confirmation of Bus- Off reset, and the node resumes normal communication.	Faulty harness/connector connection Same network segment ECU Fault External interference	1. Plug fuse or controller connector one by one Parts, observe whether the fault is eliminated; if the fault is eliminated, locate the corresponding controller, replace the controller, and then contact Chang'an technician to troubleshoot the single controller problem. 2. If the failure of plugging and unplugging the controller is not eliminated,

						Check the controller connectors one by one for good contact and whether the terminals are pin-out. 3. Plug and unplug all controllers on the terminal resistor CAN line, test the terminal resistance, remove the controller and return to normal, then the controller is abnormal. Obstacle, replace controller Contact Chang'an technical personnel after troubleshooting controller problems
U128387	D283	Record the fault when the BCM module communication is lost.	1. Network wake-up time ≥1s&& 2.The non-Crank state lasts more than 500 ms&& 3. Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& 4.Not bus-off state or&&after bus-off is restored for 1s 5.Message BCM_28B Missing ≥1s;	Received BCM_28B Message	1. Harness or connector fault 2. GW or HU or BCM fault	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U128487	D284	Record the fault when the communication of PEPS module is lost.	Network wake-up time ≥1s&& Non-Crank state for more than 500 ms&& Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& Non-bus-off state or 1s after bus-off recovery&& Message PEPS_	Received PEPS_298 Message	Harness or connector fault GW or HU or PEPS fault	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Test terminal resistance Whether it is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is

			298 Missing ≥1s;			damaged, and observe whether the fault is eliminated after replacing the controller.
U128687	D286	Record the fault when the communication of AC module is lost.	Network wake-up time ≥1s&& Non-Crank state for more than 500 ms&& Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& Non-bus-off state or 1s after bus-off recovery&& Message AC_39B Missing ≥1s;	Received AC_39B Message	Harness or connector fault GW or HU or AC fault	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Test terminal resistance Whether it is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U128987	D289	Record fault when RRS module communication is lost	Network wake-up time ≥1s&& Non-Crank state for more than 500 ms&&	Received RRS_2E0 Message	Harness or connector fault GW or HU or RRS fault	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Test terminal resistance Is it about 60 ohms, if obvious

			Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& Non-bus-off state or 1s after bus-off recovery&& 5.Message RRS_2E0 Missing ≥1s			A difference of less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U128C87	D28C	Record fault when ACC module communication is lost	On gear ≥1s&& Non-Crank state for more than 500 ms&& Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& Non-bus-off state or 1s after bus-off recovery&& Message ACC_35E Missing ≥1s;	Received ACC_35E Message	Harness or connector fault GW or HU or ACC fault	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U128D87	D28D	When LAS module communication is lost, record the fault.	On gear ≥1s&& Non-Crank state for more than 500 ms&& Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& Non-bus-off state or 1s after bus-off recovery&& Message LAS_ 332 Missing ≥1s;	Received LAS_ 332 Message	Harness or connector fault GW or HU or LAS fault	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U128F87	D28F	Record fault when IP module communication is lost	Network wake-up time ≥1s&& Non-Crank state	Received IP_ 385 message	Harness or connector fault HU or IP fault	1. Check whether all controller connectors are in good contact

			for more than 500 ms&& Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& Non-bus-off state or 1s after bus-off recovery&& Message IP_ 385 missing ≥1s;			and whether the terminals are pin-out. 2. Test terminal resistance Whether it is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U129087	D290	When WLCM module communication is lost, record the fault.	On gear ≥1s&& Non-Crank state for more than 500 ms&& Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& After non-bus-off state or bus-off is restored for 1s;	Received WCLM_ 558 message	Harness or connector fault GW or HU or WLCM fault	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged and replace.

			5.Message WCLM_ 558 missing ≥1s;			The controller shall observe whether the fault is eliminated.
U129287	D292	When EMS module communication is lost, record the fault.	On gear ≥1s&& Non-Crank state for more than 500 ms&& Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& Non-bus-off state or 1s after bus-off recovery&& Message EMS_ID 355 missing ≥1s;	Received EMS_ 355 Message	Harness or connector fault GW or HU or EMS fault	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U129387	D293	When TCU module communication is lost, record the fault.	On gear ≥1s&& Non-Crank state for more than 500 ms&& Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& Non-bus-off state or 1s after bus-off recovery&& Message TCU_ID 338 missing ≥1s;	Received TCU_ID 338 message	Harness or connector fault GW or HU or TCU fault	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U129487	D294	When ESP module communication is lost, record the fault.	On gear ≥1s&& Non-Crank state for more than 500 ms&& Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& Non-bus-off state or 1s after bus-off recovery&& Message ESP_ID 187	Received ESP_ID 187 message	Harness or connector fault GW or HU or ESP fault	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether

			missing ≥1s;			the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U129787	D297	When LCDAL module communication is lost, record the fault.	On gear ≥1s&& Non-Crank state for more than 500 ms&& 3. Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& 4.Non-bus-off status Or bus-off recovery 1s Rear&& 5.Message LCDAL_ID2AE Missing ≥1s	Received LCDAL_ID2AE Message	Harness or connector fault GW or HU or LCDAL fault	1. Check whether all controller connectors are in good contact and whether the terminals are pin-out. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.

U170187	D701	SRS node 50 message Missing (only in THUCAN node not Go to sleep or not In bus-off state Test)	1. Bus off fault generation Code does not exist. Barrier code and Bus off After normal communication is restored 1s&& 2.1 s rear THU from sleep Sleep to wake up&& 3.6. 5v< complete vehicle system voltage <18v&& 4. Can message SRS_50 loss greater than 2.5s	Received SRS_50 Message	Gateway CAN connection is broken On or fault	1. Check all controls Whether the connector is connected Good contact, terminal No exit pin check gateway Status 2. Test terminal resistance 60 ohm left Right, if the apparent deviation is less than 40 or Above 80, check Terminal resistance controller For damage, replace Controller rear observation Does the obstacle clear
U19A186	D9A1	One of the normal operation conditions of AVM function. When the steering angle is invalid, the auxiliary line is not displayed, and the underbody transparent function is degraded.	1. Working voltage 8.5 V-16.5 V; 2.After the system is in non-BUS OFF state or recovers from BUS OFF for 1s; 3.After the power supply status is IGN ON 3s; 4. The DTC is triggered if the continuous 5-frame signal is above the invalid position bit.	1. Working voltage 8.5-16.5 V; 2. If the steering angle signal value is no longer above the invalid position, the DTC will become history.	1. SAS controller fault 2. AVM controller fault	1. Check whether the controller connectors are in good contact, and whether the terminals are in good contact. Check the gateway status. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U19A286	D9A2	One of the normal operation conditions of AVM function. When the received gear signal is invalid, the auxiliary line is not displayed, and the underbody transparent function is degraded.	1. Working voltage 8.5 V-16.5 V; 2.After the system is in non-BUS OFF state or recovers from BUS OFF for 1s; 3.After the power supply status is IGN ON 3s; 4. The DTC is triggered if the continuous 5-frame signal is	1. Working voltage 8.5-16.5 V; 2. If the gear signal value is no longer above the invalid position, the DTC will become history.	1. TCU controller fault; 2. AVM controller fault	1. Check whether the controller connectors are in good contact, and whether the terminals are in good contact. Check the gateway status. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or

			above the invalid position bit.			If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U19A386	D9A3	One of the normal operation conditions of the AVM function, when the vehicle speed signal is invalid, the LDW, bottom transparent and online calibration functions are degraded, and the vehicle speed icon on the DVR is invalid signal.	1. Working voltage 8.5 V-16.5 V; 2.After the system is in non-BUS OFF state or recovers from BUS OFF for 1s; 3.After the power supply status is IGN ON 3s; 4. The DTC is triggered if the continuous 5-frame signal is above the invalid position bit.	1. Working voltage 8.5-16.5 V; 2. If the vehicle speed signal value is no longer above the invalid position, the DTC will become history.	1. ESP controller fault; 2. AVM controller fault	1. Check whether the controller connectors are in good contact, and whether the terminals are in good contact. Check the gateway status. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U19A586	D9A5	One of the normal operation conditions of AVM function, when the brake pedal status signal is invalid,	1. Working voltage 8.5 V-16.5 V;	1. Working voltage 8.5-16.5 V; 2. The brake pedal status signal value is no longer above the invalid position.	1. EMS controller fault; 2. AVM controller fault	1. Check whether the controller connectors are in good contact, and whether the terminals are in good contact. Check the gateway status.

		DVR brake pedal icon displays invalid icon	2.After the system is in non-BUS OFF state or recovers from BUS OFF for 1s; 3.After the power supply status is IGN ON 3s; 4. The DTC is triggered if the continuous 5-frame signal is above the invalid position bit.	If the conditions are met, the DTC becomes history.		2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U19A686	D9A6	One of normal operation conditions of AVM function. When the accelerator pedal status signal is invalid, DVR accelerator pedal icon displays invalid icon.	1. Working voltage 8.5 V-16.5 V; 2.After the system is in non-BUS OFF state or recovers from BUS OFF for 1s; 3.After the power supply status is IGN ON 3s; 4. The DTC is triggered if the continuous 5-frame signal is above the invalid position bit.	1. Working voltage 8.5-16.5 V; 2. If the accelerator pedal position signal value is no longer above the invalid position, the DTC will become history.	1. EMS controller fault; 2. AVM controller fault	1. Check whether the controller connectors are in good contact, and whether the terminals are in good contact. Check the gateway status. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U19AC86	D9AC	One of the normal operation conditions of AVM function. When the RR LH wheel speed data is invalid, the function will stop the 3D model wheel display effect.	1. Working voltage 8.5 V-16.5 V; 2.After the system is in non-BUS OFF state or recovers from BUS OFF for 1s; 3.After the power supply status is IGN ON 3s; 4. The DTC is triggered if the continuous 5-frame signal is above the invalid position bit.	1. Working voltage 8.5-16.5 V; 2. If the left rear wheel speed data signal value is no longer above the invalid position, the DTC will become history.	1.The EPBi/ESP controller is faulty; 2. AVM controller fault	1. Check whether the controller connectors are in good contact, and whether the terminals are in good contact. Check the gateway status. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.

U19AD86	D9AD	One of the normal operation conditions of AVM function. When the right front wheel speed data is invalid, the function will stop the 3D model wheel display effect.	1. Working voltage 8.5 V-16.5 V; 2.After the system is in non-BUS OFF state or recovers from BUS OFF for 1s; 3.After the power supply status is IGN ON 3s; 4. The DTC is triggered if the continuous 5-frame signal is above the invalid position bit.	1. Working voltage 8.5-16.5 V; 2. If the FRT RH wheel speed data signal value is no longer above the invalid position, the DTC will become history.	1.The EPBi/ESP controller is faulty; 2. AVM controller fault	1. Check whether the controller connectors are in good contact, and whether the terminals are in good contact. Check the gateway status. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U19AE86	D9AE	One of the normal operation conditions of AVM function. When the front left wheel speed data is invalid, the function will stop the 3D model wheel display effect.	1. Working voltage 8.5 V-16.5 V; 2.After the system is in non-BUS OFF state or recovers from BUS OFF for 1s;	1. Working voltage 8.5-16.5 V; 2. If the FRT LH wheel speed data signal value is no longer above the invalid position, the DTC will become history.	1.The EPBi/ESP controller is faulty; 2. AVM controller fault	1. Check whether the controller connectors are in good contact, and whether the terminals are in good contact. Check the gateway status. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or

			3.After the power supply status is IGN ON 3s; 4. The DTC is triggered if the continuous 5-frame signal is above the invalid position bit.			If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.
U12A200	D2A2	Record fault when DSM module communication is lost	Network wake-up time ≥1s&& Non-Crank state for more than 500 ms&& Power supply voltage Inside 8.5 V~16.5 V ≥500ms&& Non-bus-off state or 1s after bus-off recovery&& Message DSM_3EA Missing ≥1s;	1. Working voltage 8.5-16.5 V; 2.After the bus is not closed and the bus is restored for 1s, the DTCs are cleared if the above conditions are met after receiving the DSM_3EA normal message.	Seat controller CAN Disconnection or fault	1. Check whether the controller connectors are in good contact, and whether the terminals are in good contact. Check the gateway status. 2. Check whether the terminal resistance is about 60 ohms, if obvious deviation is less than 40 or If it is above 80, check whether the terminal resistance controller is damaged, and observe whether the fault is eliminated after replacing the controller.

Fault symptom diagnosis

Inspection and confirmation

General inspection

1. Check whether the vehicle part number, software and hardware version number match the vehicle model configuration, and read relevant information of parts through diagnosis.

2. Use diagnostic scanner to confirm whether the vehicle is subject to current fault or history fault code. If so, record the fault code information and check the fault information according to DTC fault code table.

Appearance inspection list

General appearance inspection

Inspection items	Evaluation criteria
Housing	There is no obvious shrinkage mark, no burr, no crack, the surface is extinguished, and there is no glare.
Viewable	No obvious bubbles, inclusions, corrugations, spots, scratches and cracks. Numbers, characters and symbols shall be clear and complete.
Lighting effect	Able to see all kinds of numbers and text symbols on the display screen
LCD	The surface shall be clean and free of cracks or deformation, and there shall be no residual shadow after lighting.

Fault symptom table display type fault

Symptoms	Possible causes	Maintenance method
Display screen is black and cannot be turned on.	Fuse burns	Check the fuse of the vehicle system and replace it.
	Main socket A1, A4 corresponding harness fault	Measure the harness corresponding to pins A1 and A4 of main socket with a multimeter for short circuit, open circuit and looseness, and replace the harness if any.

	Display screen fault	Replace the test display. If the fault follows the display, replace the display.
	Vehicle fault	Exchange the test host. If the fault follows the host, replace the host.
Display blue screen, flower screen, white screen	Vehicle fault	Replace the test display. If the fault follows the display, replace the display.
	Display screen fault	Replace the test vehicle. If the fault follows the host, replace the host.
Display Splash	Display screen fault	Replace the test vehicle. If the fault follows the host, replace the host.
	Dimmer fault	Switch the test dimmer. If the fault follows the dimmer, replace the dimmer.
Touch failure	Vehicle fault	Replace the test display. If the fault follows the display, replace the display.
	Display screen fault	Replace the test vehicle. If the fault follows the host, replace the host.
Crash, restart	Battery voltage too low or too high	Multimeter two-drive battery voltage, below 8V or above In case of 16 V, do not handle the main unit, and check and repair the battery.
	Main socket A1, A4 power supply short circuit	Measure the wiring harness corresponding to pins A1 and A4 of main socket with a multimeter for short circuit, and replace if necessary.
	Vehicle fault	Replace vehicle

Screen fault

Symptoms	**Possible causes**	**Maintenance method**
Display screen is black and cannot be turned on.	Fuse burns	Check the fuse of the vehicle system and replace it.
	Main socket A1, A4 corresponding harness fault	Measure the harness corresponding to pins A1 and A4 of main socket with a multimeter for short circuit, open circuit and looseness, and replace the harness if any.
	Faulty cable between display and host	Check the connecting line for missing assembly and looseness. If any, reassemble it again. Inspect the aging and poor contact of the connecting wire, if any, replace the connecting wire. Remove the connecting wire, measure it with a multimeter for short circuit and open circuit, if any, replace the connecting wire.
	Display screen fault	Replace the test display. If the fault follows the display, replace the display.
	Vehicle fault	Exchange the test host. If the fault follows the host, replace the host.
Display blue screen, flower screen, white screen	Vehicle fault	Replace the test display. If the fault follows the display, replace the display.
	Display screen fault	Replace the test vehicle. If the fault follows the host, replace the host.
Display Splash	Display screen fault	Replace the test vehicle. If the fault follows the host, replace the host.

	Dimmer fault	Switch the test dimmer. If the fault follows the dimmer, replace the dimmer.
Touch failure	Vehicle fault	Replace the test display. If the fault follows the display, replace the display.
	Display screen fault	Replace the test vehicle. If the fault follows the host, replace the host.
Crash, restart	Battery voltage too low or too high	Multimeter two-drive battery voltage, below 8V or above In case of 16 V, do not handle the main unit, and check and repair the battery.
	Main socket A1, A4 power supply short circuit	Measure the wiring harness corresponding to pins A1 and A4 of main socket with a multimeter for short circuit, and replace if necessary.
	Vehicle fault	Replace vehicle

Bluetooth communication abnormal

Symptoms	**Possible causes**	**Maintenance method**
Bluetooth not connected	Equipment is too far away	If the device such as mobile phone or PAD is too far away from the vehicle, Bluetooth signal cannot be received. In this case, it is only necessary to close them.
	Bluetooth compatibility issues	The latest multimedia system can be upgraded for connection, which restarts the device
	Multimedia volume not on	If the multimedia system volume is not on, it may cause the false appearance that Bluetooth cannot be connected. In this case, you only need to increase the volume.

Navigation and positioning fault

Symptoms	**Possible causes**	**Maintenance method**
Navigation cannot be positioned	There is no GPS signal at the vehicle position.	Without maintenance, the vehicle can drive out of no signal area.(Areas without signal or signal difference are generally: Garage, workshop, under viaduct, dense area of high building, tunnel, etc.)
	GPS antenna fault	Replace the test antenna. If the fault follows the antenna, replace the antenna.
	GPS feeder body section fault	Replace the test feeder. If the fault follows the feeder, replace the feeder.
	GPS feeder instrument panel section fault	Replace the test feeder. If the fault follows the feeder, replace the feeder.
	The output voltage of the host GPS socket is abnormal.	Use a multimeter to measure whether the voltage of pin No.1 of the host's gps socket is 3.3 V-5.5 V. If not, replace the host. Note: For model with TBOX, no voltage on pin No.1 of host GPSsocket is normal.
	Vehicle fault	Exchange the test host. If the fault follows the host, replace the host.
Slow search	GPS signal difference of vehicle location	Without maintenance, the vehicle can drive out of the signal poor area.(Areas without signal or signal difference are generally: Garage, workshop, under viaduct, dense area of high building, tunnel, etc.)

	GPS antenna fault	Replace the test antenna. If the fault follows the antenna, replace the antenna.
Path planning error	Old map	Network update map
No destinations found	Destination does not exist	No treatment
	Old map	Network update map

Audio without sound

Symptoms	Possible causes	Maintenance method
No sound	Human click mute	Readjust volume
	Speaker fault	Swap the test speakers, if the fault follows the speaker, replace the speaker.
	Circuit fault between host and speaker	Remove the main socket B chamber socket, measure whether there is short circuit or open circuit in pin B1-B8 of harness end with a multimeter. If there is locking fault, replace the harness.
	Host fault	Exchange the test host. If the fault follows the host, replace the host.

Sound noise

Symptoms	Possible causes	Maintenance method
Noise and broken sound	Speaker fault	Check the appearance of the speaker for appearance damage, etc.
	Host fault	Exchange the test host. If the fault follows the host, replace the host.

Volume adjustment switch fails

USB flash drive cannot be recognized

Symptoms	Possible causes	Maintenance method
Unable to recognize USB flash drive	USB flash drive is damaged	Put the USB flash drive on other vehicles and observe its identification. If most vehicles cannot be identified, replace with normal U. Disk use
	USB adapter cable fault	Dismantle the front panel of central control host, check whether there is missing and looseness between the USB adapter cable and the host, if yes, reassemble again. Exchange test adapter wiring, if the fault follows the adapter wiring, replace the component.
	Host fault	Exchange the test host. If the fault follows the host, replace the host.
The USB flash drive can be identified, but the music file cannot be identified.	Music file is not compatible with damaged format	Replace music files in common format without any treatment (MP3, WMA, APE, FLAC, etc.)

Removal and installation

Infotainment Terminal Assembly Removal

1. Disconnect the battery negative harness. Refer to Battery Assembly

2、 Remove the A/C panel lower guard plate. See A/C control panel

3. For removing A/C control panel, refer to A/C control panel 4. Remove A/C air outlet.

Refer to Inner and Outer Circulation Door Actuator

5、 Remove front display screen assembly

(1) Remove the three screws (2N.m) on the right side of the display screen with hexagon socket tool, as shown in the figure below.

(2) Remove the two plug covers on the back of the display screen with a rocker, as shown in the figure below.

(3) Remove the five screws (5.5N.m) of the vehicle machine with hexagon socket tool, as shown in the figure below.

(4) Disconnect the harness plug connected to the vehicle infotainment terminal assembly, and remove the vehicle infotainment terminal assembly host.

Install shark fin antenna in reverse order of removal

Installing and removing

Install in the reverse order of removal.

Disconnect battery negative harness

Remove headliner.

See Removing and installing headliner

Disconnect the shark fin antenna and feeder connector 1.

Remove the retaining nut of shark fin antenna base, and remove the shark fin antenna.

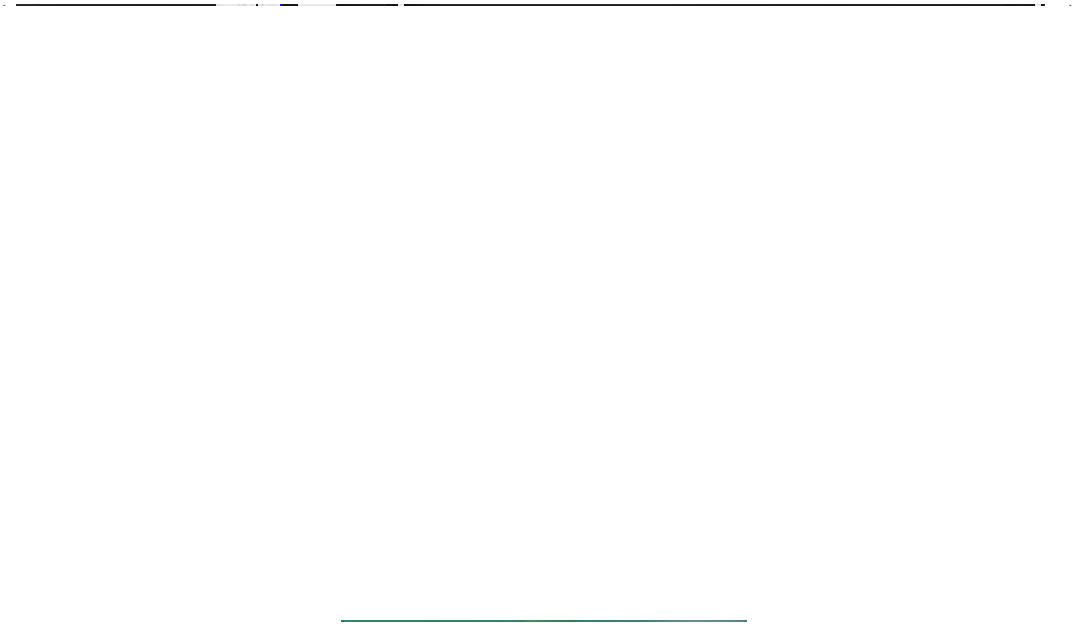


Figure 131:

Feeder

Disconnect the battery negative electrode;
As the feeder and the vehicle harness are bound together, if the GPS feeder instrument section is faulty, please dismantle the instrument panel electric harness assembly. In case of GPS feeder body section problem, please remove chassis electric wire harness assembly.
Removal method Installation sequence is reverse to removal sequence.

Tweeter removal

Tool

Disconnect the negative

battery harness. Refer to

Battery Assembly

Remove A-pillar upper

trim panel. Refer to

Replacement of A-pillar

inner panel assembly

Use a Phillips screwdriver to remove the tweeter retaining screws and remove the tweeter.

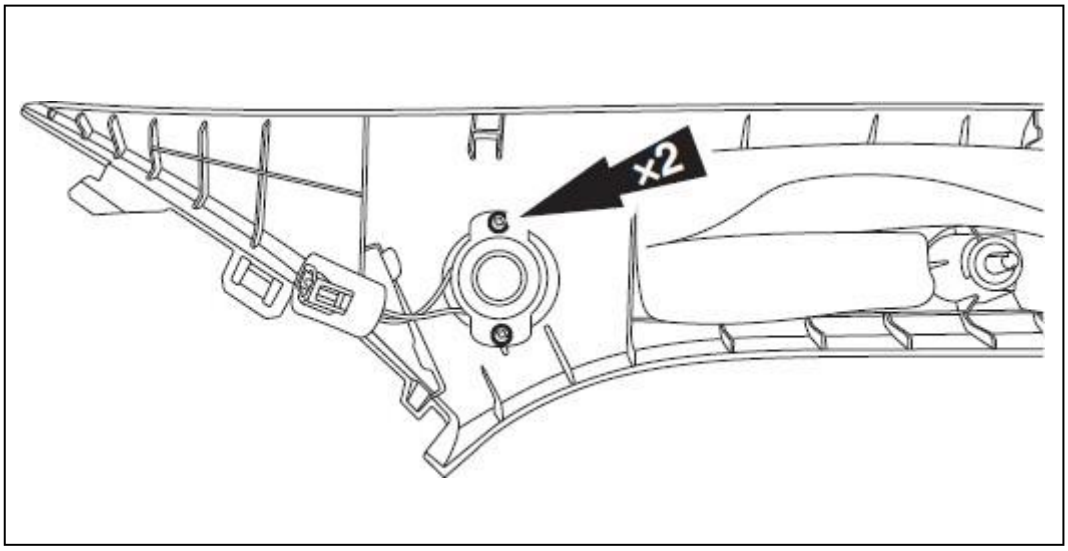


Figure 133:

Installation

Install in the reverse order of removal.

Woofer

1. Reverse order of installation and removal
2. Disconnect the battery negative harness.
3. Dismantle front door interior trim panel

Refer to Removing and installing front door trim panel

4. Disconnect the woofer harness connector.

5.Remove three retaining screws of bass speaker with cross screwdriver, torque 3±0.5N.m

6. Remove the woofer.

Spare parts atlas

F280401 F280402 F280408

Intelligent cabin system specifications

Driver fatigue detection camera

Name	Specifications
Working voltage	8±0.5 V CAMERA, 10 V LED ARRAY
Working current	80mA~100mA@12V
Operating temperature	-40℃~85℃

Interior HD camera

Name	Specifications
Working voltage	8±0.5 V(CAMERA)
Working current	60mA~80mA@12V
Operating temperature	-40℃~85℃

Composition and position distribution

Serial number	Part number	Name	Remarks
1	3600130-AW03	Driver state monitoring infrared camera assembly	Intelligent
2	3600160-AW01	Interior monitoring HD camera assembly	Intelligent

System functional principle introduction

Driver fatigue detection camera

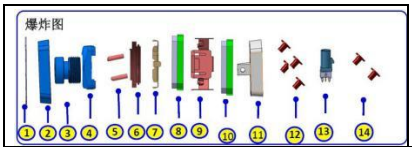
The camera captures the driver's driving state image, and the vehicle machine receives the image captured by the camera to judge whether the driver is in fatigue state at present. The camera interior contains LED infrared light supplement lamps to support night driver status monitoring.

Interior HD camera

The in-vehicle HD camera takes pictures of the in-vehicle scene and sends them to the vehicle. The vehicle can perform face recognition and in-vehicle photography according to the image.

Inspection of part structure principle

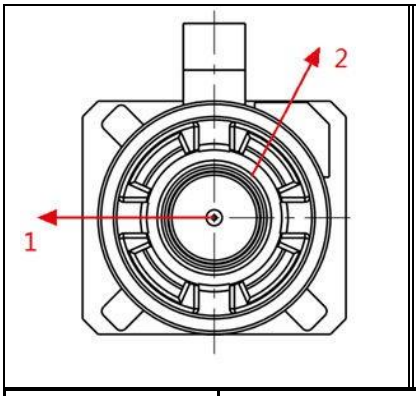
Infrared monitoring camera product structure

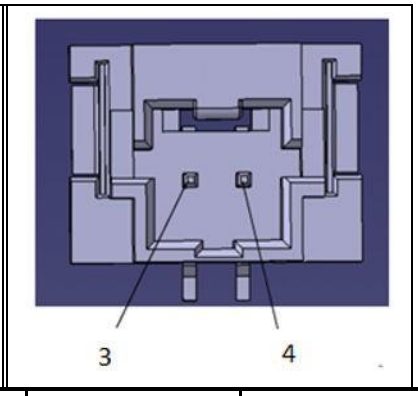


Serial number	Name	Serial number	Name
1	PC board	8	Shield cover 2

2	Front cover	9	sensor
3	Lens	10	power
4	Lens holder	11	Rear lid
5	Light guide pillar	12	Screw
6	Sealing ring	13	Screw
7	Shield cover 1	14	Connector

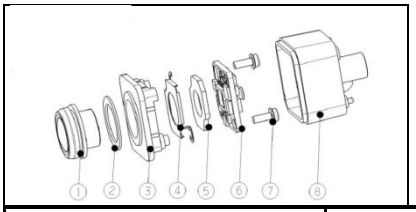
Interface definition





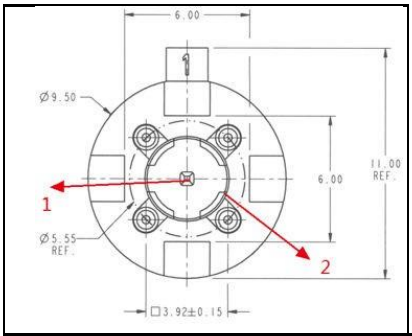
Pin number	Pin definition	Signal type	Signal range	Test conditions	Remarks
1	POC	Video signal	135 -150 mA(@8V)	Measure pin pin of power interface camera with multimeter	
2	GND	Shielding ground	135 -150 mA(@8V)	/	
3	IR LED+	Power supply signal	500 mA(@8V)	Use a multimeter to measure pin pin of power supply interface LEDs.	
4	IR GND	Power supply ground	500 mA(@8V)	/	

Interior HD Camera Product Structure



Serial number	Name	Serial number	Name
1	Single lens	5	Dust proof gum
2	Glue	6	PCBA
3	Holder	7	Screws
4	Shield	8	RR Case

Interface definition



Pin number	Pin definition	Signal type	Signal range	Test conditions	Remarks
1	POC	Video signal	90-120 mA(@8V)	Measure pin pin of power interface camera with multimeter	
2	GND	Shielding ground	90-120 mA(@8V)	/	

Fault symptom diagnosis

Inspection and confirmation

Confirm the customer's problem.
Visually inspect whether there are obvious mechanical or electrical damage marks, and whether the camera body is damaged, loose and water inflow.
Use a multimeter to

troubleshoot system faults.

Fault symptom table

Fault 1	Camera is not powered
Test conditions	Details/Results/Measures
1. Measure pin pin of power interface camera with a multimeter	
Purpose: To determine whether the power supply, grounding wire and video wire of the camera are faulty.	A. Measure whether there is 8V left and right voltage input
	? Yes Turn B
	? No Turn to step 2
	B. Check whether the resistance between the body and the camera head end grounding wire is less than 0.5 Ω, whether the video line is shorted, and whether the resistance is less than 0.5 Ω.
	? Yes Replace camera
	? No Turn to step 2
2. Check DVD player V1/V2, two pins and hard wire wiring	
Objective: To determine whether the harness from DVD and DVD to the camera end is faulty.	A. Check whether V1/V2 has 8V left and right power supply output.
	? Yes Troubleshooting connector and DVD to camera wiring harness
	? No Replacing DVD player
Fault 2	Night fatigue monitoring function disorder
Test conditions	Details/Results/Measures
1. Confirm whether the LEDs work.	
Purpose: Judge whether the LED lamp power supply is faulty.	A. Check whether there are two red LEDs in the camera in dark environment.
	? Yes Turn B
	? No Turn to step 2
	B. Confirm whether the camera software and hardware version number is the latest?
	? Yes Confirm the vehicle software and hardware version number

2. Check whether the LEDs interface is normal.	
Objective: To determine whether the harness of LED lamp power supply is faulty.	A. Check whether PIN3/PIN4 has 8V power supply input.
	? Yes Replace camera
	? No Turn B
	B. Check whether there is 8V power supply output at vehicle end B1/B4.
	? Yes Troubleshooting connector and DVD to camera wiring harness
	? No Replacing the vehicle

Camera is not powered

Test conditions	Measures
1. Measure pin pin of power interface camera with a multimeter	
Purpose: To determine whether the power supply, grounding wire and video wire of the camera are faulty.	A. Measure whether there is 8V left and right voltage input
	? Yes Turn B
	? No Turn to step 2
	B. Check whether the resistance between the body and the camera head end grounding wire is less than 0.5Ω, whether the video line is shorted, and whether the resistance is less than 0.5Ω.
	? Yes Replace camera
	? No Turn to step 2
2. Check DVD player V1/V2, two pins and hard wire wiring	
Objective: To determine whether the harness from DVD and DVD to the camera end is faulty.	A. Check whether V1/V2 has 8V left and right power supply output.
	? Yes Troubleshooting connector and DVD to camera wiring harness
	? No Replacing DVD player

Night fatigue monitoring function disorder

Test conditions	Measures
1. Confirm whether the LEDs work.	
Purpose: Judge whether the LED lamp power supply is faulty.	A. Check whether there are two red LEDs in the camera in dark environment.
	? Yes Turn B
	? No Turn to step 2
	B. Confirm whether the camera software and hardware version number is the latest? (Viewed via camera product label)
	? Yes Confirm the vehicle software and hardware version number(View via Upgrade APP)
	? No Replacing camera
2. Check whether the LEDs interface is normal.	
Objective: To determine whether the harness of LED lamp power supply is faulty.	A. Check whether PIN3/PIN4 has 8V power supply input.
	? Yes Replace camera
	? No Turn B
	B. Check whether there is 8V power supply output at vehicle end B1/B4.
	? Yes Troubleshooting connector and DVD to camera wiring harness
	? No Replacing the vehicle

Removal and installation

Infrared monitoring camera

The driver fatigue monitoring camera is

installed above the steering column. Tool:

Cross screwdriver

Torque: 1.5±0.3 N·m

Removal

Remove the steering column cover upper housing; See Removing and installing section.
Remove the camera;

Installation

Install the camera on the upper housing of the column cover;
Plug in the connector and install the upper housing. Refer to

Removing and Installing. Interior HD camera

The interior HD camera is mounted near the dome

lamp on the interior rearview mirror cover. Tool:

Cross screwdriver

Torque: 1.5±0.3 N·m

Removal

Remove the inner rearview mirror cover; See Removing and installing section.
Remove camera.

Installation

Install the camera on the inner rearview mirror cover;
Plug in the connector and install the inner rearview mirror cover. See Removing and installing section.

Spare parts atlas

F280706

Sunroof system specifications

General specifications

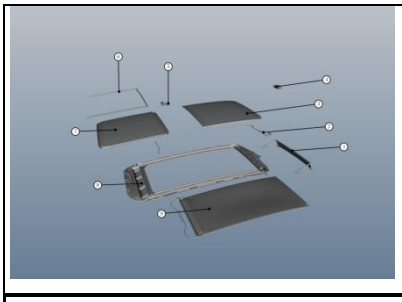
Name	Parameters
Working voltage	9V-16V
Initialization voltage	9V-16V
Working current	≤5A
Quiescent current	≤0.2mA

Torque specification

Name	N. M
Sunroof assembly mounting bolt	8±1N.m
Sliding glass mounting bolt	5±0.5N.m
Fixed glass mounting bolt	5±0.5N.m
Sun blind mounting bolt	2±0.2N.m

Composition and position distribution

Composition



Serial number	Part name	Quantity
1	Sunroof guide net assembly	1
2	Sunroof harness assembly	1
3	Sunroof front glass assembly	1
4	Sunroof glass motor assembly	1
5	Sunroof roller shutter motor assembly	1
6	Sunroof rear glass sealing strip	1
7	Sunroof rear glass assembly	1
8	Sunroof frame assembly	1
9	Sunroof sunshade assembly	1

Position distribution

System functional principle introduction

Sunroof system function introduction

Panoramic roof includes two glass assemblies, sun blind assembly, wind screen assembly, etc. The front glass assembly and sunshade curtain can be electrically driven through switch keys, voice, etc. The rear glass assembly becomes fixed glass and cannot be moved;

Panoramic roof glass and sunshade curtain have linkage function,

sunshade curtain opening is always greater than glass opening; The

sunroof can be switched through intelligent signals such as voice and

key remote control.

Sunroof system operation introduction

Rearward 1st gear: Control the rolling shutter to open automatically or the glass to open automatically (the rolling shutter is fully opened), and press long or short press automatically;

Rearward 2nd gear: Control glass to open automatically (linkage sun blind), long press or short press automatically

Forward 1st gear: Control glass automatic operation to close or roller shutter automatic operation to close (glass fully closed), long press or short press automatically

Forward 2nd gear: Control roller shutter to close automatically (linked glass), long press or short press automatically

The upward gear is the tilting switch, not the tilting position, to the tilting; Warping state, no action. Long press or short press automatically

Inspection of part structure principle

Sunroof motor assembly

When the sunroof cannot work normally, first confirm

whether the vehicle voltage is normal; Confirm

whether the sunroof assembly harness connector is

properly inserted;

Confirm whether the sunroof connector is faulty, as shown in the figure below.

Corresponding definitions of numbers are shown in the following table.

Pin number	Pin definition	Signal type	Signal range	Test conditions	Remarks
1	Power supply ground	GND	0	Ignition switch ON, ground to body	
2	Sunroof/Sunshade Open Signal	Low level	9~16V	Ignition switch ON, ground to body	
3	Sunroof/Sunshade Close Signal	Low level	9~16V	Ignition switch ON, ground to body	
4	-	-	-	-	
5	Power supply	Power supply	9~16V	Ignition switch ON, ground to body	
6	IGN signal(Reserved)	High level	9~16V	Ignition switch ON, ground to body	
7	Rolling sun curtain opening signal(Reserved)	Low level	9~16V	Ignition switch ON, ground to body	
8	Curtain closing signal(Reserved)	Low level	9~16V	Ignition switch ON, ground to body	
9	Lin line	High level	9~16V	Ignition switch ON, ground to body	
10	Sunroof tilting model	Low level	9~16V	Ignition switch ON, ground to body	

Sunroof switch

Refer to Interior Front Dome Lamp Chapter

Common methods

Sunroof self-learning method

First ensure the sunroof and sunshade are fully closed;

Press and hold the sunroof switch button forwards and do not place it. After 3 seconds, it will feel the sunroof shaking and accompanied by mechanical movement sound. At this time, press and hold the button still and the sunroof glass and sunshade curtain will open and close automatically;

The sunroof glass and sunshade curtain both move to the closed position and release the button. The sunroof is initialized;

Fault symptom diagnosis

Inspection and confirmation

Inspect the surface difference between sunroof glass and roof cover to confirm whether it meets the design requirements.(The front glass is 1.7±1.5 mm lower than the top cover, and the rear glass is 1.7±1.5 mm higher than the top cover.)

Run the sunroof glass and sunshade, and confirm whether there is abnormal sound in the sunroof glass and sunshade;

Appearance check list

Check the sunroof glass, sunroof sealing strip and sunroof sunshade appearance for problems. See the following table for details:

Serial number	Inspection content	Inspection standard
1	Does the sunroof glass have cracks	No crack
2	Whether the sunroof sealing strip (including outer sealing strip) is intact and free of damage; Does the sealing strip have ash deposit	The sealing strip is free of damage and ash accumulation.
3	Whether sunroof sunshade curtain is damaged or dirty	No damage and dirt

Fault symptom table

Main fault symptoms of sunroof are shown in the following table.

Serial number	Fault symptoms	Symptom	Remarks
1	Sunroof leakage	When the sunroof glass is closed, rainwater enters the vehicle to wet the roof and other interior trims.	
2	Sunroof abnormal sound	There is obvious abnormal sound during sunroof opening and closing and during vehicle driving.	
3	Sunroof cannot operate	Use buttons to operate the sunroof in ON gear or driving process, and the sunroof has no action;	
4	Sunroof does not operate in place	The sunroof cannot be opened and closed completely during operation.	

Sunroof leakage

There are two main reasons for water leakage of sunroof:

Sunroof outer sealing strip and roof are not bonded in place (height difference between sunroof sealing strip and roof is wave);

Sunroof drain pipe can not put water rule out from sealing strip (sunroof water pipe is blocked by foreign matter); There is a drain pipe at each corner of the sunroof, as shown in the figure below;

Remove the water pipe clamp (orange parts in the figure below) of the sunroof at the leakage position, and confirm whether the water pipe or sunroof water outlet is blocked;

Sunroof abnormal sound

Sunroof abnormal sound mainly has the following reasons:

Abnormal sound of windscreen when sunroof is closed;

Abnormal sound of windscreen rotating shaft: Abnormal sound due to insufficient oil coating on windscreen rotating shaft and lower spring (orange area in the following figure);

Abnormal noise on bumpy road during driving;

The main reason for abnormal sound on bumpy road is that the outer sealing strip of sunroof has not been cleaned for a long time and ash deposit; By opening the sunroof glass, clean the sunroof sealing strip with a clean cloth or brush and apply lubricating oil; As shown below:

Abnormal sound of mechanical group during sunroof operation:

In case of abnormal sound of mechanical group, apply lubricating oil to the accessible position of mechanical group and guide rail, and run repeatedly for several times to ensure sufficient lubrication. If it cannot be solved, replace the sunroof frame assembly;

Sunroof cannot be closed in place

The main reason why the sunroof cannot be closed in place is that there is foreign matter inside the guide rail, resulting in the mechanical group not running to the end or anti-pinch reversing. Check and clean the inside of the guide rail.

Open the front glass, check and clean the orange position of the guide rail in the following figure, close the sunroof for detection after cleaning, if still unable to close in place, confirm the sunroof after initialization.

If it cannot be solved after initialization, replace the sunroof frame assembly.

Sunroof cannot be opened.

The main reason why the sunroof cannot be fully opened is mechanical group fault. If there is no foreign matter in the guide rail, replace the sunroof frame assembly;

Removal and installation

Sunroof motor assembly

Close the glass to the fully closed position before removal and installation.

Sunroof controller and sunroof motor are integrated structure. Replace the sunroof glass motor

assembly or sunroof sunshade motor assembly. Removal

Remove headliner.Headliner

The sunroof glass motor assembly is at the front of the sunroof. When removing the sunroof glass motor assembly, press and pull out the orange harness connector in the following figure.

Remove the three orange bolts as shown in the figure with T25 ratchet wrench, remove the sunroof glass motor assembly, and remove the sunroof glass motor assembly.

The sunroof sunshade motor assembly is at the rear of the sunroof. When removing the sunroof sunshade motor assembly, press and pull out the orange harness connector in the following figure.

Dismantle three orange bolts as shown in the figure with T25 ratchet wrench, take down sunroof sunshade motor assembly, and dismantle sunroof sunshade motor assembly to finish.

Installation

The installation sequence is the reverse of the removal sequence.

The sunroof must be re-initialized after installation. Refer to

Sunroof Self-Learning Method Sunroof Switch

Refer to Interior Front

Dome Lamp Chapter

Sunroof Frame

Removal

Remove headliner, Removing and installing headliner

Remove the clamp at the connecting part of front and rear water pipes of sunroof and sunroof with pointed-nose pliers, pull out the water pipe (red ring area in the figure), and remove the orange assembly bracket in the figure with M10torque wrench, torque requirement 8±1N.M

Remove the mounting point of the sunroof in the orange area in the figure with M10 sleeve, and remove the mounting point at the front and rear frame as far as possible. When there are two mounting points on the left and right guide rails, 3-4 people are required to lift the sunroof from the inside. After all the mounting points are removed, take them out from the tailgate. Torque requirements are 8±1N.M;

Remove the front and rear glass, motor and sun blind from the sunroof, and the remaining sunroof frame assembly.Sunroof glass sunroof motor assembly sun blind

Installation

The installation sequence is the reverse of the removal sequence.

After installation, the sunroof must be initialized.Sunroof

self-learning method Sunroof glass

Removal

Front glass removal: Open the front glass to the tilting position, and remove the six bolts (three on the left and three on the right) of the front glass with T25. The torque is 5N.M. Remove the front glass from the upper part.

Rear glass removal: Open the front glass to the fully open position, and remove the two Z-direction bolts of the rear glass with T25 tool. The torque is 5N.M.

Dismantle six bolts (three on the left and three on the right) on both sides of rear glass with T25, and the torque is 5N.M. Remove the front glass from the upper part.

Installation

The installation sequence is opposite to the removal sequence;

Ensure the height difference between the front part of front glass and the top cover is 1.7±1.0 (front glass is low) during installation; The height difference between rear part of rear glass and top cover is -1.7 ±1.0 (rear glass height);

After installation, the sunroof must be initialized.Sunroof self-learning method

Sun blind removal

Remove the sunroof rear glass assembly and sunshade motor.Sunroof motor sunroof glass

Use a cross screwdriver to remove the two bolts of the left and right limiting blocks of the sunroof sunshade curtain. The torque is 3N.M;. Remove and pull out the limiting block transversely.

Run the sunshade backward to the gap position of the limiting block in the figure, and take out the cross bar of the sunshade upward.

Dismantle six bolts (three on the left and three on the right) of sunroof sunshade end cover with T25 tool, and the torque is 3N.M; Remove the sunroof sunshade assembly forward;

Installation

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

After installing the stopper, slide the sun blind cross bar backward to the position of the stopper.

After installation, initialize the sunroof.Sunroof self-learning method

Removing front drain pipe of sunroof

Remove relevant interior trim parts; Removing and installing headliner Removing and installing A-pillar upper trim panel assembly Removing and installing A-pillar lower trim panel assembly Removing and installing instrument panel

Remove the elastic clamp at the overlapping area of the sunroof water pipe and sunroof with pointed-nose pliers. Pull the water pipe out of the remaining pipe clamps and plugs.

Installation

The installation sequence is reverse to the removal sequence. The

water pipe plug of the sunroof and the first pipe clamp at the upper end

are marked with lines. Sunroof rear drain pipe

Removal

Relevant parts such as ceiling shall be removed; Removing and installing headliner Removing and installing C-pillar trim panel

Remove the elastic clamp at the connecting position of sunroof water pipe and sunroof with sharp-nose pliers, and pull the water pipe out of other pipe clamps and plugs;

Installation

The installation sequence is reverse to the removal sequence. The water pipe plug of the sunroof and the first pipe clamp at the upper end are marked with lines;

Spare parts atlas

F270106

Multifunctional Seat Specifications

Seat specification

Project	Seat frame	Headrest	Mask
Driver's seat	Seat height, seat front and rear, backrest angle adjustment, seat basin half-basin structure, frame pipe sheet structure, suspension spring grid spring structure	Integrated headrest	Leather
Copilot seat	Seat height, backrest angle adjustment, seat basin half-basin structure, frame pipe sheet structure, suspension spring grid spring structure	Integrated headrest	Leather
Rear seat	Seat height, backrest angle adjustment, seat basin half-basin structure, frame pipe sheet structure, suspension spring grid spring structure	Movable head restraint	Leather

Seat heating specification

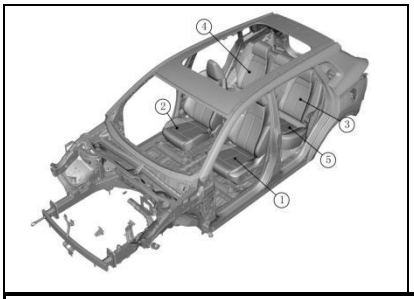
Seat heating	The heating pad of the main passenger and the front passenger share one controller module, and the heating control module is fixed on the main passenger seat; The heating system control module uses CAN communication. Third gear heating, low gear: 35±3℃, medium gear: 40±3℃; High gear: 45±3℃.

Seat Installation Torque Specification

Name	Unit(N.m)
Connecting point of rear row seat back middle hinge assembly and body	45±5
Front row seat mounting foot plate and body floor connection point	45±5
Connecting point of rear seat cushion rear steel wire and body floor	25±3

Composition and position distribution

Seat assembly composition and position distribution are as follows, and spare parts composition is shown in spare parts atlas.



Serial number	Name
1	Driver seat assembly
2	Copilot seat assembly
3	Passenger 60% seat back assembly
4	Passenger 40% seat back assembly
5	Three-person passenger seat cushion assembly

System functional principle introduction

Heating system:

Front seat heating is seat cushion heating, traditional alloy wire fever is used, and heating pad is affixed to seat foam A side. Use ECUs and bimetal thermostat +NTC multiple protection. Overcurrent, undercurrent, overvoltage, undervoltage, short circuit, open circuit, heating wire broken wire protection.

The heating pad of the main passenger and the front passenger share one controller module, and the heating control module is fixed on the main passenger seat. The heating control module uses CAN communication.

Heating gear: Front seat third gear heating, low gear: 35±3℃, medium gear: 40±3℃; High gear: 45±3℃.

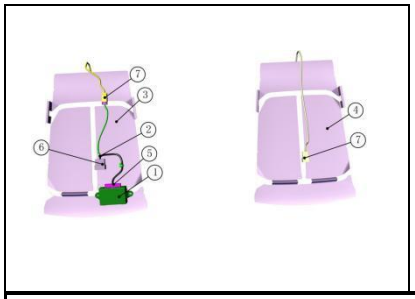
Seat power adjustment:

Electric adjustment of the driver's seat includes front and rear adjustment, height adjustment and backrest angle adjustment; Electric adjustment of passenger seat includes front and rear adjustment and backrest angle adjustment.

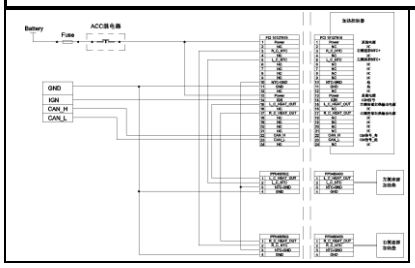
The main passenger's electric adjustment can only be controlled through the physical switch on the seat guard, without seat memory function.

Inspection of part structure principle

Seat heating controller seat heating structure



Serial number	Name
1	Seat heating controller
2	Driver seat heating harness
3	Driver seat cushion heating pad
4	Co-driver seat cushion heating pad
5	Seat heating controller interface
6	Interface between driver seat heating and cab harness
7	Seat cushion heating pad body interface



Seat heating controller interface

End face	Electrical terminal	Harness end
Hole position definition		
Sheath type	FCI 10127819	FCI 10127815

Seat Heating Controller Interface Pin Definition

Pin number	Pin definition	Pin description	Signal type	Signal range	Test conditions
1	Power	System power supply	Power supply	9-16V	Always with seat heating on and grounding the body
2	NC	NC	NC	NC	NC
3	R_C_NTC	Passenger's Seat NTC +	Temperature sensor signal	1-5V	Always with seat heating on and grounding the body
4	NC	NC	NC	NC	NC
5	L_C_NTC	Driver's Seat NTC +	Temperature sensor signal	1-5V	Always with seat heating on and grounding the body
6	NC	NC	NC	NC	NC
7	NC	NC	NC	NC	NC
8	NC	NC	NC	NC	NC
9	NC	NC	NC	NC	NC
10	NTC-GND	NTC ground	Grounding	0	Always with seat heating on and grounding the body
11	GND	Ground	Grounding	0	Always with seat heating on and grounding the body
12	NC	NC	NC	NC	NC
13	Power	System power supply	Power supply	9-16V	Always with seat heating on and grounding the body
14	IGN	IGN signal	Ignition signal	9-16V	Always with seat heating on and grounding the body
15	L_C_HEAT_OUT	Driver heating output power supply	Power supply	9-16V	Always with seat heating on and grounding the body
16	NC	NC	NC	NC	NC
17	R_C_HEAT_OUT	Front passenger's seat heating output power supply	Power supply	9-16V	Always with seat heating on and grounding the body
18	NC	NC	NC	NC	NC
19	NC	NC	NC	NC	NC
20	NC	NC	NC	NC	NC
21	NC	NC	NC	NC	NC
22	CAN_H	Can signal _ high	CAN	2.5-3.5V	Always with seat heating on and grounding the body
23	CAN_L	Can signal _ low	CAN	1.5-2.5V	Always with seat heating on and grounding the body

24	NC	NC	NC	NC	NC

Driver Seat Heating and Cabin Harness Interface Pin Definition

Pin number	Pin definition	Pin description	Signal type	Voltage signal range	Test conditions

1	CAN_L	Can signal _ low	CAN	1.5-2.5V	Always with seat heating on and grounding the body
2	CAN_H	CAN_H	CAN	2.5-3.5V	Always with seat heating on and grounding the body
3	GND(Grounding)	GND (grounding) grounding	Grounding	0	Always with seat heating on and grounding the body
4	IGN1	IGN signal	Ignition signal	9-16V	Always with seat heating on and grounding the body
5	Power	Power supply	Power supply	9-16V	Always with seat heating on and grounding the body
6	NC	NC	NC	NC	NC
7	NC	NC	NC	NC	NC
8	NTC-GND	NTC ground	Grounding	0	Always with seat heating on and grounding the body
9	R_C_NTC	Passenger's Seat NTC +	Temperature sensor signal	1-5V	Always with seat heating on and grounding the body
10	R_C_HEAT_OUT	Front passenger's seat heating output power supply	Power supply	9-16V	Always with seat heating on and grounding the body
11	GND	Heating ground	Grounding	0	Always with seat heating on and grounding the body
12	NC	NC	NC	NC	NC

Seat cushion heating pad body interface

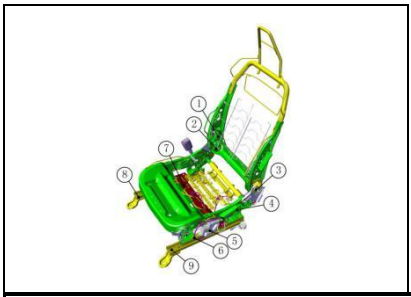
End face		Electrical terminal		Harness end	
Hole position definition					
Sheath type		PP0480403		PP0480502	
Pin number	Pin definition	Pin description	Model type	Voltage signal range	Test conditions
1	L_C_HEAT_OUT or R_C_HEAT_OUT	Power supply	Power supply	9-16V	Always with seat heating on and grounding the

					body
2	L_C_NTC or R_C_NTC	NTC +	Temperature sensor signal	1-5V	Always with seat heating on and grounding the body

3	NTC-GND	NTC ground	Grounding	0	Always with seat heating on and grounding the body
4	GND	Ground	Grounding	0	Always with seat heating on and grounding the body

Seat adjustment motor

Electric adjustment structure and principle



Serial number	System structure	Functional principle
1	Backrest angle adjustment motor	Backrest angle adjustment drive
2, 3	Backrest angle adjuster	Backrest angle adjustment actuator
4	Seat height adjustment motor and gear set	Seat height adjustment actuator
5	Electric adjustment switch	User operated button signal is converted into adjustment signal
6	Electric adjustment harness	Regulating signal and electric energy transmission
7	Electric slide axle and motor	Seat fore and aft adjustment drive
8, 9	Electric slide rail	Seat fore and aft adjustment actuator

DTC Diagnostic

Heating controller

Serial number	Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance advice
1	U1F4088	Can bus is off Closed, resulting in control failure to send/receive bus data normally, resulting in normal implementation of related functions affected	1. Bus sleep wakeup After 1000 ms, or when there is no network management function, it is detected that the power supply hard wire signal is switched from non-ON gear to ON gear 1000 ms; 2.The vehicle power supply voltage is within 6.5-18 V; 3.Engine state EMS_EngineStatus is not 0x1 "Crank" 4.Bus off counter value NBusOffCount>=5.	Harness fault	Plug fuse or controller connector one by one, observe whether the fault is eliminated, if it is eliminated, locate the correspondin g controller, replace the controller, and then contact Chang'an technician to troubleshoot the single controller problem. If the plugging and unplugging of the controller fails to be eliminated, check whether the connectors of

					each controller are in good contact and whether the terminals are pin-out. Check the CAN wire of the unit controller for short circuit or open circuit.

2	B1D0116	Monitor whether the vehicle power supply is normal and whether the controller function can be supported.	1.After power supply status is IGN ON, 3s;2, engine status signal EMS_EngineStatus not crank, or 1000 ms from crank to running Rear; 3.The power supply voltage is less than 9V and lasts for 1s;	Battery fault	Contact Chang'an technician to check the power supply voltage when the fault occurs. Check whether the battery voltage is lower than 9V. If the battery voltage is normal, check whether the voltage at the power supply end of the control box is lower than 9V.
3	B1D0217	Monitor whether the vehicle power supply is normal and whether the controller function can be supported.	1.After power supply status is IGN ON, 3s;2, engine status signal EMS_EngineStatus not crank, or 1000 ms from crank to running Rear; 3.The power supply voltage is greater than 16 V and lasts for 1s.	Battery fault	Contact Chang'an technician to check the power supply voltage when the fault occurs. Check whether the battery voltage is higher than 16 V. The battery voltage is normal. Check whether the voltage at the power supply end of the control box is higher than 16 V.
4	U1F4187	Record function failure due to seat heating controller not receiving 0x1A6 message	1.The power supply voltage is 9~. Within 16 V range; 2. One second after power-on; 3.The engine is not in crank state; 4.No Bus-Off fault; 5. The message from EMS is not received for 1 second.(ID 0x1A6)	External ECU fault	Check whether EMSs send 0x1A6 messages normally. Check whether there is normal cycle 0x1A6 message on the CAN bus. If there is periodic normal 0x1A6 message, check the CAN bus harness at the control box end. If the harness is normal, power on and off again, and check whether the harness returns to normal.

5	U1F4287	Record function failure due to seat heating controller not receiving 0x 262 message	1.The power supply voltage is 9~. Within 16 V range; 2. One second after power-on; 3.The engine is not in crank state; 4.No Bus-Off fault; 5.The message from PEPS is not received for one consecutive second.(ID 0x 262)	External ECU fault	Check whether PEPS sends 0x 262 message normally. Check whether there is 0x 262 message of normal cycle on can bus. If the existence period is normal 0x 262 message, check control Box end CAN bus harness. If the harness is normal, power on and off again, and check whether the harness returns to normal.
6	U1F4387	Record function failure due to seat heating controller not receiving 0x 506 message	1.The power supply voltage is 9~. Within 16 V range; 2. One second after power-on; 3.The engine is not in crank state; 4.No Bus-Off fault; 5. Not more than one continuous second	External ECU fault	Check whether HU sends 0x 506 message normally. Check whether there is 0x 506 message of normal cycle on can bus.

			Receive message from HU (ID 0x506)		If the existence period is normal 0x 506 message, check control Box end CAN bus harness. If the harness is normal, power on and off again, and check whether the harness returns to normal.
7	U1F4487	Record function failure due to seat heating controller not receiving 0x38D message	1.The power supply voltage is 9~. Within 16 V range; 2. One second after power-on; 3.The engine is not in crank state; 4.No Bus-Off fault; 5.The message from T-Box is not received for one second.(ID 0x38D)	External ECU fault	Check whether T-BOX sends 0x38D message normally. Check whether there is 0x38D message of normal cycle on CAN bus. If there is periodic normal 0x38D message, check the CAN bus harness at the control box end. If the harness is normal, power on and off again, and check whether the harness returns to normal.
8	B1D0711	Driver seat heating high-end output short circuit to ground fault	When the driver side is heated, the high-end short ground time is greater than 40 ms.	Harness fault	Disconnect the driver heating pad line. Measure whether the resistance of heating pad circuit is very small and judge whether the heating pad circuit is short circuit. If the heating pad circuit is short circuit, replace the heating pad. If the heating pad is not short-circuited, measure whether the resistance of the control box driver heating output terminal to ground is very small and judge whether the

					internal circuit of the control box is short-circuited. If the internal circuit of the control box is short-circuited, replace the control box. If the inside of the control box is not short-circuited, try to power on and off again. Check whether the fault is recovered. If the power-on/off fault is still not recovered again, try to replace the control box to see if there is any fault.
9	B1D0713	Driver seat heating high output open circuit fault	When the driver side is heated, the high-end short circuit time is greater than 200 ms.	Harness fault	Disconnect the driver heating pad line. Measure whether the resistance of heating pad circuit is large, and judge whether the heating pad circuit is on.

					Circuit, if the heating pad circuit is open, replace the heating pad. If the heating pad is not open, try to power on and off again, and check whether the fault is recovered. If the power-on/off fault is still not recovered again, try to replace the control box to see if there is any fault.
10	B1D0811	Passenger seat heating high-end output short circuit to ground fault	When the passenger side is heated, the high-end short ground time is greater than 40 ms.	Harness fault	Disconnect the passenger heating pad circuit. Measure whether the resistance of heating pad circuit is very small and judge whether the heating pad circuit is short circuit. If the heating pad circuit is short circuit, replace the heating pad. If the heating pad is not short-circuited, measure whether the resistance of the control box passenger's heating output terminal to ground is very small and judge whether the internal circuit of the control box is short-circuited. If the internal circuit of the control box is short-circuited, replace the control box. If the inside of the control box is not short-circuited, try to power on and off again. Check whether the fault is

					recovered. If the power-on/off fault is still not recovered again, try to replace the control box to see if there is any fault.
11	B1D0813	Front passenger seat heating high-end output open circuit fault	When the passenger is heated, the high-end short circuit time is greater than 200 ms.	Harness fault	Disconnect the passenger heating pad circuit. Measure whether the resistance of heating pad circuit is very large, and judge whether the heating pad circuit is open. If the heating pad circuit is open, replace the heating pad. If the heating pad is not open, try to power on and off again, and check whether the fault is recovered. If the power-on/off fault is not recovered again, try to replace it.

					Check the control box for this fault.
12	B1D0911	Driver seat heating temperature sensor short circuit to ground fault.	The driving temperature sensor has a short ground time greater than 1s.	Harness fault	Disconnect the driver heating pad line. Measure whether the resistance of the main driver temperature sensor is very small, and judge whether the main driver temperature sensor is short circuit; if the main driver temperature sensor is short circuit, replace the heating pad. If the driver temperature sensor is not short-circuited, try to power on/off again and detect whether the fault is recovered. If the power-on/off fault is still not recovered again, try to replace the control box to see if there is any fault.
13	B1D0913	Short supply or open circuit fault of driver seat heating temperature sensor	Short power supply or open circuit time of driver temperature sensor is greater than 1s.	Harness fault	Disconnect the driver heating pad line. Measure whether the main driver temperature sensor resistance is very large, and judge whether the main driver temperature sensor is open circuit; if the main driver temperature sensor is short circuit, replace the heating pad. If the driver temperature sensor is not open circuit, try to power on/off again and detect whether the fault is

					recovered. If the power-on/off fault is still not recovered again, try to replace the control box to see if there is any fault.
14	B1D0A11	Passenger seat heating temperature sensor short circuit to ground fault	The passenger temperature sensor has a short ground time greater than 1s.	Harness fault	Disconnect the passenger heating pad circuit. Measure whether the front passenger temperature sensor resistance is very small; judge whether the front passenger temperature sensor is short circuit; if the front passenger temperature sensor is short circuit, replace the heating pad. If the temperature sensor of the passenger is not short-circuited, try to power on and off again and detect whether the fault is recovered.

					4 If the power-on/off fault is still not recovered again, try to replace the control box to see if there is any fault.
15	B1D0A13	Passenger seat heating temperature sensor short power supply or open circuit fault	The passenger's temperature sensor has a short power supply or an open circuit time greater than 1s.	Harness fault	Disconnect the passenger heating pad circuit. Measure whether the front passenger temperature sensor resistance is very large, judge whether the front passenger temperature sensor is open circuit, and replace the heating pad if the front passenger temperature sensor is open circuit. If the temperature sensor of the passenger is not open, try to power on and off again, and detect whether the fault is recovered. If the power-on/off fault is still not recovered again, try to replace the control box to see if there is any fault.

Fault symptom diagnosis

Check and confirm seat heating

Confirm the customer's seat heating problem, such as faulty vehicle configuration, occurrence time and phenomenon, and usage before the fault.
Visually inspect for visible signs of mechanical or electrical damage.
Inspect the seat heating controller and relevant wiring harness that is easy to see or can be seen to find out whether there is abnormal connection of wiring harness and connector, and whether there is serious wear and damage of cushion cover, etc.
If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step.
If the visual inspection is passed, read the heating controller system version information and fault through the diagnostic scanner. And refer to the fault symptom table for repair.
After completing the fault repair, always clear the

electric adjustment of heating controller fault code.

Confirm the customer's electric adjustment problems, such as the configuration of the faulty vehicle, the occurrence time and phenomenon, and the usage before the fault.
Visually inspect for visible signs of mechanical or electrical damage.
Inspect the seat power adjustment mechanism and relevant harness that is easy to see or can be seen to find out whether there is abnormal connection of harness and connector, whether the adjustment mechanism is interfering, loose, broken, etc.
If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step.
If the visual inspection is passed, refer to the symptom table for repair.

Appearance check list

Seat heating appearance check list

Mechanical part	Electrical part
Cushion cover	Heating controller Driver's seat heating adapter harness driver's seat heating pad and its own harness passenger's seat heating pad and its own harness

Appearance check list of electric adjustment of seat

Mechanical part	Electrical part

Power button Electric slide axle, flexible shaft and motor Electric slide rail Height adjustment motor and gear set Seat basin frame Recliner motor Recliner and connecting rod	Electric switch Electric adjustment harness

Fault symptom table

Heating system

If the fault occurs but no DTCs are stored in the control module and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
No heating display and no heating function	Abnormal host communication	Refer to Heating No Heating Display and Heating No Function Diagnostic Procedure
	Is the heating controller software in abnormal state	
	Heating function relay burns	
	Heating controller hardware damage	
No heating display but heating function is normal	Abnormal heating controller software	Reference Heating No Heating Display but Heating Function Normal Flow

Power seat adjustment

Perform electric adjustment fault diagnosis and rule out according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Power seat front and rear adjustment, height adjustment and backrest angle adjustment all fail	Seat power adjustment power supply relay burns open circuit or short circuit of body harness Open circuit or short circuit of seat power adjustment harness Power switch damaged	Refer to the failure diagnosis process of power seat fore-and-aft adjustment, height adjustment and backrest angle adjustment.
Electric front and rear adjustment fails, and other electric adjustment functions are normal.	Front and rear adjustment motor is damaged Power adjustment front and rear adjustment harness branch open circuit or short circuit power switch damage	Refer to power seat front and rear adjustment failure, other power adjustment function normal diagnostic process
Electric height adjustment fails and other electric adjustment functions are normal.	Height adjustment motor damaged Power height adjustment harness branch open circuit or short circuit power switch damage	Refer to the normal diagnostic process of power seat height adjustment failure and other power adjustment functions.
Electric backrest angle adjustment fails and other electric adjustment functions are normal.	Backrest angle adjustment motor damaged Power backrest angle adjustment harness branch open circuit or short circuit power switch damage	The reference electric backrest angle adjustment fails and other electric adjustment functions are normal.

Seat heating function failure

Heating No Heating Display and Heating No Function Diagnostic Process:

Test procedure	Details/Results/Measures
1. Check whether the heating signal of the host is sent normally.	Check whether the host heating signal is sent normally: Connect vehicle diagnostic interface with CANoe equipment; Touch the seat heating switch and check the Bcan network to see if there is heating signal delivered by the host and if the delivered signal is correct

	? Yes, go to step 2; ? No, refer to the main unit maintenance section Repair main unit.
2. Check whether the heating controller software is in abnormal state.	Check whether the heating controller software is in abnormal state: Disconnect the battery negative or lower seat heating and body harness connector, and manually reset the heating controller. Confirm whether the heating function operates normally after resetting. ? Yes, confirm that the heating controller software status is abnormal. ? No to step 3.
3. Check whether the heating function relay is damaged.	Check heating function relay for damage: Replace the heating function relay and confirm whether the heating function is restored to normal. ? Yes, confirm that the heating function relay is damaged. ? No, go to Step 4.
4. Check whether the heating controller hardware is damaged.	Check heating controller hardware for damage: Replace the heating controller and confirm whether the heating function returns to normal. ? Yes, confirm that the heating controller hardware is damaged. ? No, find the cause of the fault from other symptoms.

Heating No heating display but seat cushion heating function normal diagnostic process:

Test procedure	Details/Results/Measures
1. Check whether the heating controller software is in abnormal state.	Check whether the heating controller software is in abnormal state: Disconnect the battery negative or lower seat heating and body harness connector, and manually reset the heating controller. Confirm whether the heating function operates normally after resetting. ? Yes, confirm that the heating controller software status is abnormal. ? No, find the cause of the fault from other symptoms.

Seat power adjustment failure

Power seat front and rear adjustment, height adjustment, backrest angle adjustment all failure diagnosis process

Diagnostic steps	Details/Results/Measures
1. Check whether the seat power supply relay is damaged.	Check whether the seat power supply relay is burned out: Replace the power seat power relay and confirm whether the power adjustment function returns to normal. ? Yes, confirm the power seat power relay is damaged; ? No, go to step 2.
2. Check whether the seat electric adjustment body harness path is open circuit or short circuit.	Check seat power adjustment body harness passage for open circuit or short circuit: Unplug the power adjustment connector under the seat, test the voltage, resistance and current signals of the harness terminal connector with a multimeter, and judge whether the circuit is open or short. ? Yes, refer to Wiring Harness Repair section Repair Wiring Harness; ? No, go to step 3.
3. Check seat power adjustment harness for open circuit or short circuit	Check seat power adjustment harness path for open circuit or short circuit: Remove the seat outer shield, remove the power switch connector, use a multimeter to test the voltage, resistance and current signals of the harness terminal connector, and judge whether the circuit is open or short. ? Yes, replace the seat harness; ? No, go to Step 4.

4. Check whether the electric adjustment switch is damaged.	Check seat power adjustment switch for damage: Replace the seat power adjustment switch and confirm whether the function is restored to normal.

	? Yes, confirm as switch fault; ? No, find the cause of the fault from other symptoms.

Power seat front and rear adjustment failure, other power adjustment function normal diagnostic process:

Diagnostic steps	Details/Results/Measures
1. Check whether the front and rear adjustment motors of seat electric adjustment are damaged.	Inspect the front and rear adjustment motors of seat power adjustment for damage: Pull out connector of front and rear adjustment motor of seat electric adjustment, press front and rear adjustment button, use multimeter to test voltage, resistance and current signal of connector of harness end, and judge whether there is open circuit or short circuit. ? Yes, go to step 2; ? No, replace the seat power track assembly.
2. Inspect whether the power switch is damaged.	Check power switch for damage: Remove the seat outer shield, replace the seat power adjustment switch, and confirm whether the function is restored to normal. ? Yes, confirm the electric switch is damaged; ? No, replace the seat power adjustment harness. If the function is still normal, find out the cause of the fault from other symptoms.

Normal diagnostic process of power seat height adjustment failure and other power adjustment functions:

Diagnostic steps	Details/Results/Measures
1. Check whether the seat electric height adjustment motor is damaged.	Check seat power height adjustment motor for damage Unplug the seat electric height adjustment motor connector, press the height adjustment button, use a multimeter to test the voltage, resistance and current signals of the harness end connector, and judge whether the circuit is open or short. ? Yes, go to step 2; ? No, replace the seat basin assembly.
2. Check whether the electric switch is damaged.	Check power switch for damage: Remove the seat outer shield, replace the seat power adjustment switch, and confirm whether the function is restored to normal. ? Yes, confirm the electric switch is damaged; ? No, replace the seat power adjustment harness. If the function is still normal, find out the cause of the fault from other symptoms.

Electric backrest angle adjustment fails and other electric adjustment functions are normal:

Diagnostic steps	Details/Results/Measures
1. Check whether the electric seat back angle adjustment motor is damaged.	Check seat power backrest angle adjustment motor for damage: Pull out the connector of seat electric backrest angle adjustment motor, press the backrest angle adjustment button, test the voltage, resistance and current signal of harness end connector with a multimeter, and judge whether there is open circuit or short circuit. ? Yes, go to step 2; ? No, replace backrest assembly.
2. Check whether the electric switch is damaged.	Check power switch for damage: Remove the seat outer shield, replace the seat power adjustment switch, and confirm whether the function is restored to normal. ? Yes, confirm the electric switch is damaged; ? No, replace the seat power adjustment harness. If the function is still normal, find out the cause of the fault from other symptoms.

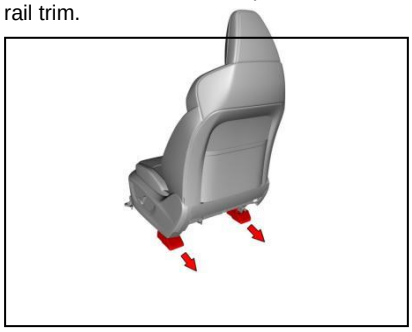
Removal and installation

Front row seat assembly

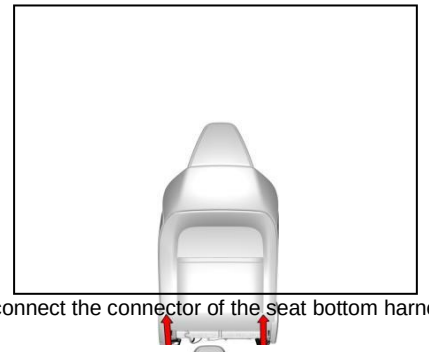
Disconnect battery negative harness

First move the front seat to the front-most position, and remove the front retaining bolts of the seat with a ratchet wrench and No. 13 socket. Torque: 45 Nm.

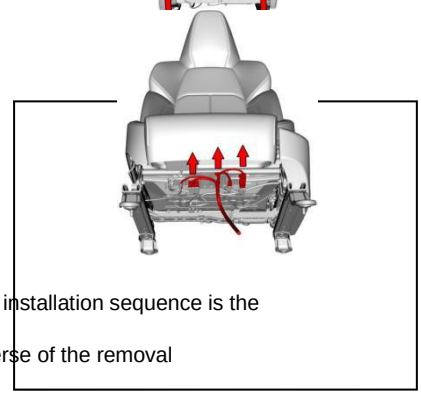
Move the seat to the front-most position, and use a rubber hammer to strike the rear of the vehicle to remove the rear left and right slide rail trim.



Then use a ratchet wrench and No. 13 socket to remove the seat rear retaining bolt, torque: 45 Nm.



Disconnect the connector of the seat bottom harness, pry open the harness clips with a screwdriver, and remove the front seat.



The installation sequence is the

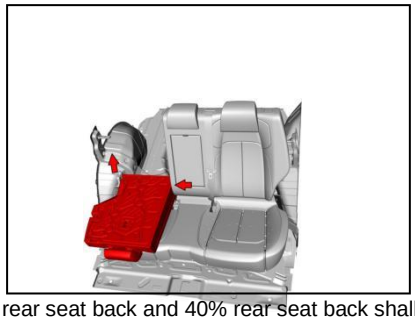
reverse of the removal

sequence. Rear row seat

assembly

Turn the unlocking handle forward and put down 40% of the seat back.

Open the trim cover at 40% seat back pivot, pull out the seat pivot in the direction of U-shaped groove opening, and then pull out the pivot at the other end of the seat back horizontally outwards.



60% rear seat back and 40% rear seat back shall be removed in the same way. The 60% rear seat back is equipped with rear middle passenger seat belt, which is removed and placed in the trunk.

Remove the seat belt mounting screws.

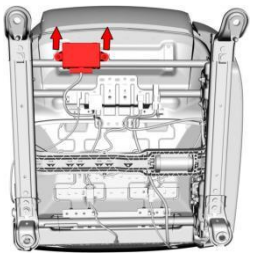
Remove the two mounting screws connecting the rear end of the passenger three-person seat cushion assembly to the vehicle body, and lift both sides of the cushion upward to release the cushion from the cushion mounting clips. Rear row seat large cushion retaining bolt torque: 30N.m.

Remove the rear middle seat belt mounting screws and remove the 60% rear seat back. Rear middle seat belt retaining bolt torque: 69N.m.

The installation sequence is the reverse of the removal sequence.

Seat heating controller

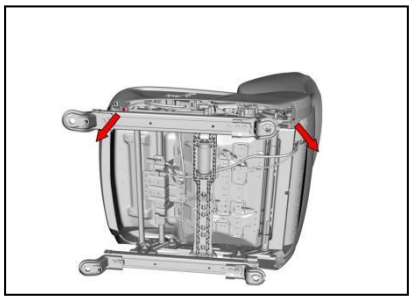
The seat heating controller is arranged under the driver's seat. When removing, use a cross screwdriver to remove the lower screw, pull out the seat heating controller connector, and remove the heating controller. Installation is the reverse of the procedure for removal.



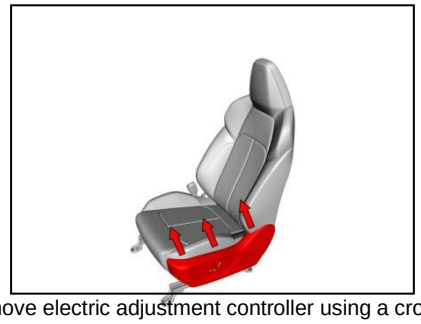
Seat adjustment motor

Remove front seat and pry off the adjustment button cover using a flat screwdriver.

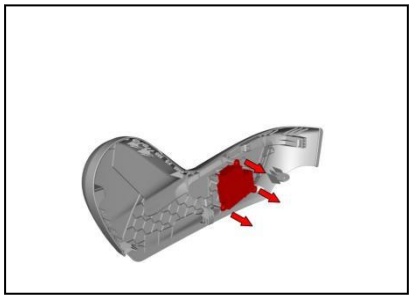
Put the seat down and use a cross screwdriver to remove the guard plate and install the tapping screw.



Unclip the outer seat guard in the direction of arrow, remove the wire harness plug, and then remove the outer seat guard.

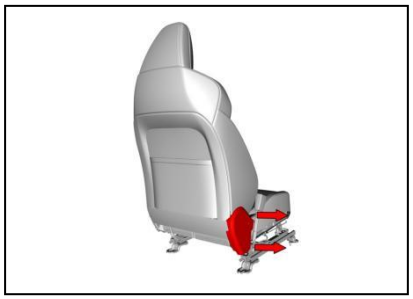


Remove electric adjustment controller using a cross driver.



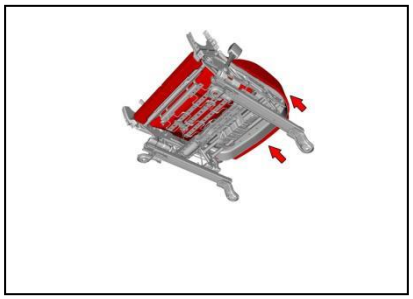
Use a cross screwdriver to remove the inner guard plate retaining screws.

Remove inner side guard outwards.

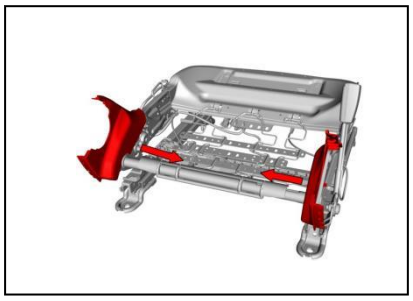


Use ratchet wrench and T50 hexagon socket insert to remove the connecting bolts of seat cushion and backrest, and the seat backrest and seat cushion can be separated.

Use a flat screwdriver to remove the seat cushion foam cover assembly and seat basin frame connecting buckle, and remove the seat cushion foam cover assembly.



Remove inner cover plate of guard plate.



Spare parts atlas

F271101 F271103

Multi-Function Mirror Specifications

Exterior rearview mirror is one left and one right. Because the driver is on the left side, the left and right exterior rearview mirrors are not completely symmetrical to meet the driver's visual field requirements.

Composition and position distribution

Composition

Serial number	Name
1	Lens(Some models are equipped with lens electric heating, and there is electric heating symbol on the glass.)
2	Parallel line prompt lamp(Only some models have corresponding pattern symbols on glass lenses.)
3	Lens regulator
4	Frame
5	Mirror body bracket
6	Mirror cover
7	Side turn signal lamp
8	Power folder(For manual folding configuration, the corresponding shaft and spring)
9	Rotary surface cover plate
10	Lens base
11	Lens base lower cover plate
12	Mirror housing

13	Panoramic camera(Only for some models, left side without camera and right side with blind spot camera for other models)
14	Aluminum alloy frame
15	Gasket
16	Hole blocking foam
17	Harness connector bracket
18	Harness connector
19	Waterproof foam strip

Position

The exterior rearview mirror is installed in the area of the front quarter window.

System functional principle introduction

All functions of exterior rearview mirror include: Lens electric adjustment (1), lens electric heating (2), parallel auxiliary prompt lamp (3), power folding (4), camera (5), side turn signal lamp
(6) .

In the above functions, only the lens electric adjustment (1) is available for all models. Camera (5) is divided into two cases: One is left and right panoramic camera; There is no camera on the left side and a side-visible camera on the right side. The two cameras correspond to different models.

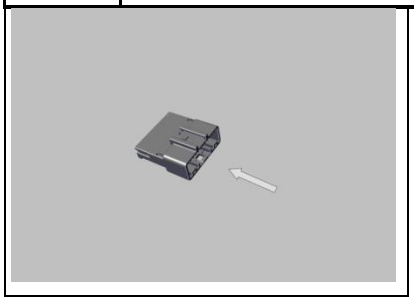
Inspection of part structure principle

Rearview mirror assembly

Connector assembly on exterior rearview mirror assembly, according to the direction of arrow shown in the figure, the pins are defined as follows:

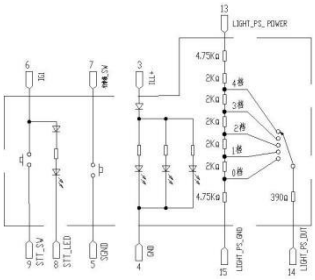
Serial number	Function description
1	Lens up and down adjustment

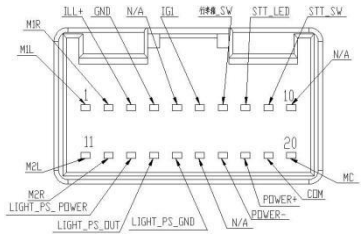
2	Lens adjustment common end
3	Lens left and right adjustment
4	Side turn signal lamp ground wire
5	Side turn signal lamp power supply
6	Electric heater power supply
7	Power folding
8	Electric reset
9	Parallel line prompt lamp power supply
10	Parallel line prompt lamp ground wire



Functional structure of instrument panel switch box

Instrument panel switch box includes rearview mirror direction adjustment switch, rearview mirror folding switch, rearview mirror selection switch, idle start/stop switch, power tailgate control switch and headlamp height adjustment switch. Schematic diagram and pin definition of PIN





Pin pin	Function abbreviation	Input/output	Function description
1	M1L	Output	Left rearview mirror up and down output
2	M1R	Output	Right rearview mirror up and down output
3	ILL+	Input	Backlight power supply input
4	GND	Input	Ground
5	NA	NA	NA
6	IG1	Input	Power input
7	NA	NA	NA
8	STT_LED	Output	STT indicator lamp control
9	STT_SW	Output	STT switch signal output
10	NA	NA	NA
11	M2L	Output	Left and right output of left rearview mirror
12	M2R	Output	Right rearview mirror left and right output
13	LIGHT_PS_POWER	Input	Headlamp adjustment power supply
14	LIGHT_PS_OUT	Output	Headlamp adjustment output
15	LIGHT_PS_GND	Input	Headlamp adjustment ground
16	NA	NA	NA
17	POWER-	Input	Motor power supply ground
18	POWER+	Input	Positive pole of motor power supply
19	COM	Output	Common terminal
20	NA	NA	NA

Common methods

Fault symptom diagnosis

Inspection and confirmation

Through lens adjustment, check whether the upper and lower adjustment functions of left and right lenses are normal.

If there is electric heating symbol on the lens, turn on the switch on the instrument panel and wait for about 5~10 minutes. If there is obvious fever on the lens by touching it with your hand, it indicates that the heating function of the lens is normal. If there is no electric heating symbol, it means no electric heating function.

Key lock the vehicle and check whether the exterior rearview mirror is folded normally. Unlock the key and check whether the exterior rearview mirror resets normally. Press the folding switch on the instrument panel to check whether the exterior rearview mirror is normal.
Fold and reset. If there is no folding switch on the instrument, there is no power folding function.
Press the double flash switch on the instrument panel, and check whether the side steering lamp on the exterior rearview mirror flashes normally.
Power on the vehicle, and check whether the parallel line prompt lamp (2) on the left and right lenses is on (about 3s).

Appearance check list

Mirror cover (1) of exterior rearview mirror is high gloss black spraying. The lens base (2), the lens housing (3), the lens frame (4), and the lens base lower cover plate (5) are high-gloss black non-spraying. Check the appearance paint surface of the mirror cover (1) for paint and scratches. Check the appearance of other high gloss black paint-free parts for scratches and other defects.

Fault symptom table

Serial number	Fault symptom table
1	Exterior rearview mirror lens adjustment fails and adjustment direction is abnormal.
2	Lens of exterior rearview mirror is not heated(The glass lens has electric heating symbol before it has electric heating function.)
3	Power folding failure of exterior rearview mirror
4	Power folding of exterior rearview mirror has abnormal sound

5	The side steering lamp of the exterior rearview mirror is not on, and the inside of the side steering lamp is fogged.
6	When the exterior rearview mirror drives at high speed, there is a whistle.

Abnormal sound at rearview mirror during driving

During driving, if there is abnormal sound at the rearview mirror, it may be caused by foreign matter inside. It is necessary to remove the glass lens (1) and mirror cover (2) of the outer rearview mirror and check the foreign matter.

Rearview mirror lens cannot be adjusted

Remove the exterior rearview mirror from the vehicle.
Remove the gasket (1) on the exterior rearview mirror.
Remove the screws (2) on the exterior rearview mirror with a cross-recessed screwdriver.
Pull out the metal piece (3) on the exterior rearview mirror, and then remove the harness connector (4).
Take out the harnesses a, b and c on the connector, and separately connect 12 V power supply to check whether the lens adjustment function is normal. Where a corresponds to the up and down adjustment of exterior rearview mirror lens, b corresponds to the common end, and c corresponds to the left and right adjustment of exterior rearview mirror lens.
If the external rearview mirror lens adjustment is normal, the adjustment failure is related to the vehicle control system; If the lens adjustment of exterior rearview mirror is abnormal, replace the exterior rearview mirror.

Locking mirror cannot be folded

For the exterior rearview mirror with electric folding function, press the power folding button, the exterior rearview mirror can be folded and reset, but the vehicle key is used for locking and unlocking, the exterior rearview mirror cannot be folded and reset, because the body controller is faulty, and the exterior rearview mirror has no problems. In this case, check and repair the body controller.

For exterior rearview mirror with electric folding function, press power folding button, exterior rearview mirror cannot be folded and reset, but use vehicle key to lock and unlock, exterior rearview mirror can be folded and reset, because power folding switch has fault, and exterior rearview mirror has no problem. This situation requires checking and repairing the power folding switch.

For exterior rearview mirror with electric folding function, press power folding button, or lock and unlock with vehicle key, exterior rearview mirror cannot be folded or reset, replace new exterior rearview mirror, and the fault disappears, which indicates that exterior rearview mirror has fault. In this case, the faulty part shall be returned to the manufacturer of exterior rearview mirror for inspection and maintenance.

Removal and installation

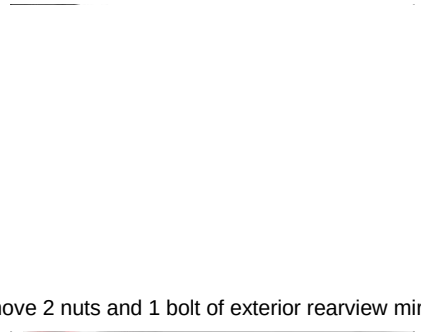
Left and right rearview mirror assembly outer rearview mirror

Removal

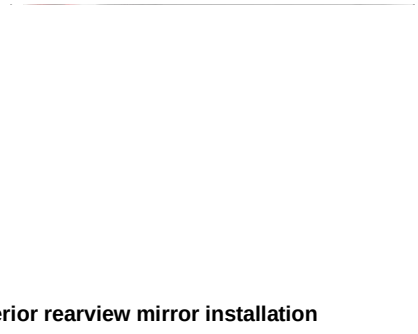
Remove front door interior trim panel, refer to Removing and installing front door interior trim panel

Remove front door trim window trim, refer to Removing and installing front door trim window trim.

Remove connector of exterior rearview mirror assembly. For a leaded panoramic camera, also remove the corresponding panoramic camera connector.



Remove 2 nuts and 1 bolt of exterior rearview mirror with sleeve.



Exterior rearview mirror installation

The installation sequence is the reverse of the removal sequence.

Instrument Panel Switch Box Removal and Installation

Before removing the instrument panel switch box, first remove the lower guard of the driver; refer to Removing and Installing;

After removing the driver's lower guard plate, unscrew the switch mounting screws with a hexagon socket screwdriver, torque: 1±0.2N.m, remove the instrument panel switch box, and pull out the connector;

The installation sequence is the reverse of the removal sequence.

Spare parts atlas

F271002

Specification of power tailgate

Name	Specifications	Remarks
Operating temperature	-30℃~85℃	
Working voltage	9V~16V	
Maximum working current	25A	
Locked current	≤30A	

Composition and position distribution

Power tailgate system consists of controller (2), drive rod (4), balance rod (1) and power tailgate lock (3).

System functional principle introduction

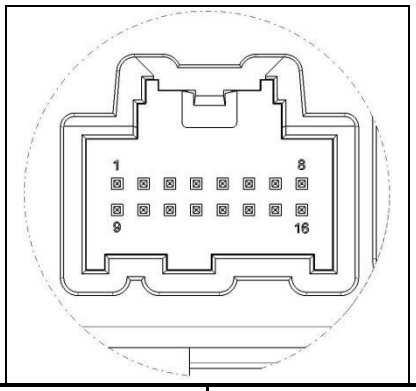
The power tailgate assembly consists of drive rod, balance rod, bracket, harness, power tailgate lock, controller and control button.

The working principle of the electric support rod is to realize the optimal design of the electric support rod through the motion mechanics calculation, and realize the optimal solution by adjusting the torque of the motor, gearbox gear ratio, lead of the screw rod, spring force value and other variables. Drive lever is controlled by ECU controller to realize smooth operation. Active learning, tailgate soft stop, intelligent anti-pinch. Small door opening noise, with temperature protection, voltage protection, and can handle malicious operation. With sound prompt function. It has fault prompt function and can instruct maintenance personnel to overhaul products according to alarm prompt.

Inspection of part structure principle

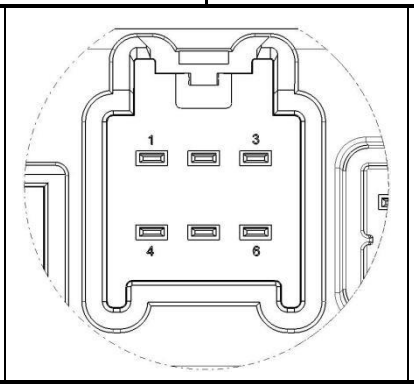
Tailgate controller

The tailgate controller mainly controls the door speed of the tailgate and has built-in safety protection functions, such as anti-pinch and anti-collision (collision contact anti-pinch). The tailgate controller works in cooperation with the on-board computer ECU to control opening or closing the tailgate to ensure vehicle access safety.



Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
1	-	-	-	-	
2	-	-	-	-	
3	Tailgate lower edge switch	Digital signal	9~16 V, rated current 0.01A	Switch pressed to body ground	

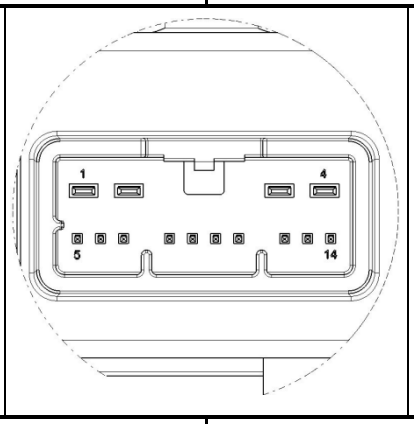
Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
4	-	-	-	-	
5	Semi-lock switch	Digital signal	9~16 V, rated current 0.01A	Body ground when fully unlocked	
6	Full lock switch	Digital signal	9~16 V, rated current 0.01A	Body ground when fully unlocked	
7	CAN L	Can bus	-	-	
8	-	-	-	-	
9	-	-	-	-	
10	-	-	-	-	
11	-	-	-	-	
12	Driver side switch	Digital signal	9~16 V, rated current 0.01A	Switch pressed to body ground	
13	-	-	-	-	
14	Lock reset switch	Digital signal	9~16 V, rated current 0.01A	Grounding the body when the fan teeth of the lock are not in place	
15	CAN H	Can bus	-	-	
16	Signal ground	GND	0V	Always ground the body	



Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
1	Positive pole of self-priming motor/negative pole of unlocking motor	PWM signal	0~16V	Close the tailgate to the half-lock position to trigger self-suction or trigger the electric door opening or electric unlocking with the switch.	
2	Self-priming motor negative/unlocking motor positive	PWM signal	0~16V	Close the tailgate to the half-lock position to trigger self-suction or trigger the electric door opening or electric unlocking with the switch.	
3	30a power supply positive	Power supply	9~16V	-	Supply power to motor

4	10a power supply positive	Power supply	9~16V	-	Supply power to ECU
5	-	-	-	-	

Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
6	Power supply ground	GND	0	Always ground the body	

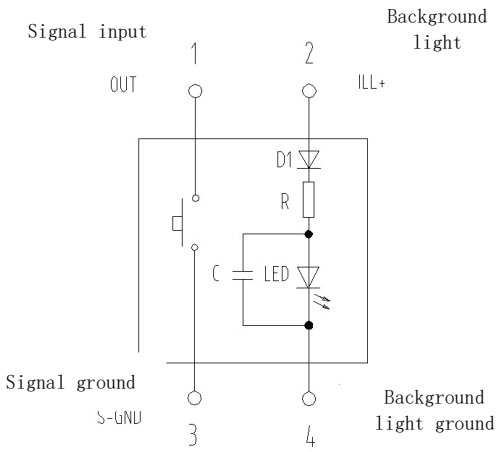


Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
1	Pole motor door closing positive pole/pole motor door opening negative pole	PWM signal	0~16V	Trigger electric door opening or closing with switch	
2	Pole motor door closing negative/pole motor door opening positive	PWM signal	0~16V	Trigger electric door opening or closing with switch	
3	-	-	-	-	
4	-	-	-	-	
5	-	-	-	-	
6	-	-	-	-	
7	-	-	-	-	
8	Hall sensor power supply	Power supply	9~16V	-	
9	Hall signal 1	PWM signal	9~16V	Alternating high and low levels during tailgate movement	
10	Hall signal 2	PWM signal	9~16V	Alternating high and low levels during tailgate movement	
11	Hall signal ground	GND	0	Always ground the body	
12	-	-	-	-	
13	Buzzer	PWM signal	0~16V	Trigger electric door opening or closing with switch	
14	Buzzer grounding	GND	0	Always ground the body	

Interior tailgate opening switch

Refer to Instrument Panel Switch Box chapter

Schematic diagram of power tailgate exterior closing switch and definition of pin PIN



Signal output

Background light

Signal ground

Background light ground

Pin	Function abbreviation	Input/output	Function description	Signal type
1	OUT	Output	Control signal output	Low efficiency
2	ILL+	Input	Background light power supply	PWM
3	S-GND	Input	Control signal ground	GND
4	GND	Input	Background photoelectric source ground	GND

Height learning switch

When the controller is powered on, if the maximum opening degree has not been learned, it is necessary to execute an effective opening action to make the tailgate locked at the mechanical limit. The controller records the Hall pulse number of locked rotation at this time as the maximum opening degree of the system. The controller supports the user to set the user-defined opening degree. When the tailgate is opened to the user-specified opening degree, make the tailgate hover, and long press the tailgate button for 3s to trigger the user-defined opening degree learning.

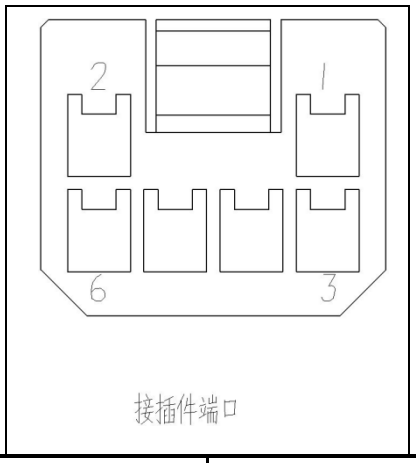
Self-suction tailgate lock

Self-suction tailgate lock is mainly used to lock/unlock tailgate to ensure normal opening/closing of tailgate.

1	Full lock switch +
2	Half lock switch +
3	Grounding
4	Motor +
5	Motor -
6	Reset switch

Electric strut

Electric strut system includes drive rod and balance rod, drive rod body, including PCB board, drive motor, speed reduction mechanism, screw mechanism, spring and sleeve; Balance bar body, including friction mechanism or air support rod, spring and outer sleeve.



Pin number	Function description
1	Close door
2	Door opening
3	Hall power supply
4	Hall signal 1
5	Hall signal 2
6	Hall ground

Tailgate alarm speaker

The tailgate alarm speaker is integrated with the tailgate lock self-suction lock. The controller issues different buzzer reminders according to different operation modes. The reminder mode is as follows:

Mode No.	Period	Number of times	Remarks
Sound mode 1	Cycle 1S, off 100%	Continuous	Buzzer silence
Sound mode 2	Cycle 1S, ON 50%, OFF 50%	Continuous	Door opening and closing prompt
Sound mode 3	Cycle 1S, ON 100%	1	Self-learning is successful; Custom opening setting succeeded
Sound mode 4	Cycle 0.6 S, ON 50%, OFF 50%	3	Trigger pinch-and-lock event and abuse mode
Sound mode 5	Cycle 0.6 S, ON 50%, OFF 50%	2	Door opening conditions are not satisfied; Learning conditions are not met

DTC Diagnostic

Fault code description of tailgate controller

Fault code	Meaning	Triggering conditions	Possible fault causes	Maintenance steps
U1F0087	Bus communication fault	GW_1A8 message missing	Can bus fault Gateway fault GW_1A8 related module fault	Check CAN bus on/off with diagnostic scanner Check gateway status with diagnostic scanner Check GW_1A8 related module on/off with multimeter
U1F0187	Bus communication fault	GW_ 187 message missing	Can bus fault Gateway fault GW_ 187 relevant module fault	Check CAN bus on/off with diagnostic scanner Check gateway status with diagnostic scanner Check GW_1A8 related module on/off with multimeter
U1F0287	Bus communication fault	BCM_28B node missing	Can bus fault BCM fault	Check CAN bus on/off with diagnostic scanner Check BCM on/off with diagnostic scanner
U1F0687	Bus communication fault	BCM_ 298 message missing	Can bus fault BCM fault	Check CAN bus on/off with diagnostic scanner Check BCM on/off with diagnostic scanner
U1F0387	Bus communication fault	AC_ 366 node missing	Can bus fault AC fault	Check CAN bus on/off with diagnostic scanner Check BCM on/off with diagnostic scanner
U1F0588	Bus communication fault	Can bus fault	Can bus fault	Check CAN bus on/off with diagnostic scanner Check BCM on/off with diagnostic scanner
B1D8016	Unstable voltage	Power supply voltage out of range(Low)	Battery voltage too low	Check battery voltage with a multimeter
B1D8017	Unstable voltage	Power supply voltage out of range(High)	Battery voltage too high	Check battery voltage with a multimeter
B1D8111	Strut fault	Brace motor short circuit to ground	Harness J3_1 or J3_2 short circuit to ground Brace internal short circuit to ground PTS module internal short circuit to ground	Check wiring harness J3_2 and J3_1. On-off It is recommended to replace the electric brace. It is recommended to replace PTS module
B1D8112	Strut fault	Brace motor short circuit to power supply	Harness J3_1 or J3_2 is short to power supply. Support rod internal short circuit to power supply PTS module internal short circuit to power supply	1. Check harness(J3_2 and J3_1) It is recommended to replace the electric brace. It is recommended to replace PTS module
B1D8113	Strut fault	Strut motor open circuit	Harness J3_1 or J3_2 open circuit Internal open circuit of strut PTS module internal open circuit	Check wiring harness J3_2 and J3_1 ON/OFF It is recommended to replace the electric support rod. Replacing PTS module
B1D8239	Strut fault	Hall sensor A error	Harness J3_9 fault Hall sensor fault PTS module internal fault	Use a multimeter to check the wiring harness J3_9 on and off. It is recommended to replace the electric brace. It is recommended to replace PTS module
B1D8339	Strut fault	Hall sensor B error	Harness J3_10 fault Hall sensor fault PTS module internal fault	Check harness J3_ 102 connection/disconnection with a multimeter It is recommended to replace the electric brace.

				It is recommended to replace PTS module
B1D8411	Strut fault	Hall sensor power supply short circuit to ground	Harness J3_8 short circuit to ground Hall sensor internal short circuit to ground PTS module internal short circuit to ground	Check harness J3_8 connection/disconnection with a multimeter Build and replace electric support rod It is recommended to replace the PTS mold.

B1D8567	Tailgate lock fault	Half lock switch open or short	Harness J1_5 fault Lock switch fault PTS module internal short circuit to ground	Check harness J1_5 connection/disconnection with a multimeter It is recommended to replace the lock It is recommended to replace the PTS module.
B1D8568	Tailgate lock fault	Full lock switch open or short	Harness J1_6 fault Lock switch fault PTS module internal short circuit to ground	Check harness J1_6 connection/disconnection with a multimeter It is recommended to replace the lock It is recommended to replace the PTS module.
B1D8569	Tailgate lock fault	Reset switch open or short	Harness J1_14 fault Lock switch fault PTS module internal short circuit to ground	Check harness J1_14 connection/disconnection with a multimeter It is recommended to replace the lock PTS module is recommended.
B1D8611	Tailgate lock fault	Lock motor short circuit to ground	Harness J2_1 or J2_2 short circuit to ground Lock internal short circuit to ground PTS module internal short circuit to ground	Check harness J2_1 and J2_2 with a multimeter On-off It is recommended to replace the lock It is recommended to replace the PTS module.
B1D8612	Tailgate lock fault	Lock motor short circuit to power supply	Harness J2_1 or J2_2 is short to power supply. Lock internal short circuit to power supply PTS module internal short circuit to power supply	Check harness J2_1 and J2_2 with a multimeter On-off It is recommended to replace the lock It is recommended to replace the PTS module.
B1D8613	Tailgate lock fault	Lock motor open circuit	Harness J2_1 or J2_2 open circuit Lock interior open circuit PTS module internal open circuit	Check harness J2_1 and J2_2 with a multimeter On-off It is recommended to replace the lock It is recommended to replace PTS module
B1D8711	Buzzer fault	Buzzer short circuit to ground	Harness J3_13 short circuit to ground Buzzer internal short circuit to ground PTS module internal short circuit to ground	Check harness J3_13 connection/disconnection with a multimeter It is recommended to replace the buzzer. It is recommended to replace the PTS module.
B1D8713	Buzzer fault	Buzzer fault - short circuit to power supply or open circuit	Harness J3_13 short circuit to power supply or harness J3_13 or J3_14 open circuit Buzzer internal open circuit 3.PTS module internal open circuit	Check harness J3_13 and J3_14 ON/OFF It is recommended to replace the buzzer. It is recommended to replace the PTS module.
B1D8811	Switch fault	Lower edge switch short circuit to ground	1.Harness J1_3 short circuit to ground 2.Switch is short to ground 3.PTS module internal short circuit to ground	Check harness J_3 connection/disconnection with a multimeter It is recommended to replace the switch. It is recommended to replace the PTS module.

B1D8911	Switch fault	Driver side switch short circuit to ground	Harness J1_12 short circuit to ground Switch short circuit to ground PTS module internal short circuit to ground	Check harness J_12 connection/disconnection with a multimeter It is recommended to replace the switch. It is recommended to replace PTS module
B1D8B67	Tailgate opening fault	Electric door opening or closing timeout	Lock tailgate misalignment or misalignment of tailgate position or sealing stop	Check whether the lock body enters the buckle smoothly. Whether there is blocking during tailgate opening and closing
B1D8C13	Tailgate opening fault	J2_3 Open circuit or intermittent failure	Wiring harness J2_3 intermittent failure or poor contact	Check J2_3 harness connection/disconnection with a multimeter

Fault symptom diagnosis

Inspection and confirmation

Before operating the power tailgate opening/closing, please check the surrounding environment of the vehicle, make sure that the opening/closing space is sufficient and does not affect the normal traffic of other vehicles and pedestrians, so as to avoid accidents or mechanical accidents of tailgate.

Appearance check list

All parts shall be free of rust, scratch, crack, burr and other defects. The surface of plastic parts shall be flat and free from defects such as influence on use or visible deformation. All movement parts of tailgate lock (with self-suction) assembly shall be flexible, free from jamming and abnormal noise. All friction parts of electric tailgate brace shall be greased, connector port shall be free of deformation, pin shall be free of skew corrosion, glue seal shall be free of defects such as leakage.

Fault symptom table

Fault symptoms	Possible causes
Power tailgate cannot be opened	Insufficient voltage; Power tailgate system enters the game protection; Drive strut motor overheating, enter thermal protection mode; Strut fault.
Abnormal sound of support rod during opening	The operating ambient temperature is lower than -35℃; Poor lubrication of braces.
Strut leakage	Poor seal of strut
Touch operation button Power tailgate has no action	Door is not unlocked; The electric tailgate system is not powered; Power tailgate system is not self-learning.

Tailgate opening height cannot be set

The tailgate opening height cannot be set. If the controller detects that the learning condition is not met, the user-defined learning fails and the BCM does not flash the turn signal lamp.

Open the tailgate to the opening degree specified by the user, make the tailgate hover, press and hold the tailgate button for 3s to trigger the learning of the customized opening degree, and the setting range of height is from the full opening angle of the tailgate to the half opening angle.

Fault cause cannot be set for tailgate height: Touch button time is less than 3s; The setting height is within the height setting range.

Tailgate cannot be fully closed

Tailgate self-suction lock fault,

tailgate lock does not self-suction.

Power supply fault, check whether

the circuit is connected.

The tailgate controller fails and no lock signal is input.

The strut will fall automatically when rising.

The tailgate equalizer bar fails, and it will automatically fall during electric rising.

The tailgate load (snow or other loads) is too large and the lifting force is insufficient.

Removal and installation

Tailgate controller

Remove right C-pillar trim panel of side wall, refer to Removing and installing C-pillar trim panel

Unplug the tailgate controller harness connector. The tailgate controller is installed by two M6 outer hexagon bolts, as indicated by arrows in the figure below. Tool: Sleeve (08), bolt tightening torque 8±1N.m

The installation sequence is the reverse of the removal sequence.

Interior tailgate opening switch

Refer to Instrument Panel Switch Box chapter

Power tailgate closing switch removal and installation

Open the spring clips at both ends of the switch and remove the power tailgate closing switch;
Press and hold the locking card of harness end connector, and remove the connector;
The installation sequence is the reverse of the removal sequence.

Tailgate lock removal

- Remove trim panel for tailgate, see Removing and installing trim panel for tailgate

-Unscrew retaining bolt of tailgate lock (arrow), tool: T12, bolt Tightening torque 23±2N.m (7.5 ftlb.)

- Remove tailgate lock

Figure 134:

Disconnect tailgate lock connection plug ①②

Take out tailgate lock

Figure 135:

Installation

Install in reverse order. After installation, adjust tailgate lock.

Electric strut

The removal and installation of left tailgate electric brace is described here. The removal and installation of right brace can be generally referred to the left. If it is necessary to remove the tailgate power support rod, the tailgate must be reliably supported by objects, otherwise, the single tailgate power support rod cannot keep the tailgate open.

Removal

When removing the electric support rod with the tailgate open and supported, use a thin straight screwdriver tool. First insert the straight end into the circular circlip of the electric support rod (the position indicated by the arrow), then press the straight end to open the circlip at a certain angle. At this time, the electric support rod can be removed from the body.

Installation

When assembling the electric support rod, align the electric support rod joint with the ball joint pin, and gently tap the support rod to clamp it into the ball joint to complete the assembly.

Spare parts atlas

F270108 F270502

Exterior Body Repair

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Diagnostic Examination and Confirmation of Fault Symptoms

Identify customer issues.

Drive the vehicle in four directions with a test drive evaluation of the wind sound at a speed specified by the customer or higher, setting the inside and outside air circulation switches to internal circulation mode during which all windows, multimedia and air conditioning blower motors are turned off.

Visually inspect the door seal components and body appearance for obvious

damage and deformation or traces of improper assembly. Visual Checklist

Door seal components	Body appearance
Window groove Inner clip strip Outer clamping strip Door seal, door frame seal	Exterior mirrors Front wiper Roof rack Fixed glass

If the apparent cause of the observed or raised problem has been found, the cause must be corrected before proceeding to the next step.

If the visual inspection passes, confirm the fault and refer to the fault symptom table.

Malfunction Symptom Chart

Symptoms	Possible causes	Measures
Air leakage around door	Improper installation of door/door frame seal	Correct installation of door/door frame seals
	Door/door frame seal mating loose	Replace door/door frame seal
	Exterior door storm	Door adjustment
	Scuff plate is not installed properly	Correct installation of scuff plates
	Broken, collapsed or twisted door/door frame seal	Replace door/door frame seal Reference: Removing and installing front door
Air leak near window groove	Window groove is not installed properly	Install window groove correctly
	Improper glass installation	Proper installation of glass
	The window groove does not fit well with the glass guide groove	Affix a sponge of appropriate size to the corresponding position of the glass guide slot
	Broken, collapsed or twisted windows	Replace glass groove
	Glass channel width too large	Adjust glass guide groove to lower opening size Reference: Removing and installing front door
Air leakage at inner clip	Improper installation of inner clip strip	Correct Installation of Inner Clamping Strip
	Inner clip strips not attached to glass	Adjusting door glass and inner clip strip installation position Door opening dimension
	The end of the inner clip is not in contact with the window groove	Adjusting the front and rear positions of the inner clamping strip
	Inner clip strip end seal sponge falls off	Add sealing sponge at the end of inner clip strip
	Broken or twisted inner clip strip	Replace inner clip strip Reference: Removing and installing front door
Air leakage at outer clamping strip	Improper installation of outer clip strip	Proper installation of outer clamping strip
	Outer clip strip and glass are not attached	Adjusting door glass and outer clip strip installation position Door opening dimension
	The end of the outer clamping strip is not in contact with the groove and frame of the window	Adjust the front and rear position of the outer clamping strip, and the outer clamping strip and the window
	Outer clip strip end seal sponge falls off	Paste sponge on contact surface of groove and window frame
	Broken or twisted outer strips	Add sealing sponge at the end of outer clip strip
		Replace outer clip strip Reference: Removing and installing front door
Exterior mirrors sound	Improper mounting of exterior rearview mirror	Correct installation of rearview mirror
	Exterior mirror rain shield is not installed properly	Correctly install rain shield
	Exterior rearview mirror enclosure has excessive outburst, entrapment, or fit clearance	Reinstall the exterior mirror housing and adjust the clearance to the normal range
	Exterior mirror gasket is not installed properly	Install gasket correctly
	Wire harness through-hole seal sponge on outer rearview mirror inner frame is missing or misplaced	Outer rearview mirror inner frame wiring harness through holes filled with sealing sponge to seamless
	Offset of glue line or leakage on both sides of exterior rearview mirror installation sheet metal	Outer rearview mirror mounting position: The offset of glue line or the leakage hole

	Outside rearview mirror base manhole plug is lost	shall be sealed with sealant(Sealant available Telerson)
	Broken exterior rearview mirror	Install outer rearview mirror base access hole plug
	Exterior mirror gasket is broken	Replace exterior rearview mirror Replace exterior mirror gasket Reference: Left and Right Mirror Assembly
Wind at front wiper	Front Wiper Installation Position Too High Front Wiper Damage	Install front wiper correctly Replace front wiper
Wind at roof rack	Improper roof rack installation(Loose, edge warped)	Correct installation of roof rack

	Broken roof rack	Replace Roof Rack Reference: Rack
Air leakage around fixed glass	Poor sealing around fixed glass Fixed glass broken	Reseal Fixed Glass Replace Fixed Glass

Air Leakage Diagnosis Flow at Fixed Glass

Test conditions	Details/Results/Actions
1. Check appearance of fixed glass	
	A. Check whether the fixed glass is broken? ? Yes Replace the fixed glass and confirm that the wind noise level of the faulty vehicle reaches the level of the faulty vehicle. ? No Go to step 2.
2. Check the seal around the fixed glass	
	A. Reseal the fixed glass. Is the wind noise problem repeated at the customer specified speed or higher? ? Yes The fixed glass wind noise level is normal, continue to troubleshoot other wind noise problems. ? No Repair completed.

Wind Noise Diagnostic Flow at Front Wiper

Test conditions	Details/Results/Actions
1. Inspect front wiper appearance	
	A. Inspect the front wiper for damage? ? Yes Replace the front wiper and verify that the faulty vehicle's wind noise level reaches the trouble-free vehicle level. ? No Go to step 2.
2. Check front wiper installation position	
	A. Check whether the front wiper is installed in place? ? Yes The front wiper has normal wind noise levels and continues to troubleshoot other wind noise problems. ? No Reinstall the front wiper and verify that the faulty vehicle's wind noise level reaches the trouble-free vehicle level.

Wind noise diagnosis flow at exterior rearview mirror

Test conditions	Details/Results/Actions
1. Check outside rearview mirror installation	
	A. Check whether there is clearance between exterior rearview mirror and door? ? Yes Reinstall the exterior rearview mirror, repair and adjust the exterior rearview mirror to have no clearance from the door, and confirm that the wind noise level of the faulty vehicle reaches the faulty vehicle level. ? No Go to Step 2
2. Inspect exterior rearview mirror rain shield(Customer add-on)	
	A. Remove rain shield Is the wind noise problem repeated at the customer specified speed or higher? ? Yes Go to Step 3 ? No Correctly install the rain shield and confirm that the wind noise level of the faulty vehicle reaches the fault-free vehicle level.
3. Check exterior mirror housing clearance	
	A. Seal all exterior mirror housing mating gaps with tape Is the wind noise problem repeated at the customer specified speed or higher? ? Yes Go to step 4. ? No Properly install the exterior mirror housing or replace the exterior mirror and verify that the faulty vehicle has a faulty vehicle level of wind noise.
4. Inspect the outer rearview mirror base access hole plug	
	A. Inspect the outer rearview mirror base access hole plug for loss or damage. ? Yes Replace the outer rearview mirror base access hole plug, and confirm that the wind noise level of the faulty vehicle reaches the fault-free vehicle level. ? No Go to Step 5

5. Inspect exterior mirror gasket	
	A. Remove the Excluded Mirror. Inspect the exterior mirror gasket for misalignment or damage? ? Yes Install the exterior mirror gasket correctly or replace the exterior mirror gasket. After restoring the mirror, confirm that the wind noise level of the faulty vehicle reaches the level of the faulty vehicle. ? No Go to step 6.
6. Check harness via seal on outer rearview mirror inner frame	
	A. Remove the mirror gasket Inspect the harness via seal sponge on the outside rearview mirror inner frame for missing or misplaced installation? ? Yes Fill the wiring harness through hole on the inside frame of the exterior rearview mirror with sealing sponge until there is no seam. After restoring the rearview mirror, confirm that the wind noise level of the faulty vehicle reaches the level of the faulty vehicle. ? No Go to step 7.
7. Check the glue on both sides of the exterior rearview mirror installation sheet metal	
	A. Inspect for offset glue lines or leaks on both sides of the exterior mirror mounting sheet metal? ? Yes Outer rearview mirror mounting position: The offset of glue line or the leakage hole shall be sealed with sealant (The sealant can be used with Telesson), and confirm the wind noise level of the faulty vehicle reaches the level of the faulty vehicle after restoring the rearview mirror. ? No The wind noise level of the exterior rearview mirror is normal, continue to check for other wind noise problems.

Door Seal Parts Air Leakage Diagnostic Process

Test conditions	Details/Results/Actions
1. Fully sealed door area	
	A. Use adhesive tape to seal all door gaps, window grooves, inner clip strips and outer clip strips. Note that the adhesive tape should be attached smoothly and the edges of the adhesive tape should be free of warping or flashing. Is the wind noise problem repeated at the customer specified speed or higher? ? Yes The door seal components have normal wind noise levels and continue to troubleshoot other wind noise problems. ? No Go to step 2.
2. Check door/door frame seal	
	A. Tear the tape from any section of the door gap approximately 10 cm long at a time. Is the wind noise problem repeated at the customer specified speed or higher? ? Yes Confirm that the tape is removed as the problem point, refer to the corresponding measures in the fault symptom table for repair and adjustment, and confirm that the wind noise level of the faulty vehicle reaches the level of the faulty vehicle. ? No Go to step 3.
3. Check glass groove seal	
	A. Tear the tape from any section of the glass groove approximately 10 cm long at a time. Is the wind noise problem repeated at the customer specified speed or higher? ? Yes Confirm that the tape is removed as the problem point, refer to the corresponding measures in the fault symptom table for repair and adjustment, and confirm that the wind noise level of the faulty vehicle reaches the level of the faulty vehicle. ? No Go to step 4.
4. Check inner clip strip seal	

	A. Tear the tape from any section of the inner clip strip approximately 10 cm long at a time. Is the wind noise problem repeated at the customer specified speed or higher? ? Yes Confirm that the tape is removed as the problem point, refer to the corresponding measures in the fault symptom table for repair and adjustment, and confirm that the wind noise level of the faulty vehicle reaches the level of the faulty vehicle.

Test conditions	Details/Results/Actions
	? No Go to step 5.
5. Check outer clamp strip seal	
	A. Tear the tape from any section of the inner clip strip approximately 10 cm long at a time. Test drive evaluation at the speed specified by the customer or higher until the wind noise problem recurs. Confirm that the tape is removed as the problem point, refer to the corresponding measures in the fault symptom table for repair and adjustment, and confirm that the wind noise level of the faulty vehicle reaches the level of the faulty vehicle.

Front Body Fender

Removal and installation

Tools

Name	Quantity
Slotted screwdriver	1
Phillips screwdriver	1
Sleeve Assembly	1

Caution The removal and installation of the left-hand fender is described here, and the removal and installation of the right-hand fender is generally referred to the left. Disassembly

Reference: Removing and installing front bumper, nonenone

Open the front left door and unscrew the fender mounting bolts - arrow -. Bolt Tightening torque 9±2N (17 ftlb.).

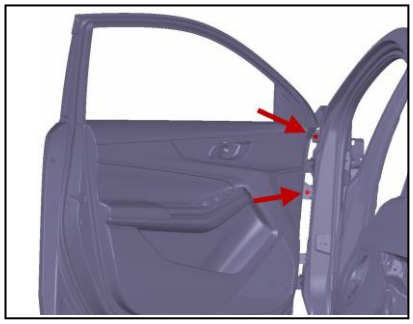


Figure 136:

Unscrew the front bumper side mounting bracket retaining screws - arrow -. Remove the front bumper side mounting bracket (1).

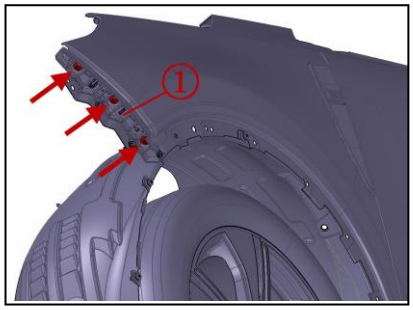


Figure 137:

Unscrew the fender mounting bolts - arrow -. Bolt Tightening torque 9±2N (17 ftlb.).

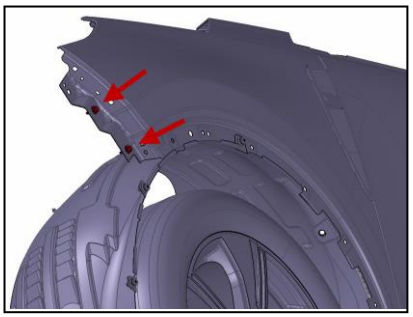


Figure 138:

Remove the front wheel housing panel clips - arrow -, remove the front wheel housing panel (1), and expose the mounting nuts in the lower middle position on the rear side of the fender.

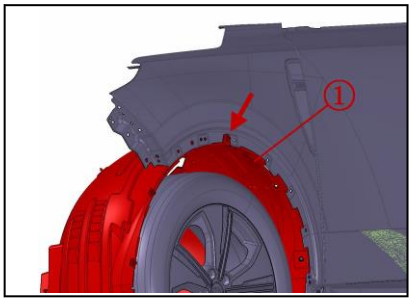


Figure 139:

Unscrew the fender mounting

nuts - arrow -. Nut Tightening

torque 9±2N (17 ftlb.).

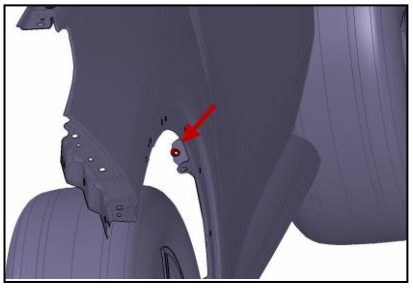


Figure 140:

Unscrew the fender mounting

bolts - arrow -. Bolt Tightening

torque 9±2N (17 ftlb.).

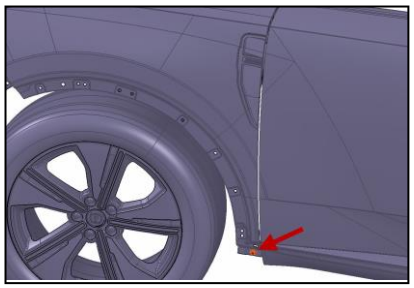


Figure 141:

Unscrew the fender mounting

bolts - arrow -. Bolt Tightening

torque 9±2N (17 ftlb.).

Remove the fender.

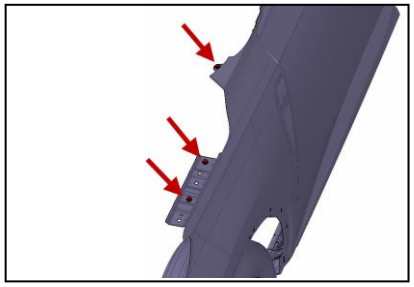


Figure 142:

Installation

Installation is generally performed in reverse order.

Caution The fender shall be installed with care to avoid deformation or paint damage.

F270102

Windshield material specifications

Name	Specifications
1K adhesive	WSKM-2G309-B
2K adhesive	ESK-M2G369-A1
2K Hardener	ESK-M2G369-A2

Removal and installation

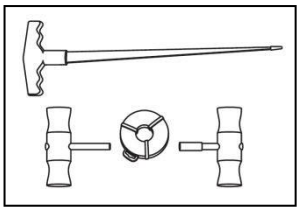


Figure 143:

Windshield

deglue tool hot air

gun

Glue cutter

glue gun

Caution If the ambient temperature is less than 10oC, the PU adhesive should be heated in a furnace for about 15 min or with a hot air gun to about 25oC.

1

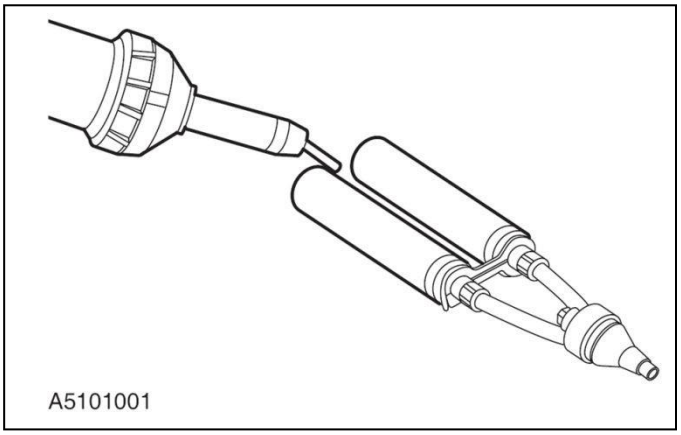


Figure 144:

Disassembly

Disconnect the negative

battery harness.

Reference Battery

Assembly

Remove the front cover trim and wiper arm.

Reference Front Wiper

Remove the inner

rearview mirror.

Refer to Remove

and Install

Remove the A-pillar

left and right trim

panels. Refer to

Remove and Install

Remove front windshield with

special tool. Special tool:

Windshield degluing tool

Warning

Gloves and goggles should be worn when using special tools as debris can occur during cutting. Earplugs should be worn during cutting. Failure to follow these instructions may result in injury.

Caution Care should be taken during cutting to avoid damage to the body or trim panel.

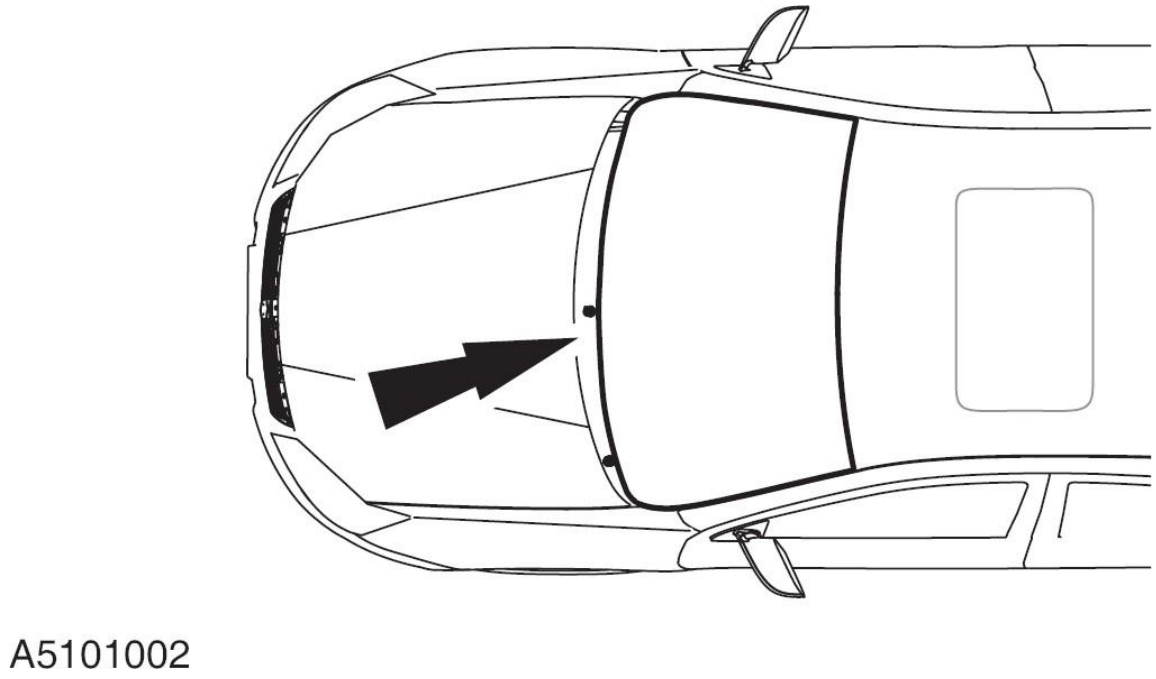


Figure 145:

With the help of other technicians, remove the front windshield with a glass suction cup.

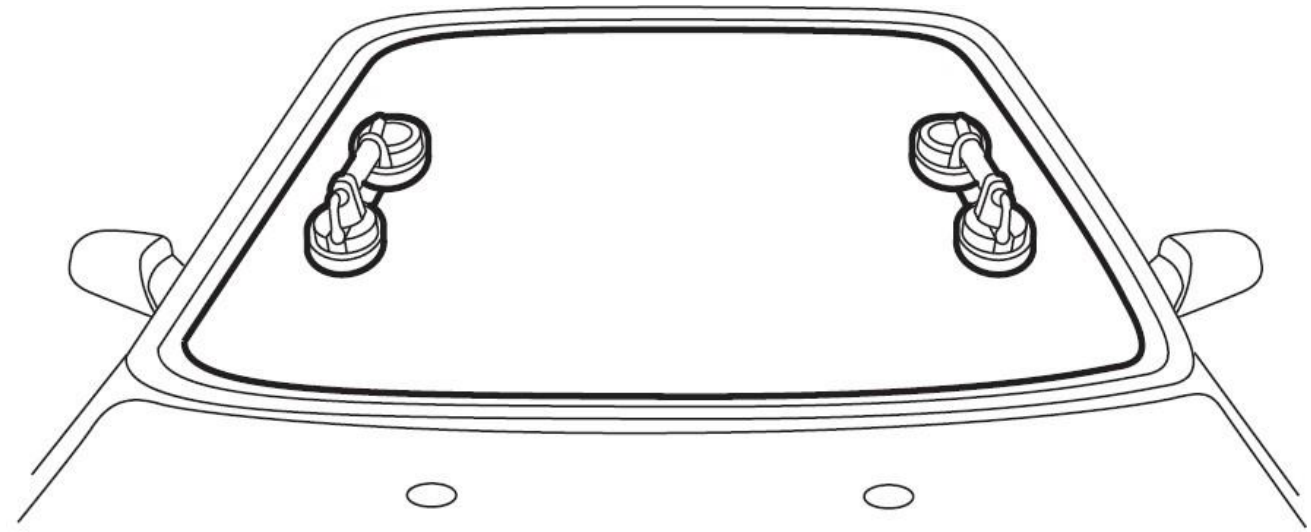


Figure 146:

Installation

Warning

When using PU adhesive, open the door to avoid increasing pressure in the compartment due to door closure.

Warning

Avoid contact with cleaned surfaces, which may affect the bonding effect of the adhesive.

Caution Scratch off excess adhesive overflowing grooves and flanges.

Clean the remaining adhesive in the windshield groove flange.

The sealing area of the weld shall be inspected for damaged metal sheets, rust or irrelevant materials and other substances liable to cause glass breakage.

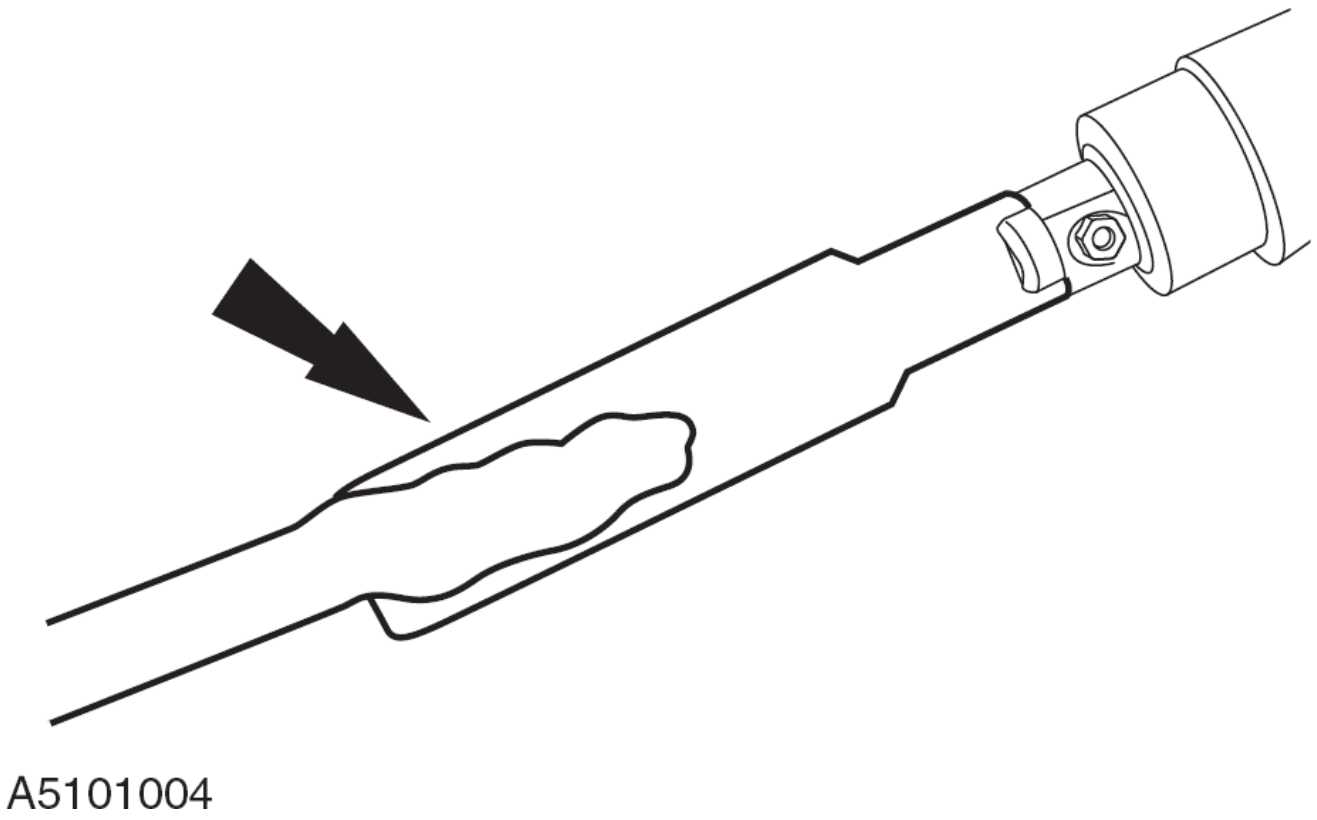


Figure 147:

Control the hot-air gun temperature to 25 ° C to eliminate moisture from the windshield slot flanges and glass adhesive strips.

Caution In order to ensure the use of the adhesive, moisture on all bonding surfaces shall be eliminated.

4.. Prepare PU adhesive, glass and other accessories.

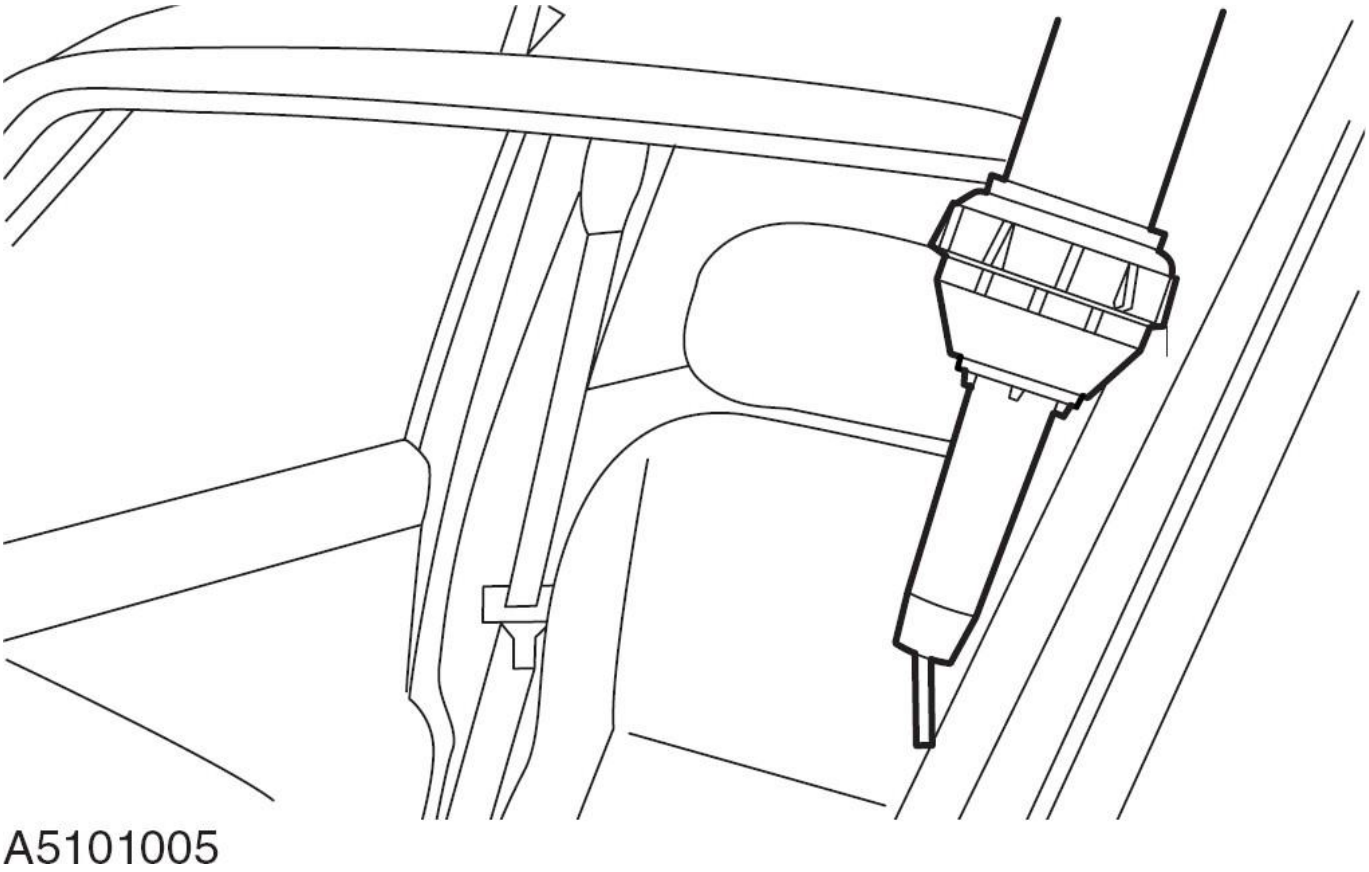


Figure 148:

Apply PU adhesive continuously along the bonding line to the windshield frame edge by a width of 8~10 mm.

Caution In order to prevent water leakage, 20 mm shall be applied repeatedly in any area where the adhesive tape has leakage.

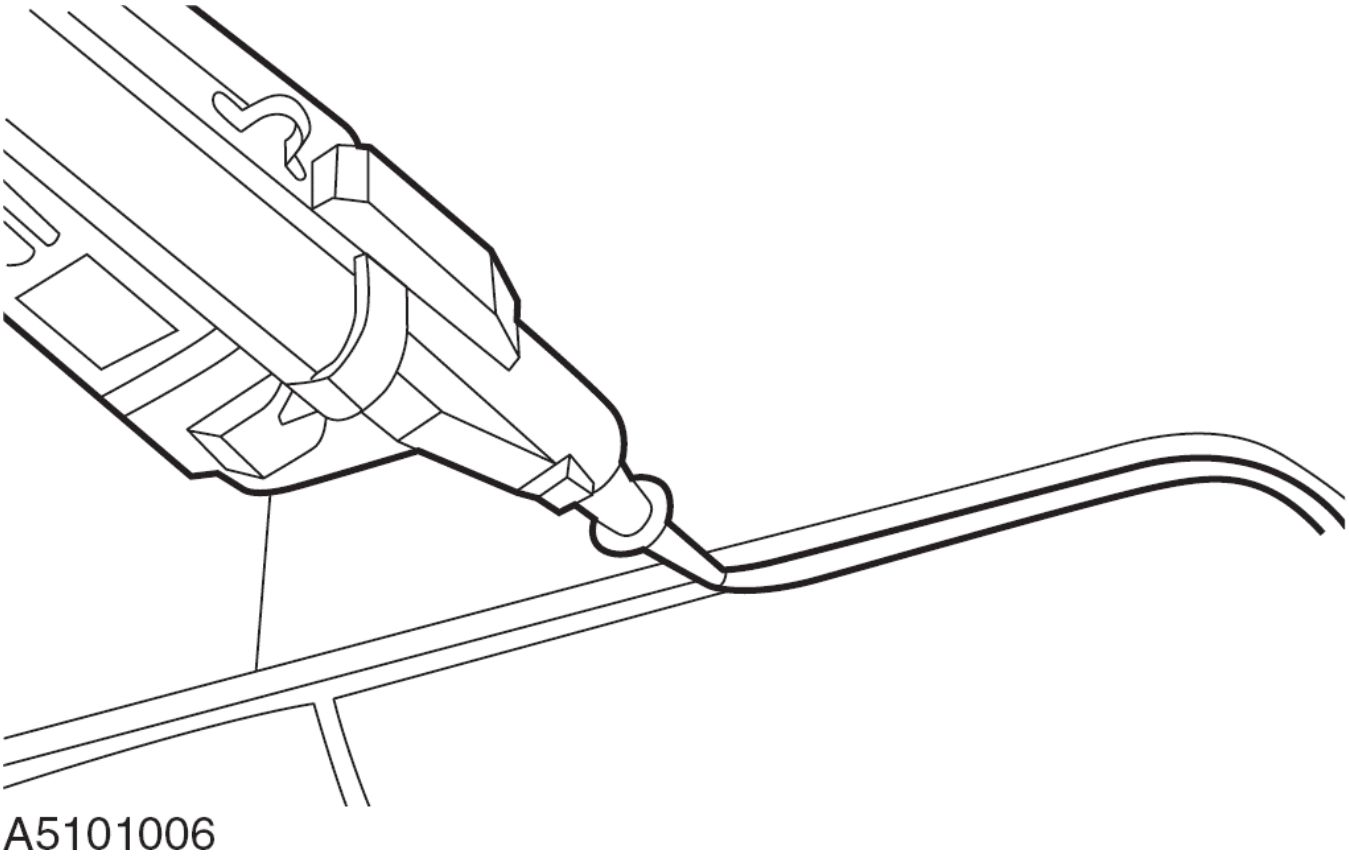


Figure 149:

Use a glass suction cup with the help of another technician to install the windshield.

Caution Press all parts of the glass evenly so that the glass is fully bonded to the adhesive.

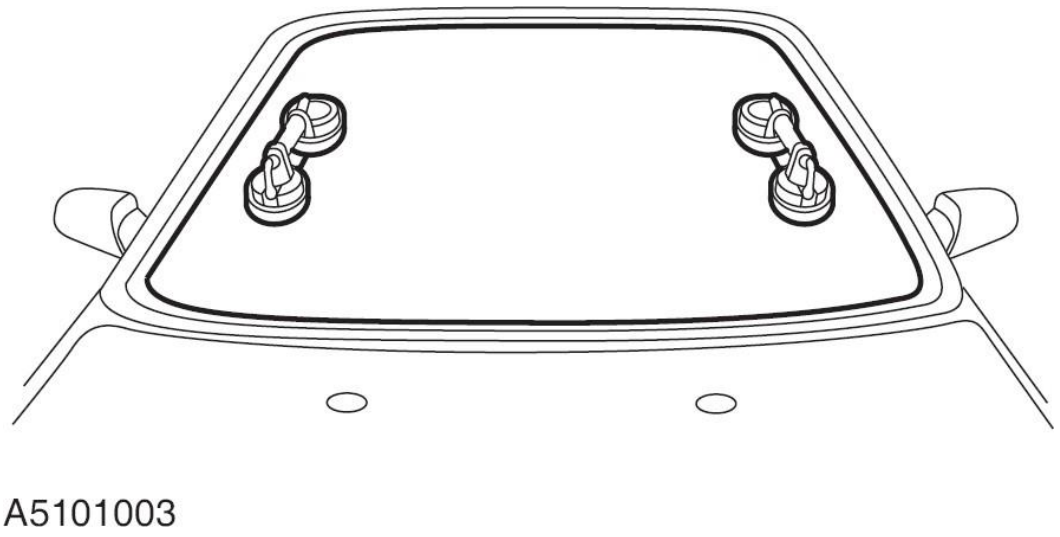


Figure 150:

If the ambient temperature drops below 10℃, use a hot air gun to heat at about 50 mm ° C from the surface for 15 min inside or outside the vehicle.

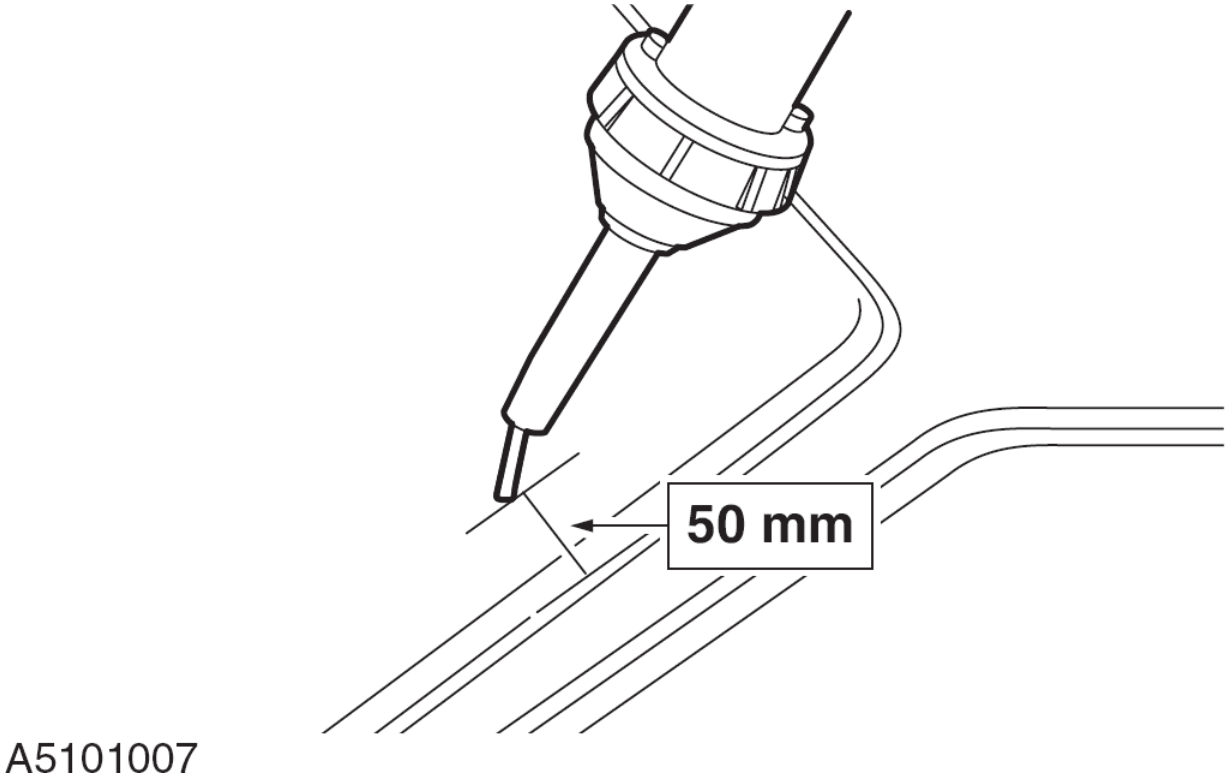


Figure 151:

Install the A-pillar left

and right trim panels.

Refer to Remove and

Install

Install the inside

rearview mirror.

Refer to Remove

and Install

Install the front cover trim and wiper arm.

Connect the negative battery harness.

Reference Battery Assembly

F270501

Cover Plate Cover Front Cover

Removing and installing front cover

Caution Remove and install with the assistance of a service technician. The front cover assembly must be removed in conjunction with another service technician to prevent damage to the windshield. Disassembly

1. Unscrew front cover assembly mounting bolts (left and right) - arrow -

Remove the front cover assembly.

Bolt Tightening torque 33±2N (7.5 ftlb.).

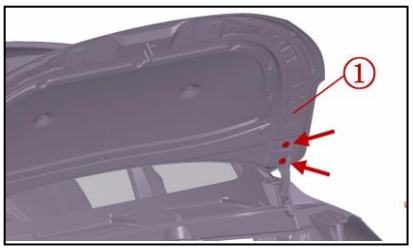


Figure 152:

Installation

Installation is generally in reverse order

Caution Adjust the front cover assembly after installation.

Adjusting the front cover assembly

Loosen (without screwing out) the front cover hinge mounting bolt (front cover side) - arrow - to adjust the front cover assembly (1) for appearance clearance matching.

Rotate the front cover cushion (2) pad to adjust the exposed height of the cushion, and adjust the appearance height difference of the front cover assembly (1).

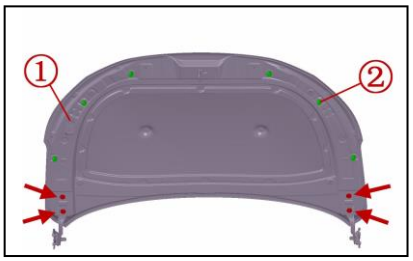


Figure 153:

Do not forcibly close the front cover until the Caution cushion has been adjusted to prevent the edge of the front cover from hitting the bumper or the front combination lamp.

Caution If the front cover assembly is closed, the gap dimensions across the circumference are uniform, not concave or convex, and the contours are aligned, the front cover assembly is properly adjusted.

Caution During adjustment, paint damage at the front cover hinge shall be avoided. If paint damage occurs, make up the paint.

Removing and installing front cover hinge

Disassembly

Remove the fender. Remove fender refer to

Removing and installing Unscrew hinge

mounting bolt - arrow - using a torque wrench.

Bolt Tightening torque

33±2N (7.5 ftlb.).

Remove the front

cover hinge.

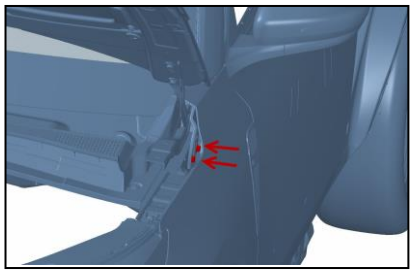


Figure 154:

Installation

Installation is generally performed in reverse order.

Removing and installing front cover lock

Disassembly

Remove the upper trim

cover clips. Remove the

upper decorative cover

(1)

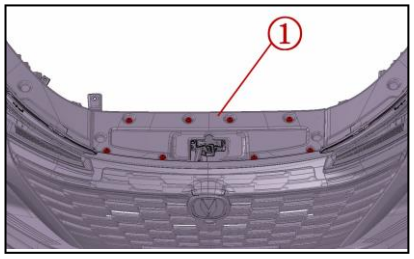


Figure 155:

Unscrew front cover lock

mounting bolt - arrow. Bolt

Tightening torque 9±2N (17

ftlb.).

Remove the front cover lock (3).

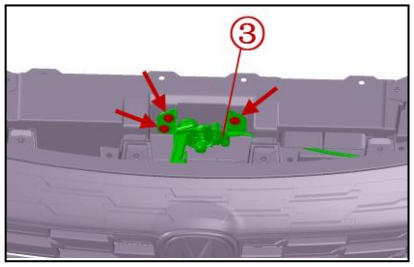


Figure 156:

Pull out the front cover unlocking

cable (2) in the -arrow-direction.

Remove the front hood lock (3).

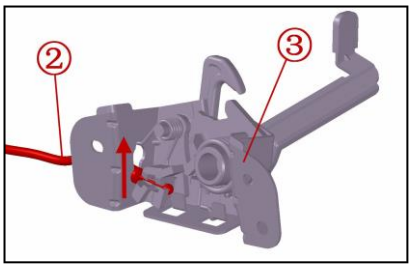


Figure 157:

Installation

Installation is generally performed in reverse order.

Caution Make sure that the front cover unlocking cable head fully engages the corresponding slot in the front cover lock.

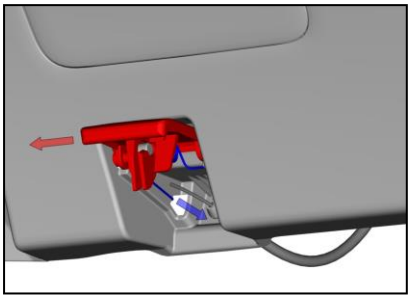
Caution Make sure the front hood lock mounting bolts are tightened to 9±2N (37 ftlb.).

Removing and installing front cover unlocking handle

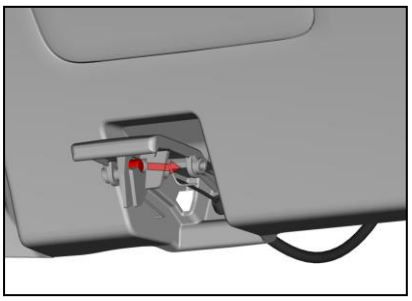
Disassembly

The handle is opened normally and the spring retaining end at the left root is pulled out.

Toggle the handle to the maximum angle and use Tooling CA501-002 to gently pry the shaft to pull the handle out.



Remove the cable lock cylinder head directly from the handle.



Installation

Installation is generally performed in reverse order.

Removing and installing front cover unlocking zip

Disassembly

Refer to Removing and Installing Front Bumper to complete the front bumper removal.

Refer to Combination Headlamp Assembly I to complete headlamp removal.

Disengage the retaining clips - arrow - on the front cover unlocking cable.

Remove the front cover unlocking cable (1).

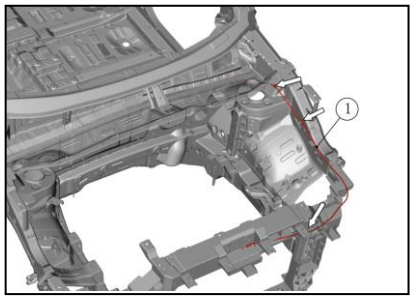


Figure 158:

Installation

Installation is generally in reverse order

Removing and installing front cover buffer

Disassembly

1. Unscrew the front cover cushion (1) in the -arrow-direction.

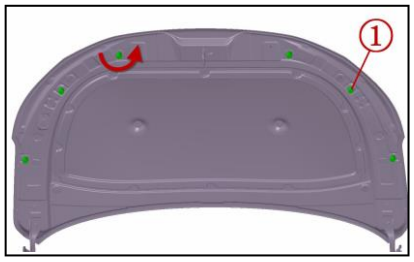


Figure 159:

Installation

Installation is generally performed in reverse order.

Caution After the installation, adjust the front cover cushion. Rotate the front cover cushion in the direction of arrow to adjust the height of the front cover area.

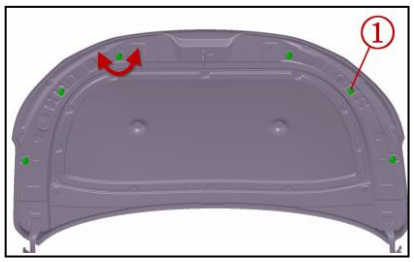


Figure 160:

Removing and installing sound insulation for front cover

Disassembly

1. Disengage 14 front cover sound insulation pad retaining clips - arrow -, clips can be reused. Remove the front cover sound insulation pad (1).

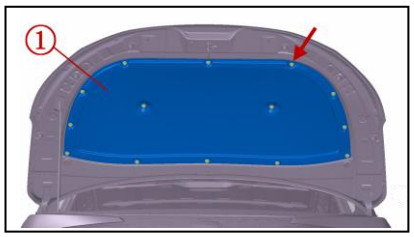


Figure 161:

Installation

Installation is generally performed in reverse order.

Removing and installing front cover sealing strip

Disassembly

1. Disengage the sealing strip retaining clips in the front cover - arrow -. Remove the sealing strip (1) in the front cover.

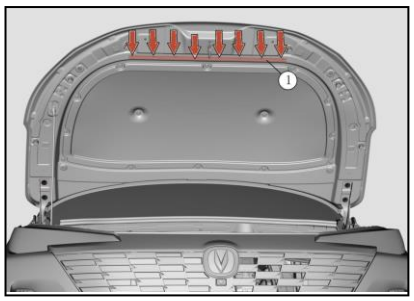


Figure 162:

Installation

Installation is generally performed in reverse order.

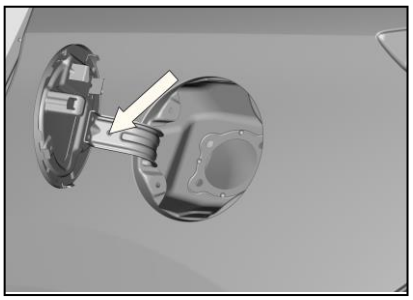
F270101

Fuel tank door

Removing and installing fuel tank door

Disassembly

Disengage the rope retaining clips - arrow -.



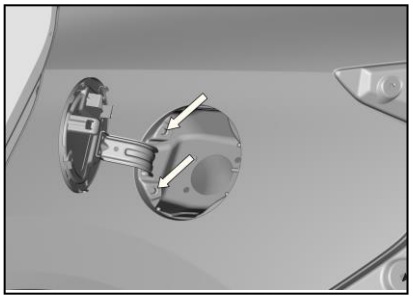
Unscrew the tank door

mounting bolt - arrow -. Bolt

Tightening torque 9±2N (17

ftlb.).

Remove the tank door assembly.



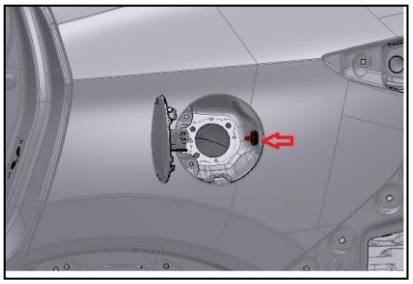
Installation

Installation is generally performed in reverse order.

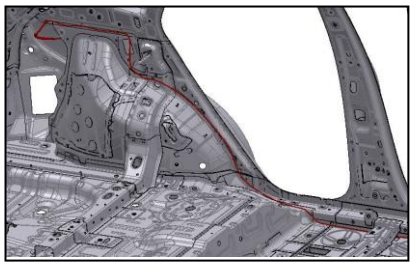
Removing and installing tank door lock and zip lock

Disassembly

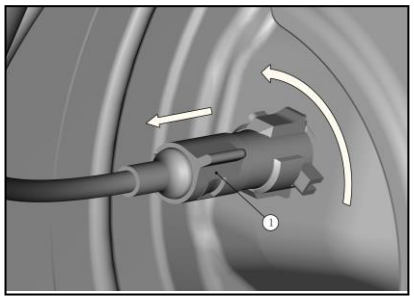
The tank door lock (arrow) is visible when the tank door is opened by the unlocking handle.



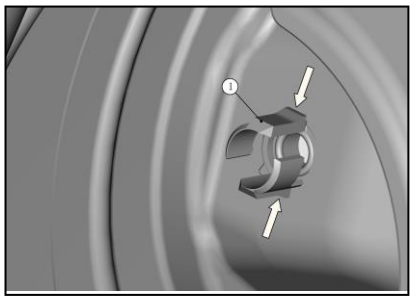
Remove the trunk side C-Pillar trim panel, refer to Removing and installing C-Pillar Trim Panel and pull the interior left side carpet away to see the cable run.



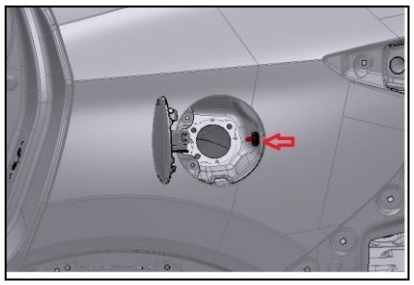
Rotate the sleeve in the direction of rotation shown by the arrow. Be careful not to be scratched by the body sheet metal.



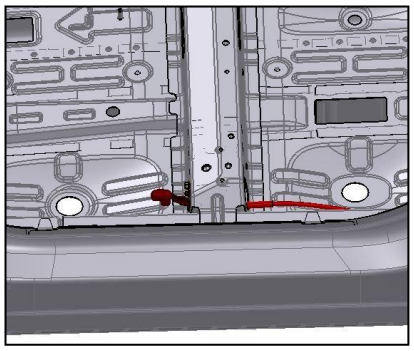
Press the position shown in the -arrow-direction to release the tank door lock. Be careful not to be scratched by the body sheet metal.



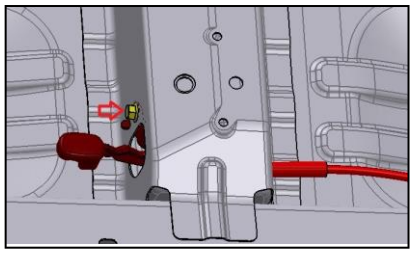
Remove the tank door lock in the -arrow-direction.



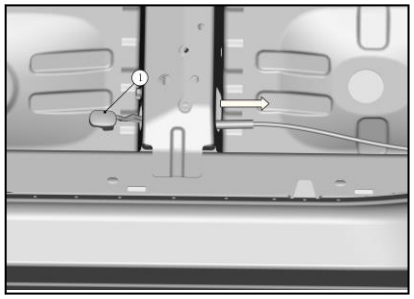
To the driver's position, remove the door sill trim, refer to Removing and installing front door sill trim assembly; Pull off the main carpet assembly to see the tank cover unlocking handle.



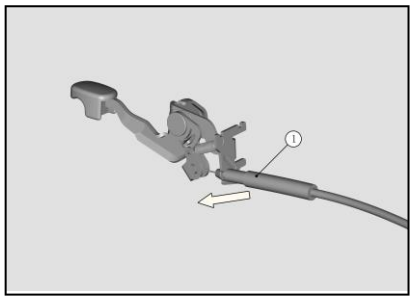
Remove unlocking handle mounting screw (arrow), Tool: Sleeve (08), Torque: 8±1N.m.



Through the rear sheet metal hole, take out the unlocking handle with cable (1) in the direction of -arrow-.



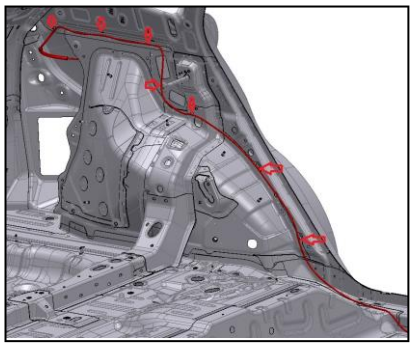
Remove the fuel tank door cable head (1) in the -arrow-direction.



Remove the cable retaining clip - arrow - and

remove the cable (1) from the tank door. Be careful

not to be scratched by the body sheet metal.



Installation

Installation is generally performed in reverse order.

F270105

Front door

Front door trim panel

Removing and installing front door trim panel

Disconnect the negative battery harness. Refer to Battery Assembly

Use a flat screwdriver to pry open the front door inner handle screw cover plate (as shown in the figure below), and then use a cross screwdriver to remove the fixing screws (as shown in the figure below).

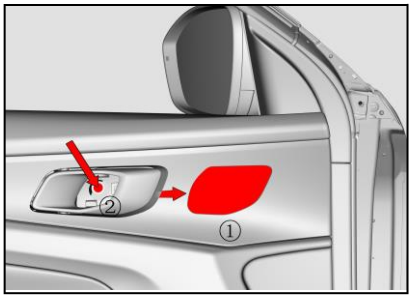


Figure 163:

Remove the fixing screws at the handle box of the front door inner trim panel (as shown in the figure below (3)), and then remove the fixing screws with a cross screwdriver (as shown in the figure below (4)).

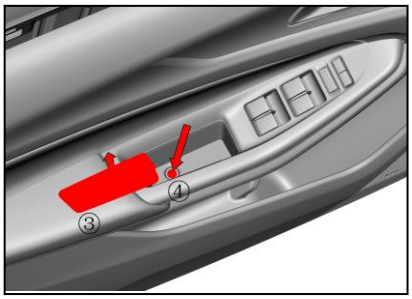


Figure 164:

Use a plastic screwdriver to remove the front door interior trim panel glass lift button panel assembly.

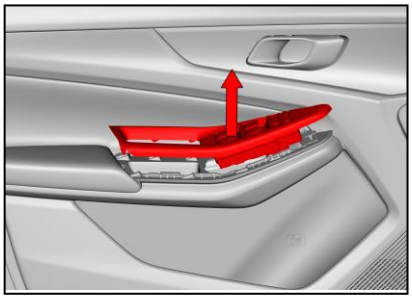


Figure 165:

Remove the front door interior trim panel glass lift button panel and disconnect the power window switch harness plug.

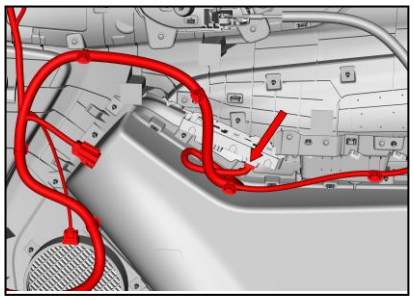


Figure 166:

Use a plastic screwdriver to pry open the front door trim panel.

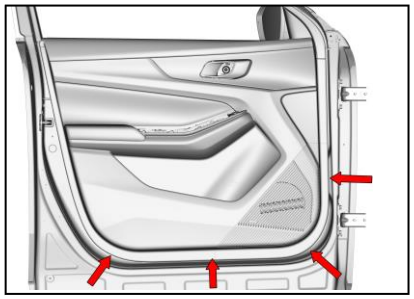


Figure 167:

Remove the front door inner handle cable.

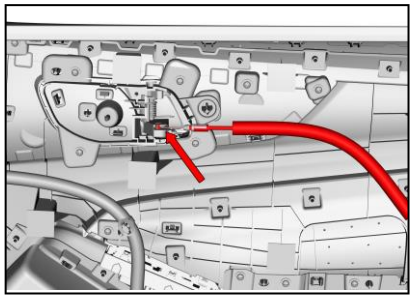


Figure 168:

Remove the front door trim panel and snap it as shown.

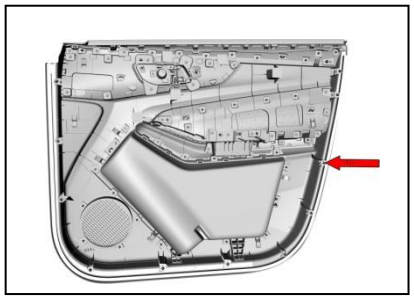


Figure 169:

Installation

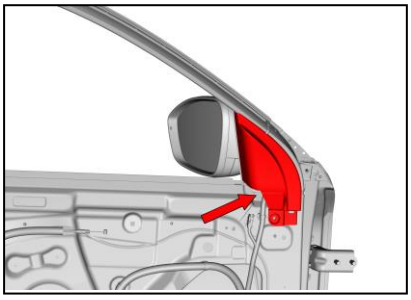
The installation sequence is the reverse of the removal sequence.

Caution The front door trim panel buckle is a disposable component, and the front door trim panel buckle needs to be replaced during installation. The assembly and removal methods of the right front door trim panel and the left front door trim panel are consistent.

Removing and installing trim for front door trim

Disassembly

Remove the front door trim panel. Refer to Removing and installing front door trim panel
Remove the front door trim trim by hand.



Installation

The installation sequence is the reverse of the removal sequence.

F270803

Front door member

Removing and installing front door

Tools

Name	Quantity
Slotted screwdriver	1
Phillips screwdriver	1
Sleeve Assembly	1

Caution 1. The removal and installation of the left front door is described here, and the removal and installation of the right front door is basically the same.

2. Remove and install with the assistance of a technician.

Disassembly

Turn off all appliances and the

starter switch. Disconnect the

negative battery terminal.

1. Disengage the front door harness jacket in the direction of arrow;

Figure 170:

2. Disconnect the left front door harness fixing clip, and the "arrow" in the figure;

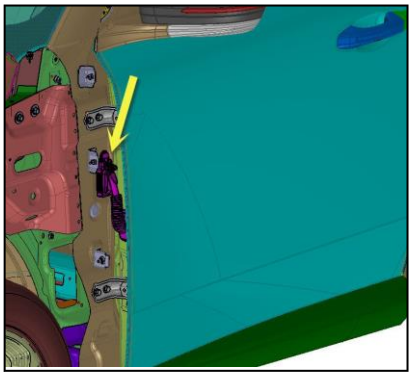


Figure 171:

3. Disconnect the front left door harness connector and "arrow" in the figure;

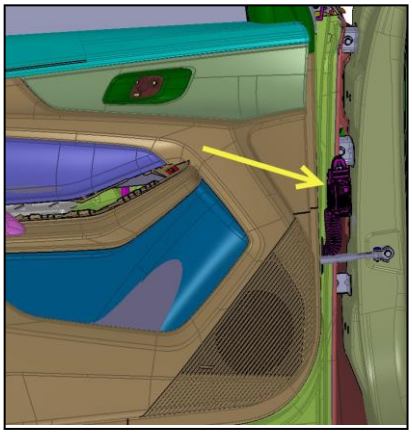


Figure 172:

4. Screw out the fixing bolts of the front door stopper (at the side wall) with No. 10 sleeve, and "arrow" in the figure; Bolt tightening torque: 23±3N.m (7.5 ftlb.).

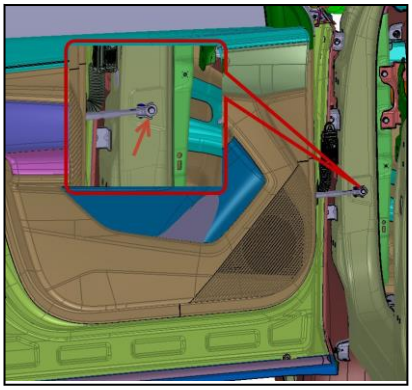


Figure 173:

5. Screw out the fixing bolts of the front door hinge (at the door) with No. 13 sleeve, and the "arrow" indicator; Removing front door

Bolt tightening torque: 33±3N.m

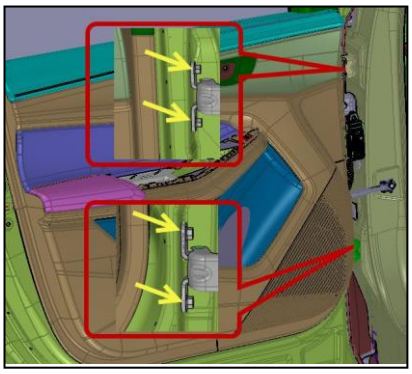


Figure 174:

Installation

The installation is generally carried out in reverse disassembly order, with the following considerations: After the installation is completed, adjust the front door.

Adjust front door

Caution 1. Before adjusting the front door, the vehicle must be parked on a level ground.

2. Make adjustments with the assistance of an assembler.

1. Unscrew (without screwing out) the front door hinge (at the door) retaining bolts using No. 13 sleeve and adjust the front door at the "arrow" indicator. Bolt tightening torque: 33±3N.m

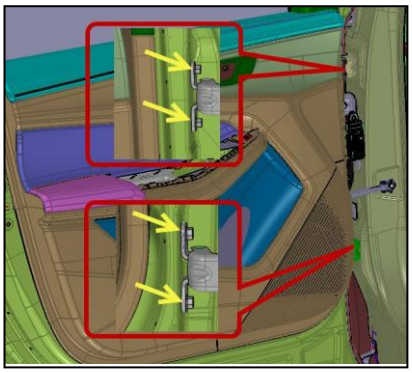


Figure 175:

Caution 1. If the front door is closed, the clearance is uniform, does not protrude inward or outward, and the contours are aligned, it indicates that the door has been correctly adjusted.

2. According to the above steps, if the adjustment effect is not achieved, refer to the following steps for the next adjustment.

2. Remove the fender

3. Unscrew (without screwing out) the front door hinge (at the side wall) retaining bolts with No. 13 sleeve and adjust the front door 1 at the "arrow" indicator. Bolt tightening torque: 33±3N.m

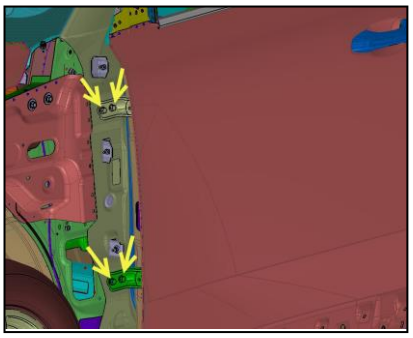


Figure 176:

Removing and installing front door hinge

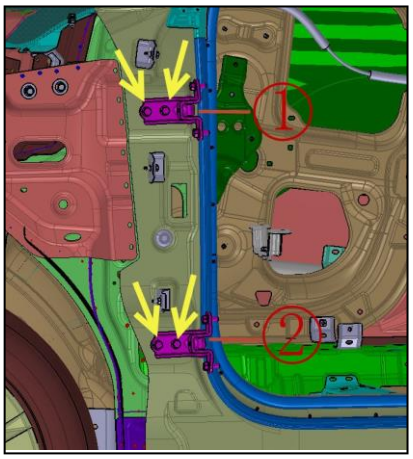
Disassembly tool:

Name	Quantity
Socket # 13	1

Remove front door, see Removing and installing front door chapter

Using socket # 13, unscrew the front door hinge (side wall) retaining bolts at the "arrow" indicator; Bolt tightening torque: 33±3N.m (7.5 ftlb.).

Remove the front door upper hinge 1 and lower hinge 2;



Installation

1 The installation is done generally in reverse order of removal, noting the front door adjustment after the installation is complete.

Removing and installing front door arrester

Caution The removal and installation of the left front door stops are described here, and the removal and installation of the right front door stops are substantially the same.

Disassembly tool

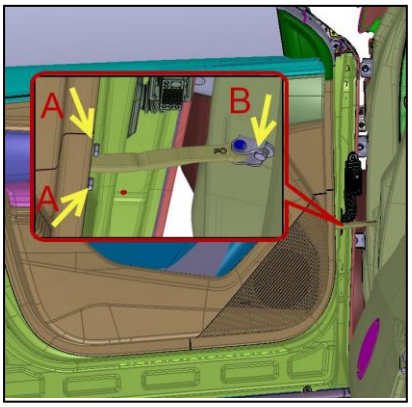
Name	Quantity

10 # sleeve	1

Remove the front door trim panel and uncover the front door waterproof film; Removing and installing front door trim panel

Using socket # 10, unscrew the front door stopper (at the door) retaining bolts at the "Arrow A" indicator; Tightening torque: 9±2N.m.

Using socket # 10, unscrew the front door stopper (side wall) retaining bolts at the "Arrow B" indicator; Tightening torque: 23±3N.m (17 ftlb.).



Remove the front door stop.

Installation

Installation is generally performed in reverse disassembly order.

F270103

Front door handles and sealing strips

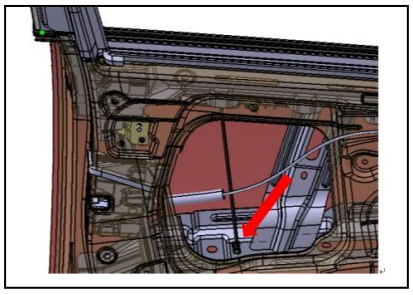
Removing and installing front door outer opening handle

Caution The removal and installation of the left-hand front door outside handle is described here, and the removal and installation of the other three door outside handles are the same.

Only the driver door has a keyless entry switch button harness. When removing the front left door handle, always pull out the button connector before removing the handle.

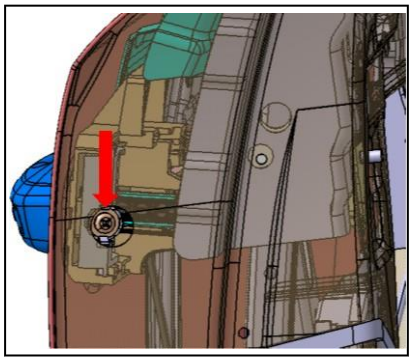
Disassembly

Remove the front door trim panel, unclip the front door waterproof film, and remove the left front door keyless entry button connector, arrow



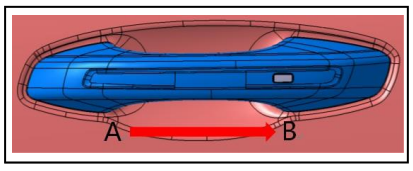
Remove waterproof cover

Remove the waterproof cover and use a Phillips screwdriver to rotate the screws indicated by the arrows in the figure. (No need to take it off, loosen it)



Remove outer handle

Pull the front door outside handle in the direction of arrow A and take out the front door outside handle in the direction of arrow B



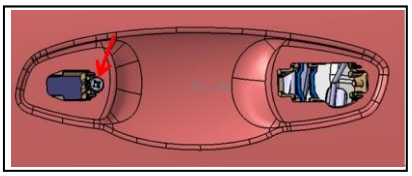
Removing and installing front door handle bracket

Disassembly

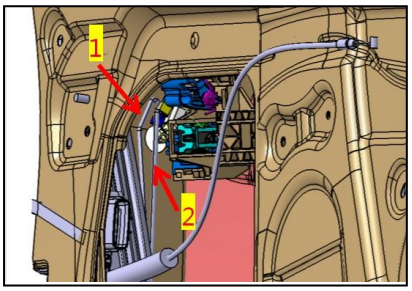
Remove front door trim, Removing and installing unclip front door waterproof film.

Remove the front door outside handle. Removing and installing front door outer opening handle

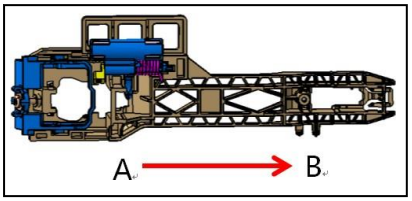
Use a Phillips screwdriver to loosen the front left door handle seat retaining bolt at the "arrow" indicator.



Remove cylinder rod 1 and outer handle rod 2.



Hold the base and remove the front door handle firmly from the A→B.



Installation

The installation is generally carried out in reverse disassembly sequence, other three doors have no lock cylinder connecting rod 1, and other disassembly and assembly methods are consistent with those of the left front door.

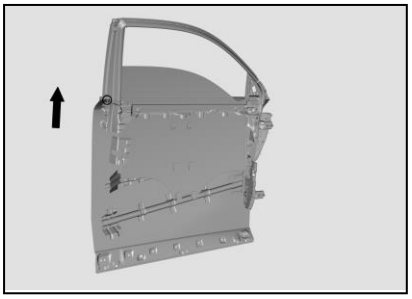
Removing and installing outer clip strip for front door

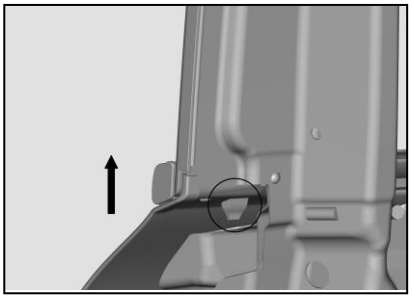
Disassembly

Connect the battery, switch on the ignition to "ON" position, and lower the front door window glass to the lowest position Left and right mirror assemblies

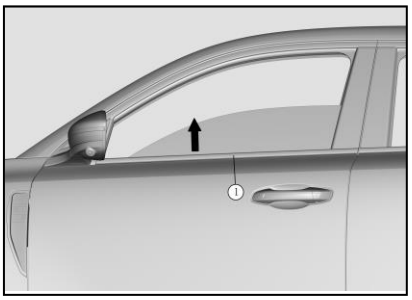
Removing front door exterior mirror

Remove front door outer water cut B-pillar end clip in direction of arrow





Take out front door outside water cut 1 in direction of arrow



Installation

When installing, align the outer water cut rear end with reference to the sheet metal B-pillar end, and then press the end clip and body part.

Removing and installing front door inner clip strip

Caution The removal and installation of the left front door inner clip strip is described here, and the removal and installation of the right front door inner clip strip is substantially the same. Disassembly

Remove front door trim Removing and installing front door trim

Remove front door inner clip strip 1 in direction of arrow

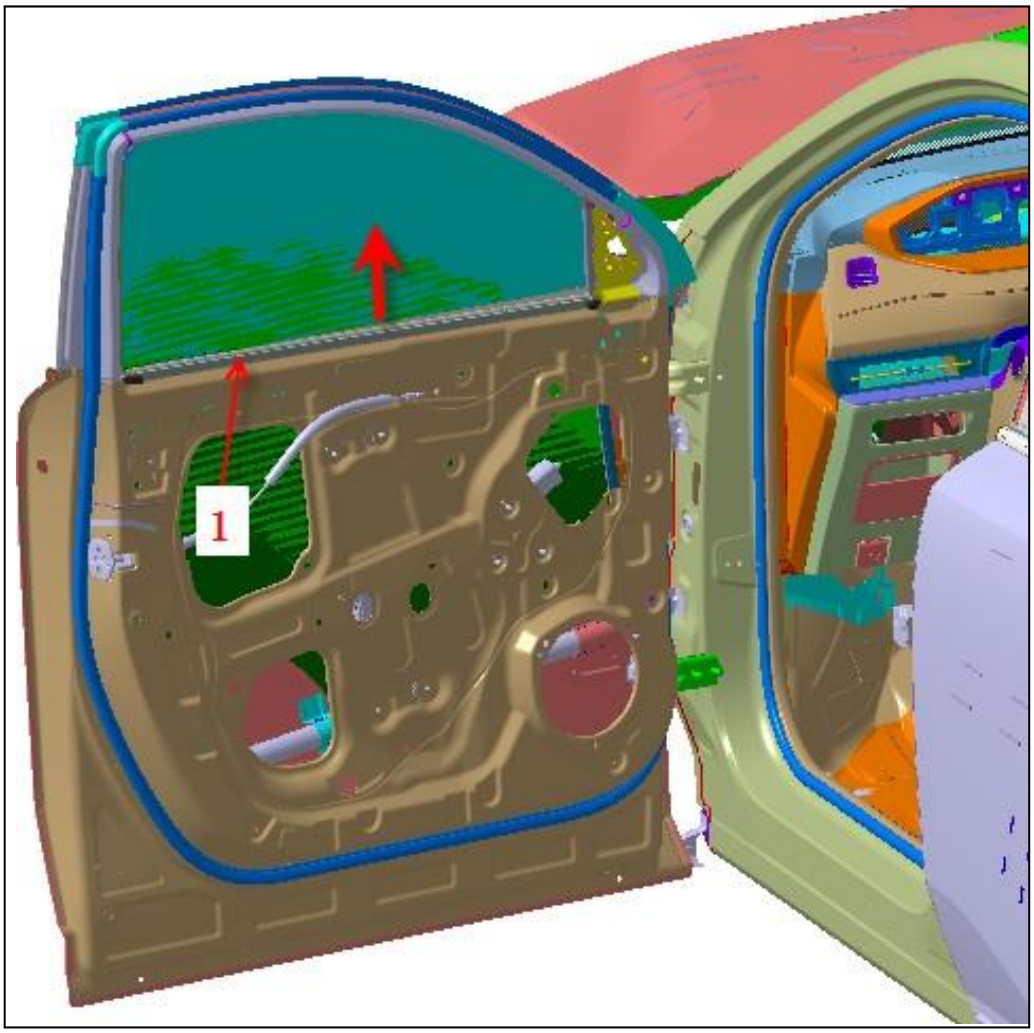


Figure 177:

Installation

Installation generally in reverse disassembly order

Removing and installing front door frame seal

Caution The removal and installation of the front left door frame seal is described here, and the removal and installation of the front right door frame seal is substantially the same.

Disassembly

Remove left front door sill trim 1 Removing and installing front door sill trim panel assembly

Remove front door frame seal 2 from body flange

Figure 178:

Installation

Installation is generally performed in reverse disassembly order, with the following considerations:

Caution Install the front door frame seal at the flange and press tight.

Removing and installing front door sealing strip

Caution The removal and installation of the front left door seal is described here, and the removal and installation of the front right door seal is substantially the same. Disassembly

Pull off front door sealing strip retaining clip at the "arrow" indicator

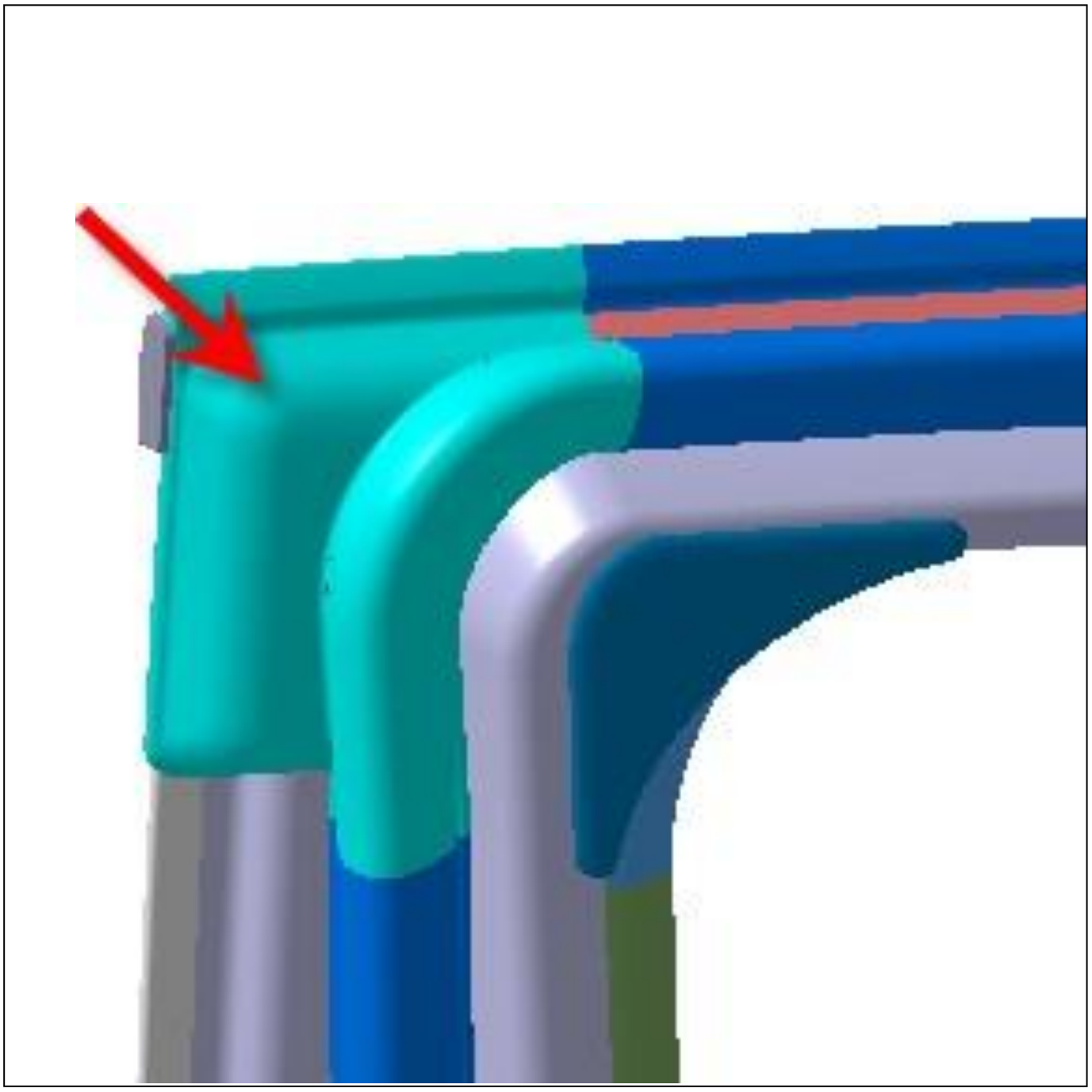


Figure 179:

Pull front door seal 1 and retaining clip out of the door in direction of arrow A. Unscrew retaining bolt 3 for front door stopper 2 (side wall side)

At the indicator, remove the front door weatherstrip 1

Bolt tightening torque: 23±3N.m

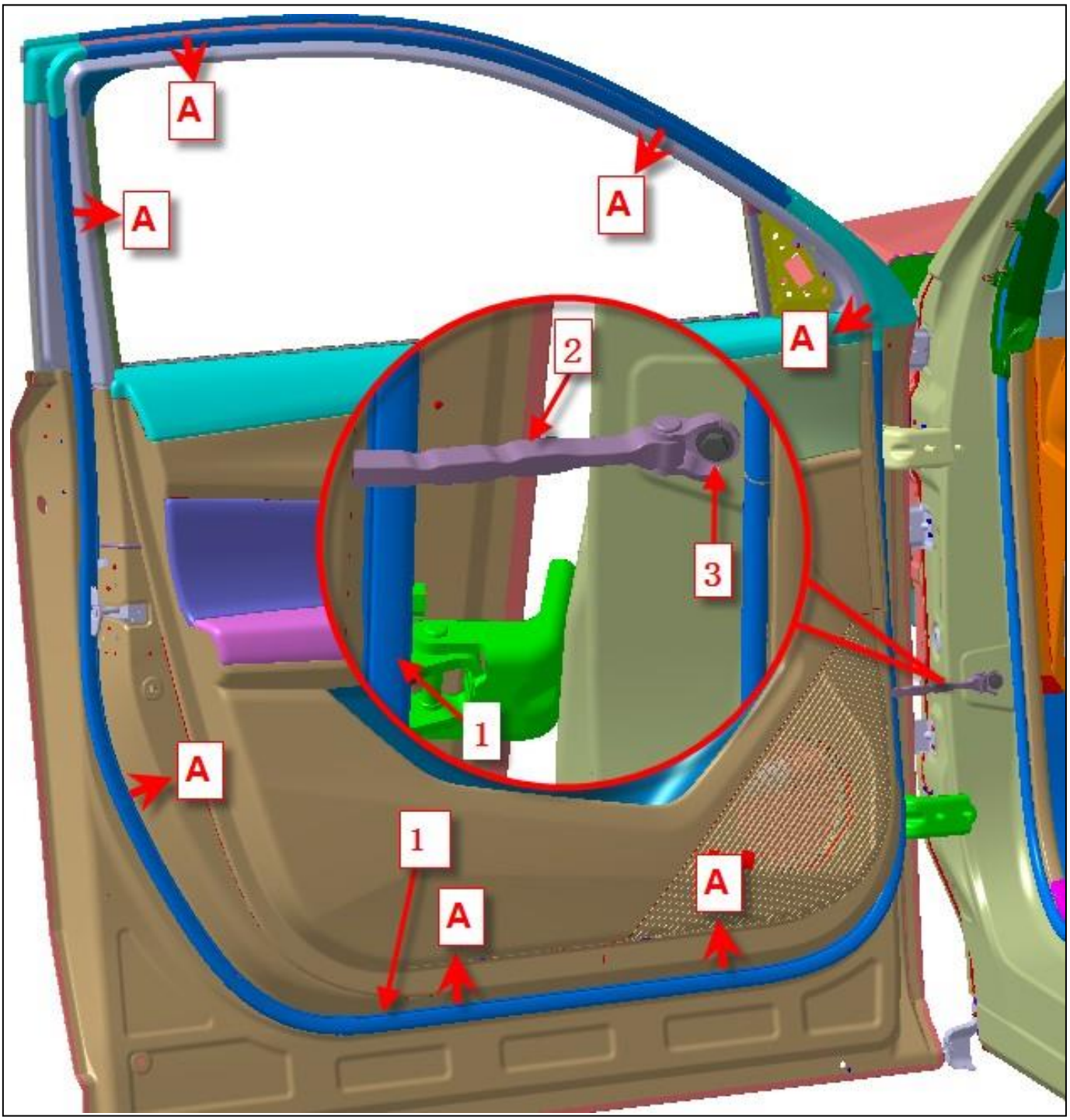


Figure 180:

Installation

Installation is generally performed in reverse disassembly order, with the following considerations:

Caution Inspect the retaining clips for damage and replace if necessary.

Removing and installing front door window glass

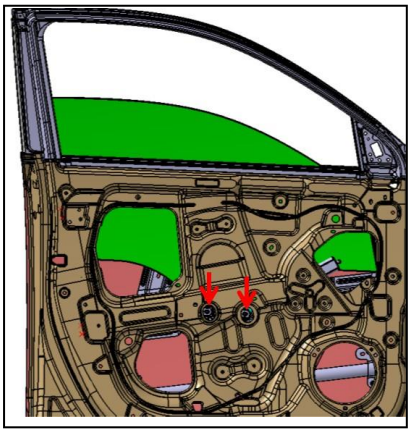
Disassembly

Caution The removal and installation of the left front door glass is described here, and the removal and installation of the right front door glass is substantially the same.

Removing front door trim Removing and installing

Open front door waterproof membrane

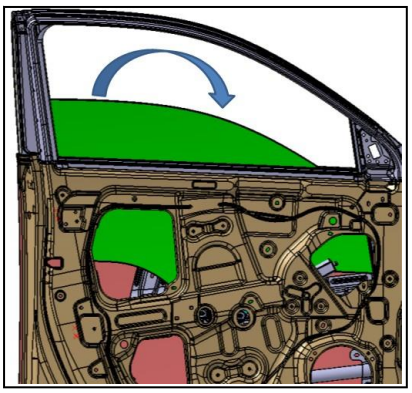
Lower the front door glass until the front door retaining bolts are visible from the openings, unscrew the front door glass retaining bolts using the # 10 sleeve. Bolt tightening torque: 9±2N.m (17 ftlb.).



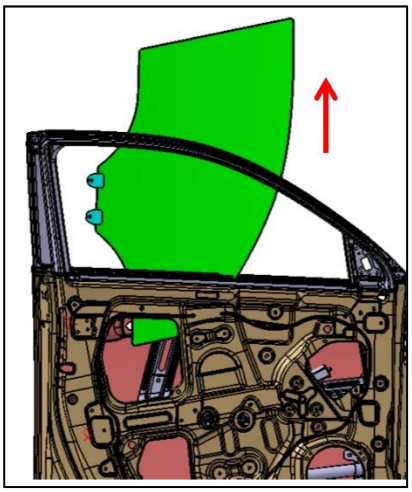
Caution If the work step cannot proceed due to a fault in the regulator motor, the front door window regulator mechanism can be removed so that the window regulator is adjusted to the removal position.

If the rear door glass is difficult to rotate when removed, loosen the chute bolts to increase the glass rotation space.

Hold the top of the glass and rotate the front door glass clockwise to remove it.



Rotate the glass to the position shown below and remove the glass upward.



Installation

Installation is generally performed in reverse disassembly order.

Removing and installing front door window regulator

Disassembly

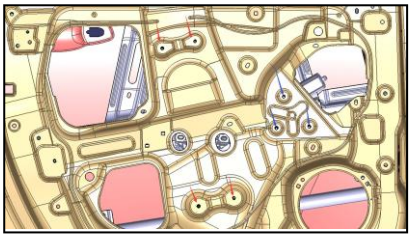
Caution The removal and installation of the left front door window regulator is described here, and the removal and installation of the right front door window regulator is substantially the same.

Remove front door glass Removing and installing front door window glass

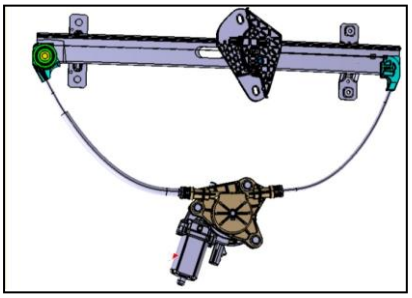
Using No. 10 sleeve, unscrew the front door window regulator retaining bolts at the "red arrow" indicator.

Using No. 10 sleeve, unscrew the front door window regulator motor retaining bolts at

the "blue arrow" indication Tightening torque: 9±2N.m (7.5 ftlb.)



Remove the front door window regulator.



Installation

The installation is generally carried out in reverse disassembly order, with the following considerations.

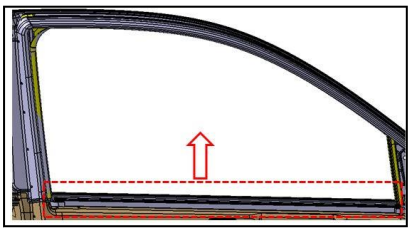
Caution After installation, perform a glass lifter function test.

Removing and installing front door glass slot

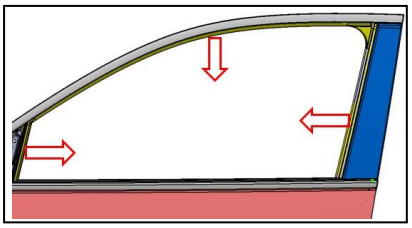
Disassembly

Remove the front door glass. Refer to Removing and installing front door window glass

Remove the front door inner water cut in the direction of the red arrow.



Take out the front door glass slot in the direction of the "red arrow."



Installation

Installation is generally performed in reverse disassembly order.

Removing and installing front door glass rail

Disassembly

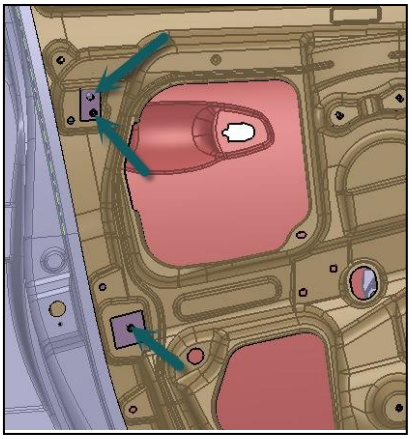
Caution The removal and installation of the left front door glass rail is described here, and the removal and installation of the right front door glass rail is substantially the same.

Remove the front door glass groove. Removing and installing front door glass groove

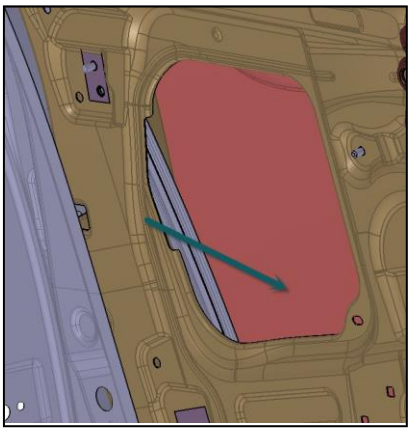
Remove the front door glass rail. Removing and installing front door glass rail

Using # 10 sleeve, unscrew the front door glass front rail retaining bolts

at the "arrow" indicator. Bolt tightening torque: 9±2N.m (17 ftlb.).



Remove the front door glass front rail as indicated by the arrow in the figure.



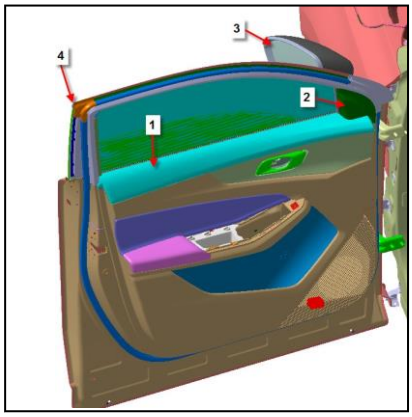
Installation

Installation is generally performed in reverse disassembly order.

Removing and installing front door frame trim strip

Disassembly

1. Remove front door trim panel assembly (1), refer to Removing and installing front door trim panel

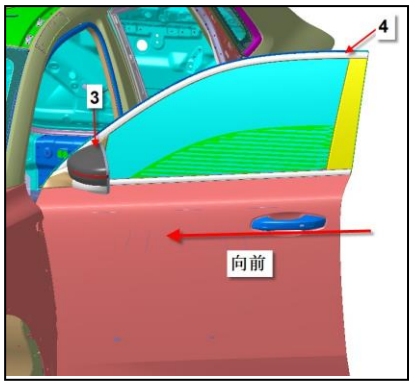


2. Remove front door trim (2), see Removing and installing front door trim

3. Remove the outside rearview mirror assembly (3), refer to the left and right rearview mirror assemblies

4. Remove the window frame trim strip (4), pull the front door back toward the outside, and then pull it to the front.

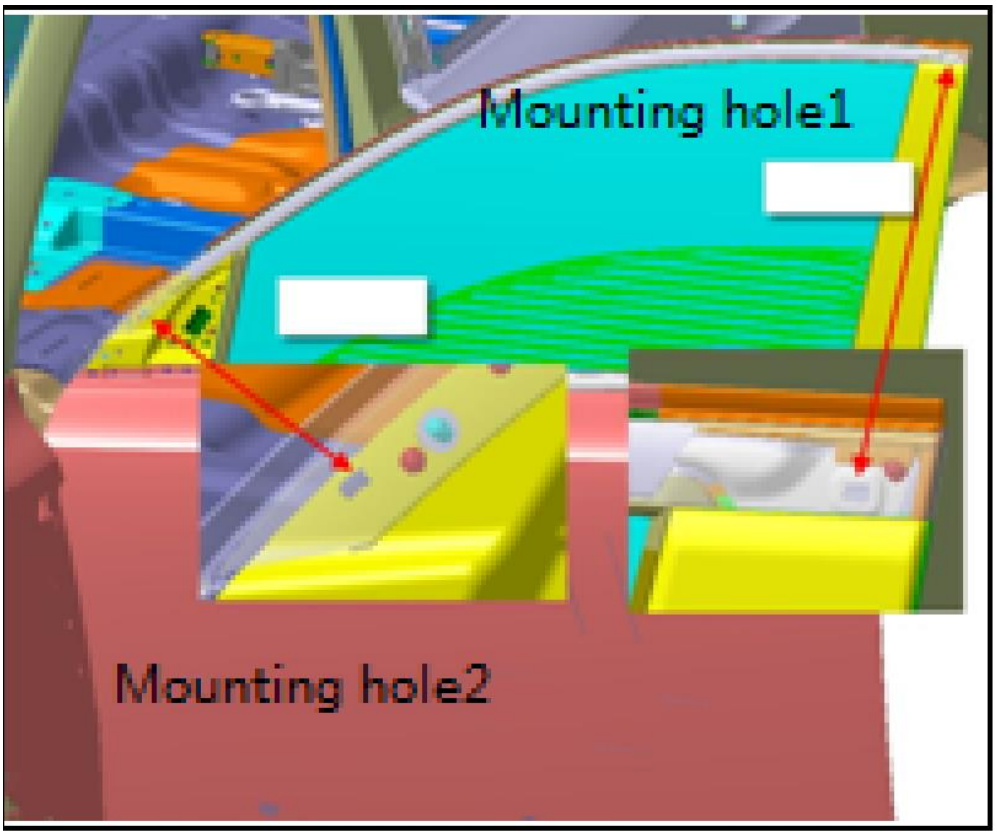
Pull the front buckle firmly(Care should be taken not to scratch the fender or side wall and it is recommended that the doors be closed)



5. Clean the remaining double-sided adhesive on the window frame and install it after dismantling

1. Tear the double-sided adhesive tape protective film and high-gloss protective film on the window frame decoration bright strip

2. Clamp the rear end of the front door window frame trim bright strip into the buckle hole 1, and gradually clamp the window frame trim bright strip forward until the front end buckle is clamped into the buckle hole 2



3. Press the window frame decoration bright strip to make it fit with the window frame well

4、 Install exterior rearview mirror assembly, front door trim trim, front door trim panel assembly in reverse of removal

F27040

1

F27040

2

F27040

7

F27040

8

F27040

9

F27060

4

Rear door

Rear door trim panel

Removing and installing rear door trim panel

Disconnect the negative battery harness. Refer to Battery Assembly

Use a plastic screwdriver to remove the rear door inner trim panel.

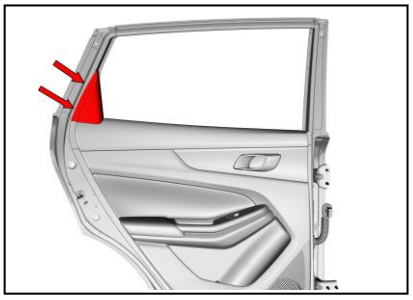


Figure 181:

Use a flat screwdriver to pry open the rear door inner handle screw cover (as shown in the figure below), and then use a cross screwdriver to remove the fixing screws (as shown in the figure below).

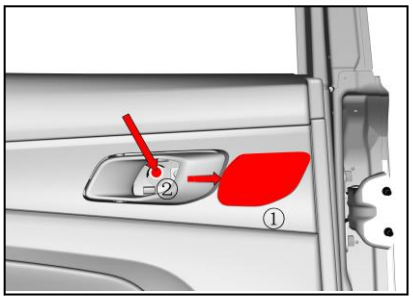


Figure 182:

Remove the fixing screws at the handle box of the rear door inner trim panel (as shown in Fig. 3 below), and then remove the fixing screws with a cross screwdriver (as shown in Fig. 4 below).

Figure 183:

Use a plastic screwdriver to remove the rear door trim panel glass lift button panel assembly.

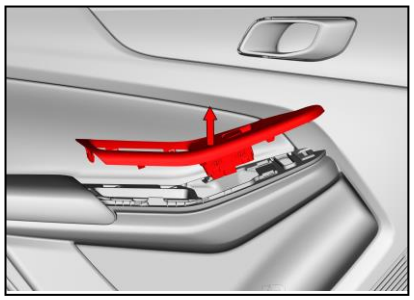


Figure 184:

Remove the rear door interior trim panel glass lift button panel and disconnect the power window switch harness plug.

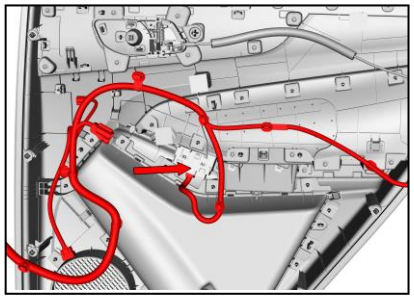


Figure 185:

Use a plastic screwdriver to pry open the rear door trim panel.

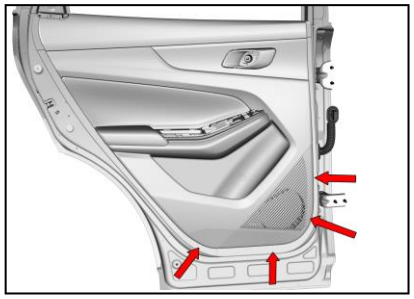


Figure 186:

Remove the rear door inner handle cable (position (5) below) and low frequency antenna harness plug (position (6) below).

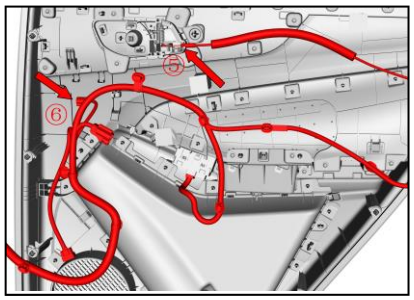


Figure 187:

Remove the rear door trim panel and snap it as shown.

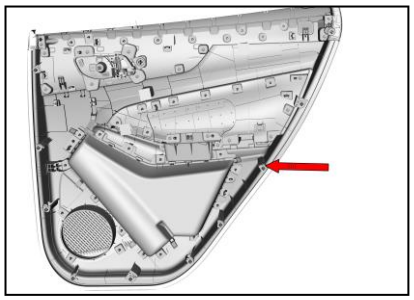


Figure 188:

Installation

The installation sequence is the reverse of the removal sequence.

F270804

Rear door member

Removing and installing rear door(Left)

Tools

Name	Quantity
Slotted screwdriver	1
Phillips screwdriver	1
Sleeve Assembly	1

Caution The removal and installation of the left rear door is described here, and the removal and installation of the right rear door can be generally referred to the left. Disassembly

1. Turn off all electrical appliances and start switch.

2. Disconnect the battery negative terminal.

3. Disengage the rear door harness cover in the direction of the arrow.

4. Disconnect the rear door harness connector plug in the direction of the arrow.

Figure 189:

5. Use No. 10 sleeve to unscrew the fixing bolts of the rear door stopper (side wall) at the arrow in the figure.

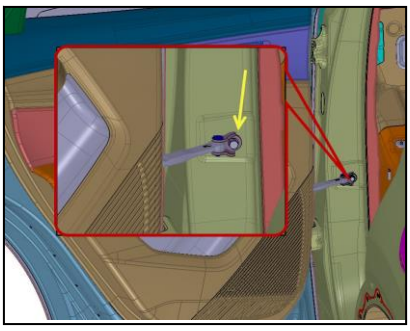


Figure 190:

6. Unscrew the fixing bolts of the rear door hinge (at the door) at the arrow in the figure using the No. 13 sleeve.

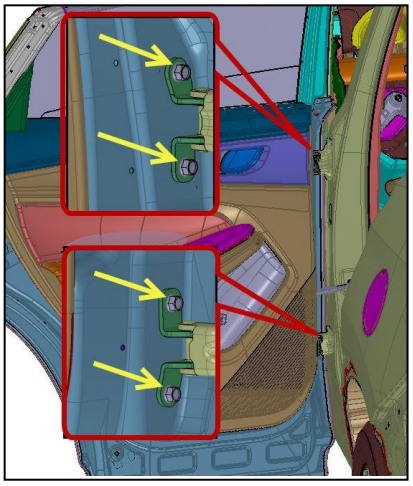


Figure 191:

7. Remove the

rear door.

Installation

The installation is generally performed in reverse order, noting the following:

After installation, perform the

rear door adjustment. Bolt

tightening torque: 33±3N·m

Adjust Rear Door

Caution 1. When adjusting the rear door, the vehicle must be parked at rest on a level ground.

2. Make adjustments with the assistance of an assembler.

1. Adjust the rear door by turning (without screwing out) the fixing bolts of the rear door hinge (at the door) at the arrow in the figure with No. 13 sleeve. Bolt tightening torque: 33±3N·m (17 ftlb.).

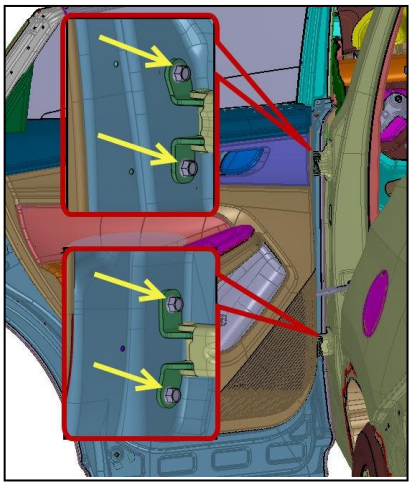
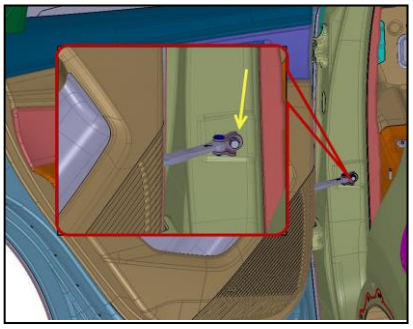


Figure 192:

Caution 1. If the gap dimensions are uniform and not concave or convex inward and the contours are aligned when the rear door is closed, the rear door is properly adjusted.

2. According to the above steps, if the adjustment effect is not achieved, refer to the following steps for the next adjustment

2. Use No. 10 sleeve to unscrew the fixing bolts of the rear door stopper (side wall) at the arrow in the figure.



Bolt tightening torque: 23±3N·m

3. Adjust the rear door by turning (without screwing out) the rear door upper hinge (at the side wall)

and the lower hinge retaining bolts using the No. 13 sleeve. Bolt tightening torque: 33±3N·m

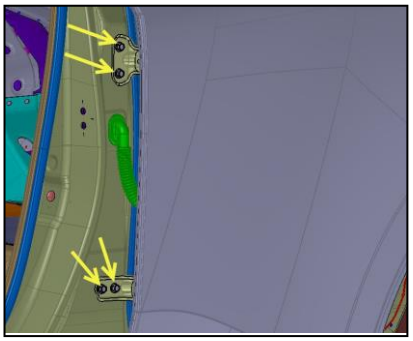


Figure 193:

Removing and installing rear door hinge

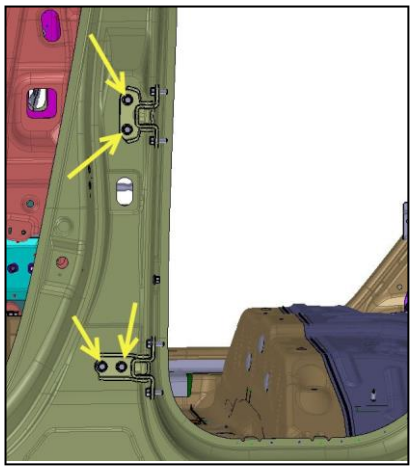
Disassembly tool

Name	Quantity
Socket # 13	1

Remove the rear door. See Removing and installing rear door(Left)

Using the # 13 sleeve, unscrew the rear door upper hinge (side wall) retaining bolts at the arrow in the figure; Bolt tightening torque: 33±3N·m.

Remove the rear door upper and lower hinges.



Installation

The installation is generally performed in reverse order with attention to the rear door adjustment after the installation is completed.

Removing and installing rear door stopper assembly

Caution Removal and installation of the left-hand rear door stop is described here, and removal and installation of the right-hand rear door stop can be generally referred to the left.

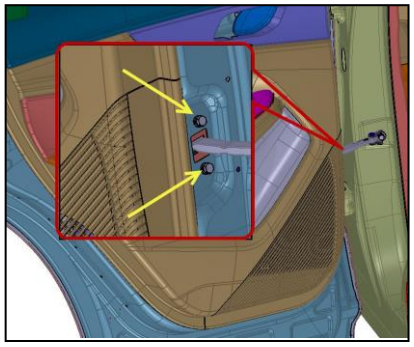
Disassembly tool

Name	Quantity
10 # sleeve	1

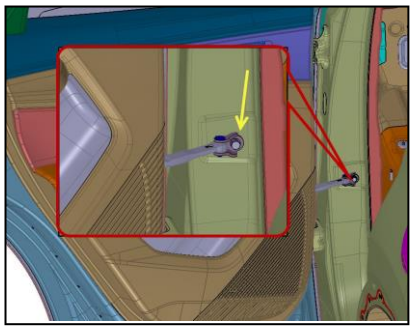
Remove the rear door trim panel. Removing and installing rear door trim panel

Open the rear door waterproof membrane.

Unscrew the two retaining bolts (at the arrow in the figure) of the rear door stopper (at the door) using the No. 10 sleeve. Tightening torque: 9±2N·m (17 ftlb.).



Using No. 10 sleeve, unscrew the rear door stop (side wall) retaining bolt at the arrow in the figure. Tightening torque: 23±3N·m (7.5 ftlb.).



Remove the rear door stop.

Installation

Installation is generally performed in reverse disassembly order.

F270103

Rear door handle and sealing strip

Removing and installing rear door outer handle

See Removing and installing front door outer opening handle

Removing and installing rear door handle bracket

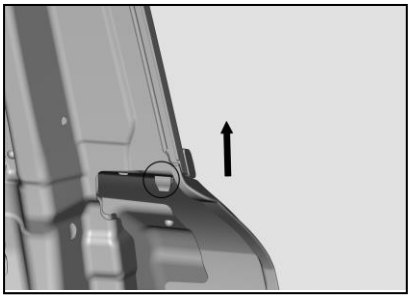
See Removing and installing front door handle bracket

Removing and installing rear door outer clip strip assembly

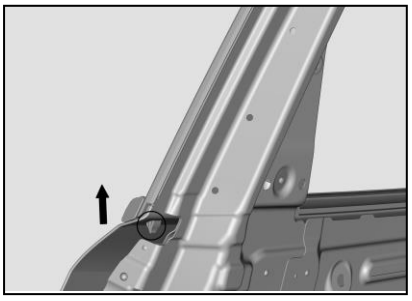
Disassembly

Connect the battery, switch on the ignition to "ON" position, and lower the rear door window glass to the lowest position

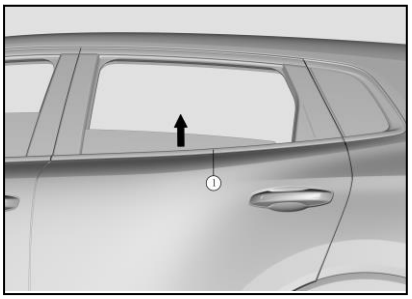
Remove rear door outer water cut B-pillar end clip in direction of arrow



Remove rear door outer water cut C-pillar end clip in direction of arrow



Then take out the outer water cut 1 of the rear door in the direction of the arrow shown below



Installation

When installing the outer water cut of the rear door, ensure that the ends of the B pillar and C pillar of the outer water cut of the rear door are aligned, press the end of the B pillar and the middle body in turn, and then press the end of the C pillar

Removing and installing rear door sealing strip

Disassembly

Pull out the rear door seal corner retaining clips at the "arrow" indicator

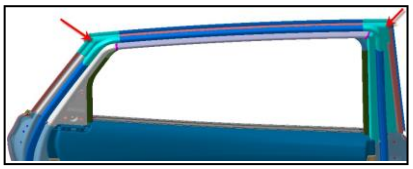


Figure 194:

Pull rear door seal 1 and retaining clip out of the door in direction of arrow A.

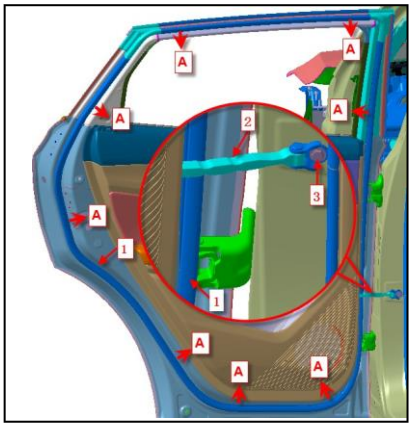


Figure 195:

Unscrew the retaining bolts 3 of the rear door stopper 2 (side wall side); Remove rear door sealing strip1 at the indication, bolt Tightening torque 23±3N.m (7.5 ftlb.). The removal and installation of the left rear door seal is described here, and the removal and installation of the right rear door seal is substantially the same.

Installation

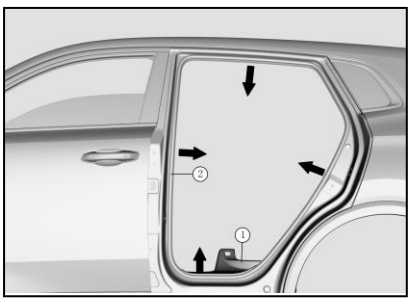
The installation sequence is the reverse of the removal sequence.

Removing and installing rear door frame seal

Disassembly

Remove rear door sill trim assembly 1 Removing and installing rear door sill trim assembly

Press the arrow to remove the rear door frame seal 2



Installation

Installation order is reverse to removal order

Removing and installing rear window glass

Refer to Removing and installing front door window glass.

Removing and installing rear door window regulator

Refer to Removing and installing front door window regulator.

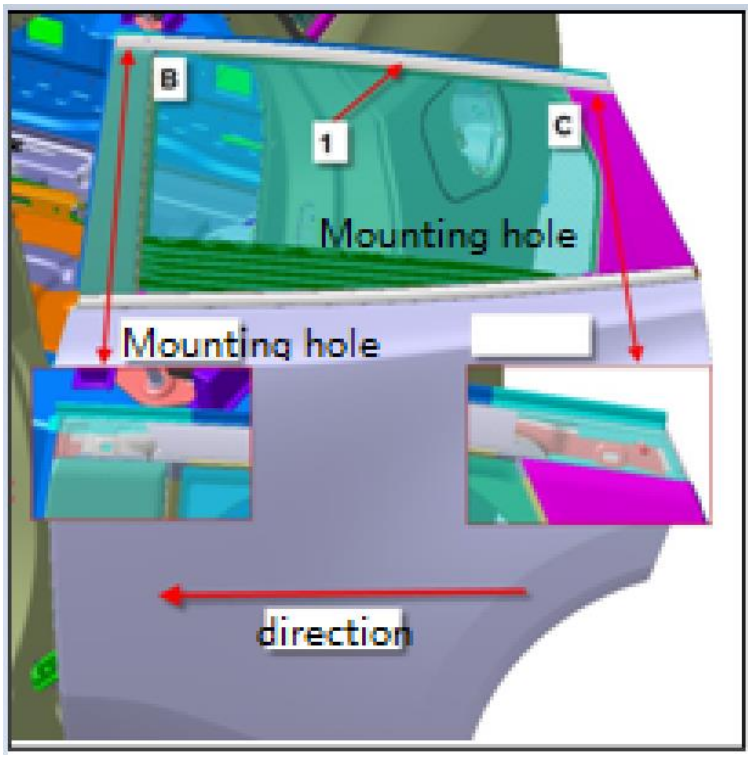
Removing and installing rear door glass slot

1. See Removing and installing front door glass slot

Removing and installing rear door frame trim strip

Disassembly

1. Pull the window frame trim bright strip (1) B-pillar end buckle to the outside direction, and then pull it to the C-pillar end



2. Force the C-pillar end buckle away from the vehicle

3. Clean the remaining double-sided

adhesive on the window frame and install it

after dismantling

1. Tear the double-sided adhesive tape protective film and high-gloss protective film on the window frame decoration bright strip

2. Clamp the pillar B end of the rear door window frame trim bright strip into the buckle hole 1, and gradually clamp the window frame trim bright strip toward the rear of the vehicle until the pillar C end buckle is clamped into the buckle hole 2

3. Press the window frame decoration bright strips to make them fit well with the window frame. Check the matching of the surrounding parts and finish the installation

F270401

F270402

F270407

F270408

F270409

F270604

Tailgate

Removing and installing tailgate air strut

Tips

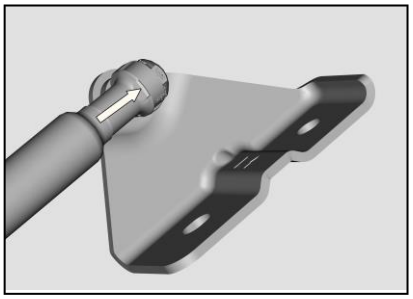
The removal and installation of the left tailgate air strut is described here, and the removal and installation of the right tailgate air strut can be generally referred to the left.

To remove the tailgate air strut, the tailgate must be reliably supported by an object, otherwise a

single tailgate air strut cannot keep the tailgate open. Disassembly

--When disassembling the pneumatic support rod with the tailgate open and supported, use a thin straight screwdriver tool to insert the straight end into the circular circlip of the pneumatic support rod, and then press the straight end

The circlip opens at an angle so that the air strut can be removed from the body.



Caution 1. In general, only one of the two struts on the same vehicle will fail/fail. To avoid misjudgment, please use the elimination method to determine which of the two struts is the specific missing part, and then replace it.

2. For maintenance, please use compressed air to purge the dust collected at the boot mouth. If the dust adheres to the boot mouth, use a clean cloth or industrial wiping paper to remove the dust, and then use compressed air to purge the dust.

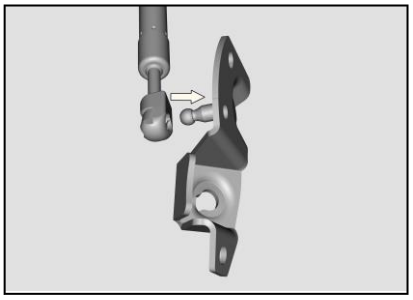
3. When painting the body sheet metal, the pneumatic support rod must be effectively protected to avoid air leakage caused by paint sticking to the pneumatic support rod; In case of protection with the stripe tape, the stripe tape must be removed from the strut after painting, otherwise the stripe tape will enter the pneumatic strut and cause air leakage.

Warning

When repairing the accessory parts of the air support rod, pay attention to avoid collision and scraping the air support rod. Otherwise, there is air leakage of the air support rod, which may cause explosion of the air support rod when it is serious.

Installation

- When assembling the air strut, align the air strut joint with the ball pin and gently tap the air strut into the ball joint to complete the assembly.



Removing and installing tailgate weld assembly

Tips

Remove and install with the assistance of

a service technician. Disassembly

--Unscrew the retaining bolts of the tailgate hinge (tailgate side).

--Remove tailgate

welding assembly (1).

Bolt Tightening torque

33±3Nm (17 ftlb.)

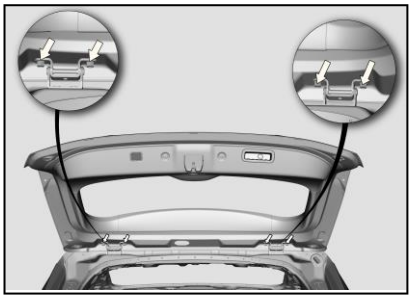


Figure 196:

Installation

Installation is generally performed in flyback and tailgate adjustment is performed after installation.

Adjusting Tailgate Welding Assembly

Adjust the tailgate by unscrewing (without screwing out) the tailgate hinge (tailgate side) retaining bolts. Tool: Sleeve (1 2), bolt Tightening torque 33±3N.m (7.5 ftlb.)

Figure 197:

Tips

The tailgate is adjusted if the gap dimensions are uniform across the closed tailgate weld assembly, are not concave or convex, and are contoured.

Install the above steps. If the adjustment effect is not achieved, refer to the following steps for the next adjustment.

- Remove C-pillar upper trim assembly, refer to Removing and installing C-pillar trim

- Disengage roof rear retaining clips, see Removing and installing roof liner

- Adjust the tailgate weld assembly hinge by loosening (without unscrewing) the tailgate hinge (header side) retaining bolts. Tool: Sleeve (1 2), bolt Tightening torque 33±3N.m (7.5 ftlb.)

Figure 198:

Removing and installing tailgate hinge

Disassembly

Remove tailgate

Remove C-pillar upper trim assembly, refer to Removing and installing C-pillar trim

Disengage roof rear retaining clips, see Removing and installing roof liner

Unscrew the fixing bolts of the tailgate hinge (top cover side), and take out the tailgate hinge (1). Tool: Sleeve (1 2), bolt Tightening torque 33±3N.m (7.5 ftlb.)

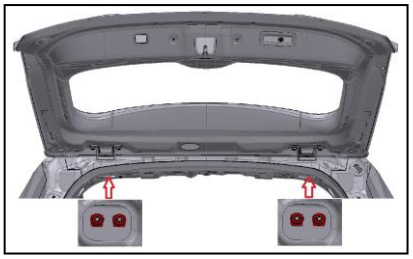


Figure 199:

Installation

The installation shall be carried out in reverse order, and the tailgate shall be adjusted after the installation is completed

Removing and installing tailgate latch

Disassembly

Unscrew retaining bolt of tailgate lock pin

Remove tailgate lock pin (1)

Bolt Tightening torque 23±2Nm (7.5 ftlb.)

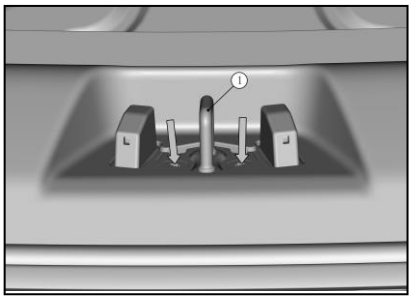


Figure 200:

Installation

Installation is generally performed in reverse order.

Removing and installing tailgate buffer block

Disassembly

Unscrew the tailgate buffer block (1) in the direction of the arrow.

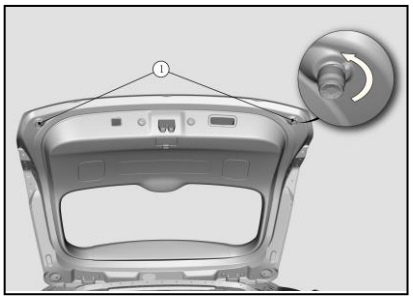


Figure 201:

Installation

The installation is generally performed in reverse order, and after the installation is completed, the tailgate buffer block is adjusted.

The flatness of the tailgate and the body can be adjusted by selecting the tailgate buffer block (1) in the -arrow -1- or -2-direction.

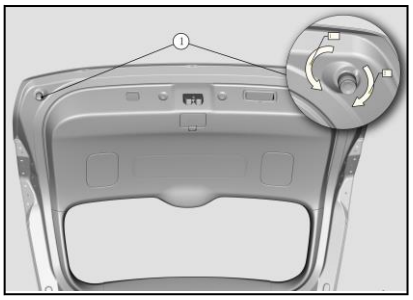


Figure 202:

Removing and installing tailgate frame seal

Disassembly

Remove the tailgate sealing strip (1) from the body flange.

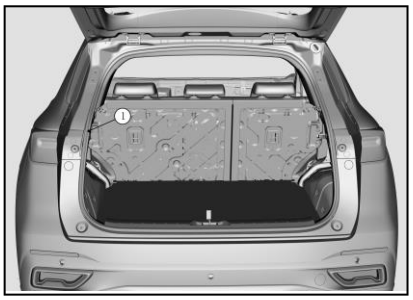


Figure 203:

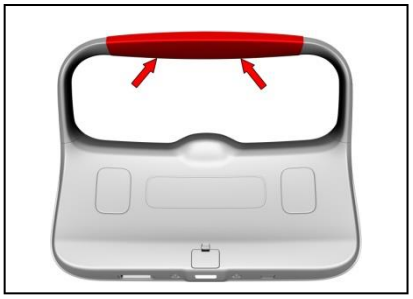
Installation

Install generally in reverse order, taking care to install the tailgate seal at the body flange and press tight.

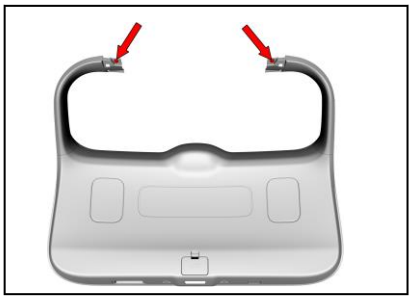
Removing and installing tailgate trim panel

Disassembly

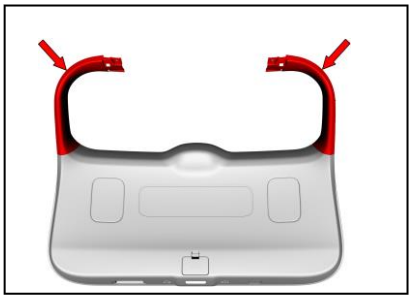
Use a plastic screwdriver to pry open and remove the tailgate upper trim.



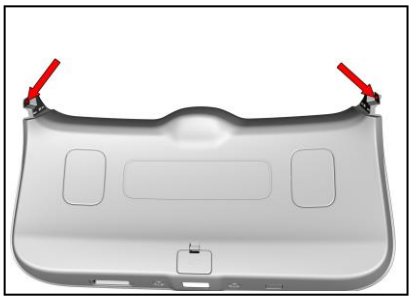
Use a Phillips screwdriver to remove the screws securing the tailgate left and right trim.



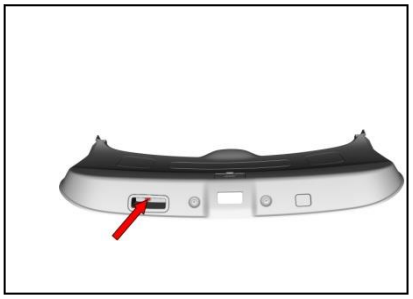
Remove the left and right tailgate trim.



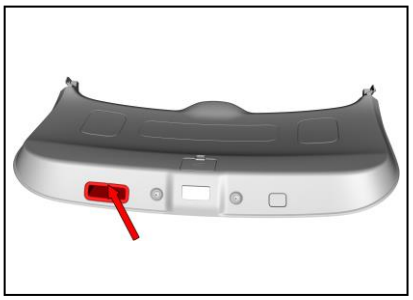
Use a Phillips screwdriver to remove the retaining screws that secure both sides of the tailgate lower trim.



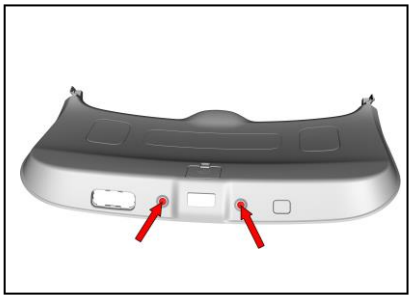
Use a Phillips screwdriver to remove the retaining bolts of the tailgate buckle box.



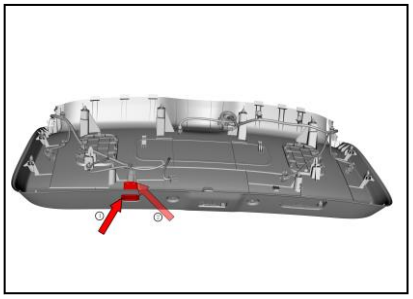
Use a flat-blade screwdriver to pry up and remove the tailgate buckle box.



Use a Phillips screwdriver to remove the two Phillips screws under the tailgate lower body.



Use a slotted screwdriver to pry up the power tailgate switch (position (1) as shown in the figure) and disconnect the power tailgate switch harness plug (position (2) as shown in the figure). This step is omitted if there is no power liftgate switch for a low configuration model.



Remove the tailgate lower trim panel.

Installation

The installation sequence is the reverse of the removal sequence.

Warning The back door trim panel buckle is a disposable component, and a new back door trim panel buckle needs to be replaced during installation.

F270108

Bumper

Removing and installing front bumper

Disassembly

Disconnect the negative

battery harness.

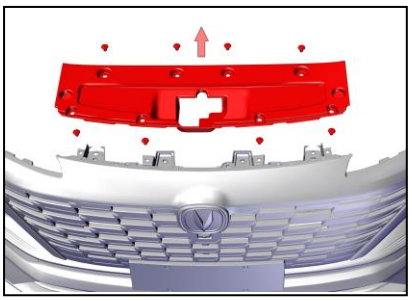
Reference: Battery

Assembly

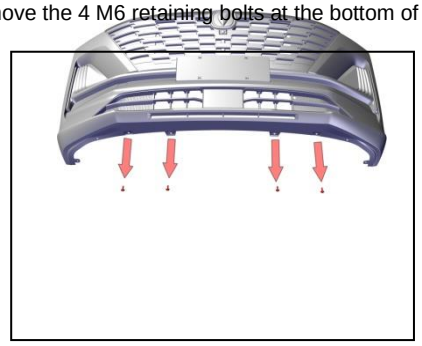
Removing front wheel arch trim

Reference: Removing and installing wheel cover

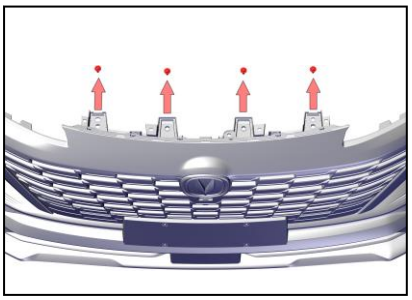
Unscrew 8 push screws with a Phillips screwdriver and remove the front bumper upper trim cover



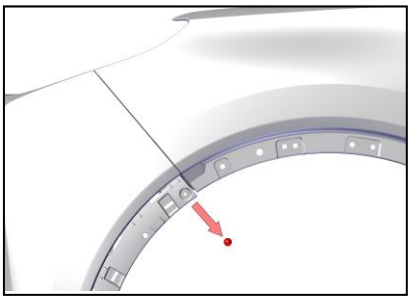
Remove the 4 M6 retaining bolts at the bottom of the bumper with # 10 sleeve.



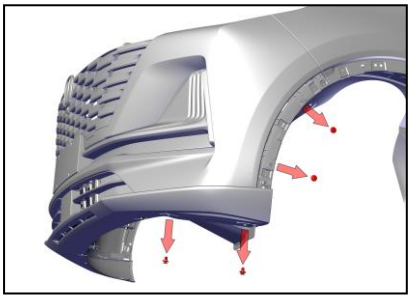
Remove the 4 M6 attaching bolts on the upper bumper with # 10 sleeve.



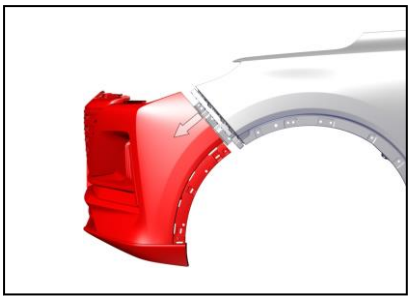
Use a Phillips screwdriver to remove 2 screws on the left and right sides of the bumper.



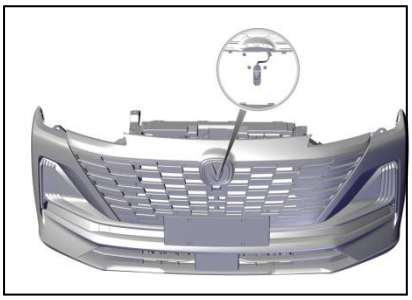
Use a Phillips screwdriver to remove the 4 push screws on the left and right sides

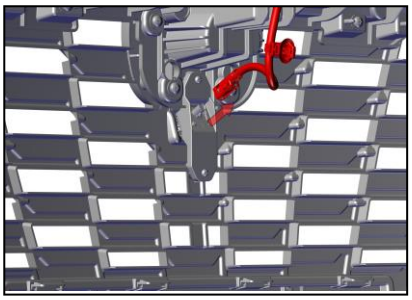


Pull the front bumper outward by hand to disengage the front bumper from the side bracket. Same operation on the left and right sides.



Remove the front camera harness plug by hand.





Remove the front bumper.

Installation

The installation sequence is the reverse of the removal sequence.

Removing and installing rear bumper

Disassembly

Disconnect the negative

battery harness;

Reference: Battery

Assembly

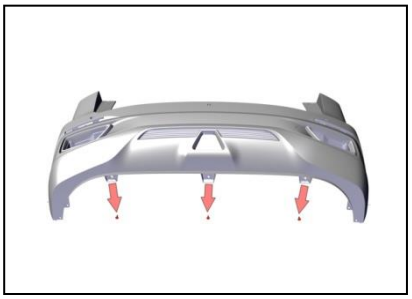
After disassembly of the combination lamp;

Reference: Combined rear light(Including reversing lamp, brake lamp)

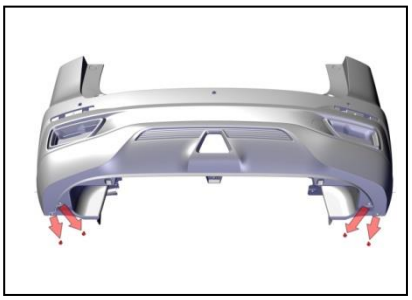
Remove the rear wheel arch trim;

Reference: Removing and installing wheel cover

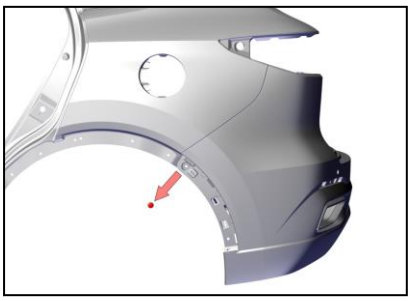
Remove the 3 M6 bolts on the lower side of the rear bumper with No. 10 sleeve;



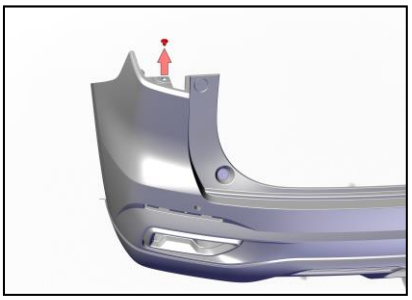
Remove the 4 Phillips screws with a Phillips screwdriver



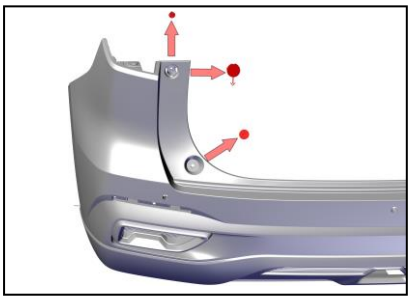
Use a cross screwdriver to remove the cross push screws at the right and left wheel arch joints of the rear bumper, one on each side symmetrically;



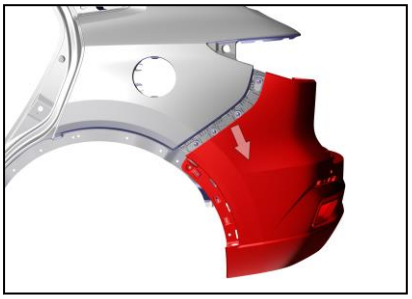
Use a cross screwdriver to remove the cross push screws at the left and right rear combination lamps on the upper part of the bumper, one on each side symmetrically;



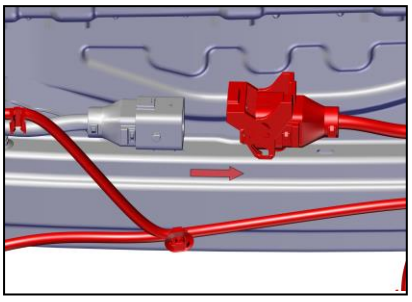
Use a flat screwdriver to pry open the screw cover plate at the arrow, remove the left and right bolts M6X2 on the upper part of the bumper with No. 10 sleeve, and remove the hexagon socket head screws X2 on the left and right with hexagon socket screwdriver;



Pull the rear bumper in the direction of the arrow with your hand, symmetrical to the left and right;



Disconnect the rear bumper wiring harness connector and remove the rear bumper assembly. Two persons are recommended here;



Reverse Radar Disassembly:

Reference: Rear Probe

Rear fog lamp and reflex reflector removal:

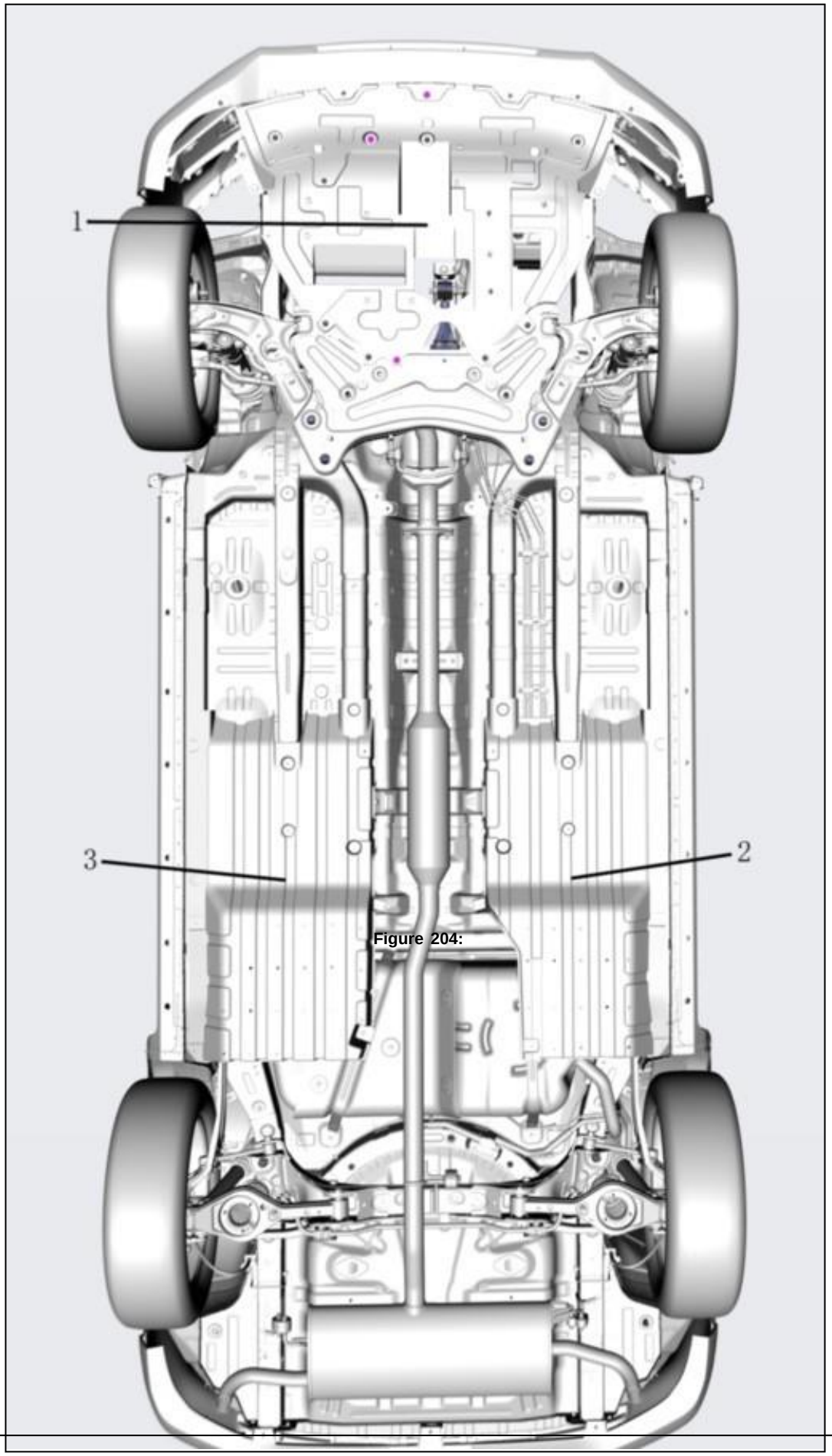
Reference: Rear fog lamp assembly and reflex reflector assembly

Installation

The installation sequence is the reverse of the removal sequence.

Body exterior trim

Bottom shield



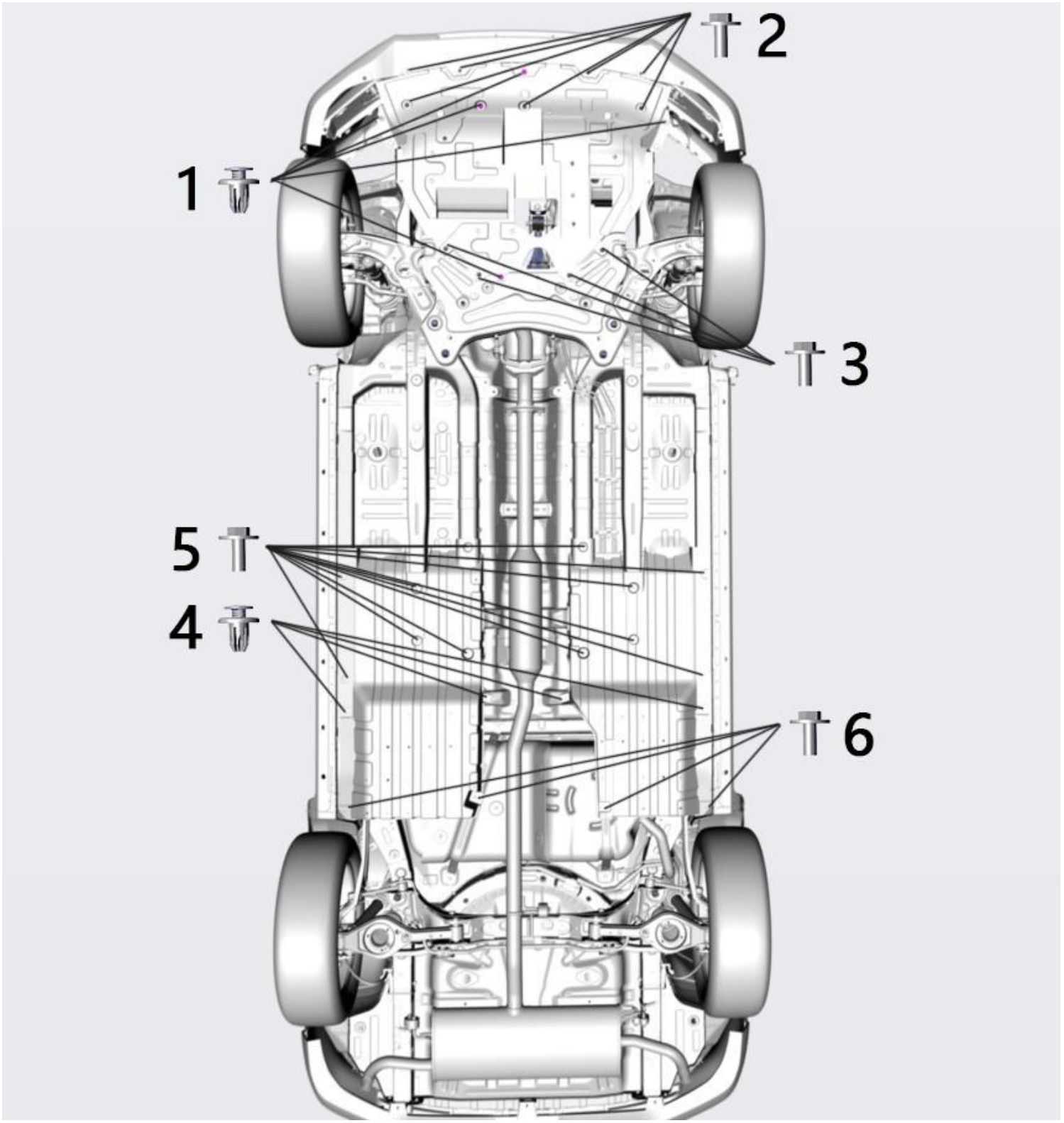
1287

Figure 204:

Serial Number	Part Name
1	Underhood lower shield
2	Lower left guard assembly in chassis(Left)
3	Lower left guard assembly in chassis(Right)

Disassembly

1. Disassemble/assemble the standard parts in turn according to the following figure;


1
2
3
4
5
6

Serial Number	Part Name	Serial Number	Part Name
1	Crosshead X5	4	Cross Push X4
2	Cross recessed pan head tapping screw and large washer combination M6X7	5	Cross recessed pan head tapping screw and large washer combination M6X12
3	Cross recessed pan head tapping screw and large washer combination M6X4	6	Cross recessed pan head tapping screw and large washer combination M6X4

Installation

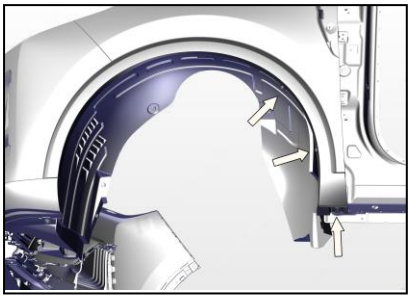
The installation sequence is the reverse of the removal sequence.

Wheel Cover

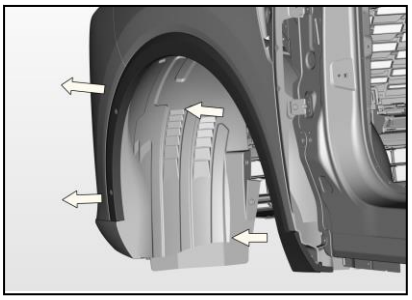
Disassembly

Front wheel arch

Use a screwdriver to remove 3 cross push screws at the joint between the left and right front wheel arches and the fender, which are symmetrical between the left and right;

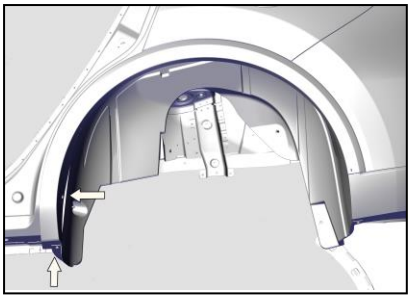


Remove the front wheel arch by hand in the direction of the arrow, symmetrical to the left and right;

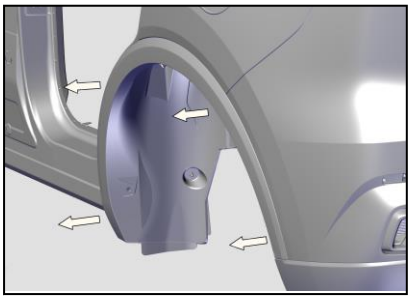


Rear wheel arch

Use a screwdriver to remove 2 cross push screws at the connection between the left and right rear wheel arches and the side wall, which are symmetrical;



Remove the rear wheel arch by hand in the direction of the arrow, symmetrical to the left and right;

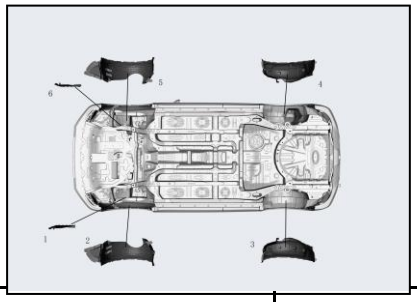


Installation

The installation sequence is the reverse of the removal sequence.

Wheel housing and engine side guards

1.



Serial Number	Part Name	Serial Number	Part Name
1	Engine side guard assembly(Right)	4	Rear Wheel Hood Liner Assembly(Left)
2	Front Wheel Hood Panel Assembly(Right)	5	Front Wheel Hood Panel Assembly(Left)
3	Rear Wheel Hood Liner Assembly(Right)	6	Engine side guard assembly(Left)

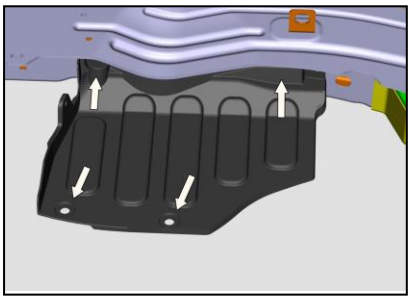
Disassembly

Remove the front and rear wheels; Wheels and tyres

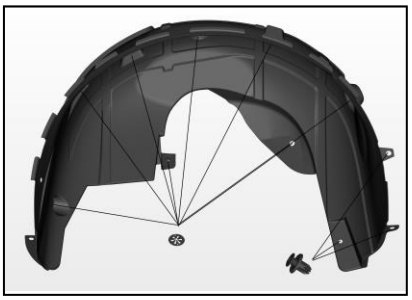
Remove the front and rear wheel covers; Wheel Cover

Use a screwdriver to remove 12 fixing clips and pull out the front wheel housing liner according to the figure below;

After the front wheel housing liner is removed, use M6 sleeve and screwdriver to remove 2 engine side shield mounting bolts and 2 clips respectively, and remove the engine side shield;



As shown in the figure below, use a screwdriver to remove 8 thrust round nuts and 2 cross screws, and then take out the rear wheel housing liner;



Installation

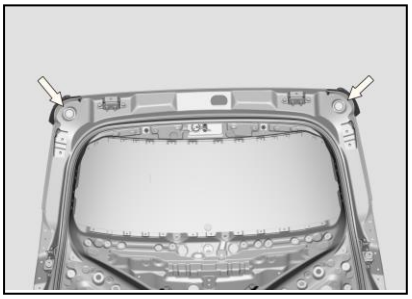
The installation sequence is the reverse of the removal sequence.

Spoiler

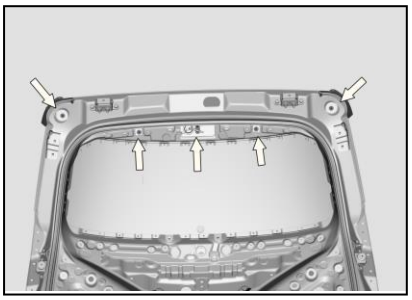
Disassembly

Disconnect the negative battery harness. See Battery

Remove both end plugs on the tailgate.



Using an M6 sleeve, remove the spoiler 5 retaining nuts.



Pull out the spoiler to the rear, disconnect the high mounted brake lamp harness connector, and pull out the washer kettle rear nozzle 2-way pipe.

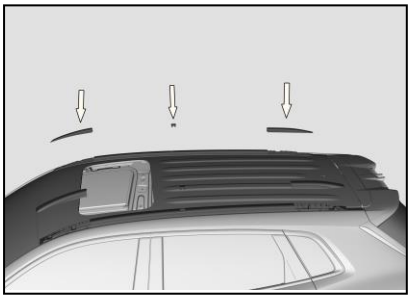
Installation

The installation sequence is the reverse of the removal sequence.

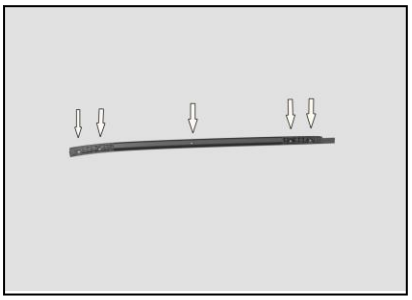
Luggage rack

Disassembly

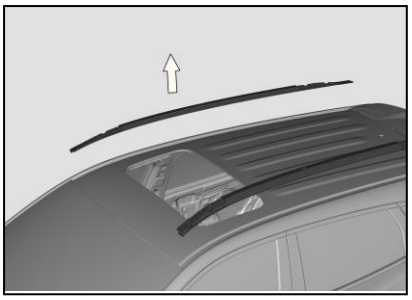
Remove the rack front cover, rack middle cover, rack rear cover.



Using an M6 sleeve, remove the bolts attaching the 5-position single-sided luggage rack.



Remove the luggage rack upward.



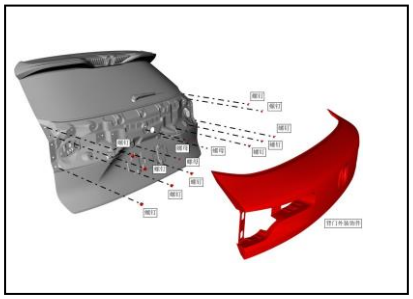
Installation

The installation sequence is the reverse of the removal sequence.

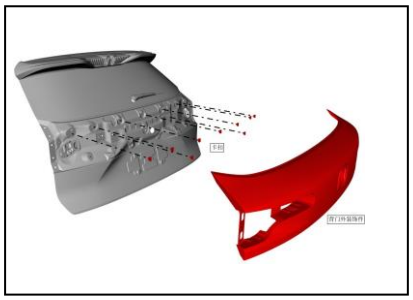
Tailgate exterior trim and clutch box

Remove tailgate trim panel, see Removing and installing tailgate trim panel
Remove rear combination light at the left and right, see Combination rear light(Including reversing lamp, brake lamp)

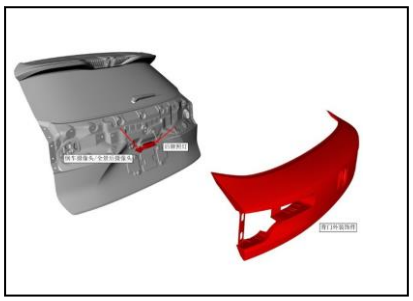
Remove the 3 nuts from the tailgate exterior trim using a sleeve and the 10 screws from the tailgate exterior trim using a hexagon socket screwdriver.



Use a flat opening to remove the 9 clips of the tailgate exterior trim to remove the tailgate exterior trim from the vehicle.



Remove the Reverse Camera/Panoramic Rear Camera from the tailgate exterior trim, refer to Rear Camera and License Plate Lamp Assembly

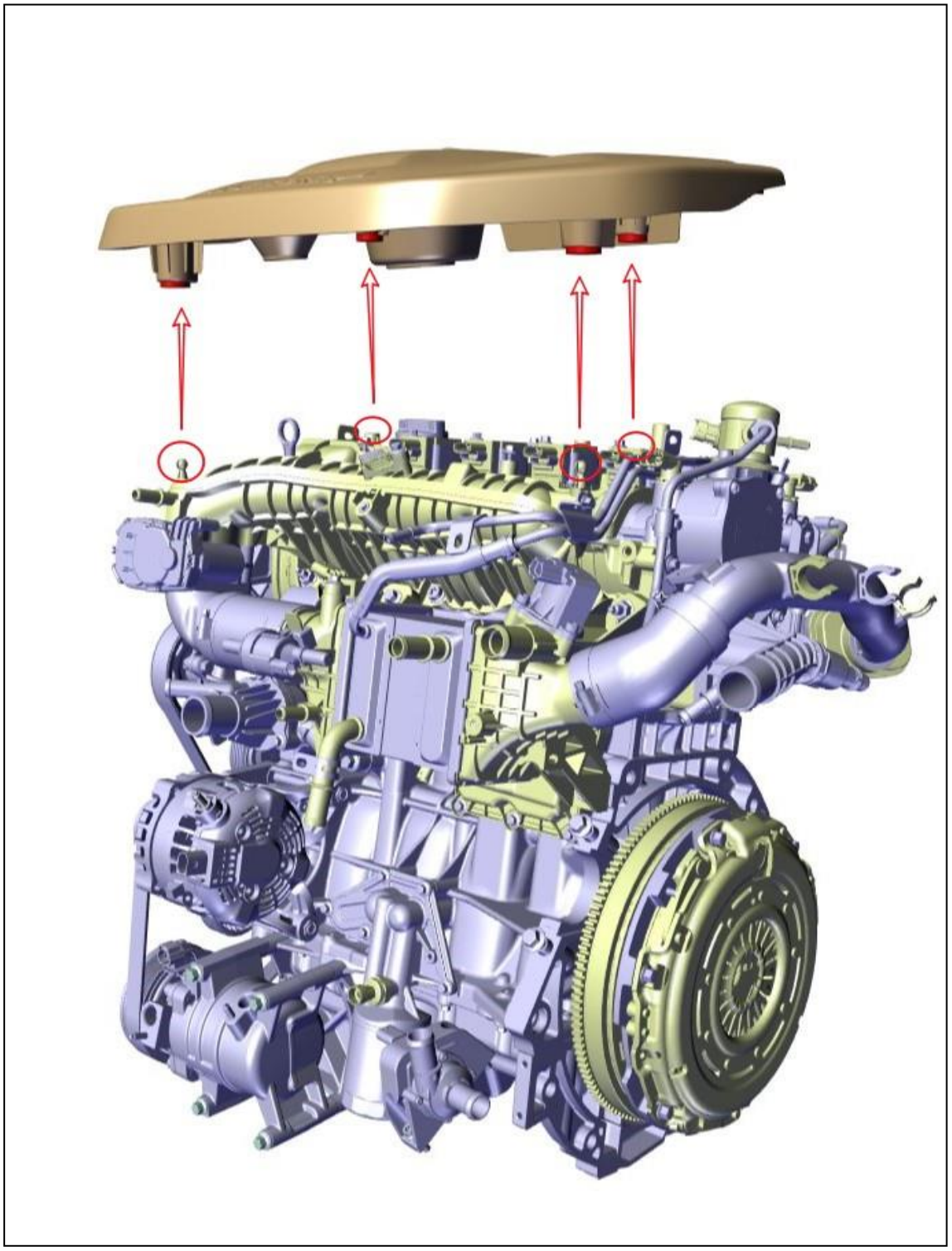


The installation sequence is the reverse of the removal sequence.

Removing and installing engine trim cover

I. Removing the Engine Trim Cover

1 Hold the engine trim cover and lift it up to remove the 4 rubber sleeves from the ball stud



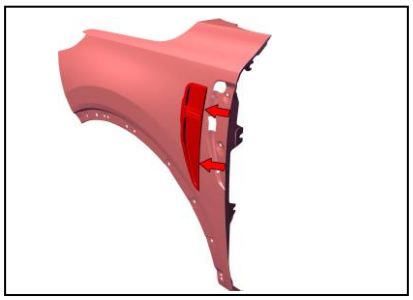
II. Installing the engine trim cover

1 Install engine trim cover in reverse order of removal

Removing and installing front fender trim

Disassembly

1 Hold the front fender trim close to the front door and pull out in direction Y of the arrow.



Installation

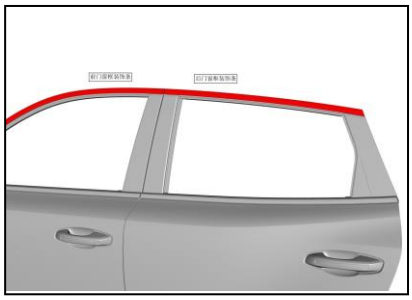
Align the two locating snap holes in the center of the front fender trim with the fender mounting holes and push the front fender trim into the front fender trim;

After pushing in the front fender trim, tap the edge to snap the three clips into place;

Removing and installing front door frame outer trim panel assembly

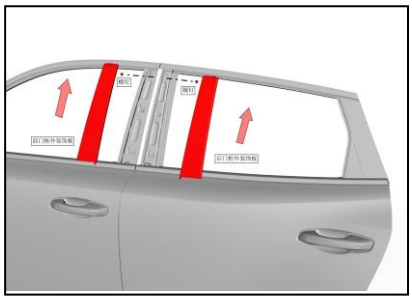
Removing the door frame outer trim panel

Remove window frame trim strip for front and rear doors, see Removing and installing front door window frame trim strip and Removing and installing rear door window frame trim strip.

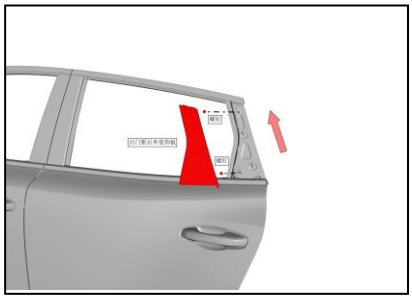


Remove 1 screw with a Phillips screwdriver and slide the left front door frame outer trim panel upward in the direction of arrow to remove the front door frame outer trim panel. The right side is removed in the same way as the left side.

Remove 1 screw with a Phillips screwdriver and slide the left rear door frame outer trim panel upward in the direction of arrow to remove the rear door frame outer trim panel. The right side is removed in the same way as the left side.



Use a Phillips screwdriver to remove the 2 screws and slide the left rear door frame outer trim panel upward in the direction of the arrow to remove the rear door frame outer trim panel. The right side is removed in the same way as the left side.



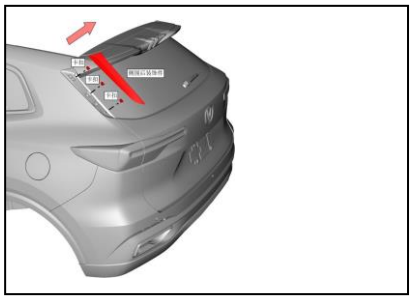
Installing outer trim panel for door frame

Installation is the reverse of removal.

Removing and installing side wall rear trim assembly

Removing side wall rear trim

The left side wall rear trim has 3 clips. Remove the left side wall rear trim, pull out in the direction of the arrow. Removing this piece may damage the side wall rear trim and require a new one. The right side is removed in the same way as the left side.

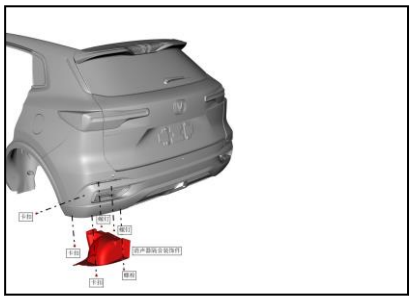


Installation mode and removal mode of side wall rear trim

Removing and installing silencer sound insulation trim assembly

Removing the muffler sound insulation trim

Remove the two screws with a Phillips screwdriver.
Remove 1 bolt (hexagon-head bolt) with sleeve.
Unscrew the 3 plastic clips with a Phillips screwdriver.
Remove the left muffler sound insulation trim from the vehicle. The right side is removed in the same way as the left side.



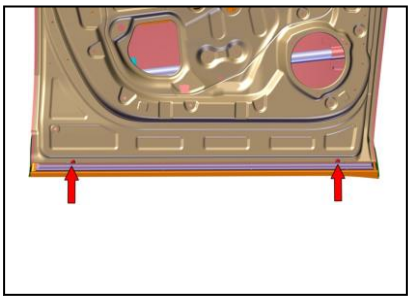
Installing muffler sound insulation trim

The installation sequence is the reverse of the removal sequence.

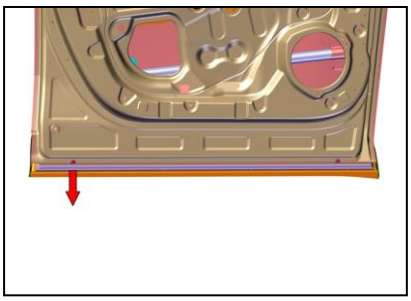
Removing and installing outer door guard assembly

Disassembly

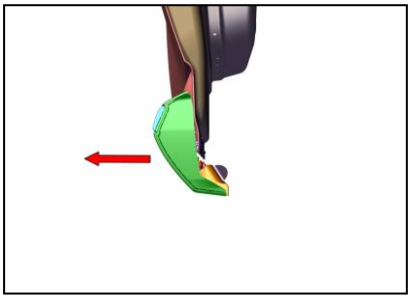
Remove 1 screw at the front and rear ends of the door outer shield;



Press down the door outer shield firmly in the direction of the arrow to make the bottom edge of the door sheet metal escape from the door outer shield limiting groove;

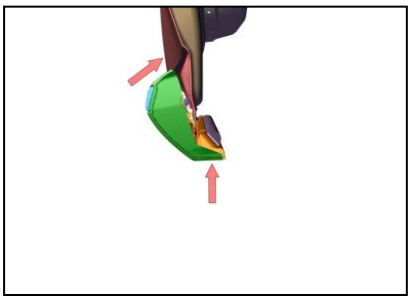


Pull out the door outer guard plate with force according to the direction of the arrow, so that the clip of the door outer guard plate comes out of the door sheet metal mounting hole;

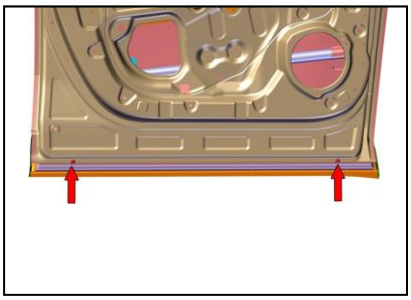


Installation

Align the door outer guard plate limiting groove with the lower edge of the door sheet metal, while lifting the door outer guard plate up, align the buckle with the door sheet metal mounting hole, and push in firmly in the direction of arrow;



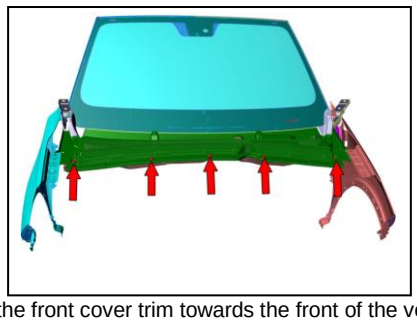
Install 1 screw at the front and rear ends of the door outer shield.



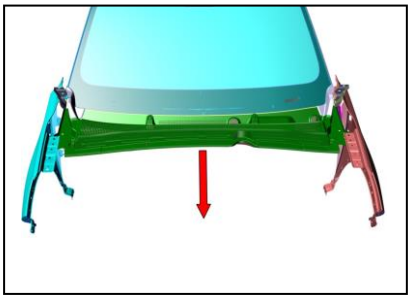
Removing and installing front cover trim assembly

Disassembly

Remove upper fender trim assembly, refer to Removing and installing upper fender trim assembly
Remove the 5 front cover trim mounting studs;



Pull the front cover trim towards the front of the vehicle in the direction of the arrow so that it comes out of the clips on the front stop glass and remove the front cover trim.



Installation

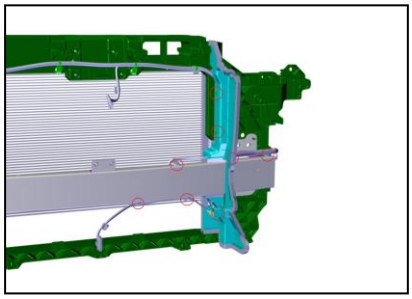
1 Installation is the reverse of removal.

Removing and installing front-end module air deflector assembly

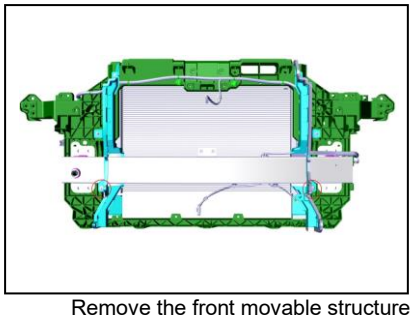
Disassembly

Remove front bumper assembly, refer to Removing and installing front bumper

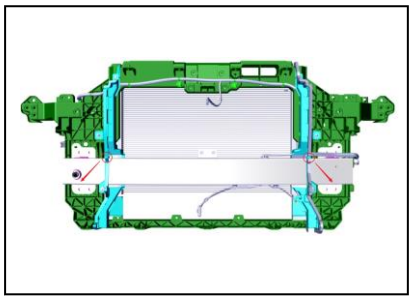
Remove the front module wiring harness and the front module air deflector (left) and the mounting clips of the front impact beam, totally 8 places;



Remove the front module air deflector and front impact beam mounting screws 2;

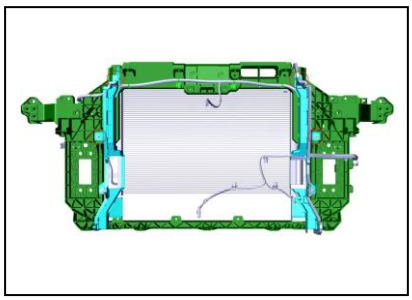


Remove the front movable structure clip of the front module air deflector, and rotate the front baffle to 90° to open it;



Remove the front impact beam;

Remove the front module air deflector and the front frame self-tapping screws 1 left and 1 right, push the screws 1 left and 1 right, and cancel the front module air deflector.



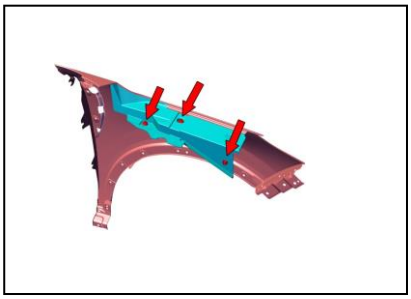
Installation

1 Installation is the reverse of removal.

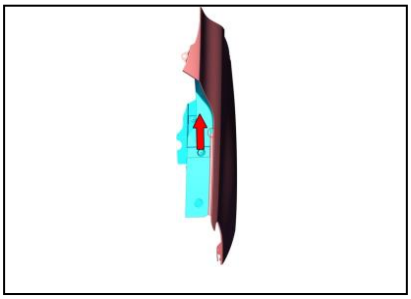
Removing and installing upper trim assembly for fender

Removal

Remove the 3 plastic push screws of the trim on the fender with a screwdriver;



Push the upper trim of the fender toward the rear of the vehicle to release it from the bolt at the position of the fender;



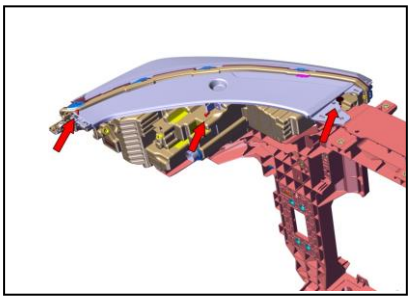
Remove upper trim of
fender. Installation

1 Installation mode is opposite to removal mode.

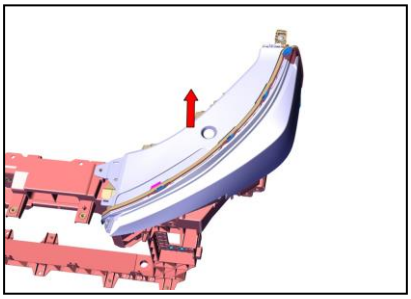
Removing and installing upper trim assembly for headlight

Removal

Remove upper fender trim, refer to Removing and installing upper fender trim assembly
Dismantle 1 front bolt, 1 middle and 1 rear self-tapping screw;



Push on the front headlight upper trim in direction of arrow and take it off accordingly.



Installation

1 Installation mode is opposite to removal mode

Body interior repair

Body interior repair 1316
Fault symptom diagnosis 1317
Dashboard 1317
Front interior 1318
Inside rearview mirror 1318
Dashboard 1320
Console 1326
Central interior trim 1342
A-Pillar Upper Trim Panel Assembly 1342
A-Pillar Lower Trim Panel Assembly 1343
Front sill trim panel assembly 1344
Rear Sill Trim Panel Assembly 1345
B-pillar trim 1346
C-pillar trim 1347
Headliner 1349
Spare parts atlas(Pillar trim) 1351
Rear interior trim 1352
Back Sill Trim Panel Assembly 1352
Trunk tool storage box 1353

Fault symptom diagnostic dashboard

If the left and right air outlets fail to slide or get stuck, it is only necessary to replace the corresponding air outlet assembly during maintenance

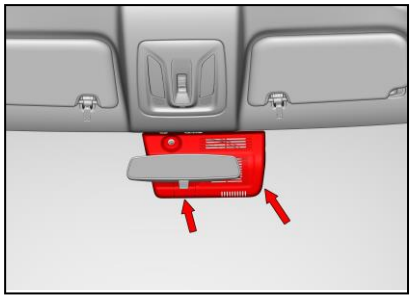
There is no damping or abnormal sound in the glove box assembly. During maintenance, replace the glove box assembly or damping block according to the following disassembly and assembly steps

Front interior mirror

Removing and installing lane departure sensor trim cover

Disassembly

Use a plastic screwdriver to pry the lane departure cover toward the interior of the vehicle.



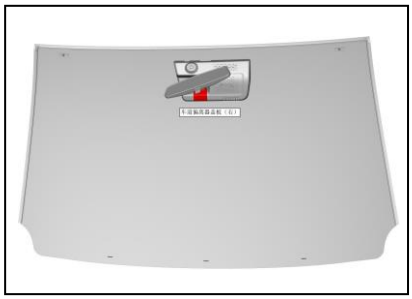
Installation

The installation sequence is the reverse of the removal sequence.

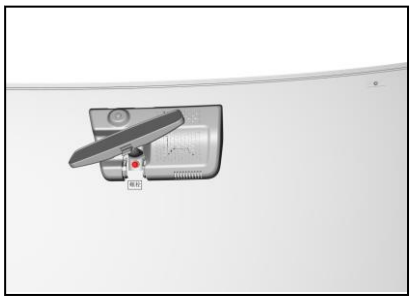
Removing and installing inner rearview mirror

Removing inner rearview mirror(High configuration)

Remove lane departure sensor trim cover (right), see Removing and installing lane departure sensor trim cover.



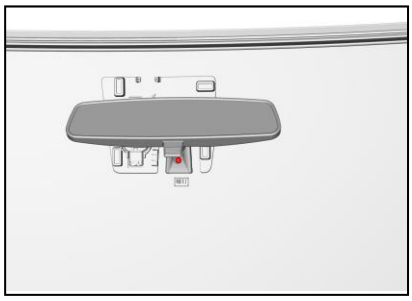
Remove the inner rearview mirror by unscrewing the inner rearview mirror retaining bolts counterclockwise using a hexagon-head screwdriver.



Removing inner rearview mirror(Medium)

Remove lane departure sensor trim cover, see Removing and installing lane departure sensor trim cover.

Use a hexagon socket screwdriver to unscrew the inner mirror retaining screws counterclockwise.

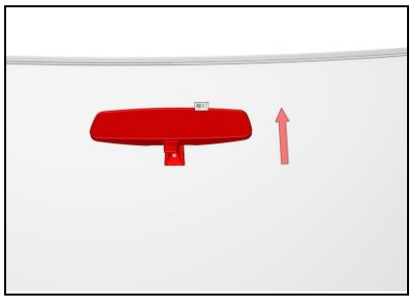


Move the inner mirror upward in the direction of the arrow to remove it.

Removing inner rearview mirror(Underweight)

Use a hexagon socket screwdriver to unscrew the inner mirror retaining screws counterclockwise.

Move up to remove the inner mirror.



Mirror Installation

The installation sequence is the reverse of the removal sequence.

F271001

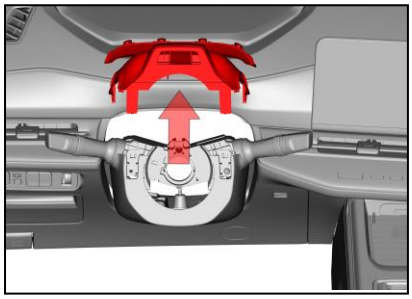
Dashboard

Removing and installing dashboard

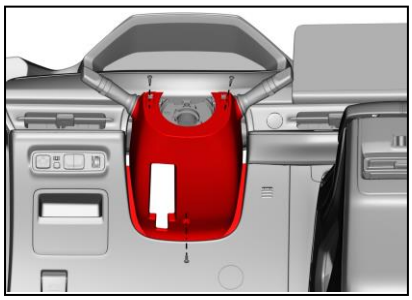
Disassembly

Removing steering lock housing

Using tool CA501-002, gently pry along the edge to remove the steering lock housing upper housing



Remove the steering lock housing lower housing set screws 3 (cross recessed pan head tapping screws and plain washer assembly ST4.2×16), remove the steering lower housing

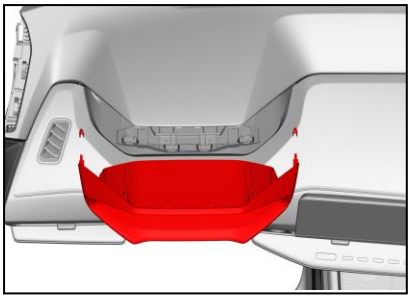


Removing light combination switch

Reference: Combination switch

Removing instrument cluster cover

Use Tool CA501-002 to gently pry off the instrument cluster cover along the edges, only one V-shaped card on the left and right sides, and the remaining edges are self-contained



Removing the gauge

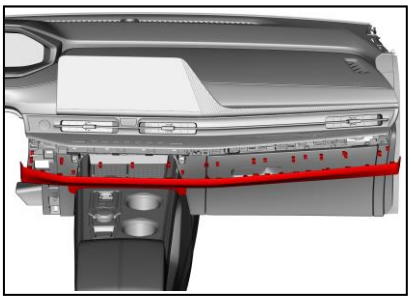
Reference: Instrument cluster assembly

Removing left and right A-pillar upper and lower trim panels

Reference: Removing and installing A-pillar upper trim assembly Removing and installing A-pillar lower trim assembly

Removing right trim strip

Using Tool CA501-002, pry gently along the edge, it is recommended to start from the upper right edge, with seven orange V-cards and four self-contained cards on the upper edge and eight white V-cards on the lower edge

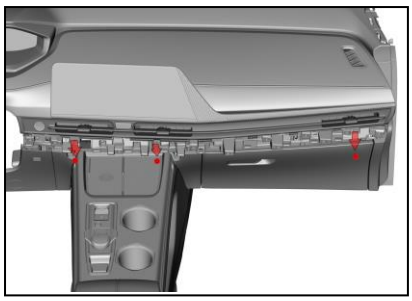


Removing air-conditioning control panel

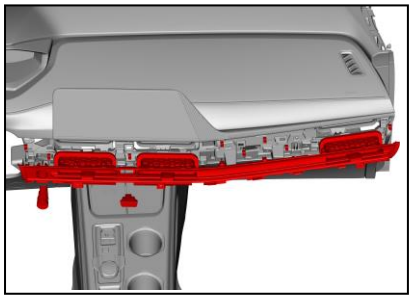
Reference: Air conditioning control panel

Removing central vent panel

Remove the 3 screws at the lower end of the 3 nozzles on the nozzles panel(Hexagon socket pan head tapping screw and plain washer assembly 4.2X16)



Use Tool CA501-002 to gently pry along the edge. It is recommended to remove the eight V-cards and seven self-cards from the vent panel starting from the right edge



Remove one-key start and

emergency alarm switch

Reference: One-key start

switch

Remove Multimedia Display/Car System Entertainment Terminal

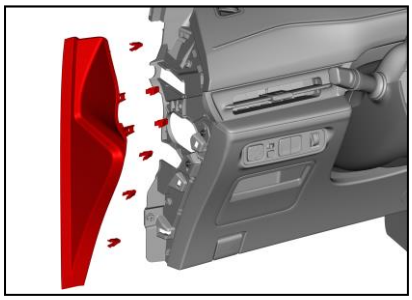
Reference: Car Infotainment Terminal Assembly

Removing left and right instrument panel covers

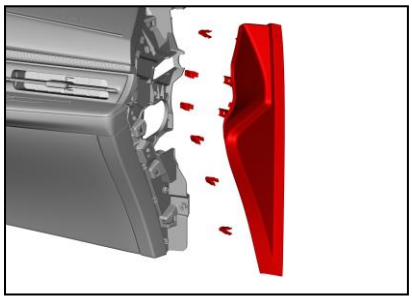
Removing the front door frame seal

Reference: Removing and installing front door frame seal

Using Tool CA501-002, gently pry along the edge, remove the left side cover, six V-Cards

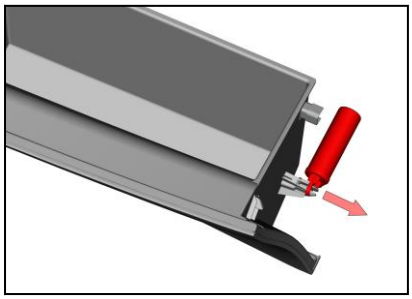


Using Tool CA501-002, gently pry along the edge, remove the right side cover, six V-Cards



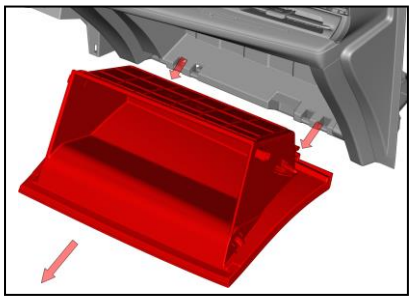
Remove glovebox

Open the glove box and lever out the damper mounting sleeve using Tool CA501-002



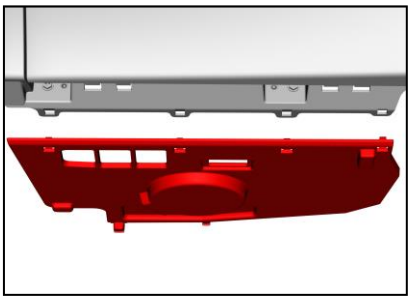
Squeeze the left and right sides of the glove box body, take out the stoppers at both ends, and the glove box can rotate to the bottom

Turn the glovebox to approx. 90° open (close to maximum rotatable angle) and pull the glovebox out



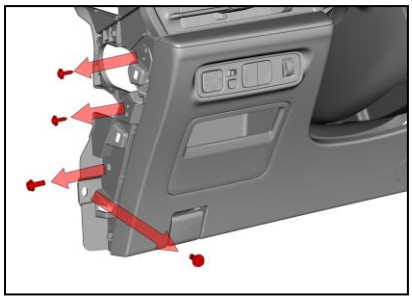
Removing the front passenger baffle

Use Tool CA501-002 to pry open the front four self-clips of the front passenger baffle and remove the passenger baffle

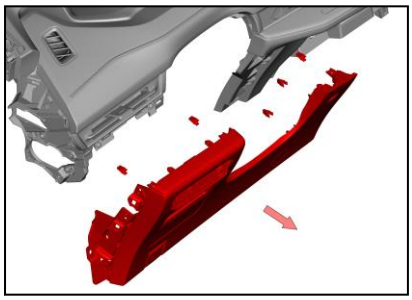


Removing the driver's undershield

Remove the two screws (hexagon socket recessed pan head self-tapping screw and plain washer assembly 4.2X16) and two bolts (cross head screws M6)



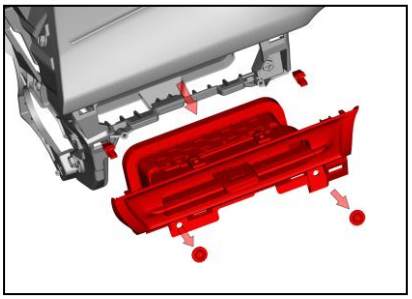
Use Tool CA501-002 to pry open the main driver lower guard (with upper left trim) and remove the combination switch, internal temperature sensor, and harness connector for the access port



Removing left side vent panel

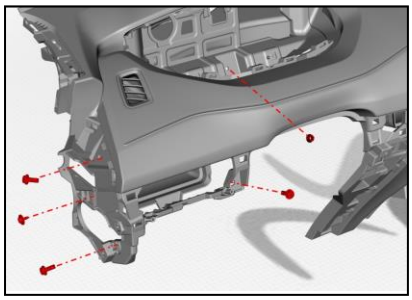
Remove 1 screw on the lower right side of the vent(Hexagon socket pan head tapping screw and plain washer assembly 4.2X16)

Use Tool CA501-002 to pry open the vent panel, left and right two V-cards and upper two themselves

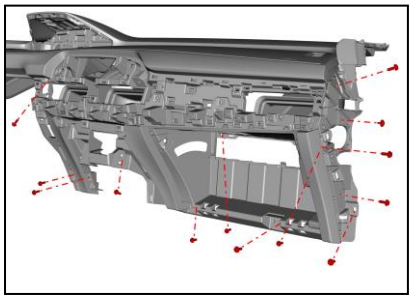


Removing the instrument panel body assembly

Remove the three retaining bolts (cross recessed hexagon head screw M6), one screw (hexagon socket recessed pan head tapping screw and plain washer assembly 4.8X16) and one nut (hexagon flange nut M6) on the left side of the instrument panel body



Remove the eleven fixing bolts (cross recessed hexagon head screw M6) and one screw (hexagon socket recessed pan head tapping screw and plain washer assembly 4.8X16) in the middle and right side of the instrument panel body.



Dismantling passenger safety

Reference: Front passenger airbag

Pull out instrument panel body with accessory assembly to the rear

The Caution instrument harness can be removed directly with the instrument panel body, check for harness interference when removing, and be careful to scratch the instrument panel with metal objects!

Installation

Install in reverse order of removal

Before installation, each part shall be inspected for deterioration or damage and replaced if a defect is found. Note that the internal harness connections are accurate.

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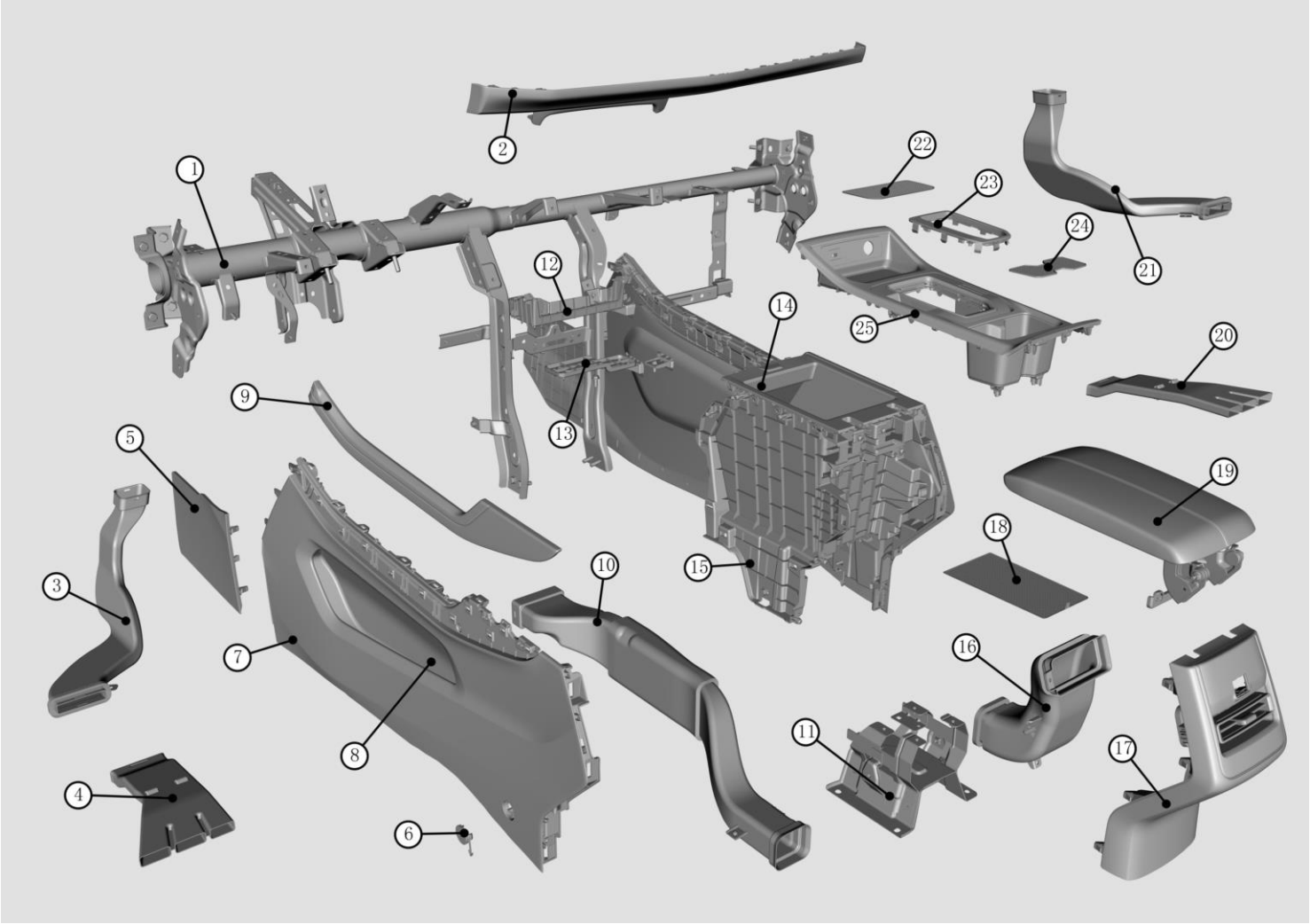
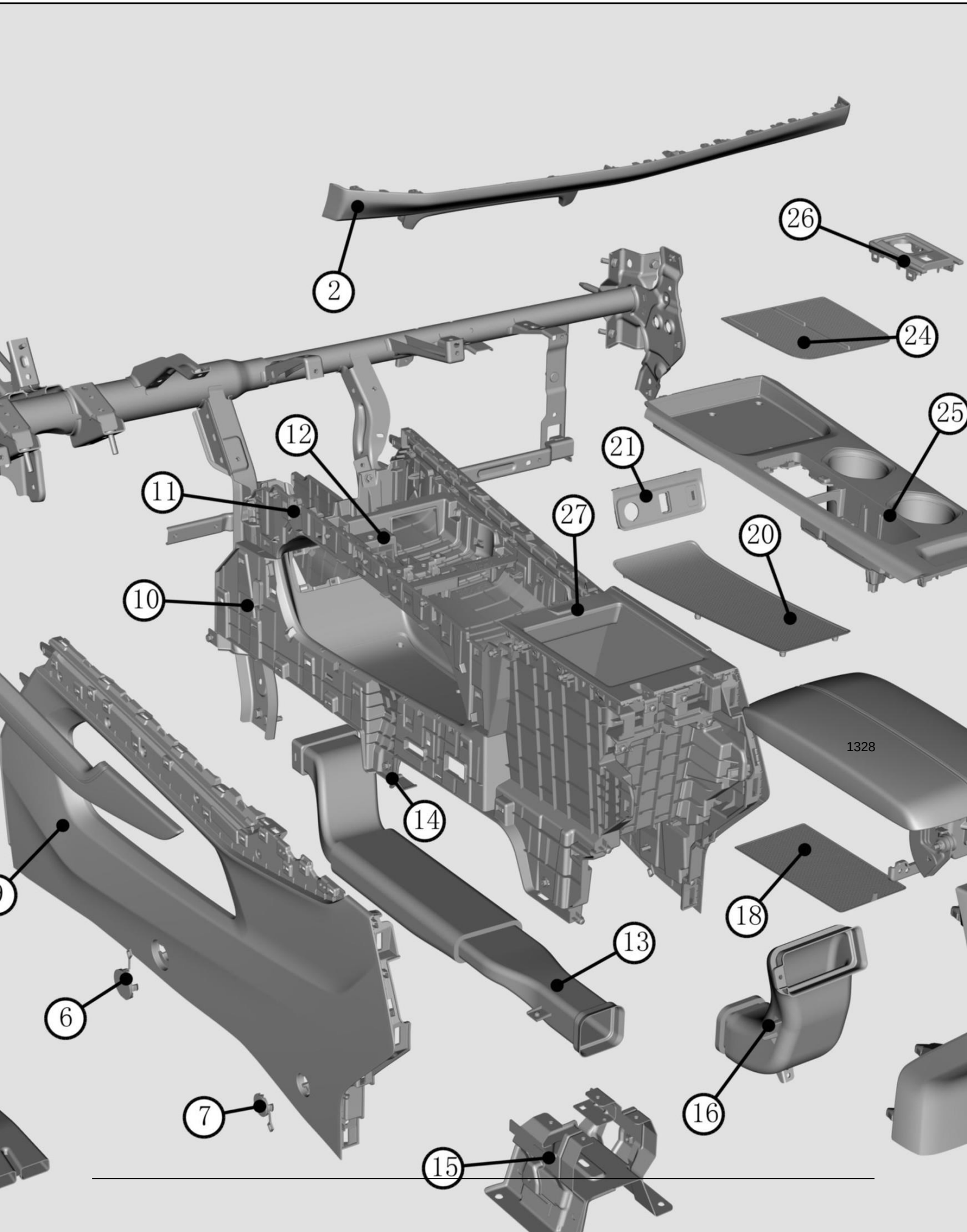
Console

Central Control Box - Assembly Overview



Serial Number	Part Name	Serial Number	Part Name
1	Steering support	14	Center Armrest Box Upper Cover
2	Instrument panel right trim strip I	15	Central control armrest box body
3	Front end of left rear blowing foot duct	16	Rear face duct
4	Rear end of left rear blow foot duct	17	Central control rear panel
5	Central Control Front Extension Left	18	Center Armrest Box Mat
6	Center box rear screw cover	19	Central control armrest
7	Central control left side panel	20	Rear end of right rear blowing foot duct
8	Central control left storage box inner panel	21	Front end of right rear blowing foot duct
9	Central control left cover	22	Central control front storage box mat
10	Front end of rear exhaust face duct	23	Central Shift Panel
11	Central control mounting bracket	24	Cup holder
12	Central control upper attachment bracket	25	Central control trim panel
13	Central control lower attachment bracket		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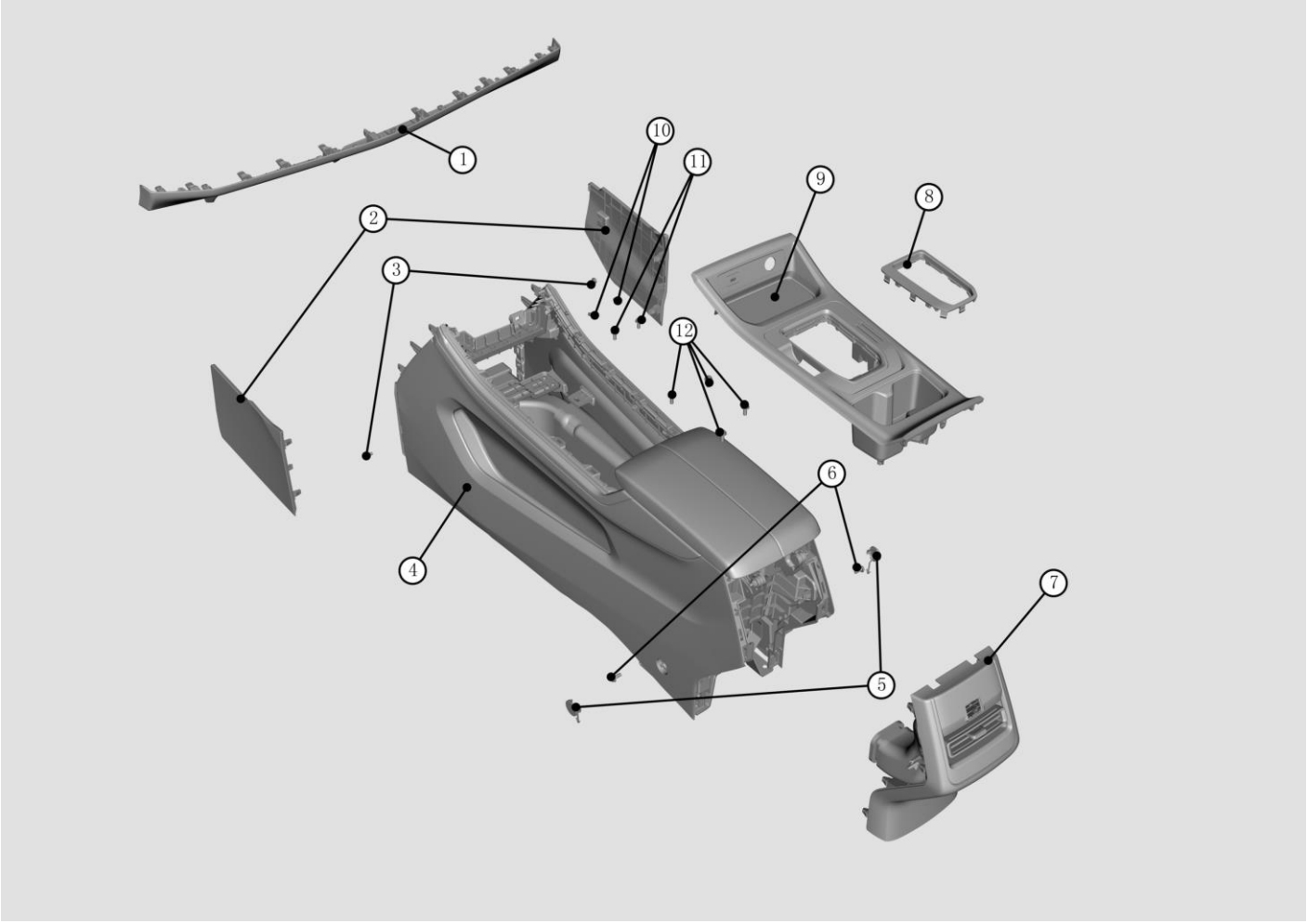
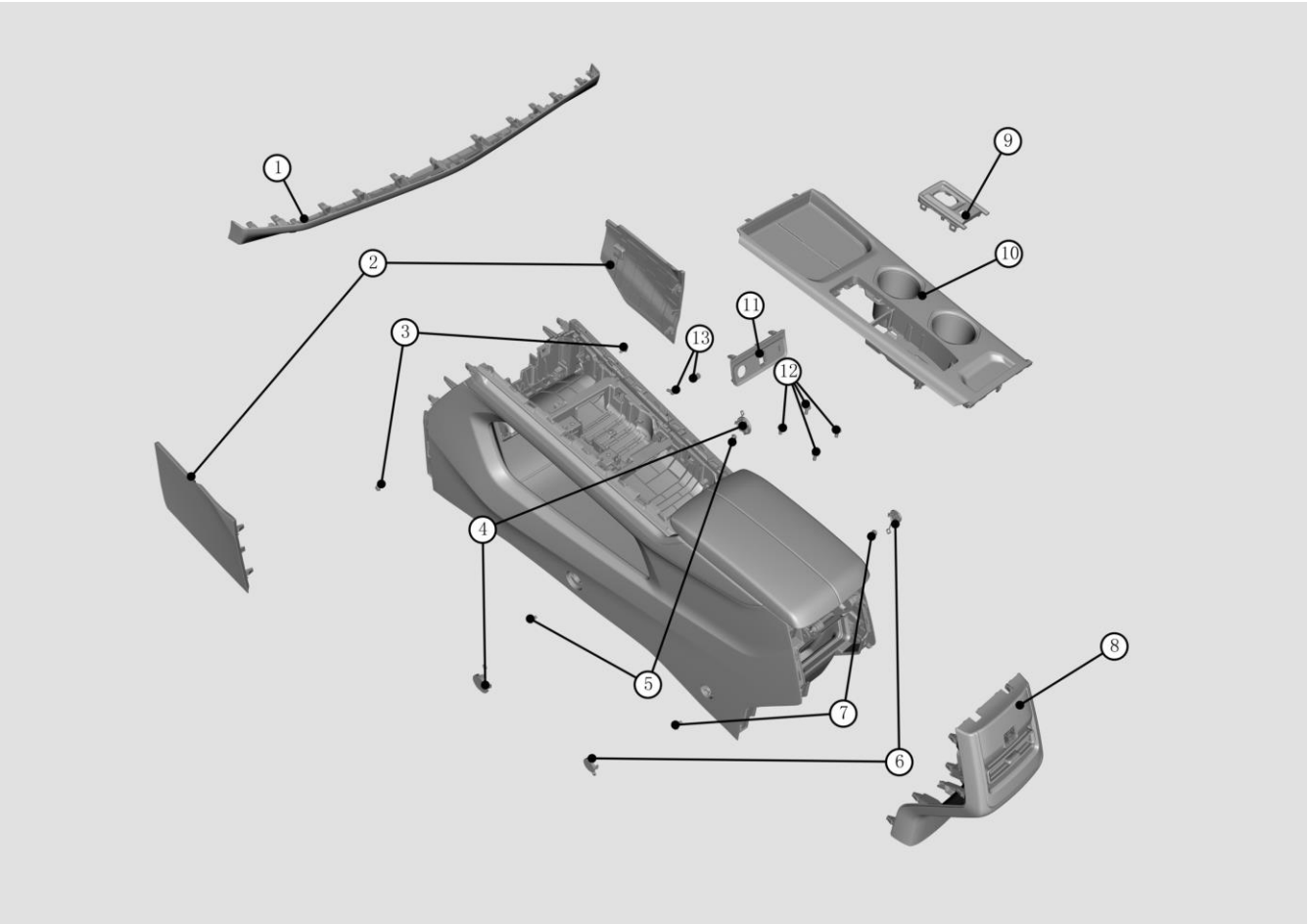
Serial Number	Part Name	Serial Number	Part Name
1	Steering support	15	Central control mounting bracket
2	Instrument panel right trim strip I	16	Rear face duct
3	Front end of left rear blowing foot duct	17	Central control rear panel
4	Rear end of left rear blow foot duct	18	Center Armrest Box Mat
5	Central Control Front Extension Left	19	Central control armrest
6	Center box middle screw cover	20	Central control middle storage box mat
7	Center box rear screw cover	21	Cigarette lighter panel
8	Central control left cover	22	Rear end of right rear blowing foot duct
9	Central control left side panel	23	Front end of right rear blow face duct
10	Central lower skeleton	24	Central control front storage box mat
11	Central control upper frame	25	Central control trim panel
12	Electronic Shift Reinforcement Bracket	26	Central Shift Panel
13	Front end of rear exhaust face duct	27	Center Armrest Box Upper Cover
14	Central control central mounting bracket		

Central Control Box - Overview



Serial Number	Part Name	Serial Number	Part Name
1	Instrument panel right trim strip I	7	Central control rear panel
2	Central control front extension	8	Central Shift Panel
3	×2 bolts(Left and right front extensions visible after removal)	9	Central control trim panel
4	Central control body	10	×2 bolts(Visible after removing the central control trim panel)
5	Central control rear screw cover	11	×2 bolts(Visible after removing the central control trim panel)
6	×2 bolts(Rear screw cover visible after removal)	12	×4 bolts(The armrest is open and the armrest box pad is visible)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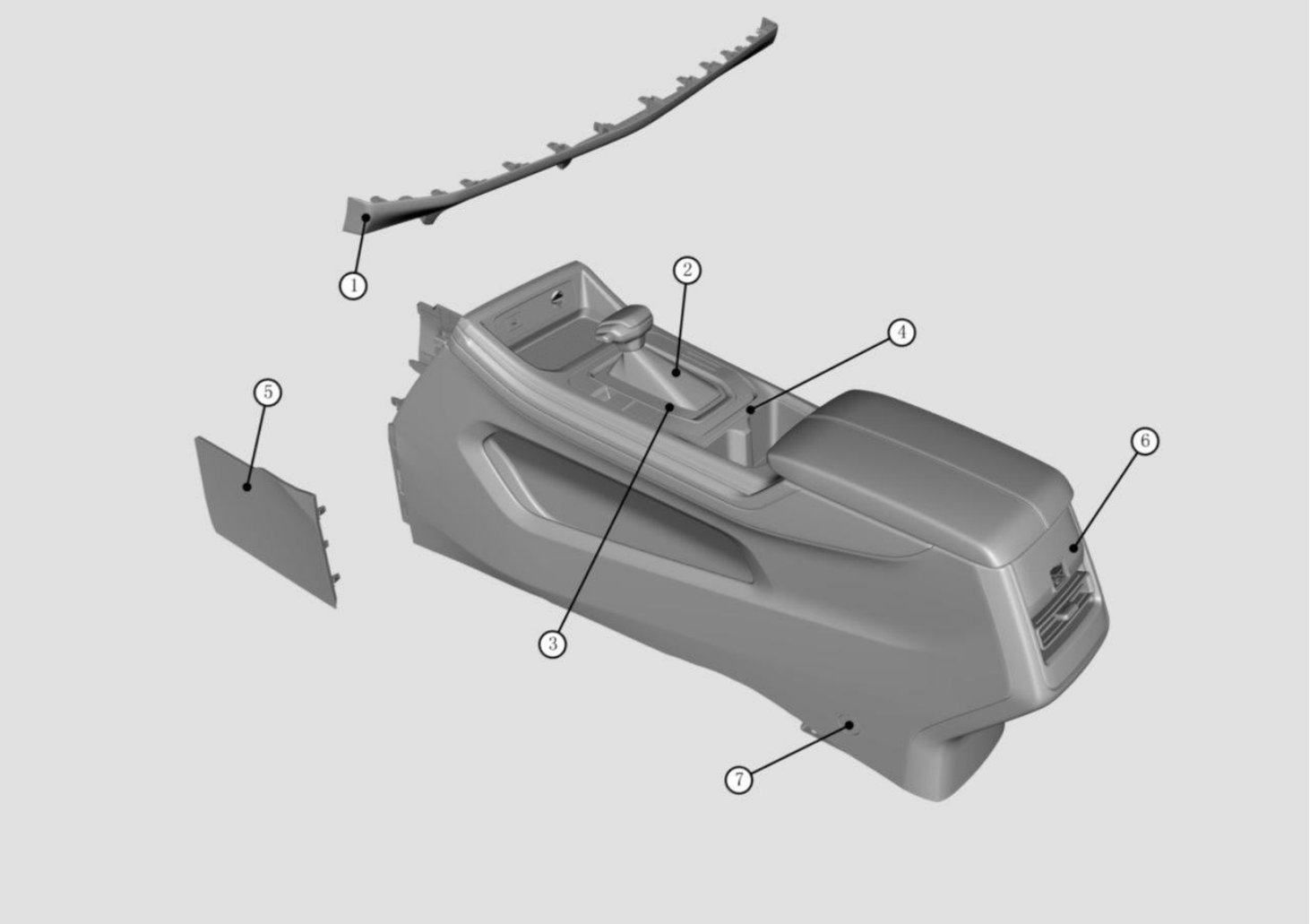
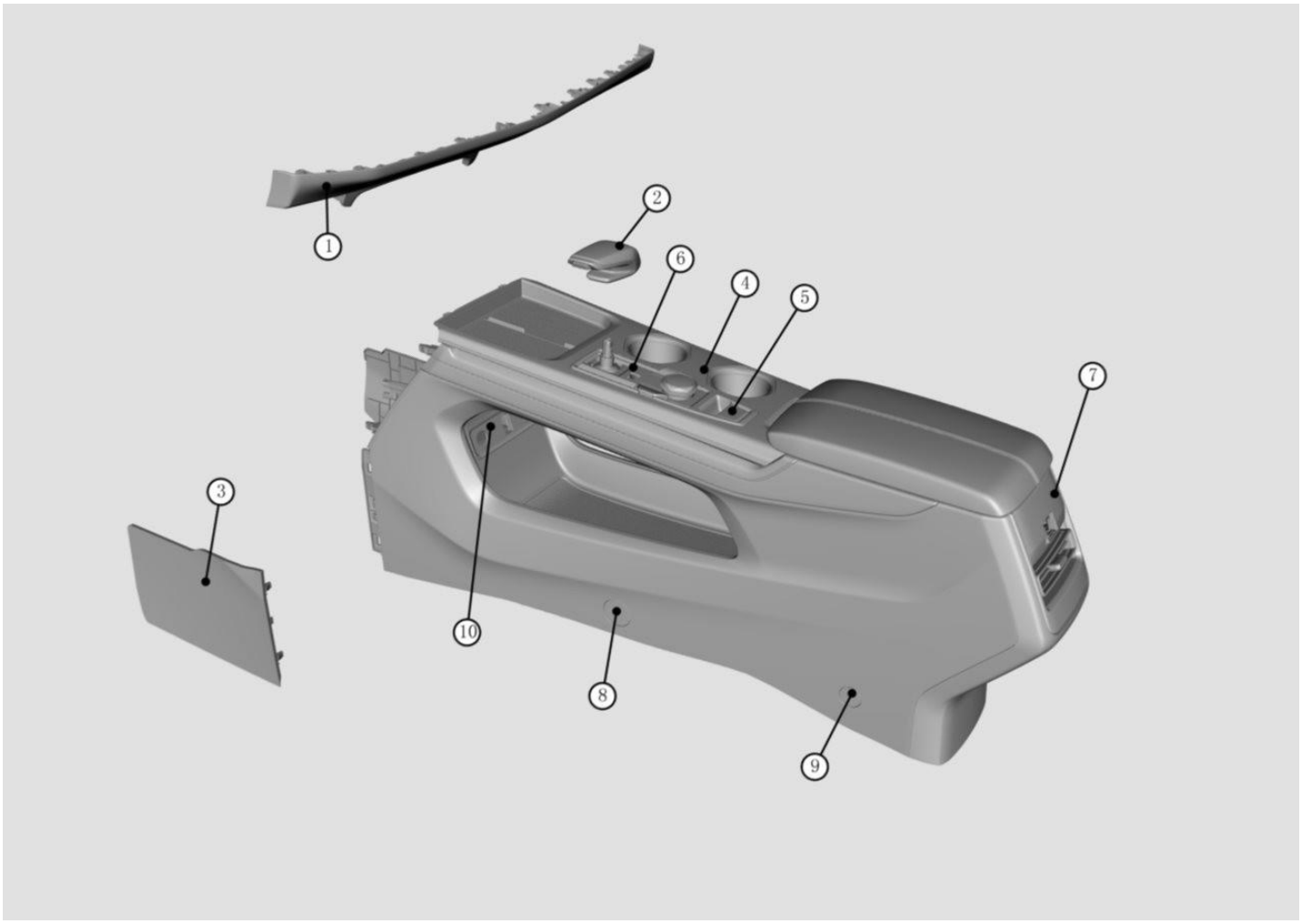
Serial Number	Part Name	Serial Number	Part Name
1	Instrument Panel Right Trim I	8	Central control rear panel
2	Central control front extension	9	Central Shift Panel
3	×2 bolts(Left and right front extensions visible after removal)	10	Central control trim panel
4	Central control middle screw cover	11	Cigarette lighter panel
5	×2 bolts(Middle screw cover visible after removal)	12	×4 bolts(The armrest is open and the armrest box pad is visible)
6	Central control rear screw cover	13	×2 bolts(Visible after removing the central control trim panel)
7	×2 bolts(Rear screw cover visible after removal)		

Caution 1. After all the above screws are removed, the whole armrest end can be lifted up and pulled back out of the whole central control box. 2. Before removing the center console, ensure that the peripheral harness connector is disconnected;

Center Box - Overview of Trim Disassembly Sequence



Caution Disassembly sequence rules: **1. First dismantle Class 1 parts (outermost layer) and finally dismantle Class 3 parts (innermost layer); Level 4 represents that the rest to be dismantled can only be dismantled as a whole;** 2. Adjacent parts shall be dismantled in the order of precedence in the following table; 3. Disconnect the harness during disassembly, and remember the connection mode of the harness;	
Level 1(Remove first)	1. Right side trim strip of instrument panel I(Skid) 2. Gearshift bellows(Pull)
Level 2	3. Gearshift panel(Pull) 4. Central control decorative panel(Pull) 5. Left and right front extension plates(Skid) 6. Central control rear panel(Skid) 7. Central control rear screw cover plate(Skid)
Level 3	Bolt
Level 4	**Caution 1. Disassembly of the whole: At the rear end of the middle control box, take the whole middle control box upward and backward Out;** 2. After the central control box is taken out, take out the disassembling screws of the rear blow face air pipe; 3. For overall disassembly, please refer to the list of central control box - complete disassembly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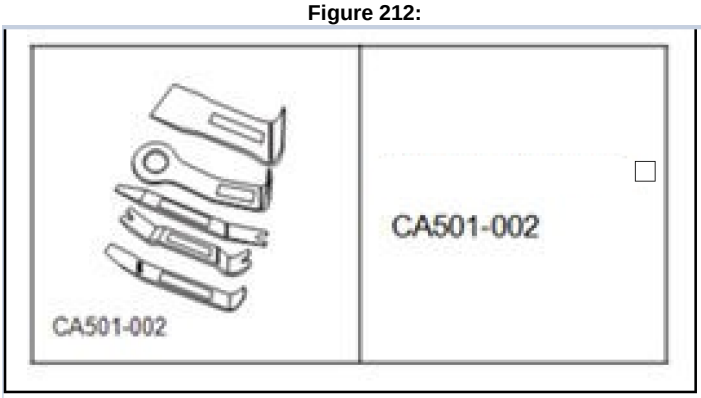
Caution Disassembly sequence rules: **1. First dismantle Class 1 parts (outermost layer) and finally dismantle Class 3 parts (innermost layer); Level 4 represents that the rest to be dismantled can only be dismantled as a whole;** 2. Adjacent parts shall be dismantled in the order of precedence in the following table; 3. Disconnect the harness during disassembly, and remember the connection mode of the harness;	
Level 1(Remove first)	1. Right side trim strip of instrument panel I(Skid) 2. Gearshift ball joint(Pull)
Level 2	3. Left and right front extension plates(Pull) 4. Central control decorative panel(Skid) 5. Central control switch(Back press) 6. Shift panel(Back card point press) 7. Central control rear panel(Lower pull) 8. Central control middle screw cover plate(Skid) 9. Central control rear screw cover plate(Skid) 10. Cigarette lighter panel(Skid)
Level 3	Bolt
Level 4	**Caution 1. Disassembly of the whole: At the rear end of the middle control box, take the whole middle control box upward and backwardOut (Please remove the electronic shift before disassembly);** 2. After the central control box is taken out, take out the disassembling screws at the front end of the rear face blowing duct; 3. For overall disassembly, please refer to the list of central control box - complete disassembly

Removing and installing central control box

Special tools

Figure 212:



Disassembly

1 Disconnect the negative battery harness. Reference: Battery Assembly

Remove the right trim I of the instrument panel, pry it off with a plastic crowbar, and then pull it out

Mechanical gearshift configuration Remove the gearshift dust cover and pull it up directly by hand

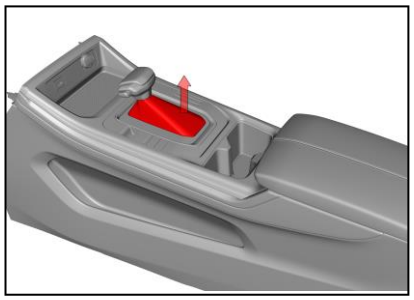


Figure 213:

Electronic Shift Configuration Remove the shift ball head and pull it up directly by hand

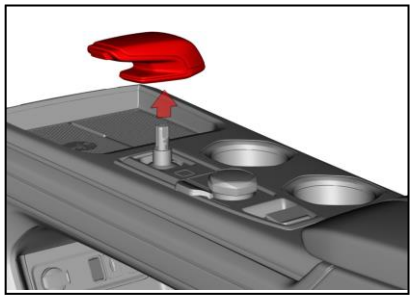


Figure 214:

Mechanical gearshift configuration, remove the gearshift panel and pull it up directly by hand

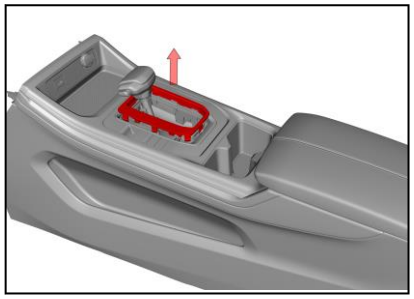


Figure 215:

Removing the central control trim panel

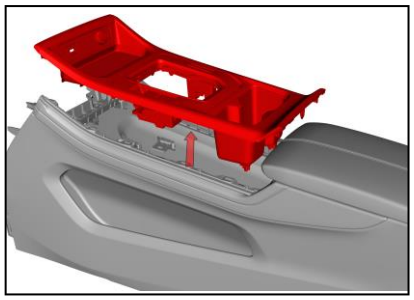


Figure 216: Mechanical Gearshift Configuration The Central Control Trim Panel Is Removed, Moved From The Gearshift, And Pulled Up Directly By Hand

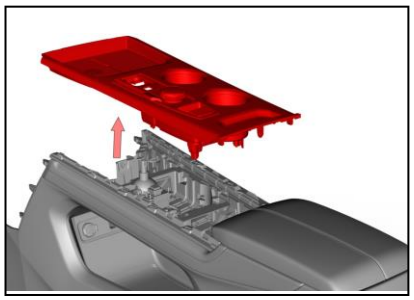
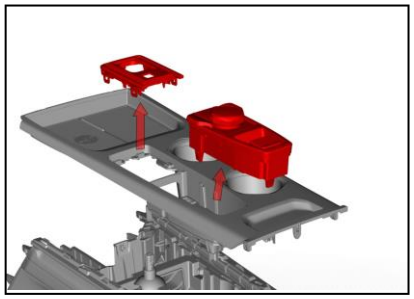


Figure 217: Remove The Electronic Shift Configuration Central Control Trim Panel, Pull It Up From The Rear Cup Holder Position, Or Pry It Off The Edge With A Crowbar, And Then Pull It Out

Caution All harness plugs shall be removed synchronously, and then the central control trim panel shall be removed. For the harness of electronic shift central control switch box, the central control switch box shall be removed after removing the central control trim panel

Remove the electronic shift configuration shift panel and central control switch box, press the pin from the back to push out the shift panel and central control switch box



Remove upper bolt with sleeve or Phillips screwdriver

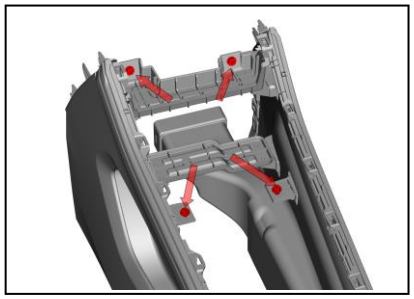


Figure 218: Mechanical Shift Configuration Bolts 4x

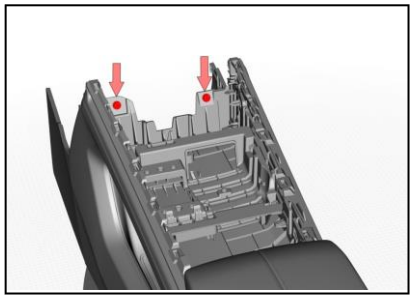
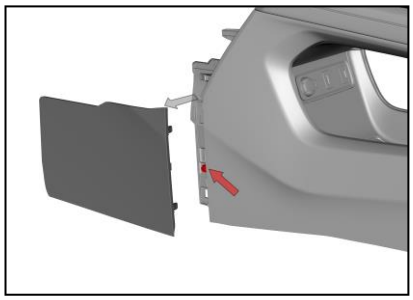
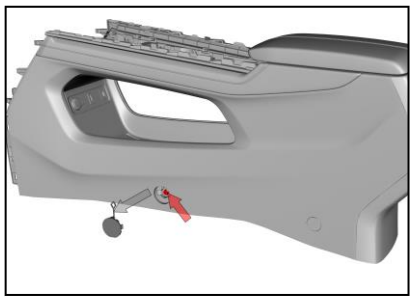


Figure 219: Electronic Shift Configuration Bolts 2x

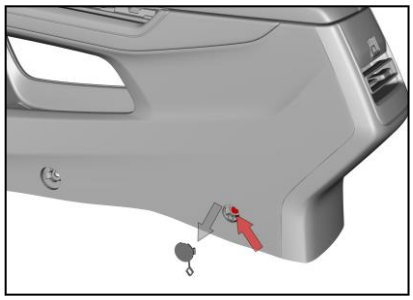
Dismantle the left and right of the front extension plate and 2 bolts of the central control, pull the front extension plate directly from the bottom, and then dismantle the bolts



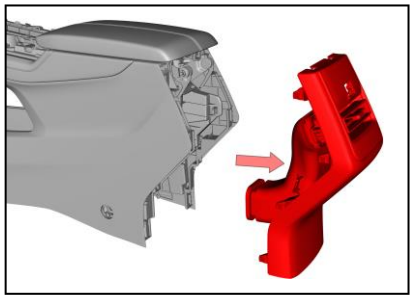
Remove the left and right screws and bolts of the middle electronic gearshift screw cover plate, pry the screw cover plate off with a straight screwdriver, and then remove the bolts



Remove the left and right screws and 2 bolts of the rear central control screw cover plate, pry the screw cover plate off with a straight screwdriver, and then remove the bolts

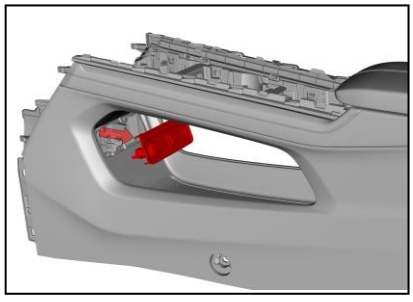


Remove the central control rear panel and pull out directly from the lower part by hand



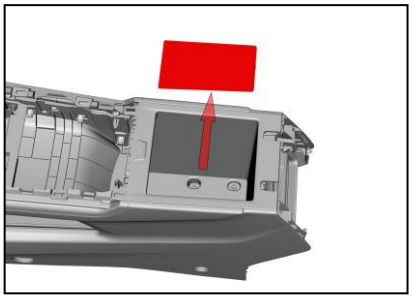
Caution After removing the rear panel of the central control, the rear USB harness needs to be removed

Remove the electronic shift configuration cigarette lighter panel, pry it off the edge with a plastic crowbar and remove it

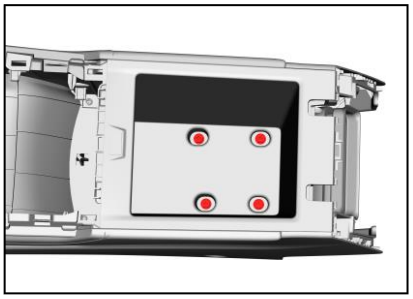


Caution All wiring harnesses need to be removed after removing the cigarette lighter panel

Open the armrest and remove the armrest box mat



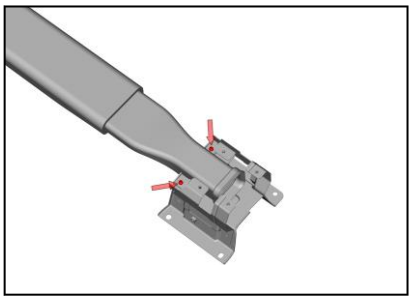
Remove the 4 bolts of the armrest box with a sleeve or Phillips screwdriver



Remove the central control box

Before removing the central control box of Caution electronic gearshift configuration, remove the four bolts with sleeve to remove the electronic gearshift

Remove the front end of the rear blow face duct, and remove the 2 screws with a Phillips screwdriver



Installation

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

Caution electronic gearshift configuration central control box, central control decorative panel and gearshift panel assembly sequence, need to first install the central control decorative panel in place, then install the gearshift panel, and finally install the central control electrical switch box

Caution Before installation, each part shall be inspected for deterioration or damage and replaced if a defect is found. Note that the internal harness connection is accurate and the air duct is well aligned.

F271202

Central interior trim

A-Pillar Upper Trim Panel Assembly

Removing and installing A-pillar upper trim panel assembly

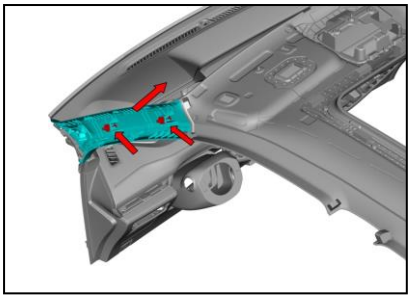
Disassembly

Remove the front door frame seal (left). See Removing and installing front door frame seal

Use a plastic screwdriver or use your hand (be careful to wear protective tools) to pull the A-pillar upper trim panel assembly (left) toward the interior of the vehicle, so that the secondary card is first pulled out of the A-pillar upper trim panel assembly (left).

Use a buckle driver to remove the 2 secondary buckles from the sheet metal.

Remove the A-Pillar Upper Trim Panel Assembly (Left) from the instrument panel by hand (be careful to wear protective tools).



Installation

The installation sequence is the reverse of the removal sequence.

Caution Before installation, each part shall be inspected for deterioration or damage and replaced if a defect is found. Right Part Removal and Installation Refer to Left Part Disassembly Method.

A-Pillar Lower Trim Panel Assembly

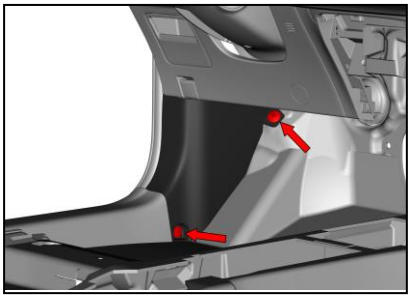
Removing and installing A-pillar lower trim panel assembly

1.Disassembly

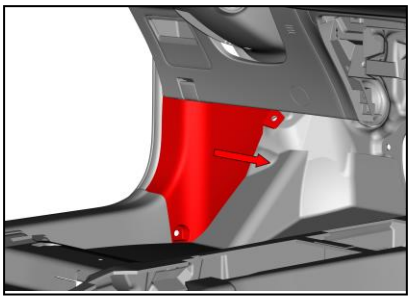
Remove front sill trim (left). Refer to Removing and installing front sill trim assembly

Remove the front door frame sealant strip (left). See Removing and installing front door frame seal

Use a flathead screwdriver to remove the A-Pillar Lower Trim Panel snaps and push nails.



Remove the A-Pillar Lower Trim Panel Assembly (Left) by hand toward the interior of the vehicle to ensure that the metal V-clips stuck in the sheet metal are released.



Installation

The installation sequence is the reverse of the removal sequence.

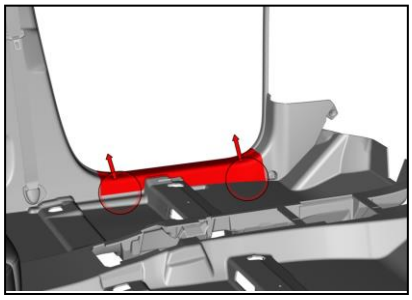
Caution Before installation, each part shall be inspected for deterioration or damage. If any defect is found, it shall be replaced. If the metal V-shaped card is removed and left on the sheet metal hole, it shall be removed from the sheet metal and connected to the part before installation. Right Part Removal and Installation Refer to Left Part Disassembly Method.

Front sill trim panel assembly

Removing and installing front door sill trim assembly

Disassembly

1 Place both hands in the circle shown below and pull the front door sill upwards with vertical force. After the metal clips and self-clips come out, the front door sill trim panel (left) can be removed.



Installation

The installation sequence is the reverse of the removal sequence.

Caution Before installation, each part shall be inspected for deterioration or damage. If any defect is found, it shall be replaced. If the metal V-shaped card is removed and left on the sheet metal hole, it shall be removed from the sheet metal and connected to the part before installation. Right Part Removal and Installation Refer to Left Part Disassembly Method.

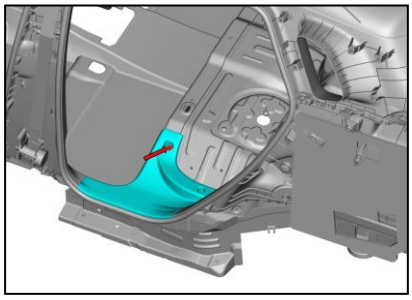
F270904

Rear Sill Trim Panel Assembly

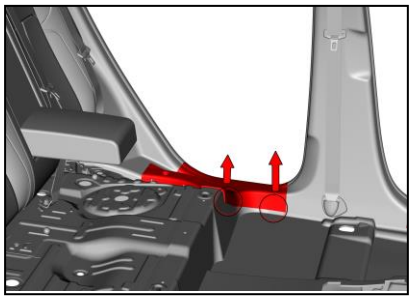
Removing and installing rear door sill trim assembly

Disassembly

Using a Phillips screwdriver, remove the rear cross recessed pan head tapping screw and plain washer assembly from the rear of the rear sill trim.



Put both hands into the circle position shown in the following figure, and pull the rear door sill trim panel with vertical upward force at the same time, and take out the rear door sill trim panel (left) after the metal buckle and self-buckle come out.



Installation

The installation sequence is the reverse of the removal sequence.

Caution Before installation, each part shall be inspected for deterioration or damage. If any defect is found, it shall be replaced. If the metal V-shaped card is removed and left on the sheet metal hole, it shall be removed from the sheet metal and connected to the part before installation. Right Part Removal and Installation Refer to Left Part Disassembly Method.

F270904

B-pillar trim

Removing and installing B-pillar trim

Disassembly

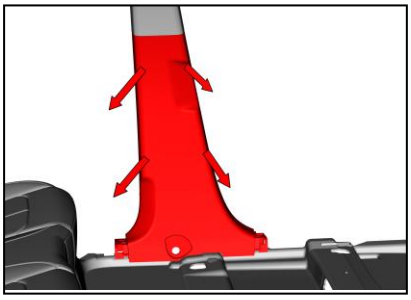
Remove front sill trim (left). Refer to Removing and installing front sill trim assembly

Remove rear sill trim (left). Refer to Removing and Installing Rear Sill Trim Panel Assembly

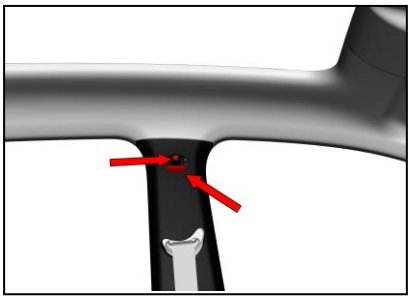
Remove the front and rear door frame seals (left). Refer to Removing and installing front door frame seal See Removing and installing rear door frame seal

Use a sleeve to remove the anchor cover and bolts at the lower end of the seat belt. See front seat belt

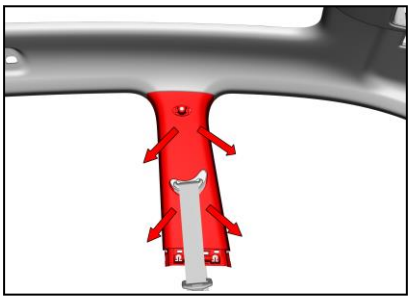
Pull down the lower trim panel of pillar B (left) toward the vehicle interior by hand, and then remove the lower trim panel of pillar B (left) after the buckle is released from the sheet metal.



Use a flat-blade screwdriver to pry open the B-pillar curtain airbag screw hole cover (left), and then use a Phillips screwdriver to remove the screws in this position.



Pull the upper trim panel of pillar B (left) by hand toward the interior of the vehicle, and then remove the upper trim panel of pillar B (left) after the buckle is released from the sheet metal.



Installation

The installation sequence is the reverse of the removal sequence.

Caution When installing the upper trim panel on the B-pillar, the slide buttons must be aligned with the seat belt high adjuster.

C-pillar trim

Removing and installing C-pillar trim

Disassembly

Remove the rear seat assembly. Refer to Rear Seat Assembly

Remove rear sill trim (left). Refer to Removing and Installing Rear Sill Trim Panel Assembly

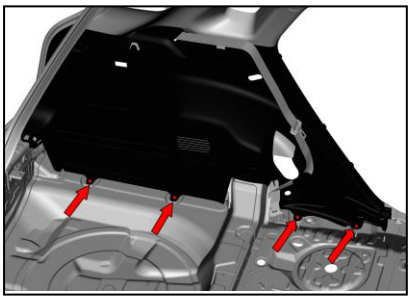
Remove the rear door frame seal (left). See Removing and installing rear door frame seal

Remove the back sill trim. Refer to Removing and Installing Rear Sill Trim Panel Assembly

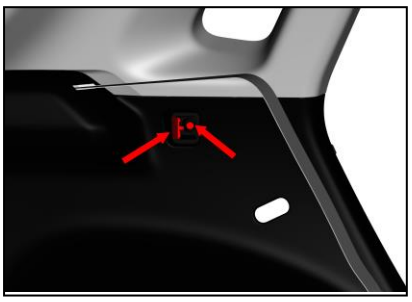
Remove the trunk tool storage box. Refer to Removing and Installing Trunk Tool Storage Box

Remove the rear seat belt anchor point. See rear seat belt

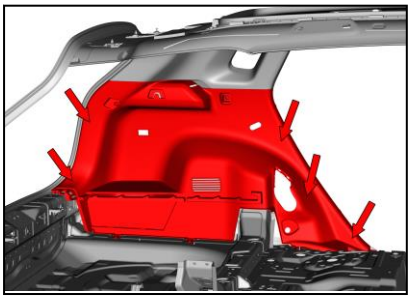
Use a Phillips screwdriver to remove the 4 Phillips pan head tapping screws and plain washer assemblies.



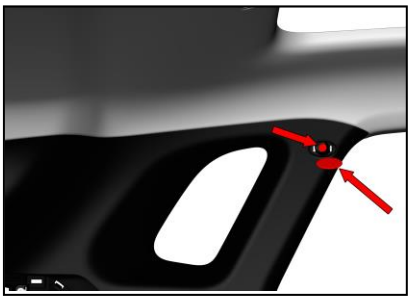
Pry off the C-pillar lower trim panel screw cover with a flat-blade screw and remove this position screw with a Phillips screwdriver.



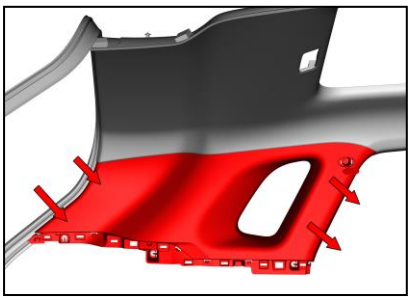
Remove the C Pillar Lower Trim Panel Assembly (Left) along with the power socket and trunk lamp by hand toward the interior of the vehicle and remove the C Pillar Lower Trim Panel Assembly (Left) after the clips come out.



Pry open the C-Pillar Upper Trim Panel Screw Cover with a flat-blade screws and remove the screws with a Phillips screwdriver.



Remove the C Pillar Upper Trim Panel Assembly (Left) by hand toward the interior of the vehicle and remove the C Pillar Lower Trim Panel Assembly (Left) after the clips come out.



Installation

The installation sequence is the reverse of the removal sequence.

Caution Before installation, each part shall be inspected for deterioration or damage. If any defect is found, it shall be replaced. If the buckle is removed, it shall be left on the sheet metal hole. During installation, it shall be removed from the sheet metal and clamped to the part before assembly. Right Part Removal and Installation Refer to Left Part Disassembly Method.

3.

Headliner

Removing and installing headliner

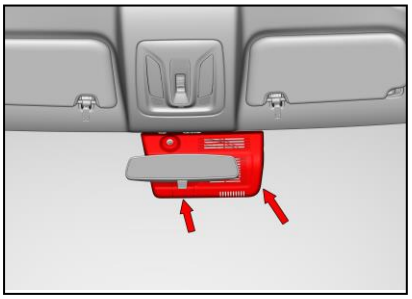
Disassembly

Remove the A-Pillar Upper Trim Panel Assembly. Refer to Removing and Installing A-Pillar Upper Trim Panel Assembly

Remove B-pillar trim. See Removing and installing B-pillar trim

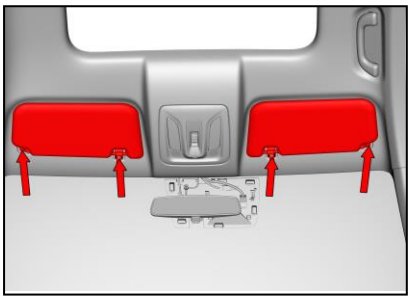
Remove the C-pillar trim. Refer to Removing and installing C-pillar trim

Use a plastic screwdriver to pry open and remove the lane departure sensor trim cover.

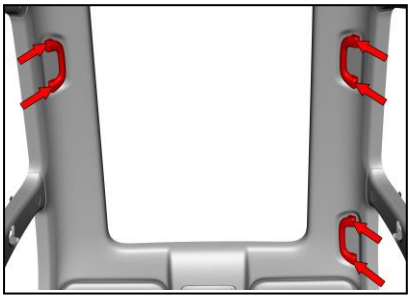


Remove the headlight. See interior headlight

Remove the sun visor and remove the 4 screws with a Phillips screwdriver.

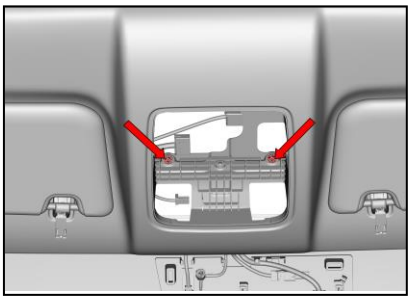


Remove the safety handle, remove the screws with a Phillips screwdriver, and remove the 3 safety handles.

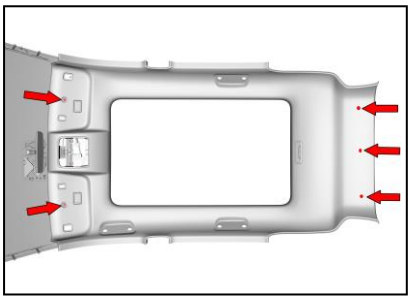


Remove the ceiling harness connector, refer to the ceiling harness circuit diagram for specific location. See roof harness

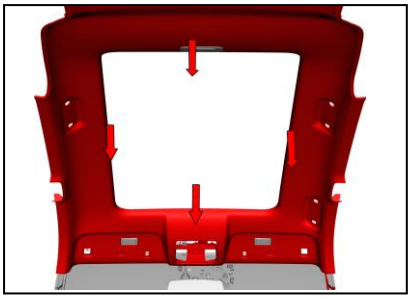
Use a Phillips screwdriver to remove the bolts at the front dome lamp position.



Use a plastic screwdriver to remove the 2 tree nails at the front end, and then remove the 3 clips with a pry bar along the back of the headliner.



Hand down around the skylight to release the mushrooms and remove the headliner.



Installation

The installation sequence is the reverse of the removal sequence.

Caution Before installation, each part shall be inspected for deterioration or damage. If any defect is found, it shall be replaced. If the buckle is removed, it shall be left on the sheet metal hole. During installation, it shall be removed from the sheet metal and clamped to the part before assembly.

3.

F270802

F270808

F270809

Spare parts atlas(Pillar trim)

F270805

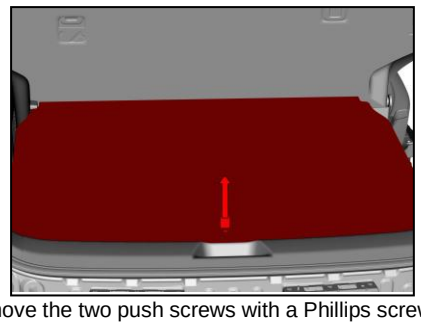
Rear interior trim

Back Sill Trim Panel Assembly

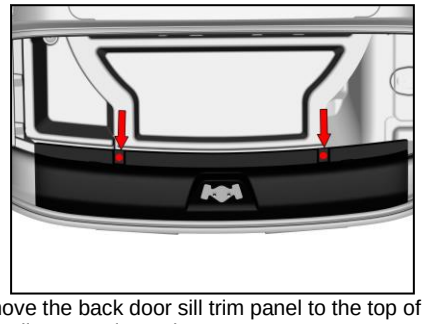
Removing and installing back door sill trim assembly

Disassembly

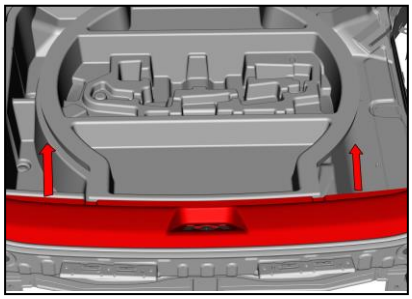
Remove the trunk carpet directly.



Remove the two push screws with a Phillips screwdriver.



Remove the back door sill trim panel to the top of the vehicle by hand, and then remove the back door sill trim panel by hand after the clips and the clips are released.



Installation

The installation sequence is the reverse of the removal sequence.

Caution Before installation, each part shall be inspected for deterioration or damage. If any defect is found, it shall be replaced. If the buckle is removed, it shall be left on the sheet metal hole. During installation, it shall be removed from the sheet metal and clamped to the part before assembly. Right Part Removal and Installation Refer to Left Part Disassembly Method.

F270801

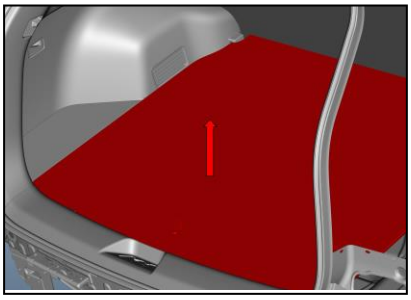
F270806

Trunk tool storage box

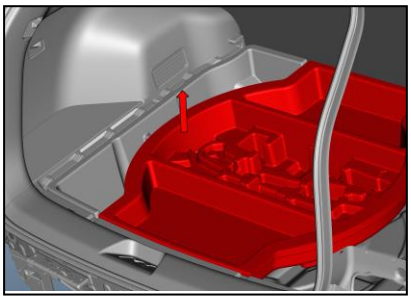
Removing and installing trunk tool storage box

Disassembly

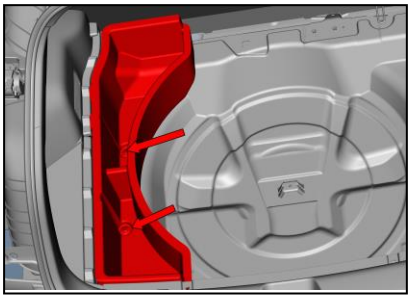
Remove the trunk carpet.



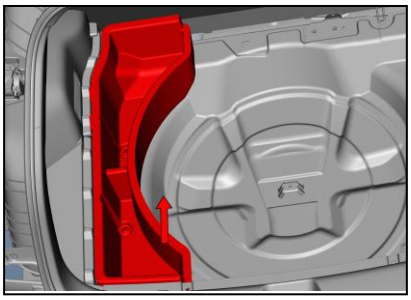
Remove the trunk tool storage box (middle) directly up.



Use a plastic screwdriver to remove the two snaps that secure the trunk tool storage box (left).



Remove the trunk tool storage box directly up (left).



Installation

The installation sequence is the reverse of the removal sequence.

Caution Right Part Removal and Installation Refer to Left Part Disassembly.

F270807

Restraint system

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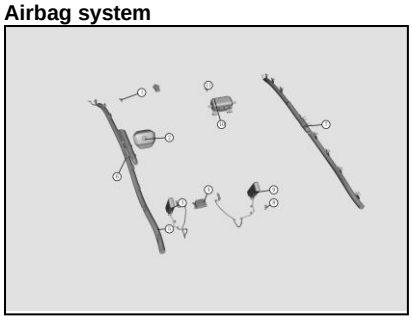
F271704. 1399

Specifications

Serial number	Component name	Quantity
1, 11	Front collision sensor assembly	2
2	Driver front airbag assembly	1
3	Driver side airbag assembly	1
4	Airbag controller assembly	1
5, 8	Side impact sensor assembly	2
6	Side curtain airbag(Left)	1
7	Side curtain airbag(Right)	1
9	Front passenger side airbag assembly	1
10	Front airbag assembly of front passenger	1

Composition and position distribution

Airbag system



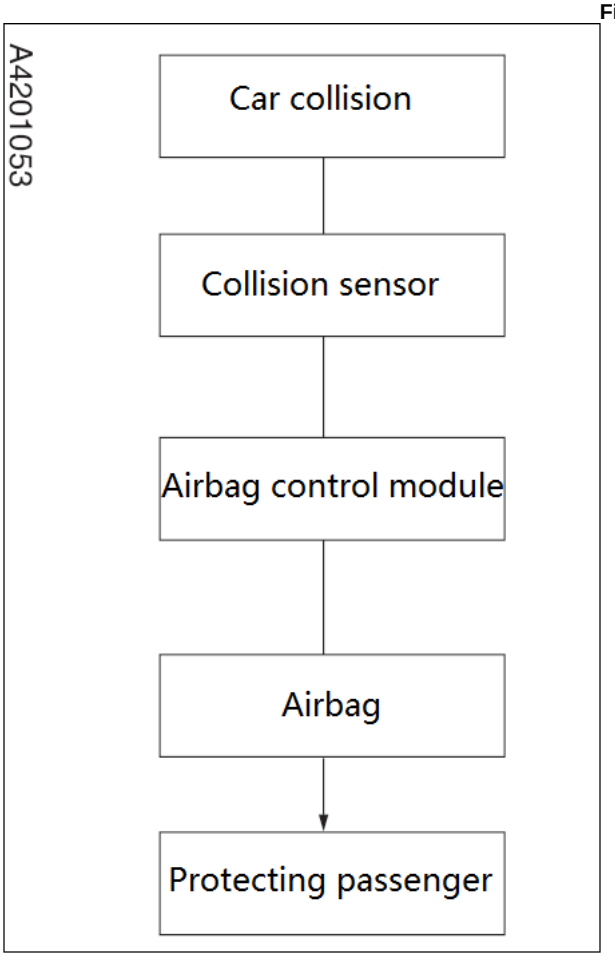
System introduction

The English name of vehicle airbag is AIRBAG, and vehicle airbag is Supplemental Restraint System for short.

Airbag system includes collision sensor, airbag controller and various airbags (including main driver airbag, co-driver airbag, seat main passenger seat side airbag and left and right side curtain airbag).

In case of collision, the sensor sends the collision signal to the airbag controller. The airbag controller can judge whether the minimum requirements of airbag initiation are met according to the degree of collision, and then issue the ignition command to detonate the airbag. A soft airbag filled with gas is formed between the occupant and the interior structure parts (such as steering wheel, instrument panel, interior trim panel, etc.) quickly. The impact is mitigated and the collision energy is absorbed through the exhaust damping action of the airbag, so as to reduce the degree of injury of the occupant.

Figure 220:



Warning
SRS airbag system can fully play the role of protecting occupants only under the conditions of using seat belt. Reference: 5.1.4 Seat belt system.

Warning
Inspect the airbag system after each collision. Airbag and airbag controller can no longer be used after collision and must be replaced! The new airbag system must be checked by a professional technician to confirm that it is defective and functioning properly.

Warning
It is forbidden to place rearward child seats in the front row, and the rear row is the safe position for children.

Warning
It is prohibited to place or stick any articles in the area equipped with airbag to avoid accidental injury when the airbag is detonated.

Seat belts are the main way to protect occupants. Both front and rear seats have seat belts. The front and rear seats use three-point diagonal belts. The front seat belt buckle is mounted on the seat track of the respective seat. The rear seat belt buckle is fixed on the floor.

Front and rear seat belts are equipped with emergency locking function. The locking function is activated when the seat belt is quickly pulled out of the retractor. The locking function prevents the belt from being pulled out more than the permitted retracted position.

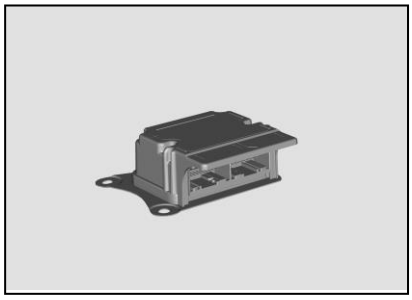
The front seat belt retractor has the force limiting function. In case of frontal collision, when the tension on the chest webbing exceeds the set value, the retractor will release a small length of webbing to reduce the compression injury of the webbing to the occupant's chest.

Front seat belts are equipped with unfastened reminder function to remind users to wear seat belts at all times through visual and audible information. The rear seat is equipped with unfastened reminder function to remind the user to wear seat belt through visual information.

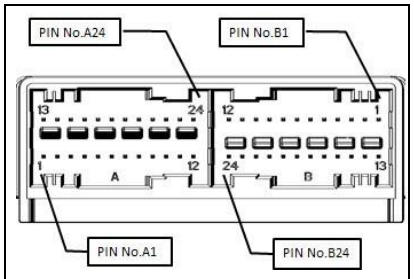
Inspection of part structure principle

Airbag controller

The airbag controller is mounted on the floor of the central tunnel under the central control box. Airbag controller contains positive collision sensor, which can sense front collision signal. The airbag controller monitors the entire airbag system. ACU for short.



Airbag controller interface definition



Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
A1	Power supply	Simulation	9-16V	Ignition switch on, body ground	
A2	Crash output	Duty cycle	/	/	
A3	Passenger seat belt buckle +OPSFP	Simulation	/	/	
A4	NA	/	/	Ignition switch on, body ground	
A5	Rear middle seat belt buckle	Simulation	/	/	
A6	Analog ground	/	/	/	
A7	Driver front sensor negative	Simulation	6.7v	Ignition switch on, body ground	
A8	Driver front sensor positive	Simulation	6.7v	Ignition switch on, body ground	
A9	Passenger front sensor positive	Simulation	6.7v	Ignition switch on, body ground	
A10	Passenger front sensor negative	Simulation	6.7v	Ignition switch on, body ground	
A11	CAN_L	Bus CAN	1.5v-2.5v	Ignition switch on, body ground	
A12	CAN_H	Bus CAN	2.5v-3.5v	Ignition switch on, body ground	
A13	Driver seat belt buckle	Simulation	/	/	
A14	NA	/	/	/	
A15	Power supply ground	/	/	/	
A16	NA	/	/	/	
A17	Driver seat belt pretensioner negative	Simulation	1.25v	Ignition switch on, body ground	

A18	Driver seat belt pretensioner positive	Simulation	1.25v	Ignition switch on, body ground	
A19	Passenger seat belt pretensioner positive	Simulation	1.25v	Ignition switch on, body ground	
A20	Passenger seat belt pretensioner negative	Simulation	1.25v	Ignition switch on, body ground	
A21	Passenger front airbag negative	Simulation	1.25v	Ignition switch on, body ground	
A22	Passenger front airbag positive electrode	Simulation	1.25v	Ignition switch on, body ground	
A23	Driver front airbag positive	Simulation	1.25v	Ignition switch on, body ground	
A24	Driver front airbag negative	Simulation	1.25v	Ignition switch on, body ground	
B1	NA	/	/	/	
B2	NA	/	/	/	
B3	Rear row driver side seat belt buckle	Simulation	1.25v	Ignition switch on, body ground	
B4	Rear passenger side seat belt buckle	Simulation	1.25v	Ignition switch on, body ground	
B5	Passenger rear side airbag negative	Simulation	1.25v	Ignition switch on, body ground	
B6	Passenger rear side airbag positive electrode	Simulation	1.25v	Ignition switch on, body ground	
B7	Driver rear side airbag positive	Simulation	1.25v	Ignition switch on, body ground	
B8	Driver rear side airbag negative	Simulation	1.25v	Ignition switch on, body ground	
B9	Passenger peripheral acceleration sensor positive	Simulation	6.7v	Ignition switch on, body ground	
B10	Passenger peripheral acceleration sensor negative	Simulation	6.7v	Ignition switch on, body ground	
B11	Driver peripheral acceleration sensor negative	Simulation	6.7v	Ignition switch on, body ground	
B12	Driver peripheral acceleration sensor positive	Simulation	6.7v	Ignition switch on, body ground	
B13	Passenger rear seat belt pretensioner negative	Simulation	1.25v	Ignition switch on, body ground	
B14	Passenger rear seat belt pretensioner positive	Simulation	1.25v	Ignition switch on, body ground	
B15	Driver rear seat belt tensioner positive	Simulation	1.25v	Ignition switch on, body ground	
B16	Driver rear seat belt pretensioner negative	Simulation	1.25v	Ignition switch on, body ground	
B17	Passenger side airbag negative	Simulation	1.25v	Ignition switch on, body ground	
B18	Passenger side airbag positive electrode	Simulation	1.25v	Ignition switch on, body ground	

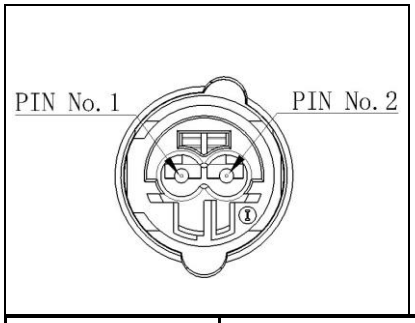
B19	Driver side airbag positive	Simulation	1.25v	Ignition switch on, body ground	

B20	Driver side airbag negative	Simulation	1.25v	Ignition switch on, body ground	
B21	Passenger curtain airbag negative	Simulation	1.25v	Ignition switch on, body ground	
B22	Passenger curtain airbag positive electrode	Simulation	1.25v	Ignition switch on, body ground	
B23	Driver curtain airbag positive electrode	Simulation	1.25v	Ignition switch on, body ground	
B24	Driver curtain airbag negative	Simulation	1.25v	Ignition switch on, body ground	

Driver front airbag

The driver's front airbag is clamped in the steering wheel through three clamping feet, and opens in front collision, forming a soft airbag between the driver and the steering wheel to protect the driver. Abbreviation
DAB.

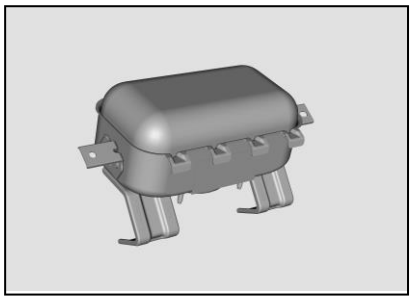
Driver front airbag interface definition



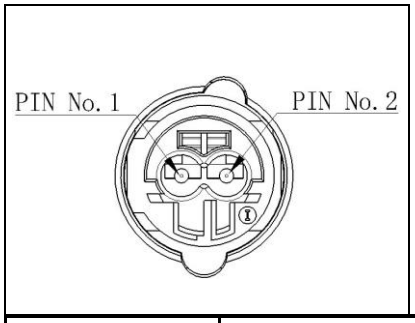
Pin number	Pin definition	Signal type	Signal range	Test conditions	Remarks
1	Driver front airbag assembly positive	Simulation	/	Ignition switch on, body ground	Powered by airbag controller
2	Driver front airbag assembly negative	Simulation	/	Ignition switch on, body ground	Powered by airbag controller

Front airbag of co-driver

The upper side of front passenger's airbag is connected to the instrument panel through two bolts and nuts, and the lower side is fixed to the steering support through two bolts. In case of frontal collision, it is opened to form a soft air bag between the passenger and the instrument panel to protect the occupant. PAB for short.



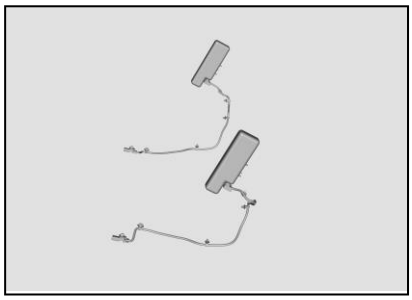
Definition of front airbag interface of co-driver



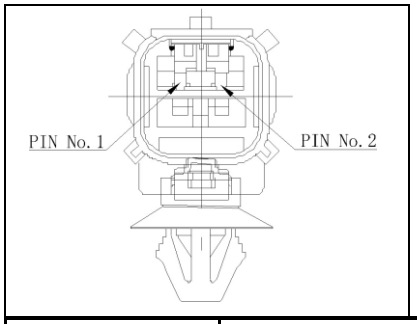
Pin number	Pin definition	Signal type	Signal range	Test conditions	Remarks
1	Front airbag assembly positive pole of co-driver	Simulation	/	Ignition switch on, body ground	Powered by airbag controller
2	Negative pole of front airbag assembly of co-driver	Simulation	/	Ignition switch on, body ground	Powered by airbag controller

Front seat side airbag

The seat side airbag is installed in the seat backrest and opened in case of side impact, forming a soft airbag between the occupant and the occupant to protect the occupant. SAB for short.



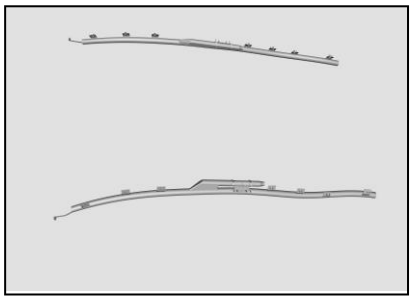
Side airbag interface definition



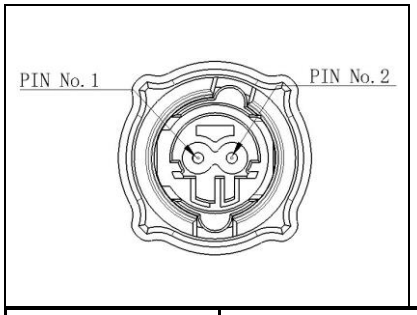
Pin number	Pin definition	Signal type	Signal range	Test conditions	Remarks
1	Positive pole of side airbag assembly	Simulation	/	Ignition switch on, body ground	Powered by airbag controller
2	Side airbag assembly negative	Simulation	/	Ignition switch on, body ground	Powered by airbag controller

Left and right air curtain

The side air curtain is installed in the body side wall interior trim panel and headliner. It is opened in case of side impact, forming a soft air bag between the occupant and the occupant to protect the occupant. Cab for short.



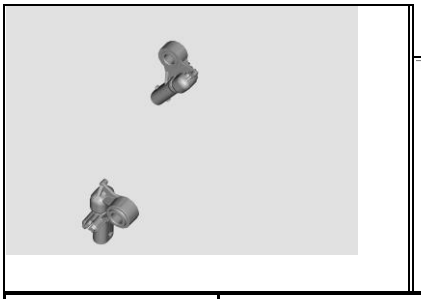
Side curtain interface definition

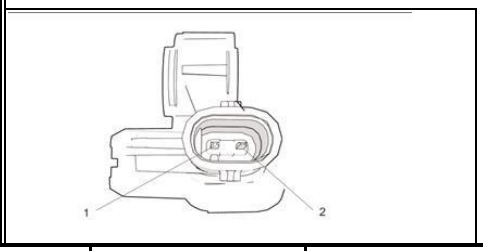


Pin number	Pin definition	Signal type	Signal range	Test conditions	Remarks
1	Side curtain airbag assembly positive electrode	Simulation	/	Ignition switch on, body ground	Powered by airbag controller
2	Negative pole of side curtain airbag assembly	Simulation	/	Ignition switch on, body ground	Powered by airbag controller

Side impact sensor

The side impact sensor is installed at the lower part of pillar B and is an acceleration sensor. In case of side impact, it can sense the impact signal and send the signal to the airbag controller. PAS for short.



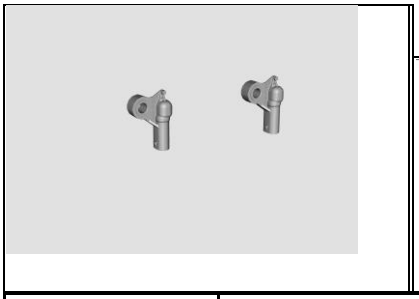


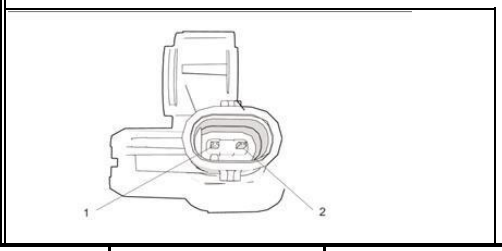
Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
1	Grounding	Grounding	/	Ignition switch on, body ground	Powered by airbag controller
2	Signal	Number	/	Ignition switch on, body ground	Powered by airbag controller

Warning There are positive and negative points on the pins of the collision sensor. Pin 1 is the grounding terminal and pin 2 is the signal terminal, which cannot be reversed. Otherwise, the airbag controller cannot complete self-check.

Front collision sensor

The front impact sensor is installed on the headlamp bracket. It is an acceleration sensor. In case of frontal collision, it can sense the collision signal and send the signal to the airbag controller. Abbreviation
UFS.





Pin number	Pin definition(Description)	Signal type	Signal range	Test conditions	Remarks
1	Grounding	Grounding	/	Ignition switch on, body ground	Powered by airbag controller
2	Signal	Number	/	Ignition switch on, body ground	Powered by airbag controller

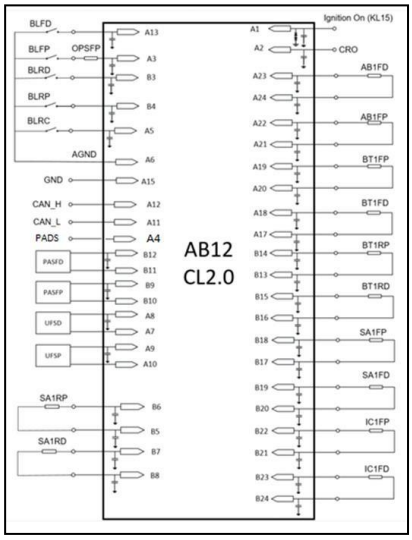
Warning There are positive and negative points on the pins of the collision sensor. Pin 1 is the grounding terminal and pin 2 is the signal terminal, which cannot be reversed. Otherwise, the airbag controller cannot complete self-check.

Common methods

Airbag system test method

The airbag controller (ACU) can monitor whether the airbag system works normally in real time. If the airbag system is faulty, the controller will illuminate the airbag warning lamp to prompt the user for maintenance.

Description **If the airbag warning lamp is always on, the airbag system must be overhauled.**



DTC Diagnostic

DTC diagnosis operation method

Step 1	Connect the diagnostic scanner to the OBD connector on the lower left side of the instrument panel. Turn the ignition switch to the "ON" position. Turn on the diagnostic scanner/or the diagnostic software in the computer to enter the diagnosis.	Yes	Proceed to step 2.
		No	To communication fault repair operation reference: Communication fault
Step 2	A. Double-click Changan vehicle icon; B. Double-click "S 203" icon; C. Double-click "Airbag system" D. Double-click "Read fault"; E. Double-click "Read current fault"; F. Double click "Clear DTC" to clear the system DTC; F. Double-click "Refresh"; H. Whether "system normal" is displayed;	Yes	Repair completed.
		No	Other DTCs are displayed. According to the maintenance category, the fault codes can be divided into 5 categories: 1. Collision accident; 2. Internal fault; 3. Circuit fault; 4. Misconfiguration; 5. Communication fault; If multiple fault types occur, press this Carry out priority maintenance in sequence. Note: Fault code B1B**** is the same as 9B****

Fault code table

Fault code	Fault meaning	Triggering conditions	Possible fault causes	Maintenance steps(Troubleshooting, diagnosis and maintenance steps)
U11011616	Low voltage error	Voltage below 9V continuously exceeds 10s	Abnormal power supply	Check the power supply voltage to restore the voltage to 9-16 V.
U11001717	High voltage error	Voltage above 16 V continuously exceeds 10s	Abnormal power supply	Check the power supply voltage to restore the voltage to 9-16 V.
U158087	ABM send message is not responded	If ECU sends no response within 2.5 s, it will report this DTC error.Reporting this DTC error requires the following prerequisites: 1.Power supply gear on rear 1s 2.Power supply gear OFF 50 ms, 3.The voltage is within the normal working range of 9-16 V.No Bus off occurs or 1s after Bus off resumes normal communication, 5.Without using 28Service Pause Communication.	Abnormal CAN network	Check CAN network
U158486	Invalid speed information	If ECU receives invalid vehicle speed signal, it will report this DTC error and error confirmation time: Immediately report this DTC error requires the following prerequisites: 1.Power supply gear on rear 1s 2.Within power supply gear OFF 50 ms, 3.The voltage is within the normal working range of 9-16 V.No Bus off occurs or 1s after Bus off resumes normal communication, 5.Without using 28 service to suspend communication	Invalid signal sent by ESP	Check ESP
U158287	Lost communication with ESP	No ESP signal is received within (Id: 0x 187), this DTC error will be reported.The following prerequisites are required to report this DTC error: 1.Power supply gear on rear 1s 2.Power supply gear OFF 50 ms 3.The voltage is within the normal working range of 9-16 V.No Bus off occurs or Bus off resumes normal communication 1s 5.Without using 28 service to suspend communication	Abnormal CAN network	Check CAN network

U158587	Lost communication with EMS	If no EMS signal is received in ECU 1s (Id: 0x 196), this DTC error will be reported.The following prerequisites are required to report this DTC error: 1.Power supply gear on rear 1s 2.Power supply gear OFF 50 ms 3.The voltage is within the normal working range of 9-16 V.No Bus off occurs or Bus off resumes normal communication 1s 5.Without using 28 service to suspend communication	Abnormal CAN network connection	Check CAN network connection
U00018888	Communication bus interrupt	If the bus off recovery fails five times, this DTC error will be reported.Reporting this DTC error requires the following prerequisites: 1.1s after power supply gear on(Off 1 seconds after the last power supply gear)	Abnormal CAN network	Check CAN network

		Power supply gear OFF 50 ms The voltage is within the normal working range of 9-16 V 4.Without using 28 service to suspend communication		
B1B0049	Internal fault	ECU internal key hardware and software error	ECU internal key hardware and software error	Return to repair shop for repair
B1B0050	Internal fault with life cycle counter function	ECU internal key hardware and software error	ECU internal key hardware and software error	Return to repair shop for repair
B002201	Can controller related failure	Can drive communication exceeds 500ms	Problem with CAN controller hardware	1. If history fault, try to clear error 2.If it is always the current reason Obstacle, replacement
B1B0111	Driver side acceleration sensor short circuit to ground	Sensor positive connected to ground for duration in the same power cycle About 2.7 seconds, or the sensor positive electrode is connected to the ground before power-on. This fault can be found after power-on initialization.	Sensor wiring problem	Check the sensor wiring to ensure that the sensor is connected properly.
B1B012B	Driver side acceleration sensor wiring	Wire the positive electrodes of the two sensors before power-on. This fault will be found immediately after power-on initialization.	Sensor wiring problem	Check the sensor wiring to ensure that the sensor is connected properly.
B1B0155	Driver side acceleration sensor not configured	The controller sensor is not equipped, but the vehicle is equipped with this sensor.	The sensor is not configured in the software configuration.	Make sure that the sensor has been configured in the software configuration. After re-power-on initialization, the fault will become history fault.
B1B014A	Driver side acceleration sensor initialization error	Wrong sensor type	Connecting sensor of wrong type	Replace correct type sensor
B1B0181	Driver side acceleration sensor receives invalid data	Unstable communication between controller and sensor(Poor contact)	Poor contact between controller and sensor connecting wire	Check the sensor wiring to ensure that the sensor is connected properly.
B1B0112	Positive electrode of driver side acceleration sensor is connected to power supply.	In the same power-on cycle, the sensor positive is connected to the power supply for 3 to 4 seconds, or the sensor positive is connected to the ground before power-on, and the fault can be found after power-on initialization.	Sensor wiring problem	Check the sensor wiring to ensure that the sensor is connected normally. In the same power-on cycle, the fault will be relieved after 2 to 3 seconds. The fault will be relieved immediately after power-on again.
B1B0113	Driver side acceleration sensor open circuit	Sensor disconnection	Sensor wiring problem	Make sure the sensor is connected properly, and release the fault after 3 to 4 seconds.
B1B0129	Driver side acceleration sensor error due to signal enhancement or algorithm sensor watchdog error	The acceleration signal is too strong and exceeds the range for a certain time.(0.13 seconds to 5 seconds)	The acceleration signal is too strong and exceeds the range for a certain time.(0.13 seconds to 5 seconds)	Replace both sensor and controller
B1B0196	Driver side acceleration sensor internal error	Sensor has internal fault or abnormal connection during sensor initialization	Sensor has internal fault or abnormal connection during sensor initialization	Power off the controller and replace it with a new sensor. Power on the controller and clear the

				error within the power-on period.
B1B0211	Copilot side acceleration sensor short circuit to ground	Sensor positive connected to ground for duration in the same power cycle About 2.7 seconds, or the sensor positive electrode is connected to the ground before power-on. This fault can be found after power-on initialization.	Sensor wiring problem	Check the sensor wiring to ensure that the sensor positive connection is normal.
B1B022B	Passenger's side peripheral front acceleration sensor wiring	Connect the positive electrodes of the two sensors before power-on. This fault will be found immediately after power-on initialization.	Sensor wiring problem	Check the sensor wiring to ensure that the sensor positive connection is normal.

B1B0255	The co-driver side acceleration sensor is not configured.	The controller sensor is not equipped, but the vehicle is equipped with this sensor.	The sensor is not configured in the software configuration.	Make sure that the sensor has been configured in the software configuration. After re-power-on initialization, the fault will become history fault.
B1B024A	Co-driver side acceleration sensor initialization error	Wrong sensor type	Connecting sensor of wrong type	Replace correct type sensor
B1B0281	The co-driver side acceleration sensor receives invalid data.	Unstable communication between controller and sensor(Poor contact)	Poor contact between controller and sensor connecting wire	Check the sensor wiring to ensure that the sensor is connected properly.
B1B0212	The positive electrode of the co-driver side acceleration sensor is connected to the power supply.	In the same power-on cycle, the sensor positive is connected to the power supply for 3 to 4 seconds, or the sensor positive is connected to the ground before power-on, and the fault can be found after power-on initialization.	Sensor wiring problem	Check the sensor wiring to ensure that the sensor is connected normally. In the same power-on cycle, the fault will be relieved after 2 to 3 seconds. The fault will be relieved immediately after power-on again.
B1B0213	Front passenger side acceleration sensor open circuit	Disconnecting sensor	. Sensor wiring problem	Make sure the sensor is connected properly, and release the fault after 3 to 4 seconds.
B1B0229	Passenger side acceleration sensor error due to signal enhancement or algorithm sensor watchdog error	The acceleration signal is too strong and exceeds the range for a certain time.(0.13 seconds to 5 seconds)	The acceleration signal is too strong and exceeds the range for a certain time.(0.13 seconds to 5 seconds)	Replace both sensor and controller
B1B0296	Co-driver side acceleration sensor internal error	Sensor has internal fault or abnormal connection during sensor initialization	Sensor has internal fault or abnormal connection during sensor initialization	Power off the controller and replace it with a new transmitter. Power on the controller and clear the error within the power-on period.
B1B0311	Driver front sensor short circuit to ground	Sensor wiring problem	Sensor wiring problem	Check the sensor wiring to ensure that the sensor positive connection is normal.
B1B032B	Front acceleration sensor wiring	Sensor wiring problem	Sensor wiring problem	Check the sensor wiring to ensure that the sensor positive connection is normal.
B1B0355	Driver front sensor configuration error	The sensor is not configured in the software configuration.	The sensor is not configured in the software configuration.	Make sure that the sensor has been configured in the software configuration. After re-power-on initialization, the fault will become history fault.
B1B034A	Driver front acceleration sensor initialization error	Connecting sensor of wrong type	Connecting sensor of wrong type	Replace correct type sensor
B1B0381	Invalid data received by driver front acceleration sensor	Poor contact between controller and sensor connecting wire	Poor contact between controller and sensor connecting wire	Check the sensor wiring to ensure that the sensor is connected properly.
B1B0312	Positive pole of driver's front acceleration sensor is connected to power supply.	Sensor wiring problem	Sensor wiring problem	Check the sensor wiring to ensure that the sensor is connected normally. In the same power-on cycle, the fault will be relieved after 2 to 3 seconds. The fault will be relieved immediately after power-on again.

B1B0313	Driver front acceleration sensor open circuit	Sensor wiring problem	Sensor wiring problem	Make sure the sensor is connected properly, and release the fault after 3 to 4 seconds.
B1B0329	Driver front impact acceleration sensor error due to signal enhancement or algorithm sensor watchdog error	The acceleration signal is too strong and exceeds the range for a certain time.(0.13 seconds to 5 seconds)	The acceleration signal is too strong and exceeds the range for a certain time.(0.13 seconds to 5 seconds)	Replace both sensor and controller
B1B0396	Driver front acceleration sensor internal error	Sensor has internal fault or abnormal connection during sensor initialization	Sensor has internal fault or abnormal connection during sensor initialization	Power off the controller and replace it with a new transmitter. Power on the controller and clear the error within the power-on period.
B1B0411	Copilot front acceleration sensor short circuit to ground	Sensor positive connected to ground for duration in the same power cycle About 2.7 seconds, or power on	Sensor wiring problem	Check the sensor wiring to ensure that the sensor positive connection is normal.

		Before the sensor positive electrode is connected to the ground, this fault can be found after power-on initialization.		
B1B042B	Copilot front acceleration sensor wiring	Connect the positive electrodes of the two sensors before power-on. This fault will be found immediately after power-on initialization.	Sensor wiring problem	Check the sensor wiring to ensure that the sensor positive connection is normal.
B1B0455	The co-driver's front acceleration sensor is misconfigured.	The controller sensor is not equipped, but the vehicle is equipped with this sensor.	The sensor is not configured in the software configuration.	Make sure that the sensor has been configured in the software configuration. After re-power-on initialization, the fault will become history fault.
B1B044A	Pre-drive acceleration sensor initialization error	Wrong sensor type	Connecting sensor of wrong type	Replace correct type sensor
B1B0481	Copilot front acceleration sensor receives invalid data	Unstable communication between controller and sensor(Poor contact)	Poor contact between controller and sensor connecting wire	Check the sensor wiring to ensure that the sensor is connected properly.
B1B0412	The positive electrode of the pre-drive acceleration sensor is connected to the power supply.	In the same power-on cycle, the sensor positive is connected to the power supply for 3 to 4 seconds, or the sensor positive is connected to the ground before power-on, and the fault can be found after power-on initialization.	The sensor is not configured in the software configuration.	Check the sensor wiring to ensure that the sensor is connected normally. In the same power-on cycle, the fault will be relieved after 2 to 3 seconds. The fault will be relieved immediately after power-on again.
B1B0413	Co-driver front acceleration sensor ON	Disconnecting sensor	The sensor is not configured in the software configuration.	Make sure the sensor is connected properly, and release the fault after 3 to 4 seconds.
B1B0429	Co-driver front collision acceleration sensor error due to signal enhancement or algorithm sensor watchdog error	The acceleration signal is too strong and exceeds the range for a certain time.(0.13 seconds to 5 seconds)	The acceleration signal is too strong and exceeds the range for a certain time.(0.13 seconds to 5 seconds)	Replace both sensor and controller
B1B0496	Co-driver front acceleration sensor internal error	Sensor has internal fault or abnormal connection during sensor initialization	Sensor has internal fault or abnormal connection during sensor initialization	Power off the controller and replace it with a new transmitter. Power on the controller and clear the error within the power-on period.
B1B1011	Driver airbag circuit is short to ground.	Circuit short to ground for 1.5 seconds	Circuit connection status is wrong	Check the circuit connection status to ensure that the circuit is not shorted to ground, and the fault will be relieved after 3s.
B1B1012	Driver airbag circuit short circuit to power supply	Circuit shorted to power for 1.5 seconds	Circuit connection status is wrong	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.
B1B1013	Driver airbag circuit resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range ((2.08ohm -3.92ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. (2.08ohm -3.92ohm), 3 The fault will be released in seconds.

B1B101A	Driver airbag circuit resistance too low	Circuit resistance decreases to low resistance: Less than 1.3 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range (2.08ohm -3.92ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. (2.08ohm -3.92ohm), 3 The fault will be released in seconds.
B1B102B	Driver airbag circuit wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Circuit connection error	Check the circuit wiring to ensure that the circuit is not wired with other circuits. The fault will be relieved immediately after power-on again.
B1B1055	Driver airbag circuit connection configuration error	Circuit connected to an unconfigured line for 1.5 seconds	ECU circuit configuration error	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.

B1B1111	Copilot airbag circuit is short to ground	Circuit short to ground for 1.5 seconds	Circuit connection status error	Check the circuit connection status to ensure that the circuit is not shorted to ground, and the fault will be relieved after 3s.
B1B1112	Copilot airbag circuit is short to power supply	Circuit shorted to power for 1.5 seconds	Circuit connection status error	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.
B1B1113	Copilot airbag circuit resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B111A	Passenger's airbag circuit resistance too low	Circuit resistance decreases to low resistance: Less than 1.1 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B112B	Copilot airbag circuit wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Circuit connection error	Check the circuit wiring to ensure that the circuit is not wired with other circuits. The fault will be relieved immediately after power-on again.
B1B1155	Copilot airbag circuit connection configuration error	Circuit connected to an unconfigured line for 1.5 seconds	ECU circuit configuration error	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.
B1B1211	Driver seat belt tensioner short circuit to ground	Circuit short to ground for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to ground, and the fault will be relieved after 3s.
B1B1212	Driver seat belt pretensioner short circuit to power supply	Circuit shorted to power for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.
B1B1213	Driver seat belt pretensioner resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B121A	Driver seat belt pretensioner resistance too low	Circuit resistance decreases to low resistance: Less than 1.1 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B122B	Driver seat belt pretensioner wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Wrong circuit connection status	Check the circuit wiring to ensure that the circuit is not wired with other circuits. The fault will be relieved immediately after power-on again.

B1B1255	Driver seat belt pretensioner connection configuration error	Circuit connected to an unconfigured line for 1.5 seconds	ECU circuit configuration error	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.
B1B1311	Copilot seat belt tensioner short circuit to ground	Circuit short to ground for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to ground, and the fault will be relieved after 3s.
B1B1312	Pretensioner of passenger's seat belt is short to power supply.	Circuit shorted to power for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.
B1B1313	Passenger's seat belt pretensioner resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range.

				1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B131A	Passenger's seat belt pretensioner resistance is too low	Circuit resistance decreases to low resistance: Less than 1.1 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B132B	Pre-driver's seat belt tensioner wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Wrong circuit connection status	Check the circuit wiring to ensure that the circuit is not wired with other circuits. The fault will be relieved immediately after power-on again.
B1B1355	Copilot seat belt pretensioner connection configuration error	Circuit connected to an unconfigured line for 1.5 seconds	ECU circuit configuration error	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.
B1B1411	Driver side airbag circuit short to ground	Circuit short to ground for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to ground, and the fault will be relieved after 3s.
B1B1412	Driver side airbag circuit short circuit to power supply	Circuit shorted to power for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.
B1B1413	Driver side airbag resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B141A	Driver side airbag circuit resistance too low	Circuit resistance decreases to low resistance: Less than 1.1 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B142B	Driver side airbag circuit wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Wrong circuit connection status	Check the circuit wiring to ensure that the circuit is not wired with other circuits. The fault will be relieved immediately after power-on again.
B1B1455	Driver side airbag circuit connection configuration error	Circuit connected to an unconfigured line for 1.5 seconds	ECU circuit configuration error	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.
B1B1511	Passenger side airbag circuit is short to ground.	Circuit short to ground for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to ground, and the fault will be relieved after 3s.
B1B1512	Front passenger side airbag circuit is short to power supply	Circuit shorted to power for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.

B1B1513	Passenger side airbag circuit resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B151A	Passenger side airbag circuit resistance too low	Circuit resistance decreases to low resistance: Less than 1.1 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B152B	Passenger's side airbag circuit wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Wrong circuit connection status	Check circuit wiring to ensure that the circuit is not wired with other circuits.

				This fault will be released immediately after new power-on.
B1B1555	Passenger side airbag circuit connection configuration error	Circuit connected to an unconfigured line for 1.5 seconds	ECU circuit configuration error	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.
B1B1611	Copilot curtain airbag circuit is short to ground	Circuit short to ground for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to ground, and the fault will be relieved after 3s.
B1B1612	Copilot curtain airbag circuit is short to power supply	Circuit shorted to power for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.
B1B1613	Copilot curtain airbag circuit resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B161A	Copilot curtain airbag circuit resistance too low	Circuit resistance decreases to low resistance: Less than 1.1 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B162B	Copilot curtain airbag circuit wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Wrong circuit connection status	Check the circuit wiring to ensure that the circuit is not wired with other circuits. The fault will be relieved immediately after power-on again.
B1B1655	Copilot curtain airbag circuit connection configuration error	Circuit connected to an unconfigured line for 1.5 seconds	Wrong circuit connection status	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.
B1B1711	Driver curtain airbag circuit short circuit to ground	Circuit short to ground for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to ground, and the fault will be relieved after 3s.
B1B1712	Driver curtain airbag circuit is short to power supply	Circuit shorted to power for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.
B1B1713	Driver curtain airbag circuit resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B171A	Driver curtain airbag circuit resistance too low	Circuit resistance decreases to low resistance: Less than 1.1 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released

				in seconds.
B1B172B	Driver curtain airbag circuit wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Wrong circuit connection status	Check the circuit wiring to ensure that the circuit is not wired with other circuits. The fault will be relieved immediately after power-on again.
B1B1755	Driver curtain airbag circuit connection configuration error	Circuit connected to an unconfigured line for 1.5 seconds	ECU circuit configuration error	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.
B1B1811	Rear driver side airbag circuit short circuit to ground	Circuit short to ground for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to ground, and the fault will be relieved after 3s.

B1B1812	Rear driver side airbag circuit short circuit to power supply	Circuit shorted to power for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.
B1B1813	Rear driver side airbag circuit resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B181A	Rear driver side airbag circuit resistance too low	Circuit resistance decreases to low resistance: Less than 1.1 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B182B	Rear driver side airbag circuit wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Wrong circuit connection status	connect correctly
B1B1855	Rear driver side airbag circuit connection configuration error	Circuit connected to an unconfigured line for 1.5 seconds	ECU circuit configuration error	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.
B1B1911	Rear passenger side airbag circuit short circuit to ground	Circuit short to ground for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to ground, and the fault will be relieved after 3s.
B1B1912	Rear passenger side airbag circuit short circuit to power supply	Circuit shorted to power for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.
B1B1913	Rear passenger side airbag circuit resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B191A	Rear passenger side airbag circuit resistance too low	Circuit resistance decreases to low resistance: Less than 1.1 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B192B	Rear passenger side airbag circuit wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Wrong circuit connection status	Check the circuit wiring to ensure that the circuit is not wired with other circuits. The fault will be relieved immediately after power-on again.
B1B1955	Rear passenger side airbag circuit connection configuration error	Circuit connected to an unconfigured line for 1.5 seconds	ECU circuit configuration error	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.
B1B1A11	Driver knee airbag circuit short circuit to ground	Circuit short to ground for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to ground,

				and the fault will be relieved after 3s.
B1B1A12	Driver knee airbag circuit is short to power supply	Circuit shorted to power for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.
B1B1A13	Driver knee airbag circuit resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B1A1A	Driver knee airbag circuit resistance too low	Circuit resistance decreases to low resistance: Less than 1.1 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.

B1B.71A2B	Driver knee airbag circuit wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Circuit connection status is wrong	Check the circuit wiring to ensure that the circuit is not wired with other circuits. The fault will be relieved immediately after power-on again.
B1B1A55	Driver knee airbag circuit connection configuration error	Circuit connected to an unconfigured line for 1.5 seconds	ECU circuit configuration error	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.
B1B1D11	Rear Driver Seat Belt Pretensioning Circuit Short to Ground	Circuit short to ground for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to ground, and the fault will be relieved after 3s.
B1B1D12	Rear Driver Seat Belt Pretension Circuit Short to Power	Circuit shorted to power for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.
B1B1D13	Rear driver seat belt pretensioning circuit resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B1D1A	Rear driver seat belt pretensioning circuit resistance too low	Circuit resistance decreases to low resistance: Less than 1.1 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B1D2B	Rear Driver Seat Belt Pretensioning Circuit Wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Wrong circuit connection status	Check the circuit wiring to ensure that the circuit is not wired with other circuits. The fault will be relieved immediately after power-on again.
B1B1D55	Rear Driver Seat Belt Pretensioning Loop Connection Configuration Error	Circuit connected to an unconfigured line for 1.5 seconds	ECU circuit configuration error	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.
B1B1E11	Rear passenger's seat belt pretensioning circuit is short to ground	Circuit short to ground for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to ground, and the fault will be relieved after 3s.
B1B1E12	Rear passenger seat belt preload circuit is short to power supply	Circuit shorted to power for 1.5 seconds	Wrong circuit connection status	Check the circuit connection status to ensure that the circuit is not shorted to the power supply, and the fault will be relieved after 3s.
B1B1E13	Rear passenger seat belt pretensioning circuit resistance too high	Circuit resistance rises to high resistance: Greater than 5.5 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.

B1B1E1A	Rear passenger seat belt pretensioning circuit resistance too low	Circuit resistance decreases to low resistance: Less than 1.1 ohms and lasts Interval 1.5 seconds	Circuit resistance not in normal range 1.74ohm -3.1ohm	Check the circuit resistance to ensure that the circuit resistance is within the normal range. 1.74ohm -3.1ohm, 3 The fault will be released in seconds.
B1B1E2B	Rear passenger's seat belt pretensioning circuit wiring	The circuit is wired with other circuits, and this fault is found after power-on.	Wrong circuit connection status	Check the circuit wiring to ensure that the circuit is not wired with other circuits. The fault will be relieved immediately after power-on again.
B1B1E55	Rear passenger seat belt pretensioning circuit connection configuration error	Circuit connected to an unconfigured line for 1.5 seconds	ECU circuit configuration error	Check ECU circuit configuration to ensure that no additional circuit is connected to ECU, and the fault will be relieved after 3s.

B1B2012	Driver seat belt buckle short circuit to power supply or wiring	The switch is short-circuited to the power supply for 500 ms in the same power-on cycle, or the switch is connected to the power supply before power-off, and this fault will be found after re-power-on initialization.	Incorrect switch connection status	Check the switch connection status to ensure that it is not connected to the power supply, and the fault can be relieved automatically after 1s, or relieved automatically after re-power-on initialization.
B1B2055	Driver seat belt buckle configuration error	Clear the switch configuration position, connect the switch and restart the ECU.	Switch buckle configuration error	Set the switch configuration position, connect the switch and restart the ECU.
B1B2112	Copilot seat belt buckle short circuit to power supply or wiring	The switch is short-circuited to the power supply for 500 ms in the same power-on cycle, or the switch is connected to the power supply before power-off, and this fault will be found after re-power-on initialization.	Incorrect switch connection status	Check the switch connection status to ensure that it is not connected to the power supply, and the fault can be relieved automatically after 1s, or relieved automatically after re-power-on initialization.
B1B2155	Co-driver seat belt buckle configuration error	Clear the switch configuration position, connect the switch and restart the ECU.	Switch buckle configuration error	Set the switch configuration position, connect the switch and restart the ECU.
B1B2212	OPSFP Switch Seat Occupancy Sensor Short to battery Co-driver seat cushion detection short circuit to power supply	Initial: Short the switch to Vbat Start ECU - fault should qualify Remove the short - fault should dequalify in the same POC. Cyclic: Start the ECU. Create a short to Vbat - fault should qualify Remove the short - fault should dequalify in the same POC The switch is short-circuited to the power supply in the same power-on cycle for 500 ms, or the switch is connected to the power supply before power-off, and this fault will be found after re-power-on initialization.	The cable is wrong connected switch connection status is incorrect	Make the calbe right connected, not connect to the Bat, the fault will be dequalifed after 1 second. Or the fault will be dequalified after init. Check the switch connection status to ensure that it is not connected to the power supply, and the fault can be relieved automatically after 1s, or relieved automatically after re-power-on initialization.
B1B2255	OPSFP Switch Seat Occupancy Sensor Configuration fault. Co-driver seat cushion detection configuration error	Clear configuration bit of the switch Connect the switch and start ECU clear the switch configuration position, connect the switch and restart the ECU.	Bit of switch was not configured correctly. Switch buckle configuration error	Set configuration bit of the switch Connect the switch and start ECU Set the configuration position of the switch, connect the switch and restart the ECU.
B1B2412	Rear passenger seat belt buckle on driver's side short circuit to power supply or wiring	The switch is short-circuited to the power supply for 500 ms in the same power-on cycle, or the switch is connected to the power supply before power-off, and this fault will be found after re-power-on initialization.	Incorrect switch connection status	Check the switch connection status to ensure that it is not connected to the power supply, and the fault can be relieved automatically after 1s, or relieved automatically after re-power-on initialization.
B1B2455	Driver rear passenger seat belt buckle misconfiguration	Clear the switch configuration position, connect the switch and restart the ECU.	Switch buckle configuration error	Set the switch configuration position, connect the switch and restart the ECU.

B1B2512	Rear middle passenger seat belt buckle short circuit to power supply or wiring	The switch is short-circuited to the power supply for 500 ms in the same power-on cycle, or the switch is connected to the power supply before power-off, and this fault will be found after re-power-on initialization.	Incorrect switch connection status	Check the switch connection status to ensure that it is not connected to the power supply, and the fault can be relieved automatically after 1s, or relieved automatically after re-power-on initialization.
B1B2555	Rear middle passenger seat belt buckle misconfiguration	Clear the switch configuration position, connect the switch and restart the ECU.	Switch buckle configuration error	Set the switch configuration position, connect the switch and restart the ECU.
B1B2612	Rear passenger seat belt buckle on front passenger side is short circuit to power supply or wiring	The switch is short-circuited to the power supply for a duration of 500 ms in the same power cycle, or the switch has been connected to power before power-off.	Incorrect switch connection status	Check the switch connection status to ensure that it is not connected to the power supply, and the fault can be relieved automatically after 1s, or repeated.

		Source, this fault will be found after re-power-on initialization		The fault is relieved automatically after new power-on initialization.
B1B2655	The rear passenger seat belt buckle on the passenger side is misconfigured.	Clear the switch configuration position, connect the switch and restart the ECU.	Switch buckle configuration error	Set the switch configuration position, connect the switch and restart the ECU.
B1B3012	Collision output short circuit power supply	The crash output is short-circuited to the power supply for 0.8-1 seconds in the same power-on cycle, or the crash output is connected to the power supply before power-off, and this fault will be found after re-power-on initialization.	Connection error	Check the collision output connection status to ensure that it is not connected to the power supply, and the fault can be relieved automatically after 0.8-1 seconds, or relieved automatically after re-power-on initialization.
B1B3014	Impact output short ground or disconnected	CRO Hardwired Short to GND or Open Short ground or disconnected impact output in the same power-on cycle, duration 0.8-1 seconds	Connection error	Check the impact output connection status to ensure that it is not connected to the ground or disconnected, and the fault can be automatically released after 0.8-1 seconds.
B1B3055	Collision output configuration error	Connect the indicator and de-configure it. Connect crash output hardwire and do not configure it	Collision output hard wire connection error or configuration error	Connect the crash output hardwire and configure it
B1B4100	Front Crash Detected Front collision detected	Front Airbag Deployment Crash Front collision	Front collision	Replace with a new ECU
B1B4200	Driver side collision detected	Left side collision	Left side collision occurs	Replace with a new ECU
B1B4300	Front passenger side collision detected	Right side collision	Right side collision	Replace with a new ECU
B1B4400	Rear collision detected	Rear collision	Rear collision	Replace with a new ECU
B1B5001	ECU power supply is too low(Wire impedance too high)	The voltage at both ends of the ECU is not within the 9V-16 V range due to the connection problem between the ECU and the power supply. (Wire impedance too high)	Too high wiring impedance between ECU and power supply causes voltage at both ends of ECU out of normal range 9V-16 V	Check the wire connection between battery and ECU to make the voltage return to 9-16 V.
B1B6001	System configuration mismatch	An external device mode is configured but not monitored	Incorrect system configuration	Replace controller
B1B6101	The sensor identification code is inconsistent with the predetermined identification code of the algorithm.	Change the sensor identification code	The sensor identification code is inconsistent with the predetermined identification code of the algorithm.	Replace controller
B1B6201	Parameter output identification code is inconsistent with predetermined identification code of algorithm	Modify parameter output IDs in algorithm, calculate checksum, power on	Parameter output identification code is inconsistent with predetermined identification code of algorithm	Replace controller
B1B6301	Item parameter identification code is inconsistent with predetermined identification code of algorithm	Modify parameter output IDs in algorithm, calculate checksum, power on	Item parameter identification code is inconsistent with predetermined identification code of algorithm	Replace controller

B1B6401	Transmission parameter value identification code is inconsistent with predetermined identification code of algorithm	Modify parameter output IDs in algorithm, calculate checksum, power on	Item parameter identification code is inconsistent with predetermined identification code of algorithm	Replace controller
B1B6501	Check code updated incorrectly	Modify parameter output IDs in algorithm, calculate checksum, power on	Check code updated incorrectly	Re-offline configuration
B1B6648	Software mismatch error	Bootloader causes Software version Mismatch	Software mismatch	Replace software brush
B1B6701	Single sensor rationality check failure	No front impact sensor is configured in the software.(Front collision sensor configuration)	No front impact sensor is configured in the software.(Front collision sensor configuration)	Upper collision sensor configured in software (With front collision sensor configuration)

Fault symptom diagnosis fault symptom table

Symptoms	Possible causes	Measures
Airbag lamp is not on all the time	Instrument fault	Replace instrument (refer to chapter "Instrument assembly");
Airbag lamp flashes	Airbag controller ignition function is not activated	Carry out offline configuration operation (refer to chapter ecu of airbag);
Airbag lamp is always on	Vehicle crash	Reference: Airbag ecu section;
	Airbag controller internal fault	Reference: Airbag ecu section;
	Connector fault Circuit fault Fault of part itself(Such as airbag, seat belt pretensioner, sensor, etc.)	Reference: Airbag ecu section;
	The configured airbag controller does not match the vehicle configuration. Offline configuration error	Reference: Airbag ecu section;
	Communication fault with other controllers Faulty connection to gateway	Reference: Airbag ecu section;
Seat belt not fastened reminder lamp abnormal	Seat belt buckle connector fault Seat belt buckle circuit fault Fault of seat belt buckle itself	Reference: Abnormal section of safety belt not fastened;
Mechanical fault of seat belt(Stuck, not returning, etc.)	Parts are clamped with foreign matter Strap surface is broken or excessive dirt Interior trim deformation	Reference: Seat belt return and pull out abnormal section;

Seat belt does not fasten to remind abnormality

Front seat belt does not fasten to remind abnormality

Analysis			
Tool	Diagnostic scanner(Kt 700, latest software)		
Fault content	When the ignition switch is in the "ON" position, the driver's seat belt is not tied and the warning lamp is off. When the ignition switch is in the "ON" position, the seat belt is fastened and the seat belt warning lamp is always on.		
Possible causes	A. Airbag controller circuit fault; B. Seat belt buckle harness and plug fault; C. Seat belt buckle itself fault; D. Passenger seat sensor fault; E. Instrument fault;		
Maintenance			
Step	**Operation**	**Results/measures**	
1	Inspect whether the airbag lamp is abnormal. If the airbag lamp is abnormal, priority shall be given to handling the abnormal fault of the airbag lamp;(Refer to DTC Diagnostic Operation Method section) Ensure that the seat belt unfastened reminder lamp returns to normal after the airbag lamp is normal?	Yes	End of maintenance;
		No	Go to Step 2
2	Connect the diagnostic scanner to the OBD connector on the lower left side of the instrument panel. Turn the ignition switch to the "ON" position. Turn on the diagnostic scanner/or the diagnostic software in the computer to enter the diagnosis C.Open Changan vehicle icon; Select "CS55 PLUS" first; Open "airbag system"; F. Open "Read data stream"; G. Open "Read input/output value"; H. Unplug the seat belt buckle to be tested; (The front passenger is not alerted and the passenger seat must be seated); I. Check whether the resistance corresponding to seat belt buckle meets the following range? Greater than 6000 ohms when plugging, less than 3Ω?	Yes	Maintenance instrument; Refer to Abnormal Flashing of All Indicators of Instrument.
		No	If there is a fault, enter the repair steps. 3;
	L If the front passenger seat belt is not fastened, check whether the passenger seat position sensor (SBR) functions normally. Pull out lock tongue of seat belt; Check whether the passenger lock buckle resistance in the input and output values meets the following range according to seated and unseated? Is it more than 6000 ohms when not sitting, and less than 3Ω ohms when sitting?	Yes	Passenger's seat position sensor (SBR) No fault.
		No	Replace passenger seat position sensor (SBR). See Seat position sensor section
3	Inspect whether the harness is damaged. Are the plugs loose?	Yes	Repair harness
		No	Replace seat belt buckle; See Seat belt buckle section

Airbag configuration error

<table>
<tr><td colspan="4">Analysis</td></tr>
<tr><td>Fault content</td><td colspan="3">Misconfiguration</td></tr>
<tr><td>Possible causes</td><td colspan="3">The configured airbag controller does not match the vehicle configuration.
Offline configuration error</td></tr>
<tr><td colspan="4">Maintenance</td></tr>
<tr><td>Step</td><td>Operation</td><td colspan="2">Results/measures</td></tr>
<tr><td rowspan="2">Offline configuration</td><td rowspan="2">A. Double-click Changan vehicle icon;
B. Double-click "S 203" icon;
C. Double-click "Airbag system";
D. Double-click "Special function";
E. Double-click "offline configuration";
F. Enter the maintenance time and double click "Next";
G. Input the VIN code of the vehicle and double click "Next";
H. Select the number of circuits to be configured and double-click "Next";
I. Double-click "Activate Configuration";
J. Wait for offline configuration to run
K. If "Configuration succeeded" is prompted, double-click "Close" to finish.</td><td>Yes</td><td>Configuration completed</td></tr>
<tr><td>No</td><td>Analyze the fault code and repair the fault.
Reference: DTC diagnosis operation method</td></tr>
</table>

Seat belt return and pull out abnormal

Analysis			
Fault content	Seat belt return is slow, does not return, pull out is stuck		
Possible causes	A. Excess dirt on the webbing surface; B. The surface of webbing is damaged; C. Insert foreign matter into the retractor; D. Heterotopic interference webbing due to other parts or harness wiring;		
Maintenance			
Step	**Operation**	**Results/measures**	
1	Pull out all webbing. Inspect the webbing surface for dirt or damage that affects the pull-out rewinding. If there is dirt, clean the webbing with detergent.If damaged, replace with a new seat belt retractor assembly. Ensure that the surface of the webbing is free of dirt and the webbing is free of damage, and whether it returns to normal?	Yes	End of service If the seat belt retractor is replaced, the faulty part must be returned to Chang'an.
		No	Go to step 2.
2	A.(Dismantle lower trim panel of pillar B (not dismantle upper trim panel temporarily). (Rear seat belt) Remove the fabric plate. B. Check whether there is foreign matter stuck in the retractor and webbing stroke. If yes, remove foreign matter. C. After ensuring that there is no foreign matter in the retractor, is it normal?	Yes	End of seat belt repair. Restore the vehicle interior. See B-pillar trim section
		No	Go to Step 3
3	Inspect the webbing for interference from other harnesses or parts. If so, dispose of the interfering object. Ensure that the wiring harness is normal after interference?	Yes	End of seat belt repair. Restore the vehicle interior. See B-pillar trim section
		No	Go to Step 4
4	A.(Front seat belt) Remove the upper B-pillar inner trim panel. B. Check whether the webbing interferes with other objects.If so, handle interfering objects. D. Ensure that the webbing returns to normal without interfering objects?	Yes	End of seat belt repair. Restore the vehicle interior. See B-pillar trim section
		No	Replace seat belt retractor. Return the faulty parts to Chang'an.

Removal and installation

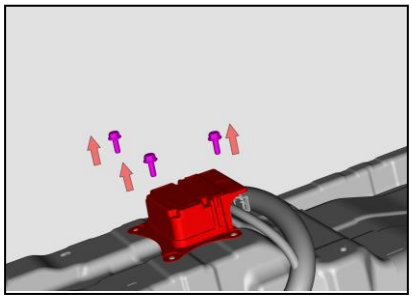
Airbag controller

Removal

Remove centre compartment. See Removing and installing centre compartment

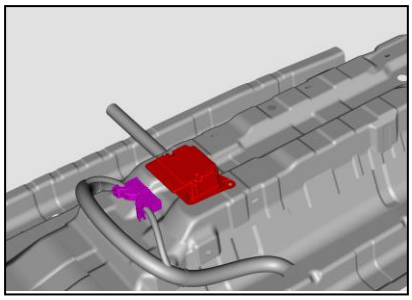
Remove the airbag controller

mounting bolts. Torque:



9±1Nm

Pull off connector plug of airbag controller.



Installation

The installation sequence is the reverse of the removal sequence.

Warning

The airbag controller must be handled gently. Pay attention to avoid bumping, knocking and falling during assembly. It is not allowed to disassemble the controller housing without permission. After the controller is tightened, it is necessary to check that the torque of the fastening bolt is not less than 9N•m.

Warning

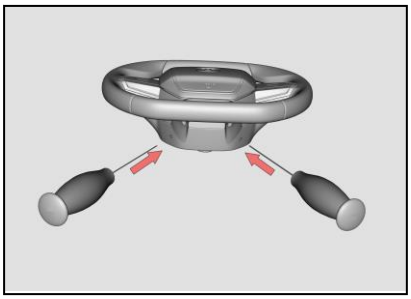
The product barcode on all airbag system parts is the unique and permanent identification of the part. No tear or contamination is allowed during disassembly, so that the manufacturer can perform quality tracing and performance inspection on the part.

Driver front airbag

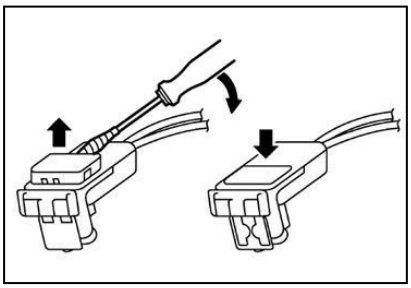
Removal

Turn off the engine so that the key is in OFF position.

Insert a flat screwdriver into the disassembling hole at 5 and 7 o'clock on the side of the steering wheel bottom cover until the airbag is clamped with steel wire, and then force the bucket to release all the airbag clamping feet from the clamping steel wire.



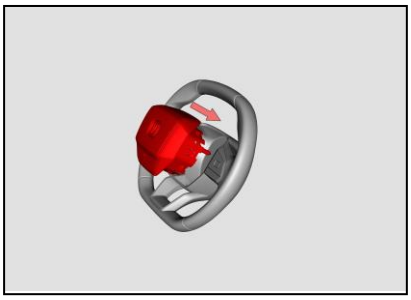
Pry up the secondary clip with a flat screwdriver, and remove the connector of the airbag.



Installation

Plug in connector of driver front airbag

Align the three steel clips of the driver's front airbag with the three mounting holes in the steering wheel, and press down firmly.



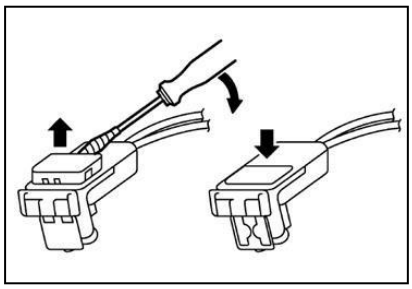
Shake the driver's front airbag to check whether it is installed in place and whether the surrounding clearance is even.

Front airbag of co-driver

Removal

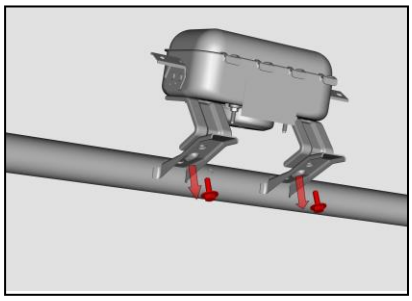
Remove glove box panel. Refer to Removing and installing dashboard

Remove front airbag harness connector of front passenger.



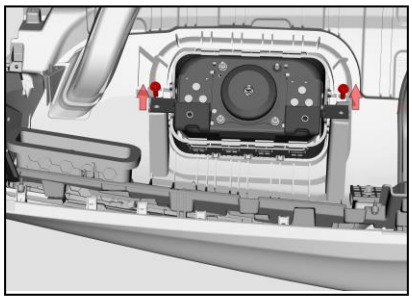
Remove retaining bolts of front passenger airbag

and steering support. Torque: 9±1Nm



Remove dashboard, Removing and installing dashboard

Remove the nuts fixing the passenger's airbag to the instrument panel.



Installation

The installation sequence is the reverse of the removal sequence.

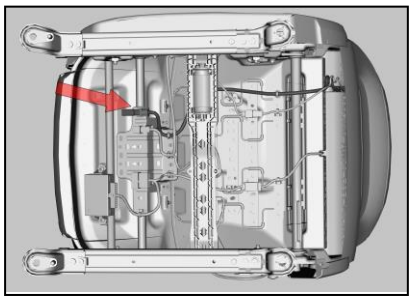
Front seat side airbag

Removal

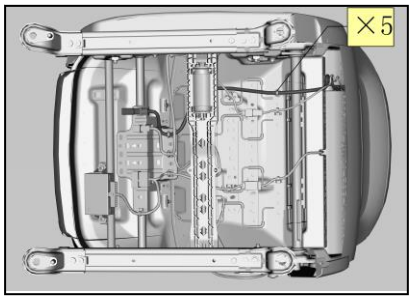
Remove seat cover and foam.

Refer to front seat assembly section

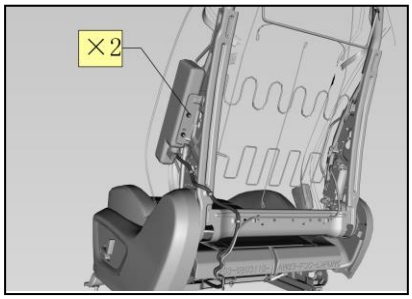
Remove seat side airbag harness connector



Remove the harness clips.



Remove the side airbag and seat back mounting nuts, torque 5±1Nm.



Installation

The installation sequence is reverse to the removal sequence, and the wiring specification of the harness shall be ensured.

Side curtain

Removal

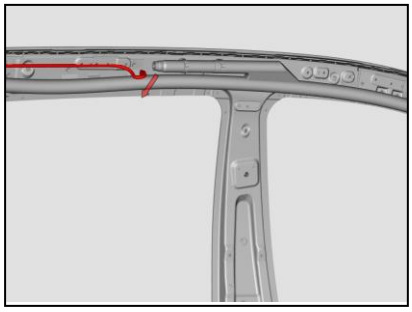
Remove A\B\C-pillar.

Reference: Removing and installing A-pillar upper trim panel assembly Removing and installing A-pillar lower trim panel assembly Removing and installing B-pillar trim panel C-pillar trim panel

Remove headliner.

Removing and installing headliner chapter

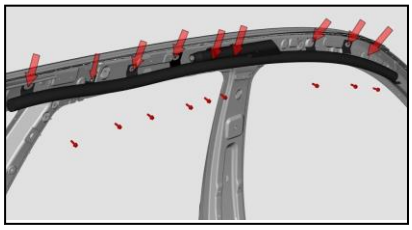
Unplug the side curtain airbag connector.



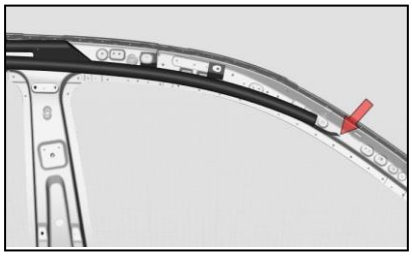
Remove the retaining bolts of side curtain

airbag and gas generator. Torque:

9±1Nm



Remove the retaining clips of side curtain airbag tension strap.



Installation

The installation sequence is the reverse of the removal sequence.

Side impact sensor

Removal

Remove seat.

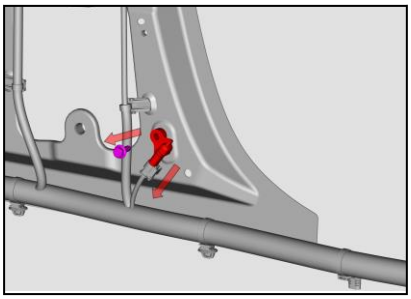
Reference: Front seat assembly section

Remove door sill trim and B-pillar lower trim.

Reference: Removing and installing B-pillar trim

Remove side impact sensor

mounting bolt torque:



9±1Nm

Unplug the side impact sensor

connector. Installation

The installation sequence is the reverse of the removal sequence.

Warning

The side impact sensor must be handled gently. Pay attention to avoid bump, knock and fall during assembly. It is not allowed to disassemble the housing without permission. After tightening the sensor, it is necessary to check the torque value of the fastening bolt is not less than 9N•m.

Front collision sensor

Removal

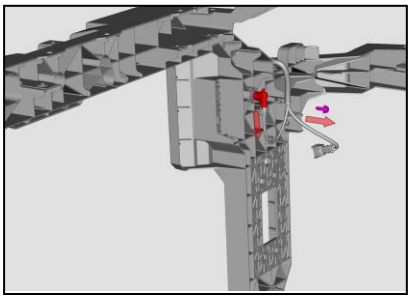
Remove front bumper.

Reference: Front bumper section

Remove front-end module.

Remove front collision sensor mounting bolt torque: 9±1Nm

Unplug the front impact



sensor connector. Installation

The installation sequence is the reverse of the removal sequence.

Warning

The front collision sensor must be handled gently. Pay attention to avoid bumping, knocking and falling during assembly. It is not allowed to disassemble the housing without permission. After tightening the sensor, it is necessary to check the torque value of the fastening bolt is not less than 9N•m.

Front seat belt

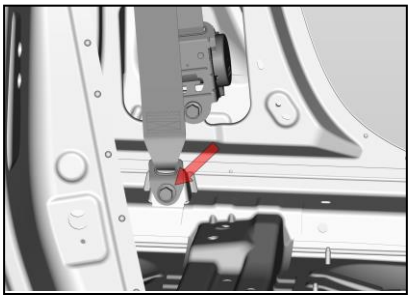
Removal

Turn off the engine so that the key is in OFF position.

Removing B-pillar lower trim panel

Refer to B-pillar trim section

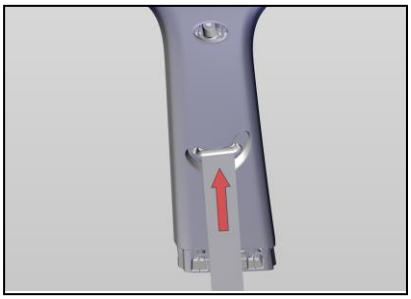
Use ratchet wrench and No.14 socket tool to remove the bolt of lower fixing point of seat belt, with torque of 45Nm.



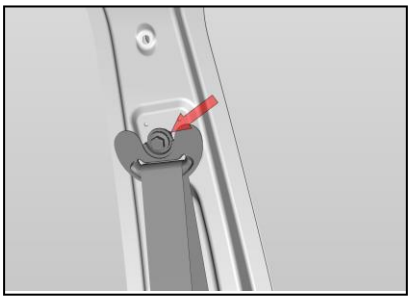
Remove the B-pillar upper trim panel and exit the webbing

from the B-pillar upper trim panel. Refer to B-pillar

trim section



Use ratchet wrench and No. 14 socket tool to remove seat belt guide ring, torque: 45Nm.

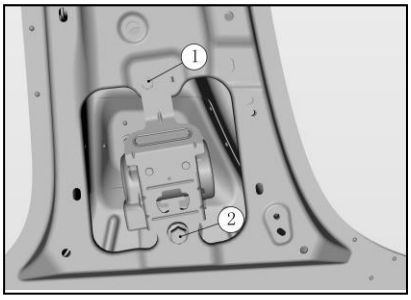


Removing belt retractor

Use ratchet wrench and 10 # socket tool to dismantle fixing bolt (1) of upper connecting plate of seat belt retractor,

torque: 10Nm. Use ratchet wrench and No. 14 socket tool to remove the lower retaining bolt (2) of seat belt retractor,

with torque of 45Nm.



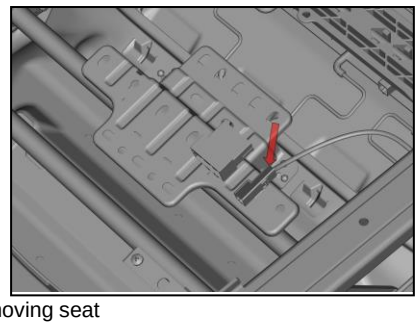
Installation

The installation sequence is the reverse of the removal sequence.

Seat belt buckle

Removal

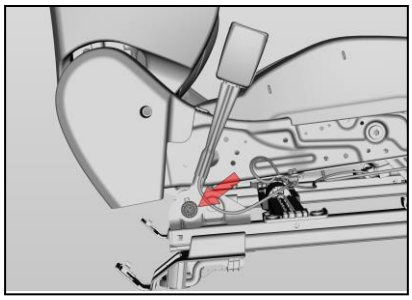
Turn off the engine so that the key is in the OFF position.
Unplug the connector connected to the buckle harness.



Removing seat

Refer to Front Seat Assembly Chapter

Remove seat belt buckle, torque: 45Nm



Installation

The installation sequence is the reverse of the removal sequence.

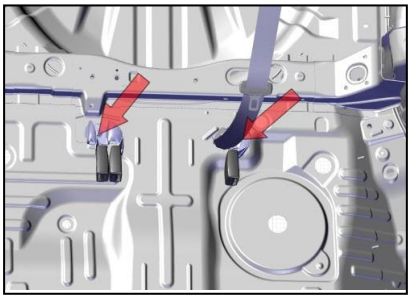
Rear seat belt buckle

Removal

Remove rear seat.

Refer to Rear Seat Assembly Chapter

Use ratchet wrench and No. 14 socket tool to remove rear left and right seat belt buckle assembly, torque: 45Nm.



Installation

The installation sequence is the reverse of the removal sequence.

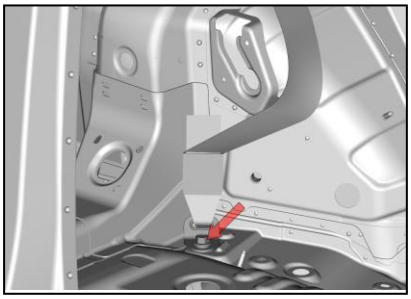
Rear seat belt

Removal

Removing rear seat

Refer to Rear Seat Assembly Chapter

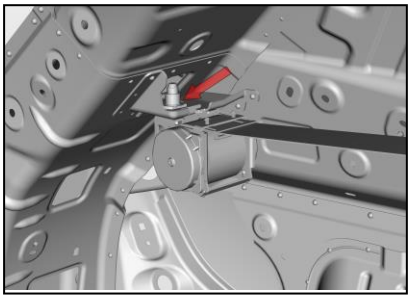
Use a ratchet wrench and No. 14 socket tool to remove the left/right seat belt lower anchor bolt, torque: 45Nm.



Removing C-pillar trim

Refer to C-pillar trim section

Use ratchet wrench and No. 14 socket tool to dismantle fixing point bolt of left/right seat belt retractor, torque: 45Nm.



Installation

The installation sequence is the reverse of the removal sequence.

Spare parts atlas

F271701

Body repair(Accident Vehicle Maintenance)

Body maintenance. 1400
Body repair 1401
Accident Vehicle Maintenance Operation Specification 1401
Technical data 1409
Front of body 1423
Middle of body 1435
Body Rear 1452
Spare parts atlas 1472

Body repair

Accident Vehicle Maintenance Operation Specification General Maintenance Specification

Vehicle protection

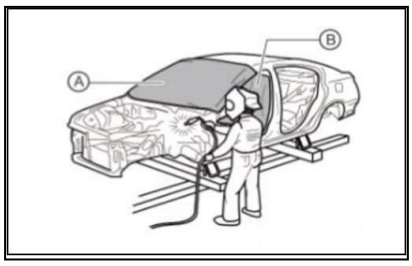
When performing welding work, the paint, windows, seats and carpets must be covered with heat-resistant and fire-resistant protective sleeves, such as glass protective sleeves and seat protective sleeves. Safety measures

Warning

The corresponding safety regulations of the state must be observed during the body repair work. If in doubt, please consult the relevant departments.

Do not park unprotected vehicles in the body workshop (splash sparks can cause fire, damage to paint and windows).

Safety Tips

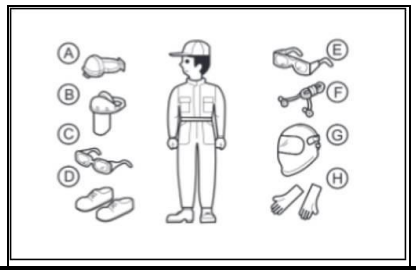


Prior to vehicle operation, check for fuel leaks and if fuel leaks are found, handle them in advance.

To perform welding work near the fuel tank, remove the fuel tank, drain the fuel line and block the fuel line. Ensure that the body workshop is well ventilated.

Safety Tips

Caution All operations must be performed by technicians certified by the relevant national qualification and safety measures must be taken. Labor protection articles such as protective glasses, gloves, labor protection shoes and earplugs must be worn according to specific conditions.



Symbols	Name
A	Dust mask
B	Dustproof protective screen
C	Safety glasses
D	Labor Shoes
E	Goggles
F	Earbuds
G	Welding shields
H	Welder gloves

Safety use correction device

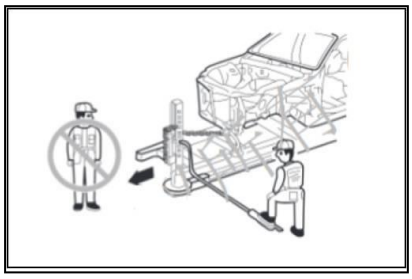
Warning

The use of body correction hydraulics or towing devices to correct for vehicle damage due to an accident can result in significant forces on the body that can injure others.

Personnel in the work area must be secured.

Pull body

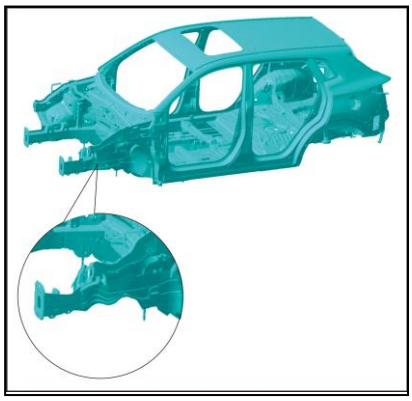
When pulling the body or frame with a puller, it is prohibited to stand in a straight position on the traction chain, and the safety cable must be used.



Precautions for Body Structure Steel Plate Operation

Structural steel plate tortuous deformation must be replaced

Once the structural steel plate is found to have zigzag deformation, it must be replaced.



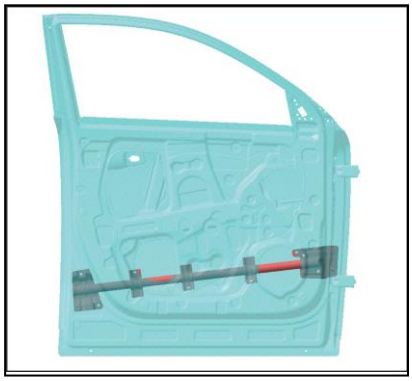
Warning

According to the design requirements, the structural steel plate must be consistent with the original design shape. If structural steel sheets are deformed in an accident, or the deformed parts are repaired and reused, they may not meet the safety performance requirements of the original design. If a zigzag steel plate is found, it must be replaced.

Door crash beams cannot be serviced separately

The door impact beam cannot be welded.

The door impact beam cannot be pulled or repaired.



Warning

The door impact beams and their supports are very important safety components that reduce the likelihood of injury to the occupant in the event of a side impact.

If the door impact beam and its support are damaged, the door assembly must be replaced.

Accident Vehicle Maintenance Sequence

Removal and installation

Important components that must be inspected

If the body suspension is suspected of being damaged or deformed, check the suspension of the vehicle on the body alignment device and make the necessary adjustments.

Check the steering gear and steering tie rods for normal operation, visual inspection for deformation and cracks.

Inspect all chassis components.

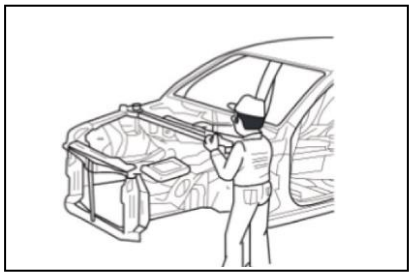
Check wheels and tyres for damage, check concentricity and balance: Check tyre patterns and walls for cracks, and check tyre pressure.

Inspect the engine, transmission, axle and muffler lugs for damage. - A road test shall be carried out after maintenance to determine whether the vehicle can be driven safely and whether the safety performance complies with the standards.

Caution If the vehicle has been subjected to significant pressure, the above components must be checked and the vehicle position detection performed.

Measurement

Prior to disassembly and cutting work, measurements shall be made according to body dimensional drawings, using a body or frame that is being damaged by a puller bridge.



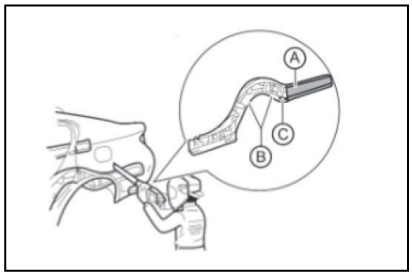
Disassembly

Cutting site

A- Allowed cutting location

B- Curved area

C- Reinforcement

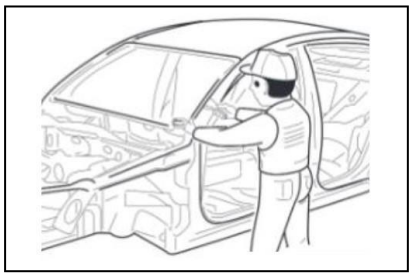


Caution 1.The straight section must be cut and the reinforcement section must not be cut.

Cutting affects the rigidity of the body, so reliability and safety must be handled in accordance with the maintenance manual.

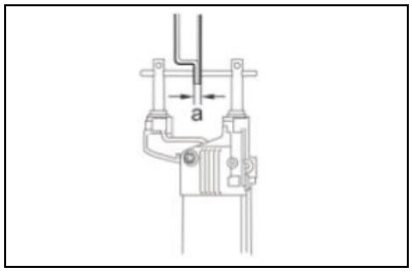
Do not drill or cut in the area where the harness is installed. Check that no hoses, wires are damaged before and after cutting and drilling.

When removing adjacent components, protective tape must be affixed around the body and on the tool to avoid damage to the components.

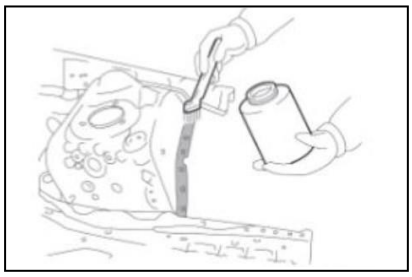


Installation Preparation

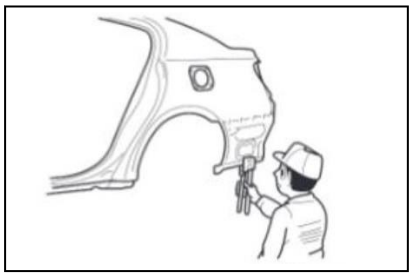
Spot welding: In general, when the total thickness a of the welded plate exceeds 3 mm, the plug welding shall be performed with MIG welder. Spot welding of steel plate thicknesses exceeding 3 mm does not guarantee the durability of the connection.



Remove the new parts and body film to be welded and apply spot-weld sealant (or penetration primer).



For areas that cannot be spot welded or are too thick, use a punch or drill to drill holes before performing plug welding.

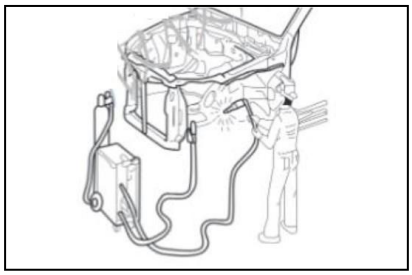


Thickness of weld	Plug hole size(Mm)
Not more than 1.6	Φ6
Greater than 1.6	Φ8

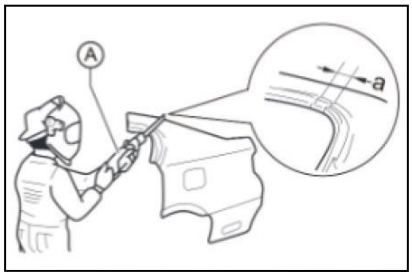
Precautions for operation of electronic components:

During welding, the electronic components may be damaged by the current delivered by the welder through the body.

Before starting welding, disconnect the battery negative terminal and set ground near the body welding area.



Cutting position requirements: Use service tool A: Pneumatic saw, cutting width a: 20~30 mm.



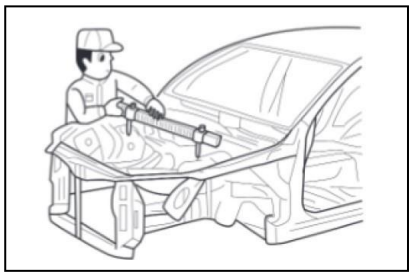
The new part is coarsely cut in the joint area, and the a area must be reserved with the overlapping lapping area of 20~30 mm.

Installation

Measurement before welding:

Before installing new components, dimensional measurements must be made in accordance with the body dimensional drawings to ensure proper assembly.

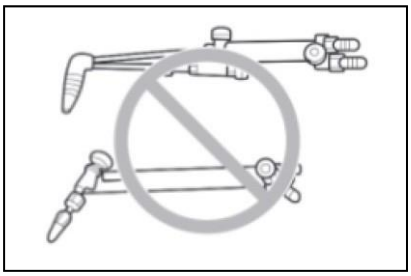
Confirm proper assembly after installation.



Welding precautions:

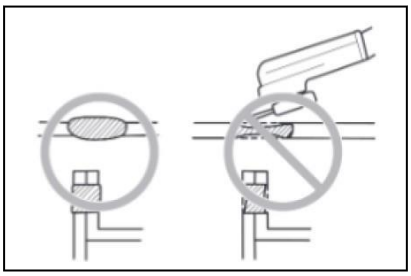
Spot welding: Generally 1.3 times the number of original welding points of the manufacturer.

Plug welding: Generally more than the number of original welding points of the manufacturer.



MIG (Metal Inert Gas) welder shall be used for fill welding. Do not use gas welding or filler welding in areas other than those specified in the steel plate.

Precautions for grinding process after welding:



The weld must be checked after welding to ensure that the weld is secure.

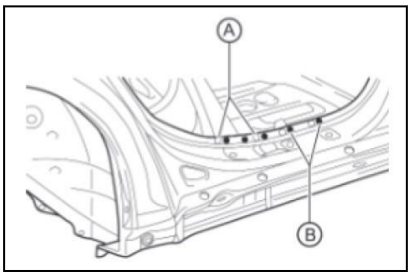
When using an angle grinder to grind the welding area, do not over grind, otherwise the strength of the welding area will be reduced.

Spot weld location:

A- Old joint location

B- New joint location

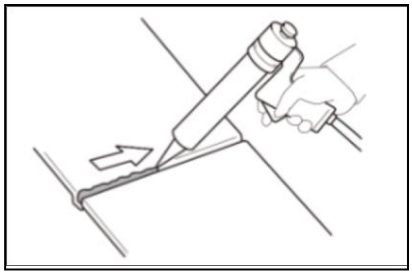
Avoid overlapping welding with old weld nugget areas.



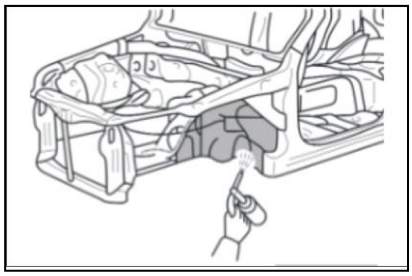
Rust prevention treatment

Rust prevention treatment(Before painting)

Applying body sealant with a pneumatic (electrical) dynamic sealant gun is a waterproof and corrosion-resistant measure that requires applying body sealant to the door, to the seam of the hood steel plate, and to the edge of the hood.

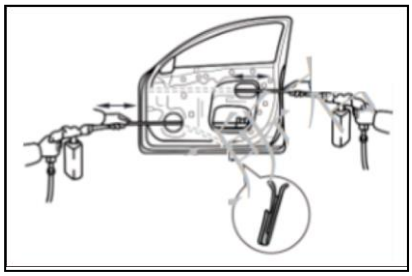


In order to prevent corrosion and avoid damage to the body steel plate due to flying stone impact, the underbody and the inside of the wheelhouse should be coated with a thick stone coating.



Rust prevention treatment(After painting)

In order to prevent corrosion of the coating area, enough anti-rust agent should be applied to the inside of the side door, engine cover and tailgate trunk, and the welding area of the hinge and pillar
(Wax).



Anti-rust treatment by coating

In order to avoid corrosion and protect the vehicle body from the impact of the road surface, the underbody and the inside of the wheelhouse should be sprayed with anti-crushed stone coating.

Precautions for relevant system operations

Protect adjacent parts of body steel plate

- When attaching different types of parts to body steel plates, pay attention to the following to prevent damage to the parts and body steel plates. 1.Before repairing body steel plates, remove adjacent components or use protective covers to isolate the components.

Before removing a part using a screwdriver or scraper, wrap the sharp part of the tool around it with a protective rubber sleeve to avoid damaging the part and body paint.

Before removing the body outer surface parts, affix the body with protective tape to avoid damaging the paint surface.

Before drilling or cutting a part, apply protective tape to the body to avoid damaging the paint surface.

Caution paint finish for paint repair operation.

Electronic control unit

To prevent damage to the ECU, the following precautions must be observed when repairing the body: Disconnect the battery negative terminal before welding.

Do not expose the ECU to ambient temperatures above 80oC and remove the original ECU when service ambient temperatures may be as high as 80℃. The ECU must not come into contact with solder electrodes.

The electronic control unit must be replaced if there is a significant deformation of the control unit housing.

Wiring port or circuit is severely damaged.

The joint connection is damaged or corroded by moisture.

Battery

Before welding, remove the battery negative terminal. Refer to Battery Assembly When performing open flame operation near the battery, remove the battery first.

Fuel tank and fuel hose precautions

Extra care must be taken in the fuel tank and fuel hose when grinding and welding the body. The removed fuel tank and fuel hose must be placed in a safe place.

Air conditioning

Do not weld on refrigerant-filled air-conditioning components, whether using solder or solder (for welding operations that may heat up the air-conditioning components). When engaged in paint repair, the temperature of the parts placed in the paint baking room or in the preheating area shall not exceed 80 degrees Celsius, and the excessive temperature may produce high pressure and cause explosion.

Caution If welding is required near the refrigerant hose, the refrigerant in the air conditioning system must be recovered. Spot welding releases invisible UV rays, causing the refrigerant to decompose.

The recycled air conditioning refrigerant must be operated by a professional.

When repairing a vehicle, refrigerant shall be recovered to avoid contact with the human body.

Protective gloves and goggles must be worn to avoid refrigerant damage.

⚠Warning

If liquid refrigerant enters the eye, rinse the eye thoroughly with water, then drip in the eye and seek the help of a doctor. Even if the eye does not feel pain, the doctor must be told that the frostbite is caused by refrigerant R124a. If the body accidentally comes into contact with the refrigerant, immediately rinse the area thoroughly with water.

Although the refrigerant is not a flammable material, it is still prohibited to smoke in the room where the refrigerant vapors are present. The lighted cigarettes will react chemically with the refrigerant gases and produce toxic gases causing personal injury.

Airbags

If a welder is used, first remove all airbag and belt retractor assemblies.

If it is possible to impact the "Impact Sensor," remove the Impact Sensor.

Caution Check the seat belt system after each accident. If damage occurs, replace it in time.

Technical data

Body gap break dimension

Body - Front

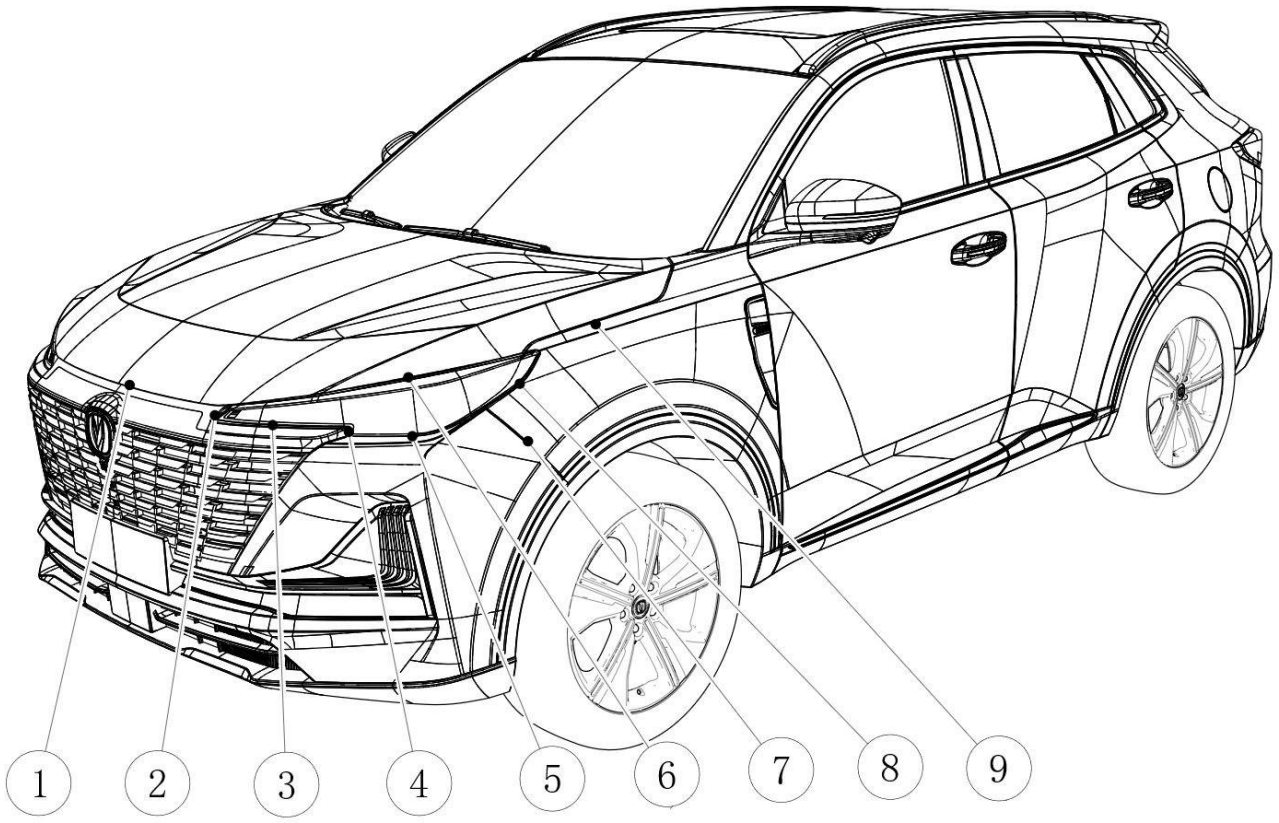


Figure 221:

Location	Detailed description	Permissible gap dimensions(Mm)	Allowable Segment Dimensions(Mm)
1	Front cover relative to front security grille	4.0~8.0, P≤2.5	/

Location	Detailed description	Permissible gap dimensions(Mm)	Allowable Segment Dimensions(Mm)
2	Front cross light relative to headlight (upper Y To)	0.2～3.8	/
3	Headlights relative to headlights(Down Z)	0.5～3.5	/
4	Headlights relative to headlights (Lower Y To)	0.2～3.8	/
5	Front bumper relative to headlamp	0.8～3.2	/
6	Front cover relative to headlamp	3.5～6.8	/
7	Front bumper relative to fender	0.0～1.0	-1.0～0.5
8	Headlights relative to fender	0.3～2.7	/
9	Front cover relative to fender	2.5~4.5, P≤1.0, S≤1.0	-2.0 ~0.0, P≤1.0

Body - Central

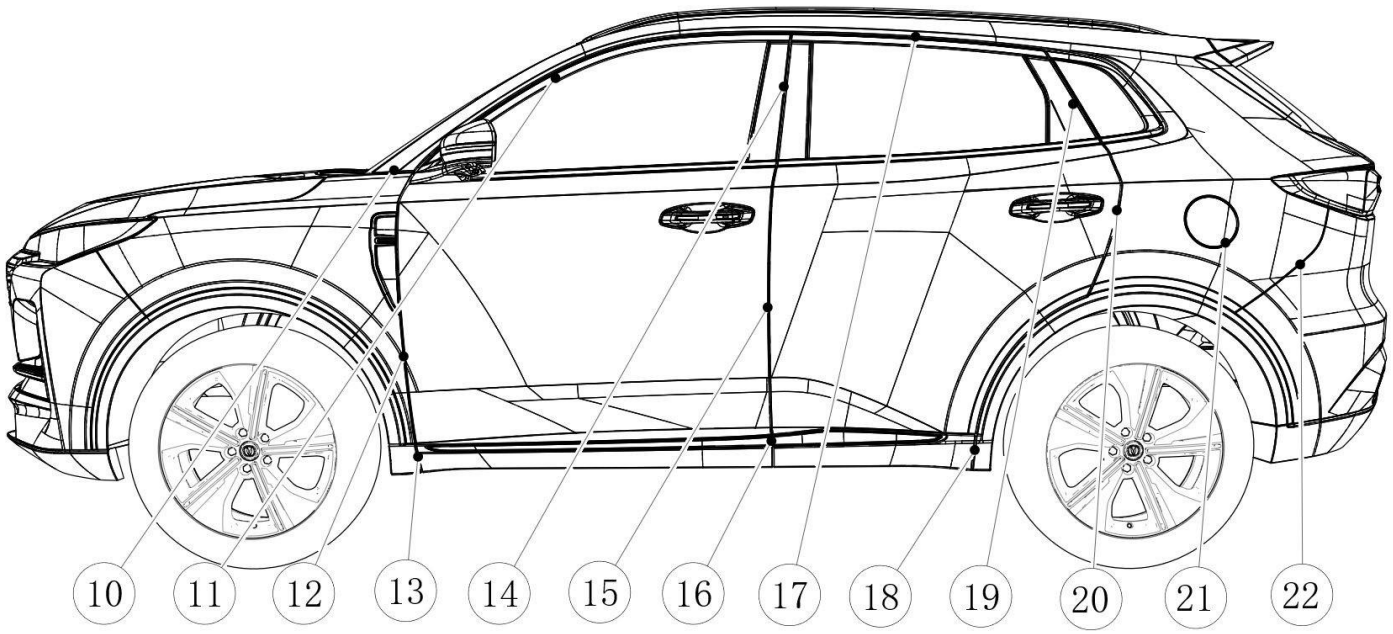


Figure 222:

Location	Detailed description	Permissible gap dimensions(Mm)	Allowable Segment Dimensions(Mm)
10	Fender relative to A-pillar	0.8～3.2	/
11	Front door window frame relative to side wall	4.0～7.0	No visual outburst
12	Fender relative to front door	2.8~4.8, P≤1.0, S≤1.0	-0.5 ~1.0, P≤1.0
13	Front wheel cover relative to front door guard	2.5~5.5, P≤1.5	-1.5～2.0
14	Front door window frame exterior trim relative to rear door window frame exterior trim	2.8~5.2, P≤1.2	-1.0～1.5
15	Lower front door relative to lower rear door	2.8~4.8, P≤1.0, S≤1.0	-0.5 ~1.0, P≤1.0
16	Front door guard relative to rear door guard	3.5~6.5, P≤1.5	-1.5～2.0
17	Rear door window frame relative to side wall	4.0～7.0	No visual outburst
18	Rear door lower guard relative to rear wheel arch	2.5~5.5, P≤1.5	-1.5～2.0
19	Rear door frame relative to rear triangle window	2.8~5.2, P≤1.2	-3.5～-1.0
20	Rear door relative to side wall	2.8~4.8, P≤1.0, S≤1.0	-0.5 ~1.0, P≤1.0
21	Tank cap relative to side wall	2.2~3.8, P≤0.8	-1.5 ~0.5, P≤1.0
22	Rear protection relative to side wall	0.0～1.0	-1.0～0.5

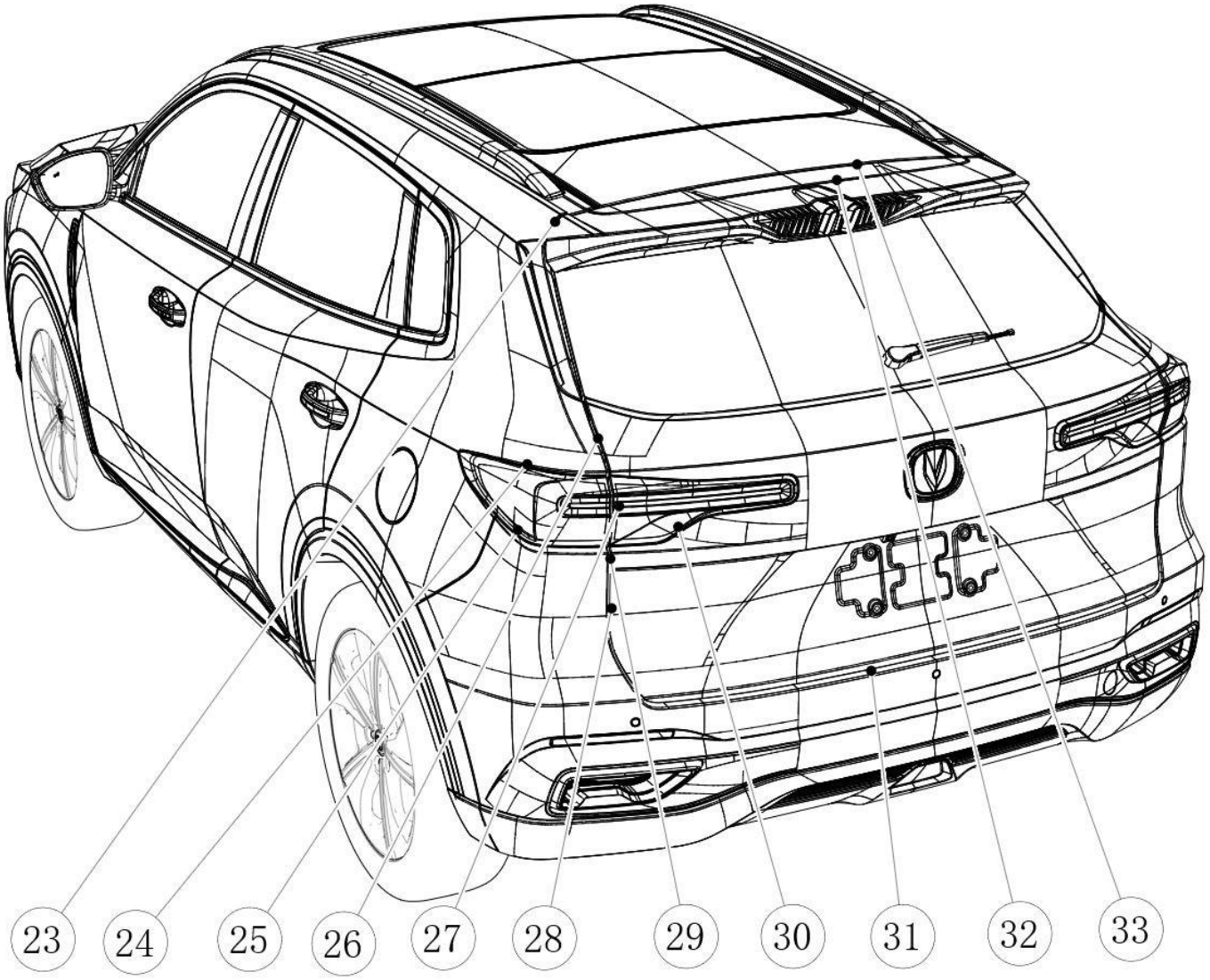


Figure 223:

Location	Detailed description	Permissible gap dimensions(Mm)	Allowable Segment Dimensions(Mm)
23	Spoiler relative to side wall	3.0~6.0, P≤1.5	-2.5 ~0.5, P≤1.5
24	Rear tail light A relative to side wall	0.3~2.7, P≤1.2	/
25	Rear tail light A relative to rear bumper	0.3~2.7, P≤1.2	/
26	Tailgate trim relative to side wall	2.5~5.5, P≤1.5, S≤1.5	-2.2 ~0.2, P≤1.2
27	Rear tail light B relative to rear tail light A	2.5~5.5, P≤1.5, S≤1.5	-2.5 ~0.5, P≤1.5
28	Tailgate relative to rear protection(Lower)	2.5~5.5, P≤1.5	-5.0--2.0, P≤1.5
29	Tailgate exterior trim relative to rear protection	2.5~5.5, P≤1.5	-3.5 ~0.5, P≤1.5
30	Rear taillight B relative to tailgate trim	0.3~2.7, P≤1.2	/
31	Tailgate relative to lower rear bumper	5.0~9.0, P≤2.0	/
32	Spoiler relative to tailgate	0.0～3.0	-2.5～0.5
33	Tailgate relative to top cover	5.0~8.0, P≤1.5	-2.0～0.0

Symbol Interpretation Operating Symbol A- Spot Welding

B-MIG Filling

C-MIG Butt welding

D-cut

E-

glue

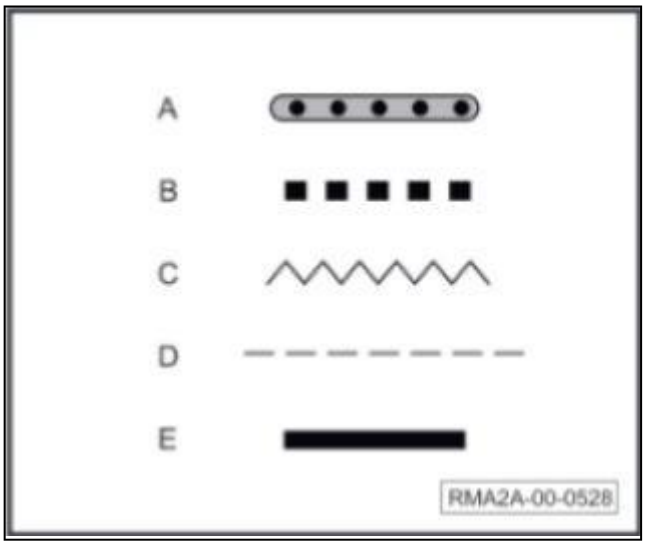
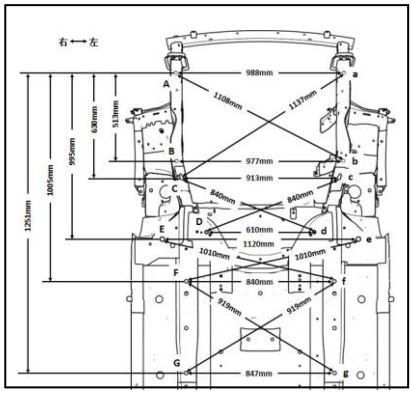


Figure 224:

Body Reference Dimensions

Nacelle Reference Dimensions



Tip:

The symbol in uppercase indicates the right side of the body and the match in lowercase indicates the left side of the body (looking forward from the rear of the vehicle).

Letter	Name	Aperture	Letter	Name	Aperture
A,a	Engine compartment side beam front section locating hole	φ20	E,e	Skid hole	φ26
B,b	Leak hole	φ20	F,f	Engine compartment side beam rear section front locating hole	φ20
C,c	Engine carrier front mounting stud	φ16	G,g	Engine compartment side beam rear section rear locating hole	φ20
D,d	Engine carrier rear mounting vias	φ18			

Floor Bottom Reference Dimensions

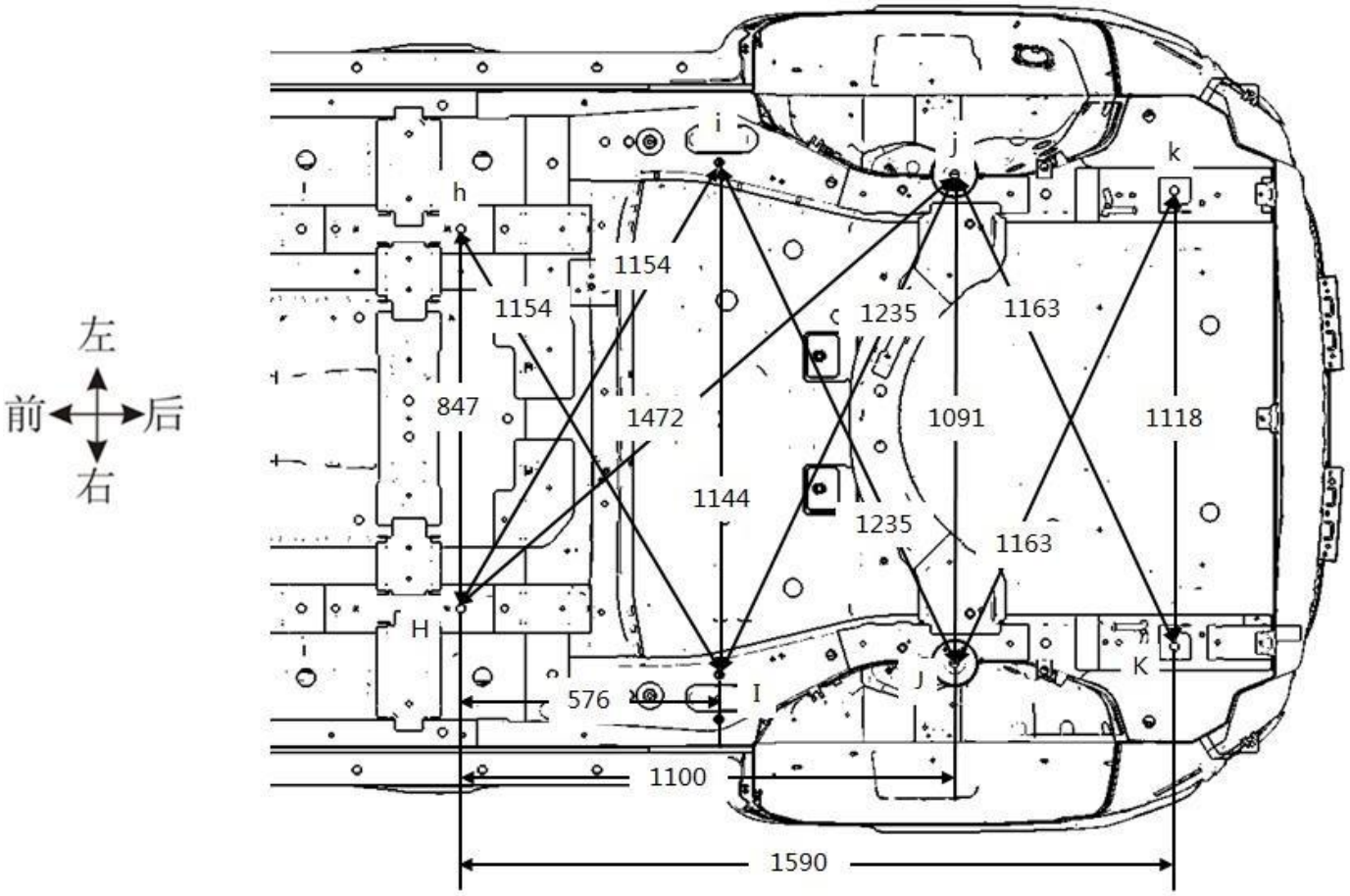


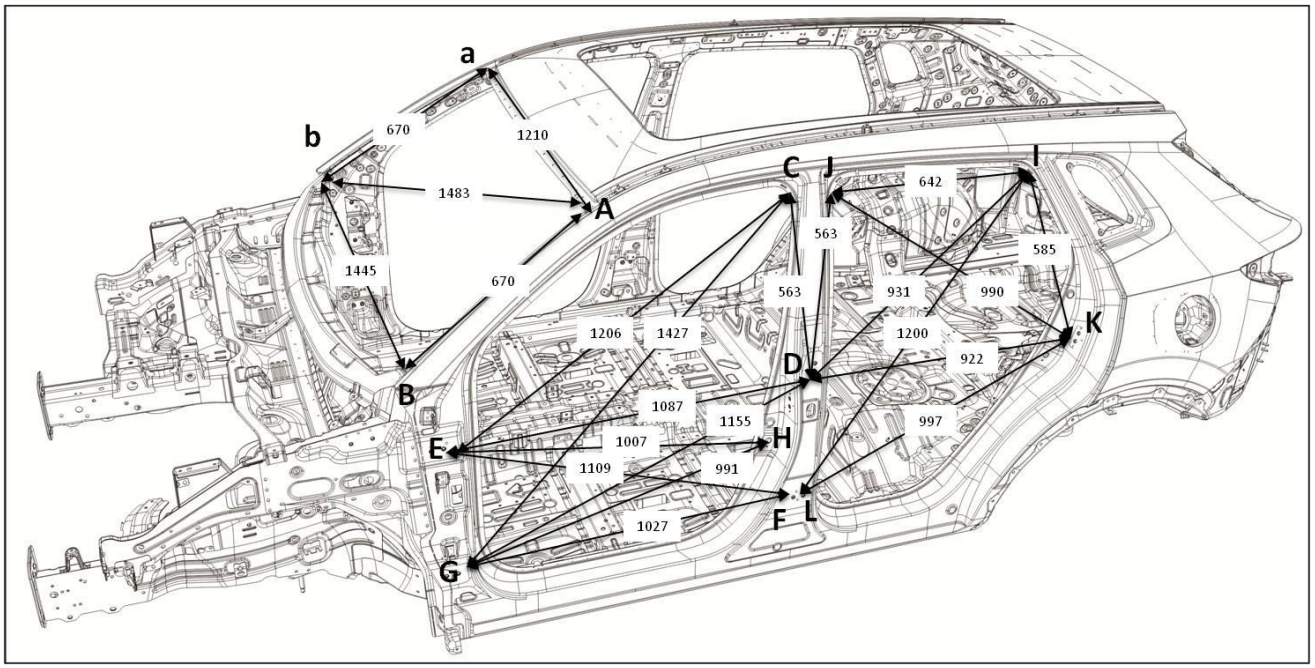
Figure 225:

Tip:

The symbol in uppercase indicates the right side of the body and the match in lowercase indicates the left side of the body (looking forward from the rear of the vehicle).

Letter	Name	Aperture	Letter	Name	Aperture
H,h	Front floor outer side rail process hole	φ20	J,j	Rear Chassis Spring Mounting Hole	φ20
I,i	Rear chassis trailing arm mounting hole	φ20	K,k	Rear reference hole	φ20

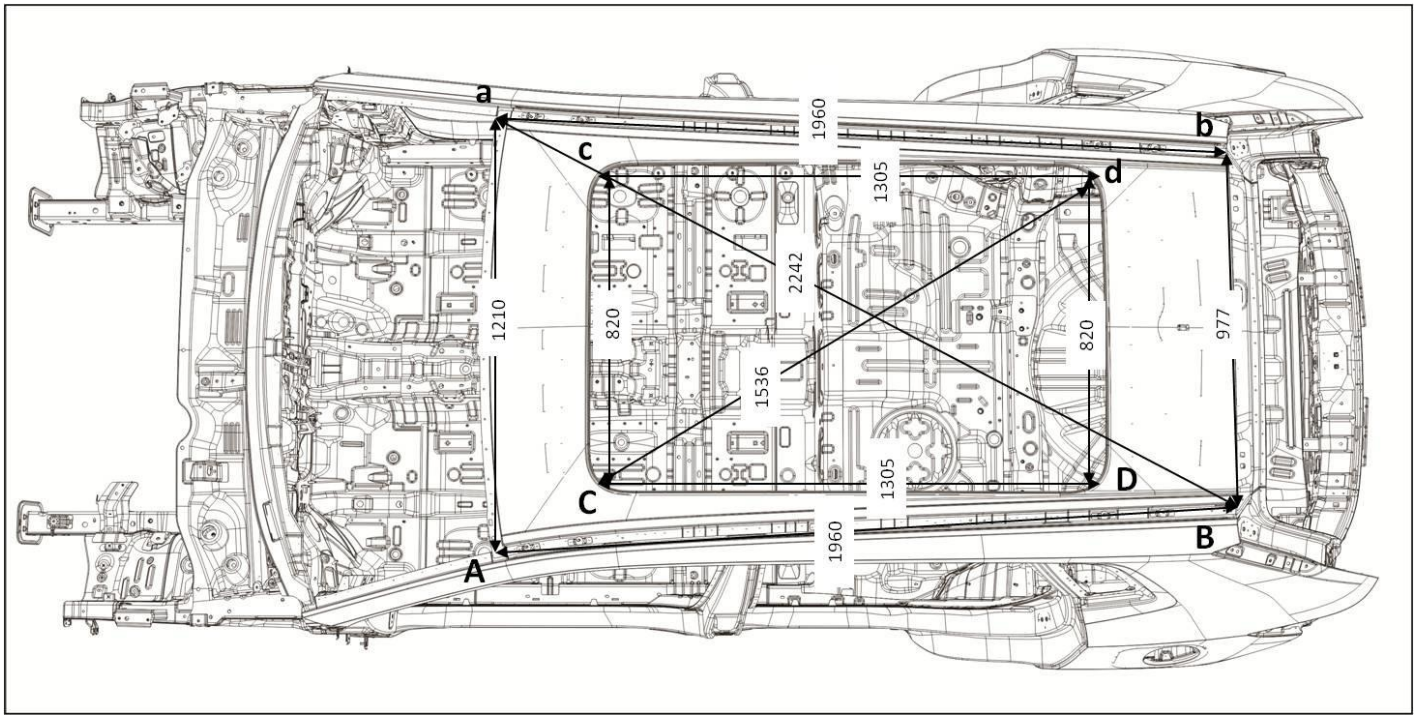
Central Reference Dimensions



Tip:

The symbol in uppercase indicates the left side of the body and the match in lowercase indicates the right side of the body (looking forward from the rear of the vehicle).

Letter	Name	Aperture
A,a	Top Cover Sheet Metal Top Angle	/
B,b	Intersection of heater pressure chamber plate and side wall sheet metal	/
C	Side wall front door top fillet welds	/
D	Rear door upper hinge lower mounting hole	φ13
E	Front door upper hinge rear mounting hole	φ13
F	Rear door lower hinge front mounting hole	φ13
G	Front door lower hinge rear mounting hole	φ13
H	Front door sensor via	φ20
I	Side wall rear door top fillet welds	/
J	Side wall rear door top fillet welds	/
K	Rear door lock pin lower mounting hole	φ13
L	Rear mounting hole for rear door lower hinge	φ13

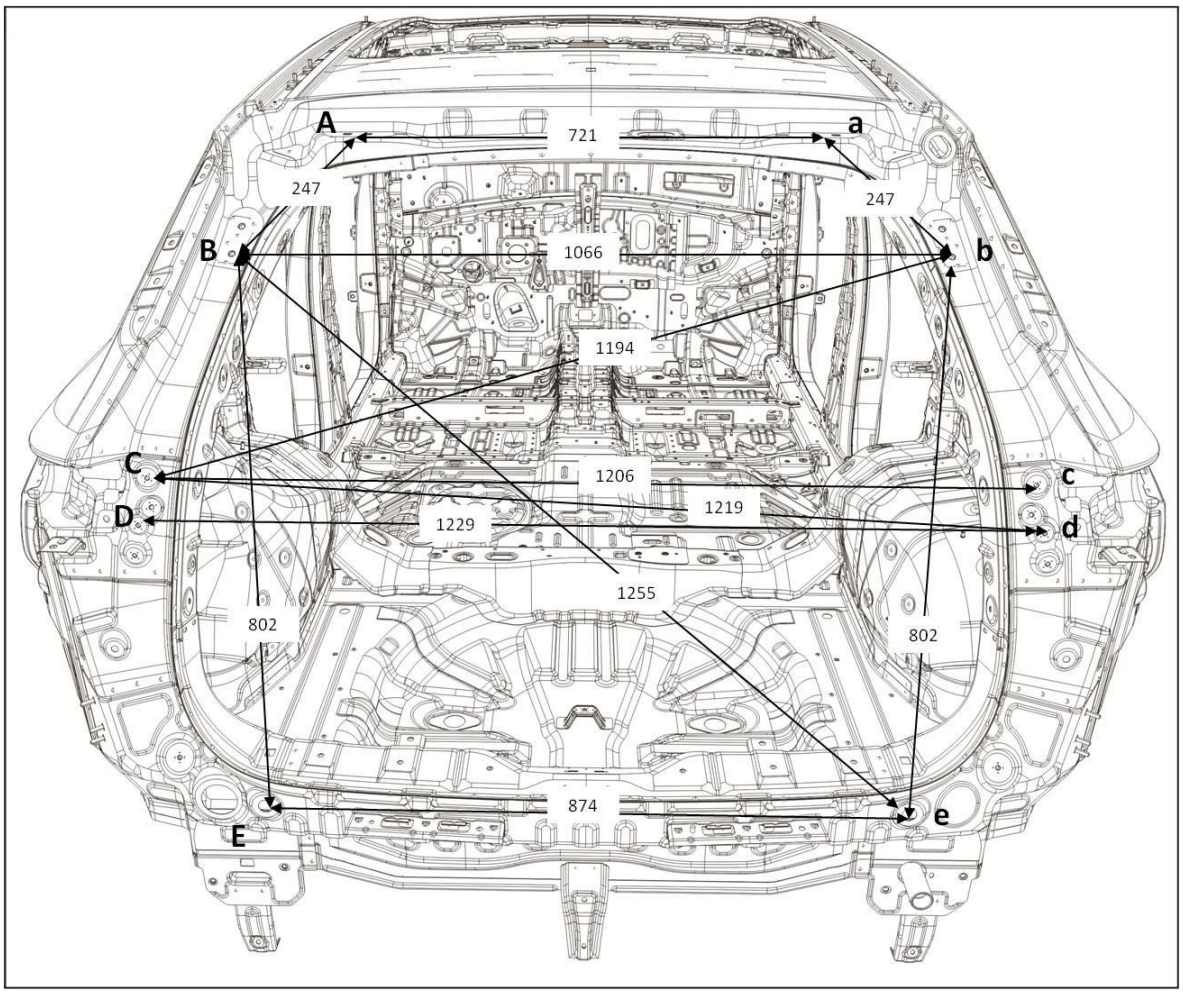

a
b
c
d
A
B
C
D
1960
1305
2242
1210
820
1536
820
977
1305
1960

Tip:

Symbols in uppercase letters refer to the left side of the body and symbols in lowercase letters refer to the right side of the body(Looking forward from the rear)

Letter	Name	Aperture
A,a	Top Cover Sheet Metal Top Angle	/
B,b	Top Cover Sheet Metal Top Angle	/
C,c	Roof corner	/
D,d	Roof corner	/

Rear Reference Dimensions



Tip:

The symbol in uppercase indicates the left side of the body and the match in lowercase indicates the right side of the body (looking forward from the rear of the vehicle).

Letter	Name	Aperture
A,a	Tailgate hinge mounting vias	12×12
B,b	Tailgate strut mounting vias	φ11
C,c	Tail light mounting hole	φ7
D,d	Tail light mounting hole	φ7
E,e	Tail apron locating hole	φ20

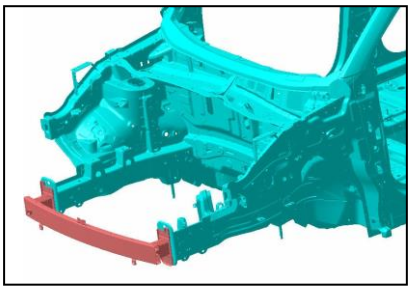
Front of body

Replace Front Impact Beam Assembly

Removing the original part

Warning

Vehicle protection safety measures



Tips

Measure the body alignment dimension

and check the connections for deformation.

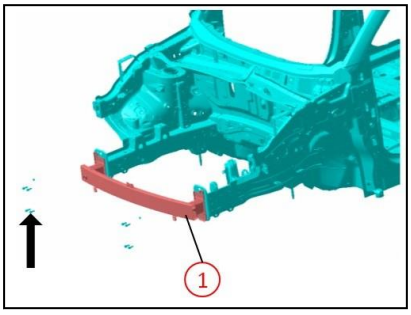
Use a measuring tool such as a telescopic

ruler.

Removing the original part

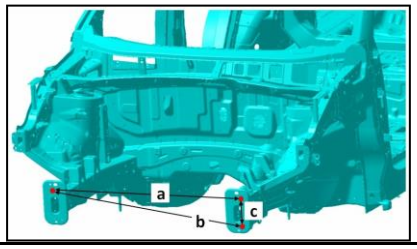
1. Use an adjustable wrench to unscrew the fixing bolts and nuts indicated by arrows in the figure below.

2. Take out the front anti-collision beam assembly.



Replacement preparation

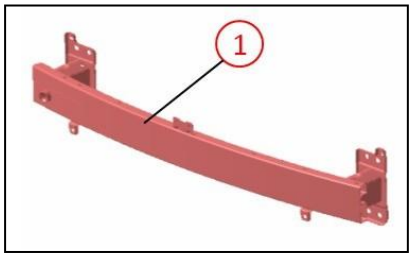
1. Measure the dimension value according to the following figure, and re-measure whether the installation position dimension is normal. If it is not normal, it needs to be treated differently.



Symbols	Length(Mm)
a	1020

b	1031
c	148

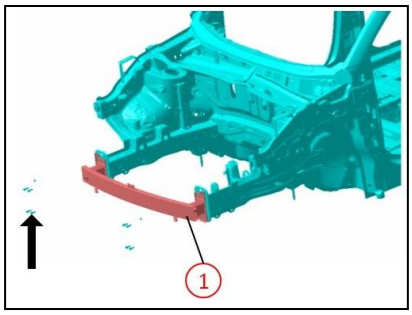
2. Prepare new items.



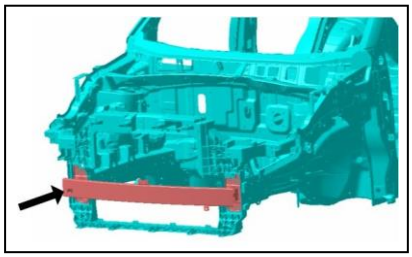
Installation

1. Install the front anti-collision beam assembly.

2. Tighten the fixing bolts and nuts indicated by the arrows in the figure below.



3. Apply anti-rust agent in the nut pipe hole indicated by arrow.



Replace pedestrian protection beam assembly

Warning

Safety Precautions => See Accident Vehicle Maintenance Operations-Vehicle Protection/Safety Protection

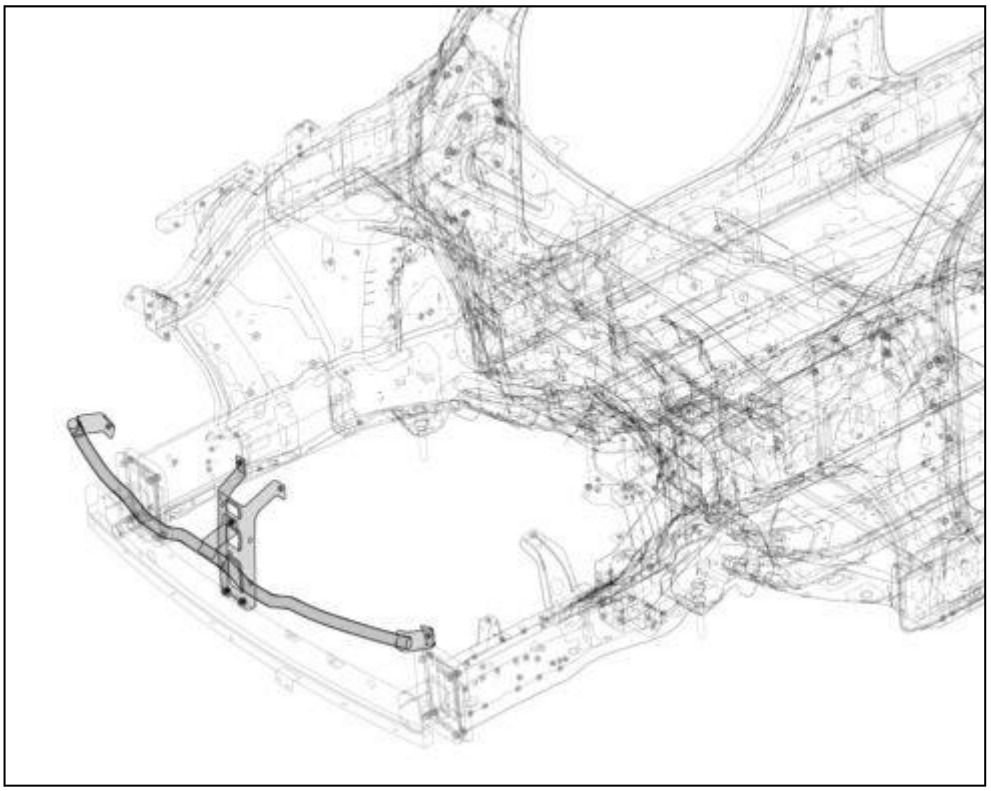


Figure 226:

Tips

Measure the body alignment dimension and check the connections for deformation.

Use a suitable testing tool.

Removing the original part

Unscrew the fixing bolt - arrow -.

Remove the pedestrian protection beam assembly.

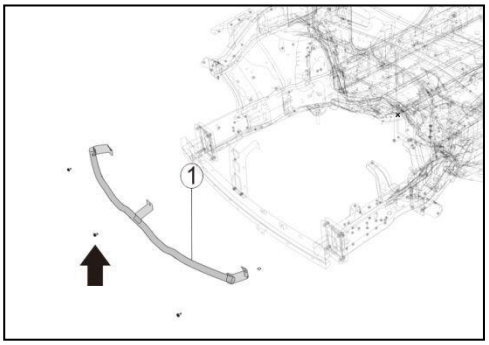


Figure 227:

Prepare new parts

Prepare new parts.

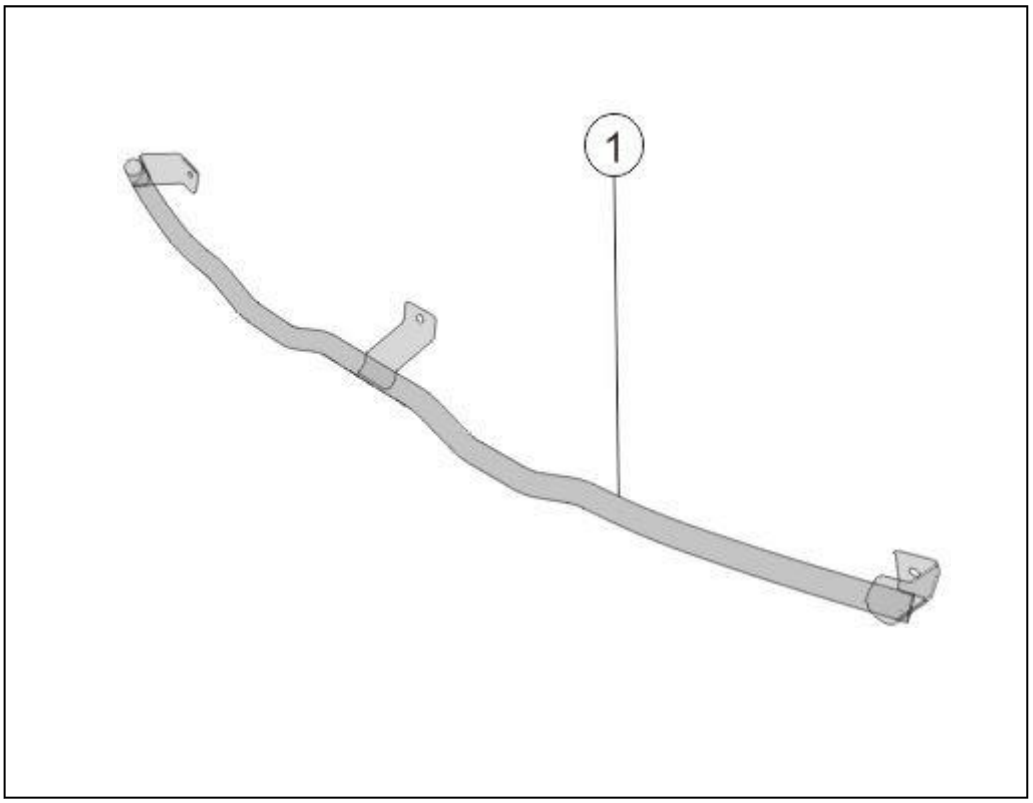
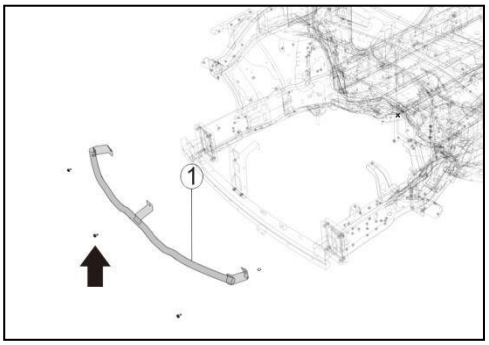


Figure 228:

Mounting components

Install the front impact

beam assembly.



Tighten the retaining

bolt - arrow -.

Figure 229:

Apply rust inhibitor in hole - arrow -.

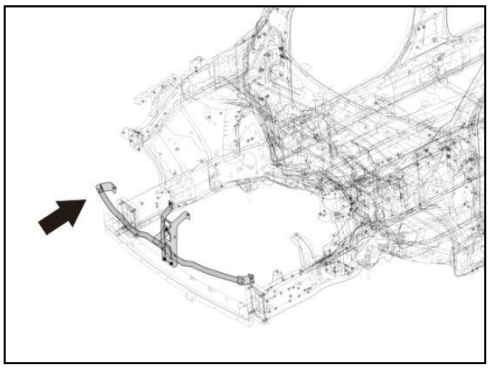


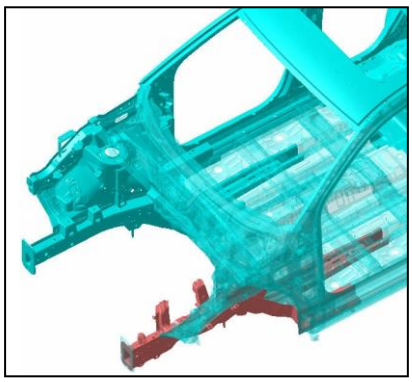
Figure 230:

Replace the engine compartment side beam welding sub-assembly

Removing the original part

Warning

Safety Precautions => See Accident Vehicle Maintenance Operation Specification-Vehicle Protection/Safety Measures



Tips

Measure the body alignment dimension

and check the connections for deformation.

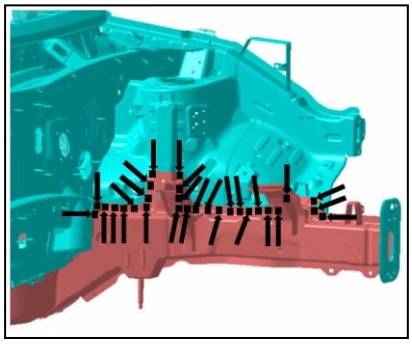
Use inspection tools such as telescopic

rulers.

Removing the original part

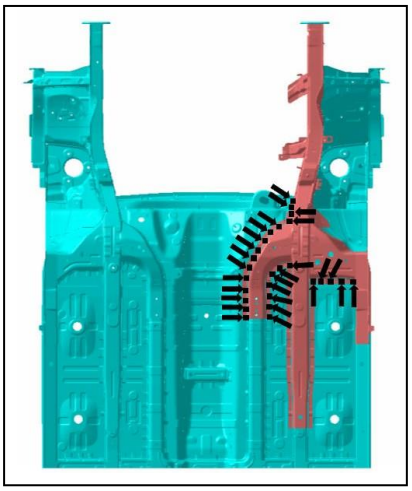
1. Use the scraper to remove the foreign matter in the welding area of the engine compartment edge beam welding sub-assembly and expose the welding spot.

2. Use pneumatic drill to drill the exposed welding points, as shown in the figure below.



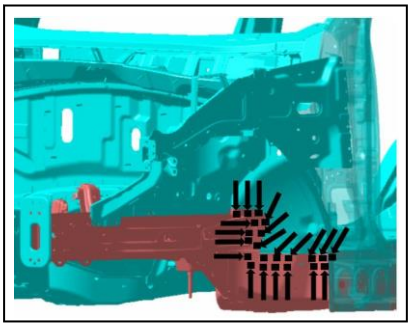
3. Disconnect the welds with a chisel and hammer to separate the front rail assembly from the front wheel bulge assembly.

4. Use pneumatic drill to drill the exposed welding points, as shown in the figure below.



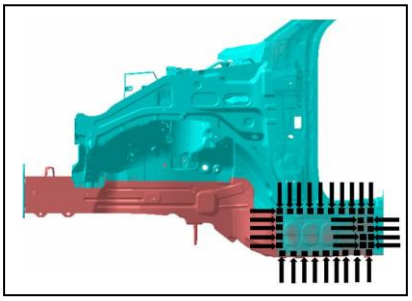
5. Use a chisel and hammer to separate the front rail assembly from the front panel and front floor.

6. Use pneumatic drill to drill the exposed welding points, as shown in the figure below.



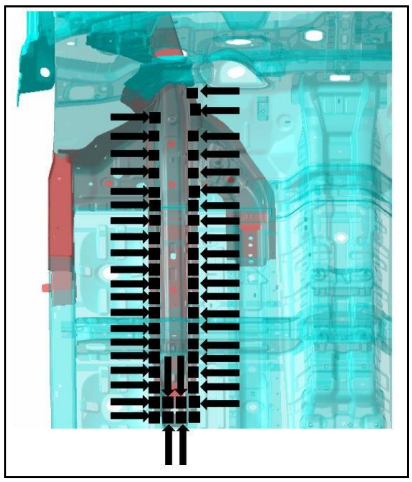
7. Use a chisel and hammer to remove the welds to separate the front rail assembly from the front wall panel.

8. Use pneumatic drill to drill the exposed welding points, as shown in the figure below.



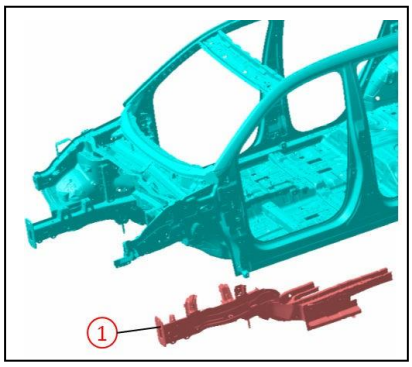
9. Disconnect the welds with a chisel and hammer to separate the front rail assembly from the side wall.

10. Use a pneumatic drill to drill out exposed welds, as shown in the figure below.



11. Use a chisel and hammer to separate the front rail assembly from the front panel and front floor.

12. Remove the engine compartment edge beam welding sub-assembly.



Replacement Preparation

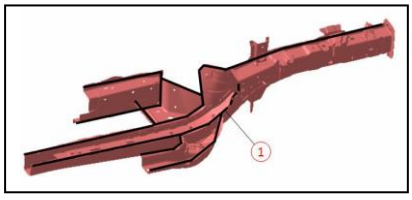
1. Remove the welding slag in the body welding area.

2. Clean the anti-corrosion coating in the work area and body connection area.

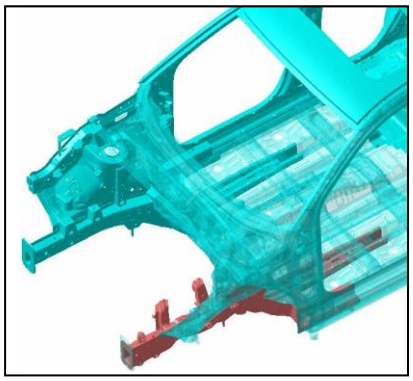
3. Apply the penetration primer to the body welding area.

4. Remove the anti-corrosion coating on the inner and outer edges of the new part.

5. Apply penetration primer on the welding position of new parts. See the figure below for details.



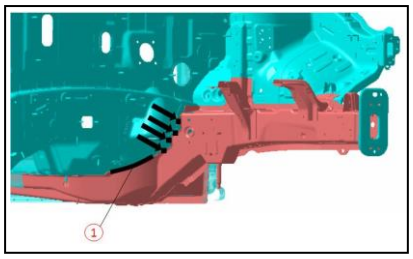
6. Use the self-locking clip to correctly install the new parts on the vehicle, as shown in the figure below.



7. Install the front subframe to ensure that the engine compartment edge beam welding sub-assembly is in the correct installation position.

Welding

1. Use resistance spot welding machine to weld the following area (1), see the following figure for details.



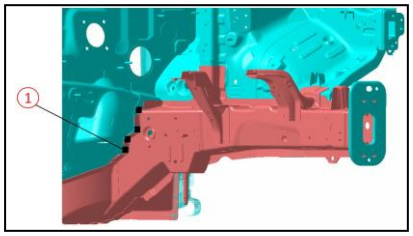
2. Use MIG welder to weld the area indicated by arrow above.

3. Remove welding slag and clean the working area.

4. Carry out rust prevention treatment on the new welding area.

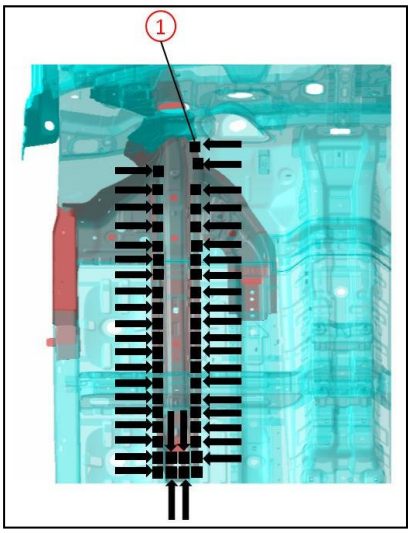
5. Seal the seam between the component and the vehicle with sealant.

6. Apply finger pressing glue on the gap between the sheet metal, and see the area (1) in the figure below for the position.



7. The size of glue coating area shall be controlled according to the gap size, subject to failure to fall under various vehicle conditions.

8. Use resistance spot welding machine to weld the area (1) shown in the figure below, see the figure below for details.

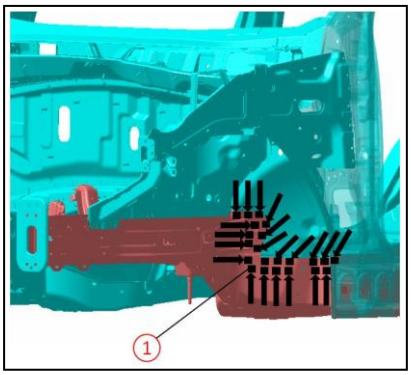


9. Remove welding slag and clean the working area.

10. Rustproof the new welding area.

11. Seal the seam between the component and the vehicle with sealant.

12. Use resistance spot welding machine to weld the area (1) shown in the figure. See the figure below for details.

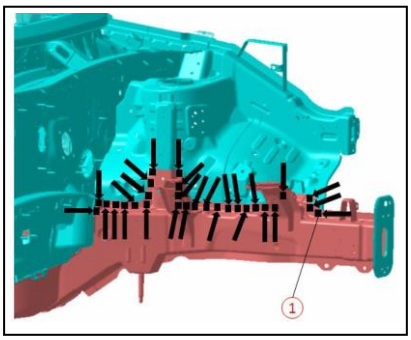


13. Remove welding slag and clean the work area.

14. Rustproof the new welding area.

15. Seal the seam between the component and the vehicle with sealant.

16. Use resistance spot welding machine to weld the area (1) shown in the figure. See the figure below for details.

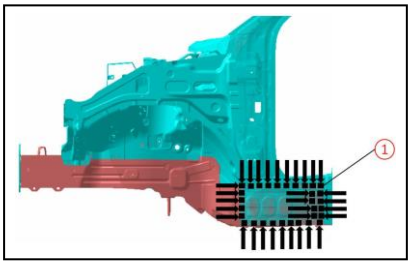


17. Remove welding slag and clean the working area.

18. Rustproof the new welding area.

19. Seal the seam between the component and the vehicle with sealant.

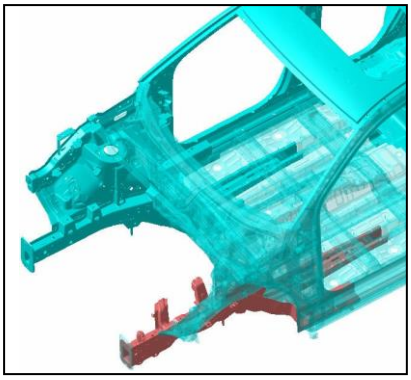
20. Use resistance spot welding machine to weld the area (1) shown in the figure. See the figure below for details.



21. Apply finger pressing glue on the gap between the sheet metal, and see the area (1) in the above figure for the position.

22. The size of glue coating area shall be controlled according to the gap size, subject to failure to fall under various vehicle conditions. Rustproof the new welding area.

23. After the welding is completed, spray the external surface topcoat.

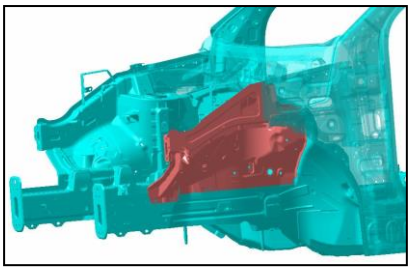


Replace front wheel drum weld assembly

Removing the original part

Warning

Safety Precautions => See Accident Vehicle Maintenance Operation Specification-Vehicle Protection/Safety Measures



Tips

Measure the body alignment dimension

and check the connections for deformation.

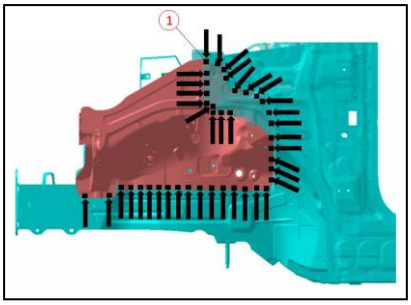
Use a measuring tool such as a telescopic

ruler.

Removing the original part

1. Clean the foreign matter in the front wheel drum weld assembly area with a spade tool to expose the welding spot.

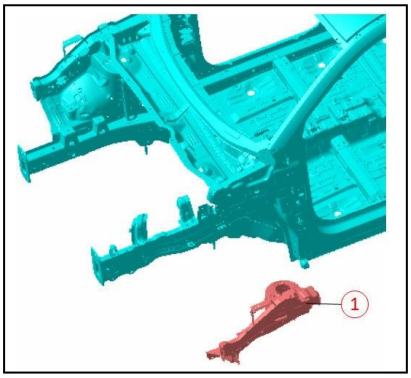
2. Use a pneumatic drill to drill the exposed welding points. See the figure below for details.



3. Use a chisel and hammer to remove the welds.

4. Use an adjustable wrench to remove the front frame mounting bolts.

5. Remove the front wheel bulge assembly.



Replacement Preparation

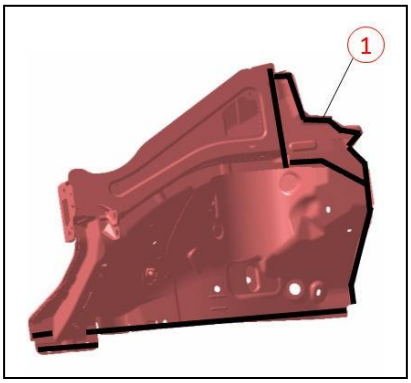
1. Remove the welding slag in the body welding area.

2. Clean the anti-corrosion coating in the work area and body connection area.

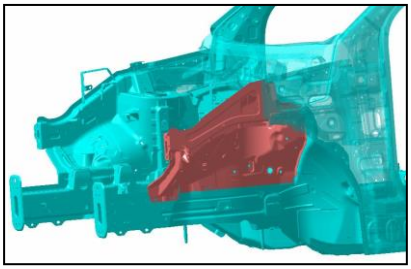
3. Apply the penetration primer to the body welding area.

4. Remove the anti-corrosion coating on the inner and outer edges of the new part.

5. Apply penetration primer on the welding position of new parts. See the figure below for details.

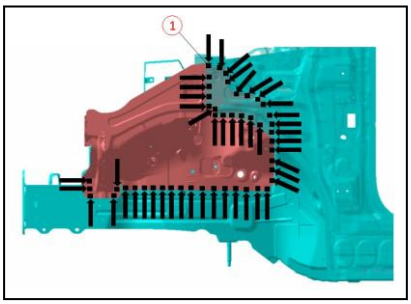


6. Install new parts and correctly install the front rail assembly to the vehicle with self-locking clips, as shown in the figure below.



Welding

1. Use resistance spot welding machine and gas shielded welding machine to weld the area (1) shown in the figure. See the figure below for details.

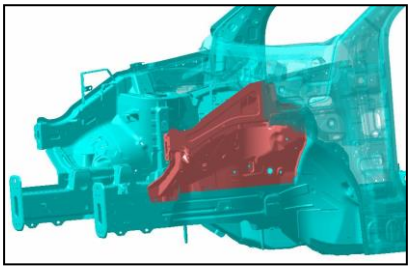


2. Remove welding slag and clean the working area.

3. Carry out rust prevention treatment on the new welding area.

4. Seal the seam between the component and the vehicle with sealant.

5. After the welding is completed, spray the external surface topcoat.



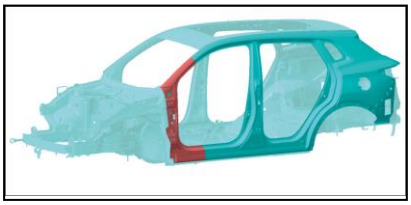
Middle of body

Replace A-pillar side wall outer panel

Removing the original part

Warning

Vehicle protection safety measures



Tips

- Measure the body alignment dimension and check the connection for deformation.

- Use detection tools such as

telescopic rulers. Removing

the original part

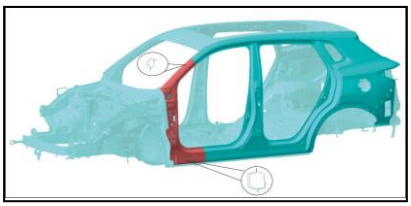
Use a small shovel to remove the sill PVC adhesive layer.

Cut along the illustration to remove

cut edges. Tips

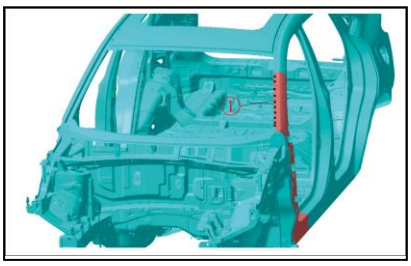
- The operator can adjust the position and depth of the cut by referring to the cross-section of the critical area.

- Damage to internal stiffeners is not allowed.



Clean the welding area and expose the welding points.

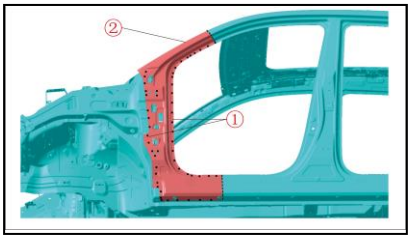
Drill out exposed welds (1)



Clean the welding area and expose the welding points.

Drill out exposed welds (1)

Use a chisel and hammer to remove the welding points and remove the A-pillar side wall outer panel.

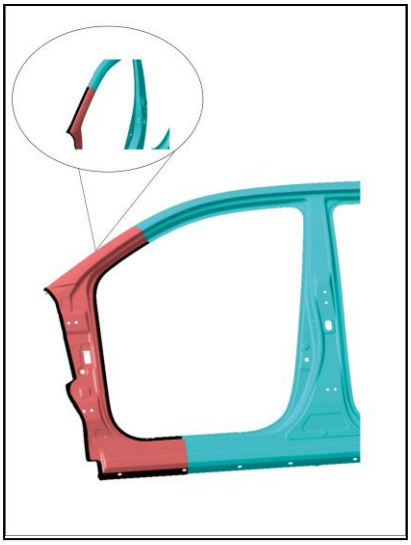


Preparing new parts

Cut the A-pillar side wall outer panel on the bench with enough cross-section to add new parts.

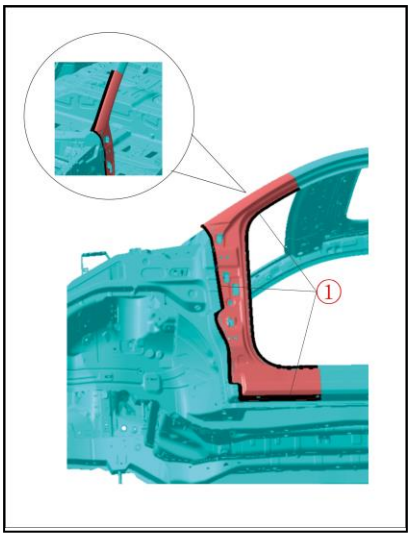
Remove the anticorrosive coating from the new A-Pillar Side Shroud outer panel cutter welds.

Apply penetration primer to the new part welds.



Clean the welding slag in the work area and remove the anti-corrosion coating in the body connection area.

Apply penetration primer in area 1.

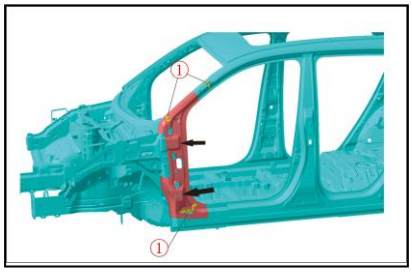


Apply a full weld primer to the front door upper and lower hinge mounting holes at the side wall outer panel mating - arrow - areas.

Dimensions: 30mmX60mm.

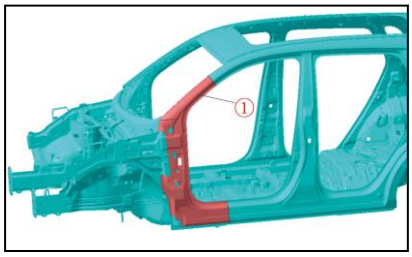
Apply continuously and evenly to the joint.

Apply expansion glue to the joint area (1) between the reinforcement and the outer panel of side wall on column A.



Fix the new A-pillar side wall outer panel (1) to the vehicle with self-locking clips.

Install the front door and correct the installation position of the A-pillar side wall outer panel.

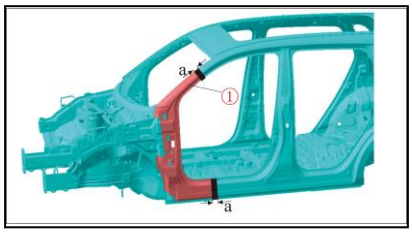


Welding

Install the A-pillar side wall outer panel (1) onto the vehicle and fix it with self-locking clip.

Check that the components overlap the vehicle bead, a: Approx. 50 mm.

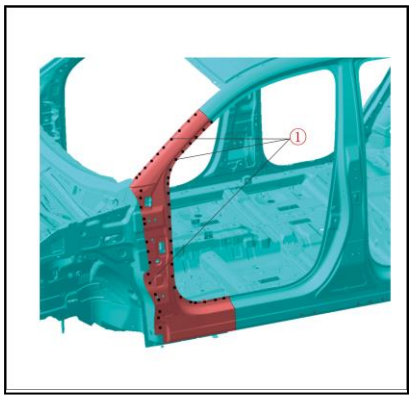
Cut the edges of the sheet metal to remove excess and create an ideal weld gap.



Use spot welding to weld the connection area (1)

Level weld and remove weld slag.

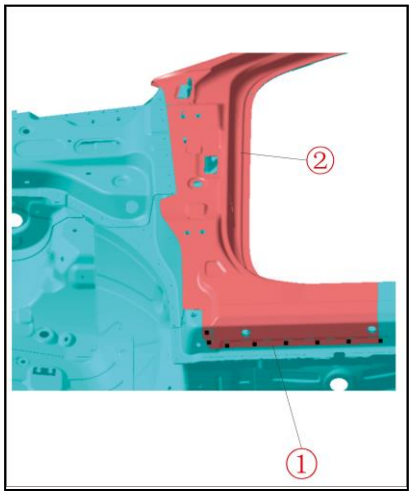
Rust-proof treatment at the new welding area.



Use spot welding to weld the connection area (1)

Level weld and remove weld slag.

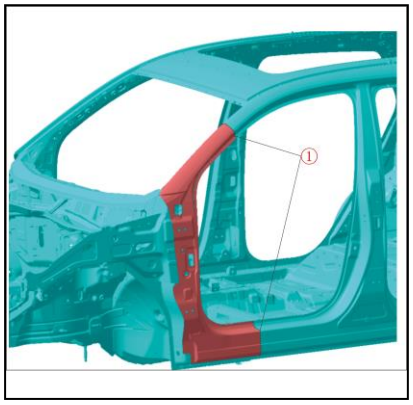
Perform anti-rust treatment on the new welding area of A-pillar side wall outer panel (2).



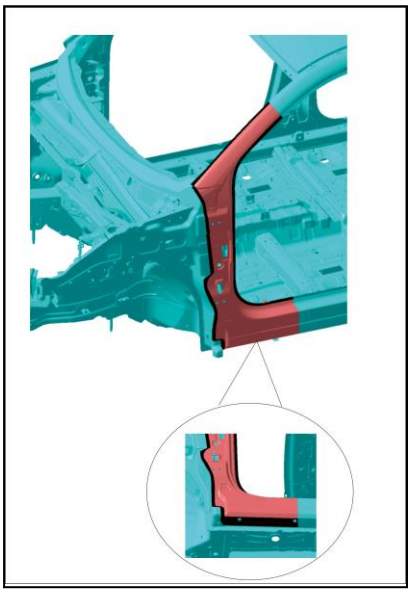
Use MIG welder to weld joint gap (1).

Level weld and remove weld slag.

Rust-proof treatment at the new welding area.



Seal the seam between the component and the vehicle with sealant.

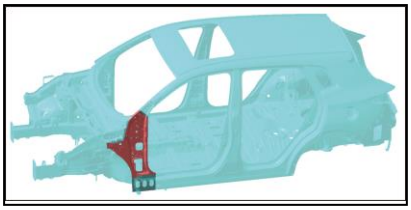


Replace A-Pillar Inner Panel Assembly

Removing the original part

Warning

Vehicle protection safety measures



Tips

- Measure the body alignment dimension and check the connection for deformation.

- Use a measuring tool such

as a telescopic ruler.

Removing the original part

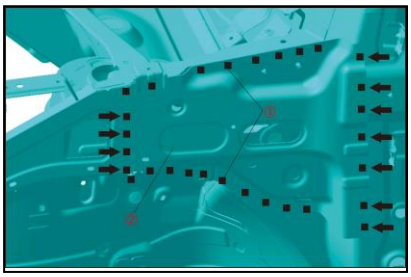
Remove the A-pillar side wall outer panel.

Clean the welding area and expose the welding points.

Drill out exposed welds.

Use a grinder to grind the - arrow - pointed raised solder joints.

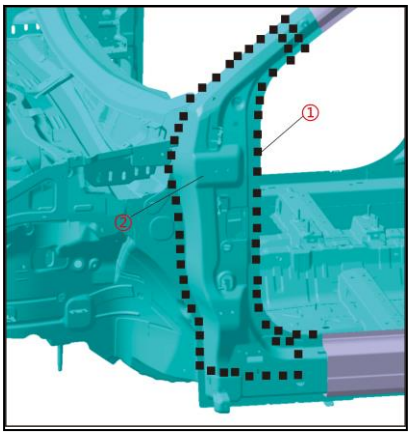
Use a chisel and a hammer to remove the welding points and remove the side wall front connecting plate (2).



Clean the welding area and expose the welding points.

Use a pneumatic drill to drill the weld points (1) shown.

Use a chisel and hammer to disassemble the welding point and remove the reinforcement (2) on pillar A.

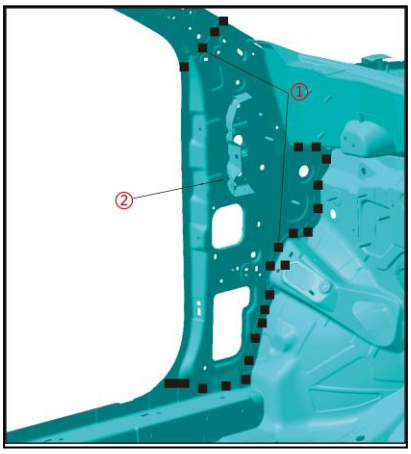


Clean the welding area and expose the welding points.

Use a pneumatic drill to drill the weld points (1) shown.

Use a grinder to grind the - arrow - pointed raised solder joints.

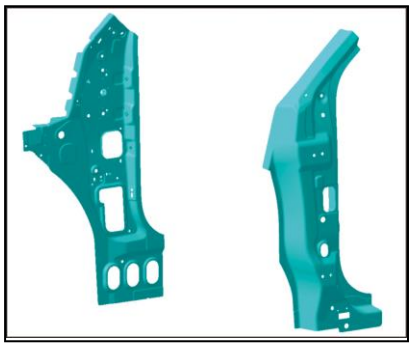
Use a chisel and a hammer to dismantle the welding points and dismantle the lower inner panel assembly of pillar A (2).



Preparing new parts

Remove the anticorrosive coating around the inner and outer edges of the new part.

Apply corrosion protection to cut edges and apply penetration primer to new part welds.

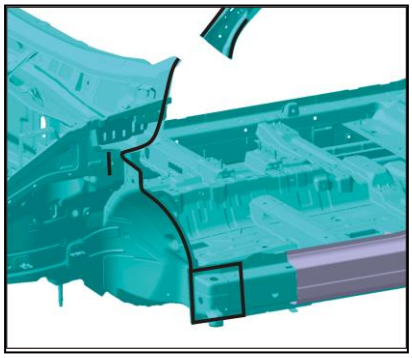


Clean the welding slag in the work area and remove the anti-corrosion coating in the body connection area.

Fix the new A-pillar lower inner panel assembly (1) to the body with self-locking clips.

Correct installation position.

Apply full weld primer alignment at the connection area.

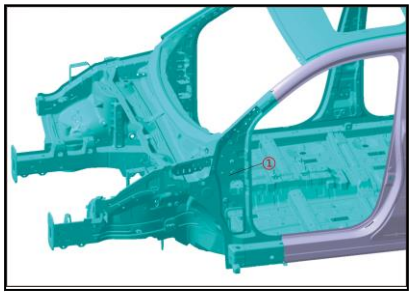


Welding

Fix the A-pillar lower inner panel assembly (1) to the body and fix it with self-locking clips.

Spot weld the connection area (1) as shown.

Rust-proof treatment at the new welding area.



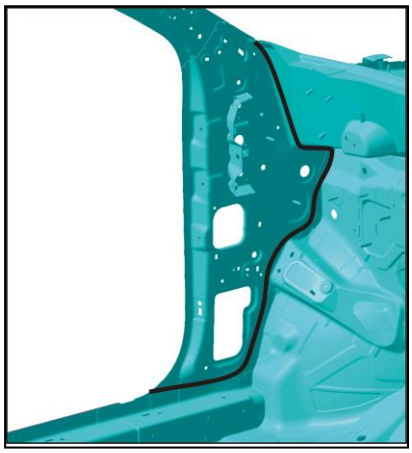
Seal the seam between the component and the vehicle with sealant.

Install the A-pillar lower reinforcement (2) plate to the vehicle with self-locking clips.

Spot weld the connection area (1) as shown.

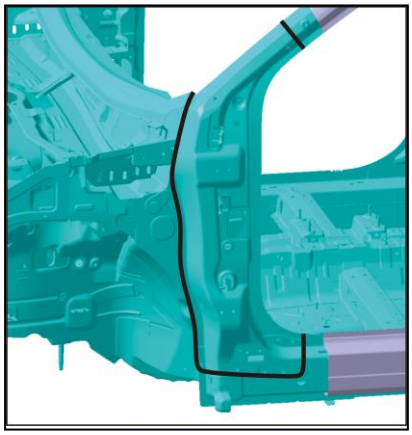
Remove solder residue.

Rust-proof treatment at the new welding area.



Seal the seam between the component and the vehicle with sealant.

Spray exterior finish.

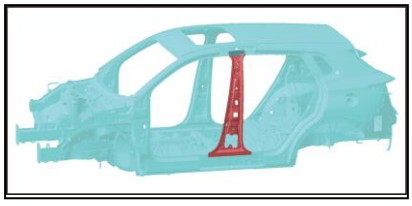


Replace B-Pillar Inner Panel Assembly

Removing the original part

Warning

Vehicle protection safety measures



Tips

- Measure the body alignment dimension and check the connection for deformation.

- Use detection tools such as

telescopic rulers. Removing

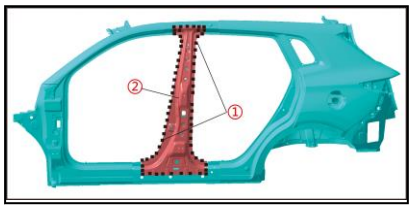
the original part

Remove the B-pillar side wall outer panel.

Clean the welding area and expose the welding points.

Use a pneumatic drill to drill the weld points (1) shown.

Use a chisel and hammer to remove the welding points and remove the B-pillar reinforcement.

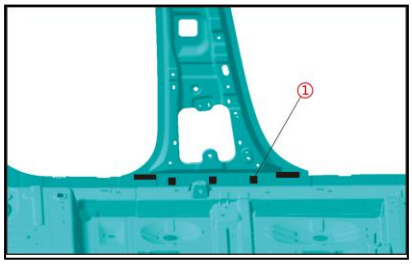


Clean the welding area and expose the welding points.

Use a pneumatic drill to drill the weld points (1) shown.

Use a grinder to grind the solder joints in area 2.

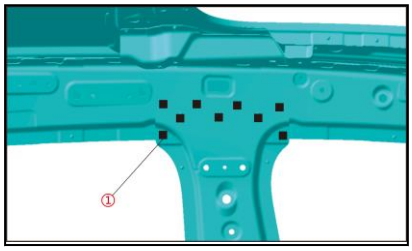
Use a chisel and hammer to disengage the welds to separate the B Pillar Inner Panel Welding Assembly from the Sill Side Girder.



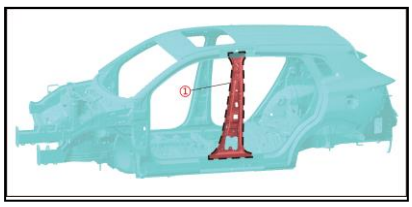
Clean the welding area and expose the welding points.

Use a pneumatic drill to drill the weld points (1) shown.

Separate the welds with a chisel and hammer to separate the B Pillar Inner Panel Welding Assembly from the B Pillar Inner Panel Upper Edge Beam.



Use a chisel and hammer to dismantle the welding points, and dismantle the welding assembly of B pillar inner panel.



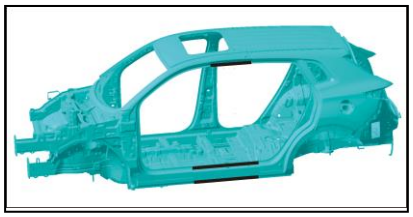
Preparing new parts

Remove the anticorrosive coating around the inner and outer edges of the new part.

Apply penetration primer to the new part welds.

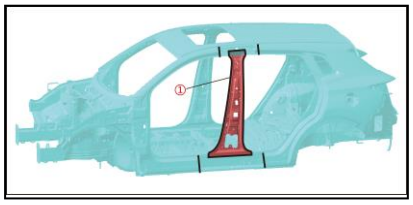
Clean the welding slag in the work area and remove the anti-corrosion coating in the body connection area.

Apply penetration primer at the work area.



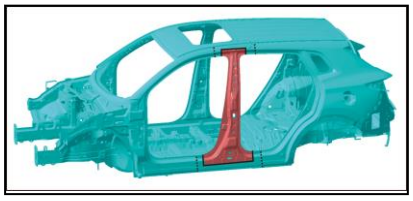
Correctly install B-pillar inner panel welding assembly (1) and fix it with self-locking clip.

Apply penetration primer at the welding area.



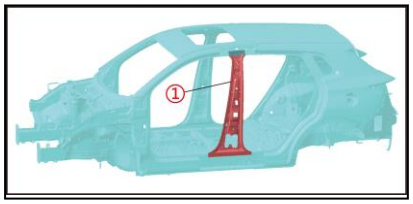
Clean the welding slag in the work area and remove the anti-corrosion coating in the body connection area.

Apply penetration primer at the work area.



Welding

Install the B pillar inner panel welding assembly (1) to the body correctly and fix it with self-locking clip.

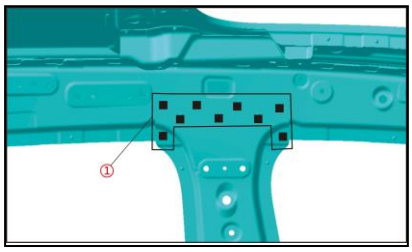


Weld the connection area (1) with a resistance spot welder.

Remove the welding slag and clean the work area.

Apply rust preventative to the new welding area.

Seal the seam between the component and the vehicle with sealant.



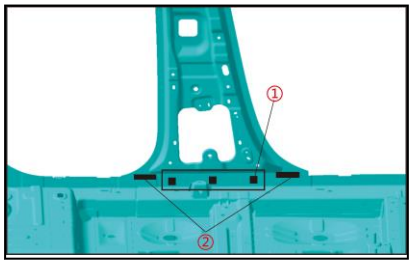
Weld the connection area (1) with a resistance spot welder.

Use a MIG welder to weld the connection area ().

Remove the welding slag and clean the work area.

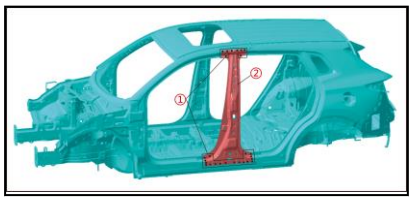
Apply rust preventative to the new welding area.

Seal the seam between the component and the vehicle with sealant.



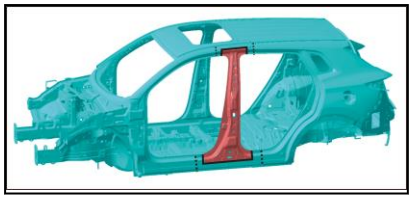
Install B pillar reinforcement (2) to the vehicle and fix it with self-locking clip.

Weld the connection area with a resistance spot welder.



Seal the seam between the component and the vehicle with sealant.

Paint the exterior finish.

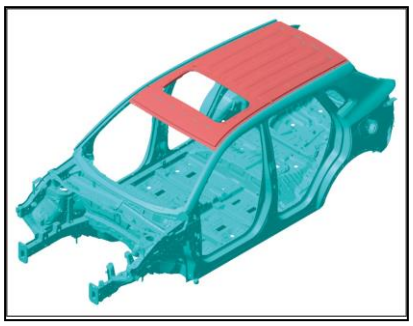


Replace top cover

Removing the original part

Warning

Vehicle protection safety measures



Tip:

- Measure the body alignment dimension and check the connection for deformation.

- Use detection tools such as

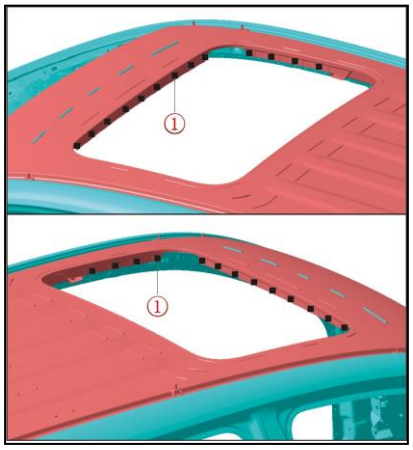
telescopic rulers. Removing

the original part

Clean the welding area and expose the welding points.

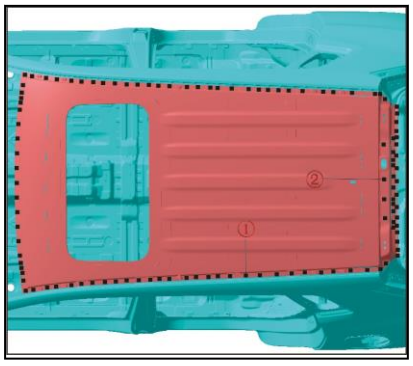
Use a rechargeable torch drill to drill the weld points (1) shown.

Using a chisel and hammer, separate the top cover from the sunroof reinforcement ring assembly.



Remove the topcoat around the bead of the top cover to expose the solder joints.

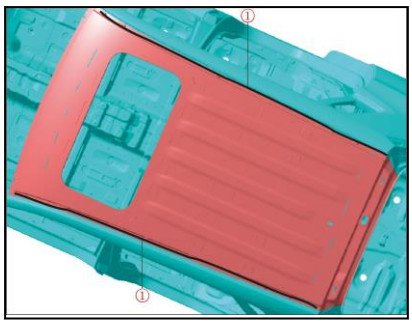
Use a rechargeable torch drill to drill the weld points (1) shown. Remove the solder joint with chisel and hammer, and remove the top cover (2).



Preparing new parts

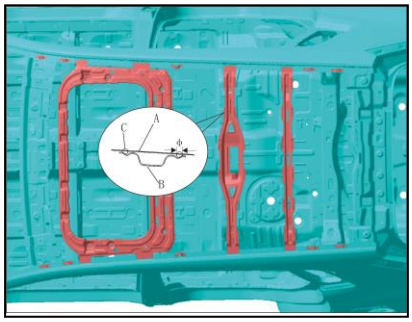
Remove the corrosion protection around the inner and outer edges of the new part.

Apply penetration primer to welding area (1).



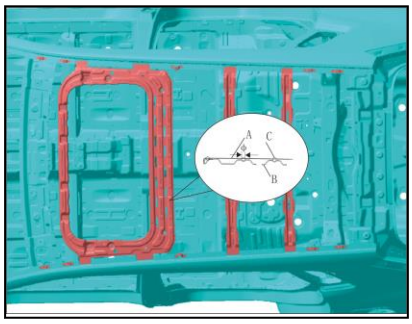
For vehicles without sunroof: Apply damping glue between roof cover and roof panel cross member; Dimensions: Φ=6 mm, full glue bath.

A - Top cover B - Top cover beam C - Shock Absorber



For models equipped with sunroof: Apply damping glue between roof cover and roof beam and sunroof reinforcement ring assembly; Dimensions: Φ=6 mm— full glue bath.

A - Top cover B - Top cover beam C - Shock Absorber



Welding tips:

- Check the windshield diagonal

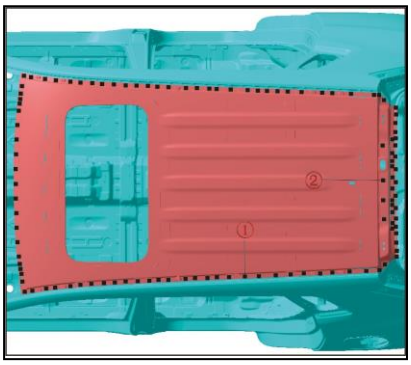
before welding. 1.Use the self-

locking clip to correctly assemble

the top cover (2).

Check correction and edges and edges.

Use a spot welder to weld the top cover to the windshield area, the hatchdoor area, and the left and right side wall outer panel connection area.

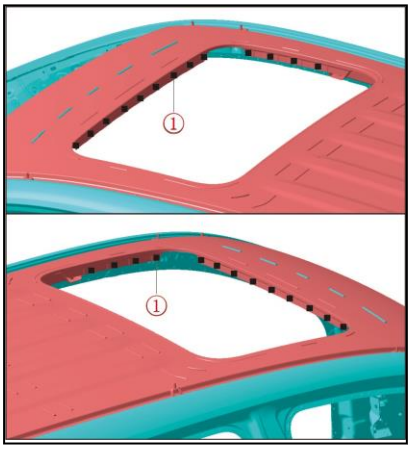


Use a spot welder to weld the roof and sunroof reinforcement ring assembly area (1).

Apply rust preventative to the new welding area.

Apply sealant between the top cover outer panel and the sunroof reinforcement ring assembly.

Spray exterior finish.

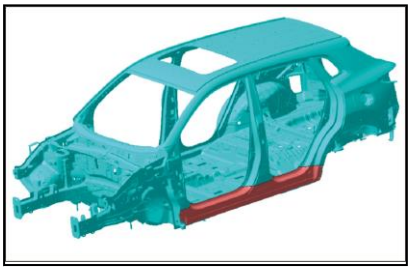


Replace lower side wall outer panel

Removing the original part

Warning

Vehicle protection safety measures



Tips

- Measure the body alignment dimension and check the connection for deformation.

- Use a telescopic ruler as a testing tool.

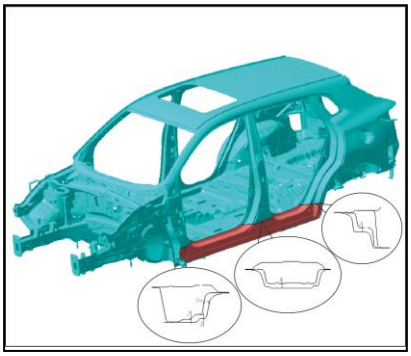
Removing the original part

Cut along the cut line shown to remove

cut edges. Tips

- The operator can adjust the position and depth of the cut by referring to the cross-section of the critical area.

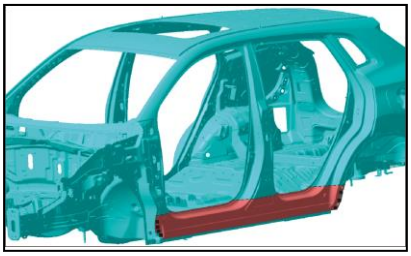
- Damage to internal reinforcement is not allowed.



Remove the sealant material from the sill to expose the welds.

Use a rechargeable torch drill to drill the weld points shown.

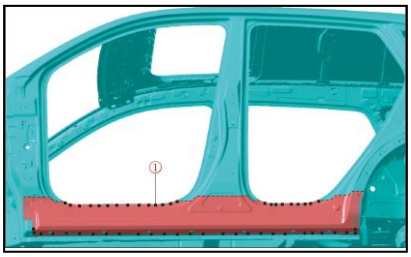
Remove the solder joint with a chisel and hammer.



Remove the sealant material from the sill to expose the welds.

Use a suitable tool to drill out the welding points (1) shown.

Remove the solder joint with a chisel and hammer and remove the lower side wall outer panel.

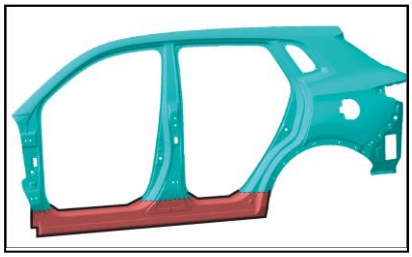


Preparing new parts

Cut the side wall outer panel on the table, leaving a cross-section wide enough to add new parts.

Remove the anticorrosive coating on the edge of the side wall outer panel.

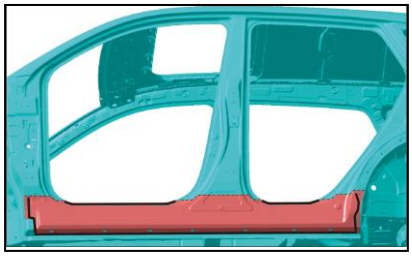
Apply a full weld primer to the side wall outer panel weld.



Welding

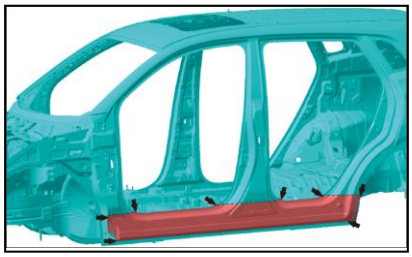
Clean the welding slag in the work area and remove the anti-corrosion coating in the body connection area.

Apply penetration primer at the work area.



Use a self-locking clip to secure the new side wall outer panel cutters to the belt body.

Correct installation position.

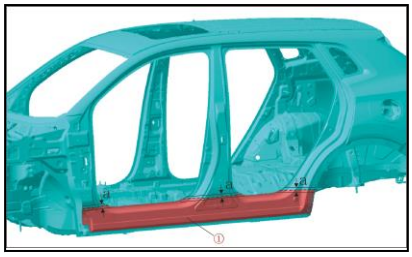


Install the lower side wall outer panel (1) to the vehicle and fix it with self-locking clips.

Check corrective condition and welds around edges.

Check that the components overlap the vehicle bead, approximately a:50 mm.

Cut the edges of the sheet metal to remove excess and create an ideal weld gap.

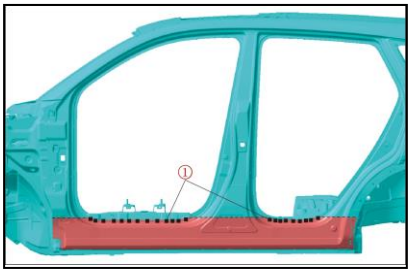


Use a spot welder to weld the area (1) shown.

Level the welding surface and clear the solder joints.

Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.

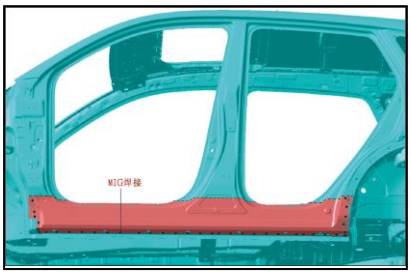


Use MIG welder to weld the lap edge of the side wall outer panel and the sill outer panel.

Level the welding surface and remove the welding slag.

Apply anti-rust agent to the new welding area.

Applying sealant to body connection area



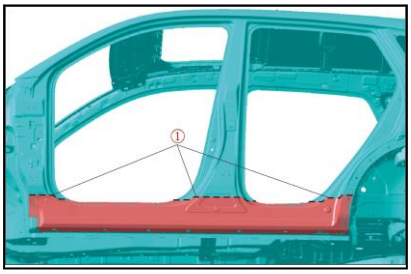
Weld the gap with MIG welder.

Level the welding surface and remove the welding slag.

Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.

Spray exterior finish.



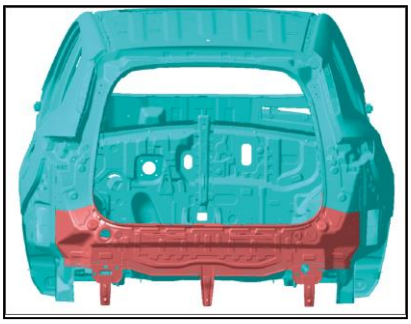
Body Rear

Replace rear apron weld assembly

Removing the original part

Warning

Vehicle protection safety measures



Tips

- Measure the body alignment dimension and check the connection piece for deformation.

- Use a telescopic ruler as a

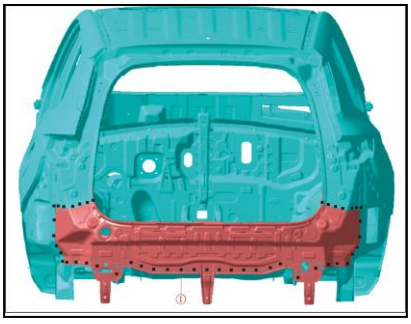
testing tool. Removing the

original part

Clean the welding area to expose the welding points.

Use a rechargeable torch drill to drill the solder joints (1) shown.

Use a chisel and hammer to separate the rear apron weld assembly from the rear floor and rear floor support plate.

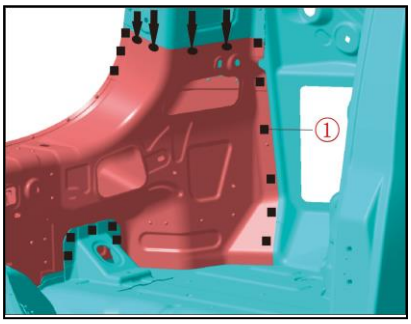


Clean the welding area to expose the welding points.

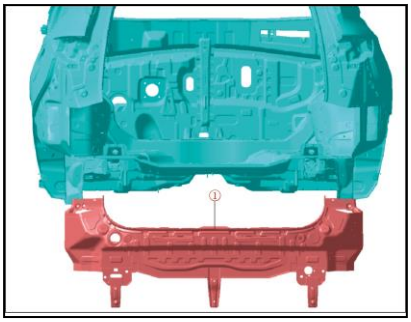
Use a rechargeable torch drill to drill the solder joints (1) shown.

Use a grinder to grind the - arrow - pointed raised solder joints.

Use a chisel and hammer to separate the rear apron weld assembly from the middle of the D-pillar inner panel and the side wall outer panel.



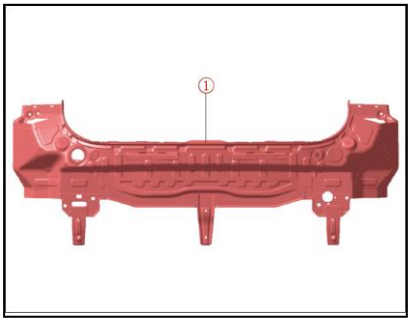
Remove the welds with a chisel and hammer and remove the rear apron weld assembly (1).



Preparing new parts

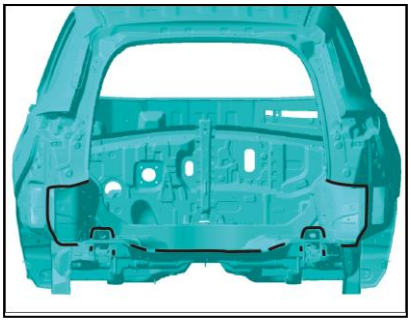
Remove the anti-corrosion layer around the edge of the new part.

Apply penetration primer on edges.



Clean the welding slag in the work area and remove the corrosion protection in the body connection area.

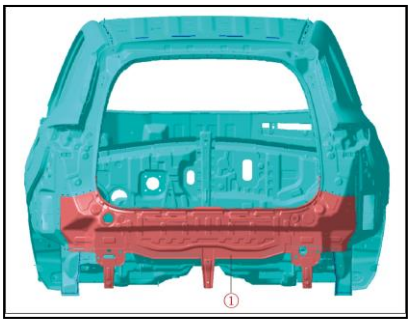
Apply penetration primer to the connection area.



Install the new parts (1) onto the body and fix them with self-locking clips.

Install the rear bumper, rear impact cross member, correct the rear apron weld assembly installation position.

Check the alignment to ensure that the edge seams are even.

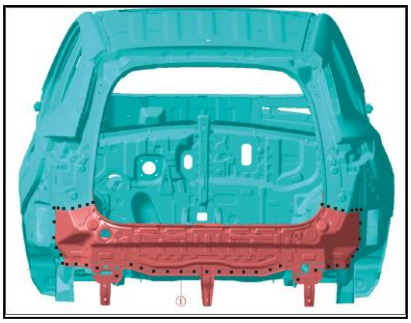


Welding

Correctly install the rear apron welding assembly to the body and secure with the self-locking clips.

Weld the connection area (1) with a spot welder.

Remove the welding slag and clean the work area.



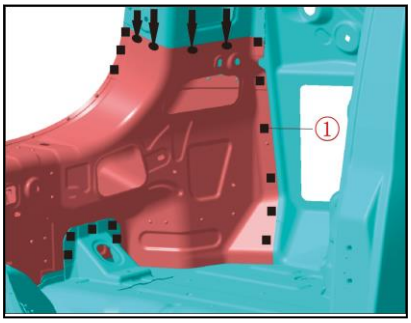
Weld the connection area (1) with a spot welder.

Weld in connection area with MIG welder - arrow -.

Remove the welding slag and clean the work area.

Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.



Correctly install the rear apron welding assembly to the body and secure with the self-locking clips.

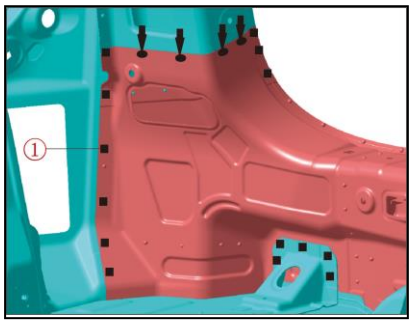
Weld the connection area (1) with a spot welder.

Weld in connection area with MIG welder - arrow -.

Remove the welding slag and clean the work area.

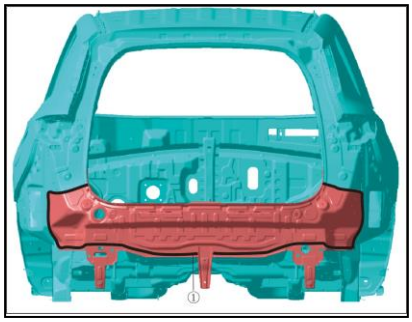
Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.



Apply sealant to connection area (1).

Spray exterior finish.

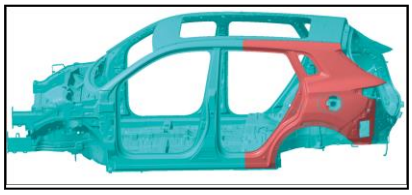


Replace rear side wall outer panel

Removing the original part

Warning

Vehicle protection safety measures



Tips

Measure the body alignment dimension and check the connections for deformation.

Use a measuring tool such as

a telescopic ruler. Removing

the original part

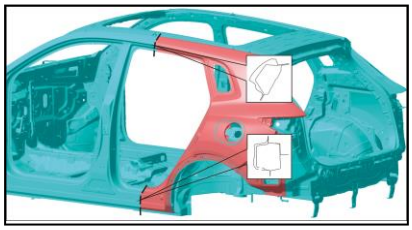
Use a shovel to remove the sealant layer at the sill.

Cut along the area shown.

Tips

The operator can adjust the position and depth of the cut by referring to the cross-section of the critical area.

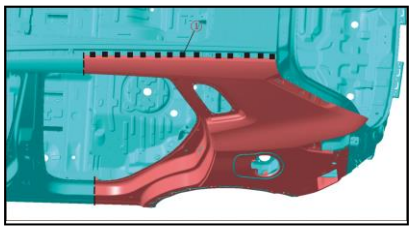
Damage to the internal reinforcement plate is not allowed.



Clean the welding area to expose the welding points.

Use a rechargeable torch drill to drill the solder joints (1) shown.

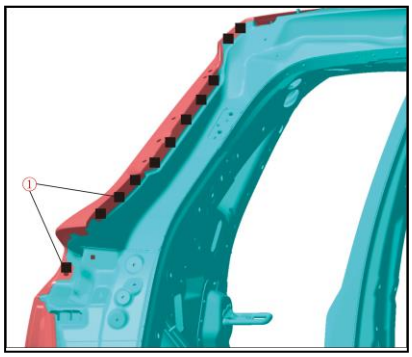
Use a chisel and hammer to separate the rear of the side wall outer panel from the top cover weld assembly.



Clean the welding area to expose the welding points.

Use a rechargeable torch drill to drill the solder joints (1) shown.

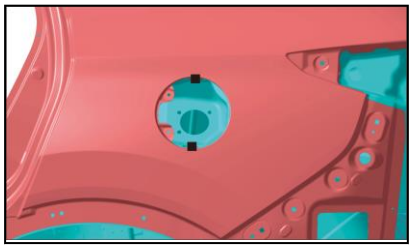
Use a chisel and hammer to separate the solder joint from the rear of the side wall outer panel from the side wall rear sink assembly.



Clean the welding area to expose the welding points.

Use a rechargeable torch drill to drill through the solder joints shown.

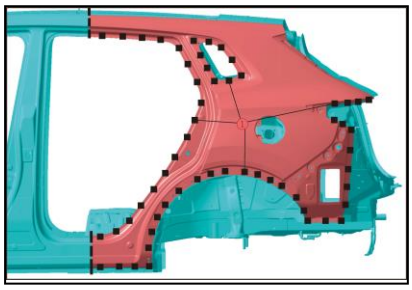
Use a chisel and hammer to separate the rear of the side wall outer panel from the filler box.



Clean the welding area to expose the welding points.

Use a rechargeable torch drill to drill the solder joints (1) shown.

Remove the solder joint with a chisel and hammer and remove the rear of the side wall outer panel.

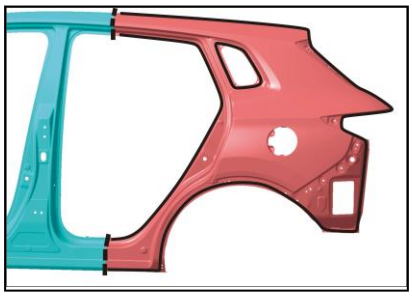


Preparing new parts

Cut the side wall outer panel on the table with enough cross-section to add new parts.

Remove the anticorrosive coating on the inner and outer edges of the new side wall outer panel cutters.

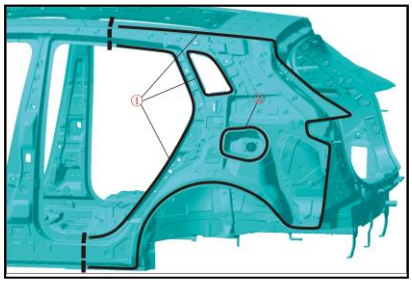
Apply a penetration primer to the edges of the new sidewall outer panel cutters.



Clean the welding slag in the work area and remove the anti-corrosion coating in the body connection area.

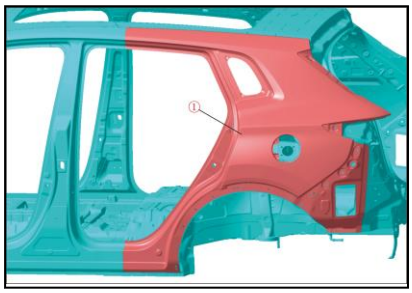
Apply penetration primer to work area (1).

Apply sealant to area 2.



Install the new part correctly and fix it with self-locking clip.

Install the rear door and tailgate welding assembly and correct the installation position of the side wall outer panel.



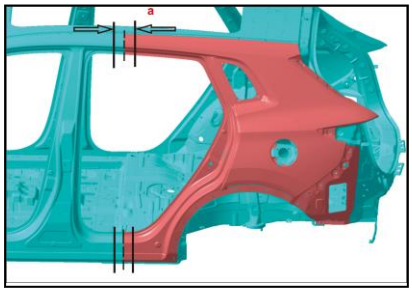
Welding

Install the rear part (1) of the side wall outer panel to the vehicle and fix it with the self-locking clip.

Check corrective condition and welds around edges.

Check that the components overlap the vehicle bead, approximately a:50 mm.

Cut the edges of the sheet metal to remove excess.

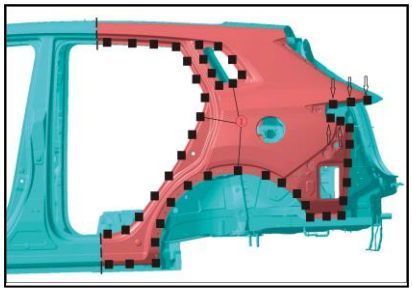


Weld the connection area (1) with a spot welder.

Weld in connection area with MIG welder - arrow -.

Level the welding surface and clear the solder joints.

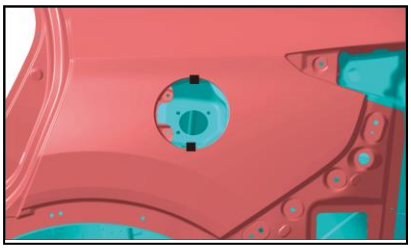
Apply anti-rust agent to the new welding area.



Weld in connection area with MIG welder.

Level the welding surface and clear the solder joints.

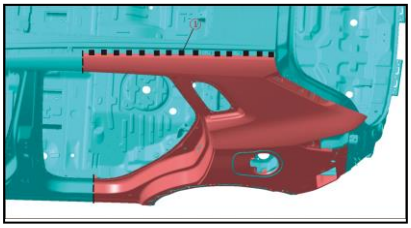
Apply anti-rust agent to the new welding area.



Weld the connection area 1 using a MIG welder.

Level the welding surface and clear the solder joints.

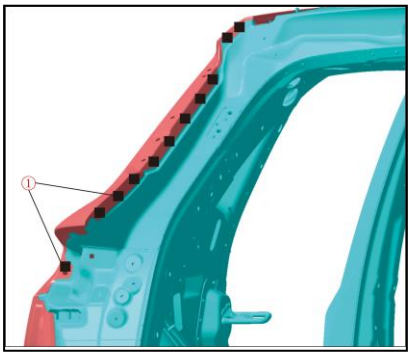
Apply anti-rust agent to the new welding area.



Weld the connection area 1 using a MIG welder.

Level the welding surface and clear the solder joints.

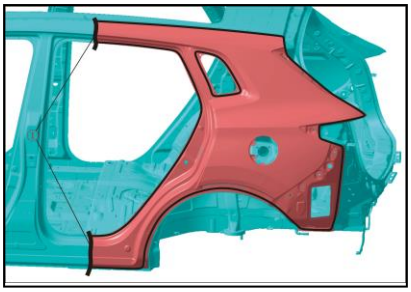
Apply anti-rust agent to the new welding area.



Weld in connection area -① using a MIG welder.

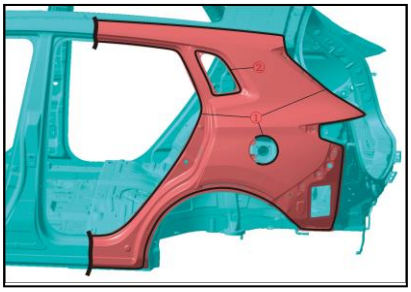
Level the welding surface and clear the solder joints.

Apply anti-rust agent to the new welding area.



Apply anti-rust agent to new welding area (1) and (2).

Apply sealant to the new welding area (1).

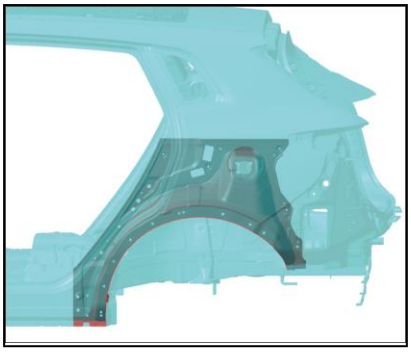


Replace rear hub outer panel

Removing the original part

Warning

Safety Precautions => See Accident Vehicle Maintenance Operation Specification-Vehicle Protection/Safety Measures



Tips

Measure the body alignment dimension and check the connections for deformation.

Use a measuring tool such as

a telescopic ruler. Removing

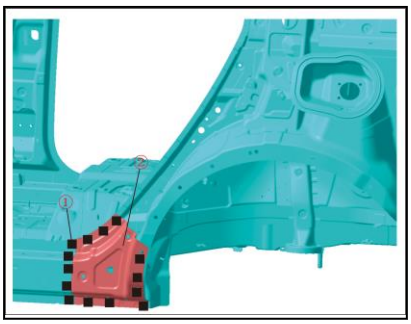
the original part

Remove the rear side wall outer panel.

Clean the welding area to expose the welding points.

Use a rechargeable torch drill to drill the solder joints (1) shown.

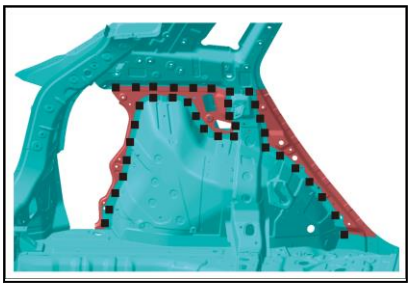
Remove the solder joint with a chisel and hammer, and remove the rear section (2) of the sill reinforcement.



Clean the welding area to expose the welding points.

Use a rechargeable torch drill to drill off the joint welds.

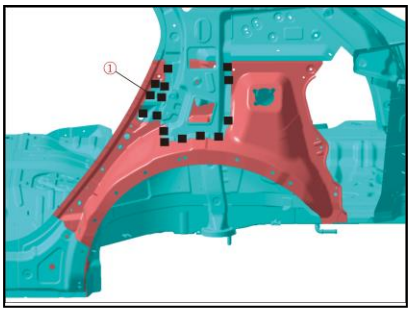
Use a chisel and hammer to separate the rear hub bag outer plate assembly from the rear hub bag inner plate assembly and other components.



Clean the welding area to expose the welding points.

Use a rechargeable torch drill to drill the joint welds.

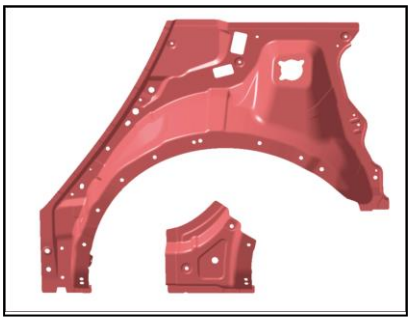
Remove the welds with a chisel and hammer and remove the rear hub outer panel assembly.



Preparing new parts

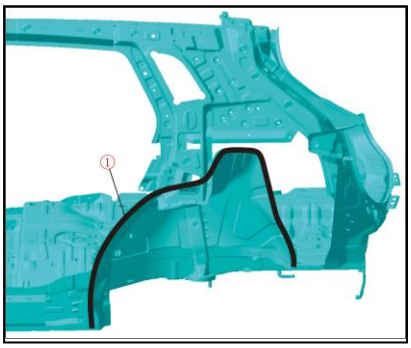
Remove the anticorrosive coating around the edges of the new part inner panel.

Apply penetration primer to the welding location of the part.



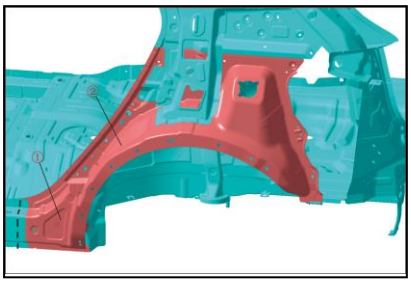
Clean the welding slag in the work area and remove the anti-corrosion coating in the body connection area.

Apply full weld primer at connection area (1).



Correctly install the rear section (1) of the new side wall door sill reinforcement and the rear hub outer panel assembly (2), and fix them with self-locking clips.

Install the back of the side wall outer panel, check the correction, and ensure that the joint width is uniform.



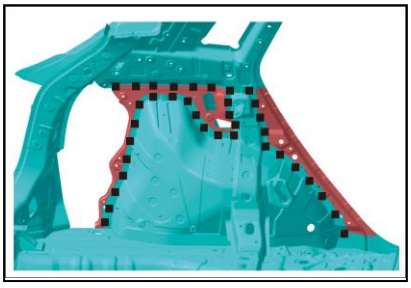
Welding

Fit new parts on the body and secure with self-locking clips.

Weld in the connection area with a spot welder.

Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.

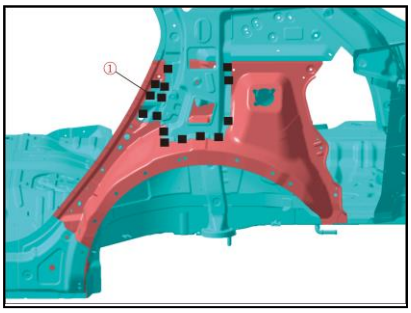


Weld the connection area (1) with a spot welder.

Level weld and remove weld slag.

Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.



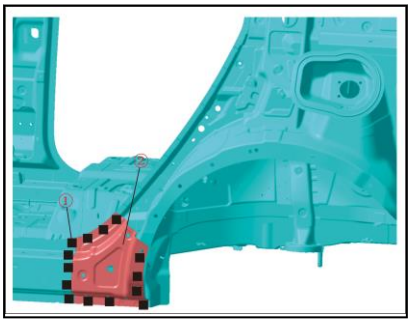
Weld the connection area (1) with a spot welder.

Level weld and remove weld slag.

Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.

Spray exterior finish.

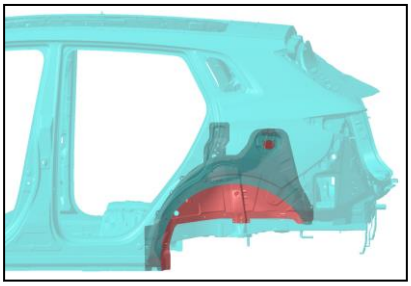


Replace rear hub inner panel assembly

Removing the original part

Warning

Vehicle protection safety measures



Tips

Measure the body alignment dimension and check the connections for deformation.

Use a measuring tool such as

a telescopic ruler. Removing

the original part

Remove the rear side wall outer panel.

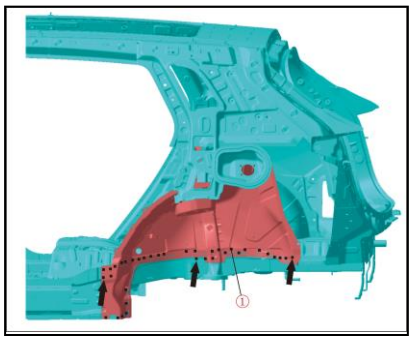
Remove the rear hub outer panel assembly.

Clean the welding area to expose the welding points.

Use a grinder to grind the - arrow - pointed raised solder joints.

Use a rechargeable torch drill to remove exposed welds.

Use a chisel and hammer to separate the rear hub bag inner panel assembly from the rear floor.

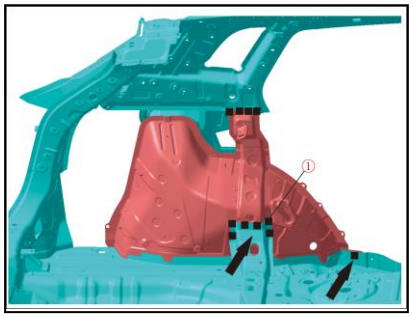


Clean the welding area to expose the welding points.

Use a grinder to grind the - arrow - pointed raised solder joints.

Use a rechargeable torch drill to remove exposed welds.

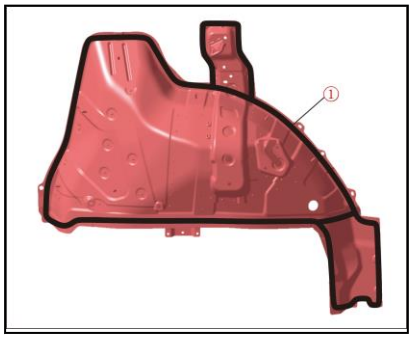
Use a chisel and hammer to remove the solder joint and remove the rear hub inner panel assembly.



Preparing new parts

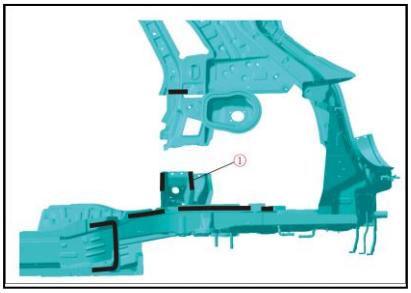
Remove the anticorrosive coating around the new part.

Apply a full weld primer on the edge of the new rear hub bag inner panel assembly (1).



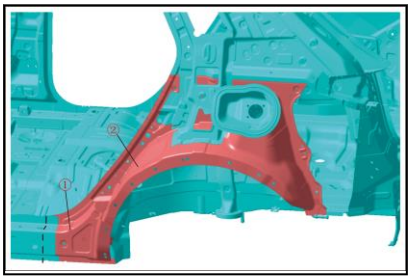
Clean the welding slag in the work area and remove the anti-corrosion coating in the body connection area.

Apply penetration primer to work area (1).



Correctly install the rear section (1), rear hub bag outer plate assembly (2) and rear hub bag inner plate assembly of side sill reinforcement, and fix them with self-locking clips.

Install the rear section of the side sill reinforcement, check the correction, and ensure that the joint width is uniform.



Welding

Fit new parts on the body and secure with self-locking clips.

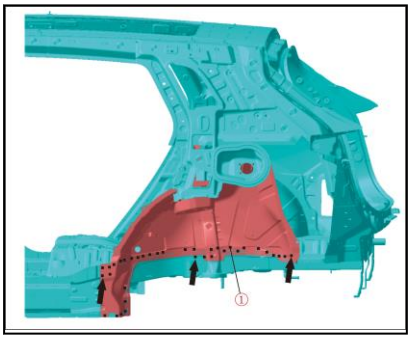
Weld the connection area (1) with a spot welder.

Weld in connection area - arrow - using MIG welder.

Level weld and remove weld slag.

Apply anti-rust agent to the new welding area.

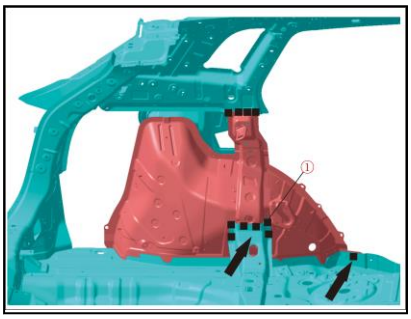
Apply sealant to the body connection area.



Weld the connection area (1) with a spot welder.

Weld in connection area with MIG welder - arrow -.

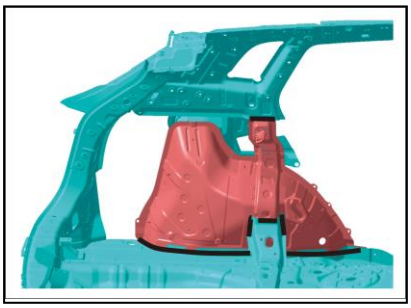
Level weld and remove weld slag.



Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.

Spray exterior finish.

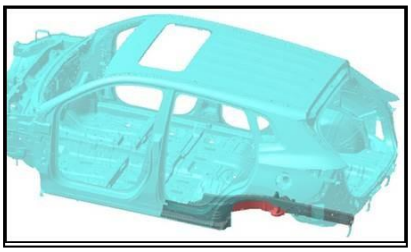


Replace Rear Rail Assembly

Disassembly

Warning

Safety precautions, see Vehicle Protection



Tip:

- Measure the body alignment dimension and check the connection for deformation.

Use a measuring tool such as

a telescopic ruler. Removing

the original part

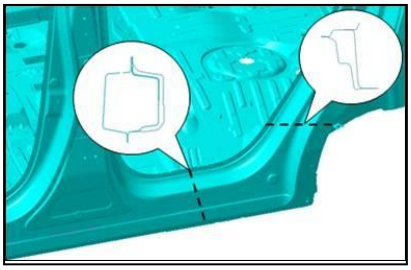
Tip:

The operator can adjust the position and depth of the cut by referring to the cross-section of the critical area.

Damage to the internal reinforcement plate is not allowed.

- Use a shovel to remove the PVC adhesive layer at the threshold.

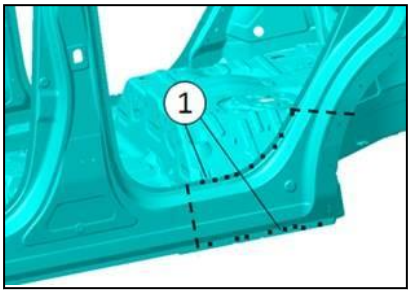
- Cut along the area shown.



Clean the welding area to expose the welding points.

Use a rechargeable torch drill to remove exposed welds.

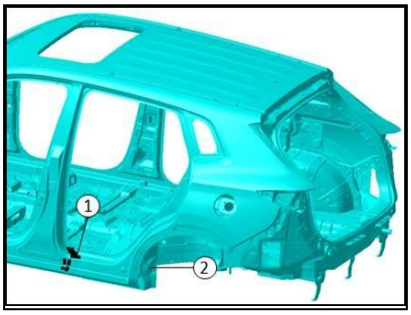
- Disassemble solder joint with chisel and hammer and remove side wall outer panel.



Clean the welding area to expose the welding points.

Use a rechargeable torch drill to remove exposed welds.

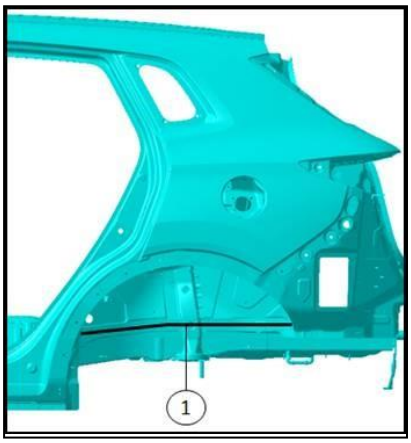
Remove the solder joint with chisel and hammer, and remove the rear section (2) of the door sill reinforcement plate.



Clean the welding area to expose the welding points.

Use a rechargeable torch drill to remove exposed welds.

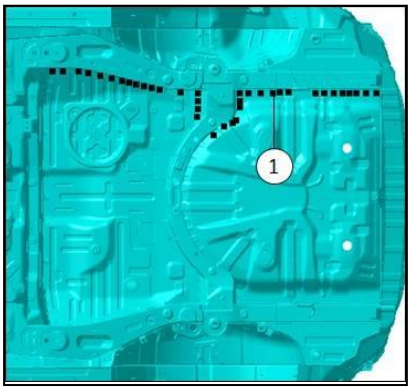
Use a chisel and hammer to separate the rear rail assembly from the rear floor.



Clean the welding area to expose the welding points.

Use a suitable tool to drill out exposed welds.

Use a chisel and hammer to remove the solder joints and remove the rear rail assembly.



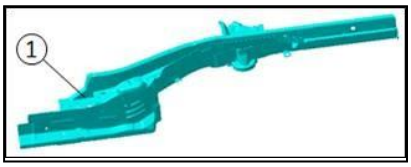
Preparation

Clean the welding slag in the work area and remove the anti-corrosion coating in the body connection area.

Apply penetration primer to the work area.

Remove the anticorrosive coating around the new part.

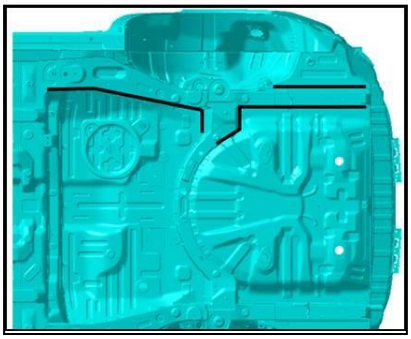
Apply a penetration primer to the edges of the sheet metal parts.



Secure the rear rail assembly to the body with self-locking clips.

Correcting component mounting position.

Apply penetration primer to the work area.



Welding

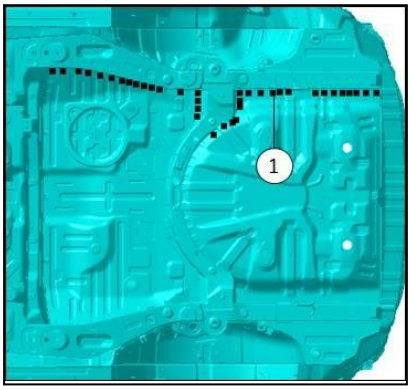
Fit new parts on the body and secure with self-locking clips.

Weld the connection area (1) with a spot welder.

Level weld and remove weld slag.

Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.



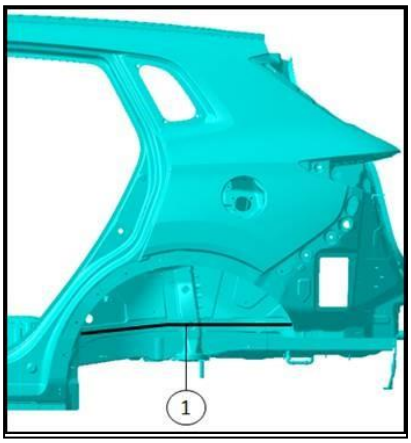
- Weld the connection area with MIG welder at the arrow.

Weld the connection area (1) with a spot welder.

Level weld and remove weld slag.

Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.



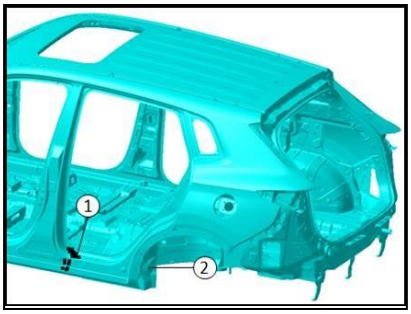
Assemble the new door sill reinforcement (2) to the body and fix it with self-locking clips.

Weld the connection area (1) with a spot welder.

Level weld and remove weld slag.

Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.

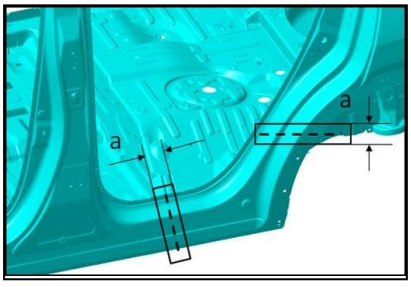


Install the rear part (1) of the side wall outer panel to the vehicle and fix it with the self-locking clip.

Check that the components overlap the vehicle bead, approximately a:50 mm.

Cut the edges of the sheet metal to remove excess and create an ideal weld gap.

Check corrective condition and welds around edges.



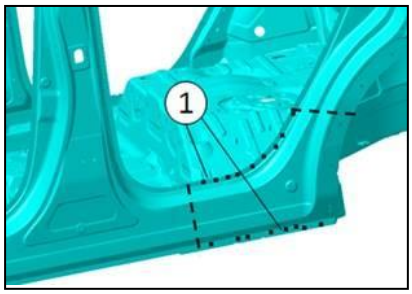
Weld the connection area (1) with a spot welder.

Level weld and remove weld slag.

Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.

Spray exterior finish.



MIG weld weld Ⓒ.

Level weld and remove weld slag.

Apply anti-rust agent to the new welding area.

Apply sealant to the body connection area.

Spray exterior finish.