EVO Electric Service Manual

FOREWORD

This manual contains on-vehicle diagnosis and service procedures for EVO electric by DR. It is very important to read and be familiar with this manual thoroughly for proper repair and maintenance. This manual should be kept in a handy place for quick and easy reference.

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

DR will provide technical bulletin or supplementary volume. Therefore, please obtain the latest information about this Manual.

CAUTION:

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

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

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

EVO - Electric

Body

Chassis

EMB

High voltage

Bumpersystem

Safety Precaution

To the electrical technicians who use medical electronic devices precautions

Prohibit Operation

Warning:

1 Strong magnetic components have been assembled on this vehicle

2 Technicians shouldn't operate electronic pacemaker or other medical electronic devices in this vehicle, or the functions of medical devices may be affected by strong magnetic components.

Precautions for normal charging

Warning:

3 If a technician uses a medical electric device such as an implantable cardiac pacemaker or an implantable heart pacemaker defibrillator, the possible effects on the devices must be checked before starting the charge operation.

4 If a technician using a medical electric device such as implantable cardiac pacemaker or an implantable heart pacemaker defibrillator he must not enter the vehicle compartment (including luggage room) during normal charge operation.

Communication equipment operation precautions

- **If the technician uses medical electronic devices such as cardiac pacemaker, cardioverter, defibrillator and other medical electronic equipment, please keep enough distance with the communication devices.**
- **The electromagnetic wave of the remote intelligent terminal may affect the**

function of the medical device such as cardiac pacemaker, cardioverter, defibrillator and other medical electronic devices.

- **If the technician uses the medical device such as cardiac pacemaker, multiplexer, defibrillator and other medical electronic equipment, the electromagnetic wave of the remote intelligent terminal may affect the function of the device. The possible effect of the remote intelligent terminal on the medical electronic devices must be checked by the manufactures of the medical electronic devices .**

Inspection of key points before the maintenance

The high-voltage system may automatically operate. Please confirm the remote air conditioning and fixed-time charging haven't been set before the maintenance.

Attention:

If remote air-conditioning or fixed-time charging is set, the high voltage system will run automatically even the switch is off.

Precautions of auxiliary restraint system "airbag" and "seat belt pretension"

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

Warning:

Always observe the following items for preventing accidental activation.

1 **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized DR dealer.**

2 **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "SRS AIR BAG".**

3 **Do not use any electrical test devices to test any circuit of the auxiliary restraint system unless these tests are in the instructions described in the service manual. The wire harness and connectors of the auxiliary restraint system should adopt to yellow or orange color.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the power switch ON, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using power tools or a hammer, turn the key in the "LOCK" position, unplug the cathode of 12V lead-acid battery and wait at least 1 minute for maintenance.**

Precautions of removing the 12V battery

When removing the 12V battery, turn the power switch to "ON", and then to "OFF".

Note:

1 **The automatic 12V battery charge control may start even when the power switch**

is in OFF state.

1 The automatic 12V battery charge control does not start within approximately one hour when the power switch is turned ON/OFF.

Matters needing attention

1 Before the repairing which no need the power: rotate the key to LOCK gear and disconnect the 12V battery negative.

2 After disconnect the 12V battery negative, the memory of radio and other control devices will be cleared.

3 Replace new oil seal, gasket,gasket ring,O ring,lock washer,cotter pins,self-locking nuts and other parts.

4 Place the removed parts in order and according to the positions as they are assembled .

5 If necessary, use approved binders, sealants or equivalent products.

6 For safe and efficient repair work, you should use hand tools, power tools (disassembly only) and special tools.

7 Before repairing the vehicle:

Cover the fender, interior and carpet with a suitable cover. Be careful do not scratch the paintwork with keys, buttons or something like this.

Front bumper

Attention

● The bumper is a resin material. Do not exert strength on it and avoid contact with the oil.

● Do not scratch the outer surface of the bumper during disassembly.

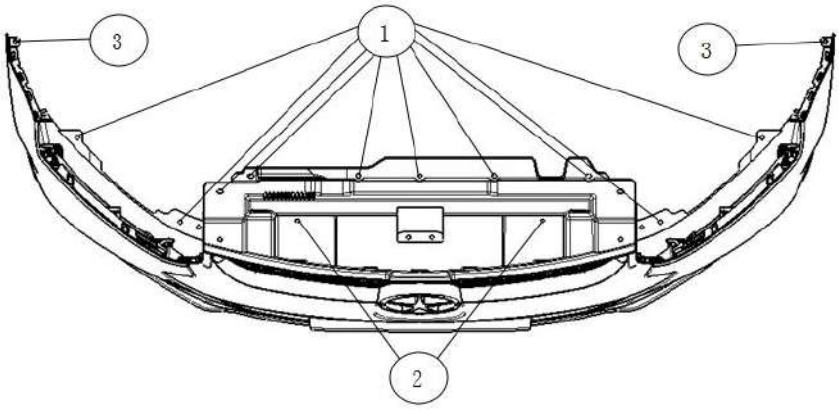
● When the front bumper is assembled, it is put in place with the bumper fixed bracket card.

● After installation, check whether there is a surface difference and clearance between the bumper and the vehicle body.

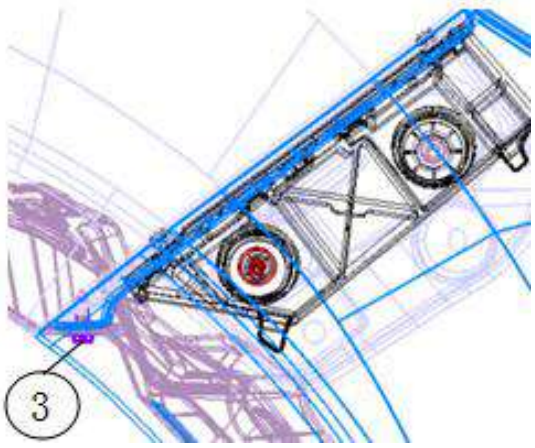
Disassembly and Assembly

Removal

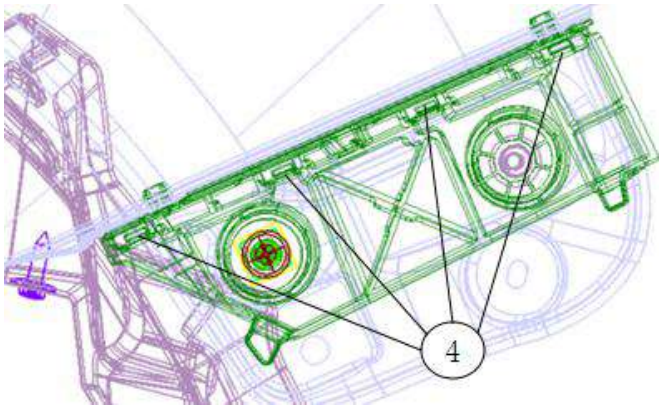
1 Open engine cover and support it with rod jRemove the 21 expansion buckles （5522101U2152） on the upper、side and lower part of front bumper illustrated in diagram 1 and the two hex T-shaped screws (12442-0520F71）illustrated in diagram 2. Tools: cross screwdriver and straight screwdriver.



2 remove the two hex T-shaped screws（12442-0520F71）fixing the left and right side of the front bumper with fender。 illustrated in diagram 3

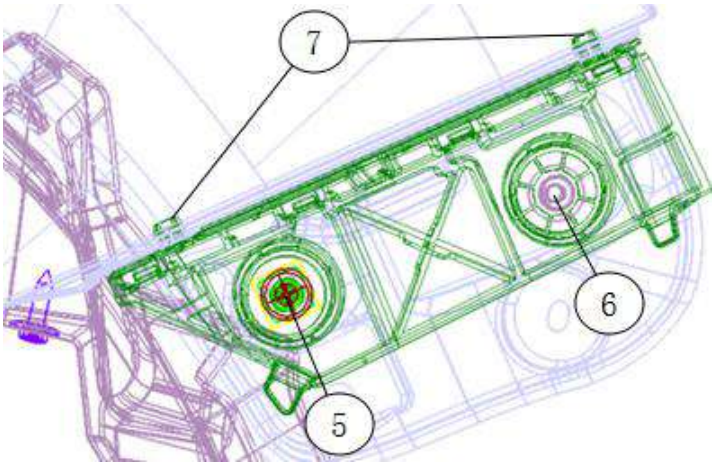


3 Hold the lower flanging of the bumper by hand to apply force outwards to separate the bumper from the fender , insert into the gap with a straight screwdriver , lift the retaining bar bracket and the bumper flange in turn from the bottom upwards(illustrated in diagram 3) , and separate the bumper and the bumper support.



4 Remove the whole bumper, disconnect the front combination light's line harness connector and remove the bumper.

5 The removal of front bumper left and right fixing bracket, remove the bolts （ 11254-0616F62 ） illustrated in diagram 6 with socket spanner, one left and right side, remove the screws （ 12493-0620F71 ） illustrated in diagram 5 with cross screwdriver, one left and right side, pull out the buckles outwards illustrated in diagram 7 with buckle pliers, two left and right side, take down bumper bracket.



Assembly

Follow the opposite sequence of the disassembly to assemble.

Install anti-collision beam of front bumper and front cabin bracket

Matters needing attention

● The front module and the car body are fixed by 8 bolts, and the tightening torque is 20N.m to 25N.m;

Disassembly and Assembly

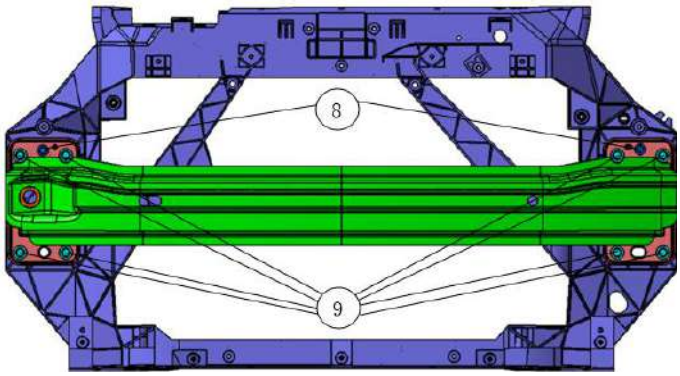
Removal

1 Before removing the anti-collision beam and the front cabin bracket,remove the front bumper and left and right headlamp, disconnect the pipes of the radiator、condenser、oil cooler (if assembled) on the front cabin bracket, connecting with body, and remove

the wire harness on the front cabin bracket.

2 remove the eight bolts（11254-0835F62）illustrated in diagram 9.

3 Take down front cabin bracket assembly.



4 the front anti-collision beam can be disassembled solely through removing the two bolts(11254-0616F62) illustrated in diagram 8.

Assembly

Follow the opposite sequence of the disassembly to assemble.

Rear bumper

Precautions

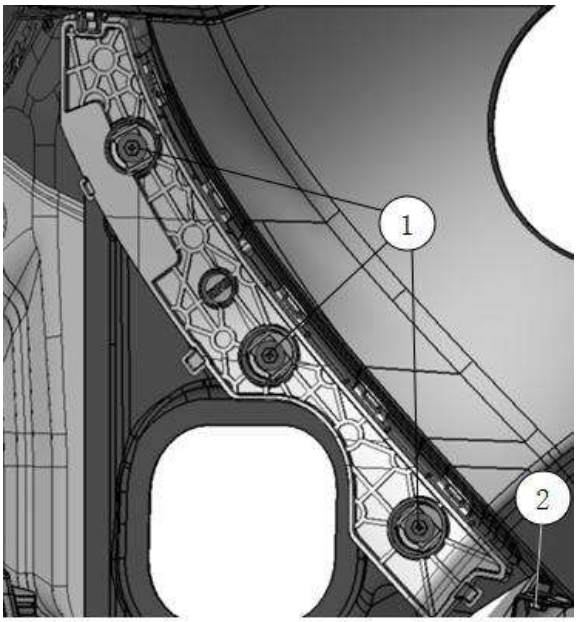
● The bumper is a resin material. Do not exert strength on it and avoid contact with the oil.

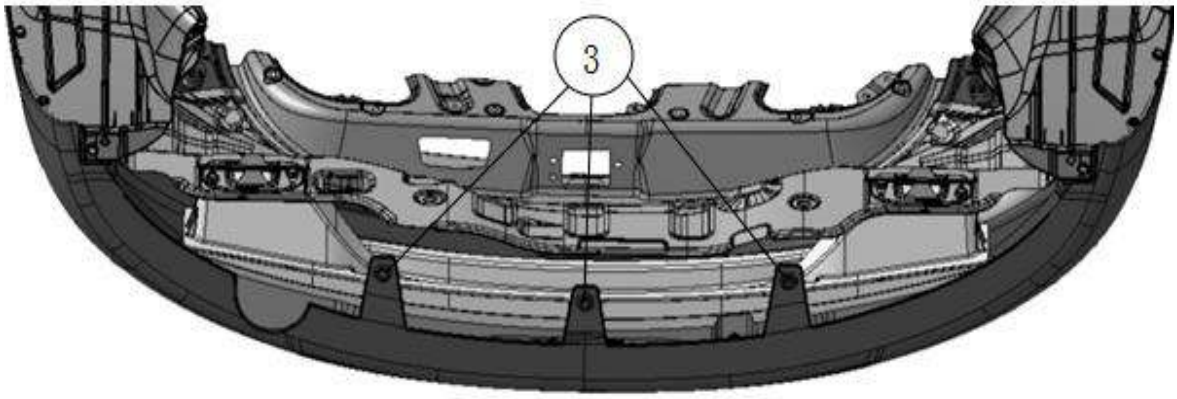
● Do not scratch the outer surface of the bumper during disassembly.

Disassembly and Assembly

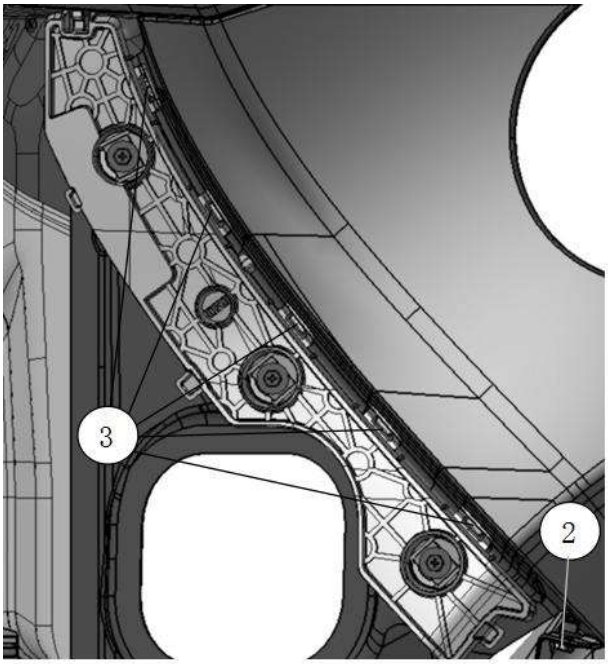
5 Open the tail gate and remove the left and right combination lamp assembly、left and right rear wheel cover.

6 Remove the rear bumper fixing bracket screws （ 12442-0520F71) and buckles(2804012U2210) illustrated in diagram 1,three left and right side;remove the screws（12442-0520F71) fixing bumper and side body illustrated in diagram 2,one left and right side;remove the three buckles（5522101U2152) fixing the lower part of bumper and rear anti-collision beam illustrated in diagram 3.





7 Hold the lower flanging of the bumper by hand to apply force outwards to separate the bumper from the bodywork sheet metal , insert into the gap with a straight screwdriver , lift the retaining bar bracket and the bumper flange in turn from the bottom upwards , and separate the bumper and the bumper support.

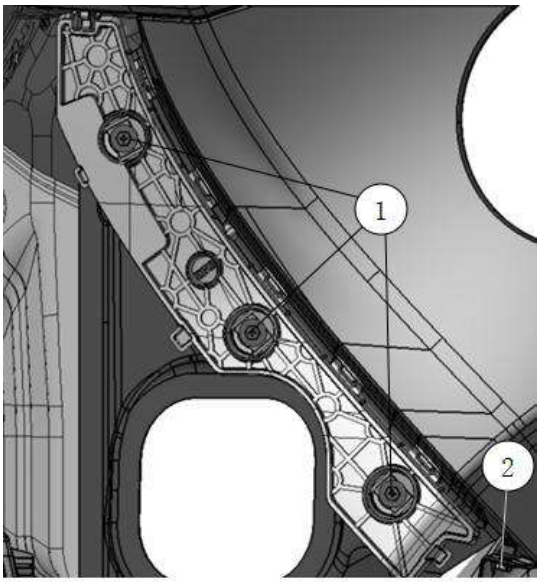


8 disassemble rear bumper. Disconnect the wire harness connector and take down the bumper.

Rear bumper disassembly

1 The removal of rear bumper left and right fixing bracket,remove the screws （12442-0520F71）illustrated in diagram 1 with cross screwdriver,three left and right side,pull out the buckles outwards with buckle pliers,two left and right side,take down

bumper bracket.



2 Follow the opposite sequence of the disassembly to assemble.

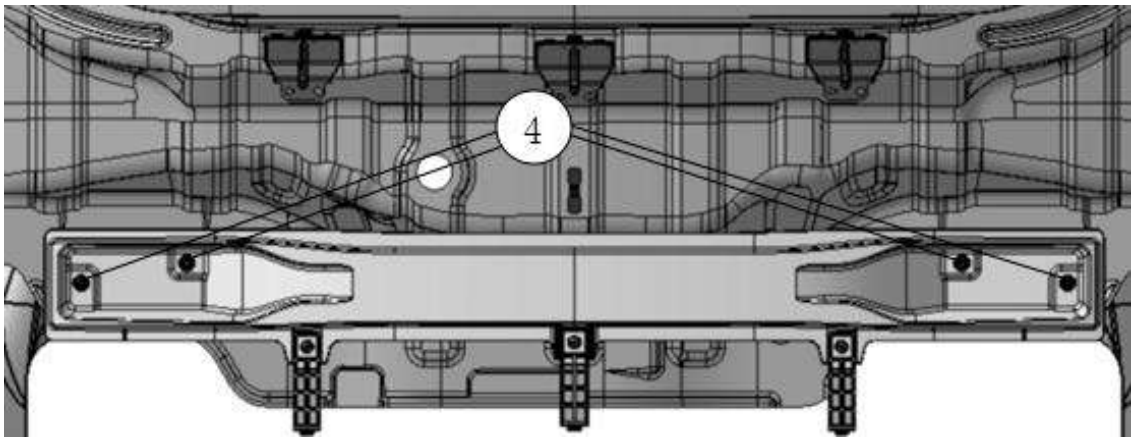
Rear anti-collision beam

Precautions

● The rear anti-collision beam assembly and the car body are fixed by 4 nuts, and the tightening torque is 9N.m to 11N.m.

Disassembly and Assembly

1 Before removing the rear anti-collision beam,remove the rear bumper,then remove the 4 fixing nuts (13395-0800F71) of rear anti-collision beam illustrated in diagram 4.



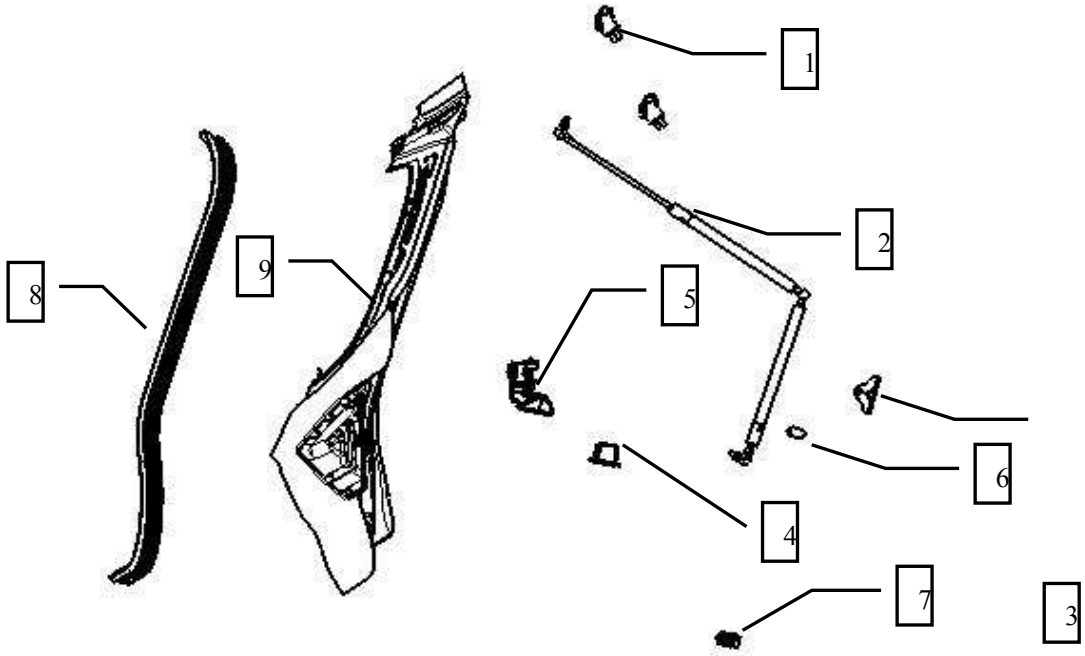
2 Take down rear anti-collision beam assembly.

3 Follow the opposite sequence of the disassembly to assemble.

Door cover system

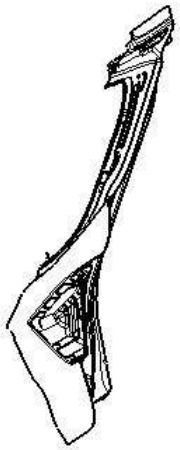
1、Tail door structure

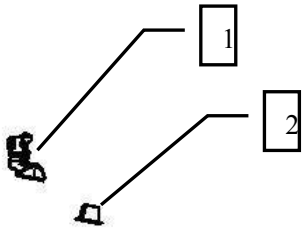
Tail door structure decomposition



1、tail door hinge　2、tail door air spring pole　3、tail door air spring pole　bracket　4、tail door lock buckle 5、tail door lock body　6、tail door fixing dumper block　7、tail door adjustable dumper block　8、tail door rubber strip　9、tail door metal plate assembly

1、Tail door lock device





disassembly

1) disassembly sequence
Remove inner trim panel
① Tail door lock
②Tail boor lock buckle

Assembly

2) assembly sequence
Remove inner trim panel
① Tail door lock
②Tail boor lock buckle

Important work—

1、Insert the connector of electric open handle wire harness on the lock body,using the little hole of lock body as the location hole,align the hole position,fix the lock body on car body with three bolts 11293-0616F71;

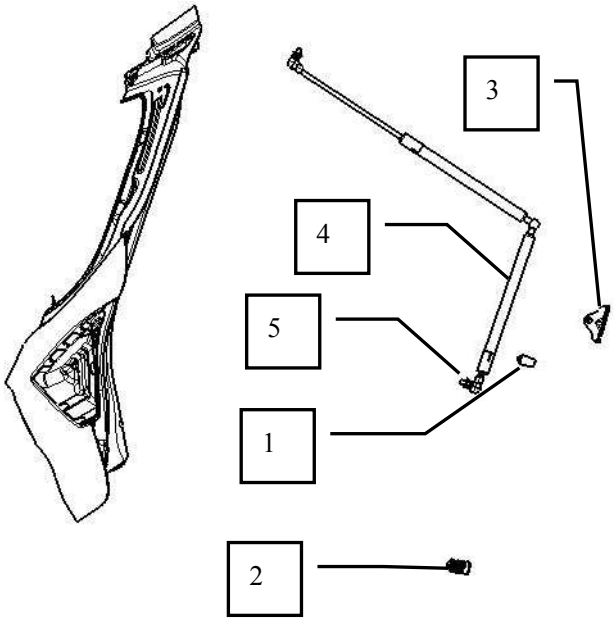
2、fix the lock assembly on car body with two countersunk screws Q2500825F71S;

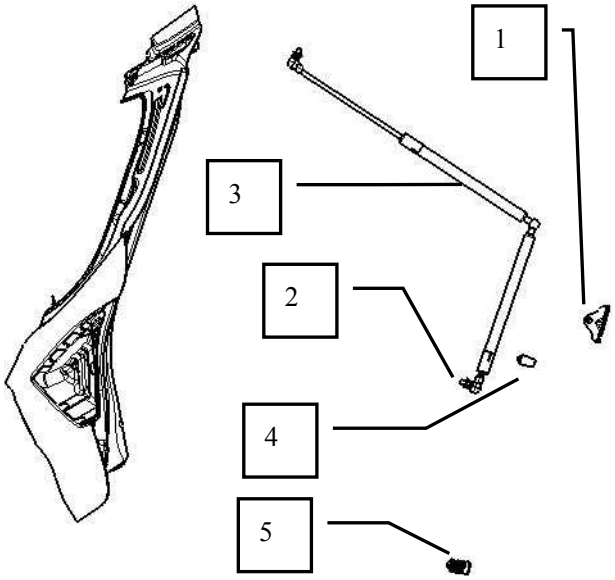
3、 torque problem:

Tail door lock assembly and disassembly needs 10mm socket spanner

Tightening torque (N.m)	9±2

2、Tail door locating mechanism





disassembly

Assembly

1) disassembly sequence

The assistant helps to hold the tail door

① Tail door fixing bumper block
② Tail door adjustable bumper block
③ Air spring pole ball joint

2) assembly sequence

The assistant helps to hold the tail door

① Air spring pole ball joint pin and bracket
② Air spring pole ball joint pin

Important work—

1、Fix air spring pole ball joint pin and bracket on rear wall,fixing bolt 11293-0616F38；

2、Then fix air spring pole ball joint pin on tail door

3、Clamp the air spring pole of tail door on the air spring pole ball joint pin △attention Make sure the cylinder is at the top during the assembly.

4、Tail door right air spring pole assembly is the same as the left.

5、Install the tail door fixing dumper block on the corresponding hole;

6、Rotate the tail door adjustable dumper block into the corresponding hole;

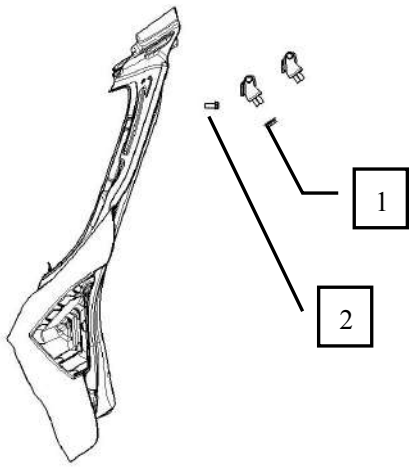
2、 torque problem：

Air spring pole ball joint pin and bracket disassembly needs 12mm socket spanner

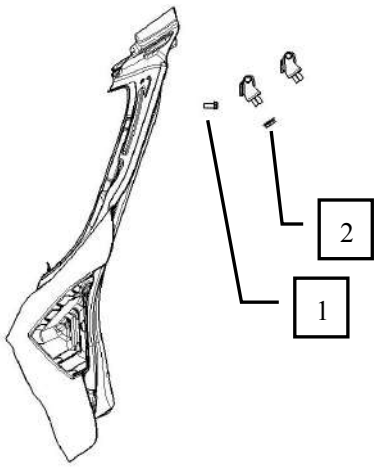
Tightening torque (N.m)	9±2

Air spring pole ball joint pin assembly and disassembly need 12mm socket spanner

3、Tail door hinge device



disassembly



Assembly

1) disassembly sequence

The assistant helps to hold the tail door

① Body side hinge

② Tail door side hinge

2) assembly sequence

The assistant helps to hold the tail door

① Tail door side hinge

② Body side hinge

Important work—

1、Preload tail door right and left hinge assembly on tail door assembly by hex flange locating bolt 11293-0820F71;

2、Preload tail door hinge on bodywork roof cover assembly by hex flange nut 13271-0800F38,adjust clearance between left tail door assembly and bodywork to meet the design requirement ;

3、Fasten the two hex flange nuts of tail door right and left hinge assembly on bodywork,and confirm the fastening torque. Open the tail door,fasten tail door right and left hinge hex flange locating bolt on the tail door;

4、 torque problem:

Tail door side hinge disassembly needs 12mm socket spanner

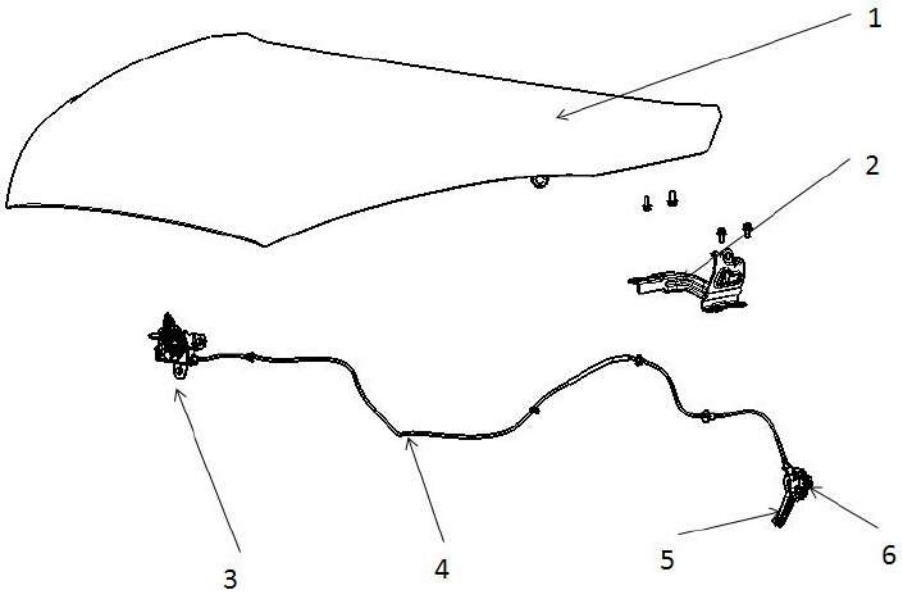
Tightening torque (N.m)	33±3

Tail door side hinge disassembly needs 12mm socket spanner

Tightening torque (N.m)	27±2

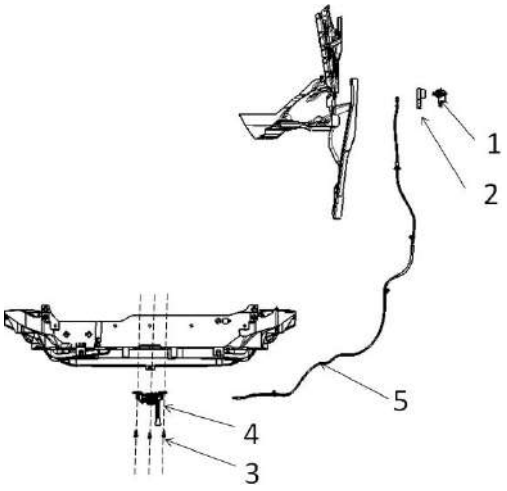
2、 Front cabin cover structure

Front cabin cover structure decomposition

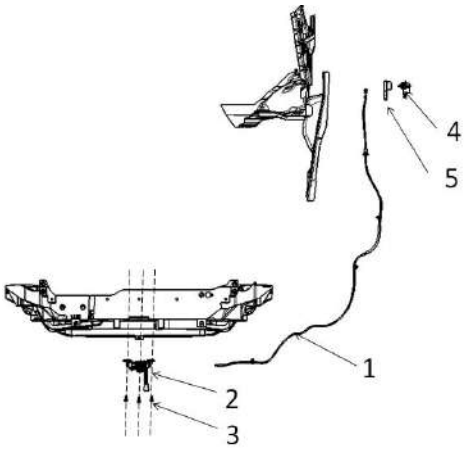


1、front cabin cover assembly 2、front cabin cover hinge 3、front cabin lock 4、front cabin drawbench 5、 front cabin cover open handle 6、front cabin cover open handle base assembly

1、Front cabin cover lock device



Disassembly



Assembly

1) disassembly sequence

Open engine cover and support it with the front cabin rod

① Front cabin open handle
② front cabin cover open handle base assembly
③ hexagon flange bolt
④ front cabin cover lock

2) assembly procedures:

Open engine cover and support it with the front cabin rod

① front cabin cover drawbench
② Clamp and connect front cabin cover drawbench and the lock.
③ hexagon flange bolt
④ front cabin cover open handle base

Important work－

1. clamp the buckle on the front cabin cover drawbench assembly onto corresponding location of the car. Clamp the dust cover on the drawbench when putting the drawbench through the front cabin metal plate.

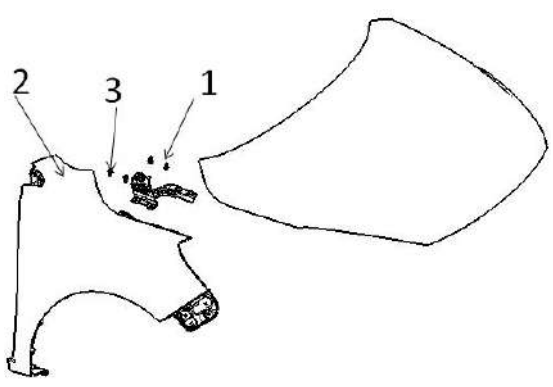
2. Connect the ball head and the buckle of the front cover drawbench assembly to the front cabin cover lock. Then fasten the lock assembly on FEM with the 5 fixing bolts.

3. Clamp the cylinder buckle of the front cover drawbench assembly to the front cabin cover open handle base assembly. Fix the front cabin cover open handle with screws to the A column sheet metal, then connect the handle to the base assembly.

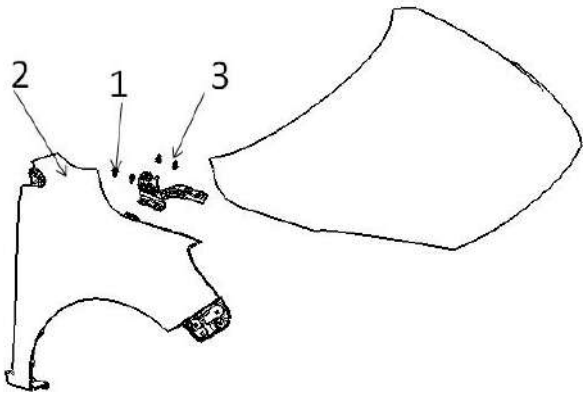
4、 torque:

Tightening torque (N.m)	9±2

2、Front cabin cover hinge device



Disassembly



Assembly

1) disassembly sequence

open the front cabin cover with assistant helping

① Hex flange bearing surface toothed bolt of front cabin side

② fender

③ Hex flange bearing surface toothed bolt of body side

2) assembly sequence

open the front cabin cover with assistant helping

① Hex flange bearing surface toothed bolt of body side

② fender

③ Hex flange bearing surface toothed bolt of front cabin side

Important work－

1.The left/right hinge assembly is pre-tightened on the front cabin cover body assembly.

2.Preload the front cabin cover assembly on the car, adjust the gap and face difference between the cover assembly and the body to make them even and beautiful.

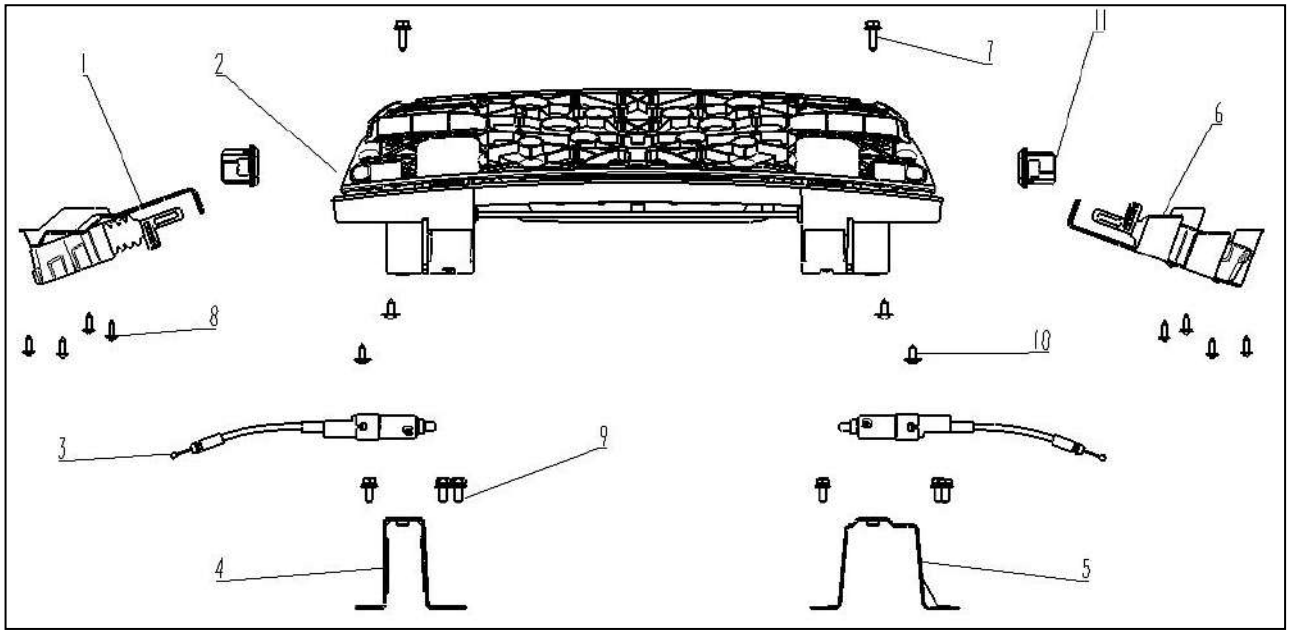
3、 torque：

Tightening torque (N.m)	33±3

3、charging port cover structure

1、Installation precautions

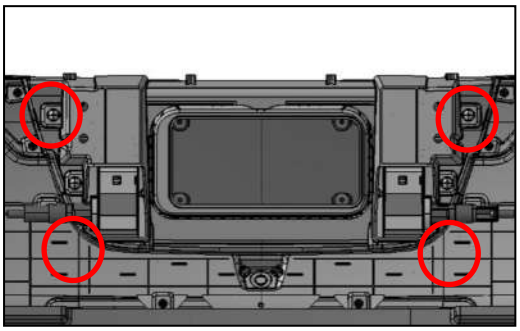
- Prevent damage or scratch while disassembling or assembling parts
- In the disassembly of some larger components, ensure at least two people should operate in case of parts fall-off.
- When installing plastic parts, make sure the screws are installed in the mounting holes first,and then carefully tighten the screws.
- The charging cover relates to electrical components.Please put the key in the “LOCK before installing it.



1.Left electric actuator 2.charging port cover assembly 3.lock actuator of the cover 4.the left cover mounting bracket 5.the right cover mounting bracket 6.right electric actuator 7.11293-0616F71 hex bolt and flat spring washer assembly 8.12493-0412F71 M type sunk screw 9.11293-0620F62 hex bolt and flat spring washer assembly 10.12493-0512F38 M type sunk screw 11.charging port cover actuator clip connector

2.Adjustment and replacement of charging port cover assembly

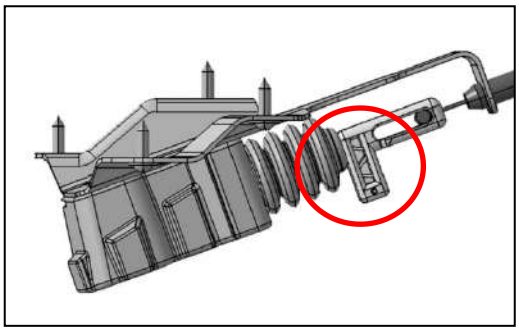
Adjustment of charging port cover:



- Take down front bumper, Refer to “front bumper assembly replacement”.
- Use cross screwdriver to disassemble the charging port cover fixing screws;
- Adjust the charging port cover to the appropriate position, and ensure the cooperation with the front bumper.

Gap uniform:

- Fasten screws with the cross screwdriver.
- Tightening torque: （7±2）N.m
- Install front bumper, Refer to “front bumper assembly replacement”.

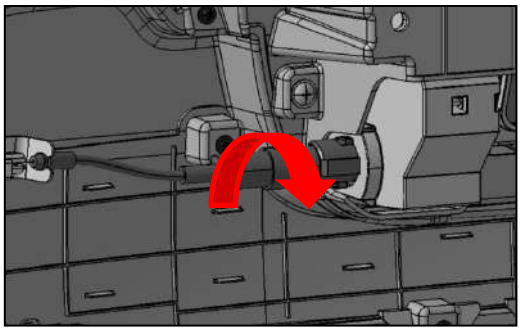


Attention：

- The charging port cover must be closed during the installation;
- Remove the front bumper assembly and then pull this embossment to open the cover.

Replacement of charging port cover:

Disassembly:



- Disassemble front bumper, Refer to “front bumper replacement”.

Charging port cover;

- Turn the charging port cover lock actuator clockwise and pull it out,

Place and preserve the cover actuator well after Disassembling the actuator

All the two side actuators need to be disassembled;

- Use cross screwdriver to disassemble the charging port cover fixing screws;
- Disassemble the charging port cover,refer to “Replacement of charging port cover”.

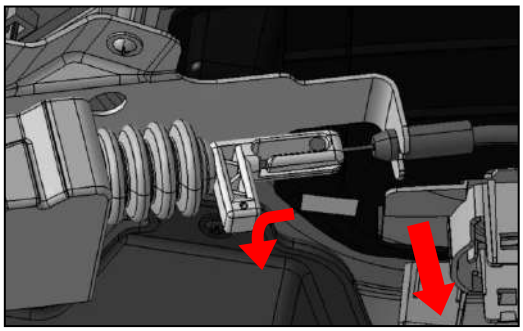
Assembly:

Follow the opposite sequence of the disassembly procedures.

Replacement of charging port lock actuator:

Disassembly:

- Disassemble front bumper, Refer to “front bumper replacement”.



And open charging port cover;

- Turn the charging port cover lock actuator clockwise and pull it out,

Place and preserve the cover actuator well after Disassembling the actuator

All the two side actuators need to be disassembled;

- Remove the drawbench connector from the slot.

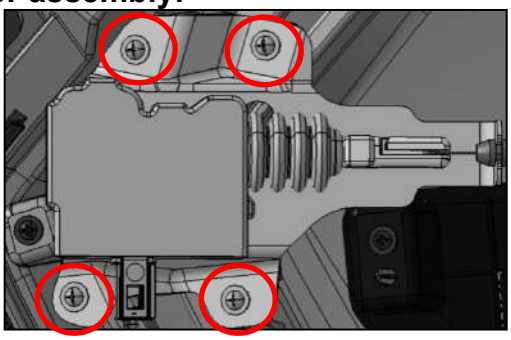
And take down the cylinder pin head from the slot.

Assembly:

Follow the opposite sequence of the disassembly procedures.

Replacement of charging port cover electric actuator assembly:

Disassembly:



- Disassemble front bumper, Refer to “front bumper replacement”.

And open charging port cover;

- Remove the drawbench connector from the slot.

And take down the cylinder pin head;

- Disconnect the connector of electric actuator.
- Use cross screwdriver to disassemble the four fixing screws of electric actuator.

Assembly:

Follow the opposite sequence of the disassembly procedures.

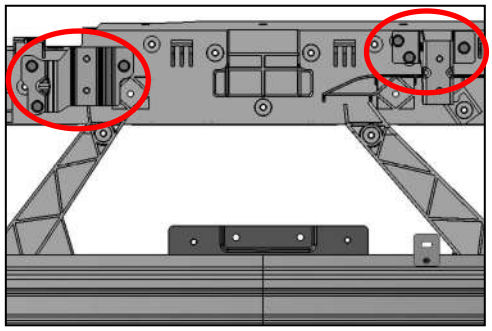
Attention：

- After the installation is completed, start the vehicle and press the charging port cover starting switch, and confirm that the actuator normally operates and open the charging port cover;
- The electric actuators differentiates the left and right sides, Pay attention to confirm that when installing.
- Confirm the drawbench is clamped into the slot completely when clamping the drawbench,in case of falling off late at work.

Replacement of charging port cover mounting bracket:

Disassembly:

- Take down front bumper, Refer to “front bumper assembly replacement”;
- Disassemble the bracket installed on the front module with socket spanner



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Assembly:

Follow the opposite sequence of the disassembly procedures.

Attention：

- When mounting the bracket, notice that the left side of the support lower end has a drawbench, and it should be careful not to press it.

4、Door structure

Door decomposition

Attention：

■The doors assembly methods are the same.

■When disassembling and assembling the door assembly, take good guard against the door and body scratch.

■After the door assembly is complete,it must to adjust to ensure the door open and close normally,The head of the hinge assembly bolt is also repainted(car body color).

■Inspect whether the hinge rotating part exists poor lubrication or not. Apply lubrication grease if necessary.

■Because of the heavy weight of door parts,The disassembly process requires a lot of cooperation with multiplayer.

Replacement of front door stopper:

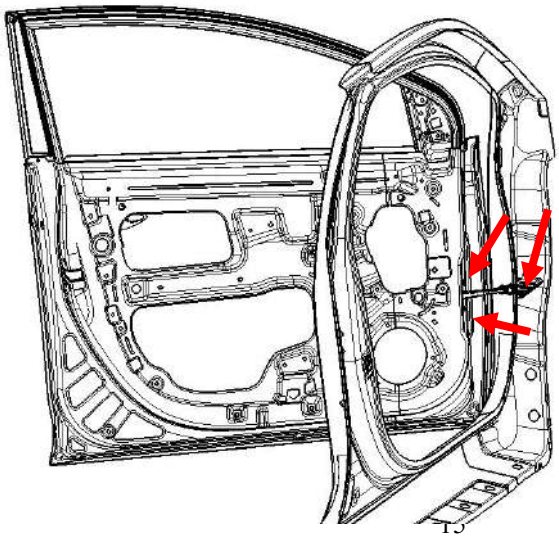
1) disassembly

①Remove the fixing bolt connecting the body and the stopper with a 12mm socket spanner.

■tightening torque: 16.7～25.5 N•m

② Remove 2 fixing bolts connecting the door and the stopper with a 10mm socket spanner.

■ Tightening torque:7.8～11.8 N•m



1）Assembly

Follow the opposite sequence of the disassembly procedures.

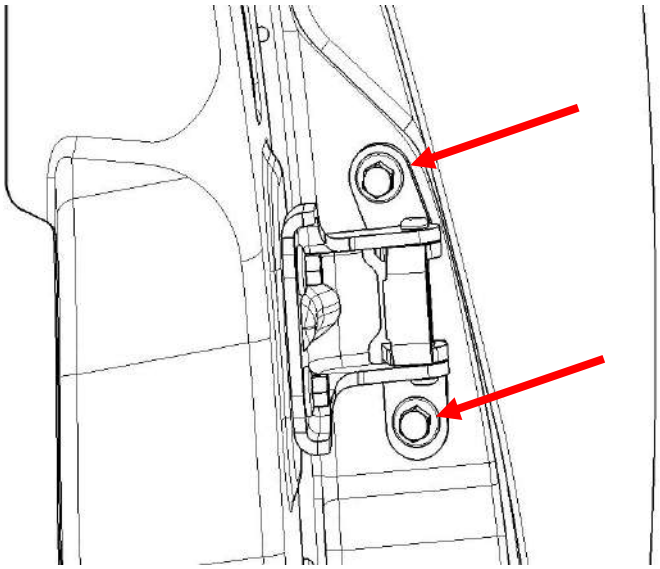
Replacement of front side door hinge assembly

1) disassembly

① Disassemble door stopper, Refer to “door stopper replacement”;

② Remove the fixing bolt connecting the door and the hinge with a 12mm socket spanner.

■ Tightening torque:29～35 N•m



Attention：

■Disassembly should be done in several times. Do not loosen all parts in one time.

■Please disassemble from lower part to upper part.

③ unplug the rubber sleeve of door harness, then unplug the door’s electric connector.

④ lift down vehicle door with assistance of other people.

2) assembly

Follow the opposite sequence of the disassembly sequence.

Attention：

■ tightening should be done in several times during the installation. Do not tighten all

bolts well in one time.

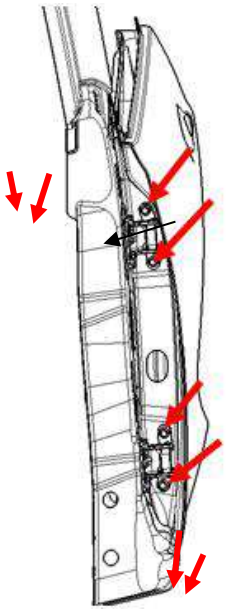
Replacement of front door hinge

1) disassembly

① Remove the front side door assembly Refer to “Replacement of front side door assembly”

② Remove the fixing bolt connecting the body and the hinge with a 12mm socket spanner.

■ Tightening torque:29～35 N•m



■ Assembly

Follow the opposite sequence of the disassembly procedures.

Replacement of front door waterproof membrane:

1) disassembly

① Disassemble door inner trim panel.

② Disassemble wire harness fixing buckle.

③ separate waterproof membrane and take it down.

2) assembly

Follow the opposite sequence of the disassembly procedures.

Attention：

■Do not touch the surface of the adhesive to reduce the effect of the reattachment weakening.

■Be careful when taking down the waterproof membrane, so as not to damage the waterproof membrane.

Replacement of front door lock assembly:

1） Disassembly

① Disassemble front door inner trim panel.

② disassemble water-proof membrane

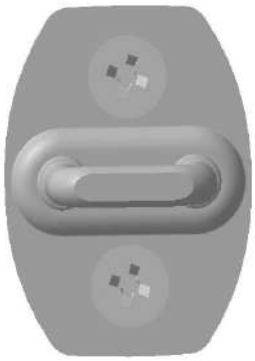
③ Disassemble the front door window guide rail

④ disconnect lock connector.

⑤ disassemble the fixing bolt of lock assembly.

⑥ disconnect the connection between door outward rod and

⑦ take out lock assembly(tightening torque 8±1N.m).



2) assembly

Follow the opposite sequence of the disassembly sequence.

Attention：

■the parts must be installed on the original position during installation.

■ after assembly, check whether door's opening and closing are normal, and the locking should be firm If not, please adjust or re-assemble the lock

Replacement of front door lock buckle

1) disassembly

① mark the position of current lock buckle

② disassemble fixing bolt of lock buckle

(tightening torque 15.5±2N.m).

③ disassemble lock buckle

2) assembly

Follow the opposite sequence of the disassembly sequence.

Adjustment of front door lock buckle

① loosen the buckle's screw

② move the buckle to the needed direction. Ensure the buckle is in the middle of door lock.

③ tighten the fixing bolt of buckle

④ close door and check whether side difference and clearance meet the demand.

Note:

replacements of components on left and right front door are the same.

Replacement of inner weather-strip of front side door

1) disassembly

① Disassemble door inner trim panel. Refer to "replacemen trim panel".

② pull out one end of the weather-strip,take it down slowly.

Attention：

■ Do not exert too much force when disassembling , which may cause parts' deformation;

2) assembly

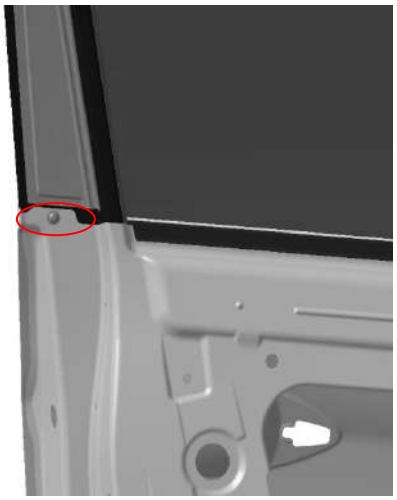
① Make the front side door inner weather-strip align to the B column, keep the gap 1~2mm, install the rear end first, and then slowly install the weather-strip well.

Replacement of outer weather-strip of front door window

1) disassembly

① Descend the door glass to the lower end.

② unscrew the fixing screws of outer weather-strip of front door



③ Disassemble outer weather-strip of front door

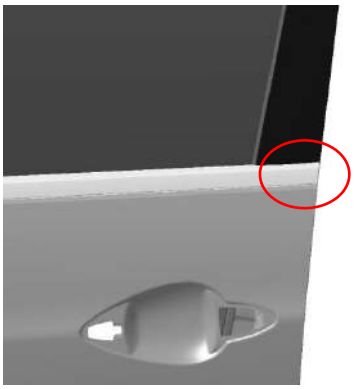
Attention：

■ Do not exert too much force when disassembling , which may cause parts' deformation;

■Check the weather-strip in vision after disassembly,if there is deformation found,please replace it.

2) assembly

① Make the front side door outer weather-strip align to the B column frame, and then slowly install the weather-strip well from one end.



② fasten the fixing screws of outer weather-strip of front side door,tightening torque:3～5N.m.

Replacement of front door window

1) disassembly

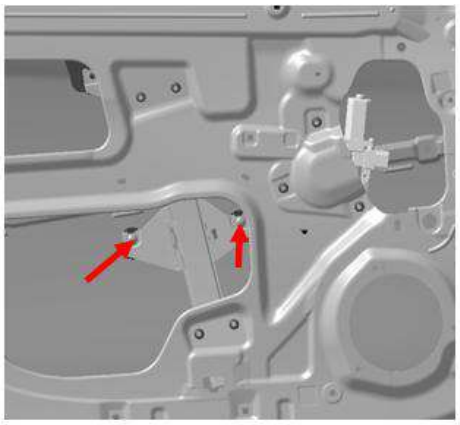
① Disassemble door inner trim panel. Refer to "replacement of front door inner trim panel".

② disassemble water-proof membrane Refer to “Replacement of front door waterproof membrane”.

③ disassemble inner weather-strip of front side door. Refer to “Replacement of inner weather-strip of front side door”

④ install the window regulator switch back,lift the window to the appropriate location, be easy to disassemble the fixing screw for front door window.

⑤ Disassemble the fixing screw for front door window.



⑥ unscrew the fixing bolt of the front door window glass guide rail

⑦ take down the door window glass.

2) assembly

① install the window regulator switch back,lift the window to the middle location,be easy to install the glass in the regulator.

② put the window glass in the door,lift the glass to the top.

③ install the fixing screw,fasten the glass guide rail fixing bolt,tightening torque:9±2N.m.

④ install inner weather-strip of front side door Refer to “inner weather-strip of front side door”

⑤ install waterproof membrane. Refer to “Replacement of front door waterproof membrane”.

⑥ Install the front door inner trim panel. Refer to “replacement of front door inner trim panel”.

Replacement of front door window glass regulator

1) disassembly

① Disassemble door inner trim panel. Refer to “replacement of front door inner trim panel”.

② disassemble water-proof membrane Refer to “Replacement of front door waterproof membrane”.

③ disassemble inner weather-strip of front side door. Refer to “inner weather-strip of front side door”

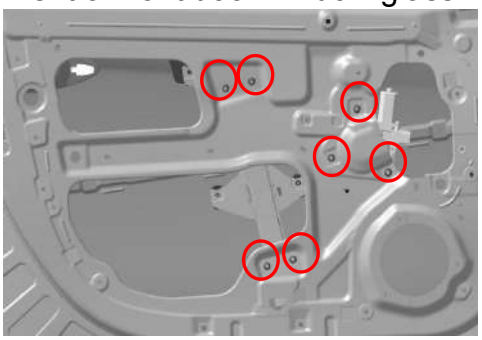
④ Disassemble window glass。 Refer to”Replacement of front door window glass”

⑤ disassemble the fixing nuts of glass bracket.

⑥ disassemble the fixing nuts of glass regulator motor.

⑦ Disconnect the harness connector of the glass regulator motor.

⑧ Take out the glass regulator.



2) assembly

① connect the harness connector of glass regulator, put in glass assembly.

① Install the fixing nuts of front door window glass. Tightening torque: 9 ± 2N.m

③ Install the fixing nuts of front door window regulator motor. Tightening torque: （9±2）N.m

③ Install door glass. Refer to”Replacement of front door window glass”

⑤ install inner weather-strip of front side door Refer to “Replacement of inner weather-strip of front side door”

⑥ install waterproof membrane. Refer to “Replacement of front door waterproof membrane”.

⑦ Install the front door inner trim panel. Refer to “replacement of front door inner trim panel”.

Replacement of front door window glass groove

1) disassembly

① Disassemble door inner trim panel. Refer to “replacement of front door inner trim panel”.

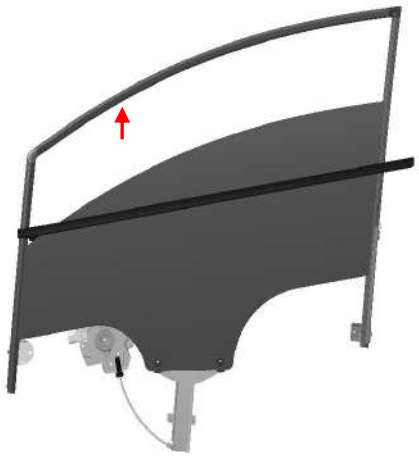
② disassemble water-proof membrane Refer to “Replacement of front door waterproof membrane”.

③ disassemble inner weather-strip of front side door. Refer to “inner weather-strip of front side door”

④ Disassemble outer weather-strip of front door window. Refer to “Replacement of outer weather-strip of front door window”

⑤ Disassemble window glass Refer to”Replacement of front door window glass”

⑥ Disassemble the front door guide rail



⑦ Disassemble front door guide rail,quarter window,groove.

⑧ Disassemble front door window glass groove.

2) assembly

① After preloading the front door guide rail,quarter window and glass regulator,install them on the door.

② Install outer weather-strip of front door window. Tightening torque: (3～5)N.m Refer to “outer weather-strip of front door window”.

③ Install the glass regulator of front side door Refer to “Replacement of front door

window glass regulator". Tightening torque: (7～11)N.m

③ Install door glass. Refer to"Replacement of front door window glass"

⑤ install inner weather-strip of front side door Refer to "Replacement of inner weather-strip of front side door"

⑥ install waterproof membrane. Refer to "Replacement of front door waterproof membrane".

⑦ Install the door inner trim panel. Refer to "replacement of front door inner trim panel".

Replacement of front door window glass lower guide rail

1) disassembly

① Disassemble door inner trim panel. Refer to "replacement of front door inner trim panel".

② disassemble water-proof membrane Refer to "Replacement of front door waterproof membrane".

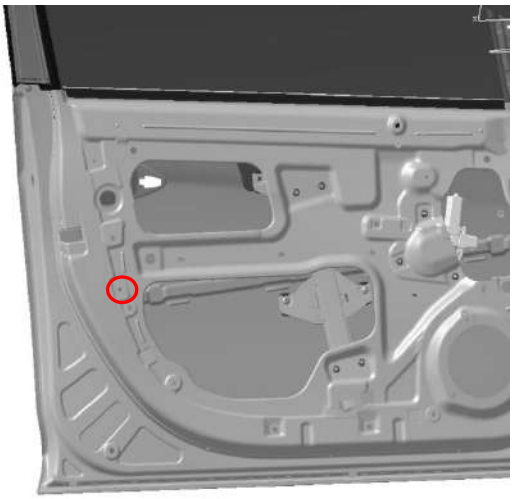
③ disassemble inner weather-strip of front side door. Refer to "inner weather-strip of front side door"

④ Disassemble outer weather-strip of front door window. Refer to "Replacement of outer weather-strip of front door window"

⑥ Disassemble window glass Refer to"Replacement of front door window glass"

⑦ Pull out the lower guide rail groove.

⑧ loosen the fixing bolt of lower guide rail,take down the guide rail



2) assembly

① install the guide rail,tighten the fixing bolt,tightening torque is (6～10)N.m

② install front door window glass regulator groove,install the two connecting feet first

③ Install the glass regulator of front side door Refer to “Replacement of front door window glass regulator”. Tightening torque: (7～11)N.m

③ Install door glass. Refer to”Replacement of front door window glass”

⑤ Install outer weather-strip of front door window. Tightening torque: (3～5)N.m Refer to “outer weather-strip of front door window”.

⑥ install inner weather-strip of front side door Refer to “Replacement of inner weather-strip of front side door”

⑦ install waterproof membrane. Refer to “Replacement of front door waterproof membrane”.

⑧ Install the front door inner trim panel. Refer to “replacement of front door inner trim panel”.

Replacement of rear door stopper

1) disassembly

①Remove the fixing bolt connecting the body and the stopper with a 12mm socket spanner.

■tightening torque: 16.7～25.5 N•m

② Remove 2 fixing bolts connecting the door and the stopper with a 10mm socket spanner.

■ Tightening torque:7.8～11.8 N•m

2) assembly

Follow the opposite sequence of the disassembly procedures.

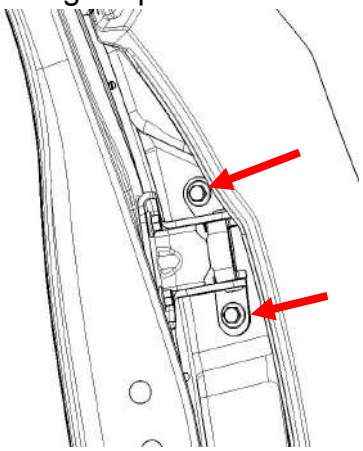
Replacement of rear side door hinge assembly

1) disassembly

① Disassemble door stopper, Refer to “door stopper replacement”;

② Remove the fixing bolt connecting the door and the hinge with a 12mm socket spanner.

■Tightening torque:29～35 N•m



Attention：

■Disassembly should be done in several times. Do not loosen all parts in one time.

■Please disassemble from lower part to upper part.

③ unplug the rubber sleeve of door harness, then unplug the door's electric connector.

④ lift down vehicle door with assistance of other people.

2) assembly

Follow the opposite sequence of the disassembly sequence.

Attention：

■ tightening should be done in several times during the installation. Do not tighten all bolts well in one time.

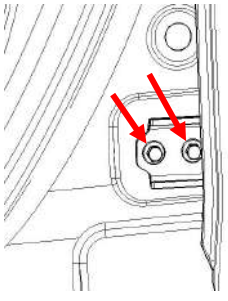
Replacement of rear door hinge

1) disassembly

① Remove the front side door assembly Refer to "Replacement of front side door assembly"

② Remove the fixing bolt connecting the body and the hinge with a 12mm socket spanner.

■ Tightening torque:29～35 N•m



■ Assembly

Follow the opposite sequence of the disassembly procedures.

Replacement of rear door waterproof membrane:

1) disassembly

① Disassemble rear door inner trim panel.

② Disassemble wire harness fixing buckle.

③ separate waterproof membrane and take it down.

2) assembly

Follow the opposite sequence of the disassembly procedures.

Attention：

■When assembling the waterproof membrane, the waterproof membrane should not be allowed to cover the mounting hole of the door trim panel.

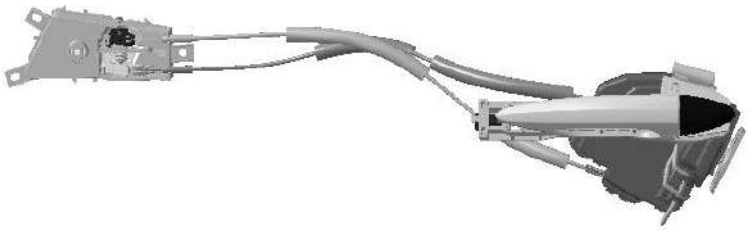
■Do not touch the surface of the adhesive to reduce the effect of the reattachment weakening.

Replacement of rear door lock assembly

1) disassembly

① Disassemble rear door inner trim panel.

②disassemble water-proof membrane



③ Pull out the connector

④ Pull out the lower guide rail groove.

⑤ disassemble glass guide rail

⑥ disassemble the fixing bolt of lock assembly.

⑦ disconnect the connection between door outward rod and lock.

⑧ pull out lock body assembly

2) assembly

Follow the opposite sequence of the disassembly procedures.

Note：

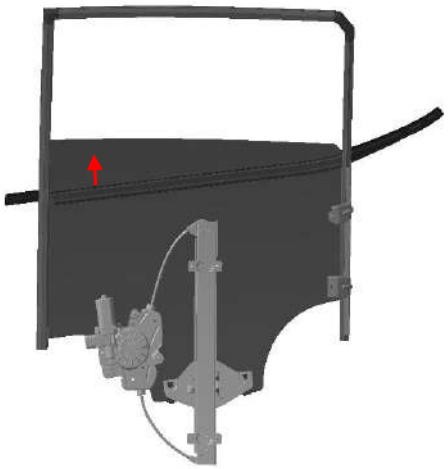
Hint: replacement of components on left and right rear door are the same. Please lift the glass to the highest point before disassembling.

Replacement of inner weather-strip of rear side door

1) disassembly

① Disassemble door inner trim panel. Refer to “replacement of rear front side door inner trim panel”.

② pull out one end of the weather-strip,take it down slowly.



Attention：

■ Do not exert too much force when disassembling , which may cause parts’ deformation;

2) assembly

① Make the rear side door inner weather-strip align to the B column, keep the gap 1~2mm, install the front end first, and then slowly install the weather-strip well.

Replacement of outer weather-strip of rear door window

1) disassembly

① Descend the door glass to the lower end.

② unscrew the two fixing screws of outer weather-strip of door

③ Disassemble outer weather-strip of rear door

Attention：

■ Do not exert too much force when disassembling , which may cause parts’ deformation;

2) assembly

① Make the front side door outer weather-strip align to the B column frame, and then slowly install the weather-strip well from one end.

② fasten the fixing screws of outer weather-strip of rear side door,tightening torque:3～5N.m.

Replacement of rear door window

1) disassembly

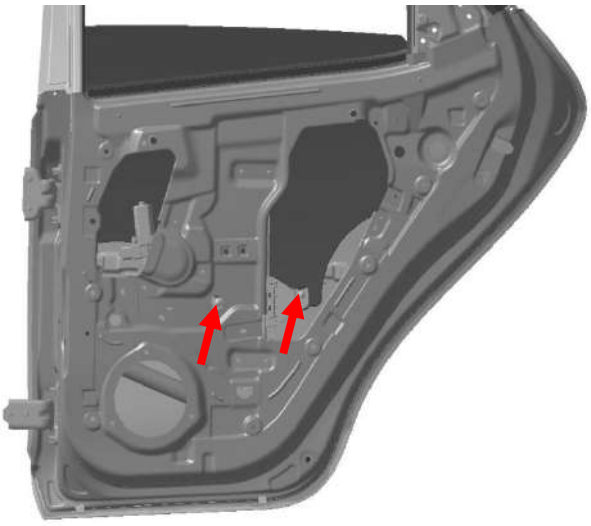
① Disassemble door inner trim panel. Refer to “replacement of rear front door inner trim panel”.

② disassemble water-proof membrane Refer to “Replacement of rear door waterproof membrane”.

③ Disassemble outer and inner weather-strip of rear side door Refer to “Replacement of inner and outer weather-strip of rear side door”

④ install the window regulator switch back,lift the window to the appropriate location,be easy to disassemble the fixing screw of rear door window glass

⑤ Disassemble the fixing screw of rear door window



⑥ Disassemble the fixing screw of rear door window glass lower guide rail.

⑦ take down the door window glass.

2) assembly procedures:

① install the window regulator switch back,lift the window to the appropriate location,be easy to install the fixing screw of door window glass.

② put the window glass in the door,align to the mounting hole.

③ install the fixing screw of door window glass,tightening torque:(7～11)N.m.

① install lower fixing bolt of the rear guide rail,tightening torque is (6～10)N.m

⑤ install inner weather-strip of rear side door Refer to “Replacement of inner weather-strip of rear side door”

⑥ install waterproof membrane. Refer to “Replacement of rear door waterproof membrane”.

⑦ Install the front door inner trim panel. Refer to “replacement of rear front door inner trim panel”.

Replacement of rear door window glass regulator

1) disassembly

① Disassemble door inner trim panel. Refer to “replacement of rear front door inner trim panel”.

② disassemble water-proof membrane Refer to “Replacement of rear door waterproof membrane”.

③ disassemble inner and outer weather-strip of rear side door. Refer to “inner and outer weather-strip of rear side door”

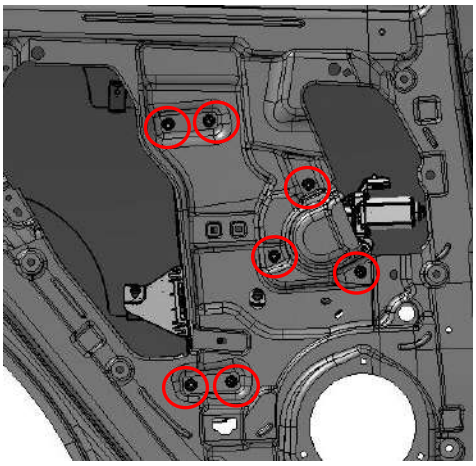
④ Disassemble window glass Refer to”Replacement of rear door window glass”

⑤ Disconnect the harness connector of the glass regulator motor.

⑥ disassemble the fixing nuts of glass bracket.

⑦ disassemble the fixing nuts of glass regulator motor.

⑧ Take out the glass regulator.



2) assembly

① put glass regulator in,install fixing nuts of rear door window glass bracket. Tightening torque: (7～11)N.m

② Install the fixing nuts of rear door window regulator motor. Tightening torque: (7～11)N.m

Install rear door window glass. Refer to"Replacement of rear door window glass"

④ connect the harness connector of rear door window glass regulator.

⑤ install waterproof membrane. Refer to "Replacement of rear door waterproof membrane".

⑥ install inner and outer weather-strip of rear side door Refer to "Replacement of inner and outer weather-strip of rear side door"

⑦ Install the front door inner trim panel. Refer to "replacement of rear front door inner trim panel".

Replacement of rear door window glass groove

1) disassembly

① Disassemble door inner trim panel. Refer to "replacement of rear front door inner trim panel".

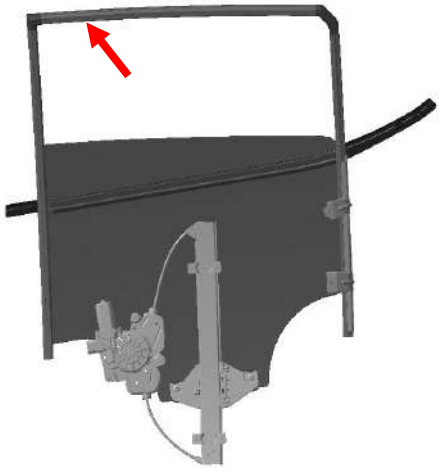
② disassemble water-proof membrane Refer to "Replacement of rear door waterproof membrane".

③ disassemble inner weather-strip of rear side door. Refer to "Replacement of inner weather-strip of rear side door"

④ Disassemble window glass Refer to"Replacement of rear door window glass"

⑤ Disassemble outer weather-strip of rear door window. Refer to “Replacement of outer weather-strip of rear door window”

⑥ Disassemble rear door window glass groove.



2) assembly

① install rear door window glass regulator groove,install the two connecting feet first

② Install door widow glass. Refer to”Replacement of rear door window glass”

③ install inner weather-strip of rear side door. Refer to “Replacement of inner weather-strip of rear side door”

④ Install outer weather-strip of front door window. Tightening torque: (3～5)N.m Refer to “outer weather-strip of rear door window”

⑤ install waterproof membrane. Refer to “Replacement of rear door waterproof membrane”.

⑥ Install the front door inner trim panel. Refer to “replacement of rear front door inner trim panel”.

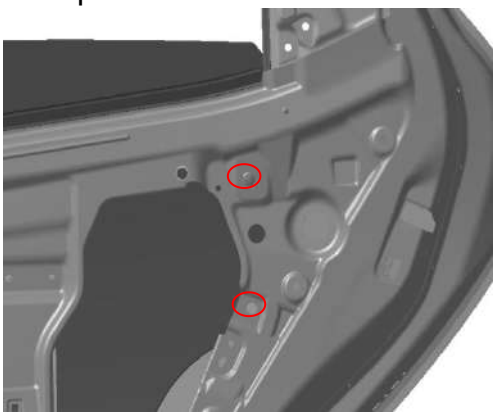
Replacement of rear door window glass lower guide rail

1) disassembly

① Disassemble door inner trim panel. Refer to “replacement of rear front door inner trim panel”.

② disassemble water-proof membrane Refer to “Replacement of rear door waterproof membrane”.

③ install glass regulator back,lift the glass to the top.



④ Pull down the lower guide rail glass groove.

⑤ loosen the two fixing bolts of lower guide rail,take down the guide rail

2) assembly

① Install lower guide rail,fasten the upper fixing bolt,don't fasten the lower fixing bolt temporarily. Tightening torque: (6～10)N.m

② install rear door window glass regulator groove,install the two connecting feet first

③ Install door window glass. Refer to"Replacement of rear door window glass"

④ fasten the lower fixing bolt of guide rail. Tightening torque: (6～10)N.m

⑤ install inner weather-strip of rear side door Refer to "Replacement of inner weather-strip of rear side door"

⑥ Install outer weather-strip of front door window. Tightening torque: (3～5)N.m Refer to "outer weather-strip of rear door window"

⑦ install waterproof membrane. Refer to "Replacement of rear door waterproof membrane".

⑧ Install the front door inner trim panel. Refer to "replacement of rear front door inner trim panel".

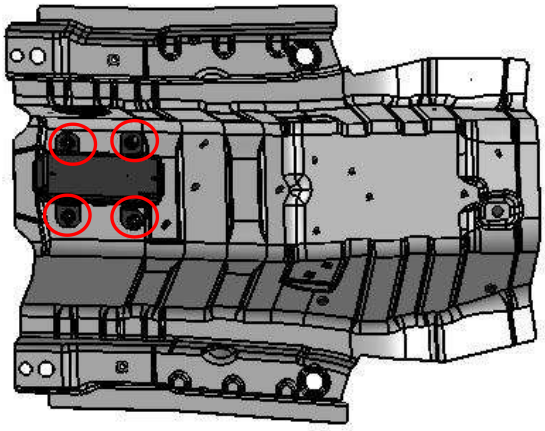
Replacement of door electric window anti-pinch controller

1) Disassembly procedures

① Disassemble the auxiliary dashboard,refer to "auxiliary dashboard".

② disconnect the connector between window anti-pinch controller and the wire harness.

③ loosen the four fixing bolts of window anti-pinch controller,take down the controller.



2) Disassembly procedures

① put in window anti-pinch controller,fasten the four mounting bolts,tightening torque （7~11）N.m.

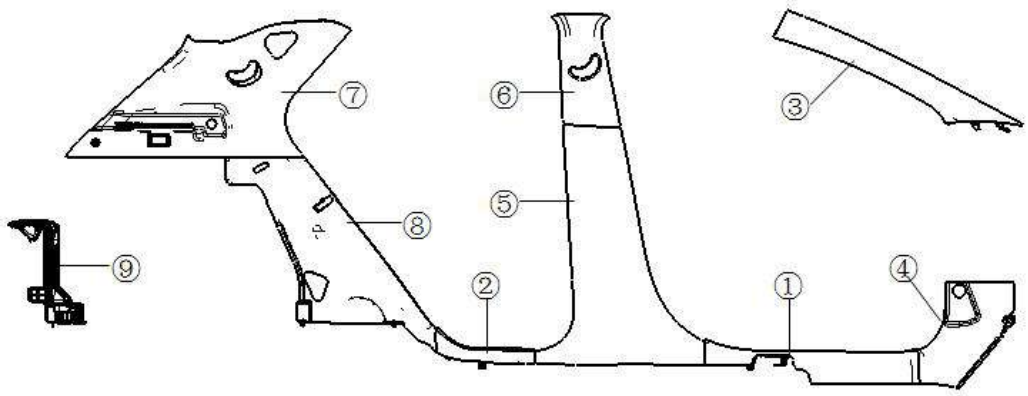
② connect the two connectors of window anti-pinch controller.

③ Install the auxiliary dashboard.

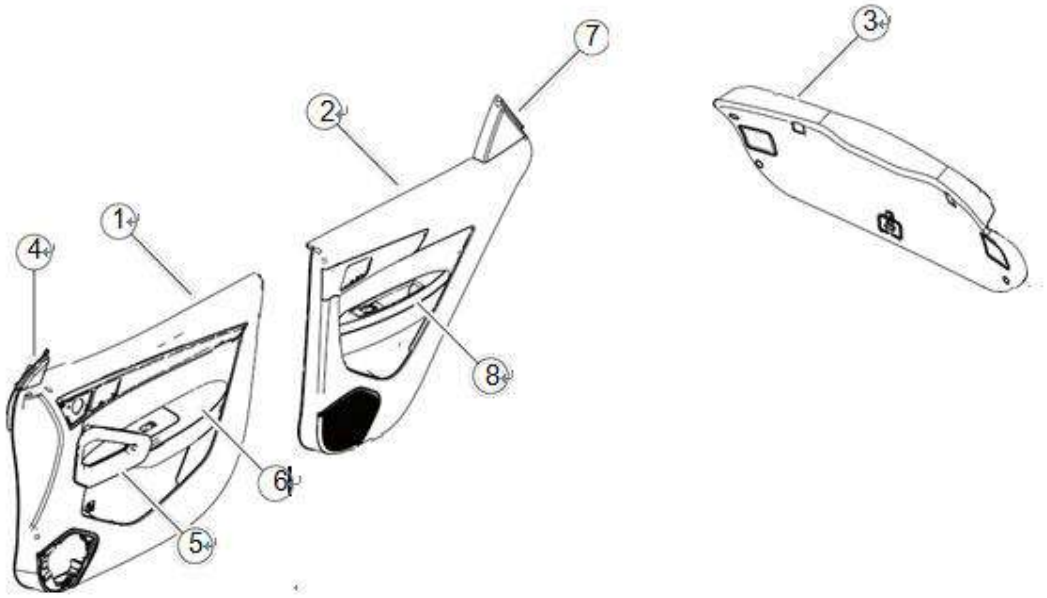
Side wall door trim panel

Disassembly and installment

Explosive view



①Front door threshold protect panel assembly ② rear door threshold protect panel assembly ③ A column upper trim panel assembly ④ A column lower trim panel assembly ⑤ B column lower trim panel assembly ⑥ B column upper trim panel assembly ⑦ C column lower trim panel assembly ⑧ C column upper trim panel assembly ⑨ Tail door threshold protect panel assembly

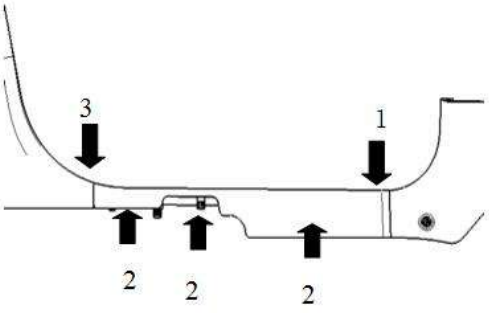


①Front door trim panel assembly ② rear door trim panel assembly ③ tail door trim panel assembly
④ Front door triangle window cover assembly ⑤ front door inclined handle ⑥ Front door handrail panel
⑦ Rear door triangle window cover assembly ⑧ Rear door handrail panel

Guard plate of front sill guard

Disassembly:

- Pry the structure between front end of front door threshold protect panel and B column lower protect panel with slotted screwdriver;
- Disassemble the three threshold iron buckles in turn;
- Pry the structure between rear end of front door threshold protect panel and B column lower protect panel with slotted screwdriver;



Assembly:

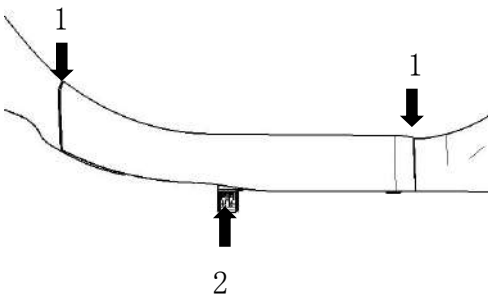
When installing,align the clamping structure and bolt structure of both end of front door threshold protect panel with A column lower protect panel and B column lower protect panel. And aligning the fastener of threshold protect panel with threshold iron buckle, clap the buckles into the metal plate holes.

Guard plate of rear sill guard

Disassembly

Pry the clamping structure between rear end of rear door threshold protect panel and B column lower protect panel、 C column lower protect panel with slotted screwdriver;

Disassemble the clamp between the two threshold iron fastener, and remove the rear door threshold protect panel.



Installation

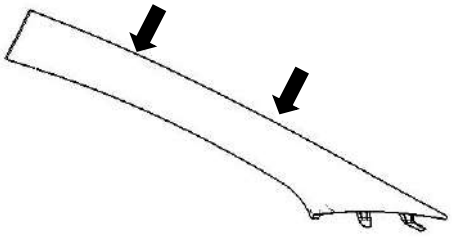
When install, insert the clamping structure of front and rear end of the rear door threshold protect panel fastener into the B and C column lower protect panel, and aligning with the iron buckles of body hole site to clap tightly.

A column upper trim panel assembly

Disassembly:

Remove the front door frame adhesive tape, pry the upper end of A column with slotted screwdriver, remove the one plastic clips successively and the one

iron buckle, and then remove the A column upper protect panel from the dashboard junction.



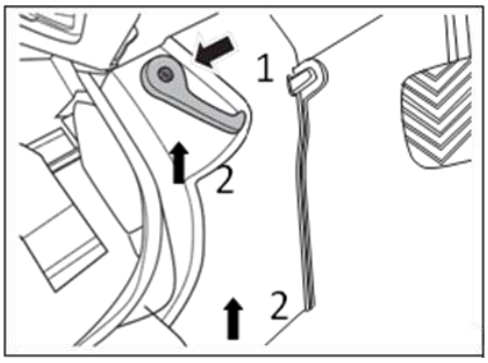
Assembly:

When installing, insert the lower end of the A column into the instrument panel, then aligning the fastener with body hole site to press in and clap tightly.

A pillar lower protect panel assembly

Disassembly:

- Remove the front threshold panel assembly and use the pry bar to lift the engine cover on the lower trim panel to open the handle. ;
- Use a pry bar to pry up the two buckles connecting A column bottom guard and vehicle body,take down the A pillar lower trim panel.



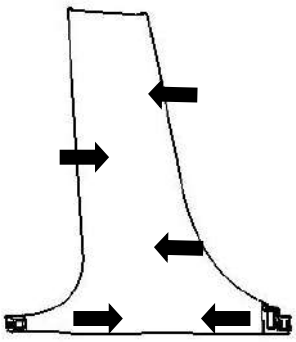
Assembly:

When installing,put A pillar in installation position,clamp the buckles well,install front side door frame strip. Put the engine open handle in the installation position,fasten the buckles well.

B pillar lower protect panel assembly

Disassembly:

- Disassemble the front threshold protect panel assembly, disassemble rear threshold protect panel assembly;
- Adjust the front row seat to the foremost position,Use a pry bar to pry up the buckles connecting B column bottom guard and vehicle body,take down the B pillar lower trim panel.



Assembly:

When installing,put B pillar in installation position,clamp the buckles well,install front and rear side door frame strips. Install the protect panel of the rear door threshold install the protect panel of the front door threshold

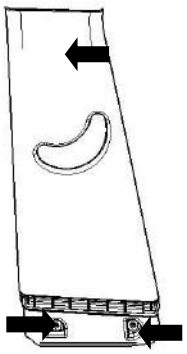
NOTE:When removing the side column trim panel, you should adjust the front seat position so as to facilitate the disassembly of the B lower trim panel assembly.

B pillar upper trim panel assembly

Disassembly:

- Disassemble B column lower protect panel;

- **Remove the front and rear door frame adhesive tapes;**
- Slide up the trim cover at the fixed point below the belt to expose the entire lower fixation points, and then unscrew the one fixing bolt
- Pry the three buckles which fastened the B column upper protect panel to the body with slotted screwdriver, pull out the B column lower protect panel.



Assembly:

When installing, aligning the B column lower trim panel fastener with the body hole site to press into it and clap it tightly.

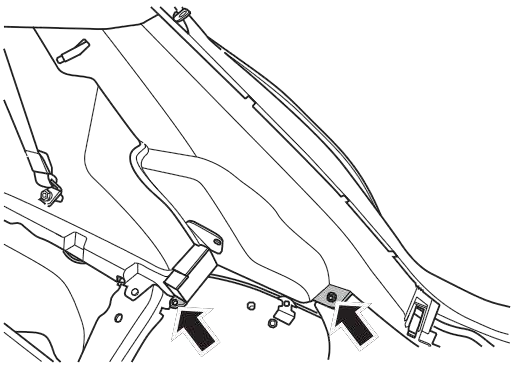
Attention:

Safety belt lower fixed point should be disassembled when remove the side column trim panel.

C pillar lower protect panel assembly

Disassembly:

- Remove rear door threshold protect panel assembly,remove rear seat cushion assembly,remove rear seat backrest assembly,Remove the two bolts attached to the body and remove the bracket.
- Remove the 2 fixing screws fixing C pillar lower trim panel's bottom end and vehicle body.
- Pry up the connection of the body of the C column lower trim panel and the body.
- Take down C column lower trim panel



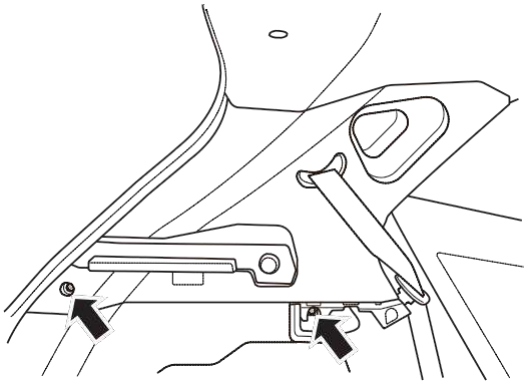
Assembly:

When installing, connect rear seat backrest lower fixing bracket and the upper end of C column protect panel with C column upper protect panel, and then press the C column lower protect panel into metal plate hole, tighten the lower screw of the C column lower protect panel with cross screwdriver.

C pillar upper protect panel assembly

Disassembly:

- Remove rear door threshold protect panel assembly,remove rear seat cushion assembly,remove rear seat backrest assembly,Remove rear seat backrest lower fixing bracket assembly,remove C column lower protect panel.
- Remove the one fixing bolt of rear seat's safety belt.
- Remove 2 fixing screws connecting C column upper trim panel and car body.
- Pry up 8 buckles connecting C pillar upper trim panel and vehicle body.
- disconnect the connection between C pillar upper trim panel and trunk light.
- Take down C column upper trim panel



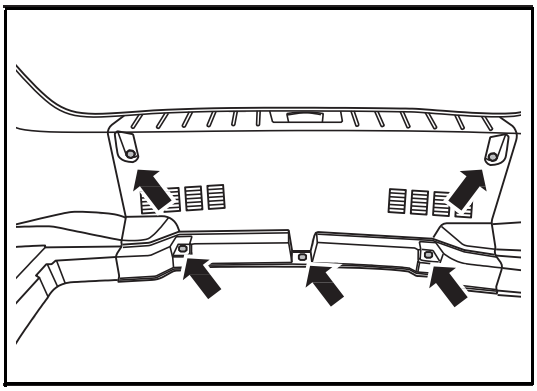
Assembly:

When installing,connect the connection between C pillar upper trim panel and trunk light,remove rear side door frame strip、the connection between tail sealing strip and C column upper trim panel assembly,put C column upper trim panel in installation position,clamp the buckles. Tighten the two fixing screws,install the rear side door trim strip、tail sealing strip. Fasten the bolt of rear seat's safety belt fixing point.

Tail door threshold assembly

Disassembly:

- Open trunk cover,take out spare tire cover buckle.
- Remove 5 expansion buckles on the tail door threshold assembly.
- pry the 6 buckles connecting tail door threshold assembly and vehicle body with a pry bar.
- Take down tail door threshold assembly。



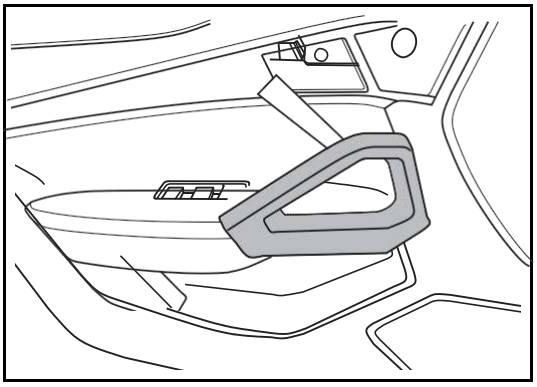
Assembly:

When installing,put tail door threshold assembly in the installation position,clamp the buckles well,then install 5 expansion buckles on the tail door threshold assembly,install tail door sealing strip,install spare tire cover and close the trunk cover.

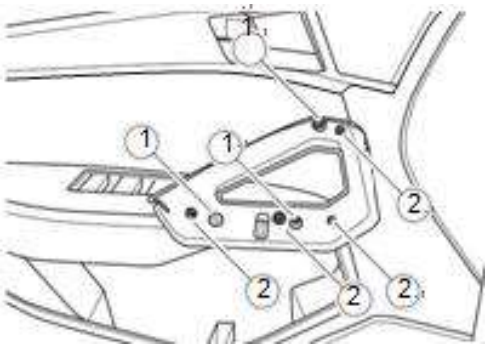
front door handle

Removal

- Open the front door,pry the front door handle outer board assembly;



- Remove the 7 fixing screws of front door handle inner board,take down front door handle. ;



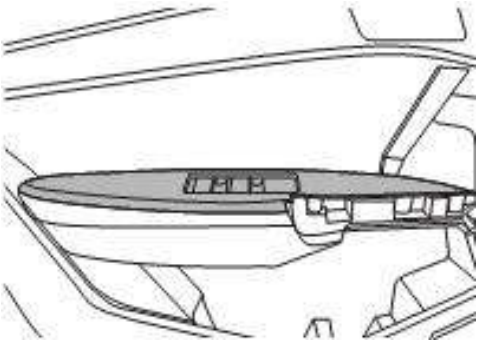
Assembly:

When installing,put front door handle inner board in the installation position,fasten the 7 fixing screws of front door handle,put front door handle in the installation position,clamp the buckles well.

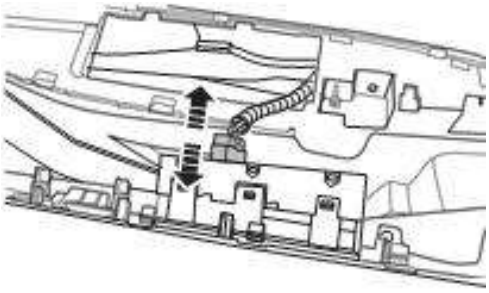
front door armrest

Disassembly:

- Disassemble front door handle See front door handle
- Pry the connection between front door handle and front door trim panel with a pry bar.



- Disconnect wire harness connector,take down front door armrest



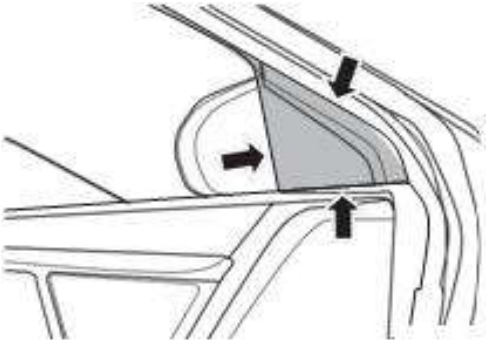
Assembly:

When installing.connect the connector,put front door armrest in installation position and fasten the buckles well,install the front door handle at last.

Front door triangle window cover

Disassembly:

- pry the buckle that connect triangle cover board and metal plate of front door，front door triangle window cover with a pry bar.



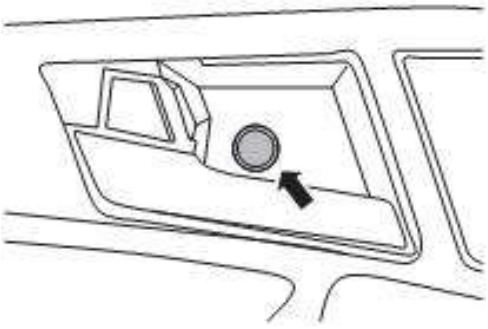
Assembly:

When installing,put Front door triangle window cover in installation position and clamp it tightly.

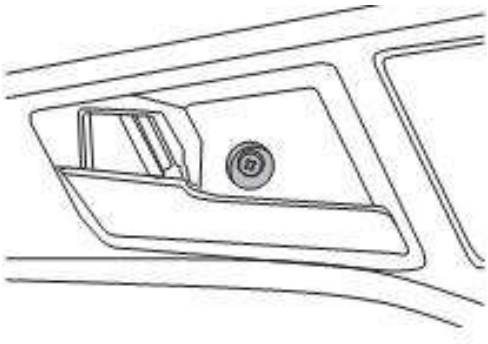
front door trim panel

Disassembly:

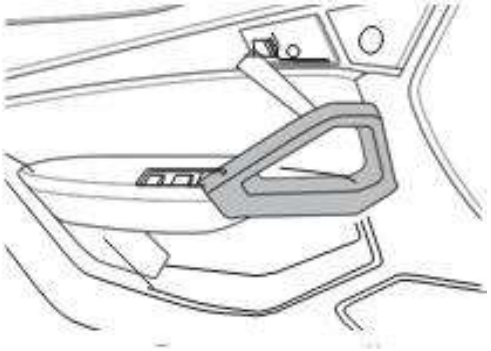
- Disassemble front door armrest refer to front door armrest
- Remove front door triangle window cover refer to front door triangle window cover
- Pry the front door inner handle screw cover.



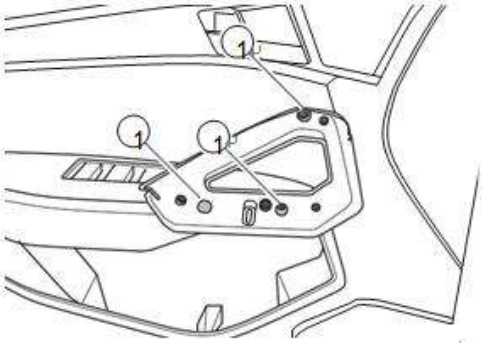
- Remove the 1 fixing screw in the screw cover



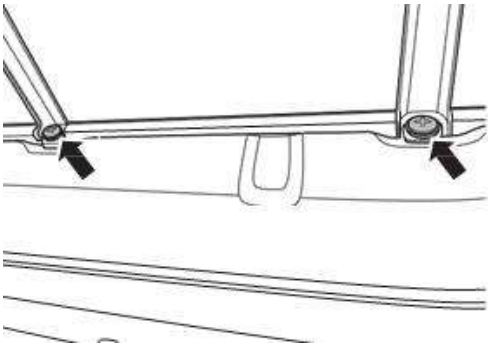
- Pry the front door handle,and take it down



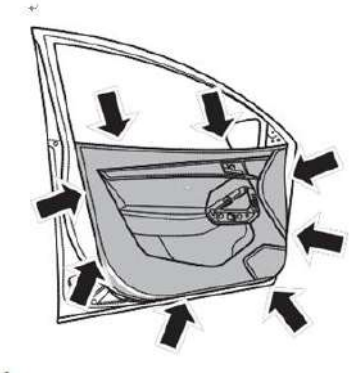
- Remove the 3 fixing screws① connecting front door handle inner board and front door.



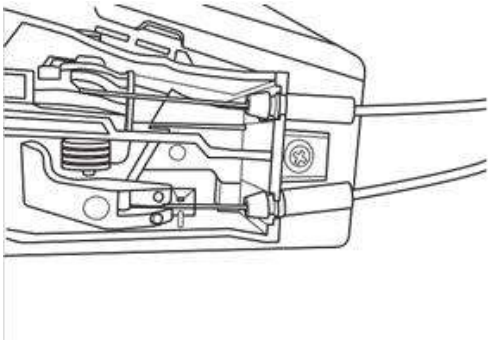
- Remove the 2 fixing screws connecting front door and front door trim panel assembly.



- Pry 8 buckles connecting front door inner trim panel and the vehicle body.



- Disconnect front inner handle cable and the inner locking cable.



- Disconnect main switch connecting harness of window regulator.
- Remove front door trim panel assembly.

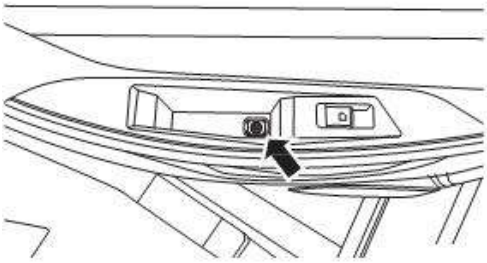
Assembly:

When installing,connect door wire harness and inner open handle well,then press front door trim panel into metal plate,fasten two fixing screws of front door trim panel,fasten inner open handle screw,install door armrest,install front door handle,at last install front triangle window trim panel.

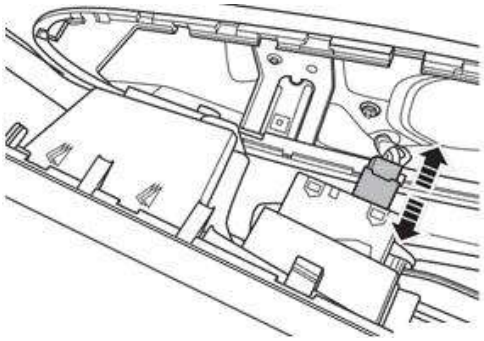
Rear armrest panel assembly

Disassembly:

- Pry armrest panel cover with a pry bar.
- Remove the 1 fixing screw of rear armrest panel cover



- Pry the connection between armrest panel and rear door inner trim panel with a pry bar.
- Disconnect wire harness connection,take down door armrest



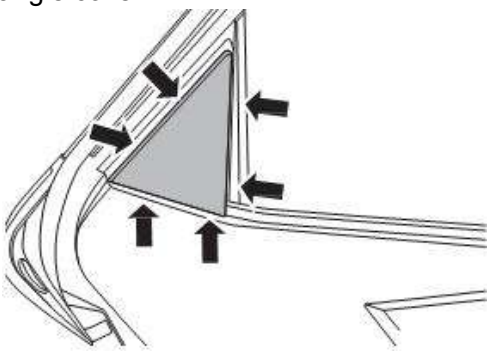
Assembly:

When installing,connect wire harness well,then connect armrest panel and rear door inner trim panel,fasten one screw,install the armrest panel cover.

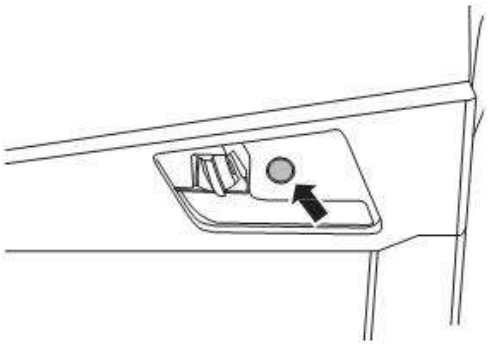
Rear door inner trim panel

Disassembly:

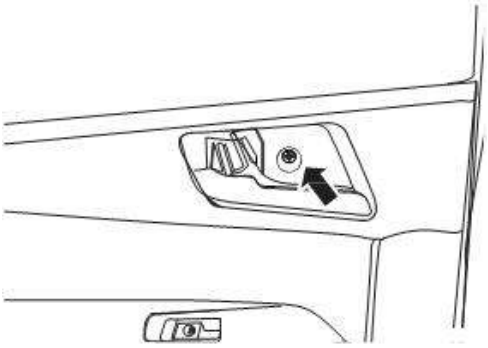
- Open front door,first pry the three plastic buckles on rear triangle cover in turn with a straight screwdriver,take down rear triangle cover .



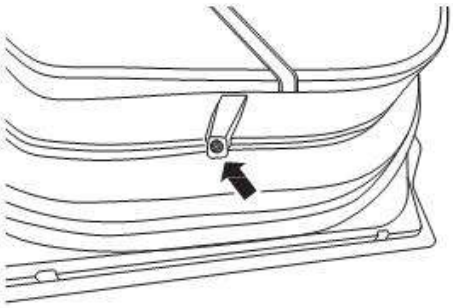
- Pry up the rear door inner handle cover.



- Remove the screws in the cover.



- Remove rear door armrest panel refer to rear door armrest panel assembly.
- Remove the one fixing screws from the lower part of the trim panel to the door.



- Unscrew the wire drawing of inwards handle of the rear door;
- Disconnect rear door wire harness
- Remove rear door inner trim panel assembly.

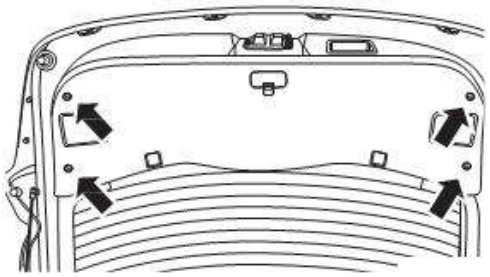
Assembly:

First ,connect door wire harness and inner open handle well,then press rear door trim panel into metal plate,fasten one fixing screws of rear door trim panel,fasten inner open handle screw,install door armrest,at last install rear triangle window trim panel.

Tail door trim panel assembly

Disassembly:

- Remove the 4 fixing screws connecting tail door and tail door trim panel assembly.
- Pry 11 buckles connecting tail door and tail door trim panel.
- Remove tail door trim panel assembly.



Assembly:

Install the 11 buckles connecting tail door and tail door trim panel,then fasten the 4 fixing screws connecting tail door and tail door trim panel assembly.

Dashboard

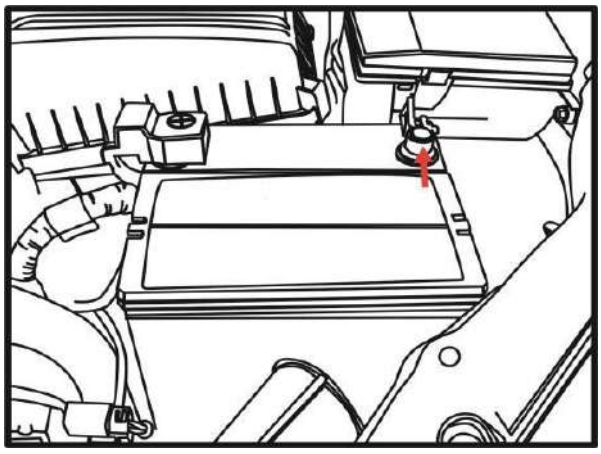
Precautions

- Strictly compliance with airbag system operation matters needing attention, otherwise it will cause vehicle damage and personal injury.
- The battery negative terminal must be removed before removing the wire harness and connectors, and waiting for at least 1min, otherwise it will cause damage to the vehicle.
- When removing and installing components, protect the parts to be removed with cloth to prevent damage.
- Remove the metal clips from the decoration, wrapped flat screwdriver blade with cloth.
- Be careful not to damage the body parts.
- Ensure the clip firmly installed in the hole on the vehicle body when install body trim parts, and then carefully to press them into body.
- Some components need two persons to operate when one person can not complete the assembly and disassembly to prevent falling.
- Don't force too much when assembly and disassembly some parts, otherwise may cause the deformation of the part.

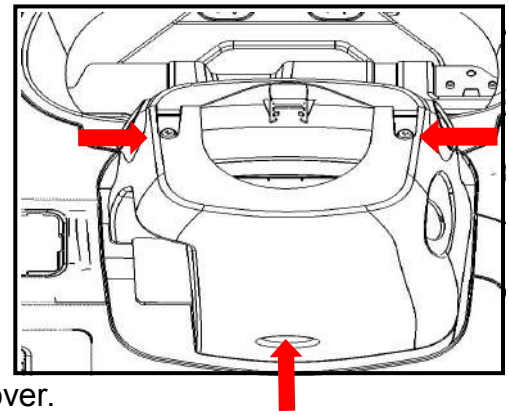
Disassembly and installment

steering column trim cover

- Disconnect the battery negative.



- Remove steering wheel assembly. Refer Steering Wheel Replacement
- Remove the fixing screw of steering column lower cover.

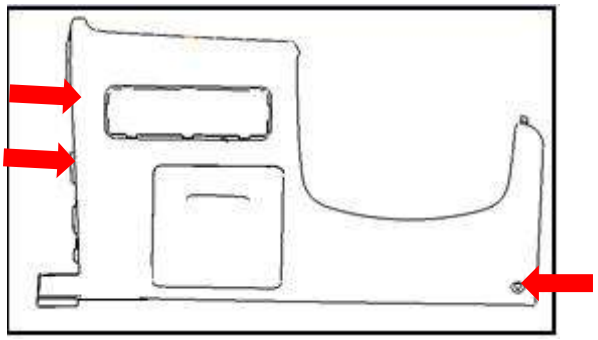


- Remove steering column upper、lower trim cover.
- Install in the reverse order above.
- Note that the steering column shall be placed in the center position

■ Tightening torque:1.4 N·m

instrument panel lower protection plate on the driver side

- Remove the dashboard cover (left end) and remove the fixing screws(4 in total) of lower protection plate on driver side.

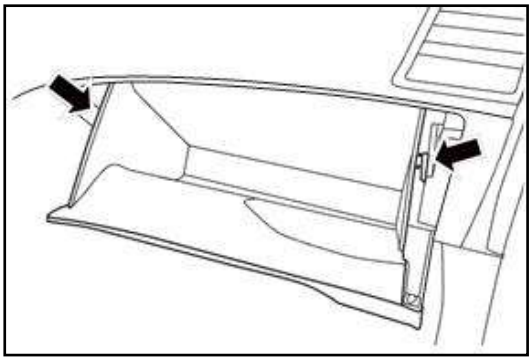


- Pull the lower protect panel out so that the buckle is separated.
- Disconnect the socket of wire harness and connector which connect the lower protection panel the driver's side.
- Follow the opposite sequence of the disassembly to assemble the lower side protection panel.

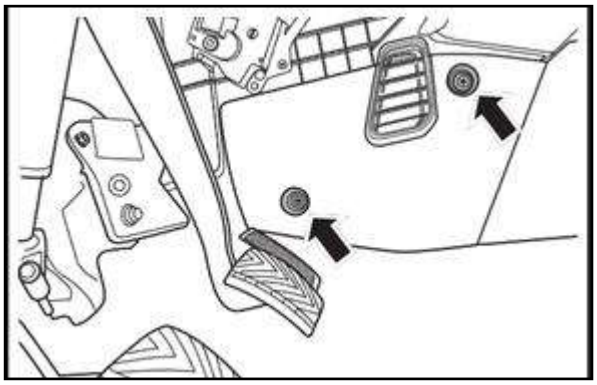
■ Tightening torque:1.4 N·m

Glove box

- Open glove box to the maximum opening angle. Pull the side wall of the glove box inwards and pull out at the same time, so that the both sides stop cylinders slide out.
- Flatten the glove box and pull out the glove box from the opening of the dashboard.
- Follow the opposite sequence of the disassembly to assemble.



Auxiliary dashboard extender



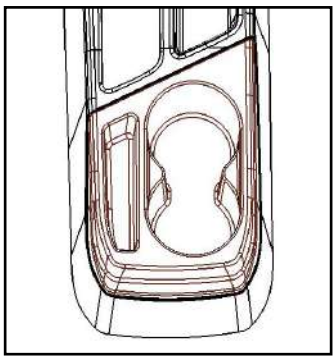
Disassembly:

- Disassemble the fixing buckle of left extender.
- Remove the buckle near the back end of the vehicle and take down left extender.
- The right side method is the same as the left one.

Installation

Follow the opposite sequence of the disassembly to assemble

Auxiliary dashboard cup holder cover



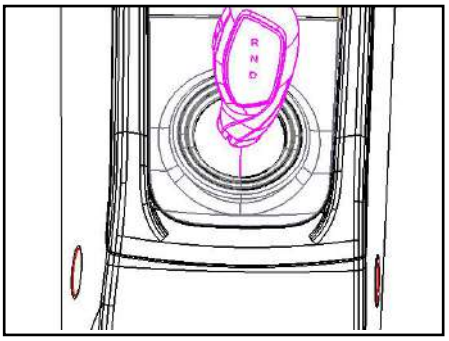
Disassembly

- Pry up the cup holder cover assembly in the end of auxiliary dashboard .

Assembly

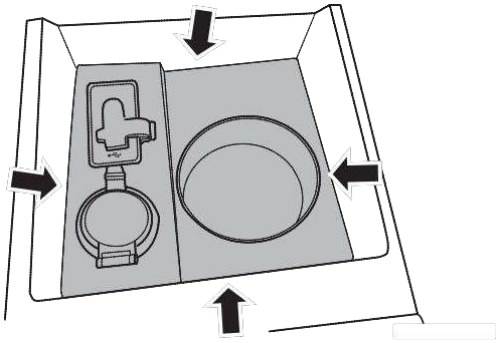
- put cup holder cover in installation position and clamp it tightly.

shift cover



- Separate the connection between shift cover and auxiliary dashboard panel,take down the cover

front storage box assembly



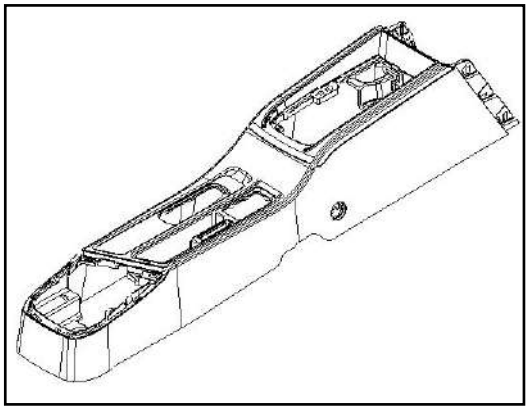
Removal

- Remove shift cover,take down the cover
- Pry front glove box cover with a pry bar
- Disconnect wire harness connection, take down front front glove box cover

Assembly

Follow the opposite sequence of the disassembly to assemble

Auxiliary dashboard body



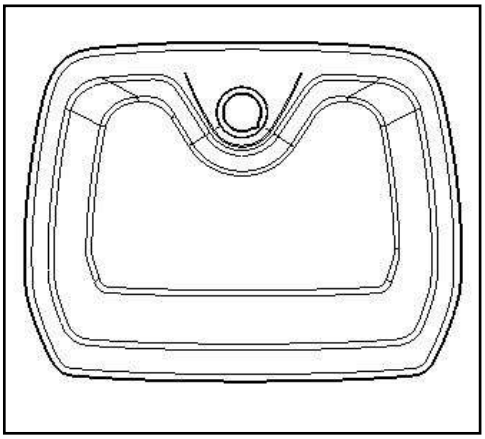
Disassembly

- Remove auxiliary dashboard cup holder cover, take down the cover.
- Remove auxiliary dashboard control panel, take down the panel.
- Remove front glove box
- Remove screw cover on the two sides of auxiliary dashboard
- Remove the fixing screws(three) connecting to the body.
  - Tightening torque:1.4 N·m
- Remove the fixing bolt(one) connecting to the body.
  - Tightening torque: 5-7 N.m.
- Take down S switch panel.
- EPB is standard configuration,take down EPB switch panel.
- (Hand brake choosing configuration:pull the brake to the max angle) take down auxiliary dashboard body.

Installation

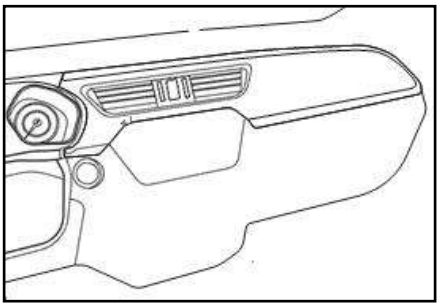
- Follow the opposite sequence of the disassembly sequence to install the auxiliary dashboard front body.
  - Tightening torque:1.4 N·m
  - Tightening torque: 5-7 N.m.

central glove box cover



- Pry front glove box cover with a pry bar.
- Disconnect wire harness connection,take down central glove box cover

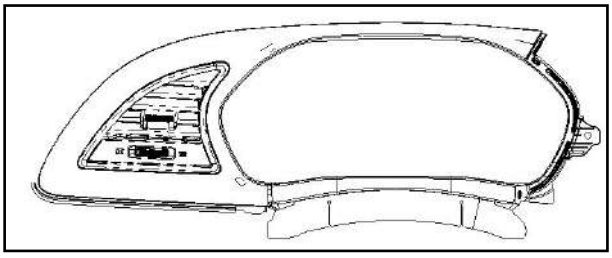
Central right trim panel



- Pry the fixing buckles of central right trim panel carefully
- Disconnect wire harness connection,take down central glove box cover assembly.

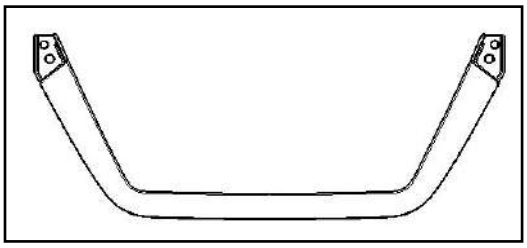
Central left trim panel

- Disassemble the central right trim panel. Take down the central trim panel.
- Use cross screwdriver to disassemble the fixing screws of right trim panel.
  - ■ Tightening torque:1.4 N·m
- Pry the fixing buckles of central left trim panel carefully



MP5 panel

- Disassemble the central right trim panel. Take down the central trim panel.
- Disassemble the central left trim panel. Take down the central left trim panel.
- Use cross screwdriver to disassemble the fixing screws of MP5 panel.
  - Tightening torque:1.4 N·m
- Pry MP5 panel with a pry bar.



left and right end cover of dashboard

- Pry off the cover fixing bucklesù(four in total) with buckle screwdriver

or straight screwdriver, remove end cover of dashboard.

- The left and right sides methods are the same.

Dashboard

- Disconnect the battery negative.
- Remove steering wheel assembly. Refer Steering Wheel Replacement.
- Remove steering column trim cover. Refer to “replacement of steering column trim cover”
- Remove airbag clock spring. Refer to “replacement of airbag Clock Spring”.
- disassemble the instrument panel down protection plate on the driver side. Refer to “replacement of instrument panel down protection plate on the driver side”.
- Remove Combination switch. Refer Combination Switch Replacement.
- Remove the steering column assembly. Refer to “replacement of steering Column Replacement”.

- Remove glove box. Refer to “replacement of glove box”.
- Remove central glove box cover,refer to “replacement of central glove box cover”
- Remove auxiliary dashboard body. Refer to “replacement of auxiliary dashboard body”.
- Remove central left trim panel. Refer to “replacement of central left trim panel”.
- Remove central right trim panel. Refer to “replacement of central right trim panel”.
- Remove MP5 panel. Refer to “replacement of MP5 panel”.
- Remove MP5. Refer to “replacement of MP5 ”.
- Remove air conditioner controller. Refer to “replacement of air conditioner controller”.
- Remove combination instrument assembly. Refer Combination Instrument Assembly Replacement.
- Remove dashboard left and right end cover Refer Replacement of Left and Right End Cover of Dashboard
- Remove left front door and right strip**.** Refer Replacement of Left Front Door and Right Strip**.**
- Remove the left and right lower trim panels on the A column. Refer Replacement of the Left and Right Lower Trim Panels on the A Column.
- Remove the left and right upper trim panels on the A column. Refer Replacement of the Left and Right Upper Trim Panels on the A Column.
- Remove the fixing nuts of combination instrument、MP5、left and right side、central lower side、glove box、left and right A pillar.
  - Tightening torque:5 N·m
- Disconnect all electrical connectors.
- Lift the dashboard tube girder with the help of the assistant.
- Assemble according to the opposite sequence of the disassembly procedures.

Dashboard bracket

- Remove instrument panel crossbar welding assembly. Refer Dashboard Assembly Replacement.
- Disconnect all electrical equipment that is connected to the dashboard tube girder.
- Disconnect dashboard wire harness.
- Remove the dashboard bracket left and right fixing bolts.
- Remove the fixing bolts in the front of dashboard bracket,remove from front cabin interior.
- Remove the connection between A/C main body and front cabin interior. Refer to “replacement of A/C main body”.
- Remove central fixing bolt and bracket of dashboard bracket.
- Carry off the dashboard bracket with the help of the assistant.
- Follow the opposite of the disassembly to assemble.
  - Tightening torque: Center 5-7 N•m，left,right and front part: 20N•m.

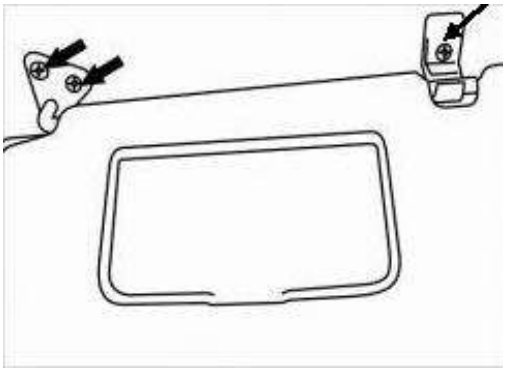
Soft interior trim

Disassembly and Assembly

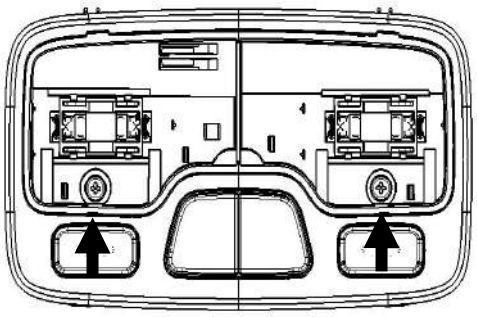
1. Ceiling

Disassembly

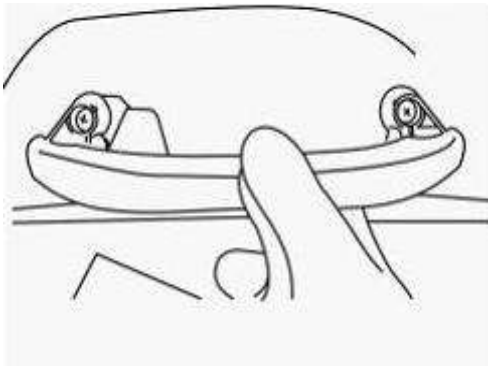
1. Use cross opener to dismantle sunshade rotating shaft and fixing bolts of sub-holder, take off sunshade.



2. Remove the fixing screw and disconnect the connectors of front ceiling lamp, refer Front Ceiling Lamp Disassembly Instructions to remove the front ceiling lamp.

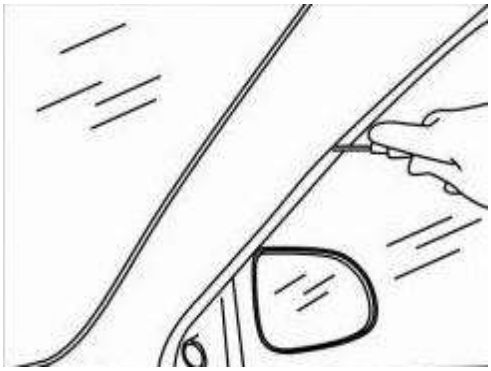


3. Dismantle all the assisting handles with cross opener.

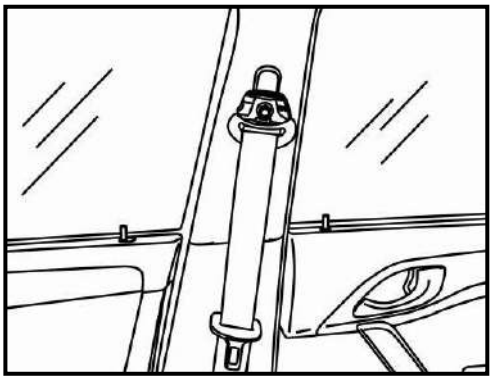


4. Dismantle door sealant, refer to “Dismantle instructions of door sealant”.

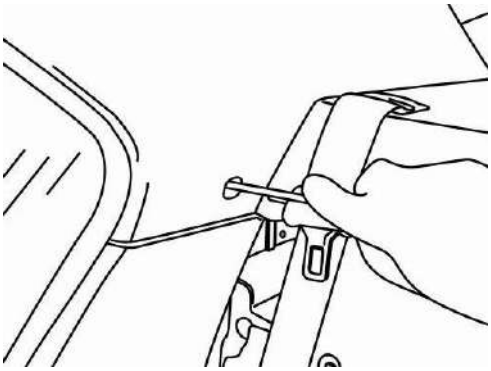
5. Disassemble top trim panel of A column, refer to “Top Trim Panel of A Column Disassembly Instructions”.



6. Disassemble top trim panel of B column, refer Top Trim Panel of B Column Disassembly Instructions.



7. Disassemble top trim panel of C column, refer Top Trim Panel of C Column Disassembly Instructions.



8. Remove fixing buckles of ceiling with buckle pincers.

9. Remove the ceiling gently and remove the ceiling assembly from the rear door.

Installation

Follow the opposite sequence of the disassembly to asseemble.

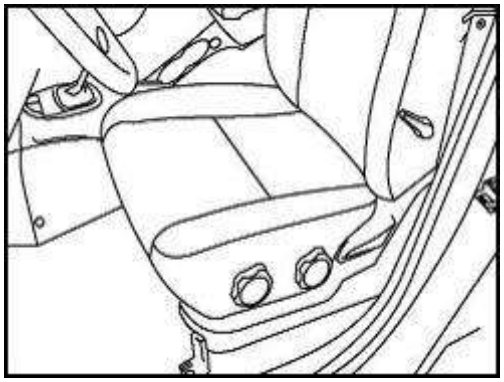
Attention：

- **Do not bend the ceiling assembly too much during installation**
- **When installing the ceiling assembly, the sun visor and the rear buckles fastening hole of the ceiling assembly shall be aligned with the corresponding holes on the car body before installing.**

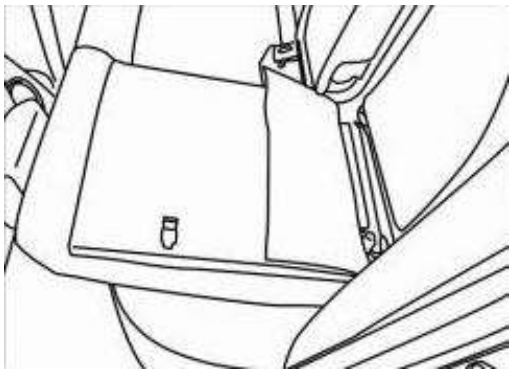
2. Carpet

Carpet dismantle

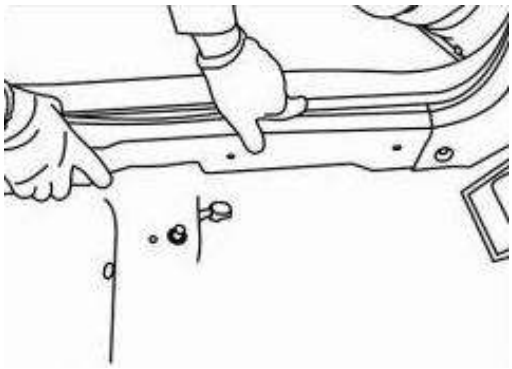
1. Remove the fixing bolts of the front seat and disconnect the seat connectors. Refer to the “Disassembly Instructions of the Front Seat”, then remove the seat.



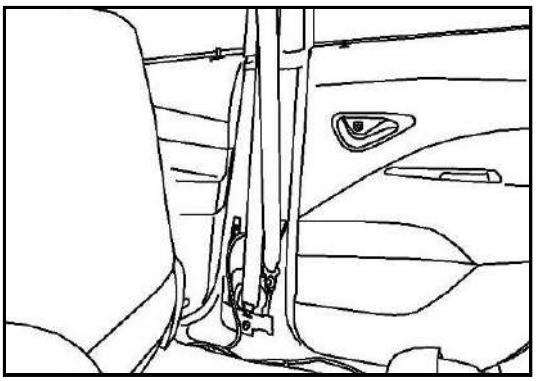
2. Remove the rear seat and its bracket. Refer to "Disassembly Instructions of Rear Seat".



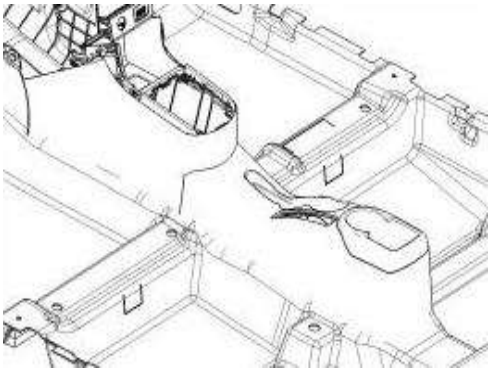
3. Remove front and rear threshold protect panel, refer to “Disassembly Instructions of Front and Rear Threshold”.



4. Disassemble lower trim panel of A/B/C column, refer to “Lower Trim Panel of A/B/C Column Disassembly Instructions”.



5. Disassemble the secondary instrument panel with reference to the “secondary instrument panel”.



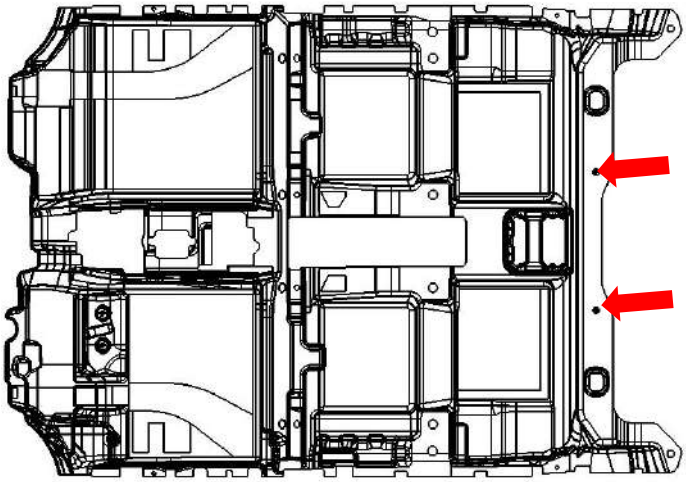
6. Remove the carpet buckle with a buckle pincers.

7. Dismantle carpet.

Carpet assembly

1. Move the carpet into the car,lay out and show the corresponding seat installation holes for

the positive hole position.

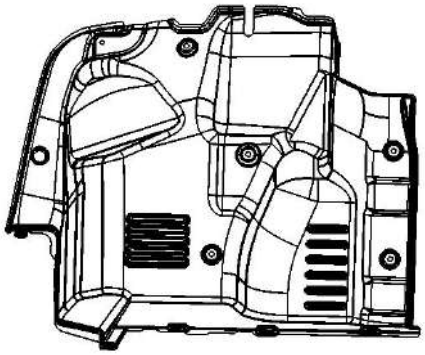


2. Pull out the seat connecting wiring harness under the carpet and compacted the carpets of the sub dashboard and fasten the carpets with the buckles.

3. Trunk side trim panel

Disassembly

Dismantle the 24 buckles (symmetrically left and right) of the left and right side panel with buckle pincers, pull out the left and right side panel.



Assembly

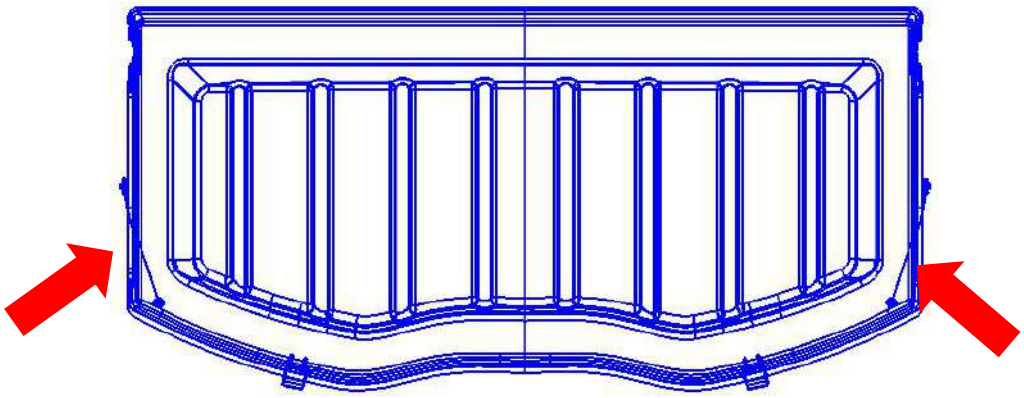
Follow the opposite sequence of the disassembly to assemble.

4. Clothes hanger assembly

Disassembly

Remove the hanging rope on the rear windshield slightly, hold the clothes hanger with hand

gently and take off it from rotating axle.



Assembly

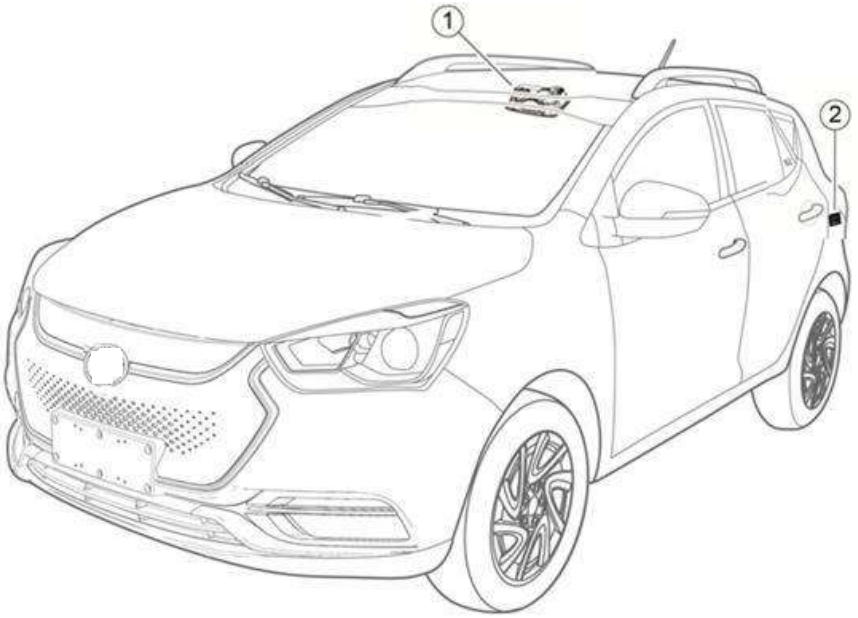
Follow the opposite sequence of the disassembly to assemble.

Lighting system

1. Outline

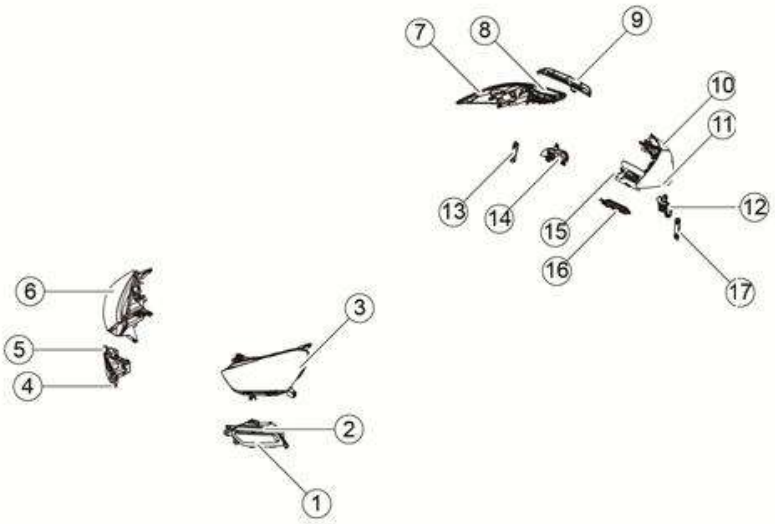
(1) structure summary

Internal lighting parts location map



1. front roof lamp 2. Trunk lamp

External lighting parts location map

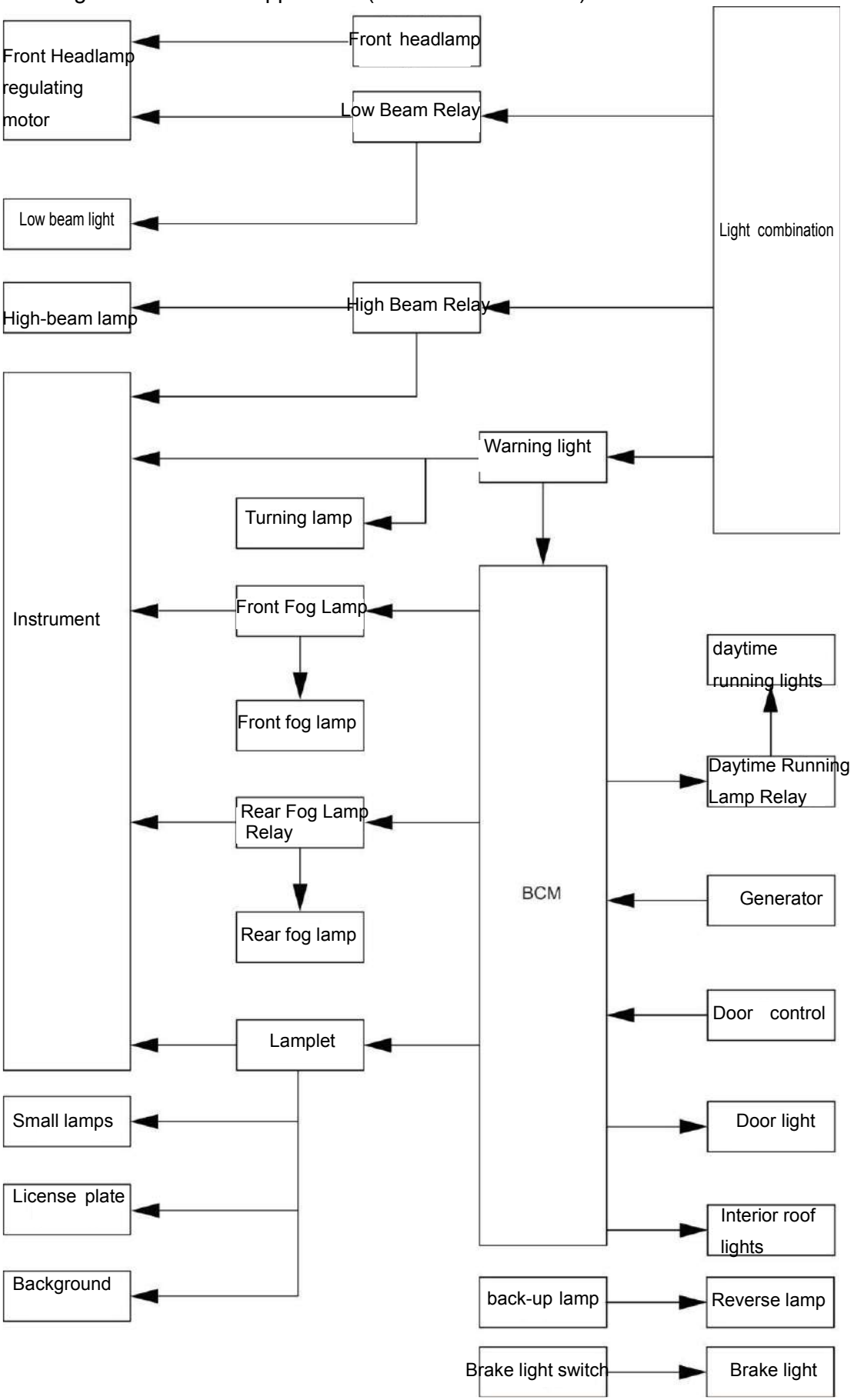


1.Front left fog light	2.Left daytime traffic light	3.Left front combination lamp

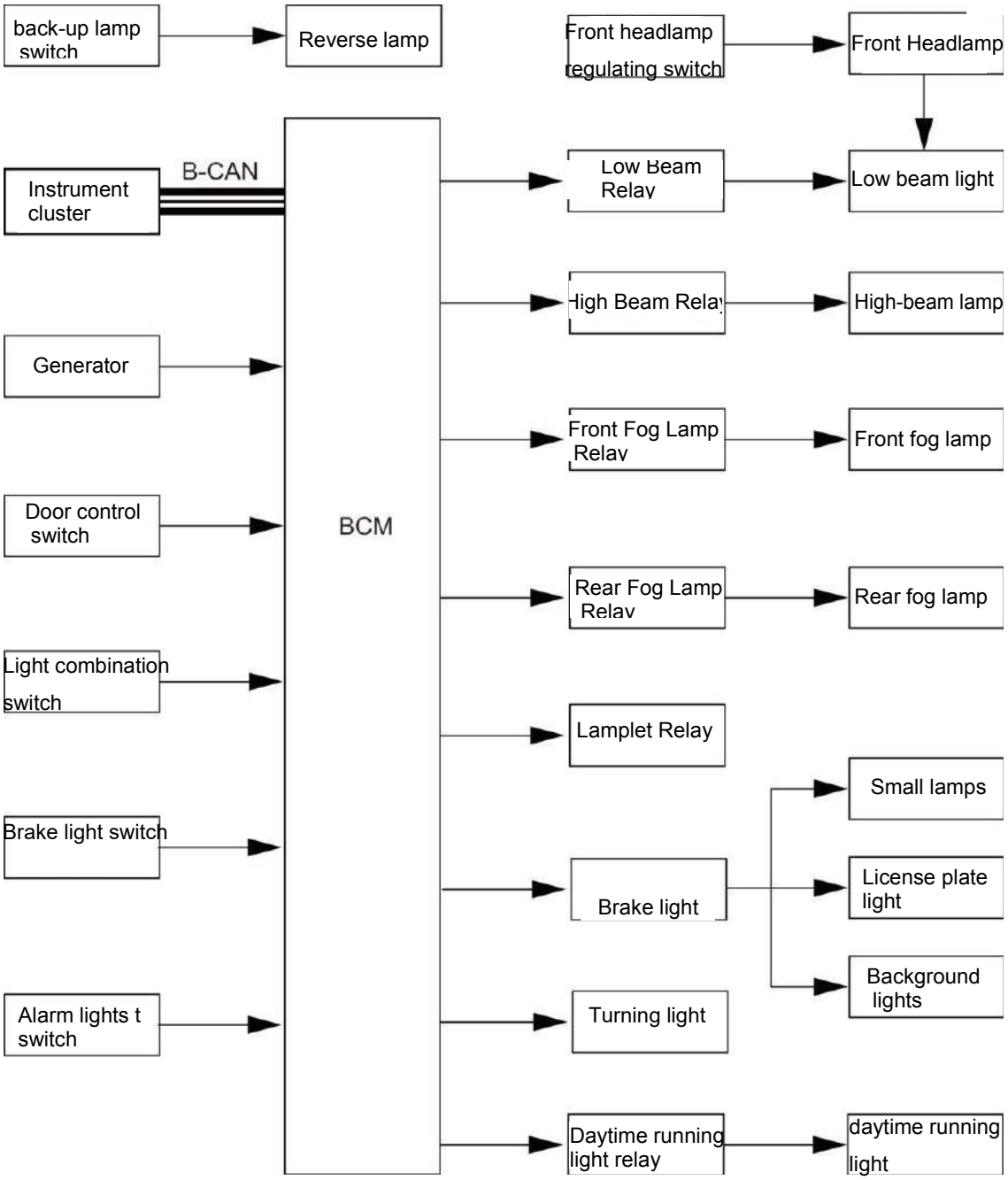
4.Front right fog light	5.Right daytime traffic light	6.Right front combination lamp
7.Right rear circumference combination lamp	8.Right rear door combination lamp	9.High position brake lamp
10.Left rear circumference combination lamp	11.Left rear door combination lamp	12.Left reversing lamp
13.Right reflector	14.Right reversing lamp	15.License plate lamp
16.Rear fog light	17.Left reflector	

(2) the working principle

Schematic diagram of electrical appliances (without CAN models)



Schematic diagram of electrics(with CAN models)



(3) technical parameters

Serial	Name	Bulb type	Power	Lighting color
1	High-beam lamp	H7	2×55W	White
2	Low beam light	H7	2×55W	White
3	Front turn signal lamp	PY21W	2×21W	Amber
4	Front position light	W5W	2×5W	White
5	Front fog lamp	H8	2×35W	White
6	daytime running lights	LED	2×5.6W	White
7	Rear position light/brake	P21/5W	2×21W+2×5W	Red
8	Rear turn signal	P21W	2×21W	Amber
9	Rear position light	W5W	2×5W	White
10	Rear fog lamps	LED	5.6W	Red
11	back-up lamp	P21W	2×21W	White
12	License plate lamp	W5W	2×5W	White
13	Braking lamp (high level)	LED	1.7W	Red
14	Front roof light	C10W	2×10W	White
15	Luggage compartment	KHA	5W	White

(4) Torque parameters

Serial No.	Items	Torque （N.m）
1	Front combination lamp fixing bolt	3~5
2	Front fog lamp fixing screws	1~3
3	daytime running lights	1~3

(5) Maintenance Precautions

1. Disconnect the negative terminal of the battery and wait for at least 1 min before removing the electrical harness connector, otherwise damage to the vehicle may occur.

2. When removing and installing components, use cloth to protect the parts to be removed from damage.

Remove the metal clip from the trim cover the screwdriver blade with cloth. Be careful not to damage the body components;

4. During disassembly of some components, if one person can not complete the work, you need two people to operate, so as not to fall down.

5. Do not exert too much force when disassembling and assembling some accessories, because the parts may be deformed.

6. Do not remove the lamp and the back cover from the lamp body for too long time, as dust, moisture, smoke, etc may enter into the lamp and affect lamp performance. Install a new lamp immediately after removing the lamp in the front combination lamp reflector.

7. The front combination lamp is semi-enclosed, use a replaceable halogen bulb. Replacement of light bulb can be carried out in the engine compartment, but it is recommended to replace it after disassembly;

8. When operating the lamp, only hold the bulb's plastic seat, and do not touch the glass cover.

9. Do not shake or turn the lamp during disassembly.

2. The fault diagnosis

(1) Troubleshooting Table

Num	faults	Cause Analysis	Solution	Remark
1	Headlamps, fog lights, turn signals do not work	Bulb filament blown	Replace the lamp	
		Fuse blown	Replace the fuse.	
		Power fails, harness	Repair circuit fault	
		Relay does not work	Replace the relay	
		Light switch does not work	Change the light switch	
		Light switch circuit failure	Repair light switch circuit fault	
		BCM fault	Replace the BCM	
2	Reversing light does not work	Reversing light fuse blown	Replace the fuse.	
		Reversing light switch is not	Adjust the installation of reversing	
		Reversing light switch is	Replace the reversing light switch	
		Reversing light filament	Replace the lamp	
3	Brake light does not work	Brake lamp fuse blown	Replace the brake light fuse	
		Brake light switch installed	Adjust and install brake light	
		Brake light switch damage	Replace the brake light switch	
		Brake light bulb filament	Replace the lamp	

(2) lighting system fuse, relay and wiring connector list

Serial	Lighting	Fuse	Relay	Wire harness connector
1	Left low beam	IF16 20A	IR03	E05-8
2	Right low beam			E20-8
3	Left high beam	IF17 15A	IR04	E05-10
4	Right high			E20-10
5	Left front	IF04 10A	IR08	E05-7
6	Lfet rear position			E09-6
7	Left front inside			T12-1
8	Left License			RB02-1
9	Right front	IF04 10A		E20-7
10	Right rear			F28-6
11	Right rear inside			T17-1
12	Right License			RB05-1
13	Left front turn	\	\	E05-2
14	Left turn signal			D02-1
15	Right rear turn			F09-4
16	Right front turn			E20-2
17	Right turn signal			D11-1
18	Right rear turn			F28-4
19	back-u	IF20 10A	\	RB01-1/RB08-1
20	back-up lamp			C24
21	Left brake light	\	\	F09-5
22	Right brake			F28-5
23	Braking lamp			T01-1
24	Brake light	\	\	E11
25	Left front fog	IF07 15A	IR10	E03-1
26	Right front fog			E23-1
27	Rear	IF38 10A	IR09	RB04-1

(3) the fault diagnosis flow chart

Headlamps, fog lights, turn signals do not work

Steps	Checking content	Solution	Decision specification	Next step	
				Yes	No
1	Confirm the fault phenomenon	Ignition switch placed in the appropriate location, light switch move to the corresponding position.	Is the corresponding light on?	Next step	Turn to step 3
2	Check for intermittent failure	Check and handle the loose situation of related harness connector			
3	Check the related lamp fuse	Remove related light fuse	Whether the fuse is burnt-out?	Replace the fuse, turn to next step	Turn to step 5
4	Check if the fault is eliminated after changing fuse	Put the light switch to the corresponding gear.	Is the corresponding light on?	Faults exclusion	Next step
5	Check the related lamp filament	Remove the related lamp bulb and check the filament.	Is the filament blown?	Replace the related lamp bulb,turn to next step	Turn to step 7
6	Replace the lamp bulb, and check whether the fault has been eliminated	Put the light switch to the corresponding gear.	Is the corresponding light on?	Faults exclusion	Next step
7	Check the power of the corresponding lamp	Use a multimeter to measure the voltage between the corresponding harness connector terminals and the ground.	Voltage Standard: 11 ~ 14 V voltage is within the standard?	Next step	Turn to step 9
8	Check the corresponding lamp ground circuit	Use a multimeter to measure the resistance between the corresponding harness connector terminals and reliably.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness
9	Check the output voltage of related lamp relay	Use a multimeter to measure the voltage between the corresponding harness connector terminals and the ground.	Voltage Standard: 11 ~ 14 V voltage is within the standard?	Next step	Turn to step 11
10	Check the circuit between the corresponding light harness connector and relay.	Use a multimeter to measure the resistance between the corresponding harness connector terminals and electrical equipment.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness

11	Check the input power of corresponding relay	Use a multimeter to measure the voltage between the corresponding harness connector terminals and the ground.	Voltage Standard: 11 ~ 14 V voltage is within the standard?	Next step	Repair or replace the electrical box
12	Replace the corresponding relay, check if the fault is eliminated?	Put the light switch to the corresponding gear.	Is the corresponding light on?	Faults exclusion	Next step
13	Check the wiring between the relay and BCM	Use the multimeter to measure the resistance of the circuit between the corresponding relay and the terminals of the BCM harness connector.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness
14	Check the line between light switch and BCM	Use the multimeter to measure the resistance between the light switch and the corresponding terminal of the BCM harness connector.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness
15	Replace the light switch, check if the fault is eliminated?	Replace the light switch, put the light switch to the corresponding gear.	Is the corresponding light on?	Faults exclusion	Next step
16	Replace BCM and check whether the failure is solved	Replace BCM, Put the light switch to the corresponding gear.	Is the corresponding light on?	Faults exclusion	

Reversing light does not work

Steps	Checking content	Solution	Decision specification	Next step	
				Yes	No
1	Confirm the fault phenomenon	Put the ignition switch to “ON” and put the gear in reverse.	If the back up light is lit?	Next step	Turn to step 3
2	Check for intermittent failure	Check and handle the loose situation of related harness connector			
3	Check the reversing lamp fuse	Remove the backup lamp fuse.	Is the fuse blown?	Replace the fuse, turn to next step	Turn to step 5
4	Check if the fault is eliminated after changing fuse	Put the ignition switch to “ON” and put the gear in reverse.	If the back up light is lit?	Faults exclusion	Next step

5	Check the reversing light bulb	Remove the reversing lamp and check the filament.	Is the filament blown?	Replace the reversing lamp bulb,turn to next step	Turn to step 7
6	Check if the fault is removed after replacing the reversing light bulb	Put the ignition switch to “ON” and put the gear in reverse.	If the back up light is lit?	Faults exclusion	Next step
7	Check the reversing light power	Use a multimeter to measure the voltage between the reverse light harness connector related terminals and ground.	Voltage Standard: 11 ~ 14 V voltage is within the standard?	Next step	Turn to step 9
8	Check the reversing light ground line	Use a multimeter to measure the resistance between the reverse light harness connector related terminals and ground.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness
9	Check the circuit between the reversing light and reversing light switch.	Use a multimeter to measure the resistance between the reverse light harness connector related terminals and recersing light switch.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness
10	Check the circuit between the reversing light switch and the reversing light fuse.	Use multimeter to measure resistance between the reversing light switch harness connector related terminal and the reversing light fuse.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness
11	Replace the reverse lamp switch and check whether the failure has been eliminated.	Replace the reversing light switch, place the ignition switch to “ON” position and the gear in the reverse gear.	If the back up light is lit?	Faults exclusion	

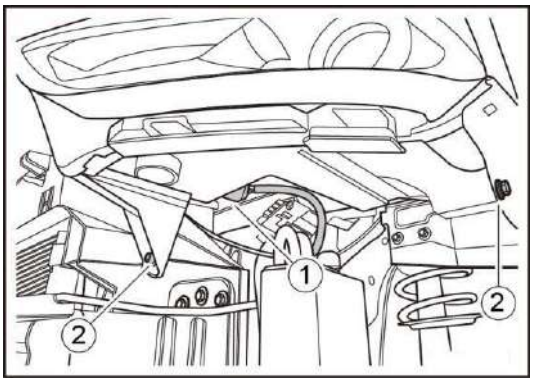
Brake light does not work

Steps	Checking content	Solution	Decision specification	Next	
				Ye	No
1	Confirm the fault phenomenon	Turn the ignition switch OFF and depress the brake pedal.	Whether the brake light is on.	Handle intermittent problems and go to the next step	Turn to step 3
2	Check for intermittent failure	Check and handle the loose situation of related harness connector			
3	Check the brake light fuse	Remove the brake light fuse.	Is the fuse blown?	Replace the braking light fuse, turn to next step	Turn to step 5
4	Check if the fault is eliminated after changing fuse	Turn the ignition switch OFF and depress the brake pedal.	Whether the brake light is on.	Faults exclusion	Next step
5	Check the brake light bulb	Remove the braking lamp bulb and check the filament.	Is the filament blown?	Replace Brake lamp bulb	Turn to step 7
6	After replacing the braking lamp bulb, and check whether the fault has been eliminated	Replace the braking lamp bulb, turn the ignition switch to OFF, and press the brake pedal.	Whether the brake light is on.	Faults exclusion	Next step
7	Check the brake light power	Press the brake pedal and measure the voltage between the brake light harness connector related terminals and ground.	Voltage Standard: 11 ~ 14 V voltage is within the standard?	Next step	Turn to step 9
8	Check the brake light ground line	Measure the resistance between the brake light harness connector related terminals and ground.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness
9	Check the circuit between the brake light and the brake light switch.	Measure the resistance between the brake light harness connector related terminals and brake light switch.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness

10	Check the circuit between the brake light switch and the brake light fuse.	Measure the resistance between the brake light switch connector and the brake light fuse.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness
11	Replace the brake lamp switch and check whether the failure has been eliminated.	Replace the brake light switch, turn the ignition switch to OFF position and the gear into the reverse gear.	Whether the brake light is on.	Faults exclusion	

3、Disassembly and Assembly

Front combination lamp assembly



(1) disassembly

1. open the front cabin cover.

2. Disconnect the negative harness of the battery refer to the disconnection and connection of the battery cable

3. Disassemble Front cabin front cover, refer to front cabin front cover

4. Disassemble Front Wheel cover refer to front wheel cover

5. disassemble front bumper upper cover

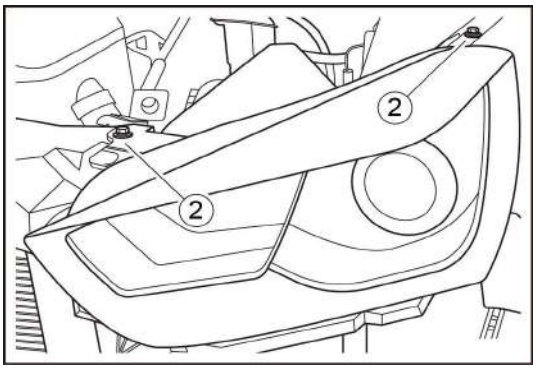
6. Disassemble front bumper assembly

7.Remove the front combination lamp assembly

1). Disconnect front combination lamp assembly harness connector①.

2). Disassemble the 4 fixing bolts② of front combination lamp

3) Remove the front combination lamp assembly.



(2). installation

Install the front combination lamp assembly

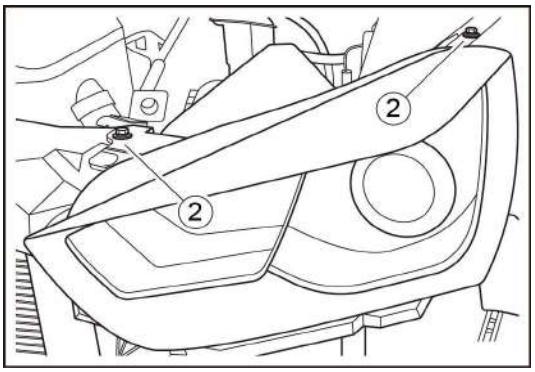
1) Put front combination lamp assemble to the installation position, fasten 4 fixing bolts.

△Attention

It is a must to fasten in opposite order with disassemble.

Tightening torque 3~3 N·m

2). Connect front combination lamp assembly harness connector.



2. Install front bumper assembly

3. Install front bumper upper cover

4. Install front wheel cover

5. Install Front cabin front cover

Connect the battery negative cable.

7. Close front cabin cover.

(3) Adjustment

1. Adjust front combination light lighting

1). Confirm that all tires are under normal pressure.

2) Place the vehicle and tester on the same flat surface.

3) Verify that the vehicle is empty except for the driver (or placing equivalent weight at the driver's seat).

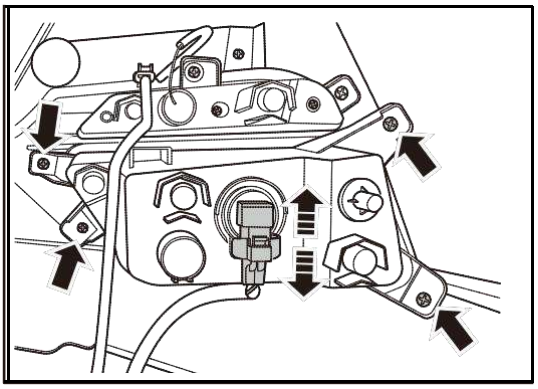
4) Turn on the front combination lamp low beam light.

5) Adjust the light with the adjusting screw.

6). There is a dimming point of low beam and high beam adjusting up and down, height of the low beam, high beam can be adjusted up and down; There is a dimming point of high beam, low beam left and right adjustment, height of the low beam, high beam can be adjusted left and right. If repairs were made to the front of the vehicle body and / or the front combination lamp assembly was replaced, check the light and adjust it in place with the light detector.

7). Follow the light meter until it is adjusted.

Front fog lamp assembly



(1) disassembly

1. open the front cabin cover.

2. Disconnect the negative harness of the battery refer to the disconnection and connection of the battery cable

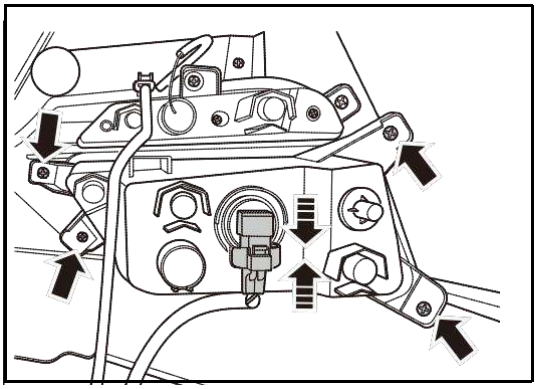
3. Disassemble Front Wheel cover refer to front wheel cover

4. Remove Front fog lamp assembly

1). Disconnect front fog lamp assemble harness connector.

2). Remove the 4 fixing screws of the front fog assembly and front bumper.

3). Remove the front fog lamp assembly.



(2) installation

Install the front fog lamp assembly

1) . Put front fog lamp assemble to the installation position, fasten 4 fixing bolts.

Tightening torque 1~3 N·m.

2). Connect front fog lamp assembly harness connector.

2. Install front wheel cover

Connect the battery negative cable.

4. Close front cabin cover.

(3) Adjustment

1. Adjust front fog lamp lighting

△ Note that the front fog light beam must be adjusted to provide the correct road lighting.

△ Note Mounting the new fog lamp assembly, or repairing vehicle's front side may disturb the front fog lamp mounting bracket. Therefore, be sure to check the beam adjustment for the front fog lamp.

△ Note that the front fog lamp assembly beam can not be adjusted horizontally.

1). To ensure the accurate adjustment of the vertical beam of the front fog lamp, first prepare the vehicle according to the following steps.

·If other maintenance has been done to the vehicle, should confirm that all parts of the vehicle are in place first.

· Make sure the fuel is at full capacity or slightly lower.

· Put the vehicle on the ground level from the target screen 1.52m.

· Stop all other operations on the vehicle.

· Shake the vehicle suspension in place.

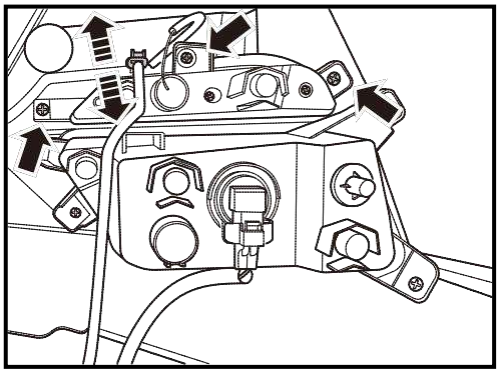
· Cover the front combination light when adjusting the fog light beam.

2). light the front fog lamp.

3). Insert the cross screwdriver through the space below the front bumper to access the vertical adjusting screw of the fog lamp.

4). Adjust the fog lamp up and down so that the top of the highlight area is 102mm lower the horizontal center line(2). The range on the targeted screen is 0mm (3) under the horizontal center line (5).

5). Turn off the front fog lamps



daytime running lights

(1) Disassembly

1. Open the front cabin cover.

2. Disconnect the negative harness of the battery

refer to the disconnection and connection of the battery cable

3. Disassemble Front Wheel cover refer to front wheel cover

4. Disassemble daytime running lights assembly

1). Disconnect daytime running lights assembly harness connector.

2). Remove the 3 fixing screws of the daytime running lights assembly and front bumper.

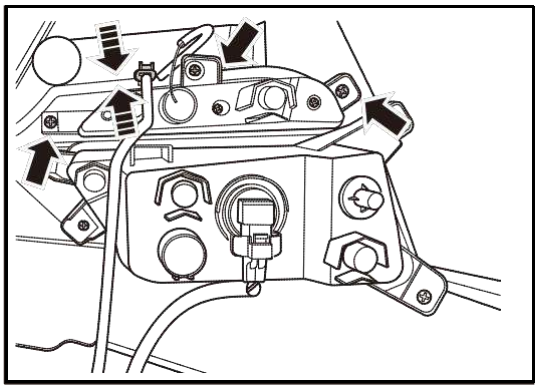
3). Remove daytime running lights assembly

(2) Installation

1. Install daytime running lights assembly

1) . Put daytime running lights assemble to the installation position, fasten 3 fixing bolts. Tightening torque 1~3 N·m.

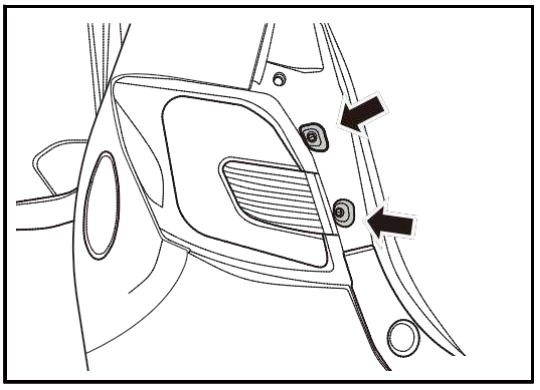
2). Connect daytime running lights assembly harness connector.



2. Install front wheel cover

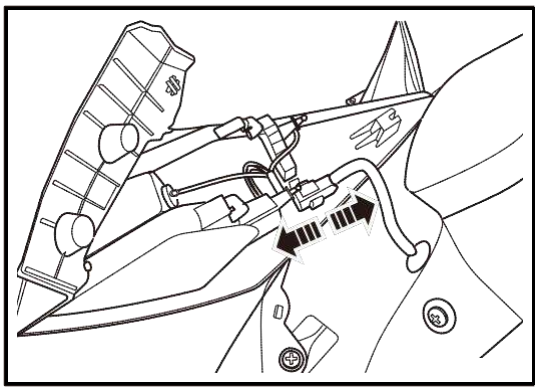
Connect the battery negative cable.

4. Close front cabin cover.



Rear side body combination lamp assembly

(1) Disassembly



1. Open the tailgate

2. Open the front cabin cover.

3. Disconnect the negative cable of the battery refer to the disconnection and connection of the battery cable

4. Remove Rear side body combination lamp assembly

1). Remove 2 fixing bolts of rear combination lamp assemble.

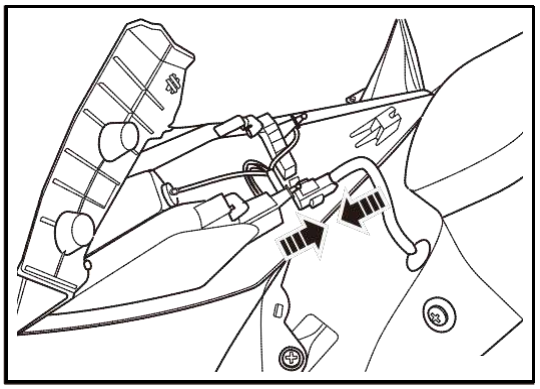
2). Move back the rear side body combination lamp assembly, disconnect harness connector.

3). Remove Rear side body combination lamp assembly.

(2) Installation

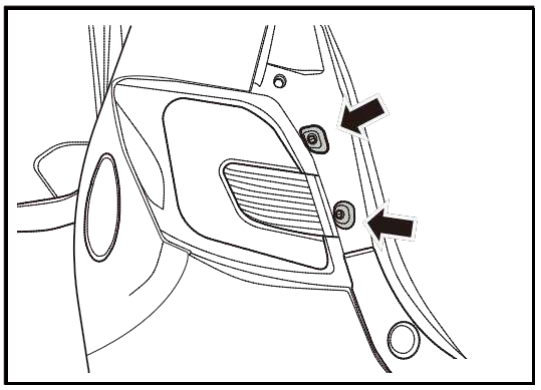
1. Install rear side body combination lamp assembly

1). Connect rear side body combination lamp assembly harness connector, install rear side body combination lamp assembly.



2). Fasten 2 fixing bolts of rear side body combination lamp assembly.

△ Note Check if the rear side body combination lamp is good before installation, no damage is allowed during installation to the rear side body combination lamp. Check if the rear side body combination lamp is good after installation, if the space between it and the car body is appropriate, re-installation is necessary if there is any problem.



2. Close tailgate
3. Connect the battery negative cable.
4. Close front cabin cover.

Tailgate combination lamp assembly

(1) Disassembly

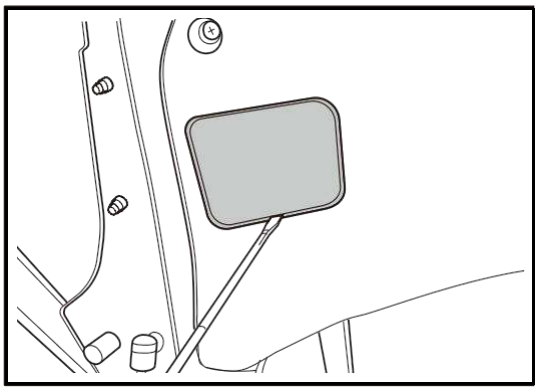
1. Open the tailgate

2. Open the front cabin cover.

3. Disconnect the negative cable of the battery refer to the disconnection and connection of the battery cable

4. Disassemble tailgate combination lamp assembly

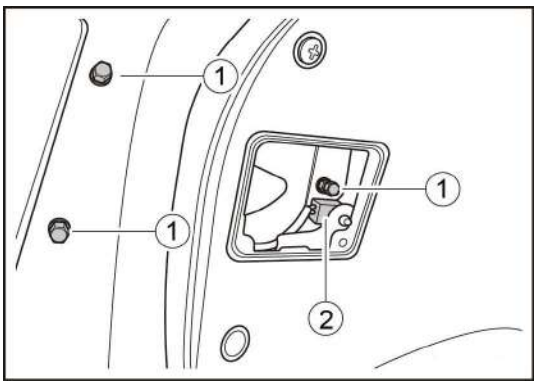
1). Pry out the rear lights repair cover.



2). Remove 3 fixing bolts① of rear combination lamp assemble.

3). Disconnect the tail door combination lamp harness connector②.

4. Remove tailgate combination lamp assembly.

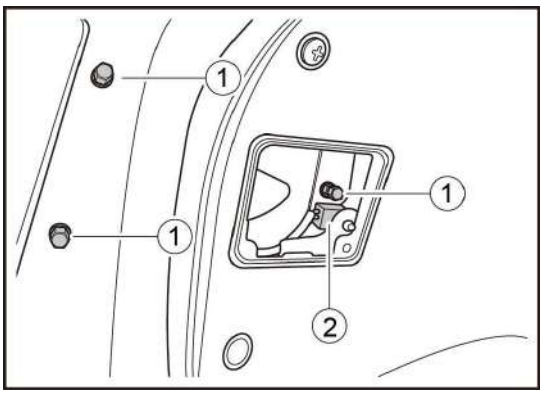


(2) Installation

1.Install tailgate combination lamp assembly

1). Put the tailgate combination lamp assembly into installation position, fasten 3 fixing bolts① of rear combination lamp assembly.

2). Connect the tail door combination lamp harness connector②.



3). Install the rear lights repair cover.

△ Note Check if the tailgate combination lamp is good before installation, no damage is allowed during installation to the tailgate combination lamp. Check if the tailgate combination lamp is good after installation, if the space between it and the car body is appropriate, re-installation is necessary if there is any problem.

Braking lamp (high level)

(1) Disassembly

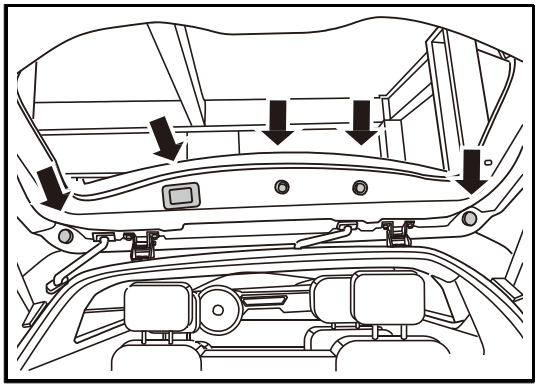
1. Open the tailgate

2. Open the front cabin cover.

3. Disconnect the negative cable of the battery refer to the disconnection and connection of the battery cable

4. Disassemble empennage and brake light assembly

1). Remove 5 rubber caps.

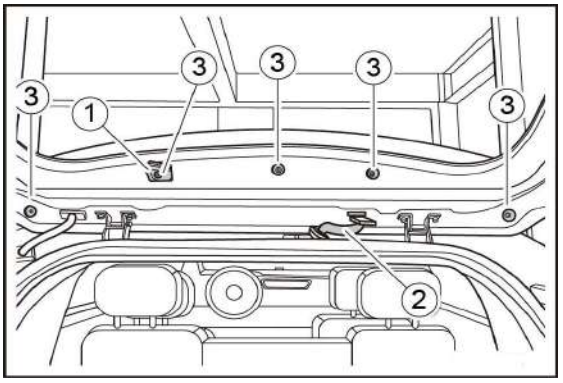


2). Pull out the wash hose cover②, disconnect washing hose and car body water hose.

3). Remove 5 fixing bolts③.

4). Disconnect the harness of high mounted braking lamp①.

5). Remove empennage and brake light assembly.

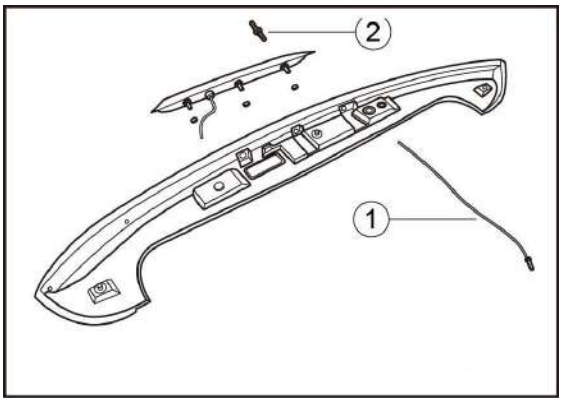


5. Disassemble high mounted brake lamp

1). Remove 3 bolts holding the high mounted brake light and lamp cover.

2). Disconnect rear window water pipe① and rear window nozzle②.

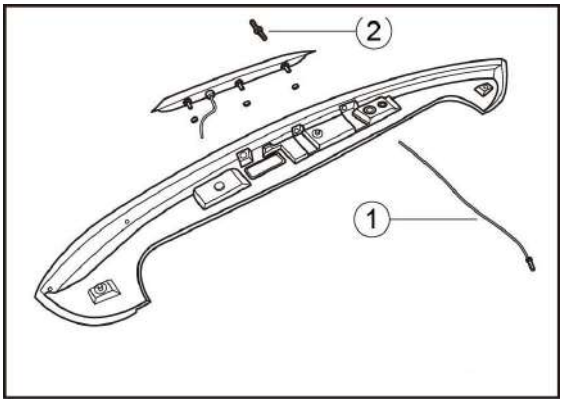
3). Unplug the rear window nozzle.



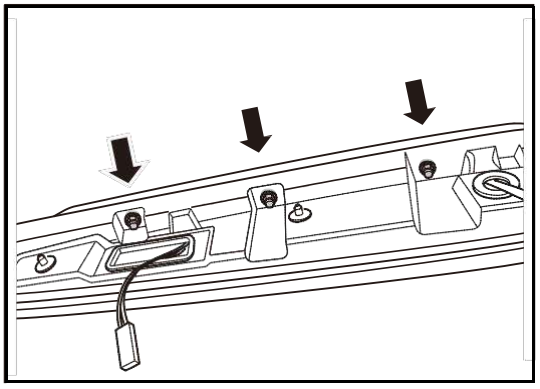
(2) Installation

1. Install high mounted brake lamp

1). Install rear window nozzle②, connect rear window water pipe①.



2). Install high mounted brake light, fasten 3 bolts fixing lamp cover.

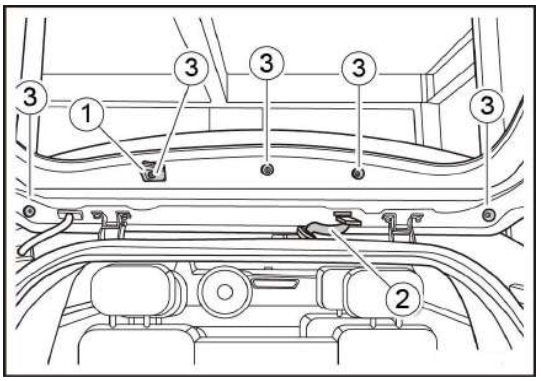


2. Install empennage and brake light assembly

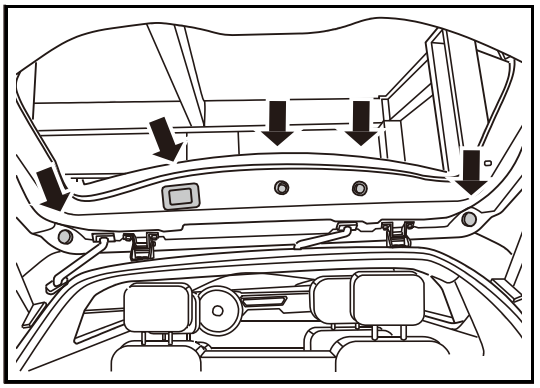
1). Put the empennage at the installation position, connect high mounted brake light assembly①.

2). Fasten 5 fixing bolts③.

3) Connect rear washing pipe and car body water pipe②, install water pipe cover.



4). Install 5 caps.



3. Close tailgate

Connect the battery negative cable.

5. Close front cabin cover.

License plate lamp assembly

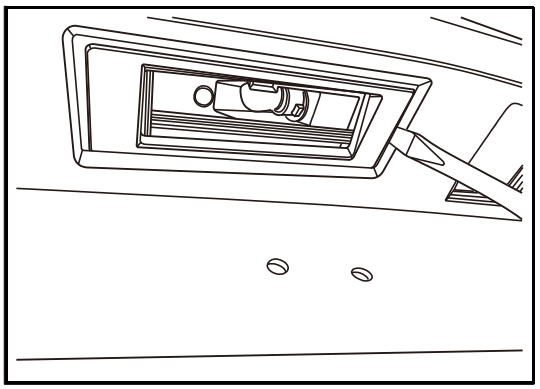
(1) Disassembly

1. Open the front cabin cover.

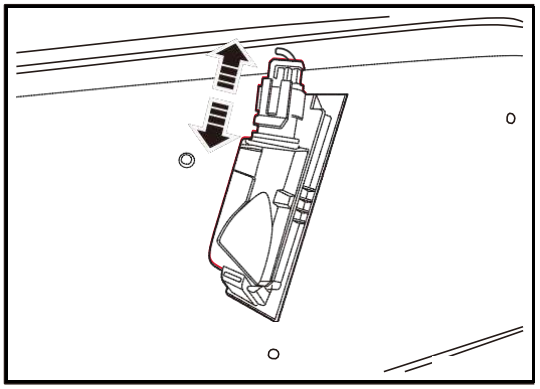
2. Disconnect the negative cable of the battery refer to the disconnection and connection of the battery cable

Remove the license plate light assembly

1). Pry open license plate light assembly.

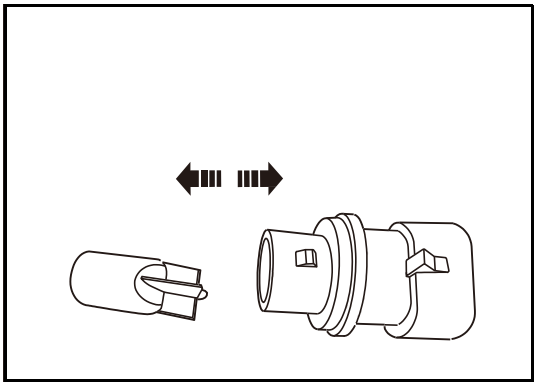


2). Disconnect the license plate lamp harness connector and remove the license plate lamp assembly.



3). Screw off license plate lamp base.

4). Unplug license plate lamp bulb.



(2) inspection

1. Check license plate lamp

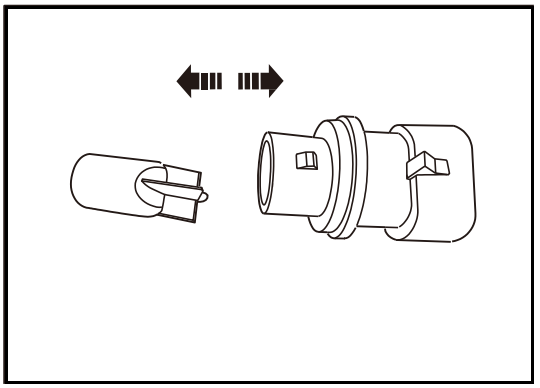
1).Check if license plate lamp filament is blown.

(3) Installation

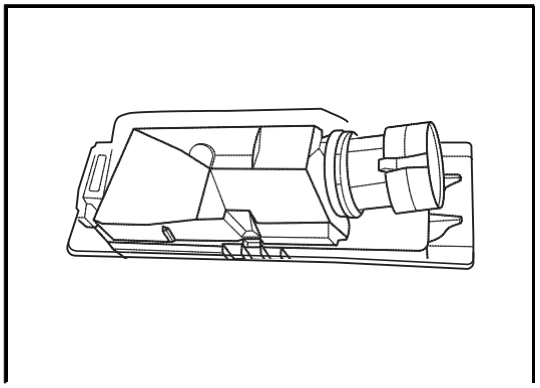
Attention

Install license plate light assembly

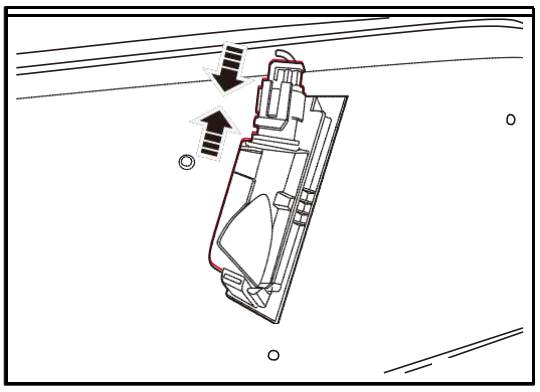
1). Screw on license plate lamp bulb.



2). Install license plate lamp base.



3). Connect license plate lamp assembly harness connector.



4). Press the license plate lamp assembly into the mounting hole and ensure it in place.

△ Note Check if bulb is good before installing, should aligning the mounting hole and install in place.

Connect the battery negative cable.

3. Close front cabin cover.

Front roof light assembly

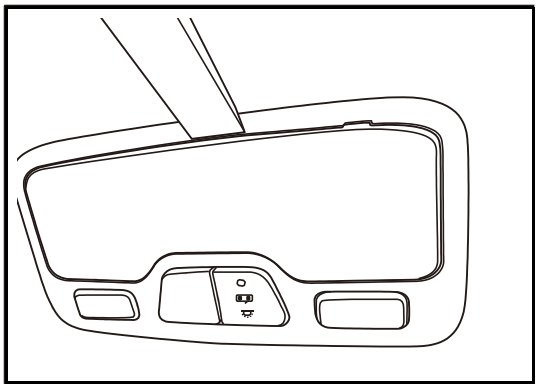
(1) Disassembly

1. Open the front cabin cover.

2. Disconnect the negative cable of the battery refer to the disconnection and connection of the battery cable

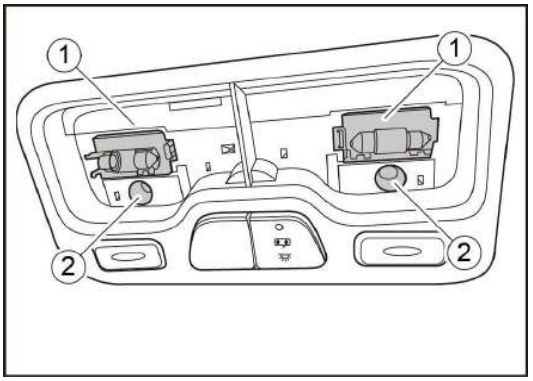
Remove Front roof light assembly

1). Install the front light assembly.

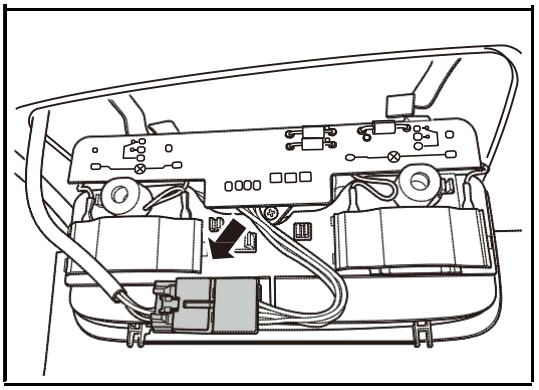


2). Remove 2 bulbs of front roof lamp①.

3). Disassemble the 2 fixing bolts② of front roof lamp.



4). Disconnect the harness connector of front roof lamp assembly, and remove the front roof lamp assembly.



Inspection

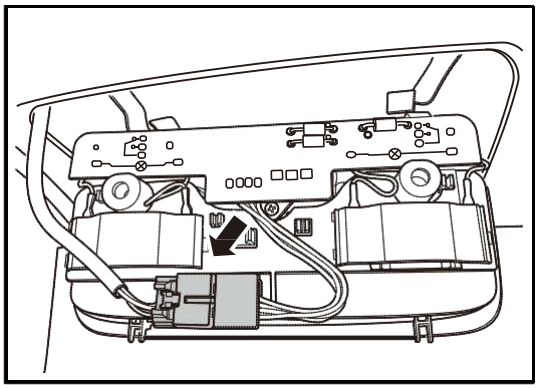
1. Check front roof lamp

1).Check if front roof lamp filament is blown.

(3) Installation

Install the front light assembly

1). Connect front roof lamp assembly harness connector.

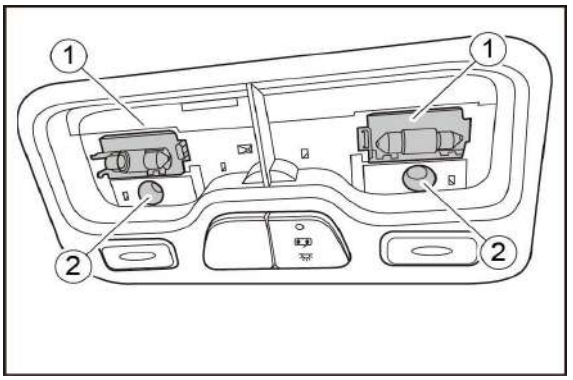


2). Turn front roof lamp① into mounting hole and ensure installation in place.

3). Fasten 2 fixing bolts② of front roof lamp.

4). Install the front light assembly cover and ensure installation in place.

△ Note Check if bulb is good before installation, and make sure bulb installed correctly. After installation, check whether it is within the requirements.



Connect the battery negative cable.

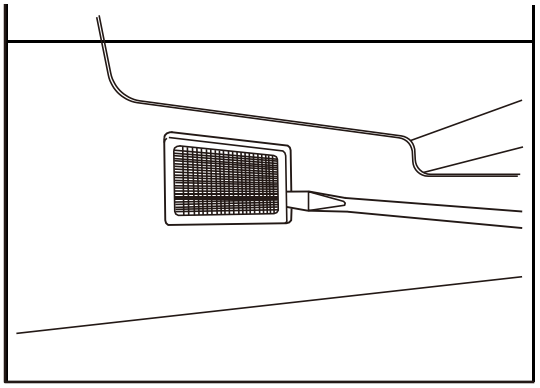
3. Close front cabin cover.

Luggage compartment lamp

(1) Disassembly

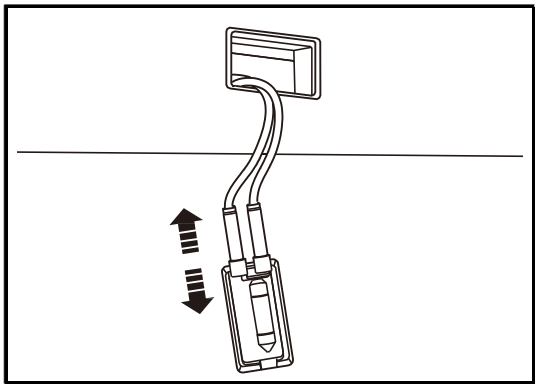
1. Open the tailgate
2. Open the front cabin cover.
3. Disconnect the negative cable of the battery refer to the disconnection and connection of the battery cable
4. Disassemble the trunk lamp

1). Pry out the trunk lamp.



2). Disconnect trunk lamp harness connector.

3). Disassemble the trunk bulb.

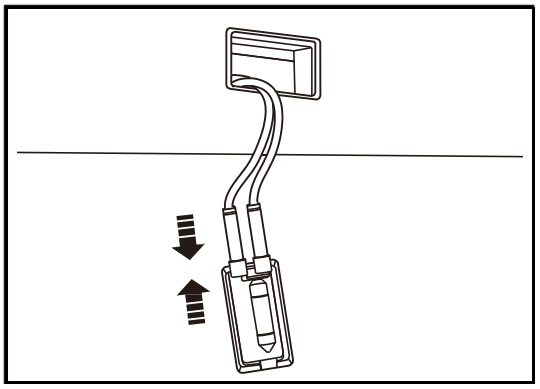


(2) inspection

1. Check trunk lamp

1).Check if trunk lamp filament is blown.

(3) Installation



1. Install the trunk lamp

1). Install the trunk bulb.

2). Connect trunk lamp harness connector.

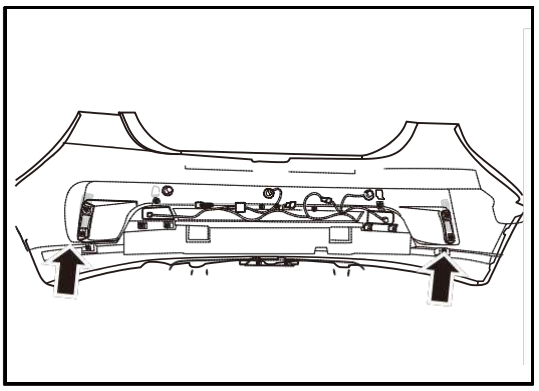
3). Press the trunk lamp into the mounting hole and ensure it in place.

. Close tailgate
Connect the battery negative
cable.
4. Close front cabin cover.

Rear reflector assembly

(1) Disassembly

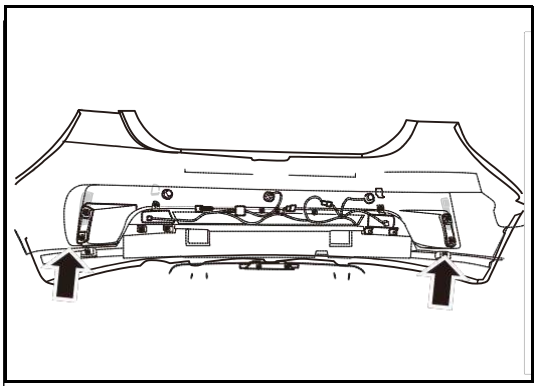
1. Open the tailgate
2. Open the front cabin cover.
3. Disconnect the negative harness of the battery refer to the disconnection and connection of the battery cable
4. Disassemble rear side body combination lamp assembly, refer to rear side body combination lamp assembly
5. Remove the Rear bumper assembly
Refer to the rear bumper assembly
6. Disassemble rear reflector assembly



7. Disassemble rear reflector assembly
   1). Remove the 2 fixing screws of rear reflector assembly.
   2). Remove rear reflector assembly.

(2) Installation

1. Install rear reflector assembly
  1). Put the rear reflector assembly in installation position, fasten 2 fixing screws.
△ Note Check if reflector is good before installation. Do not damage the reflector during installation. After installation, check if the reflector installation is in place, if the gap with bumper is appropriate, if not in place or inappropriate, reinstall it.

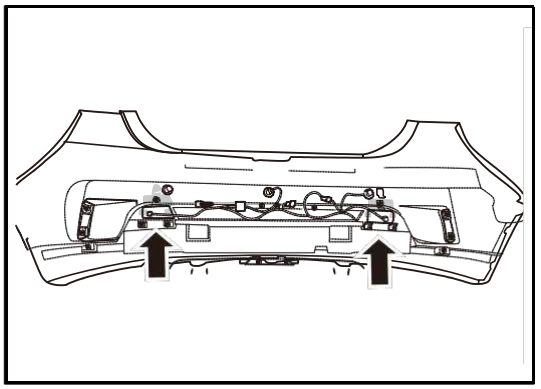


Install rear bumper assembly
3. Install rear side body combination lamp assembly
4. Close tailgate
Connect the battery negative cable.
6. Close front cabin cover.

Reverse lamp assembly

(1) Disassembly

1. Open the tailgate
2. Open the front cabin cover.
3. Disconnect the negative cable of the battery refer to the disconnection and connection of the battery cable
4. Disassemble rear side body combination lamp assembly, refer to rear side body combination lamp assembly
5. Remove the Rear bumper assembly Refer to the rear bumper assembly
6. Disassemble reverse lamp assembly
   1). Disconnect reverse lamp assembly harness connector.
   2). Remove 3 fixing screws of rear reverse lamp assembly.
   3). Remove rear reverse lamp assembly.



(2) Installation

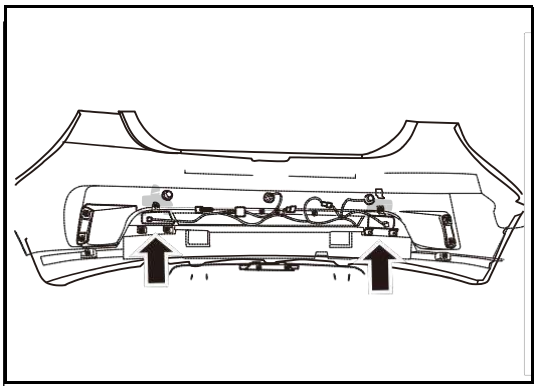
1. Assemble rear reverse lamp assembly

1). Put the rear reverse lamp assembly in installation position, fasten 3 fixing screws.

2). Connect rear reverse lamp assembly harness connector.

△Attention

Check the rear reverse lamp is intact before installation.
Damage to rear reverse lamp is not allowed during installation.
After installation, check if the rear reverse lamp installation is in place, if the gap with bumper is appropriate, if not in place or inappropriate, reinstall it.



Install rear bumper assembly

3. Install rear side body combination lamp assembly

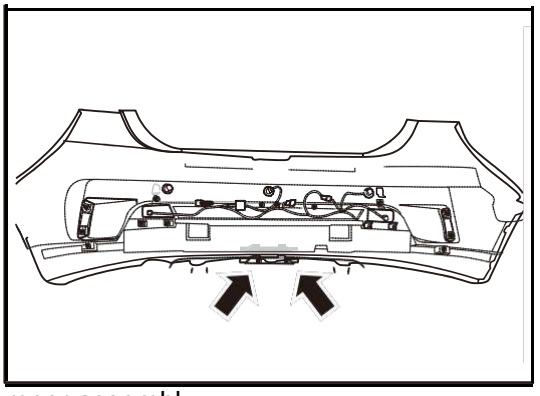
4. Close tailgate

Connect the battery negative cable.

6. Close front cabin cover.

Rear fog lamp assy

(1) Disassembly

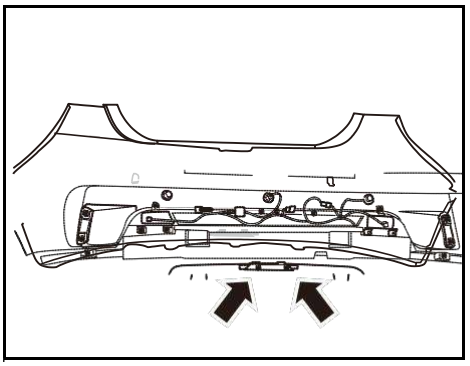


1. Open the tailgate
2. Open the front cabin cover.
3. Disconnect the negative cable of the battery
refer to the disconnection and connection of the battery cable
4. Disassemble rear side body combination lamp assembly, refer to rear side body combination lamp assembly
5. Remove the Rear bumper assembly Refer to the rear bumper assembly

6. Disassemble rear fog lamp assembly
   1). Disconnect rear fog lamp assembly harness connector.
   2). Remove 2 fixing screws of rear fog lamp assembly.
   3). Disassemble the connection between rear fog lamp assembly and rear bumper, remove rear fog lamp assembly.

(2) Installation

1. Assemble rear fog lamp assembly



   1). Put the rear fog lamp assembly in installation position, make sure connection with bumper is good,
   Tighten 2 fixing screws.
   2). Connect rear fog lamp assembly harness connector.
   △Attention
   Check if the rear fog lamp is intact before installation.
   Do not damage the rear fog lamp during installation.
   After installation, check if the rear fog lamp installation is in place, if the gap with bumper is appropriate,
   if not in place or inappropriate, reinstall it.

Install rear bumper assembly
3. Install rear side body combination lamp assembly
4. Close tailgate
Connect the battery negative cable.
6. Close front cabin cover.

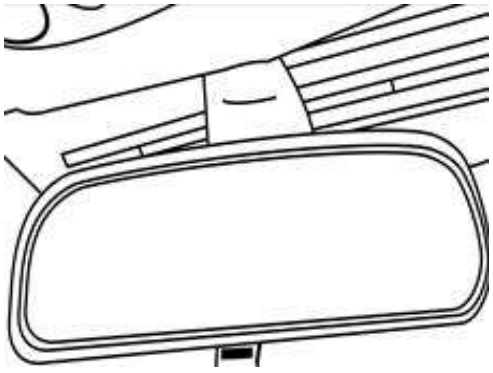
Outside rear view mirror

Disassembly and Assembly

Interior rear view mirror

Disassembly

Disassemble rear view mirror from the base with slotted screwdriver.



Installation

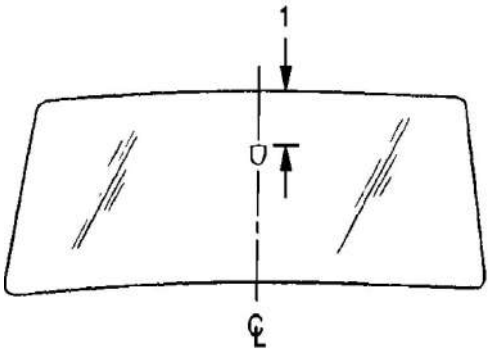
Press inner rear view mirror into the inner rear view mirror pedestal and confirm the installation is firm.

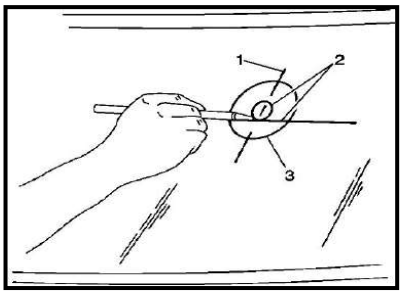
Install the inner rear view mirror base.

Precautions:

- The inner rear view mirror is attached to the rear view mirror base. The inner rear view mirror pedestal is glued to the windshield with Plastic polyethylene acetal adhesive. To install an independent inner rear view mirror pedestal or a new part, the following items are required:
- Loctite™ Instant Adhesive 312.
- (according to preparation of step 4 and 5)Original inner rear view mirror pedestal or replace new inner rear view mirror pedestal.
- A wax marker pen or crayon.
- Isopropyl alcohol.
- Cleaning tissue
- Thin steel gauze or sandpaper (320 or 360)
- Measure the top dimensions from the top of windshield (1) to the inner rear view mirror pedestal(2). The size is 79 mm.

- Mark at a position outside of the windshield with a wax pen or crayon. Draw a large circle along the inner rear view mirror pedestal outside edge on the windshield outer surface (3).





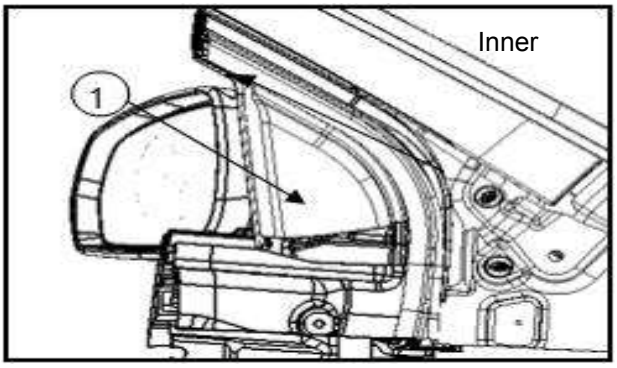
The sketch map of installation of the inner rear view mirror

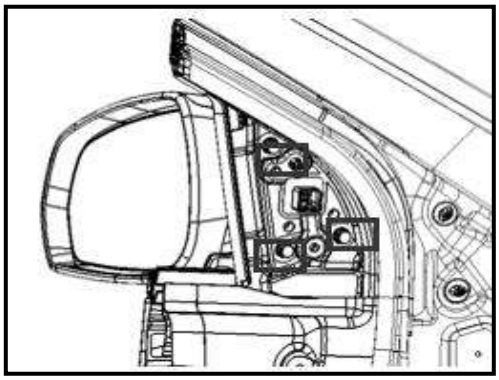
- Use glass detergent of common type,clean the circle on the inner side of windshield with polishing paper towel or common part number. Scrub the area until it is completely clean and dry. After drying, clean the area with the tissue what stained with isopropyl alcohol to remove the traces of washing powder or detergent.
- Attention：
- If the original inner rear mirror pedestal is used again, all adhesive traces must be removed before reinstalling.
- Use a thin (320 or 360) steel gauze or sandpaper to polish the bonding surface of the new inner rear view mirror or factory mounted original inner rear view mirror pedestal.
- Wipe the polished inner rear mirror pedestal with a clean tissue stained with isopropyl alcohol. open-air dry it.
- Before install it onto the windshield, prepare the inner rear mirror pedestal according to the manufacturer's instructions.

- Place the inner rear view mirror correctly at the pre-marked position. The half rounded end pointing upward is not allowed. Press the inner rear view mirror pedestal against the windshield for 30 to 60 seconds, applying constant pressure on the windshield.
- After 5 minutes, remove all excess adhesive with tissue stained with isopropyl alcohol or window cleaner.
- Re-install the inner rear view mirror.

Exterior rear view mirror

Disassembly





- Disconnect the battery negative.
- Carefully pry the trim panel with a slotted screwdriver.
- Unscrew the 3 fixing bolts of rear view mirror.
- Disconnect the rear view mirror connector.
- Remove the rear view mirror assembly

Installation

Follow the opposite sequence of the disassembly to asseemble.

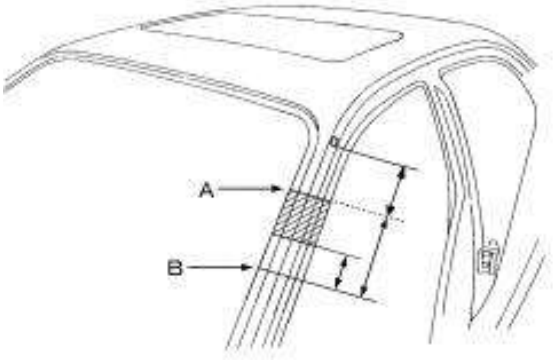
Body component maintenance and replacement

Body component maintenance and replacement

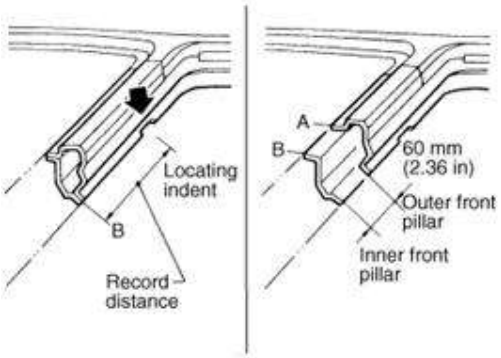
Overview

- **This section is used to provide guidance to the technicians with higher skills and experience in the maintenance of collision vehicles, and will use the modern service tools and equipment Those who do not have the vehicle body repair skills do not attempt to use the methods in this section to repair the vehicle.**
- **Encourage technicians to read the body repair manual (basic version) to guarantee the original function and quality of the vehicle The body repair manual (basic version) contains additional information, caution and warning that are not included in this manual. The technician shall refer to the two operating manuals to confirm the proper maintenance methods.**
- **Please note that this manual is a worldwide version, and there may be some procedures that are not applicable to some countries and regions.**

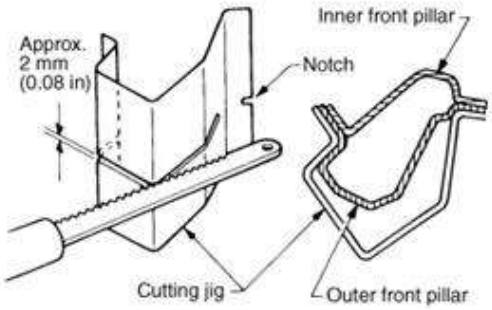
The front pillar connection points can be anywhere in the shaded part of the picture. According to the structure of the body, the optimum connection point is A.



Confirm the shearing position and record the distance from the locking mark. According to the distance records to shear the repair parts. Cut out the outer panel of front pillar at the 60mm upper the inner panel of front pillar .



In order to facilitate the shearing of front pillar outer panel, please prepare shear fixture. At the same time, it will also make maintenance parts can be accurately shear in the junction.



Examples of searing operations with fixture are as follows.

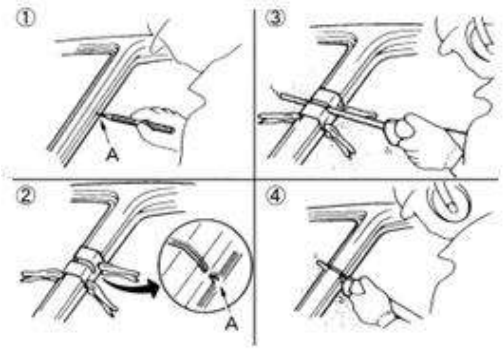
1. Mark shear line A: shear position of front pillar outer plate B: shear position of front column inner plate;

2.Align the shear line and notch of the fixture to clamp the front column;

3.Cut the front pillar outer plate(A position) along the groove of the fixture.

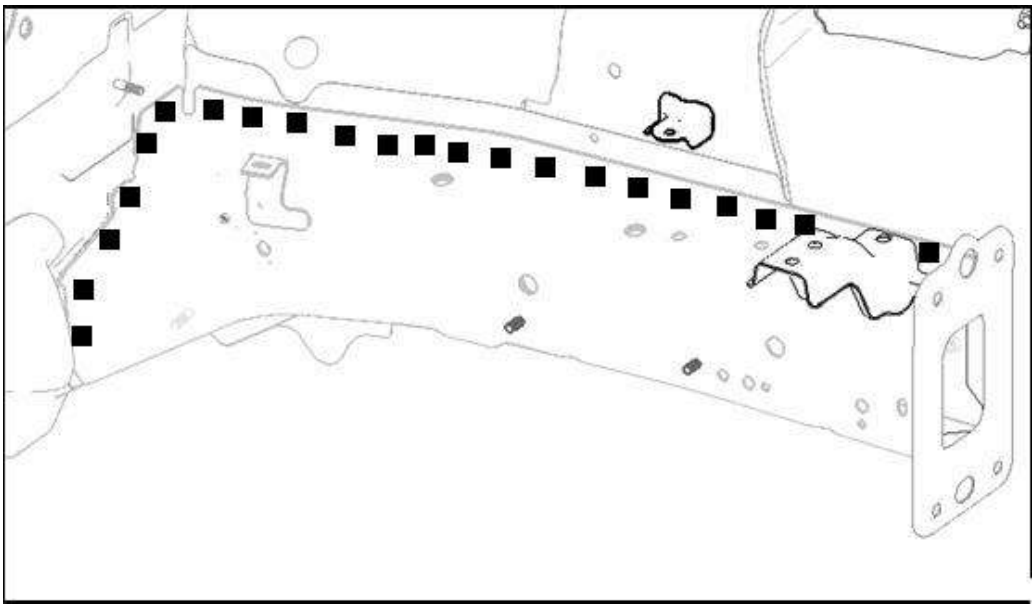
4.Remove the fixture and cut out the rest part.

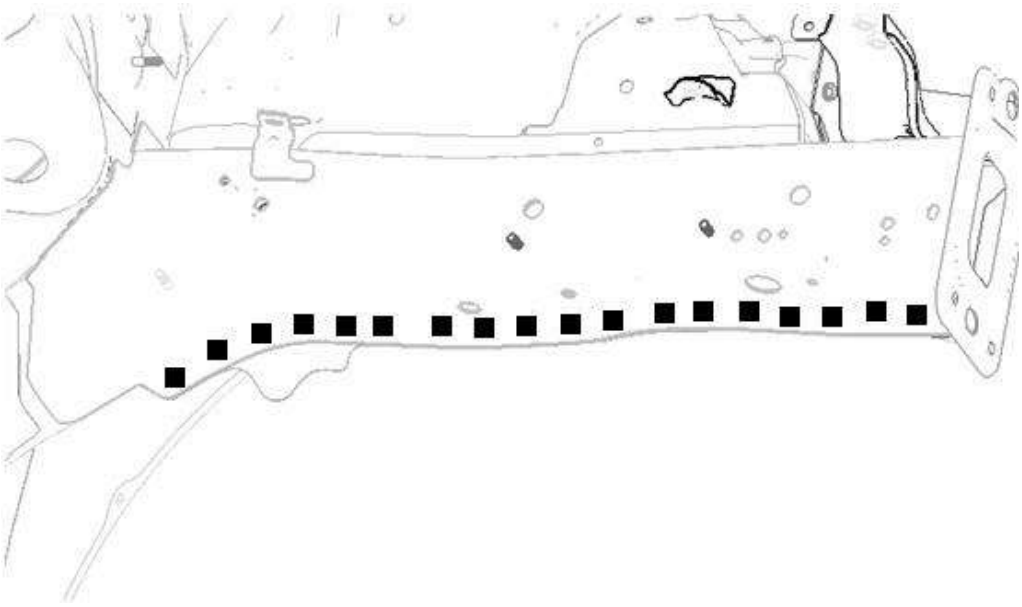
5.Cut the front pillar inner plate(B position) with the same method.



Replacement of outboard longitudinal beam (right and left symmetrically)

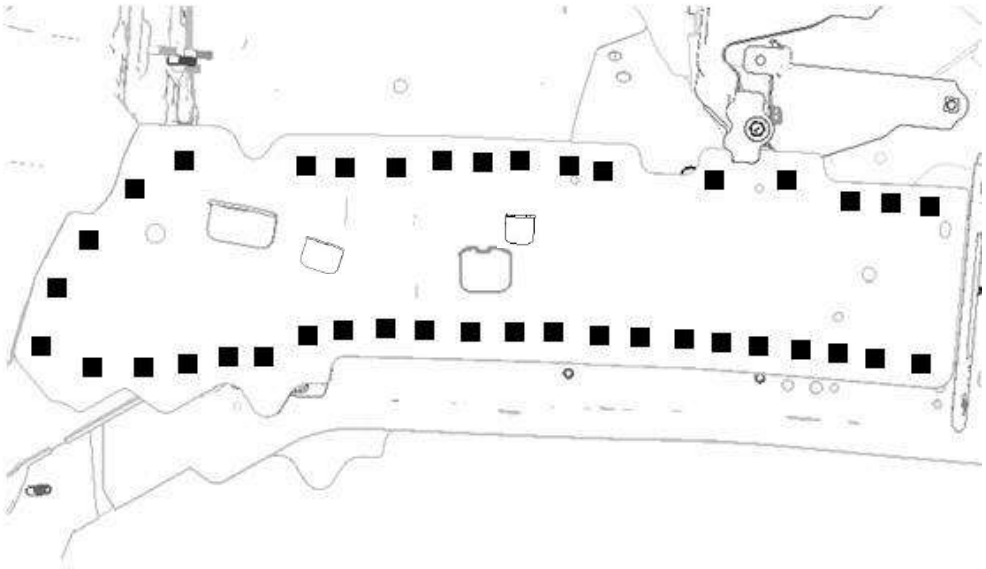
The solder joint as below:





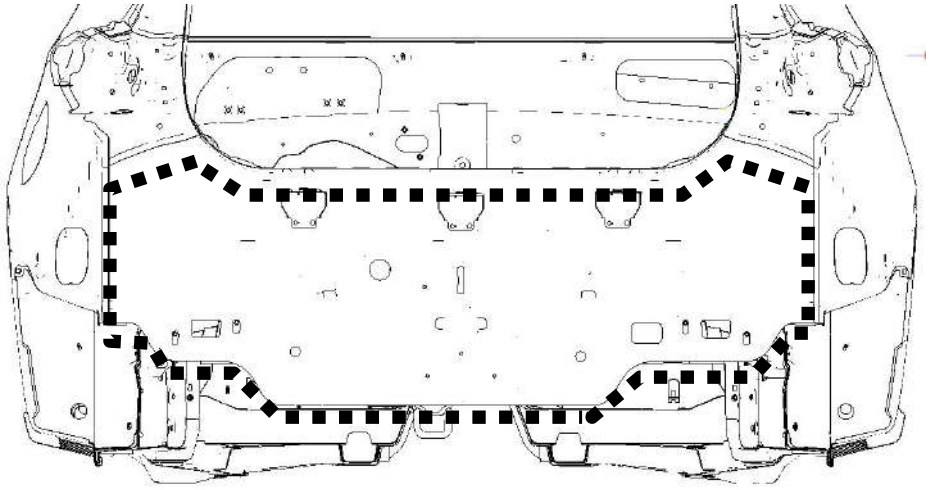
Replacement of outboard longitudinal beam (right and left symmetrically)

The solder joint as below:



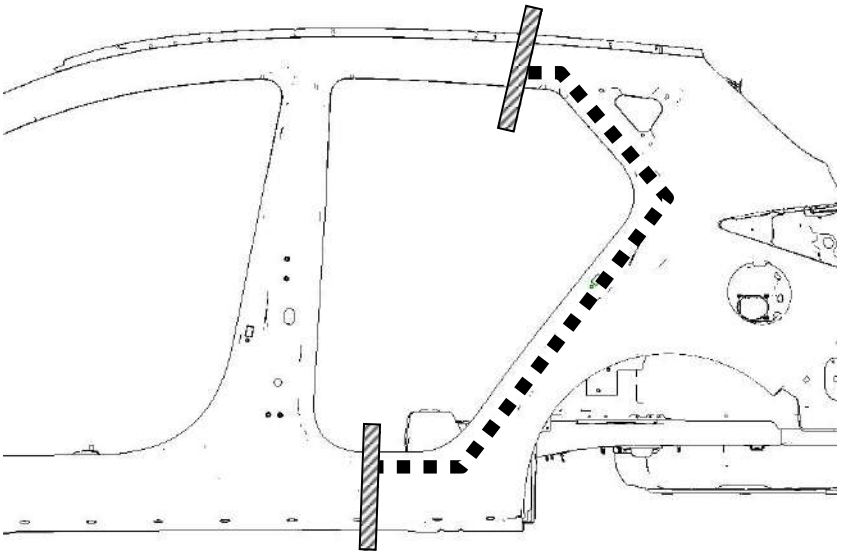
Replacement of outer panel of rear wall

The solder joint as below:



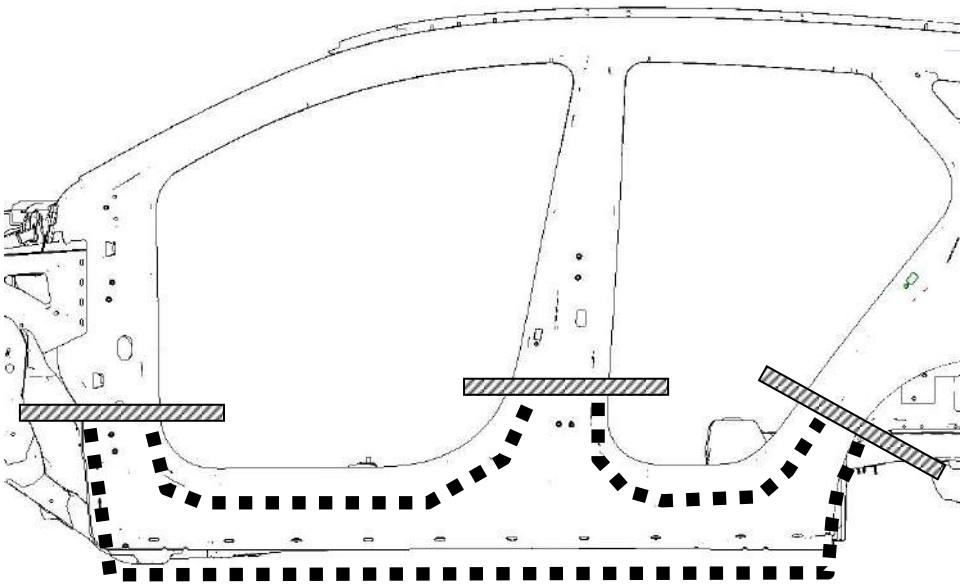
Replacement of the rear part of the side wall outer panel(right and left symmetry)

The solder joint as below:



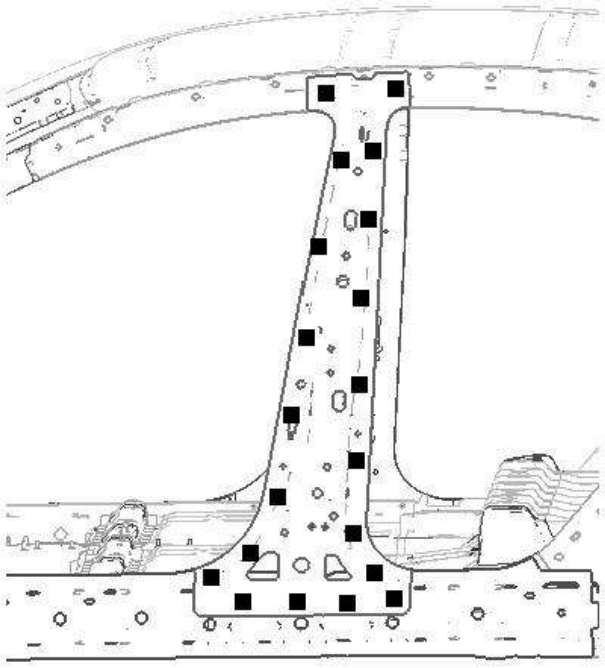
Replacement of the threshold part of the side wall outer panel(right and left symmetry)

The solder joint as below:



Replacement of the B pillar of side wall(right and left symmetry)

The solder joint as below:



Vehicle body size check

Vehicle body data

In the body maintenance process, in order to guarantee the running performance of the car and the better service for you, the repair personnel

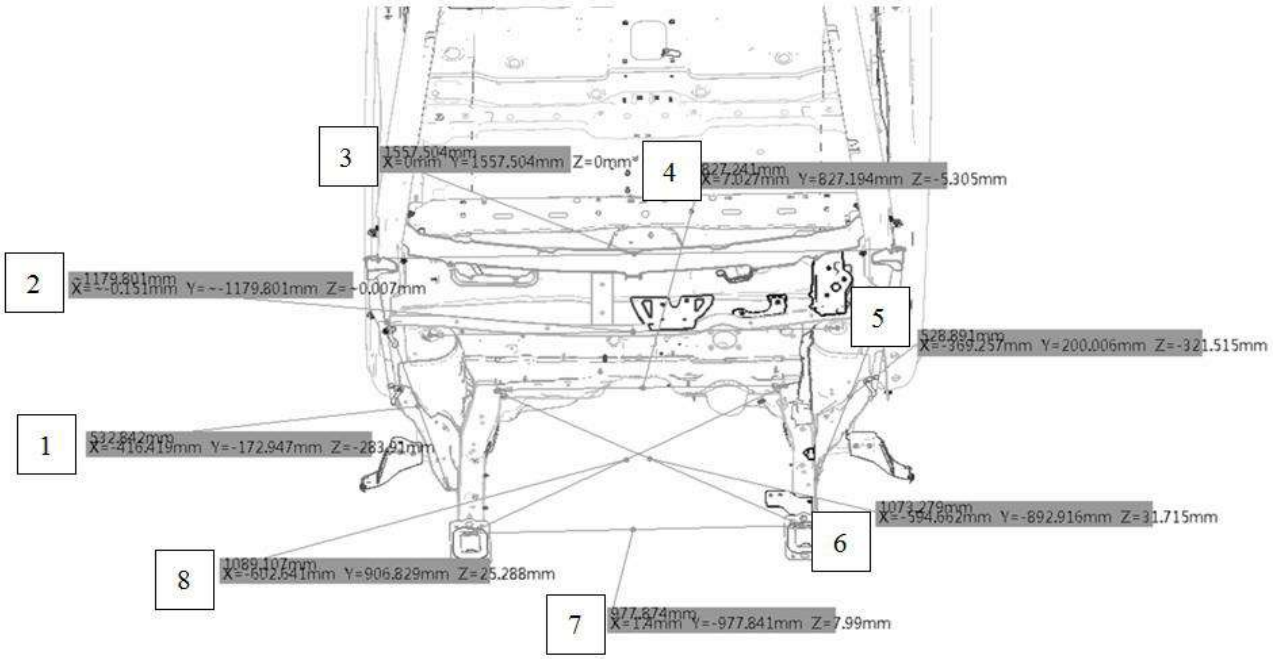
should check the size of body-in-white accordance to the following size.

Data measured points	Position information	Numerical value（mm）
1	The distance from the middle of the top cover to the middle of the upper outer plate of the ventilated cover plate.	764
2	The distance from the middle of the top cover to the bottom dead center of front windshield.	829
3	The distance from the A pillar to B pillar at R angle above the bottom dead center of front door frame.	1007.8
4	The length of the he bottom dead center of B pillar front door frame	883.5
5	The distance from the B pillar to V pillar at R angle above the bottom dead center of rear door frame.	813.5
6	The oblique diagonal length from front top to rear bottom of the rear door frame.	949.3
7	The height of rear door frame	960.2
8	The oblique diagonal length from front bottom	974.5

	to rear top of the rear door frame.	
9	The width of the bottom dead center of rear door threshold	336.4
10	Front door frame height	952.1
11	The oblique diagonal length from front top to rear bottom of the front door frame.	945.5
12	The width of the bottom dead center of front door threshold	728.3
13	The length of the he bottom dead center of A pillar front door frame	630
14	The oblique diagonal length from front top to rear bottom of the front door frame.	1316.8
15	Distance from the middle of the upper outer plate of the ventilated cover to the upper end of the front windshield	806.4
16	The gap distance of R angle below the windshield's bottom dead center of the right and left side wall outer panel.	1344.3

Engine bay data

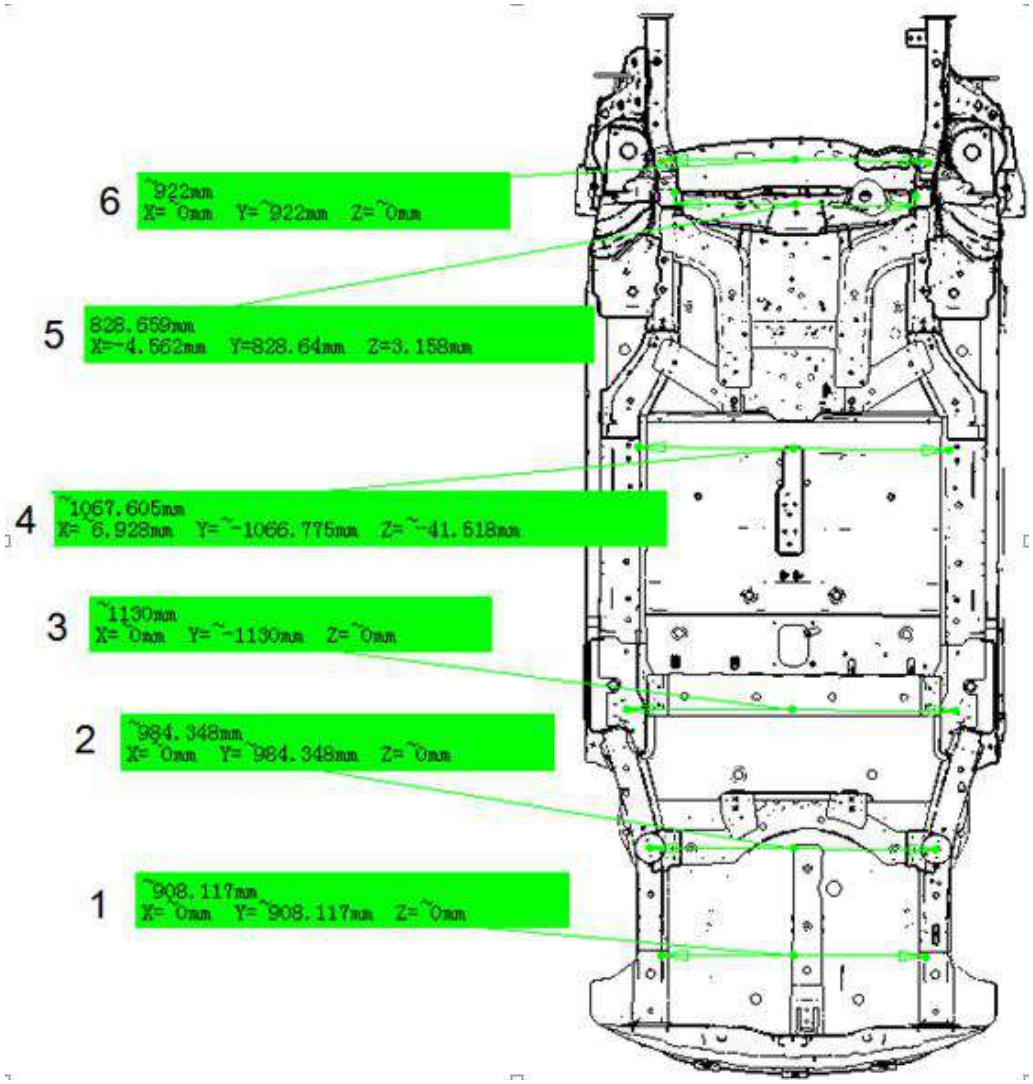
In the body maintenance process, in order to guarantee the running performance of the car and the better service for you, the repair personnel should check the size of body-in-white accordance to the following size.



Data measured points	Position information	Numerical value （mm）
1	The length of right front suspension side beam	532.8
2	The hole center gap of left and right front shock absorber mounting plate	1179.8
3	The maximum width of the connection position of left and right side wall with engine bay	1557.5
4	The maximum length of overlap of the front crossbeam and engine bay	827.2
5	The length of left front suspension side beam	528.9
6	The distance from the front end of left engine bay front stringer to the diagonal front wall crossbeam	1073.3
7	The hole center gap of the front panel of the left and right engine bay front stringer	977.9
8	The distance from the front end of right engine bay front stringer to the diagonal front wall crossbeam	1089.1

Beam data

In the body maintenance process, in order to guarantee the running performance of the car and the better service for you, the repair personnel should check the size of body-in-white accordance to the following size.



Data measured points	Position information	Numerical value （mm）
1	The inner wall gap of the left and right stringer of rear floor	914.0
2	The hole gap of left and right mounting plate at the side rear of the battery	984.3
3	The gap of the left and right mounting holes of the rear suspension	1130.0
4	The rear part inner wall gap of the left and right stringer behind the floor	1061.7
5	The hole gap of the rear part of the engine bay left and right stringer	895.0
6	Interval of right front assembling holder holes and secondary frame	922.0

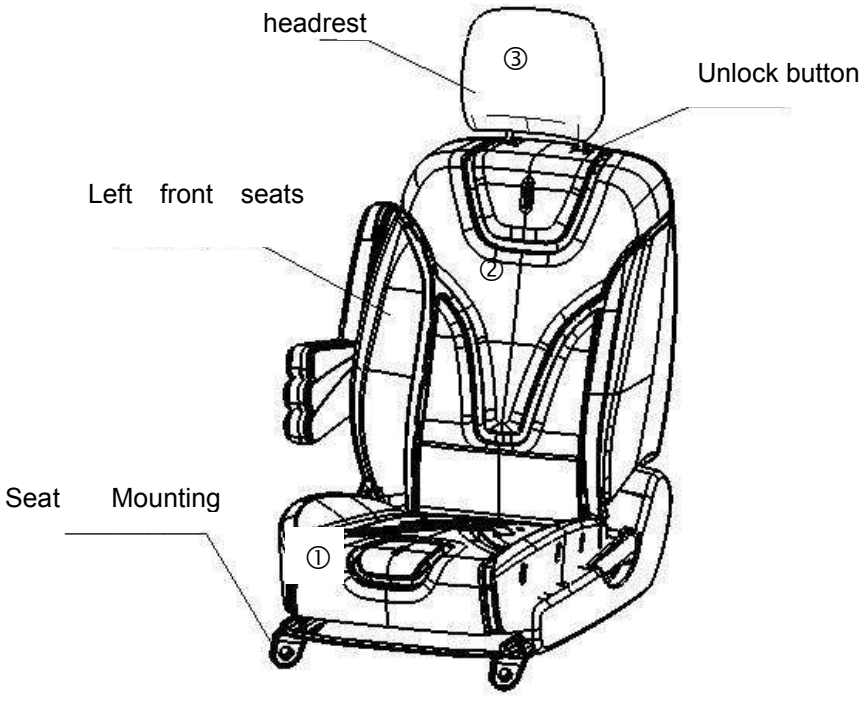
Seat belt

Attentions:

- Pay attention to the seat fixing bolt installation sequence.
- Position the seat in the final position, check the locking of each slide, and then tighten the front retaining bolt temporarily.
- Place the seat in the front position, check the lock on each slide, and tighten the anchor bolt completely.
- Place the seat in the final position and tighten the front bolt thoroughly.
- Check that the front and back operating seats are smooth and that all locking parts are properly locked.
- Replace damaged rear seat cushion clips.
- Mounting procedure for seat fixing bolts and nuts.
- Check that the operation of the tilted seat and folded seat backrest is smooth and proper.

Seat replacement

Front seat disassembly



- At first, remove the bolts 11251-1025F62① of seat assembly② (the seat

should be slided forward when removing the rear bolt). Installation tool S=14, the seat mounting bolt tightening torque:■45N.m-55N.m ）;

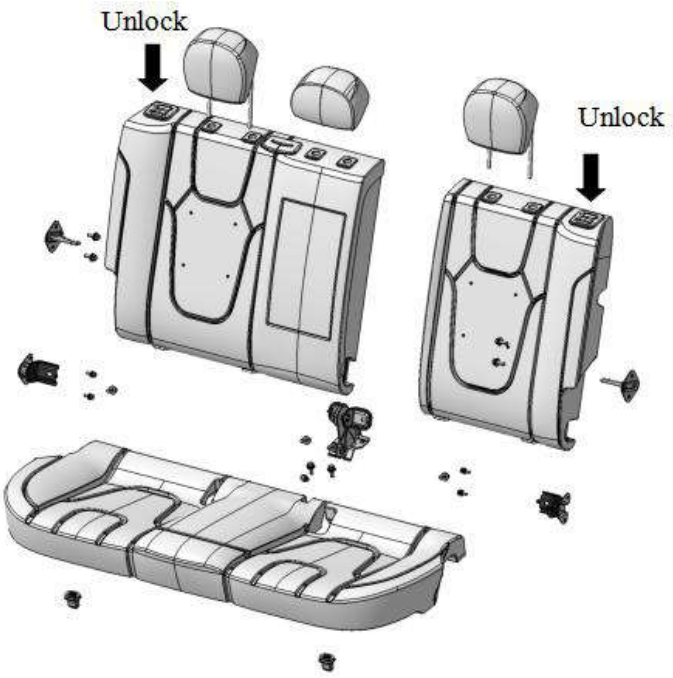
- Next, press the headrest release button on the headrest guide and pull up the headrest③ hard;
- Finally, separate the wire harness connector buckle of the safety belt inserted reminder, then remove the seat.

Front seat installation

Install according to the reverse procedure for disassembly.

Rear seat disassembly

- Lift the front part of the seat cushion and pull-out the cushion from the buckle. At the same time, push the cushion backward to make sure the clamping steel wire back of the cushion have been separated from the anti slip hook so that the cushion can be removed.
- Press hard the release button of left seat backrest, turn forward the backrest, unscrew the fastening bolts at the bottom of the backrest back successively (Installation tool S=14, the seat mounting bolt tightening torque:45N.m-55N.m ）, remove left backrest;
- Remove the bolts of mid safety belt from the rear row seat(Installation tool S=14, the lower mounting bolts tightening torque: 45N.m-55N.m);
- Press hard the release button of right backrest of rear seat, turn forward the backrest, unscrew the fastening bolts at the bottom of the backrest back successively (Installation tool S=14, the seat mounting bolt tighten torque:45N.m-55N.m ）, remove right backrest.



Rear seat installation

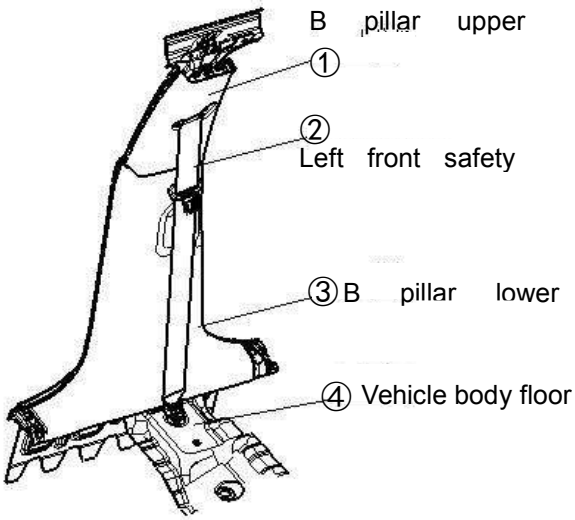
Install according to the reverse procedure for disassembly.

Safety belt replacement

Attention：

- Make sure not to damage the retractor when disassemble the safety belt.
- Replace the damaged buckle on the guard panel.

Front safety belt disassembly



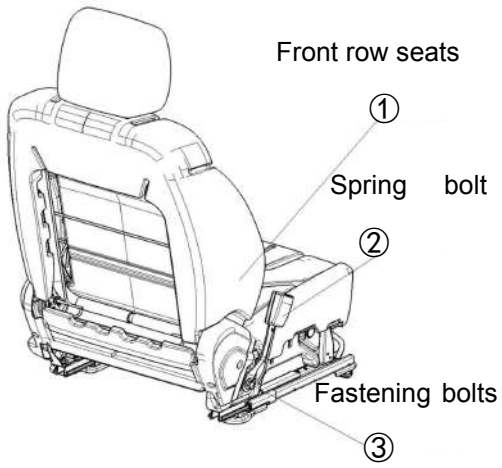
- First disassemble the front door sill guard panel and rear door sill guard panel, refer to front and rear door sill assembly.
- Slide up the belt② along the strip of the trim cover at the lower fixing point on the car floor, make it exposed, and then unscrew the lower fastening bolts (Installation tool S=14, specified torque: 45N.m-55N.m)
- Remove B column lower guard③ Refer to B column lower guard assembly.
- Remove B column upper guard①, put the spring bolt and lower fixing plate and trim cover through B column upper guard.
- Unscrew upper fixing screws (Installation tool S=14, specified torque: 45N.m-55N.m).
- Unscrew the mounting bolt of retractor(Installation tool S=14, specifies torque: 45N.m-55N.m). At the same time, disassemble the bolts11251-06161 of upper connecting bracket of retractor(Installation tool S=10, specified torque: 6N.m-8N.m).

Front safety belt installation

Assemble according to the opposite sequence of the disassembly procedures.

Disassembly of front safety belt latch

- Remove the front seat①. (Refer the seat part)
- Put the seat bottom upward, separate the plug of connecting wire harness.
- Disassemble the fixing nuts③ (Installation tool S=14, specified torque: 45N.m-55N.m).At the same time, separate the wiring harness and cushion fixing buckle (copilot have no), disassemble the front safety belt latch②.



The front belt latch installation

Assemble according to the opposite sequence of the disassembly procedures.

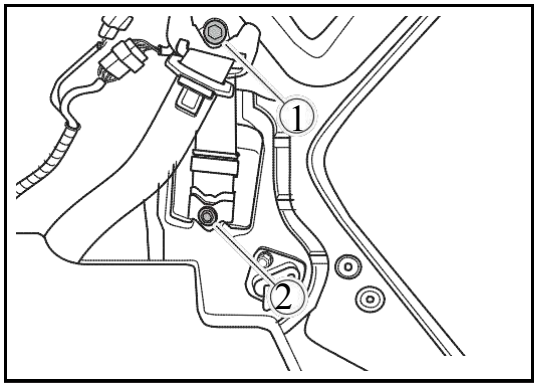
Rear row outside safety belt disassembly

- 1. Dismantle the guard panel of the rear door threshold
  refer to the guard panel of the rear door threshold
- 2. Dismantle the rear seat cushion assembly
  refer to the rear seat cushion assembly
- 3. Dismantle the rear seat back assembly
  refer to the rear seat back assembly
- 4. Dismantle the lower bracket of the rear seat back
  refer to C pillar low panel assembly
- 5. Dismantle the C pillar lower panel assembly

refer to the C pillar lower panel assembly

- 6. Dismantle 1 fixing bolt of rear row seat safety belt panel lower fixing point, dismantle the C pillar upper panel assembly
  refer to the C pillar upper panel
- 7. Disassemble rear outside three-point safety belt assembly
  1). Disassemble safety belt guiding ring fixing bolt①.
  2). Disassemble 1 bolt of retractor②.
  3). Remove rear row safety belt assembly.

  Installation tool S=14, specified torque: ■45N.m-55N.m.



Rear row outside safety belt assembly

Assemble according to the opposite sequence of the disassembly procedures.

Rear safety belt latch disassembly

- Disassemble the rear seat. (Refer the rear seat part)
- Unscrew the double lock fastening bolt①, and disassemble the safety belt buckle. Installation tool S=14, specified torque: ■45N.m-55N.m.

Rear safety belt latch installation

Assemble according to the opposite sequence of the disassembly procedures.

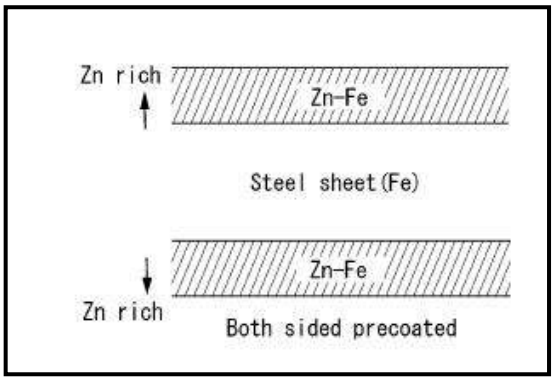
Vehicle body anticorrosion sealing

Anticorrosion instruction

The below upgraded anticorrosion method has been realised in factory, same method is advised when repair or replace vehicle body.

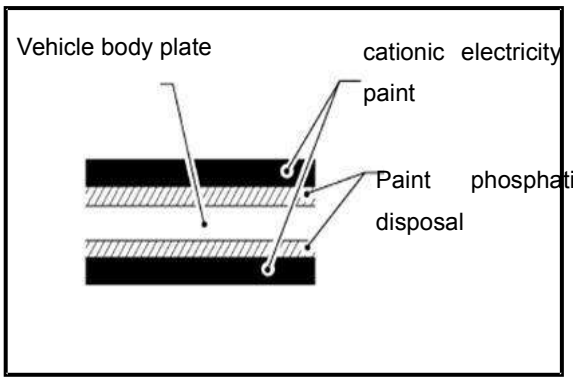
Anticorrosion Painting layer steel

A new kind of anticorrosion Painting layer steel uses zinc-coated thin steel plate instead of traditional coated plate, improving the capability of remedy and anticorrosion ability. Zinc-coated steel is kind of Zn-Fe alloy made from electroplate and heating, providing good and long-term anticorrosion ability and uses cationic electricity sedimentary paint.



Phosphate coating disposal and cationic electricity sedimentary paint

Chromating and cationic electricity sedimentary paint provide good anticorrosion protection and applicable for all vehicle body.



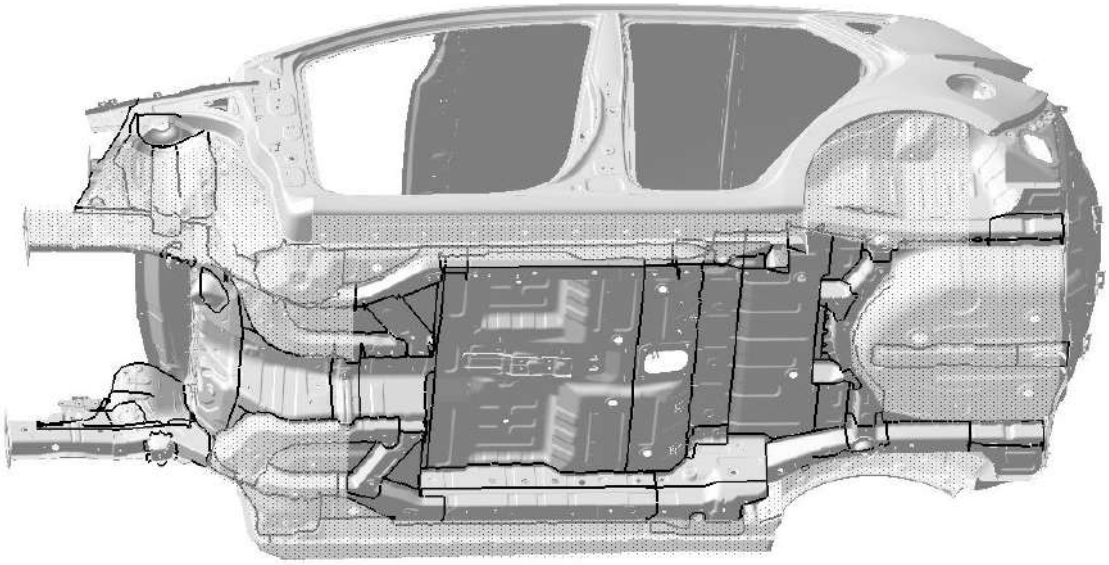
Note: minimum damage to paint is a must during welding

undercoat

Undercoat of floor and cabin is to be against corrosion/vibration/noise and stones bumping, so repair is to use the plate after same process, using inner paiting layer is a part of undercoat of anticorrosion/ sound insulation/ anti vibration/ impact.

Precautions:

- **Do not paint the undercoat everywhere unless it is regulated area;**
- **Do not paint around the exhaust pipe, influencing heat dissipation effect;**
- **Do not paint at rotating part;**
- **Paint green wax after painting the undercoat;**
- **After painting the vehicle body sealant, paint the undercoat.**

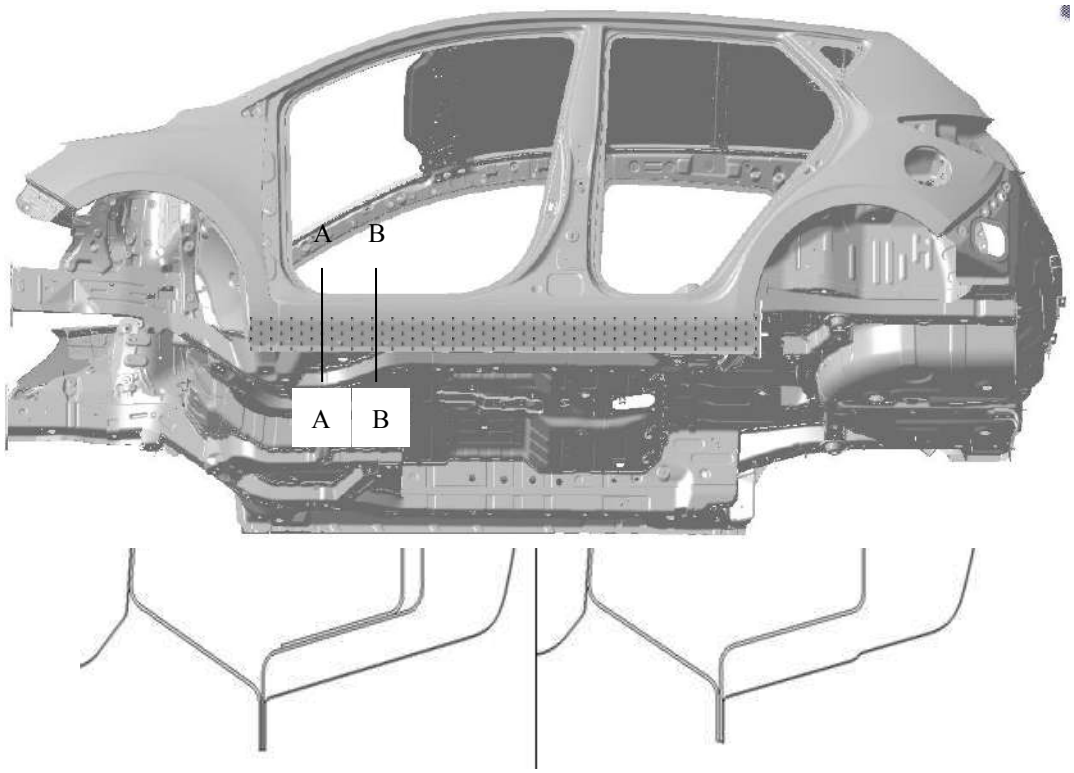


Undercoat part

Sealing parts

Stone splash protection

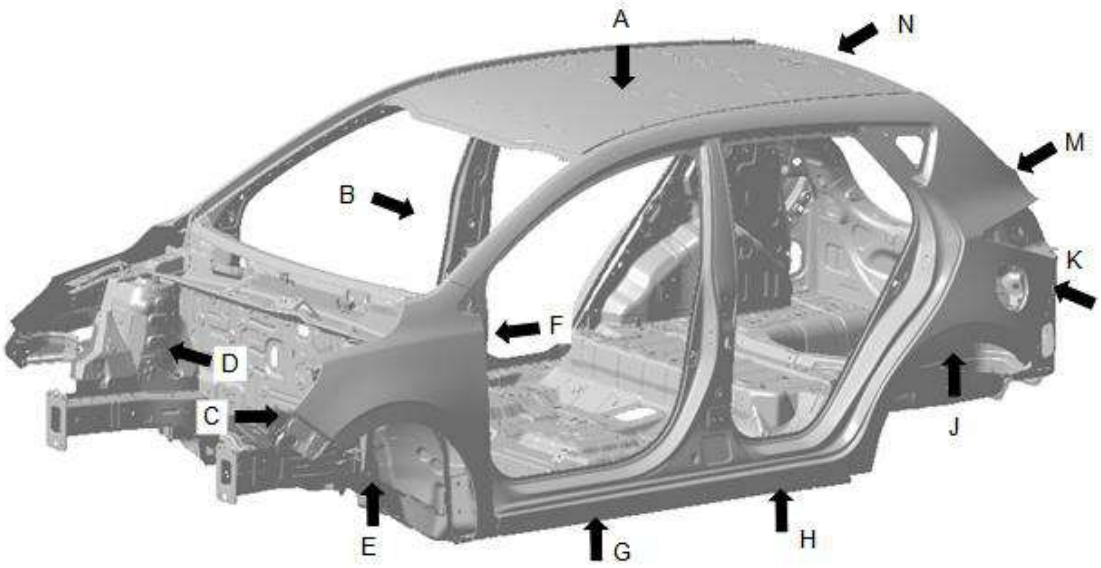
To prevent the damage from stone, lower floor(mud guard/ door, etc.) will be painted with a layer of undercoat. When replacing or repairing these panels, same materials should be used as anti stone crash. This material should be with functions including anticorrosion/ strong durable/ impact resistance/ long warranty, etc.



Stone splash protection layer

Vehicle body gumming sealing

Below diagram shows, sealant is commonly used at smooth place without cutting or gaps in the factory sealing area. But sealant can't be used too much, and touch is not allowed to sealant by other no-need-sealing area.



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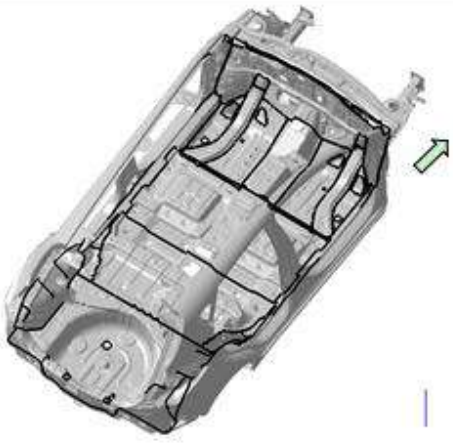
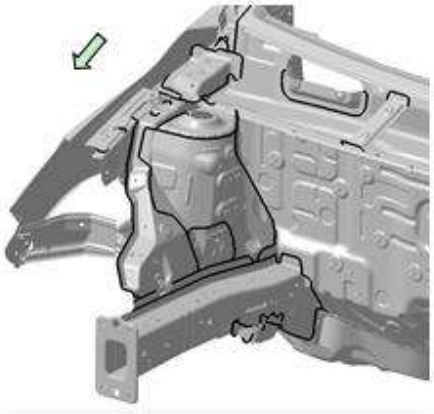
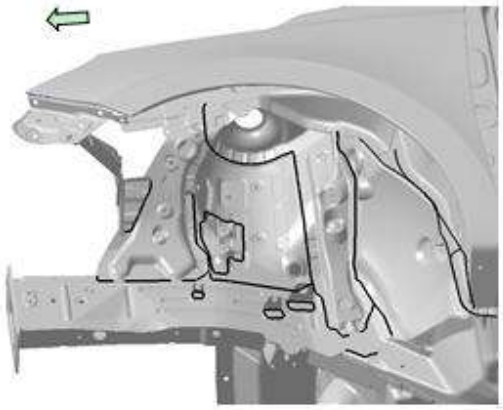
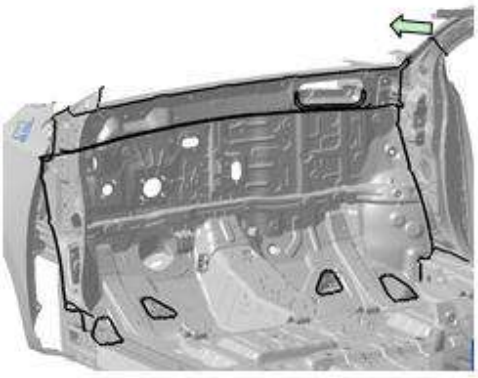
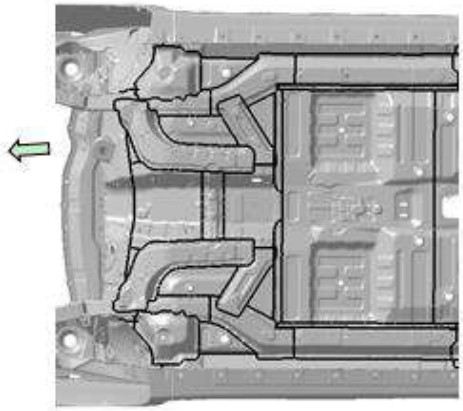
	
C	D
	
E	F
	

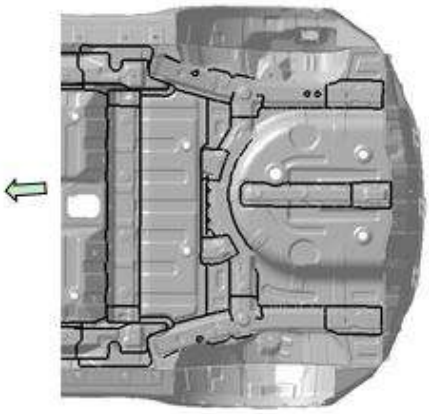
Vehicle body front face

Sealing parts

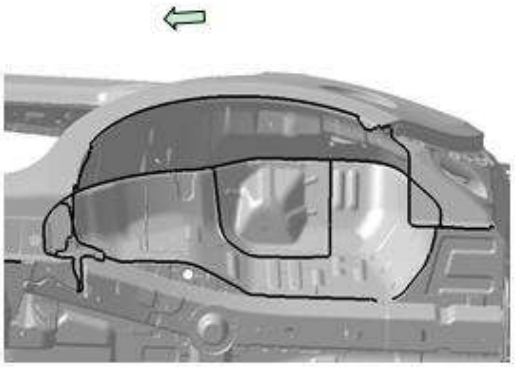
G



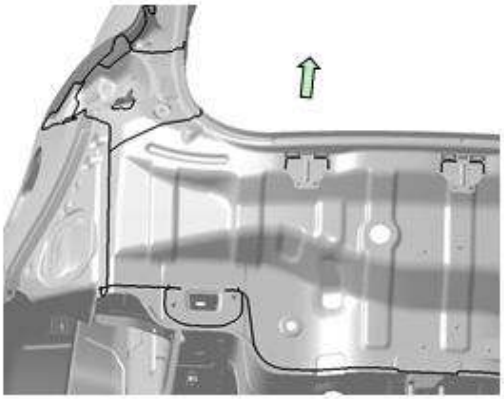
H



J



K



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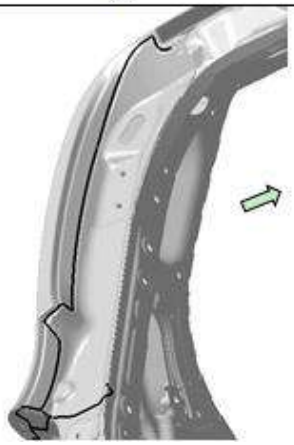


N

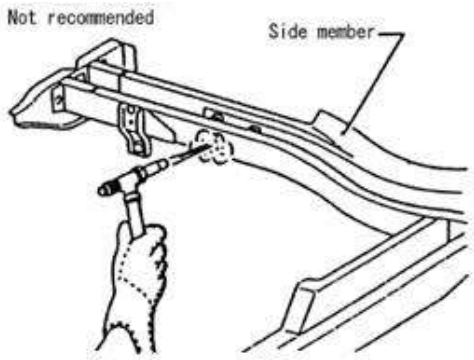
Vehicle body front face

Sealing parts

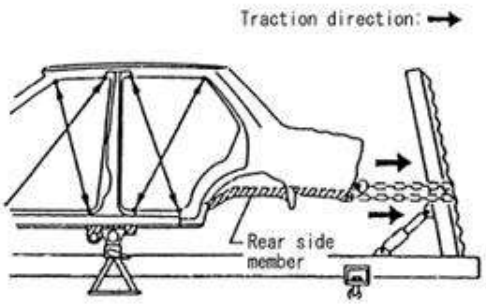
Repair high-strength steel

Maintenance Precautions

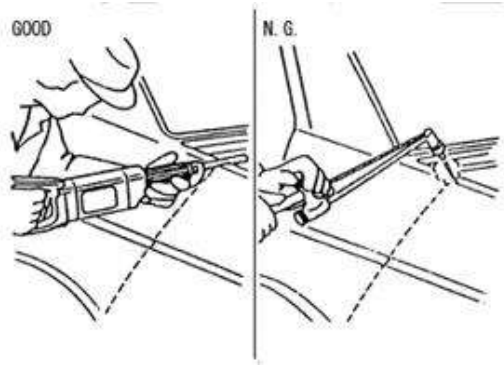
It is not recommended to heat when repairing some steel framed structure, because heating will weaken its performance; when heating is inevitable, temperature of high strength steel part shall not exceed 550 ℃.



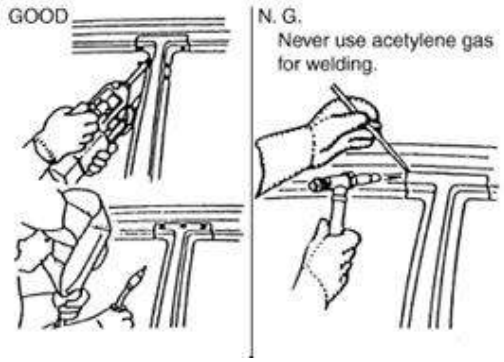
When straightening car body, should be careful to pull high strength steel, because it is extremely strong, over pulling will make other parts that connect with steel deformed, in this case, increasing measuring numbers and careful pulling the steel panel is the only way.



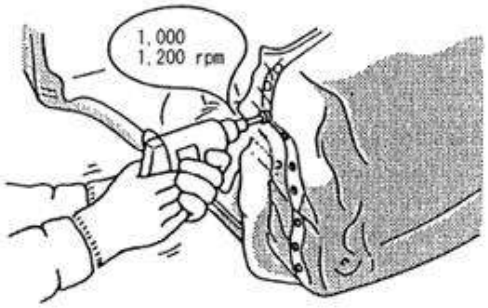
When cutting high strength steel, saw is a choice if can be replaced to avoid gas cutting, which can avoid surrounding panel wakening due to high temperature. If gas cutting is inevitable, be sure temperature influencing range is within 50mm.



When welding high strength steel, spot welding is strongly recommended at any case,minimizing the influence to its surroundings due to welding heat; Rare gas shielded welding is the second choice when spot welding can't proceed, do not use gas welding due to its weak welding strength.



The strength of spot welding position is higher than other places that don't have welding position on high strength steel. When cutting welding spots of high strength steel, using drilling machine with low rpm and high torque(1,000 to 1,200 rpm) can increase its durability and operability.

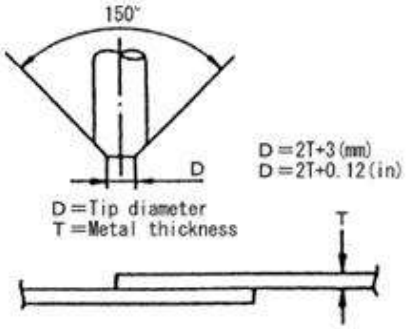


Precautions of spot welding high strength steel

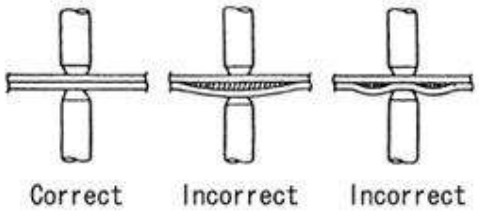
This task should be carried out under the standard operation condition,

following issues should be paid attention when spot welding high strength steel:

electrode tip diameter shall be chosen according to metal panel thickness.



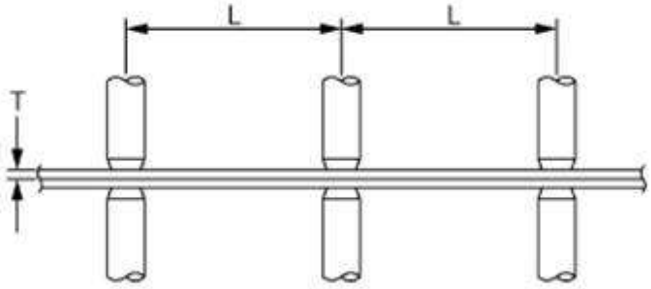
Panel shall be stick to each other without sundries or intervals



Restrain welding points intervals size according to the following instructions

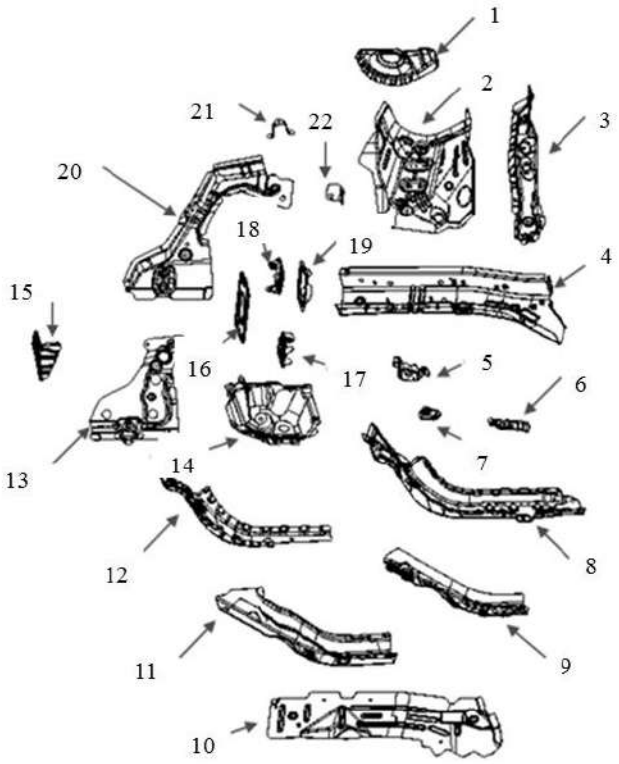
Unit: mm (in)

Thickness (T)	Minimum pitch (L)
0.6 (0.024)	10 (0.39) or more
0.8 (0.031)	12 (0.47) or more
1.0 (0.039)	18 (0.71) or more
1.2 (0.047)	20 (0.79) or more
1.6 (0.063)	27 (1.06) or more
1.8 (0.071)	31 (1.22) or more



Car body components：

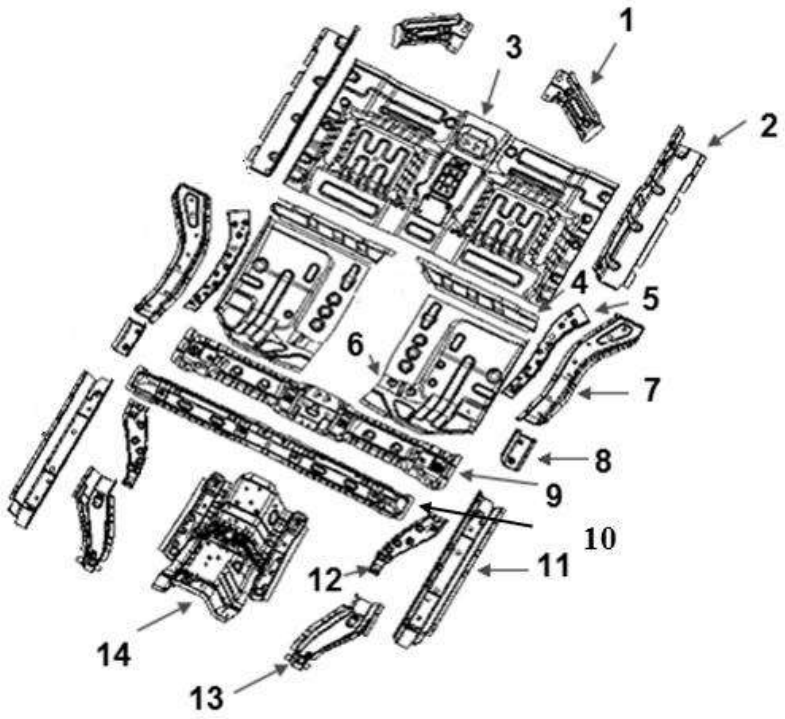
Engine compartment groups:



Serial No	Position name	Material strength(Mpa)
1	Shock absorber installing panel	Up 440
2	Front wheel cover	Under440
3	Front wheel cover reinforcing plate	Up 440

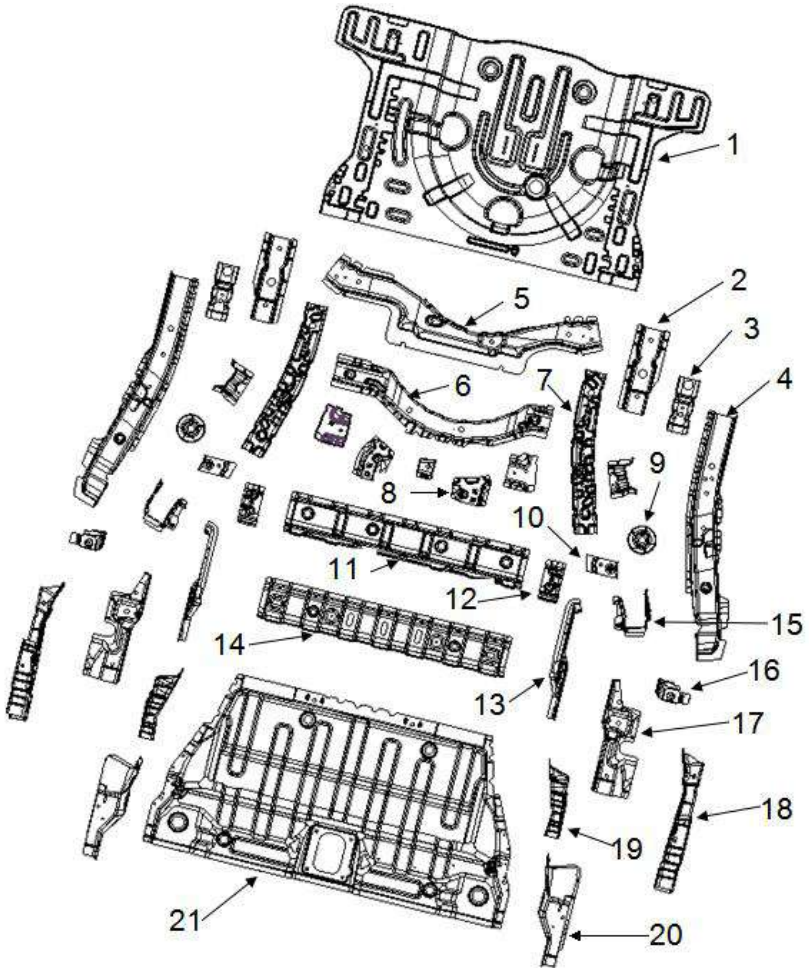
4	Carling front part of the engine compartment	Up 440
5	Front installing holder of sub-frame	Up 440
6	Rear reinforcing plate of front part of the engine compartment	Up 440
7	Reinforcing plate of front installing holder of sub-frame	Under440
8	Rear installing panels of sub-frame	Up 440
9	Reinforcing plate of rear part of the engine compartment	Up 440
10	Rear sealing panel of carling of the engine compartment	Up 440
11	Rear part of carling of the engine compartment	Up 440
12	Reinforcing plate of rear installing panels of sub-frame	Up 440
13	Rear sealing panel of front suspension boundary beam of the engine compartment	Up 440
14	Rear part connecting panel of carling of the engine compartment	Up 440
15	Installing holder connecting panel of wing panel headlights	Under440
16	Installing panle of anti-collision beam	Up 440
17	Front reinforcing plate of front part of the engine compartment	Under440
18	Mid reinforcing plate of front part of the engine compartment	Under440
19	Reinforcing plate of installing panle of front anti-collision beam	Up 440
20	Front suspension boundary beam of the engine compartment	Up 440
21	Rear installing holder of wing panel	Under440
22	Connecting panel of front suspension boundary beam of the engine compartment	Under440

Front floor part group:



Serial No	Position name	Material strength(Mpa)
1	Lower beam of front floor	Up 440
2	Connecting panel of floor carling	Up 440
3	Upper floor of battery	Under440
4	Front connecting panel of upper floor of battery	Up 440
5	Connecting panel of front floor carling	Up 440
6	Front floor	Under440
7	Front floor carling	Up 440
8	Rear reinforcing plate of floor lower carling	Up 440
9	Rear beam of front seats	Up 440
10	Front beam of front seats	Up 440
11	Rear part of floor lower carling	Up 440
12	Front reinforcing plate of floor lower carling	Up 440
13	Front part of floor lower carling	Up 440
14	Central passage	Up 440

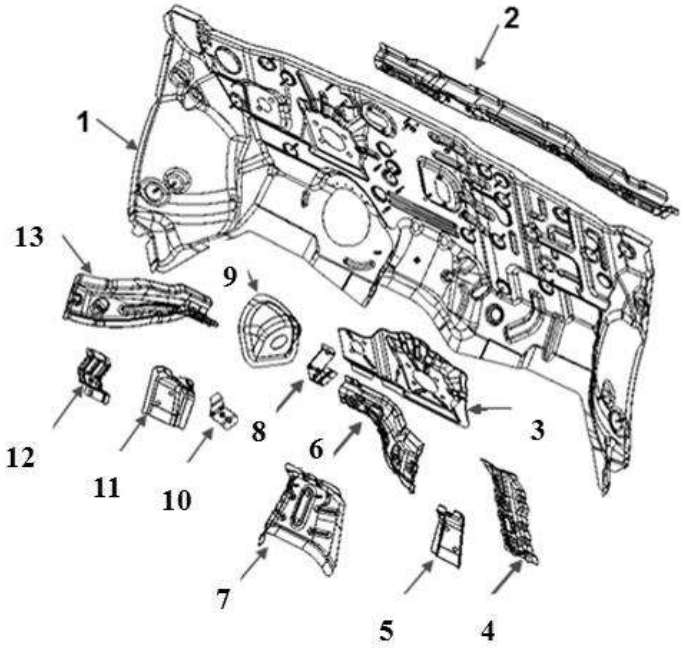
Rear floor part group:



Serial No	Position name	Material strength(Mpa)
1	Spare tire installing panel	Under440
2	Rear part of rear floor left carling	Up 440
3	Rear reinforcing plate of rear floor left carling	Under440
4	Left carling of rear floor structure	Up 440
5	Upper torsion beam of rear floor	Up 440
6	Rear beam of rear floor structure	Up 440
7	Front reinforcing plate of left carling of rear floor structure	Under440
8	Left installing holder of battery end	Up 440
9	Left installing base of rear suspension	Under 440
10	Installing reinforcing plate of left rear safety belt	Under 440

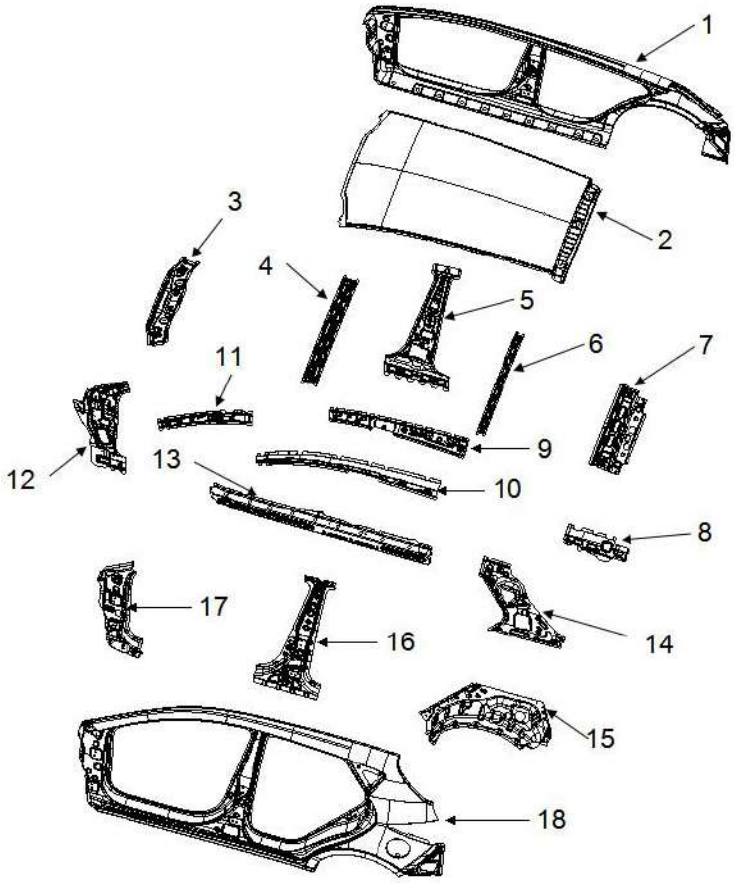
11	Front beam of rear floor structure	Up 440
12	Left connecting plate of front beam of rear floor structure	Up 440
13	Connecting plate of rear left installing plate of battery side	Up 440
14	Mid fixing plate of rear seat	Under440
15	Left installing plate of rear axle	Up 440
16	Reinforcing plate of left installing plate of battery side rear	Up 440
17	Left installing plate of battery side rear	Up 440
18	Left threshold rear part	Up 440
19	Left threshold rear part connecting plate	Up 440
20	Left threshold rear part reinforcing plate	Under440
21	Left floor seat installing plate	Under440

Front mold group:



Serial No	Position name	Material strength(Mpa)
1	Front mold plate	Under440
2	Front mold plate beam	Up440
3	vacuum booster installing plate	Under440
4	Front mold plate reinforcing plate	Up 440
5	Connecting panel of right frnot floor carling of front mold	Up 440
6	Right reinforcing plate of front mold beam	Up 440
7	Central passage connecting panel of front mold plate	Up 440
8	Right installing holder of AC	Under440
9	Steering column cover	Under440
10	Left installing holder of AC	Under440
11	Connecting panel of left frnot floor carling of front mold	Up 440
12	Accelerator pedal installing plate	Under440
13	Left reinforcing plate of front mold beam	Up440

Side skirt group:



Serial No	Component name	Material strength(Mpa)
1	Out panel of right side skirt	Under440
2	Out panel of top cover	Under440
3	Front beam of top cover	Under440
4	Central beam of top cover	Up 440
5	Left mid door column trim panel	Up 440
6	Second beam of top cover	Under440
7	Upper panel of rear beam of top cover	Up 440
8	Left reinforcing plate of top cover side skirt connecting	Under440
9	Left mid door column upper frame panel	Under440
10	Reinforcing plate of left mid door column upper frame panel	Up440
11	Inner upper panel of left A column	Up 440
12	Lower inner panel of left A column	Up 440
13	Left threshold reinforcing plate	Up440
14	Upper inner panel of left C column	Under440

15	Outer panel of left rear wheel cover	Under440
16	Reinforcing plate of left B column out panel	Up 440
17	Reinforcing plate of left front door column	Up440
18	Out panel of left side skirt	Under440

Dispose parts of extra high strength steel

Weaken or additional connecting is forbidden;

It is forbidden to weaken or additional connect extra high strength steel such as carling, if it is damaged, front floor assembly must be replaced.

Spray paint

Operate according to battery protection standard during dry spray;

When spray booth is used, keep the temperature in and out of threshold(lower than 60℃) , minimizing damage to lithium battery.

Attention:

- **Install a non-contact thermometer;**
- **If battery is covered, the cover shall be removed to measure inner temperature;**
- **If the spray temperature exceeds 60℃ out of threshold, battery should be removed before spraying.**

Car protection

Seat/glass/carpet all need to be removed or covered by appropriate material(Splash cover), so they will not be dirty or damaged by welding slag. Also, when cutting or welding part is close to high voltage part, this high voltage part shall be covered by insulating heatproof cover(Splash cover).

Body exterior system maintenance

Contents

Front combination light

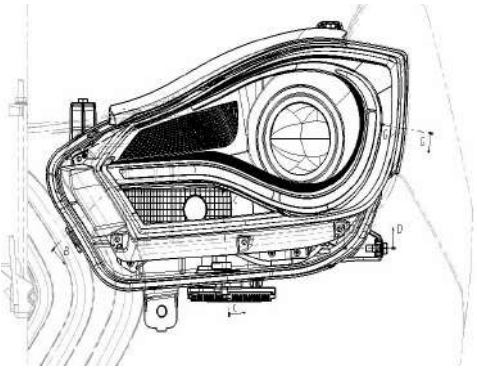
Disassembly and Assembly

Front combination light lighting adjusting

Precautions

Front combination light

Components location map



Disassembly and Assembly

Removal

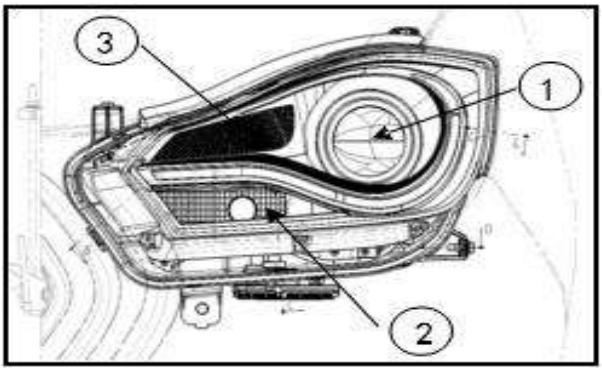
1 Disconnect the battery negative.

2 Take down front bumper, Refer to “front bumper replacement”.

3 Remove the 4 installation points fixing screws of front combination headlamp, removal torque is 3N.m~5N.m.

4 Carefully move front combination headlamp and remove electrical connector.

5 Remove the front combination lamp assembly.



1 high beam/low beam light 2 turning light 3 position light

Assembly

1 Connect the electric connector of front headlamp assy.

2 Assemble front headlamp assy and fixing bolt.

3 Assemble front bumper, Refer to “front bumper replacement”.

4 Assemble battery’s cathode.

5 Check whether headlamp can meet the requirement.

6 If not, please adjust headlamp, refer to “front combination light adjusting”.

Front combination light lighting adjusting

1 Confirm that all tires are under normal pressure

2 Place the vehicle and tester on the same flat surface.

3 Verify that the vehicle is empty except for the driver (or placing equivalent weight at the driver's seat).

4 Turn on the combination lamp near beam.

5 Adjust the light with special adjusting tools.

Low beam, high beam Adjust up and down in a dimming point, adjust the low beam, high beam up and down; High beam, low beam left and right adjustment in a dimming point, adjust the low beam, high beam About height. If repairs were made to the front of the vehicle body and / or the front combination lamp assembly was replaced, check the light and adjust it in place with the light detector.

6. Follow the light meter until it is adjusted.

Precautions

● Do not remove the light bulb and the rear cover from the lamp body for too long time. Because the entrance of dust, moisture, smoke, etc. may affect the performance of the lamp. The new bulb should be installed immediately after removing the bulb or rear cover and return the rear cover back.

● The combination headlamp is semi closed and uses a replaceable Hernia headlight. Replacement of light bulb can be carried out in the engine compartment, but it is recommended to replace it after disassembly.

● When operate the bulb, you can only hold the base of the bulb. Do not touch the glass shell.

● Do not shake or turn bulb when disassembling.

● Do not remove the lamp and the back cover from the lamp body for too long as dust, moisture, smoke, etc. entering the lamp may affect lamp performance. Install a new lamp immediately after removing the lamp in the front combination lamp reflector.

Front turn signal lamp

Precautions

Disassembly and Assembly

Front turn signal bulb

PreCautions:

● Do not remove the front turning light from the lamp body for too long as dust, moisture, smoke, etc. entering the lamp may affect lamp performance. Install a new lamp immediately after removing the lamp in the front combination lamp reflector.

● The combination headlamp is semi closed and uses a replaceable halogen bulb. The replacement of bulb can be carried out in the engine compartment, but removing it to replace is preferred.

● When operate the bulb, you can only hold the plastic holder of the bulb. Do not touch the glass shell.

● Do not shake or turn bulb when disassembling.

Disassembly and Assembly

Removal

1 Disconnect the battery negative.

2 Unplug the indicator lamp rear connector, unscrew its base counterclockwise.

3 Twisting the turn signal lamp off counterclockwise to remove it from the lamp holder.

4 Replace turn signal lamp bulb。

Assembly

During assembly, please follow the opposite sequence of disassembly procedures.

Front position light

Precautions

Front position light

Precautions

● front position light and DRL use LED illuminant, can’t be disassembled and replaced.

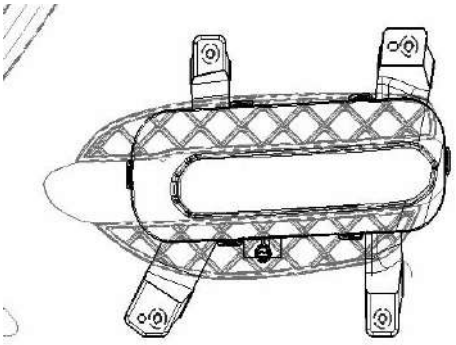
Front fog lamp

Disassembly and Assembly

Precautions

Front fog lamp

Components location map



Disassembly and Assembly

Removal

1 Disconnect the battery negative.

2 Disassemble front bumper. Refer to”Replacement of front bumper”.

3 Remove the fixing screws of the fog lamp on the front bumper.

4 Disconnect the appliances connector to remove the fog lamp assembly.

Assembly

1 Install the front fog lamp assembly.

2 Connect appliances connectors.

3 Assemble front bumper, Refer to “front bumper replacement”.

4 Assemble battery’s cathode and check the light. Please adjust light if it cannot reach to the requirement. Refer to “the adjustment of the front fog light beam”.

5 Tightening torque of bolts: (2±1) N·m

Precautions

● front fog light uses LED illuminant, can’t be disassembled and replaced.

● Follow the opposite sequence of disassembly procedures.

● Detect the light after installation. Please adjust light if it cannot reach to the requirement. Refer to “the adjustment of the front fog light beam”.

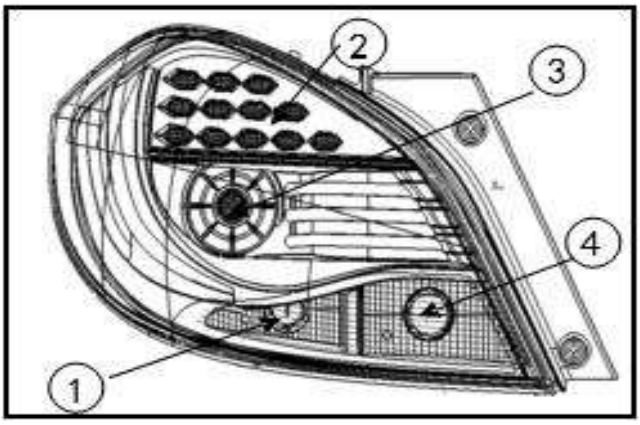
Taillight

Disassembly and Assembly

Precautions

Taillight

Components location map



1 rear turning lamp 2 braking lamp 3 rear position lamp 4 rear fog lamp(left fog lamp right reversing lamp)

Disassembly and Assembly

Removal

1 Disconnect the battery negative.

2 Remove the 2 bolts from trim panel of taillight.

3 Unplug connector after removing taillight, replace the whole light or bulb.

Assembly

Follow the opposite sequence of the disassembly procedures.

Precautions

● Check the taillight before installation.

● Do not damage the taillight when installing.

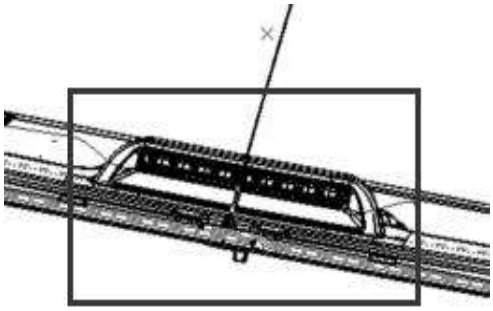
● After installation, check if the taillight installation is in place, if the gap with vehicle body is appropriate, if not in place or inappropriate, reinstall it.

Braking lamp (highlevel)

Disassembly and Assembly

Braking lamp (high level)

Components location map



Disassembly and Assembly

Removal

1 Disconnect the battery negative.

2 Disassemble coat rack.

3 Plug out connector.

4 Use cross screwdriver to disassemble the fixing screws.

5 Take off High brake lights and replace.

Assembly

Assemble according to the opposite sequence of the disassembly.

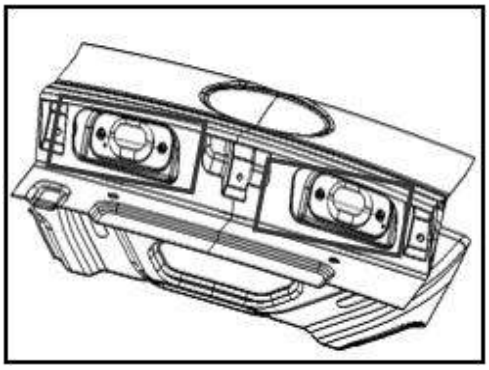
License plate light

Disassembly and Assembly

Precautions

License plate light

License plate light Components location map



Disassembly and Assembly

Removal

1 Disconnect the car battery.

2 Use cross screwdriver to disassemble the fixing screws of license plate light.

3 Remove license plate light.

4 Remove connector, replace license plate light.

Assembly

Follow the opposite sequence of the disassembly procedures.

Precautions

● Check the bulb before installation.

● When installing the lamp holder, should aligning the mounting hole and be installed in place.

● Should check after installation.

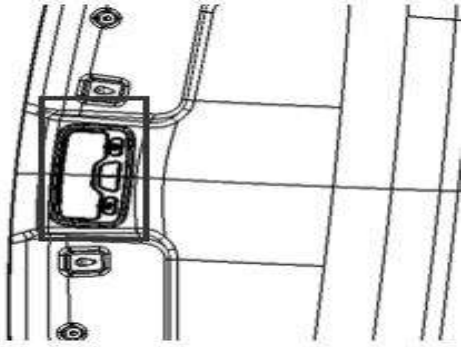
Front roof light

Disassembly and Assembly

Precautions

Front roof light

Diagram of components position of front roof lights



Disassembly and Assembly

Disassembly

1 Disassemble front roof light cover.

2 Remove 2 fixing screws of front roof lamp by sequence.

3 Remove the front roof lamp from the roof, disconnect the connector carefully.

4 Replace front roof light.

Assembly

Follow the opposite sequence of the disassembly procedures.

Precautions

- **choose the bulb needs to be replaced according to real situation.**
- **Check if bulb is intact before installation.**
- **Assemble bulb to the base well.**
- **Check after installation if within standard.**

Inner rear view mirror

Disassembly and Assembly

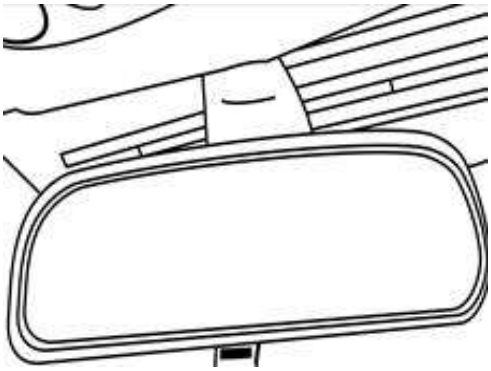
Precautions

Inner rear view mirror

Disassembly and Assembly

Disassembly

1 Disassemble rear view mirror from the base with slotted screwdriver.



Assembly

1 Press inner rear view mirror into the inner rear view mirror pedestal and confirm the installation is firm.

2 Install the inner rear view mirror base.

Precautions

● The inner rear view mirror is attached to the interior rear view mirror pedestal. The inner rear view mirror pedestal is glued to the windshield with Plastic polyethylene acetal adhesive. To install an independent inner rear view mirror pedestal or a new part, the following items are required:

● Loctite™ Instant Adhesive 312.

● (according to preparation of step 4 and 5)Original inner rear view mirror pedestal or replace new inner rear view mirror pedestal.

● Wax marker or crayon.

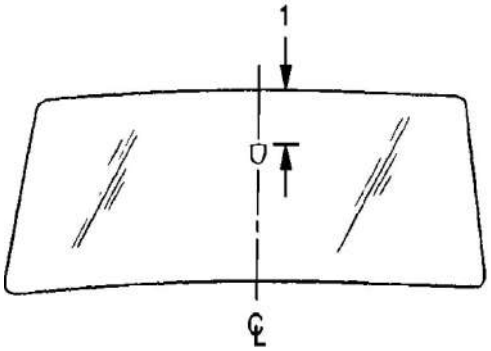
● Isopropyl alcohol.

● Cleaning tissue.

● Thin steel gauze or sandpaper (320 or 360)

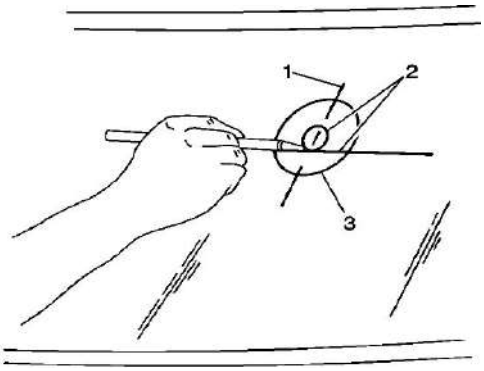
● ① Measure the top dimensions from the top of windshield (1) to the inner rear view mirror pedestal(2). The size is 79 mm.

The sketch map after install the inner rear view mirror



● Mark at a position outside of the windshield with a wax pen or crayon. Draw a large circle along the inner rear view mirror pedestal outside edge on the windshield outer surface (3).

The sketch map of installation of the inner rear view mirror pedestal



● Use glass detergent of common type,clean the circle on the inner side of windshield with polishing paper towel or common part number. Scrub the area until it is completely clean and dry. After drying, clean the area with the tissue what stained with isopropyl alcohol to remove the traces of washing powder or detergent.

Attention：

● If the original inner rear mirror pedestal is used again, all adhesive traces must be removed before reinstalling.

● Use a thin (320 or 360) steel gauze or sandpaper to polish the bonding surface of the new inner rear view mirror or factory mounted original inner rear view mirror pedestal.

● Wipe the polished inner rear mirror pedestal with cleaning tissue stained with isopropyl alcohol. open-air dry it.

● Before install it onto the windshield, prepare the inner rear mirror pedestal according to the manufacturer's instructions.

● Place the inner rear view mirror correctly at the pre-marked position. The half rounded end pointing upward is not allowed. Press the inner rear view mirror pedestal against the windshield for 30 to 60 seconds, applying constant pressure on the windshield.

● After 5 minutes, remove all remaining adhesive with tissue stained with isopropyl alcohol or window cleaner.

● Re-install the inner rear view mirror.

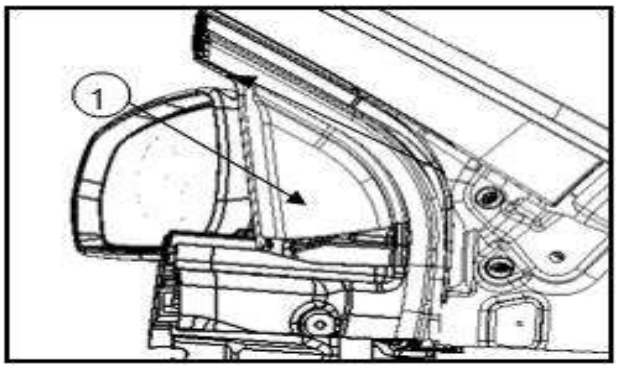
Outside rear view mirror

Disassembly and Assembly

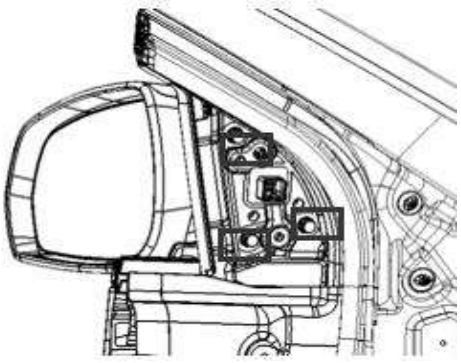
Outside rear view mirror

Disassembly and Assembly

Disassembly



1 inner trim panel



1 Disconnect the battery negative.

2 Carefully pry the trim panel with a slotted screwdriver.

3 Unscrew the 3 fixing bolts of rear view mirror.

4 Disconnect the rear view mirror connector.

5 Remove the rear view mirror assembly

Assembly

Follow the opposite sequence of the disassembly to asseemble.

Lamps and lanterns maintenance data and specification

Bulb power and light color

Lamps and lanterns maintenance data and specification

Bulb power and light color

Lamps and lanterns specification

Name	Function	Type	Power	Light color
Headlamp	Front position lamp	Light bulb(W)	2x5W	white
	High/low beam headlight	Xenon lamp	2x25W	white
	Daytime Running Light	LED	2x6W	white
	Turn lights	Light bulb(PY21W)	2x21W	amber
Front fog light	Front fog light	LED	2x5W	white
Taillight	Rear position lamp	LED	2x2W	red
	Break light	Light bulb(W)	2x2W	red
	Reversing light	Light bulb(W)	2x21W	amber
	Rear Turn lights	Light bulb(P)	1x2W	white
	Rear fog light	Light bulb(P)	1x2W	amber

Top cover outer protective device

Disassembly and installment

Precautions

Top cover outer protective device

Disassembly and Assembly

Disassembly

1 Remove the top roof rack and trim strip.

2 The slotted screwdriver should be wrapped with buffer belt when use it, and the the peripheral parts should be also to wrapped with buffer belt to avoid damage.

3 Wear gloves to protect your hands.

4 Be careful not to scratch the body surface.

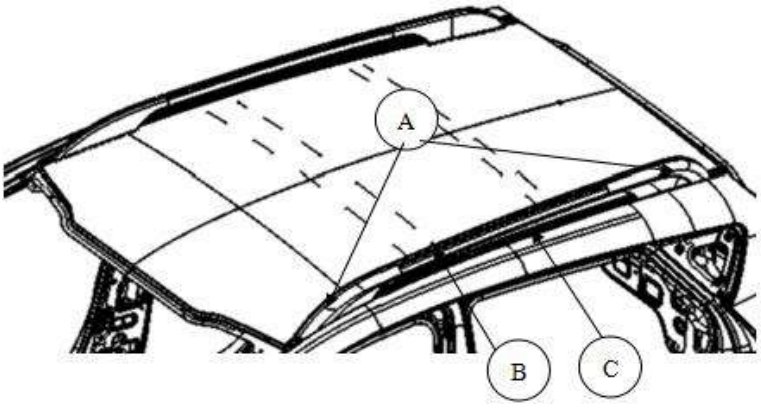
5 Remove front and rear cover(A) of roof rack with a screwdriver or other tools.

6 Use ratchet wrench and sleeve or other tools to disaseemble roof rack assembly(B).

7 Remove the top trim strip assembly(D) with a screwdriver or other tools.

Assembly

Assembly sequence is opposite to the disassembly sequence.



Attention

- **Be careful not to scratch the surface of the plating when using the screwdriver**
- **Wear gloves to protect your hands.**

Tail gate outer protective device

Tail gate outer protective device

Disassembly and Assembly

Precautions

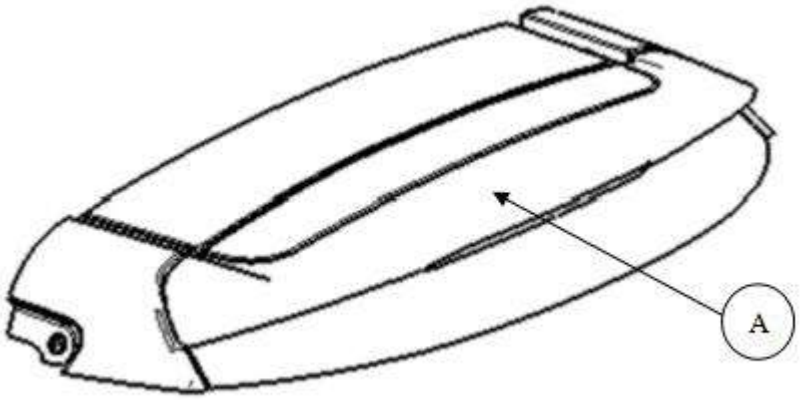
Disassembly

1 Unscrew the 5 nuts with the ratchet wrench and the sleeve;

2 Remove tailgate trim and rear wing assembly (A)

Assembly

Assembly sequence is opposite to the disassembly sequence.



PreCautions:

- **Be careful not to scratch the surface of the plating when using the wrench**
- **Wear gloves to protect your hands.**

Side window device

Disassembly and Assembly

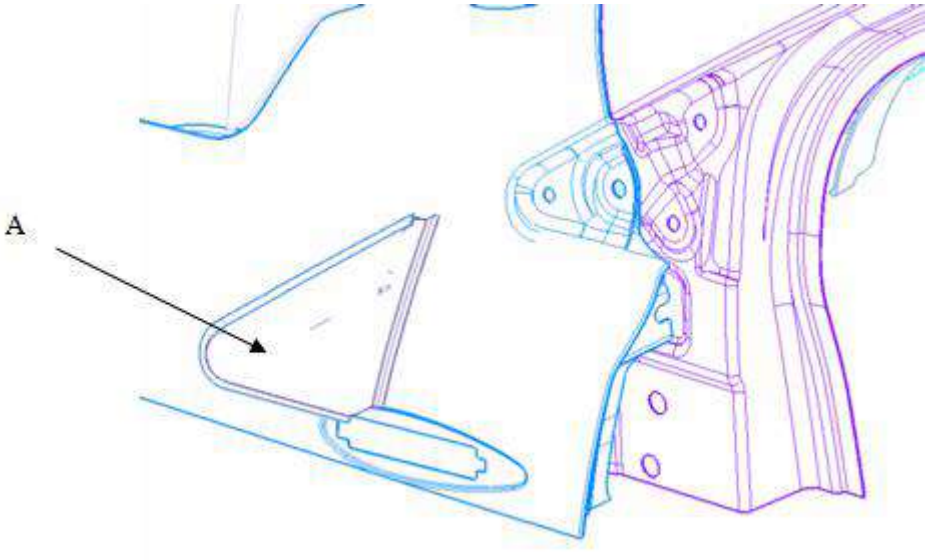
Precautions

Side window device

Disassembly and Assembly

Disassemble front triangle cover board

1 Pry open and take off the front triangle cover board(A) with screwdriver;
Note: this part is irreversible disassembly, new part has to be replaced after disassembly.



Disassemble left and right side window

1 Cut off side window fixing adhesive with adhesive cleaning tool.

2 Pry open side window (A) with tool, so the buckle will be off from car hole mounting place.

3 Scrape off the remaining sealant from side window bonding surface with scraper when installation.

4 Clean car welding surface with sponge soaked with alcohol, keep away from oil, grease and water after cleaning.

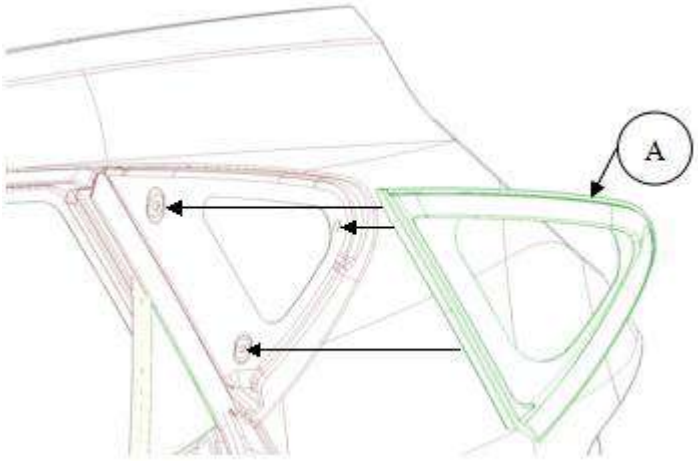
5 Use sponge to smear one layer of base coat on the glass sealant surface, do not touch with hand.

6 Guarantee the sealant track is clean of side window, and smear the base coat, put glass cement along with the track after the base coat is dry. Section of glass cement is isosceles triangle of 8*12.

7 Install side window to the car aligning the mounting hole.

Assembly

Assembly sequence is opposite to the disassembly sequence.



Attention

● Be careful not to scratch the surface of the plating when using the screwdriver

● Wear gloves to protect your hands.

● Front triangle cover is irreversible disassembly, new part has to be replaced after disassembly.

● Wear gloves to protect your hands when dismantling triangle window.

● Be careful not to scratch the body surface when dismantling triangle window.

● Do not scratch the lacquer when dismantling triangle window, otherwise it needs to be smeared again. Cover surroundings before painting.

Front wind shield and sealing strip device

Disassembly and Assembly

Precautions

Front windshield glass and sealing strip device

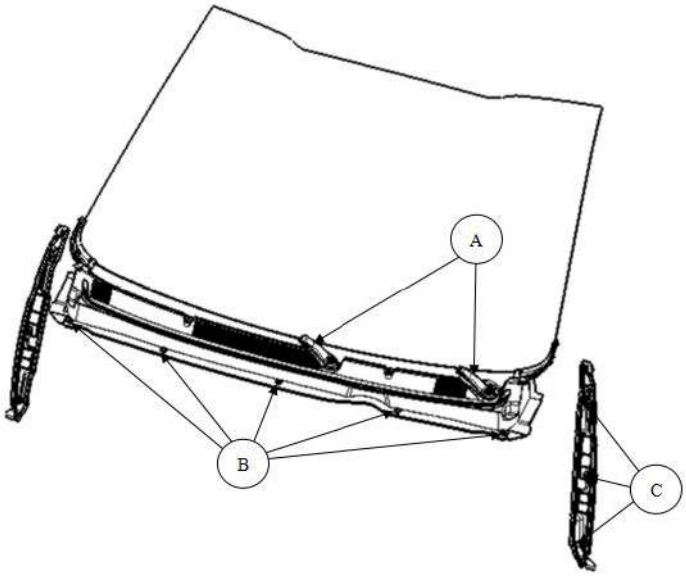
Disassembly and Assembly

Disassembly

1 Open the engine compartment cover, make sure it is supported safely. Remove the cover for the lower wiper shaft unscrew the nut and remove the wiper arm .

2 Disconnect the washing pipe, remove all ventilation cover panel fixing buckles B .

3 Pull out the ventilation cover panel to the front direction. to separate it from the front windshield, then remove the ventilation cover panel.



4 Remove fixing buckles(C) of all fenders and trim panels.

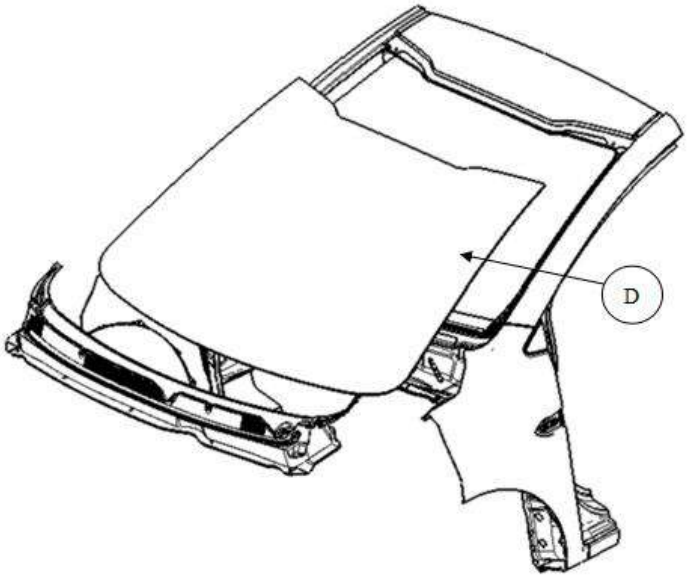
5 Disassemble front windshield glass and sealant rubber strip.

6 The glasses are assembled to the vehicle body with sealant, which is irreversible assembly process. If you want to remove the glass, sealant must be cut to separate the glasses from the body. The process may be broke glasses, or even damage to the operator, so the operator must take protective measures to remove the glass.

7 Disconnect the wire harness of the connecting wire and glass, If there are any other wiring harness such as heating wire, it also needs to be disconnected.

8 Cut the glass sealant with steel wire or special cutting tool.

9 Use sucking disc to remove the glass (D) from the body.



Assembly

Assembly sequence is opposite to the disassembly sequence.

PreCautions:

● Glass is vulnerable parts, must pay attention to it when assemble and disassemble.

● The body must be painted when install glass, and the sealant shall be evenly applied to the glass without breaking.

● After the glass installation is complete, water can be sprinkled in one hour to check whether it is completely sealed.

● Do not drive the vehicle for one hour after the glass installation is complete. Sealant needs at least 24 hours to be solidified.

If the vehicle is used during this period, must be slow down.

● Please wear gloves and other protective measures in operation.

Side window device

Disassembly and Assembly

Precautions

Rear side window device

Disassembly and Assembly

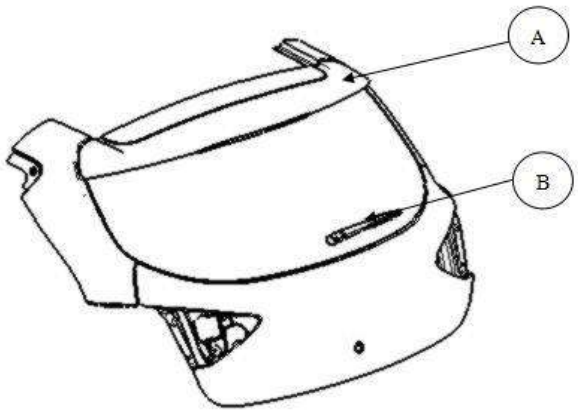
Disassemble rear windshield glass

1 Must dismantle the empennage(A) and rear windscreen wiper(B) first

2 Disconnect the wire harness of the heating line from the glass. If there are any other wiring harness, it also needs to be disconnected.

3 Cut the glass sealant with steel wire or special cutting tool.

4 Use sucking disc to remove the glass from the body.



Assembly

Assembly sequence is opposite to the disassembly sequence.

Attention

● Glass is vulnerable parts, must pay attention to it when assemble and disassemble.

● The body must be painted when install glass, and the sealant shall be evenly applied to the glass without breaking.

● After the glass installation is complete, water can be sprinkled in one hour to check whether it is completely sealed.

● Do not drive the vehicle for one hour after the glass installation is complete. Sealant need at least 24 hours to be solidified. If the vehicle is used during this period, must be slow down.

● Please wear gloves and other protective measures in operation.

Wheel cover system

Disassembly and Assembly

wheel cover system

Disassembly and Assembly

Disassemble guide plate and splash guard

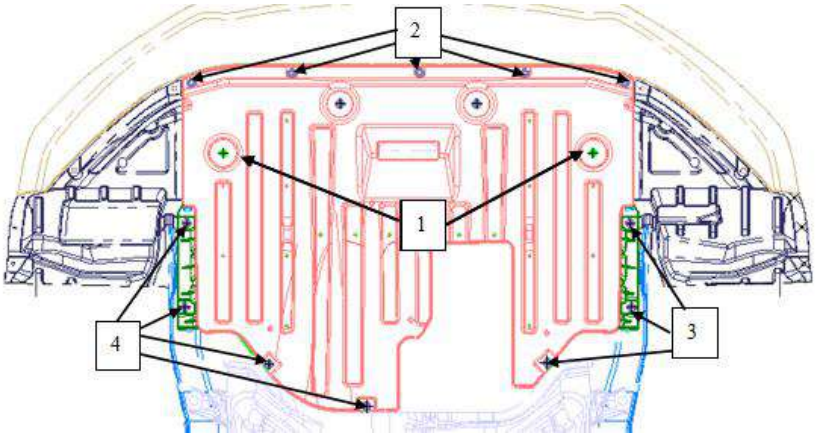
1 Screw off nut(1 place) with sleeve wrench.

2 Screw off all bolts(2/3/4 place) with sleeve wrench.

3 Remove guide plate and splash guard.

Assembly

Assembly sequence is opposite to the disassembly sequence.



Disassemble headlight cover

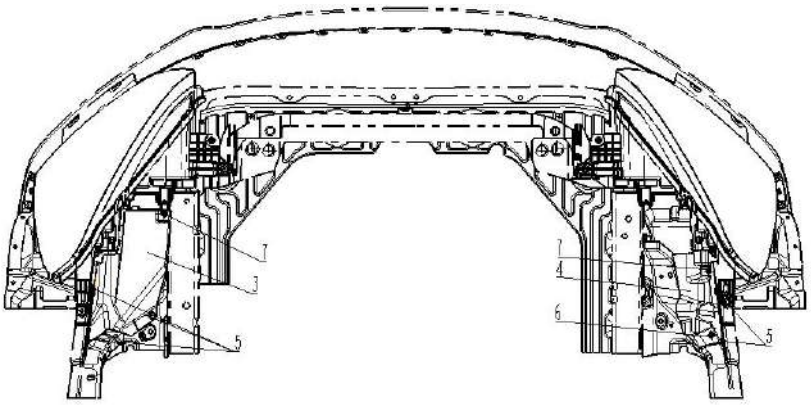
4 Screw off screws (5 place) with cross opener;

5 Remove all the plastic buckles(7 place) with buckle opener;

6 Remove left/right headlamp cover(3/4place);

Assembly

Assembly sequence is opposite to the disassembly sequence.



Disassemble front wheel cover

7 Remove all the plastic buckles(3/4/5/6/7 place) with buckle opener;

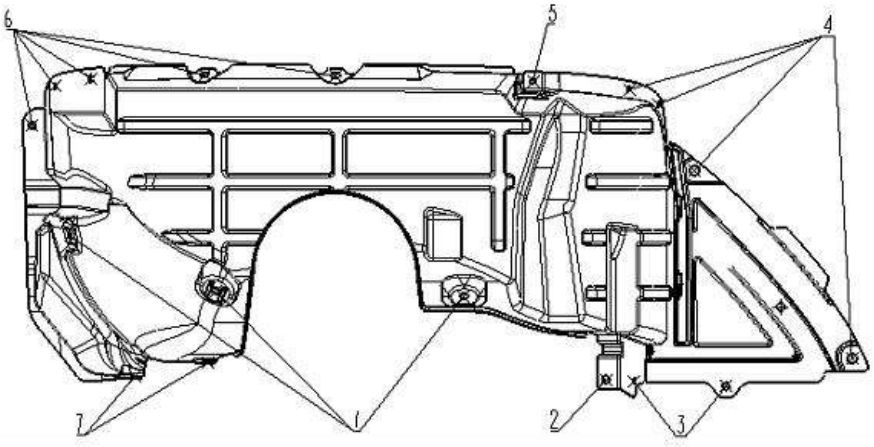
8 Screw off bolts (2 place) with sleeve wrench;

9 Screw off all screws (5 place) with cross opener;

10 Remove wheel cover.

Assembly

Assembly sequence is opposite to the disassembly sequence.



Disassemble rear wheel cover

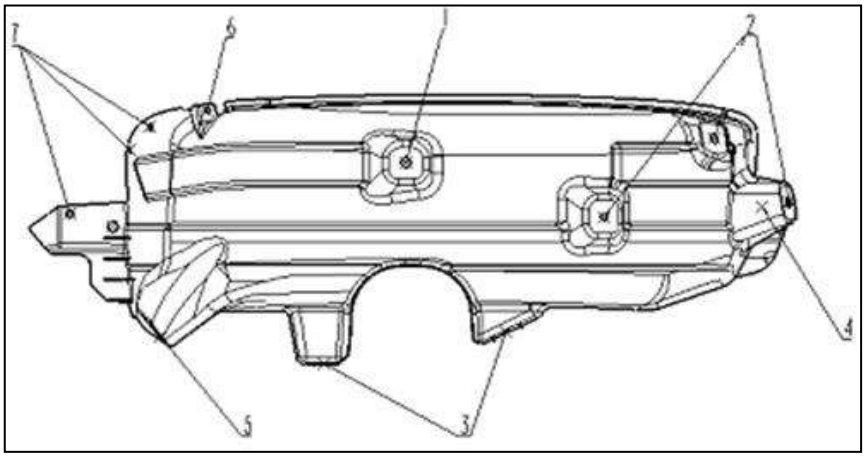
11 Remove all the plastic buckles(1/2/3/4/5/7 place) with buckle opener;

12 Screw off all screws (6 place) with cross opener;

13 Remove rear wheel cover.

Assembly

Assembly sequence is opposite to the disassembly sequence.



Front bumper

Precautions

Disassembly and Assembly

Front bumper

PreCautions:

● The bumper is a resin material. Do not exert strength on it and avoid contact with the oil.

● Do not scratch the outer surface of the bumper during disassembly.

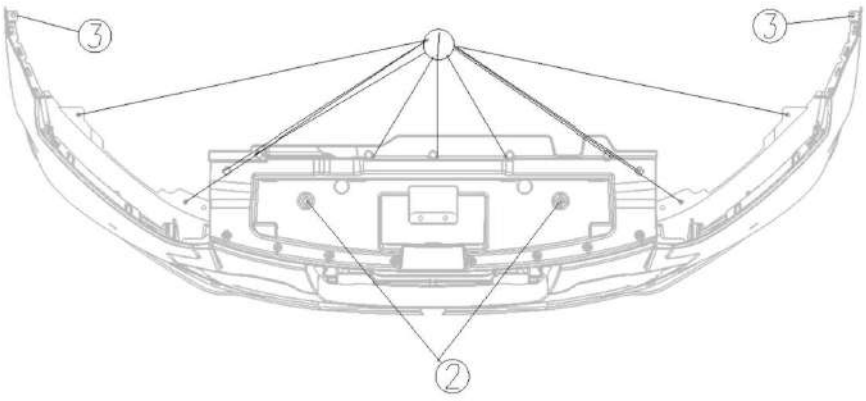
● When the front bumper is assembled, it is put in place with the bumper fixed bracket card.

● After installation, check whether there is a surface difference and clearance between the bumper and the vehicle body.

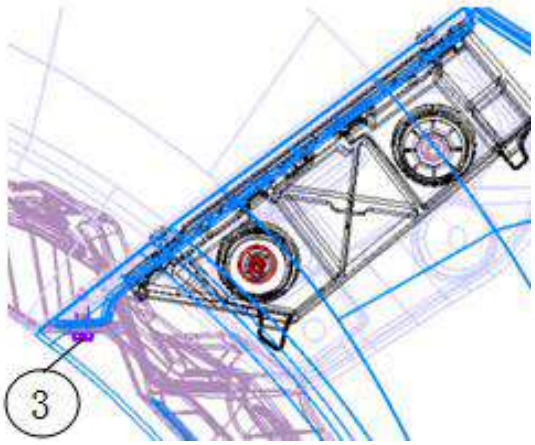
Disassembly and Assembly

Disassembly

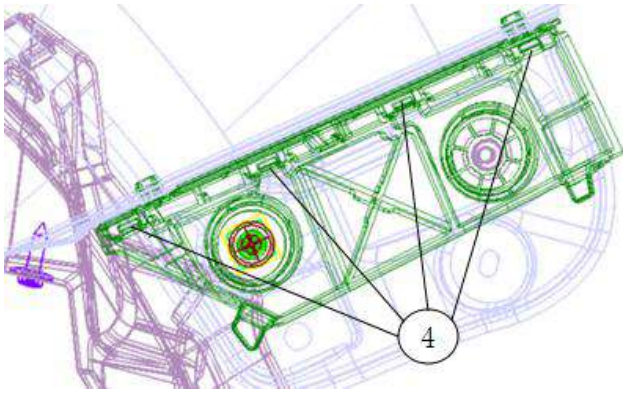
1 Open engine cover, support with supporting pole, dismantle opening device of charging interface(refer to the dismantle requirement of opening device of charging interface). Remove the 21 expansion buckles（5522101U2152） on the upper、side and lower part of front bumper illustrated in diagram 1 and the two hex T-shaped screws （ 12442-0520F71 ） illustrated in diagram 2. Tools: cross screwdriver and straight screwdriver.



2 Remove the two hex T-shaped screws（12442-0520F71）fixing to left and right side of the front bumper with fender. illustrated in diagram 3

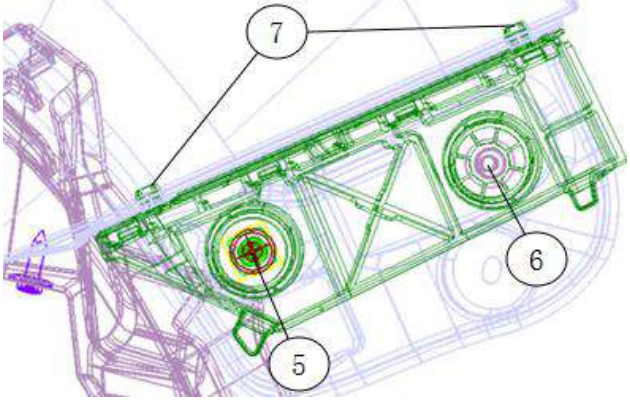


3 Hold the lower flanging of the bumper by hand to apply force outwards to separate the bumper from the fender , insert into the gap with a straight screwdriver , lift the retaining bar bracket and the bumper flange in turn from the bottom upwards(illustrated in diagram 3) , and separate the bumper and the bumper support.



4 Remove the whole bumper,disconnect the front combination light's line harness connector and remove the bumper.

5 The removal of front bumper left and right fixing bracket,remove the bolts （11254-0616F62） illustrated in diagram 6 with socket spanner,one left and right side,remove the screws （12493-0620F71） illustrated in diagram 5 with cross screwdriver,one left and right side,pull out the buckles outwards illustrated in diagram 7 with buckle pliers,two left and right side,take down bumper bracket.



Assembly

Follow the opposite sequence of the disassembly to asseemble.

Anti-collision beam of front bumper and front hood

holder

Precautions

Disassembly and Assembly

Install anti-collision beam of front bumper and front cabin bracket

Precautions:

● The front module and the car body are fixed by 8 bolts, and the tightening torque is 20N.m to 25N.m;

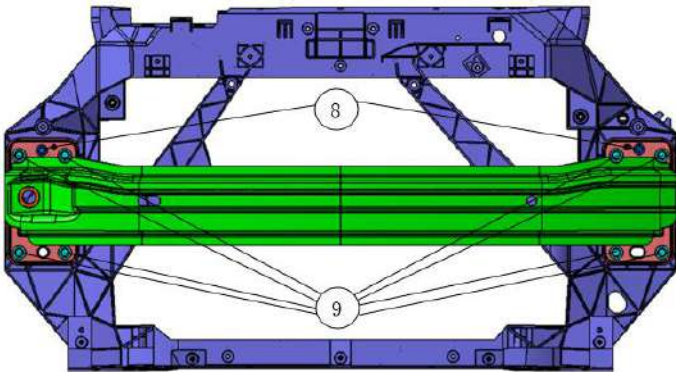
Disassembly and Assembly

Disassembly

1 Before removing the anti-collision beam and the front cabin bracket,remove the front bumper and left and right headlamp, disconnect the pipes of the radiator、 condenser、 oil cooler (if assembled) on the front cabin bracket, connecting with body, and remove the wire harness on the front cabin bracket.

2 remove the eight bolts（11254-0835F62）illustrated in diagram 9.

3 Take down front cabin bracket assembly.



4 the front anti-collision beam can be disassembled solely through removing the two bolts(11254-0616F62) illustrated in diagram 8.

Assembly

Follow the opposite sequence of the disassembly to asseemble.

Rear bumper

Precautions

Disassembly and Assembly

Rear bumper

Precautions:

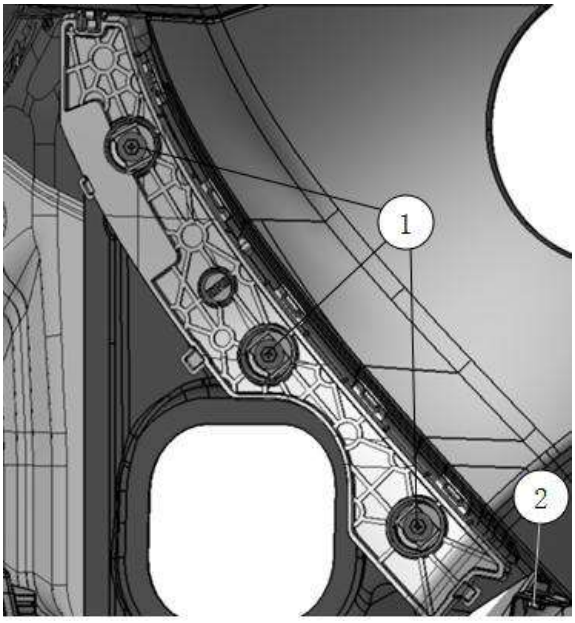
● The bumper is a resin material. Do not exert strength on it and avoid contact with the oil.

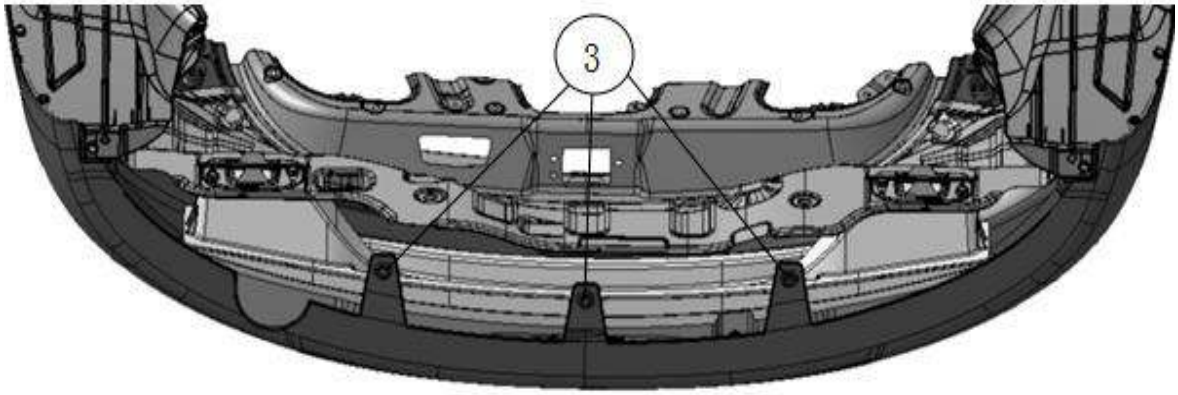
● Do not scratch the outer surface of the bumper during disassembly.

Disassembly and Assembly

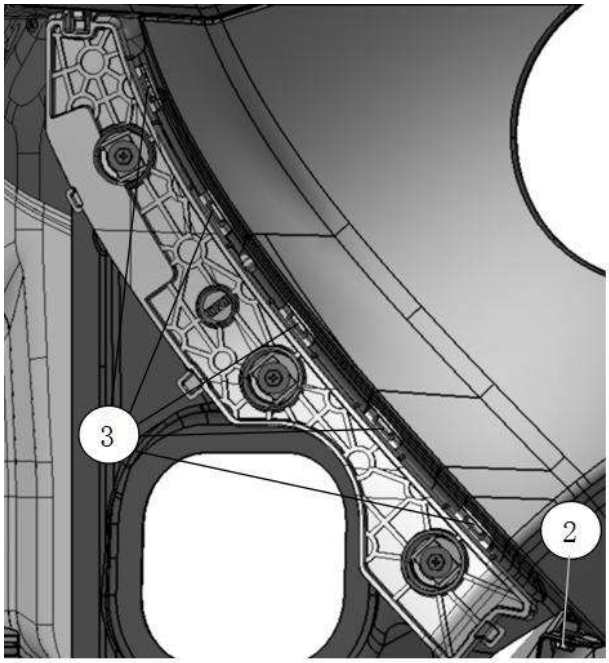
1 Open the tail gate and remove the left and right combination lamp assembly、left and right rear wheel cover.

2 Remove the rear bumper fixing bracket screws （ 12442-0520F71) and buckles(2804012U2210) illustrated in diagram 1,three left and right side;remove the screws（12442-0520F71) fixing bumper and side body illustrated in diagram 2,one left and right side;remove the three buckles（5522101U2152) fixing the lower part of bumper and rear anti-collision beam illustrated in diagram 3.





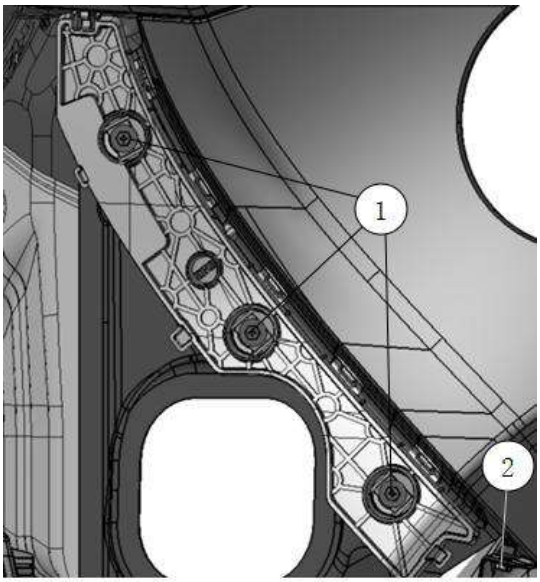
3 Hold the lower flanging of the bumper by hand to apply force outwards to separate the bumper from the bodywork sheet metal , insert into the gap with a straight screwdriver , lift the retaining bar bracket and the bumper flange in turn from the bottom upwards , and separate the bumper and the bumper support.



4 disassemble rear bumper. Disconnect the wire harness connector and take down the bumper.

Disassembly of rear bumper holder:

1 The removal of rear bumper left and right fixing bracket,remove the screws （12442-0520F71） illustrated in diagram 1 with cross screwdriver,three left and right side,pull out the buckles outwards with buckle pliers,two left and right side,take down bumper bracket.



2 Assemble according to the opposite sequence of the disassembly procedures.

Rear anti-collision beam

Precautions

Disassembly and Assembly

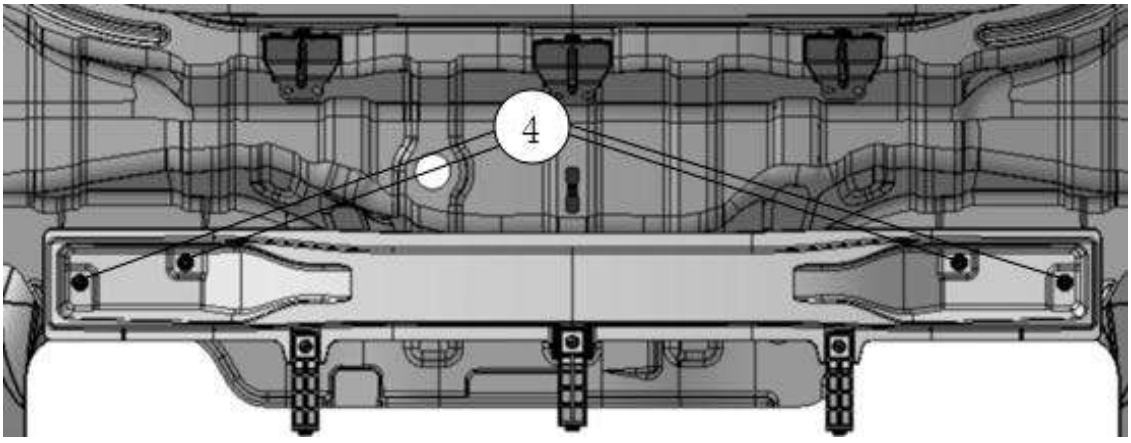
Rear anti-collision beam

Precautions:

● The rear anti-collision beam assembly and the car body are fixed by 4 nuts, and the tightening torque is 9N.m to 11N.m.

Disassembly and Assembly

1 Before removing the rear anti-collision beam,remove the rear bumper,then remove the 4 fixing nuts (13395-0800F71) of rear anti-collision beam illustrated in diagram 4.



2 Take down rear anti-collision beam assembly.

3 Assemble according to the opposite sequence of the disassembly procedures.

Side window device

Reference

Be careful not to scratch the surface of the plating when using the screwdriver

Wear gloves to protect your hands.

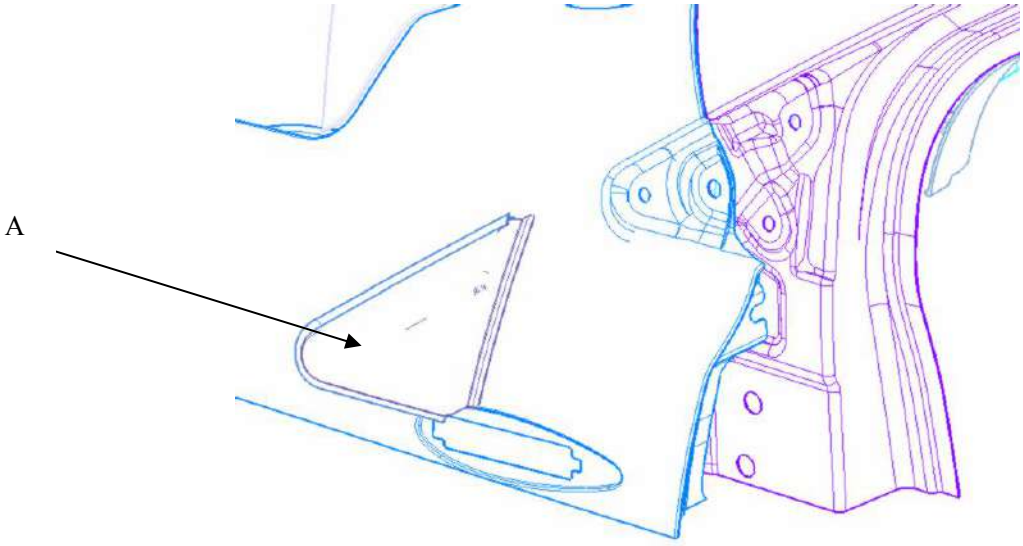
8 Front triangle cover board

Disassembly procedures:

1.1 use slotted screwdriver

1 Pry open and take off the front triangle cover board(A) with toolsr;

Note: this part is irreversible disassembly, new part has to be replaced after disassembly.



Installation Sequence:

1.2 put front triangle panel aligning with car body mounting place and press.

2. Left and right side window

Wear gloves to protect your hands.

Be careful not to scratch the body surface;

Disassembly procedures:

2.1 Cut off side window fixing adhesive with adhesive cleaning tool;

2.2 Pry open side window (A) with tool, so the buckle will be off from car hole mounting place.

Installation Sequence:

2.3 Scrape off the remaining sealant from side window bonding surface with scraper when installation;

Note: ＊Do not scratch the lacquer when dismantling triangle window, otherwise it needs to be smeared again;

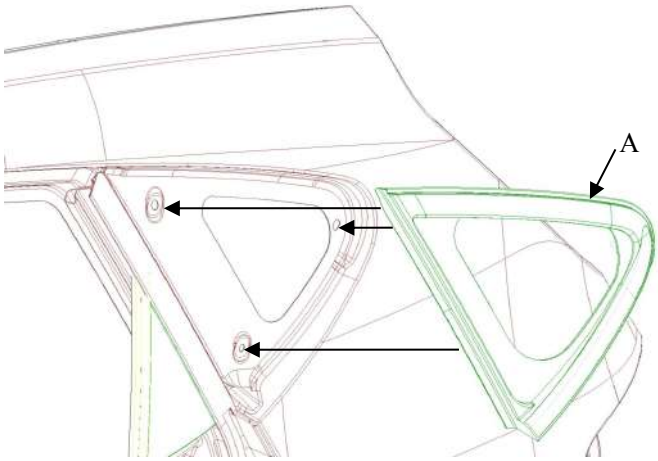
＊ Cover surroundings before painting;

2.4 Clean car welding surface with sponge soaked with alcohol, keep away from oil, grease and water after cleaning.

2.5 Use sponge to smear one layer of base coat on the glass sealant surface, do not touch with hand.

2.6 Guarantee the sealant track is clean of side window, and smear the base coat, put glass cement along with the track after the base coat is dry. Section of glass cement is isosceles triangle of 8*12;

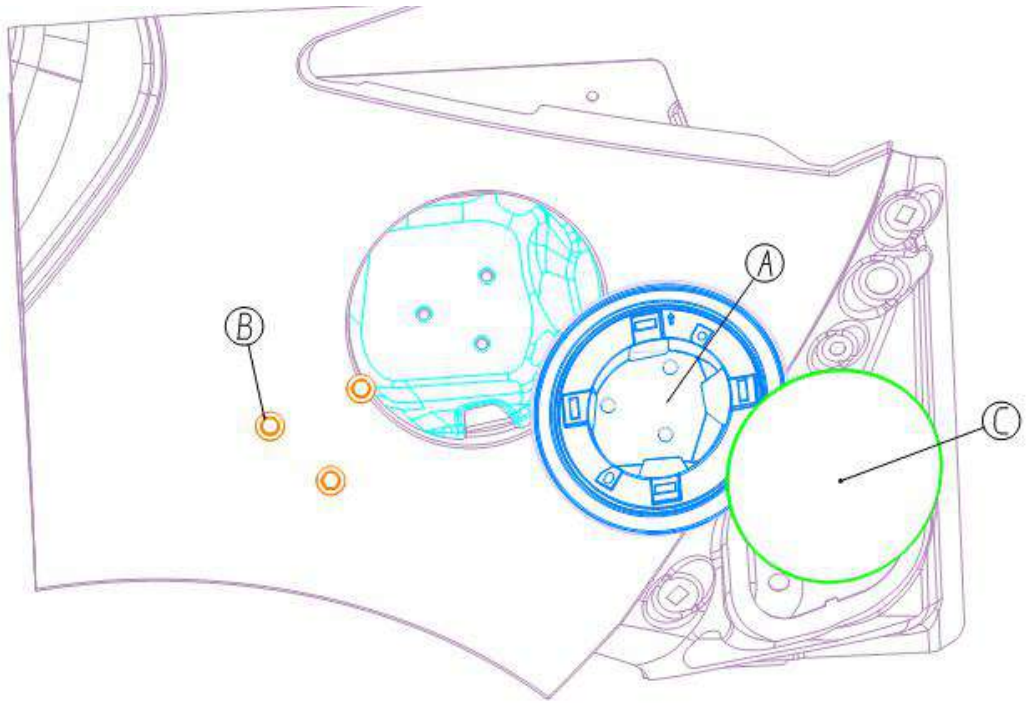
2.7 Install side window to the car aligning the mounting hole.



3. Plastic filler cap

Wear gloves to protect your hands.

Be careful not to scratch the body surface;



Disassembly procedures:

3.1 Pull out from the gap between C place of plastic filler cap and pedestal A of plastic filler cap with tools such as finger or slotted opener, take off with power slowly;

3.2 Loose fixing bolts B of pedestal of plastic filler cap with tools by sequence;

3.3 Remove pedestal A of plastic filler cap, avoidnig scraping to car body side part during removal;

Installation Sequence:

3.4 Follow the opposite sequence of the disassembly procedures.

EVO Electric

Body

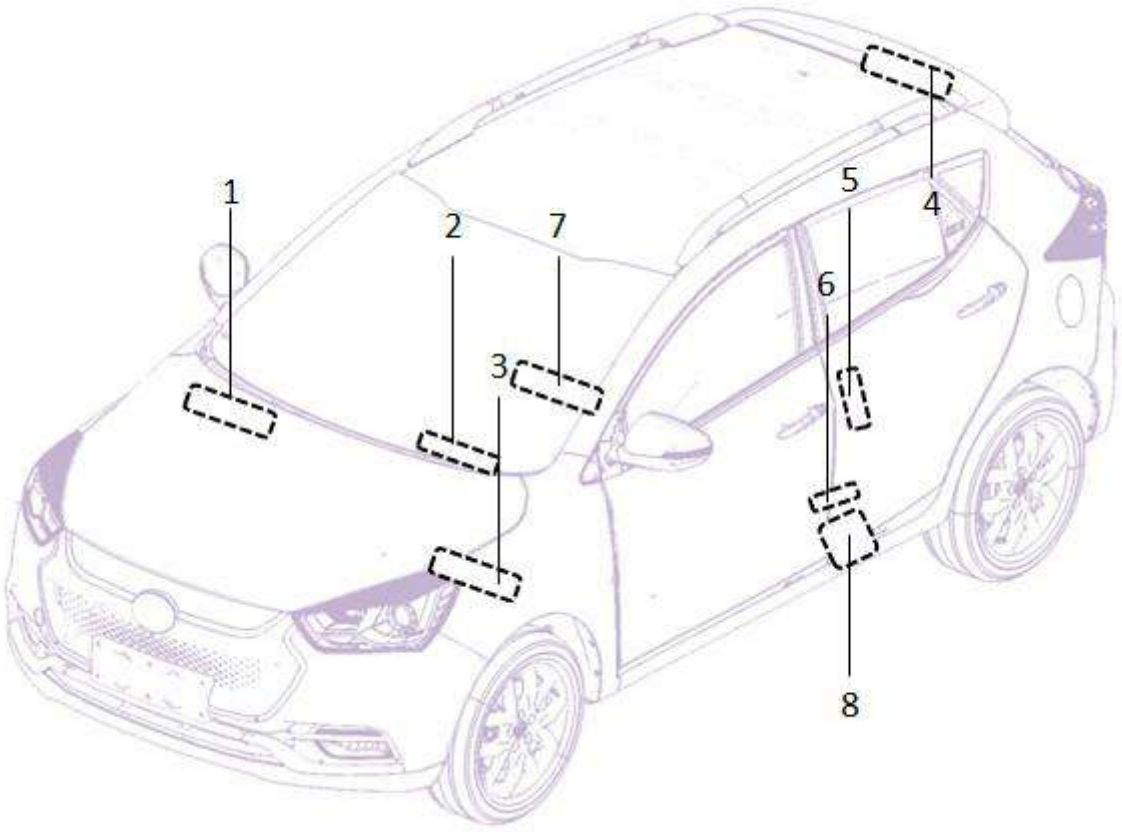
Chassis

EMB

High voltage

Vehicle information

Identification Nr



1 VIN plate (in glove box)

2. VIN plate (beam under windshield)

3 VIN plate(front left wheel package)

4 VIN plate(on the right side of metal in the tail gate)

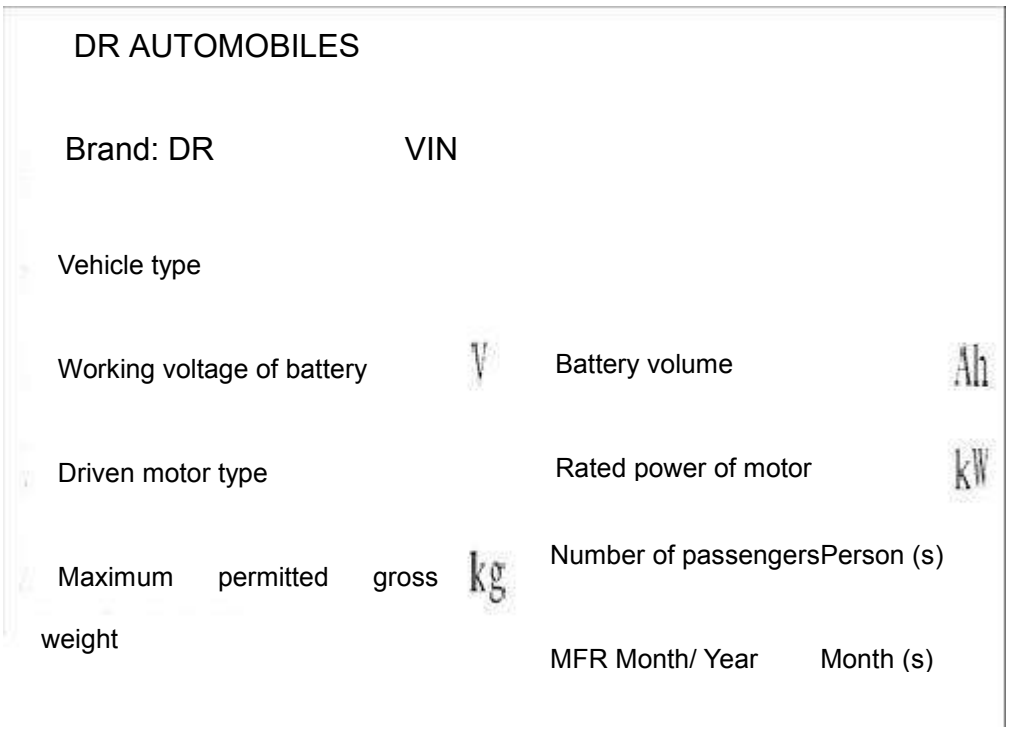
5. VIN plate(Upper limit device of left back door)

6. VIN plate (under the left Pillar B)

7. VIN plate (body beam)

8 product plate (under the left Pillar B)

Product plate



Suspension system

Cautions

Cautions for electric technicians using medical electrics

Forbidden operation

Warning:

- There are strong magnetic components in the vehicle
- If technician use medical electrics,e.g electronic pacemakers, which couldn't be operated in the vehicle ,otherwise,the function of electrics may be effected by strong magnetic components.

Cautions for normal charge

Warning:

- If technician use the medical electrics like pacemakers, cardiovascular, in addition to the top, the machine only could be used after the function of machine checked and confirmed before normally operation.
- In the normal charging operation, Medical electrics may be affected by electromagnetic wave. When Technicians use the medical electrics like pacemakers, cardiovascular, in addition to the top etc, it is not allowed to enter into crew capsule (including luggage).

Cautions for communication equipment

- If technicians use the medical electrics like pacemakers, cardiovascular, in addition to the top etc, please keep enough distance with the communication equipment.
- Remote intelligent terminal of electromagnetic waves may affect the function of the medical electrics like pacemakers, cardiovascular, in addition to the top etc.
- If technicians use the medical electrics like pacemakers, cardiovascular, in addition to the top etc, remote intelligent terminal of electromagnetic waves may affect the function of the medical electrics. It is needed to let the manufacturer of the medial electrics confirm that the possible affection to medical electric equipment when using remote intelligent terminal .

Keypoint checking before maintenance

High pressure system can be run automatically, it is need to confirm that remote air conditioning and recharged regularly are not set before maintenance.

Cautions：

- If set remote air-conditioner or charged regularly, even though the switch is closed, high pressure system can be run automatically.

Cautions for "safety airbag"and"safety belt preloaded"of auxiliary constraint system

The combination use of "safety airbag"and"safety belt preloaded"of auxiliary constraint system and front seat belt could decrease the damage to driver and passengers when collision. The auxiliary constraint system include seat belt, airbag for driver, airbag for co-driver. The detailed information for auxiliary constraint system could refers to the sections of “airbag system” and “seat belt”

Warning:

To avoid unexpected accident, we need to obey the following:

- To avoid the auxiliary constraint system invalid, all the maintenance only could be operated by DR authorized distributors because the risk of injury to people will be increased after invalid.
- Non-standard auxiliary constraint system of maintenance including non-standard disassembly and installation, may result in auxiliary constraint system accident triggered, causing personal injury accidents. About remove the airbag module method, please see "airbag system" section.
- In addition to the maintenance instructions in the manual operation, do not use electrical test equipment to test any circuit of auxiliary constraint system. Auxiliary constraint system of connectors and wiring harness use yellow or orange color.

Cautions when use electrical tools (pneumatic or electric)and hammer

- when electric switch in the "ON" block, near the airbag diagnostic sensors or other sensor, do not use power tools or hammer to operate sensor parts area. Severe vibration may activate the sensor, some airbags, causing serious damage.
- When using power tools or hammer, put the keys in the "LOCK" block, unplug the 12 v lead-acid battery cathode, waiting at least 1 minute, then for checking and maintenance.

Cautions for removing 12V battery

Turn the key to “on”,then to “lock” before remove 12v battery

Tip:

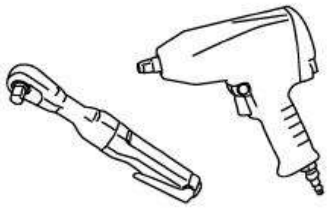
- Even if the key in the "LOCK" and the 12 v battery charging function may start automatically.
- **A**fter turn the key to "ON" --> "LOCK", 12 v battery automatic charging will not start.

Cautions for checking and maintenance suspension system

- It shall thoroughly check before repair or replacement parts.
- Check fastening parts torque after installation.

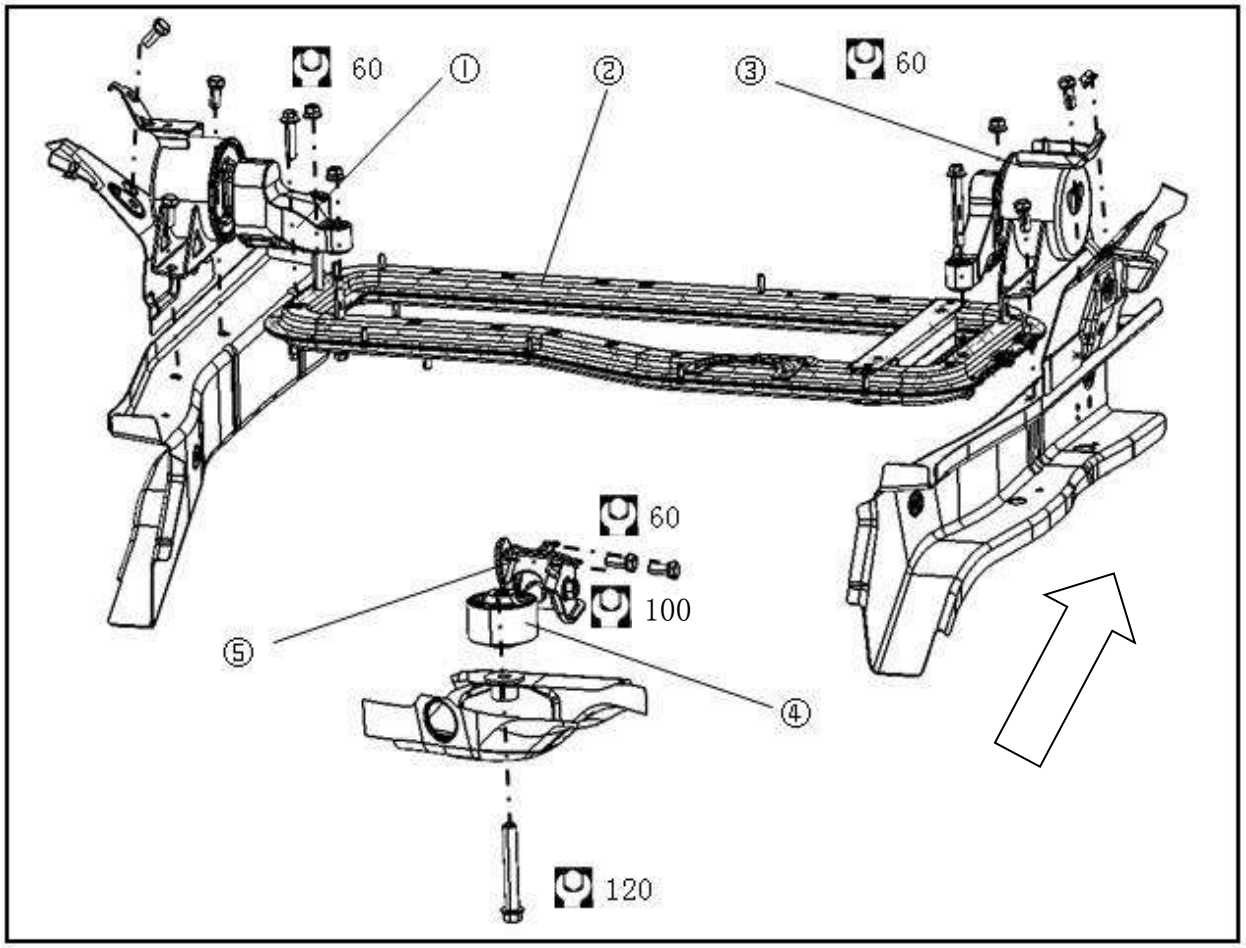
Preparation work

Commonly used tools

Tool	Diagram	Instruction
Power tool		Install and remove bolts and nuts

Suspension system

Explosion diagram



1 soft mat assembly of left suspension
2 power train beam
3 soft mat assembly of right suspension
4 rear suspension bracket
5 soft mat of rear suspension

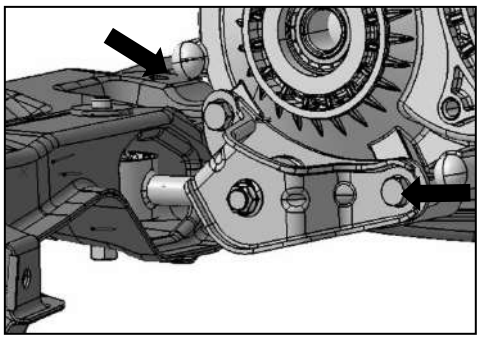
N·m

Soft mat and bracket of rear suspension

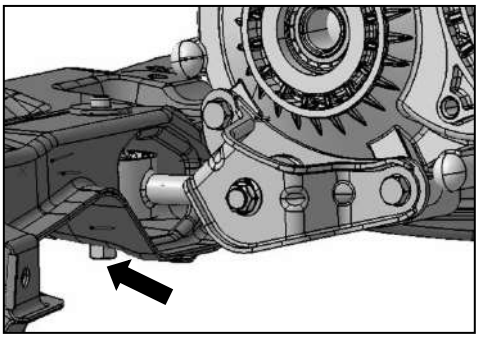
Remove and installation

Remove

1 Remove connecting bolts between rear Suspension bracket and reducer.

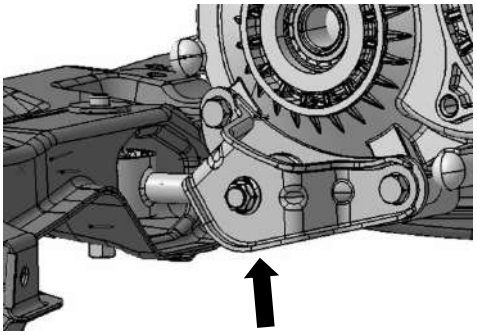


2 Remove connecting bolts between rear suspension Soft mat and front vice frame



3 Take out bracket and soft mat of rear suspension

4 Remove the connecting bolts between rear suspension bracket and soft mat, make the soft mat and bracket separate.



Cautions:

- When remove, avoid knock against scratches and damage the powertrain components.

Check after remove

1 check whether there is any deformation, crack or damage on the rear suspension bracket. If there is, please replace.

2 check whether there is any deformation, crack or damage on the metal parts of rear suspension soft mat . If there is, please replace.

3 check whether there is any crack, degumming or aging on the rubber parts of rear suspension soft mat. If there is, please replace.

Installation

1 install connecting bolts between bracket and soft mat of rear suspension.

- Tighten torque:90～110N·m

2 install connection bolts between rear suspension soft mat and front vice frame.

- Tighten torque:110～130N·m

3 install connecting bolts between rear suspension bracket and reducer.

- Tighten torque:50～60N·m

Cautions:

- All of the bolts shall be pre-tightened,then tighten to the specified torque.

Left and right suspension soft mat assembly

Remove and installation

Remove

1 Lift up the vehicle and use the tool to support power train.

2 Remove the bracket and soft mat of rear suspension

3 Remove the connecting bolts and nuts between left and right suspension soft mat assembly and power train supporting beam.

4 Remove the connecting bolts between left and right suspension soft mat and body.

5 Remove left and right suspension soft mat assembly.

Cautions:

- When removing, avoid power train shaking and drop which resulted in injury to people.
- When removing, avoid knock against scratches and damage the power train components.

Check after remove

1 Check whether there is deformation, crack or damage on the metal parts of left and right suspension soft mat assemble. If yes, please replace.

2 Check whether there is crack ,degumming or aging on the rubber parts of left and right suspension soft mat assemble. If yes, please replace.

Install

1 Install the connecting bolts between let and right suspension soft mat assembly and body.

- Tighten toque:50～70N·m

2 power train supporting beam.

- Tighten torque:50～60N·m

3 Install bracket and soft mat of rear suspension

Cautions:

- All of the connecting bolts shall be pre-tightened,then tighten to the specified torque.

Power train beam

Remove and install

Remove

1 Remove connection pipe between the power train assembly components and radiator assembly , please see the "cooling system -cooling water pipe".

2 Unplug the high and low voltage wiring harness connector which is connected with power train parts .

3 Lifting the vehicle, use tools to support the power train assembly.

4 Remove the left front driving shaft assembly, right front driving shaft assembly, please see the "front axle - front driving shaft.

5 Remove left and right suspension soft mat assembly,bracket and soft mat of rear suspension. separate the power from the car body.

6 Remove the motor controller and motor controller bracket, remove motor controller, please refer to "electric tumble sub-manual- controller".

7 Remove the high pressure connection box and charger, please see the "charging system - charging machine".

8 Remove the vacuum pump, please see the "braking system - vacuum booster system".

9 Remove the front low voltage wire clamp clasp, remove the front low voltage wiring harness.

10 Remove the air conditioning compressor and air conditioning compressor bracket, please see the "air conditioning system - compressor".

11 Remove the cooling water pump and cooling water pump bracket, please see the "cooling system - cooling water pump".

12 Remove the fixed nut of motor and reducer and powertrain beam; please see the "electric tumble sub-manual - motor", "electric tumble sub-manual - reducer.

13 Take out power train assembly beam

Cautions:

- When removing, avoid power train shaking and drop which resulted in injury to people.
- When removing, avoid knock against scratches and damage the power train assembly components.

Check after remove

1 Check whether there is deformation,crack other damage on the power train assembly beam,if there is, please replace.

2 Check whether there is deformation,crack other damage on the bolts,nuts,casing and welding bracket of the power train assembly beam. If there is, please replace.

Install

Install in the opposite order of remove

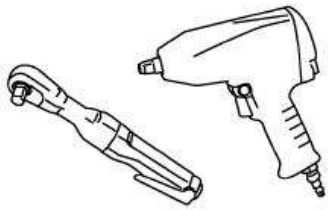
Cautions:

- All of the connecting bolts shall be pre-tightened,then tighten to the specified torque.

Accelerating operation <system

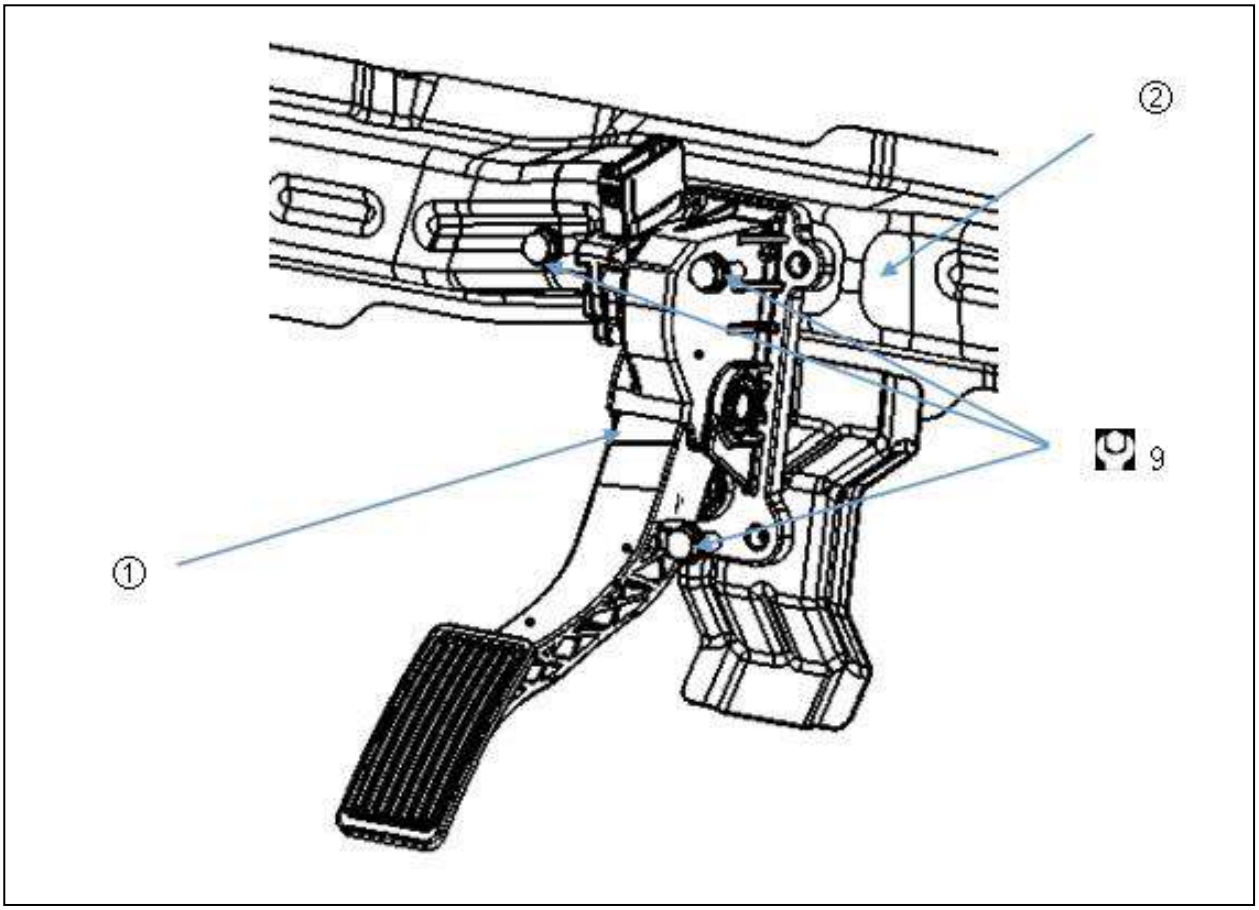
Preparation work

Commonly used tools

Tool	Diagram	Instruction
Power tool		Install and remove bolts and nuts

Remove and installation

Explosion diagram



1 Accelerating pedal assembly 2 body

： N•m

Remove

1 Unplug the connection parts of the accelerating pedal assembly

2 Remove fixed bolt of accelerating pedal assembly and take out the accelerating pedal assembly from the body

- Tighten torque:7～11N•m

Cautions:

- Do not disassemble accelerating pedal assembly
- Avoid bumping when operating
- Avoid touch the water for accelerating pedal assembly

Install

Install in the opposite order of remove.

Checking after installation

1 check whether there is irregularities and binding for accelerating pedal within the whole itinerary. If there is, please replace.

2 check whetehr the accelerator can return to the initial position after loosen. If not, please replace.

3 inspect the accelerator pedal position sensor signals:

① turn the key to “LOCK”

② connect connectors

③ turn the key to “ON”

④ Check the voltage of the VCU connectors under the following conditions:

VCU			Conditions		Voltage (V)
Connectors	+	-			
	Port no	Port no			
M31	34(Signal 1)	1	Accelerator pedal	Fully released	0.75±0.1
				Fully press	4.45±0.2
	15(Signal 2)			Fully released	0.375±0.1
				Fully press	2.225±0.2

Check whether the result is normal.

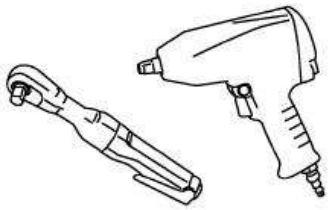
Yes>>checking finish

No>> Replace accelerator pedal. Please refers to “Remove and Installation”

Electronic shift operating system

Preparation work

Commonly used tools

Tool	Diagram	Instruction
Power tool		Install and remove bolts and nuts
Digital multimeter		Detecting voltage signal

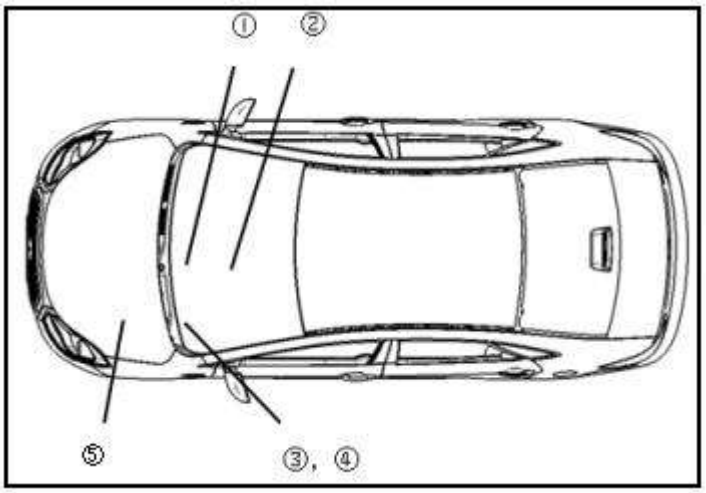
System description

Description

- Replacing the traditional mechanical shift operating mechanism, electronic shift operating system use electrical signals to simulate the gear shift to realize the driver's intention to change gear.
- Electronic shift operating mechanism is located in the corresponding gear, gear signal will continue to output the signals to VCU.

Parts layout

Related parts position



Related parts description

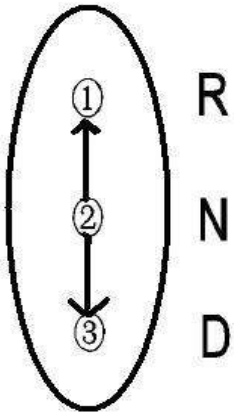
1	VCU	Receive output shift signal of electronic shift operating mechanism and realize vehicle driving.
2	Electronic shift operating mechanism	Identify the driver's intention to shift, output related shift signal to the VCU
3	Combination instrument	When Electronic shift operating mechanism in any shift, combination instrument has related showing
4	Shift signal light	When electronic shift operating mechanism in any shift, the corresponding shift light on
5	Battery	Provide 12Vvoltage needed by electronic shift operating mechanism work

VCU

- Receive output shift signal of electronic shift operating mechanism、simulated the driver's manipulation of intention and realize vehicle driving.

Electronic shift operating mechanism

Electronic shift operating mechanism has three shifts :R,N,D

R	Shift according to the picture on the right path and press the reversing lock in driving process.(when shift first time, please step down the braking pedal)	
N	Shift according to the picture on the right path lock in driving process. (once first start, the default shift is shift N. when shift first time, please step down the braking pedal)	
D	Shift according to the picture on the right path lock in driving process. (when shift first time, please step down the braking pedal)	

Tips:

- When the vehicle is in the position of “OFF” or “ACC”,electronic shift operating mechanism doesn’t work.

Combination instrument

- Receive the shift signal output from VCU, the instrument shows related shift.

Shift indicating light

- Shift indicating light is on the combination instrument.
- Shift indicating light shows the present status of the vehicle.
- If electronic shift operating mechanism has fault, shift lighting turn to shift N.

Electronic shift warning light

- If there is fault appearing in electronic shift operating mechanism system, Electronic shift warning light will be on .
- If power on, shift first without pressing down the braking pedal, the instrument will show the tipping sentence: Please press down the braking pedal.

Battery

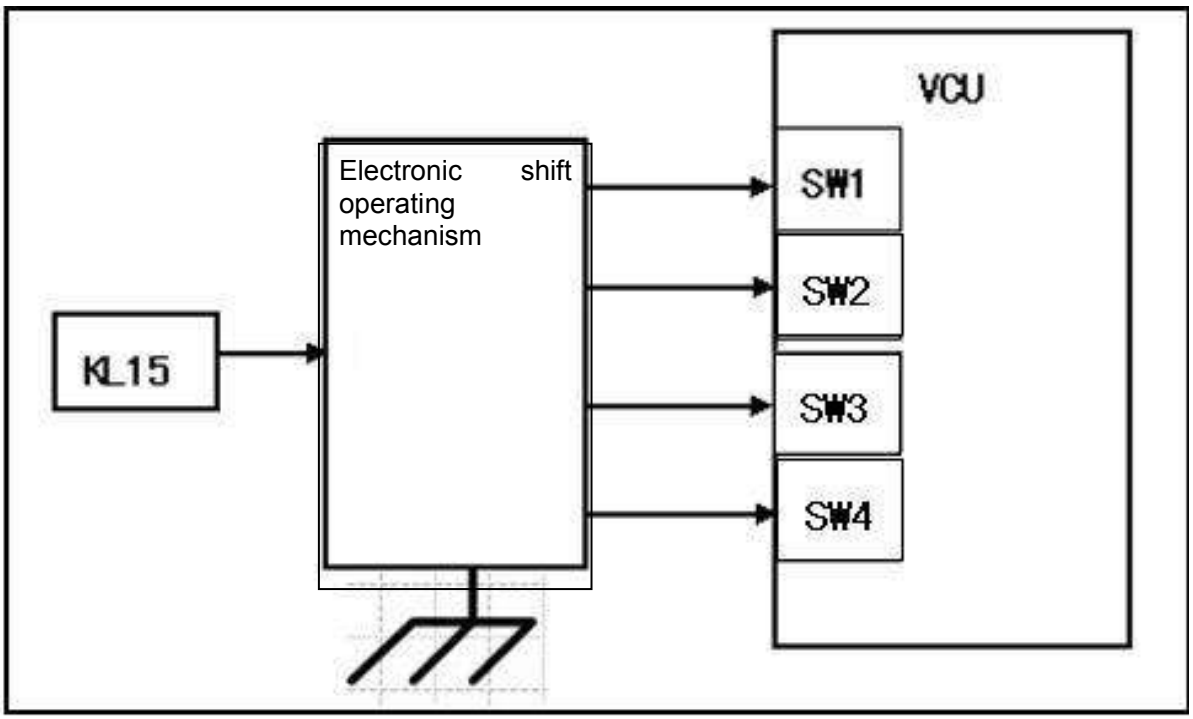
- When vehicle is in the status of “ OFF”or “ACC”, the battery doesn’t work.
- When battery works, it will provide voltage 12 V required by shift operating mechanism.

System

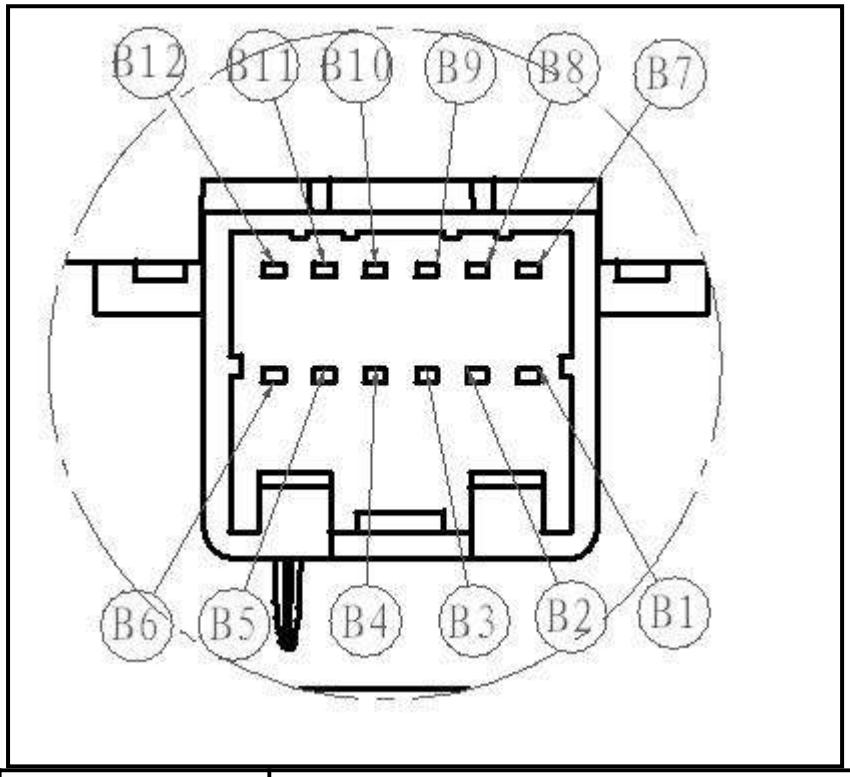
System description

- When electronic shift operating system is in any shift, electronic shift operating system will output related shift signal.
- when there is failure in electronic shift operating mechanism, VCU will send failure code.

System principle diagram



Stitch definition



Stitch no	Definition	Remark
B1	IGN	Power signal of shifing mechanism, receiving through start switch.
B2	SW1	Switch Signal 1
B3	GND	Power, same body
B4	SW2	Switch Signal 2
B5	Standby	
B6	SW3	Switch Signal 3
B7	Standby	
B8	SW4	Switch Signal 4
B9	Standby	
B10	Standby	
B11	Standby	
B12	Standby	

Logic of shift signal output：

	SW1	SW2	SW3	SW4
Position ③（D）	0	1	0	1
Position②（N）	1	0	0	1
Position ①（R）	1	1	0	0
Position ①+R gear button	1	1	1	1

SW1-SW4 signal

Logic 1 shows the voltage range [2.9，3.4](V)

Logic 1 shows the voltage range[1.4，1.9](V)

Check

Caution：

- when checking, put the car in the status of “ON”
- When checking, please keep distance with the magnet.

1 Confirm the status of shift operating mechanism fixing and whether the connecting status of connectors are normal.

2 Whether shift handle is bending、damage and cracks. If so, please replace.

3 If the vehicle shift signal appears abnormally, please keep vehicle in the status of “ON”, please use digital multimeter to test each stitch voltage of optional shift operating mechanism assembly connector, detailed as following:

	Stich B1	Stich B2	Stich B3	Stich B4	Stich B6	Stich B8
Shift D	9-16V	1.4-1.9V	0V	2.9-3.4V	1.4-1.9V	2.9-3.4V
Shift N	9-16V	2.9-3.4V	0V	1.4-1.9V	1.4-1.9V	2.9-3.4V
Shift R	9-16V	2.9-3.4V	0V	2.9-3.4V	1.4-1.9V	1.4-1.9V
Position ①+R gear button	9-16V	2.9-3.4V	0V	2.9-3.4V	2.9-3.4V	2.9-3.4V

If the testing process, if any voltage for any stich under any shift is beyond the voltage range of the above form, shift operating mechanism assembly should be replaced timely; if any voltage for any stich under any shift is within the voltage range of the above form, please check other parts.

Fault diagnosis

Fault code

Fault code	Fault name	Diagnosis condition	Possible reason
P3006	SW1 shift signal with abnormal voltage	Voltage of SW1 shift signal is not in the range [2.9，3.4]V or [1.4，1.9]	1 harness 2 Electronic shift operating mechanism 3 VCU
P3007	SW2 shift signal with abnormal voltage	Voltage of SW 2 shift signal is not in the range [2.9，3.4]V or [1.4，1.9]	1 harness 2 Electronic shift operating mechanism 3 VCU
P3008	SW3shift signal with abnormal voltage	Voltage of SW 3 shift signal is not in the range [2.9，3.4]V or [1.4，1.9]	1 harness 2 Electronic shift operating mechanism 3 VCU
P3009	SW4 shift signal with abnormal voltage	Voltage of SW4 shift signal is not in the range [2.9，3.4]V or [1.4，1.9]	1 harness 2 Electronic shift operating mechanism 3 VCU
P300A	Shift signal with wrong logic	In the range of signal combination don’t belong to output signal combination of shift R, shift N, shift D	1 harness 2 Electronic shift operating mechanism 3 VCU

P3006 SW1 shift signal with abnormal voltage

DTCP3006 fault check

Fault code	Fault name	Diagnosis condition	Possible reason
P3006	SW1 shift signal with abnormal voltage	Voltage of SW1 shift signal is not in the range [2.9，3.4]V or [1.4，1.9]	1 harness 2 Electronic shift operating mechanism 3 VCU

Fault confirmation procedure

1 Preparation work

If there is another fault happen at the same time, please put the vehicle in the status of “OFF”, check again after waiting for at least 10 s.

2 Fault checking

① put the vehicle in the status of “OFF”；

② remove the connecting parts which connect low voltage harness with electronic shift operating mechanism

③ put the vehicle at the status of “ON” s

④ Using multimeter to check whether there are abnormal voltage for the voltage of harness connectors and three pins voltage corresponding to B1, B2,B3;

Yes>> turn to 5

No >> replace shift operating mechanism assembly

⑤ Put the vehicle in the status of “OFF”

⑥ Remove the connectors between low voltage harness and VCU

⑦ Put the vehicle in the status of “ON”

⑧ Using multimeter to check whether there are abnormal voltage for the voltage of harness connectors and three pins voltage corresponding to B1, B2,B3;

Yes >> replace VCU

No >> replace harness

Finish >>

DTC P3007 SW2 shift signal with abnormal voltage

DTCP3007 fault checking

Fault code	Fault name	Diagnosis condition	Possible reason
P3007	SW2 shift signal with abnormal voltage	Voltage of SW2 shift signal is not in the range [2.9，3.4]V or [1.4，1.9]	1 harness 2 Electronic shift operating mechanism 3 VCU

Fault confirmation procedure

1 Preparation work

If there is another fault happen at the same time, please put the vehicle in the status of “OFF”, check again after waiting for at least 10 s.

2 Fault checking

① put the vehicle in the status of “OFF”;

② remove the connecting parts which connect low voltage harness with electronic shift operating mechanism

③ put the vehicle at the status of “ON” s

④ Using multimeter to check whether there are abnormal voltage for the voltage of harness connectors and three pins voltage corresponding to B1, B3,B4;

Yes>> turn to 5

No >> replace shift operating mechanism assembly

⑤ Put the vehicle in the status of “OFF”

⑥ Remove the connectors between low voltage harness and VCU

⑦ Put the vehicle in the status of “ON”

⑧ Using multimeter to check whether there are abnormal voltage for the voltage of harness connectors and three pins voltage corresponding to B1, B3,B4;

Yes >> replace VCU

No >> replace harness

Finish >>

DTC P3008 SW3 shift signal with abnormal voltage

DTC P3008 fault checking

Fault code	Fault name	Diagnosis condition	Possible reason
P3008	SW3 shift signal with abnormal voltage	Voltage of SW3 shift signal is not in the range [2.9，3.4]V or [1.4，1.9]	1 harness 2 Electronic shift operating mechanism 3 VCU

Fault confirmation procedure

1 Preparation work

If there is another fault happen at the same time, please put the vehicle in the status of “OFF”, check again after waiting for at least 10 s.

2 Fault checking

① put the vehicle in the status of “OFF”;

② remove the connecting parts which connect low voltage harness with electronic shift operating mechanism

③ put the vehicle at the status of “ON” s

④ Using multimeter to check whether there are abnormal voltage for the voltage of harness connectors and three pins voltage corresponding to B1, B3,B6;

Yes>> turn to 5

No >> replace shift operating mechanism assembly

⑤ Put the vehicle in the status of “OFF”

⑥ Remove the connectors between low voltage harness and VCU

⑦ Put the vehicle in the status of “ON”

⑧ Using multimeter to check whether there are abnormal voltage for the voltage of harness connectors and three pins voltage corresponding to B1, B3,B6;

Yes >> replace VCU

No >> replace harness

Finish >>

DTCP3009 SW4 shift signal with abnormal voltage

DTCP3009 fault checking

Fault code	Fault name	Diagnosis condition	Possible reason
P3009	SW4 shift signal with abnormal voltage	Voltage of SW4 shift signal is not in the range [2.9，3.4]V or [1.4，1.9]	1 harness 2 Electronic shift operating mechanism 3 VCU

Fault confirmation procedure

1 Preparation work

If there is another fault happen at the same time, please put the vehicle in the status of “OFF”, check again after waiting for at least 10 s.

2 Fault checking

① put the vehicle in the status of “OFF”；

② remove the connecting parts which connect low voltage harness with electronic shift operating mechanism

③ put the vehicle at the status of “ON” s

④ Using multimeter to check whether there are abnormal voltage for the voltage of harness connectors and three pins voltage corresponding to B1, B3,B8;

Yes>> turn to 5

No >> replace shift operating mechanism assembly

⑤ Put the vehicle in the status of “OFF”

⑥ Remove the connectors between low voltage harness and VCU

⑦ Put the vehicle in the status of “ON”

⑧ Using multimeter to check whether there are abnormal voltage for the voltage of harness connectors and three pins voltage corresponding to B1, B3,B8;

Yes >> replace VCU

No >> replace harness

Finish >>

DTCP 300A shift signal with wrong logic

DTCP fault checking

Fault code	Fault name	Diagnosis condition	Possible reason
P300A	shift signal with wrong logic	Signal combination don't belong to output signal combination of shift R,shift N, shift D	1 harness 2 Electronic shift operating mechanism 3 VCU

Fault confirmation procedure

1 Preparation work

If there is another fault happen at the same time, please put the vehicle in the status of "OFF", check again after waiting for at least 10 s.

2 Fault checking

① put the vehicle in the status of "OFF";

② remove the connecting parts which connect low voltage harness with electronic shift operating mechanism

③ put the vehicle at the status of "ON" s

④ Using multimeter to check whether there are abnormal voltage for the voltage of harness connectors and six pins voltage corresponding to B1, B2,B3,B4,B6B8;

Normal or abnormal

Normal >> replace shift operating mechanism assembly

Abnormal >> turn to 5

⑤ Put the vehicle in the status of "OFF"

⑥ Remove the connectors between low voltage harness and VCU

⑦ Put the vehicle in the status of "ON"

⑧ Using multimeter to check whether there are abnormal voltage for the voltage of harness connectors and six pins voltage corresponding to B1, B2,B3,B4,B6B8;

Normal or abnormal

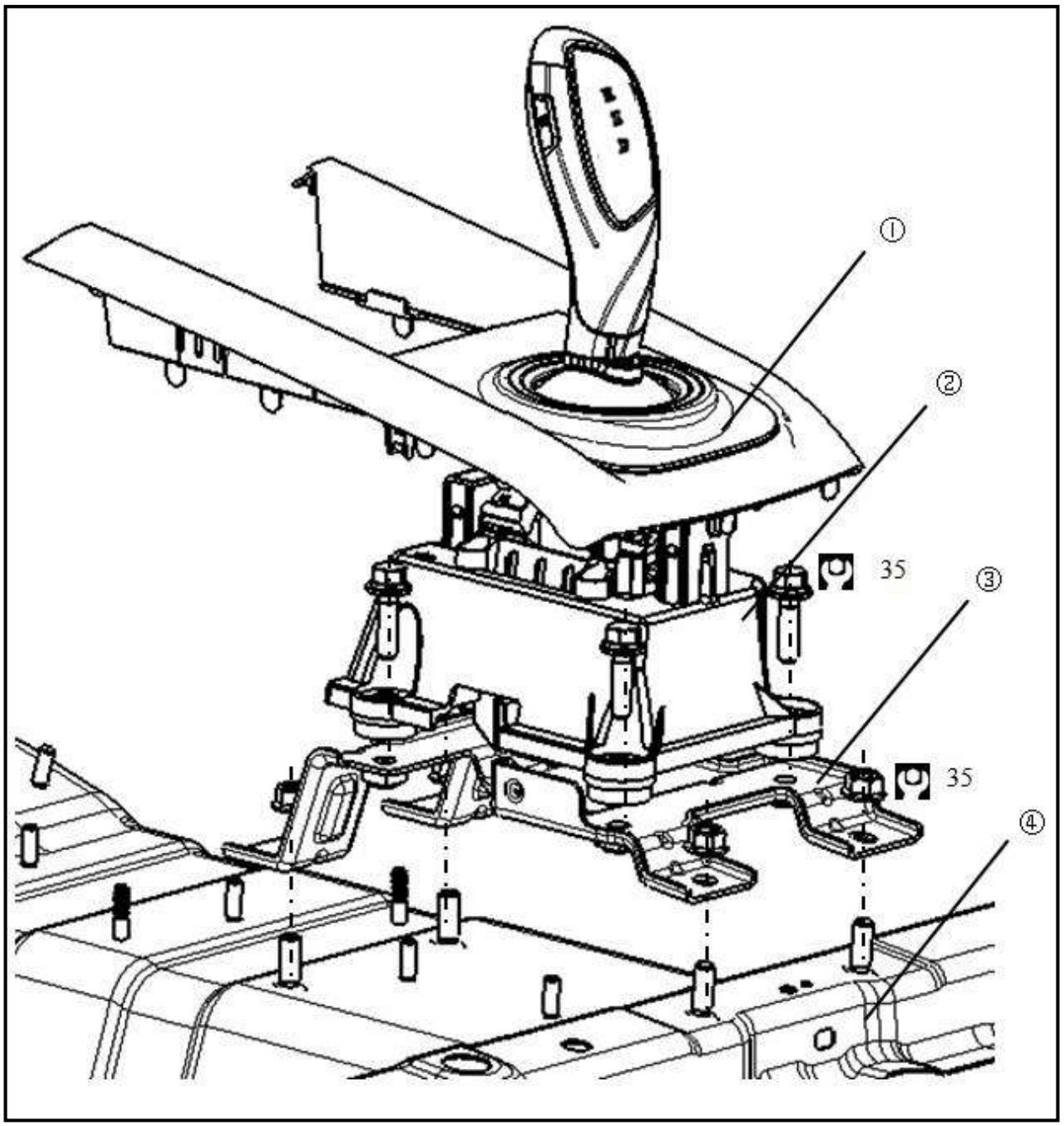
Normal >> replace harness

Abnormal >> replace VCU

Finish >>

Remove and install

Explosion diagram



P1 Deputy instrument panel

2 Electronic shift operating mechanism

3 installing bracket of Deputy instrument panel

4 downside board assembly of the body

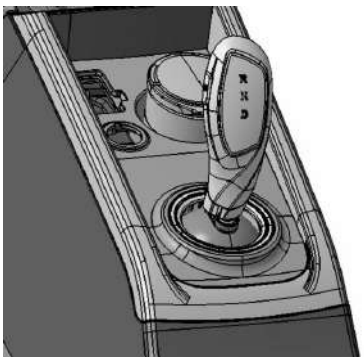
: N·m

Cautions：

- Put the vehicle in the status of “OFF” in the process of remove and installation.
- Avoid to knock and hit the electronic shift operating mechanism in the process of remove and installation.
- Put electronic shift operating mechanism away from strong magnetic things after remove, It is forbidden to put it into water or put it in the place with high humidity.

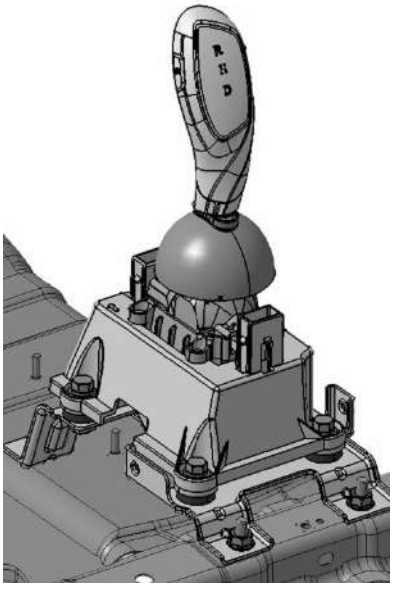
Remove

1 Remove deputy instrument panel assembly, please refers to “deputy instrument panel assembly”



2 Remove the hex bolt and flat pad assembly between the electronic shift operating mechanism and the installing bracket.

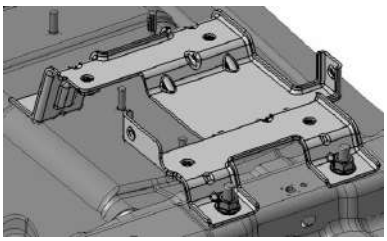
- Tighten torque ：30～35N·m



3 Remove electronic shift operating mechanism

4 Remove the hex flange nut between the electronic shift operating mechanism and downside board assembly of body

- Tighten torque ：30～35N·m



5 Remove the installation bracket of electronic shift operating mechanism

Check after remove

- Check whether it could be operated flexibly for the electronic shift operating mechanism. If couldn't shift normally, please replace.
- Check whether there is out stitching phenomenon, if so, please replace.
- Check whether there is deformation ,bending or loose for shift operating mechanism . If there is, please replace.
- Check whether there is deformation ,bending or loose for installation bracket of shift operating mechanism . If there is, please replace.

Install

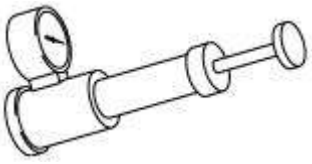
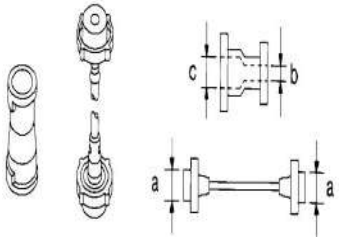
Install in the opposite order of remove

- when Install connectors of low voltage harness , assure it touch well with the connectors of shift operating mechanism, without loose.
- After installation, electrical shift operating mechanism equipped well with vice instrument assembly without loose.
- After installation, assure the instrument will show related shift when the shift in R、N、D position.

Cooling system

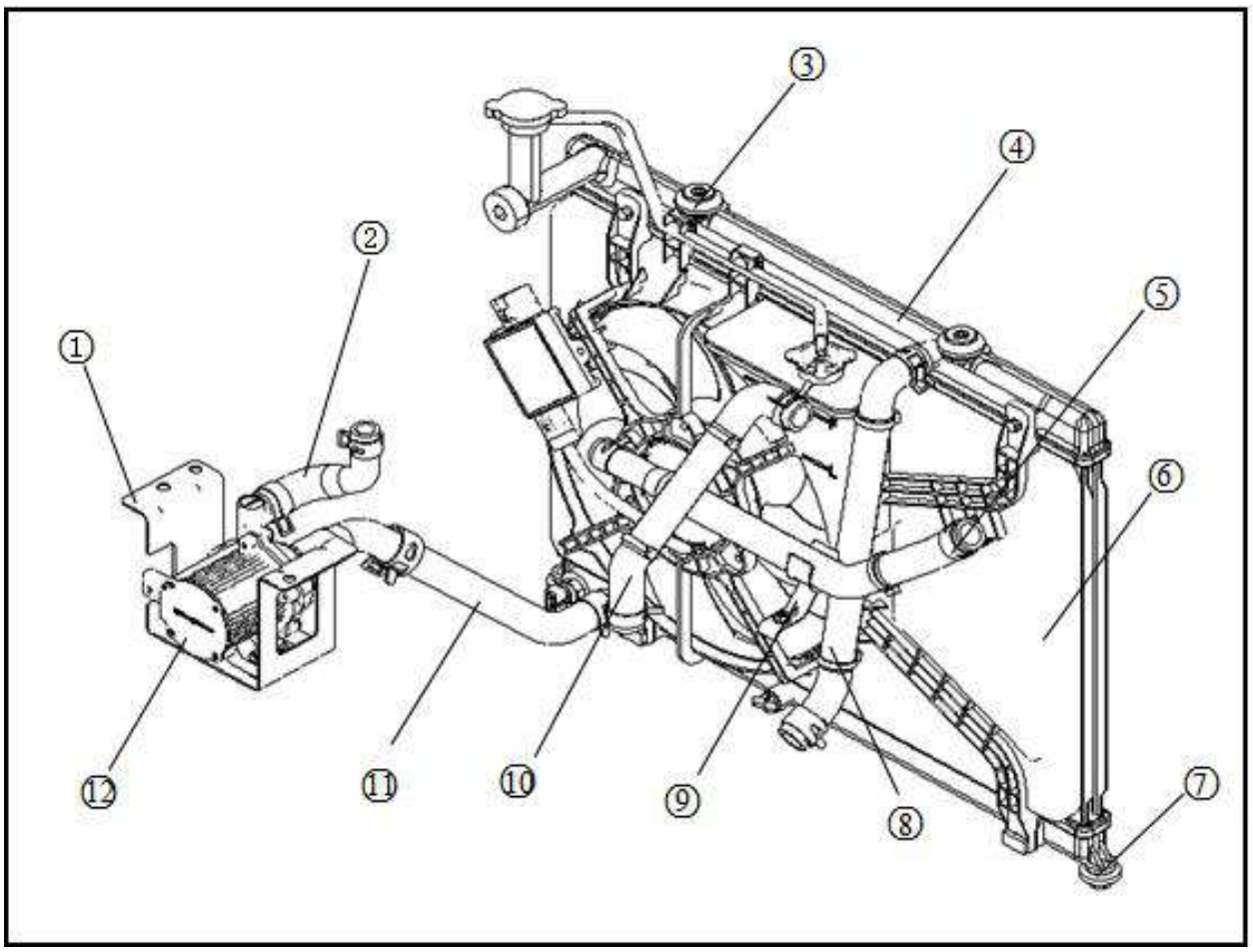
Preparation work

Commonly used tools

Name	Diagram	Instruction
Radiator cover detector		cooling system leaking detection
Radiator cover detector adapter		Connect radiator cover detector,different radiator cover and filling mouth

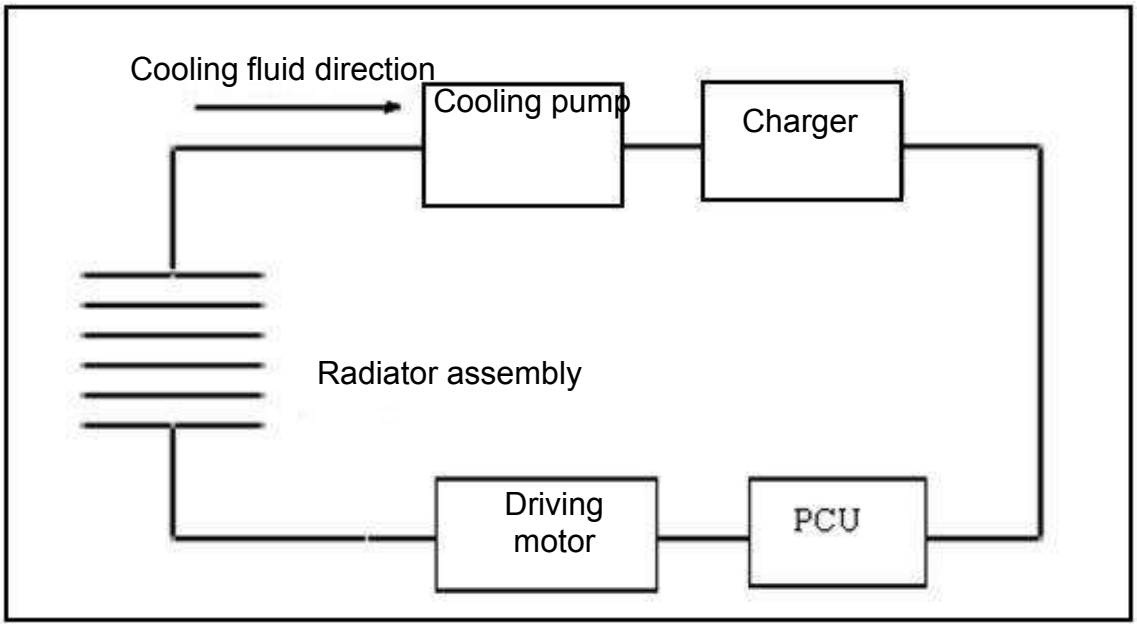
System description

Parts layout



1 Cooling water pump bracket	2 inlet pipe of electric charger	3 up suspension of radiator
4 Radiator assembly	5 PCU inlet pipe PCU	6 Radiator fan assembly
7 downside suspension of radiator	8 Inlet pipe of radiator	9 PCU inlet pipe bracket PCU
10 PCU outlet pipe	11 Outlet pipe of radiator	12 Cooling water pump

System principle



Basic inspection

1 Check whether the cooling fluid is full, if not,please fill full. Please see “Maintenance-cooling system”

Warning：

- **It is forbidden to open radiator assembly filler when the cooling fluid at high temperature to avoid overflowed coolant injury people.**

2 when the key is on “ON”, use hand to touch cooling pump cover to check whether cooling pump vibrate continuously, if not, please repair or replace.

Fault diagnosis

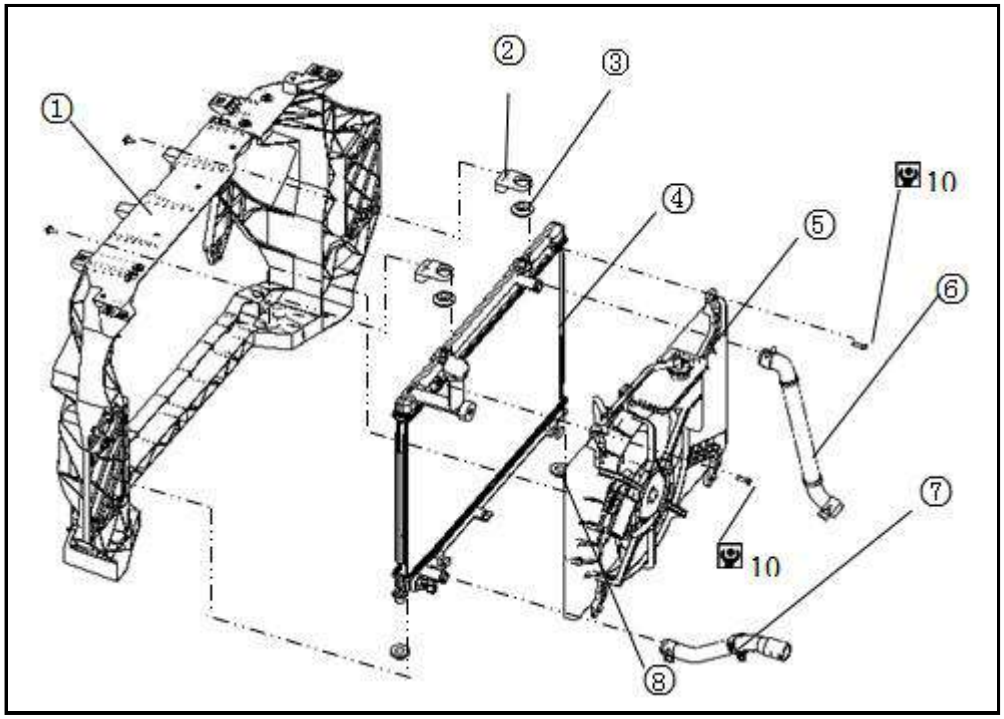
Overheating reason analysis

	Symptoms		Inspection item	
Cooling system parts in fault	Poor heat dissipation	Pump failure	Cooling pump	
			Cooling pump provide power	
		Radiating fan damaged	dust or confetti jam	
			Mechanical damage	
		Radiator pipe jam	Too much foreign bodies (corrosion, dirt, sand, etc	
	air flow is insufficient	Cooling fan not work	Radiator fan assembly	
		Fan rotate with big resistance		
		Fan blade damage		
	wind cover damage			
	Cooling fluid model is not correct			
	poor quality of cooling liquid		Cooling fluid viscous	
	Cooling liquid insufficient	Cooling liquid leaking	Cooling fluid soft pipe	Clamp loose
				Hose burst
			Cooling pump	Not well sealed
			Radiator cover	loose
				Not well sealed
			Radiator assembly	"O" ring of water mouth damage, aging or the installation is not correct
				temperature sensor interface damage
				radiator assembly burst
			Expansion kettle	Expansion kettle broken
others	Air circulation not well	Bumper vent clogging		
		Condenser blocked		

Remove and install

Radiator assembly, radiator fan assembly

Explosion diagram



1 Front-end module assembly	2 radiator suspension bracket	3 Radiator upside suspension
4 Radiator assembly	5 Radiator fan assembly	6 Radiator inlet pipe
7 Radiator outlet pipe	8 Radiator downside suspension	

: N·m

Remove

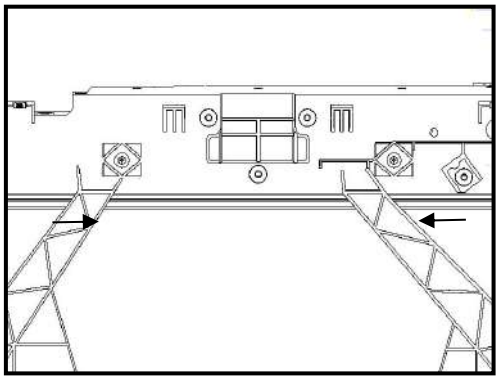
Warning：

- **It is forbidden to open radiator cover immediately after stop the car,because cooling fluid temperature is very high, cooling fluid with high temperature may overflow from radiator filling mouth,which resulted in serious burns.**

1 Screw off the water radiator and radiator cap, emptying coolant.

2 Remove radiator inlet and outlet pipe

3 Remove air-conditioner pipe connected with Condenser.please refers to “air-conditioner system- Remove and installation”.



Caution：

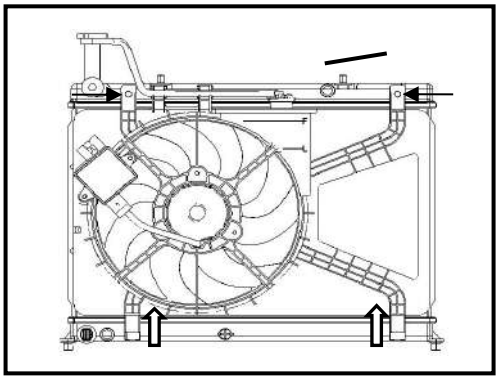
- **Pulling on the air conditioning pipe is prohibited.**

4 Remove the radiator fan assembly and temperature sensor connector .

5 Remove front bumper.please refers to “body-body system”

6 Remove the radiator support fixed screw of the front-end module, remove the radiator assembly, radiator fan assembly.

7 Remove the fixed bolt of radiator assembly and radiator fan assembly , and separate the above parts.



⇧：Remove direction

Check after remove

Radiator assembly

Check whether there is crack, damage or other damage in the radiator assembly surface. If yes, please remove.

Check whether the radiator fin lodging area is 2% greater than the total area. If yes, please repair or replace.

Check the water temperature sensor connector to see if there is any breakage, cracks or other damage. If yes, please replace.

Radiator fan assembly

Check whether there is crack, damage or other damage for the radiator fan assembly . If yes, please replace.

Check whether there is any breakage, cracks or other damage for the radiator fan connectors and wiring harness assembly . If yes, please replace.

Check the expansion water hose (1) whether there is ageing, cracking, or other damage. If yes, please replace the hose.

Caution：

- **the scratch or damage to the radiator core body is prohibited when remove .**

Install

Install in the opposite order of remove . fill coolant, please see "maintenance - cooling system".

Check after installation

Check whether the radiator cap and bottle caps are tightened.

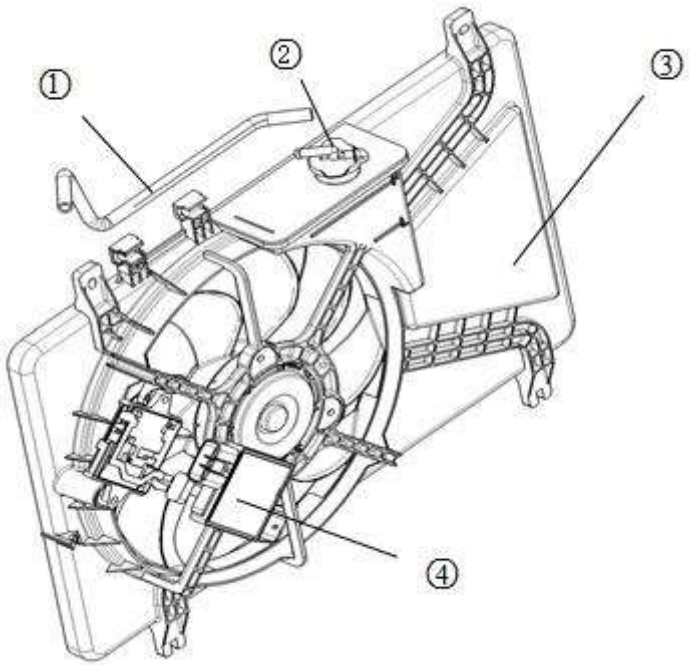
Check whether there is coolant leakage with the radiator cover detector.

Turn the key to “on” position, open air-conditioner in cool,check whether coolant pump and radiator fan assembly work normally.

Remove and Install

Radiator fan assembly

Explosion diagram



1 Expansion kettle hose

2 Expansion kettle cover

3 Radiator fan cover

4 Fan controller

Remove

1 Remove the expansion kettle hose and the kettle cover.

2 Remove the fan controller and radiator fan fixed bolt, unplug the connector, remove the fan controller.

Check after remove

Fan controller

Check whether there is a needle, curved back, breakage, cracks or other damage. If yes, please replace.

Expansion kettle hose

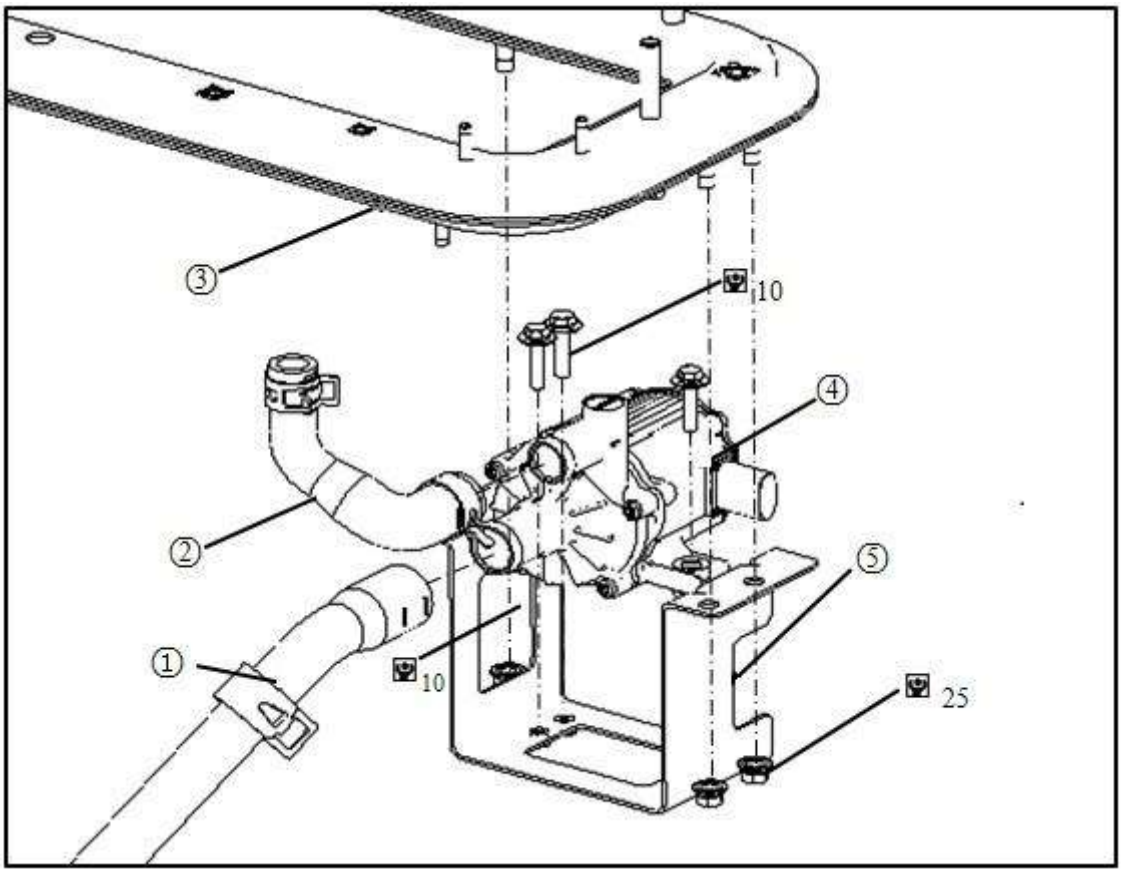
Check whether there is inflation kettle hose aging, cracking, or other damage. If yes, please replace the hose.

Install

Install in the opposite order of remove

Cooling pump

Explosion diagram



1 Radiator outlet pipe 2 Charger inlet pipe 3 Power train beam

4 Cooling pump 5 Cooling pump

: N·m

Remove and install

Remove

Warning：

- **It is forbidden to open radiator cover immediately after stop the car,because cooling fluid temperature is very high, cooling fluid with high temperature may overflow from radiator filling mouth,which resulted in serious burns.**

1 Empty coolant. Please see the "maintenance - cooling system”.

Tip:

- **Please operate when the power train assembly is in low temperature.**

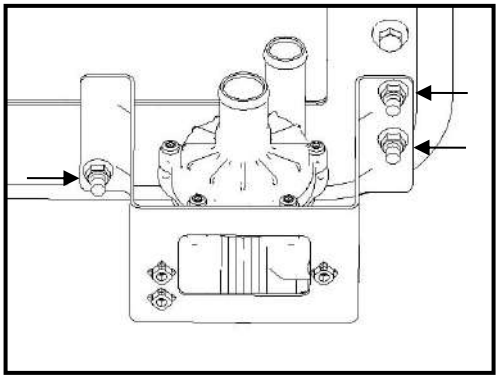
2 Unplug cooling pump connectors

Caution：

- **To avoid hand scratches when plug connectors.**
- **Avoid coolant splash onto the high pressure components and connectors. If yes, please immediately wipe clean.**

3 Remove radiator outlet pipe and charger inlet pipe.

4 Remove cooling pump bracket fixed nut, take out cooling pump and cooling pump bracket.

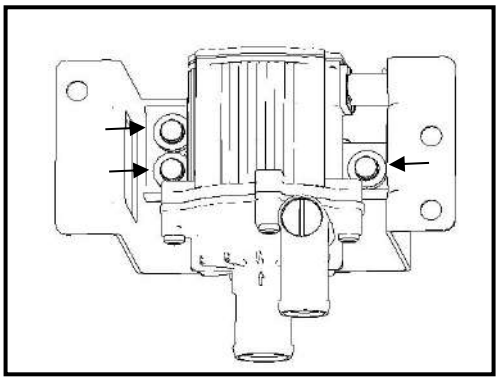


- **Tighten torque: 30～35N·m.**

Caution:

- **Avoid cooling pump falling or onslaught. If yes, please replace.**

5 Remove fixed bolts of cooling pump and separate cooling pump and bracket.



- **Tighten torque：8～12N·m.**

Install

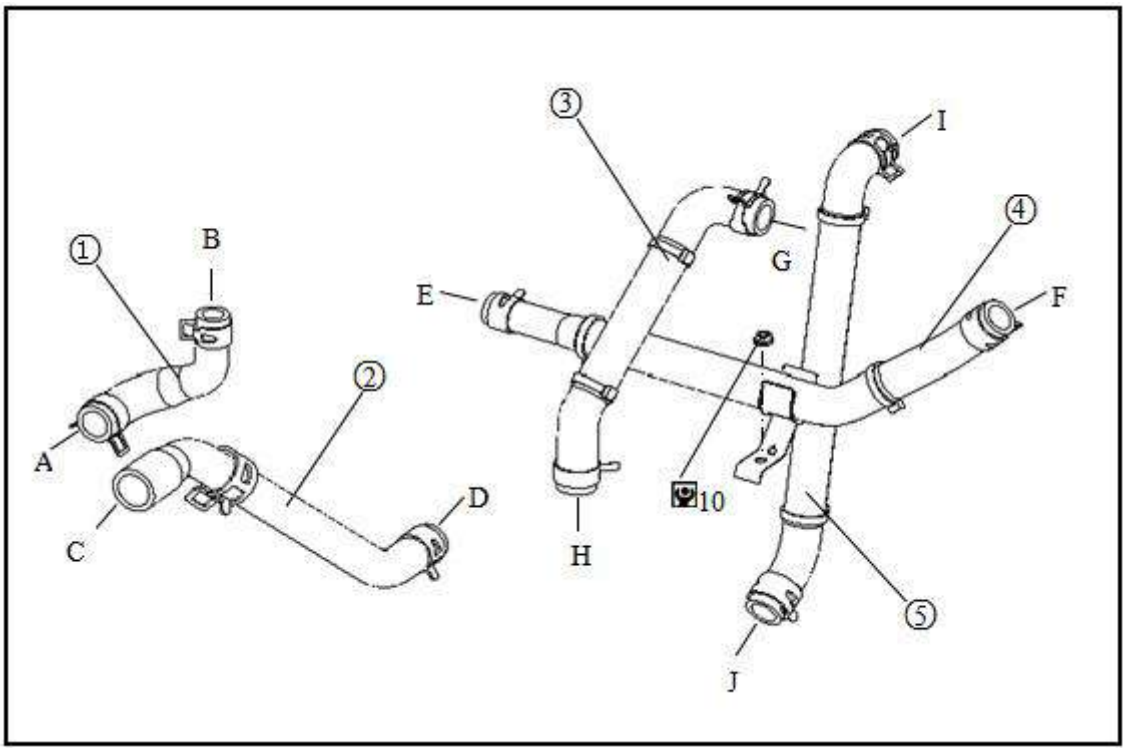
Install in the opposite order of remove.

Tip:

- **When installing radiator outlet pipe and charger inlet pipe, please make cooling pump steady with hand.**

Cooling pipe

Parts layout



1 Charger inlet pipe	2 Radiator outlet pipe	PCU outlet pipe	4 PCU inlet pipe
5 Radiator inlet pipe	6 Driving motor outlet pipe		
A Connect cooling pump	B Connect charger	C connect cooling pump	D connect radiator assembly
E connect charger	F connect PCU	G connect PCU	H connect driving motor
I connect radiator assembly	J connect driving motor		

: N·m

Maintenance data and specifications

Cooling fluid

Cooling fluid filling volume(L)	≈3.1
Expansion kettle capacity(L)	0.15

Radiator

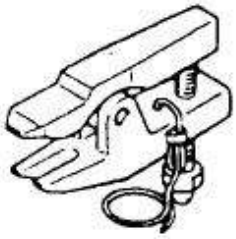
Pressure of leak detection（kPa）	93~121

Front axle

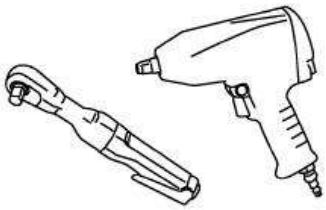
Preparation work

Special tools

Actual tool shape may be different from illustration shown as following

Tool	Diagram	Instruction
Steering transmission rod		Remove the connecting ball head

Commonly used tools

Tool	Diagram	Instruction
Power tool		Install and remove bolts and nuts

Troubleshooting

Troubleshooting for noise,vibration and unsmooth(NVH)

NVH troubleshooting diagram

Using the table below helps to find the causes of symptoms. If necessary, repair or replace these parts.

reference			--	--	--	Front axle-7	--	Front axle-10	Front axle and front suspension	Front axle	NVH of wheel	NVH of whee	Driving shaft	NVH of braking part	NVH of steering part
Possible reason and parts			Universal joint angle is too big	Sliding resistance of universal joint	unbalance	Unfitableinstallation	Parts interference	Wheel bearing damaged	Front axle and front suspension	Front axle	tyre	Wheel	Driving shaft	Brake	Steering
sympto m	Drivin g shaft	Noise	×	×				×	×	×	×	×		×	×
		Vibration	×		×			×	×	×	×	×		×	×
	Front axle	Noise				×	×	×	×		×	×	×	×	×
		Vibration				×	×	×	×		×	×	×	×	×
		Shaking				×	×	×	×		×		×		×
		fibrillation				×	×		×		×	×		×	×
		Uncomfortabl e or difficult to operate				×	×		×		×	×			

×：Fittable

Front driving shaft

Check and Maintenance

1 Check whether the driving shaft and universal joint is loose and other damages.

2 Check whether anti-dust cover has cracks and other damage

Caution：

- If the driving shaft appears noise or vibration, please replace the driving shaft assembly.

Anti-dust cover of driving shaft replacement

1 Lift vehicle, remove front tire. Please refer to “wheel and tire”

- Tightening torque: 90～110 N·m

2 Remove the wheel speed sensor from universaljoint. Please refer to “wheel speed sensor”.

Caution：

- Please don’t pull the wheel speed sensor harness.
- Tightening torque: 8～10 N·m

3. Remove the front brake caliper assembly from the steering knuckle, and hung fixed. Please refer to the “front brake pliers”.

Caution：

- Ban to press on the brake pedal after removing the brake caliper assembly.
- Tightening torque: 65~75N•m

4 Loose the locking nut of driving shaft

- **Tightening torque: 240～260N•m**

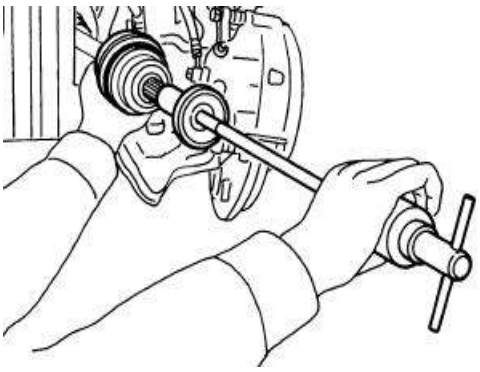
5 Tapping the driving shaft with a hammer (or the right tool) and wood make it separate with rim and bearing assembly, then remove the locking nut of driving shaft.

Caution：

- The angle for universal joint placed at shaft fixing end shall not be too big and do not pull and move it.
- Be sure to support universal joint spherical shell, shaft and other parts when put down the driving shaft.●

If couldn’t separate rim and driving shaft as above operation, you could use pulling tools (or appropriate tools).

6 Remove steering rod ball head from the steering rod.



Caution：

- Use special tool to avoid to damage ball head **dust-proof**
- Tightening torque: 15～34N•m

7 Loosen the fixing bolts and nuts of absorber and steering joint.

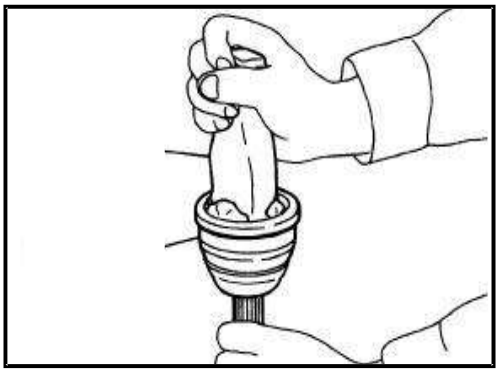
- **Tightening torque: 75～90N•m**

8 Separate driving shaft from rim and bearing

Caution：

- The angle for universal joint placed at shaft fixing end shall not be too big to avoid pushing and the ball cage off.

9 Remove the dustproof sleeve clamp



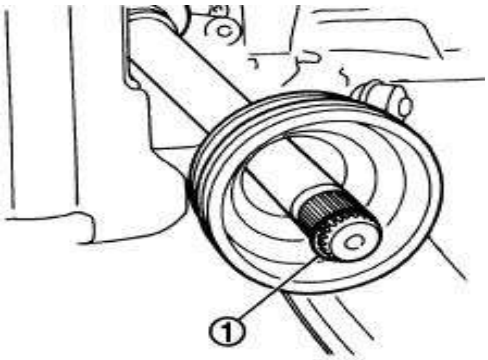
10 Screw driving shaft puller (or the appropriate tools) into the bolt hole of universal joint subassembly; pull the universal joint shaft assembly from holes.

Caution:

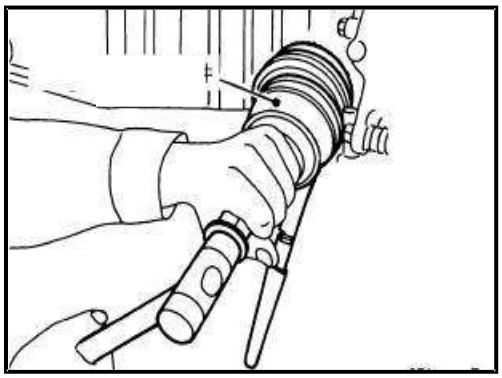
- If couldn't pull out universal joint subassembly,please try again after removing the driving shaft from the vehicle

11 Remove the ring clamp from the driving shaft, and remove the dust-off cover.

12 Dry the grease with paper on the joint universal assembly.



13 Apply the right amount of grease in the dentate hole of the universal joint subassembly,Until grease liquid from the circular groove and dentate hole. Dry the old grease with after daub lubrication fat.



14 Wrap spline with tape to avoid damage dustproof. Install the new dust Set and dustproof sleeve clamp on the driving shaft.

Grease type: CVJM-2008J

Filling Qty: 120g±10g

Caution：

- please don’t repeatedly use dustproof and dustproof sleeve clamp.

15 remove the tape on the bearing.

16 Place the snap ring on the groove of the shaft edge. Align the bearing on the edge of the shaft with universal joint subassembly alignment. Then install the bearing on the universal joint subassembly with snap ring.

Caution：

- Please don’t repeatedly use the snap ring
- when installing snap ring, please use special tool

17 Install the universal joint subassembly on the drive shaft with a plastic hammer.

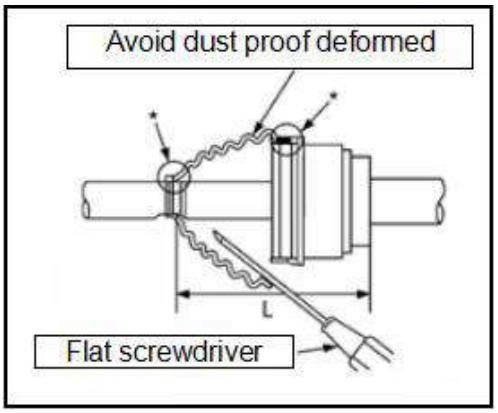
Caution:

- **Confirm universal joint subassembly has**

Meshing correctly when rotating drive shaft.

18 Daub evenly the right amount of grease to the inside of dust proof from large diameter side of dust proof.

19 Install dust proof into the shell ridge as shown in the picture



Caution:

- If grease stick to dust proof fixed on the surface ,to prevent dust proof from falling off, please wipe clean.

20 Inserted flat screw driver from large diameter side of dust proof, let the air outside, and adjust the dust proof installation length, avoiding dust proof deformation.

Caution:

- If dust proof drawing is prolonged, it may be damaged.
- Be careful with flat screwdriver, avoid to damage dust proof.

21 Fixed the new dust proof with tools

Caution:

- Forbidden to reuse dust proof clamp.

22 Fix the universal joint and driving shaft to confirm the dust cap installed in the correct position.

Caution:

- Dust proof installed in wrong position, please use the new dust proof clamp to install.

23 Confirm cir-clip meshing completely at the moving end of driving shaft.

24 Insert the driving shaft into front wheel assembly, then tighten the locking nut of the driving shaft.

25 Install bolts and nuts of absorber and steering joint.

26 Install steering rod ball and fix the nut with standard torque.

Caution：

- when install, fix bolt first to avoid rotating then locking nut.

27 Install brake pliers components, fixing brake hose.please refer to “front brake”and “brake pipe”.

28 Install steering joint on the wheel speed sensor. Please refer to “wheel speed sensor”.

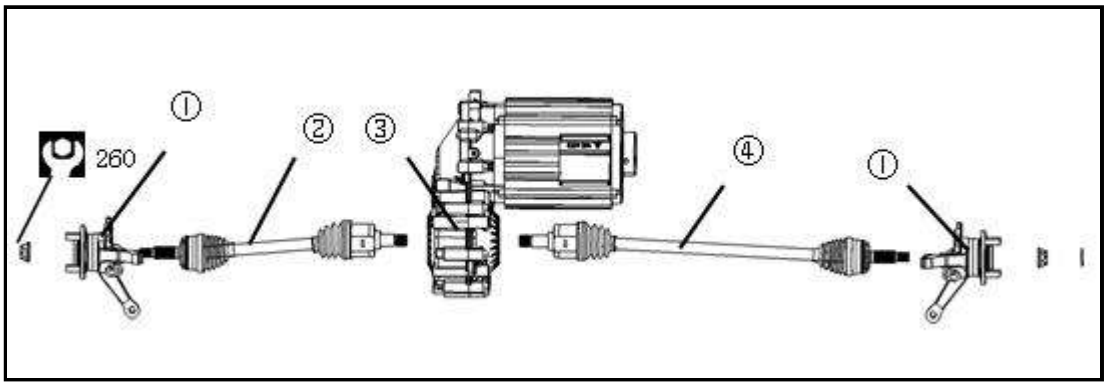
29 Tighten the the locking nut of driving shaft to standard torque.

- **Tighten torque: 240～260N·m**

30 Install tyre and tighten with standard torque. Please refer to “maintenance specification”

Remove and install

Explosion diagram



1 Hub assembly

2 left front driving shaft assembly

3 Reducer assembly

4 Right front driving shaft assembly

: N·m

Remove

1 Lift the vehicle and remove the front tyre. Please see the "wheel and tyre”.

2 Remove the wheel speed sensor from the steering joint. Please see the " wheel speed sensor".

Caution:

- Pull wheel speed sensor wiring harness is prohibited.

3 Remove the braking clipper assembly from steering joint and fix it. Please refer to front braking clipper”.

Caution

- Don’t press down the braking pedal after removing braking clipper.

4 Remove brake disc

5 Loosen driving shaft locking nut.

6 Separate fixed end of driving shaft and the front wheel assembly with a hammer (or the right tool) and wood tapping the driving shaft.

Caution：

- The angle for universal joint placed at shaft fixing end shall not be too big and please also be care do not push the moving joint too much.
- Please assure to support the Shell (components) of universal joint, shaft and other parts when put down the driving shaft.
- If still couldn’t separate the rim and driving shaft, please use the puller(or other tools)

7 Remove the tie rod from the steering knuckle ball head.

Caution:

- To avoid damage the dust-proof of ball head, please use special tools.

8 Loosen fixed bolts and nuts of shock absorber and steering knuckle.

9 Remove the driving shaft from the hub and bearing assembly .

10 Pry out of the driving shaft from the reducer side.

Caution:

- The angle for universal joint placed at shaft fixing end shall not be too big and please also be care do not push the moving joint too much.

Check after remove

1 Turn the universal joint to check whether it is flexible, smooth, or any serious loose.

2 Check whether there is crack, breakage and dust proof grease leakage.

3 If there happens the conditions not in line with the specification, please disassemble the driving shaft and replace defective parts.

Installation

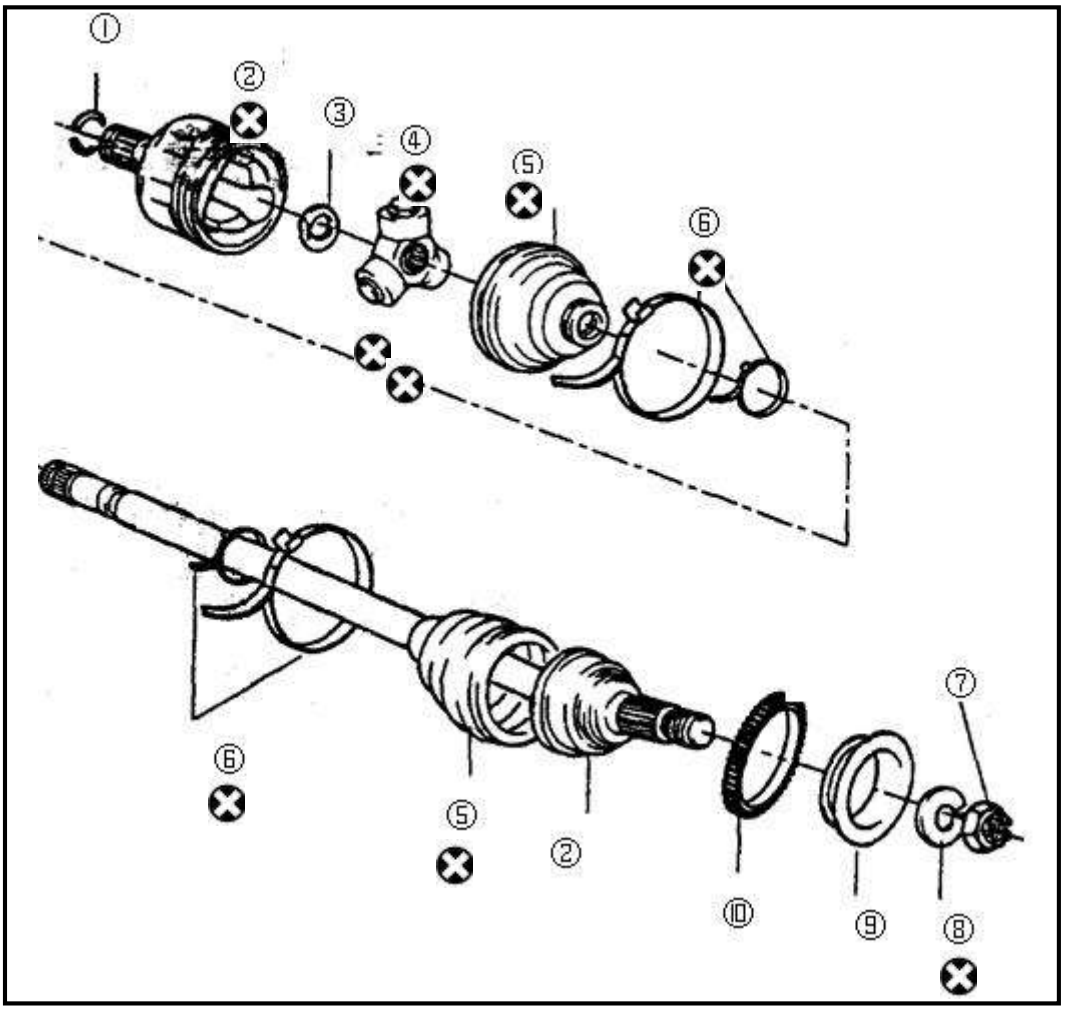
Install in the opposite order of remove. About the tightening torque, please refer to “Maintenance specification”

Caution:

- Before installing the driving shaft, a new reducer oil seal should be replaced.
- Forbidden to reuse the components which couldn’t be reused.
- Insert the driving shaft reducer side,avoiding to damage the oil seal
- confirm the cir-clip meshing completely.
- Applying gear oil on the spline of driving shaft.
- When installing the driving shaft, make the cir-clip opening facing down.

Remove and install

Explosion



1 Cir-clip	2 shell	3 snap ring	4 Trigeminal assembly	5 dust proof
6 clamp of dust proof	7 locking nut	8gasket	9 dust cover	10 wheel speed sensor gear ring

Replace after remov

Disassemble

On the side of reducer

1 Fixing driving shaft in vise.

Caution：

- When fixing driving shaft in vise,

please use aluminum or copper plate to protect the driving shaft.

2 Remove the dustproof sleeve clamp, and then remove the dustproof from shell in the set.

3 Mark on the spherical shell and driving shaft , pull the ball shell.

Caution：

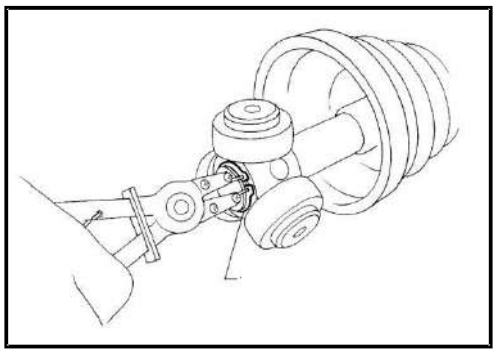
- Marking with painting or similar materials.

Please don't scratch the surface.

4 Remove the snap ring and fork assembly.

5 Remove the dust proof from driving shaft

6 Use paper cloth dry the old grease on the removed parts.



On the side of wheel

1 Fixing the driving shaft in vise

Caution：

- When fixing driving shaft in vise, please use aluminum or copper plate to protect the driving shaft.

2 Remove clamp of dust proof

3 Make driving shaft puller (or appropriate tools) totally screwed into the universal joint thread, then separate the driving shaft from the universal joint.

Caution：

- If try many times still not successfully remove the universal joint, please replace the drive shaft assembly.

4 Remove the cir-clip from driving shaft, take out the dust proof

5 Remove the gear ring of wheel speed sensors from the driving shaft.

6 Turning the ball shell and use paper cloth wipe grease on the removed parts.

Check after removing

Driving shaft

Check whether there is any deformation , crack, rust or other damage on the driving shaft rod. If yes, please replace driving shaft assembly.

Subassembly of universal joint (wheel side)

Check：

- Check whether the gimbal subassembly is excessive spin and the driving shaft is too loose.
- Whether there is a foreign body in the inside of universal joint.
- Check whether there is universal joint compression deformation, cracks and internal damage.

If found that do not conform to the provisions of the state, please replace the universal joint subassembly.

Shell and fork assembly(in the side of reducer

Check whether there are scratches or wear and tear in the rolling contact surface between ball shell and trigeminal assembly, if yes, please replace at the same time.

Caution：

- Shell and fork assembly in a device.

Dust proof and wheel speed sensors

- **Check whether there are cracks or other visible damage. If yes, please replace.**

Install

In the side of reducer

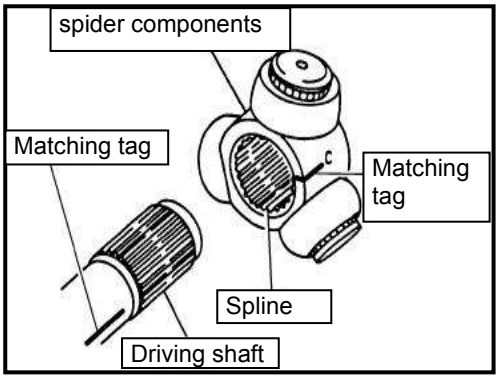
1 Wrapped spline with tape to avoid damage dust proof, install the new dust proof on the driving shaft and fastening clamp at small end

Caution：

- **Forbidden to repeat use damaged dust proof and clamp.**

2 Demolish adhesive tape around the driving shaft spline.

3 When assembly fork assembly,line in the paint marker, install fork assembly with reverse angle to bearing.

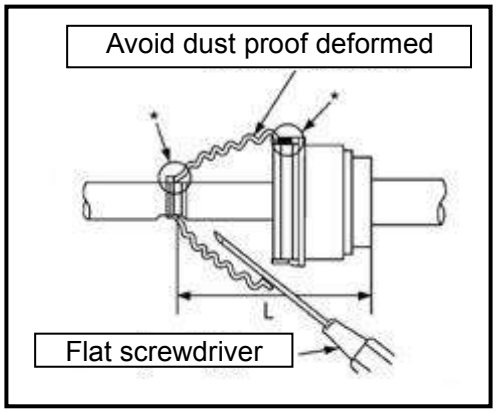


4 Fix fork assembly to the shell with snap ring.

5 Use the recommended lubricating oil daub trigeminal assembly and slippery surface.

6 Install the shell to the trigeminal assembly, then apply recommended grease.

7 Install the clamp into the slot as show in the picture



Caution：

- If grease stick to dust proof fixed on the surface , dust proof may fall off, please wipe clean.

8 Inserted flat screwdriver from large diameter side of dust proof, let the air outside, and adjust the dust proof installation length, avoiding dust proof deformation.

Caution:

- If dust proof drawing is prolonged, it may be damaged.
- Be careful with flat screwdriver, avoid to damage dust proof.

9 Fix new dust proof clamp with special tools

Caution:

- Forbidden to reuse dust proof clamp.

10 Fix shell and driving shaft ,then confirm the dust cap installed in the correct position.

Caution：

- Dust proof installed in wrong position, please use the new dust proof clamp to install.

11 install wheel speed sensor and sustproof to the shell.

In the side of wheel

Assemble in accordance with step 14~ 23 of "replacement of driving shaft dust proof”

Caution：

- When assembling, should guarantee the universal joint assembly in line with driving shaft.
- When assembling, confirm the wheel speed sensor and shell is matched completely.
- Please install wheel speed sensor after pressing into dustproof.

Maintenance data and specification

Wheel bearing

Item	tand Sar values
Clearance between bearing end	0.05 mm or less

D rving shaft

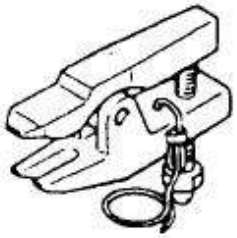
	Wheel side	eRducer sid
Universal joint type	AC	G I
G re as volume	120 g±10g	120 g±10g

Front suspension

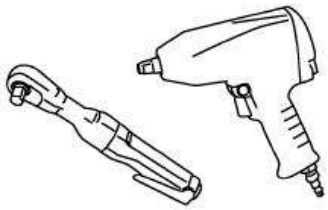
Preparation work

Special tools

The factual tool shape may be different with the diagram showing.

Tool	Diagram	Instruction
Steering transmission rod die		Remove the connecting ball head
Helical spring puller		Disassembly and installation of helical spring

Commonly used tools

Tool	Diagram	Instruction
Power tool		Install and remove bolts and nuts

Troubleshooting

Troubleshooting for noise,vibration and unsmooth(NVH)

NVH troubleshooting diagram

Using the table below helps to find the causes of symptoms. If necessary, repair or replace these parts.

Referring content			Front suspension-remove and install	Front suspension-shocker absober check	--	--	--	Front suspension-remove and install	Front suspension-wheel positioning	Front suspension-Stabilizer bar	Front axle and front suspension NVH	Wheel NVH	Wheel NVH	Front axle NVH	Braking system NVH	Steering system NVH
Possible reason and parts			Improper install, loose	shock absorber deformed, damaged or bending	Bushing aging	Parts interference	Spring fatigue	Suspension loosing	Not accurate for wheel positioning	Stabilizer bar fatigue	Front axle and front suspension	tyre	wheel	Driving shaft	Brake	Steering system
sympt om	Front suspe ntion	Noise	√	√	√	√	√	√			√	√	√	√	√	√
		Vibration	√	√	√	√		√			√	√	√	√	√	√
		Shaking	√	√	√	√	√				√	√		√		√
		fibrillation	√	√	√	√			√		√	√	√		√	√
		Uncomforta ble or difficult to operate	√	√	√	√	√		√	√	√	√	√			

√：fitable

Wheel positioning

Caution:

- Check wheel positioning under unloading position.
- Just adjust front beam, camber angle, kingpin caster angle and kingpin inclination angle couldn't be adjusted.
- If the camber angle, kingpin caster angle and kingpin inclination is not in the scope of the standard, please check whether there is worn or damaged in the front suspension, front wheel hub assembly, post assembly and ball pin of hem arm assembly. If yes, please replace.

Basic checking

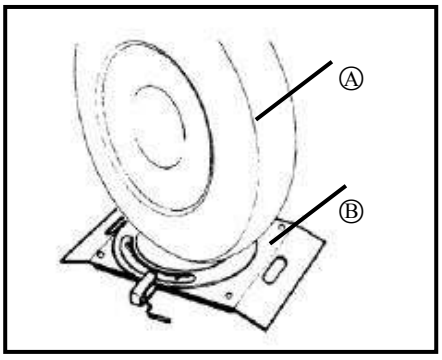
- Check whether tire pressure is normal, whether the tire has abnormal wear. Please see the "wheel - wheel assembly.
- The front wheel hub assembly axial clearance. Please see the "front axle - front wheel hub assembly.
- Check the ball pin axial clearance of hem arm assembly. Please see the "front suspension - the hem arm assembly.
- whether each tightening parts of front axle and suspension is loosing
- Whether there are cracks, deformation or other damage in the parts of wheel hub assembly, front mast assembly and hem arm assembly .

If you find the above situation, please check after maintenance wheel alignment.

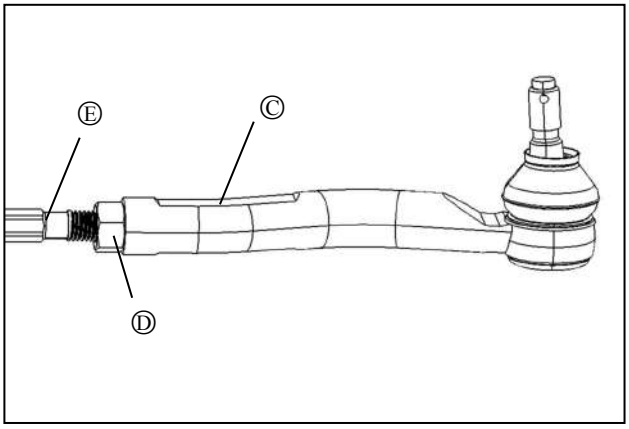
Front mast check

Caution:

- Check wheel positioning when vehicle unloading and on the leveling position. If front mast is not in the standard range,Please adjust according to the following step.



1 place the vehicle on four-wheel locator(B),front wheel (A) is placed on the steering plate.
2 Set standard front mast value on four- wheel locator
3 straighten the steering wheel and fixed.



4 loose locking nut (D) of left and right tie rod (C) end.
5 Turning left and right interior rod(E)

In clockwise or counterclockwise to adjust front mast data to standard value

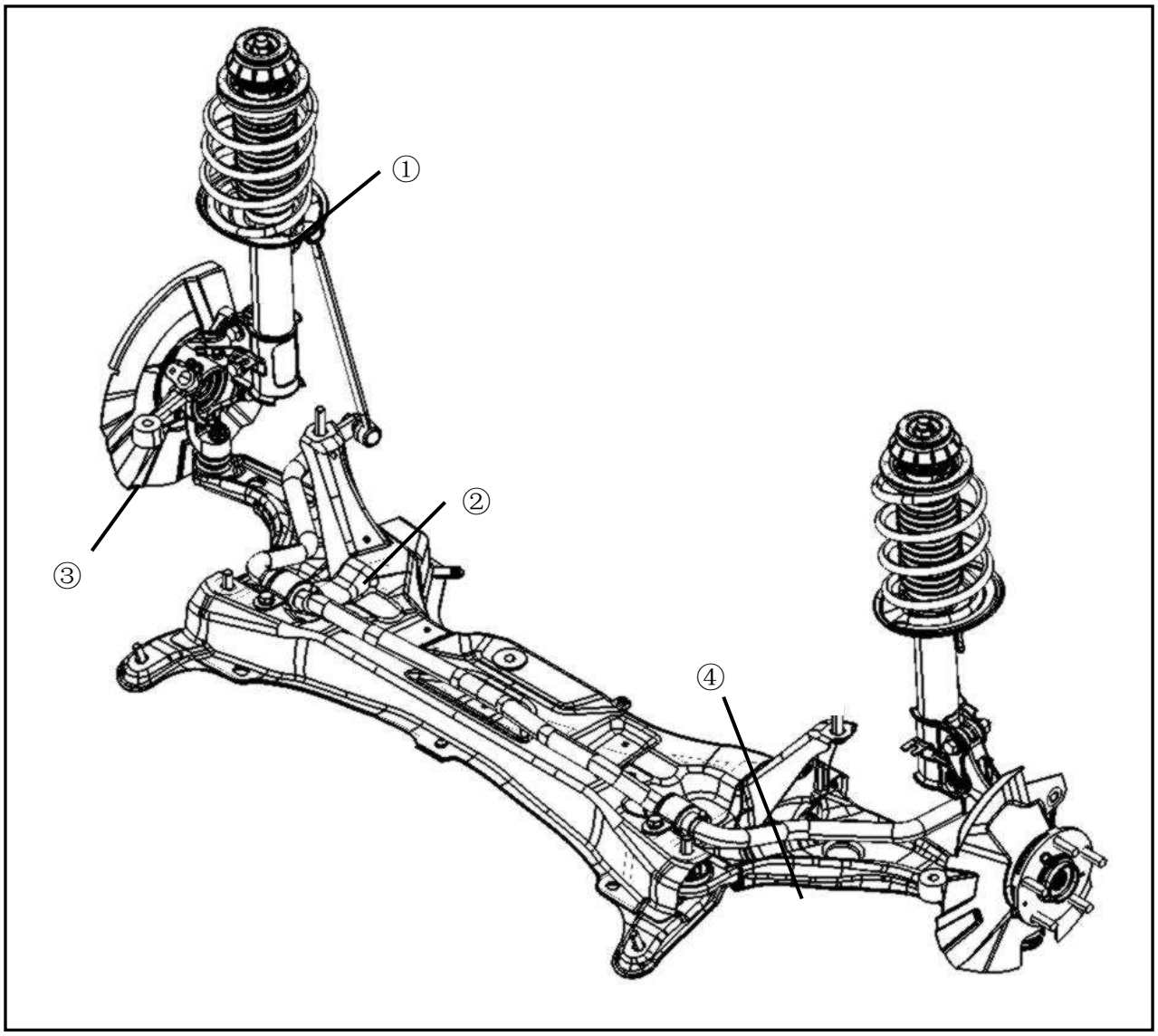
Caution

- steering amount of left and right interior tie rod shall be the same.

6 Lock the locking nut at the tie rod end.

Front suspension assembly

Front suspension layout



1 Front mast assembly 2 Front vice frame 3 Front rim assembly 4 Hem arm assembly

Front mast assembly

Remove and install

Remove

1 Remove front wheel, please see “wheel-wheel assembly”.

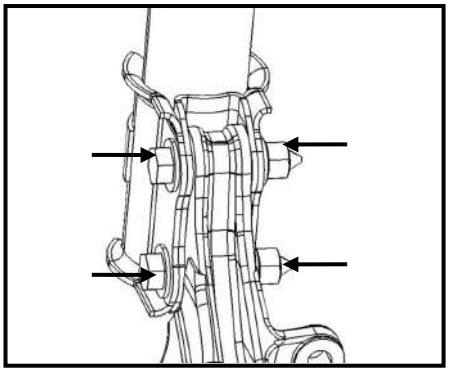
2 Remove wheel speed sensor, please see “ braking control system-wheel speed sensor”

Caution:

- Pull wheel speed sensor wiring harness is prohibited.

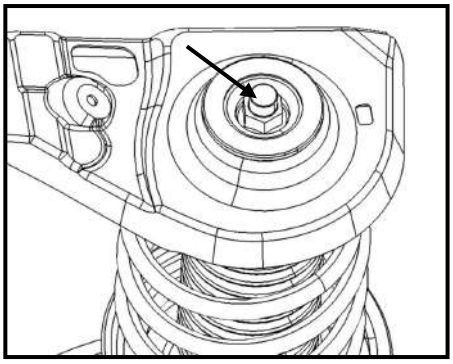
3 Remove the brake hose fixed bolt and remove brake hose. Please see the "brake system - brake pipe".

4 Remove the fixed bolts and nuts of front mast assembly and steering knuckle.

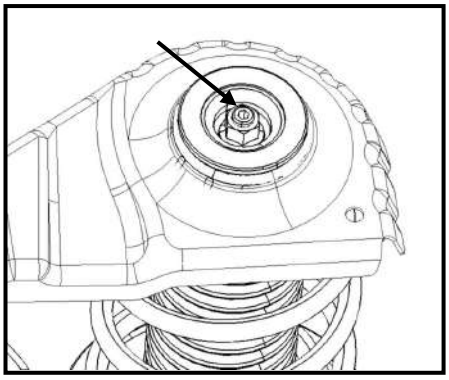


● Tightening torque：110～120N·m

5 Remove the nut dustproof of front mast assembly



6 Remove the fixed nut of front mast assembly and body.



● Tightening torque：60～72N·m

7 Take off front mast assembly.

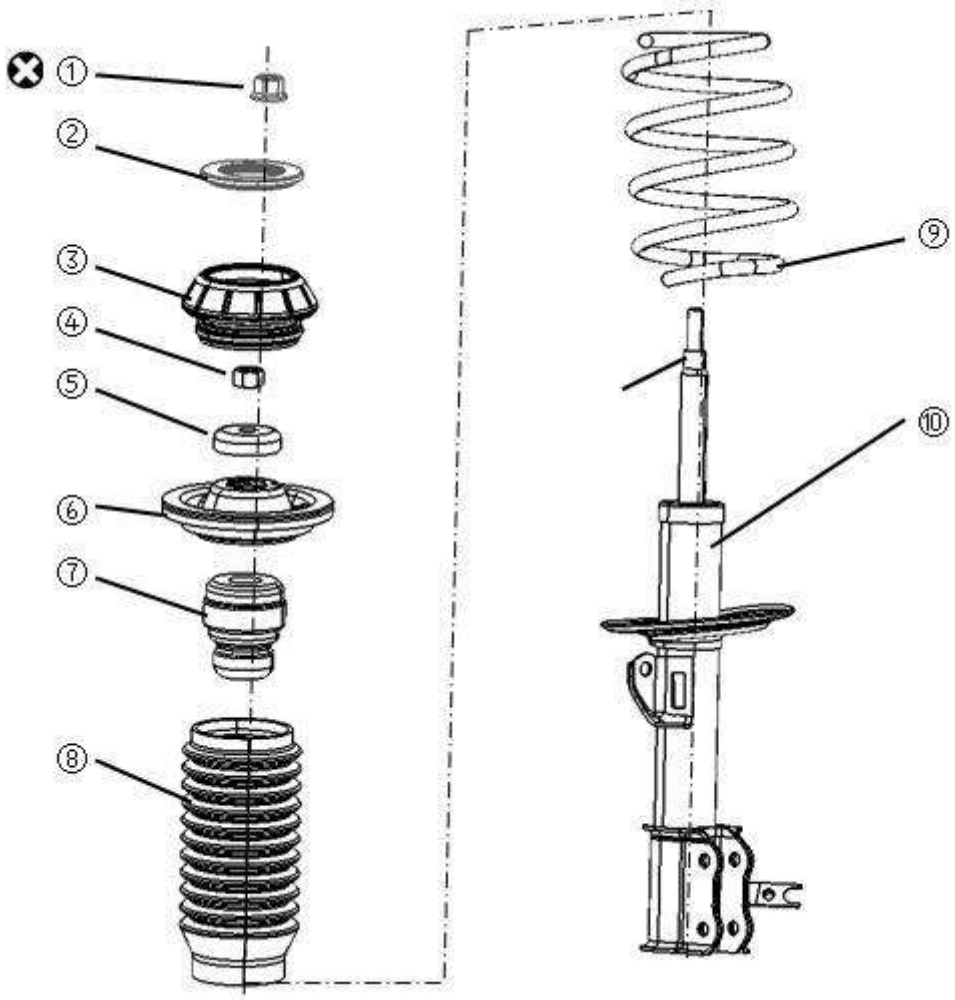
Inst lla

Install in the opposite order of remove

- Forbidden to repeated to use the installing nut of front mast assembly.
- Tightening parts shall be tightened under unloading condition.
- Check wheel positioning . Please see “front suspension-wheel positioning”

Disassembly and assembly

Explosion diagram



1 Nut	2 Decorative cover	3 upper supporting assembly	4 Nut
5 Shock absorber bearing	6 upper trampoline	7 Cushion block	8 Dust proof
9 Helical spring	10 Front shock absorber		

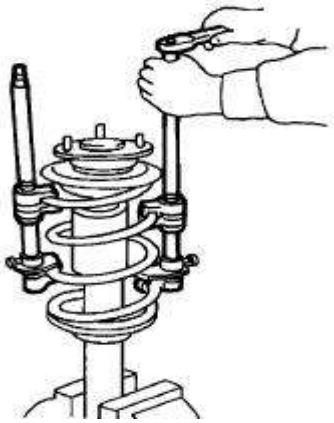
⊗ ： Replace after disassembly

Disassembly

Caution:

- Forbid to damage the front shock absorber piston rod

1 Use spring puller to compress spiral spring, until it separated with trampoline.



Caution:

- Confirm the puller has been completely installed, and then began to compress.
- Banning to use pneumatic tools to tighten the screw spring puller.

2 Fixing shock absorber piston rod end, remove the locking nut of the piston rod.

3 Remove the shock absorber bearing, spring cushion, dust proof, cushion block.

4 Remove the helical spring with puller, then slowly loosen the puller, remove the coil spring.

Check after disassembly

Front shock absorber

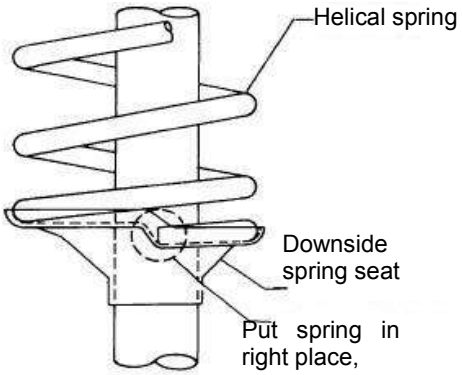
- Check whether there is deformation, crack, leakage, or other damage. If yes, please replace.
- Check whether the piston rod is damaged, wear or deformation. If yes, please replace.

Upper spring cushion, cushion block and dust proof

Check whether there is a crack, the rubber parts for wear, aging or other damage. If yes, please replace.

Helical spring

Check whether there is deformation, crack, rust, wear and tear or other damage of spiral spring. If yes, please replace.



Shock absorber bearing

Check for wear, noise, or other damage. If yes, please replace.

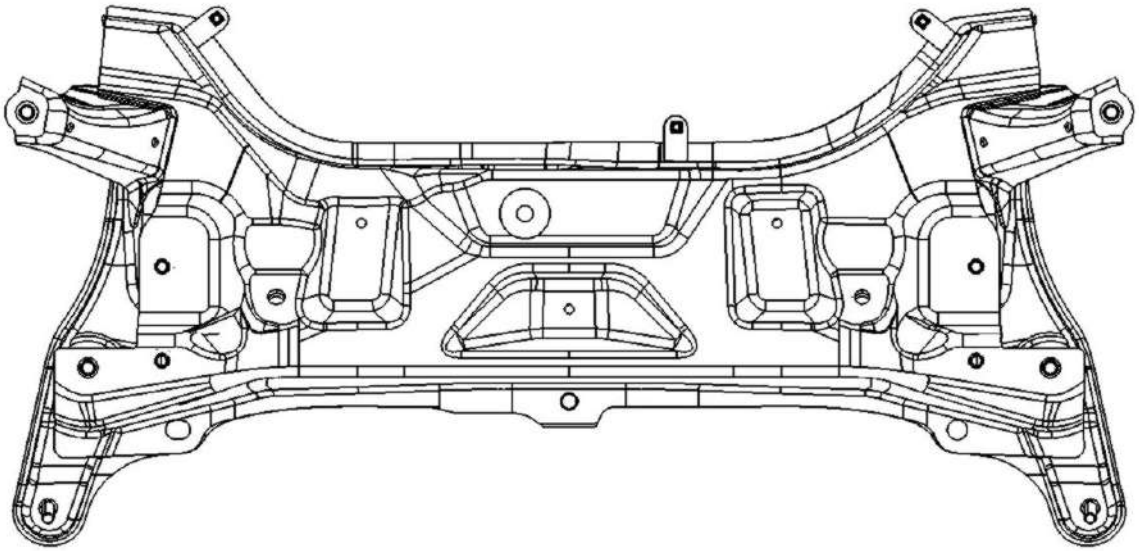
Install

Install in the opposite order of disassembly.

Caution:

- Forbid to damage the front shock absorber piston rod
- let large diameter end of helical spring to downwards, aiming at the downside spring seat.
- Confirm the puller has been completely installed, and then began to compress.
- When disengage the puller, should check whether the coil spring installation location is correct.

Front vice frame



Remove and install

Remove

1 Remove tightening parts of the steering gear assembly,intermediate axle and steering knuckle.Please see “ steering system-steering assembly”

2 Remove the downside protection board of front-tank

3 Remove the connected nut of stabilizer bar pull rod and former post assembly.

4 Remove the fasteners of left and right lower swing arm assembly and the steering knuckle.

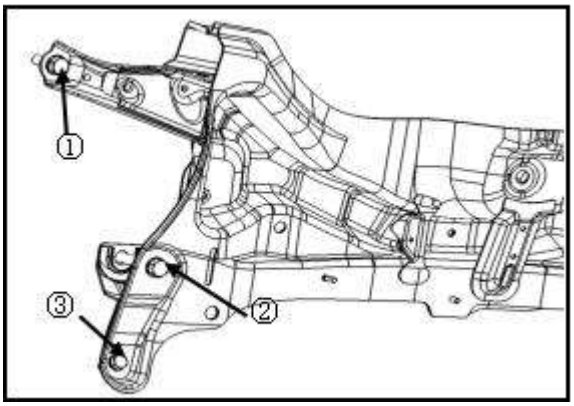
Please see “front suspension-lower swing arm assembly”.

5 Remove rear suspension soft mat and bracket. Please see the "suspension system - rear suspension soft mat and bracket.

6 Remove the connecting nut between power battery under guard Ⅰ and vice frame.

7 Remove the fixing bolt of auxiliary frame and body , remove the auxiliary frame and redirector assembly and left and right hem arm assembly fixed on the auxiliary frame.

- Tightening torque（①）：130～150N·m
- Tightening torque（②）：130～150N·m
- Tightening torque（③）：60～72N·m



8 Remove the steering gear assembly on the auxiliary frame .Please see the "steering system -steering assembly".

9 Remove the stabilizer bar and stabilizer bar on the pull rod of auxiliary frame. Please see the "front suspension -stabilizer bar".

10 Remove left and right lower swing arm assembly. Please see the "front suspension - the lower hem arm

assembly.

Check after remove

Check whether there is a crack, rust or other visible damage. If yes, please replace.

Install

Install in the opposite order of remove.

Installation bolt screwing order of vice frame :②→①→③

Hem arm assembly

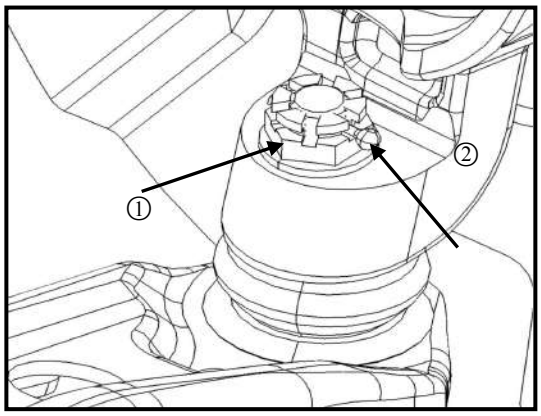
Remove and install

Remove

1 Lifting the vehicle, remove the front wheels. Please see "wheel - wheel assembly.

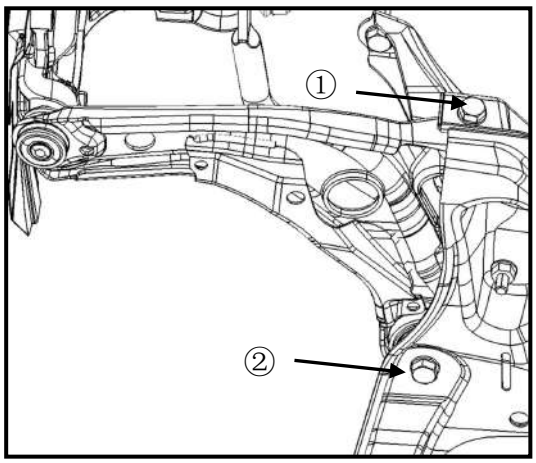
2 Remove the cotter pin （①）on ball pin of hem arm assembly.

3 Remove the slot type nut （②）connecting ball pin of hem arm assembly with steering knuckle.



● Tightening torque：60～72N•m

4 Remove fixing bolt(①)for front installing bushing of hem arm assembly and the auxiliary frame .



● Tightening torque：130～150N·m

5 Remove fixing bolt（②）for rear installing bushing of hem arm assembly and the auxiliary frame.

● Tightening torque：130～150N·m

6 Use hammer (or the right tool) and wood tapping hem arm assembly slightly, separate hem arm assembly and steering knuckle, remove the hem arm assembly.

Check after remove

Visual check

- Check whether the bushing is worn or damaged. If yes, please replace.
- Check whether the hem arm assembly has deformation or other damage. If yes, please replace.
- Check if there is a crack, damage, aging or other damage in the ball pin dust proof of hem arm assembly. If yes, please replace.

Swing torque check for the ball pin

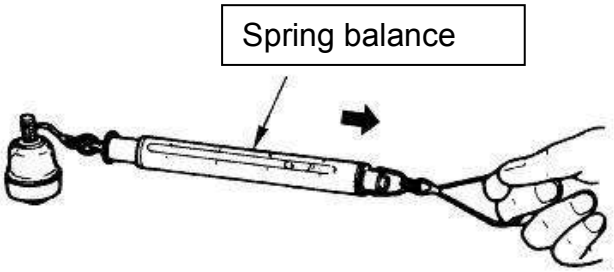
1 Turn the ball pin stud at least 10 times, check whether there is the binding. If yes, please replace the hem arm assembly.

2 Lift a spring balance in the ball pin stud slit . Measuring pin ball stud started turning force, calculating oscillating torque.

oscillating torque：1～3N·m

Spring balance showing range：16.7～50N

If surpass the specified range, please replace hem arm assembly.



The ball pin axial clearance check

Move the ball pin stud along the axial , measuring axial clearance.

axial clearance：≤0.2mm(adding±850N force along axial)

If surpass the specified range, please replace hem arm assembly.

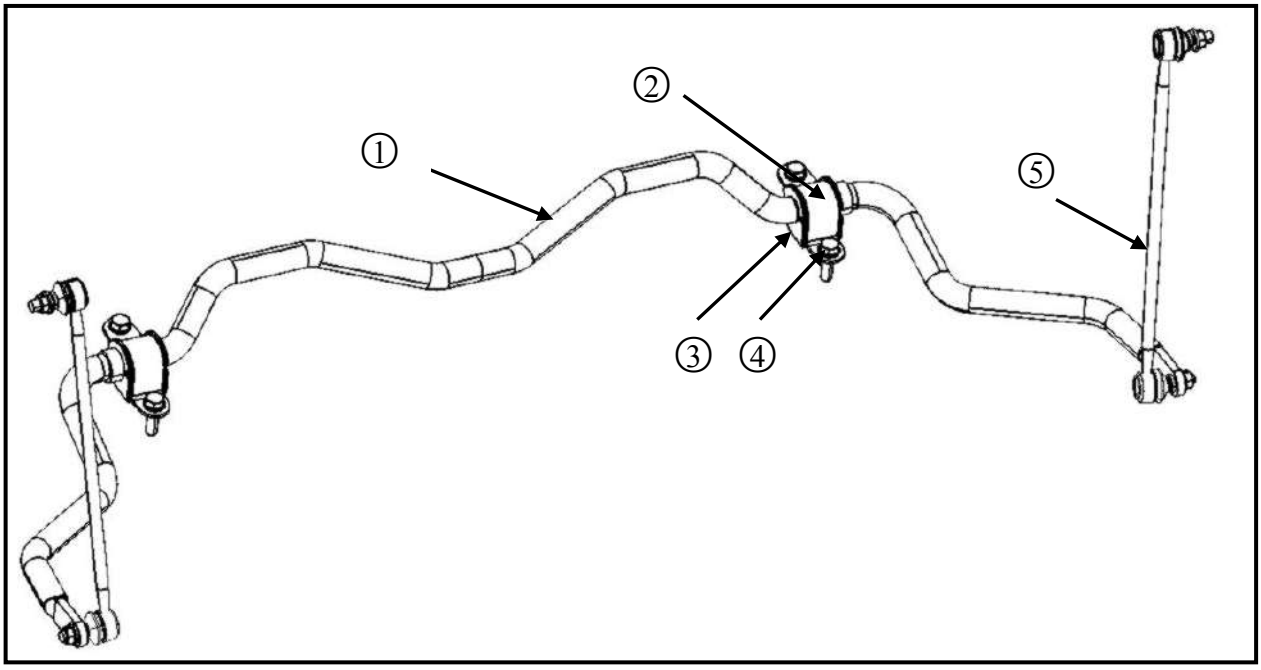
Install

Install in the opposite order of remove

Caution:

- Forbid to use the damaged parts.
- Tightening tighten parts when vehicle unloading.
- Check wheel positioning, please see “front suspension-wheel positioning”

Stabilizer bar

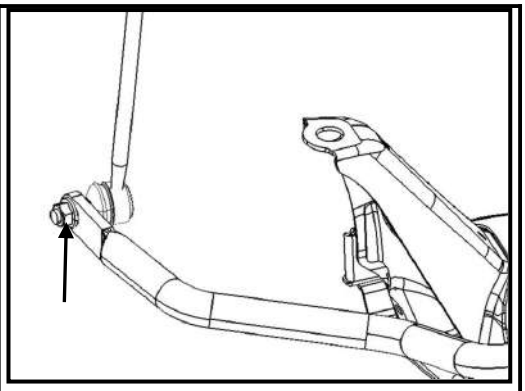
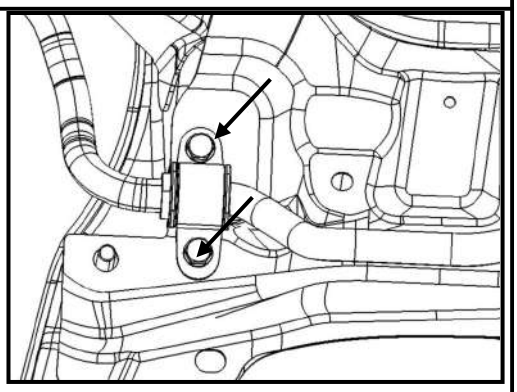


1 Stabilizer bar | 2 Fixing bracket of stabilizer bar | 3 Bushing of stabilizer bar

4.Bolt | 5 Rod of stabilizer bar

Remove and install

Remove

1 Remove the front auxiliary frame and redirector assembly fixed on the auxiliary frame, left and right hem arm assembly parts. Please see the "front suspension - front auxiliary frame". 2 Remove the steering gear assembly on auxiliary frame. Please see the " steering system -steering assembly". 3 Remove the fixing nut of stabilizer bar rod and stablizer Rod,remove the stabilizer bar rod. ● Tightening torque: 55N·m～65N·m	
4 Remove the bolts for stabilizer bar fixing Bracket and take off stabilizer bar and bushing. ● Tightening torque: 60N·m～72N·m	

Check after remove

Check whether there is deformation,wearing or other damages in stabilizer bar,stabilizer bar rod and stabilizer bar fixing bracket, if yes, please replace.

Check whether there is crack, aging, wear and tear or other damage on stabilizer bar bushing, stabilizer bar rod liner . If yes, please replace.

Install

Install in the opposite order of remove

Caution:

- Forbid to use unrepeatable used parts.
- Diagonal tighten stabilizer bar fixing bracket bolts.

Front wheel hub assembly

Remove and install

Remove

1 Remove front wheel, please see “wheel-wheel assembly”.

2 Remove wheel speed sensor, please see “ braking control system-wheel speed sensor”

Caution:

- Pull wheel speed sensor wiring harness is prohibited.

3 Remove the brake hose fixed bolt and remove brake hose. Please see the "brake system - brake pipe".

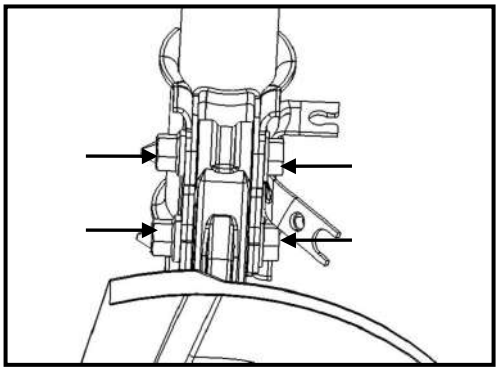
4 Remove the brake caliper assembly and suspension fixed. Please see the "brake system - brake pliers.

Caution：

- Forbidden to pedal on the brake pedal after removing the brake caliper assembly .

5 Remove the limit screw of brake disc , remove the brake disc.

6 Remove the retaining bolt of front pillar assembly and front wheel assembly.



● Tightening torque: 100N·m～120N·m

7 Remove the locking nut of drive shaft

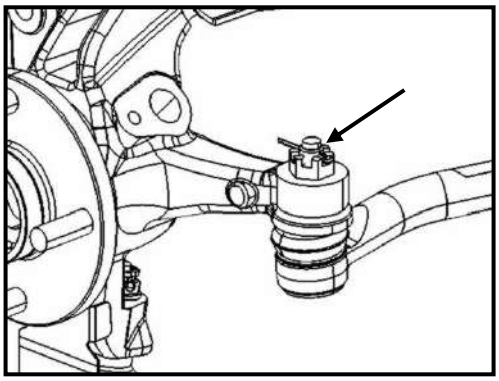
● Tightening torque: 240N·m～260N·m

8 Tapping the drive shaft with a hammer (or the right tool) and wood to separate from front wheel assembly.

Caution：

- Please use puller (or fittable tool) if couldn’t seperate according to above procedure.
- After the separation, must support fixed end gimbal spherical shell and the shaft.
- Angle of universal joint drive shaft at fixed end shall not too big, and do not pull move section.

9 Remove ball head of steering pulling bar .please see “steering system- mechanical steering of steering assembly



Caution：

- Please use special tool or proper tool to avoid

Damaging dust-proof of ball head

10 Remove the ball pin of downside hem arm. Please see the "front suspension - the downside hem armassembly.

Caution：

- Please use special tool to avoid to damage the dust proof of ball pin.

11 Remove front hub assembly

Check after removing

- Check if parts deformation, cracks or other damage. If yes, please change.

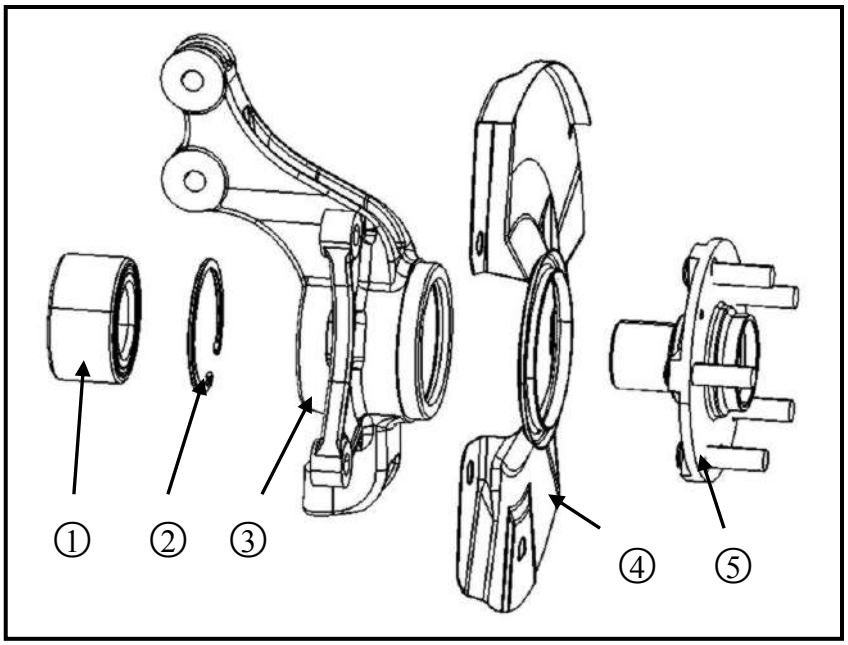
Install

Install in the opposite order of remove

- Forbidden to repeated to use the installing nut of front mast assembly.
- Tightening parts shall be tightened under unloading condition.
- Check wheel positioning . Please see “front suspension-wheel positioning”

Disassembly and assembly

Explosion diagram



1 Bearing　　2 Circlip　　3 Front steering knuckle

4 Fender　　5 flange

Disassembly

1 Remove the flange with proper tool(such as copper hammer)

2 Remove circlip with circle ring clipper.

3 Remove the bearing with proper tool(such as copper hammer)

4 Remove the fender with proper tool.

Caution：

- To avoid slip bearing, resulting in personal injury.
- If try many times still not make knuckle and bearing separation, please replace the front wheel hub assembly.

Check after remove

1 Steering knuckle

Check whether there is the scratch, crack, or other damage in steering knuckle and bearing contact surface. If yes, please change.

2 Circlip

Check the circlip for cracks or other damage. If yes, please change.

3 Flange

- Check whether hub bolt is pulled long.
- Check whether there is the scratch, crack, or other damage in flange and bearing contact surface. If yes, please change.

Assembly

1 Equipping fenders on the steering knuckle.

2 Daub appropriate amount of grease in the steering knuckle and bearing contact .

3 Press the new bearing into the steering knuckle, installing spring.

Caution：

- No press on bearing inner ring to avoid damage to the bearings.
- the bearing type of left and right front wheel hub assembly must be the same..
- Forbidden to use the damaged parts.

4 Press the flange into the bearing inner ring.

Caution：

- When pressing, use equipment to support bearing inner ring to avoid damage to the bearings.

Check after assembly

- **C**heck whether flange, bearing, steering knuckle assembly are in place.
- Measuring axial clearance of bearing.

Standard:0.05mm～0.07mm

Caution：

- If axial clearance beyond the standard, please assembly again.
- Measure the moving of wheel hub assembly at flange end .

Standard:0～0.08mm

Caution：

- If beyond the standard, please assembly again.

Maintenance data and specification

Wheel positioning(unloading*)

Camber angle	Minimum	-6′
	standard	24′
	maximum	54′
	Left and right difference	≤30′
Kingpin caster angle	Minimum	3.15°
	standard	3.65°
	maximum	4.15°
	Left and right difference	≤0.75°
Kingpin inclination	Minimum	+9.5°
	standard	+10.5°
	maximum	+11.5°
Total front beam	Minimum	-6′
	standard	7.5′
	maximum	21′

Ball pin of hem arm assembly

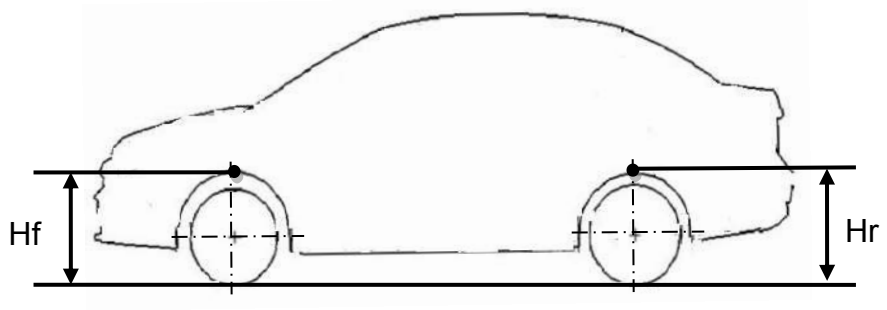
Ball pin of hem arm assembly	Swing torque	1N·m～3N·m
	Axial clearance	≤0.2mm

Bearing

Item	Standard value
shaft end clearance	0.05～0.07mm

Fender flares height (unloading condition)

Item	Standard value
Front（Hf）	706
Rear（Hr）	715



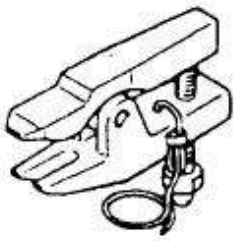
*： Coolant, engine oil, washing liquid is full. The spare tire, jack, hand tools and floor mats are all in the specified location.

Rear suspension

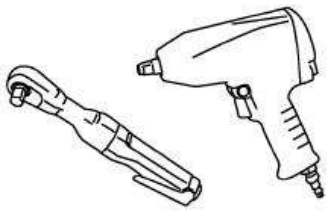
Preparation work

Special tools

The factual tool shape may be different with the diagram showing.

Tool	Diagram	Instruction
Steering transmission rod die		Remove the connecting ball head

Commonly used tools

Tool	Diagram	Instruction
Power tool		Install and remove bolts and nuts

Troubleshooting

Troubleshooting for noise,vibration and unsmooth(NVH)

NVH troubleshooting diagram NVH

Using the table below helps to find the causes of symptoms. If necessary, repair or replace these parts.

Referring content			Rear suspension-remove and install	Rear suspension-shocker absober check	--	--	--	Rear suspension-remove and install	Rear suspension-wheel positioning	Rear axle and front suspension NVH	Wheel NVH	Wheel NVH	Braking system NVH
Possible reason and parts			Improper install, loose	shock absorber deformed, damaged or bending	Bushing aging	Parts interference	Spring fatigue	Suspension loosing	Not accurate for wheel positioning	Stabilizer bar fatigue	Rear axle and rear suspension	Tyre	brake
symptom	Rear suspention	Noise	√	√	√	√	√	√		√	√	√	√
		Vibration	√	√	√	√		√		√	√	√	√
		Shaking	√	√	√	√	√			√	√		
		fibrillation	√	√	√	√			√	√	√	√	√
		Uncomfortable or difficult to operate	√	√	√	√	√		√	√	√	√	

√：fitable

Wheel positioning

Caution:

- Check wheel positioning under unloading position.
- Front beam and camber angle can only be tested, cannot be adjusted
- If front beam and camber angle are not in the standard range, please check whether there is wearing, deformation or other damages in rear beam assembly, rear sliding column assembly and helical spring, if yes, please replace.

Basic checking

- Check whether tire pressure is normal, whether the tire has abnormal wear. Please see the "wheel - wheel assembly.
- The rear wheel hub assembly axial clearance. Please see the "rear axle - rear wheel hub assembly.
- whether each tightening parts of rear axle and suspension is loosing.
- Check whether there is crack,deformation or other damages in rear wheel hub assembly , rear sliding column and rear beam assembly.

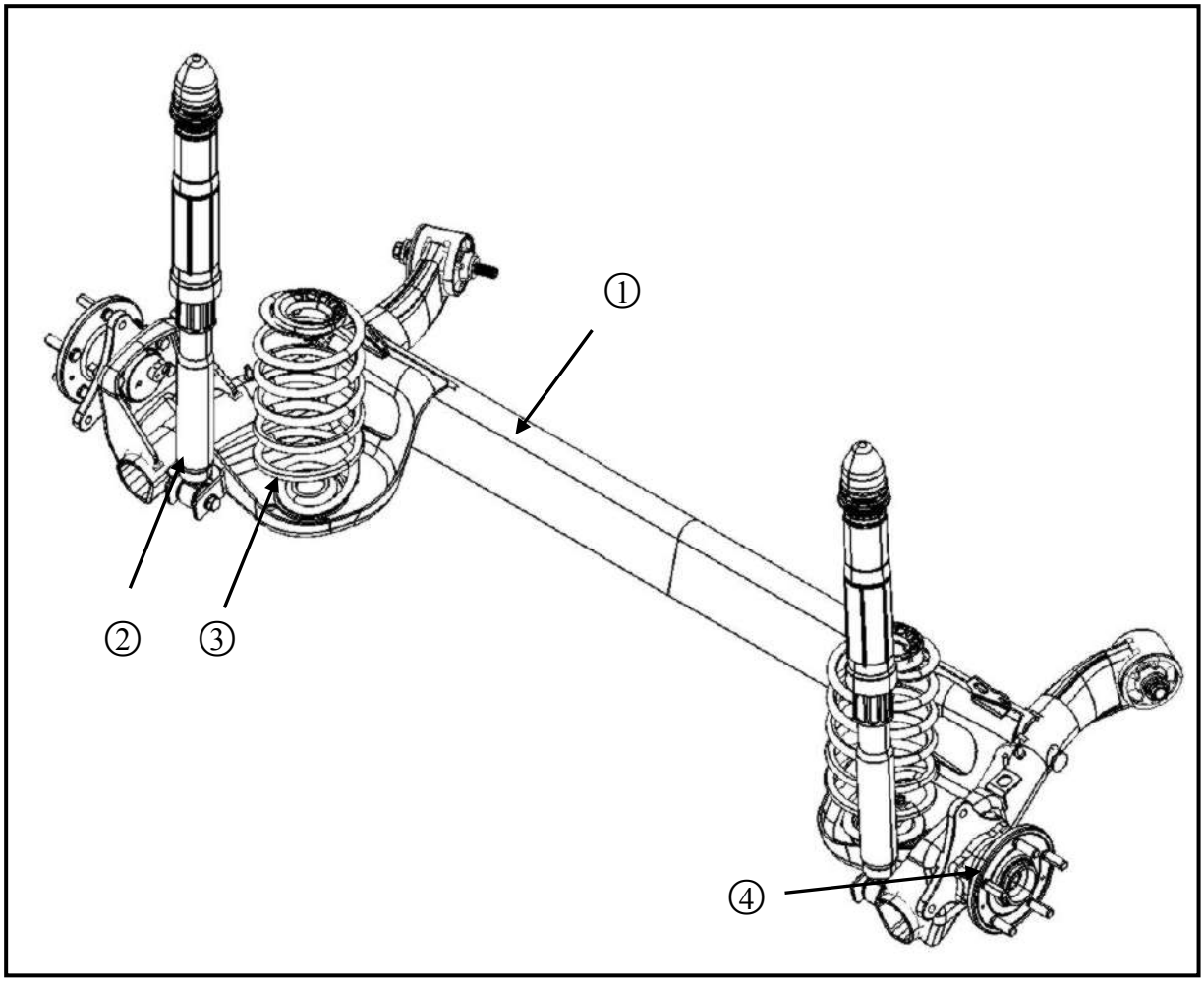
If you find the above situation, please check after maintenance wheel alignment.

Front beam, extraversion

Place the vehicle on the four-wheel locator, see the wheel positioning data. If it is not in line with the specified value, please check after maintenance.

Rear suspension assembly

Rear suspension layout



1 Rear beam assembly

2 Rear sliding column assembly

3 Rear spiral spring

4 Rear hub assembly

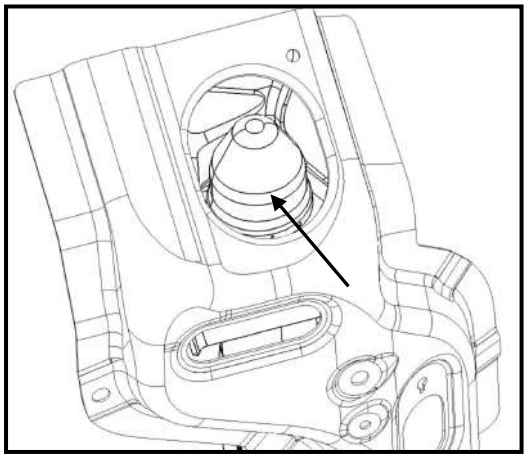
Rear sliding column assembly

Remove and installation

Remove

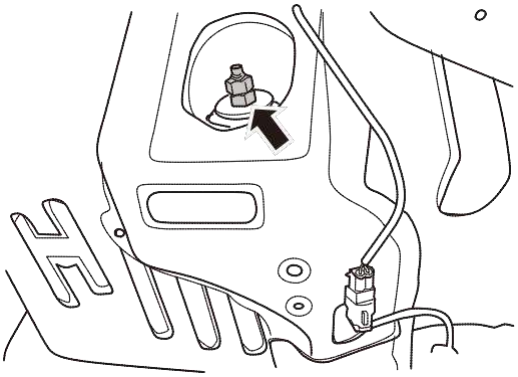
1 Remove the protection face of trunk

2 Remove decorative roof of rear sliding column assembly



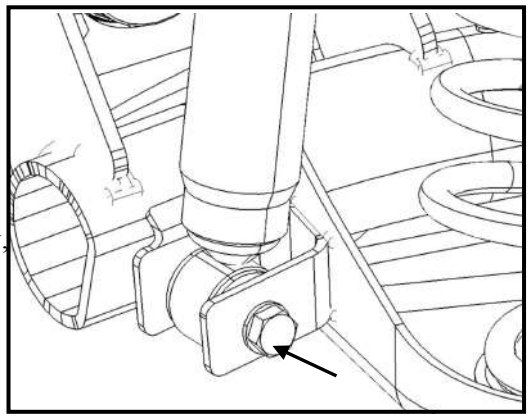
3 remove two nuts of connecting rear sliding column assembly and body

● Tightening torque：30～45N·m



4 Remove the installing bolts of rear sliding column assembly and rear beam assembly.

● Tightening torque：60～72N·m



Warning

● In order to ensure the maintenance staff personal safety, convenient to remove and installation,please use the geosyncline.

Caution

- when disassembly, should avoid sliding column assembly, coil spring suddenly dropping, even cause personal injury.

Check after remove

- Check whether there is deformation, oil spills, cracks or other damage. If yes, please replace.

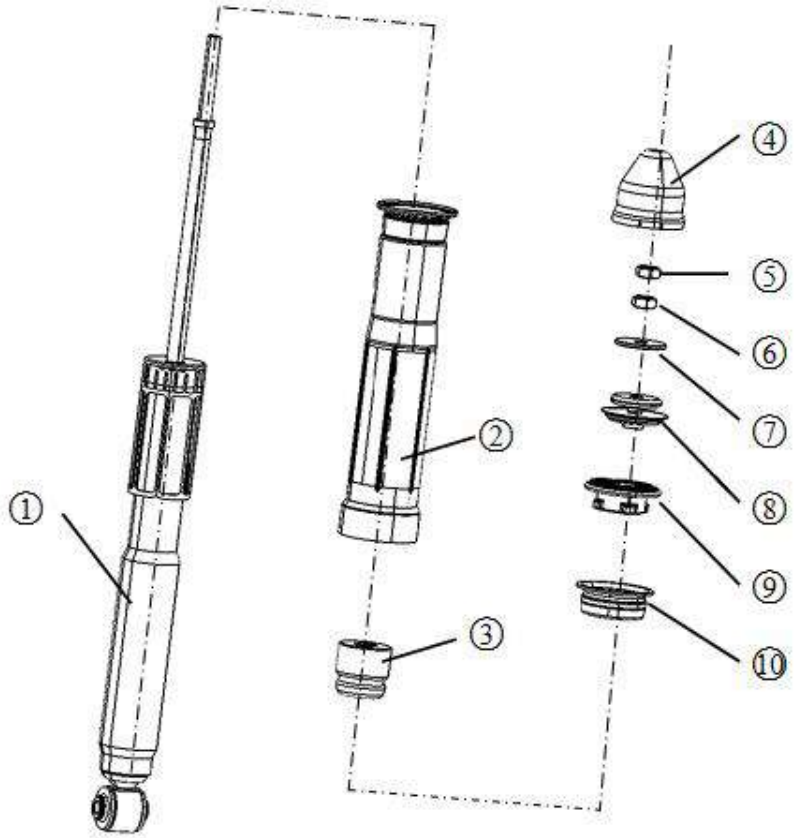
Install in the opposite order of remove.

Caution

- Forbid to use damaged parts.
- When install rear sliding column assembly and car body, put the two nut screw into the piston rod thread section, visual thread with 2 ~ 3 teeth (if thread to reveal too much, need to reassemble), tighten the upper nut with the torque wrench.

Disassembly and assembly

Explosion diagram



1 Rear shock absorber assembly	2 Dust proof	3 Buffer block	4 Nut
5 Nut	6 Nut	7.Gasket	8 Upper rubber mat B
9 Upper rubber mat A	10 Buffer block bearing		

Disassembly

Caution:

- Forbid to damage rear shock absorber assembly piston rod when dissembling.

1 Remove decorative proof with flat screwdriver.

2 Remove two nuts

3 Remove the washer, rubber mat, Upper rubber mat B, Upper rubber mat A, buffer block bearing, dust cover and buffer block in order.

Check after disassembly

Rear shock absorber assembly

- Check whether there is oil leakage, deformation or other damage. If yes, please replace.
- Check if there is a scratch, deformation or other damage to the piston rod. If yes, please remove.

Buffer block, dust proof and upper rubber mat A, Upper rubber mat B

Check whether there is aging, flaw, wear or other damage. If yes, please remove.

Buffer block bearing

Check whether there is cracks, wear, deformation or other damage. If yes, please replace.

Assembly

Assemble in the opposite order of disassembly

Caution

- Forbid to use damaged parts.
- Avoid to damage piston rod when assembling.

Rear crossbeam assembly

Remove and install

Remove

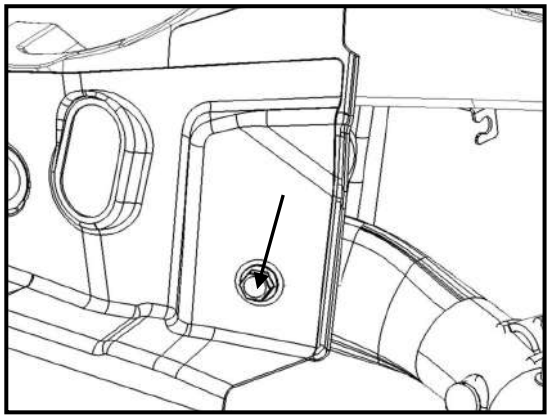
1 Remove rear wheel hub assembly. Please see " rear axle- rear wheel hub assembly
2 Remove braking pipe. Please see "braking system-braking pipe"
3 Remove the fixing nut for parking drawing and rear crossbeam assembly.
4 Remove the fixing bolts for rear sliding column assembly and rear crossbeam assembly.
5 Take off rear spiral spring.

Caution:

- Avoid the rear spiral spring suddenly dropping and cause personal injury when removing.

6 Remove the connecting bolt for rear crossbeam assembly and body.

● Tightening torque:130N·m～150N·m



Check after remove

- Check whether there is obvious deformation,crack, rust, liner damage or other damages for rear crossbeam. If yes, please replace.

Install

Install in the opposite order of remove.

Caution:

- Tightening tighten parts when vehicle unloaded.
- Check wheel positioning after installation.

Rear spiral spring

Remove and install

Remove

1 Lifting the vehicle to support the rear wheel.
2 Remove the fixing bolts for rear sliding column assembly and rear crossbeam assembly.
3 Take off wheel supporting slowly and rear spiral spring,upper and down rubber mat of rear spring.

Check after remove

- Check whether there is deformation,crack, rust or other damages in rear spiral spring. If yes, please replace.
- Check whether there is cracks、aging/wearing or other damages in upper and down rubber mat of rear spring. If yes, please replace.

Install

Install in the opposite order of remove.

Caution:

- Tightening tighten parts when vehicle unloaded.

Rear wheel hub assembly

Remove and install

Remove

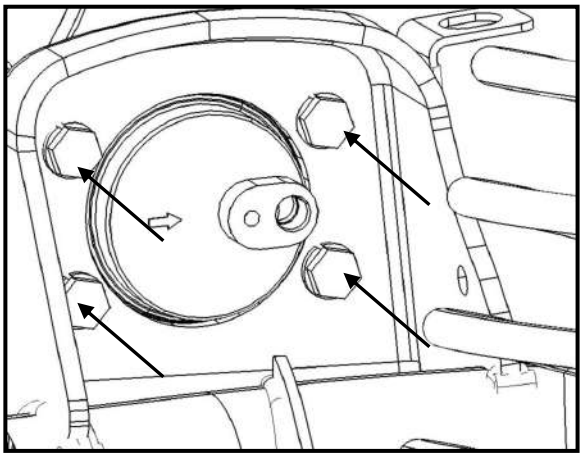
1 Lift the vehicle and remove front wheel, please see “wheel-wheel assembly”.

2 Remove rear brake clipper

3 Remove rear brake disc

4 Remove the connectting bolts of rear wheel speed sensor and rear hub assembly, remove rear wheel speed sensor.

5 Remove four retaining bolt of rear hub assembly and rear frame assembly, remove rear wheel hub.



● Tightening torque:60N·m～72N·m

Check after remove

- Check whether there is deformation,crack or other damages in parts.
- Check whether the bub bolts is pulled long.

If there is above phenomenon, please replace.

Install

Install in the opposite order of remove

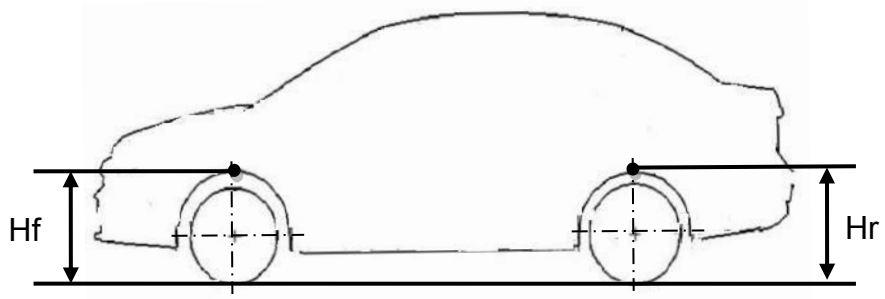
Maintenance data and specification

Wheel positioning(unloading*)

Camber angle	Minimum	-26′
	standard	-56′
	maximum	-1°26′
	Left and right difference	≤30′
Front beam (one side)	Minimum	0′
	standard	12′
	maximum	24′

Fender flares height (unloading condition *)

Item	Standard value
Front（Hf）	706
Rear（Hr）	715



*：Coolant, engine oil, washing liquid is full. The spare tire, jack, hand tools and floor mats are all in the specified location.

Wheel

Tips and cautions for wheel service and maintenance

- The original DR wheel is specially designed for each type vehicle, is only used for specified type.
- Please use authentic DR parts,wheels, valve cap and tire nut.
- Please use after wheel balance adjustment. Please adjust wheel balance with DR original balance block. ●

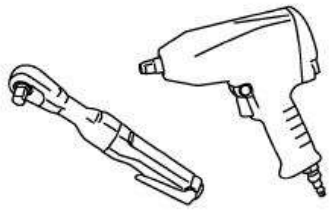
When do maintenance, please avoid scratch the surface coating. When clean the dirt on wheels, please use soft brush, it is prohibited to use any abrasives, steel wire brush, or other tools may damage the coating. Please use neutral detergent if necessary.

- Please rinse thoroughly the wheels after driving in n the release of deicing salt (deicing salt) road.
- When equipped wheel assembly onto the vehicle, please clean up the foreign bodies on the surface of the installed wheels in case of wheel deformation.
- Please do not apply oil on the tire nut and screw.
- Please use the hand to tighten the valve cap, banning the use of tools.

Prep ation Work

Commonly used tools

The factual tool shape may be different with the diagram showing

Tool	Diagram	Instruction
Power tool		Install and remove bolts and nuts

Basic check

Working process

1 Collect customer information

Before check carefully ask customer concerns or driving vehicles together with the customer which is very important to solve the problem.

2 Basic check

① key is on the shift of “LOCK”.

② Check all the tire pressure and adjust it to the specified value. Please see the “wheel - maintenance data and specification”.

③ Check the tread. Please see the “wheel - regular maintenance”.

④ Check wheel.Please see the “wheel - regular maintenance”.

If there is any fault or cannot continue to use the spare parts, please repair or replace.

3 Road test check

① Start vehicle.

② Driving vehicles for 10 minutes with more than 40 km/h speed, then stop.

4 Confirm the symptoms disappear

If symptoms disappear, that is, complete maintenance. If did not disappear, need to do basic check and road test again.

Troubleshooting

Troubleshooting for noise,vibration and unsmooth(NVH)

NVH troubleshooting diagram

Using the table below helps to find the causes of symptoms. If necessary, repair or replace these parts.

Referring content			Wheel diagram -explosion	Wheel-test	Wheel-wheel balance check	Wheel- tire pressure	Wheel-tread check	-	-	Wheel maintenance and specificaion	Front axle-driving shaft assembly	Reducer NVH	Front axle and rear suspension NVH	Rear axle and front suspension NVH	-	Braking system NVH	Steering system NVH
Possible reason and parts			Improper install, loose	Not round	Not balance	Tire pressure abnormal	Abnormal wearing.	Deformation ofr wearing	inconsistency	Wrong tire data	Driving shaft	Reducer	Front axle and front suspension	Rear axle and rear suspension	Tire	Wheel	brake	Steering assembly
symptom	Tire	Noise	√	√	√	√	√	√	√		√	√	√	√		√	√	√
		Shaking	√	√	√	√	√	√	√	√	√		√	√		√	√	√
		Jumping	√	√	√	√	√	√	√	√			√	√		√	√	√
		Uncomfortable or difficult to operate	√	√	√	√	√	√		√			√		√	√		
	Wheel	Noise	√	√	√			√			√	√	√	√	√		√	√
		Shaking	√	√	√			√			√		√	√	√		√	√
		Jumping	√	√	√			√					√	√	√		√	√
		Uncomfortable or difficult to operate	√	√	√			√					√	√	√			

√：fittable

Regular maintenance

Wheel assembly

Check

Check the wheel whether there is bending, damage, crack, abnormal wearing and tearing or other damage. If yes, please replace.

Wheel assembly balance adjustment

Remove

1 Remove wheel assembly needed to be adjusted.

2 Remove the old balance blocks on both sides of the wheels, and clear the foreign body on the tire tread pattern.

Tips:

- **If it is the new tires ,should remove tape on the tires .**

Caution:

- **When remove , avoid to scratch the wheel.**

Wheel assembly balance adjustment

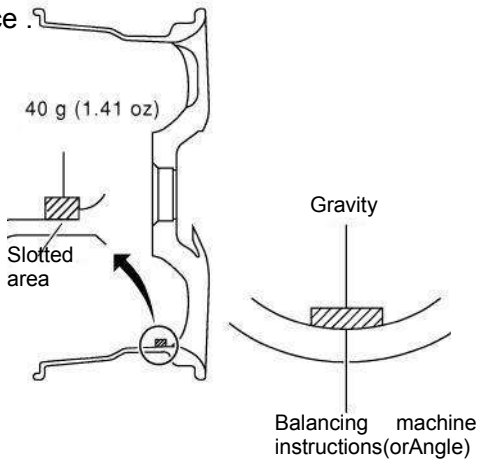
1 Equip wheel assembly in the wheel balance machine through the central hole, then starting wheel balance machine.

2 When the wheel balancing machine shown on the display unbalance value on either side of the inside and outside, to the lateral unbalanced value multiplied by 5/3 that is the need to use the balance of block theoretical quality.Then choose the closest balance blocks installed on the specified location.

Caution:

- Before installing the balance block, please clean the mating surface .

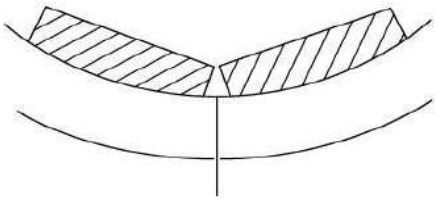
a. When equipping the wheel balance block on the wheel, as shown in the picture on the right, should be put in the slotted area with inner wall of the wheel, make the center of the balance location of the quasi wheel balancing machine instructions (or Angle).



Caution:

- Balance block cannot repeatedly be used
- it shall be installed not more than three balance blocks in a single wheel lateral.
- Always use original balance block.

b. If the calculated balance blocks quantity is more than 50 g, install two pieces balance block on a straight line.



Balancing machine instructions
(or Angle)

Caution:

- It is forbidden to put balance block on another piece of balance block.

3 Restart wheel balance machine.

4 According to the position of the wheel balancing machine instructions (or Angle), hit balance block into the inner side of the wheel.

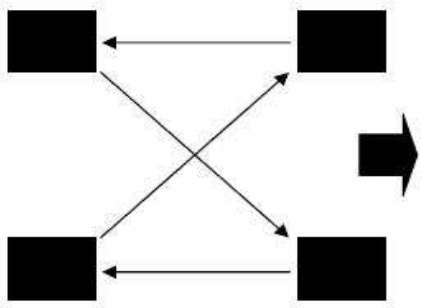
Caution:

- Shall install the lateral balance blocks, and then install the inside of the balance block.
- The balance block installed in a single wheel inside shall be no more than two pieces.

5 Start balancing machine. Confirm the rest of the inside and outside the imbalance value is ≤5g. If either side of the residual unbalance value is more than 5 g, please re-install the balance block.

Wheel assembly transposition

The recommended transposition wheel assembly as shown in figure. Arrows point to the vehicle direction.

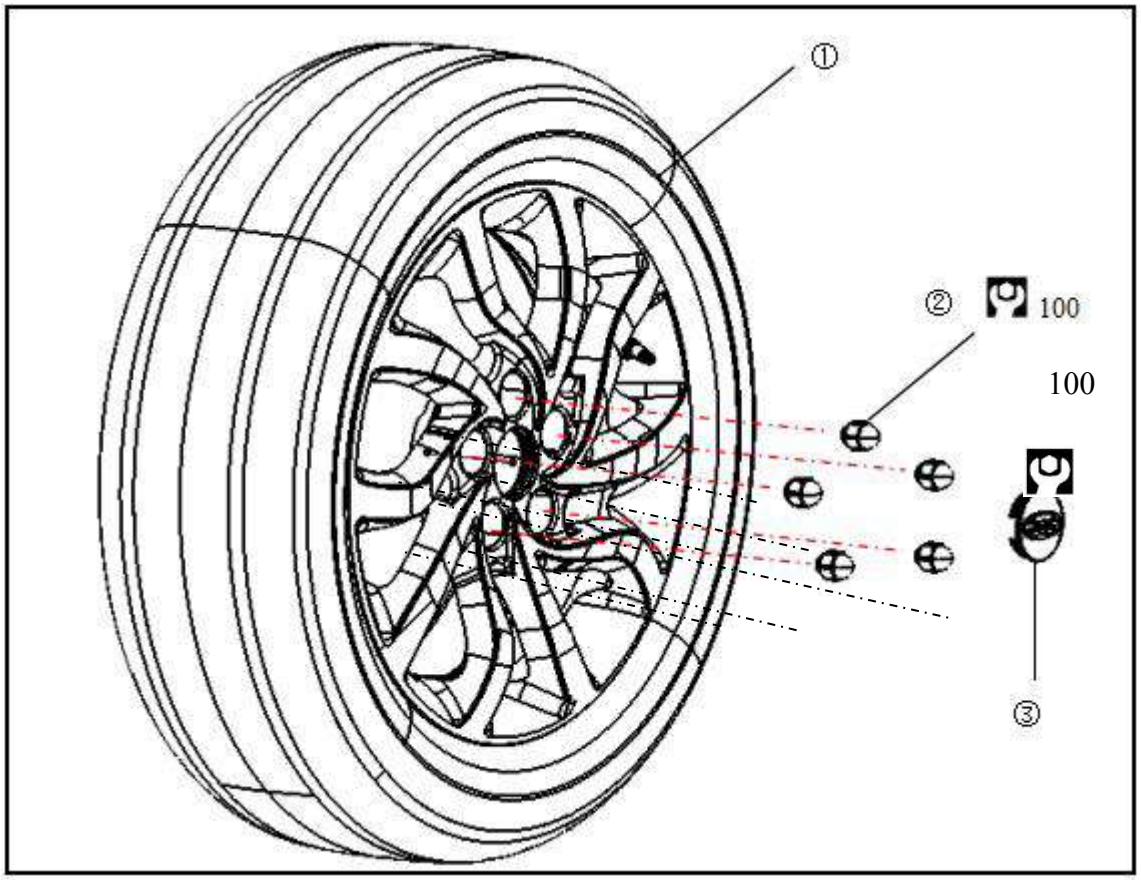


Caution:

- Please transposition according to the regulation of the vehicle warranty maintenance manual .
- When install the wheel assembly, please tighten tire nut according to the regulated torque , prohibiting more than standard torque requirements. When tighten tyre nut, should be 2 to 3 times diagonal tightening in case of wheel deformation.
- Please use DR original tire nut.

Remove and install

Explosion diagram

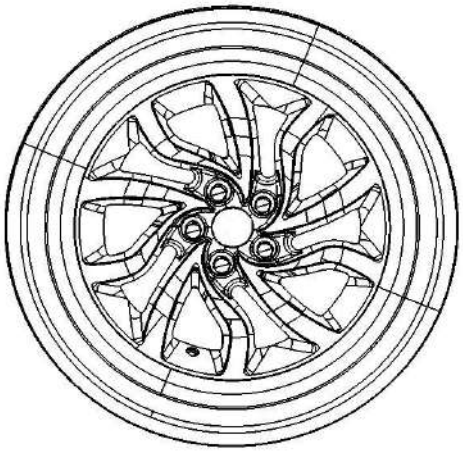


1 wheel assembly　　2 nut of tyre　　3 decorative cover assembly

: N·m

Remove and install

Remove



1 Remove tire nut.

- Tightening torque：90～110N·m

2 Remove wheel assembly

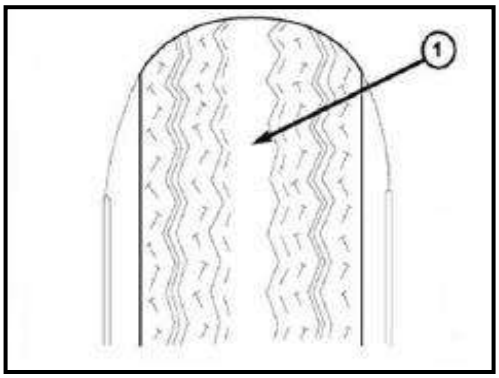
Check after remove

1 Tire pressure check

Check tire pressure. If it is not in the standard range ,please adjust it.

- **Standard value：220±10kPa**

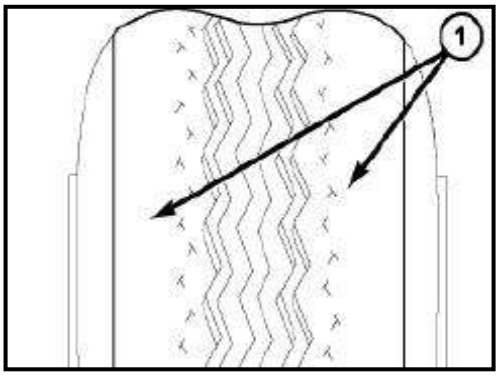
Caution:



- Check the tire pressure with good performance of the tire pressure gauge .
- Tire pressure should check once a month under the cold condition, cold condition refers to the vehicle parking at least 3 hours or 3 hours after the mileage traveled is less than 1.6 km.
- When the environmental temperature changes often, should often check the tire pressure.
- Inaccurate tire pressure may be resulted in:

Insufficient tire pressure may resulted in tire shoulder wearing, tire deflection, rolling resistance increase quickly.

b Air pressure is too high may result in central tire crown rapid wearing and tearing, and reduce the size of tire buffering capacity.



2 The tire surface inspection

① Check whether there is a foreign body in the tire tread pattern. If yes, please clean it.

② check the height of tire tread

Caution:

- When the tire tread depth used to limit or less, tire tread pattern will show wearing marks.When wearing mark appear three places, please replace the tires.

3 replace tire

① Tire should be replaced after vehicles moving after 50000 km.

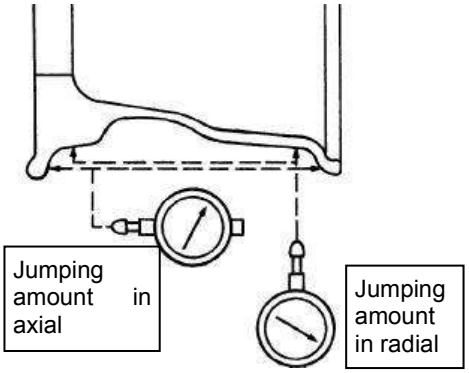
② If appear any of the following one, also need to replace:

- The tire show curtain or curtain line
- Tire bulge, uplift, or layered.
- Tires were pricked, cut, or other damage, beyond repair.

Caution:

- In new tire period should avoid nasty acceleration, sharp turn or nasty brake, avoid to use in the bad road conditions, prevent new tires damaged too early.
- Tyre specification 205/55 R16 94V
- Please do tire assembly balance adjustment after change tire .

4 Wheel check

• Check whether there is cracks or other damage in the wheel. If yes, please replace. • Check whether the wheel has deformation. If yes, please measure the jumping amount. Remove the tire and install wheel in the wheel balance machine. As shown in figure set the dial gauge, measuring wheel hop. If more than standard, please replace.	

Install

Install in the opposite order of remove

Maintenance data and specification

Item			parameter
Wheel jumping amount	Radial	Steel wheels (e.g., equipment)	≤1.0mm
		Aluminum wheels	≤0.3mm
	axial	Steel wheels (e.g., equipment)	≤1.0mm
		Aluminum wheels	≤0.3mm
Tire pressure(cold condition)			
Tire specification			

Braking system

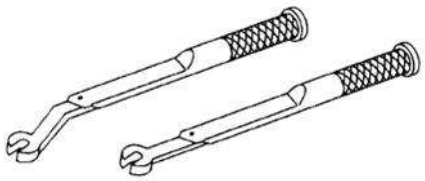
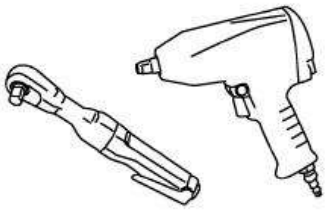
Cautions for braking system maintenance

- When find force on the brake pedal heavier or lighter, please check or adjust the braking system.
- When key in the "ON" block and vacuum pump is working, the brake pedal stroke may feel very heavy or very short, this is normal phenomenon. If braking system fault warning lights keep light in driving, please check the related parts.
- when the brake system power supply failure occurs , brake system without vacuum booster, brake force will be entirely depends on the force on the brake pedal. Combination instrument of brake system failure warning lights lit at this time.
- Please put keys in "LOCK" and ABS connectors unplug before maintenance, or disconnect the 12 v battery cathode .
- Because the dust on the front and rear brake has an effect to human body, please use clear dust collector before maintenance, blow out air gun is strictly prohibited.
- When disassembling and installing brake line , please use oil pipe wrench.
- Don't make brake fluid splash on paint surface to avoid damage the paint. If splashed on paint surface, please immediately wash with water.
- clean the brake parts with water.
- Please use the new brake fluid cleaning brake pliers or other brake system components.
- It is prohibited to use gasoline or kerosene and other mineral oil, to avoid damage to the braking system and brake control system components.
- Banning the use of liquid containing petroleum base and oil base fluid container.
- Repeated use of discharged brake fluid is prohibited.
- Check no brake fluid leakage after replacing parts.
- After repairing or replacement brake drum (dish), brake shoe, or brake soft during driving very short, be sure to running-in brake joint surface.
- Vacuum pump of flooding is prohibited.

Preparation work

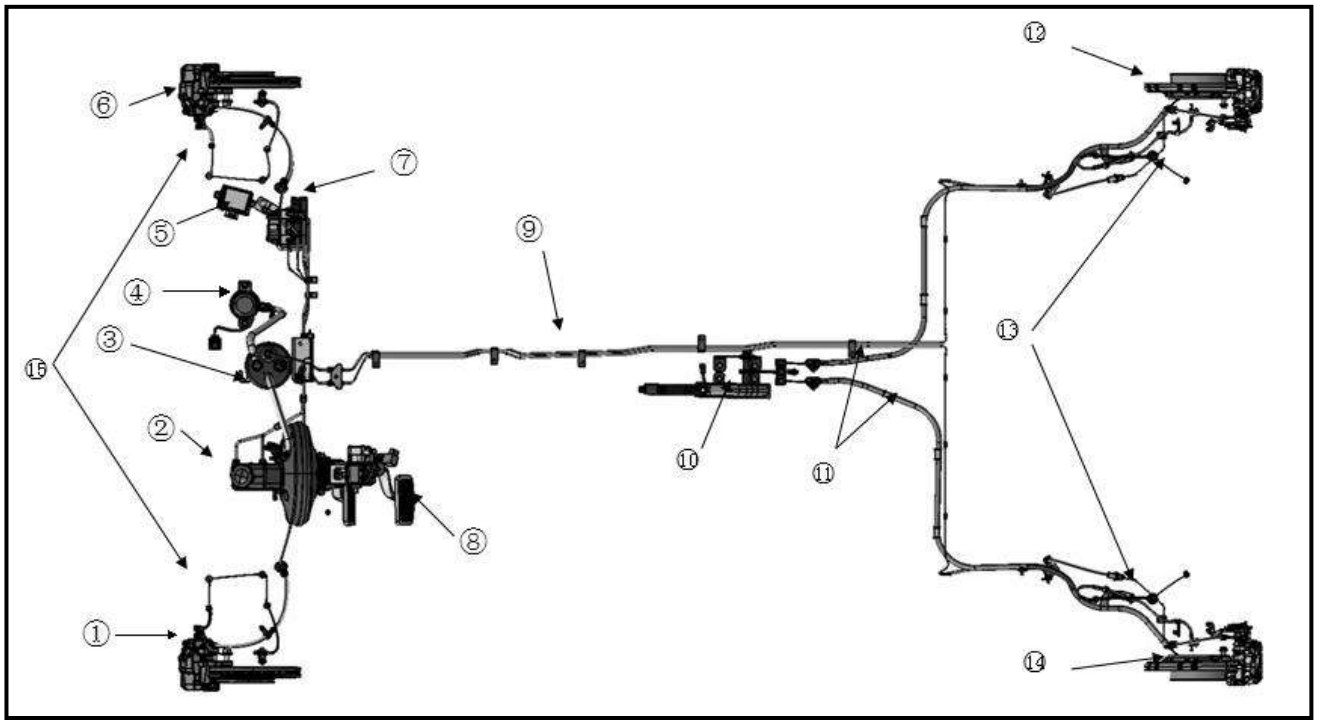
Special maintenance tools should be used for disassembly if necessary.

Commonly used tools

Tool	Diagram	Instruction
Pipe wrench		Remove and install braking lines
Power tool		Install and remove bolts and nuts

System description

Component parts



1 left front braker assembly

2 vacuum booster with brake master pump assembly

3 Vacuum tank assembly

4 Vacuum pump

5 vacuum pump controller assembly

6 right front brake caliper assembly

7 ABS controller assembly

8 Brake pedal assembly

9 brake line

10 parking brake handle assembly

11 left and right parking drawing assembly

12 right rear parking brake assembly

13 ABS wheel-speed sensor for the rear wheel assembly

14 left rear brake assembly

15 ABS wheel-speed sensor assembly for front wheel

Parts description

No	Parts	Function
1、6	Left and right front braker assembly	Response of the hydraulic braking force
2	Vacuum booster with brake master pump assembly	Transmit pedal force and provide power, establish hydraulic braking, detect brake liquid level and output the combination instrument signal. Warning lights lit on the meter, when the liquid level is too low warning light is on. 
3	Vacuum tank assembly	Store vacuum, Detect and output vacuum degree signal to the vacuum pump controller assembly
4	Vacuum pump	Controlled by the vacuum pump controller assembly, vacuum
5	Vacuum pump controller assembly	Receive vacuum degree signal,control vacuum pump opening and closing
7	ABS controller assembly	Receives the brake lamp switch, wheel speed sensor signal through hard line. Output the following signals to VCU through the CAN communication: ABS working status, speed, four rounds of speed.
8	Brake pedal assembly	Actuation vacuum booster and provide mechanical power, detection of the pedal stroke and output brake signal to VCU.
9	Brake line	Pass the brake fluid and hydraulic pressure
10	Parking brake handle assembly	Locking or loosen parking drawing
11	Left and right parking drawing assembly	Passing parking handle force and stroke
12、14	Left and right rear parking brake assembly	Response the braking force provided by the hydraulic and parking drawing
13、15	ABS wheel-speed sensor for front and the rear wheel assembly	Detect wheel rotating speed and transmit wheel speed signal to the ABS controller assembly

Basic check

Diagnosis and maintenance process

Fault diagnosis process details

1 Collect customer information

Before check, carefully ask customer concerns or driving vehicles together with the customer which is very important for solving the problem.

2 Check symptom

According to the infroamtion collected through interviewing with the customer ,reappear information of customer specified symptoms. Check whether the symptoms caused by the failure mode.

Caution:

When symptoms are caused by normal operation, please fully inspect each related parts and let customers understand the symptoms are normal.

3 Repair or replace defective parts

① Repair or replace defective parts

② re-assembly and connect after repairing or replace defective parts

4 Confirm the symptoms disappear

If symptoms disappear, meaning complete the maintenance. If not, then return to step 3.

Diagnostic work list

In general, customers have their own judgment standard to a problem. Therefore, careful enough to ask to understand customer's concern is very important. Preparing interview list make diagnostic information systematic. Some times, many conditions occur at the same time resulting in failure.

Interview list sample

<table>
<tr><td colspan="8">Interview list</td></tr>
<tr><td colspan="2" rowspan="2">Customer name</td><td rowspan="2">Gender</td><td>Plate No</td><td></td><td>Original registered date</td><td colspan="2"></td></tr>
<tr><td>Model</td><td></td><td>VIN</td><td colspan="2"></td></tr>
<tr><td colspan="2">Production date</td><td></td><td>Motor power</td><td></td><td>Mileage</td><td colspan="2">km</td></tr>
<tr><td colspan="3" rowspan="4">Symptom</td><td colspan="5">□no（ ）function</td></tr>
<tr><td colspan="5">□（ ）Warning light on</td></tr>
<tr><td colspan="5">□noise □vibration</td></tr>
<tr><td colspan="5">□others（ ）</td></tr>
<tr><td colspan="3">Firstly appear</td><td colspan="5">□recently □other（ ）</td></tr>
<tr><td colspan="3">Appearing frequency</td><td colspan="5">□always □regular □sometimes（ times/day）</td></tr>
<tr><td rowspan="4">Climate condition</td><td colspan="2"></td><td colspan="5">□no relation</td></tr>
<tr><td colspan="2">weather</td><td colspan="5">□sunny □cloudy □rainy □snow □others（ ）</td></tr>
<tr><td colspan="2">temperature</td><td colspan="5">□hot</td></tr>
<tr><td colspan="2">comparative humid</td><td colspan="5">□high □normal □low</td></tr>
<tr><td colspan="3">Road conditions</td><td colspan="5">□city road □suburb □highway □Mountain road □non-paving road</td></tr>
<tr><td colspan="3">Operation conditions etc</td><td colspan="5">□no relation
□Drive motor startup □Unload □Driving □Speedup
□ drive with same speed □decrease speed □turning □steering wheel turning</td></tr>
<tr><td colspan="3">Other conditions</td><td colspan="5"></td></tr>
<tr><td colspan="3">Remark</td><td colspan="5"></td></tr>
</table>

Troubleshooting

Abnormal brake pedal feeling

Fault description

When press brake pedal, appear abnormal pedal feeling(such as soft or hard, etc.)

Diagnosis procedure

1 Check front and rear axle

In accordance with the "maintenance - axis and suspension", check whether the front axle loose seriously. If yes, repair or replace defective parts. If not, enter the next step.

2 Check the brake disc jumping and brake drum jumping

In accordance with the "maintenance - brake disc, brake drum" check brake disc jumping and brake drum jumping. If it is normal, enter the next step. If not, repair or replacement.

3 Check braking fluid leakage

In accordance with the "maintenance - brake fluid" check whether the brake fluid is leaking. If it is normal, enter the next step. If not, repair or replace defective parts.

4 Check the brake pedal

In accordance with the "maintenance - brake pedal" check the brake pedal. If it is normal,enter the next step. If not, adjust the pedal.

5 Check braking force

Check the brake force. If it is normal,enter the next step. If not, check each component of brake system.

6 Check brake performance

Disconnect connectors of ABS, vacuum pump, and press on the brake pedal more than five times continuously, make the ABS, vacuum booster, brake energy recovery system not work. Check whether the vehicle braking performance is normal.Restore connectors after check.

Long braking distance

Failure description

Braking distance is long when ABS is activated.

Diagnosis procedure

Tips：

- On unstable road, such as the non-paving road, sand road, snow road, etc., the braking distance of the ABS activation can be longer than without ABS, which is the normal phenomenon.

1 Check 12V battery

When key in the "LOCK" block, check whether the battery cable is normal connected, and measure whether the battery voltage in the range of 12 ~ 12.7 V. If it is normal, enter the next step. If not, repair or replace defective parts.

2 Check vacuum booster

Check vacuum booster. If it is normal, enter into next step.if not, check each part of braking system, repair or replace defective parts.

3 Check braking force

Check braking force. If it is normal, enter the next step. If not, check each part of braking system, repair or replace defective parts.

4 Check braking performance

Disconnect connectors of ABS, vacuum pump, and press on the brake pedal more than five times continuously, make the ABS, vacuum booster, brake energy recovery system not work. Check whether the vehicle braking performance is normal.Restore connectors after check.

Vacuum pump not work

Failure description

Vacuum doesn’t work and failure warning light of braking system on combination instrument is always on.

Diagnosis procedure

Tips：

●Vacuum pump doesn’t work without enough vacuum degree, which is normal phenomenon.

1 Check 12V battery

When key in the "LOCK" block, check whether the battery cable is normal connected, and measure whether the battery voltage in the range of 12 ~ 12.7 V. If it is normal, enter the next step. If not, repair or replace defective parts.

2 Check vacuum booster system

Put Key on “ON”block,press braking pedal 5 times continuously and check carefully whether the vacuum pump work . If it doesn’t work, enter the next step. If work, finish the check.

3 Check vacuum tank assembly

Disconnect vacuum tank assembly pressure switch connector, pressure switch end connectors is measured with a multimeter if two terminals are conducted. If conduct,means that pressure switch is failure, replace the vacuum tank assembly, and the according to the step 2 recheck vacuum booster system. If not, connect the vacuum tank connector to the next step.

4 Check vacuum pump

Disconnect the vacuum pump connector, connect with the positive (red) wire of vacuum pump connector and battery anode with line, connect anode (black line) and battery cathode socket. If the vacuum pump does not work, replace the vacuum pump, vacuum booster reexamination and according to the step 2. If the vacuum pump work, connect the vacuum pump connector, then to the next step.

5 Check vacuum pump controller

Replace the vacuum pump controller. According to the step 2 review vacuum booster, if vacuum pump work, finish diagnosis. If the vacuum pump does not work, check the vacuum pump repair insurance and associated wiring harness, see “the electric system- grounding and circuits ”.

Vacuum pump continuous working

Failure description

When don't step on the brake pedal, the vacuum pump work continuously, could continue to hear the sound of the vacuum pump work, vacuum pump surface temperature is higher.

Diagnosis procedure

1 Check 12V batter

When key in the "LOCK" block, check whether the battery cable is normal connected, and measure whether the battery voltage in the range of 12 ~ 12.7 V. If it is normal, enter the next step. If not, repair or replace defective parts.

2 Check vacuum booster system

Put key on “ON” block, press braking pedal,check whether there is boost for braking. If yes, enter next step. If not,enter to the forth step.

3 Check vacuum tank assembly

Disconnect vacuum tank assembly pressure switch connector, pressure switch end connectors is measured with a multimeter if two terminals are conducted. If conduct,means that pressure switch is failure, replace the vacuum tank assembly, and the according to the step 2 recheck vacuum booster system. If not, connect the vacuum tank connector to the next step.

4 Check vacuum pump

Replace vacuum pump and wait for 15 s. If vacuum pump stop work, which means fault has been out and recheck vacuum booster system according to step 2. If continue to work, go to next step.

5 Check vacuum pump controller

Replace vacuum pump controller and waiting for 15s. If vacuum pump stop work, which means the failure is out and recheck vacuum booster system according to step 2,finish diagnosis.If continue to work, check vacuum booster、related harness and pipe.

Vacuum pump work frequently

Failure description

When don't step on the brake pedal, vacuum pump work frequently and automatically.

Diagnosis procedure

Tips：

- **Frequent press on the brake pedal, the vacuum pump will work frequently, which is the normal phenomenon.**

1 Check vacuum booster system

Put the key on "ON" block, quick and continuous press the braking pedal 5 times,waiting for 10 minutes after vacuum pump stopping work. If vacuum automatically start work, means vacuum tank assembly、vacuum hose、vacuum booster etc has air leakage.

2 Check related parts

Check the vacuum hose coupling, pipe clamp, if not well installed, please re-install.

Check whether there is hose connection wall crack, if yes, please replace the vacuum hose.

Replace the vacuum tank assembly and the re-inspection vacuum booster system, if the fault has been ruled out, finish the diagnosis. If the fault has yet to rule out, replace the vacuum booster and re-inspection vacuum booster system.

Tips:

- **vacuum hose has a multilayer structure to ensure the tightness and durability, surface minor cracks will not affect the use.**

Normal working status

Description

Phenomenon	Conclusion
Braking pedal may moved down when braking	This phenomenon may mean vacuum pump work normally,not failure.
When the key in the "LOCK" and step on the brake pedal, brake pedal stroke may shorten, pedal feel may harden.	This phenomenon may be vacuum degree in the vacuum tank reduce, vacuum booster effect is abate, not failure.
When the key on "ON" block, front cabin have noise, the noise suddenly disappeared over a period of time.	This phenomenon may be the automatic stop after vacuum pump to start the work after a period of time , not failure.
Step on the brake pedal in the process of vehicle driving, pedal violent vibration with cabin noise.	This phenomenon may be ABS in regulating hydraulic braking, not failure.

Other common troubleshooting table for braking system

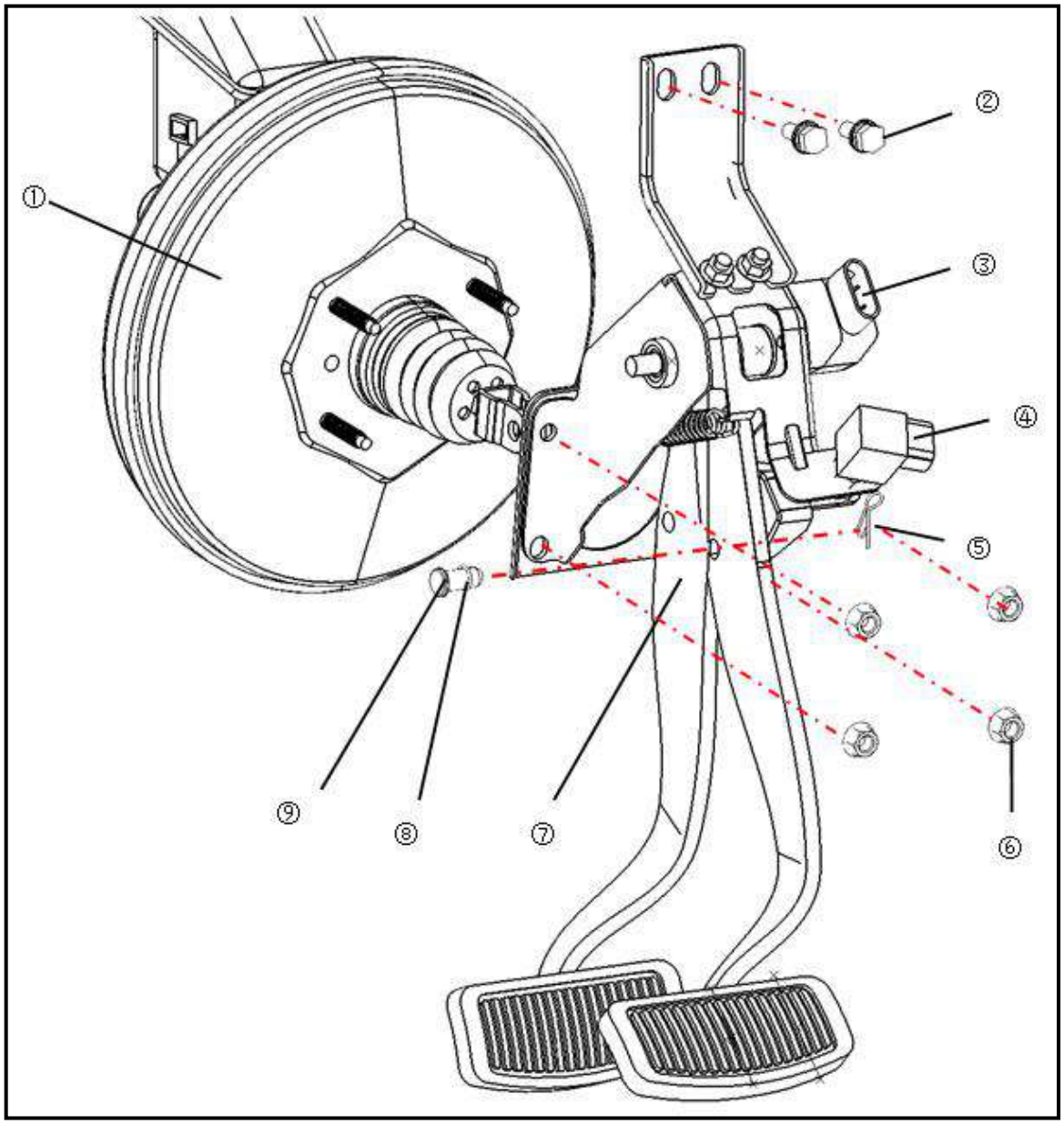
Failure	Possible reason	Solution
When braking, vehicles run partial to one side	Left and right ire pressure is insufficient	Adjust tire pressure
	Wheel alignment is not correct	Wheel alignment
	Poor contact for friction plate	Adjust friction plate
	Friction surface with grease or oil	Replace friction plate
	Brake sub-pump assembly is not correct	Re-assemble
Not enough braking force	Few brake fluid or with pollution	Supplement or replace
	Air in braking system	Exhaust
	Vacuum booster with failure	Replace vacuum booster
	Poor contact for friction plate	Adjust friction plate
	Friction surface with grease or oil	Replace friction plate
	The friction drag lag cause brake rotating parts overheating.	Repair or replace
	Braking fluid leakage	Repair or replace
Pedal stroke increases	Air in braking system	Exhaust
	Braking fluid leakage	Repair or replace
	Clearance from vacuum booster push rod to brake master cylinder is too large	Repair or replace
Exit brake lag	Parking brake is not completely loose	loose
	Parking brake improper adjustment	loose
	Brake master cylinder oil return port congestion	Clean after disassembly
	Return spring of rear brake damaged	Replace
	Insufficient lubrication for sliding parts	lubricate
	Return spring of brake master cylinder valve or piston damaged.	Replace brake master pump
	Clearance between vacuum booster pus hrod and brake master cylinder is too small	Repair or replace
Insufficient parking brake force	Rear brake shoe damaged	Repair or replace
	Rear brake shoe with grease or oil	Replace rear brake
	Parking brake drawing stuck	Repair or replace
	Parking lever stroke is too large	Adjust parking lever
Vacuum pump not work	Vacuum pump damaged	Replace vacuum pump
	Vacuum pump controller damaged	Replace vacuum pump controller
	Vacuum tank pressure switch short-circuit or damaged	Replace vacuum tank assembly
	Vacuum pump fuse damaged	Replace insurance
	Related harness、connector short-circuit or break	Repair or replace

Vacuum continuous work	Vacuum pump controller damaged	Replace vacuum pump controller
	Vacuum tank assembly pressure switch damaged	Replace vacuum tank assembly
	Vacuum tank assembly leakage	Replace vacuum tank assembly
	Vacuum hose air leakage	Repair or replace
	Vacuum pump damaged	Replace vacuum pump
	Vacuum tank pressure switch harness break	Repair or replace

Remove and installation

Brake pedal

Explosion diagram



1 vacuum booster	2 bolts	3 Angle sensor
4 brake lamp switch	5 rivets	6 hex flange surface nut
7 Brake pedal assembly	8 ring	9 main pump pin

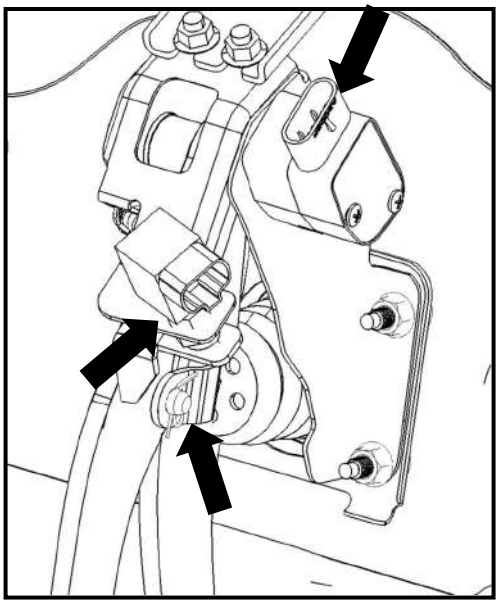
Remove and install

Remove

1 Remove the lower part of the dashboard. Please see the "Body systems - interior dashboard".

2 Disconnect the brake lamp switch and angle sensor connector.

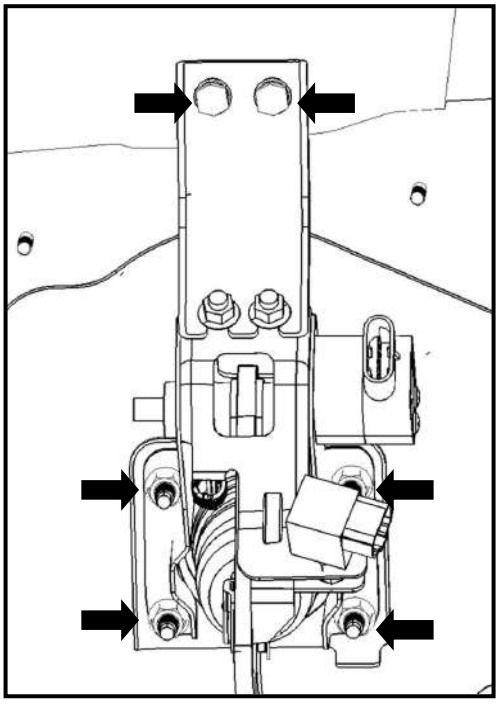
3 Remove the main pin shaft, which is connected with the vacuum booster,Disconnect the connection with vacuum booster.



4 Remove the fixing bolt of brake pedal and body, and fixing nut with the vacuum booster.

- Tightening torque：20-25N·m

5 Take out the brake pedal assembly



Check after remove

Brake pedal

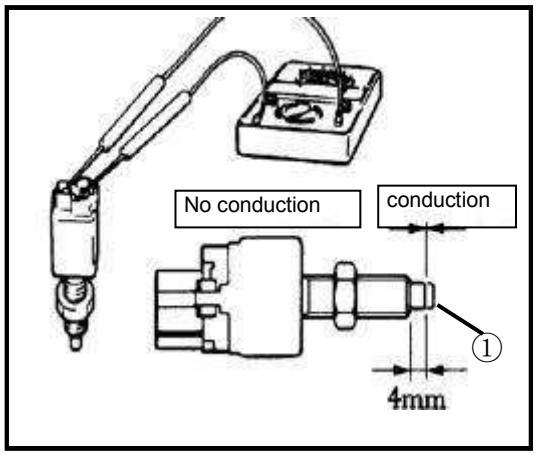
- Check whether the main pump pin shaft hole has wearing deformation.
- Check whether brake pedal has cracks, deformation or other damage.

Main pump pin shaft

- Check whether the main pump pin is damaged or deformed, if yes, please replace.

Brake lamp switch

- Multimeter is used to inspect 2 terminals of the brake lamp switch ,when press and release the sliding column ①of brake lamp whether it is conduction. As shown in figure, when press sliding column > 4 mm, not conduction between terminals, and conduction once loose, which explain the brake lamp switch work normally. Otherwise, the brake lamp switch failure, please replace the brake lamp switch.



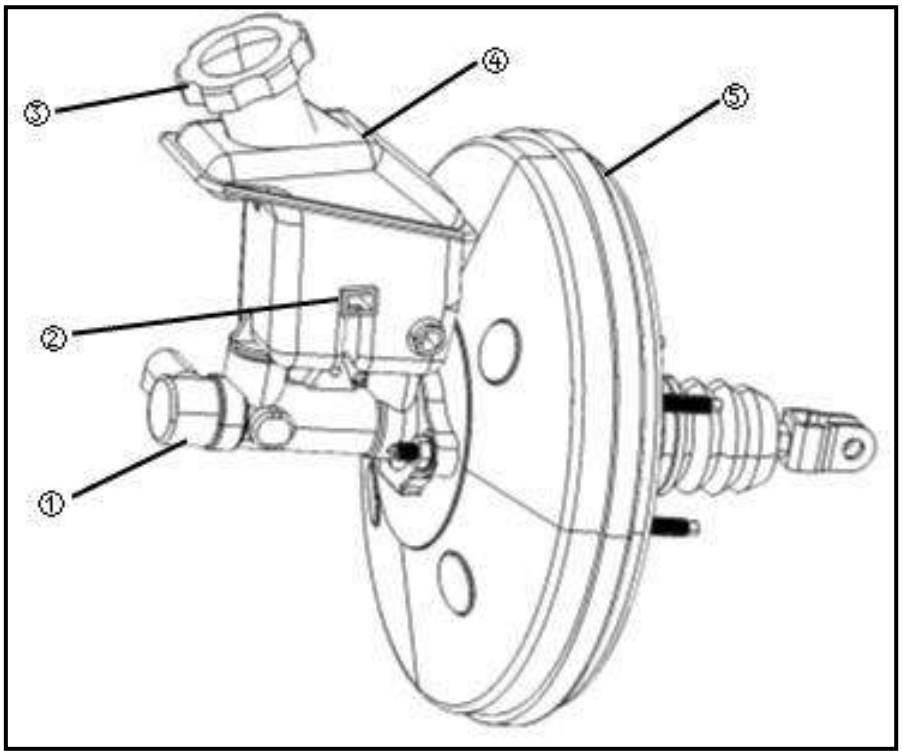
Install

Install in the opposite order of remove

Caution:

- Check whether the brake pedal operation is smooth.
- Shall check and adjust the brake pedal free stroke after installation
- Check the clearance between the brake pedal and the brake lamp switch .

Vacuum booster with brake master pump assembly



1 Brake master pump | 2 Brake liquid level switch | 3 storage tank cover

4 storage tank | 5 vacuum booster

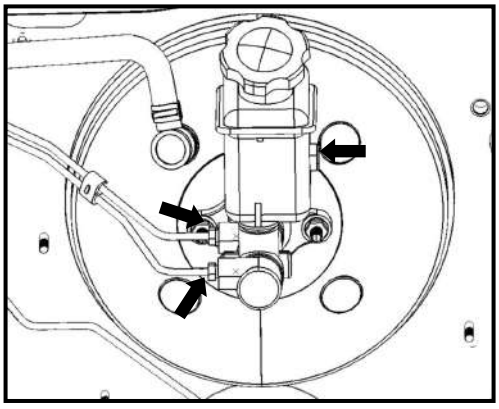
Remove and install

Caution:

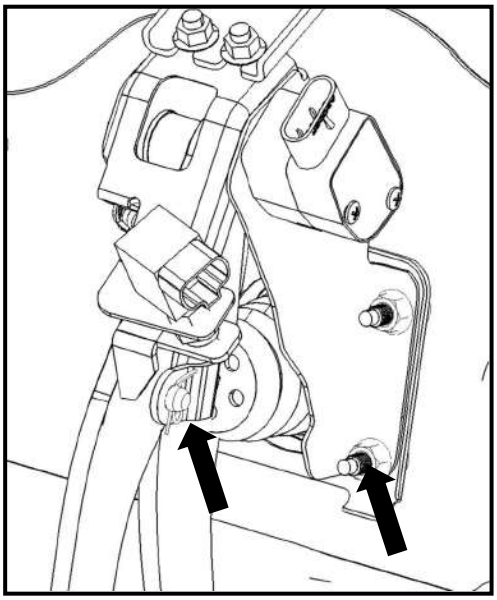
- Don't let the brake fluid splashed on paint surface, otherwise it will damage the paint. If splashed on paint surface, please immediately wash with water.

Remove

1) Discharge the brake fluid. Please see the "maintenance - brakefluid.
2) Remove the connectors connected with the brake fluid level switch.
3) Remove the braking hard tube pump with pipe wrench.



1. Remove the main pump pin shaft, which is connected with the brake pedal assembly, remove the main pump pin shaft, collar, rivets.
2. Remove the fixing nut of brake pedal and vacuum booster, take offthe vacuum booster with brake master pump assembly.



Install

Install in the opposite order of remove. Fill braking fluid and exhaust. Please see “maintenance-brake fluid”

Caution:

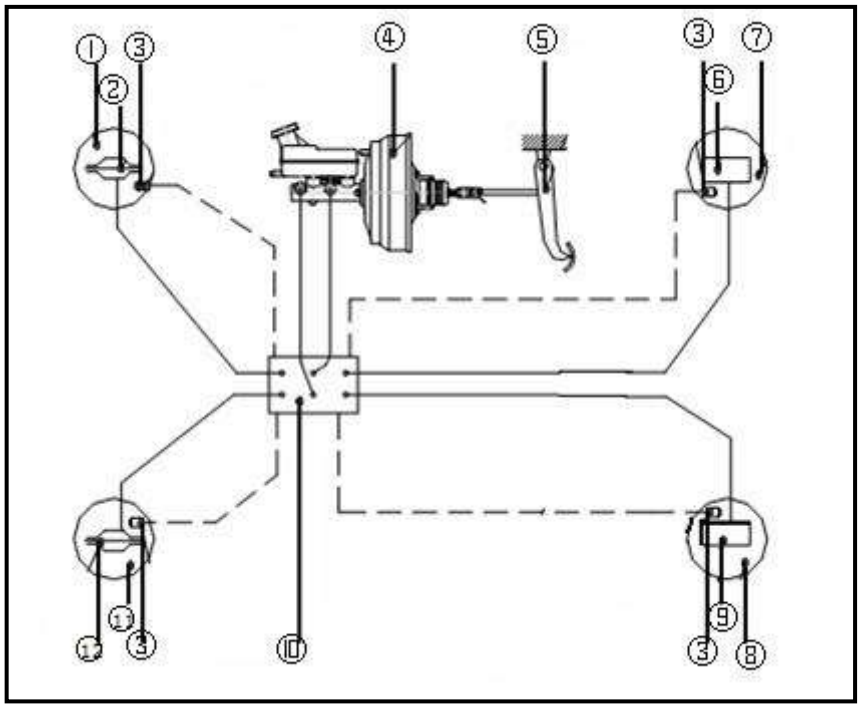
- Please refill brake fluid “DOT4”
- Repeated use of emitted brake fluid is prohibited.
- When install the pump pin, shall be coated with grease: SAE J310 or similar products.

Check after install

Check whether there is leakage on master pump mounting surface, liquid storage tank installation surface and brake pipe joint . If yes, repair or replacement.

Brake pipe

Hydraulic pipe



1 Right front wheel	2 right front sub-pump	3 wheel speed sensor
4 vacuum booster with brake master pump assembly	5 Brake pedal	6 Right rear sub pump
7 Right rear wheel	8 left rear whee	9 left rear sub pump
10 ABS module ABS	11 left front wheel	12 left front sub pump

Caution:

- All brake hose and brake pipe cannot be excessive bending, distortion and stretch.
- Confirm there is no interference for pipe with other parts when turning.
- Braking pipeline is an important safety components, if discover the brake fluid leak, must tighten. If found damaged parts, please replace.
- When broken brake pipe, please seal well open end to avoid let foreign body in .
- Be careful not let brake fluid splash on paint surface to avoid damage paint. If splashed paint on surface, please immediately wash with water.
- Please refill brake fluid “DOT4”
- Repeated use of emitted brake fluid is prohibited

Master cylinder flow-line assembly

1 Remove

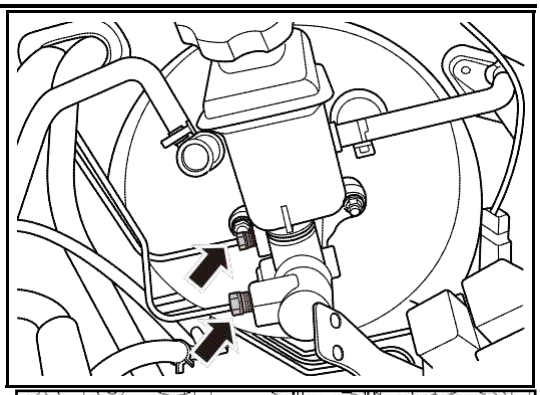
① Open the engine cover

② Exhaust braking fluid , please see “maintenance-braking fluid”

③ Remove master cylinder flow-line assembly

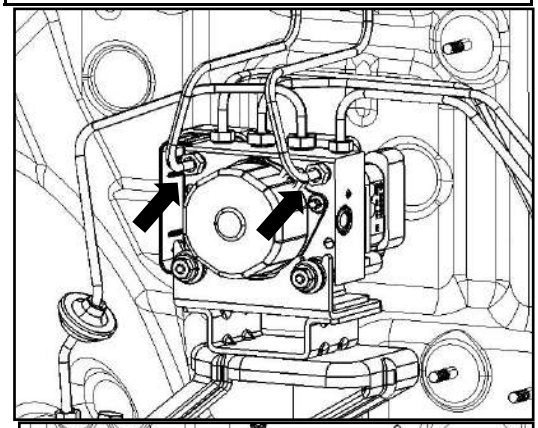
1) Remove the tubing nut, release the connections between master cylinder tubing assembly and brake master cylinder.

- Tightening torque: 16～18N·m

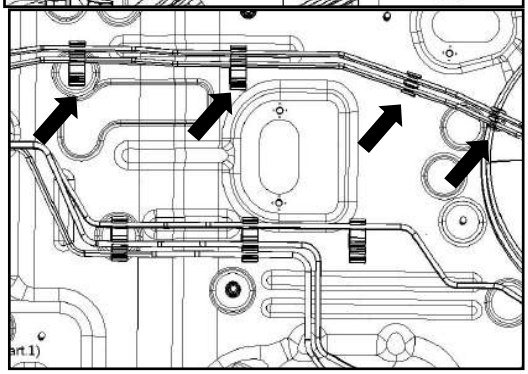


2) Remove the tubing nut, release the connection of master cylinder tubing assembly and ABS/ESP controller.

- Tightening torque: 16～18N·m



3) Release two pipe clamps and two front tube clamps of fixed master cylinder of flow-line assembly.



2 Install

Install in the opposite order of remove

Front braking pipe assembly

1 Remove

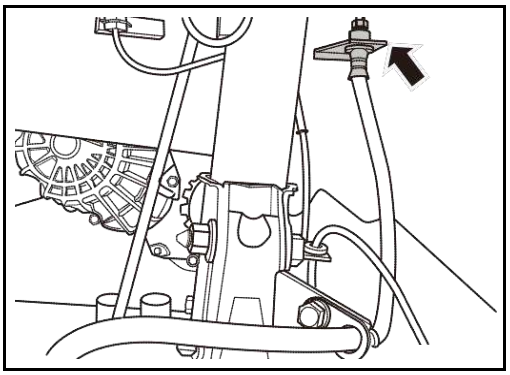
① Open the engine cover

② Exhaust braking fluid , please see “maintenance-braking fluid”

③ Remove left front braking hose assembly

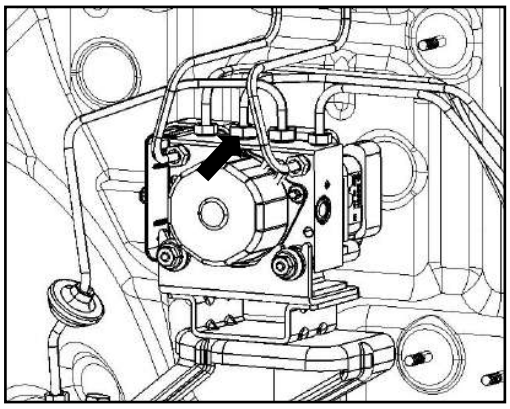
1) Remove the connecting nut and clip of left front braking oil hose and left front braking hose, take off the connection of left front braking oil hose and left front braking hose

- Tightening torque: 16～18N·m



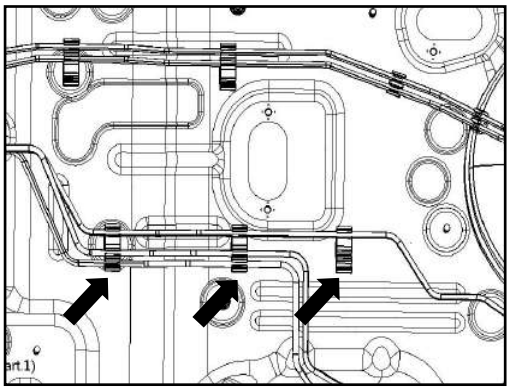
2) Remove the connecting nut of left front braking oil hose and ABS/ESP controller, remove the connection of left front braking oil hose and ABS/ESP controller.

- Tightening torque: 16～18N·m



2) Remove the three pipe clips for fixing left front braking oil pipe assembly.

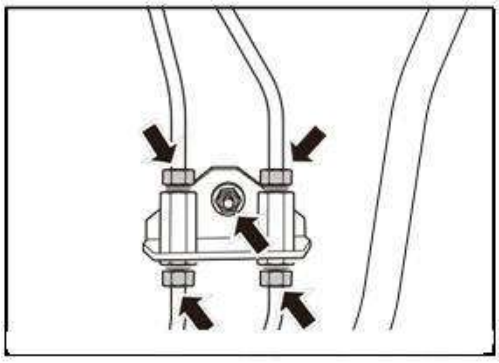
3) Remove left front braking oil pipe assembly



④ Remove left rear connecting braking pipe assembly, right rear connecting braking pipe assembly.

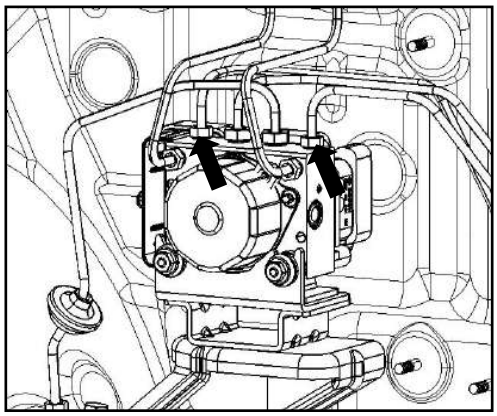
1) Remove one oil fuse nut and clipper of which connecting with left /right connecting braing pipe

- Tightening torque: 16～18N·m

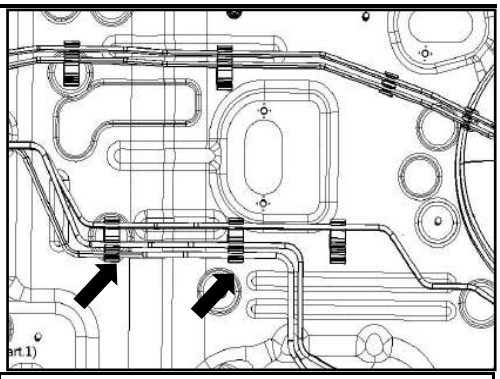


2) Remove the connecting nut of left/right rear braking pipe Assembly and oil hose of ABS controller, remove the connection of left/right rear braking pipe assembly and oil hose of ABS controller

- Tightening torque: 16～18N·m



3) Take off 2 front pipe clipper for fixing left/right rear braking pipe assembly
4) Take off left rear braking pipe assembly and right rear braking pipe assembly

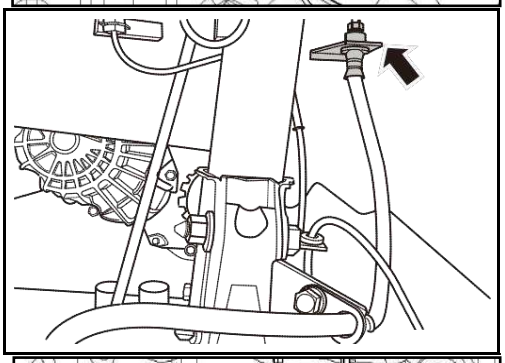


2 Install

① Install left front braking oil pipe assembly.

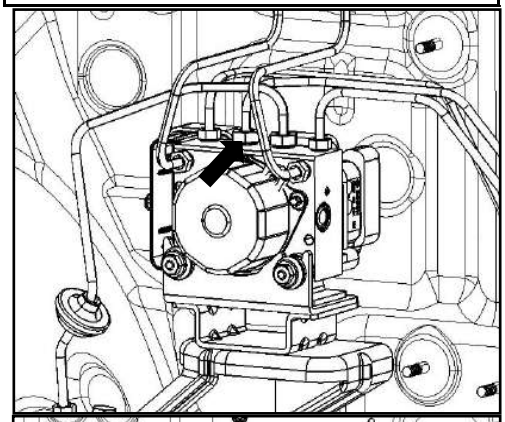
② Install the connecting nut and clipper of left Front braking oil hose and left front braking hose.

- Tightening torque: 16～18N·m

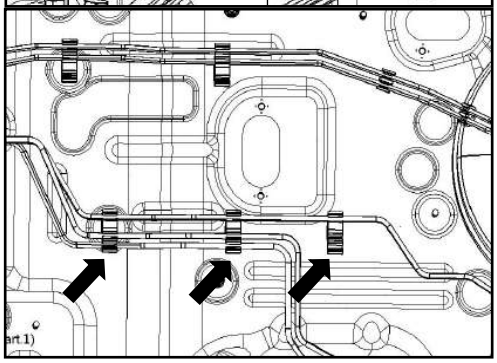


2) Install connecting nut of left front braking oil hose and ABS/ESP controller.

- Tightening torque: 16～18N·m



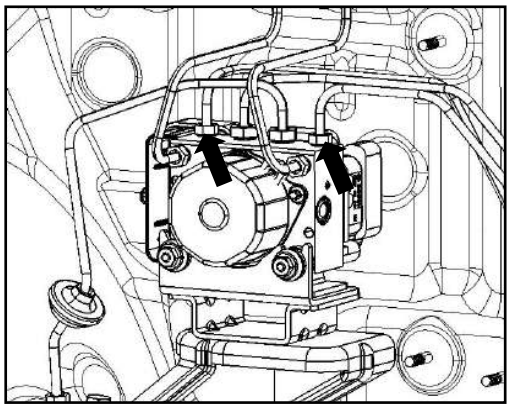
3) Install left front braking oil hose on the 2 clippers for fixing left front braking oil hose assembly.



③ Install left rear connecting braking pipe assembly, right rear connecting braking pipe assembly,.

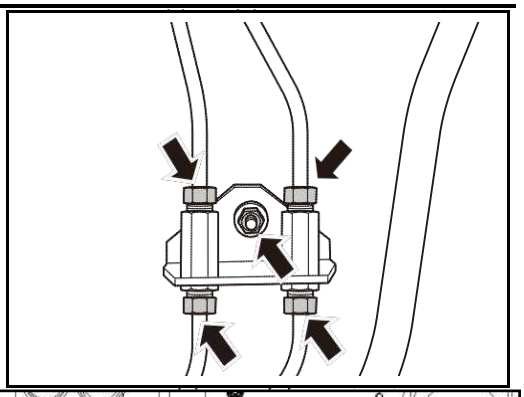
1) Install one connecting nut of left /right rear braking pipe and ABS/ESP controller.

- Tightening torque: 16～18N·m

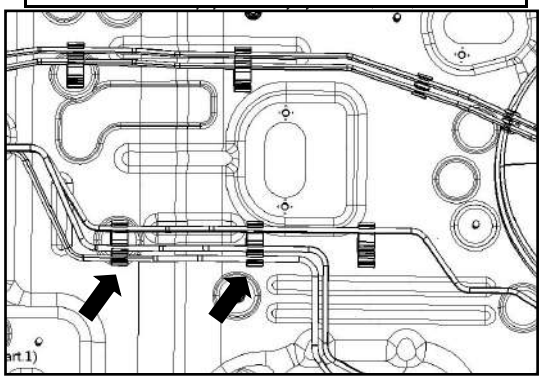


2) Install one connecting nut and clipper of left /right rear braking pipe and rear part of left /right rear braking pipe.

- Tightening torque: 16～18N·m



3) Install left /right rear braking pipe assembly on the pipe clipper.
4) Add braking fluid. please see “maintenance-braking fluid”
5) Braking system exhaust, please see “maintenance-braking system exhaust”
6) Close engine cover.



Right front braking pipe assembly

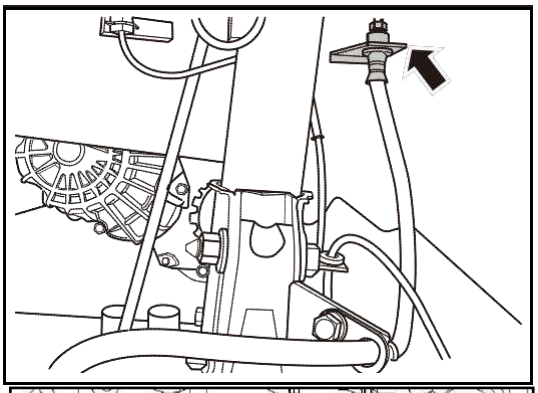
1 Remove

① Open the engine cover

② Exhaust braking fluid , please see “maintenance-braking fluid”

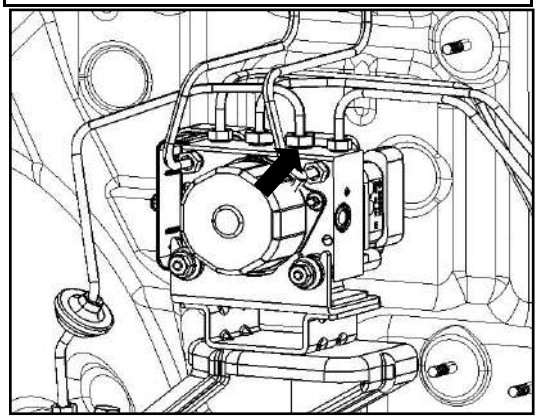
④ Remove right front braking hose assembly

1) Remove the connecting nut and clip of right front braking oil hose and right front braking hose, take off the connection of right front braking oil hose and right front braking hose .



2) Remove the connecting nut of right front braking oil hose and ABS/ESP controller, remove the connection of right front braking oil hose and ABS/ESP controller.

3) Take off right front braking oil pipe assembly



2 Install

① Install according to remove order of right front braking oil hose.

② Add braking fluid. please see “maintenance-braking fluid”

③ Braking system exhaust, please see “maintenance-braking system exhaust”

⑤ Close engine cover.

Rear braking pipe assembly

1. Remove

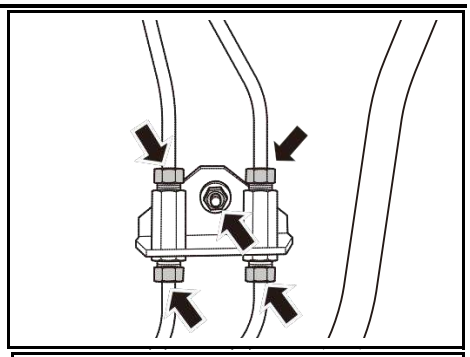
① Open the engine cover

② Exhaust braking fluid , please see “maintenance-braking fluid”

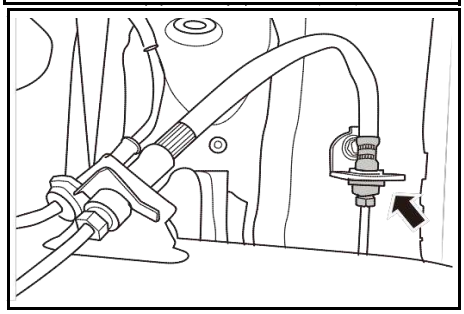
③ Remove rear wheel, please see “wheel”

④ Remove left rear braking pipe rear assembly、right rear braking pipe rear assembly

1) Remove connection nut of the left and right rear connect braking hard tube assembly and rear part of left and right rear brake pipe , take off the connection of left and right rear connection braking hard tube assembly and rear part of left, right rear brake pipe.



2) Remove the connecting nut and clipper of rear part of left and right rear brake hard tube assembly and left and right rear brake hose.

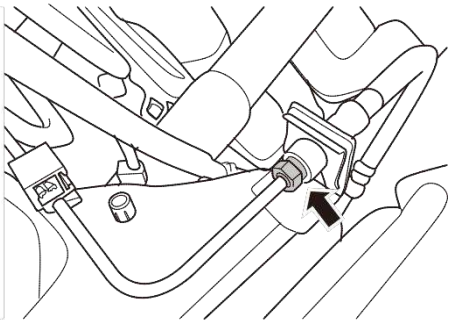


3) Take off 5 pipe clippers and one individual pipe clipper connecting rear part of left and right rear brake hard tube assembly and body

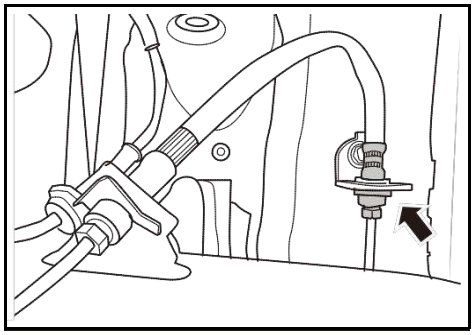
4) Take off left and right rear brake hard tube assembly

⑥ Remove connection of left rear braker hard tube assembly and right rear braker hard tube assembly.

1) Remove the connecting nut and clipper of left rear brake hard tube assembly and left rear brake hose II, take off connection of left rear brake hard tube assembly and left rear brake hose II.



2) Remove the connecting nut and clipper of left rear brake hard tube assembly and left rear brake hose, take off connection of left rear brake hard tube assembly and left rear brake hose.

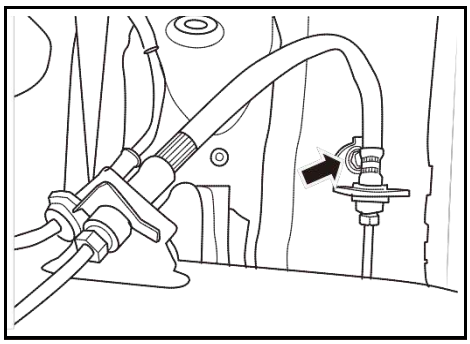


3) Take off connection of left rear brake hard tube assembly and right rear brake hard tube assembly.

⑦ Remove rear brake oil hose bracket

1) Remove the fixing bolts of brake oil hose bracket and body.

2) Take off rear brake oil hose bracket.



2 Install

① Install according to remove order of rear brake pipe assembly.

② Add braking fluid. please see “maintenance-braking fluid”

③ Braking system exhaust, please see “maintenance-braking system exhaust”

④ Install rear wheel

⑤ Close engine cover

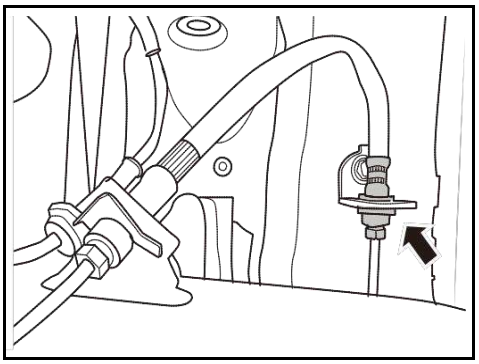
Rear brake hose assembly

1. Remove

① Exhaust braking fluid , please see “maintenance-braking fluid”

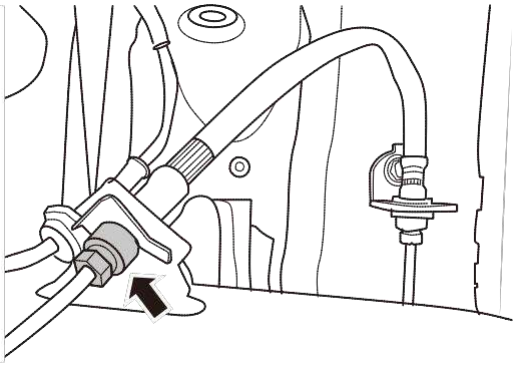
② Remove rear brake hose assembly

7) Remove the connecting nut and clipper of rear brake hose assembly and rear part of rear brake hard tube.



2) Remove the connecting nut and clipper of left rear brake hose assembly and left rear brake hard tube assembly

3) Take off rear brake hose assembly.



2 Install

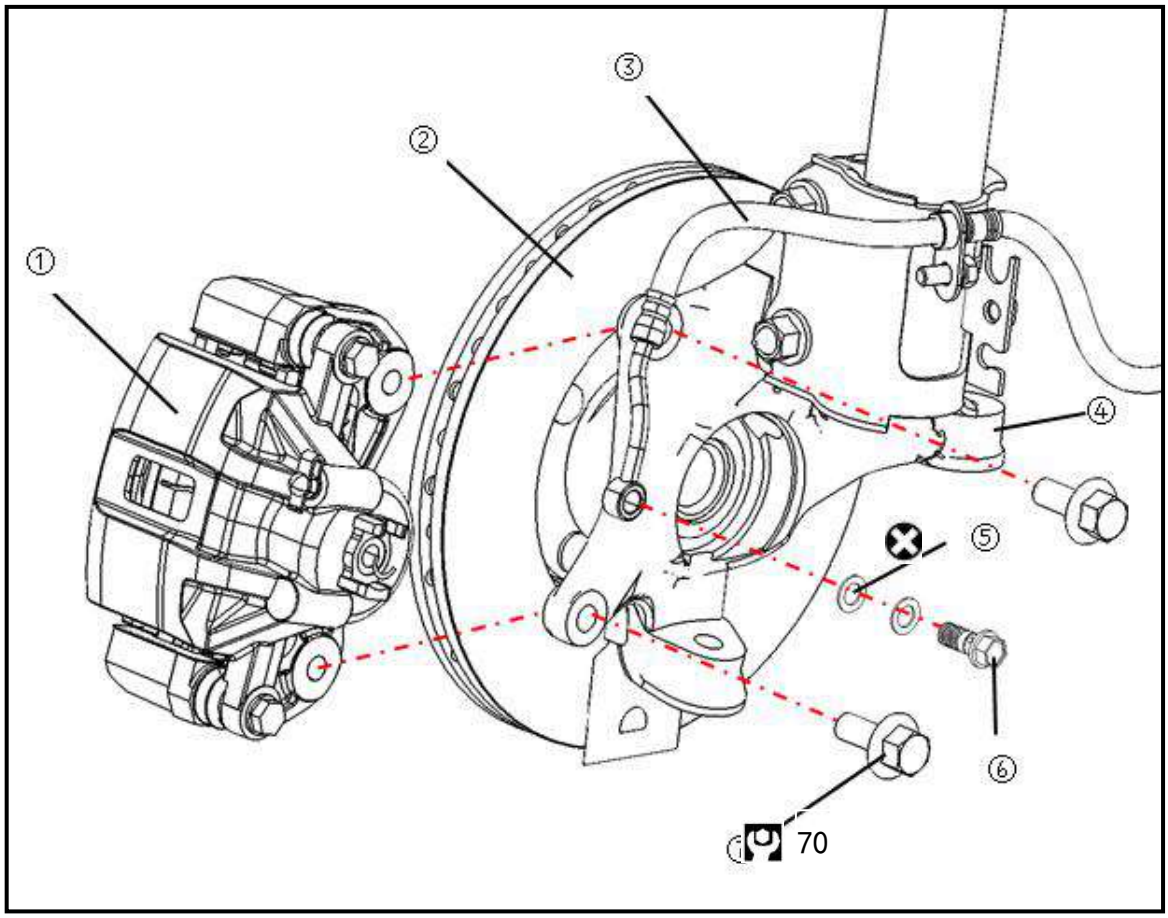
① Install according to remove order of rear brake hose.

② Add braking fluid. please see “maintenance-braking fluid”

③ Braking system exhaust, please see “maintenance-braking system exhaust”

Front braker

Explosion diagram



1 front brake pliers	2 front brake disc	3 front brake hose	4 steering knuckle
5 sealing washer	6 brake hose perforation bolt	7 hexagon flange bolts	

: Replace after remove

: N·m

Caution:

- Should thoroughly clean the brake pliers, make damage caused by dust and other substances to a minimum.
- When remove brake pliers, forbid to press brake pedal to avoid the piston ejected.
- To avoid damage piston dust proof when remove.
- Unless dismantle or replace the brake pliers, otherwise prohibited to remove connection bolt of brake pliers and brake hose . After remove the brake pliers, please use the rope hoist brake pliers to avoid pull brake hose.
- If the friction plate and silencing slice are severely corrosion, please replace the new friction plate.
- Avoid brake fluid splash on the brake disc, if yes, please erase immediately.

Remove and install

Friction plate

Remove

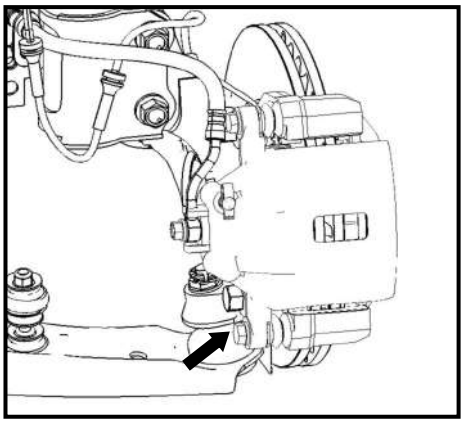
1 Remove wheel, please see “Wheel”

- Tightening torque:90～110N·m

2 Remove the fixing bolt for Brake pliers locating pin

- Tightening torque:22～32N·m

3 Lift pump with rope , then remove the friction plate.

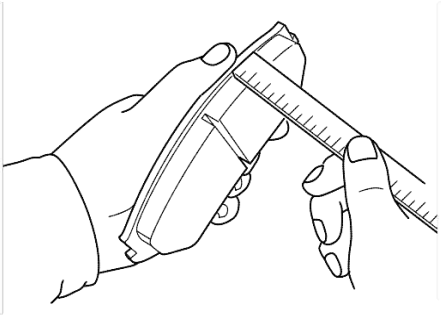


Check after remove

Check thickness of friction plate with a scale.

Standard thickness: 9.5 mm

Friction limit thickness:2mm



Caution

- If the thickness of friction plate is less than the thickness of the wear limit, please replace friction plate

Install

1 Install friction plate on the bracket.

2 Press down piston when installing friction plate, then install sub pump on the bracket.

Tips:

- Check the brake fluid level of brake liquid storage tank, prevent overflow.

3 Install sliding pin of downside braking pliers, and tighten.

4 Fix brake disc with tire nut and press brake pedal till returning brake feeling.

5 Rotate brake disc, check whether the friction plate is installed well.

6 Install wheel.

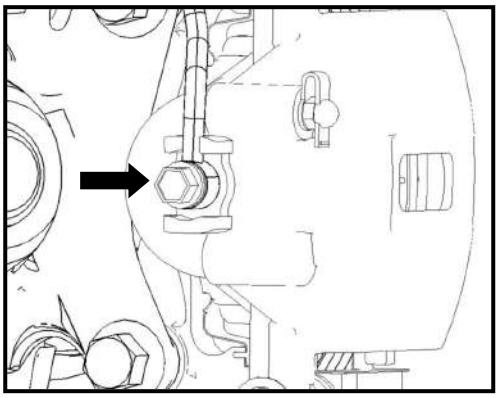
Brake pliers

Remove

1 Remove wheel

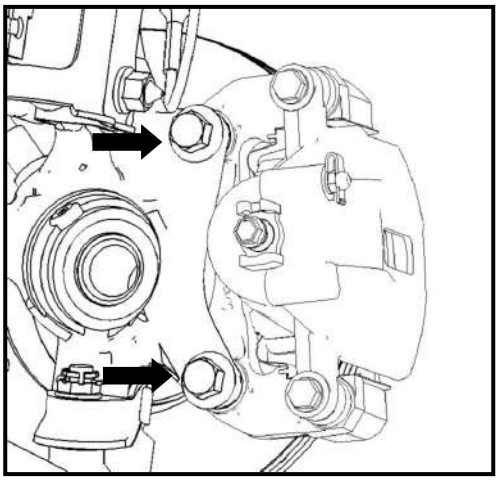
2 Remove Perforated bolt of brake hose.

- Tightening torque:25～30 N·m



3 Remove connecting bolt for brake pliers and steering knuckle , then take off brake pliers.

- Tightening torque:65～75 N·m



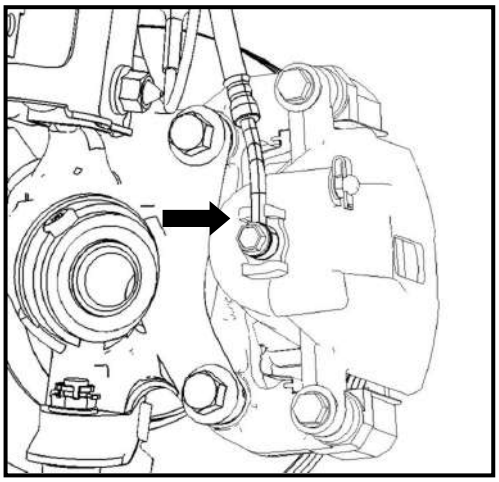
Install

1 Install the brake caliper to the steering knuckle, and screw down the bolt.

Caution:

- Avoid the fixing bolt and fixing bolt pads of steering knuckle, brake caliper, brake hose to be with oil and water.

2 Install the brake hose to the brake caliper, and screw the bolt.



Caution:

- Please refill brake fluid “DOT4”
- Reuse brake hose seal gasket is prohibited.
- Aim the brake hose and brake caliper limit and connect it.

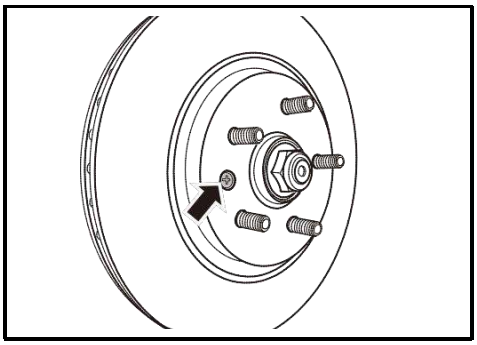
3 Fill brake fluid and exhaust. Please see “maintenance-brake fluid”

4 Rotate brake disc, check whether brake pliers installed well.

5 Install wheel.

Front brake disc

Remove



1 Remove wheel, please see “Wheel”

2 Remove front brake caliper, please see “front brake caliper assembly”

3 Remove front brake disc

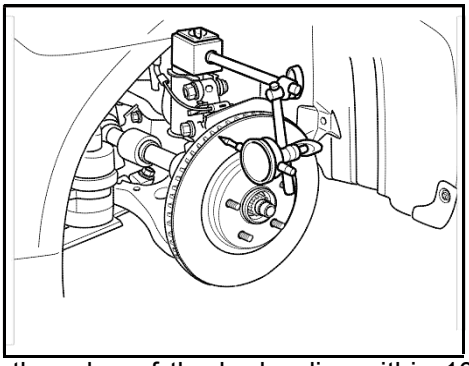
1) Remove the ten screws on the front brake disc.
- Tightening torque : 10～15N·m

2) Take off front brake disc.

Check after remove

1 Visual inspection

Check whether the front wheel brake disc surface is uneven wear, crack and serious damage. If yes, please change.



2 Beat quantity check

1) Fix front wheel brake disc on wheel hub.

Caution:

- Please confirm the wheel axial clearance not too big before measuring.

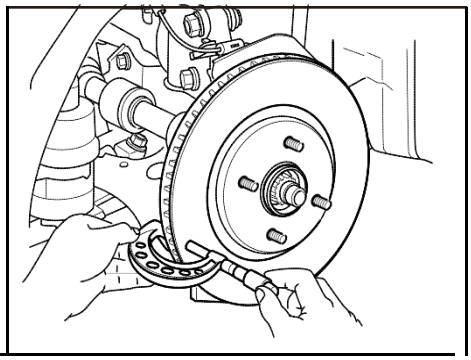
8) Check beat quantity with a dial indicator, which could measure on the edge of the brake disc within 10 mm.

9) Use the dial indicator check runout, the brake disc inside edge measurements 10mm

- Beat limit quantity:0.05mm

If beat quantity surpass limit, please replace brake disc or do the necessary processing.

3. Thickness check



1) Check the thickness of the brake disc with a micrometer. If the thickness is less than wear and tear limit, please replace the brake disc.

Standard thickness: 25 mm

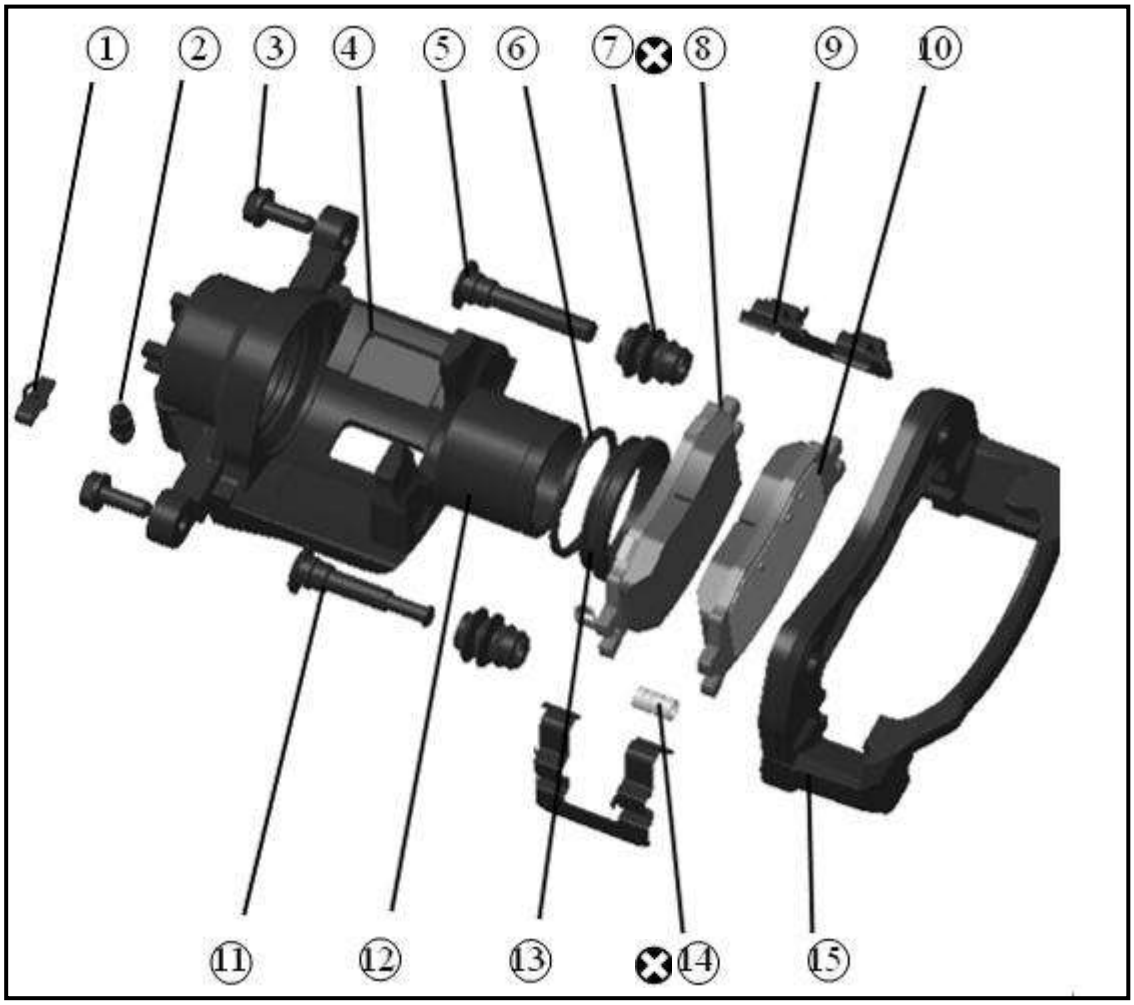
Friction limit thickness:23mm

Install

Install in the opposite order of remove.

Disassembly and install

Explosion diagram



1 vent screw dust cover	2 vent screw	3 hex flang bolts	4 pliers body
5 positioning pin	6 piston sealing ring	7 dowel pin dust cover	8internal friction piece
9 spring leaf	10 external friction piece	11 guide pin	12 piston
13 piston dust cove	14 rubber	15 bracket	

⊗：Replace after remove

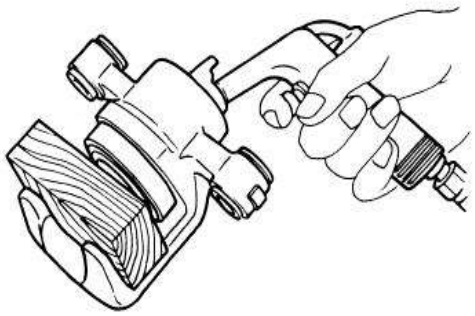
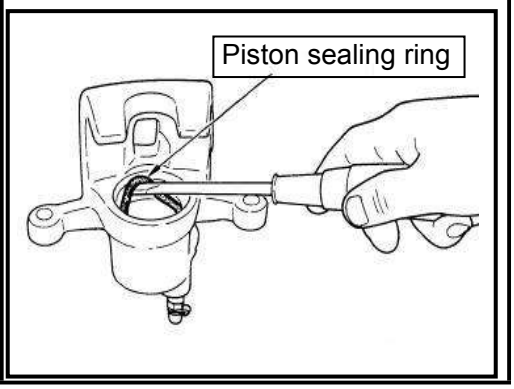
Remove

1 Remove the hex flang bolt, separate clamp body and bracket. If necessary, remove the friction piece from the bracket.

Caution:

- Avoid friction piece drop

2 Remove positioning pin、guide pin and dowel pin dust cover from bracket.

3 As show in the diagram put fitable wood,then blast to the fixed bolt hole of brake hose evenly, remove piston and piston dust cover. **Caution:** ● Avoid finger to be clamped by piston	
4 Remove the piston sealing ring from the clamp body with flat mouth screwdriver. **Caution:** ● Avoid to damage the clamp body inner cylinder wall.	

Check after remove

1 Clamp body

Check whether the inner wall of the cylinder is worn or damaged. If yes, please replace.

Caution:

● Using the new brake fluid cleaning cylinder body. It is prohibited to use gasoline or kerosene, etc

2 Bracket

Check for wearing, cracks or damage. If yes, please replace.

3 Piston

Check whether there is corrosion, wear or damage on piston surface. If yes, please replace.

Caution:

● It is prohibited to use sand paper burnish the piston surface

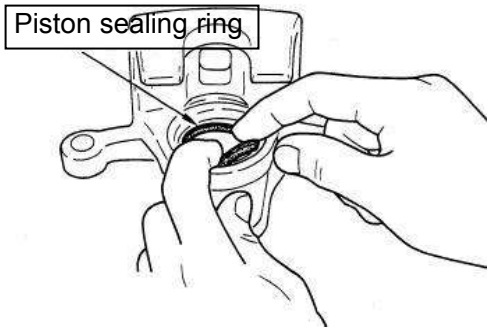
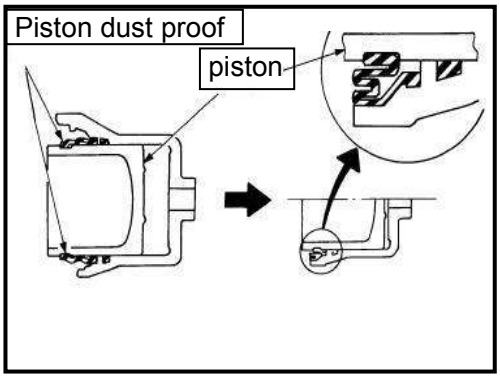
4 Positioning pin、guide pin and dowel pin dust cover

Check the sliding positioning pin, guide pin and dowel pin dust cover if there were any wear and cracks. If yes, please replace.

Assembly

Caution:

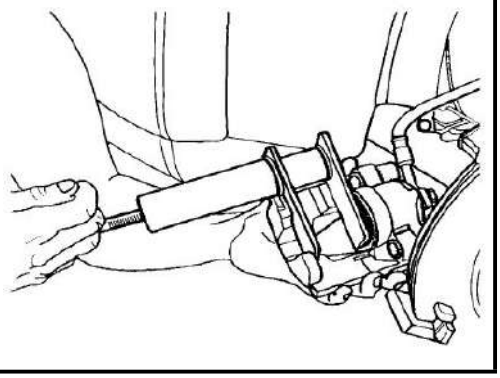
- When assembly,the specified rubber grease shall be used.

1 Daub polyethylene glycol ether lubricant rubber grease on the piston ring ,and install it into the cylinder. **Caution:** ● Ban to repeated use the piston seal ring.	
2 Apply the brake fluid on the piston, apply rubber grease on piston dust cover .Cover well piston ports with piston dust proof, and then fix the piston dust cover slowly into the groove of the cylinder block. **Caution:** ● Ban to repeated use piston dust cover	

3 Let hand reached into the cylinder and insert the piston dust cover the piston side edge into the groove of the piston.

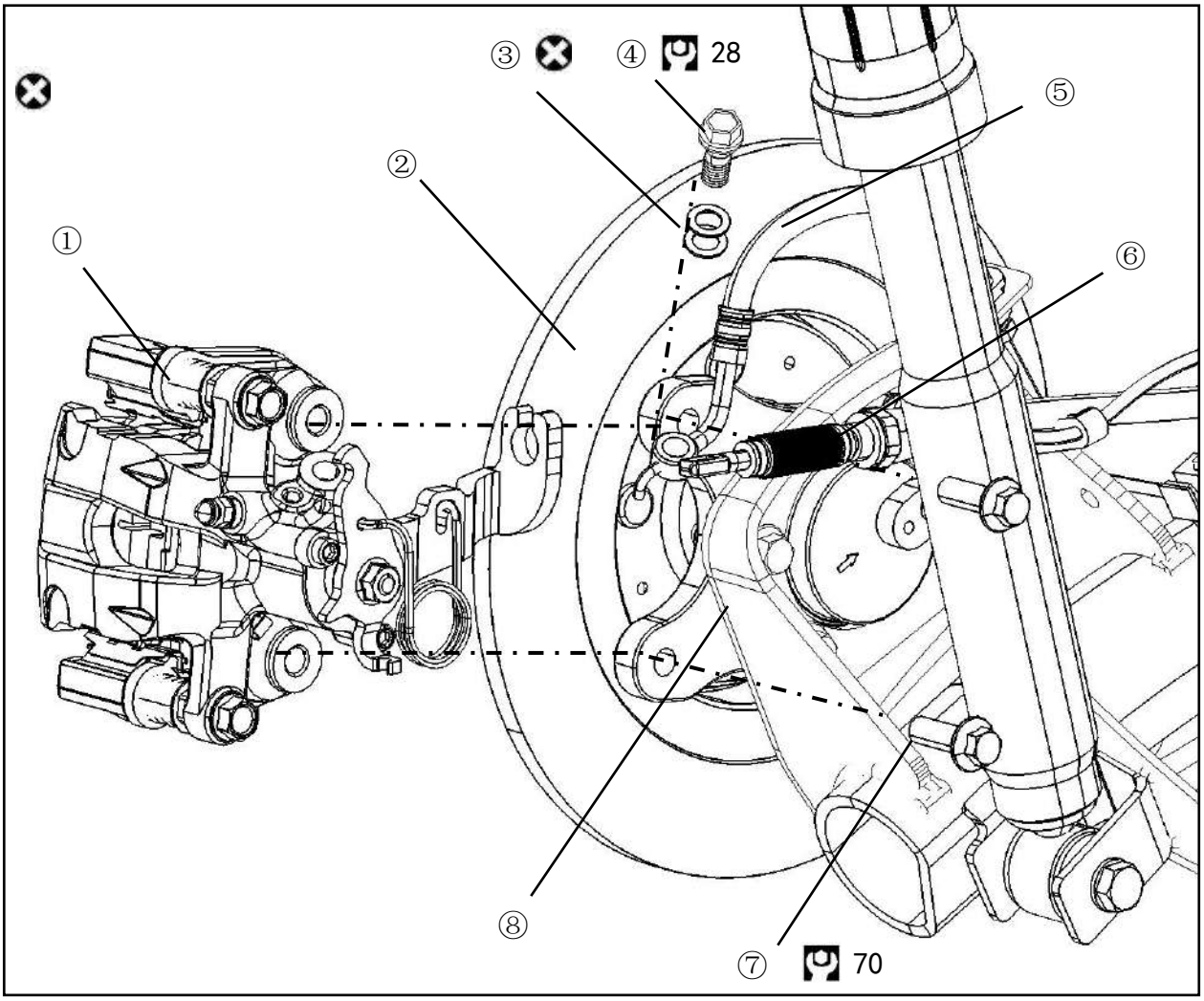
Caution:

- Evenly press the piston, avoid to scratch the inner wall of the cylinder block.

4 Install positioning pin 、guide pin and dowel pin dust proof. 5 Install the friction plate onto the scaffold. 6 Press the piston, and then install the clamp body onto the scaffold. 7 Tighten the hex flang bolts	

Rear Brake

Explosion diagram



1 rear brake caliper assembly | 2 rear brake disc | 3 Sealing washer

4 Brake oil hose perforated bolt | 5 Rear brake hose | 6 Parking brake wire drawing

7.hex flange bolt | 8 Rear frame assembly

: Replace after remove

: N·m

Caution:

- Should thoroughly clean the brake pliers, make damage caused by dust and other substances to a minimum.
- When remove brake pliers, forbid to press brake pedal to avoid the piston ejected.
- To avoid damage piston dust proof when remove.
- Unless dismantle or replace the brake pliers, otherwise prohibited to remove connection bolt of brake pliers and brake hose . After remove the brake pliers, please use the rope hoist brake pliers to avoid pull brake hose.
- If the friction plate and silencing slice are severely corrosion, please replace the new friction plate.
- Avoid brake fluid splash on the brake disc, if yes, please erase immediately.

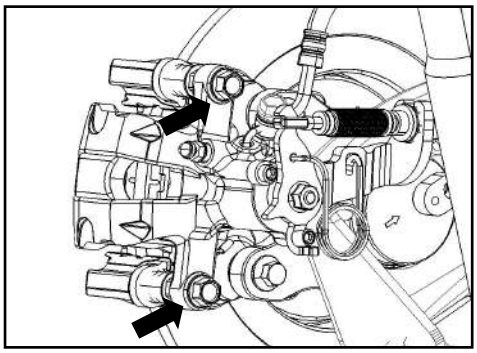
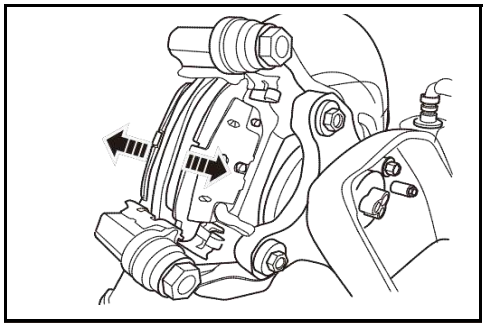
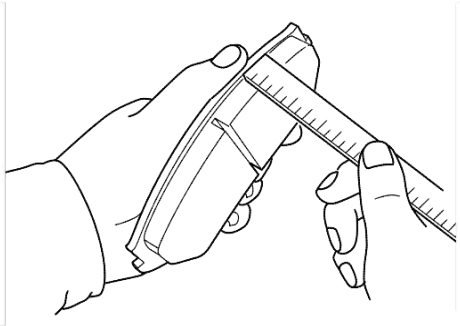
Remove and install

Friction plate

Remove

1 Remove wheel, please see “Wheel-wheel assembly”

2 Remove rear brake caliper

1) Loose parking brake. 2) Remove 2 fixing bolts of rear brake caliper. ● Tightening torque: 22～32N·m 3) Turn up the rear brake caliper assembly. **Caution：** ● Avoid to pull brake hose.	
4) Remove friction plate of out and inner brake caliper.	
Check after remove Check friction plate thickness with scale. Standard thickness: 14.7 mm Friction limit thickness:7mm	

Caution

● If the thickness of brake shoe is less than wear and tear limit, please replace the friction plate.

Install

Install in the opposite order of remove

Rear brake pliers assembly

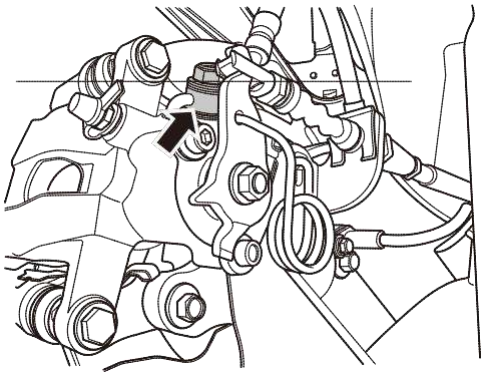
Remove

1 Remove wheel, please see “Wheel”

2 Exhaust brake fluid, please see “Maintenance-brake fluid”

3 Remove rear brake plier assembly.

1) Loose parking brake.

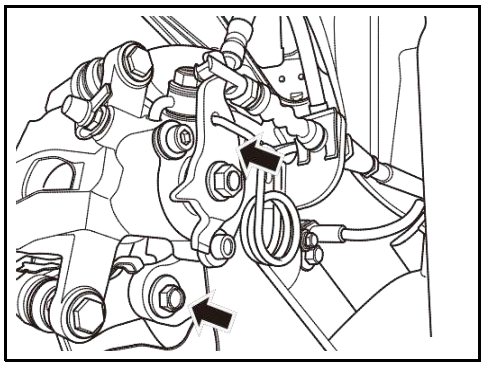


2) Remove connection of brake hose bolt and copper gaskets with rear brake hose and rear brake caliper.

- Tightening torque: ：25～30N·m

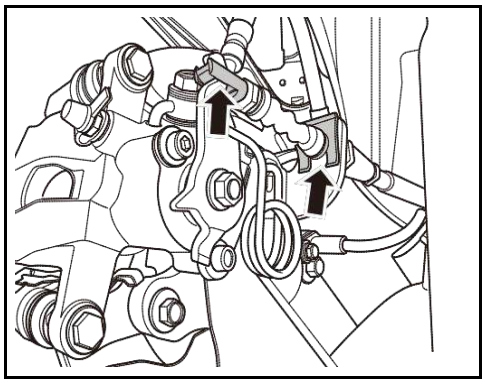
Caution:

- Please be care the copper gaskets off at both ends of bolt.



3) Remove two bolts of connecting rear brake plier Assembly and rear torque frame assembly

- Tightening torque: 65～75N·m



4) Remove the fixing nut and clipper of rear brake plier assembly and rear parking brake wire, take off the connectionof rear brake plier assembly and rear parking brake wire.

5) Take off rear brake plier assembly.

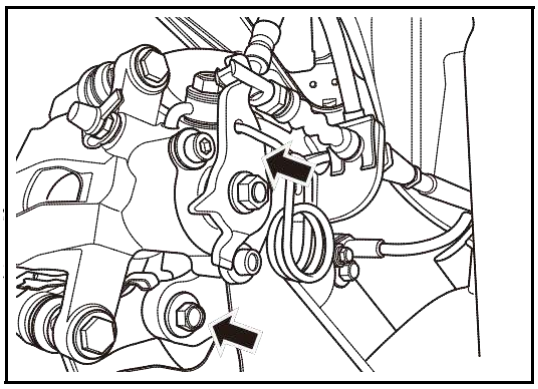
Install

1`Install rear brake plier assembly

1) Put the rear brake plier assembly on the installation position , pre-tightening fixing bolt of brake plier

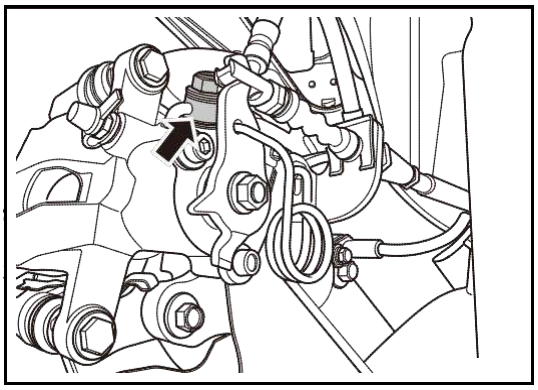
2) Tightening two bolts of connecting rear brake plier assembly and rear torque frame assembly.

- Tightening torque: 65～75N·m



3) Install connection of brake hose bolt and copper gaskets with rear brake hose and rear brake caliper.

- Tightening torque: 25～30N·m



4) install the connection of rear brake plier assembly and rear parking brake wire.

2 Fill brake fluid, please see “maintenance-brake fluid”

3 Brake system exhaust, please see “maintenance- brake system exhaust”

4 Install wheel, please see “wheel”

Rear brake disc

Remove

1 Remove wheel, please see “Wheel”

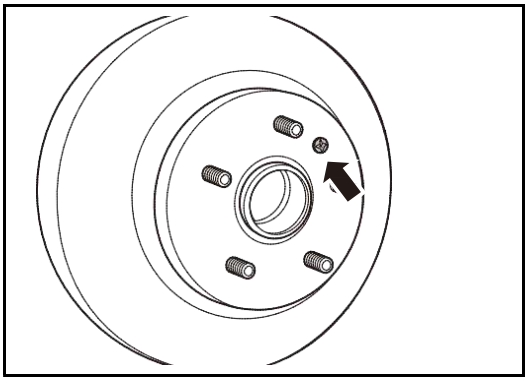
2 Remove rear brake plier assembly, please see rear brake plier assembly.

3 Remove rear brake disc.

1) Remove the cross screws of rear brake disc.

- Tightening torque: 10～15N·m

2) Take off rear brake disc.



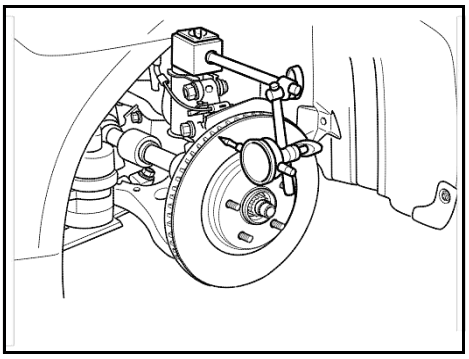
Check after remove

1 Visual inspection

Check whether the front wheel brake disc surface is uneven wear, crack and serious damage. If yes, please change.

2 Beat quantity check

2) Fix front wheel brake disc on wheel hub.



Caution:

- Please confirm the wheel axial clearance not too big before measuring.

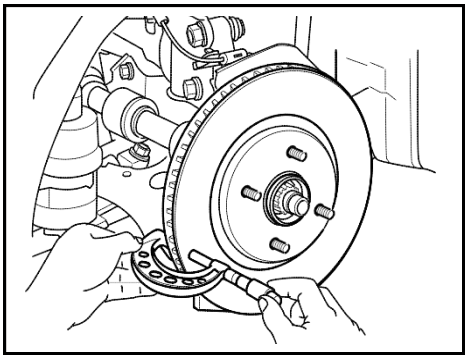
3) Check beat quantity with a dial indicator, which could measure on the edge of the brake disc within 10 mm.

- Beat limit quantity:0.05mm

If beat quantity surpass limit, please replace brake disc or do the necessary processing.

3. Thickness check

1) Check the thickness of the brake disc with a micrometer. If the thickness is less than wear and tear limit, please replace the brake disc.



Standard thickness: 9mm

Friction limit thickness:8mm

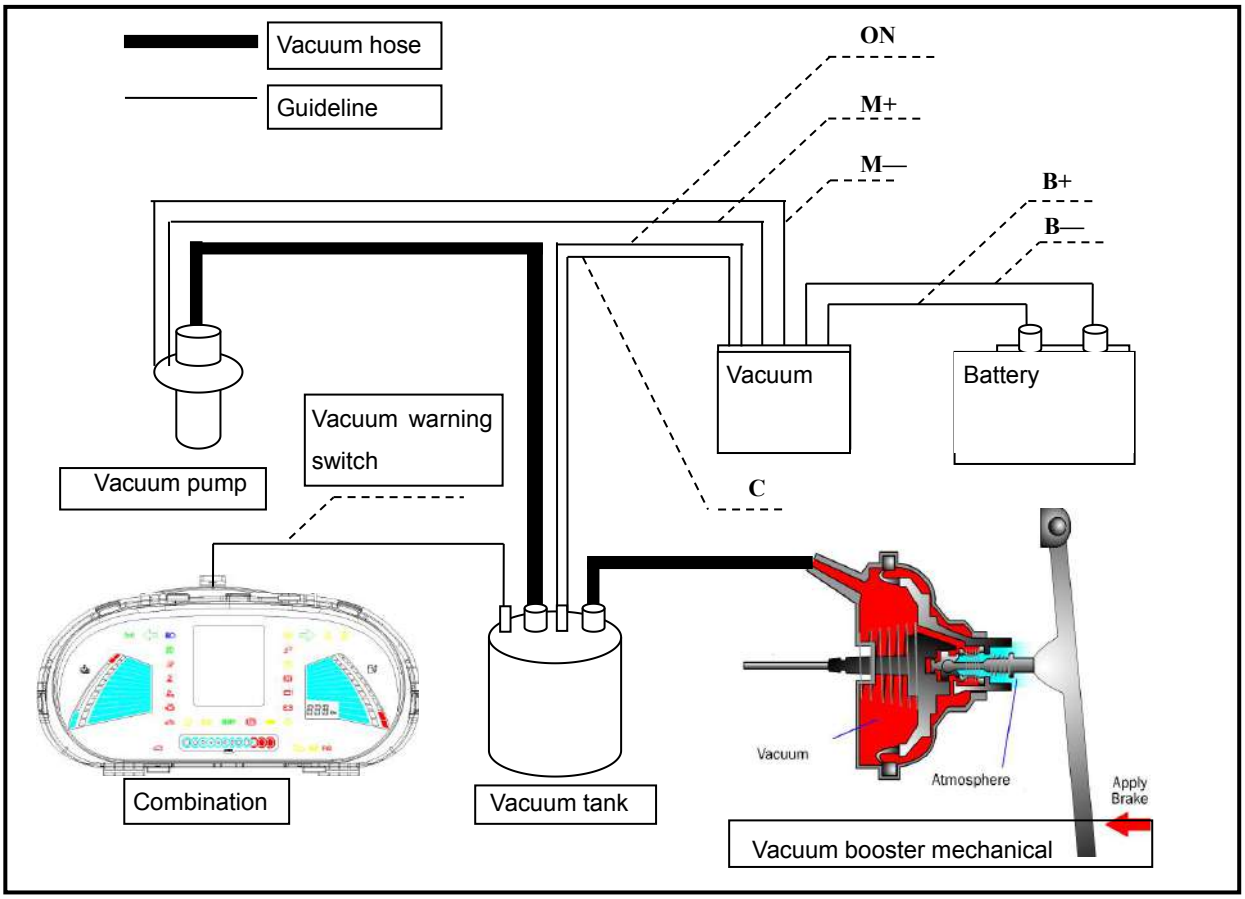
Install

Install in the opposite order of remove.

Electric vacuum booster

System description

Vacuum booster connect with vacuum tank through the vacuum hose , vacuum pump controller monitor the pressure in the vacuum tank through the pressure switch. When vacuum tank negative pressure is insufficient, the vacuum pump controller control vacuum pump, the suction of the vacuum tank, until the vacuum tank pressure to the limit.

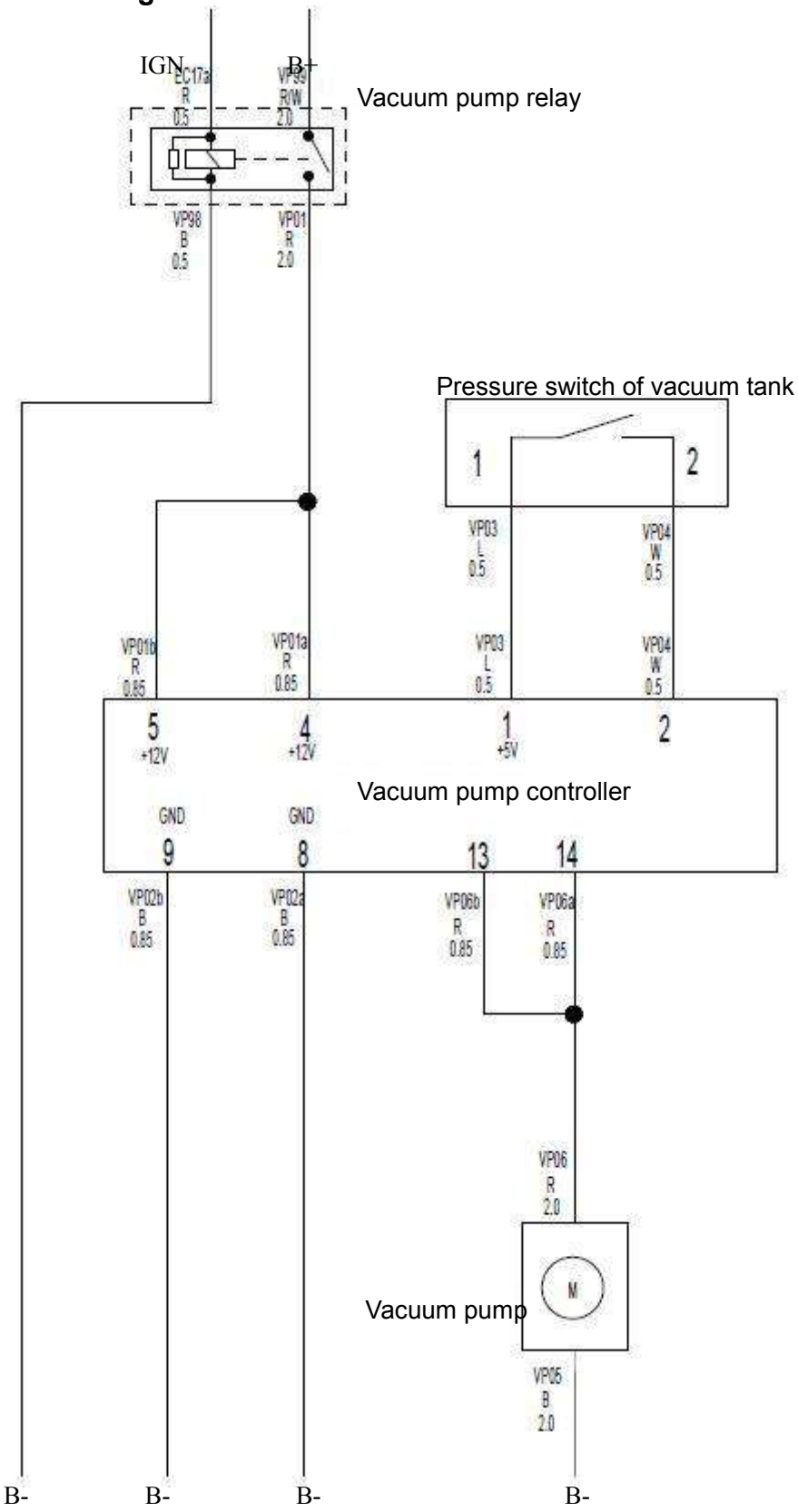


Control logic

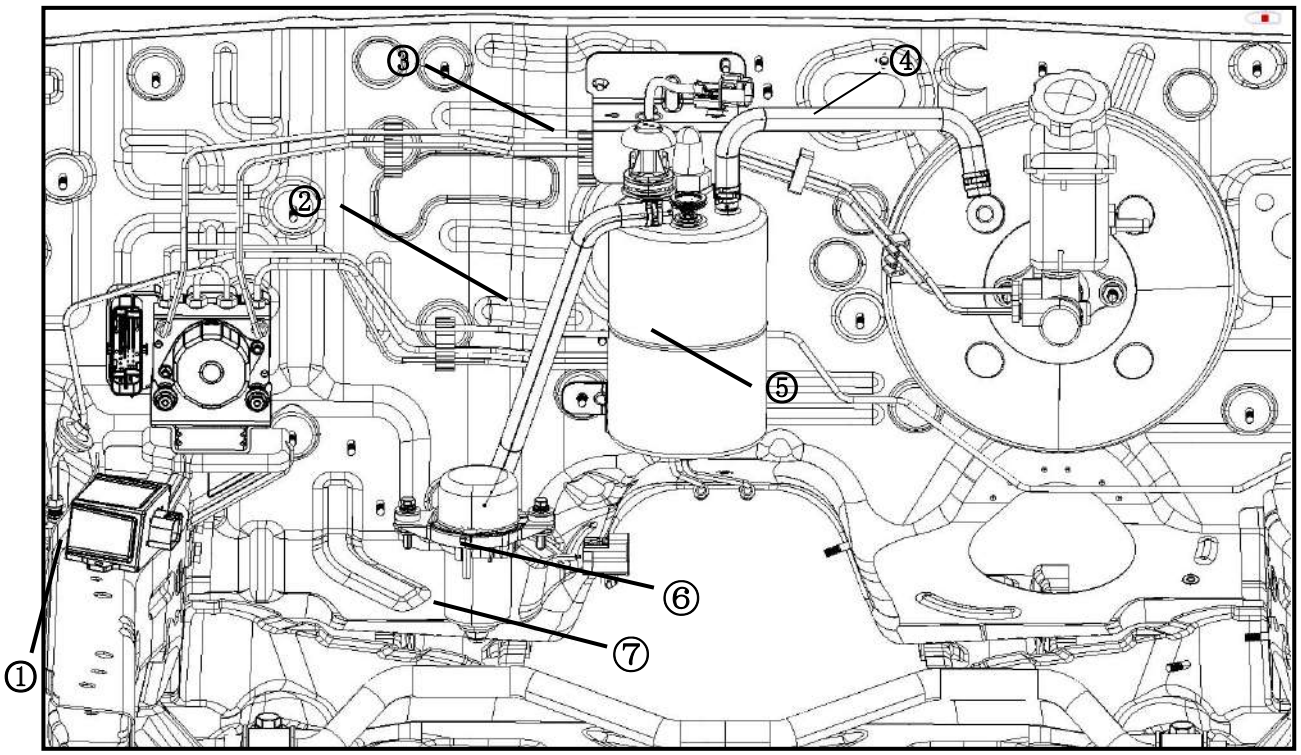
1 set up negative pressure: when lack of negative pressure in vacuum tank , the pressure switch on the vacuum tank and output signal to the vacuum pump controller, vacuum pump controller control vacuum pump suction of electricity, vacuum pump start pull out air,increasing the vacuum negative pressure in the tank; When the negative pressure to limit, vacuum pump controller delay about 10 s to break vacuum pump power.

2 Fault diagnosis: when due to unexpected conditions, such as vacuum tank leakage, vacuum pump is damaged, which make vacuum negative pressure can not meet the demand of system, vacuum alarm switch of vacuum tank will output alarm signal to the combination instrument, the braking system fault warning lights on instrument lit.

Electrical schematic diagram



Component layout



1 Vacuum pump controller 2 vacuum hose I 3 vacuum tank bracket

4 vacuum hose II 5 vacuum tank 6 vacuum pump bracket

7 vacuum pump

Remove and install

Caution:

- Forbid to distortion, pulling the vacuum hose when remove
- Forbid to damage stud of vacuum tank assembly.
- Forbid to disassemble vacuum pump.

Remove

1 Remove vacuum hose which connect vacuum tank assembly ,vacuum booster assembly and vacuum pump.

2 Unplug the vacuum tank assembly connector, remove the nut connected vacuum tank bracket with the body, remove the vacuum tank assembly and vacuum tank bracket.

- Tightening torque:7～11N•m

3 Remove the connected nut for vacuum tank and vacuum tank bracket.

- Tightening torque:20～25N•m

4 Unplug the vacuum pump connector, remove the vacuum pump and powertrain assembly beam joint bolt, remove the vacuum pump.

- Tightening torque:7～11N•m

5 Unplug the vacuum tank assembly connector, remove the bolt connected vacuum tank bracket with the body, remove vacuum pump controller.

- Tightening torque:7～11N•m

Check after remove

1 Vacuum pump controller

Check the connectors for cracking, curved needle or other damage. If yes, please replace.

2 Vacuum hose

Check whether there are cracks and aging or other damage. If yes, please replace.

Tips:

- **vacuum hose has a multilayer structure to ensure the tightness and durability, minor cracks on surface will not affect the usage.**

3 Vacuum tank assembly

Check whether there is a tank corrosion, aging and cracking of rubber parts, or other damage. If yes, please replace.

Install

Install in the opposite order of remove

Caution:

- Install the vacuum hose, banning the use of lubricating oil.

Maintenance data and specification

Specification

Item		Specification	Item		Specification
Brake bump	Type	In series	Parking brake	Type	Rear wheel mechanical brake
	Cylinder diameter	22.22mm		Brake typ	Lever
Brake booster	Type	Vacuum booster		Zip arrangement	V type layout
	Effective diameter	255mm	Wheel speed sensor	Type	Magneto-electric
	Booster proportion	7.3：1		Resistance	1-2KΩ
Front brake	Type	Floating type/with ventilation		Output voltage	Alternating
	Brake disc diameter	294mm		Air clearance	0.2-1.1mm
	Brake disc thickness	25mm	ABS, EBD warning light	type	Warning light module
	Friction plate thichness	9.5mm		Working voltage	12V
	Cylinder diameter	54mm		Working current	80mA
Rear brake	Type	Floating type/ solid plate	Vacuum tank	volume	2L
	Brake disc diameter	275mm		Voltage switch set point	-50±5 kPa
	Brake disc thickness	9mm		Voltage switch set point	-50±5 kPa
	Friction plate thichness	14.7mm		Sealing Sealing	-66.7±3kPa 15s， 15s inner voltage decrease
	Cylinder diameter	54mm			
Vacuum pump	Rated voltage	12V			
	Working voltage	10-16V			
	Working temperature	-40 -120℃			
	Working current	<17A		Protection grade	IP65
	Start current	≤90A（100ms）			
	Working time of vacuum pump(one time, 4L volume)	1000mbarto 500mbar：≤3.5s 1000mbar to 300mbar：≤7s			
	Noise	≤77dB			
	Protection grade	IP55			

Technical parameters

Item	Standard value	Item	Standard value	Limitation
Height of brake pedal	271mm	The thickness of the front brake shoe	9.5mm	7.5mm
Brake pedal stroke	127.5mm	Front disc thickness	25mm	23mm
Space between brake lamp switch outside and the pedal stock	0.5～1.0mm	Front /rear disc jump	0.025	0.05mm
Brake pedal free stroke	3～8mm	Thickness of rear disc brake friction plate	14.7mm	7.7mm
Booster air travel	0～0.5mm	Thickness of rear disc	9mm	7mm
The length of booster push rod B	117mm	Parking brake lever stroke (when add 196 N force to block assembly)	5-7 tooth	

Electrical parking system

Cautions for Electrical parking(EPB) maintenance

- As a result of the dust in rear brake has an effect to human body, please use clear dust collector to clean before maintenance ,it is prohibited to use air gun blow out.
- When electronic parking work, state of electronic parking lights lit on combination instrument.
- When the electric parking in the event of a failure, the warning lights lit on the instrument (yellow).

Caution：

- When the electronic parking is in fault state, if pull or press the EPB switch, failure indicator will light (yellow).
- When the electronic parking happens fault and unable to release or could not connected to the 12 v battery, and must release the electronic parking at this time, please use external release way to release the parking brake, see "external release"
- After change parking ECU assembly or parking ECU bracket, the parking ECU assembly is needed to be calibrated as zero, see "zero in parking ECU assembly learning".

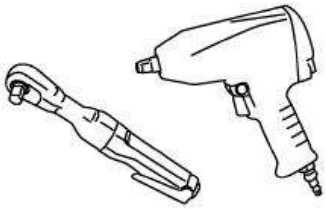
Preparation work

Special tools

The actual tool shape may be different from illustration shown.

Tool	Diagram	Instruction
Diagnostic instrument X-431		EPB system fault diagnosis

Commonly used tools

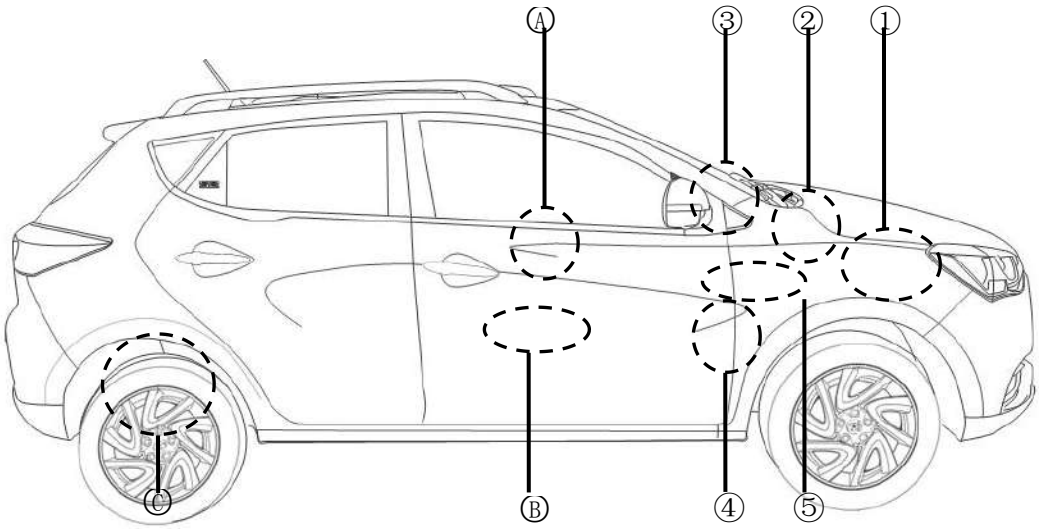
Tool	Diagram	Instruction
Power tool		Install and remove bolts and nuts

System description

This car is equipped with electronic parking brake (EPB) system. EPB recognition is from EPB switch signal, controlled by the ECU's assembly, which controls the brake caliper assembly clamping and release the parking brake. EPB switch layout is in the intermediate position of the assistant instrument board, which is convenient for the pilot operation.

Component part

Position of component parts



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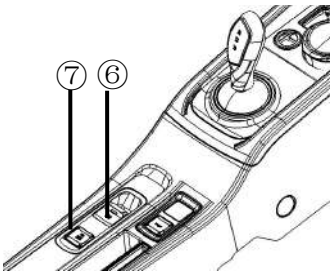

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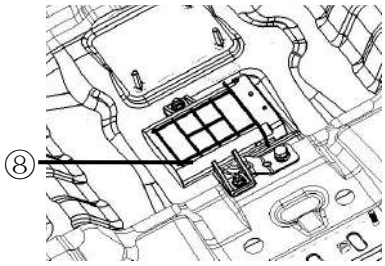

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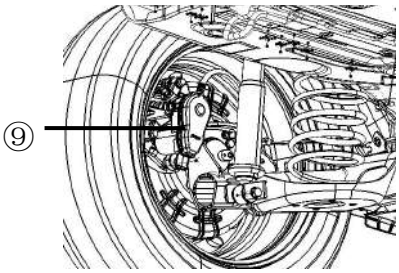


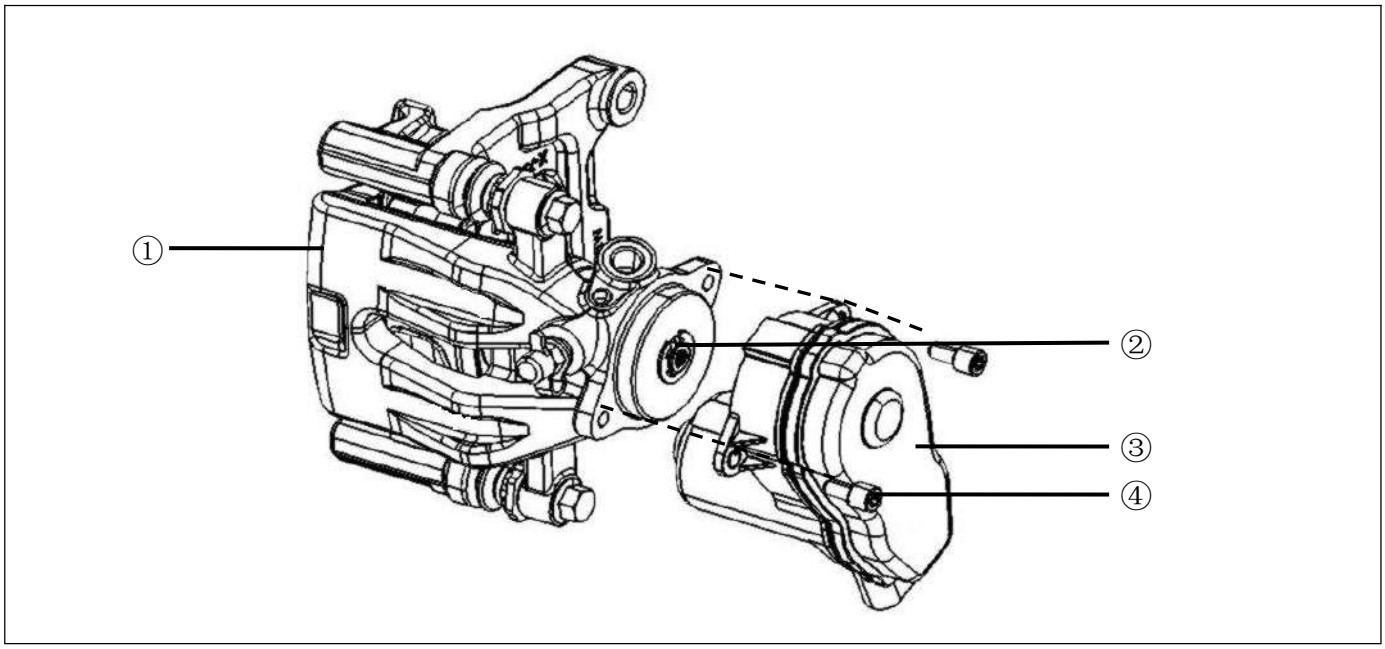
A Instrument panel

B Downside of instrument panel

C Rear suspension

Description of related parts

Serial No	Name	Function
1	Motor controller(PCU)	Send actual torque motor and motor speed signal Through CAN bus to the EPB system, which is used to start auxiliary functions for EPB.
2	ABS controller assembly ABS	Send the wheel speed signal, two rear wheel speed pulse signal, the speed signal through CAN line to the EPB system, which is used for EPB system to determine the vehicle state.
3	Combination instrument	Send left front door status and main driving belt status signal to EPB system through CAN line, which is used for EPB system to judge whether the driver is ready to start the vehicle. Receiving EPB system status,lit on or off parking light Receiving EPB system fault status, lit on or off EPB fault light.
4	VCU	Send motor fault information, the accelerator pedal signal, brake pedal signal, shift signal, the key state signals to EPB system through CAN line. Receiving EPB state signal, fault code and perform the corresponding control strategy.
5	Air-conditioner controller	Send environment temperature signal to EPB system through CAN line, which is used for EPB system estimateing the temperature of the brake disc.
6	EPB switch	Pull out switch、parking; press down switch, release parking. When parking, parking status light is on ; when releasing parking, parking status light is off.
7	AUTOHOLD switch	Control EPB system entry and exit the automatic parking mode. Press down the switch, the EPB system enter into automatic parking mode, switch state light is on; Press the switch again, EPB system exit automatic parking mode, switch state lights is off.
8	Parking ECU assembly	According to EPB switch state, the vehicle information from the CAN line could judge the driver's intentions, control rear caliper assembly clamping and released and realize the EPB system functions.
9	Rear brake plier assembly	Including two parts of brake and actuators, according to the parking ECU assembly instruction to clamp and release to realize each function of EPB system.



1Brake

2 outer releasing connection

3 executive mechanical

4 fixing bolt

5 Rear brake plier assembly

System

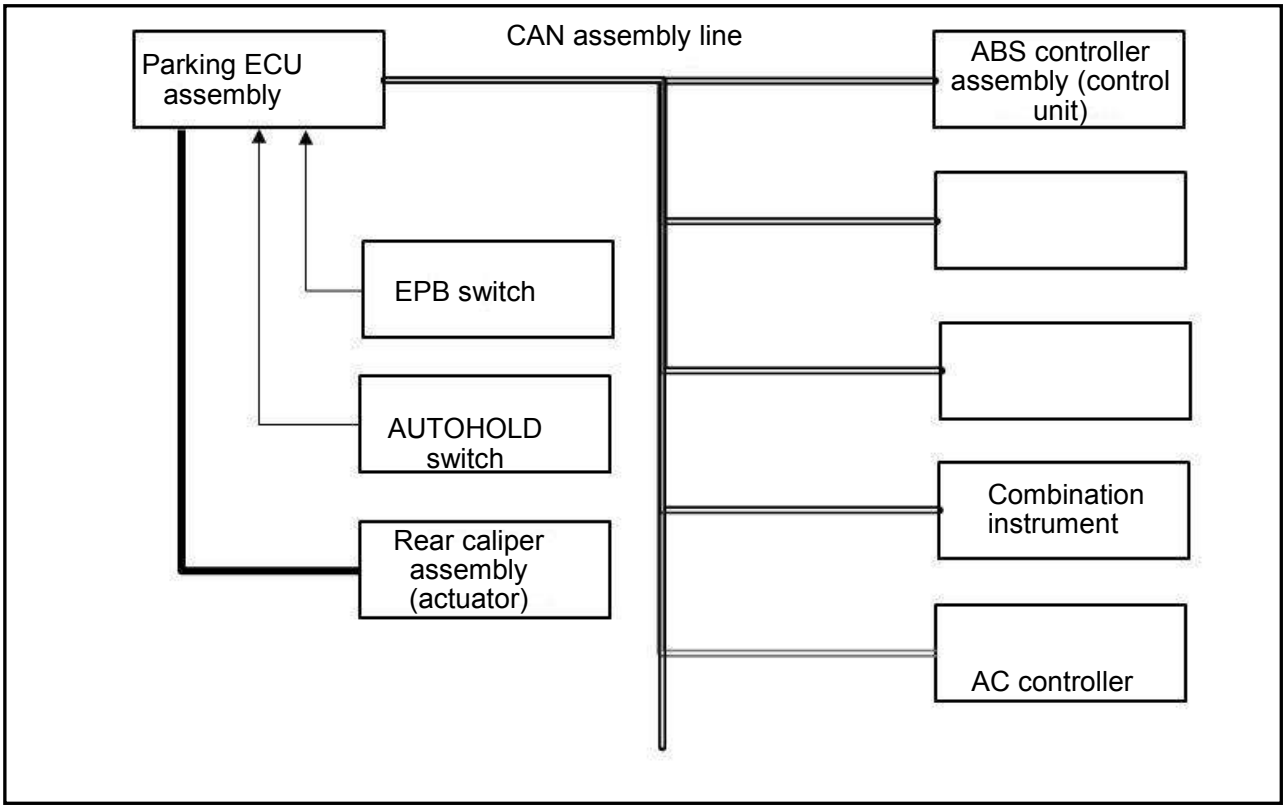
System description

When electronic parking brake works, lights on combination instrument and EPB switch will be on.

When parking brake is released, lights on combination instrument and EPB switch will be off

When the driver operate EPB switch, EPB switch will transfer the signal to the parking ECU assembly, which drives the executive mechanical of rear caliper assembly in parking ECU assembly, executive mechanical push rear caliper brake to realize parking and release.

System principle



Input and output signal

Parts	Signal description
Motor controller(PCU)	Send the following signal through CAN line to parking ECU assembly: Motor actual torque signal Motor actual rotating speed signal
ABS controller assembly	Send the following signal through CAN line to parking ECU assembly: wheel speed signal Rear wheel speed pulse signal Speed signal
Combination instrument	Send the following signal through CAN line to parking ECU assembly: left front door status signal main driving belt status signal Receiving the following signal through CAN line from parking ECU assembly: EPB system status signal EPB system fault signal
Vehicle controller	Send the following signal through CAN line to parking ECU assembly: Motor fault information Accelerator pedal signal Brake pedal switch signal Shift signal Key state signals Receiving the following signal through CAN line from parking ECU assembly: EPB status signal EPB fault information
Air-conditioner control system	Send the following signal through CAN line to parking ECU assembly: Temperature signal of outside.

EPB operation

EPB

Manual clamping

When vehicle stops, pull out the EPB switch, brake caliper assembly began to apply the parking brake force.

When the parking brake force reached set value, the parking status light is lit.

When the vehicle under the electricity, the parking status light is extinguished, the state in the EPB switch will be off 2 minutes later.

Tips：

Parking brake force will maintain.

Pull out two times

When vehicle stops, pull out the EPB switch, brake caliper assembly began to apply the parking brake force.

When the parking brake force reached set value, the parking status light is lit.

Pull out the EPB switch again; EPB system will increase clamping force.

Tips：

When you feel there is not enough parking power in the car, you can do this, such as when the vehicle in the larger ramp.

When the vehicle is off power, parking status light is off and the status light on EPB switch will be off 2 minutes later.

Tips：

Parking brake force will maintain.

Manual releasing

When the power switch is placed in the "ON" block, press down the brake pedal; and press the EPB switch at the same time, then the rear brake caliper assembly release parking.

Tips：

It couldn’t release parking if only pressing down EPB switch.

When electrical parking brake release fully, EPB status indicator light will be off.

Caution：

When the power switch is placed in the "LOCK” or “ACC” block, it couldn’t release parking through above operation.

Automatic release

When start driving and comply with the following conditions, vehicle will automatically release the parking brake.

1) Vehicle at “READY” status
2) Driver’s safty belt fasten
3) Door closed in driver’s side.
4) Shift is in “D” or “R”
5) Driver pedal down the accelerating pedal.
6) Vehicle with enough power to assure no slip slope.

When Electrical parking brake releases fully, EPB status indicator light will be off.

Electrical off parking

If the driver don’t do the parking operation before leaving vehicle, if the power switch is on “LOCK” block, EPB system will automatically parking.

Automatic parking

Place the key on the block of “ON”, press down “AUTOHOLD” switch, automatically parking function will be open. When the vehicle meets the following condition, automatically parking will happen.

1) Brake from the speed ＞4km/h to zero.
2) Vehicle completely stops.
3) The shift is on “N” shift.

When the road slope≤5%, EPB system will automatically parking after vehicle completely stopped for 2s.

When the road slope＞5%, EPB system will automatically parking once vehicle completely stopped.

Tips：

This function is often used for urban traffic jam or ramp traffic condition, which has an impact on energy consumption and travel distance. it is not recommended to use in the general situation.

Braking in driving

In the process of driving, continuously pull the EPB switch, EPB system will provide brake force to make the vehicle deceleration, while brake lights up at the same time. When the vehicle is perfectly stopped, EPB system will exert maximum braking force and complete the parking.

In the EPB braking process, the EPB system will not lock the rear wheels and cause vehicle tail out.

If loosen the EPB switch before vehicle stopping, EPB system will be released in full, the brake lights at the same time, and vehicle driving back to normal.

Tips：

With the method of pulled EPB switch to stop the vehicle, when the vehicle stops, the EPB system will exert maximum braking force, the vehicle impact will happen, which is not a fault.

Caution：

When driving, pull out EPB switch, the brake force of EPB system producing is less than the braking force of hydraulic system providing, and the braking distance will be longer.

This function should be used under the case of vehicle braking system invalid, frequent use can reduce life of rear brake.

Caution：

When ABS fault light lit up, EPB system will no longer be anti-lock function, if pulled EPB switch at this time, EPB will impose a fixed braking force.

When ABS fault light lit up, if pulled EPB switch on wet road, it will happen tail out. Please use the operation pull up and down, pull up and down again to let the vehicle stop.

When ABS fault light lit up, EPS system will not complete parking after vehicle stopped, it need release EPB switch and lull up again to complete parking.

When ABS fault light lit up, please don't stop the vehicle on the slope road, otherwise, it may not parking .

Service release

When need to replace the rear brake caliper assembly, friction slices or brake disc, release parking could be through EPB switch.

① When vehicle in flat road with slope ≤10％;

② Put EPB in the releasing status and step down brake pedal.

③ Press EPB switch for 10s and loose the EPB switch and press again immediately, the operational mechnical will bring the piton to the maximum position, when you could take out the rear brake caliper friction slices or brake disc easily.

Tips：

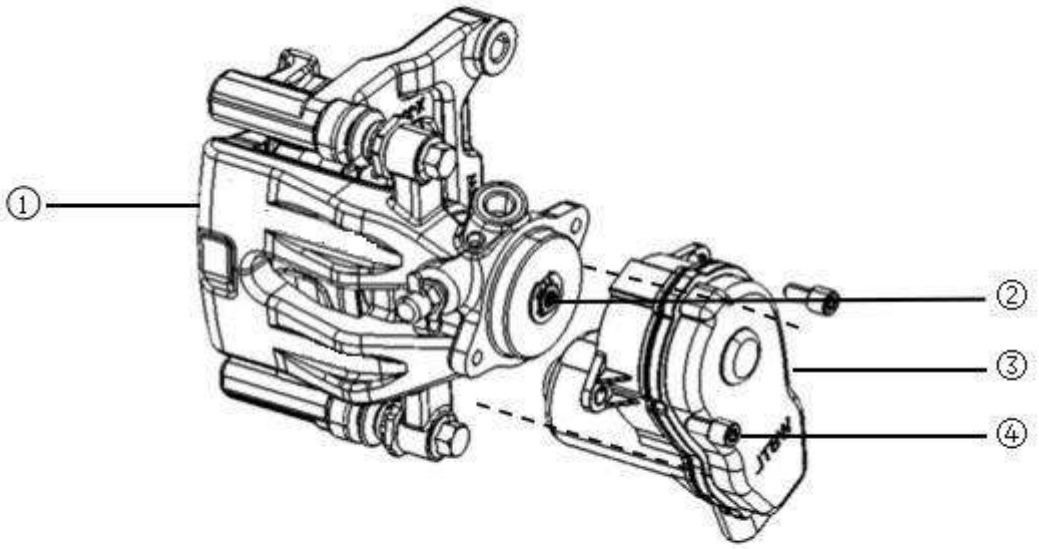
After finishing parts replacement or repair, pulled EPB switch for the first time, parking time will be long, which is a normal phenomenon.

External release

When power supply system of low voltage for vehicle is unusual, or parking ECU assembly and actuator are damaged, which might not release the parking brake through EPB switch, at this time, releasing the parking brake could use a special tool.

① Remove the fixing bolts of executive mechanical and brake, take out the executive mechanical slightly.

② Rotate screw in clockwise with special tool, release parking brake.



1 brake 2 external release interface 3 actuator 4 fixed screw

Rear brake clamp assembly

Caution：

External release will damage seal ring between the actuator and brake, so unless confirming the brake caliper assembly damage, do not use external release.

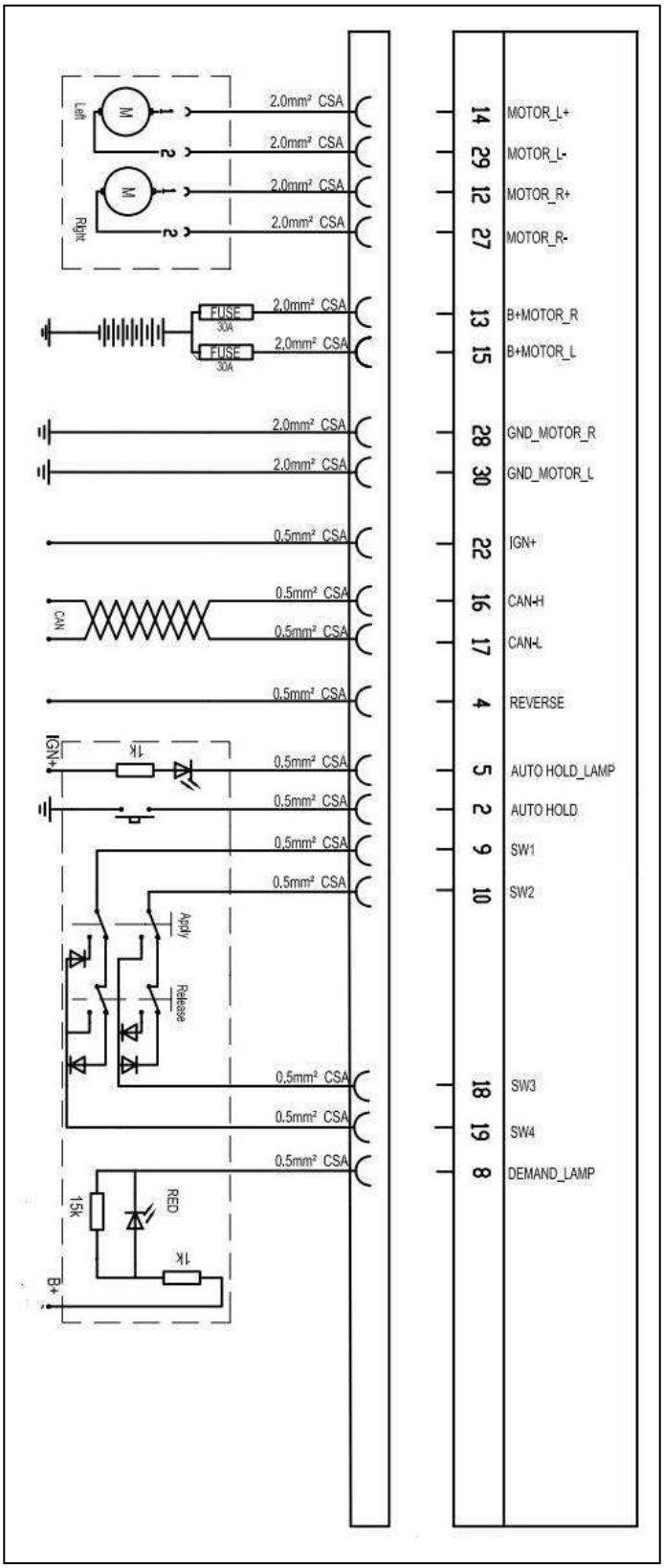
After external release, suggest replace rear brake caliper assembly.

Conditions for indicator light and fault light

When the electric switch turn from “ON” to “LOCK”or from the “LOCK” switch to “ON”, indicator light and fault light will light up to complete self-inspection.

Condition(status)	EPB status indicator (red)	EPB fault warning light (yellow)	EPB switch indicator light	AUTOHOLD switch indicator light	Tips statement in instrument
Parking	ON	OFF	ON	OFF	
With power, press down AUTOHOLD switch	OFF	OFF	OFF	ON	
Not step down brake pedal, press down EPB switch	ON	OFF	OFF	OFF	
Not fasten safety belt tightly, do automatically releasing function	ON	OFF	OFF	OFF	Please fasten tightly the safety belt
When parking brake system has fault(when parking)	OFF ON		OFF	OFF	Please go to DR shop for maintenance
When parking brake system has fault(when parking is releasing)	ON	ON	OFF	OFF	Please go to DR shop for maintenance
When EPB system has fault and EPB switch is operating, while the system couldn’t work.	ON	ON	ON	OFF	Please go to DR shop for maintenance

Schematic diagram



Safety and invalid

When EPB system has fault, fault warning light will be on in the instrument.

When EPB system has fault, part of EPB function will be limited. When the system couldn't parking, pull out or press down EPB switch, the indicator in the switch will flash and the yellow fault indicator light in the instrument will be on.

Tips：

When electrical parking couldn't be released through switch, please do "outer releasing" manually.

Fault code	Fault name	Fault grade	Phenomenon of vehicle fault
C110017	System voltage is too high	1	System voltage ＞16.5V, the system closed, unable to parking and release, all function is limited.
C110060	Actuator operating voltage is too low.	1	Parking and releasing function of fault actuator is in valid actuators clamps with maximum clamping force
C110016	System voltage is too low	1	System voltage ＜8.5 V, the system closed, unable to parking and release, all function is limited.
C110116	Electrical line has fault	4	Take CAN signal as standard, system stability decreases.
C11A418	Actuator has fault	1	Parking and releasing function of fault actuator is in valid actuators clamps with maximum clamping force
C11A477	Actuator has fault-low voltage	1	Parking and releasing function of fault actuator is in valid actuators clamps with maximum clamping force
C11A07C	Left actuator has fault-operating overtime	1	Parking and releasing function of left actuator is invalid Right actuators clamps with maximum clamping force
C11A37C	Right actuator has fault-operating overtime	1	Parking and releasing function of right actuator is invalid Left actuators clamps with maximum clamping force
C11A013	Left actuator has fault- open circuit	1	Parking and releasing function of left actuator is invalid Right actuators clamps with maximum clamping force
C11A313	Right actuator has fault-open circuit	1	Parking and releasing function of right actuator is invalid Left actuators clamps with maximum clamping force
C11A011	Left actuator has fault-control line failure	1	Parking and releasing function of left actuator is invalid Right actuators clamps with maximum clamping force
C11A311	Right actuator has fault-control line failure	1	Parking and releasing function of right actuator is invalid Left actuators clamps with maximum clamping force
C11A07E	Left actuator has fault-effective pipe failure	1	Parking and releasing function of left actuator is invalid Right actuators clamps with maximum clamping force
C11A37E	Right actuator has fault-effective pipe failure	1	Parking and releasing function of right actuator is invalid Left actuators clamps with maximum clamping force
C11A070	Left actuator has fault-mechanical damaged	1	Parking and releasing function of left actuator is invalid Right actuators clamps with maximum clamping force
C11A370	Right actuator has fault-mechanical damaged	1	Parking and releasing function of right actuator is invalid Left actuators clamps with maximum clamping force
C11A015	Left actuator has fault- short circuit	1	Parking and releasing function of left actuator is invalid Right actuators clamps with maximum clamping force
C11A315	Right actuator has fault-short circuit	1	Parking and releasing function of right actuator is invalid Left actuators clamps with maximum clamping force

Fault code	Fault name	Fault grade	Phenomenon of vehicle fault
C11A07D	Left actuator has fault-relay	1	Parking and releasing function of left actuator is invalid Right actuators clamps with maximum clamping force
C11A37D	Right actuator has fault-relay	1	Parking and releasing function of right actuator is invalid Left actuators clamps with maximum clamping force
C11A063	Left actuator has fault-transistor	1	Parking and releasing function of left actuator is invalid Right actuators clamps with maximum clamping force
C11A363	Right actuator has fault-transistor	1	Parking and releasing function of right actuator is invalid Left actuators clamps with maximum clamping force
C11A054	Left actuator has fault-Calibration error	1	Parking and releasing function of left actuator is invalid Right actuators clamps with maximum clamping force
C11A354	Right actuator has fault-Calibration error	1	Parking and releasing function of right actuator is invalid Left actuators clamps with maximum clamping force
C113800	Switch failure	2	Manual function is invalid, automatic parking and release function open automatically.
C113861	Switch failure- unstable status	2	Manual function is invalid, automatic parking and release function open automatically.
C11352A	Switch failure-pulling unsmoothly	2	Manual function is invalid, automatic parking and release function open automatically.
C11362A	Switch failure-releasing unsmoothly	2	Manual function is invalid, automatic parking and release function open automatically.
C110860	Switch failure-electrical failure	2	Manual function is invalid, automatic parking and release function open automatically.
C110862	Switch failure-status not the same	2	Manual function is invalid, automatic parking and release function open automatically.
C116045	Controller fault- stack	4	System function limited
C116040	Controller fault- D/a conversion	4	System function limited
C116042	Controller hardware fault-EEPROM	4	System function limited
C116055	Controller fault- equipped wrong	4	System function limited
C116086	Controller fault-data invalid	4	System function limited
C116054	Controller fault- No calibration	6	System function could be realized but the performance appears decreasing.
C11604C	Controller hardware fault-Advocate complementary communication	6	System function could be realized but the stability becomes decreasing.
C116004	Controller fault- Auxiliary chips	6	System function could be realized but the stability becomes decreasing.
C116046	Controller hardware fault-Primary storage	4	System function limited
C116044	Controller hardware fault-random storage	4	System function limited
C11607C	Controller fault- Auxiliary	4	System function could be realized but the stability becomes

Fault code	Fault name	Fault grade	Phenomenon of vehicle fault
	input/output control chip		decreasing.
C111329	Acceleration sensor signal invalid	4	When parking, perform maximum clamping force, it could not judge the vehicle dynamic or static in the condition of ABS fault.
C111396	Acceleration sensor Self-checking failure	4	perform maximum clamping force when parking.
U007388	CAN line bus off CAN	3	System goes into the degraded mode. In the IGN OFF state, parking can be achieved by static testing function, in IGN on state, releasing can be achieved through press the switch for long time.
U000188	Node of CAN line loss	3	System goes into the degraded mode. In the IGN OFF state, parking can be achieved by static testing function, in IGN on state, releasing can be achieved through press the switch for long time.
U010087	Node of PCU loss	4	Automatic releasing function invalid.
U010187	Node of VCU loss	4	Automatic releasing function invalid.
U012987	Node of ABS_ESC loss	4	Dynamic braking function invalid、 parking function when power off is invalid.
U014087	Node of ICM loss	4	Automatic releasing function invalid、automatic and leasing function is in valid.
U012687	Node of AC loss	4	Clamping function under high temperature downgrade
U040186	Node of PCU with invalid signal	4	Automatic releasing function invalid.
U040286	Node of VCU with invalid signal	4	Automatic releasing function invalid.
U048186	Node of ABS_ESC with invalid signal	4	Dynamic braking function invalid、 parking function when power off is invalid.
U042286	Node of ICM with invalid signal	4	Automatic releasing function invalid、automatic and leasing function is in valid.
U042886	Node of AC with invalid signal	4	Clamping function under high temperature downgrade
C11D114	EPB status light-Open circuit or short circuit to ground	4	EPB status light is always off.
C11D112	EPB status light- short circuit to height	4	EPB status light is always on.
C116154	Calibration is not finished after off line	6	Slope accuracy is reduced, slide may happen

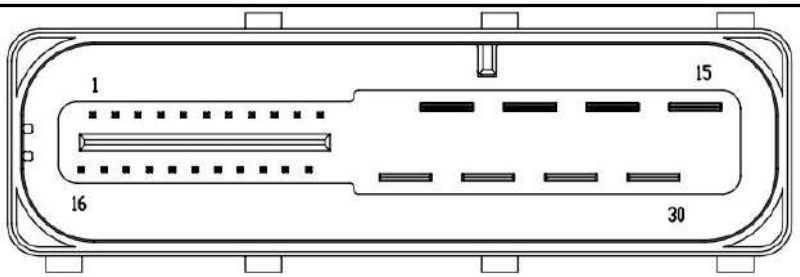
When multiple fault codes appear at the same time, rule out according to the fault grade step by step.

Tip：

Fault grade data is less, the grade is higher.

Stitch definition of connectors

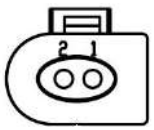
Stitch definition of connectors of parking ECU assembly



Stich no	Definition	Stich no	Definition
1	N/A	16	CAN high / CAN-H
2	Automatic parking switch signal/Autohold	17	Can low / CAN-L
3	N/A	18	EPB switch signal 3/SW3
4	N/A	19	EPB switch signal 43/SW4
5	Automatic parking switch indictator controlling signal/Autohold lamp	20	N/A
6	N/A	21	N/A
7	N/A	22	Power on switch signal/IGN+
8	Indicator controlling signal in parking status /Demand lamp	23	N/A
9	EPB switch signal 1/SW1	24	N/A
10	EPB switch signal 2/SW2	25	N/A
11	N/A	26	N/A
12	Right actuator control positive/Motor_R+	27	Right actuator control negative/Motor_R-
13	Right actuator power positive/B+Motor_R	28	Right actuator power ground/GND Motor R
14	Left actuator control positive/Motor_L+	29	Left actuator control negative/Motor_L-
15	Left actuator power positive/B+Motor L	30	Left actuator power ground/GND Motor L

Stitch definition of connectors of executive mechanical

Connectors of left and right actuator are the same, stitch definition is the same.



Stich no	Definition	Stich no	Definition
1	Motor power+	2	Motor power-

Basic check

Diagnosis and maintenance process

Fault diagnosis process details

1 Collect customer information

Before check, carefully ask customer concerns or driving vehicles together with the customer which is very important for solving the problem.

2 Check symptoms

According to the information collected through interviewing with the customer ,reappear information of customer specified symptoms. Check whether the symptoms caused by the failure mode.

Caution:

When symptoms are caused by normal operation, please fully inspect each related parts and let customers understand the symptoms are normal.

3 Diagnose whether there is fault code with diagnostic instrument

Yes>>record and delete fault code, turn to next step

No>> turn to “Normal symptom and analysis”

4 Fault confirmed again

Appears fault again and diagnose whether there is fault code with diagnostic instrument.

Yes>> turn to “fault code, electrical line fault diagnosis”

No>> check harness and connector based on discussion face to face, please see “ground and loop”

5 Maintenance or replace fault parts

Maintenance or replace fault parts, connect the connectors and harnesses again and delete fault code with diagnostic instrument.

6 Do the fault operation again to check whether there is a still fault symptom.

Yes>> back to step 3

No >> Finish maintenance

Diagnosis working list

In general, customers have their own judgment standard to a problem. Therefore, careful enough to ask to understand customer's concern is very important. Preparing interview list makes diagnostic information systematic. Sometimes, many conditions occur at the same time resulting in failure.

Interview list sample

<table>
<tr><th colspan="6">Interview list</th></tr>
<tr><td rowspan="2">Customer name</td><td rowspan="2">Gender</td><td>Plate No</td><td></td><td>Original registered date</td><td></td></tr>
<tr><td>Model</td><td></td><td>VIN</td><td></td></tr>
<tr><td>Production date</td><td></td><td>Motor power</td><td></td><td>Mileage</td><td>km</td></tr>
<tr><td rowspan="11">Fault conditions</td><td rowspan="3">Fault type</td><td colspan="4">□Unable to parking □Unable to release □Abnormal noise
□Unable to parking when braking □Still brake after release
□ Drag ground when automatic releasing
□ vehicle slip when automatic releasing □Parking light not on
□Parking light is always on □ Parking light flashing
□ Parking fault light is on
□The instrument remind to go to 4S shop for maintenance</td></tr>
<tr><td>Detailed symptom</td><td colspan="3"></td></tr>
<tr><td>Detailed abnormal noise</td><td colspan="3"></td></tr>
<tr><td>Shift</td><td colspan="4">□R □N □D</td></tr>
<tr><td>Safety belt</td><td colspan="4">□With □Without</td></tr>
<tr><td>Brake pedal status</td><td colspan="4">□NON Step □Step</td></tr>
<tr><td>Parking brake status</td><td colspan="4">□release status □parking status □releasing
□parking □Continuous</td></tr>
<tr><td>Vehicle status</td><td colspan="4">□Key LOCK □Key ACC □Key ON □READY</td></tr>
<tr><td>Vehicle moving status</td><td colspan="4">□Start in shift D □Drive in shift D □Parking in shift D
□Start in shift R □Drive in shift R □Parking in shift R
□Parking in shift N □Drive with slow speed □Drive with high speed</td></tr>
<tr><td>Road conditions</td><td colspan="4">□Steep downhill □Slow down □Flat Road
□Slowly uphill □Steep uphill</td></tr>
<tr><td>Passengers</td><td colspan="4">□5 □4 □3 □2 □1</td></tr>
<tr><td>Vehicle loading conditions</td><td colspan="4"></td></tr>
<tr><td>Outer releasing history</td><td colspan="4"></td></tr>
</table>

Interview list					
Customer name	Gender	Plate No		Original registered date	
		Model		VIN	
Production date		Motor power		Mileage	km
Check result	Check result				
	12V battery status	□Normal □Abnormal（ ）□Pending			
	Connectors status	□Normal □Abnormal（ ）□Pending			
	EPB brake status	□Normal □Abnormal（ ）□Pending			
	Friction plate status	□Normal □Abnormal（ ）□Pending			
	EPB switch status	□Normal □Abnormal（ ）□Pending			
	Other status				

Zero position learning of Parking ECU assembly

Description

Caution：

When remove、change parking ECU assembly or bracket, zero position learning of parking ECU assembly is needed to be done.

Working process

Caution：

Diagnostic instrument must be used to carry out the offline learning.

1. Vehicle preparation

① Put the vehicle in the flat road.

② Put the power-on switch in “OFF”shift.

2. Check whether the installation state of parts of EPB system is normal, if it is normal, please enter into the next step. If not, please repair or replace defective parts.
3. Put the power-on switch in “ON” block, check whether there is fault with echocardiography, if yes, check and repair. Please see "Fault code, circuit fault diagnosis”. If not, enter into the next step.
4. Select "EPB," "off line zero calibration", "start". Complete zero learning based on diagnostic instrument.

Caution：

Forbidden to operate EPB switch in the process of zero positioning learning.

5. System fault diagnostic

① Pull up EPB switch, do parking brake.

② Step down the brake pedal, press down EPB switch and release parking brake.

6. Diagnose whether there is fault code with diagnostic instrument, if yes, check and repair. Please see "Fault code, circuit fault diagnosis”. If not, enter into the next step.
7. Delete previous fault

① Put the power-on switch in “OFF” block, then put it in”ON”block after 10s.

Caution：

Take action according to step ①

② Clear historical fault, if successful, zero learning is over. If not, check the fault codes and carry out maintenance.

Fault code, circuit fault diagnosis

Parking ECU assembly fault C116045、C116040、C116042、C116055、C116086、C116054、C11604C、C116004、C116046、C116044、C11607C、C111329、C111396

Fault code	Fault name	Checking conditions	Possible reason
C116045	Controller fault- stack	Parking ECU assembly control abnormally.	Harness or connectors Parking ECU assembly
C116040	Controller fault- D/a conversion	Parking ECU assembly control abnormally.	
C116042	Controller hardware fault-EEPROM	Parking ECU assembly control abnormally.	
C116055	Controller fault- equipped wrong	Parking ECU assembly control abnormally.	
C116086	Controller fault-data invalid	Parking ECU assembly control abnormally.	
C116054	Controller fault- No calibration	Parking ECU assembly control abnormally.	
C11604C	Controller hardware fault-Advocate complementary communication	Parking ECU assembly control abnormally.	
C116004	Controller fault- Auxiliary chips	Parking ECU assembly control abnormally.	
C116046	Controller hardware fault-Primary storage	Parking ECU assembly control abnormally.	
C116044	Controller hardware fault-random storage	Parking ECU assembly control abnormally.	
C11607C	Controller fault- Auxiliary input/output control chip	Parking ECU assembly control abnormally.	
C111329	Acceleration sensor signal invalid	Parking ECU assembly control abnormally.	
C111396	Acceleration sensor Self-checking failure	Parking ECU assembly control abnormally.	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of ECU assembly is damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Replace parking ECU assembly, please see “Remove and installation”

5 Execute zero position learning of parking ECU assembly; do self-diagnosis to check whether fault code exists.

Yes >> check、maintenance the harness connected with parking ECU assembly. Please see “Electric sub-manual - grounding and loop”

No >> finish diagnosis

6 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

Fault of parking executive mechanical driving circuit

C11A011、C11A311、C11A07E、C11A37E、C11A07D、C11A37D、C11A063、C11A363

Fault code	Fault name	Checking conditions	Possible reason
C11A011	Left actuator has fault- control circuit failure	Parking ECU checks out the fault of parking executive mechanical driving circuit	Harness or connectors Parking ECU assembly
C11A311	Right actuator has fault- control circuit failure	Parking ECU checks out the fault of parking executive mechanical driving circuit	
C11A07E	Left actuator has fault-effective pipe failure	Parking ECU checks out the fault of parking executive mechanical driving circuit	
C11A37E	Right actuator has fault-effective pipe failure	Parking ECU checks out the fault of parking executive mechanical driving circuit	
C11A07D	Left actuator has fault-relay	Parking ECU checks out the fault of parking executive mechanical driving circuit	
C11A37D	Right actuator has fault-relay	Parking ECU checks out the fault of parking executive mechanical driving circuit	
C11A063	Left actuator has fault- transistor	Parking ECU checks out the fault of parking executive mechanical driving circuit	
C11A363	Right actuator has fault- transistor	Parking ECU checks out the fault of parking executive mechanical driving circuit	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of ECU assembly is damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Replace parking ECU assembly, please see “Remove and installation”

5 Execute zero position learning of parking ECU assembly; do self-diagnosis to check whether fault code exists.

Yes >> check、maintenance the harness connected with parking ECU assembly. Please see “Electric sub-manual - grounding and loop”

No >> finish diagnosis

6 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

Fault of parking actuator C11A418、C11A477、C11A07C、C11A37C、C11A013、C11A313、C11A070、C11A370、C11A015、C11A315、C11A054、C11A354

Fault code	Fault name	Checking conditions	Possible reason
C11A418	Actuator has fault	Acutator couldn't execute the order of parking ECU assembly.	Harness or connectors Left and right rear brake caliper assembly Parking ECU assembly
C11A477	Actuator has fault-low voltage	Parking ECU assembly checks out that the voltage at both end of actuator is less than 9V.	Harness or connectors Left and right rear brake caliper assembly Parking ECU assembly
C11A07C	Left actuator operates overtime	Left actuator parking overtime.	Harness or connectors Left rear brake caliper assembly Parking ECU assembly
C11A37C	Right actuator operates overtime	Right actuator parking overtime.	Harness or connectors Right rear brake caliper assembly Parking ECU assembly
C11A013	Left actuator is in open circuit.	Parking ECU assembly checks out left actuators with open circuit.	Harness or connectors Left rear brake caliper assembly Parking ECU assembly
C11A313	Right actuator is in open circuit.	Parking ECU assembly checks out right actuators with open circuit.	Harness or connectors Right rear brake caliper assembly Parking ECU assembly
C11A070	Left actuator mechanical is damaged.	Parking ECU assembly checks out left actuators with damaged circuit.	Harness or connectors Left rear brake caliper assembly Parking ECU assembly
C11A370	Right actuator mechanical is damaged.	Parking ECU assembly checks out Right actuators with damaged circuit.	Harness or connectors Right rear brake caliper assembly Parking ECU assembly
C11A015	Left actuator is short circuit	Parking ECU assembly checks out left actuators with short circuit.	Harness or connectors Left rear brake caliper assembly Parking ECU assembly
C11A315	Right actuator is short circuit	Parking ECU assembly checks out right actuators with open circuit.	Harness or connectors Right rear brake caliper assembly Parking ECU assembly
C11A054	Left actuator with Calibration error	Parking ECU assembly checks out left actuators without calibration for delivery out of factory.	Harness or connectors Left rear brake caliper assembly Parking ECU assembly
C11A354	Right actuator with Calibration error	Parking ECU assembly checks out left actuators without calibration for delivery out of factory.	Harness or connectors Right rear brake caliper assembly Parking ECU assembly

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of parking mechanical is damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Check whether the assembly of friction plate is abnormal or excessive wear.

Yes>> assembly again or replace. Next step.

No>> Next step

4Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

5 check、maintenance the harness connected executive mechanical with parking ECU assembly. Please see “Electric sub-manual - grounding and loop”

Yes>>replace the fault rear brake caliper assembly. Please see “brake system-rear brake caliper assembly-remove and installation”. Next step.

No >> finish diagnosis

6 do self-diagnosis to check whether fault code exists.

Yes>>replace parking ECU assembly. Please see “remove and installation”

No >> finish diagnosis

7 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

Switch fault C113800、C113861、C11352A、C11362A、C110860、C110862 EPB

Fault code	Fault name	Checking conditions	Possible reason
C113800	Switch failure	Parking ECU assembly checks out switch with fault.	Harness or connectors EPB switch Parking ECU assembly
C113861	Switch failure- unstable status	EPB switch status change	
C11352A	Switch failure-pulling unsmoothly	EPB switch output the signal of pulling up more than 20s	
C11362A	Switch failure-releasing unsmoothly	EPB switch output the signal of releasing more than 20s	
C110860	Switch failure-electrical failure	Parking ECU assembly don't check out signal or couldn't recognize signal.	
C110862	Switch failure-status not the same	Advocate complementary chip of parking ECU assembly checks out the EPB switch state is not the same.	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of EPB assembly are damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Change EPB switch ,do self-diagnosis to check whether fault code exists.

Yes>> next step

No >> finish diagnosis

5 Replace parking ECU assembly, please see " remove and installation"

6 Start zero position learning of parking ECU assembly,do self-diagnosis to check whether fault code exists.

Yes>> check、maintenance the harness connected EPB switch with parking ECU assembly. Please see "Electric sub-manual - grounding and loop"

No >> finish diagnosis

7 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

System electrical supplying fault U100016、U100017

Fault code	Fault name	Checking conditions	Possible reason
U100016	System voltage is too low	Supply voltage of parking ECU assembly＜8.5V	Harness or connectors Parking ECU assembly 12V battery
U100017	System voltage is too high	Supply voltage of parking ECU assembly＞16.5V	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of parking ECU assembly are damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Put power on switch on shift “ON”, check whether the voltage of 12V battery is abnormal.Please see “Electric sub-manual - grounding and loop”.

Yes>>replace 12V battery. Please see “Electric sub-manual - grounding and loop”. Next step.

No>> Next step

4 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

5 Check grounding circuit of parking ECU assembly

① Put the power on switch in the shift “LOCK”.

② Pull out he connectors of parking ECU assembly, check whether the corresponding stitch at harness end of stitch28 and stitch30 are unobstructed.

Yes>> next step

No >> circuit fault of parking ECU, maintenance or replacement. Please see“Electric sub-manual - grounding and loop”.

6 Check electrical supplying circuit of parking ECU assembly

check whether the voltage between corresponding stitch at harness end of stitch13 and stitch15 and ground are normal.

Yes>> next step

No >> circuit fault of parking ECU, maintenance or replacement. Please see“Electric sub-manual - grounding and loop”.

Caution：

perform self-diagnosis and clear fault codes after grounding or power supply circuit breakdown maintenance,and confirm whether the fault has been exempted. If fault unwinding, please continue to conduct diagnosis.

7 Replace parking ECU assembly, please see “Remove and installation”. Do the zero position learning of parking ECU assembly.

8 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

Hard line signal fault of power-on switch C110116

Fault code	Fault name	Checking conditions	Possible reason
C110116	Electrical switch circuit has fault	Parking ECU assembly couldn't receive signal of power-on or there is different between hardline signal and CAN signal.	Harness or connectors Parking ECU assembly

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of parking ECU assembly are damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Check grounding circuit of parking ECU assembly

① Put the key in the shift "LOCK".

② Pull out he connectors of parking ECU assembly, check whether the corresponding stitch at harness end of stitch28 and stitch30 are unobstructed.

Yes>> next step

No >> grounding fault, maintenance or replacement. Please see"Electric sub-manual - grounding and loop".

5 Check electrical supplying circuit of parking ECU assembly

① check whether the voltage between corresponding stitch at harness end of stitch22 and ground is zero.

② Put the power on switch in shift "ON" to check whether the voltage between corresponding stitch at harness end of stitch22 and ground is normal.

Yes>> next step

No >> power on switch signal fault, maintenance or replacement. Please see"Electric sub-manual - grounding and loop".

Caution：

Perform self-diagnosis and clear fault codes after grounding or power supply circuit breakdown maintenance,and confirm whether the fault has been exempted. If fault unwinding, please continue to conduct diagnosis.

6 Replace parking ECU assembly, please see “Remove and installation”. Do the zero position learning of parking ECU assembly.

7 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

Communication fault U010187、U040286

Fault code	Fault name	Checking conditions	Possible reason
U010187	Node of VCU loss	Parking ECU assembly couldn’t receive VCU signal through CAN .	Vehicle controller CAN communication system Parking ECU assembly
U040286	Node of VCU with one invalid signal VCU	One of the VCU signal which received by parking ECU assembly is in valid.	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of EPB controller assembly are damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Check whether VCU has fault.Please see“Electric sub-manual - grounding and loop”.

Yes>>check and repair VCU. Please see“Electric sub-manual - grounding and loop”.

No>> next step

5 Check CAN communication sub-line of EPB system is normal.Please see“Electric sub-manual - CAN communication system”.

Yes>>Replace parking ECU assembly, please see “Remove and installation”. Do the zero position learning of parking ECU assembly.

No>> repair or replace fault parts. Please see“Electric sub-manual - CAN communication system”.

6 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

Communication fault with PCU U010087、U040186

Fault code	Fault name	Checking conditions	Possible reason
U010087	Node of PCU loss	Parking ECU assembly couldn't receive PCU signal through CAN	Motor controller Harness or connectors Parking ECU assembly
U040186	Node of PCU with one invalid signal	One of the PCU signal which received by parking ECU assembly is in valid.	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of EPB controller assembly are damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Check whether PCU has fault.Please see“Electric sub-manual - driving system of electrical vehicle”.

Yes>>check and repair PCU. Please see“Electric sub-manual - driving system of electrical vehicle”.

No >>next step

5 Check CAN communication sub-line of EPB system is normal.Please see“Electric sub-manual - CAN communication system”.

Yes>>Replace parking ECU assembly, please see “Remove and installation”. Do the zero position learning of parking ECU assembly.

No>> repair or replace fault parts. Please see“Electric sub-manual - CAN communication system”.

6 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

Communication fault with ABS U012987、U048186

Fault code	Fault name	Checking conditions	Possible reason
U012987	Node of ABS loss	Parking ECU assembly couldn't receive ABS signal through CAN .	ABS controller Harness or connectors Parking ECU assembly
U048186	Node of ABS with one invalid signal	One of the ABS signal which received by parking ECU assembly is in valid.	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of EPB controller assembly are damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Check whether ABS has fault.Please see“Electric sub-manual - brake control system”.

Yes>>check and repair ABS.Please see“Electric sub-manual - brake control system”.

No >>next step

5 Check CAN communication sub-line of EPB system is normal.Please see“Electric sub-manual - CAN communication system”.

Yes>>Replace parking ECU assembly, please see “Remove and installation”. Do the zero position learning of parking ECU assembly.

No>> repair or replace fault parts. Please see“Electric sub-manual - CAN communication system”.

6 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

Communication fault U014087、U042286

Fault code	Fault name	Checking conditions	Possible reason
U014087	Node of ICM loss	Parking ECU assembly couldn't receive ABS signal through CAN .	Combination instrument Harness or connectors Parking ECU assembly
U042286	Node of ABS with one invalid signal	One of the ABS signal which received by parking ECU assembly is in valid.	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of EPB controller assembly are damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Check whether there is fault in ICM. Please see“Electric sub-manual - combination instrument”.

Yes>> Check and repair ICM. Please see“Electric sub-manual - combination instrument”.

No>> next step

5 Check CAN communication sub-line of EPB system is normal.Please see“Electric sub-manual - CAN communication system”.

Yes>>Replace parking ECU assembly, please see “Remove and installation”. Do the zero position learning of parking ECU assembly.

No>> repair or replace fault parts. Please see“Electric sub-manual - CAN communication system”.

6 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

Communication fault with AC controller U0112687、U042886

Fault code	Fault name	Checking conditions	Possible reason
U012687	Node of AC controller loss	Parking ECU assembly couldn't receive AC controller signal through CAN .	AC controller Harness or connectors Parking ECU assembly
U042886	Node of AC controller with one invalid signal	One of the AC controller signal which received by parking ECU assembly is in valid.	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of EPB controller assembly are damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Check whether AC controller has fault.Please see“Electric sub-manual - AC controller”.

Yes>>check and repair.Please see“Electric sub-manual - AC controller”.

No >>next step

5 Check CAN communication sub-line of EPB system is normal.Please see“Electric sub-manual - CAN communication system”.

Yes>>Replace parking ECU assembly, please see “Remove and installation”. Do the zero position learning of parking ECU assembly.

No>> repair or replace fault parts. Please see“Electric sub-manual - CAN communication system”.

6 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

CAN communication fault U007388、U000188

Fault code	Fault name	Checking conditions	Possible reason
U007388	CAN communication fault	Failure of input and out put of EPB system	Harness and connectors of communication Connecting harness and connectors of parking ECU
U000188	CAN communication fault	All communicaiton nodes are overtime.	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of EPB controller assembly are damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Check whether CAN communication system has fault.Please see“Electric sub-manual - CAN communication system”.

Yes>>check and repair.Please see“Electric sub-manual - CAN communication system”.

No >>next step

5 check and repair connecting harness of parking ECU assembly. Please see“Electric sub-manual - grounding and loop”.

6 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

Zero positioning unlearning of parking ECU assembly

Fault code	Fault name	Checking conditions	Possible reason
C116154	Zero positioning unlearning of parking ECU assembly.	Zero positioning unlearning of parking ECU assembly.	Parking ECU assembly

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of EPB controller assembly are damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Do the zero position learning of parking ECU assembly.

Fault of EPB switch status C11D12、C11D14 EPB

Fault code	Fault name	Checking conditions	Possible reason
C11D12	EPB switch status light- short circuit to power	EPB switch status light is always on.	Harness or connectors EPB switch Parking ECU assembly
C11D14	EPB status switch light-Open circuit or short circuit to ground	EPB status switch light is always off.	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether pins and wiring harness connector of EPB controller assembly are damaged or loosen.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block.

④ Pull up and press down EPB switch separately once time.

⑤ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Change EPB switch, do self diagnosis process to check whether there still have fault code.

Yes>> next step

No >> finish diagnosis

5 Replace parking ECU assembly, please see “Remove and installation”.

6 Do the zero position learning of parking ECU assembly.do self diagnosis process to check whether there still have fault code.

Yes>> check、repair the harness connecting EPB switch and parking ECU assembly. Please see “Electric sub-manual - grounding and loop”.

No >> finish diagnosis

7 Take action on self-diagnosis and delete old fault code after finishing diagnosis.

Common symptom and analysis

Press down EPB switch, parking couldn’t be released

1 Carry out self-diagnosis, check whether self-diagnosis result has fault code.

Yes >>check and maintenance of fault.Next step.

No>> Turn to 3

2 Check symptoms

Check whether parking could be released when pressing down EPB switch.

Yes>> diagnosis finish

No>> Next step

3 check the brake light switch and connecting harness on the brake pedal. Please see “Chassis sub-manual- brake system” and “Electric sub-manual - grounding and loop”

Yes>> repair or replace fault parts, turn to 2.

No>> Next step

4 Harness check

Check whether the positive and negative of harness of rear brake caliper assembly and parking ECU assembly is opposite. Please see “Electric sub-manual - grounding and loop”

Yes>> repair or replace harness.

NO >>replace parking ECU assembly; do zero position learning and delete old fault code after finishing diagnosis.

Pulling up EPB switch, vehicle couldn't be parking

1 Carry out self-diagnosis, check whether self-diagnosis result has fault code.

Yes >>check and maintenance of fault.Next step.

No>> Turn to 3

2 Check symptoms

Check whether parking could be done when pulling up EPB switch.

Yes>> diagnosis finish

No>> Next step

3 Harness check

Check whether the positive and negative of harness of rear brake caliper assembly and parking ECU assembly is opposite. Please see "Electric sub-manual - grounding and loop"

Yes>> repair or replace harness.

NO >>replace parking ECU assembly; do zero position learning and delete old fault code after finishing diagnosis.

No way to enter into automatic parking model

1 Carry out self-diagnosis, check whether self-diagnosis result has fault code.

Yes >>Fault code、circuit fault diagnosis.Next step.

No>> Turn to 3

2 Check symptoms

Check whether it couldenter into automatic parking model.

Yes>> diagnosis finish

No>> Next step

3 check whether the light for safty belt untightening or door unlock is on.

Yes >> check and repair according to signal track. Please see "electrical sub-manual-combination instrument"

No>> Next step

3 Replace AUTOHOLD switch, check whether it could enter and exit the automatic parking model.

Yes>> diagnosis finish

No>>check and repair connecting harness for AUTOHOLD switch and parking ECU assembly.

4 Check symptoms

Check whether it could enter and exit the automatic parking model.

Yes>> diagnosis finish

No>>replace parking ECU assembly; do zero position learning and delete old fault code after finishing diagnosis.

No way to exit automatic parking model

1 Carry out self-diagnosis, check whether self-diagnosis result has fault code.

Yes >>Fault code、circuit fault diagnosis.Next step.

No>> Turn to 3

2 Check symptoms

Check whether it could enter into or exit automatic parking model.

Yes>> diagnosis finish

No>> Next step

3 Replace AUTOHOLD switch, check whether it could enter and exit the automatic parking model.

Yes>> diagnosis finish

No>>check and repair connecting harness for AUTOHOLD switch and parking ECU assembly.

4 Check symptoms

Check whether it could enter and exit the automatic parking model.

Yes>> diagnosis finish

No>>replace parking ECU assembly; do zero position learning and delete old fault code after finishing diagnosis.

Without start auxiliary function

1 Carry out self-diagnosis, check whether self-diagnosis result has fault code.

Yes >>Fault code、circuit fault diagnosis.Next step.

No>> Turn to 3

2 Check symptoms

Check whether it has start auxiliary function.

Yes>> diagnosis finish

No>> Next step

3 check whether the light for safty belt untightening or door unlock is on.

Yes >> check and repair according to signal track. Please see “electrical sub-manual-combination instrument”

No>> Next step

4 Check symptoms

Check whether it could enter and exit the automatic parking model.

Yes>> diagnosis finish

No>>replace parking ECU assembly; do zero position learning and delete old fault code after finishing diagnosis.

Vehicles slope in the parking ramp

1 Carry out self-diagnosis, check whether self-diagnosis result has fault code.

Yes >>Fault code、circuit fault diagnosis.Next step.

No>> Turn to 3

2 Check symptoms

Check whether the function for anti-slope is normal.

Yes>> diagnosis finish

No>> Next step

3 Check whether the friction plate of rear brake caliper is over worn or equippeddnotwell. Please see “Chassis submanual- brake system”

Yes>>replace or equipped friction plate again.

No>> Next step

4 Check symptoms

Check whether the function for anti-slope is normal.

Yes>> diagnosis finish

No>>replace parking ECU assembly; do zero position learning and delete old fault code after finishing diagnosis.

Driving up EPB switch, rear wheel lockup

1 Carry out self-diagnosis, check whether self-diagnosis result has fault code.

Yes >>Fault code、circuit fault diagnosis.Next step.

No>> Turn to 3

2 Check symptoms

Check whether the fault is deleted.

Yes>> diagnosis finish

No>> Next step

3 Pull out the connectors in the left rear brake caliper; pull up EPB switch and checkwhether right rear brake caliper assembly clamp tightenly.

Yes>>replace parking ECU assembly; do zero position learning and delete old fault code after finishing diagnosis.

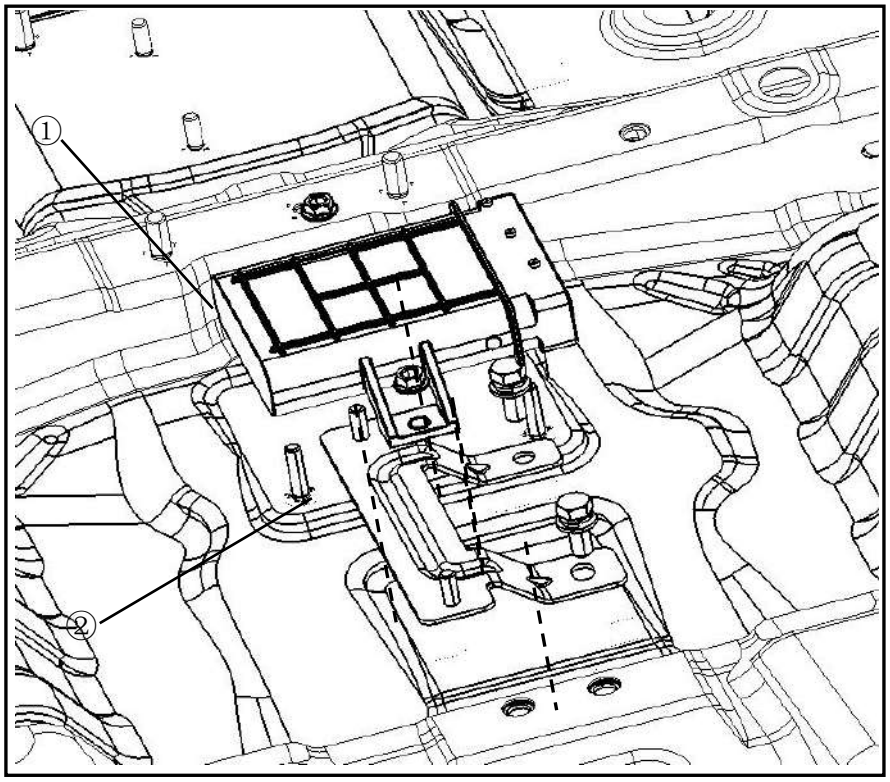
No>> Next step

4 Adujust connectors of left and right rear brake caliper assembly and fix thenagain.

Remove and installation

Parking ECU assembly

Explosion diagram



1Parking ECU assembly 2 Parking ECU bracket

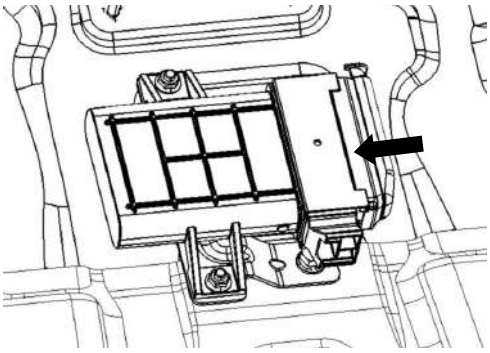
Remove and installation

Remove

1 Put power-on switches on “OFF”block, start next operation.

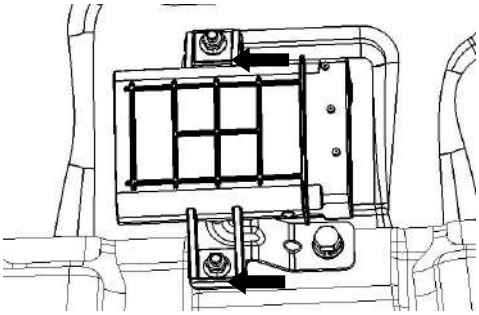
2 Remove rear part assembly of vice instrument board.

3 Pull out connectors of parking ECU assembly



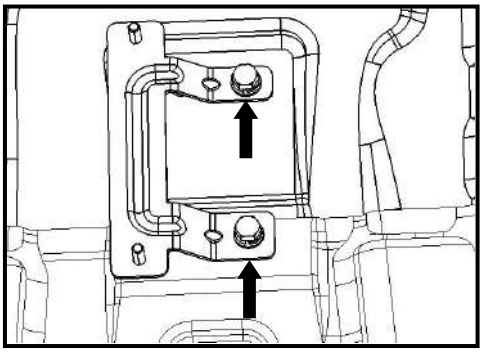
4 Remove two fixing nuts of parking ECU assembly and its bracket, take out parking ECU assembly.

- Tightening torque: 9～11N·m



5 Remove two fixing bolts of parking ECU bracket, take out parking ECU bracket.

- Tightening torque: 20～25N·m



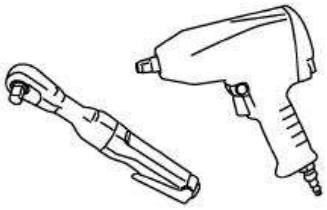
Installation

Install in the opposite order of remove.

Parking system

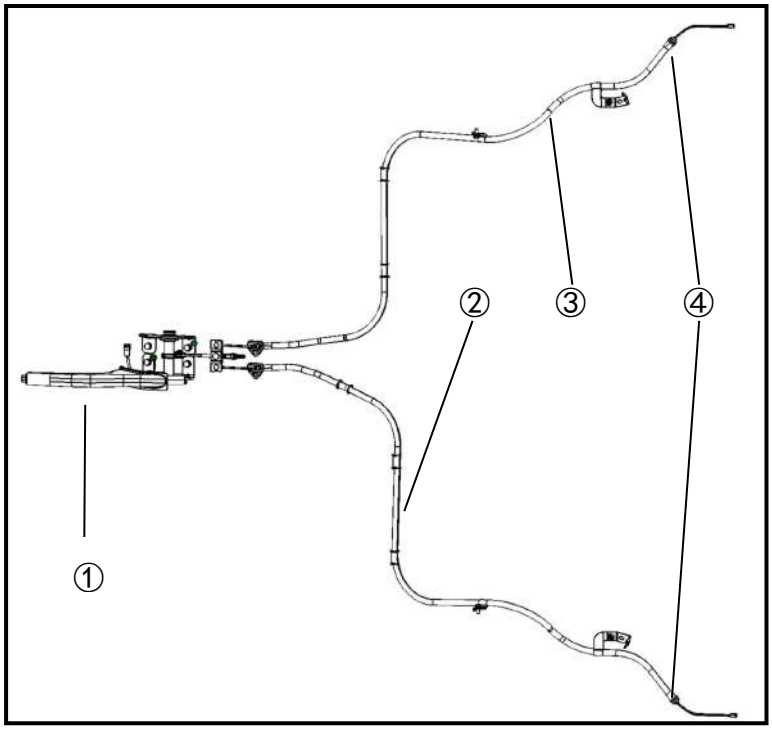
Preparation work

Commonly used tools

Tool	Diagram	Instruction
Power tool		Install and remove bolts and nuts

System description

This vehicle is equipped with mechanical parking brake system, which is composed of parking handle, left and right parking drawing.



1 Parking handle 2 Left parking drawing 3 Right parking drawing 4 Circlip

Tips:

- When pull up parking lever, there is sound "hitched, hitched" , which is the voice of the mechanical mechanism locking,and it is normal.
- When put down the parking handle, need slight lift and press down the button in the front of handle.

Basic check

Diagnosis and maintenance process

Fault diagnosis process details

1 Collect customer information

Before check, carefully ask customer concerns or driving vehicles together with the customer which is very important for solving the problem.

2 Check symptom

According to the information collected through interviewing with the customer ,reappear information of customer specified symptoms. Check whether the symptoms caused by the failure mode.

Caution:

When symptoms are caused by normal operation, please fully inspect each related parts and let customers understand the symptoms are normal.

3 Repair or replace defective parts

① Repair or replace defective parts

② re-assembly and connect after repairing or replace defective parts

4 Confirm the symptoms disappear

If symptoms disappear, meaning complete the maintenance. If not, then return to step 3.

Diagnostic work list

In general, customers have their own judgment standard to a problem. Therefore, careful enough to ask to understand customer's concern is very important. Preparing interview list make diagnostic information systematic. Some times, many conditions occur at the same time resulting in failure.

Interview list sample

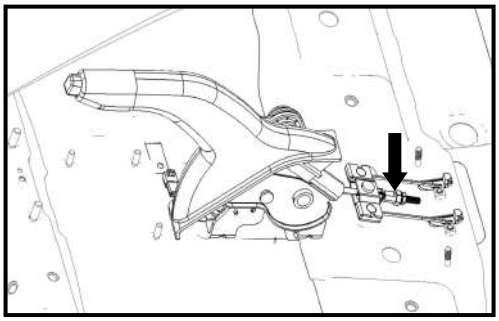
Interview list					
Customer name	Gender	Plate No		Original registered date	
		Model		VIN	
Production date		Motor power		Mileage	m
Fault conditions	Fault type	□Unable to parking □Unable to release □Abnormal noise □Unable to parking when braking □Still brake after release □handle button couldn't be out □Parking light not on when pull up parking handle □Parking light is always on □ Parking light flashing			
		Detailed symptom			
		Detailed abnormal noise			
	Shift	□R □N □D			
	Safety belt	□With □Without			
	Brake pedal status	□NON Step □Step			
	Parking handle status	□Status of putting down the parking handle □Pulling up the parking handle □Putting down the parking handle □Braking □Continuous			
	Vehicle status	□Key LOCK □Key ACC □Key ON □READY			
	Vehicle moving status	□Start in shift D □Drive in shift D □Parking in shift D □Start in shift R □Drive in shift R □Parking in shift R □Parking in shift N □Drive with slow speed □Drive with high speed			
	Road conditions	□Steep downhill □Slow down □Flat Road □Slowly uphill □Steep uphill			
	Passengers	□5 □4 □3 □2 □1			
	Vehicle loading conditions				
Check result	Check result				
	12V battery status	□Normal □Abnormal（ ） □Pending			
	Connectors status	□Normal □Abnormal（ ） □Pending			
	Parking drawing status	□Normal □Abnormal（ ） □Pending			
	Brake shoe status	□Normal □Abnormal（ ） □Pending			
	Parking handle status	□Normal □Abnormal（ ） □Pending			
	Other status				

Remove and install

Remove

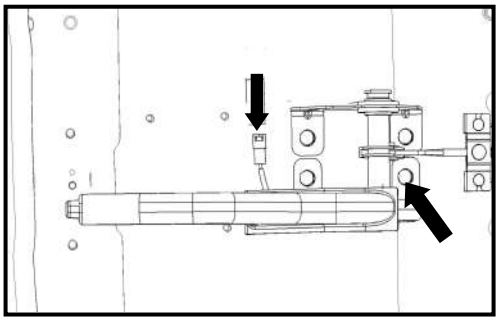
1 Remove the rear part assembly of vice dashboard.

2 Loose adjusting nut, remove left and right parking drawing.



3 Pull down parking handle connector, remove the fixing bolt of parking handle.

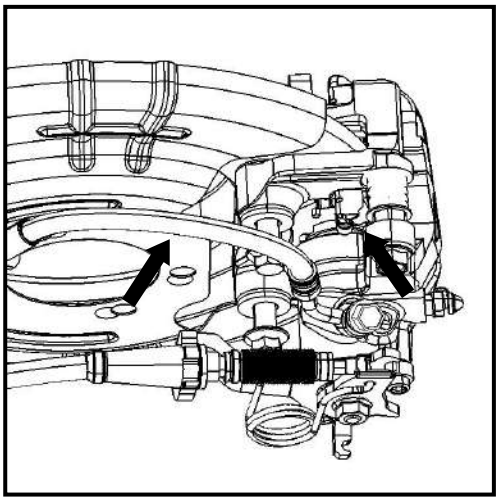
- Tightening torque：20～25N·m



4 Remove rear wheel, please see “wheel- wheel assembly.

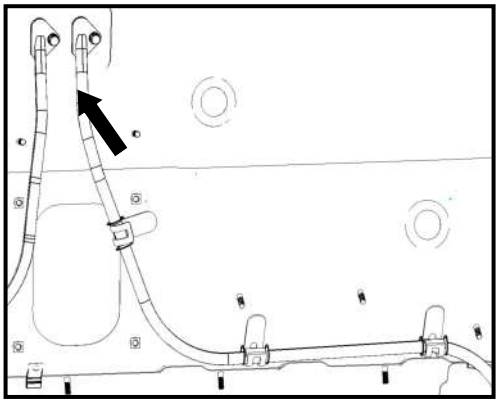
5 Remove rear brake drum, please see “braking system- rear brake”.

6 Separate parking drawing and rear brake.



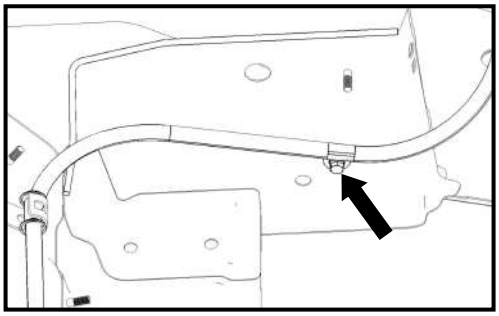
7 Remove the fixing bolt in the front part of parking drawing.

- Tightening torque：7～11 N·m



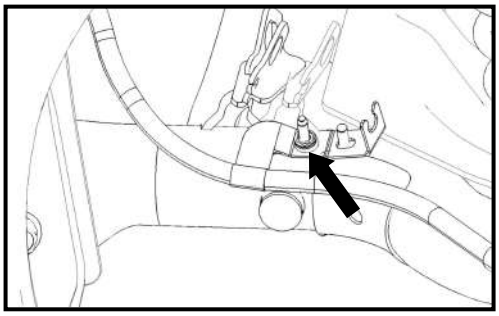
8 Remove the fixing bolt in the middle part of parking drawing.

- Tightening torque：7～11 N·m



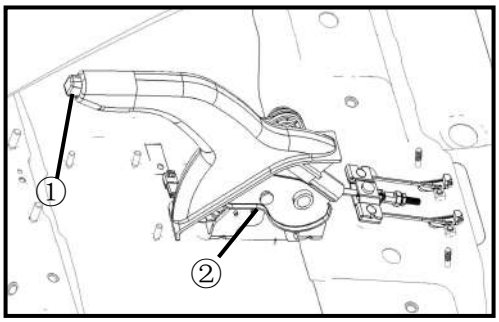
9 Remove the fixing nut in the rear part of parking drawing, remove parking drawing.

- Tightening torque：7～11 N·m



Check after remove

- Check whether the parking handle button ① is flexible and return normally, if not flexible or couldn't return back, please replace.
- Checking whether the ratchet ② of parking handle wear. If yes, please replace.
- Check whether there is deformation, wear, distortion, or other damage for parking drawing . If yes, please replace.



Install

Install in the opposite side of remove. Check and adjust parking handle stroke. Please see "maintenance-parking system"

Caution:

- Fix after adjusting parking drawing to smooth.

Brake control system

Cautions for anti-lock braking system maintenance

- Avoid to put anti-lock braking system in strong electromagnetic field.
- ABS controller assembly shall not be placed in environment with temperature more than 105 ℃ .
- Forbid to use quick charger to disconnect the battery charging, avoid to damage the anti-lock braking system.
- Before removing the connectors of ABS controller assembly, put the key in the "LOCK" block, disconnect the battery negative electrode.
- Anti-lock braking system components couldn't disassemble and repair.
- When anti-lock braking system is working, the brake pedal will be slight vibration, there may be mechanical noise, which belongs to the normal phenomenon.
- After the key on the "ON" block, brake pedal may vibrate or have mechanical noise in the self-check process of anti-lock braking system ,which belongs to the normal phenomenon.
- In unstable pavement, such as the top dress, sand road, snow road etc., the braking distance of the ABS activation is longer than without ABS, which belongs to the normal phenomenon.
- If the tires or friction plate is not used authentic DR components, braking distance or steering stability may be worsen.

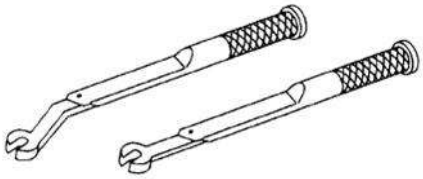
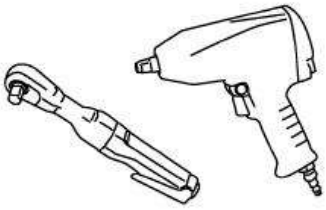
Preparation work

Special tools

The actual tool shape may be different from illustration shown.

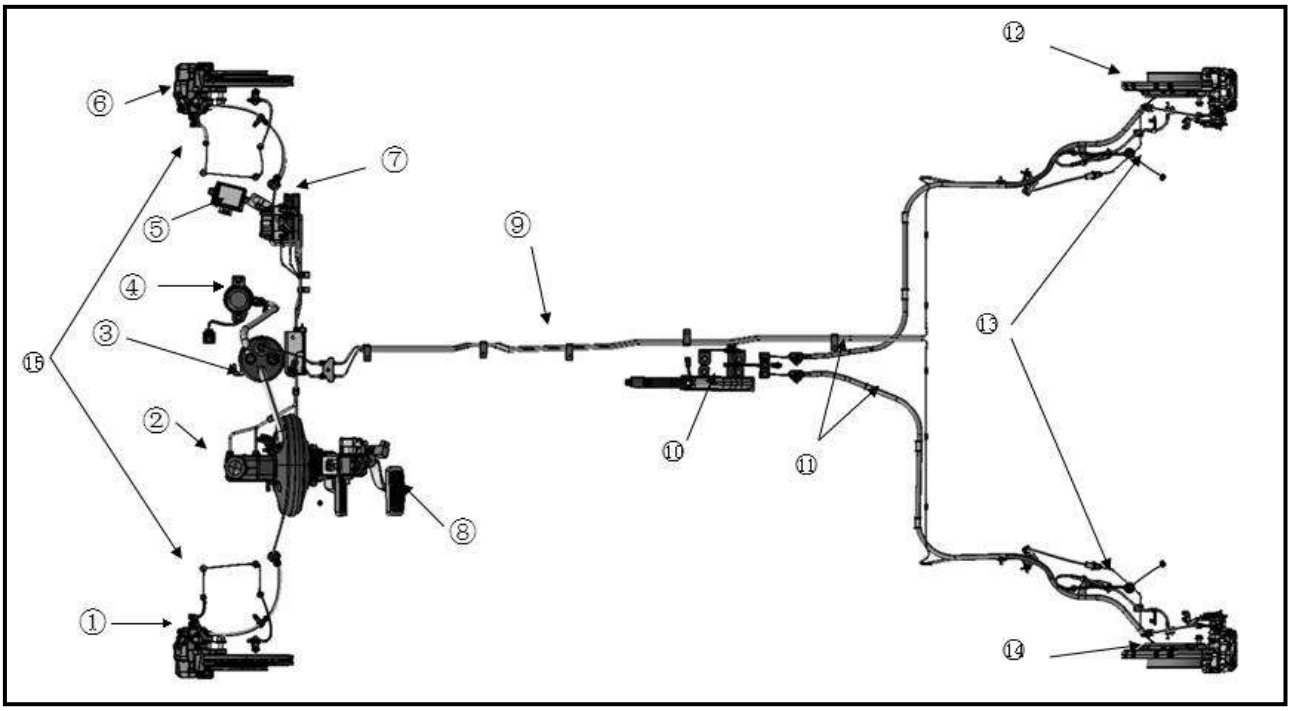
Tool	Diagram	Instruction
Diagnostic instrument X-431		ABS system fault diagnosis

Commonly used tools

Tool	Diagram	Instruction
Pipe wrench		Remove and install braking lines
Power tool		Install and remove bolts and nuts

System description

Component layout



1 left front brake caliper assembly

2 vacuum booster with brake master pump assembly

3 Vacuum tank assembly

4 Vacuum pump

5 vacuum pump controller assembly

6 right front brake caliper assembly

7 ABS controller assembly

8 brake pedal assembly

9 brake line

10 parking brake handle assembly

11 left and right parking drawing assembly

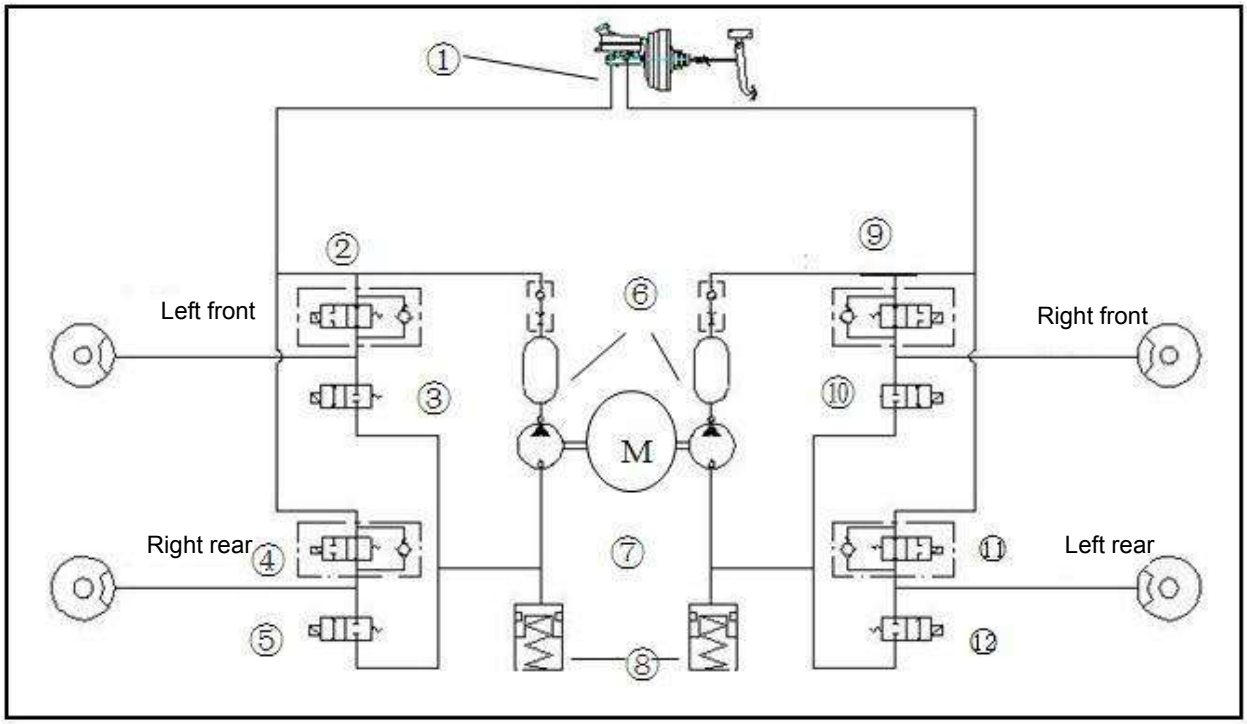
12 right rear parking brake assembly

13 ABS wheel-speed sensor for the rear wheel assembly

14 left rear parking brake assembly

15 ABS wheel-speed sensor assembly for front wheel

Hydraulic principle



1 Brake pump

2 Left front oil inlet valve

3 Left front oil outlet valve

4 Right rear oil inlet valve

5 Right rear oil outlet valve

6 Damper

7 Oil returning pump

8 Accumulator

9 Right front oil inlet valve

10 Right front oil outlet valve

11 Lleft and right oil inlet valve

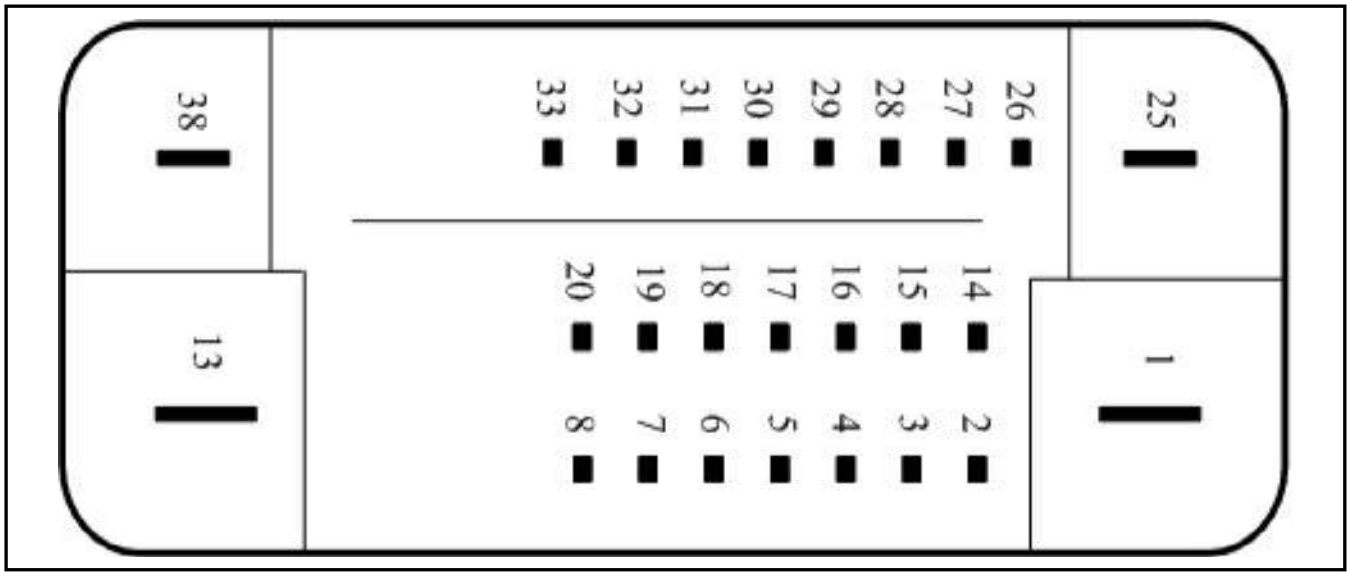
12 Left rear oil outlet valve

Fault code

Fault code		Instruction	Fault code		Instruction
Decimal	Hexadecimal		Decimal	Hexadecimal	
C190004	0x590004	ECU with too high voltage	U000500	0xC00500	CAN with too high voltage
C190104	0x590104	ECU with too low voltage	C000700	0xC00700	CAN with too low voltage
C100004	0x500004	ECU hardware fault	C100104	0x500104	CAN hardware fault
C101008	0x501008	ECU hardware fault	C000104	0xC00104	CAN off fault
C006B06	0x406B06	ABS/ESP(such as equipment) control abnormal (surpass time)	C100104	0xD00104	CAN Passive fault
C003108	0x403108	Left front wheel speed sensor :(signal fault) out of range lost Clutter, intermittent	C003A08	0x403A08	Right rear wheel speed sensor :(signal fault) out of range lost Clutter, intermittent
C003200	0x403200	Left front wheel speed sensor:Signal lines short/open circuit, power circuit off	C003B00	0x403B00	Right rear wheel speed sensor:Signal lines short/open circuit, power circuit off
C00A000	0x40A00	Left front wheel speed sensor:power lines short	C00A600	0x40A600	Right rear wheel speed sensor:power lines short
C00A100	0x40A100	Left front wheel speed sensor:power circuit short connect with power	C00A700	0x40A700	Right rear wheel speed sensor:power circuit short connect with power
C00A900	0x40A900	Left front wheel speed sensor:normal fault	C00AC00	0x40AC00	Right rearwheel speed sensor:normal fault
C003408	0x4034080	Right front wheel speed sensor :(signal fault) out of range lost Clutter, intermittent	C109904	0x509904	such failure of wheel speed sensor (cross of sensor and multi-sensor fault)
C003500	0x403500	Right front wheel speed sensor:Signal lines short/open circuit, power circuit off	C001004	0x401004	Valve failure, left front valvle inlet
C00A200	0x40A200	Right front wheel speed sensor:power lines short	C001104	0x401104	Valve failure, left front valvle inlet
C004300	0x40A300	Right front wheel speed sensor:power circuit short connect with power	C001404	0x401404	Valve failure, right front valvle inlet
C00AA00	0x40AA00	Right front wheel speed sensor:normal fault	C001504	0x401504	Valve failure, right front valvle inlet
C003708	0x403708	Left rear wheel speed sensor :(signal fault) out of	C001804	0x401804	Valve failure, left rear valvle inlet

		range lost Clutter, intermittent			
C003800	0x403800	Left rear wheel speed sensor :(signal fault) out of range lost Clutter, intermittent	C001904	0x401904	Valve failure, left rear valvle inlet
C00A400	0x40A400	Left rear wheel speed sensor:power lines short	C001C04	0x401C04	Valve failure, right rear valvle inlet
C00A500	0x40A500	Left rear wheel speed sensor:power circuit short connect with power	C001D04	0x401D04	Valve failure, right rear valvle inlet
C00AB00	0x40AB00	Left rear wheel speed sensor:regular fault	C109504	0x509504	Vavle relay fault
C002004	0x402004	Oil returning pump failure	C007208	0x407208	The regular fault (over temperature protection, signal failure, hardware failure)

Connector pins definition



Pin NO	Definition	Pin NO	Definition
1	Power terminal of motor (positive)	18	Signal terminal of wheel speed sensor(left rear)
2	wheel speed sensor output (right front wheel)	19	Power terminal of wheel speed sensor(left front)
3	N/A	20	N/A
4	Signal terminal of wheel speed sensor((right front)	25	Power terminal of valve relay
5	N/A	26	CAN-high
6	N/A	27	N/A
7	N/A	28	ECU power supply (ignition supply line)
8	Signal terminal of wheel speed sensor(left front)	29	Signal terminal of wheel speed sensor((right rear)
13	ground terminal of the motor	30	Braking light switch input
14	CAN- low	31	Power terminal of wheel speed sensor(left rear)
15	N/A	32	N/A
16	Power terminal of wheel speed sensor(right front)	33	N/A
17	Power terminal of wheel speed sensor(right rear)	38	ECU ground line

Function description

Anti-lock brake system include function of ABS and EBD

ABS function

In emergency braking or braking on dangerous road control hydraulic braking force of four wheels to prevent wheel lock.

ABS has following advantages:

1 Keep vehicle direction under control in the process of emergency braking.

2 Strengthen the operation for the vehicle under different road conditions.

Caution:

- When anti-lock braking system is working, the brake pedal will be slight vibration, there may be mechanical noise, which belongs to the normal phenomenon.
- If the power outage, anti-lock braking system stop working, ABS fault warning lights lit.
- When ABS function failure, ABS fault warning lights lit, only activate the EBD, no ABS function.
- Please use the special diagnostic instrument provided by DR to diagnose ABS fault.

EBD function

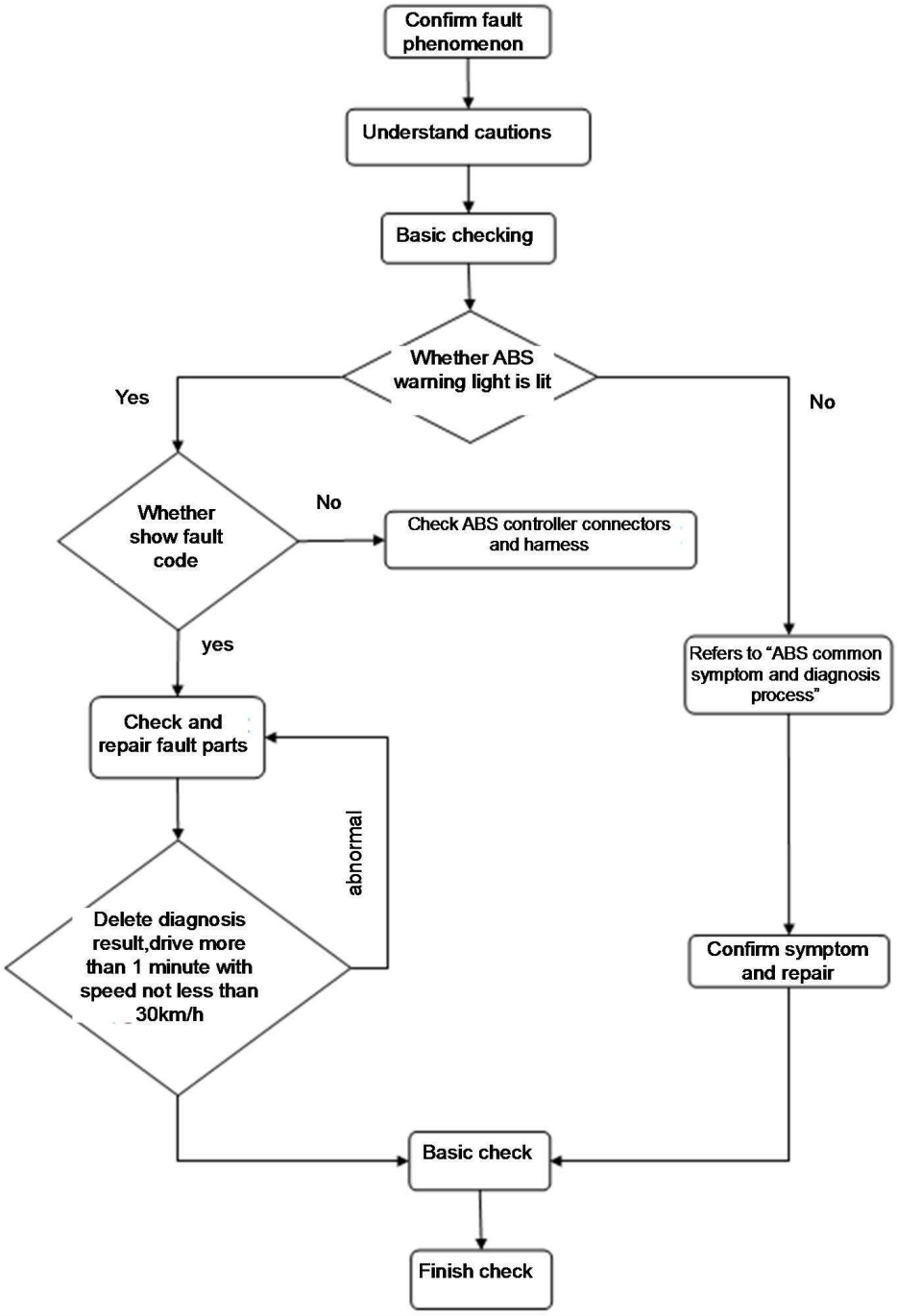
Electronic brake-force distribution (EBD) automatically adjust the braking force distribution ratio of front and rear axle, increase the efficiency of the brake, and comply with ABS braking stability.

Caution:

- EBD function failure, the braking system fault warning lights and ABS fault warning lights lit at the same time, EBD and ABS function failure.

Fault diagnosis

Diagnosis process



Caution:

- Shall check whether ABS is normal after the completion of the clean inspection .
- Fault code can't be cleaned up through removing ABS controller connector assembly, disconnect the battery connection or let the key in the "LOCK" block.

Basic check

1 Check the brake fluid level and brake lines. Please see the "maintenance - brake fluid.

2 Check whether there is leakage for ABS controller assembly. If yes, check the following items:

① Such as ABS controller assembly pipe joints with leakage, check whether the ABS controller assembly pipe joint is loose, if loose, tighten to standard torque (16 ~ 18 n · m). If there is still leakage, check whether the brake pipe joints and ABS controller assembly thread is damaged. If yes, please replace and make sure no brake fluid leakage.

② If there is leakage outside of ABS controller assembly joint, check again after clean with cloth . If there is still leakage, please replace ABS controller assembly.

Caution:

- **Forbid to disassemble ABS controller assembly.**

3 Check whether there is wearing for the friction plate and brake shoe. Please see the "maintenance - brake shoe".

4 Check whether the positive and negative battery is loose. If yes, please repair or replacement.

5 Check whether there is any mechanical fault related to the braking system of vehicles:

- Check whether there is pollution for the master cylinder brake fluid.
- Check whether there is damage for the wheel speed sensor and wiring harness, connectors, ring gear.
- Check the tires wearing degree

6 Road test vehicle

- Check for brake lag.
- Check whether the brake is stable (without backward or forward)
- Check whether the wheel bearing has abnormal noise.

Check for ABS fault warning light and brake system fault warning light

1 Turn the key to "ON" block from the "LOCK" block , ABS fault warning light and brake system fault warning lights lit. In the absence of light, please see the "ABS common symptoms and analysis".If light,go to next step.

2 After 3 seconds, check whether the ABS fault warning light and brake system fault warning light is put out. If not, go to the next step.

3 Driving vehicle for one minute at the speed of more than 30 km/h, check whether the ABS fault warning light and brake system fault warning light is put out. If not, please see the “diagnosis process”.

Confirm fault reason with diagnostic instrument

1 System instruction

Diagnostic instrument could detect problems resulted from ABS and EBD system fault, and guide maintenance technician to confirm the cause of the problem.

2 Diagnosis process

Must choose diagnostic procedures matching with the model . After all the system troubleshooting, should clear ABS fault code.

Steps	Diagnosis	Yes	No
1	① Connect or install all the parts disconnected or removed before. ② Install the diagnosis instrument on the connection of OBD. ③ Put the key on “ON”, check whether the diagnostic instrument could communicate with ABS controlling assembly.	To step 2	To step 4
2	Check whether there is current or historical fault code.	To step 3	To step 7
3	① Record the current fault code. ② Record the historical fault code. ③ Record the setting times of fault code. Tip: Before record information , do not remove the fault code. ④ Repair fault components		
4	Whether diagnostic instrument can communication with other modules of the same data line.	To step 5	To step 6
5	See "common symptoms and analysis of ABS - ABS controller assembly without communication".		
6	Check OBD connection		
7	① put key on “ON” block ② Waiting for 10 minutes ③ Turn the key to “ON”,and see whether ABS fault warning light is on.	To step 8	To step 10
8	Whether the light is off after light for 3 s .	Normal, end	To step 9
9	See "common symptoms and analysis of ABS-ABS fault warning light on but without fault code”		
10	See "common symptoms and analysis of ABS-ABS fault warning light off and without fault code”		

Common symptoms and analysis of ABS

1 No communication with ABS controller assembly

Typical reasons:

- Poor contact of OBD interface
- ABS controller assembly off ground
- ABS controller assembly without voltage provided by battery.
- ABS controller assembly without voltage provided by supreme electric switch.
- Data circuit open circuit or short circuit.
- Data line with high resistance.

2 ABS fault warning light off and without fault code

Typical reasons:

- Bulbs failure of the ABS fault warning light or socket is loose.
- Fuse disconnect
- Fault of combination instrument driver module
- ABS controller assembly and combination instrument connection line is open circuit or short circuit.

3 ABS fault warning light on and without fault code

Typical reasons:

- Combination instrument cannot communicate with ABS controller assembly .
- ABS controller assembly off ground
- ABS controller assembly and combination instrument connection line is open circuit or short circuit.
- Fault of combination instrument driver module.
- Fault of ABS controller assembly ABS

4 Braking system fault warning light on

Typical reasons:

- Brake fluid level is too low or brake fluid switch with fault.
- Vacuum booster system fault.
- EBD function invalid:

① Two coaxial wheel-speed sensor failure.

② Battery open circuit or short circuit

③ ABS controller assembly ground open or short circuit

④ The electrical switch is open circuit or ground short circuit.

- Combination instrument and ABS controller assembly is open circuit.
- Combination instrument fault
- ABS controller assembly failure

5 Brake system fault warning light is off and without fault code

Typical reasons:

- Bulbs failure of the brake system fault warning light or socket is loose.
- Fuse disconnect
- Fault of combination instrument driver module
- ABS controller assembly and combination instrument connection line is open circuit or short circuit.

6 Intermittent failure or poor contact of intermittent failure

Typical reasons:

- Circuit fault
- Relay or solenoid valve binding

ABS controller assembly exhaust

Any of the following situations occurs, need exhaust:

1 Press “braking system exhaust” can not meet the requirement of the pedal height or feeling.

2 Replace ABS controller assembly.

3 Excessive loss of brake fluid.

4 Air may enter into ABS controller assembly.

Exhaust process

1 Necessary item

① Diagnostic instrument

② Brake fluid

③ lifting machine

④ Hose with exhaust gas bottle

⑤ Safety equipment, such as safety glasses

⑥ Two maintenance personnel: one on the brake pedal and diagnostic instrument operation, another person will keep the brake fluid level of tank, and open and close exhaust bolt according to the diagnostic instrument direction .

2 Basic check

① Check the power supply system. If abnormal, please repair or replacement.

② Connect diagnosis instrument, remove all fault code. If couldn’t be removed, please find fault.

③ Check whether there is any damage on appearance of ABS controller assembly and leakage. If yes, please repair or replacement.

3 Preparation before exhaust

① Brake system exhaust. Please see “maintenance-brake fluid”

② Put key on “ON” block.

③ Connect diagnosis instrument, select procedures matching with vehicle and communication with ABS controller assembly.

④ Lifting vehicle

⑤ Perform automatic exhaust based on diagnostic instrument direction.

4 Automatic exhaust

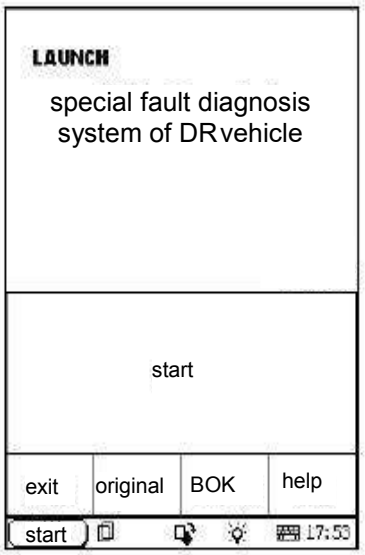
Please see the following automatic exhaust sample to complete exhaust.

Tips:

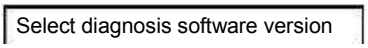
- Exhaust process could be terminated automatically by pressing the EXIT on the diagnostic instrument (EXIT) key at any time.

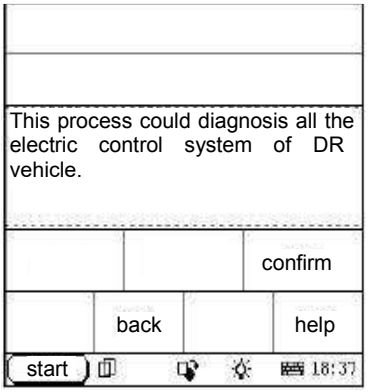
Automatic exhaust sample:

① Enter into special fault diagnosis system of DR vehicle.

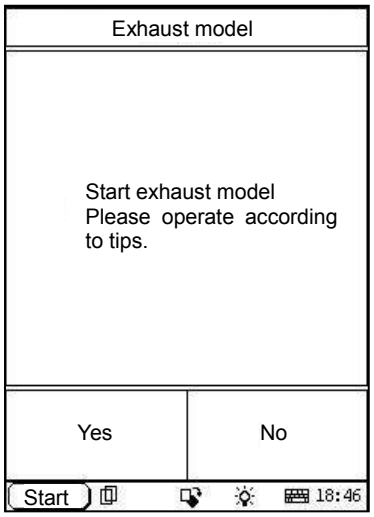


② Select diagnosis software version matching with vehicle.





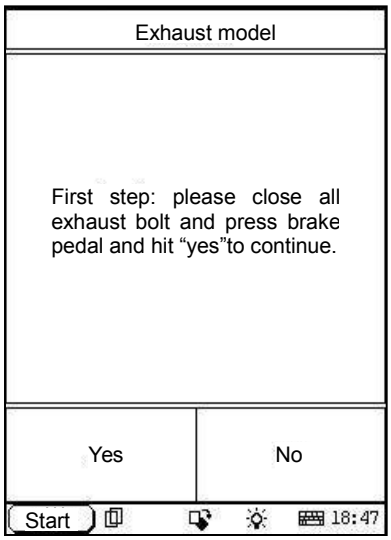
③ Enter into automatic exhaust process. Operate according to tips.



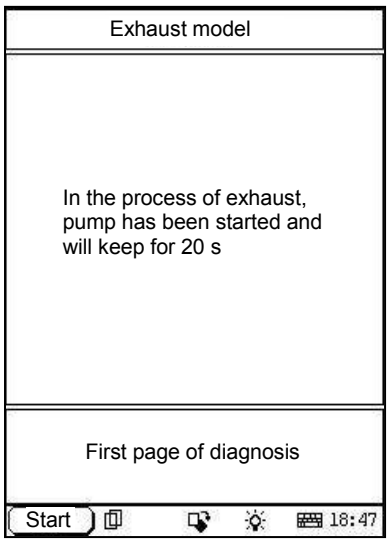
④ First step for exhaust

Tip:

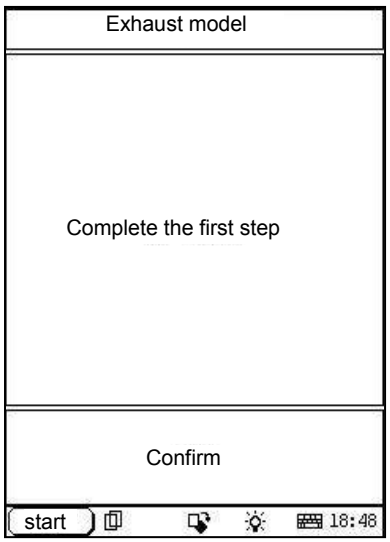
- It is necessary to step on the brake pedal and keep the brake fluid level of the tank in the process of automatic exhaust.



⑤ In the process of exhaust。



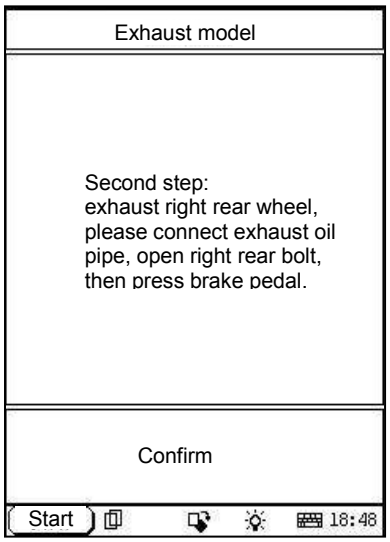
⑥ Complete the first step.



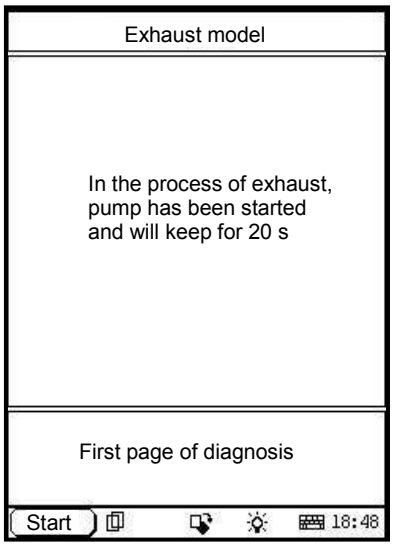
⑦ Second step of exhaust

Caution:

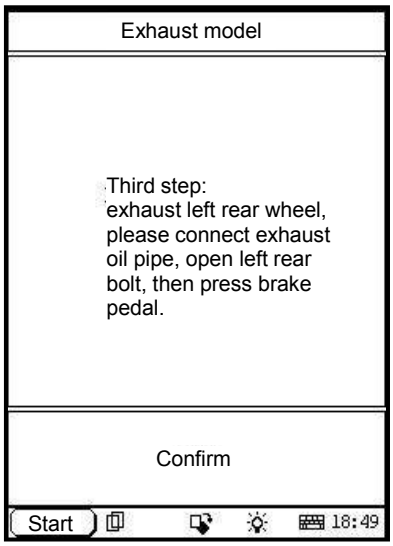
- When exhaust, exhaust bottle connected with exhaust pipe must be more than 30 mm higher than the exhaust bolt .



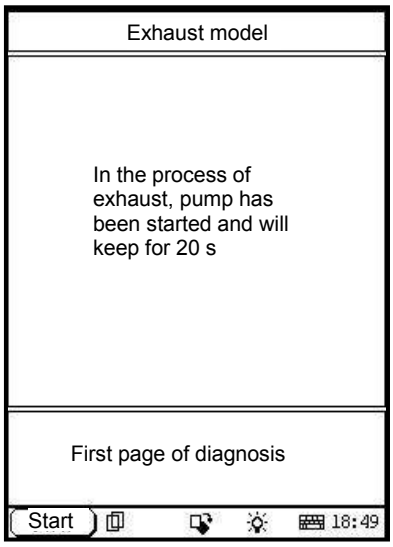
⑧ In the process of exhaust。



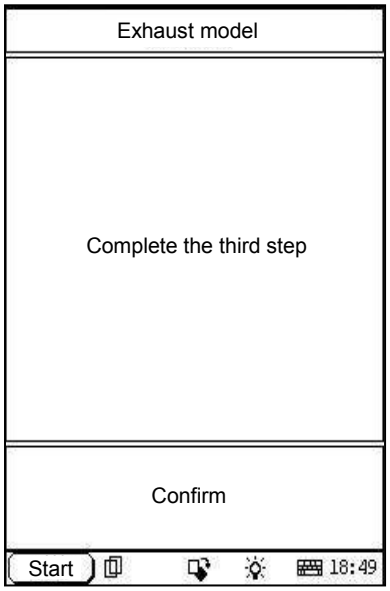
⑨ Third step of exhaust。



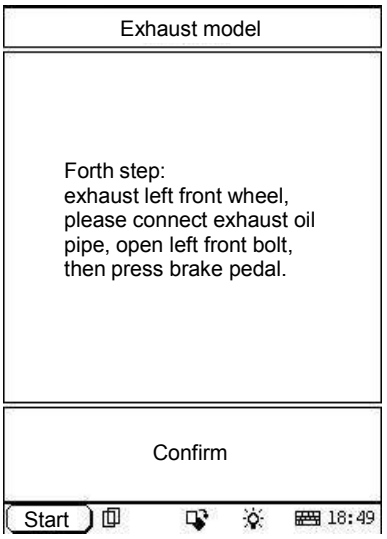
⑩ In the process of exhaust。



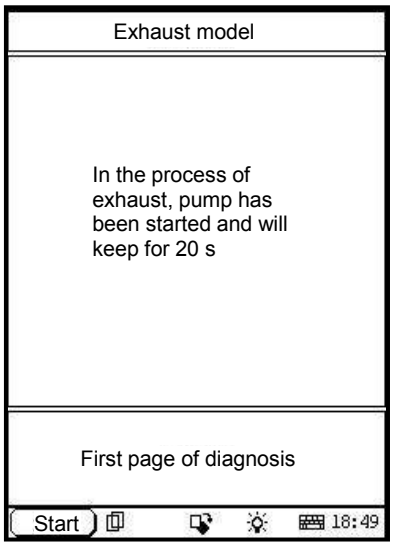
⑪ Complete the third step。



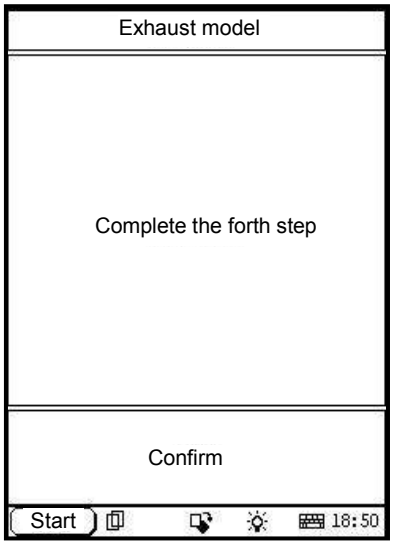
⑫ Forth step of exhaust。



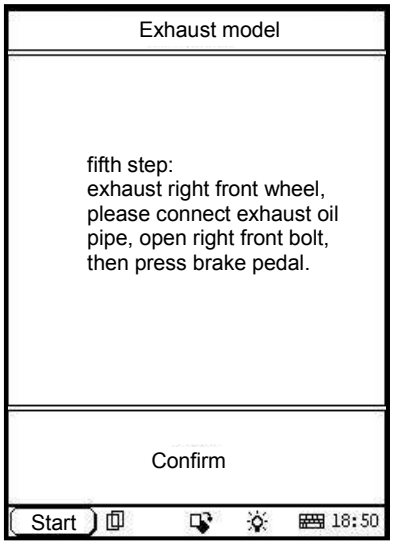
⑬ In the process of exhaust。



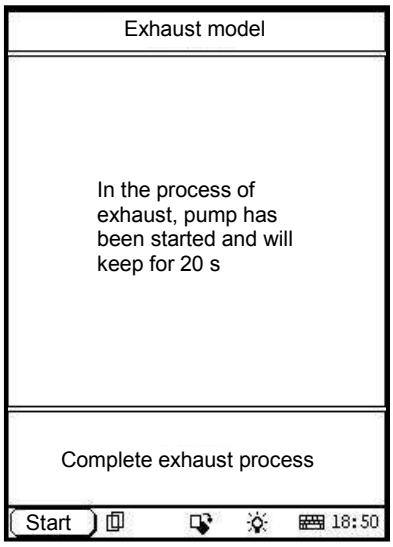
⑭ Complete the forth step。



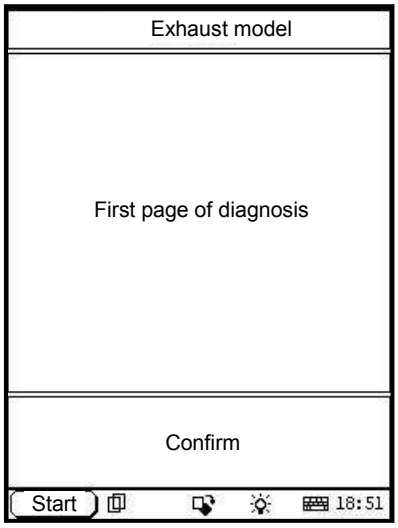
⑮ The fifth step of exhaust



⑯ In the process of exhaust



⑰ Complete exhaust。



Remove and install

Wheel speed sensor

Remove

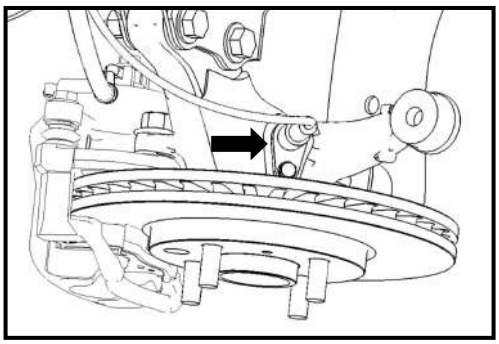
1 Front wheel speed sensor

① Lifting vehicle

② Unplug connectors

③ Remove fixing bolt of sensor and take out sensor slowly.

- Tightening torque:8～10N·m



Caution:

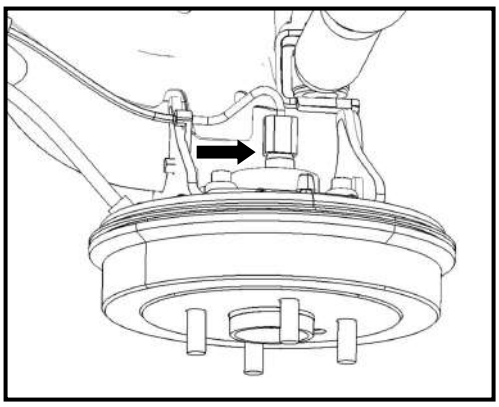
- Pulling on wheel speed sensor wiring harness is prohibited.

2 Rear wheel speed sensor

① Lifting vehicle

② Remove the column C under decorating plate, remove the sensor wiring harness connector, take off the rear wheel speed sensor.

③ Remove rear hub assembly .please see “rear axle-rear hub assembly”



Caution:

- Pulling on wheel speed sensor wiring harness is prohibited.
- Rear wheel speed sensor is integrated in the wheel hub assembly, unable to disassemble.

Check after remove

Check whether there is any foreign body in the front wheel speed sensor mounting holes, presence of scrap metal and other foreign matter in ring gear surface r. If yes, please clean up.

Install

Install in the opposite order of remove and tighten the bolt to the standard torque.

Caution:

- When installing, pay attention to the clearance between the ring gear and wheel speed sensor.

Standard value: 0.2～1.1mm。

ABS controller assembly

Remove

1 Closed on electric switch, disconnect the battery negative.

2 Plug out the ABS controller connector assembly.

3 Fully press down the brake pedal and fix with pedal frame.

4 Remove ABS controller assembly and braking hard pipe joint with the brake master cylinder assembly, mark it , use special-purpose plug insert ABS controller assembly line.

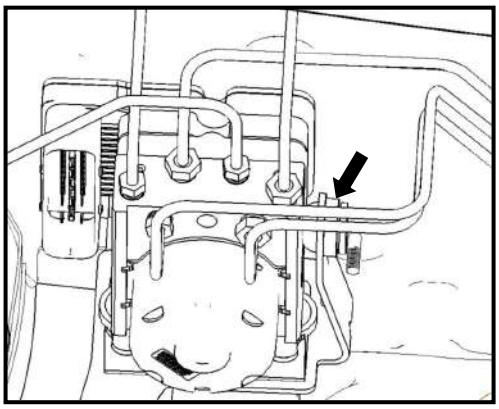
- Tightening torque：16～18N·m

5 Remove the brake hard pipe joint with the brake sub cylinder connected. Mark it well and plug ABS controller assembly line joint with special-purpose plug.

- Tightening torque：16～18N·m

6 Take off ABS controller assembly from the bracket of ABS controller .

- Tightening torque：20～25N·m



Install

Install in the opposite order of remove.Please see “Maintenance- brake fluid”.

Caution:

- Banned to remove ABS controller assembly line interface plug before equipping brake hard tube to the ABS controller assembly.

Steering system

Cautions for steering system maintenance

- When tightening the fixing bolt, vehicle shall be unloading and on the road, then check wheel alignment.
- Cautions for removing steering assembly

1 Please clean completely outside of steering assembly before disassembly.

2 Please dismantle in a clean working space to avoid the internal components from dust or other foreign body contamination.

3 Please put the parts on the parts rack in order after dismantling.

4 Clean components with nylon fabric or paper cloth . ordinary cloth will have residual chip cloth affecting parts operation.

5 Forbidden to reuse the components which couldn't be used again.

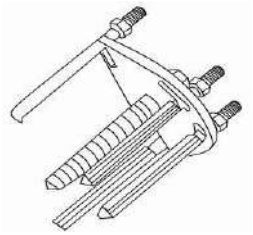
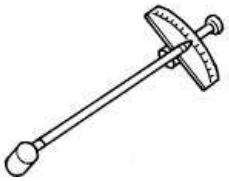
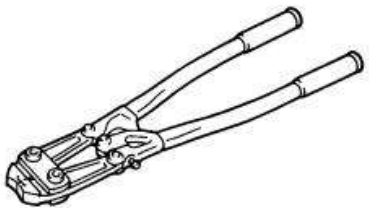
6 Please grease the designated parts before assembly.

- When quick play steering wheel, could hear the noise around steering wheel, which is the voice of the steering control system to work normally. If in the process of slowly turning the steering wheel, appear harsh noise, which is the abnormal phenomena. If necessary, please repair.
- Forbid to continuous steering in the same place.
- when disassembling parts of steering system (steering column, EPS controller, steering shaft, steering gear), must let the steering angle of steering system be zero, otherwise, the vehicle will appear badly turn back and active partial problem.

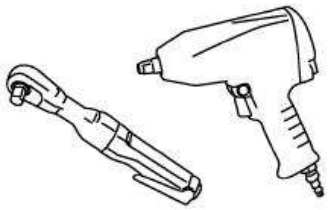
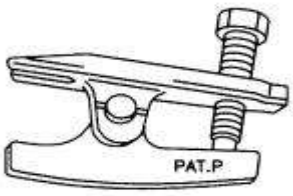
Preparation work

Special tools

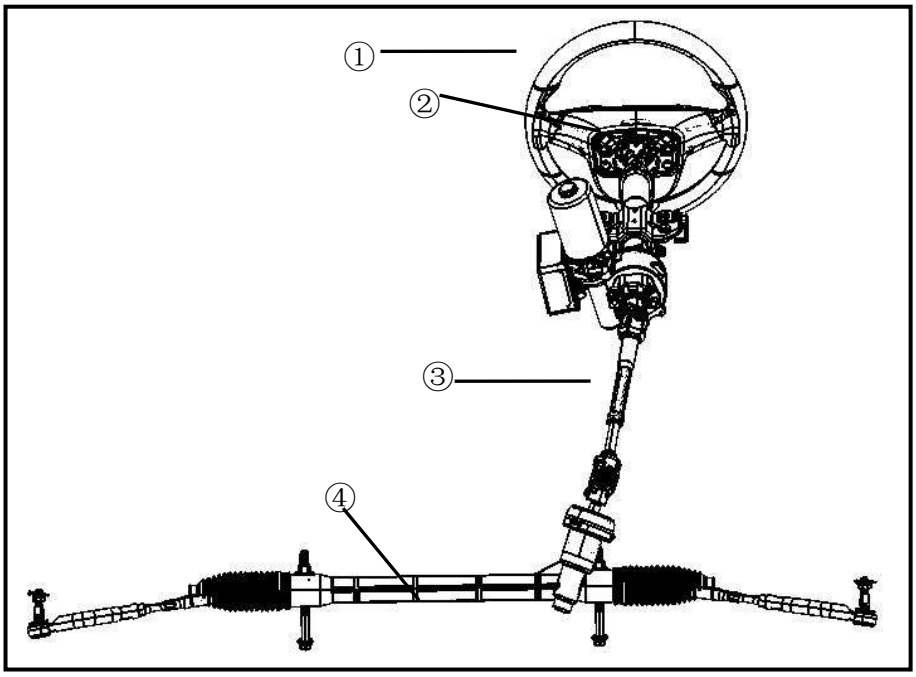
The actual tool shape may be different from illustration shown.

Tool	Diagram	Instruction
Steering wheel puller		Remove steering wheel
Pre-tighten measuring instrument		Check the torque of the steering column assembly and the pinion assembly rotating torque
Clamp pliers		Remove and install dust proof clip

Commonly used tools

Tool	Diagram	Instruction
Power tool		Install and remove bolts and nuts
Ball joint puller		Remove the outer ball head

Basic check



1 steering wheel assembly

2 steering column assembly

3 steering shaft with universal joint assembly

4 steering assembly

Check

Check middle position of steering wheel

1 Confirm the correct installation position of the steering assembly, steering column assembly and the steering wheel.

2 After wheel alignment, execute the middle inspection.Please see “the front suspension - wheel position ".

3 Parking vehicles, wheels go straight on, and make sure the steering wheel in the middle position.

4 If the steering wheel is not in the middle, please loosen the tie rod rod fine-tuning lock nut and turn right or left.

Check steering force of steering wheel

1 Vehicles parked in a horizontal dry ground, the wheels straight forward and pull the parking handle.

2 Confirm the pressure of the tire value should be within the scope of the standard value. Please see the "wheel - wheel assembly"

3 Place the vehicle on “READY” status.

4 Rotate steering wheel for 360 ° from the middle position, check the steering wheel steering force, and whether steering force has obvious fluctuation.

Steering force of steering wheel：＜25N allowed fluctuation：＜5N

L: 187.5mm

Caution:

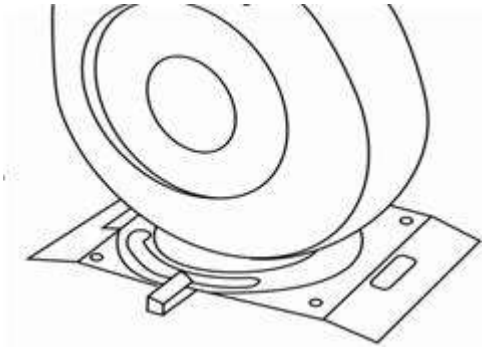
If the steering wheel steering force is more than specified value, please check or adjust the following items:

- Whether steering rod ball head is damaged.
- Preloading of steering assembly gear and rotational torque of steering rod ball head , Please see the " steering system-steering assembly"

Check steering angle of front wheel

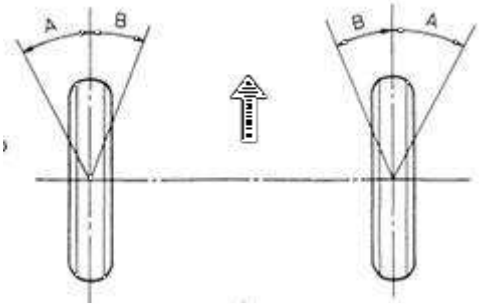
1 Check front wheel hub and detect steering angle of front wheel.

2 Place the front wheel on the steering angle measuring device (front wheel positioning steering wheel), The vehicle is in the "READY" status, turn the steering wheel left and right to the limit position,measure the largest wheel inner and outer steering angle.



Steering angle of inner wheel(angle A)：35.1°±1.5°

Steering angle of outer wheel(angle B)：30.6°±1.5°



3 If the measured value is not in the standard range, please check the following item.

Steering gear stroke

Gear stroke standard value:67±0.5mm

If gear stroke surpass standard value, please replace steering assembly.

Caution:

Inner and outer wheel steering angle couldn't be adjusted. If steering angle is different with the specified value, please check the steering gear assembly, steering column assembly and front suspension parts for wear or damage. If yes, please replace.

Learning process for steering angle of steering system to be zero

1 Put vehicles in the four-wheel positioning device to ensure qualified parameter adjustment of vehicle four-wheel positioning .

2 Adjust wheels to be straight forward and assure the steering wheel is in the middle(angle with the horizontal within0.5°)

3 Let the diagnostic instrument connect with OBD interface, the key is in the "ON" state, choose EPS calibration data in the diagnostic instrument , set the vehicle steering angle as zero, calibrate the middle position of steering wheel as zero position of steering system of EPS controller.

4 After set the steering angle as zero, please test drive and confirm, when turning back at low speed (≥10 km/h), the steering wheel can back near the middle. At the same time to ensure that the car travels in a straight line, there is no active partial problem, otherwise it is needed to check vehicle steering system again.

Troubleshooting

Troubleshooting for noise, vibration and unsmooth (NVH)

NVH Troubleshooting diagram

Using the table below helps to find the causes of symptoms. If necessary, repair or replace these parts.

Referring content			Steerin system-steering assembly check	Steerin system-steering assembly check	Steerin system-steering assembly check	Steering system-steering wheel check	Steering system-steering wheel check	Steering system-steering wheel check	Steering system-steering column assembly check	Steerinsystem-steering columnassembly	Steerin system-steering columnassembly	Steering system-steering column assembly	Steering system-steering shaft with universal joint assembly	Front axle,rear axle, front suspension, rear suspension	Wheel NVH	Wheel NVH	Front axle NVH	Brake system NVH
Possible reason and parts			Swing torque of outer ball joint	Swing torque of outer ball joint	outer ball joint clearance	steering wheel free stroke	steering wheel steering forc	wrong installation for steering wheel	Tilt adjust locking lever installed incorrectly or flabby	Fixed rubber aging	Steering column deformation or damage	wrong installation for Steering column or loose	steering shaft with universal joint loose	Front axle and suspension	Tyre	wheel	Driving shaft	Brake
symptom	steering	Noise	√	√	√	√	√	√										
		Vibration						√	√	√				√	√	√	√	√
		Shaking						√	√	√	√	√		√	√		√	
		fibrillation						√		√			√	√	√	√		√
		swing							√	√			√	√	√	√		√

√：fitable

Regular maintenance

Steering wheel

Check

Check installing status of steering wheel

1 Confirm the installing status of steering assembly、front suspension、front axle steering column.

2 Check whether there is a gap in the steering wheel up and down, left and right sides and axial.

Steering wheel shaft end gap：0mm

3 If the shaft end clearance beyond the specified value, please check the following items:

① Check the steering column assembly condition. Please see the "steering system-steering column assembly".

② Check if fixing bolt and nut of steering assembly loose. Please see the "steering system - steering assembly".

Check free stroke of steering wheel

1 Rotate the steering wheel to make the front wheel in the straight position.

2 Put the vehicle on “READY” status, turn slightly the steering wheel left and right to make the front wheel moving.

3 Measure the steering wheel rotating on outer circle.

Free stroke standard value of steering wheel:0～5°

4 When the measured value surpass the standard value, please check the following items:

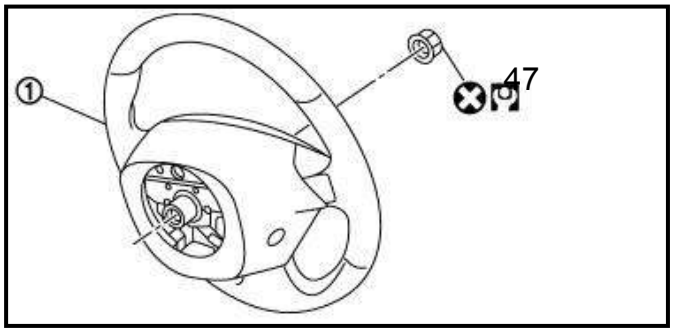
① Check whether there is loosing in every connection point of steering column assembly.

② Check installing condition of steering assembly.

Steering wheel

Remove and install

Explosion diagram



1 steering wheel

:Replace after remove

： N·m

Remove

Tip:

- When connected spiral cable, cable with adhesive plaster to make the fixed part and rotational part alignment

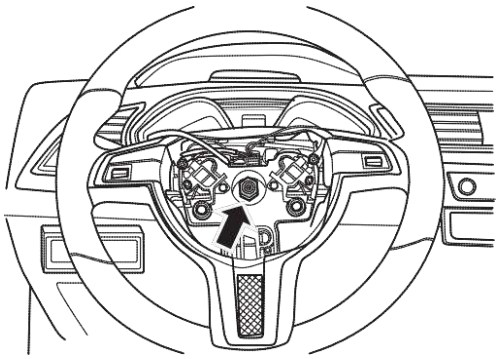
1 Park vehicle, make the wheel straight forward.

2 Open front cover.

3 Disconnect battery cathode,and wait for more than 1 minutes.

4 Remove the driver airbag modules from the steering wheel. Please see the "electrical sub-manual- safety airbag system".

5 Turning the steering wheel ensures that the front wheel drive in a straight line direction. Lock steering wheel , remove the nut and ball pad of steering wheel .



Tips：

- Pull out the steering wheel and mark it to assure the reinstall position is as the same as before.

6 Pull out the steering wheel with steering wheel puller from steering axle.

Caution：

- when pulling out the steering wheel, please pre-tightening the fixing nut of the steering wheel on steering wheel to avoid hurt the maintenance people when pull out the steering wheel .

Install

Install in the opposite order of remove.

Caution：

- please don't repeat use steering wheel nut and ball pad.
- After each change or rotating spiral cable, it is necessary to check the spiral cable in the middle position, please see the "electronic systems sub-manual - combination switch".
- When installation, must make the wheels in a straight line state, at the same time, steering wheel is in the middle position. Or marking on the steering wheel and nut n advance before disassembly when installation to ensure that tag is the same.
- when the steering wheel is installed, steering column must rotate smoothly without a "click" sound.
- After the installation of steering wheel and the driver's airbag modules , loosen regulating handle of the steering column assembly and adjust the steering wheel up and down 5 ~ 6 times to check whether the steering wheel is installed well.

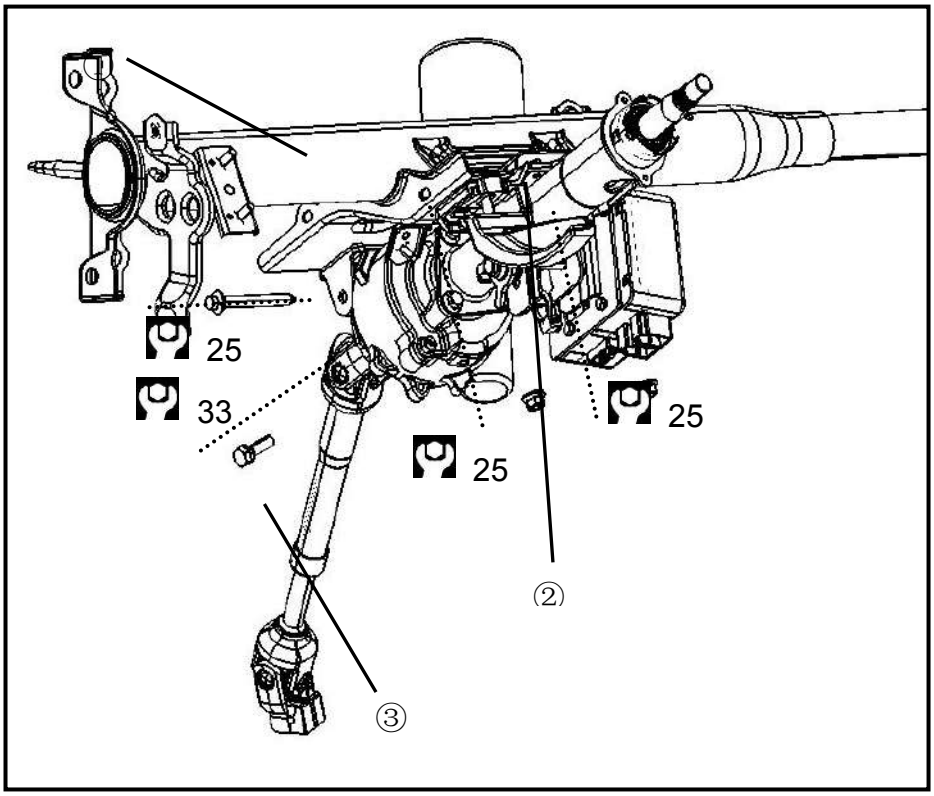
Check after install

- Set steering angle of steering wheel as zero, the removement of the parts of steering system will affect the steering angle , so when disassembling parts of steering system (steering column, EPS controller, steering shaft, steering gear), must let the steering angle of steering system be zero, otherwise, the vehicle will appear badly turn back and active partial problem.please see “ steering system-basic check”

Steering column assembly

Remove and install

Explosion diagram



1Meter frame assembly 2 Steering column assembly 3 Steering shaft with universal joint assembly

: N·m

Remove

Caution:

- Be sure to lock the regulating handle of steering column assembly before remove the steering column assembly in order to ensure the security of personnel, convenient disassembly.
- Imposing excessive axial force on the steering column assembly is not permitted when remove.
- Mark installing tag on steering column assembly and steering shaft universal joint assembly before remove the steering shaft universal joint assembly.
- Due to the steering column assembly is heavy ,please be careful when removed from the vehicle,
- It is forbidden to close to the let steering column assembly near strong magnets.
- Steering column assembly (reduction gear, the torque sensor) cannot be disassembled
- Forbidden to rotate steering assembly and steering shaft with universal joint assembly when remove the steering column assembly.

1 Park vehicle, make the wheel straight forward.

2 Disconnect battery cathode,and wait for more than 1 minutes.

3 Adjust the steering column assembly to lowest limit location.

Caution:

- Lock adjusting handle

4 Remove downside plate assembly of driver seat,please see " body sub-manual-dashboard"..

5 Remove the driver airbag modules,please see "electrical system sub-manual-airbag system"

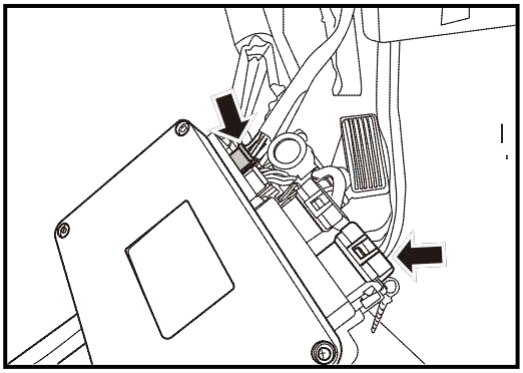
6 Remove the steering wheel assembly,please see"steering system- steering wheel"

7 Remove the steering column cover (up and down), please see "body manual-dashboard"

8 Remove the spiral cable and combination switch,please see "electrical system sub-manual-combination switch"

9 Remove the ignition lock

0 Pull out the connectors connected with EPS controller on steering column assembly (including EPS controller power connectors and EPS controller for vehicle signal connector).



11 Remove connection bolt of the steering shaft universal joint assembly and the steering column assembly , and then remove the steering shaft with universal joint assembly from the steering column assembly.

● Tightening torque:30～35N·m

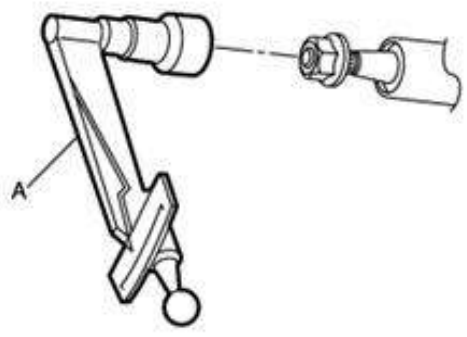
Tip:

- Mark installing tag on steering shaft universal joint assembly when remove the steering shaft universal joint assembly.

Caution:

- Please do not insert the tools (such as a screwdriver) to thread groove of steering shaft universal joint assembly when remove the steering shaft universal joint assembly .Otherwise, it can damage the thread slot. If yes, please replace the steering shaft universal joint assembly.

12 Remove fixed nuts and bolts of steering column assembly , take off the steering column assembly.



- Tightening torque:20～30N·m

Caution:

- Avoid steering column assembly falling when remove the steering column assembly.

Check after remove

- Check the steering column assembly for cracks, deformation or other damage. If yes, please replace.
- Check the input shaft and output shaft of the steering column assembly spline for wear, broken teeth. If yes, please replace.

- Preloaded measuring instrument is used to measure the rotation torque of steering column assembly.

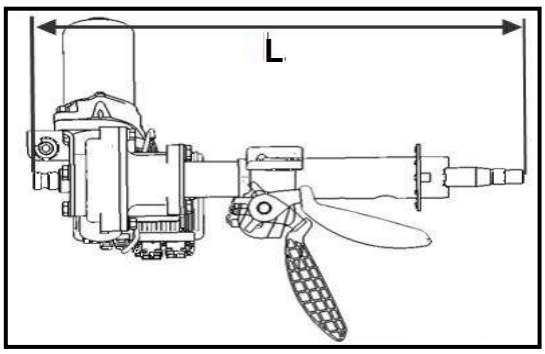
Standard value of rotating torque: 0～2.0N·m

If exceed standard value, please replace the steering column assembly (including motor, worm wheel mechanism, torque sensor).

- If vehicle has slightly hit, please measure the length of “L”

L standard value:463.5±1.5mm

If exceed standard value, please replace the steering column assembly (including motor, worm wheel mechanism, torque sensor).

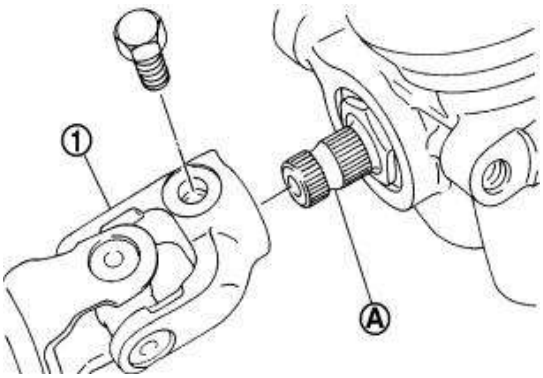


Install

Install in the opposite order of remove.

Caution:

- Forbid to impose excessive axial force on the steering column assembly.
- Forbid to repeating use the parts which couldn't be used again.
- Steering wheel should be in the middle when install the steering column assembly.
- When installation, check the steering column assembly and wire harness no winding, stuck
- Please pay attention to installation location when install the steering shaft universal joint assembly to the steering column assembly.
- Make sure connecting bolt is correctly installed in the groove(A) when connect the steering shaft universal joint assembly (1),the steering column assembly and steering gear assembly.



- Please put the keys in "READY" to check whether the steering system is working properly after the installation of the steering column assembly.

Check after installation

- Check the steering wheel free stroke, middle position of steering wheel, steering wheel steering force,front wheel steering angle .

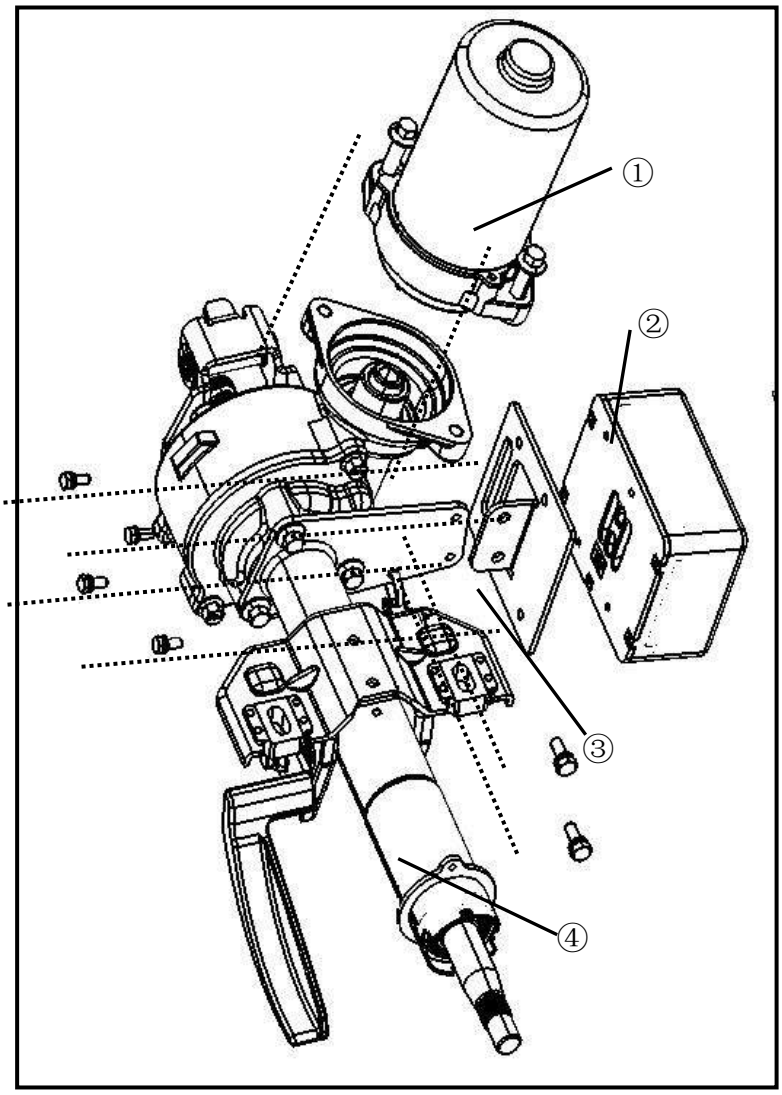
Steering wheel free stroke, please see"steering system-steering wheel"

Middle position of steering wheel, steering wheel steering force,front wheel steering angle , please see" steering system-basic check".

- Loose the regulating handle of steering column assembly to check whether adjusting steering column assembly up and down is smoothly.
- Set steering angle of steering wheel as zero, the removement of the parts of steering system will affect the steering angle , so when disassembling parts of steering system (steering column, EPS controller, steering shaft, steering gear), must let the steering angle of steering system be zero, otherwise, the vehicle will appear badly turn back and active partial problem.please see " steering system-basic check"

Disassembly and assembly

Explosion diagram

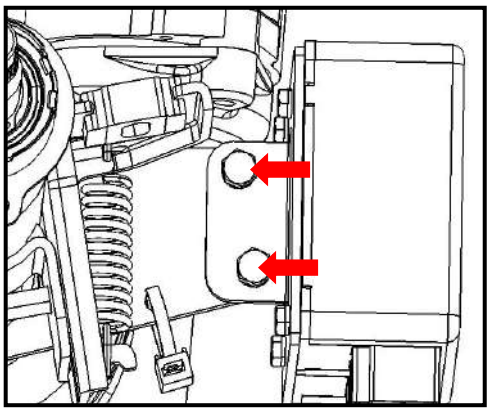


1 EPS motor EPS　　2 EPS controller　　3 Controller fixing bracket　　4 Steering column

Disassembly

1　Plug out EPS controller connectors

2　Remove the fixing bolt of controller fixing bracket and steering column,take off controller fixing bracket.



● Tightening torque: 10～15N•m

Caution:

Fix steering column with the hands or tools when loose the nut.

3 Remove the EPS controller fixing bolt, take off the EPS controller.

● Tightening torque: 10～15N•m

4 Remove the fixing bolt of EPS motor and steering column, take off EPS motor.

Caution:

- Forbid to result in knock and other damage to EPS motor when removing motor, Removing EPS motor. If yes, please replace.

Check after disassembly

EPS controller

Check whether there is any crack, loose ,curved needle or other malfunctionon EPS controller connectors . If yes, please replace.

EPS motor

Check whether there is any knock against, grinding marks or other malfunction on surface of EPS motor. If yes, please replace.

Steering column

Check whether there is any crack, deformation, corrosion, or other failure on the surface of the steering column. If yes, please replace.

Install

Install in the opposite order of remove

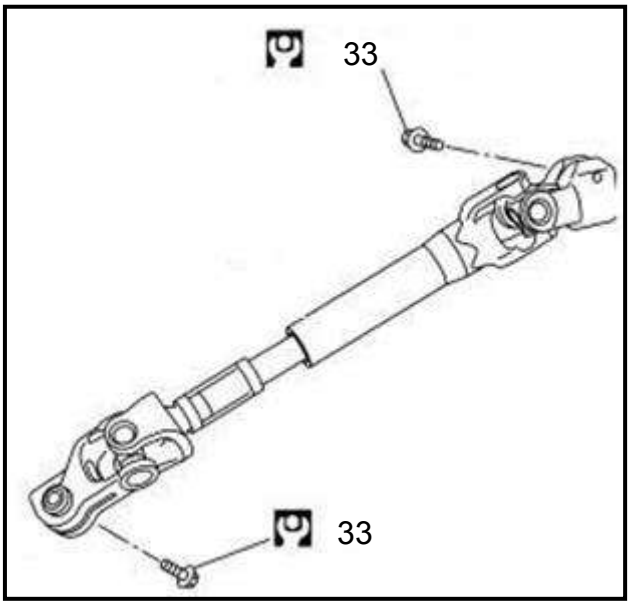
Caution:

- Forbid to apply too much axial force to the steering column.
- Forbid to repeating use the parts which couldn’t be used again.

Steering shaft with universal joint assembly

Remove and install

Explosion diagram



: N·m

Remove

Caution:

- Turning the steering wheel is prohibited to avoid spiral cable twist off when separating steering column assembly and steering shaft with universal joint assembly.

1 Parking vehicles with wheels going straight forward.

2 Adjust the regulating handle of the steering column assembly to the lowest limit position.

Caution:

- Lock adjusting handle

3 Remove downside guard plate assembly of the driver seat.

4 Remove the fixing bolt of steering shaft with universal joint and steering assembly, separating steering shaft with universal joint assembly and steering assembly.

- Tightening torque:30～35N·m

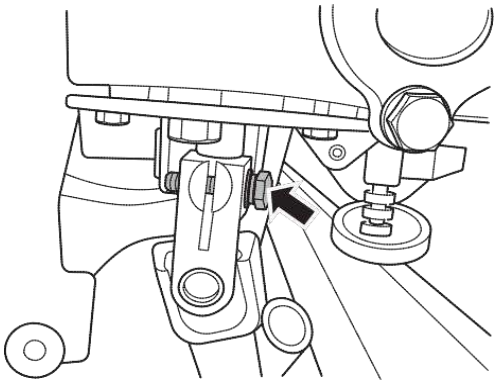
Tips:

- Mark installing tag on steering assembly and steering shaft with universal joint assembly when remove the steering shaft universal joint assembly.

Caution:

- Please do not insert the tools (such as a screwdriver) to thread groove of steering shaft universal joint assembly when remove the steering shaft universal joint assembly .Otherwise, it can damage the thread slot. If yes, please replace the steering shaft universal joint assembly.

5 Remove the fixing bolt of steering shaft with universal joint and steering assembly, take off steering shaft with universal joint assembly



- Tightening torque:30～35N·m

Tips:

- Mark installing tag on steering column assembly and steering shaft with universal joint assembly when remove the steering shaft universal joint assembly.

Check after remove

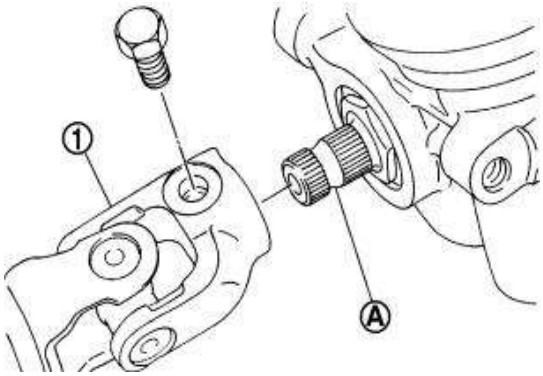
Check the steering shaft universal joint assembly of components for crack, rust or other damage. If yes, please replace.

Install

Install in the opposite order of remove, pre-tightening by hand ,then tightening with tools when tightening bolts.

Tips:

- Make sure connecting bolt is correctly installed in the groove(A) when connect the steering shaft universal joint assembly (1),the steering column assembly and steering gear assembly.



Check after installation

1 Put the vehicle on “READY”status and turn the steering wheel to check whether there is abnormal noise , shaking or steering force vibration. If yes, please replace steering shaft with universal joint assembly.

- Check the steering wheel free stroke, middle position of steering wheel, steering wheel steering force,front wheel steering angle .

Steering wheel free stroke, please see”steering system-steering wheel”

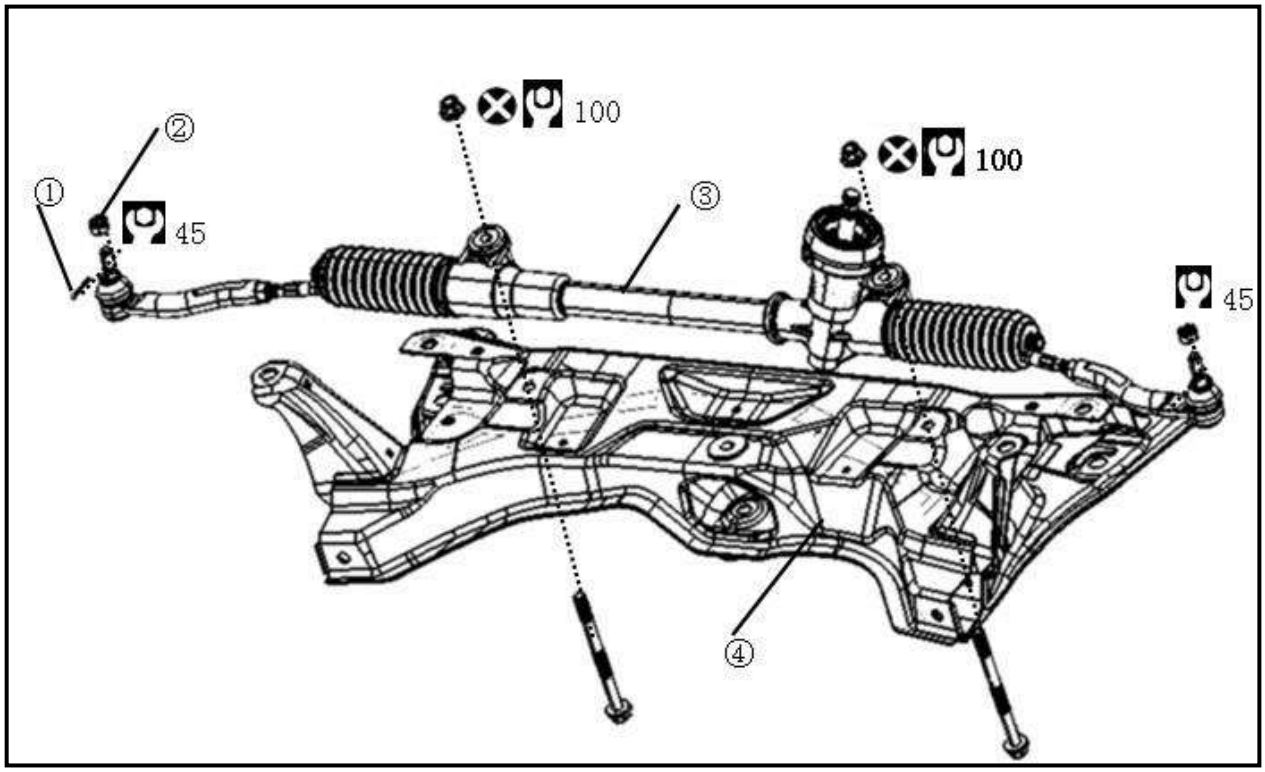
Middle position of steering wheel, steering wheel steering force,front wheel steering angle , please see” steering system-basic check”.

- Set steering angle of steering wheel as zero, the removement of the parts of steering system will affect the steering angle , so when disassembling parts of steering system (steering column, EPS controller, steering shaft, steering gear), must let the steering angle of steering system be zero, otherwise, the vehicle will appear badly turn back and active partial problem.please see “ steering system-basic check”

Steering assembly

Remove and install

Explosion diagram



1 Split pin 2 Nut 3 Steering assembly 4 Front vice frame

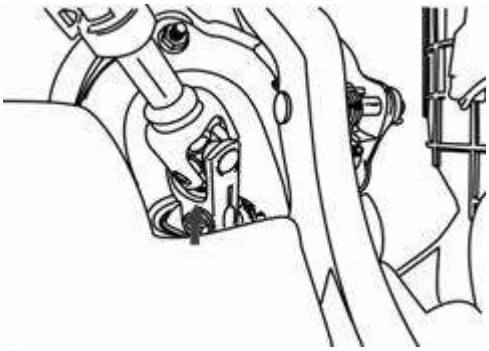
: Replace after remove

: N·m

Remove

1 Parking vehicles with wheels going straight forward.

2 Remove the fixing bolt of steering shaft with universal joint and steering assembly,separating steering shaft with universal joint assembly.



Tips:

- Mark installing tag on steering assembly and steering shaft with universal joint assembly when remove the steering shaft universal joint assembly.

Caution:

- Please do not insert the tools (such as a screwdriver) to thread groove of steering shaft universal joint assembly when remove the steering shaft universal joint assembly .Otherwise, it can damage the thread slot. If yes, please replace the steering shaft universal joint assembly.

- Forbid to turning steering wheel to avoid cut the spiral cable when separating steering shaft with universal joint and steering assembly.

3 Lifting vehicle

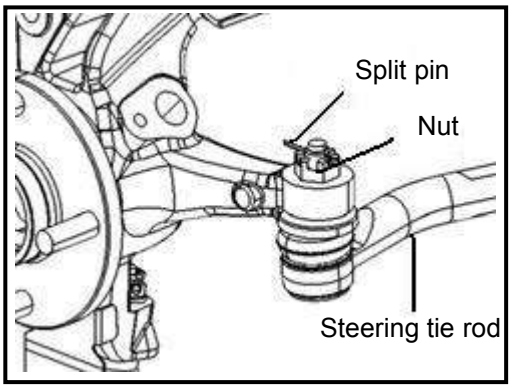
4 Remove front wheel

5 Remove steering tie rod

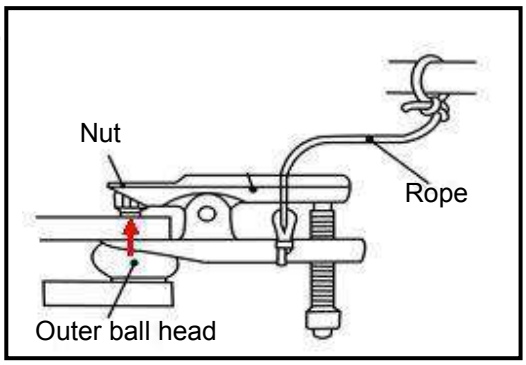
① Remove split pin of steering tie rod.

② Loose the fixing nut on the tie rod

- Tightening torque:40～50N·m



③ Remove the steering tie rod with ball joint puller (or appropriate tools) from the steering knuckle so as not to damage the ball head dust cover.



Caution:

- Temporarily tighten nut can prevent damage to thread section and suddenly dropping of ball puller.

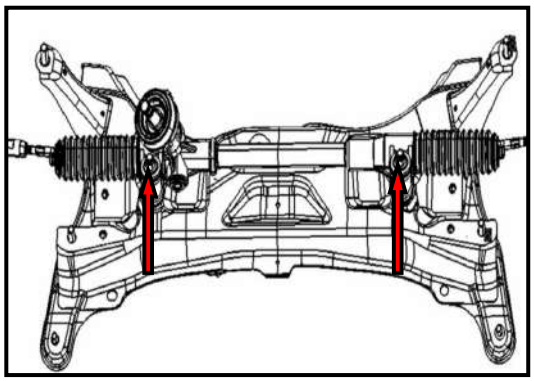
6 Remove vice frame. Please see “front suspension-front vice frame”

7 Remove fixing bolt and nut of steering assembly on front vice frame, take off steering assembly.

- Tightening torque:95～105N·m

Caution:

- **Damage the steering rack dustproof cover is prohibited.**

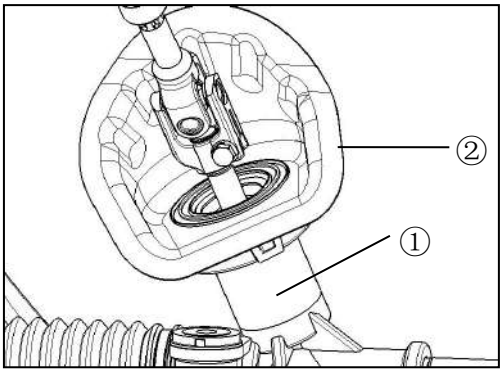


Install

Install in the opposite order of remove.

Caution:

- Clean steering proof ① and front board ② sealing surface when installing steering assembly.



- Make steering gear cover and body closely when installing steering assembly .
- Forbid to turning steering wheel to avoid cut the spiral cable when steering shaft with universal joint connecting with steering assembly.
- Tighten the ball head nut of tie rod when vehicle unloading and tire on the road.

Check after install

1 Turn the steering wheel to the limit position for several times, Whether steering wheel operation is smooth and flexible during the whole process of steering.

2 Check the steering wheel free stroke, middle position of steering wheel, steering wheel steering force,front wheel steering angle .

Steering wheel free stroke, please see"steering system-steering wheel"

Middle position of steering wheel, steering wheel steering force,front wheel steering angle , please see" steering system-basic check".

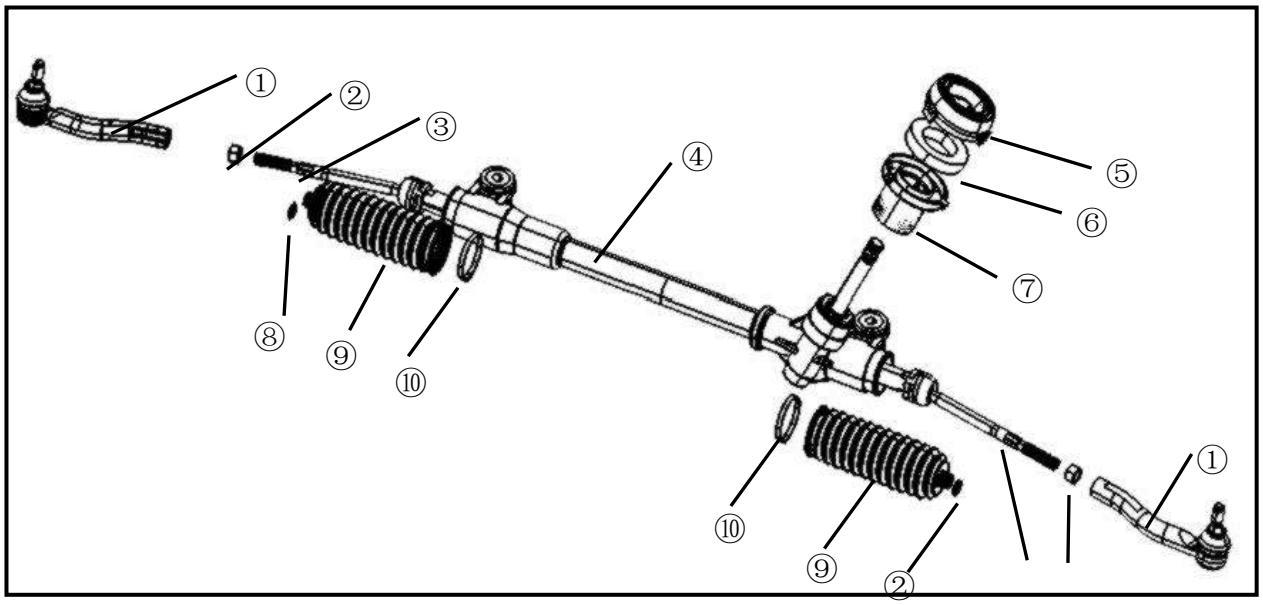
- Set steering angle of steering wheel as zero, the removement of the parts of steering system will affect the steering angle , so when disassembling parts of steering system (steering column, EPS controller, steering shaft, steering gear), must let the steering angle of steering system be zero, otherwise, the vehicle will appear badly turn back and active partial problem.please see " steering system-basic check"

Caution:

- Turn the steering wheel to check whether there is abnormal noise and steering force is too large
- After the installation is complete, please adjust the tie rod length from left to right according to former set bunch of value , after the completion of the adjustment, tightening with the lock nut and check wheel alignment. Please see "front suspension-wheel alignment"
- After wheel positioning, the steering angle of steering wheel could be set as zero.

Disassembly and assembly

Explosion diagram



1 Steering tie rod 2 Nut 3 Inner tie 4 Rack sleeve 5 Steering cover

6 Shield damping ring 7 Shield seat 8 Steel band elastic hoop 9 Rack dust proof 10 Rack dust cover band

Disassembly

1 Remove the steering gear cover, shield damping ring and shield seat.

2 Loosen the tie rod nut, rotate steering tie rod, till the inner tie out and take off the nut.

- Tightening torque:45～55N•m

Caution:

When Loosing the nut, fixing steering tie rod with wrench or other tools.

3 Remove steel band elastic clamp on gear dust proof and gear dust cover clip, take off the rack dust cover.

Caution:

- Forbid to damage inner tie rod and the rack casing when take off the rack dust cover. If damaged, please replace.

Check after dissasembly

Rack dust cover

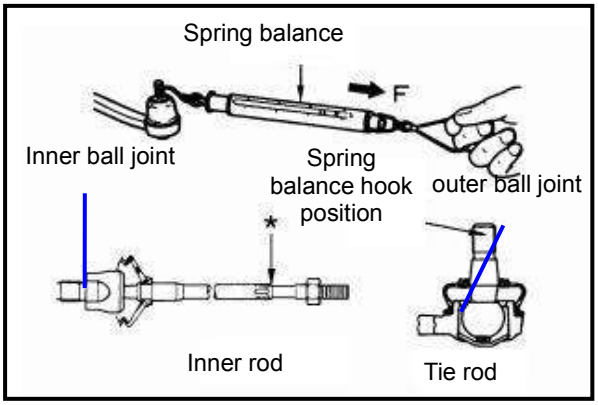
Check whether there is any crack, breakage on rack dust cover. If yes, please replace.

Rack casing

Check whether there is crack, wear, corrosion, or other malfunction in the rack casing. If yes, please replace.

Steering tie rod and inner tie

Swing torque of ball joint: hook the parts as shown in the diagram and pull the spring balance. When the ball stud and inner ball joint start moving, reading the spring balance values. If beyond the standard, please replace.



Item	Outer ball joint	Inner ball joint
Measuring point of spring balance	Upper of ball stud	Remark ☆in the measuring diagram
Swing torque	0.5～3.0N•m	0.5～3.0N•m
Spring balance measure	3.3～20N	9.3～55.5N

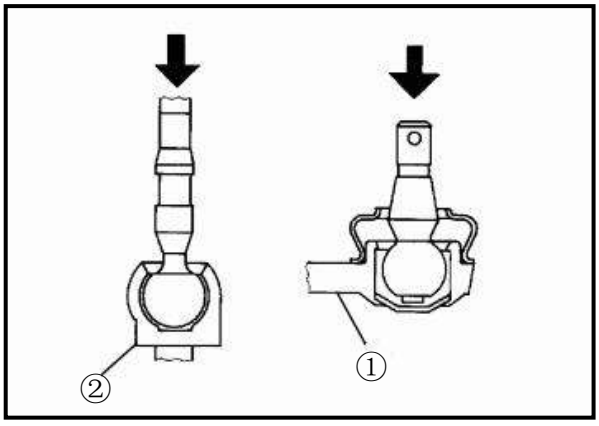
Axial clearance of ball joint

Pressure the ball screw with 490 N axial force. Measure stud moving value, and then confirm the value in the range of the following provisions.

If the tested value exceeds the standard, please replace the tie rod ① and inner tie rod ②.

Inner ball joint：≤0.15mm

Outer ball joint：≤0.15mm



Install

1 Install cover seat, shield damping ring and the steering cover on steering.

2 Grease on the inner tie rod.

Greasing quantity:3～5g

3 Grease installation location of inner tie rod steel band elastic hoop along with the groove direction, install rack dust cover.

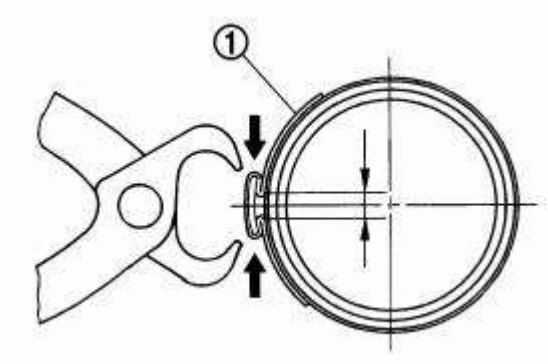
Grease type: High vacuum silicon greaseù

Greasing quantity: 2g

Caution:

- Forbid to repeat to use the rack dust cover.

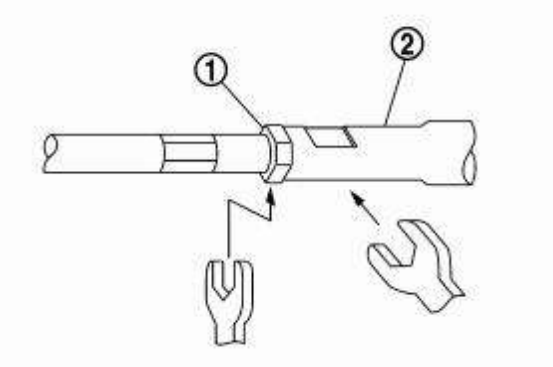
4 Install rack dust cover clip①on rack dust cover Tighten with Clamp pliers.



Caution:

- Forbid to repeat to use rack dust cover clip.
- As shown in the diagram, please install rack dust cover clamp in the groove of dust cover clamp, tighten clamp till the gap less than 3 mm.

5 Install steel band spring clip(small)on rack dust cover.

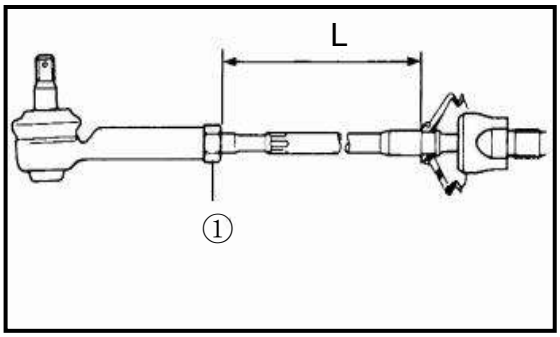


Caution:

- Forbid to reuse steel band elastic hoop.

6 Install nut① and steering tie rod.

7 Adjust standard length “L”of inner tie, then tighten nut① to specified torque.After tightening, check the inner tie length “L”again.Standard value of L:80±1mm.



Caution:

- Need wrench to fix steering tie rod② when tightening nut①.

Maintenance data and specification

Steering wheel clearance and stroke

Item	Standard
Steering wheel clearance	0
Steering wheel free stroke	5

Steering wheel steering force

Item	Standard
Steering wheel steering force	≤25

Steering angle

Item	Standard
Max inner wheel angle	35.1±1.5
Max outer wheel angle	30.6±1.5

Steering column

Item	Standard
Angle adjusting range	3.3±1
Rotating torque	0～2.0
Steering column length	463.5±1.5

Rack stroke

Item	Standard
Rack middle place	67±0.5

Swing torque of ball joint

Item	Standard
Outer ball joint	0.5～3.0
Inner ball joint	0.5～3.0

Ball joint axial clearance

Item	Standard
Outer ball joint	≤0.15
Inner ball joint	≤0.15

Inner rod length

Item	Standard
Rack middle place	80±1

Steering control system

Cautions for steering control system

- When turn steering wheel quickly,could hear the noise around steering wheel, which is the voice of the steering control system to work normally. If turn the steering wheel slowly , appear harsh noise, which is regarded as the abnormal phenomena. If yes, please repair.

Preparation work

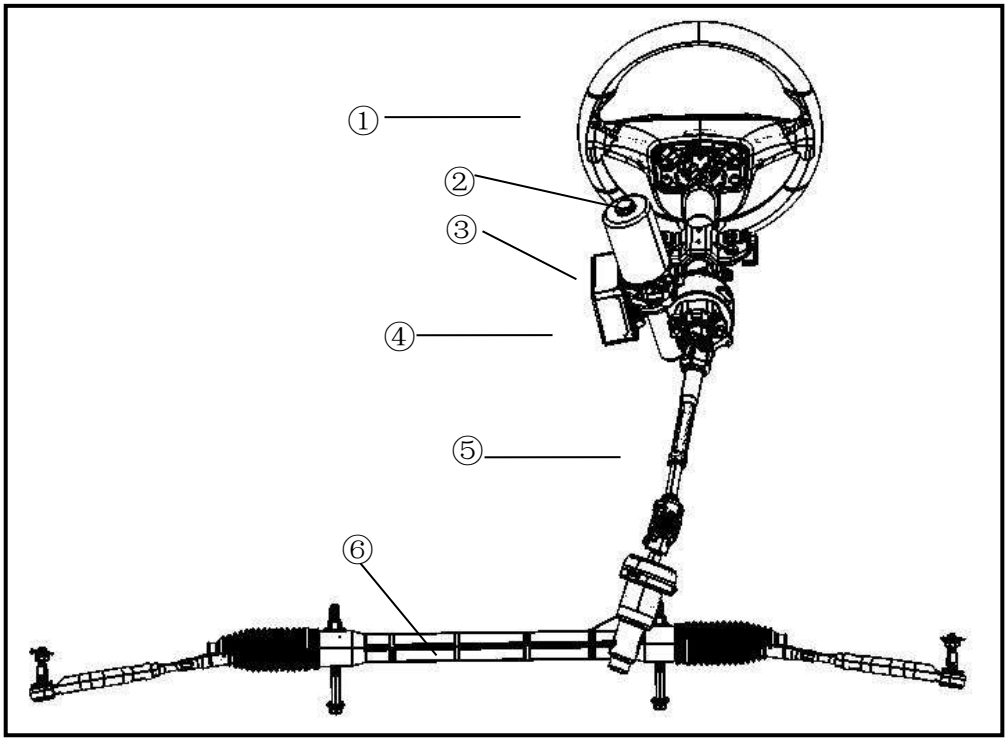
Special tools

The actual tool shape may be different from illustration shown.

Tool	Diagram	Instruction
Diagnostic instrument X-431		ABS system fault diagnosis

System description

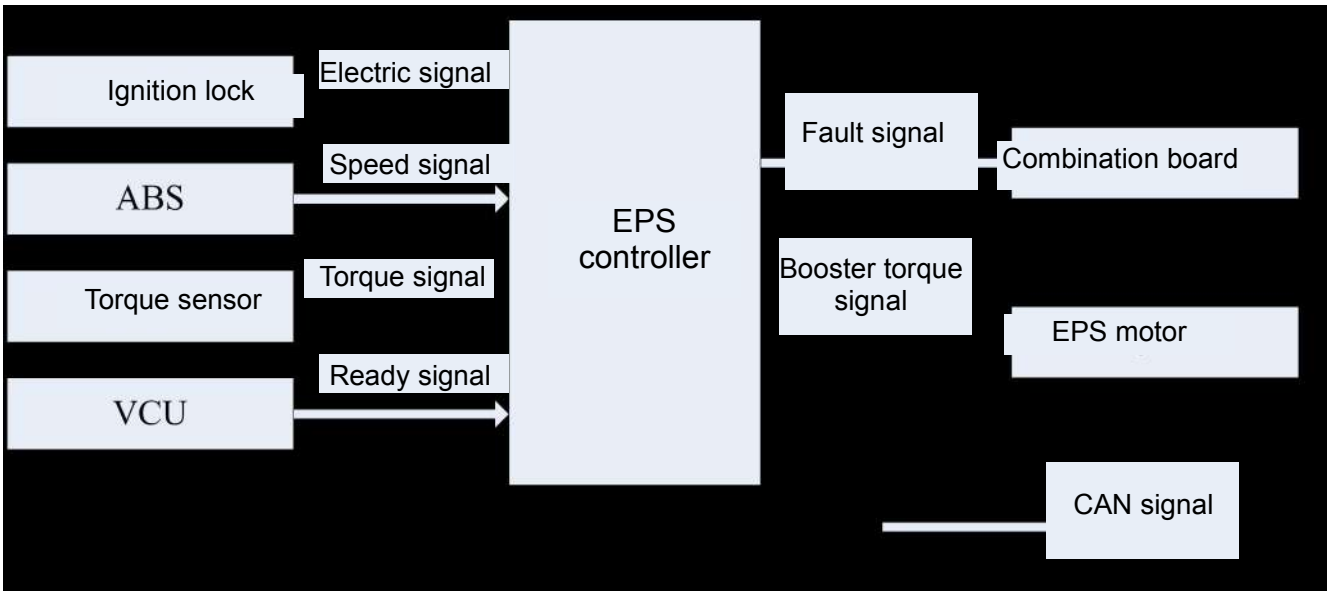
Component layout



1 Steering wheel assembly
2 Steering column
3 EPS motor
4 EPS controller
5 steering shaft with universal joint assembly
6 Steering assembly

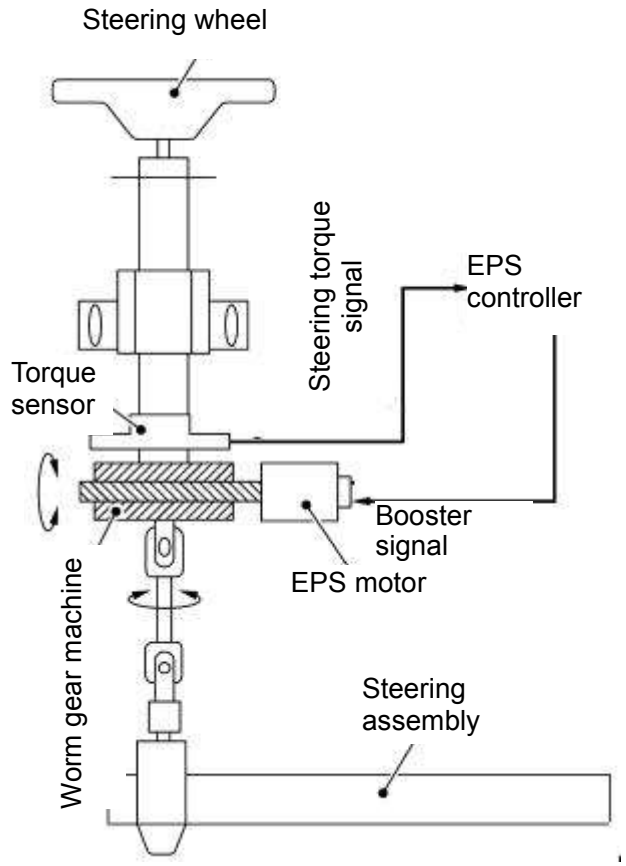
System principle

System principal diagram



Description

EPS controller receives the speed signal, the electrical signal, steering torque signal, control EPS motor and provide the best power steering torque .



Electric booster steering system fault warning light

Turn the key to "START" from the "LOCK", ,the vehicle at “READY” status, steering control system self-check.

If it is normal, the system enter the working state; If not, electric booster steering system fault warning lights lit, the system has no power.

When steering control system is failure, electrical booster steering system fault warning light lit, start safety-invalid mode.

Condition	electrical booster steering system fault warning light
After “READY”	Light off
Start vehicle	Light off
Steering control system fault	Light on

Safety- invalid

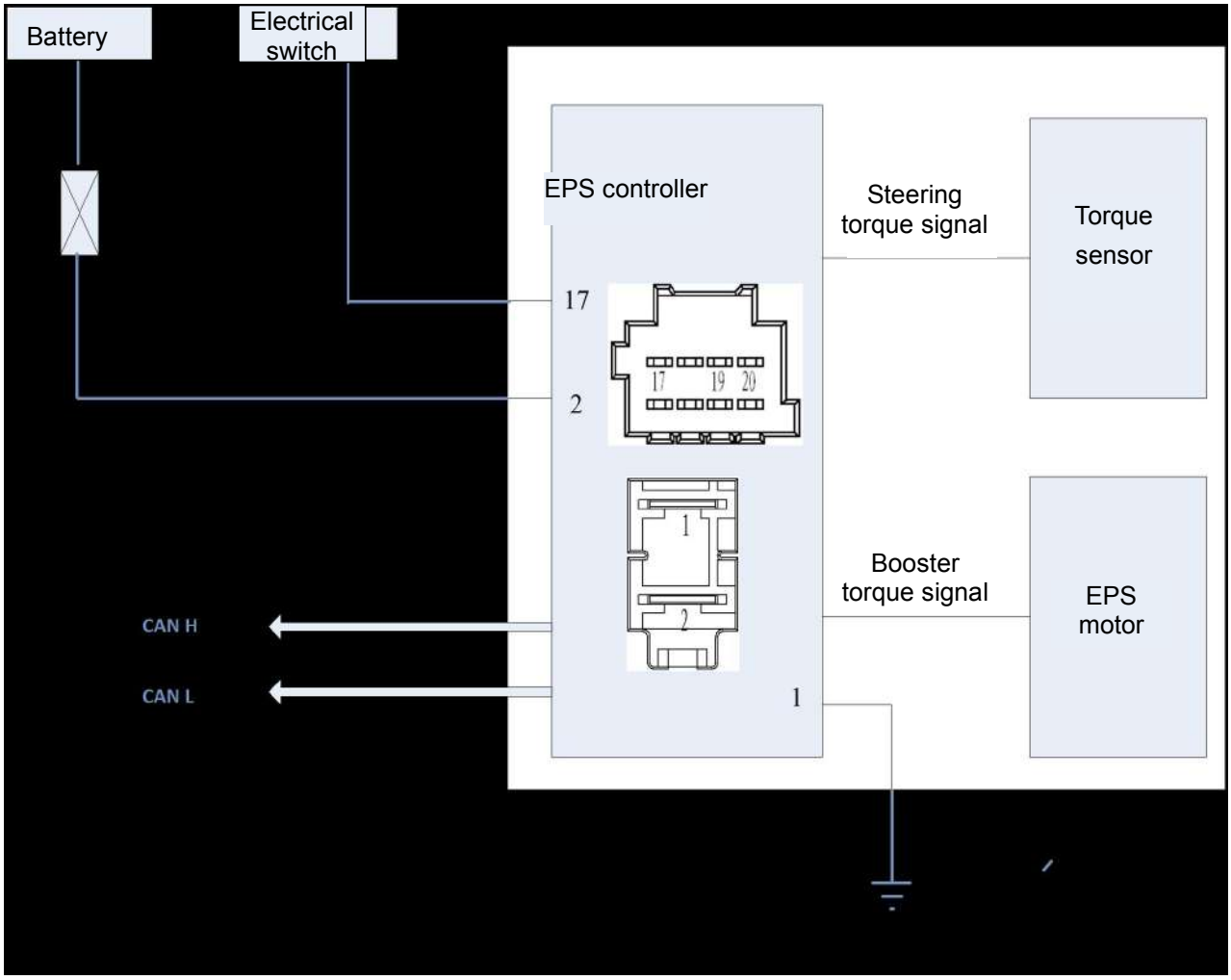
System fault, electric booster steering system fault warning lights lit, entering into no power or small power steering mode (steering wheel steering force will be heavier).

There is only speed signal fault, entering into small power mode, the steering force becomes obviously heavy.

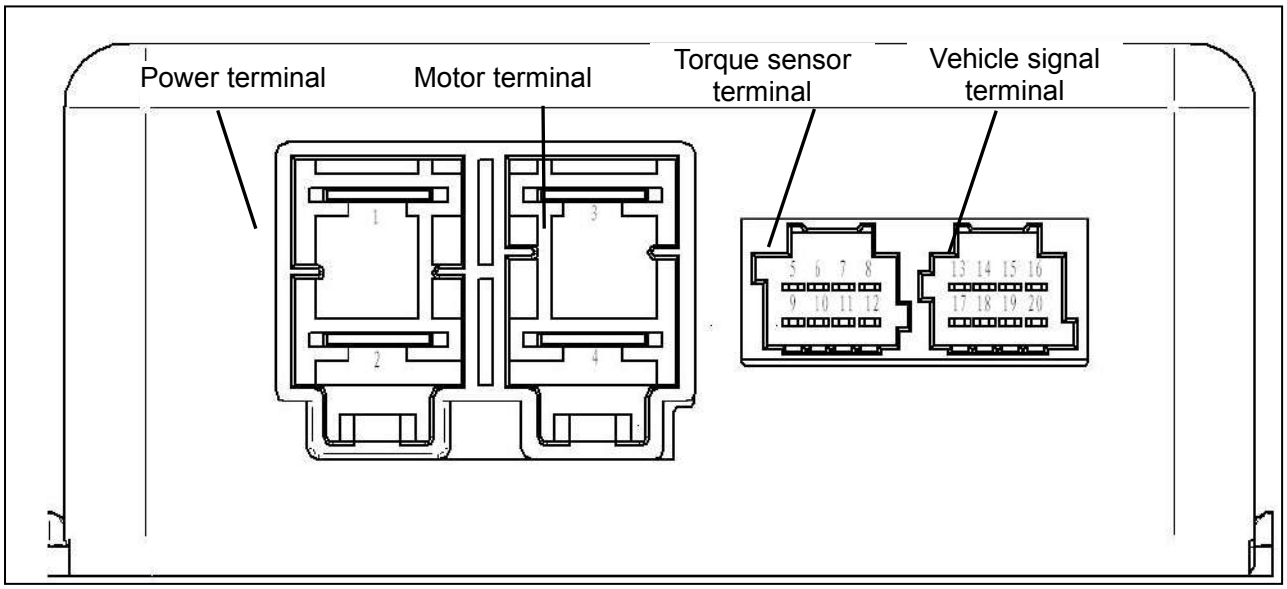
Protective function

Overload using steering function (such as continuous turning in the same place), temperature of EPS controller and EPS motor rise fast, when the temperature reached set value, EPS controller control of EPS motor, reduce the working current, (overload protection).At this time, the steering force becomes obviously heavy,which is normal. Once temperature is reduced to set data, power function will recover.

Electrical principle



Stitch definition



Stitch no	Definition	Measuring status	Reference	Remark
1	Power signal （-）,ground		0V	
2	Power signal（+）		9-16V	
3	Motor output（-）	No moving for steering wheel	5-7V	
4	Motor output（+）	No moving for steering wheel	5-7V	
5	Sensor main angle signal（PWM-P）	Key is in “ON”,steering wheel is in the middle	2.5±0.05V	
6	Sensor vice angle signal（PWM-S）	Key is in “ON”,steering wheel is in the middle	2.5±0.05V	
7	Sensor torque pulse width signal1 （PWM-T1）	Key is in “ON”,steering wheel is in the middle	2.5±0.05V	
8	Sensor torque pulse width signal 2 （PWM-T2）	Key is in “ON”,steering wheel is in the middle	2.5±0.05V	
9	Power 1 （VCC1）	Key is in “ON”	5V	
10	Grounding 1（GND1）	Key is in “ON”	0V	
11	Power 2（VCC2）	Key is in “ON”	5V	
12	Grounding 2（GND2）	Key is in “ON”	0V	
17	Electrical signal	Key is in “ON”	12V	
19	CAN-L			
20	CAN-H			

Fault code reading

Steering control system fault, fault is stored within the EPS controller, which could read through diagnosis instrument or "flash code" .

Serial No	Fault code	Description
1	C1611	Main signal of torque sensor is out of range
2	C1612	Vice signal of torque sensor is out of range
3	C1613	Main signal and vice signal of torque sensor is out of range
4	C1614	Torque sample with too long time.
5	C1615	Angle abnormal fault
6	C1317	Angle zero unlearning
7	C1621	Battery voltage too high
8	C1622	Battery voltage too low
9	C1632	EEPROM data consistency fault
10	C1641	Speed invalid fault
11	C1643	Electrical signal loss
12	C1651	Motor short circuit fault
13	C1661	Relay open
14	C1662	Current sensor-calibration fault of current middle
15	C1663	Current sensor-over current
16	C1664	+5VA voltage fault
17	C1665	EPS controller- inner fault
18	C1667	Temperature sensor-MOSFET overheat
19	U1000	CAN-BUSOFF fault or report sending overtime
20	U1001	Vehicle READY signal report overtime
21	U1002	Speed signal report accepting overtime

Basic check

Diagnostic and maintenance process

Fault diagnostic process details

1 Collect customer information

Before check, carefully ask customer concerns or driving vehicles together with the customer which is very important for solving the problem.

2 Check symptom

According to the information collected through interviewing with the customer ,reappear information of customer specified symptoms. Check whether the symptoms caused by the failure mode.

Caution:

When symptoms are caused by normal operation, please fully inspect each related parts and let customers understand the symptoms are normal.

3 Check electrical booster steering system fault warning light. Please see “electrical booster steering system fault warning light check”

4 EPS fault diagnosis and maintenance

Diagnose whether there is fault code with diagnostic instrument ;

Yes>>record and delete fault code, turn to “fault code, electrical line fault diagnosis”

No>> turn to “Normal symptom and analysis”

Diagnosis working list

In general, customers have their own judgment standard to a problem. Therefore, careful enough to ask to understand customer's concern is very important. Preparing interview list make diagnostic information systematic. Some times, many conditions occur at the same time resulting in failure.

Interview list sample

Interview list					
Customer name	Gender	Plate No		Original registered date	
		Model		VIN	
Production date		Motor power		Mileage	km
Symptom		□Steering wheel is not in the middle			
		□Electrical booster steering system fault warning light on			
		□noise □vibration			
		□others（ ）			
Firstly appear		□recently □other（ ）			
Appearing frequency		□always □regular □sometimes（ times/day）			
Climate condition		□no relation			
	weather	□sunny □cloudy □rainy □snow □others（ ）			
	temperature	□hot □warm □Cool □Cold □temperature (about ℃)			
	comparative humid	□high 高 □normal □low			
Road conditions		□city road □suburb □highway □Mountain road □non-paving road			
Operation conditions etc		□no relation □Drive motor startup □Unload □Driving □Speedup □ drive with same speed □decrease speed □turning □steering wheel turning			
Other conditions					
Remark					

Fault code、circuit fault diagnosis

Torque sensor of C1611 、C1612、C1613、C1614、C1317

Fault	Item	Instruction	Possible reason
C1611	Torque sensor	Main signal of torque sensor is out of range	Harness or connectors Torque sensor EPS controller
C1612	Torque sensor	Vice signal of torque sensor is out of range	
C1613	Torque sensor	Main signal and vice signal of torque sensor is out of range	
C1614	Torque sensor	Torque sample with too long time.	
C1615	Torque sensor	Angle abnormal fault	
C1664	Torque sensor	+5V power fault	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether EPS controller pins and wiring harness connector damage or loose.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block,

④ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Replace EPS controller, check whether fault code exists.

Yes>> torque sensor fault. Please replace steering column.

No >> finish diagnosis

Speed signal C1641、U1002

Chassis

Fault	Item	Instruction	Possible reason
C1641	Speed signa	Speed signl invalid fault	Harness or connectors ABS EPS controller
U1002	Speed signa	Speed signal accepting overtime	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether EPS controller pins and wiring harness connector damage or loose.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block,

④ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Check ABS and ground eletrical line of electric control unit

Carry out ABS diagnosis. Please see “Brake control system-fault diagnosis”to check whether there is fault.

Yes>> repair or replace.

No >> next step, finish diagnosis

5 Replace EPS controller, check whether fault code exists.

Yes>> repair or replace.

No >> finish diagnosis

EPS motor C1651

Fault	Item	Instruction	Possible reason
C1141	EPS motor	Motor short circuit	Harness or connectors EPS motor EPS controller

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether EPS controller pins and wiring harness connector damage or loose.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block,

④ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Replace EPS controller, check whether fault code exists.

Yes>> EPS motor fault, replace steering column.

No >> finish diagnosis

EPS controller C1632、C1661、C1662、C1665、C1667

Fault	Item	Instruction	Possible reason
C1632	EPS controller	EEPROM data consistency of failure	EPS controller
C1661	EPS controller	Relay open	
C1662	EPS controller	calibration error Of current middle point	
C1663	EPS controller	Current sensor overflow	
C1665	EPS controller	The control unit internal fault	
C1667	EPS controller	MOSFET overheating fault	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether EPS controller pins and wiring harness connector damage or loose.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block,

④ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Replace EPS controller

Battery voltage fault C1621、C1622

Fault	Item	Instruction	Possible reason
C1621	Battery voltage	Battery voltage too high ＞17.5V	Harness or connectors EPS controller fuse Power supply circuit 12V battery
C1622	Battery voltage	Battery voltage fault	

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether EPS controller pins and wiring harness connector damage or loose.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block,

④ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Check EPS controller grounding circuit.

① Put the key on “LOCK”block.

② Remove the EPS controller power port connector, check whether the wire end pin correspondence with the power port 1 is through with ground.

Yes >> Next step

No > > grounding circuit open circuit or short circuit. Repair or replacement, the implementation of the self-diagnosis

5 Check EPS controller power supply circuit

① Connect connectors of EPS controller at power terminal, put the key on "ON" block.

② Respectively check whether voltage between wiring harness and ground of corresponding EPS controller power port 2 and vehicle signal port 17 is normal.

Yes >> Next step

No > > harness open circuit or short circuit. Repair or replacement, the implementation of the self-diagnosis

6 Replace EPS controller.

CAN communication U1000

Fault	Item	Instruction	Possible reason
U1000	CAN communication	BUS-OFF fault or CAN report sending overtime	CAN communication EPS controller

1 Preparation work

If carried out the other fault diagnosis before, please put the key in the "LOCK" block, check again after waiting for at least 10 s.

2 Check whether EPS controller pins and wiring harness connector damage or loose.

Yes>> repair or replace. Next step.

No>> Next step

3 Perform self-diagnosis

① Delete fault code

② Put the key on "LOCK" block, waiting for more than 10 s.

③ Put the key on "ON" block,

④ Check whether fault code exists.

Yes>> next step

No >> finish diagnosis

4 Check CAN communication system, please see “Electric tumble sub-manual - CAN communication system ", detect if there is a fault .

Yes>> repair or replace.

No>> Next step

5 Replace EPS controller,check whether fault code exists.

Yes>> repair or replace.

No>> Finish diagnosis

Common symptom and analysis

Steering heavily or too light

1 Carry out self-diagnosis, check whether self-diagnosis result has fault code.

Yes >>EPS fault diagnosis and maintenance.Next step.

No>> Turn to 3

2 Check symptom

Check whether there is abnormal symptom such as “heavier”or “too light”

Yes>> Next step

No >> diagnosis finish

3 Check torque sensor

Check whether the voltage between terminal 7 and 10 of torque sensor is normal.

Yes>> check and adjust steering wheel steering force. Please see”steering system- basic check”.

No>> Replace steering column.

Different steering force for left and right

1 Carry out self-diagnosis, check whether self-diagnosis result has fault code.

Yes >>EPS fault diagnosis and maintenance.Next step.

No>> Turn to 3

2 Check symptom

Check whether it is different for the steering force for left and right.

Yes>> Next step

No >> diagnosis finish

3 Front wheel alignment check

Check whether it is normal for wheel alignment. Please see “ front suspension-wheel alignment”.

Yes>> check and adjust steering wheel steering force. Please see “ check steering wheel steering force”.

No>> wheel alignment. Turn to 2.

Vibration of steering force

1 Carry out self-diagnosis, check whether self-diagnosis result has fault code.

Yes >>EPS fault diagnosis and maintenance.Next step.

No>> Turn to 3

2 Check symptom

Check whether steering force vibrate.

Yes>> Next step

No >> diagnosis finish

3 Check the connection of steering shaft with universal joint is normal.

Yes>> check and adjust steering wheel steering force. Please see “ check steering wheel steering force”.

No>> Maintenance or replace. Turn to 2.

EVO Electric

Body

Chassis

EMB

High voltage

Windscreen Wiper Washing System

Safety Precautions

Precaution for Technicians Using Medical Electric

Operation Prohibition

Warning：

- Parts with strong magnet is used in this vehicle**.**
- Technicians using a medical electric device such as pacemaker must never perform operation on the vehicle, as magnetic field can affect the device function by approaching to such parts.

Normal charge precaution

Warning：

- **If a technician uses a medical electric device such as an implantable cardiac pacemaker or an implantable cardioverter defibrillator, the possible effects on the devices must be checked with the device manufacturer before starting the charge operation.**
- **As radiated electromagnetic wave generated by on board charger at normal charge operation may affect medical electric devices, a technician using a medical electric device such as implantable cardiac pacemaker or an implantable cardioverter defibrillator must not enter the vehicle compartment (including trunk) during normal charge operation.**

Precaution at telematics system operation

- **If a technician uses implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), avoid the device implanted part from Communication device.**
- **The electromagnetic wave of TCU might affect the function of the implantable cardiac pacemaker or the implantable cardioverter defibrillator (ICD), when using the service, etc.**
- **If a technician uses other medical electric devices than implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), the electromagnetic wave of TCU might affect the function of the device. The possible effects on the devices must be checked with the device manufacturer before TCU use.**

Key Part Check before Maintenance and Repair

Check the high-voltage system, and ensure the high-voltage system is powered off before starting the maintenance work, and disconnect the battery switch.

Cautions：

If the timer air conditioner or timer charge is set, the high voltage system starts automatically even when the power switch is in OFF state.

Precautions for SRS "Air Bag" and "seat belt pre-tensioner

Supplemental Restraint System (SRS) "Air Bag" and "seat belt pre-tensioner" are used on the front seat belts, which can help to reduce the dangers or serious injury of the driver and the front passenger in certain type of collisions. The relevant information of safe usage of the system are included in the SRS and Safety Belt Section of the Service Manual.

Warning:

In order to prevent accidents, please follow the below points：

- **Avoid the deactivation of SRS. Its failure will increase the personal injury caused by the airbag collision in the major collision accident. All the repairs must be done by the authorized dealer of DR.**
- **Improper repair, including wrong removal and installation of SRS system, will make the system unable to activate and cause personal injury. Regarding the spiral cable and airbag modules, please refer to "SRS AIR BAG".**

Unless it is allowed in Service Manual, please do not use the electronic test equipment on the relevant circuit of SRS. The harness of SRS uses yellow or orange harness or harness connector, which can be easily recognized.

Precautions for using power tools (air or electric power) and hammers.

- When the power switch is turned on, do not use the pneumatic or electric tools or hammer to hammer the surrounding areas of the airbag diagnostic sensor or airbag system sensors. Strong vibration may activate the sensors and unfold the air bag, which will cause serious injuries.
- When using the pneumatic or electric tools or hammer, please switch off the power always, unplug the 12V lead-acid battery pile head, and wait at least 1 minute and then repair.

Precautions for removing 12V battery

Before removing the 12V battery, please turn the power switch to the ON position, then turn to the OFF position.

Tips：

- When the power switch is on OFF position, the automatic charging control system of the battery may start.
- When turning the power switch from ON position to OFF position, the automatic charging control system of the battery will not start.

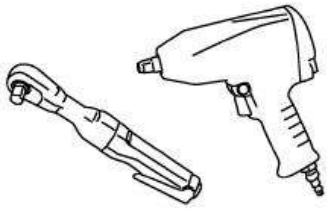
Common Precautions

- Before the serving, which is not need to use the power supply: turn the power switch to LOCK position, disconnect the 12V storage battery negative terminal.
- After disconnecting 12V storage battery negative terminal, the storage memory of radio and other control devices will be deleted.
- Use suitable method to dispose the discharged engine oil or solvent that used for washing components.
- Before inspection and assembly, please use specified liquid or solvent to wash the removed components.
- Replace the new oil seal、pad、seal ring、O-ring、lock-up gasket、split pin、self-locking nut and other components.
- Place the removed components according to the assembly-oriented position and order.
- Only the oil and lubricant recommended in this manual is allowed to be used.
- If necessary, use authorized binder、sealant or equivalent product.
- In order to repair the vehicle safely and efficiently, right use of hand tools、power tools(only for removal) and special tools is necessary.
- Before Servicing：

Use suitable cover to cover the wheel fender、interior and carpet. Attention, do not use the key、fastener or the like to scratch the paintwork.

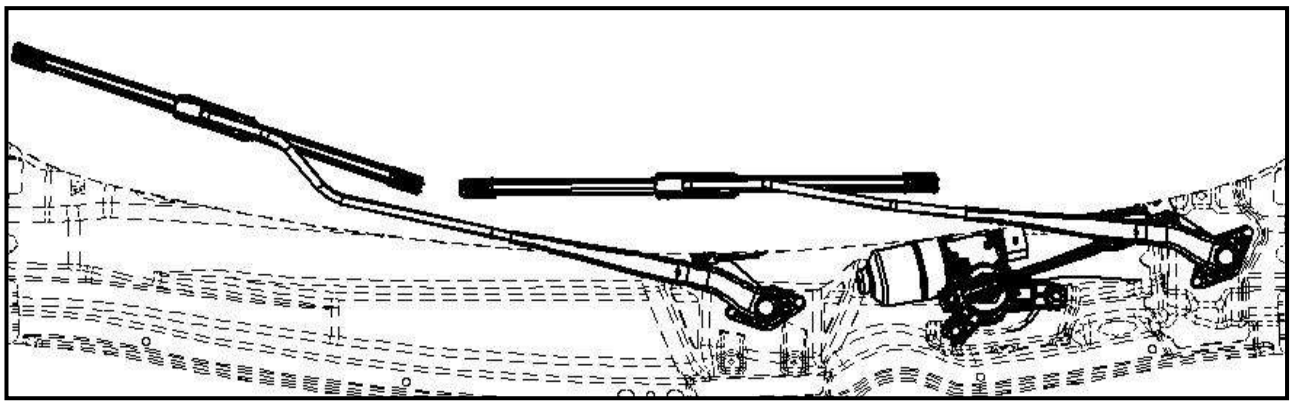
Preparations

Commonly Used Service Tools

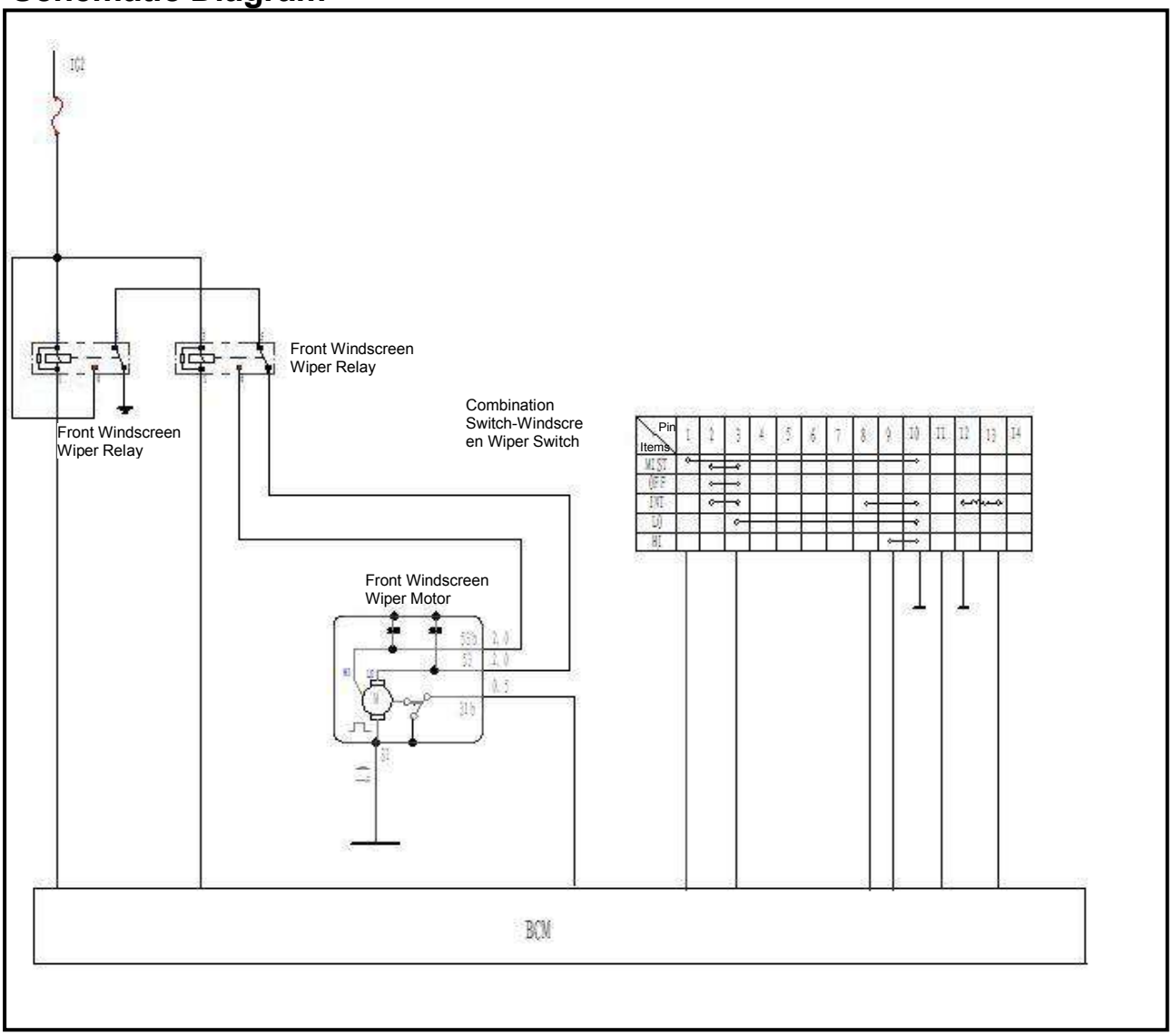
Tool		Instructions
Power Tool		Install and remove the bolts and nuts

Windscreen Wiper System

Windscreen Wiper Position

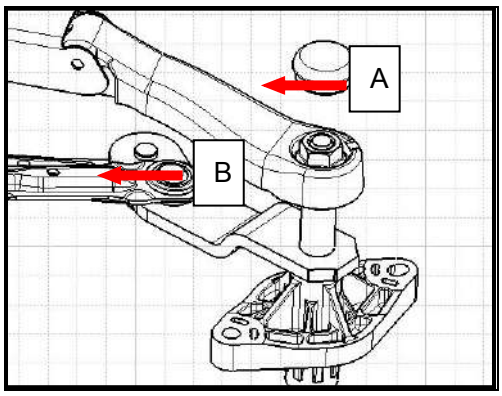


Schematic Diagram

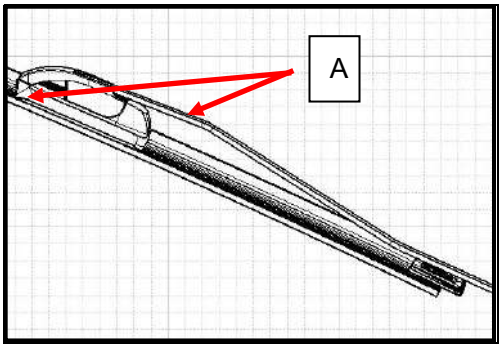


Remove

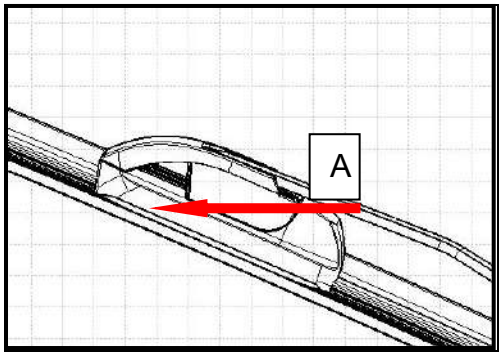
1 Open the engine compartment cover, unscrew the blanking caps(A) of the front windscreen wiper and M8 bolts(B), remove the front wiper arm and blade.



2 After unscrewing the bolts, remove the front wiper arm and balde(A).

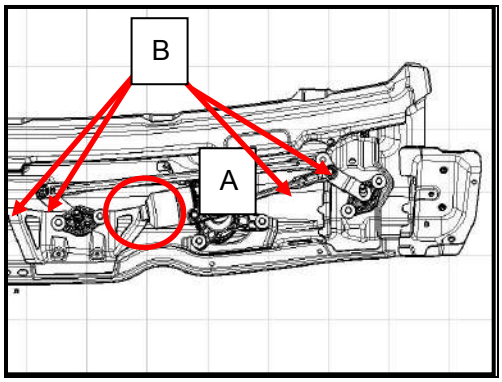


3 If it is necessary to remove the wiper blade, open the cover(A),push the wiper blade downwards.

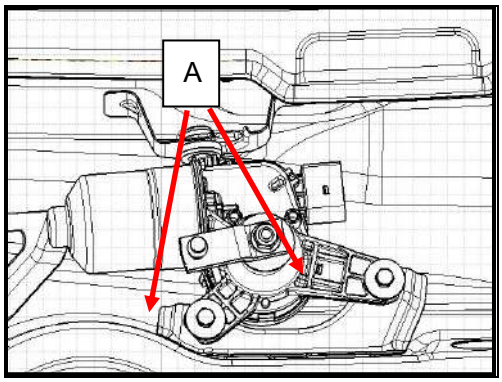


4 Remove the ventilation panel, for the specific methods, please refer to the maintenance section of the ventilation panel.

5 After removing the ventilation panel(shown as the following diagram), disconnect the motor and the ball joint A of the rod, unscrew four M6 bolts(B), remove the connecting rod assembly.



6 Unscrew the two M6 bolts(A), remove the motor assembly.



Cautions:

- Before removing the windscreen wiper motor and connecting rod assembly, make sure that the connecting rod stays at stop position automatically. In the process of removal, the blade will be damaged if violent operation is developed on it, which will influence the scrape and brushing effects.

Installation

Install in the reverse step of removal, here we will not go into details. The following steps will be emphasized on:

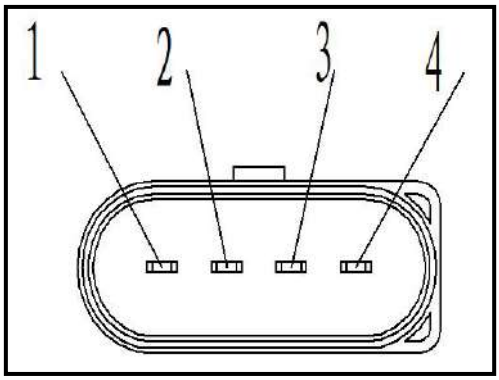
Cautions:

- **Before installing the windscreen wiper motor assembly、connecting rod assembly, connect the windscreen wiper motor and harness connectors, it can be judged that the connection is good if you hear Clatter sound.**
- **The tightening torque of the windscreen wiper motor and connecting rod assembly mounting bolts is 11N.m±1N.m.**
- Before installing the wiper arm and blade assembly, firstly, connect the windscreen wiper motor with the power supply, after the windscreen wiper motor working for 10 seconds, operate the combination switch and turn off the windscreen wiper gear, make the windscreen wiper stay at stop position.
- The blade is installed on the anchor point of the windshield.
- The tightening torque of wiper arm mounting bolts is **15N.m±2N.m.**

Inspection

Quick Operation Inspection

1 Separate the windscreen wiper motor connector.



NO	1	2	3	4
Definition	Grounding	Off-Position	Low Speed	High Speed

① Terminal 3、4 is connected with the battery positive terminal(+), terminal 1 is connected with battery negative terminal(-).

② Shown in the following diagram, check whether the motor is normal or not.

Cautions:

Position Terminal	1	2	3	4
OFF	○———	○		
LO	○———	———	○	
HI	○———	———		○

- Generally speaking, the pollution sources come from the insects、sap and the hot wax disposal of the washing liquid for the commercial vehicles. If the blade does not work normally, use good washing solution or mild detergent to clean the doors and the windows and the wiper blades, then, use clean water to clean thoroughly.

Washing System

Inspection

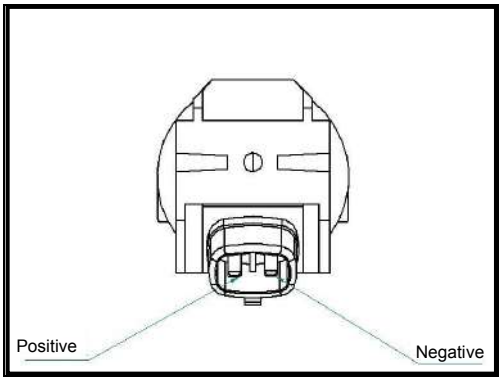
1 Connect the washing motor on the water tank, inject water into the water tank.

Cautions:

- Before injecting water into reservoir tank, check whether the filter has been mixed with foreign matters or contaminated. Clean the filter according to requirement.

2 Connect the battery positive (+) and negative(-) wires to the corresponding positive and negative terminals, check the motor for normal working conditions, check whether the washing motors works or not. Check whether the spray nozzle of the front windshield sprays or not.

3 If abnormal, replace the washing motor.



Removal

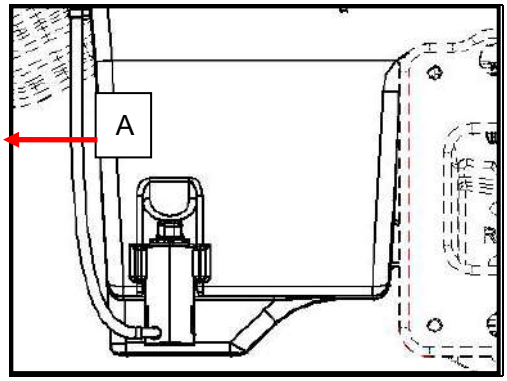
Cautions:

- When maintaining the washing pump, do not damage the washing pump seal.
- Before installing the reservoir tank of the washing pump, do not operate the washing pump. Incorrect operation may lead to the pump malfunction in advance

1 Separate the battery negative terminals.

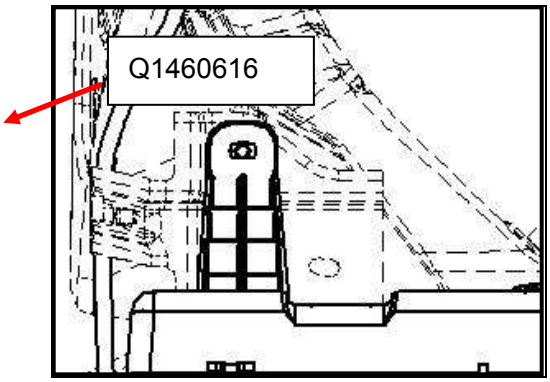
2 Remove the front bumper cover、right front headlamp.

3 Remove the washing hose(A), separate the washing motor.



1 Remove the washing motor.

2 Unscrew three M6 bolts(Q1460616), remove the washing liquid pot.



Installation

1 Install the washing liquid pot.

Cautions:

- Before installing the washing motor, check it for impurities or contamination, if necessary, clean the filter and washing motor.

2 Connect the washing motor and hose.

3 Install the washing motor.

4 Install the spray nozzle of the washing system.

5 Install the front bumper cover、right front headlamp.

Trouble Shooting

1 Check list of the common malfunctions with regard to the windscreen wiper washing system

Common Malfunctions	Malfunction reason and trouble shooting method	
Out of work	1. The motion parts get stuck 2. The battery is not connected, the thread of the connector falls off 3. The motor burns down	1. Troubleshoot the stuck fault 2. Power-on 3. Replace the new motor
Abnormal sound, malfunction	1. The abnormal sound created from the inside of the motor 2. The friction and crash phenomenon happens to the parallel mechanism in the process of movement. 3. The abnormal sound created between the blade and the window	1. Replace the motor 2. Troubleshoot the friction and crash malfunctions 3. Clean up the window
In the process of wiping and scraping, the chattering phenomenon happens to the blade	Inject the liquid detergent into the washing can, which helps the blade decrease the friction when water is sprayed	
The blade is out of level after returning to the original position	After the motor returns to the original position, take down the wiper arm and reinstall it, keep the blade remaining level	
The window can not be wiped cleanly	1. The window is not clean 2. The blade is severely worn out	1. Clean up the window 2. Replace the blade(It is suggested that the blade should be replaced in every three months)

2 Windscreen wiper washer system inspection

Step	Measures	Normal Result	Abnormal Result
1	Turn the ignition switch to ON position. Keep the washer switch at ON Position.	The windscreen wiper is working at lower speed. As long as the washer switch stays at ON position, the washer will spray detergent to the windshield. After disconnecting the switch, the washer will stop working, the windscreen wiper will return to the Stop Position after scraping for 2-4 times.	The washer is out of work.
2	Turn the windscreen wiper switch to Delay Position(pulse mode).	After the windscreen wiper scraped one time completely, it will pause for 1-2 seconds, then scrape for the next time.	The windscreen wiper will be out of work under delay mode. The windscreen wiper will be out of work under defog、delay and low speed modes.
3	Turn the windscreen wiper switch to Delay Position. Keep the windscreen wiper switch opening for 1-2 seconds.	As long as the washer stays at the Open Position, the washer will spray detergent to the windshield. The windscreen wiper will work at low speed when water spraying, after loosening the washer switch, the windscreen wiper scrapes for 2-4 times. Then, the windscreen wiper recovers pulse working.	The washer is out of work. The windscreen wiper will be out of work under delay mode. The windscreen wiper will be out of work under defog、delay and low speed modes.
4	Turn the windscreen wiper switch to the Low Speed Position.	The windscreen wiper is continually working at low speed.	The windscreen wiper will not work under defog、delay and low speed modes.
5	Turn the windscreen wiper switch to the HI Position.	The windscreen wiper is continually working at high speed.	The windscreen wiper will not work under the High Speed Mode, it will work under Low Speed Mode.
6	Turn the windscreen wiper switch to OFF Position.	The windscreen wiper returns to the Stop Position at lower speed.	The wiper blade of the windshield will keep working. The windscreen wiper keeps open

3 Diagnostic Procedure of the windscreen wiper/washing system

Malfunction Mode: regardless of the windscreen wiper switch on any gear, the windscreen wiper and washer are out of work

Step	Treatment method	Yes	No
1	Check the fuse of engine compartment fuse box、fuse of the cab fuse box for melting.	To Step 2	To Step 3
2	After troubleshooting the malfunctions caused by other circuits, replace the fuse, whether the malfunction has been troubleshot or not.		To Step 3
3	Turn on the ignition switch, check whether the motor battery and the grounding is normal or not. The voltage between the terminal 3 of the windscreen wiper motor plug and grounding is 12V, terminal 1 is grounded. The voltage between the terminal 4 of the washer motor and grounding is 12V.		To Step 4
4	Replace the windscreen wiper motor and the washing motor, whether the malfunction has been troubleshot or not.		To Step 5
5	Replace the windscreen wiper switch		

4 Malfunction Mode: only the high gear of the front windscreen wiper is out of work

Step	Treatment method	Yes	No
1	Check the motor terminal 4 and 1 for breakover.	To Step 3	To Step 2
2	Replace the windscreen wiper motor.		To Step 3
3	Check the circuits of the windscreen wiper combination switch and the windscreen wiper motor terminal 4 for normal connections.	To Step 5	To Step 4
4	Repair or replace the connection circuits of the motor terminal 4 and windscreen wiper combination switch, whether the malfunction has been troubleshot or not.		To Step 5
5	Turn the windscreen wiper combination switch to the high gear, check whether the conduction of the windscreen wiper combination switch is normal or not, the windscreen wiper combination switch terminal of 9 and 10 should be conducted.	To Step 7	To Step 6
6	Replace the combination switch, whether the malfunction has been troubleshot or not.		To Step 7
7	Repair or replace the connection circuits of the windscreen wiper combination switch terminal 10 and grounding.		

5 Malfunction Mode: only the low gear of the front windscreen wiper is out of work

Step	Troubleshooting Method	Yes	No
1	Check the windscreen wiper motor terminal 3 and 1 for breakover.	To Step 3	To Step 2
2	Replace the windscreen wiper motor		To Step 3
3	Check the circuits of windscreen wiper motor terminal 3 and the windscreen wiper combination switch for normal connections.	To Step 5	To Step 4
4	Repair or replace the connection circuits of motor terminal3 and windscreen wiper combination switch, whether the malfunction has been troubleshot or not.		To Step 5
5	Turn the windscreen wiper combination switch to the low gear, check whether the conduction of the windscreen wiper combination switch is normal or not, the windscreen wiper combination switch terminal 3 and 10 should be conducted.	To Step 7	To Step 6
6	Replace the combination switch, whether the malfunction has been troubleshot or not.		To Step 7
7	Repair or replace the connection circuits of the windscreen wiper combination switch terminal 10 and grounding.		

6 Malfunction Mode: Only the intermittent gear of the front windscreen wiper is out of work

Step	Troubleshooting Method	Yes	No
1	Turn the windscreen wiper switch to the intermittent gear, check whether the conduction of the windscreen wiper combination switch terminal is normal or not: terminal 2 and 3 is conducted, terminal 8 and 10 is conducted	To Step 3	To Step 2
2	Replace the windscreen wiper combination switch, whether the malfunction has been troubleshot or not.		To Step 3
3	Check the connection circuits of the windscreen wiper combination switch terminal 8 and the BCM for breakover.	To Step 5	To Step 4
4	Repair or replace the connection circuits of the windscreen wiper combination switch terminal 8 and BCM, whether the malfunction has been troubleshot or not.		To Step 5
5	Check the connection circuits of the BCM and the windscreen wiper relay terminal for breakover.	To Step 7	To Step 6
6	Repair or replace the connection circuits of the BCM and windscreen wiper relay, whether the malfunction has been troubleshot or not.		To Step 7
7	Turn the ignition switch to ON position, shift the windscreen wiper switch to the intermittent gear, check whether the windscreen wiper relay terminal is conducted with the grounding or not.	To Step 9	To Step 8
8	Replace the BCM. Whether the malfunction has been troubleshot or not.		To Step 9
9	Replace the windscreen wiper relay		

7 Malfunction Mode: the windscreen wiper is open all the time

Step	Troubleshooting Method	Yes	No
1	Check whether the breakover of the windscreen wiper combination switch on each gear is normal or not.	To Step 3	To Step 2
2	Replace the windscreen wiper combination switch. Whether the malfunction has been troubleshot or not.		To Step 3
3	Check the circuits between the windscreen wiper combination switch and the windscreen wiper motor for normal connections.	To Step 5	To Step 4
4	Repair or Replace the connection circuits of the windscreen wiper combination switch and the windscreen wiper motor, whether the malfunction has been troubleshot or not.		To Step 5
5	Replace the windscreen wiper motor		

8 Malfunction Mode: the washer is out of work

Step	Troubleshooting Method	Yes	No
1	Check whether the washing motor battery is normal or not, turn on the ignition switch, the voltage between the washing motor plug positive terminal and the grounding is the battery voltage	To Step 3	To Step 2
2	Repair or replace the power supply circuit of the washing motor, whether the malfunction has been troubleshot or not.		To Step 3
3	Turn the windscreen wiper combination switch to Washing Position, check the windscreen wiper combination switch for conduction, the windscreen wiper combination switch terminal 10 and 11、5 and 6 should be breakover.	To Step 5	To Step 4
4	Replace the windscreen wiper combination switch, whether the malfunction has been troubleshot or not		To Step 5
5	Check the circuits between the windscreen wiper combination switch and the washing motor for normal connection.	To Step 7	To Step 6
6	Repair or replace the circuits of windscreen wiper combination switch and washing motor, whether the malfunction has been troubleshot or not.		To Step 7
7	Replace the washing motor		

Electric Horn

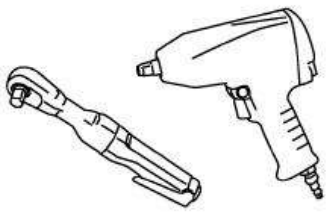
Common Precautions

- Before the serving, which is not need to use the power supply: turn the power switch to LOCK position, disconnect the 12V storage battery negative terminal.
- After disconnecting 12V storage battery negative terminal, the storage memory of radio and other control devices will be deleted.
- Replace the new oil seal, pad, seal ring, O-ring, lock-up gasket, split pin, self-locking nut and other components.
- Place the removed components according to the assembly-oriented position and order.
- If necessary, use authorized binder、sealant or equivalent product.
- In order to repair the vehicle safely and efficiently, right use of hand tools、power tools(only for removal) and special tools is necessary.
- Before Servicing：

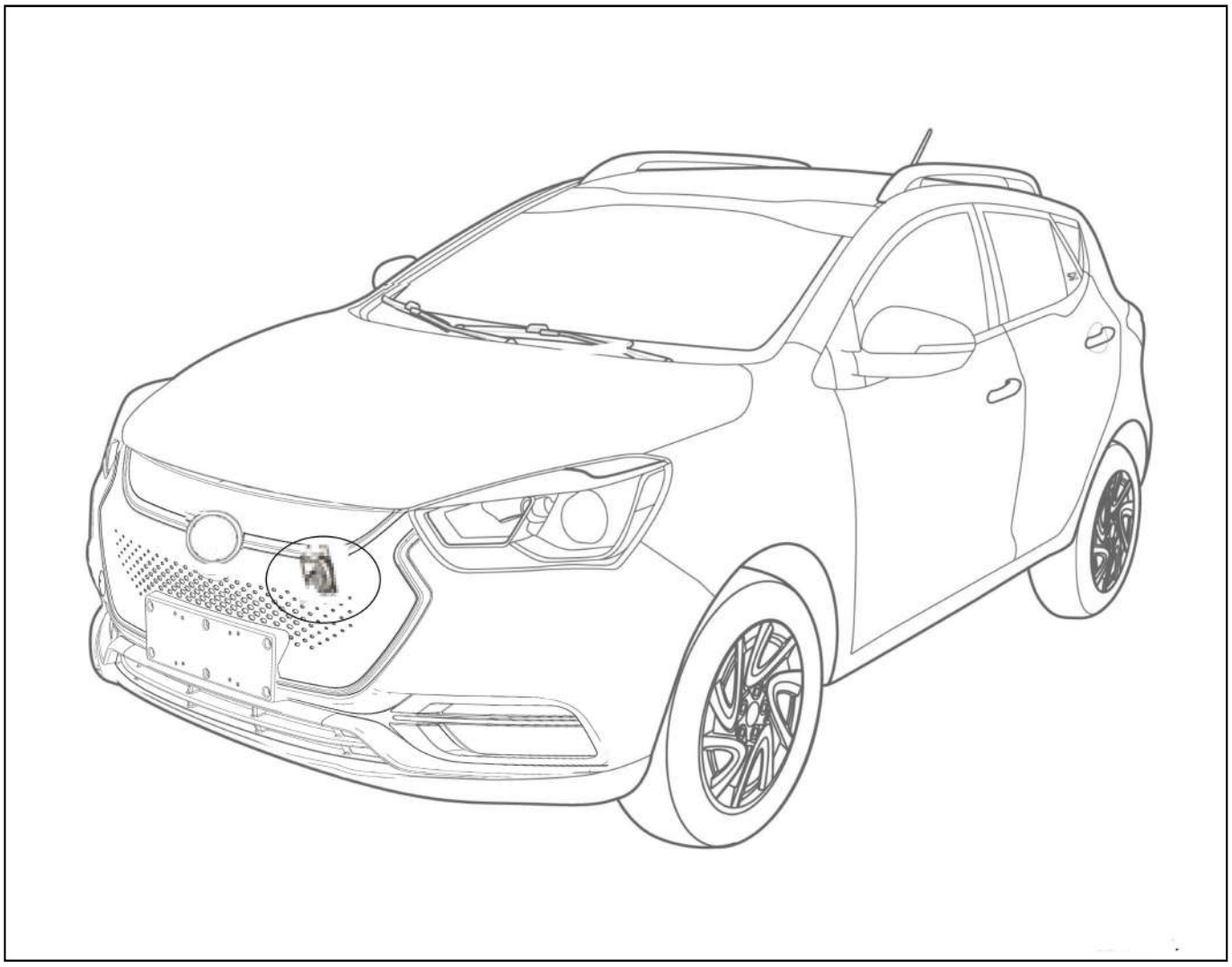
Use suitable cover to cover the wheel fender、interior and carpet. Attention, do not use the key、fastener or the like to scratch the paintwork.

Preparations

Commonly used service tools

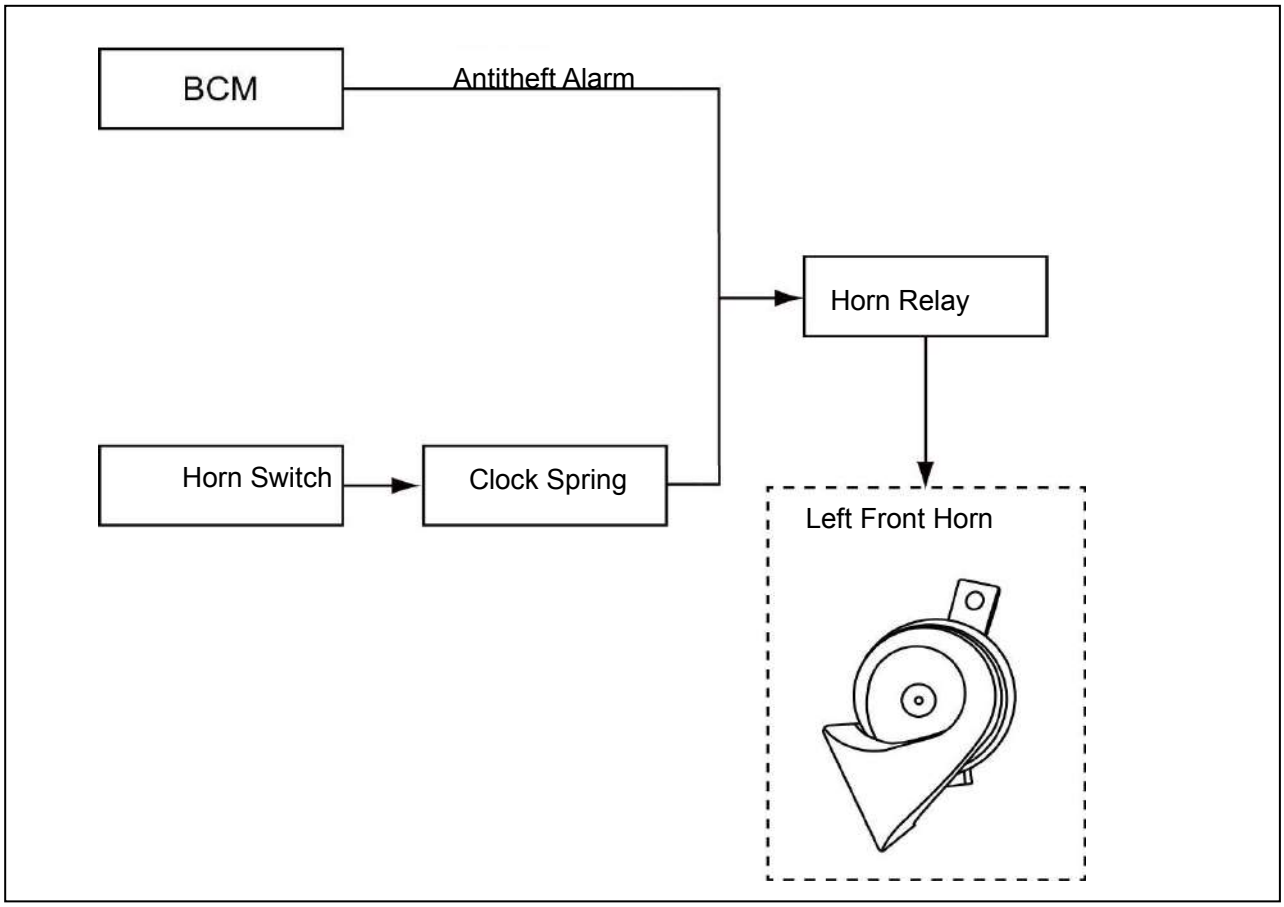
Tool		Instructions
Power Tool		Install and Remove the bolts and nuts

Components Position



Schematic Diagram

The control method of horn is to control delivery point, the pick-up of horn relay is controlled by horn switch or body controller, then power is delivered from relay to horn, thereby the horn works. The horn is always grounding.



Malfunction Diagnosis

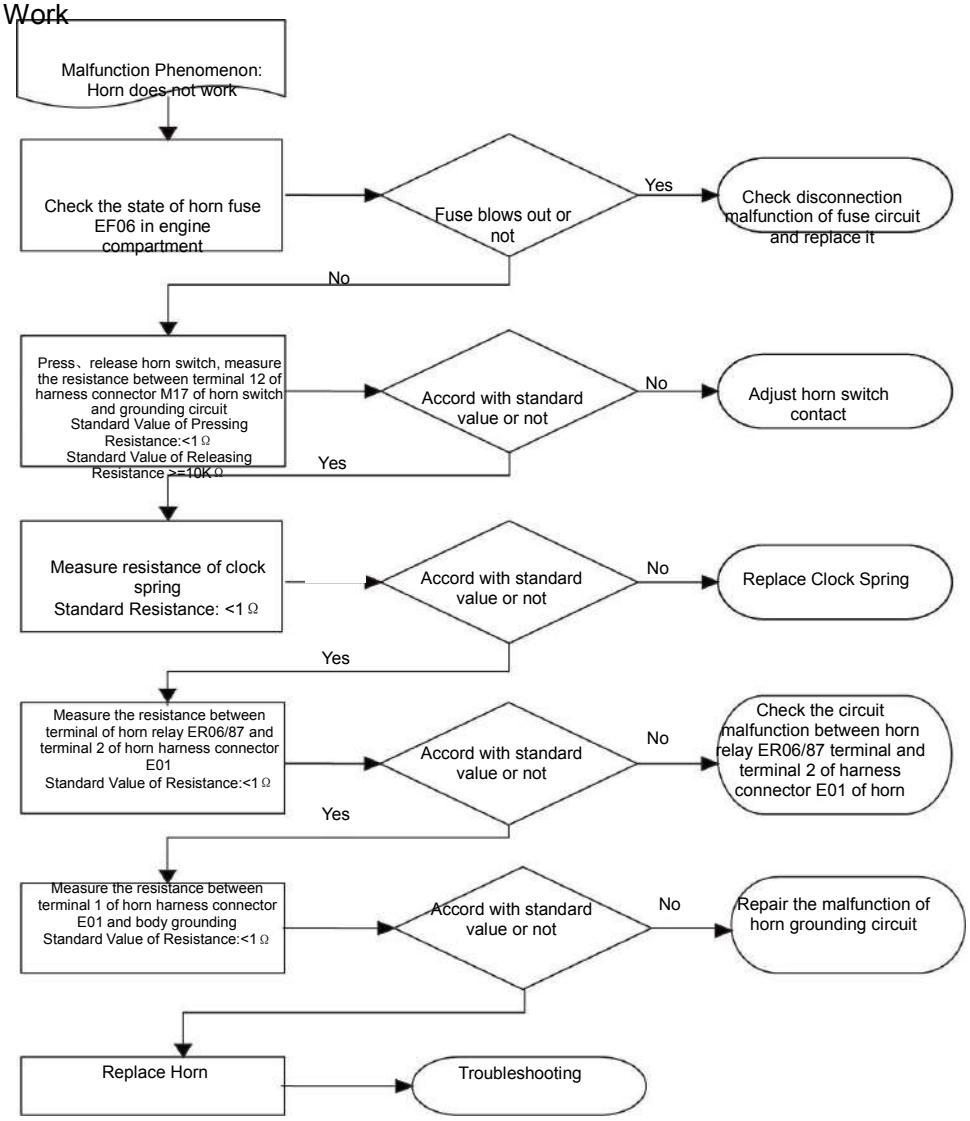
(1) List of Malfunction Diagnosis

1. Check after-sales installation device that may have influence on horn operation.
2. Check the system components that are easier to be contacted or visible to confirm that whether there is obvious damage or condition that may lead to malfunction.
3. If the horn does not work, before replacing the horn, check and repair the bad contact or disconnection malfunction of power supply or switch ground circuit.
4. As the horn does not work discontinuously or the horn switch on either side of steering wheel is out of work, it is most likely to be bad contact of horn switch contact, at this moment, the horn switch contact in the steering wheel should be adjusted.

No	Malfunction Phenomenon	Malfunction Cause Analysis	Countermeasures	Remark
1	Horn does not work	Horn relay malfunction	Replace horn relay	Refer to Horn Does Not Work
		Power supply fuse malfunction	Replace fuse	
		Horn contact malfunction	Adjust horn contact	
		Clock Spring Malfunction	Replace clock spring	
		Power circuit malfunction of horn	Check relevant circuit	
		Grounding circuit malfunction of horn	Check relevant circuit	
		Horn Malfunction	Replace horn	

(II) Flow Chart of Malfunction Diagnosis

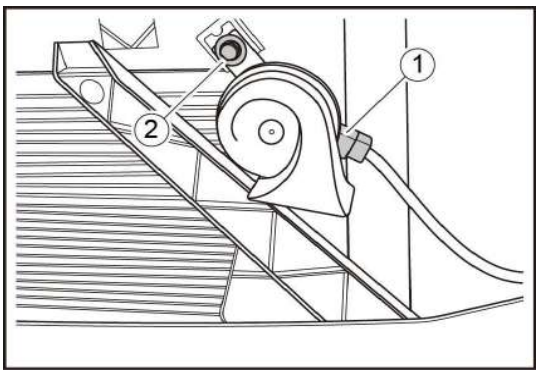
Horn Does Not Work



Removal and Installation

Removal

1. Open front compartment cover
2. Disconnect battery negative cable. Refer to Disconnection and Connection of Battery Cable
3. Remove front shield of engine. Refer to Front Shield of Engine
4. Remove front wheel cover. Refer to Front Wheel Cover
5. Remove top plate of front bumper
6. Remove front bumper assembly
7. Remove tweeter assembly

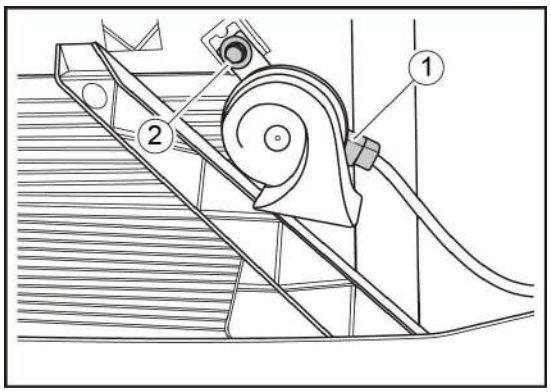


1) Disconnect harness connector ① of tweeter assembly
2) Remove one fixed bolt ② of tweeter assembly
3) Take down tweeter assembly

Installation

1. Install tweeter assembly

1) Place tweeter assembly in installation position, tighten up one fixed bolt ② of tweeter assembly
2) Connect harness connector ① of tweeter assembly



2 Install front bumper assembly
3 Install top plate of front bumper
4 Install front wheel cover
5 Install front shield of engine
6 Connect battery negative cable
7 Close front compartment cover

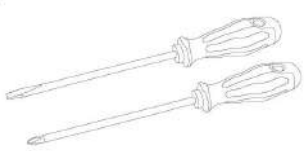
Vehicle Power Supply

Common Precautions

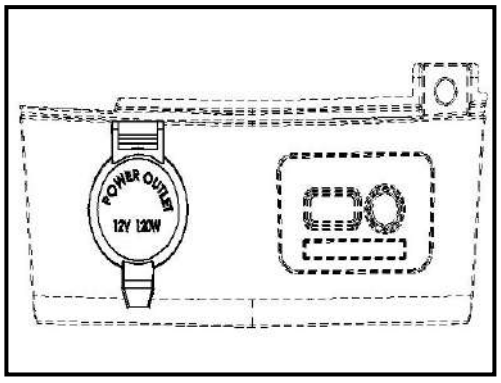
- Before the serving, which is not need to use the power supply: turn the power switch to LOCK position, disconnect the 12V storage battery negative terminal.
- After disconnecting 12V storage battery negative terminal, the storage memory of radio and other control devices will be deleted.
- Place the removed components according to the assembly-oriented position and order.
- If necessary, use authorized binder、sealant or equivalent product.
- In order to repair the vehicle safely and efficiently, right use of hand tools、power tools(only for removal) and special tools is necessary.
- Before Servicing：
- Use suitable cover to cover the wheel fender、interior and carpet. Attention, do not use the key、fastener or the like to scratch the paintwork.

Preparations

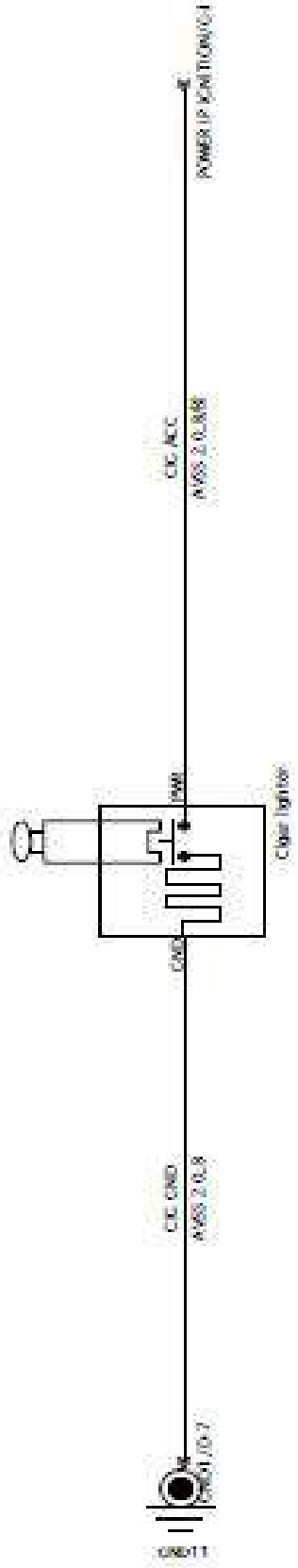
Commonly Used Service Tools

Tool		Instructions
Power Tool		Install and remove vehicle power supply

Components Position



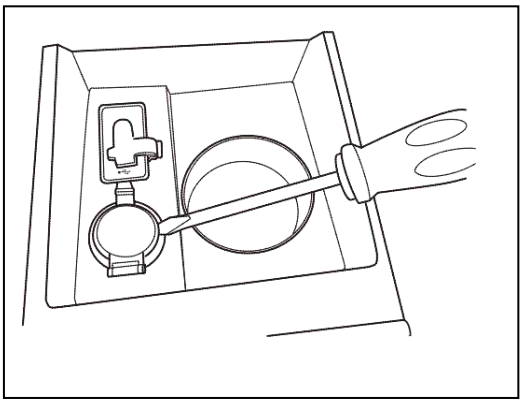
Schematic Diagram



Removal and Installation

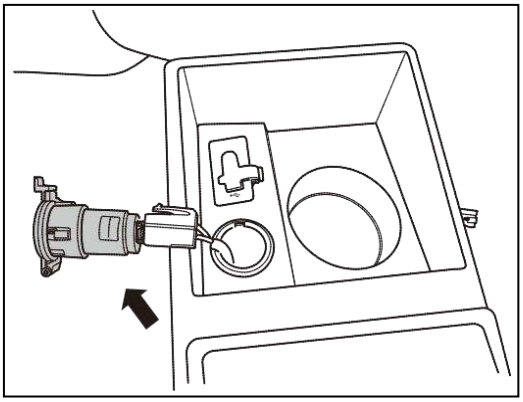
Removal

1. Open engine compartment cover
2. Disconnect battery negative cable. Refer to Battery Cable Disconnection and Connection
3. Remove Vehicle Power Supply
   1). Pry off vehicle power supply
   2). Disconnect harness connector of vehicle power supply.
   3). Take down vehicle power supply.



Installation

1. Installation of Vehicle Power Supply
   1). Connect harness connector of vehicle power supply.
   2). Install vehicle power supply into mounting hole.
2. Connect battery negative cable
3. Close front compartment cover



Malfunction Diagnosis

Vehicle Power Supply Inspection

Step	Countermeasures	Normal Results	Abnormal Results
1	Insert vehicle power supply into power supply socket, stop this operation until you hear clicking sound	As the negative pole is charged with electricity, vehicle power supply will skip to the edge of vehicle power supply socket	Vehicle power supply does not work
2	Vehicle power supply is out of work	Vehicle power supply lamp is ON	Vehicle power supply goes out

Step	Countermeasures	Yes	No
1	Check fuse Does the fuse blow out	To Step 4	To Step 2
2	Connect the positive and negative terminals with a test lamp to check out whether there is electricity or not Is the test lamp ON	To Step 5	To Step 3
3	Is vehicle power supply lamp ON	To Step 6	To Step 7
4	Replace fuse	—	To“System Inspection”
5	Replace vehicle power supply	—	To“System Inspection”
6	Replace vehicle power supply bulb	—	To“System Inspection”
7	Repair the connection with bad contact	—	To“System Inspection”

Switch System

Common Precautions

- Before the serving, which is not need to use the power supply: turn the power switch to LOCK position, disconnect the 12V storage battery negative terminal.
- After disconnecting 12V storage battery negative terminal, the storage memory of radio and other control devices will be deleted.
- Place the removed components according to the assembly-oriented position and order.
- If necessary, use authorized binder, sealant or equivalent product.
- In order to repair the vehicle safely and efficiently, right use of hand tools, power tools(only for removal) and special tools is necessary.
- Before Servicing:

Use suitable cover to cover the wheel fender, interior and carpet. Attention, do not use the key, fastener or the like to scratch the paintwork.

Combination Switch

Instruction

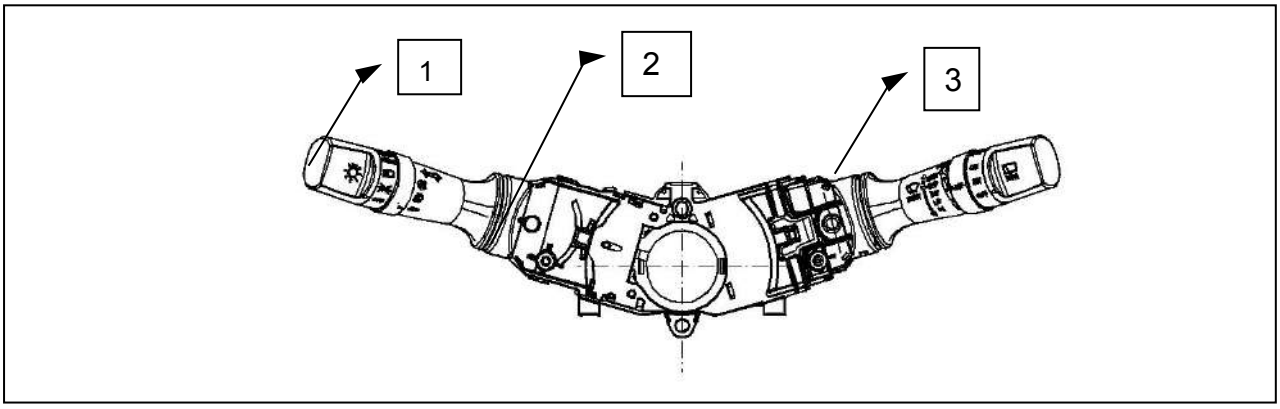


Diagram of Combination Switch Assembly

1-Lamplight Control Switch 2-Self-Returning Switch 3-Wiper Control Switch

1. Lamplight Control Switch

The lamplight control switch controls the lamplight signal of left, right steering lamp, headlamp, front fog lamp, side turning lamp, overtaking lamp. As headlamp is under working mode, it also can realize two functions of turning high beam to low beam, turning low beam to high beam.

1) Steering Lamp

The steering signal operating lever has two upward (right steering) and two downward (left steering) positions. These positions are used to send out steering signals.

As steering signal needs to be sent out, push operating lever upward or downward to bottom. As steering is over, operating lever will return automatically. An arrow on the combination instrument will glitter, which displays the steering direction.

As lane changing signal needs to be sent out, push operating lever upward or downward to bottom and loosen it, as vehicle finishes changing lane, it will return automatically. As driver sends out steering or lane changing signal, if steering arrow flitters rapidly, which turns out to be that signal lamp has been damaged, other drivers can’t catch sight of steering signal. If some bulb has been damaged, please replace it to avoid traffic accidents. As driver sends out steering or lane changing signal, the steering arrow on instrument does not flitter, check the bulb for damage, then check fuse.

2) Headlamp/Dipped Headlamp Convertor

If headlamp needs to be turned from low beam to high beam, push steering signal/multifunctional operating lever forward. As high beam is connected, if you turn on ignition switch, combination instrument will display high beam signal.

If headlamp needs to be turned from high beam to low beam, push steering signal/multifunctional operating lever backward.

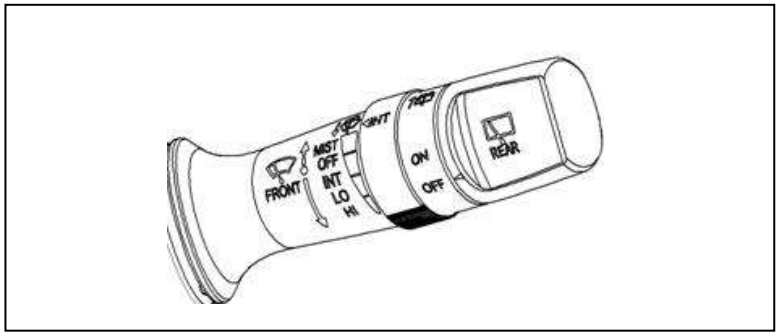
3) Overtaking Flash

This function can help driver make use of high beam headlamp to send out overtaking signal to front driver. As you make use of this function, pull steering signal/multifunctional operating lever backward until high beam is on, then loosen operating lever and make headlamp go out.

4) Front Fog Lamp

Turn front fog lamp switch to “ON” position, front fog lamp is on and front fog lamp signal displays on instrument. Only as front fog lamp switch stays “ON” position, driver can operate the rear fog lamp on sound control panel and rear fog lamp will be on.

2. Wiper Control Switch



1) Control working mode of wiper (washing, clearance, low speed, high speed).

As wiper stays on clearance gear, it has three modes to be selected: high, middle, low mode.

As ignition switch is connected, drive can operate front windshield wiper. Operate front windshield wiper by way of operating lever on the right side of steering column.

HI（High): Move operating lever to this position, wiper will scrape with high speed.

LO（Low): Move operating lever to this position, wiper will scrape stably with low speed.

INT（Intermittent): Move operating lever to this position, one cycle of scraping can be delayed.

Rotate middle section of wiper operating lever to LO direction, which can increase delay. Rotate wiper operating lever to HI direction, which can decrease delay. Only as operating lever stays on INT position, scraping speed can be adjusted.

2) Washing Liquid of Front Windshield

If you want to wash front windshield, as ignition switch has been connected, pull operating lever of washing liquid of front windshield wiper backward, washing liquid of front windshield wiper will be sprayed from front windshield nozzle.

3) Rear Wiper Switch

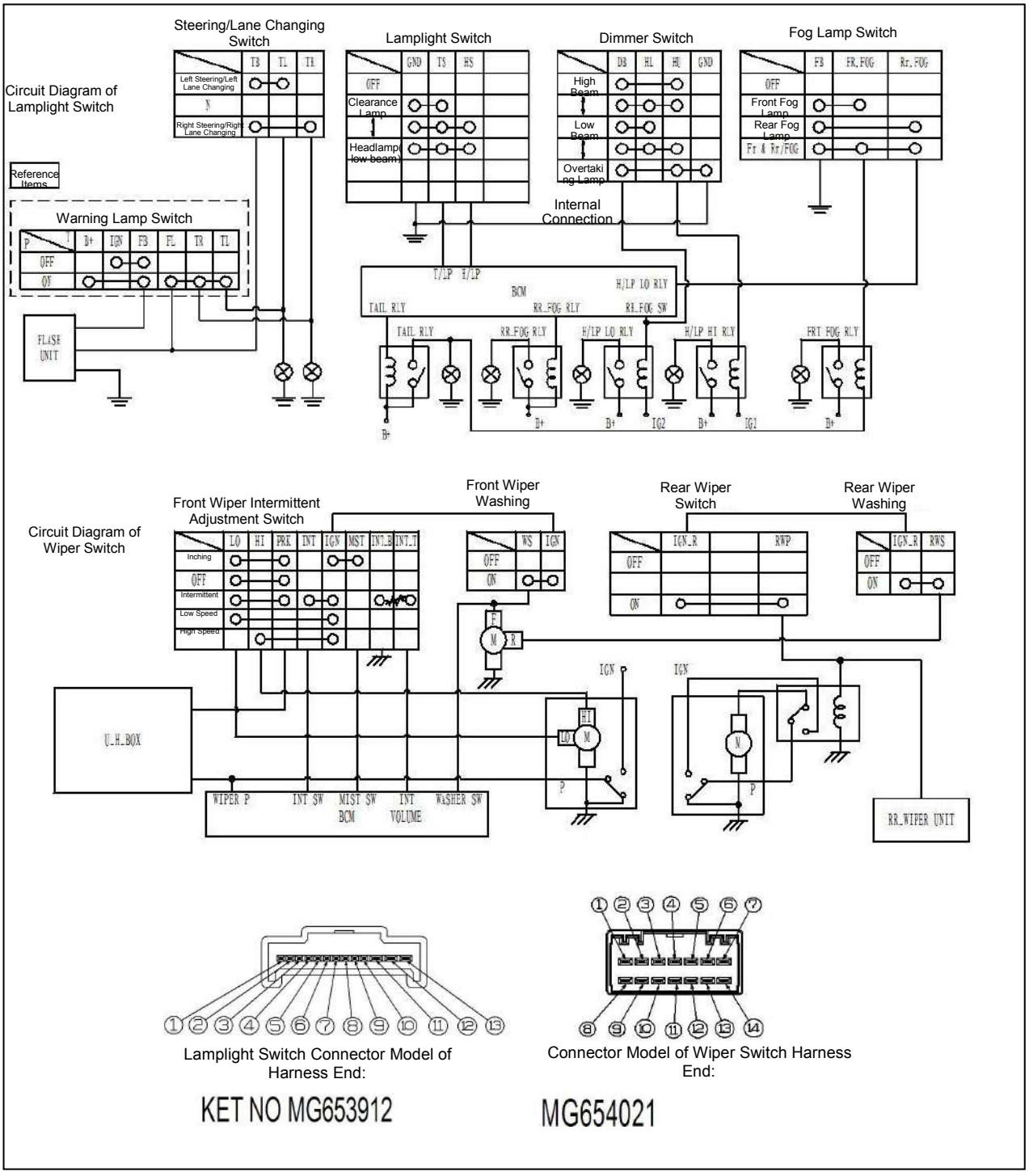
Rotate switch to ON position and start up rear wiper function.

Cautions:

- When the weather is frozen, do not use the windscreen wiper if the front windshield has not been pre-heated. Otherwise the detergent will be frozen on the front windshield, which will obscure the driver’s vision.
- As loosen operating lever, wiper will stop working, but it will still scrape for around three cycles, then it would stop scraping or recover to previous scraping speed.

Component Test

Check the conducting state for all the terminals of the wire connectors according to the following diagram. If the conducting state of all the wire connectors terminals is not in accordance with the following diagram, replace the switch.



Replacement

Cautions:

- Remove the battery negative terminal and wait for at least 3 minutes before removing the electrical appliance connectors, if not, the vehicle will be led to damage.
- When removing and installing the component parts, please use rag to protect the component parts to be removed in case of damage.
- Use the rag to wrap the crossed screwdriver blade when removing the metal clamps from the interiors.
- Attention, do not damage the component parts.
- When installing the body trim, ensure that the clamps are fixed tightly into the plate hole of the vehicle body, then press them into the plate hole carefully.
- The removal and installation work on some large component parts can't be finished by one person, therefore, in case of dropping, the work should be done by two persons.
- Please do not apply a lot of pressure when installing and removing some interiors with the reason that they are able to be deformed.

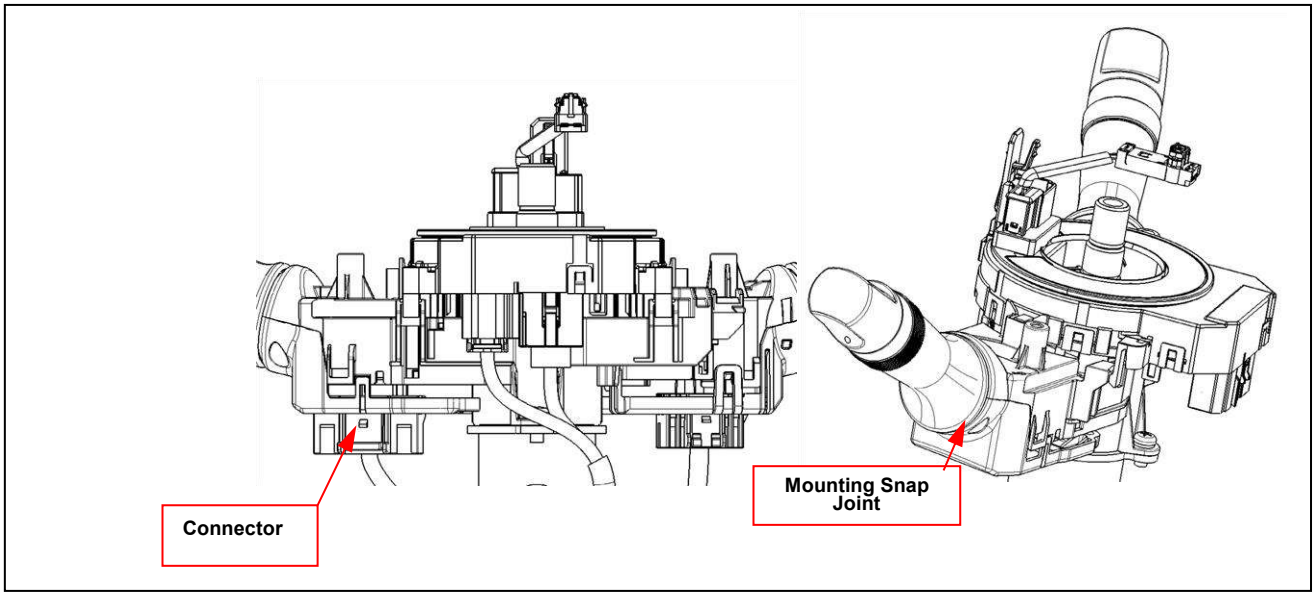
1. Removal Step

1) Turn off the ignition switch, disconnect the storage battery negative terminal and wait for more than 3 minutes.

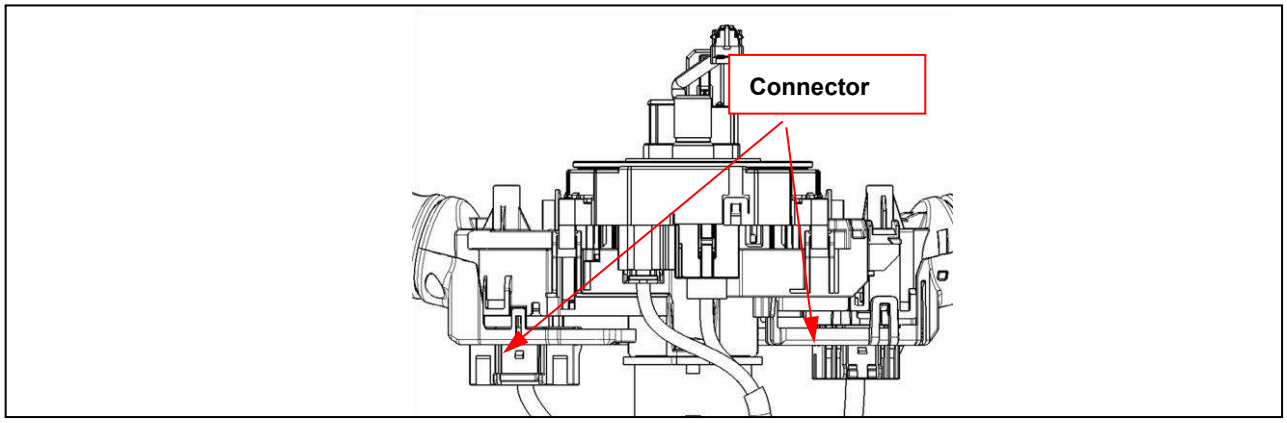
2) Remove the steering wheel.

3) Remove the upper and lower cover of the steering column cover.

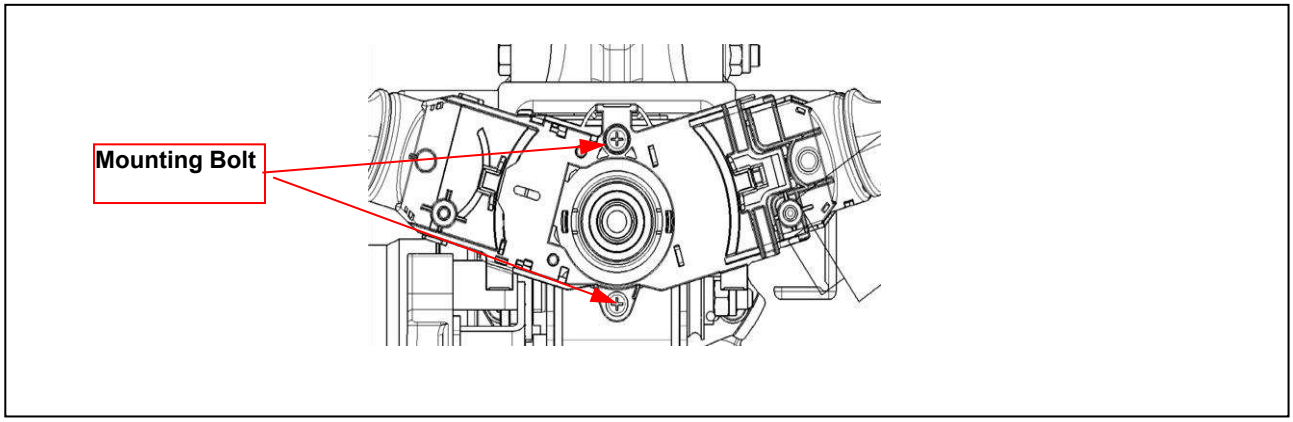
4) Pull out the clock spring harness, remove the clock spring of the air bag.



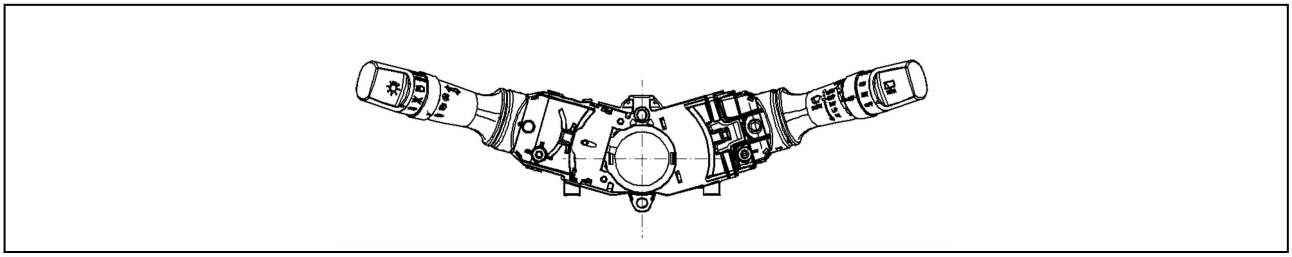
5) Disconnect combination switch connector.



6) Remove the two mounting bolts of the combination switch.



7) Pull out the combination switch assembly.



2. Installation Step

Install in the reverse order of removal.

- Tightening torque of mounting bolts: 2 N·m

Test after Installation

1. Operate the lamplight handle of the combination switch, test the working conditions for all the lamps and switches:
2. When the lamplight rotating handle is “OFF”, all the exterior illuminating lamps and the night illuminating lamps of the interior electrical appliance will turn off.
3. When the lamplight handle is in the small lamp position, the outline marker lamps, front and rear position lamps, license plate lamps, instrument illumination and all the night lamps of the interior electrical appliances will be on, if the vehicle is under driving state, the side marker lamps will be on in the meantime.

4. When the lamplight handle is in the small lamp position, press the front(rear) frog lamp switch, all the front(rear) frog lamp will be on.
5. When the lamplight handle is in the headlamp position, the headlamp lower beam will be on, while all the small lamps will keep lighted state, rotate the handle downward by 6 degrees, the high beam will be on instantaneously, the switch will automatically reset after releasing.
6. Rotate the lamplight handle forward(backward) by 15 degrees, all the right(left)steering lamps begin to flicker, while the right(left)steering indicator lamps on the instrument begin to flicker, rotate the handle to the original position, all the lamps stop flickering. Rotate the handle forward (backward)by 9 degrees, the right(left) steering lamps will flicker instantaneously, the handle will automatically reset after releasing.
7. Press the warning switch, all the steering lamps will flickers simultaneously, the left and right steering indicator lamps on the instrument will also flicker simultaneously.
8. Operate the windscreen wiper/washer of the combination switch, test the working conditions for the windscreen wiper, washer::

1) When the rotating handle is OFF, the windscreen wiper, washer will not work.
2) When the rotating handle is in the INT position ,the windscreen wiper rod will conduct the intermittent motion at regular intervals.
3) Rotate the interval time adjustment knob, keep the time variation between FAST and SLOW, the interval time of the windscreen wiper rod motion will be changed.
4) When the rotating handle is in the LO position, the windscreen wiper rod will continue to work at rather lower speed.
5) When the rotating handle is in the HI position, the windscreen wiper rod will continue to work at rather higher speed.
6) Press the washing button on the end of the handle when the windscreen wiper is working, rotate the right control handle on the combination switch to the inside of your body by 6.5°, the spray nozzle of the windscreen wiper will spray the detergents to the front windshield.

Power Window Switch

Overview

1. Power window system can lift or descend relevant window glasses through operating power window switch on each door trim panel.
2. The main switch on driver side door trim panel can help driver lift or descend window glasses on each passenger side, and lock each single switch on passenger side.
3. Only as ignition switch stays on “ON” position, power window system can receive battery voltage through circuit breaker in terminal box.

Component Instructions

Power Window Switch

Power window is controlled by power window switch on each front door trim panel. Power window switch on driver side can help driver control all power windows. All the windows on passenger side can receive battery and grounding power supply through power window switch circuit. As locking switch on passenger side power window switch stays on “locking” position, except power window switch on driver side, battery power supply of other door power window switch is disconnected.

Function Instructions

Operating Modes of Power Window: lift and descend manually, descend automatically（only applicable to power window switch on driver side).

Lift Manually: Press window lifting button and relevant window will be lifted, release lifting button, power window will stop lifting.

Lift Automatically: Press driver side window lifting button to top, window on driver side will be lifted to top or until power window lifting button is pressed again.

Descend Manually: Press window descending button, relevant window will be descended, release descending button, power window will stop descending.

Descend Automatically: Press driver side window descending button to bottom, window on driver side will be descended to bottom until power window descending button is pressed again.

As ignition switch is off, power window still can be operated, as the following conditions happen, power window can’t be operated:

1) Ignition switch is off for more than 30 seconds.
2) Any door is open.
3) Door has been locked from outside.

2. Power Window Locking

Power window locking switch can prohibit the operation of power window button on right front door, left rear door and right rear door.

Replacement

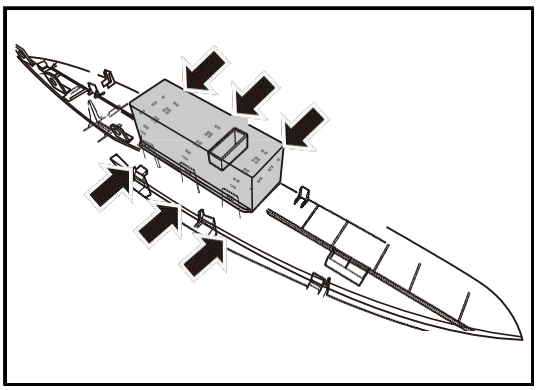
1. Removal

1) Use the cross screwdriver to take down the bolt in the middle of armrest panel

2) Use the slotted screwdriver to pry up the armrest panel.

3) Disconnect the harness connector on the power window control switch.

4) Use the cross screwdriver to remove the power window control switch.

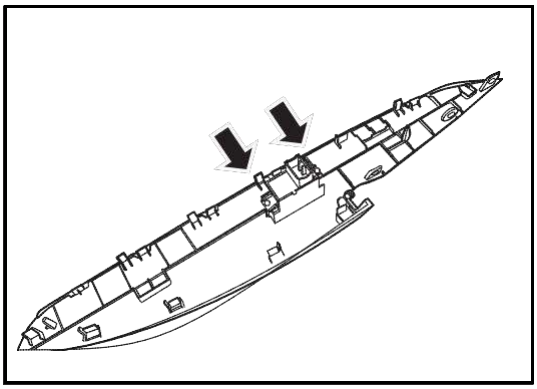


2. Installation

Install in the reverse order of removal.

Cautions:

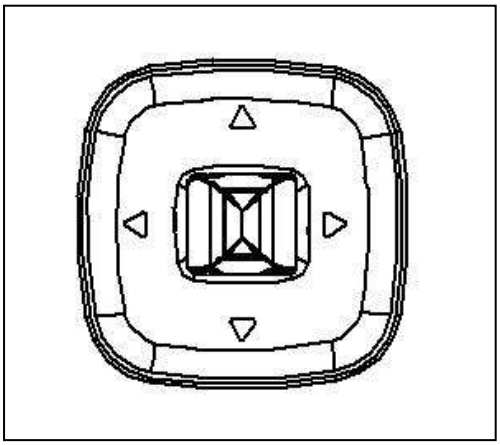
- Check whether all the keypad functions are normal or not after installation.
- If the keypads are not normal or out of work, install or replace them again.



Rearview Mirror Adjustment Switch

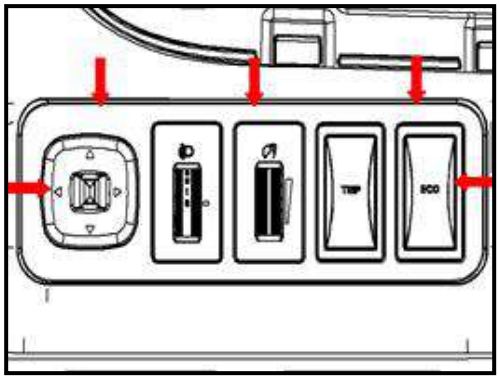
Rearview mirror adjustment switch is used to adjust the angle of left, right rearview mirror based on driver's needs. Turn the middle shifter of rearview mirror adjustment switch to left, right side, then left, right rearview mirror can be adjusted up, down, left and right.

1. Schematic Diagram of Component



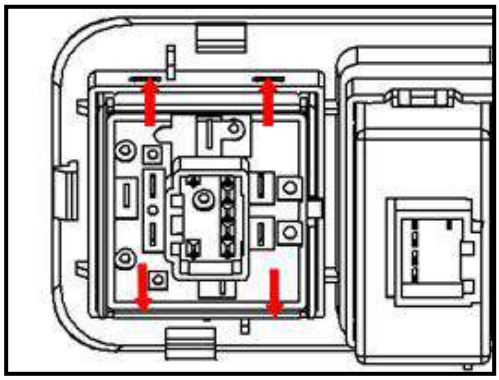
2. Removal and Installation Removal

① Use the slotted screwdriver to pry up the left lower side panel.



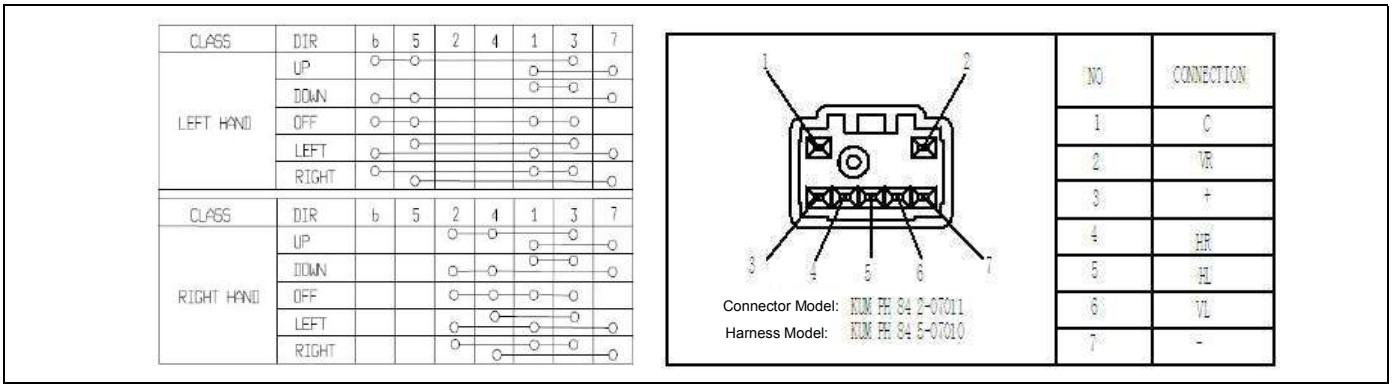
② Disconnect the harness connector on the rearview mirror adjustment switch.

③ Use the slotted screwdriver to remove the rearview mirror adjustment switch.



Inspection after Installation

Please check all the switch positions for breakover when the battery is out of work, if not, replace the switch.



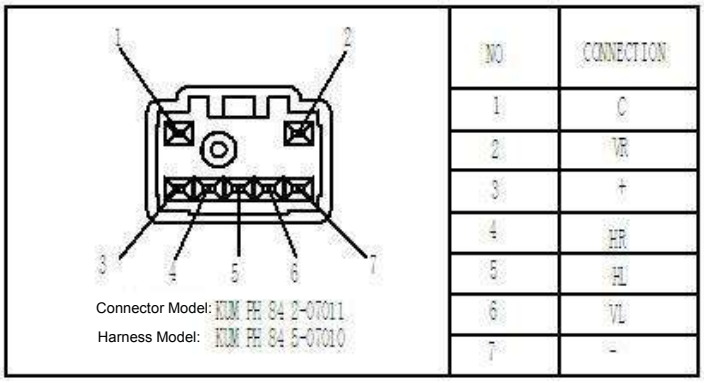
Installation

Install in the reverse order of removal.

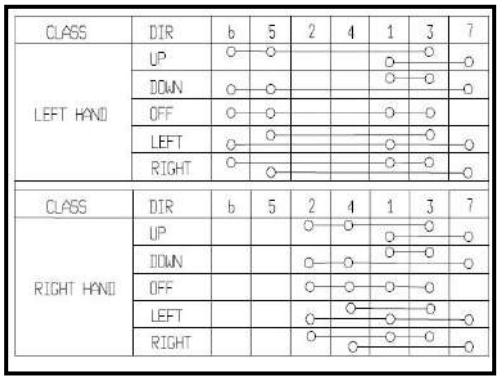
Cautions:

- Check whether all the keypad functions are normal or not after installation.
- If the keypads are not normal or out of work, install or replace them again.
- Turning the middle shifting fork of the switch to both side will make the rearview mirror adjustment available. If it stays in the middle part of the switch, the rearview mirror adjustment will not work.

Pin Definition of Rearview Mirror Adjustment Switch:



Breakover Diagram of Gears:

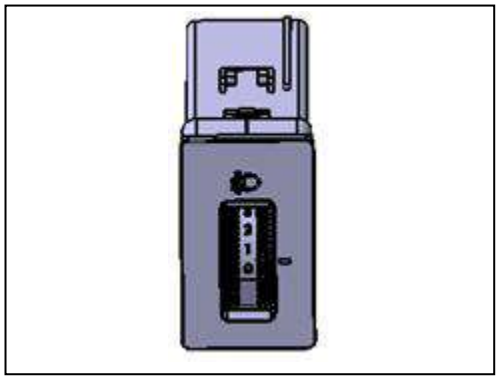


Please check all the switch positions for breakover when the switch adjustment is out of work, if not, replace the switch.

Headlamp Adjustment Switch

Headlamp adjustment switch can be adjusted by roller wheel from 0 gear to fifth gear, headlamp lamplight height can be adjusted from high to low.

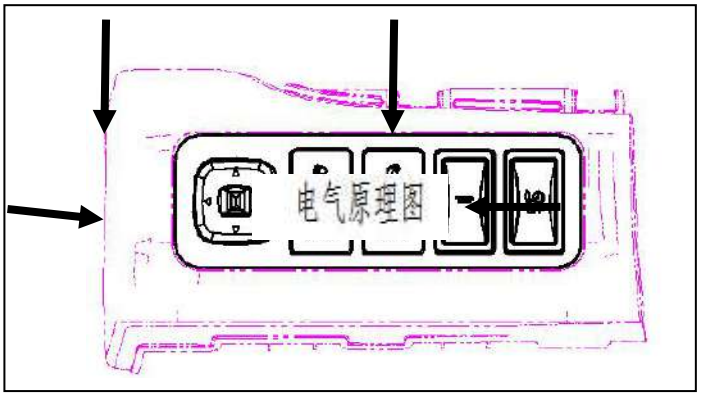
1. Schematic Diagram of Component



2. Removal and Installation

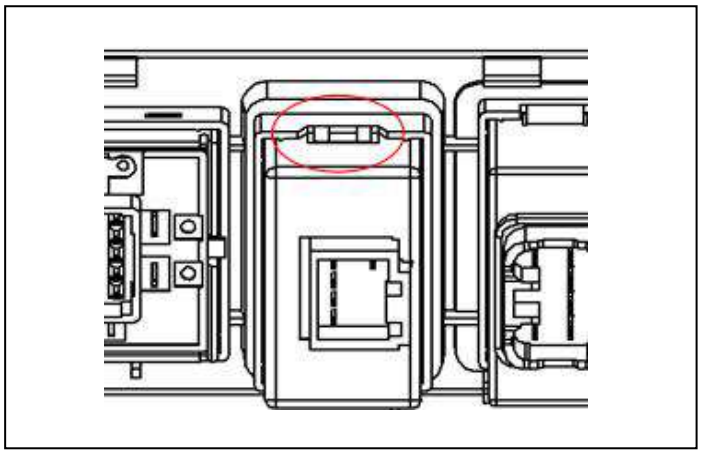
Removal

① Remove the driver left lower side bracket；



② Pull out the headlamp adjustment switch connectors；

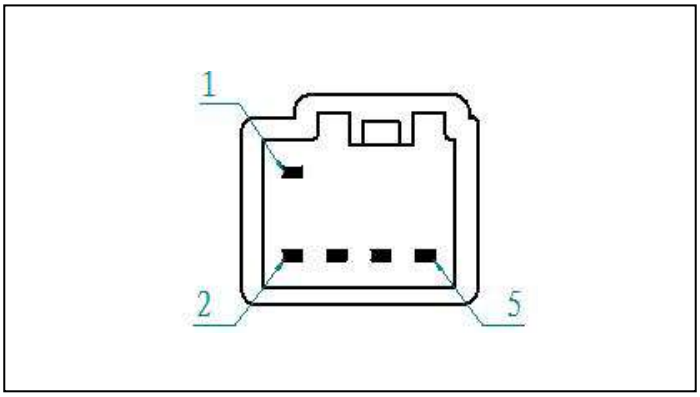
③ The headlamp adjustment switch is clamped on the left lower bracket, press the clamp block, pull out the switch.



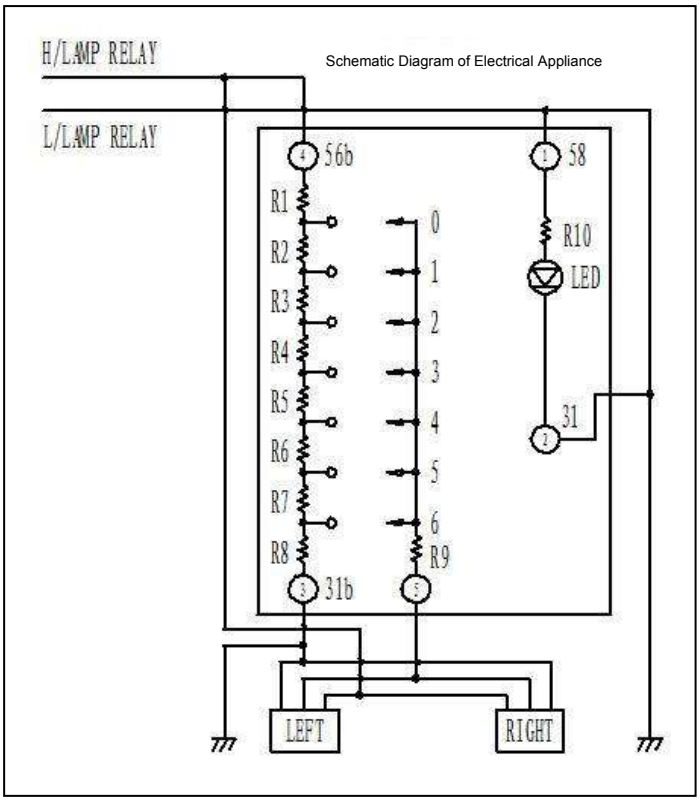
Installation

Install in the reverse order of removal.

3. Connector Terminal Model:



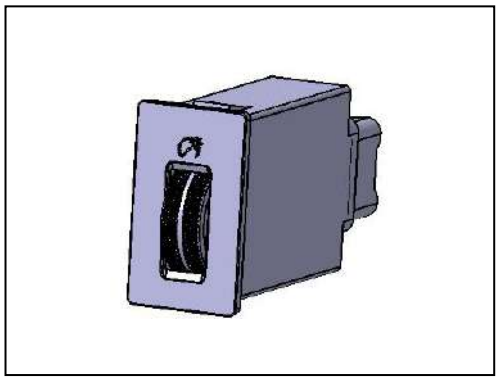
4. Wiring Diagram:



Dimmer Switch

Rotate switch button to adjust backlight luminance of vehicle interior electric devices.

1. Schematic Diagram of Component



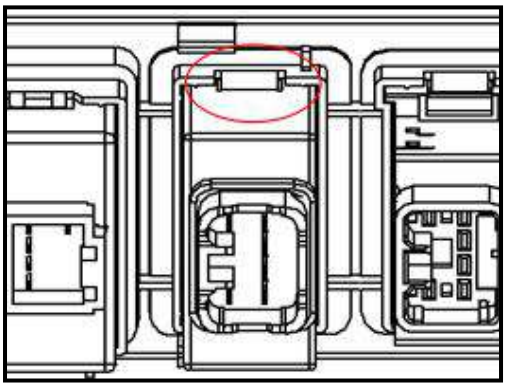
2. Removal and Installation

Removal

① Remove the driver left lower side bracket;

② Pull out the dimmer switch connectors;

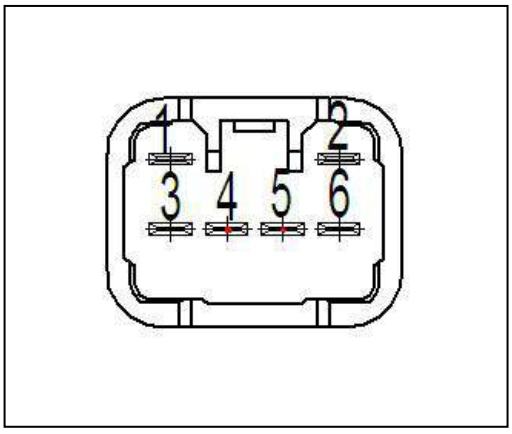
③ The dimmer switch is clamped on the left lower bracket, press the clamp block, pull out the switch.



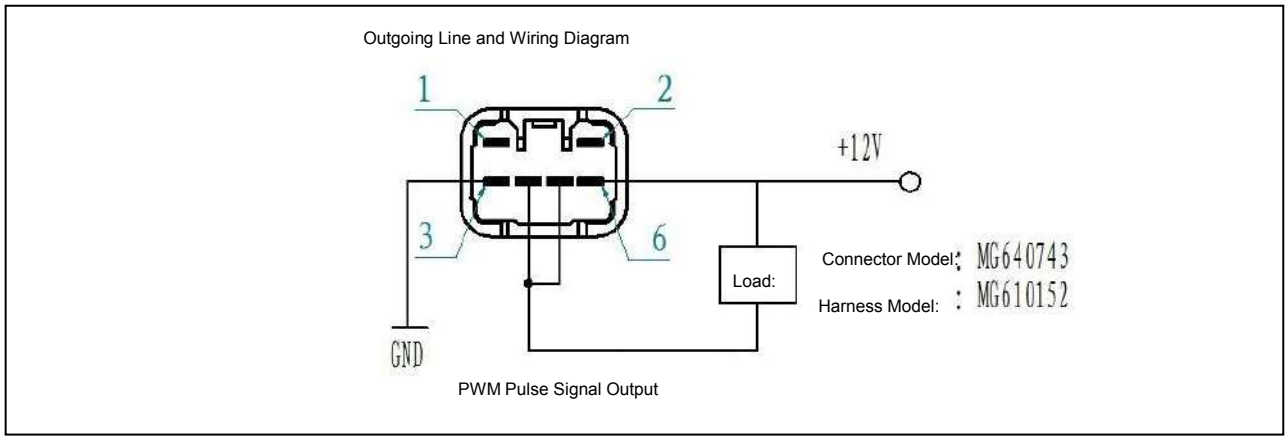
Installation

Install in the reverse order of removal.

3. Connector Terminal Model:



4. Wiring Diagram:



TRIP Switch

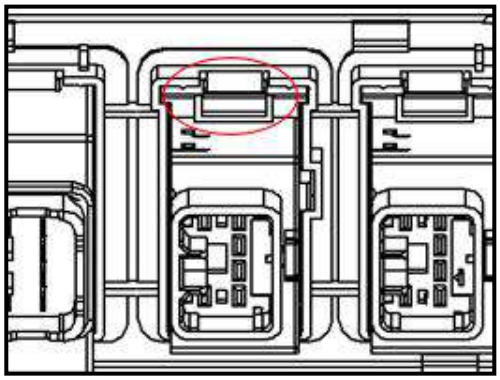
Switch Replacement

1. Removal

② Remove the driver left lower side bracket；

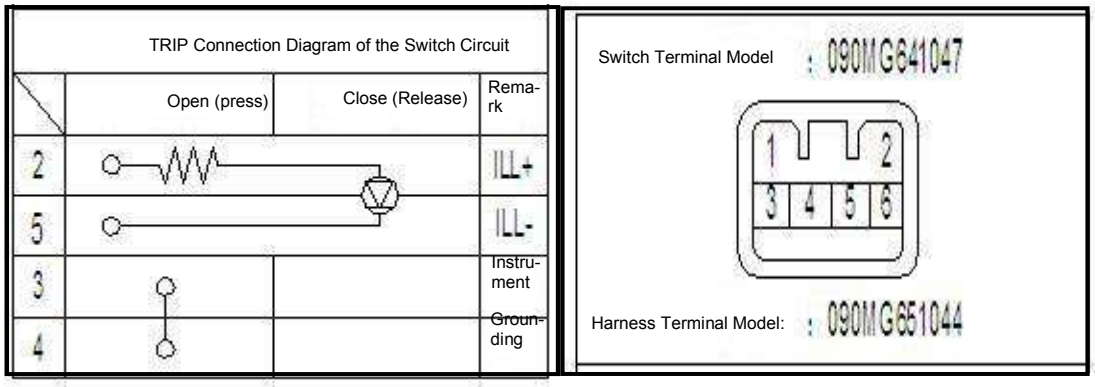
② Pull out the TRIP switch connectors；

③ The TRIP switch is clamped on the left lower side guard plate, press the clamp block, pull out the switch.



Inspection after removal

Please check all the switch positions for breakover when the battery is out of work, if not, replace the switch.



2 Installation

Install in the reverse order of removal.

TRIP

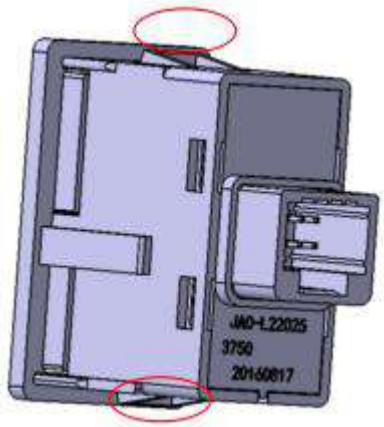
Switch Replacement

1 Removal

② Remove the driver left lower side guard plate;

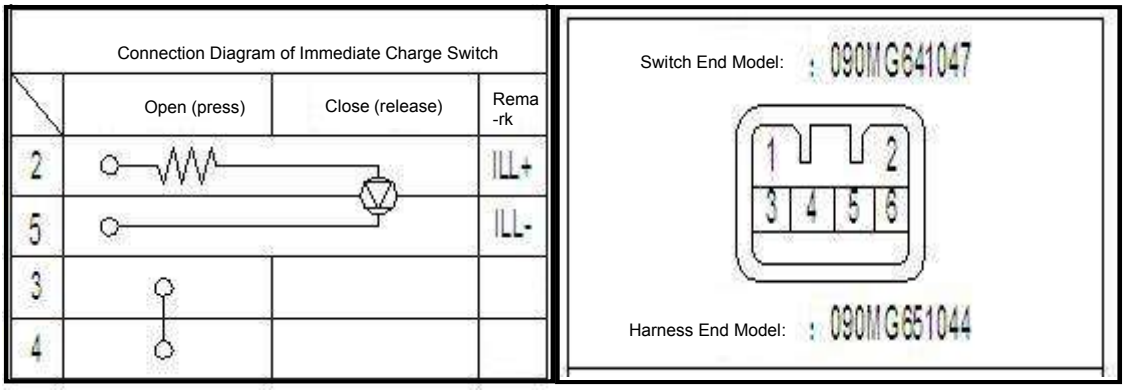
② Pull out the immediate charge switch connector;

③ Immediate charge switch is locked and connected on left downward side guard plate, press locked and connected block, take down switch.



Inspection after removal

Please check all the switch positions for breakover when the battery is out of work, if not, replace the switch.



2 Installation

Install in the reverse order of removal.

ECO switch

Switch replacement

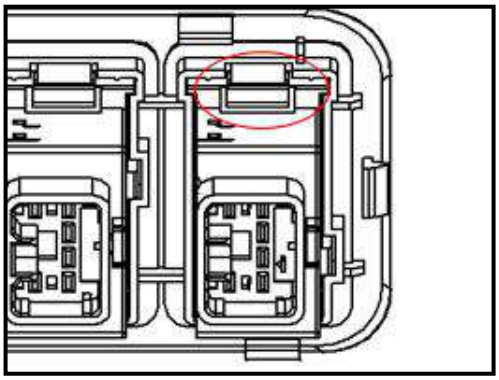
1 Disassemble

① Disassemble the driver's left lower guard plate;

② Unplug the ECO switch connector;

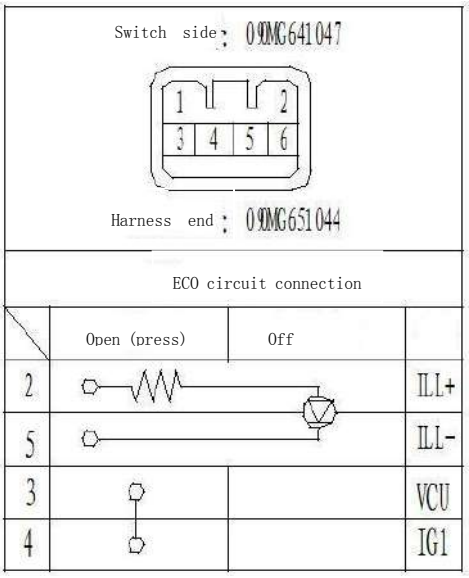
③ The ECO switch card is connected to the lower left guard plate, holding the card

connector and taking off the switch.



Check after disassembly

When not working, please check whether the status of each gear is correct. If it is not conductive, replace the switch.

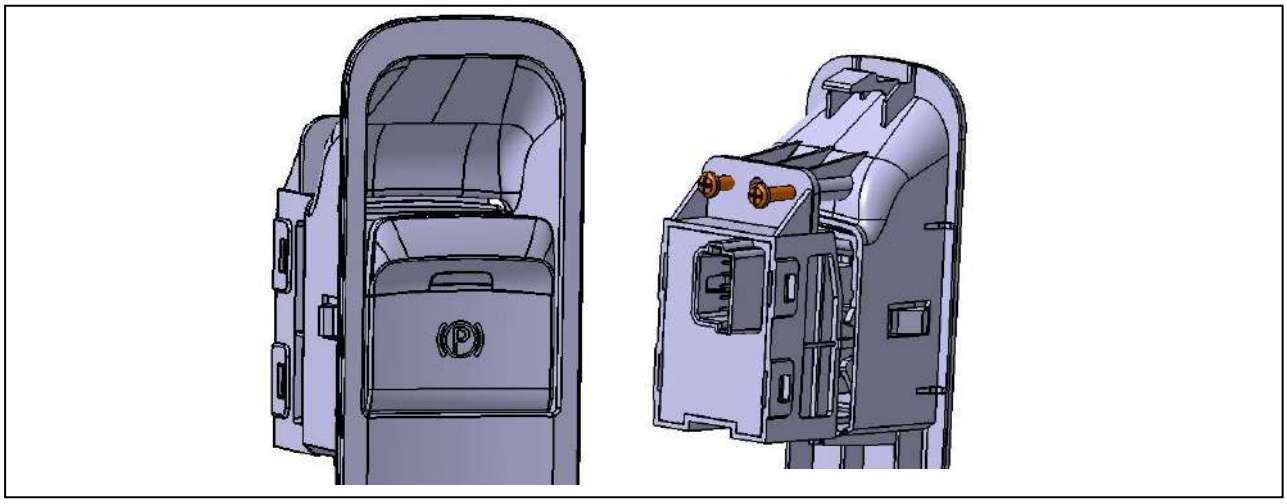


2 Installation

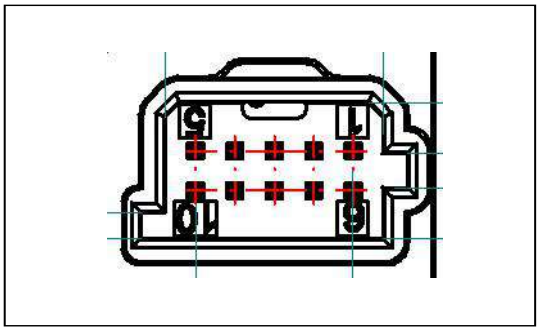
Install in reverse order of removal.

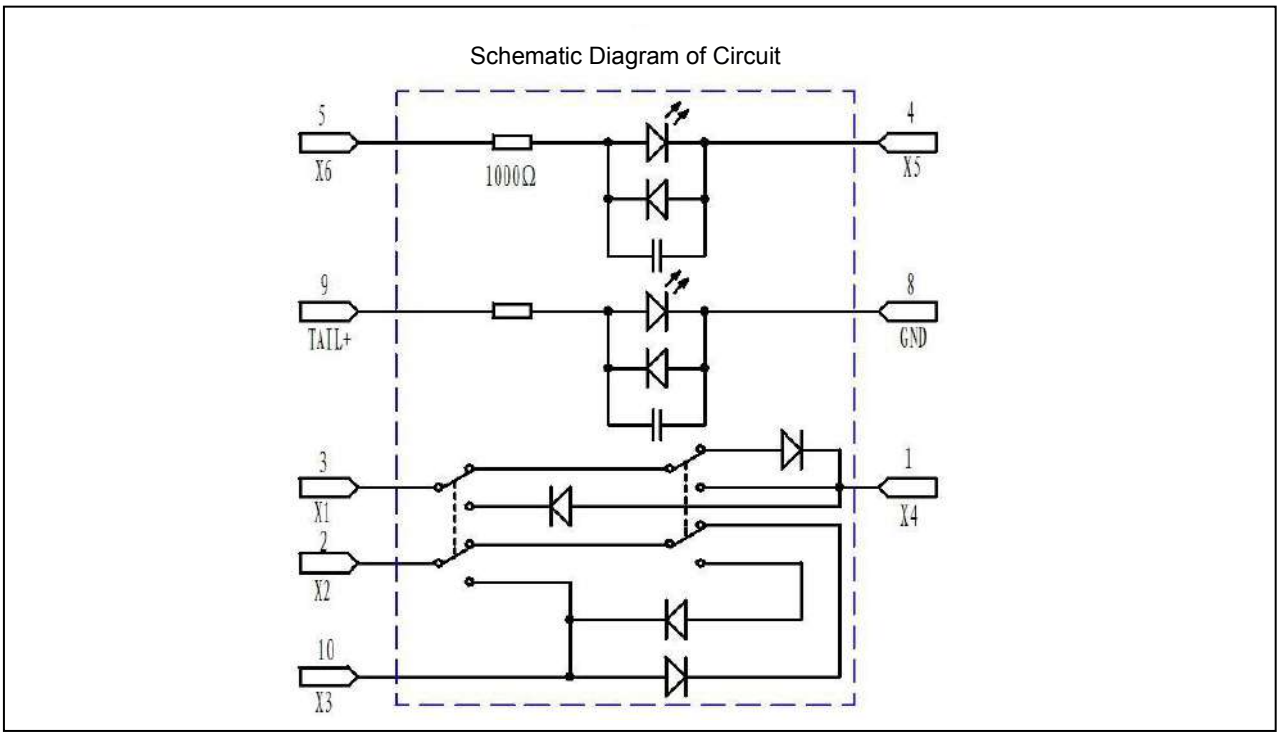
EPB Switch（Such as Equipment)

Removal: Take down switch panel, remove switch connector, use cross screwdriver to remove two mounting bolts, then EPB switch can be taken down.



Pin Definition of Switch and Principle of Circuits:

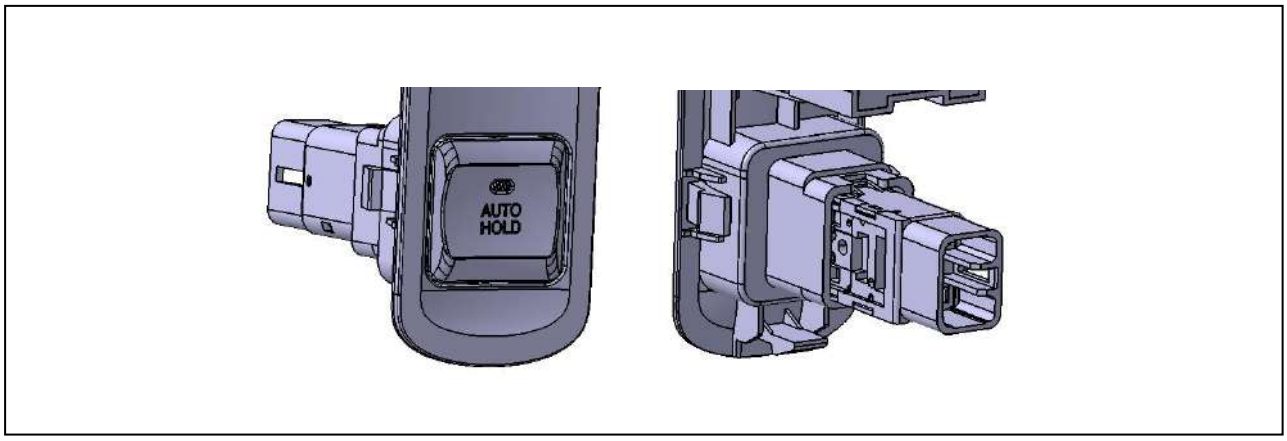




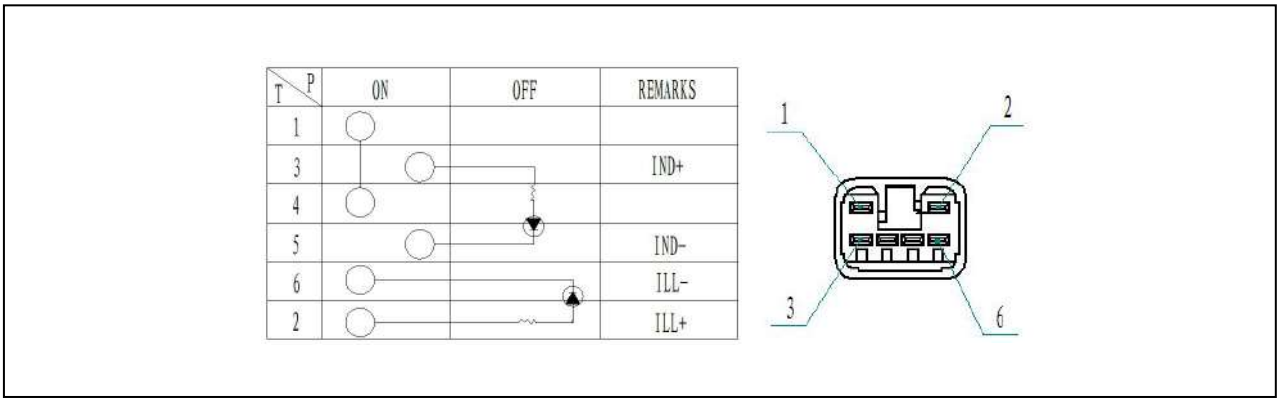
Installation: Install in the reverse order of removal.

AUTOHOLD Switch（Such as Equipment)

Removal: Take down switch panel, remove switch connector, press the plastic snaps between switch and bracket, take down AUTOHOLD switch.



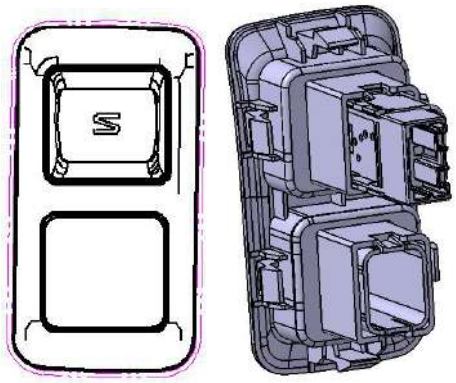
Pin Definition of Switch and Principle of Circuits as shown in the following:



Installation: The bracket inserts switch into mounting hole, press it downward until snap flicks.

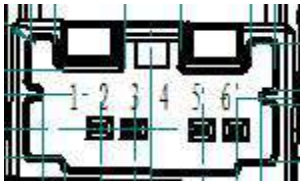
Mode Switch

Switch Removal: After removing mode switch panel, remove switch connector, press the two snaps between mode switch and switch panel, then take down mode switch.



Definition of Switch Pin

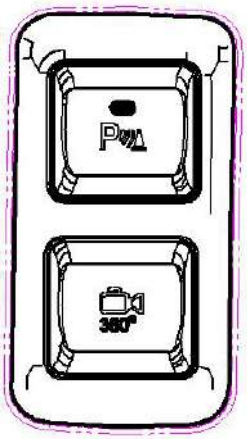
T \ P	ON	OFF	REMARKS
2	○		
3	○		
5	○	⊕	1LL-
6	○		1LL+

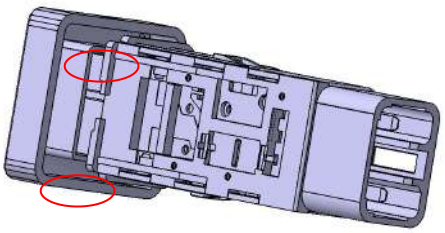


Installation: Insert switch into switch mounting hole directly, press switch downward until snap flicks.

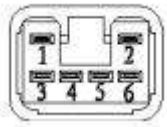
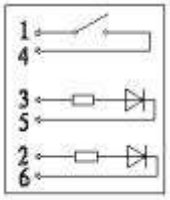
Parking aid switch

Switch Removal: After removing the mode switch panel, remove the switch connector and press the two latches between the parking assist switch and the switch panel to remove the parking assist switch.





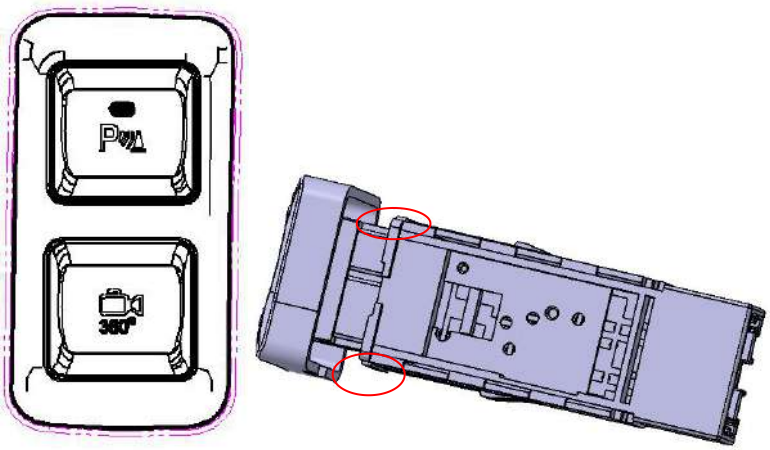
Switch pin definition

 Wire harness mating connector model: KET MG651044	Pin definition		Route diagram
	Pin number	Pin definition	
	1	Control loop	
	2	ILL（+）	
	3	IDN（+）	
	4	Control loop	
	5	IDN（-）	
	6	ILL（-）	

Installation: Insert the switch directly into the mounting hole of the switch. Press the switch down until it snaps open.

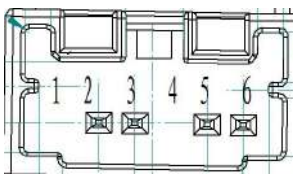
360° panoramic parking switch

Switch Removal: After removing the 360° panoramic parking switch panel, remove the switch connector and press the two card feet between the 360° panoramic parking switch and the switch panel to remove the 360° panoramic parking switch.



Switch pin definition

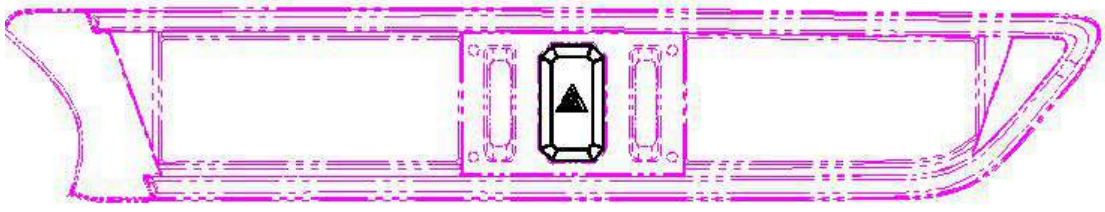
P / T	ON	OFF	REMARKS
2			
3			
5			1LL-
6			1LL+

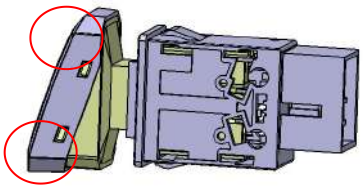


Installation: Insert the switch directly into the mounting hole of the switch. Press the switch down until it snaps open.

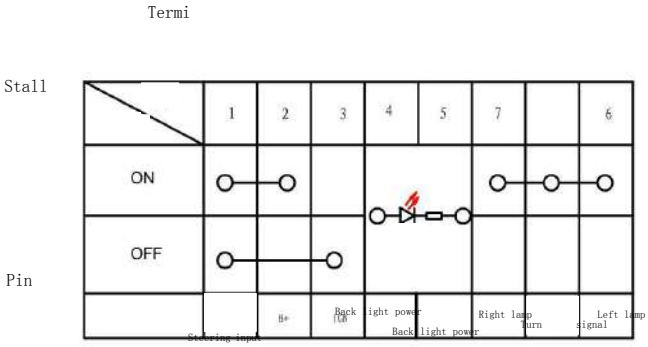
Caution lamp switch

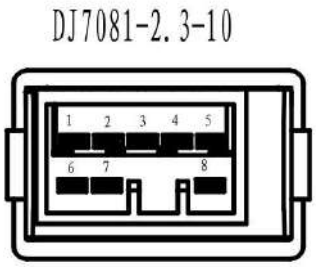
Switch Removal: After removing the warning light switch panel, remove the switch connector and press the two clips between the warning light switch and the switch panel to remove the warning light switch.





Switch pin definition

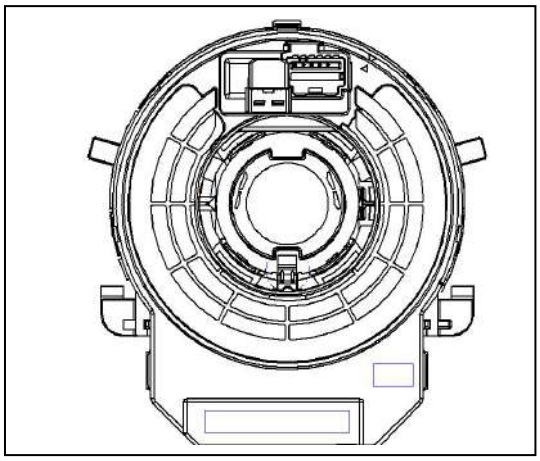




Installation: Insert the switch directly into the mounting hole of the switch. Press the switch down until it snaps open.

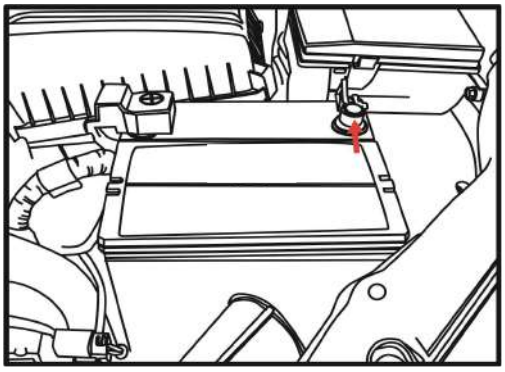
Clock Spring

1. Schematic Diagram of Component

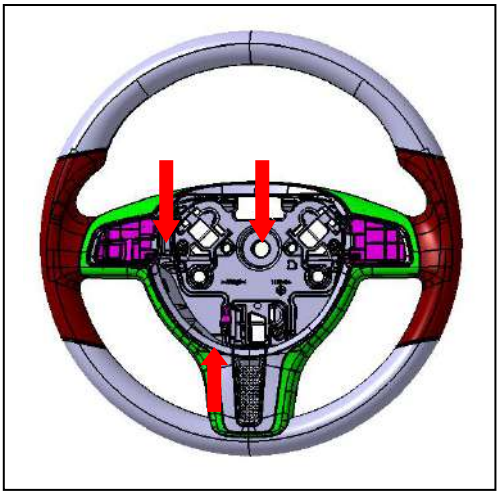


2. Removal of Airbag Clock Spring

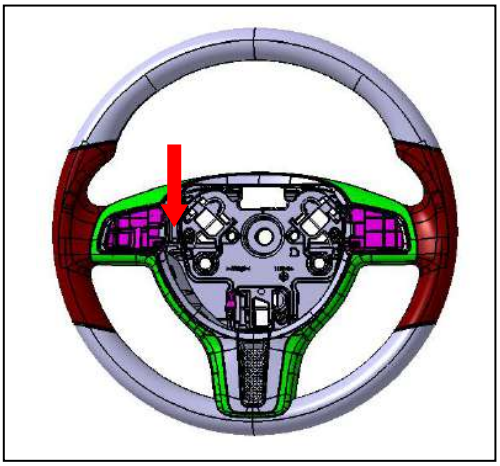
1) Disconnect the storage battery negative terminal and wait for at least 3 minutes.



2) Remove the driver air bag module, pull out the connectors.



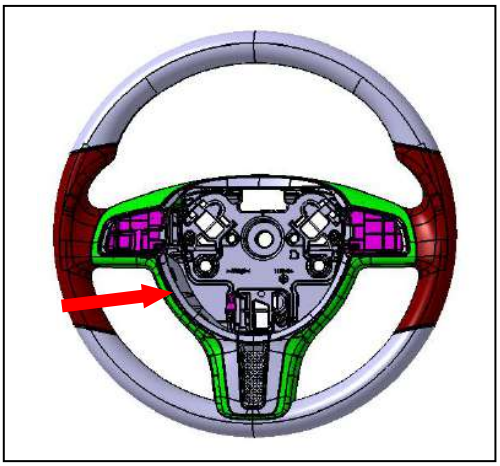
3) Remove the mounting bolts of the steering wheel, pull out the steering wheel.



Cautions:

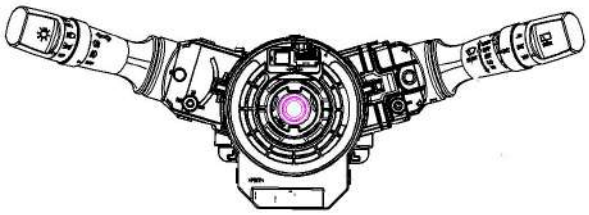
- The mounting bolts is able to be pulled out only when the steering wheel becomes loose, otherwise, the steering wheel may lead to risk or severity of injuries.

4) Disconnect the horn connectors.



5) Pry up the three block pins of the clock spring on the combination switch.

Cautions: The clock spring is able to be pulled out unless the three block pins are pried up completely. The clock spring is easy to be damaged, therefore, be careful when the removal is done.



6) Pull out the clock spring of the air bag.

3. Install clock spring of airbag

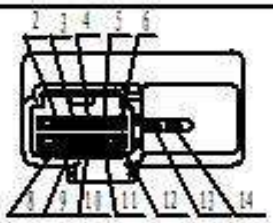
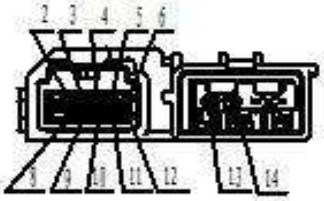
Install in the reverse order of removal.

Cautions:

- Pull out the SRS clock spring from the package, check the clock spring for damage, check whether the fixed pin is fixed on the component parts or not.
- Open the connector gland, plug the SRS harness into the connection hole, then press the gland well.
- Before installing the SRS clock spring, make sure that the front wheels stay in the middle direction.(orientation).
- Before installing the SRS clock spring, make sure that the clock spring stays in the middle direction (rotate the clock spring to the end clockwise, then rotate 2.5 rounds anticlockwise)

Definition of Clock Spring Connector As Shown In The Following:

Pin Definition of Clock Spring Connector

PIN OUT						
SPEC	Steering Side			Column Side		
14 Channel						
WIRE SIDE	SIDE	FUCTION	PIN	TERMINAL NO.	CONNECTOR	CIRCUIT
AVSS 0.5 B	Steering Wheel End	Airbag	2P	13	TYCO 1-1703139-1	DAB (+)
AVSS 0.5 B				14		DAB (-)
WIRE LESS		Reserved	12P	8	AMP (F) 1318774-1	
			12P	9		
			12P	10		
			12P	11		
		Horn	12P	12		
		Power Supply (-)	12P	2		
		Main Line 2	12P	3		
		Main Line 1	12P	4		
		Backlight Power Supply	12P	5		
		Power Supply (+)	12P	6		
WIRE LESS	Column End	Airbag	2P	13	YAZAKI 7C083-6L34-7H	DAB (+)
				14		DAB (-)
		Reserved	12P	8	AMP (F) 1318774-1	
			12P	9		
			12P	10		
			12P	11		
		Horn	12P	12		
		Power Supply (-)	12P	2		
		Main Line 2	12P	3		
		Main Line 1	12P	4		
		Backlight Power Supply	12P	5		
		Power Supply (+)	12P	6		

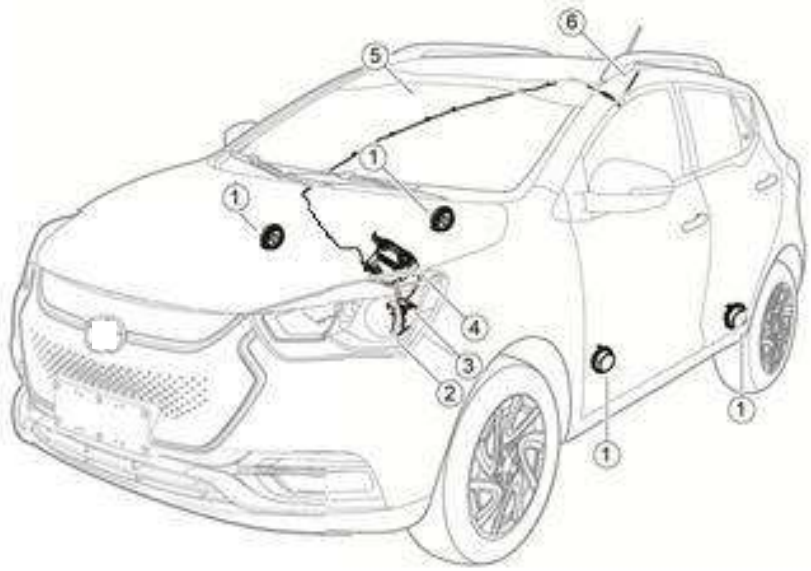
Sound System

Common Precautions

- **Before the serving, which is not need to use the power supply: turn the power switch to LOCK position, disconnect the 12V storage battery negative terminal.**
- **After disconnecting 12V storage battery negative terminal, the storage memory of radio and other control devices will be deleted.**
- **Replace new oil seal. gasket. seal ring. O-ring. lock gasket. cotter pin. self-locking nut and other components.**
- **Place the removed components according to the assembly-oriented position and order.**
- **If necessary, use authorized binder. sealant or equivalent product.**
- **In order to repair the vehicle safely and efficiently, right use of hand tools. power tools(only for removal) and special tools is necessary.**
- **Before Servicing：**

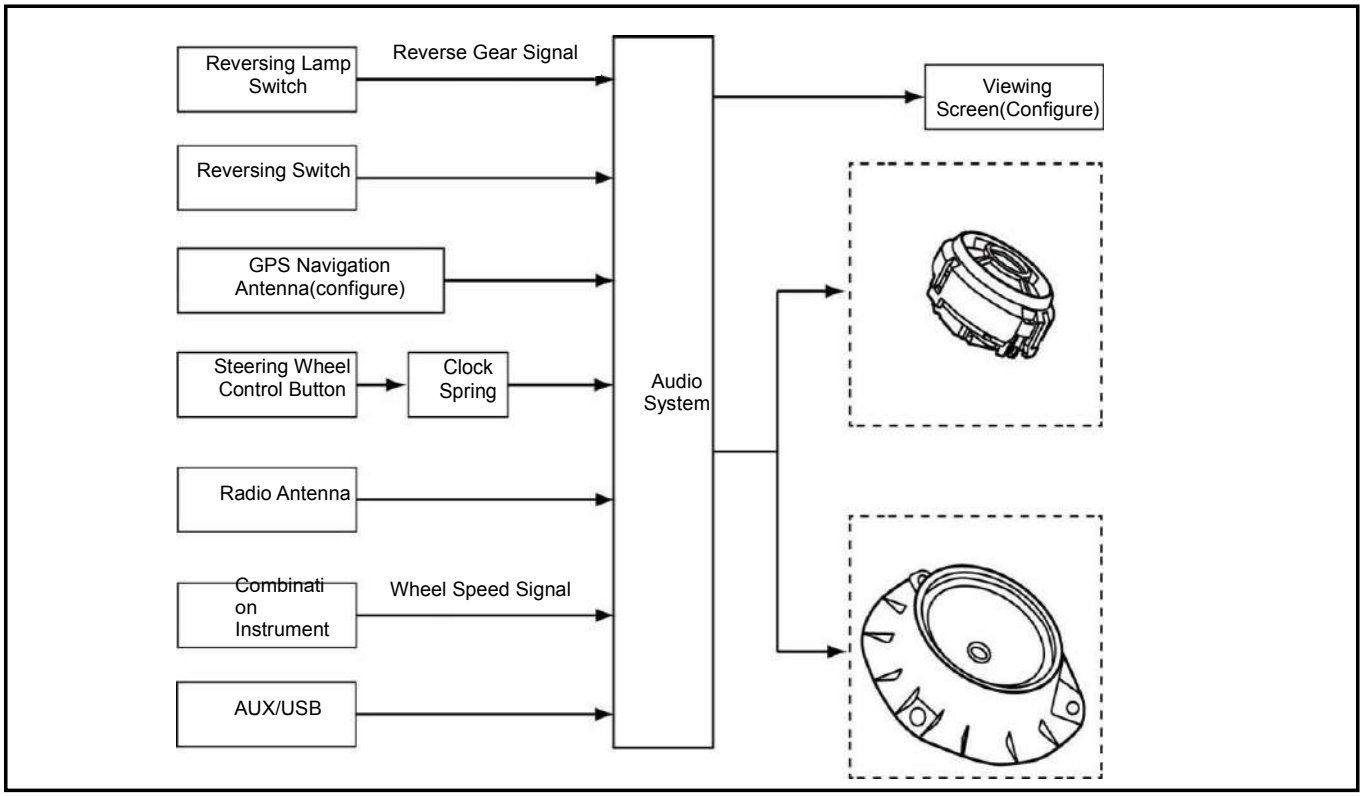
Use suitable cover to cover the wheel fender. interior and carpet. Attention, do not use the key. fastener or the like to scratch the paintwork.

Component Position



1. bass loudspeaker + high tone loudspeaker	2. multimedia interface assembly	3. multi-media interface cover plate
4. MP5 navigation host assembly	5. antenna transition line	6. shark fin antenna assembly

Working Principle



Malfunction Diagnosis

List of Malfunction Diagnosis

1. Check the after-sales installation device that may have influence on system operation.
2. Check easily accessible or visible system component to find out whether there is obvious damage or situation that may lead to malfunction.
3. For all the out-of service malfunctions of loudspeaker, conduct key inspection of the positions that are easily short-to-ground in the loudspeaker circuit, which will be helpful to troubleshoot malfunctions rapidly.
4. For the single loudspeaker out of service, the reason may be that client makes use of sound track screening function by accident, which makes single sound track out of service. This kind of malfunction does not belong to sound system malfunction, please refer to sound system instruction in user manual.

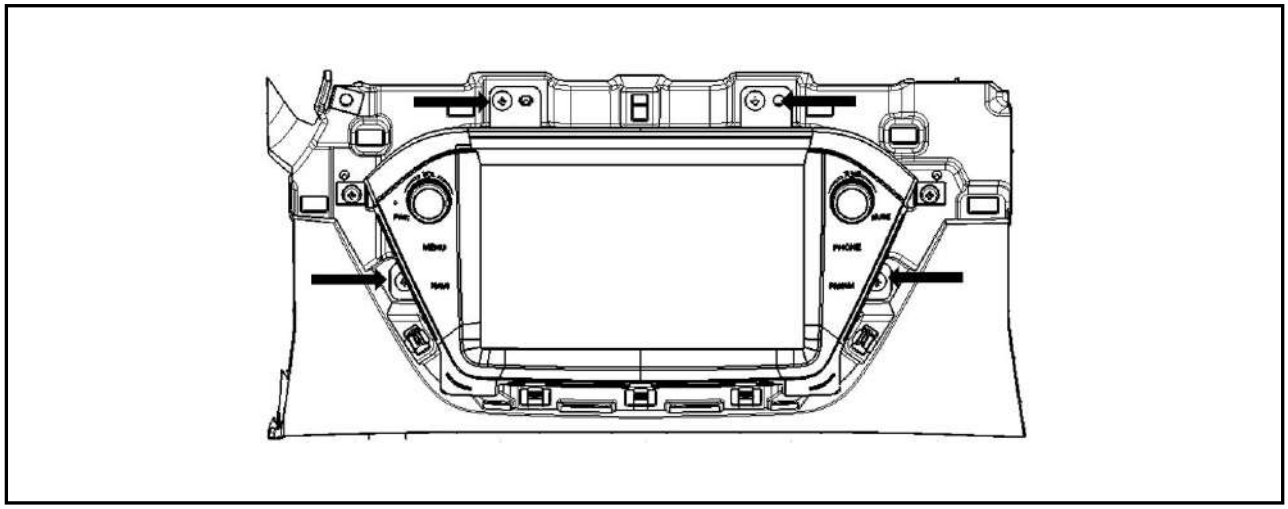
No	Malfunction Phenomenon	Analysis On Malfunction Reason	Countermeasures	Remark
1	No display of LCD screen	Disconnection of power supply switch and starting switch	Access Switch	
		Loose connecting wire	Reconnection	
		Fuse blowout	Replace new protective tube	
2	Sound can't be played	System stays in mute state	Press MUTE button and turn off mute	
		Loose connecting wire of loudspeaker	Reconnection	
		Loudspeaker damage	Replace new loudspeaker	
3	MP5 Won't Turn ON	Power Supply Fuse Malfunction	Replace Fuse	
		Radio power supply or grounding wire works	Repair Relevant Harness	
		MP5 Malfunction	Replace MP5	
4	Radio Can't Get Stations	Radio Antenna Amplifier Malfunction	Replace MP5 Amplifier	
		MP5 Malfunction	Replace MP5	
		Radio Printed Antenna Malfunction	Replace Printed Antenna	
5	No Navigation Signal	Navigation Antenna Malfunction	Replace Navigation Antenna	
		Obscured Property above vehicle	Move vehicle to open field	

Removal and Installation

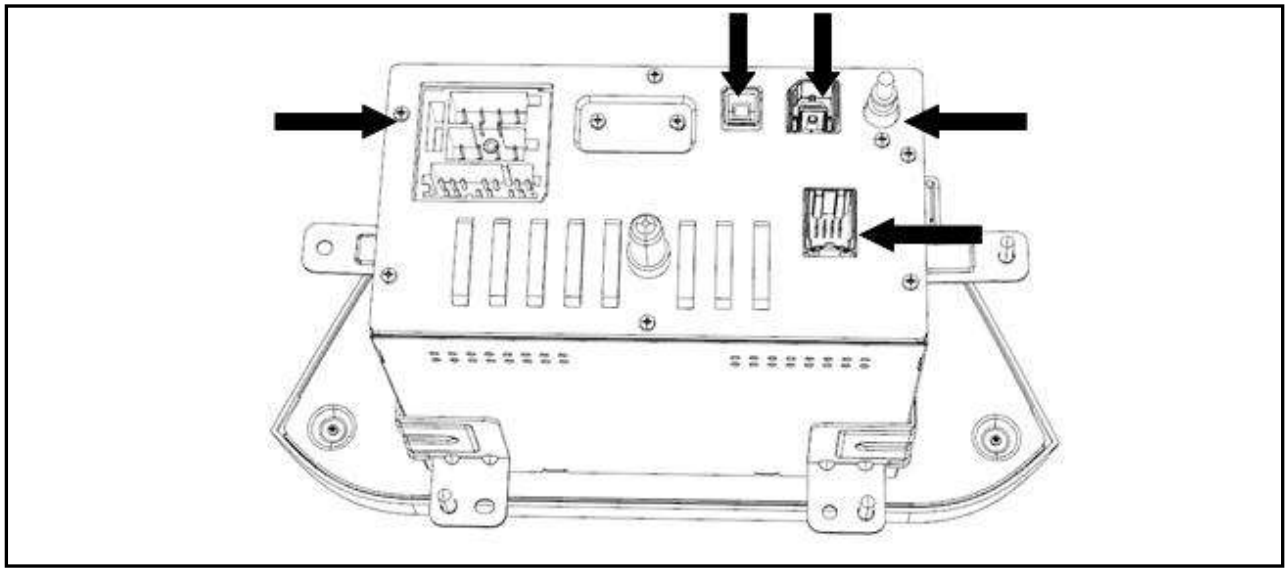
Removal and Installation of MP5

1. Open front compartment cover
2. Disconnect battery negative cable. Refer to Disconnection and Connection of Battery Cable
3. Remove decorative plate assembly on the right side of center. Refer to Decorative Plate Assembly On Right Side of Center
4. Removal MP5 panel assembly. Refer to MP5 Panel Assembly
5. Remove MP5 assembly

1). Remove four mounting bolts Q2734819 of instrument panel connecting with MP5+GPS host.



2). Remove all the connectors after removing MP5+GPS hosts.



3). Take down MP5+GPS host.

Installation

Install in the reverse order of removal.

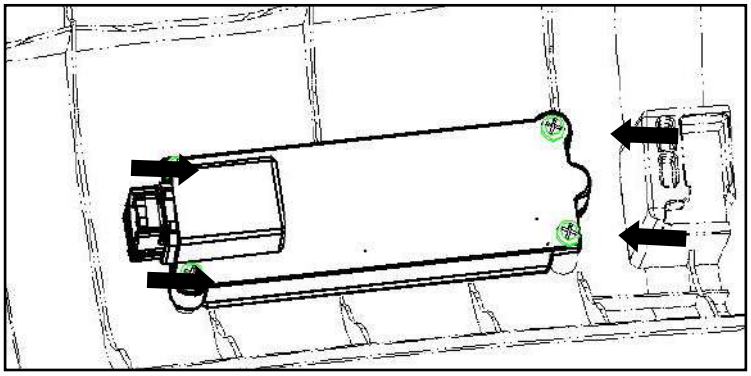
Cautions：

- **The tightening torque of installing four mounting bolts of MP5+GPS host is 4N·m～5N·m.**

Removal and Installation of Noise Reduction Module

Removal

Remove four mounting bolts 12431-03123 of noise reduction module connecting with front ceiling lamp.



Inspection after removal

Check noise reduction module for damage or crack. If does, please replace it.

Installation

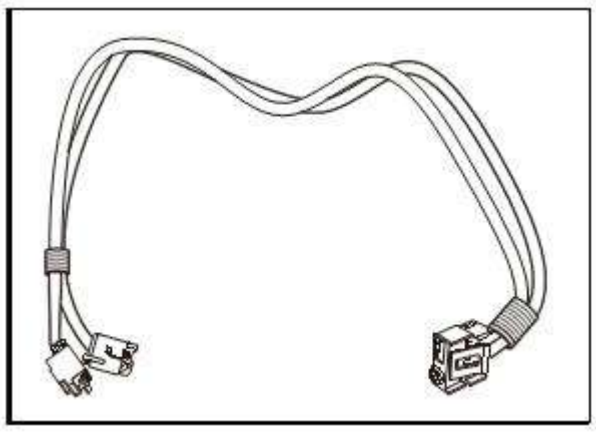
Install in the reverse order of removal

- **The tightening torque of installing four mounting bolts of noise reduction module is 4N·m～5N·m.**

Removal and Installation of Multimedia Connector Assembly

Removal

1. Open front compartment cover
2. Disconnect battery negative cable. Refer to Disconnection and Connection of Battery Cable
3. Remove decorative plate assembly on the right side of center. Refer to Decorative Plate Assembly On the Right Side of Center
4. Remove MP5 panel assembly. Refer to MP5 Panel Assembly
5. Remove MP5 assembly. Refer to MP5 assembly
6. Remove front extension panel assembly. Refer to Front Extension Panel Assembly
7. Remove cup saucer cover assembly. Refer to Cup Saucer Cover Assembly
8. Remove front storage box assembly. Refer to Front Storage Box Assembly
9. Remove vice-instrument assembly. Refer to Vice-Instrument Assembly
10. Remove multimedia connector assembly



1). Disconnect harness clamp of multimedia connector assembly.

2). Plug out multimedia connector assembly.

Installation

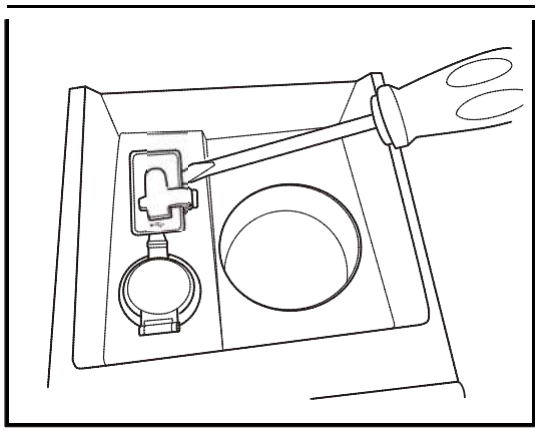
Install in the reverse order of removal.

Removal and Installation of Multimedia Connector Cover

Removal

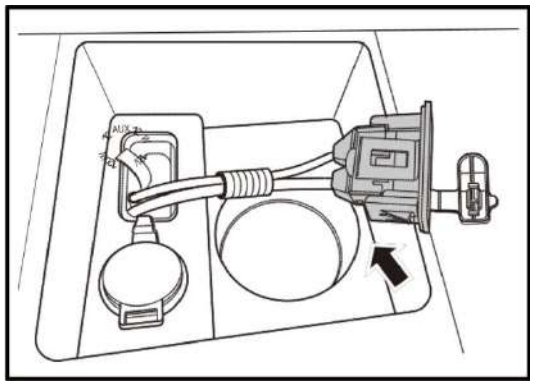
1. Open front compartment cover
2. Disconnect battery negative cable. Refer to Disconnection and Connection of Battery Cable
3. Remove multimedia connector cover

1). Pry off multimedia connector cover.



2). Disconnect harness connector of multimedia connector cover.

3). Take down multimedia cover plate.



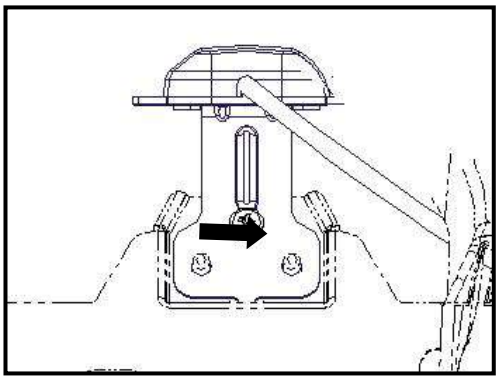
Installation

Install in the reverse order of removal.

Removal and Installation of Antenna Device

1. Removal of GPS Antenna

1 Remove one mounting bolt Q2714813 of GPS antenna connecting with instrument panel.



Inspection after Removal

1 Check GPS antenna support for damage or crack, if does, please replace it.

Installation

Install in the reverse order of removal.

Cautions：

- **Tightening torque of installing the bolt of GPS antenna is 2.5N·m～3N·m.**

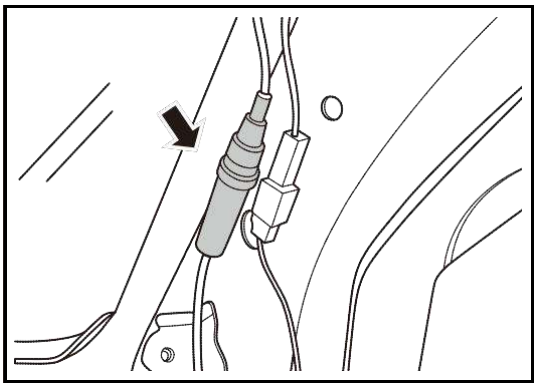
2. Transition Cable of Antenna

Removal

1. Open front compartment cover
2. Disconnect battery negative cable
3. Remove decorative plate on the right side of center. Refer to Decorative Plate ON the Right Side of Center
4. Remove MP5 panel assembly. Refer to MP5 Panel Assembly
5. Remove MP5 assembly. Refer to MP5 assembly
6. Remove glove box assembly. Refer to Glove Box Assembly
7. Remove decorative plate assembly (right) on column A. Refer to Decorative Plate Assembly On Column A
8. Remove threshold backplate (right) assembly of front door. Refer to Threshold Backplate Assembly of Front Door
9. Remove threshold backplate (right) assembly of rear door. Refer to Threshold Backplate Assembly of Rear Door
10. Remove downward decorative plate assembly (right) of column B. Refer to Downward Decorative Plate Assembly of Column B.
11. Remove upward decorative plate assembly (right) of column B. Refer to Upward Decorative Plate Assembly of Column B.
12. Remove rear seat cushion assembly. Refer to Rear Seat Cushion Assembly
13. Remove rear seat backrest assembly. Refer to Rear Seat Assembly
14. Remove fixed support （right） assembly below rear seat backrest. Refer to Downward Decorative Plate Assembly of Column C
15. Remove downward decorative assembly (right) of column C. Refer to Downward Decorative Assembly of Column C
16. Remove upward decorative assembly (right) of column C. Refer to Upward Decorative Assembly of Column C
17. Remove sun louver assembly (left. right). Refer to Sun Louver Assembly
18. Remove ceiling armrest assembly (right front. left rear. right rear). Refer to Ceiling Armrest Assembly
19. Remove front ceiling lamp assembly. Refer to Front Ceiling Lamp Assembly
20. Remove ceiling assembly. Refer to Ceiling Assembly
21. Transition Cable Rearpart of Antenna

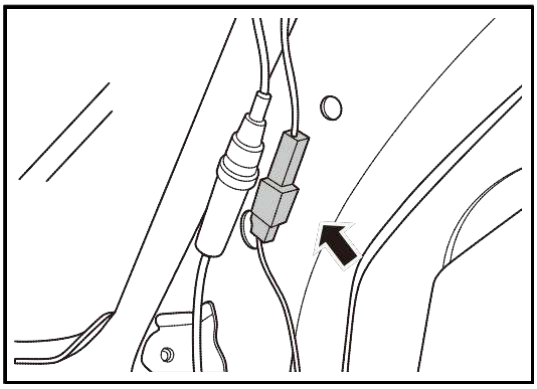
1). Disconnect butt joint of transition cable forepart and rearpart of antenna.

2). Disconnect one fixed clip between transition cable rearpart of antenna and instrument tubular beam, take down transition cable rearpart of antenna.



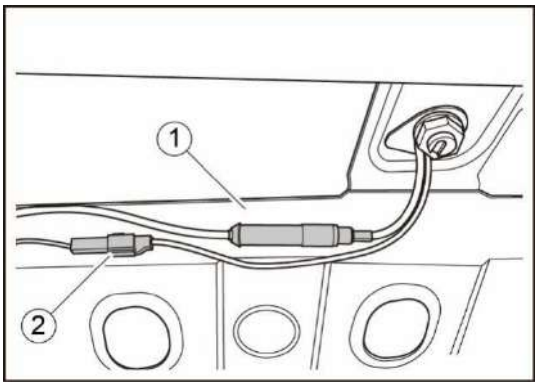
22. Remove Transition Cable Forepart of Antenna

1). Disconnect connector between transition cable forepart of antenna （amplifier）and main harness.



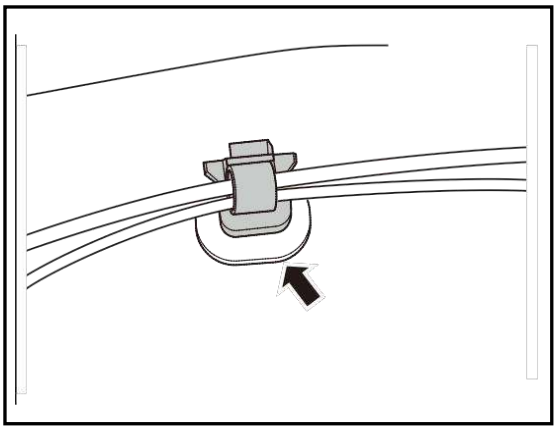
2). Disconnect harness connector ② between transition cable forepart of antenna (amplifier) and rod-type antenna assembly.

3). Disconnect butt joint ① between transition cable forepart of antenna (amplifier) and rod-type antenna assembly.

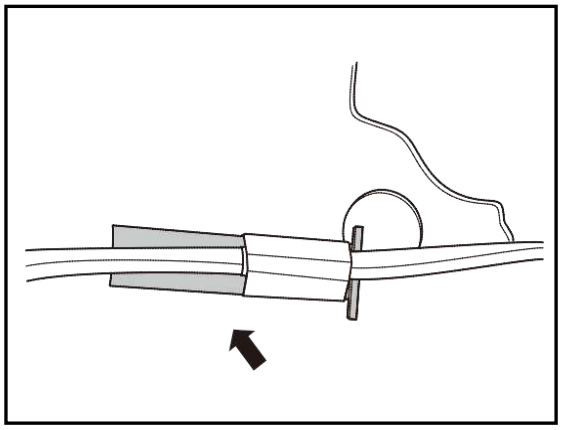


4). Plug out fixed clip between transition cable forepart of antenna and vehicle body, take down transition cable forepart of antenna.

Clip：



Clip：



Installation

Install in the reverse order of removal.

Removal and Installation of Antenna Assembly

Removal

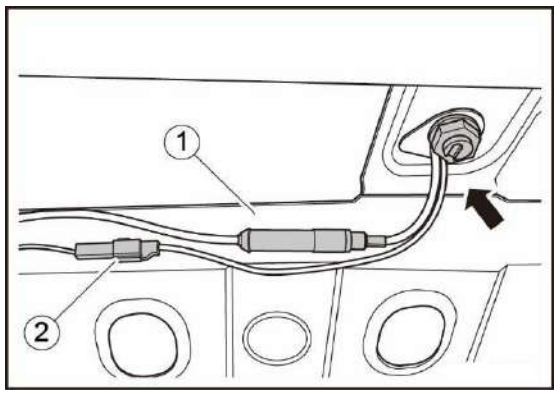
1. Open front compartment cover
2. Disconnect battery negative cable. Refer to Disconnection and Connection of Battery Cable
3. Remove upward decorative plate assembly (right) of column A. Refer to Upward Decorative Plate Assembly of Column A
4. Remove threshold backplate assembly (right) of front door. Refer to Threshold Backplate Assembly of Front Door
5. Remove threshold backplate assembly (right) of rear door. Refer to Threshold Backplate Assembly of Rear Door
6. Remove downward decorative plate assembly (right) of column B. Refer to Downward Decorative Plate Assembly of Column B
7. Remove upward decorative plate assembly (right) of column B. Refer to Upward Decorative Plate Assembly of Column B
8. Remove rear seat cushion assembly. Refer to Rear Seat Assembly
9. Remove rear seat backrest assembly. Refer to Rear Seat Assembly
10. Remove fixed support assembly (right) below rear seat backrest. Refer to Downward Decorative Plate Assembly of Column C
11. Remove downward decorative plate assembly (right) of column C. Refer to Downward Decorative Plate Assembly of Column C
12. Remove upward decorative plate assembly (right) of column C. Refer to Upward Decorative Plate Assembly of Column C
13. Remove sun louver assembly (left. right). Refer to Sun Louver Assembly
14. Remove ceiling armrest assembly (right front. left rear. right rear). Refer to Ceiling Armrest Assembly
15. Remove front ceiling lamp assembly. Refer to Front Ceiling Lamp Assembly
16. Remove ceiling assembly. Refer to ceiling assembly
17. Remove Rod-Type Antenna Assembly

1). Disconnect harness connector ② between rod-type antenna assembly and transition cable forepart （amplifier） of antenna.

2). Disconnect butt joint ① between rod-type antenna assembly and transition cable forepart of antenna.

3). Remove one fixed bolt of rod-type antenna assembly.

Draw out rod-type antenna assembly.



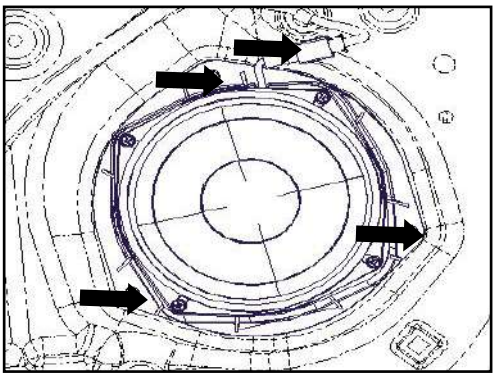
Installation

Install in the reverse order of removal.

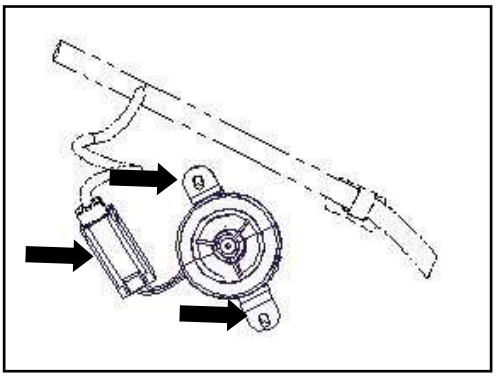
Removal and Installation of Audio Speaker Device

Removal

1. Plug out woofer connector firstly, then remove three mounting bolts Q2714213 of woofer connecting with door panel.



2. Plug out tweeter connector firstly, then remove two mounting bolts 12431-03129 connecting with trim panel of high pitched A column.



Inspection after removal

1. Check woofer and tweeter supports for crack or damage. If does, please replace it.
2. Check woofer and tweeterl connectors for crack or damage. If does, please replace it.

Installation

Install in the reverse order of removal.

Cautions：

- **Tightening torque of installing woofer and tweeter bolts is 5N·m～6N·m.**

Reversing Assist System

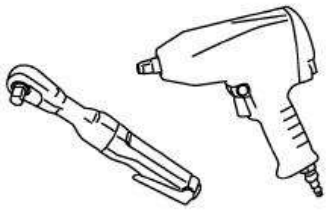
Common Precautions

- Before the serving, which is not need to use the power supply: turn the power switch to LOCK position, disconnect the 12V storage battery negative terminal.
- After disconnecting 12V storage battery negative terminal, the storage memory of radio and other control devices will be deleted.
- Replace the new oil seal、pad、seal ring、O-ring、lock-up gasket、split pin、self-locking nut and other components.
- Place the removed components according to the assembly-oriented position and order.
- If necessary, use authorized binder、sealant or equivalent product.
- In order to repair the vehicle safely and efficiently, right use of hand tools、power tools(only for removal) and special tools is necessary.
- Before Servicing：

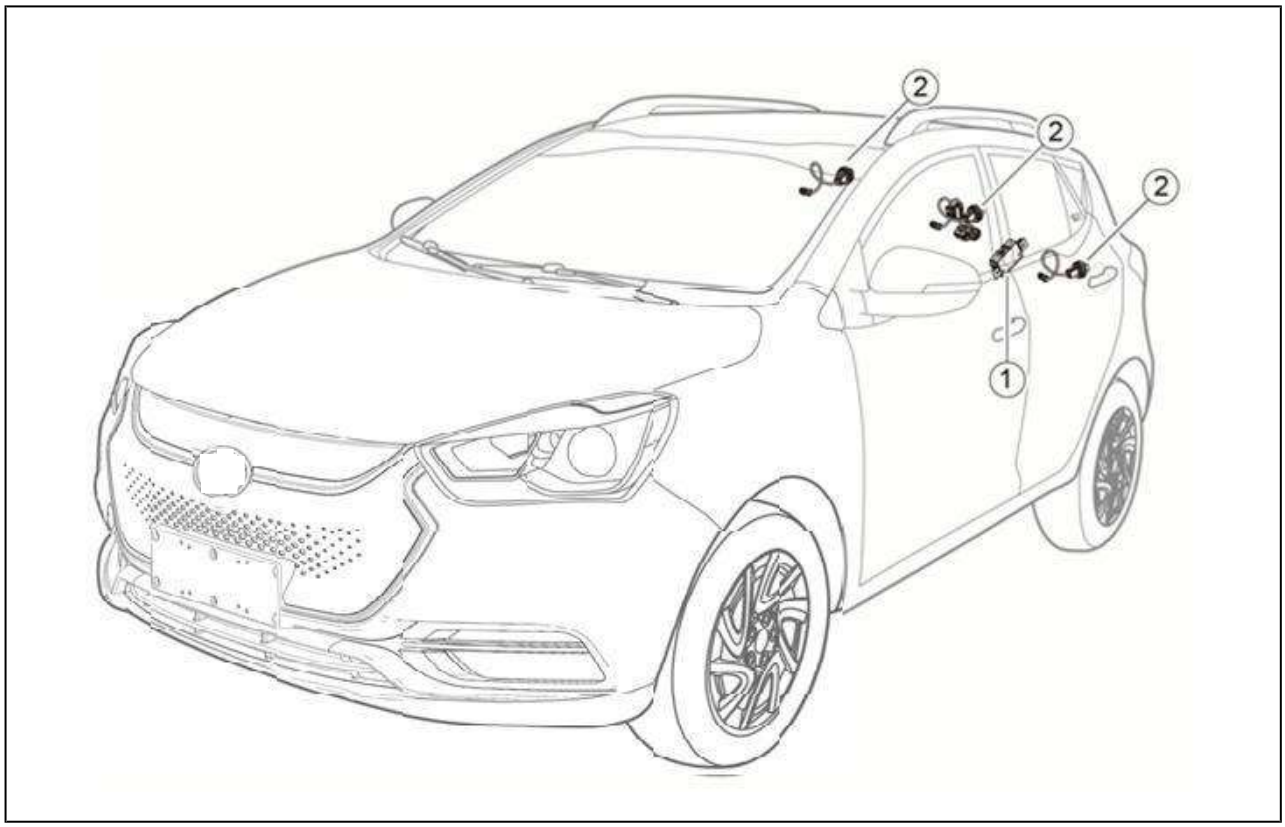
Use suitable cover to cover the wheel fender、interior and carpet. Attention, do not use the key、fastener or the like to scratch the paintwork.

Preparations

Commonly Used Service Tools

Tool		Instructions
Power Tool		Install and remove the bolts and nuts

Component Position



1. Reversing Radar Controller Assembly
2. Sensor Assembly

Malfunction Diagnosis

List of Malfunction Diagnosis EMB

No	Malfunction Phenomenon	Analysis of Malfunction Reason	Countermeasures	Remark
1	System does not work as reversing	Reversing switch has not been connected	Replace reversing switch	Refer to System Out of Service
		Poor connection between harness and main power supply	Check harness for correct connection with power supply	
		Incorrect connection of connector	Correct reconnection of all connectors	
2	Sensor does not work	Incorrect connector position result in sensor out of service	Correct reconnection of all sensor connectors	Refer to Sensor Out of Service
3	Buzzer alarms continuously, butthere is no barrier behind the vehicle	Check vehicle body or ground	Correct installation according to manual, if necessary, technicians can guide the inspection	
		Incorrect installation of sensor or sensor has come off		
		Sensor has been damaged	If sensor has been damaged, please replace it in time	
		Connecting wire of sensor has been damaged	Check harness for damage	
4	Barrier distance can’t be displayed	Abnormal battery voltage	Check battery for normal voltage	
		Whether connector position is correct or not	Turn off system, correct reconnection of all connectors	
		Sensor harness has been disturbed	Check connecting wire of sensor for contact with exhaust pipeline、muffler	
5	No prompt tone as starting up, other devices work normally without warning tone	Instrument malfunction(buzzer has been integrated into instrument)	Check connecting wire and connector of instrument, correct reconnection of instrument	
			Replace instrument	

Flow Chart of Malfunction Diagnosis

System Out of Service

Step	Inspection Content	Countermeasures	Judgement Standard	Next Step	
				Yes	No
1	Confirm malfunction phenomenon	Ignition switch stays ON gear, shift transmission to reversing gear	Whether you can hear buzzer warning sound or not	Deal with intermittent malfunction, turn to next step	Turn to step 3
2	Check intermittent malfunction	Check and deal with loose malfunction of harness connector of reversing lamp switch Check and deal with loose malfunction of harness connector of combination instrument			
3	Check reversing lamp fuse	Remove reversing lamp fuse IF20, check whether fuse has been blown out or not?	Fuse has been blown out or not?	Check fuse circuit for short circuit malfunction and replace fuse	Next step
4	Check power supply of reversing radar controller	Use multimeter to measure the voltage between No.12 terminal of harness connector F07 of reversing radar controller and reliable grounding	Voltage standard 11~14V whether voltage is in accordance with standard or not?	Next step	Inspect or replace harness
5	Check grounding wire of reversing radar controller	Use multimeter to measure the voltage between No.13 terminal of harness connector F07 of reversing radar controller and reliable grounding	Standard Resistance：less than 1Ω, Whether resistance is in accordance with standard or not?	Next step	Inspect or replace harness
6	Check the circuit between reversing radar controller and reversing lamp fuse	Shift transmission to reversing gear, measure the resistance between relevant terminal of harness connector of reversing radar controller and No.12 terminal of harness connector of reversing lamp fuse	Standard Resistance：less than 1Ω， Whether resistance is in accordance with standard or not?	Next step	Inspect or replace harness
7	Replace reversing radar controller, whether the malfunction has been removed or not?	Replace new reversing radar controller. Key switch stays ON gear, shift transmission to reversing gear	Whether you can hear prompt tone of buzzer or not?	Troubleshooting	

Sensor Out of Service

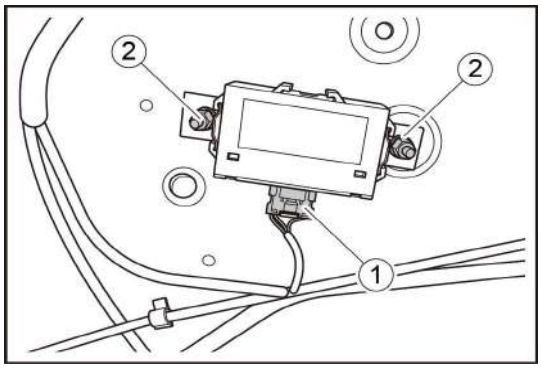
Step	Inspection Content	Countermeasures	EMB Judgement Standard	Next Step	
				Yes	No
1	Confirm malfunction phenomenon	Ignition switch stays ON gear, shift transmission to reversing gear, place suitable barrier in the rearpart of vehicle within proper range	Whether you can hear warning tone of parking	Deal with intermittent malfunction, turn to next step	Turn to Step 3
2	Check intermittent malfunction	Check and deal with loose malfunction of harness connector of reversing radar sensor			
3	Check the circuit between reversing radar sensor and reversing radar controller	Measure the resistance between No.1 terminal of harness connector RB07 of reversing radar sensor and No. 1/2/3/4 terminal of harness connector F07 of reversing radar controller	Standard Resistance：less than 1Ω，Whether resistance is in accordance with standard or not?	Next Step	Inspect or replace harness
4	Check the circuit between reversing radar controller and reversing radar sensor	Measure the resistance between No.2 terminal of harness connector RB07 of reversing radar sensor and No. 14 terminal of harness connector F07 of reversing radar controller	Standard Resistance：less than 1Ω，Whether resistance is in accordance with standard or not?	Next Step	Inspect or replace harness
5	Check the circuit between reversing radar controller and reversing radar sensor	Measure the resistance between No.4 terminal of harness connector RB07 of reversing radar sensor and No. 23 terminal of harness connector F07 of reversing radar controller	Standard Resistance：less than 1Ω，Whether resistance is in accordance with standard or not?	Next Step	Inspect or replace harness
6	Replace reversing radar sensor, whether the malfunction has been removed or not?	Replace new reversing radar sensor, turn ignition switch to ON gear, shift transmission to reversing gear, turns to reversing state	Whether the malfunctioncan be detected or not?	Troubleshooting	

Removal and Installation

Reversing Radar Controller

Removal

1. Open front compartment cover
2. Disconnect battery negative cable
3. Remove tailgate threshold assembly. Refer to Tailgate Threshold Assembly.
4. Remove threshold backplate assembly of rear door. Refer to Threshold Backplate Assembly of Rear Door
5. Remove rear seat cushion assembly. Refer to Rear Seat Assembly
6. Remove rear seat backrest assembly. Refer to Rear Seat Assembly
7. Remove rotor bracket of backrest. Refer to Downward Decorative Plate of Column C
8. Remove downward decorative plate of column C. Refer to Downward Decorative Plate of Column C
9. Remove upward decorative plate of column C. Refer to Upward Decorative Plate of Column C
10. Remove decorative plate assembly on the left side of trunk. Refer to Decorative Plate Assembly of Trunk Side
11. Remove reversing radar controller assembly

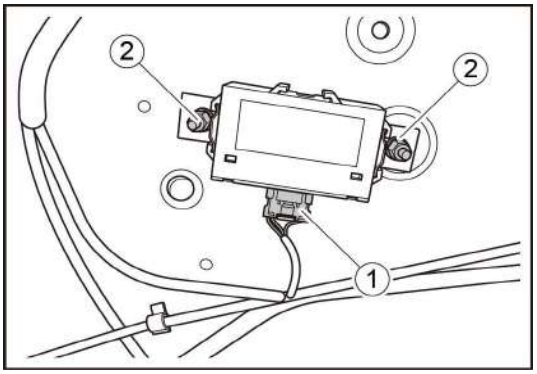


1). Disconnect harness connector ① of reversing radar controller assembly.

2). Remove two mounting bolts ② of reversing radar controller assembly.

Installation

1. Install reversing radar controller assembly



1). Install and tighten up two mounting bolts ② of reversing radar controller assembly.

Tightening torque:4~6N·m

2). Connect harness connector ① of reversing radar controller assembly

2. Install decorative assembly on the left side of trunk
3. Install upward decorative assembly of column C
4. Install downward decorative assembly of column C
5. Install rotor bracket of backrest
6. Install rear seat backrest assembly

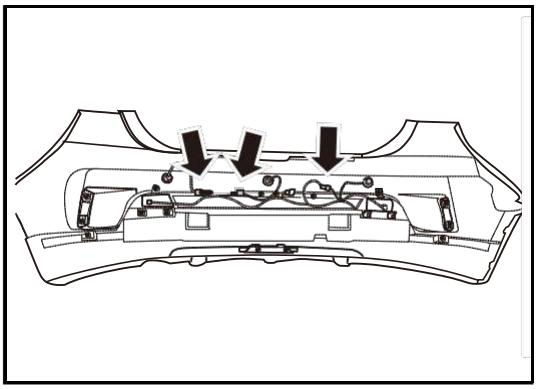
7. Install rear seat cushion assembly
8. Install rear door threshold assembly
9. Install tailgate threshold assembly
10. Connect battery negative cable
11. Close front compartment cover

Sensor Assembly

Removal

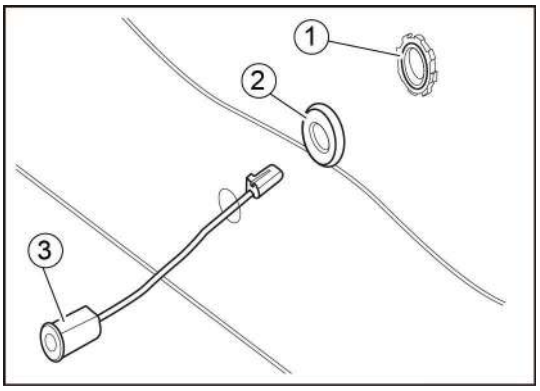
1. Open front compartment cover
2. Disconnect battery negative cable. Refer to Disconnection and Connection of Battery Cable
3. Remove quarter combination lamp assembly. Refer to Quarter Combination Lamp Assembly
4. Remove rear bumper assembly
5. Remove sensor assembly

1). Disconnect harness connector of sensor assembly



2). Rotate snap ring, take down lock catch①

3). Take down rubber pad ② with shrapnel, and take down sensor body ③ from outside

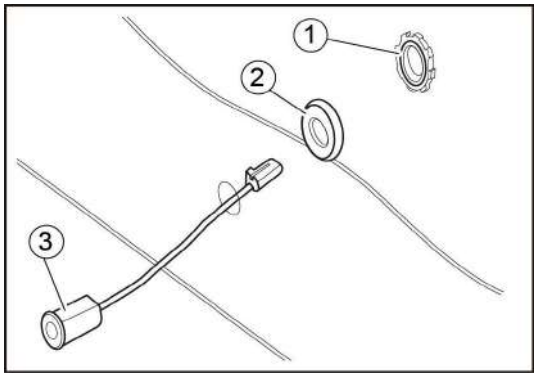


Installation

1. Install sensor assembly

1). Install sensor body ③ from front of rear bumper, install rubber pad ②and snap ring ① along the harness built in sensor body.

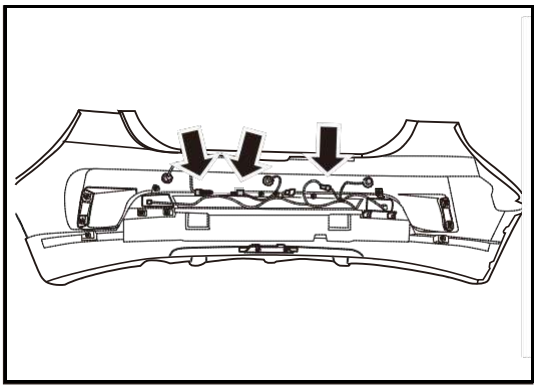
2). Rotate snap ring ① clockwise as pressing sensor body, make rubber pad and rear bumper fit closely together.



△Caution

Triangle mark of snap ring should be aligned with triangle mark of sensor assembly, that is to say, they are tightened up closely.

3). Connect harness connector of sensor.



2. Install rear bumper assembly
3. Install rear quarter combination lamp assembly
4. Connect battery negative cable
5. Close front compartment

SRS System

Cautions

Warning：

- During repair, if you do not conduct the operation according to correct procedure, it may lead to accidental explosion as airbag system has been repaired and result in serious accidents.
- The mistakes in the process of repairing may lead to accidental explosion as airbag has been repaired and result in serious accidents.
- Before conducting repair(including removal. installation. test or replacement of components and parts), please read the following instructions carefully and conduct operation according to regulated correct procedure in the service manual.
- Individuals are not permitted to remove airbag system, removal operation should be conducted by professional staff.

1. Do not decompose the driver air bag and the passenger air bag assemblies and the SRS components.
2. Never repair any of the following component parts, only use replacement parts to replace these component parts.

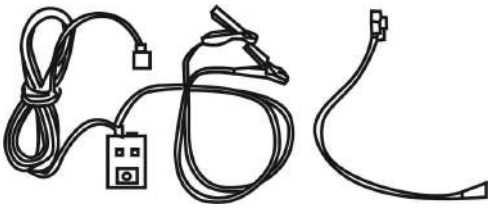
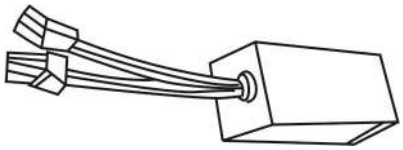
1) SRS fitted on the driver side.
2) SRS fitted on the passenger side.
3) SRS Control Module.

3. Never expose the air bag to high temperature or fire.
4. If the air bag has contact with grease. detergent. oil. or water, please use dry rag to wipe it off.
5. Never make the air bag drop. Never use the air bag if it has been dropped.
6. Only get the original replacement parts from DR authorized distributor.
7. After removing the SRS, make the front face up and put it in the smooth place. Do not put any articles on the front.
8. Verify whether the replacement parts numbers are right or not. Do not use the parts of other vehicles as substitutes.
9. Even though under the condition that the air bag was not ignited in the slight collision accident, the gasket surface and the air bag sensor should be inspected. If the dent. crack or deformation was found, install the new air bag assembly.
10. When abandoning the vehicle or the air bag, please dispose the air bag firstly.
11. After the air bag ignition, the inflatable device will become pretty hot, dispose the inflatable device after it experiences the natural cooling. Do not cool down it by water.
12. Measuring the circuit resistance of the air bag module is forbidden, which will lead to air bag ignition.

Preparations

Commonly used service and special tools are in need during the maintenance and repair.

Special Tool Diagram

Tools	Diagram	Function
Ignition Tools		Ignite the air bag
Diagnosis Inspector		Module Harness Inspector
Simulator		Check the simulator connector of the harness resistance

Overview

Generally speaking, the SRS system is the air bag system, the “SRS” identification will be found on the trim cover of the air bag or the places where being the air bags;

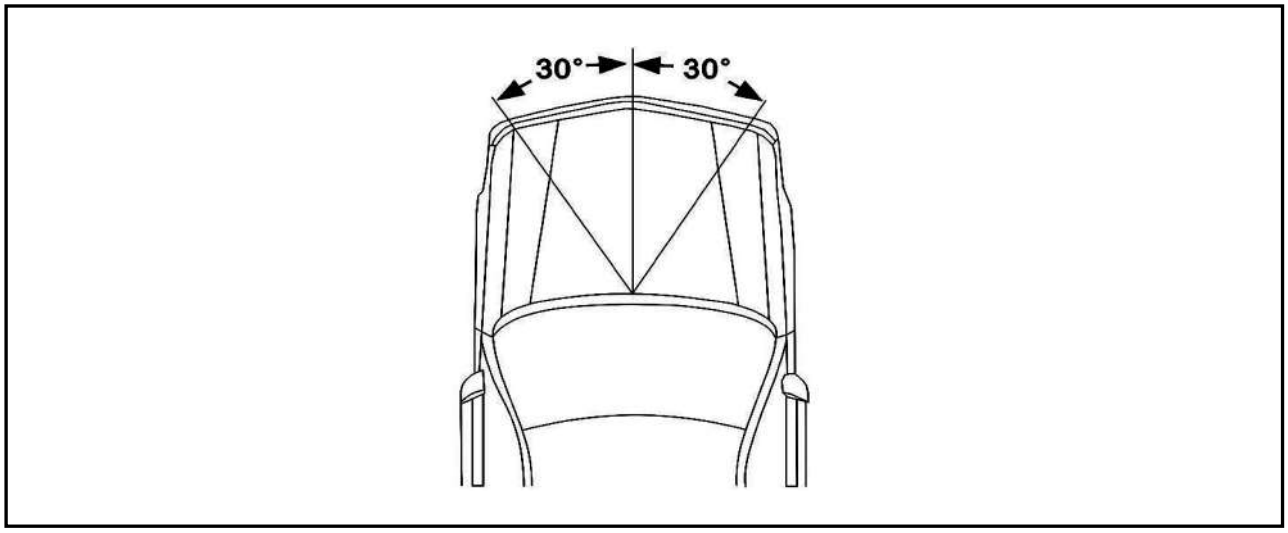
1. Driver Airbag (Driver Airbag-DAB): When the front collision happening, the air bag will protect the driver’s upper torso, in some degree, it will protect the driver from moving forward. The air bag is installed into the steering wheel commonly, the trim cover of the DAB is actually the horn cover on the steering wheel;
2. Passenger Airbag (Passenger Airbag-PAB): When the severe front collision happening, the airbag will protect the passenger’s upper torso directly, in some degree, it will protect the passenger from moving forward. The airbag is installed into the instrument panel on the passenger side commonly, which can be divided into visible or hidden type;
3. Side Airbag（Side Airbag - SAB）：The main function of side airbag is to provide extra protection for front driver. passenger. The protection parts include the breasts of front passengers and their hips as vehicle collision happened.

Cautions：

When driving the vehicle, please buckle up the seat belt according to requirement. The protective effect of the air bag used separately is not very obvious, and in a sense, if the air bag does not cooperate with the main restraint system (seat belt), it will lead severity of damage to the passenger. The air bag is the auxiliary device for the seat belt, not the replacement device for the seat belt.

Principle

1. Conditions of Airbag Deployment



Collision Angle Diagram that may lead to airbag deployment

The frontal collision with enough impact force that deviates from vehicle center line within 30 degrees may result in airbag deployment.

2. Position Diagram of Airbag System Components

Position Diagram of Airbag Components

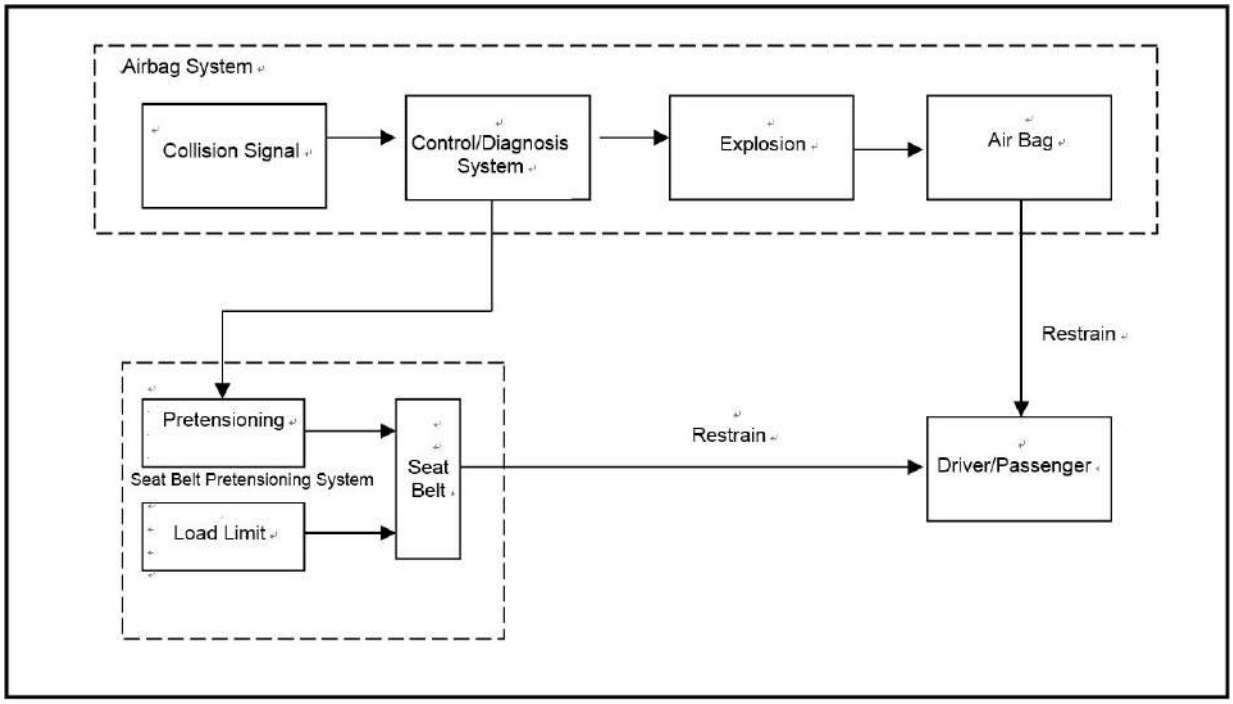
1-Driver Side Airbag	2-Passenger Side Airbag	3-Position of Airbag Control Module

3. Action Principle of Airbag System

When the collision accident happens to the vehicle, the collision between the vehicle and the obstacles called primary collision, the result of the primary collision is that the vehicle speed decreases rapidly; the collision between the occupants and the vehicle interior structure called secondary collision. Before the secondary collision happens between the occupants and the vehicle interior structure, insert a gas-filled air bag between the occupants and the vehicle interior structure quickly, the air bag will absorb the kinetic energy from the occupants through the air permeability itself and the exhaust throttle function of the deflation hole, which decreases the violent collision and isolates occupants and interior structure, finally reaches the aim to protect the occupants.

The air bag. seat and seat belt are made up of the vehicle restraint system.

Schematic Diagram of Restraint System Action



Removal and Installation

Driver SRS Assembly

1. Component

Driver airbag assembly is located in steering wheel.

Caution：

- Place the driver air bag module with gasket side facing upward when removing the driver air bag assembly or installing a new driver air bag assembly.
- Do not measure the air bag resistance, which may lead to igniting the air bag accidentally.
- Place the driver air bag in the right place, where the environmental temperature is under 80℃, and is away from electric noise.
- When electric welding is conducted, always disconnect the storage battery negative terminal and the air bag connectors.
- When the vehicle or the air bag is discarded, please use special tools to ignite the air bag.

2. Removal Steps

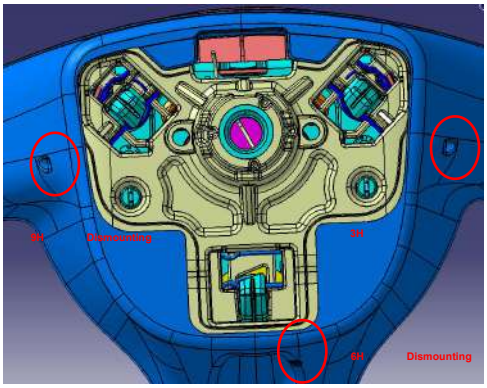
1) Before removal, disconnect the storage battery negative terminal and wait for more than 3 minutes.

2) Schematic Diagram of DAB Removal (three steps), use the straight screwdriver with the length of 15cm as the removal tool.

a. Remove the demounting holes of 3H：use screwdriver to pierce the mounting and dismounting holes on the steering wheel, stir the snap on the steering wheel, separate the snap joint from the steering wheel frame.

b. Remove the demounting holes of 6H：use screwdriver to pierce the mounting and dismounting holes on the steering wheel, stir the snap on the steering wheel, separate the snap joint from the steering wheel frame.

c. Remove the demounting holes of 9H：use screwdriver to pierce the mounting and dismounting holes on the steering wheel, stir the snap on the steering wheel, separate the snap joint from the steering wheel frame.



3) Disconnect the connectors, pull out the air bag module.

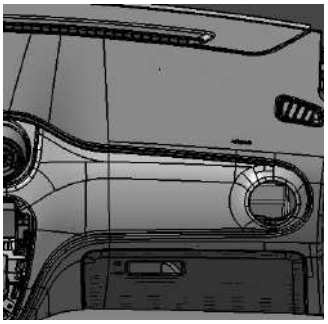
4) Place the air bag module properly according to therequirements.

The correct placement is shown as the right figure.

Placement Diagram of Driver Airbag

4. Installation Steps

Assemble in the reverse step of removal.



Co-pilot SRC Assembly

1. Component Parts Diagram

The co-pilot SRC assembly is embedded in the interior instrument panel on the co-pilot side.

Location Diagram of the co-pilot SRC Assembly Installation

Cautions：

- Do not place or post any items on the air bag surface.
- Please refer to the precautions for “Driver SRC Assembly”.

2. Removal

1) Before removal, disconnect the storage battery negative terminal and wait for more than 3 minutes.

2) Remove the glove compartment

3) Remove the mounting bolts of the passenger air bag on the instrument panel tubular beam.

4) Use flat head screwdriver to pry off airbag cover.

5) Disconnect the connector, take down the airbag from airbag box in the instrument panel.

Turn the cover upward and place the airbag.

2. Installation

Assemble in the reverse step of removal.

Air Bag Control Unit (ACU)

1. Function of the Air Bag Control Unit (ACU)

1) Induct the vehicle collision.

2) Ignite the driver and passenger air bags.

3) Ignite the pre-tensioning seat belt on the driver and passenger side.

4) Monitor the working conditions of Air Bag system.

5) Inform the driver of the air bag system state through warning indicator lamp: ready or faulted.

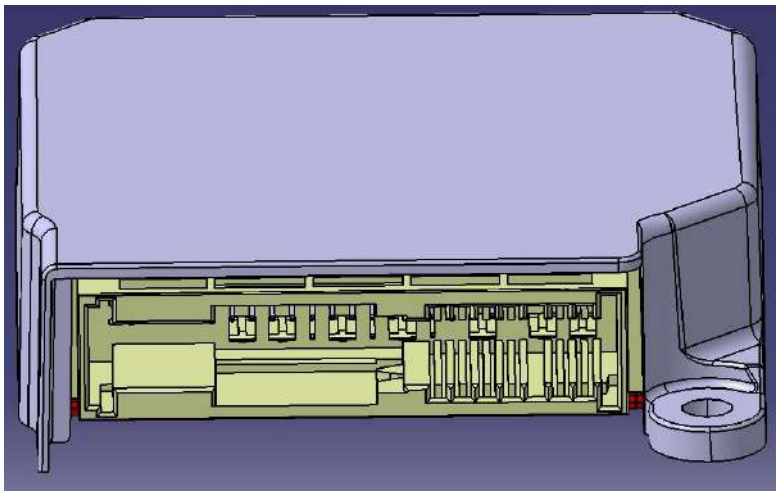
6) Diagnose and maintain the air bag system through serial diagnosis communication port.

7) After collision, record the relevant collision information data and working states of all the air bag system components.

8) After collision, transfer the collision signal to ETACS module. Engine ECU module. ETACS module opens the locked door, which is convenient for the occupants to escape; the Engine ECU module disconnects oil circuit to prevent the fire.

2. Air Bag Control Module (ACU) Pin

Terminal Diagram of ACU and Specified Content of Relevant Pin as shown in the following list



Terminal Diagram of ACU

Pin	Pin Designation	Pin Description	Terminal	4 Loops
1	DBT+	Driver Seat Belt Pretensioning Positive	Gold	X
2	DBT-	Driver Seat Belt Pretensioning Negative	Gold	X
3	PBT+	Copilit Seat Belt Pretensioning Positive	Gold	X
4	PBT-	Copilit Seat Belt Pretensioning Negative	Gold	X
5	Vbat	Power Supply Positive	Gold	X
6	GND	Grounding	Gold	X
7	W/L	Malfunction Indicator Lamp	Gold	X
8	NA	Unused	Gold	0
y	K_Line	Diagnosis Interface	Gold	X
10	DFAB+	Driver Frontal Airbag Positive	Gold	X
11	DFAB-	Driver Frontal Airbag Negative	Gold	X
12	CRO2	Collision Output 2	Gold	X
13	PFAB+	Copilot Frontal Airbag Positive	Gold	X
14	PFAB-	Copilot Frontal Airbag Negative	Gold	X
15	NA	Unused	Gold	0
16	NA	Unused	Gold	0
17	NA	Unused	Gold	0
18	NA	Unused	Gold	0
19	NA	Unused	Gold	0
20	NA	Unused	Gold	0
21	NA	Unused	Gold	0
22	NA	Unused	Gold	0
23	NA	Unused	Gold	0
24	NA	Unused	Gold	0
25	NA	Unused	Gold	0
26-27	SBO	Short-Circuit		X
28-29	SBO	Short-Circuit		X
30	NA	Unused	Gold	0
31-32	SBO	Short-Circuit		X
33	NA	Unused	Gold	0
34	NA	Unused	Gold	0
35-36	SBO	Short-Circuit		X
37	CRO1	1	Gold	X
38-39	SBO	Short-Circuit		X
40	NA	Unused	Gold	0
41-42	SBO	Short-Circuit		X
43-44	SBO	Short-Circuit		X
45	NA	Unused	Gold	0
46	NA	Unused	Gold	0
47	NA	Unused	Gold	0
48	NA	Unused	Gold	0
49	NA	Unused	Gold	0
50	NA	Unused	Gold	0

Definition table of ACU pin

3. Removal of Air Bag Control Unit (ACU)

1) Turn off the ignition switch, disconnect the storage battery negative terminal, wait for 3 or more minutes until the complete discharge of interior capacitive storage of ACU.

2) Remove the vice instrument panel(see Removal and Installation of Vice Instrument Panel).

3) Remove the three mounting bolts of ACU, loosen and pull the harness connector of ACU, pull out the ACU.

Cautions：

- Never make the ACU drop or suffer from an impact.

4. Air Bag Control Unit（ACU)

Install in the reverse step of removal

Cautions：

- Please pay attention to the direction of ACU when installing, make sure that the arrows labeled on ACU should be aligned with the vehicle driving direction.

SRS System Diagnosis

Turn the ignition switch to “ON” position, the air bag indicator lamp on the instrument panel will go out after flickering for a few seconds, which indicates that the air bag system stays in normal working state. After turning the ignition switch to “ON” position, the air bag indicator lamp will be off or always on, which indicates that the air bag system is faulted. In order to verify the malfunction reason further, the special malfunction diagnosis instrument should be used.

1) Use the diagnosis instrument to read out the malfunction code.

2) According to reminder from the malfunction code, carry out the maintenance.

3) Use the diagnosis instrument to eliminate the malfunction code.

Cautions：

- After troubleshooting the malfunction, use diagnosis instrument to eliminate the malfunction code stored in the system.

Except the explained operations in the manual, the electrical testing equipment is forbidden to be used to test any circuits of the SRS system. Do not try to repair. connect or change SRS harness, if the harness is damaged, replace the harness. The grounding position should be kept clean.

Repair

1. If the air bag is not ignited under the condition that the vehicle crash under lower speed. side collision. rollover. rear-end collision, inspect the following items:

- Check the ACU body and mounting bracket for dent. crack or deformation.
- Check the connector for damage and check the terminal for deformation.
- Check the mounting bolt. grounding wires for damage.

2. SRS System Maintenance and Inspection

1) SRS Module

① Check the gasket cover for dent. crack or deformation.

② Check the connector for damage. the terminal for deformation and wiring harness for seizure.

③ Check the gas generator body of air bag for dent. crack or deformation.

④ Install the SRS components to the steering wheel, check the components for cooperation with the steering wheel or alignment state.

2) Warning/Visible Labels

A mass of warning/visible labels in regard to SRS have been printed on the vehicle.

- On the steering wheel frame.
- On the driver air bag module.
- On the passenger air bag module.
- On the air bag control module(ACU).
- Please obey the instructions on the labels when servicing the SRS. Replace them if the labels are smudged or damaged.

3) Air Bag Control Unit(ACU)

- If the ACU malfunctions, never repair it, please replace a new one.

Disposal Method

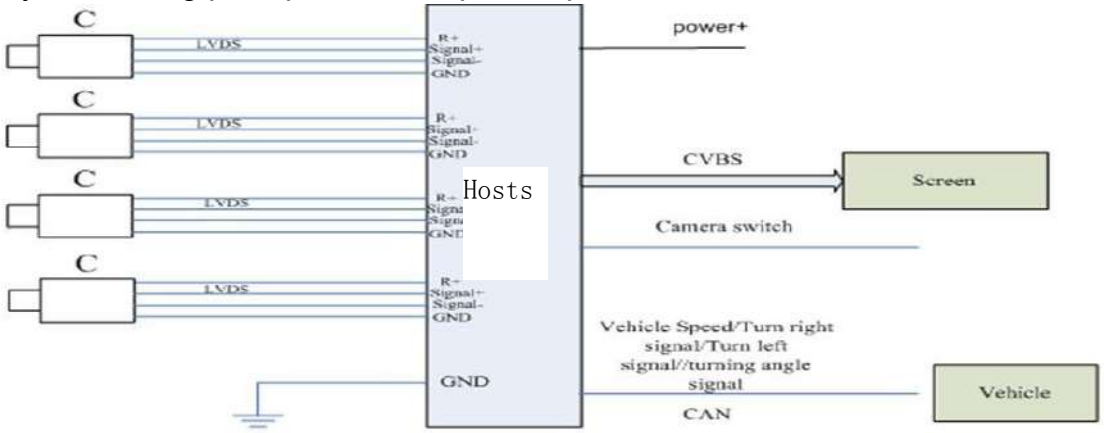
Before discarding the SRS or the vehicle equipped with SRS, ignite the SRS, without permission, any individual shall not be allowed to ignite the SRS, please hand it to professional to ignite the SRS.

360 panoramic parking assist system

360 panoramic parking assist system

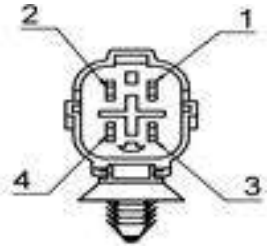
The 360 panoramic system has four wide-angle cameras around the vehicle that can cover all field of view around the vehicle. The multi-channel video images collected at the same moment are processed into a 360-degree top view of the vehicle, and finally displayed on the MP5 screen. Let the driver clearly see the presence of obstacles around the vehicle and understand the relative position and distance of obstacles to help the driver easily park the vehicle.

1, system wiring principle and component pin definition



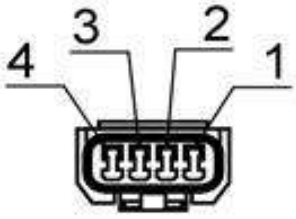
The four camera and controller terminals are defined as follows:

①front camera terminal and pin definition



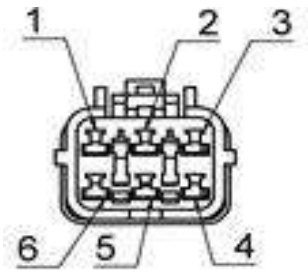
1	VCC	Power supply positive
2	GND	Power Supply Grounding
3	Video+	Positive video
4	Video-	Negative video

②left/right camera terminal and pin definition



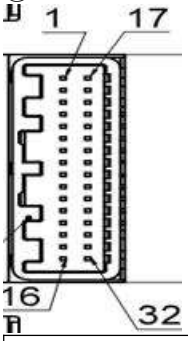
1	Video+	Positive video
2	Video-	Negative video
3	GND	Power Supply Grounding
4	VCC	Power supply positive

③rear camera terminal and pin definition



1	VCC	Power supply positive
2	GND	Power Supply Grounding
3	/	/
4	/	/
5	Video+	Positive video
6	Video-	Negative video

④Controller terminal and pin definition



1	Video Output+	CVBSoutput+
2	Camera VCC1 rear	Camera power input
3	BAfter BGND1	Camera input
4	Camera VCC2 before	Camera power input
5	BGND2 before	Camera input
6	Camera VCC3 left	Camera power input
7	BGND3 left	Camera input
8	Camera VCC4 Right	Camera power input
9	BGND4 right	Camera input
10	AVM KEY	Panoramic activation button
11	CAN LOW	bus
12	CAN HIGH	bus
13	/	NC
14	/	NC
15	/	NC
16	VCC Battery	power input
17	Video Output-	CVBS negative output
18	After Camera IN 1	Rear camera signal input
19	After AGND1	Rear camera signal input
20	Before Camera IN 2	Front camera signal input
21	Before AGND2	Front camera signal input

22	Camera IN 3 right	Right camera signal input
23	AGND3 right	Right camera signal input
24	Camera IN 4 left	Left camera signal input
25	AGND4 left	Left camera signal input
26	/	NC
27	/	NC
28	/	NC
29	/	NC
30	ACC ON	ECU activation signal input
31	/	NC
32	GND	power input

2, camera and controller replacement

1, removal steps

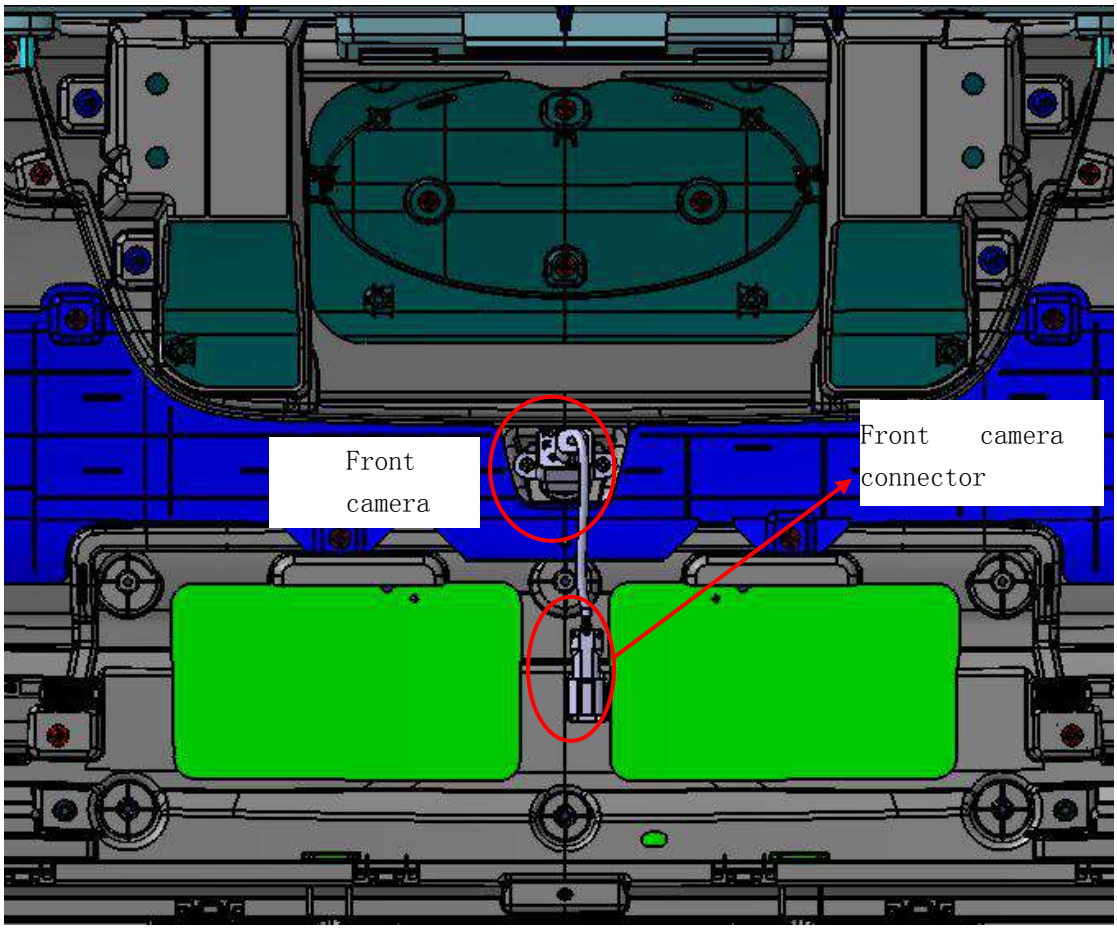
1) Front camera disassembly

a. Remove the front bumper, see "Disassembly of Front Bumper Assembly";

b. Unplug the camera harness;

c. Remove the fixing bolts;

d. Take out the front camera.



2）Left and right camera disassembly

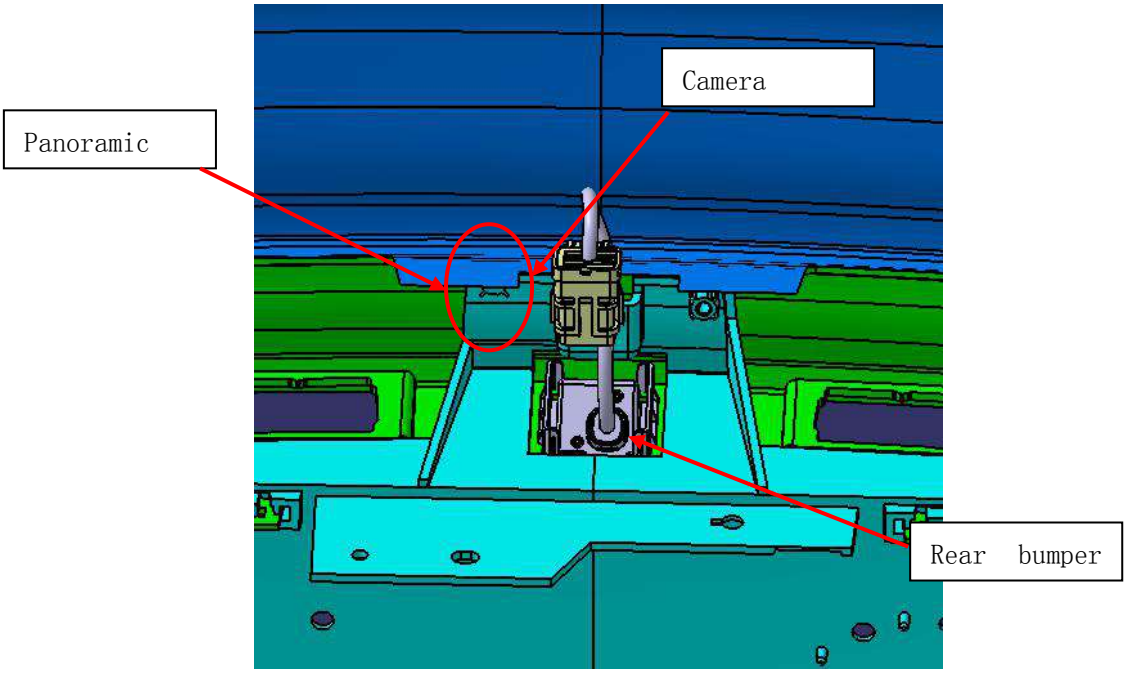
Left and right cameras and left and right rearview mirrors are not combined, and the left and right rearview mirror assemblies are replaced when the camera is replaced.

3）Rear camera disassembly

a、Remove the rear bumper assembly. See "Removal of the rear bumper" for details;

b、Unplug the rear camera connector;

c、Remove the panoramic rear camera.



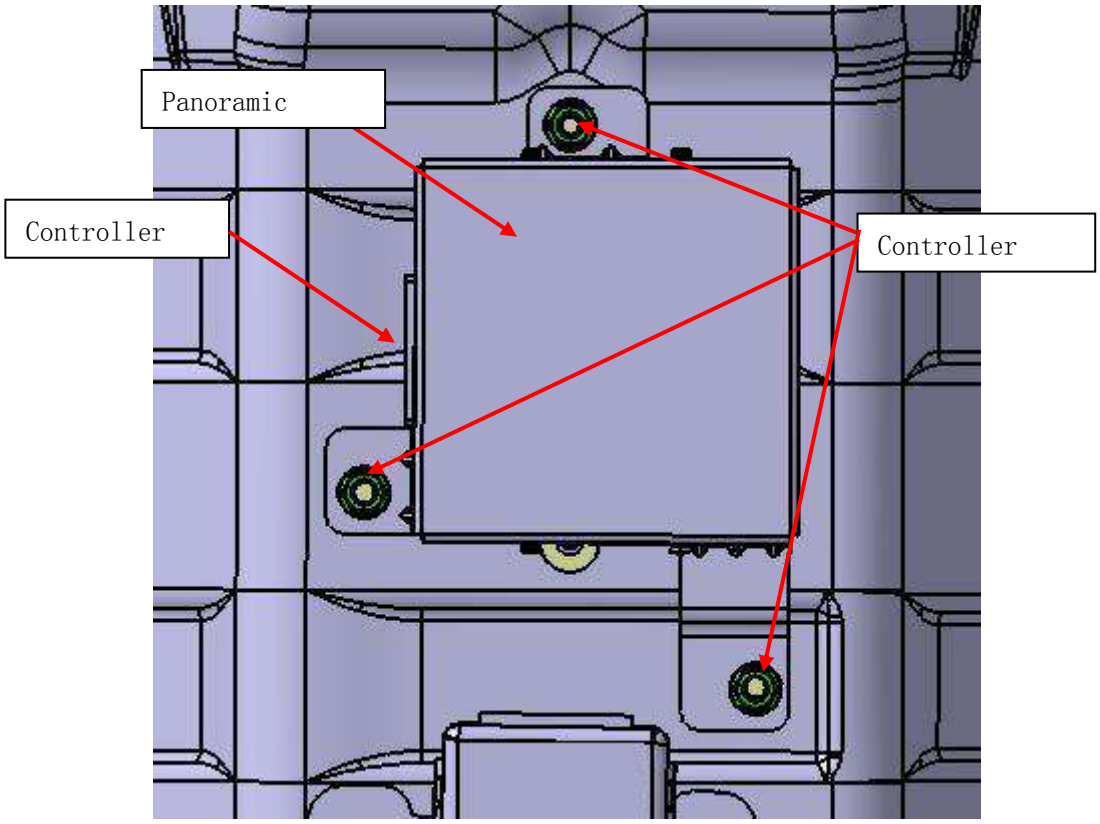
4）Controller removal

a、Remove the sub-dashboard assembly, see "Disassembly of the sub-dashboard";

b、Unplug the controller connector;

c、Remove the controller fixing nut;

d、Take out the controller.



3. Installation: Install according to the reverse procedure of disassembly.

4, common faults and maintenance methods

(1) The system does not work

Specific performance: When the "AVM" button is pressed or the car enters the reverse working state, the DVD screen does not switch to the 360 panoramic parking screen.

Cause of the malfunction: 360 panoramic parking system does not work, often the working power is not connected. If the car battery power supply is normal, the power cord is generally in poor contact.

Maintenance method: Check if 360-degree parking system power supply is normal. If the power supply is normal, please disconnect the power supply and check if the camera plug is connected properly. If the connection is normal, please check the "AVM" button switch and MP5 display. If it still can not solve the problem Please contact a professional.

(2) The camera does not work

Specific performance: Under the working conditions of the panoramic parking system, at least one area of the DVD screen is displayed in black.

Cause: The video cable is not connected securely or the camera is faulty.

Maintenance method: Check if the video cable is securely connected. Or replace the front and rear cameras or the left and right rearview mirrors corresponding to the black screen area.

(3), DVD screen display is not clear

Specific performance: In the 360 panoramic parking system working status, the DVD screen display is not clear.

Cause of failure: The surface of each camera is covered with dust, dew, and other objects.

Maintenance method: Please clean the foreign body surface of the camera.

(4) After the replacement of the parking system camera and controller calibration

Recalibration after changing camera or controller, automatic calibration process and manual calibration process

5, automatic calibration process

1）Calibration Tools: Portable Diagnostic Instruments, Calibration Cloths

2）Calibration tool requirements:

a. portable diagnostic instrument: can write VIN code, assembly date, write vehicle configuration information, related calibration;

b. Calibration cloth: The calibration cloth picture (including the car body placement position) is as follows:

Use special correction cloth to temporarily build calibration site:

As shown in the following figure, after the actual vehicles are deployed, the vehicles are parked according to the central area, centered around and centered before and after.

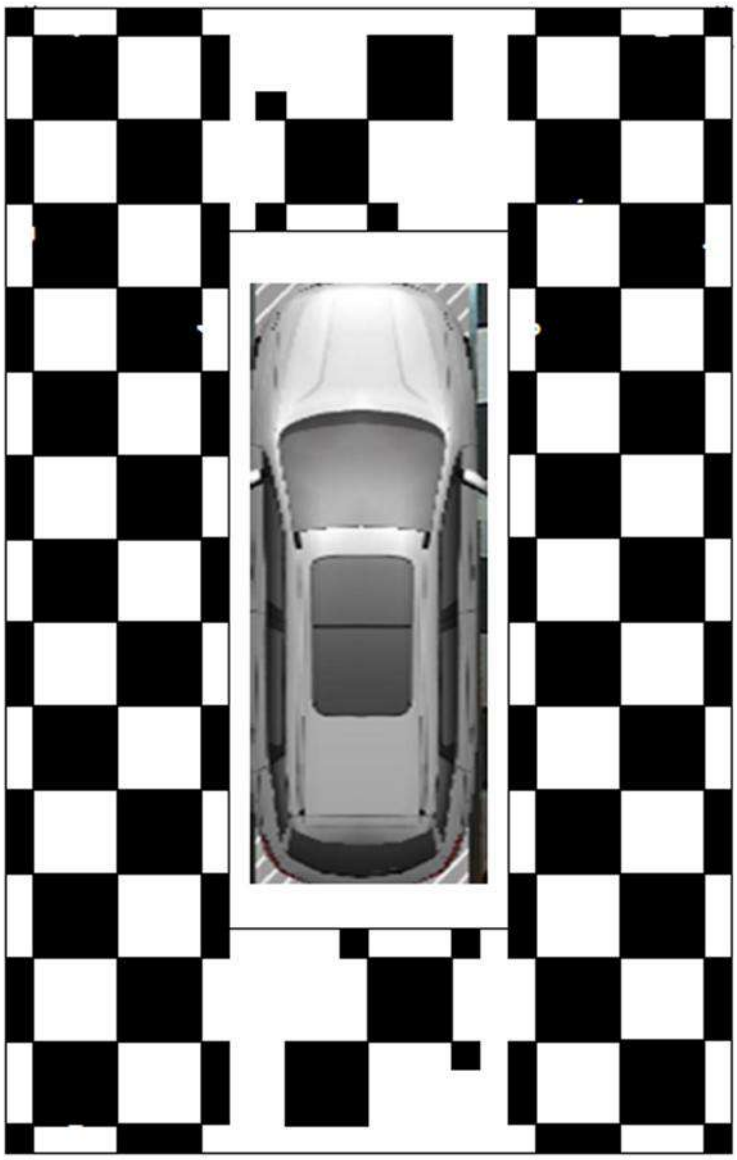
Spread the steps as follows:

1. Clear a large enough open area, it is recommended 10 meters * 7 meters, preferably indoor parking

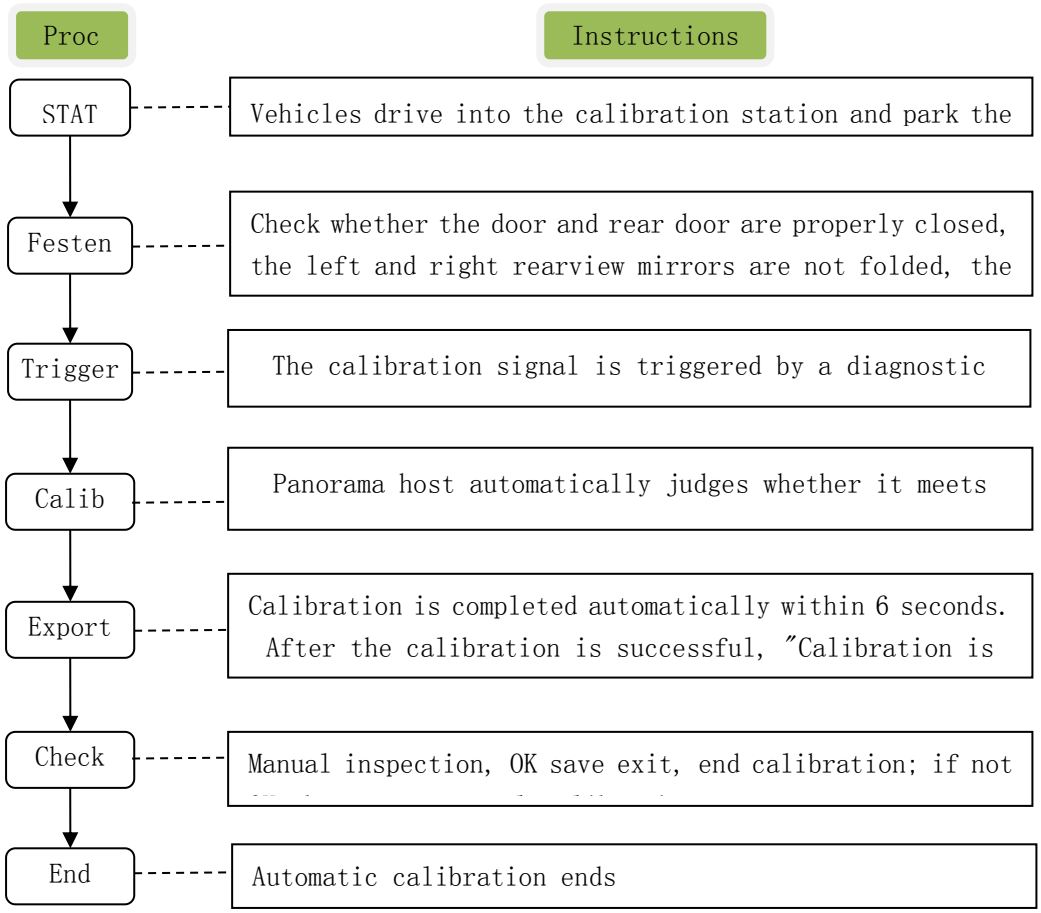
2. Park the car in the middle of the open area and reserve enough front, back, and left distribution areas.

3. Put the corrective cloth beforehand to make sure that the center line of the front correction cloth is aligned with the centerline of the car body. At the same time, the front correction cloth is parallel to the front end as shown in the following figure, and the distance between the front end and the front correction cloth is about 30cm.

4. Spread the left side of the correction fabric to ensure that the black area of the left side corrective fabric overlaps with the black frame side of the front side corrective fabric. The overlapping area is the standard black frame. See the figure below. Note: There are 4 large black squares on the inside of the vehicle body in the longitudinal direction, 5 large black squares on the outside, and the front calibration cloth is over the left calibration cloth.
5. Spread the right side of the fabric to ensure that the black frame area of the left corrective fabric overlaps with the black frame edge of the corrective fabric. The overlap area is a standard black frame. See the figure below. Note: There are 4 large black squares in the longitudinal direction on the inner side of the car body and 5 large black squares on the outer side. The front calibration is placed on top of the right calibration pad.
6. Place the rear correction cloth to make sure that the center line of the rear correction cloth and the center line of the body are aligned and parallel to the tail of the car. In addition, the black frame area on the right and left side of the correction fabric overlaps with the black frame on the front correction cloth, and the overlap area is a standard black frame.
7.After the corrective cloth is fully placed, it is best to use a heavy object to hold it in place to avoid possible displacement when the wind blows or people move around.
8.After the corrective cloth is fully placed, the front correction cloth, the right and the left correction cloths, and the checkerboard above the rear correction cloth can be used to evaluate the spreading effect.



3）Calibration process:



6, manual calibration process

1) Calibration Tool: Portable Diagnostic Instrument, Calibration Cloth

2) Calibration Tool Requirements:

a. portable diagnostic instrument: can write VIN code, assembly date, write vehicle configuration information, related calibration;

b. Calibration cloth: The calibration cloth picture (including the car body placement position) is automatically calibrated.

3）Calibration process: automatic calibration fails to enter the manual calibration mode

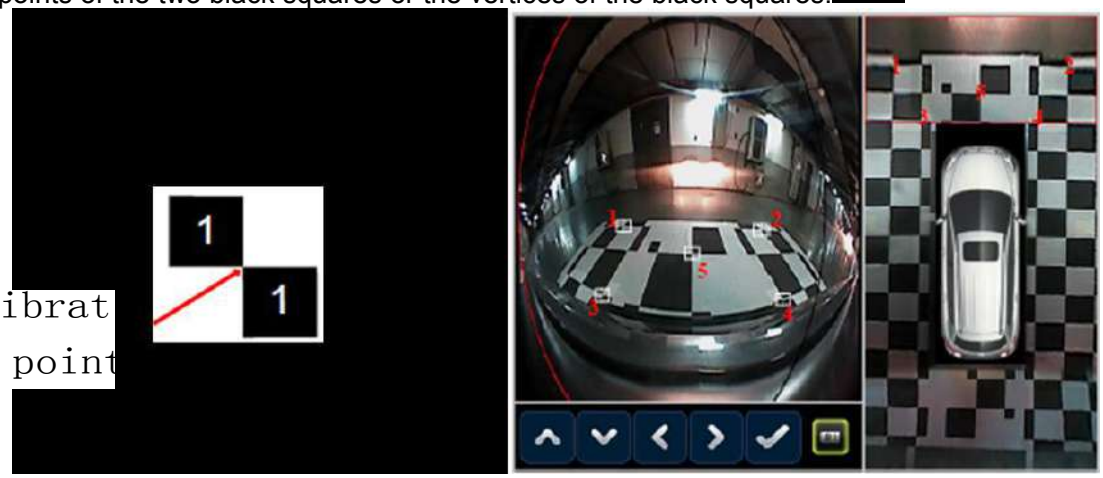
1. The following figure shows the calibration mode interface. The left area shows the original image of the four cameras. The right area shows the entire top-view effect. It is also a graph for verifying the calibration effect. The user fixed point operation is completed in the left area. Right area

2. A camera image calibration requires 5 points to be fixed, so a total of 20 points are required for calibration. The approximate order is (from the perspective of the car body) the first point in the upper left corner, the second point in the upper right corner, the third point in the lower left corner, the fourth point in the lower right corner, and the fifth point in the middle;

3. Select the corresponding camera channel by clicking on the four screens of the top, bottom, left, and right of the car model by clicking on the panorama screen on the right side of the navigation display.

 4. The user fixes the calibrated points by moving. The center of each cross must be fixed at the

focal points of the two black squares or the vertices of the black squares.

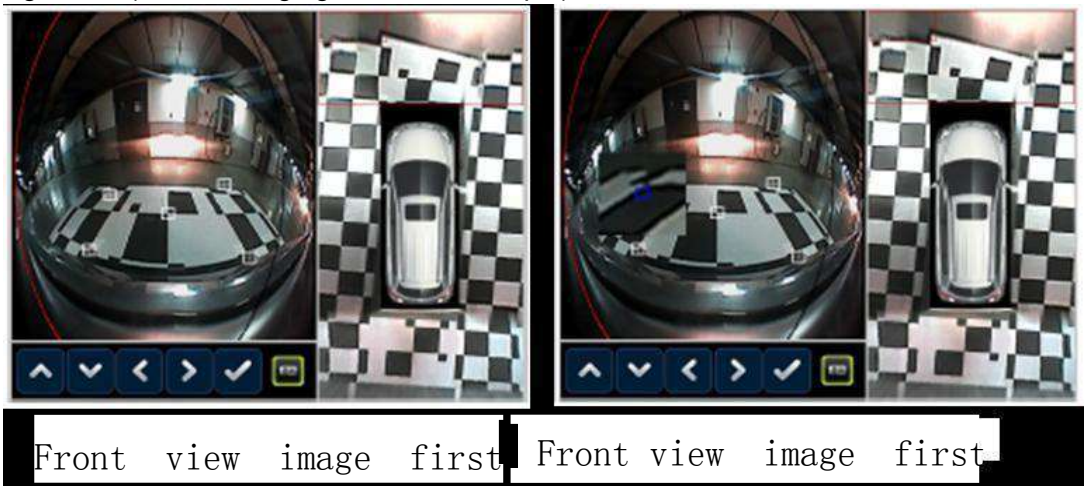


5. Directly click on the left screen to automatically zoom in on the area near the current point for user fine-tuning.

6. Denotes the position of the calibration point, which represents the calibration point selected by the current user. There are two roles: First, the switching point, which is switched in the order of 1, 2, 3, 4, and 5 (the fifth point is There is no red box, as shown below, the second is used to fix the current calibration point after fine-tuning, after the point can be enlarged to fine-tune, after the fine-tuning, click to fix the calibration point

Description:

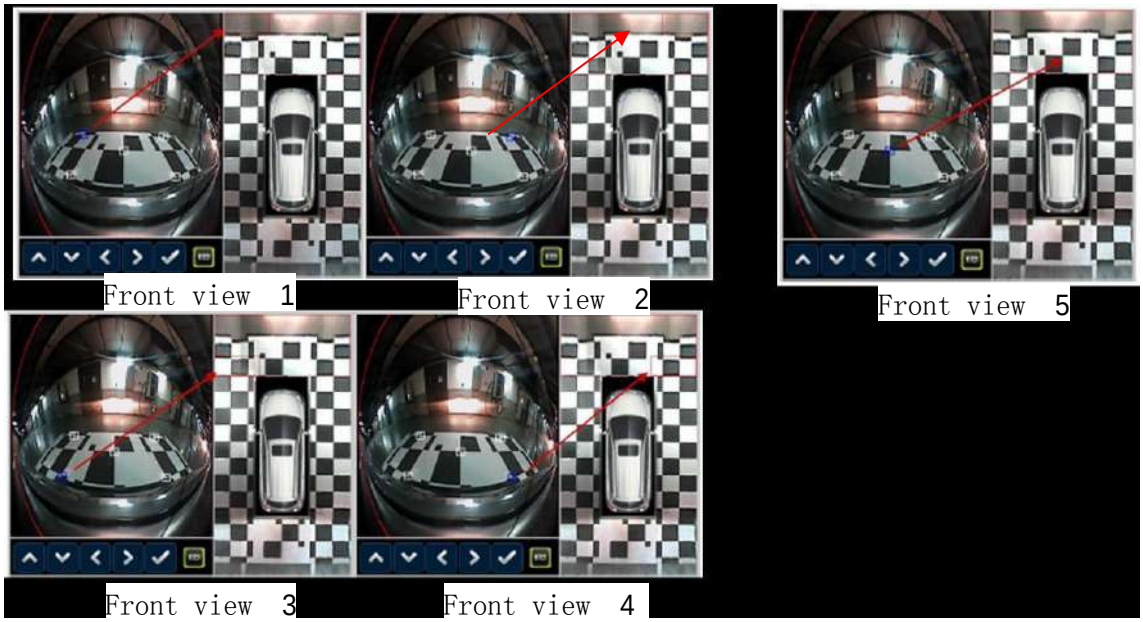
- To switch the four camera images, click on the area around the body.
- When you zoom in on the area around the calibration point, if you want to cancel this operation, click on the other area of the screen and the calibration point will return to the original position.
- Left and right images on the calibration interface can only display information for one calibration point (the left calibration point is moved, and the current calibration position is shown on the right).
- The calibration point on the screen cannot be dragged, it can only point to a certain point, and then fine-tuning.
- When you click on the left screen, it is the calibration point of the current red frame position on the right side (the following figure as an example)



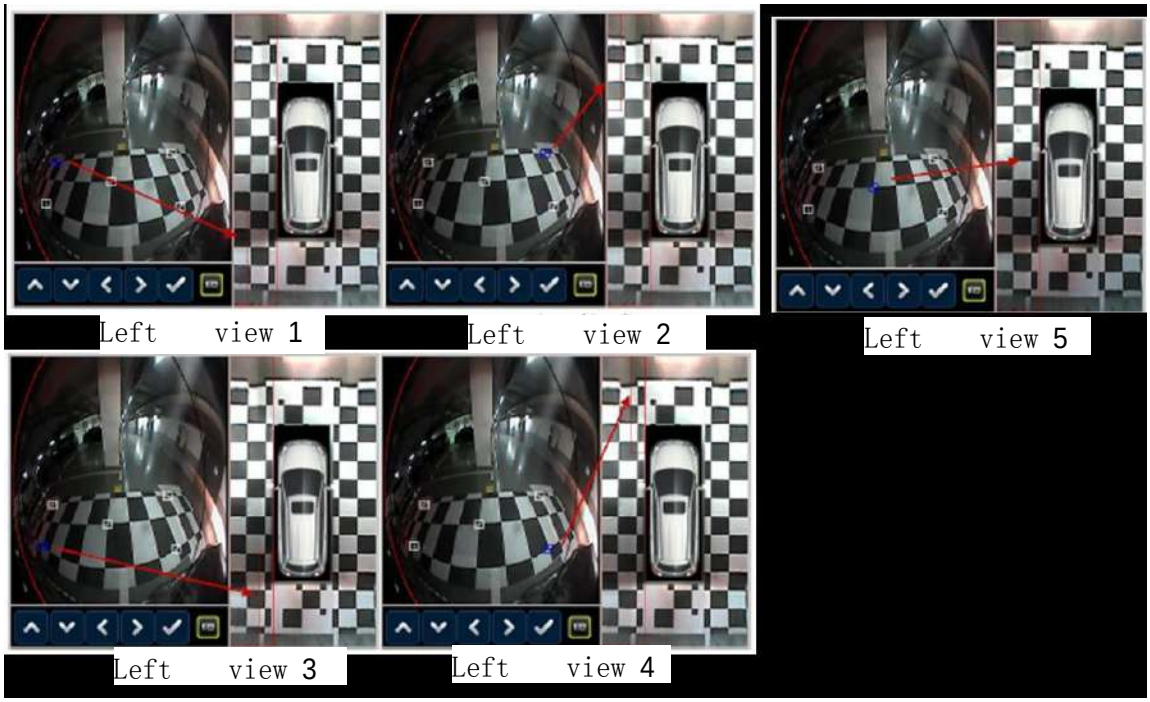
Detailed operation:

1 The user first clicks around the body (switches four camera images), while only looping points in each image, in order to be familiar with the calibration environment and the confirmation of various points, pay attention to observe the right side of the red box and the left side of the top view Variety.

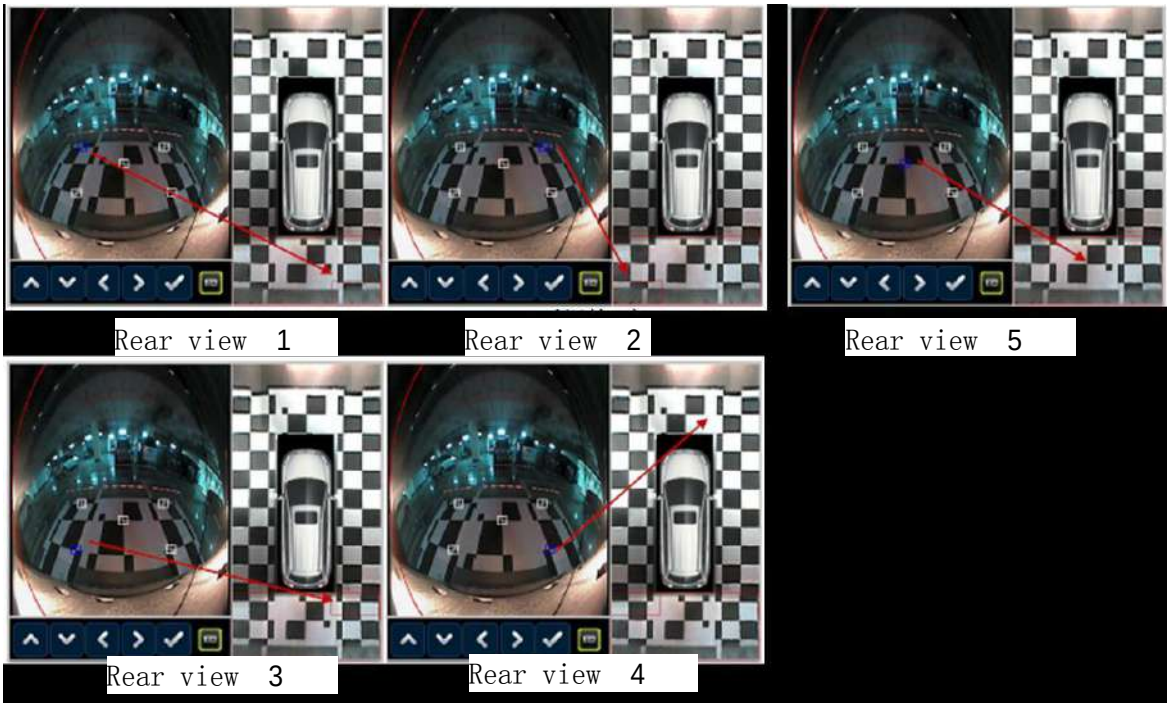
2 Start the calibration. Click the area in front of the front of the image to ensure that the current position of the red frame is 1. Then click the image on the left, move the calibration point to the correct position, and finally fix the calibration point. At this time, the red box on the right is automatically Move to the second point and continue to click on the left screen to calibrate the second point. In the same way, confirm the point after the fixed point, and then analogize the remaining 3 points.



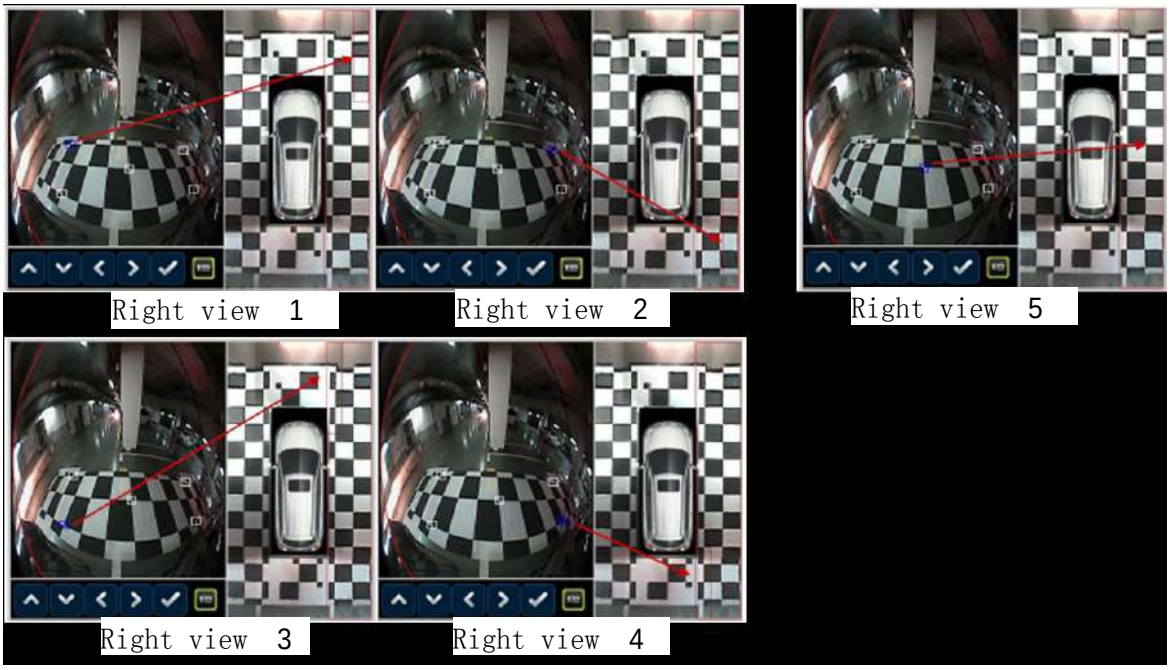
3. After all the five points of the front view image are calibrated, click on the left side of the car body and follow the operation of step 2 to fully calibrate the five points as shown in the figure below.



4. After all 5 points of the left-view image have been calibrated, click on the rear area of the vehicle body and follow the operation of step 2 to fully calibrate all 5 points, as shown in the following figure.



5. After all the 5 points of the rear view image are calibrated, click on the right side of the car body and follow the operation of step 3 to fully calibrate the 5 points as shown in the figure below.



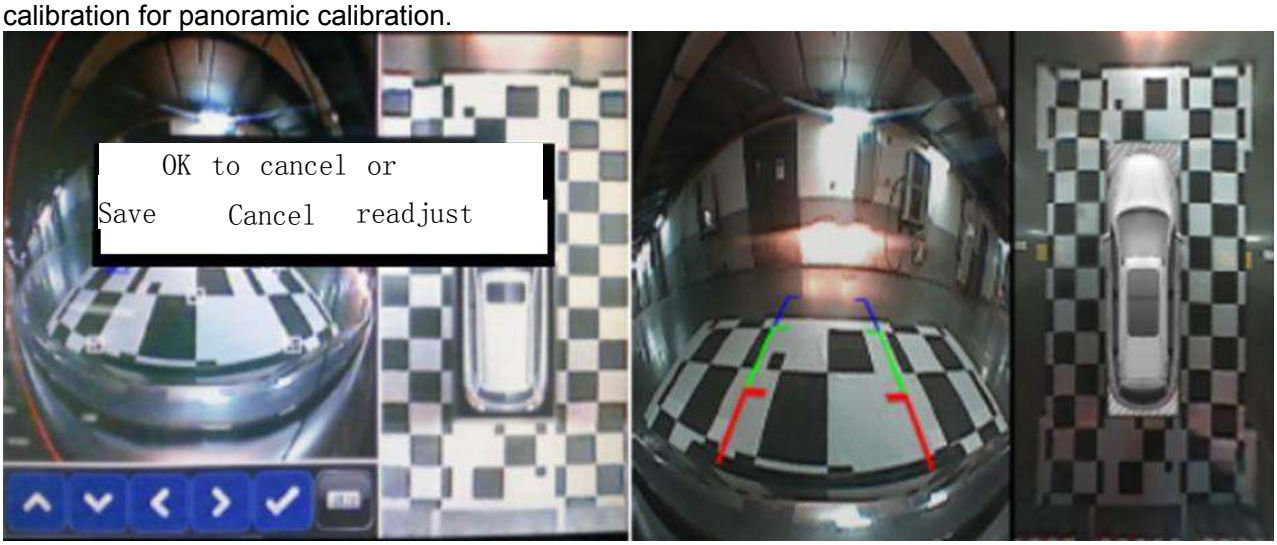
6.After completing all the calibrations of the four camera images, confirm whether the calibration cloth seen in the right top view is in good condition. If you feel any side of the calibration cloth image is not ideal, click on the side of the body, and then click to switch points to continue Make fine adjustments.

7. After confirming that the current calibration effect is satisfactory, pay attention to whether there is a blind area before and after getting off the vehicle, that is, see the blurred area (due to the camera installation position, it will lead to a certain blind area around the front, rear and body), if any As shown below, you need to click on the front of the car, and then click slowly on the left until the black shadow

completely covers the blurred area. In the same way, if there is a blind spot in the rear view, click on the rear of the car and continue to click slowly until the black shadow completely covers the blurred area; when the left/right side also has a blind spot, click on the sides of the car body and click or cover the blind spot.

Blind

8. If there is no such fuzzy area, click the "exit" button, and at the same time, click "Save and restart", otherwise it will fail. After saving, the system will automatically restart, and then wait about 10 seconds, click on the parking image, the test effect is satisfactory, if you need to fine-tune the re-enter the calibration for panoramic calibration.



Reversing radar system

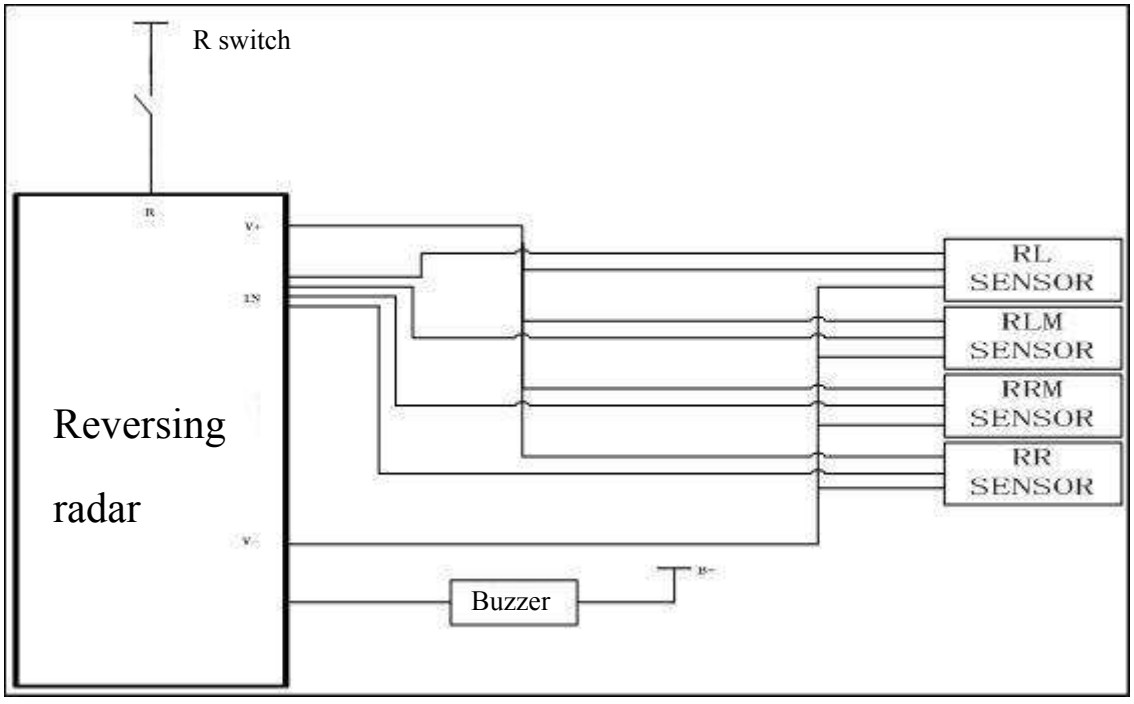
Reversing radar system

1. Outline

(1) structure summary

The reversing radar system consists of a sensor, a control module and an alarm device. The reversing radar system is based on the principle of ultrasonic distance measurement and computer data blur processing technology to determine whether there are obstacles in the reversing direction of the car, and to indicate the distance of the nearest obstacle. When the operating gear is hung in the reverse gear, the reverse switch is turned on, and the reverse light is on. After the controller receives the reverse signal, the ultrasonic sensor is controlled to send an ultrasonic signal, and the principle of the sensor self-receiving and multiple-receiving is used to accurately and completely return the echo signal. Passed to the controller, after analysis and processing by the controller, it is determined that there is an obstacle in the detection distance and the distance of the nearest obstacle, and the buzzer in the combination meter is controlled to issue an alarm sound, and different frequencies are emitted according to different distance ranges. The tweet reminds the distance of the obstacle and achieves the security warning function.

(2) the working principle



Reversing assistance system block diagram

As shown in the figure, the reversing radar system consists of the following components:

■Control module;

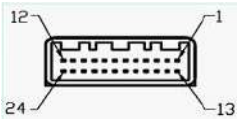
■ sensor module;

Buzzer (integrated in the meter).

System interface definition

1.Connectors of control module:

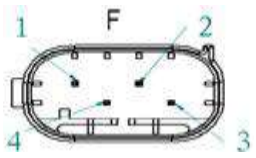
Table 1 controller module plug-in signal definition

Connector schematic	Pin number	Signal name	Function	Remark
 AMP 1-1318853-3	01	R_SHIFT	Power supply positive	Reversing power source
	02	R-buzzer	Buzzer driving	Instrument
	03	N.C.		
	04	N.C.		
	05	N.C.		
	06	N.C.		
	07	N.C.		
	08	N.C.		
	09	RL-SEN	left sensor	
	10	RL-SEN	Left middle sensor	
	11	RRM-SEN	right middle sensor	
	12	RR-SEN	right sensor	
	13	N.C.		
	14	PWR-SEN	Sensor power supply	
	15	N.C.		
	16	N.C.		
	17	N.C.		
	18	N.C.		
	19	N.C.		

	20	N.C.		
	21	N.C.		
	22	N.C.		
	23	GND-SEN	Sensor ground	
	24	GND	Ground	

2. Camera connector：

Table 2 Probe plug signal definition

Radar sensor connector shape and pin sequence	Definition of the horn connector (component side)				Remark
	1	R+(power positive)	4	Reserved	
	2	GND (power negative)			
Injection: AMP 967439-1	3	Signal			

3. Fault diagnosis

(1) Troubleshooting Table

Number	faults phenomena	Cause Analysis	Solutions	Remark
1	Reversing the system does not work	Reversing switch not connected	Replace the reversing switch	
		The harness is not connected to the mains	Check harness for correct power connection	
		Connector is incorrectly connected	Reconnect all connectors correctly	
2	Sensor fault	The connector is not positioned correctly so that the sensor does not work	Reconnect all sensor connectors correctly	
3	Buzzer keeps alarming, but no rear obstacles	Test the body or ground	According to the instructions correctly installed, if necessary, guide the inspection of professional technicians	
		Sensor installed incorrectly or dropped off		
		Sensor damaged	Sensor replacement, please replace	

			it in time	
		Sensor cable is broken	Check harness for damage	
4	Unable to display obstacle distance	Battery voltage is abnormal	Check the battery voltage is normal	
		Connector position is incorrect	Turn off the system and reconnect all connectors correctly	
		Sensor harness is disturbed	Check if the sensor cable touches the exhaust pipe or muffler	
5	Boot no beep, the other work is normal and no warnings when working	Instrument failure (buzzer integrated in the meter)	Check the instrument cable and connector and reconnect the meter correctly	
			Replace the meter	

(2) the fault diagnosis flow chart

1. System dis-function

Steps	Checking content	Solution	Decision specification	Next step	
				Yes	No
1	Confirm the fault phenomenon	Turn the ignition switch ON and put the transmission in reverse gear.	Can you hear buzzer alarm?	Handle intermittent problems and go to the next step	Go to step 3
2	Check for intermittent failure	Check and handle the reversing light switch harness connector looseness fault. Check and process the instrument cluster The harness connector is loose.			
3	Check the reversing lamp insurance	Remove the reverse light fuse IF20 and check if it is blown.	Whether the fuse is burnt-out?	Check for short circuit in fuse circuit and replace fuse	Next step
4	Check parking sensor controller power	Use a multimeter to measure the voltage between Rex11 controller harness connector F07 terminal 12 and a reliable ground.	Voltage Standard: 11 ~ 14 V voltage is within the standard?	Next step	Repair or replace the wiring harness
5	Check the reversing radar controller grounding circuit	Use a multimeter to measure the resistance between the 13th terminal of the RADA controller harness connector F07 and the reliable ground.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness
6	Check the line between the reversing radar controller and the reverse lamp fuse	Attach the transmission to the reverse gear and measure the resistance between the corresponding terminal of the reversing radar controller harness connector and the 12th terminal of the reversing lamp fuse harness connector F07.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness

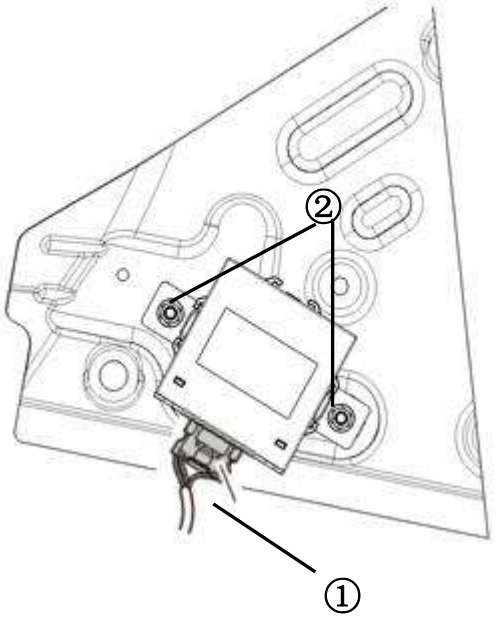
7	Replace the reverse radar controller. Is the fault cleared?	Replace the new parking sensor controller. Turn the key switch ON and put the vehicle in reverse gear.	Can you hear the buzzer beep?	Troubleshooting.	

2 Sensor foes not work

Steps	Checking content	Solution	Decision specification	Next	
				Ye	No
1	Confirm the fault phenomenon	Turn the ignition switch ON, engage the transmission in reverse, and place appropriate obstacles in the proper distance from the rear of the vehicle.	Is it possible to hear parking alert sounds?	Handle intermittent problems and go to the next step	Go to step 3
2	Check for intermittent failure	Check and handle the reversing radar sensor harness connector looseness fault.			
3	Check the wiring between the reversing radar sensor and the reversing radar controller	Measure the resistance between the reversing radar sensor harness connector RB07 terminal 1 and the reverse radar controller harness connector F07	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness
4	Check the wiring between the reversing radar sensor and the reversing radar controller	Measure the resistance between the reversing radar sensor harness connector RB07 terminal 2 and the reversing radar controller harness connector F07 terminal 14.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness
5	Check the wiring between the reversing radar sensor and the reversing radar controller	Measure the resistance between the reversing radar sensor harness connector RB07 terminal 4 and the reversing radar controller harness connector F07 terminal 23.	Standard resistance: less than 1Ω, resistance meets the standard?	Next step	Repair or replace the wiring harness

6	Replacing the reversing radar sensor, troubleshooting?	Replace the new reversing radar sensor. Put the ignitior switch in the ON position and the transmission is engaged in the reverse gear to enter the reverse position.	Can detect obstacles?	Troubleshooting.	

4. reversing radar controller assembly demolition



(1) Disassembly

1 Open the engine compartment cover.

2 Disconnect the negative port.of the battery

3. Remove rear door sill assembly See rear door sill assembly

4. Remove the rear door sill guard plate assembly See the rear door sill guard plate assembly

5. Remove rear seat cushion assembly See rear seat assembly

6. Remove rear seat back assembly See rear seat assembly

7. Remove the backrest shaft bracket See C pillar lower panel assembly

8. Dismantle the C pillar lower panel assembly

refer to the C pillar lower panel assembly

9. Remove C-pillar trim assembly See C-pillar trim assembly

10. Disassemble the trunk left panel assembly See the trunk side trim panel assembly

11. Disassemble the reversing radar controller assembly

1). Disconnect the parking sensor controller assembly harness connector 1.

2). Disassemble the parking sensor controller assembly 2 fixing nuts 2

(2) Installation

1. Install reversing radar controller assembly

1). Install and tighten the reversing radar controller assembly 2 fixing nuts.

Tightening torque 4~6N·m

2). Connect the reversing radar controller assembly harness connector.

2. Install the trunk left panel assembly

3. Install the C pillar trim panel assembly

4. Install C pillar lower trim assembly

5. Install the backrest shaft bracket

6. Install rear seat backrest assembly

7. Install rear seat cushion assembly

8. Install the rear door sill guard plate assembly

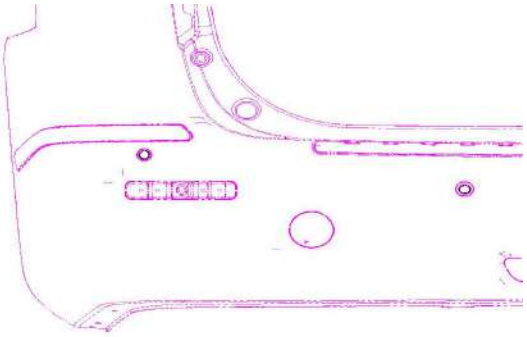
9. Install tailgate door assembly

10. Connect the battery negative cable.

11.Close the engine compartment cover

5. Sensor assy disassembly

(1) Disassembly



1 Open the engine compartment cover.

2 Disconnect the negative harness of the battery refer to the disc

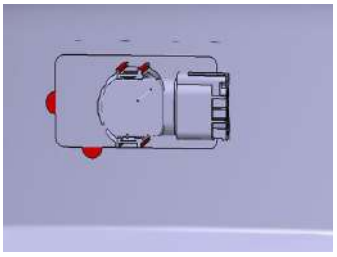
3. Disassemble rear side body combination lamp assembly, refer

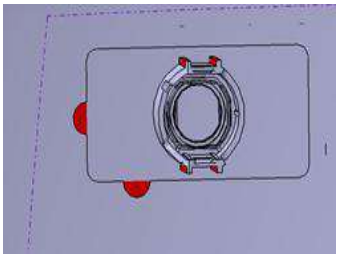
Disassemble rear bumper assembly

5. Unplug sensor electrical connector

6. Remove the sensor probe

(2) Installation





1. Connect the new sensor probe to the corresponding mounting bracket

2. Connect the electrical connector

3. Install rear bumper assembly

3. Install rear side body combination lamp assembly

4. Connect the battery negative cable.

Close the engine compartment cover

Reversing camera system

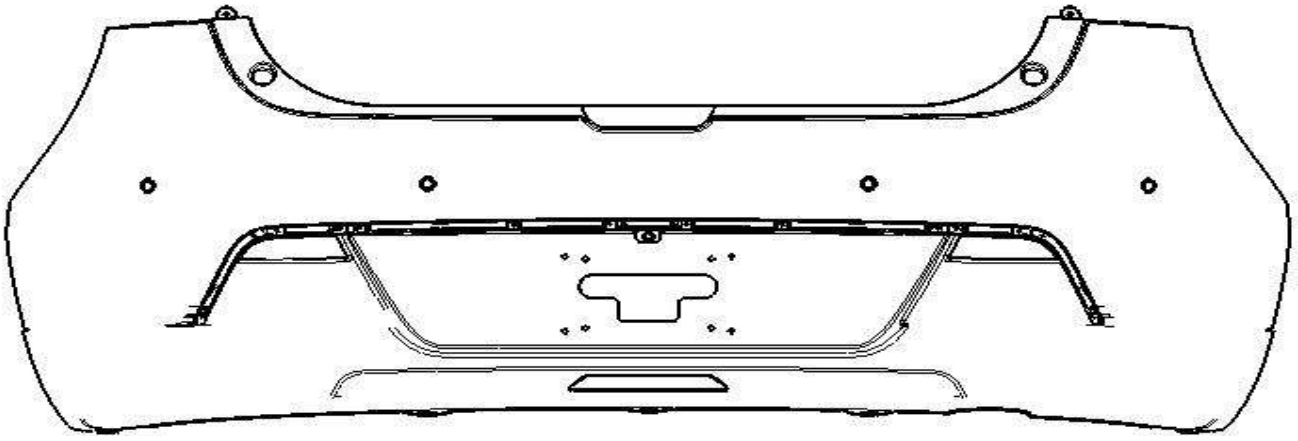
1. Outline

(1) structure summary

The reversing image system mainly consists of a rearview camera and an MP5 main unit. The camera is powered by the IGN signal. When the R-range signal is detected through the CAN bus node, the system starts immediately. At the same time, the steering wheel angle signal is obtained through the CAN bus node and the rear of the vehicle is obtained. The real-time image is sent to the camera for trajectory path calculation and image superposition processing. Finally, the image information superimposed with the reverse trajectory is transmitted to the vehicle display to assist the driver in reversing the vehicle.

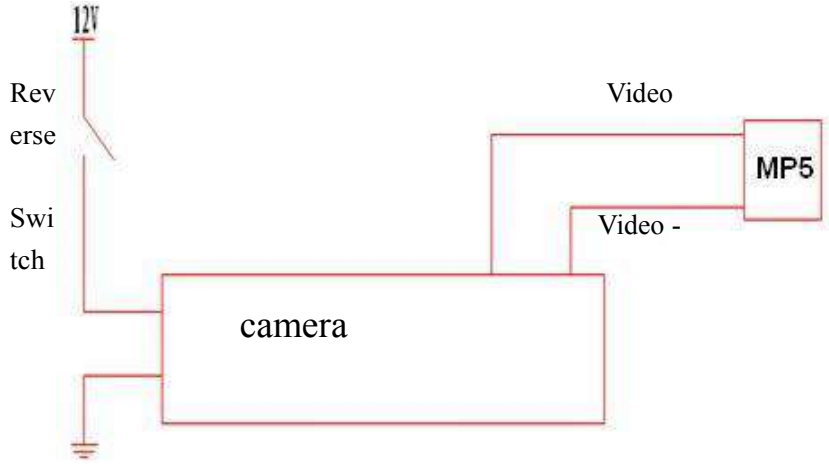
2.Original location map

Camera location map:



Remarks: The camera is installed on the corresponding mounting hole of the rear protection through the card connection.

3.System Block Diagram and Schematic



Reversing camera system block diagram

TPMS includes the following parts as shown in picture:

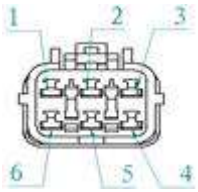
■Reversing camera

■MP5

4.System interface definition

1.Connectors of control module:

Table 1 controller module plug-in signal definition

Reversing camera connector shape and pin sequence	Definition of the horn connector (component side)				Remark
	1	GND	4	NC	Reverse feed; working current <120mA
	2	R gear power supply	5	Positive video	
	3	NC	6	Negative video	

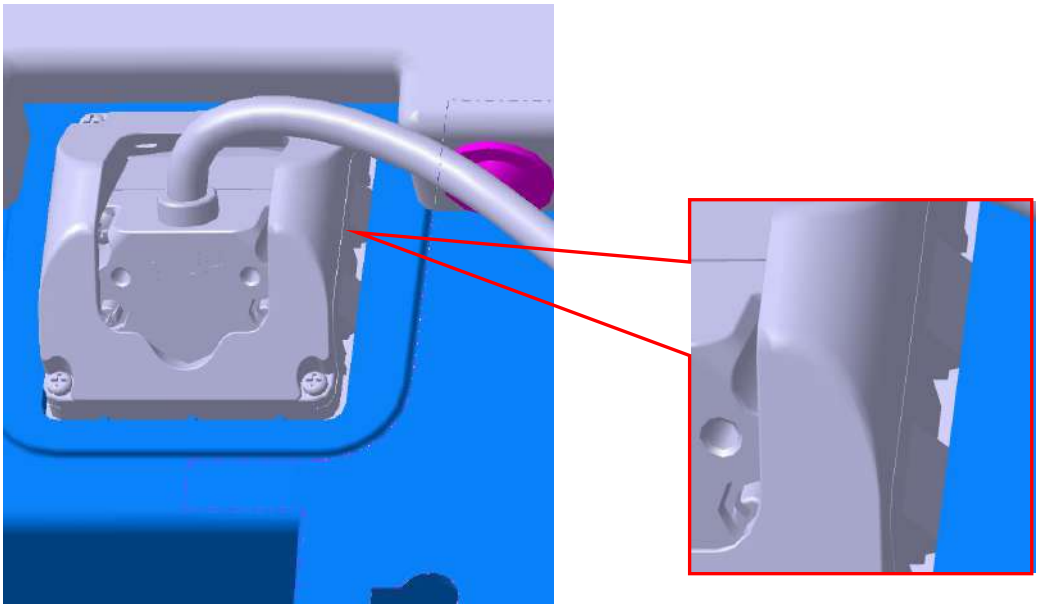
5.Reversing camera disassembly

1、 Disassembly

1)Dismantle the rear bumper

2)Unplug sensor electrical connector

3) Use a screwdriver to open the side of the camera snap structure and remove the sensor probe



2、 Installation

1) Attach a new camera card to the corresponding mounting bracket

2) Connect the electrical connector

3) assembly of rear bumper

Tire pressure monitoring

1. Outline

(1) structure summary

Tire pressure monitoring system can monitor the pressure and temperature in the tire, give alarm in time when the setting value is exceeded (the alarm indicator is indicated by the instrument light), help the driver to grasp the condition of the tire in real time and reduce the traffic accidents caused by the tire failure, increasing vehicle driving safety.

TPMS system consists of three components: alarm indicator (integrated in the dashboard), tire pressure monitoring controller, tire pressure monitoring sensor.Detailed composition is as follows

Spare	Quan	Rem
Tire pressure monitoring controller	1	Install under the secondary instrument
Tire pressure monitoring controller	4	Installed in four tires
alarm indicator	2	Integrated on the instrument cluster (two indicators) 1. tire pressure alarm indicator

Alarm indicator

Symbol (instrument)	Indicator lamp type	Indicator type
	Tire pressure	Rapid Leakage: Flashing Low Pressure:
TPMS	System fault	Sensor battery low battery: Always on Sensor failure: Steady light High frequency

Alarm type and description

Alarm	Desc
Quick tire leak	When the system is running, one or more tire pressure drops more than 30kPa within 1 minute and a rapid leak alarm is issued; if the pressure does not change or rises, the rapid leak alarm is released.
Low pressure	Under system operating conditions, one or more tire pressures are lower than the manufacturer's specified cold pressure value 75% (165kpa), issued a low pressure alarm; pressure returned to normal, lifting the low pressure alarm.
High pressure	Under system operating conditions, one or more tire pressures are higher than the manufacturer's specified cold pressure value 125% (275kpa), a high pressure alarm is issued; the pressure returns to normal

High temperature	When the system is running, one or more tire temperatures are higher than 85 °C and a high temperature alarm is issued; the temperature returns to normal and the high temperature alarm is released.
Sensor battery low power	When the system is running, one or more of the tire pressure sensors have a battery level lower than a certain value and a low-power alarm is issued. When the power is restored to normal, the low battery alarm is released.
Sensor failure	When the system is running, one or two sensor valid data is not received within 5-10 minutes (the rest of the sensors can receive valid data), and a sensor failure alarm is issued; all sensor valid data are received and the failure alarm is released.
High-frequency acceptance failure	In the system running state, the receiving controller does not receive any sensor data for 20 consecutive minutes and sends a high frequency to accept the failure alarm; any sensor valid data is received and the failure alarm is released.

1. Ignition switch ON/START. If four sensors are bound, the tire pressure warning indicator will turn off after 2s.
2. Ignition switch ON/START. If four sensors are not connected, the TPMS lamp will flash after the tire pressure warning indicator point and TPMS indicator light turn on 2s and then go out.
3. Enter the sensor learning mode. Both indicators will light up at the same time (lit). After the binding is successful, both indicators will be off at the same time.
4. During running, the system and pressure are normal and the two indicators do not light up.
5. The alarm is released and the corresponding alarm indicator goes out.
6. The system is divided into three levels according to the

priority of the alarm situation (the highest level);

Level 1: Fast Leakage

Level 2: Low pressure, high pressure, and high

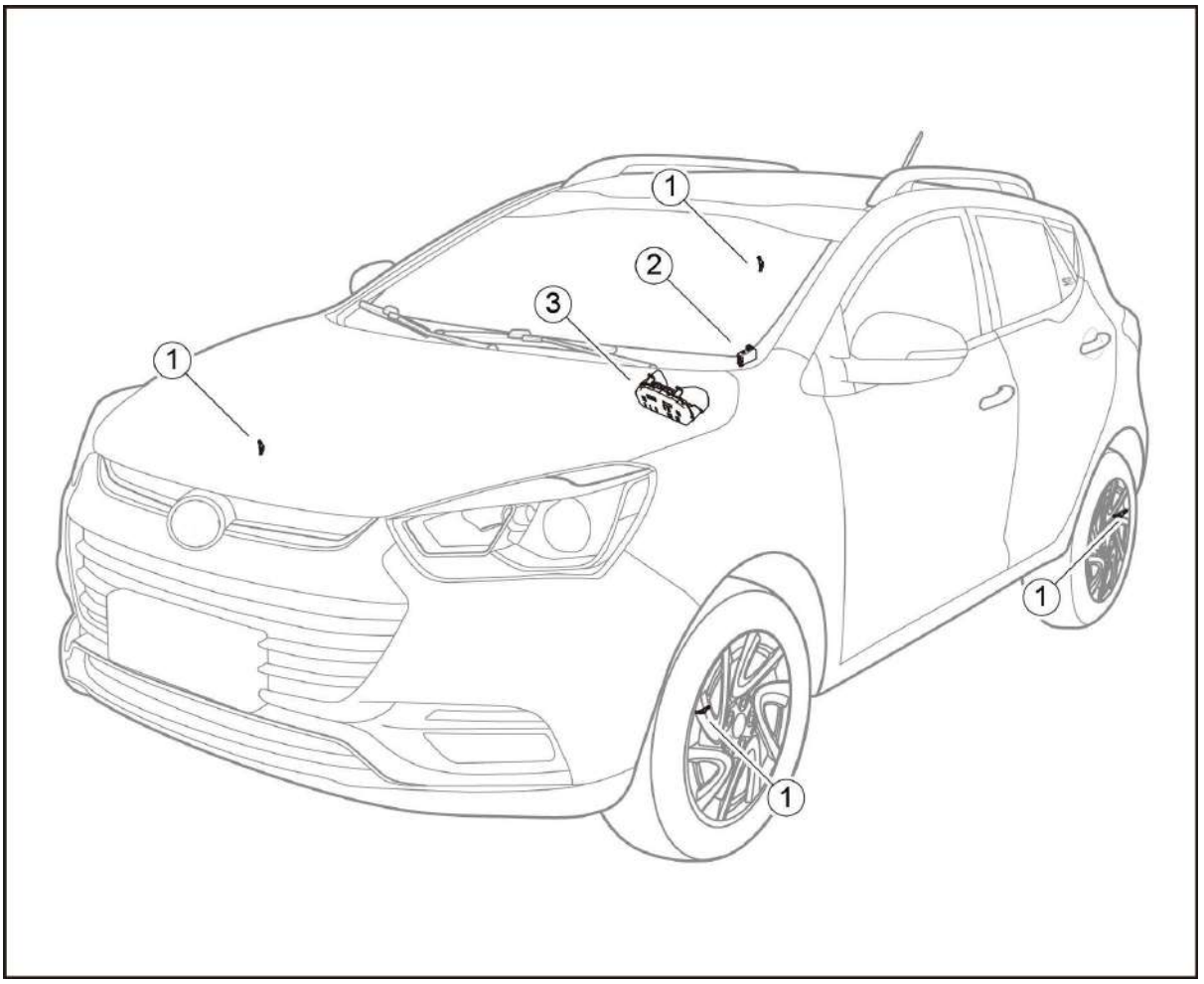
temperature Three levels: Sensor battery low power,

Sensor failure, high frequency acceptance failure

When an alarm status is indicated, the high-level alarm indicator lights first, and both LEDs do not light at the same time.

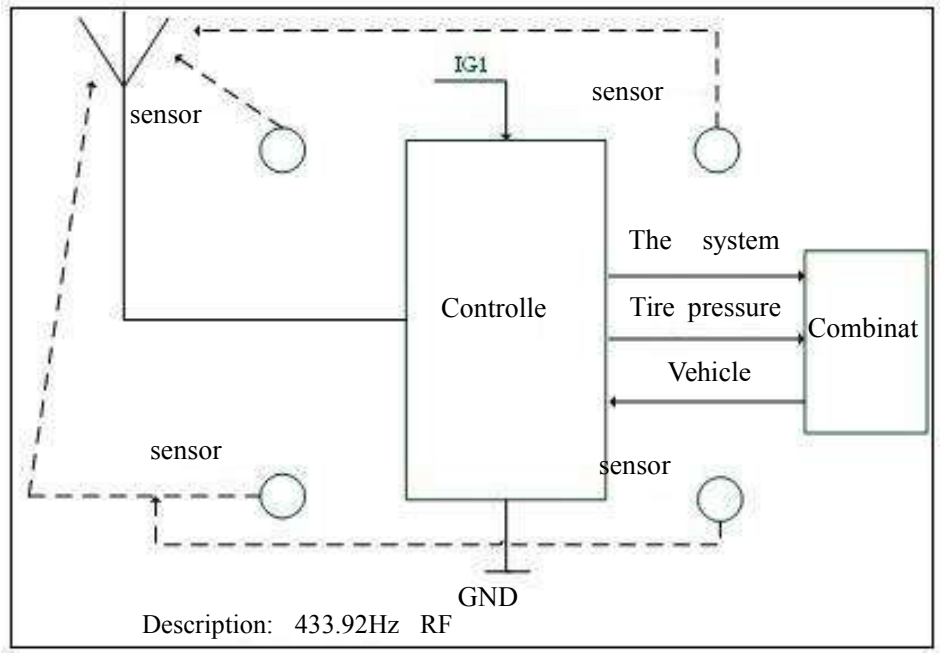
After an alarm occurs (the corresponding indicator light), if the ignition switch is turned off and then back on, the system clear various alarm status indication, re-test.

Components location:



1. Tire Pressure Monitoring Sensor 2. Tire Pressure Monitoring Controller 3. Combination Instrument

(2) the working principle



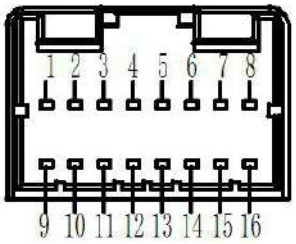
Tire pressure detection system schematic

(III) Definition of System Interface Definition

1. Check if the power supply of the tire pressure monitoring system controller is normal (9V ~ 16V).

2. The terminal of the tire pressure monitoring system control module is defined as follows:

Controller terminal definition table

Tire pressure monitoring controller	Connector definition			Note
	1	IG1	＜1A	9-16V
	2	/	/	/
	3	/	/	/
	4	/	/	/
	5	System fault	＜50mA	
	6	Tire pressure warning	＜50mA	
	7	/		
	8	/		
	9	Ground	＜1A	
	10	Vehicle speed	＜10mA	OC door input
	11	/		
	12	/		
	13	/		
	14	/		
	15	/		
	16	/		

(4) maintenance precautions

The TPMS system is the tire pressure monitoring auxiliary system. The signal transmission is completed by the high-frequency signal. When the high-frequency signal is interfered by the same frequency electromagnetic field and interfered with for a long time, it will send a system fault alarm. When the car is away from the strong magnetic field, alarm status will be automatically lifted, it is normal

Driving on a bumpy road, the vehicle turns, and the tires are stressed differently. As a result, the tire pressure is too high or too low during this period. Sometimes the system may occasionally get an alarm and travels to a flat and straight road. If the pressure is normal, it will be automatically released alarm, it is normal.

After a long time of parking, the tire pressure is normal and there is no obvious change. No sensor data has been received for 20 consecutive minutes. The TPMS lamp is on. After the vehicle is running, the sensor starts transmitting data and the TPMS lamp point goes out. This is normal.

(2). the fault diagnosis

(1) Troubleshooting Table

Number	faults phenomena	Cause Analysis	Solutions	
1	The ignition switch is ON, the tire pressure warning indicator and the TPMS indicator light up at the same time and will not turn off after 2s.	The original receiver of the vehicle is not learning binding.	To the DR shop, professionals are required to use hand-held learning tools to reacquire all tire sensor IDs and bind the receiver controller.	
		The acceptance controller has been replaced and the receiving controller has not been learned to bind.		
2	Tire pressure warning light flashes	During the driving process, tires were damaged by punctures, splits, etc., and the tire pressure rapidly decreased.	You must stop as soon as possible to check all tires and air pressure.	
		While parking (ignition switch ON/START), deflate the tire.	After the air release is stopped or inflated, the alarm will be automatically released.	
3	Tire Pressure Alarm Indicator	During stop (ignition switch ON/START), the tire is deflated, causing the air pressure to be too low.	Inflate the tire to the correct air pressure (tire pressure is listed on the tire pressure label).	
		During parking (ignition switch ON/START), the tire is inflated and the air pressure is too high.	Deflate the tire to the correct pressure value.	
		When driving on bumpy roads/turning vehicles, the tires are subjected to different forces, causing the tire pressure to be too high or too low during this period.	Drive to a flat/straight road surface and if the pressure is normal, the alarm will be automatically canceled.	
		Insufficient tire pressure was detected during driving (the tire was not inflated for a long time / leaked due to tire damage).	You must stop as soon as possible to check all tires and air pressure.	
		You must stop as soon as possible to check all tires and air pressure.	Slow down and do not overload.	
		During running, the air pressure is insufficient and the friction increases, causing the tire to overheat.	You must stop as soon as possible to check all tires and air pressure.	

Serial No.	faults phenomena	Cause Analysis	Solutions	
4	TPMS indicator lamp normally on	One or more tire pressure sensors have battery levels below a certain value.	Return the sensor to the DR shop in time and re-learn the binding.	See Tire Pressure Monitoring System TPMS indicator lamp normally on
		One of the four tires does not have a tire pressure sensor installed in one or both tires.	Install the correct sensor in the DR shop and relearn the binding.	
		One or two of the four tires are mounted incorrectly (ie, the sensor ID does not match the receiving controller ID).	Install the correct tire in the DR shop and relearn the binding.	
		Of the four tires, the tire pressure sensor of one or two of the tires fails and data cannot be transmitted.	Change the sensor to the DR shop and relearn the binding.	
		The high-frequency receiving module of the receiving controller is damaged and has not received any sensor data for 20 consecutive minutes.	Check the receiving controller at the DR shop. If you need to replace the receiving controller, you must re-learn the binding.	
		The sensor IDs of all four tires and the receiving controller ID do not match and no valid sensor data was received for 20 consecutive minutes.	Re-learn the bindings at the DR shop.	
		When the vehicle is stopped for a long time, the tire pressure is normal and there is no obvious change. The sensor does not send data to the receiving controller, and no sensor data is received for 20 consecutive minutes.	It is a normal phenomenon. After the vehicle is running, the sensor starts transmitting data and the alarm state is automatically released.	
		In the same frequency interference area (strong interference, continuous) traffic, such as airports, radio towers, etc., may cover the sensor signal.	After leaving the same frequency interference area, the alarm status will be automatically released.	
		Receiver controller wire harness bad contact	Unplug the receiving controller and reconnect it	
5	Ignition switch from OFF to ON, tire pressure alarm indicator does not light	Indicator light failure	To the DR shop, ask a professional to check the meter. If the meter is damaged, the meter needs to be replaced.	See Wheel Tire Pressure Unsatisfactory Tire Pressure Alarm Indicator Light Off

(2) the fault diagnosis flow chart

The tire pressure monitoring system (TPMS) indicator light is on

Steps	Checking content	Solution	Decision specification	Next step	
				Yes	No
1	Check the battery voltage	Use a multimeter to measure the battery voltage.	Standard value: 11 ~ 14V	Next step	Check battery or charging system
2	Check TPMS Control Unit Power Supply	Use a multimeter to measure the voltage between the TPMS	Standard value: 11 ~ 14V	Next step	Check fuse, repair or replace wiring harness
3	Check TPMS Control Unit Ground	Use a multimeter to measure the resistance between the F17	Resistance standard value: less than 1Ω	Next step	Repair or replace wiring harness
4	Replace TPMS control unit	Disconnect the negative battery cable, replace the TPMS control unit, and re-learn to bind the tire pressure monitoring sensor.	Is the system normal?	The system is normal	Next step
5	Check combination meter power supply and grounding line	Check whether the combination meter power supply and grounding line are normal	Voltage standard value: 11~14V Resistance standard value: Less than 1Ω	Next step	Repair or replace wiring harness
6	Change combination instrument		Is the system normal?	The system is normal	Next step
7	Replace Tire pressure monitoring controller	Replace Tire pressure monitoring controller Relearn the binding of tire pressure monitoring sensor	Is the system normal?	The system is normal	

Tire pressure warning indicator does not light when car tire pressure is seriously insufficient

Steps	Checking content	Solution	Decision specification	Next step	
				Yes	No
1	Check the battery voltage	Use a multimeter to measure the battery voltage.	Standard value: 11 ~ 14V	Next step	Check battery or charging system
2	Check the wiring harness between the combination meter and the TPMS control module	Disconnect TPMS control module harness connector F17 and combination meter harness connector M07, measure TPMS control module harness connector F17 terminal 6 and instrument cluster harness connector M07 terminal Resistance between 1	Resistance standard value: less than 1Ω	Next step	Repair or replace wiring harness
3	Check TPMS Control Unit Power Supply	Use a multimeter to measure the voltage between the TPMS	Standard value: 11 ~ 14V	Next step	Check fuse, repair or replace wiring harness
4	Check TPMS Control Unit Ground	Use a multimeter to measure the resistance between the F17 terminal 9 and the body ground.	Resistance standard value: less than 1Ω	Next step	Repair or replace wiring harness
5	Replace TPMS control unit	Disconnect the negative battery cable, replace the TPMS control unit, and re-learn to bind the tire pressure monitoring sensor.	Is the system normal?	The system is normal	Next step
6	Check combination meter power supply and grounding line	Check whether the combination meter power supply and grounding line are normal	Voltage standard value: 11~14V Resistance standard value: Less than 1Ω	Next step	Repair or replace wiring harness
7	Change combination instrument		Is the system normal?	The system is normal	Next step
8	Replace Tire pressure monitoring controller	Replace Tire pressure monitoring controller Relearn the binding of tire pressure monitoring sensor	Is the system normal?	The system is normal	

3. Tire pressure monitoring controller

(1) Disassembly

1 Open the engine compartment cover.

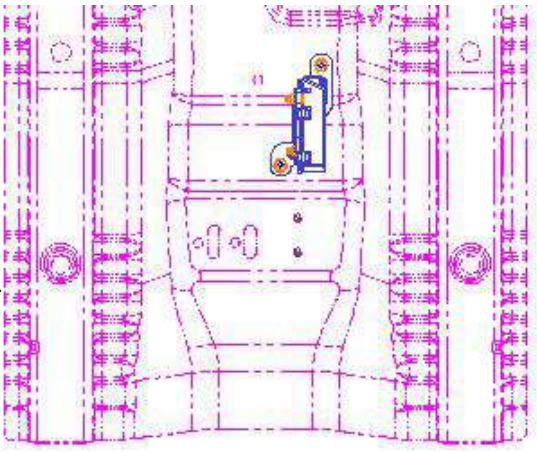
2 Disconnect the negative harness of the battery refer to the disconnection and connection of the battery

3. Dismantle the sub instrument panel house refer to sub instrument panel

7.Disassemble the tire pressure monitoring controller

1). Disconnect the tire pressure monitoring controller harness connector.

2). Remove the 2 tire pressure monitoring controller fixing nuts and take off the tire pressure monitoring controller.



(2) Installation

1. Install tire pressure monitoring controller

1). Install the tire pressure monitoring controller fixing nut.

2). Connect the tire pressure monitoring controller harness connection.

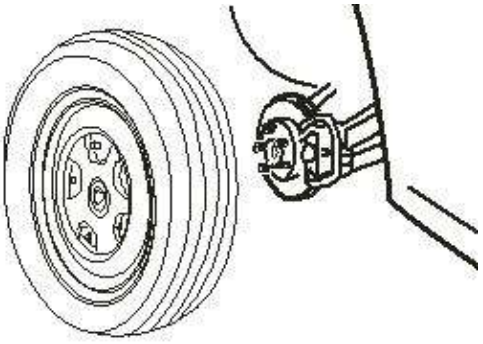
Install sub-dashboard body assembly

3. Connect the battery negative cable.

Close the engine compartment cover

4. Tire pressure monitoring controller

(1) Disassembly



1 Open the engine compartment cover.

2 Disconnect the negative harness of the battery refer to the disconnection and connection of the battery

3 disassemble the wheel, please refer to the chapter “wheel”.

4.Disassemble the tire pressure monitoring controller

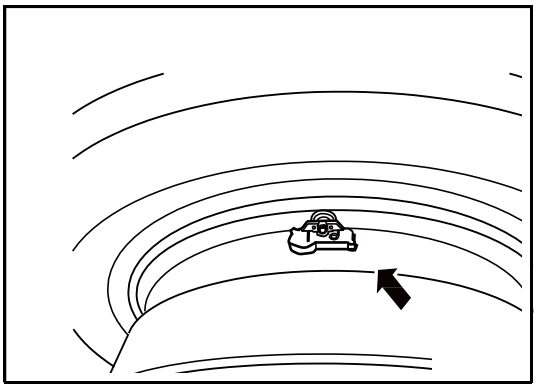
1). Remove the tire and remove the tire pressure monitoring sensor fixing nut from the outside of the rim.

2). Remove the tire pressure monitoring sensor from the inside of the rim.

(2) Installation

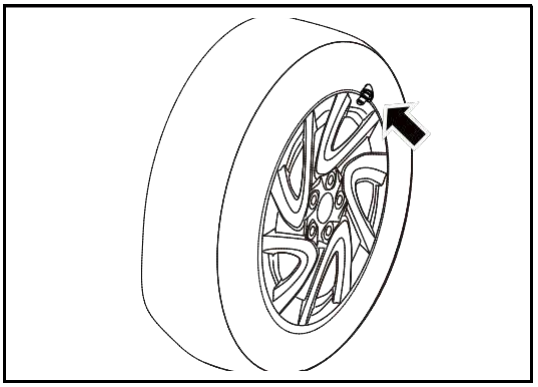
1. Install tire pressure monitoring controller

1). Install the tire pressure monitoring sensor from inside the rim.



2). Install the tire and tighten the tire pressure monitoring sensor fixing nut from the outside of the rim.

△Caution The sealing rubber of the sensor is tightly fitted with the rim to ensure the tightness of the tire.



2. Install the wheel

3. Connect the battery negative cable.

Close the engine compartment cover

PEPS system

1.Overview of the system

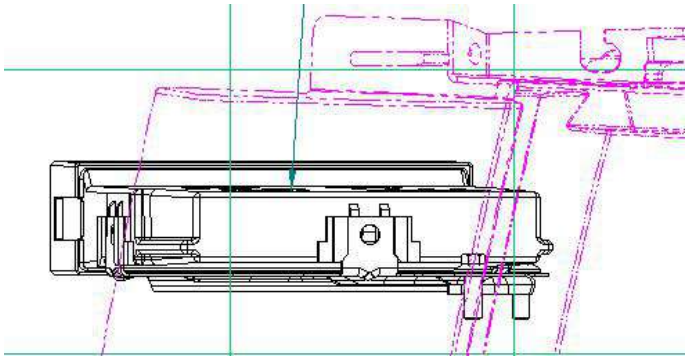
Passive Entry & Passive Start (PEPS) means a keyless entry and keyless entry system that uses state-of-the-art RFID radio frequency technology and a vehicle identification code recognition system to provide a comfortable and completely new driving experience with user-friendly convenience.

The PEPS system consists of the following units: keyless entry electronic control unit, low-frequency antenna in the car, spare antenna, integrated entry sensor in the door handle, pushbutton ignition switch, keyless access to electronic control unit bracket, low frequency antenna bracket, Antenna, electronic steering column lock, electronic lock ring, five key smart key, alarm (instrument display interface prompt). The detailed composition is as follows:

Spare parts name	Quantity	Remark
Keyless entry to the electronic control unit	1	PEPS system controller, hereinafter referred to as PEPS controller
Car low-frequency antenna	2	Search function for smart key in car
Spare antenna	1	For smart key emergency start when no electricity, smart key to match the learning
Integrated into the door handle sensor	2	Low-frequency search for the smart key outside the car
Push-button ignition switch	1	Used to start and stop the vehicle and power status switch
Keyless entry to electronic control unit bracket	1	Used for keyless entry into the electronic control unit
Rear low-frequency antenna bracket	1	Used for fixing the rear-low-frequency antenna
Electronic steering column lock	1	Acting on the steering column lock mechanism
Electronic lock snap ring	1	Used for fixing the electronic steering column lock

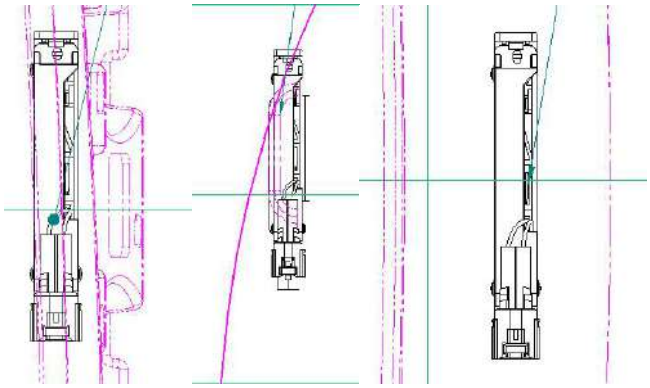
2 .Component mounting position

1) Keyless access to the electronic control unit and bracket position



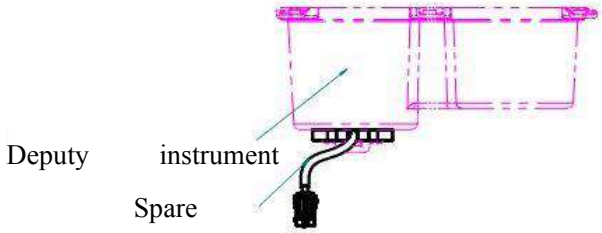
Located on the right side of the instrument panel beam

2) Car low-frequency antenna



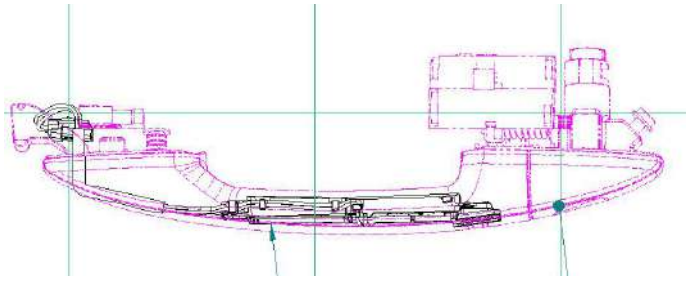
The front low-frequency antenna is located in the middle of the instrument panel beam, the low-frequency antenna is located in the rear seat, and the tailgate low-frequency antenna is located in the rear guard bar.

3) Spare antenna



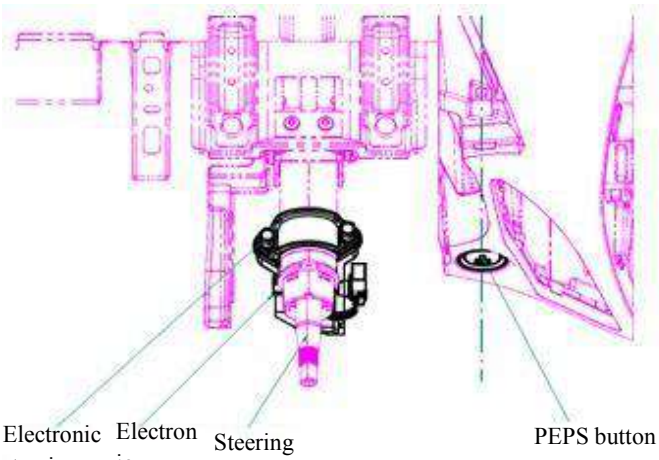
Located on the bottom of the instrument gauge cup holder

4) Integrated sensor into the door handle



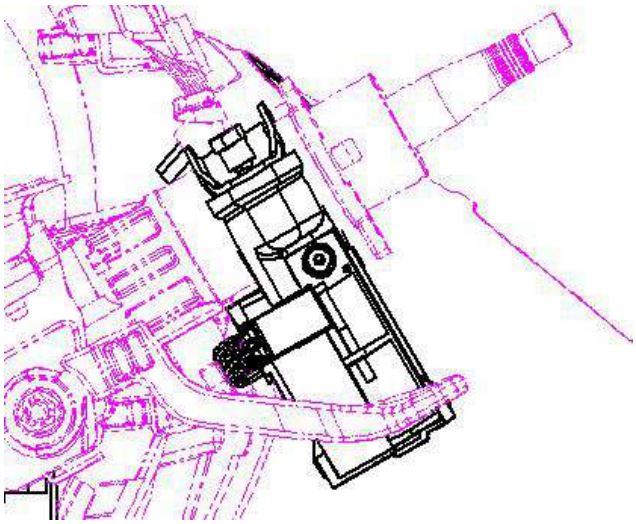
Located in the left front door handle

5) PEPS button



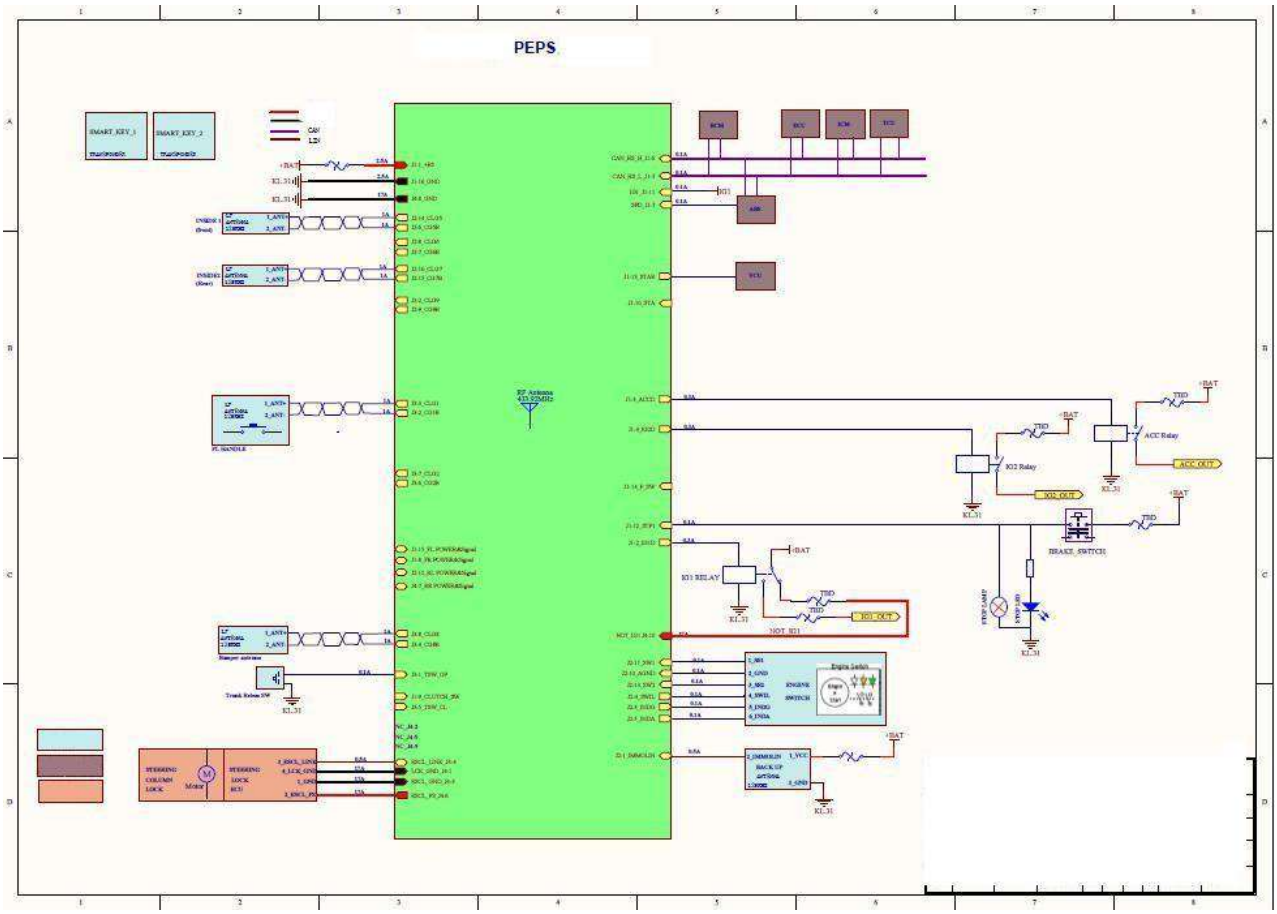
Located on the direction column

6) Electronic steering column lock and snap ring



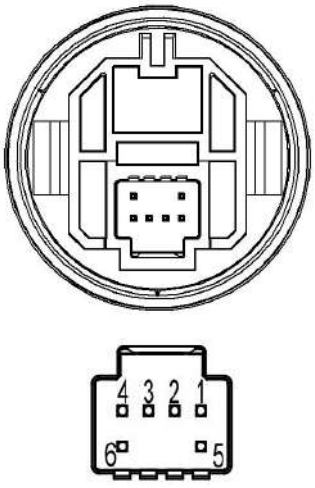
Located on the direction column

3.System principle diagram



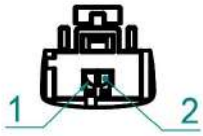
4.Component inspection

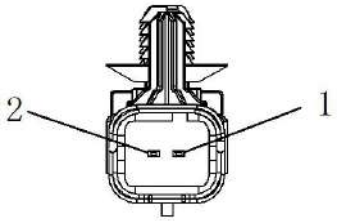
Connector terminal definition:

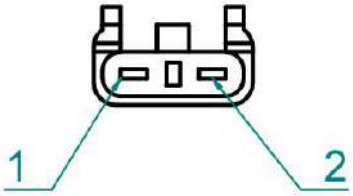


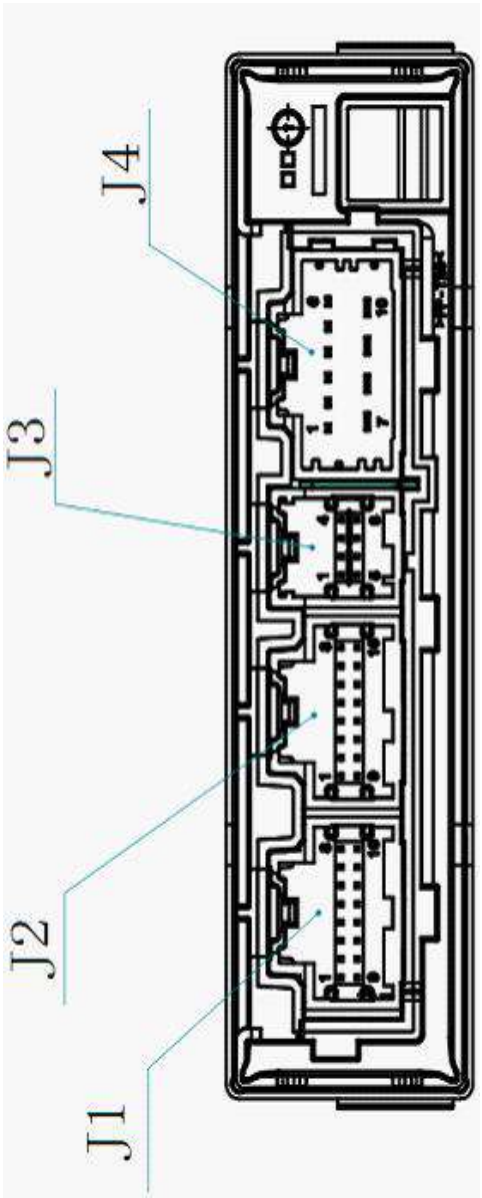
	PEPS button		
	Serial No.	Description	Note
	1	SS1	Start switch signal 1
	2	GND	Start switch
	3	SS2	Start switch signal 2
	4	SWIL	Start switch text backlight (white)
	5	INDG	Start switch backlight (green)

	6	INDA	Start switch backlight (amber)

	Spare antenna		
	Serial No.	Description	Note
	1	ANT+	Antenna positive
	2	ANT-	Antenna negative

	Car low-frequency antenna		
	Serial No.	Description	Note
	1	ANT+	Antenna positive
	2	ANT-	Antenna negative

	External handle sensor		
	Serial No.	Description	Note
	1	ANT+	Antenna positive
	2	ANT-	Antenna negative



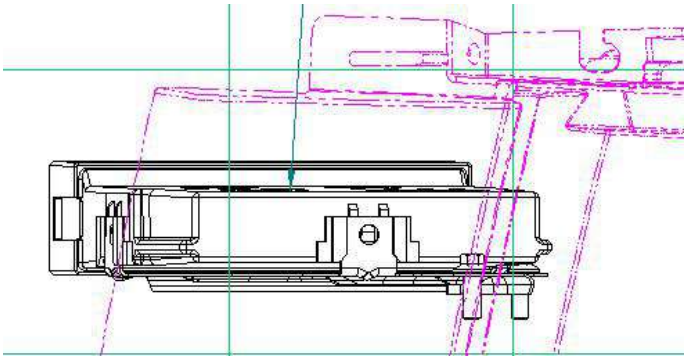
PEPS controller		
Serial No.	Description	Note
J1-1	+B	Battery positive
J1-2	IG1D	IG1 Relay Drive - High
J1-3	ACCD	ACC Relay Drive - High
J1-4	IG2D	IG2 Relay Drive - High
J1-5	CAN_HS_L	High speed CAN low
J1-6	CAN_HS_H	High speed CAN high
J1-7	SPD	Right front wheel speed signal (hard line signal)
J1-8	RESERVED	Reserved
J1-9	RESERVED	Reserved
J1-10	RESERVED	Reserved
J1-11	IG1	IG1 signal inspect
J1-12	STP1	Brake pedal signal
J1-13	STAR	Start Signal output
J1-14	RESERVED	Reserved
J1-15	RESERVED	Reserved
J1-16	GND	Ground
J2-1	ANT1	Spare antenna-LIN
J2-2	RESERVED	Reserved
J2-3	INDG	Start switch backlight (green)
J2-4	SWIL	Start switch text backlight (white)
J2-5	INDA	Start switch backlight (amber)
J2-6	CG5B	Front antenna -
J2-7	RESERVED	Reserved
J2-8	RESERVED	Reserved
J2-9	RESERVED	Reserved
J2-10	AGND	Start switch (simulated)

	J2-11	SW1	Start switch(1)
	J2-12	RESERVED	Reserved
	J2-13	SW2	Start switch(2)
	J2-14	CLG5	Front antenna +
	J2-15	CG7B	Rear internal antenna -
	J2-16	CLG7	Rear internal antenna +
	J3-1	+TSW_OP	Trunk unlock switch
	J3-2	CG1B	Left front door handle antenna -
	J3-3	CLG1	Left front door handle antenna +
	J3-4	CG8B	Rear bumper LF antenna -
	J3-5	RESERVED	Reserved
	J3-6	RESERVED	Reserved
	J3-7	RESERVED	Reserved
	J3-8	CLG8	Rear bumper LF antenna +
	J4-1	LCK_GND	Electronic steering column lock (locked)
	J4-2	RESERVED	Reserved
	J4-3	ESCL_GND	Electronic steering column lock (power ground)
	J4-4	ESCL_LINK	electronic steering column lock (LIN communication line)
	J4-5	RESERVED	Reserved
	J4-6	ESCL_PS	Electronic steering column lock (power supply)
	J4-7	RESERVED	Reserved
	J4-8	GND	Vehicle floor
	J4-9	RESERVED	Reserved
	J4-10	NOT_IG1	Non-IG1 power output

V. Replacement of parts

5.1 PEPS Controller Removal.

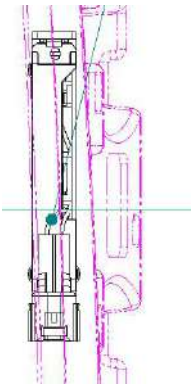
a) Disconnect the battery negative;
b) Remove the dashboard panel;
c) Disconnect the connector of the PEPS controller;
d) Remove the bolts that secure the keyless entry to the electronic control unit bracket;
e) Remove the PEPS controller and its holder from the tube beam.



5.2 In-Car Low Frequency Antenna Removal

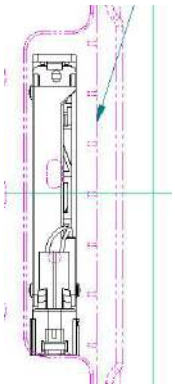
5.2.1 Front Low Frequency Antenna Removal

a) Disconnect the negative pole of the battery;
b) Remove the dashboard panel;
c) disconnect the front low frequency antenna connector;
d) Remove the low frequency antenna from the gimbal beam support.



5.2.2 Low Frequency Antenna Removal

a) Disconnect the negative pole of the battery;
b) Sub-dash panel rear panel;
c) disconnect the low frequency antenna connector;
d) Remove the anti-offset LF antenna from the stand.



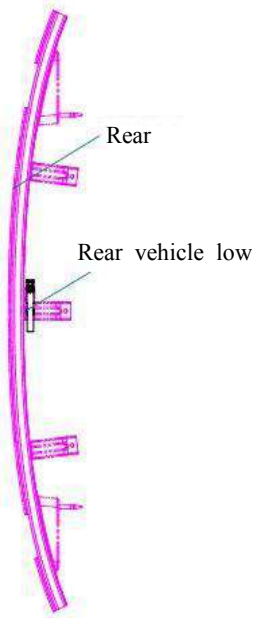
5.2.3 Rear bumper LF antenna removal

a) Disconnect the negative pole of the battery;

b) Remove the rear bumper;

c) After disconnecting the low frequency antenna connector;

d) Remove the low frequency antenna from the rear impact beam



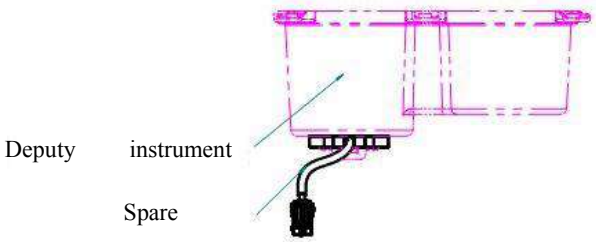
5.3 Backup Antenna Removal

a) Disconnect the negative pole of the battery;

b) remove the instrument panel;

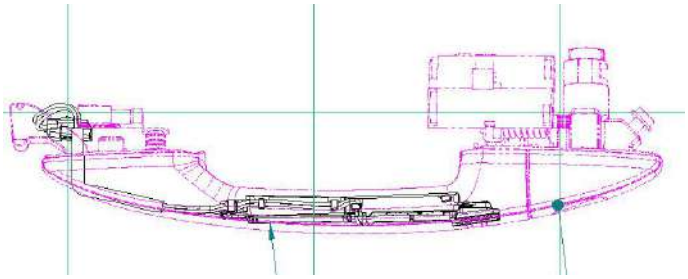
c) disconnect the backup antenna connector;

d) Remove the backup antenna from the bottom of the storage box.



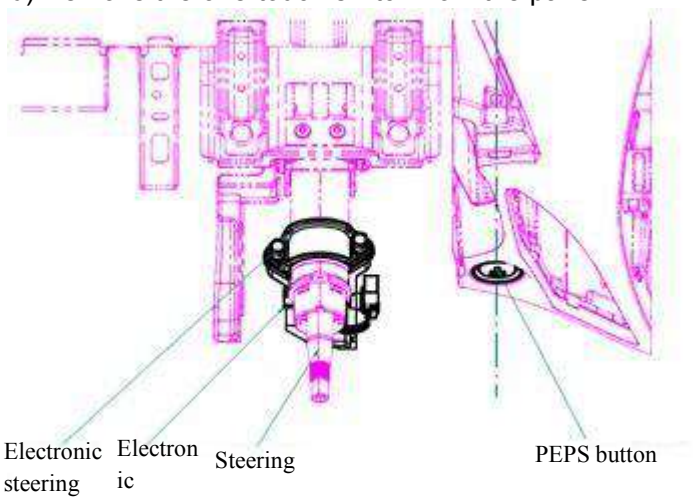
5.4 Integrated Inlet Sensor Removal in Door Handle

a) Disconnect the negative pole of the battery;
b) Remove the inner door panel of the front door;
c) Remove the front door handle;
d) Disconnect the integrated sensor access connector in the door handle;
e) Take the integrated entry sensor in the door handle out of the door handle.



5.5 PEPS start switch disassembly

a) Disconnect the battery negative;
b) Remove the instrument panel shell;
c) Disconnect a key to activate the switch connector;
d) Remove the one-touch switch from the panel.



5.6 Installation of Parts

Follow the reverse procedure for disassembly.

6.Maintenance Precautions

Instrument prompts and maintenance methods

Serial No.	Meter indicating phase	Inspection object
1	Please shift to P gear	1. Check if the shift handle is in P position. 2. Check if there is gear information on the network. 3. Check if there is a problem with the TCU. 4. Check the continuity of the P/N relay wiring harness loop harness

Serial No.	Meter indicating phase	Inspection object
		(P/N relay is located in the outdoor relay box).
2	Please turn ignition switch to OFF	Confirm that the ignition switch has been turned off to OFF
3	Key outside the vehicle	Function indicating, not detected key inside the vehicle
4	Please replace smart key	When the key has no power, the key is put into the back cup to start, and this prompt appears
5	Key unidentified	Function indicating, not detected key inside the vehicle
6	Key battery power is too low	Replace battery of smart key
7	ESCL not unlock	1. Try to unlock after turning the steering wheel 2. Read the PEPS fault code and decide the solution based on the fault code.
8	Please press brake pedal	Function indicating, only can start by pressing brake pedal
9	Please rotate steering wheel	After ESCL can't unlock, it will indicate rotating steering wheel and try to unlock again
10	Please press start button	Function indicating
11	Vehicle speed or ESCL failure , vehicle can also start "N" times	1.Check whether there is fault in ESCL, and read the PEPS fault code 2.Check whether ABS (ESC) is normal and read the fault code 3. Check whether there is fault in wheel speed sensor 4.Check whether PEPS controller J1-7 pin wiring harness is conductive 5.Process reset startup times with diagnostic instrument after locking fault problem (Note: if the vehicle needs a power-up check to perform the PEPS reset startup times directly, the startup problem can be solved at this point, but it is important to find out the cause of the decrease in the number of startup times, and if the reason is not identified, the vehicle will also have this problem again.)
12	ESCL fault	Please immediately go to the maintenance station to replace the ESCL module

Maintenance Spectial Precautions

Module	Perform actions	Matters needing attention
ESCL	Clear ESCL	When clearing ESCL, confirm normally in OFF state

Module	Perform actions	Matters needing attention
	Learning ESCL	When learning ESCL, confirm normally in OFF state
	Replace ESCL	1.ESCL must be replaced with a new ESCL, remember not to interchange with other vehicles, or the vehicle will not be able to point. 2. After the ESCL is replaced, even if the vehicle can be started normally after installation of the new ESCL, the teaching ESCL process must be performed before the vehicle can be delivered.
	Replace PEPS controller	When replacing parts of PEPS controller, be sure to replace a new controller. Remember not to swap controllers on other vehicles, or ESCL will protect itself by locking itself.
	ESCL installation	Make sure the installation is in place when ESCL is installed
Smart key	Delete all keys	Try not to use it. After deleting all keys, be sure to add the old key to the original key before adding the new key, otherwise the key may not be able to be added
	Add old key	Add the old key to ensure that you need to add the key in the back bracket, the other key is not put in the car
	Add new key	Add the new key to ensure that you need to add the key in the back bracket, the other key is not put in the car

Precautions:

Do not reset the EMS, PEPS at the same time, otherwise, the key will not be used and the module will need to be replaced

When the ICM indicates that the vehicle can also be started "N" times, after the fault problem is locked, the diagnostic instrument is used to perform the process of resetting the number of starts. (If the vehicle requires power-on check, you can directly execute the PEPS reset start times. At this time, you can solve the start-up problem, but be sure to find out the cause of the decrease in the number of start-ups. If you do not find out the reason for the delivery, the car will still have this problem again. .)

7.fault code table

Fault code meaning and how to eliminate it

Serial No.	error code	Definition of error code	Troubleshooting method
1	U0073	CAN bus lost	1. Check whether the CAN network communication is normal 2. Check if the corresponding module harness is normal or if the module is damaged.
2	U0155	Loss of ICM communication	
3	U0100	Loss of ECM communications	

Serial No.	error code	Definition of error code	Troubleshooting method
4	U0129	Loss of ABS communication	
5	U0140	Loss of BCM communications	
6	U0329	ESCL communication lost	Check if the ESCL power supply, ground, and Lin wiring harnesses are conducting.
7	U1300	Software configuration error	Replace PEPS controller
8	B1500	Driving side low frequency antenna open circuit	Check that the driver's side door handle antenna harness is conducting. (The antenna is inside the door handle)
9	B1501	Copilot side low frequency antenna open circuit	EV no such DTC
10	B1502	Low-frequency antenna in the car before the open circuit	In-vehicle front low frequency antenna open circuit Check if the front vehicle LF antenna harness is conducting. (Black antenna located on the lower side of the central control switch group)
11	B1503	Low-frequency car antenna open	Check if the low-frequency antenna harness is conducting (located in the middle position under the rear seat, under the carpet, black antenna)
12	B1504	The car rear low-frequency antenna open	EV no such DTC
13	B1505	Rear bumper low frequency antenna is open	Check that the rear bumper antenna harness is conducting (the antenna is located on the bumper beam in the rear bumper, black antenna)
14	B1506	PEPS button abnormal	Check if the harness at the start switch is on.
15	B1507	IG circuit is abnormal	Check IG1 relay wiring harness loop and IG1 relay
16	B1508	ACC circuit is abnormal	Check ACC relay wiring harness loop and ACC relay
17	B1509	Brake signal is abnormal	Check whether the brake system is normal, and clear the PEPS fault code after eliminating no abnormalities.
18	B150A	Abnormal speed signal	1. Check if the vehicle speed signal on the CAN network is abnormal. 2. Check if ABS is normal. 3. Check if the wheel speed sensor is normal.
19	B150C	Clutch signal abnormality	EV no such DTC
20	B150D	ESCL LCK_GND signal is abnormal	Check if the ESCL ground wire harness is conducting
21	B150E	ESCL LCK_PS signal is abnormal	1. Check if the ESCL power line is turned on 2. Check whether the PEPSJ4-10 pin has 12V power input when the vehicle is OFF. There is 12V power supply is normal.

Serial No.	error code	Definition of error code	Troubleshooting method
			If there is no 12V power supply, please check the IG1 relay circuit. 3. Check that the ACC, IG2, IG1 relay circuit harnesses are conducting.
22	B150F	ESCL enters self-protection mode	1. Erase the ESCL instruction through the diagnostic device (This instruction needs to be executed for 15 minutes and the entire vehicle is to be turned off) 2. After performing step 1, use the diagnostic equipment to perform teaching ESCL (this process is OFF).
23	B1510	Wheel speed signal is abnormal	1. Check if the wheel speed sensor is normal. 2. Check if the PEPS controller J1-7 harness is conducting.
24	B1511	ESCL lock exception	1. Turn the steering wheel and try again. 1. Erase the ESCL instruction through the diagnostic device (This instruction needs to be executed for 15 minutes and the entire vehicle is to be turned off) 3. After performing step 1, use the diagnostic equipment to perform teaching ESCL (this process is OFF).
25	B1512	ESCL unlock abnormal	
26	B1513	ESCL DTC return value is abnormal	
27	B1514	Startup output is abnormal	Check the starting relay circuit harness is normal.
28	B1515	ROM verification failure	Replace PEPS controller
29	B1300	PSE Internal EEPROM module error	Replace PEPS controller
30	B1301	Anti-theft controller and ECM verification failed	1. Check if the engine ECU has been replaced. If it is replaced, perform replacement engine ECU diagnosis process 2. Check if the PEPS controller has been replaced. If it is replaced, perform the replacement anti-theft controller diagnosis process 3. Check if the meter has been replaced. If it is changed, confirm whether the gauge number is correct.
31	B1302	VIN is not written	PEPS controller does not match, need to re-match PEPS controller
32	B1303	Backup antenna communication failure	Check the continuity of the backup antenna harness (the backup antenna is located on the underside of the back rest on the center console.)
33	B1304	No transponder detected	Ignore
34	B1305	The key is not stored in the anti-theft controller	PEPS controller does not match, need to re-match PEPS controller

Serial No.	error code	Definition of error code	Troubleshooting method
35	B1306	Security code is not written	
36	B1516	HSU overload failure	Replace door handle antenna
37	B1517	HSU switch failure	Replace door handle antenna

EVO Electric

Body

Chassis

EMB

High voltage

High Voltage Electric mantainance manual

HOW TO USE THIS MANUAL

Description

This volume explains “Removal Disassembly Installation Inspection and Adjustment” and “Trouble Diagnoses”.

Terms

	Description
DANGER	Violation operation may cause a death or serious personal injury. Example Touching high voltage components without using the appropriate insulated protective equipment
WARNING	Violation operation may cause a death or serious personal injury.
CAUTION	Violation operation may cause a serious personal injury or damage of components.
NOTE	Provide helpful information
OTHERS	Provide helpful information

Symbol	Description
 Electric shock symbol	Violation operation may cause an electric shock.
 Insulated gloves	Please wear insulated gloves when checking or performing service operation of high voltage components.
 Insulated safety shoes	Please wear insulated gloves when checking or performing service operation of high voltage components on lift-up vehicles.
 Safety glasses	Always wear under the following circumstances During removal/installation or check operation of high voltage components or harness where spark might appear by short circuit. Service operation inside battery pack.
 Insulated tools	Always use when performing high voltage components such as operation inside battery pack.

Units

The UNITS given in this manual are primarily expressed as the SI UNIT (International System of Unit).And with regard to tightening torque of bolts and nuts please refer to Standard Tightening Torque Table.

“Example ”

Range

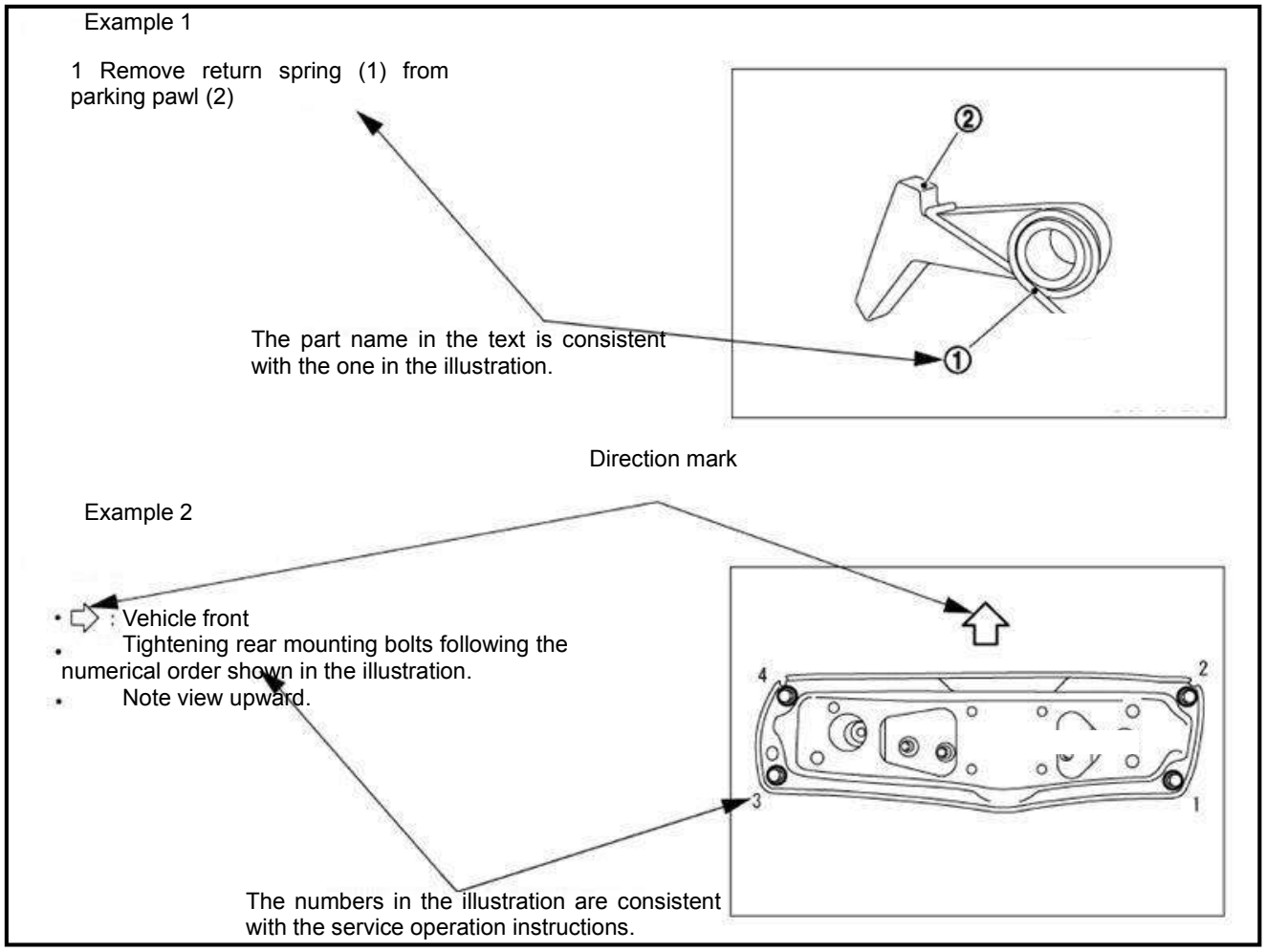
Fixing bolts of power train and suspension 50-70 N·m

Contents

- The contents are listed on the first page of every chapter.
- The small illustrations show the important steps such as inspection use of special tools knacks of work and hidden or tricky steps which are not shown in the previous large illustrations.
- Assembly inspection and adjustment procedures for the complicated units are presented in a step-by-step format where necessary.

Relation between Illustrations and Descriptions

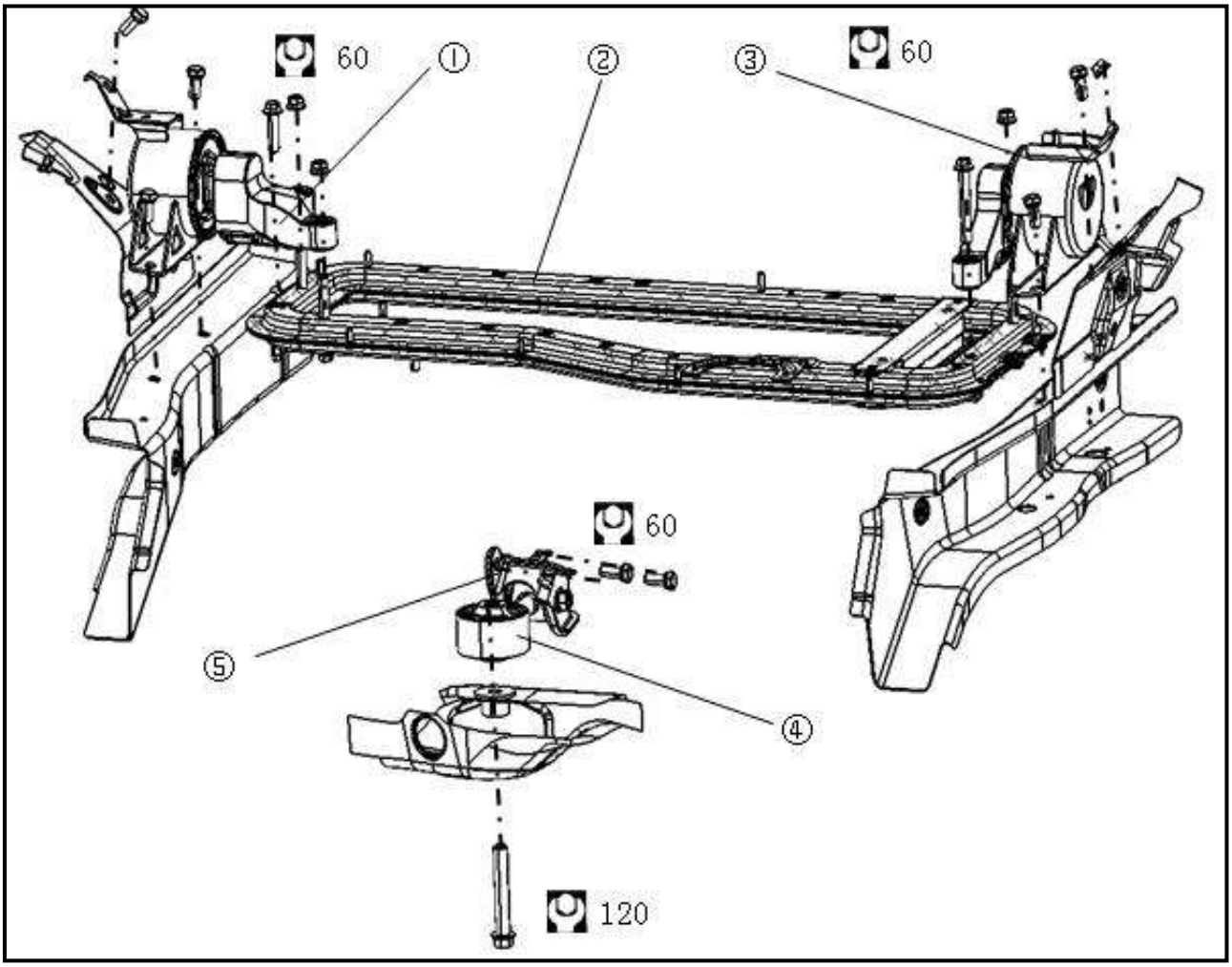
The following sample explains the relation between the part description part name and service procedures.



Components

The large illustrations are exploded views (see the following) and contain components standard parts tightening torques lubrication points assembly method and other information necessary to repairs.

Components shown in an illustration may be identified by a circled number.When this style of illustration is used the text description will follow the illustration.



1	left suspension cushion	2	power train support beam	3	right suspension cushion
4	rear suspension bracket	5	rear suspension cushion		

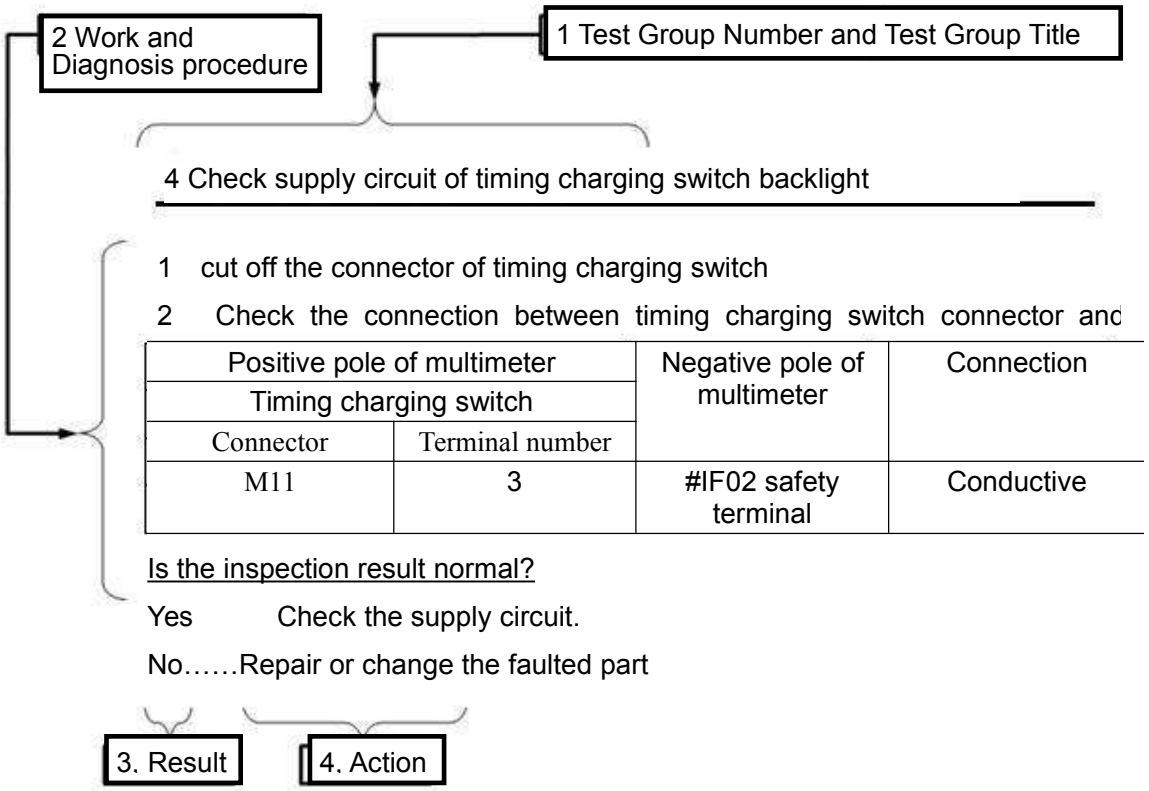
HOW TO FOLLOW TROUBLE DIAGNOSES

Description

Trouble diagnoses indicate work procedures required to diagnose problems effectively.Observe the following instructions before diagnosing.

- Before performing trouble diagnoses read the “work flow” in each section.
- After repairs re-check that the problem has been completely eliminated.
- Refer to Components Parts and Harness Connector Location for the Systems described in each section for identification/location of components and harness connectors.
- When checking circuit continuity ignition switch should be OFF.
- Please refer to the Circuit Diagram for quick pinpoint check.If you need to check circuit continuity between harness connectors in more detail such as when a sub-harness is used refer to Wiring Diagram in each individual section and Harness Layout in “Grounding and Loop” section for identification of harness connectors.
- Before checking voltage at connectors check 12V battery voltage.
- After accomplishing the Diagnosis Procedures and Electrical Components Inspection check that all harness connectors are reconnected as they were.

How to Follow Test Steps in Trouble Diagnosis



1 Test group number and test group title

Test group number and test group title are shown in the upper portion of each test group.

2 Work and diagnosis procedure

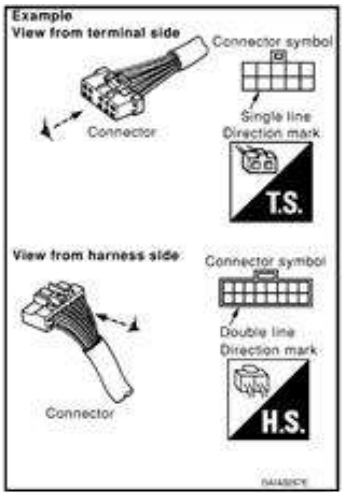
Start to test according to procedures in every test group.

3 Questions and results

Questions and results are listed in each test group.

4 Action

Next test action is based on test results of each group.



HOW TO READ WIRING DIAGRAMS

Connector Symbols

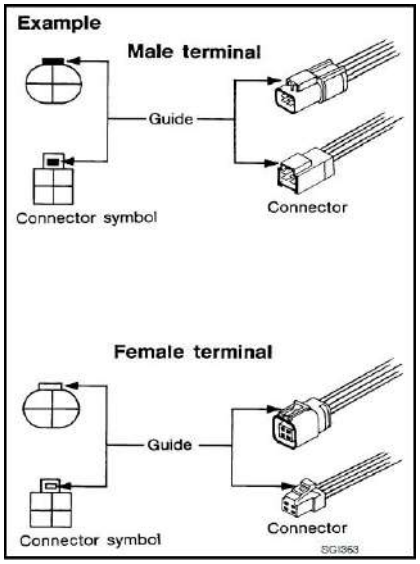
Connector symbols are shown from the terminal side and the harness side.See the following picture

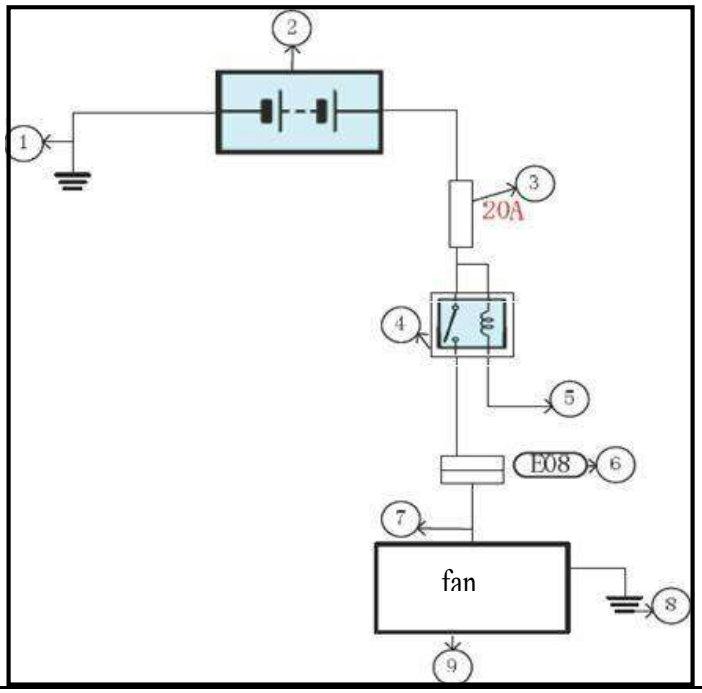
- Terminal side diagram shows the view from front of the connector and marked as TS.TS
- Harness side diagram shows the view from rear of the connector and marked as HS.HS
- Most of connector symbols in wiring diagram are shown from the terminal side.

Male and female terminals

Connector guides for male terminals are shown in black and female terminals in white in wiring diagrams.

Example





Description

Number	Item	Description
1	Battery ground	Vehicle battery ground
2	Battery	12V battery 12V
3	Fuse	Fuse and its available current value
4	Relay	Internal controlling principle of relay
5	Relay control	Working condition of relay
6	Connector number	Alphabetic characters show to which harness the connector is placed Numbers show the connector number
7	Power supply	Show the power supply of appliance
8	Ground	Show the ground location of appliance
9	Component	Show the name of appliance

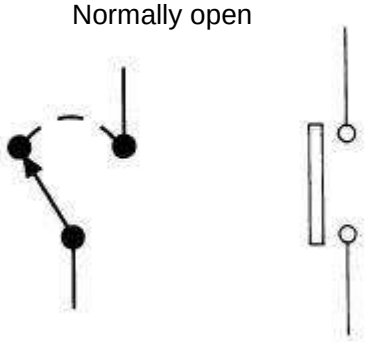
SWITCH POSITIONS

Switch positions shown in wiring diagrams are when the vehicle is in the ñnormalòcondition.

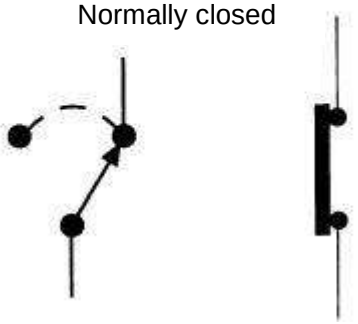
A vehicle is in the ñnormalòcondition when

- Key is in ñLOCKò
- Doors hood and trunk are closed.
- Pedals are not stepped.
- Parking brake is released.

Normally open



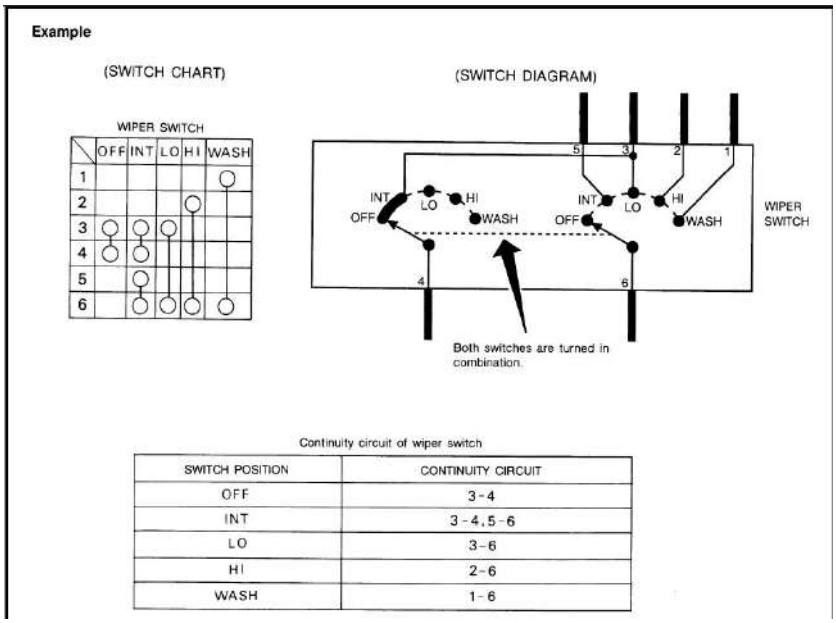
Normally closed



MULTIPLE SWITCH

The continuity of multiple switch is described in two ways as shown below.

- The switch chart is used in schematic diagrams.
- The switch diagram is used in wiring diagrams.



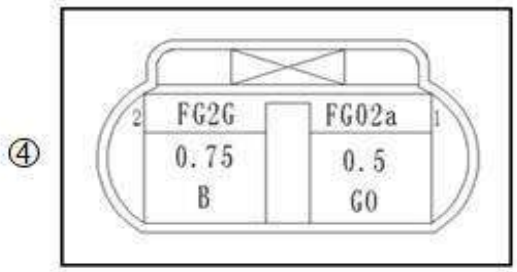
Continuity circuit of wiper switch

SWITCH POSITION	CONTINUITY CIRCUIT
OFF	3-4
INT	3-4, 5-6
LO	3-6
HI	2-6
WASH	1-6

Connector information

Left front fog light

Connector No.	
Connector Name	Left font fog light
Connector Type	[grey Sumitomo]



Terminal No.	Color of Wire	Signal Name
1	GO	Positive pole of left front fog light
2	B	Negative pole of left front fog light

1	Connector number	Alphabetic characters show to which harness the connector is placed Numbers show the connector number
2	Connector name	Definition of connector name
3	Connector type	Connector property
4	Connector	Projection of connector outline
5	Terminal number	Information of connector terminal (see 1 and 2 in the picture)
6	Wire color	Wire color code
		B=black W = white R = red G = green L = blue Y = yellow LG light green = BG = beige BR = brown OR or O = orange P = pink PU or V (Violet) = purple GY or GR = grey
		When the wire color is striped the base color is give first followed by the stripe color example B\W= black with white stripe
7	Signal name	Show the physical meaning of signal

Wrap of wiring

No.	**Symbol**	**Meaning**
1		Wrap with black corrugated pipe
2		Wrap with black clot tape
3		Tightly wrap with black PVC tape
4		Wrap with black cloth

ABBREVIATIONS

Abbreviation	Name
A/C	Air conditioner system
AC	Air conditioner controller
BDU	Battery cut-off unit
CHR	Off-board charger
DTC	Diagnostic trouble code
DC/DC	Direct current converter
DEF	Defrost
E-Drive	Electric- drive
EC	AC compressor controller
HVAC	Main device of air conditioner
ICM	Combination instrument
LBC	Battery controller
OBD	On board diagnositics
PCU	Motor controller
T-BOX	Remote intelligent terminal
TM	Reducer
VIN	Vehicle identification number
VCU	Vehicle control unit

TIGHTENING TORQUE OF STANDARD BOLTS AND SCREWS

Tightening Torque Table

No.	Name	Size	Grade			Remarks
			4.8（4）	8.8（8）	10.9（10）	
			Tightening torque （N.m）			
1	Bolts nuts	M4	1～1.5	2～3	3～3.8	
2		M5	2～3	4～7	6～8	
3		M6	3～6	7～11	10～13	
4		M7	6～8	12～16	17～22	
5		M8	8～11	18～32	25～35	
6		M8×1	6～12	20～34	27～38	
7		M10	17～22	36～55	50～63	
8		M10×1.25	18～24	40～70	63～80	
9		M10×1	20～25	42～72	65～88	
10		M12	30～39	62～78	87～109	
11		M12×1.5	32～41	65～81	91～114	
12		M12×1.25	34～42	68～85	95～119	
13		M12×1	35～44	70～88	99～125	
14		M14	45～60	99～124	140～175	
15		M14×1.5	53～67	107～134	150～188	
16		M14×1.25	56～69	111～139	156～195	
17		M14×1	58～72	115～144	162～202	
Tip 4.8 8.8 10.8 in the table are mechanical property grade of bolts while 4 6 8 are mechanical property grade of nuts.						

Screw tightening torque table

No.	Name	Size	Tightening torque （N.m）		Remarks
			4.8	8.8	
1	Screws	M4	1～1.5	1.5～2.5	
2		M5	2～3	3.5～5.5	
3		M6	3～4	6～9	
4		M8	8～11	16～22	
5		M10	13～22	25～30	

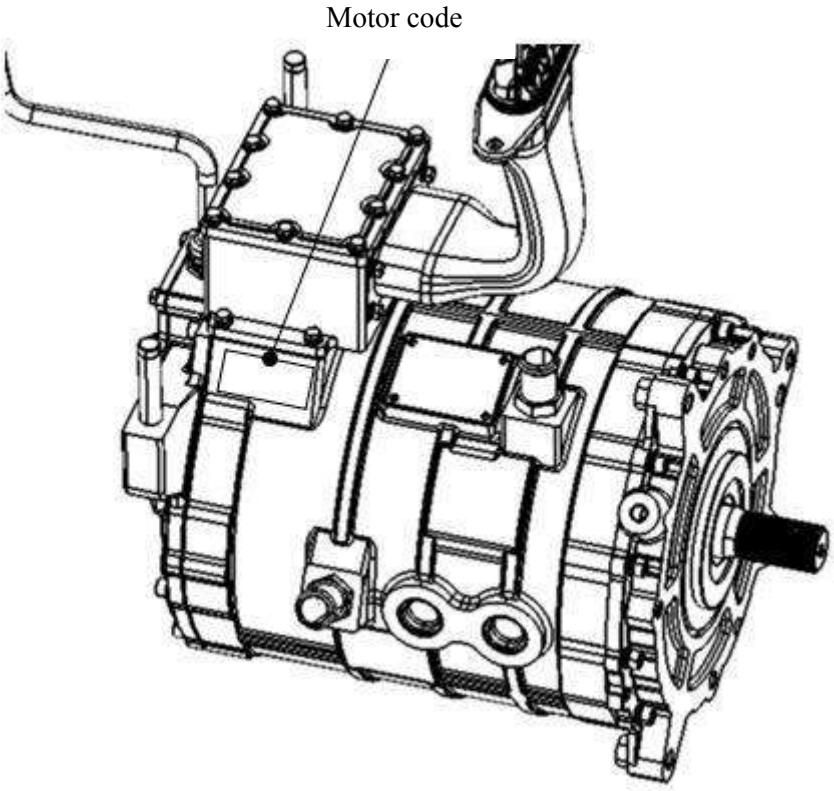
Tightening Torque of Key Parts

No.	Name	Tightening torque （N•m）
1	Fixing bolts of gear shifting operating mechanism	30～35
2	Self-lock nut of drive shaft	240～260
3	Fixing bolts between rear suspension cushion and sub-frame	130±10
4	Connecting bolts between rear suspension bracket and reducer	60±10
5	Connecting bolts between rear suspension bracket and its cushion	100±10
6	Connecting bolts between left suspension cushion and left carling	60±10
7	Connecting bolts(nuts) between left suspension bracket and power train beam	55±5
8	Connecting bolts(nuts) between right suspension bracket and power train beam	55±5
9	Connecting bolts between right suspension cushion and right carling	60±10
10	Fixing bolts of electric accelerating pedal	7～11
11	Fixing bolts between steering gear and sub-frame	95～105
12	Connecting bolts between steering gear rod ball pin and steering knuckle	40～50
13	Lock nut of inside bar length adjustment	45～55
14	Connecting bolts between steering column and steering shaft with cardan joint	30～35
15	Connecting bolts between steering shaft with cardan joint and steering gear	30～35
16	Nut of steering disc and steering column	42～52
17	Fixing nuts of brake pedal floor and vacuum booster	20～25
18	Fixing bolts between brake pedal upper and instrument frame	20～25
19	Connecting bolts of ABS hydraulic regulator and brake pipe connector ABS	16～18

20	Assembly of brake pipes	M6 bolt 10～15 M8 bolt 20～25
21	Fixing bolts of brake caliper	65～75
22	Fixing bolts between brake handle and vehicle floor	20～25
23	Fixing bolts/nuts between front column and steering knuckle /	110～130
24	Fixing bolts(assembly in X direction) between lower suspension arm and sub-frame	130～150
25	Fixing bolts between stabilizer and sub-frame	60～72
26	Fixing nuts between stabilizer and stabilizer pull rod	2～3
27	Fixing nuts between stabilizer pull rod and lower suspension arm	2～3
28	Fixing nuts between lower suspension arm ball pin and steering knuckle	60～72
29	Fixing nuts between front column and vehicle body	50～70
30	Mounting bolts (front) between sub-frame and vehicle body	110～130
31	Mounting bolts (middle) between sub-frame and vehicle body	130～150
32	Mounting bolts (rear) between sub-frame and vehicle body	60～72
33	Connecting bolts between rear hub and rear cross member	60～72
34	Connecting bolts between rear cross member and vehicle body	130～150
35	Connecting nuts between rear sliding column and vehicle body	30～45
36	Connecting bolts between rear sliding column and rear cross member	60～72
37	Buts of tire	90～110
38	Fixing bolts of high voltage terminal box	9～13
39	Fixing bolts of compressor	30～40
40	Fixing bolts of expansion valve	10～15
41	Fixing bolts of controller bracket	25～30
42	Fixing bolts of controller	25～30
43	Connecting bolts between motor and reducer	45～50
44	Connecting lock nuts between motor reducer and cross member	85～90
45	Mounting nuts between battery pack and mounting bracket Ⅰ	60～80
46	Assembly of battery pack positioning pin	18～21
47	Mounting bolts between battery pack and vehicle body (8)	90～110

48	Mounting bolts between battery pack bracket Ⅱ and vehicle body	40～50
49	Mounting bolts between battery pack bracket Ⅰ and bracket Ⅱ	60～80
50	Mounting bolts between off-board charger and cross member	15～20
51	Fixing bolts between charging socket and cable bonding terminal	15～20

MOTOR SERIAL NUMBER



Dimensions

Items	Parameters (mm)
Overall length	4135
Overall width	1750
Overall height	1560
Wheelbase	2490
Front tread	1515
Rear tread	1500

Wheels & Tires

Wheels	6.5J×16
Tires	205/55R16

PRECAUTION

PRECAUTIONS

Description

Please obey the following precautions to ensure safe and proper servicing.These precautions are not described in each individual section.

Precautions for Technicians Using Medical Electric

Operation Prohibition

Warning

- **Parts with strong magnet are used in this vehicle.**
- **Technicians using a medical electric device such as pacemaker must never perform operation on the vehicle as strong magnetic parts can affect the device function.**

Normal Charge Precaution

Warning

- **If technicians use a medical electric device such as an implantable cardiac pacemaker a cardioverter or defibrillator the device function must be checked before starting the charging.**
- **If technicians use a medical electric device such as an implantable cardiac pacemaker a cardioverter or defibrillator must not enter the vehicle compartment (including luggage room) during charging.**

Precaution at telematics system operation

- **If technicians use a medical electric device such as an implantable cardiac pacemaker a cardioverter or defibrillator please keep enough distance with telematics system.**
- **The electromagnetic wave of remote intelligent terminal might affect the function of medical electric devices such as an implantable cardiac pacemaker a cardioverter or defibrillator.**
- **If technicians use a medical electric device such as an implantable cardiac pacemaker a cardioverter or defibrillator the electromagnetic wave of remote intelligent terminal might affect the function.The possible effects on the devices must be checked with the device manufacturer before remote intelligent terminal using.**

Key Point to be Checked Before Maintenance Work

The high voltage system may starts automatically.It is required to check that the timer air conditioner and timer charger are not set before maintenance work.

Note

If the timer air conditioner and timer charger are set the high voltage system starts automatically even when the power switch is OFF.

Precaution for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

The Supplemental Restraint System “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a front seat belt helps to reduce the severity of injury to the driver and front passenger in collision.This system includes seat belts and air bags of driver and front passenger.For detailed information please see Chapter “AIR BAG” and “SEAT BELT”.

Warning

Always observe the following items for preventing accidental activation

- **To avoid the SRS failure and collision accident after the failure which could cause personal injury or death all maintenance must be performed by an authorized DR dealer.**
- **Improper maintenance including incorrect removal and installation can lead to personal injury caused by unintentional activation of the SRS.For removal of air bag module please see “AIR BAG SYSTEM”.**

- **Never use any electrical test equipment on any circuit related to the SRS unless instructions in this Service Manual.SRS wiring harness can be identified by yellow and /or orange harness**

Precautions When Using Power Tools (Air or Electric) and Hammers

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the power switch on never use air ot electric power tools or strike near the sensors with a hammer.Heavy vibration could activate the sensor and deploy the air bag possibly causing serious injury.
- When using power tools or hammers always switch the power switch OFF disconnect the 12V plumbic acid battery and wait at least 1 minute before performing any service.

Precautions for Removing 12 V Battery 12V

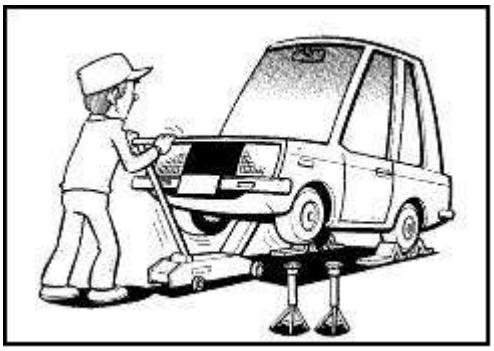
Before remove the 12V battery switch the key to “ON” and then turn to “LOCK”.

Note

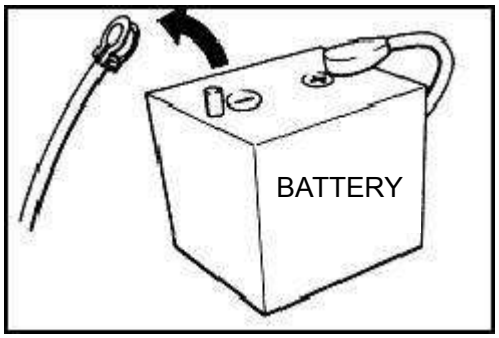
- The automatic charging of 12V battery could also be started even when the key is in “LOCK”.
- The automatic charging of 12V battery would not be started when the key is turned from “ON” to “LOCK”.

General Precautions

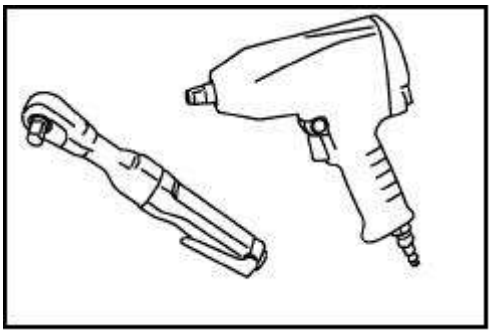
- Before jacking up the vehicle apply wheel chocks or other tire blocks to the wheels to prevent the vehicle from moving.After jacking up the vehicle support the vehicle weight with safety stands at the points designated for proper lifting before working on the vehicle.This operation should be done on a level surface.



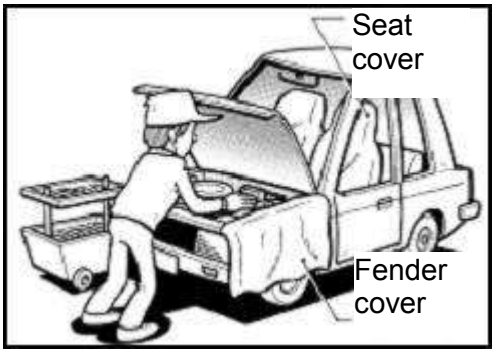
- When removing a heavy component such as battery pack or power train be careful not to lose your balance and drop them.Also do not allow them to strike adjacent parts especially the brake pipes and brake master pump.



- Before the service work which do not need to use power put the key in “LOCK” and cut off the negative pole of 12V battery.
- After cutting off the negative pole of 12V battery the restored memory of radio and other control units will be erased.
- Dispose of drained oil or the solvent used for cleaning parts in an appropriate manner.
- Clean all disassembled parts in the designated liquid or solvent prior to inspection or assembly.
- Replace oil seals gaskets seal rings O-rings locking washers cotter pins self-locking nuts etc.with new ones.
- Replace inner and outer races of tapered roller bearings and needle bearings as a set.
- Arrange the disassembled parts in accordance with their assembled locations and sequence.
- After disconnecting vacuum or air hoses attach the tag to indicate the proper connection.
- Use only the fluids and lubrications specified in this manual.
- Use approved bonding agent sealants or their equivalents when required.
- Use hand tools power tools (disassembly only) and recommended special tools where specified for safe and efficient service repairs.



- When repairing the fuel oil water vacuum or exhaust systems check all affected lines for leakage.



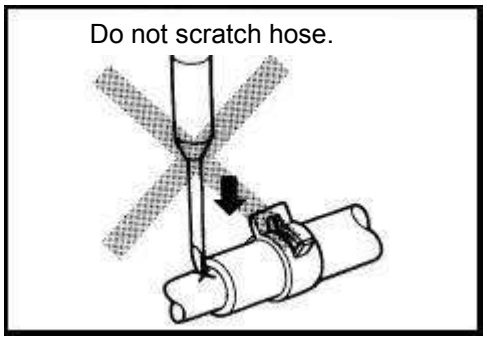
Before servicing the vehicle

Protect fenders upholstery and carpeting with appropriate covers.Take caution that keys buttons or similar things do not scratch paint.

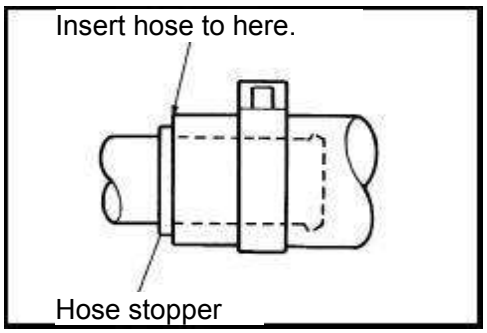
Precautions for hoses

Hose Removal and Installation

- To prevent damage to rubber hose do not pry off rubber hose with tapered tool or screwdriver.

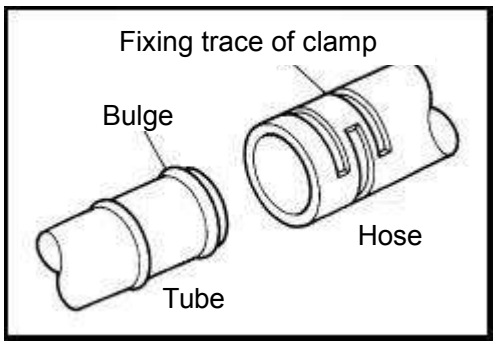


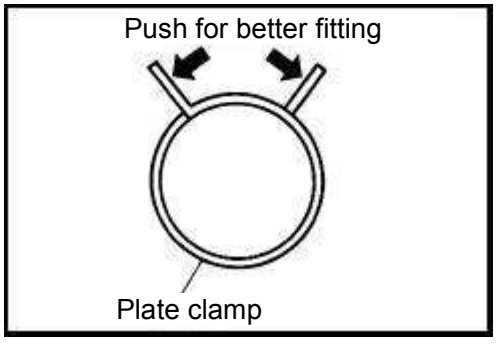
- To reinstall the rubber hose securely check that hose insertion length and orientation of clamp is correct.(If tube is equipped with hose stopper insert rubber hose into tube until it butts up against hose stopper.)



Hose Clamping

- If old rubber hose is re-used, install hose clamp in its original position (at the indentation where the old clamp was). If there is a trace of tube bulging left on the old rubber hose, align rubber hose at that position.
- Discard old clamps; replace with new ones.
- After installing plate clamps, apply force to them in the direction of the arrow, tightening rubber hose equally all around.





CAUTIONS AS TO HIGH VOLTAGE

How to Cut Off High Voltage

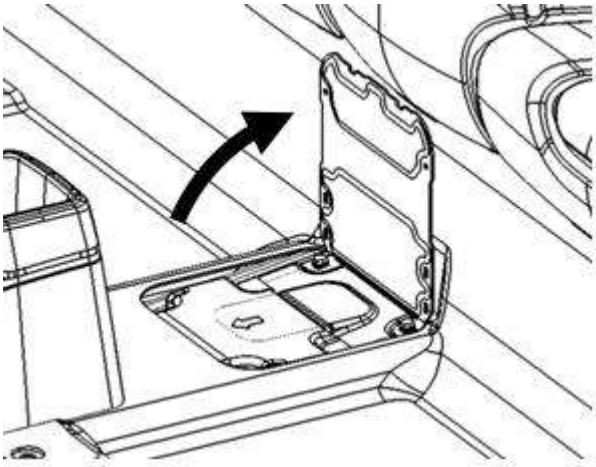
Be sure to follow the procedure below and shut off the high voltage before performing inspection or servicing of the high voltage system.

1 Turn power switch OFF.

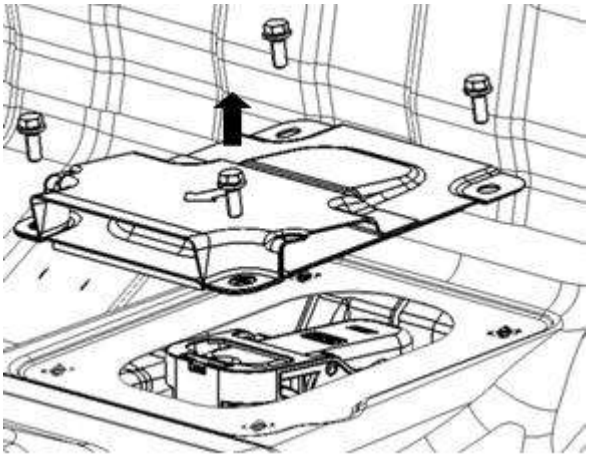
2 Disconnect 12V battery negative terminal.

3 Disconnect service plug following below procedure

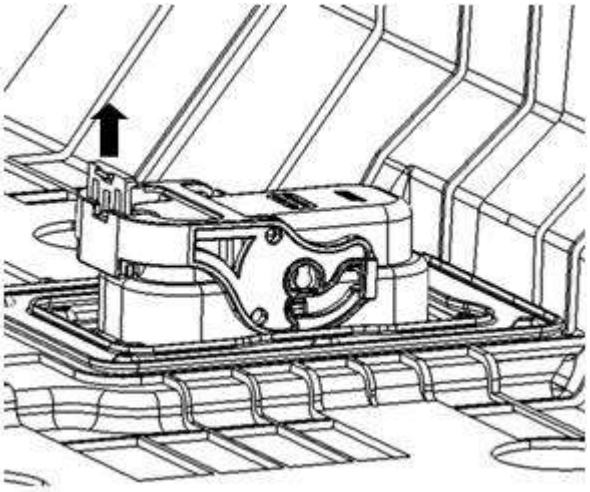
a、 Open the carpet cover above the service switch



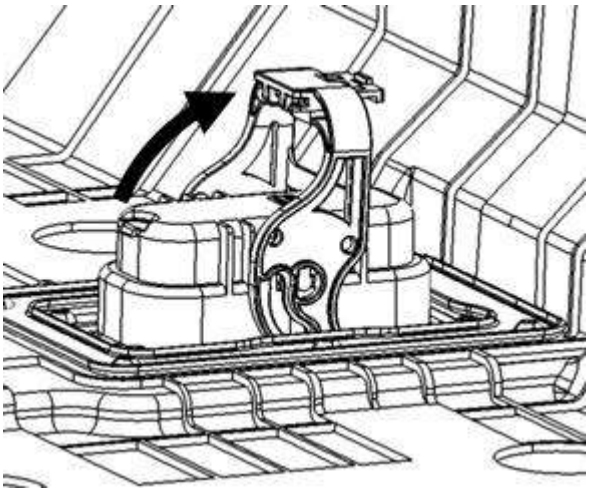
b、 Remove the installation bolts of service cover and take the service plug cover off



c、 Open the service plug second buckle



d、 Turn the service plug handle according to the direction in picture and then remove the service plug.



Danger touch high voltage components without using the appropriate protective equipment will cause electrocution.

Warning

- **Immediately protect high voltage connectors and terminals with insulating tape.**
- **Do not allow other people to operate the service plug.**

4 Wait for a minimum of 10 minutes after the service plug is removed.

Connect the Service Plug

1 Check that 12V battery is disconnected.

2 Connect the service plug

3 Press the second buckle

4 Close the service plug cover and fix with bolts

5 Close the carpet cover on the position of service plug

Danger touch high voltage components without using the appropriate protective equipment will cause electrocution.

Warning

- **Immediately protect high voltage connectors and terminals with insulating tape.**
- **Do not allow other people to operate the service plug.**

High Voltage Precautions

Warning

- **Because electric vehicles contain a high voltage battery there is risk of electric shock electric leakage or similar accidents if the high voltage component and vehicle are handles incorrectly be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Must turn the key to "LOCK" or pull it out before disconnecting service plug.**
- **Disconnect the service plug before inspection or maintenance of high voltage system and do not allow anyone close service plug during the inspection and maintenance.Be sure to wear insulating protective equipment consisting of glove shoes and glasses before beginning work on the high voltage system.**
- **Be sure that other people do not touch the vehicle when service man is operating high voltage system.When not working cover high voltage parts with an insulating cover sheet to prevent other people from contacting them.**
- **After disconnecting the service plug must not put the key in "ON" or turn to "START" gear.**

High Voltage Harness and Safety Mark

The colors of all high voltage harness are orange.Safety mark is applied to the battery pack and other high voltage devices so do not touch these harness and components..

Handling of High Voltage Harness Terminals

Immediately insulate disconnected high voltage harness connectors with insulating tape.

Regulations on Workers with Medical Electronics

The vehicle contains parts that contain power magnets.If a technician who is wearing a pacemaker or other medical devices is close to these parts the medical device may be affected by the magnets.So such persons must not perform service work on the vehicle.

Prohibited Items to Carry During the Work

Because this vehicle uses components that contain power magnetism do not carry any metal products which may cause short circuits or any magnetic media (cash cards prepaid cards etc.) which may be damaged with you when working.

Post the Warning Label of "HIGH VOLTAGE COMPONENTS IN REPARING DO NOT TOUCH"

To call the attention of other workers indicate “High voltage work in progress.Do not touch!” on vehicles where work is being performed on the high voltage systems.

DANGER

HIGH VOLTAGE REPAIR WORK IS IN PROGRESS.DO NOT TOUCH!

Person in charge _____

Copy this page during the service wok and put the folded page on the top of vehicle roof

Copy this page during the service wok, and put the folded page on the top of vehicle roof

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DANGER:

HIGH VOLTAGE REPAIR WORK IS IN PROGRESS. DO NOT TOUCH!

Person in charge: _____

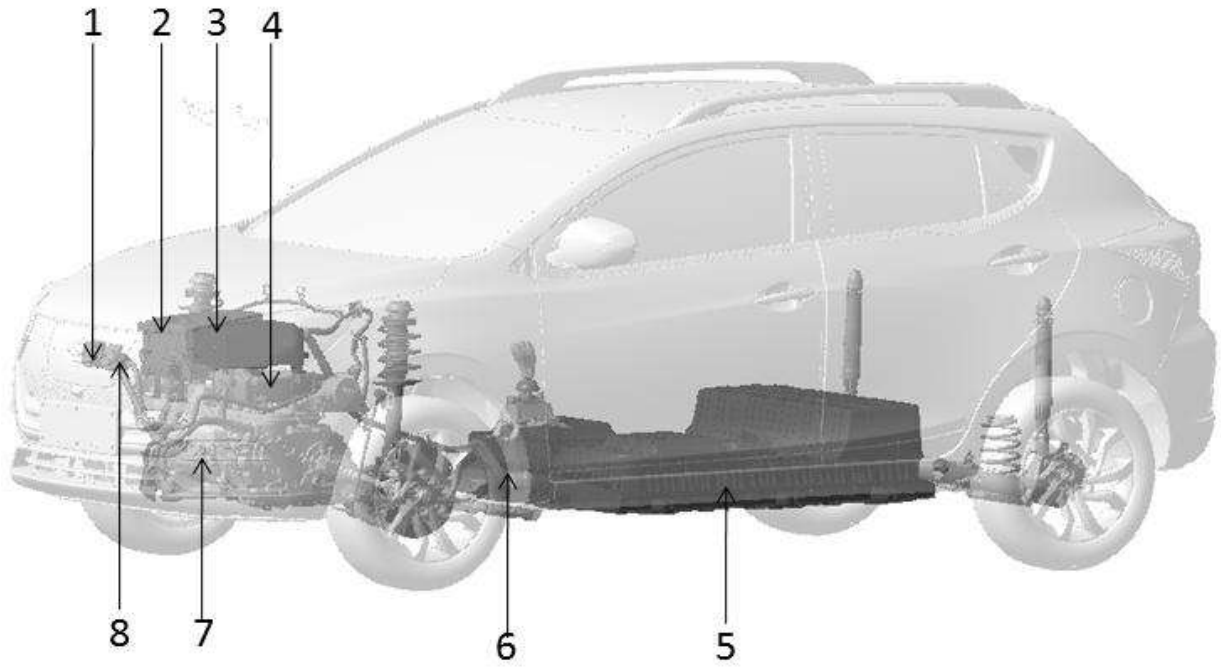
DANGER:

HIGH VOLTAGE REPAIR WORK IS IN PROGRESS. DO NOT TOUCH!

Person in charge: _____

Copy this page during the service wok, and put the folded page on the top of vehicle roof

Layout of High Voltage Components



No.	Position of Parts
1	DC charging socket
2	Drive control device
3	High voltage distribution device
4	On board charger
5	Power cell assembly
6	High voltage main cable assembly
7	Drive motor assembly
8	AC charging socket

Caution

If there are parts in this sheet attached with high-voltage labels.at time when a part needs to be replaced or when a label had become peeled be sure to apply the new label in the same position and facing in the same direction.

Insulated Protective Wear and Insulating Tools

Insulated Wear Check

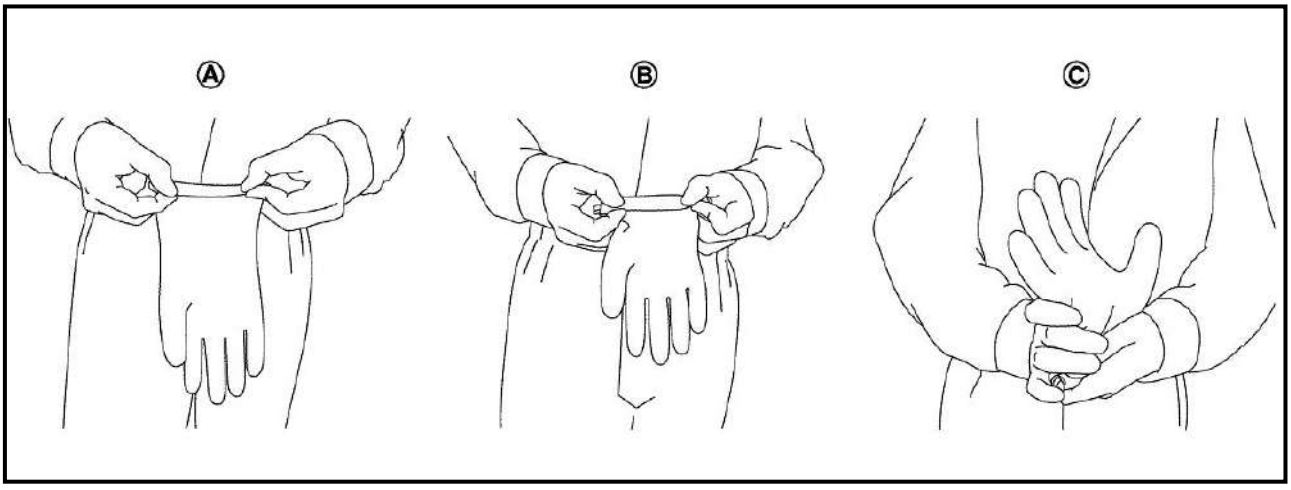
Perform an inspection before beginning work to ensure there is no abnormal problem of the protective devices.

Daily Inspection

This inspection is performed before and after use the worker need to check for deterioration and damage of these protective devices.

- Insulated gloves

Inspect the insulated gloves for scratches holes and tears.(Visual check and air leakage test)



A. Hold glove and fold as shown in the figure

B. Fold three or four times preventing air from escaping from the glove

C. Squeeze glove to check that the glove has no holes

Insulated safety shoes

Inspect the insulated safety boots for holes scratch nails metal pieces wear or other damages.(

Insulating Tools

When performing work at locations where high voltage is applied use insulated tools.

Handling of Damaged Vehicles

Preparation items

Items	Description	Purpose
Insulated gloves	Can bear 1000V/300A 1000V/300A	To protect people from high voltage electric shock
Insulated shoes	—	
Safety glasses	—	
Wrenches	—	1. To remove 12V battery negative terminal bolts 12V 2. To remove mounting bolts of the service plug cover
Heat proof solvent resistance protection gloves and shoes	Heat proof solvent resistance protection tools	To utilize when the battery electrolytic solution leaks
Mat and cloth		To absorb the battery electrolytic solution leakage
Extinguisher	Type ABC for electrical fire	To extinguish a fire
Megohmmeter	To measure at least 500V	To measure voltage on damaged harness and high-voltage parts
Insulated tape	For insulating protection	To cover the damaged high-voltage harness to protect from electric shock

How to Handle Damaged Vehicles in Specified Conditions

High voltage system shut-down procedure

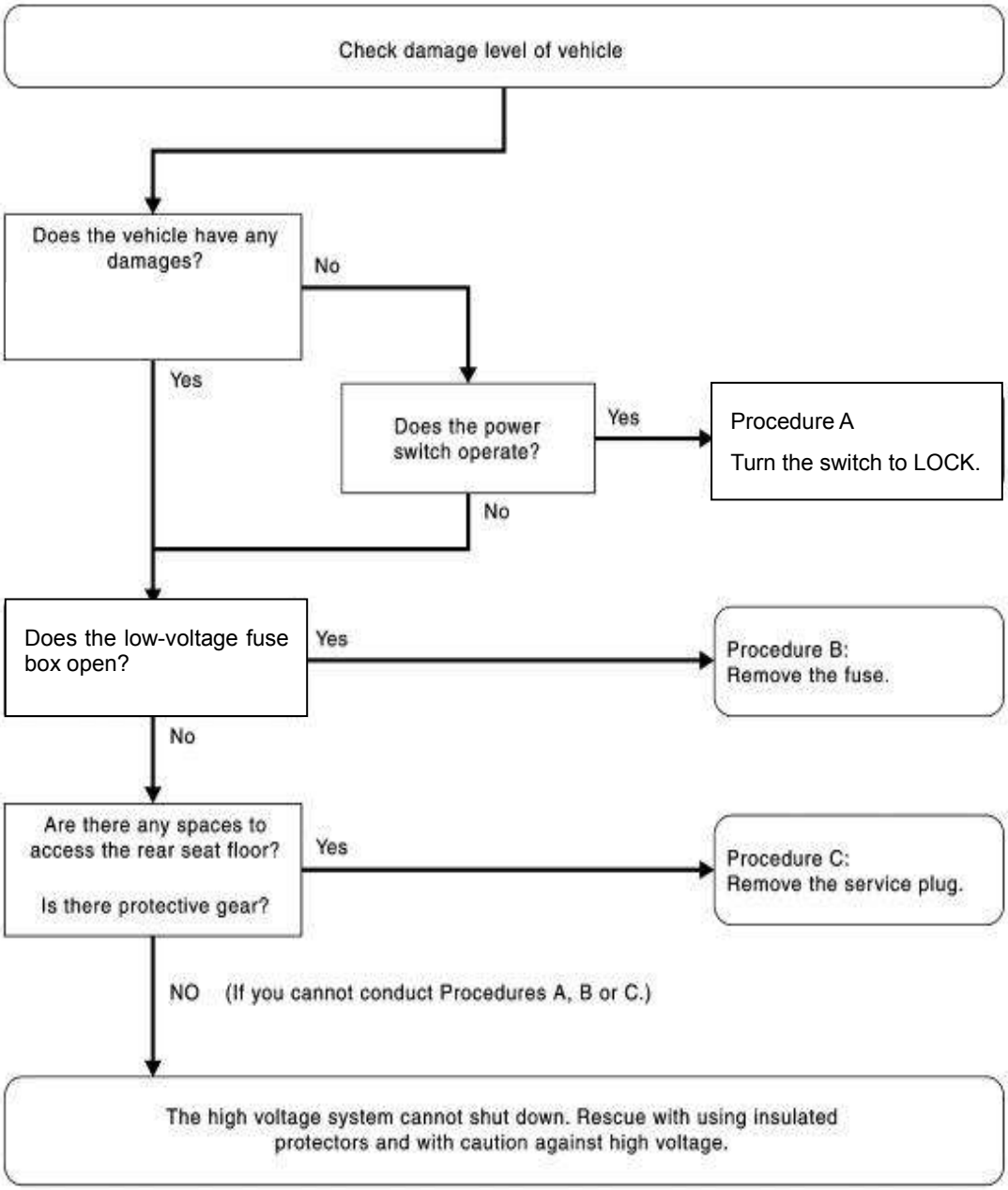
The first step for a damaged vehicle is to shut down high voltage system.Any of the following procedures can shut down the high voltage system.

If the vehicle is heavily damaged for example the battery is deformed broken or cracked insulating protective wear must be used and otherwise you must not touch the high voltage harness.

	• **If the charging harness is connected with the vehicle remove it.**
	• **To prevent from serious injury or death caused by electric shock must cut off the high voltage before dispose the damaged vehicle.Must not touch high voltage harness or parts with bare hands.**
	• **When contact with high voltage parts or harness is unavoidable or when there is risk of such contact be sure to wear insulating protective gloves.**

Caution

- **Before disconnecting the 12V battery negative terminal if necessary lower the windows unlock the doors and open the back door.Once the 12V battery is disconnected those operations will not be performed.**



Warning

- Be sure the high voltage system is disconnected when the key is in “LOCK” or “ACC”.
- Be sure the remote air conditioner remote charging and timing charge are OFF.
- The high voltage full discharged takes 10 minutes.And please wait for 10 minutes to complete discharging the high voltage.While waiting do not do any operation.
- After removing the 12V battery negative terminal do not be close to air bag within 1 minute.Otherwise there is a possibility of air bag explosion due to short circuit or damage and it may cause serious injuries.

Indications the high voltage system is ON

- If the READY indicator is ON the high voltage system is active.READY
- If the air conditioning indicator is ON the high voltage system is active.
- If the charging indicator is ON the high voltage system is active.

Procedure 1 Turn the key to “LOCK”

1 Check the state of READY indicator if it is ON the high voltage system is active.READY

2 Be sure the READY indicator lamp is OFF.

3 Disconnect the 12V battery negative terminal.Insulate the battery negative terminal with insulated tape.

4 Wait 10 minutes to complete discharging the high voltage condenser after the power switch has been turned OFF.

5 Perform the first response action for emergencies.

Procedure B Remove the fuses.(If power switch cannot be turned OFF)

1 Open the electronics box hood in front compartment.

2 Remove self-hold fuse.

3 If it cannot identify the above fuses remove all fuses in the fuse box.

4 Disconnect the 12V battery negative terminal.Insulate the battery negative terminal with insulated tape.

5 Wait 10 minutes to complete discharging the high voltage condenser after the power switch has been turned OFF.

6 Perform the first response action for emergencies.

Warning

- **Do not turn the power switch ON while fuses are being removed.**

- **To avoid unintended installation and risk of electric shock the serviceman should carry the fuses on himself/herself and do insulating treatment to the fuse box.**

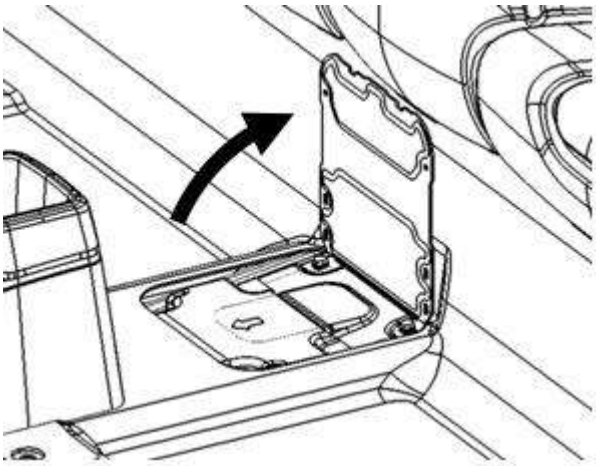
Procedure 3 Disconnect the service plug (when Procedure A and Procedure B are impossible and the use of insulating rubber gloves is possible)

Warning

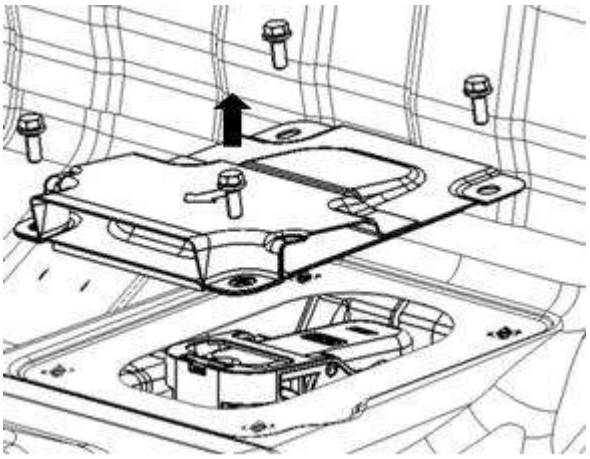
- Do not remove the service plug without wearing protective equipment to prevent any serious injury or death by electric shock.

1 Disconnect service plug

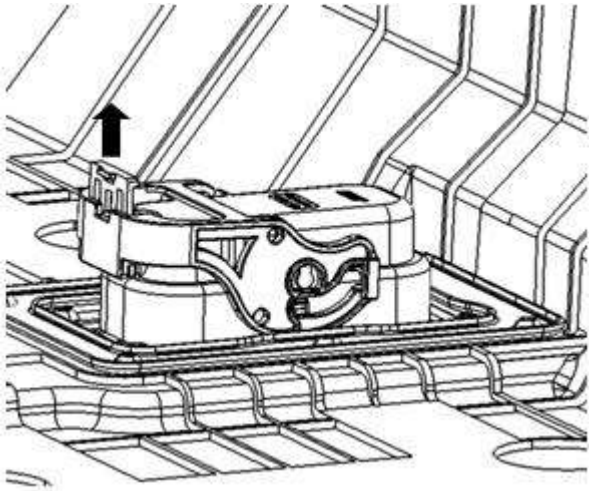
a、 Open the carpet cover above the service switch



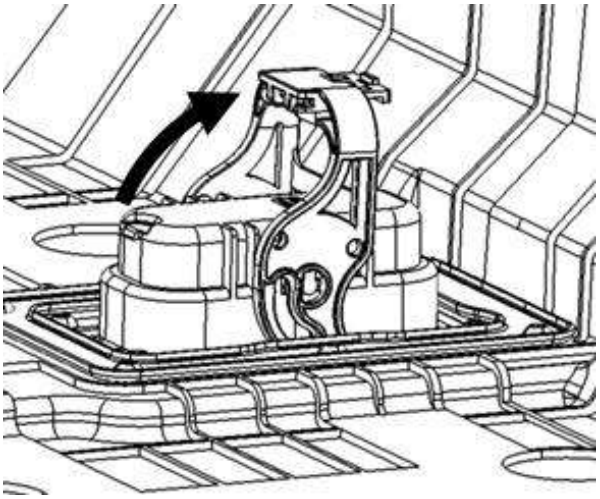
b、 Remove the installation bolts of service cover and take the service plug cover off



c、 Open the service plug second buckle



d、 Turn the service plug handle according to the direction in picture and then remove the service plug.



2 Wait 10 minutes to complete discharging the high voltage condenser after the power switch has been turned OFF.

3 Perform the first response action for emergencies.

Vehicle Fire

Warning

If it is possible use large amount of water from a fire hydrant to extinguish the fire.Do not use a small amount of water because small amount of water will make toxic gas produced by a chemical reaction between battery electrolyte and water.

Battery Pack Damage

Warning

Any absorbent mats r cloths use to wipe electrolyte must be disposed of as industrial waste as required by federal law.

- In case of electrolyte solution leakage wear insulating protective devices and wipe with a dry cloth.
- The battery electrolyte solution is clear color and has a pungent smell.Do not touch the electrolyte.
- The battery electrolyte solution is flammable.In case of leakage please keep properly ventilation.
- In case electrolyte solution comes in contact with eyes rinse plenty of running water and see a doctor immediately.

Disability of Vehicles

The battery pack must be removed from the vehicle before it is scrapped.

Warning

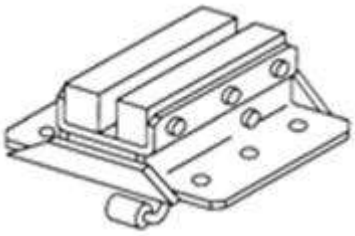
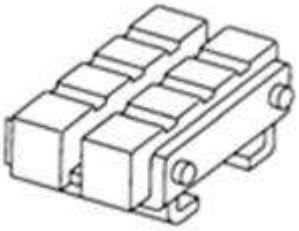
Insulate the high voltage terminals of the removed battery with insulating tape.

Handling of a Vehicle with a Faulted Battery

For the handling of a vehicle when the battery is dead refer to “Truck Towing” chapter.

LIFTING OF VEHICLE

Special Tools

Tool name	Description
Board lifting jack attachment	
Safety stand attachment	

Caution

- **Every time the vehicle is lifted up maintain the complete vehicle curb condition.**
- **Since the vehicle's center of gravity changes when removing main parts on the front side (engine transmission suspension etc.) support a jack up or equivalent tools point on the front or rear side of the vehicle..**
- **Be careful not to squeeze harness cables or pipelines.**

Jack Safety Stand and 2-Pole Lift

Warning

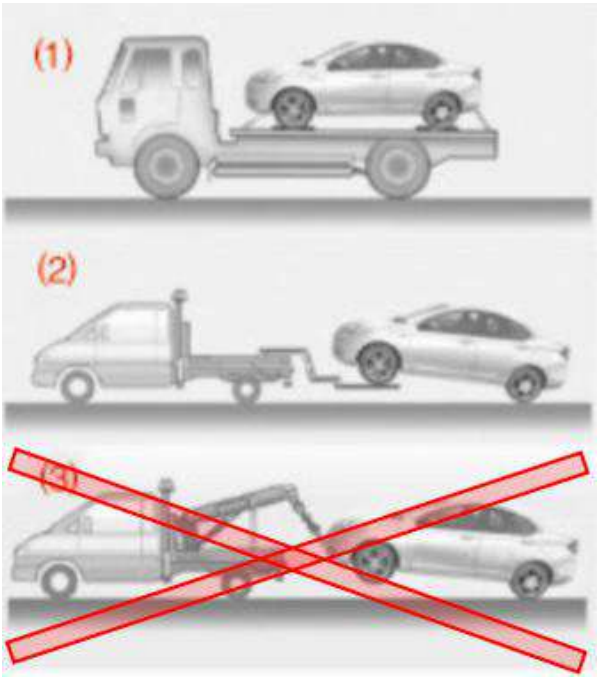
- **Park the vehicle on a level surface when using the jack.Check to avoid damaging pipes cables etc.under the vehicle.**
- **Never get under the vehicle while it is supported only by the jack.Always use safety stands when you have to get under the vehicle.**
- **Place wheel chocks at both front and back of the wheels on the ground.**
- **When lifting the vehicle open the lift arms as wide as possible and ensure that the front and rear of the vehicle are well balanced.**
- **When setting the lift arm never allow the arm to contact the brake pipes charging harness lower fence of battery.**

1 safety stand point and lift up point (front)

2 safety stand point and lift up point (rear)

Caution check the vehicle is empty when lifting.

TRUCK TOWING



- It is necessary to use proper towing equipment to avoid possible damage to the vehicle during towing operation.
- When towing make sure that the axles steering system and powertrain are in working condition.If any unit is damaged a flatbed must be used.

Normal Towing Methods

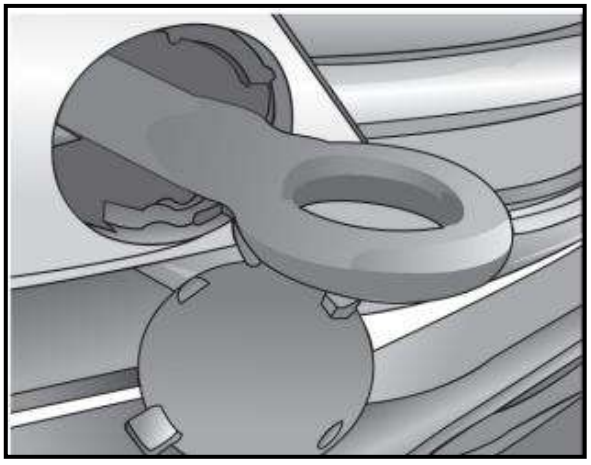
If you need to tow the vehicle please contact with DR authorized dealer or professional towing service company.Improper towing methods may damage the vehicle.

Three normal methods to tow the vehicle

- Flatbed — operator will load your vehicle on the truck.This is the best way to transport your vehicle.See picture (1).
- Carry the wheels — the method is to use two towing arms to insert the bottom of wheels (front) and carry them off the ground with other two tires still remained on the ground.See picture (2).
- Lifting — this method is to use metal cables with hook at the end and put the hook on frame or suspension to hang the front of vehicle off the ground by the cable.But this method is not available because it may seriously damage you vehicle or its suspension.See picture (3).

Vehicle Recovery (Freeing a Stuck Vehicle)

Front

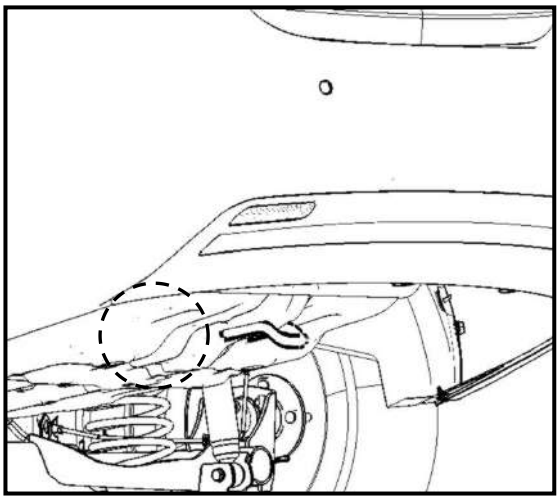


- Only use towing hook but no other parts.Otherwise the vehicle body will be damaged.
- Only use the vehicle towing hook to free a vehicle stuck in sand snow mud etc.Never tow the vehicle for a long time.
- When free a stuck vehicle the towing hook will bear a large force.So always pull the cable straight out from the front of the vehicle.Never pull on the hook at an angle.
- Stand clear of a stuck vehicle.

Warning

- Never spin your tires at high speed.This could cause them to explode and result in serious injury.Parts of your vehicle could also overheat and be damaged.
- Use wheel nut wrench to tightly assemble the dismountable towing hook.

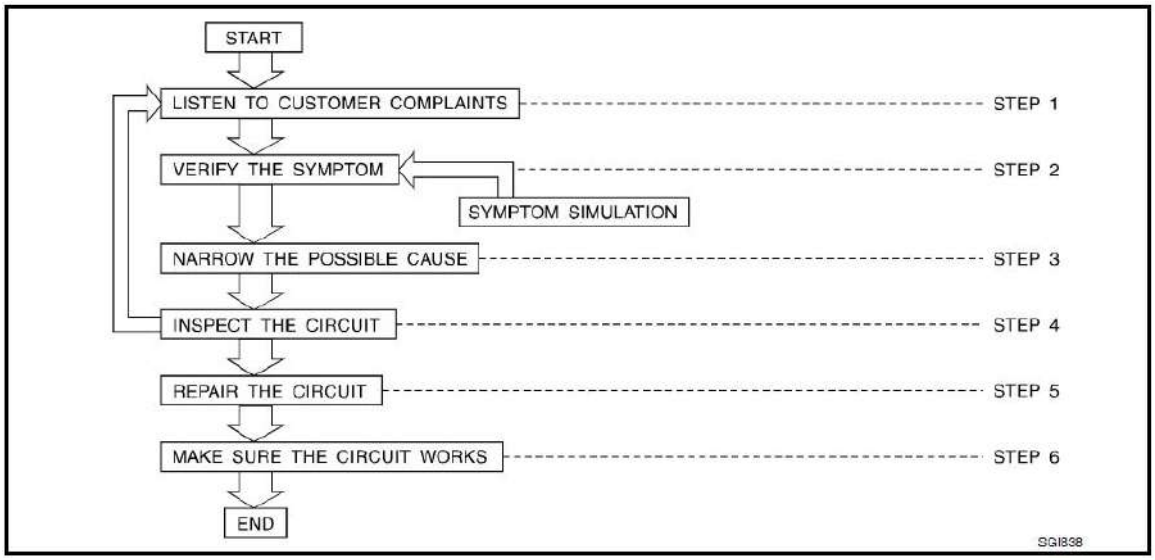
Rear



SERVICE INFORMATION FOR CIRCUIT FAULTS

How to Effiently Diagnose Circuit Fault

Work Flow



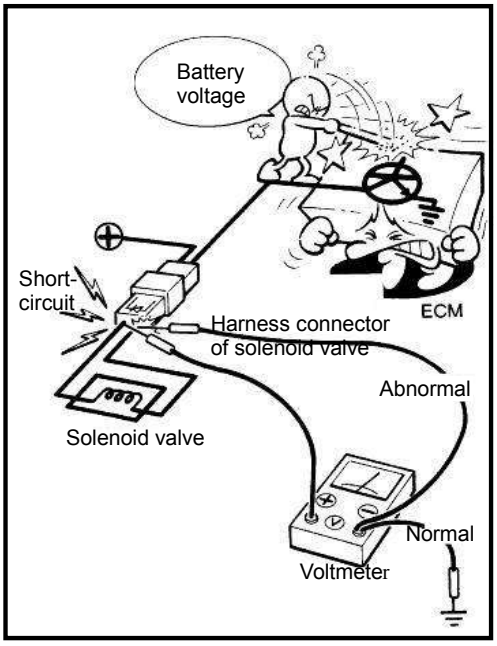
Step	Description
Step 1	Get detailed information about the conditions and the environment when the fault occurred The following are key pieces of information required to make a good analysis
	WHAT vehicle model engine vehicle controller battery management system and other systems (air conditioner).
	WHEN time date weather condition frequency.
	WHEN road conditions altitude and traffic situation.
	HOW system symptoms operating conditions (other components interactions). Service history and if any after market accessories have been installed.
Step 2	Operate the system road test if necessary; Verify the parameter of the fault; If the problem cannot be duplicated refer to “Fault Simulation Tests”.
Step 3	Collect the proper diagnosis materials together including ● Power supply routing ● System operation description ● Applicable service manual sections ● Check for any service bulletins Identify where to begin diagnosis based on your knowledge of the system operation and the customer comments.
Step 4	Check the system for mechanical binding loose connectors or wiring damage. Determine which circuits and components are involved and diagnose using the power supply routing and harness layouts.
Step 5	Repair or replace the faulted circuit or components.
Step 6	Operate the system in all modes.Verify the system works properly under all conditions.Check you have not inadvertently created a new fault during your diagnosis or repair steps.

Control Units and Electrical Parts

Precautions

- Never reverse battery terminals.
- Install only parts specified for a vehicle.
- Before replacing the control unit check the input and output functions of the components.
- Do not apply excessive force when disconnecting a connector.
- Do not drop or strike control unit.
- Be careful to prevent condensation in the control unit due to rapid temperature changes and do not let water or rain get on it.If water is found in the control unit dry it fully and then install it in the vehicle.

- Be careful not to let oil get on the control unit connector.
- Avoid cleaning the control unit with volatile oil.
- Do not disassemble the control unit and do not remove the upper and lower covers.
- when using a multimeter be careful not to let test probes get close to each other to prevent the power transistor in the control unit from changing battery voltage because of short circuiting.



- When checking input and output signals of the control unit use the specified check adapter.

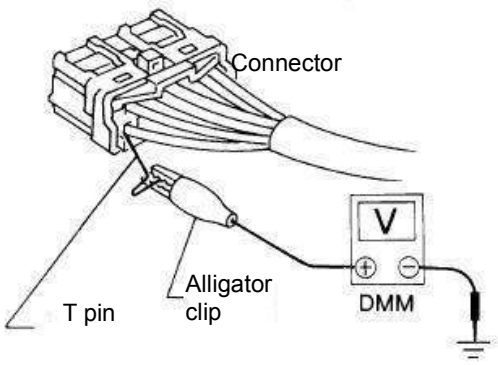
How to Check Connectors

- During circuit checks improper operation can cause connector damage or intermittent connection.
- The probe of a digital multimeter (DMM)may not correctly fit the connector cavity.To correctly probe the connector follow the procedures below using a T pin.For the best contact grasp the T pin using an alligator clip.

Measuring from Harness Side

Standard type (not waterproof type) connector should be measured from harness side with T pin.“T”

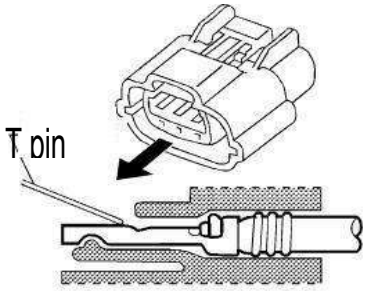
- If the connector has a rear cover such as a ECM connector remove the rear cover before measuring the terminal.
- Do not measure waterproof connector from harness side.Otherwise it may damage the seal ring in the connector.



Measuring from Terminal Side

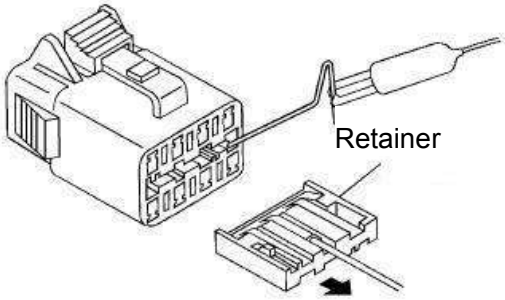
Female terminal

- There is a small notch above each female terminal and probe each terminal with the T pin through the notch. Do not insert unmatched terminals of male terminal.



Sectional view (female)

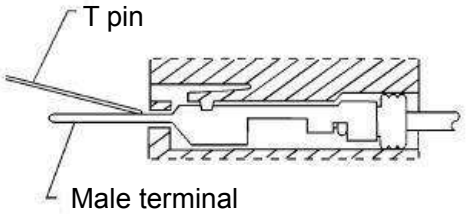
- Some connectors do not have a notch above each terminal.To probe each terminal remove the connector retainer to make contact space for probing.



Male terminal

- Carefully probe the contact surface of each terminal using a T pin.“T”

Sectional view (male)



Caution

Never bend terminal.

How to Check Poor Contact of Terminal

- Poor contact of terminal may create intermittent signals in the circuit.
- If the intermittent open circuit occurs follow the procedure below to inspect for open wires and poor contact.

1 Prepare a male terminal and 10cm of wire.10CM

Caution

Use a male terminal which matches the female terminal.

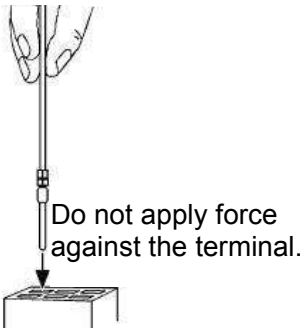
2 Disconnect the suspected faulty connector and hold it terminal side up.

Male terminal Wire

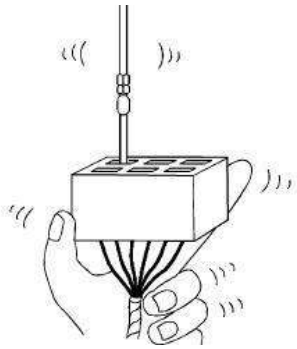
3 While holding the wire of the male terminal try to insert the male terminal into the female terminal.

Caution

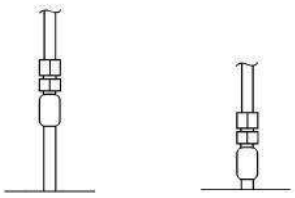
Never force the male terminal into the female terminal with your hands.



4 While moving the connector check whether the male terminal can be easily inserted or not.



- If the male terminal can be easily inserted into the female terminal replace the female terminal.



Qualified Unqualified

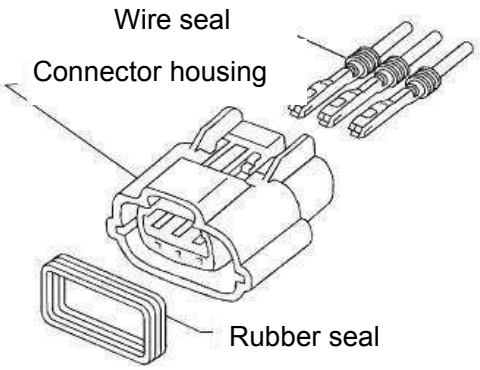
Waterproof Connector Inspection

If water waters the connector it can short interior circuits.This may be a common problem.

Check the flowing items to maintain the original waterproof characteristics.

Rubber Seal Inspection

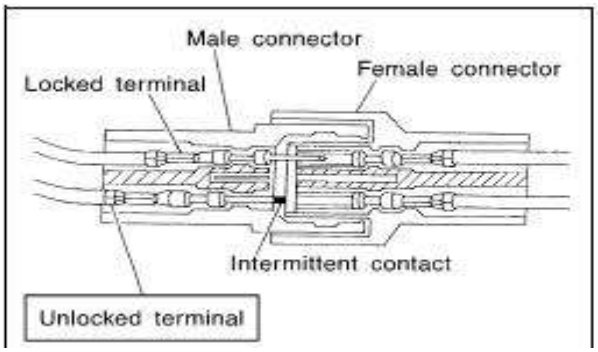
- Most waterproof connectors are provided with a rubber seal between the male and female connectors.If the seal is missing the waterproof performance may not meet specifications.



- The rubber seal may come off when connectors are disconnected.Whenever connectors are reconnected make sure the rubber seal is properly installed on either side of male or female connector.

Waterproof Plug Inspection

- The waterproof plug must be installed on the crimping area of harness and terminal.Be sure that the waterproof plug is installed properly.



Terminal Self-lock Inspection

- check if the terminal is locked by pulling wire at the end of connector.An unlocked terminal may create poor contact of harness.

Fault Simulation Test

Introduction

Sometimes the symptom is not present when the vehicle is brought in for service.So we have to re-create the conditions present at the time of the fault.Doing so may help avoid unnecessary fault diagnosis.The following section illustrates ways to simulate the conditions/ environment under an electrical fault.This section is divided into six following topics

- Vehicle vibration
- Heat sensitive
- Freezing
- Water intrusion
- Electrical load
- Cold or hot start up

Get a thorough description of the fault from the customer.It is important for simulating the conditions of the problem.

Vehicle Vibration

The problem may occur or become worse while driving on a rough rod or when engine A/C compressor is vibrating.In such a case you will want to check for a vibration related condition.Refer to the following illustration.

Connector & Harness

Determine which connectors and wiring harness would affect the electrical system you are inspecting.Gently shake each connector and harness while monitoring the system for whether the fault will occur again.This test may indicate a loose or poor electrical connection.

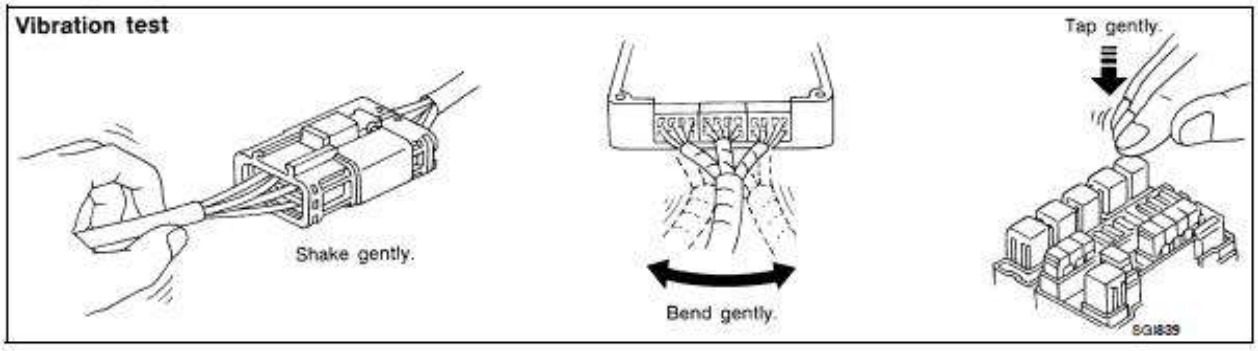
Hint

Connectors can be exposed to moisture.It is possible to get a thin film of corrosion on the connector terminals.A visual inspection may not reveal this without disconnecting the connector.If the problem occurs intermittently perhaps the problem is caused by corrosion.It is a good idea to disassemble inspect and clean the terminals on related connectors in the system.

Sensor & Relay

Gently shake the sensors and relays in the system you are inspecting.

This test may indicate a loose or poorly mounted sensor or relay.



Front compartment

There are several reasons a vehicle or motor vibration could cause an electrical complaint.Some of the things to check for are

- Connectors not fully seated.
- Wiring harness not long enough and is being stressed due to engine vibration or shaking.
- Wires laying across brackets or moving components.
- Loose dirty or corroded ground wires.
- Wires routed too close to hot components.

To inspect components under the hood start by verifying the integrity of ground connections.(Refer to “Ground Inspection” described later.) First check that the system is properly grounded.The check for loose connection by gently shaking the wiring or components as previously explained.Using the wiring diagrams inspect the wiring for continuity.（）

Behind the Instrument Panel

An improperly routed or improperly clamped harness can become pinched during accessory installation.Vehicle vibration can damage a harness which is routed along a bracket or near a screw.

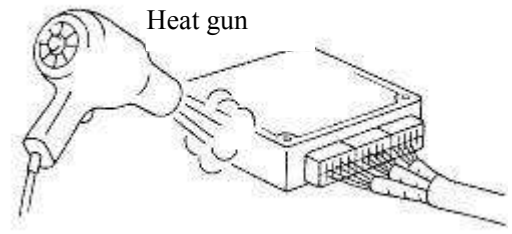
Under the Seat

An unclamped or loose harness can cause wiring to be pinched by seat components such as slide guides during vehicle vibration.If the wiring runs under the seats inspect wire routing for possible damage or pinching.

Heat sensitive

Sometimes customers may have this problem during hot weather or after car has sat for a short time.In such cases you will want to check for a heat sensitive condition.

Heating test



Do not heat above 60℃ （140°F）

To determine if an electrical component is heat sensitive heat the component with a heat gun or equivalent.

Caution

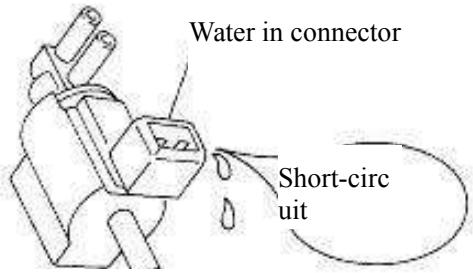
Never heat components above 60°C（140°F）.**60°C**（**140°F**）

If fault occurs while heating the unit either replace or properly insulate the component.

Freezing

The customer may indicate the fault goes away after the car warms up (winter time).The cause could be related to water freezing somewhere in the wiring/ electrical system.

Freezing test



Solenoid

Two methods to check

The first is to arrange for the owner to leave the car overnight.Check it will get cold enough to demonstrate his complaint.Leave the car parked outside overnight.In the morning do a quick and thorough diagnosis of those electrical components which could be affected.

The second method is to put the suspect component into a freezer long enough for any water to freeze.Reinstall the part into the car and check for the reoccurrence of the fault.If it occurs repair or replace the component.

Water Intrusion

The fault may occur only during high humidity or in rainy/ snowy weather.In such cases the fault could be caused by water intrusion on an electrical part.This can be simulated by soaking the car or running it through a car wash.

Water intrusion test

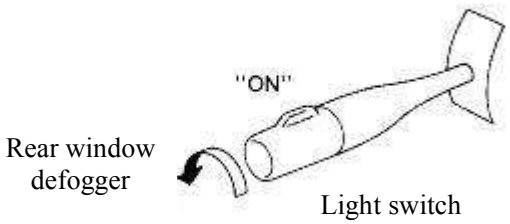
Caution

Never spray water directly on any electrical components.

Electrical load

the fault may be electrical load sensitive.Perform diagnosis with all accessories (including A/C rear window defogger radio fog lamps) turned on.

Electrical load test



Cold or Hot Start Up

On some occasions an electrical fault may occur only when the car is started cold or it may occur when the car is restarted hot shortly after being turned off.In these cases you may have to keep the car overnight to make a proper diagnosis.

Circuit Inspection

Description

In general testing electrical circuits is an easy task if it is approached in a logical and organized method.First it is important to have all available information on the system to be tested.Also get a thorough understanding of system operation.Then you will be able to use the appropriate equipment and follow the correct test procedure.

You may have to simulate vehicle vibrations while electrical components.Gently shake the wiring harness or electrical components to do this.

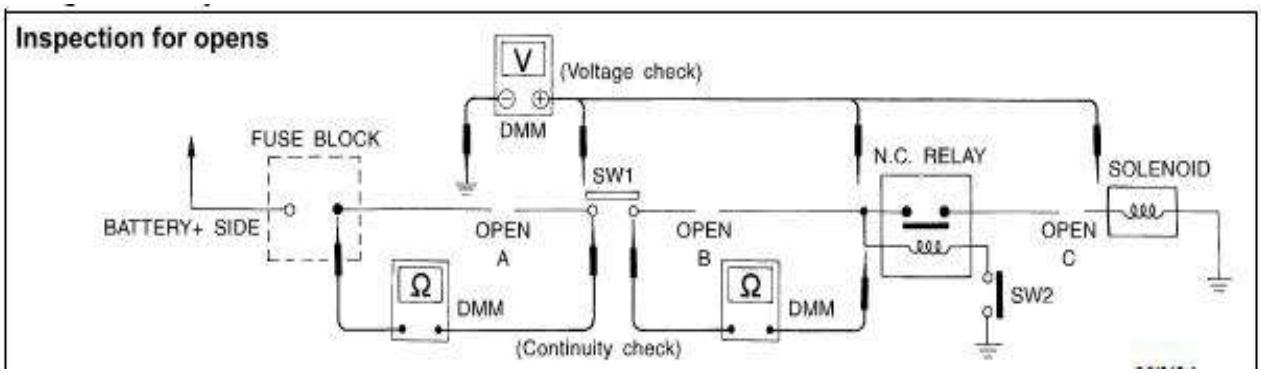
Open	A circuit is open hen there is no continuity through a section of the circuit.
Short	There are two types of shorts.
	Short Circuit When a circuit contacts another circuit and causes the normal resistance to change.
	Short to Ground When a circuit contacts a ground source and grounds the circuit.

Note

Please refer to “How to Check Terminal Port” to probe or inspect terminal port.

Testing for "Opens" in the Circuit

Before you begin to diagnose and test the system you should rough sketch a schematic of the system.This will help you to logically walk through the diagnosis process.Drawing the sketch will also reinforce your working knowledge of the system.



Continuity check method

The continuity check is used to find an open in the circuit.The digital multimeter (DMM) set on the resistance function will indicate an open circuit as over limit (no beep tone or no ohms symbol).Check to always start with the DMM at the highest resistance level.

To help in understanding the diagnosis of the open circuits please refer to the previous schematic.

- Disconnect the battery negative terminal.
- Start at one end of the circuit and inspect to the other end.(At the fuse block in this example)
- Contact one probe of the DMM to the fuse block terminal on the load side.
- Contact the other probe to the fuse block (power) side of SW1.Little or no resistance will indicate that portion of the circuit has good continuity.If there were an open in the circuit the DMM would indicate an over limit or infinite resistance condition.(point A)
- Connect the probes between SW1 and the relay.Little or no resistance will indicate that portion of the circuit has good continuity.If there were an open in the circuit the DMM would indicate an over-limit or infinite resistance condition.(point B)
- Connect the probes between the relay and the solenoid.Little or no resistance will indicate that portion of the circuit has good continuity.If there were an open in the circuit the DMM would indicate an over-limit or infinite resistance condition.(point C)

Any circuit can be diagnosed using the approach in the previous example.

Voltage Check Method

To help in understanding the diagnosis of open circuits please refer to the previous schematic.

In any powered circuit an open can be found by methodically checking the system for the presence of voltage.This is done by switching the DMM to the voltage function.

- Connect one probe of the DMM to a known good ground.
- Begin probing at one end of the circuit and inspect to the other end.
- With SW1 open probe at SW1 to check for voltage.SW1

Voltage the open is further down the circuit than SW1.

No voltage the open is between fuse block and SW1 (point A).

- Close SW1 and probe at relay.SW1

Voltage the open is further down the circuit than the relay.

No voltage the open is between SW1 and the relay (point B).

- Close the relay and probe at the solenoid.

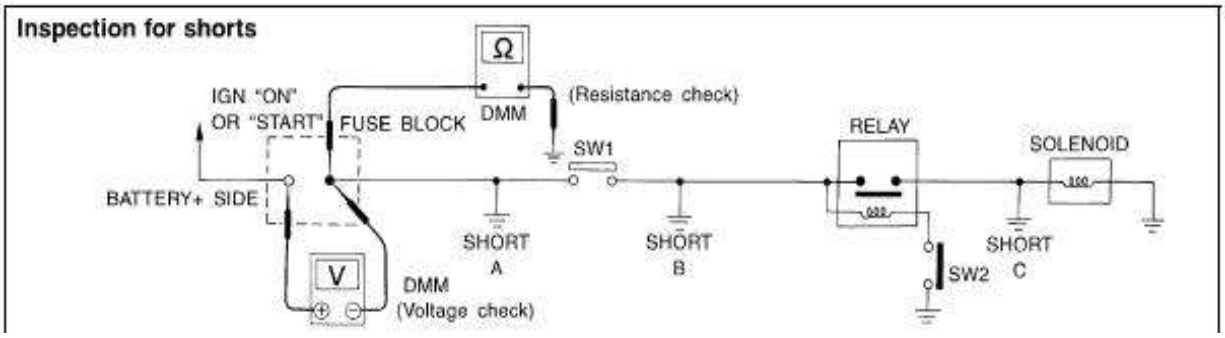
Voltage the open is further down the circuit than the solenoid.

No voltage the open is between the solenoid and the relay (point C).

Any circuit can be diagnosed using the approach in the previous example.

Testing for "Shorts" in the Circuit

To simplify the discussion of shorts in the system please refer to the following schematic.



Resistance Check Method

- Disconnect the battery negative terminal and remove the blown fuse.
- Disconnect all loads (SW1 open relay disconnected and solenoid disconnected) powered through the fuse.
- Connect one probe of the DMM to the load side of the fuse terminal.Connect the other probe to a known good ground.
- With SW1 open check for continuity.SW1

Continuity the short is between fuse terminal and SW1 (point A)

No continuity the short is further down the circuit than SW1.

- Close SW1 and disconnect the relay.Put probes at the load side of fuse terminal and a known good ground.Then check for continuity.

Continuity the short is between SW1 and the relay (point B)

No continuity the short is further down the circuit than the relay,

- Close SW1 and jump the relay contacts with jumper wire.Put probes at the load side of fuse terminal and a known good ground.Then check for continuity.

Continuity the short is between the relay and the solenoid (point C)

No continuity check solenoid back to the check.

Voltage Check Method

- Remove the blown fuse and disconnect all loads (i.e.SW1 open relay disconnected and solenoid disconnected) powered through the fuse.
- Turn the power switch to the ON or START position.Verify battery voltage at the battery + side of the fuse terminal (one probe on the battery + terminal side of the side block and one probe on a known good ground).
- With SW1 open and the DMM probes across both fuse terminals check for voltage.SW1

Voltage the short is between fuse block and SW1 (point A)

No voltage the short is further down the circuit than SW1.

- With SW1 closed relay and solenoid disconnected and the DMM probes across both fuse terminals check for voltage.SW1

Voltage the short is between SW1 and the relay (point B).

No voltage the short is further down the circuit than the relay.

- With SW1 closed relay contacts jumped with fused jumper wire and then check for voltage.

Voltage the short is down the circuit of the relay or between the relay and the disconnected solenoid (point C).

No voltage back to the checking steps and check power of fuse block.

Ground Inspection

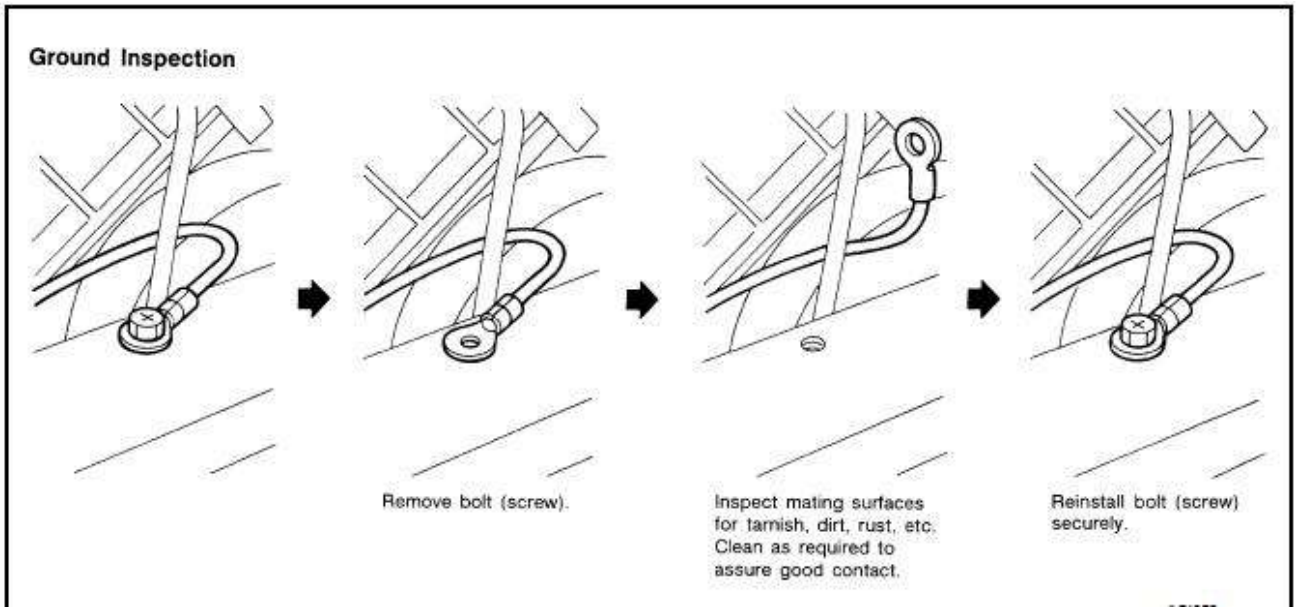
Ground connections are very important to the proper operation of electrical and electronic circuits.Ground connections are often exposed to moisture dirt and other corrosive elements.The corrosion (rust) can become an unwanted resistance.This unwanted resistance can change the way a circuit works.

Controlling signal circuits are very sensitive to proper grounding.A loose or corroded ground can drastically affect an controlling signal.A poor or corroded ground can easily affect the circuit.Even when the ground connection looks clean there can be a thin film of rust on the surface.

When inspecting a ground connection please follow these methods

- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish dirt rust etc.
- Clean as required to assure good contact.
- Reinstall bolt or screw tightly.
- Inspect for “add-on” accessories which may be interfering with the ground circuit.“ ”
- If several wires are crimped into one ground plate check for proper crimps.Check all of the wires are clean fastened providing a good ground path and with no excess wire insulation.

For detailed ground distribution information refer to “Ground and Loop” section.



Voltage Drop Tests

Voltage drop tests are often used to find components or circuits which have excessive resistance.A voltage drop in a circuit is caused by a resistance when the circuit is in operation.

Check the wire in the following picture.When measuring resistance with DMM contact by a single strand of wire will give reading of 0 ohms.This indicates a good circuit.But when the circuit operates this single strand of wire is not able to carry the current.The single strand will have a high resistance to the current.This will produce a slight voltage drop.

Unwanted resistance can be caused by many situations as follows

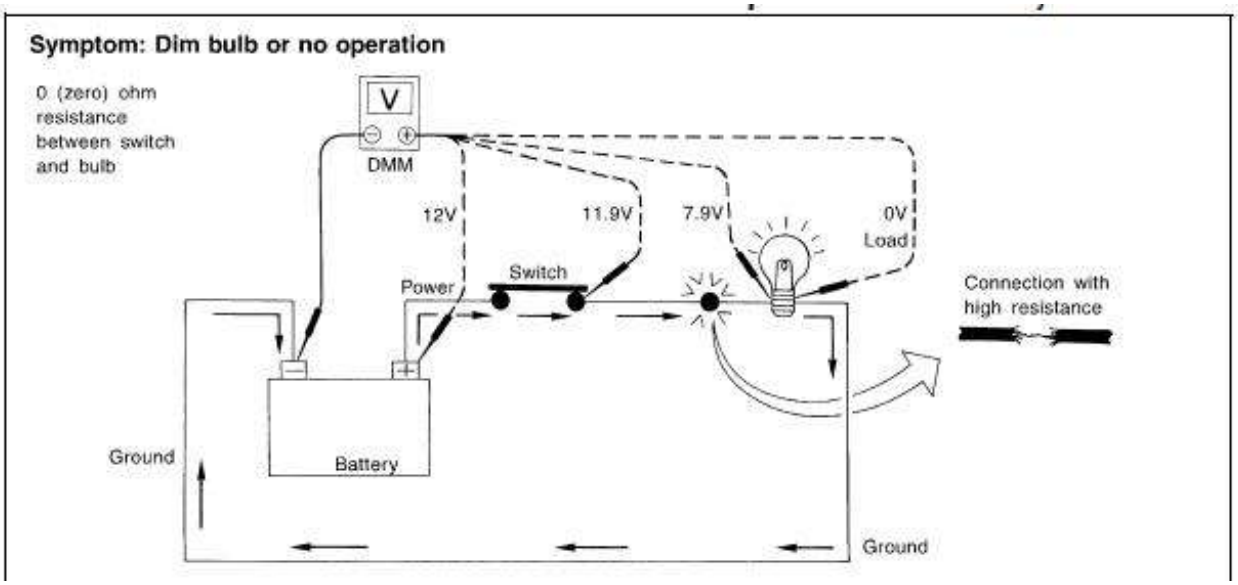
- Undersized wiring (i.e.single strand)
- Corrosion on switch contacts
- Loose wire connections or splices.

During the repair always use wire that is of the same or larger gauge.

Measuring Voltage Drop---Accumulating Method

- Connect the DMM across the connector or part of the circuit you want to check.The positive probe of the DMM should be closer to power and the negative probe closer to ground.
- Operate the circuit.
- The DMM will indicate how many volts of the circuit.

Note in the illustration that there is an excessive 4.1 volt drop between the battery and the bulb.



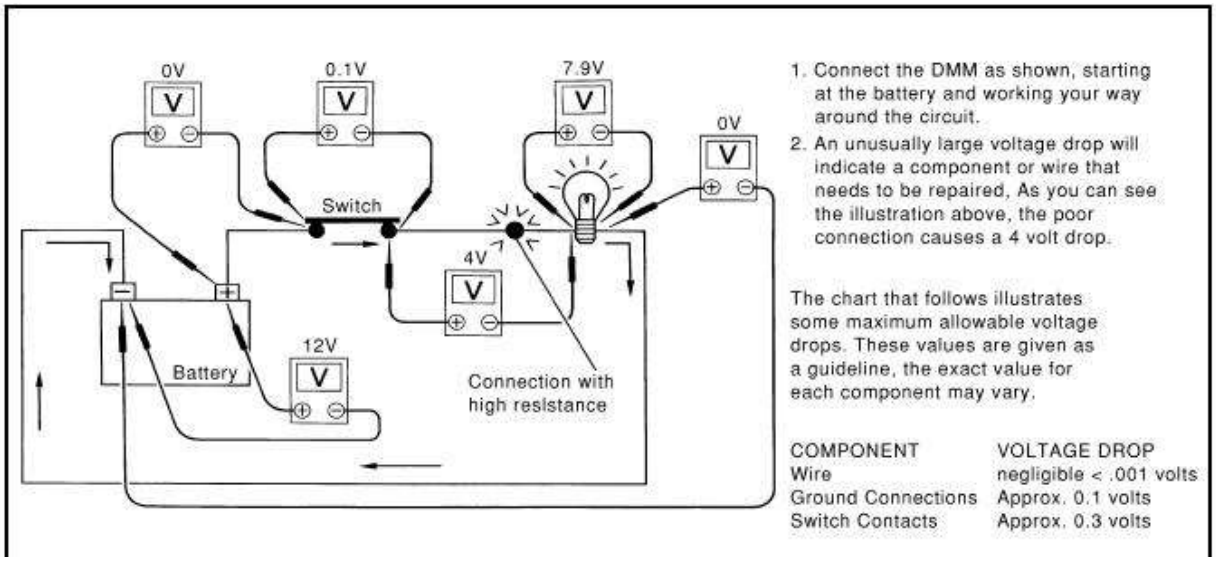
Measuring Voltage Drop --- Step by Step

The step-by-step method is most useful for checking excessive drops in low voltage systems.

Operation current of controlling system is very low.

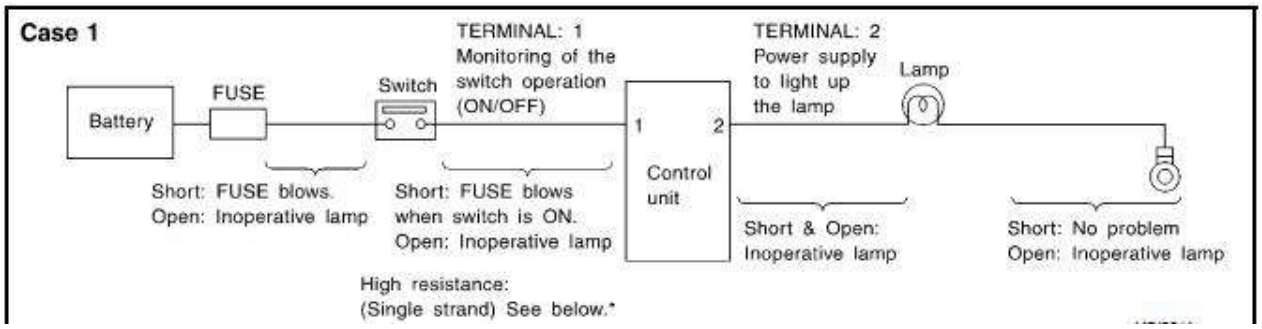
The controlling system operations can be adversely affected by any variation in resistance in the system.Such resistance variation may be caused by poor connection improper installation improper wire gauge or corrosion.

The step-by-step voltage drop test can identify a component or wire with too much resistance.



Control Unit Circuit Test

System description when the switch is ON the control unit lights up the lamp.“ON”

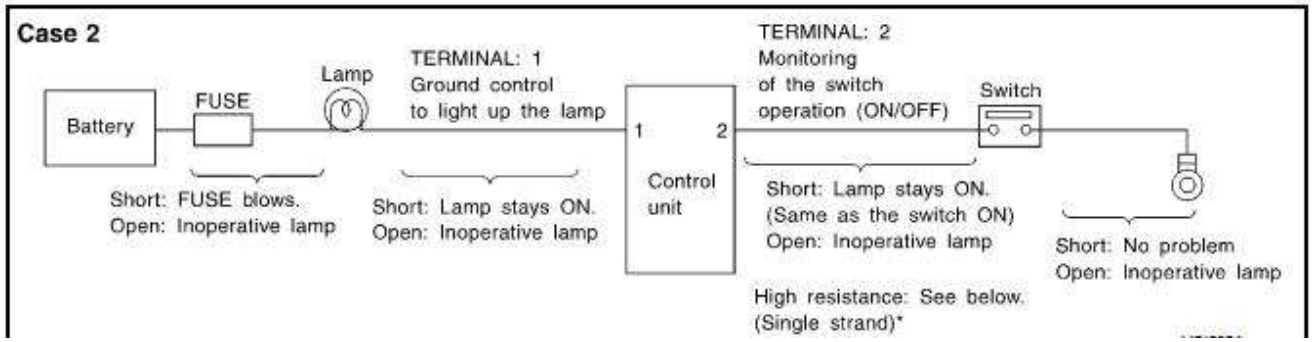


Input - Output Voltage Chart

Terminal No.	Items	Condition	Value [V]	In case of high resistance such as single strand [V] *
1	Switch	Switch ON	Battery voltage	Lower than battery voltage approx.8 (Example)
		Switch LOCK	Approx.0	Approx.0
2	Lamp	Switch ON	Battery voltage	Approx.0 (inoperative lamp)
		Switch LOCK	Approx.0	Approx.0

The voltage value is based on the body ground.

*If high resistance exists in the switch side circuit (caused by a single strand) then terminal 1 could not detect battery voltage.Control unit could not detect the switch is ON or not even if the switch is already in ON.Therefore the control unit does not supply power to light up the lamp.



Input - Output Voltage Chart

Terminal No.	Items	Condition	Value [V]	In case of high resistance such as single strand [V] *
1	Lamp	Switch ON ON	Approx.0	Battery voltage (inoperative lamp)
		Switch LOCK	Battery voltage	Battery voltage
2	Switch	Switch ON	Approx.0	Higher than 0 approx.4 Approx.4 (Example)
		Switch LOCK	Approx.5	Approx.5

The voltage value is based on the body ground.

*If high resistance exists in the switch side circuit (caused by a single strand) then terminal 2 could not detect approx.0V battery voltage.Control unit could not detect the switch is ON or not even if the switch is already in ON.Therefore the control unit does not provide ground connection signal to light up the lamp.

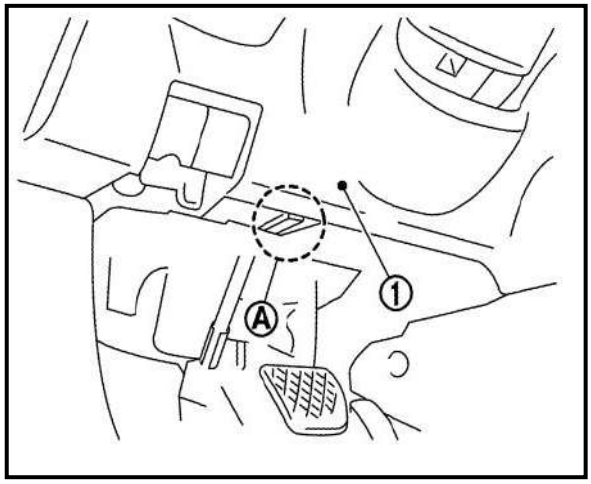
DIAGNOSTIC TOOL CHECKING SYSTEM FOR NEW ENEERGY VEHICLE

Description

- When the diagnostic tool is connected with the vehicle OBD (A) it will communicate with the control unit and do the diagnostic tests.OBD（A）

1:Left lower of instrument panel

- Refer to “Diagnosis Operation Manual of New Energy Vehicle” for more detailed information.



Diagnostic Tool Function and System Application

Function

Mode	Function
DTC reading	Display all fault codes or diagnostic items that all controller identifying or recording
Work support	This code enables a technician to adjust some devices faster and more accurately
Self-diagnosis	Retrieve DTC from ECU and display diagnostic items
Data monitoring	Monitor the input/output signal of the control unit in real time /
CAN communication diagnosis CAN	This mode displays a diagnosis result about CAN communication
DTC& self-diagnosis result confirmation DTC	The status of system monitoring tests and the self-diagnosis result can be confirmed
ECU identification ECU	Display the ECU identification number (part number) of the selected system
Configuration	Function of read/write vehicle configuration /
Special function	Other results or histories that are recorded in ECU are displayed

System Application

System	DTC reading	Self-diagnosis	Data monitoring	CAN communication diagnosis	DTC& self-diagnosis result confirmation	ECU identification	Configuration
Vehicle controller	√	√	√	√	√	√	√
Motor controller	√	√	√	√	√	√	
Battery controller	√	√	√	√	√	√	
A/C panel controller		√	√	√			
A/C compressor controller		√	√	√			
On-board charger	√	√	√	√	√		
Remote intelligent end		√	√	√			
Electric instrument			√	√			
ABS		√	√	√			

New Energy Vehicle Diagnostic Tool Data Link Circuit

Inspection Procedure

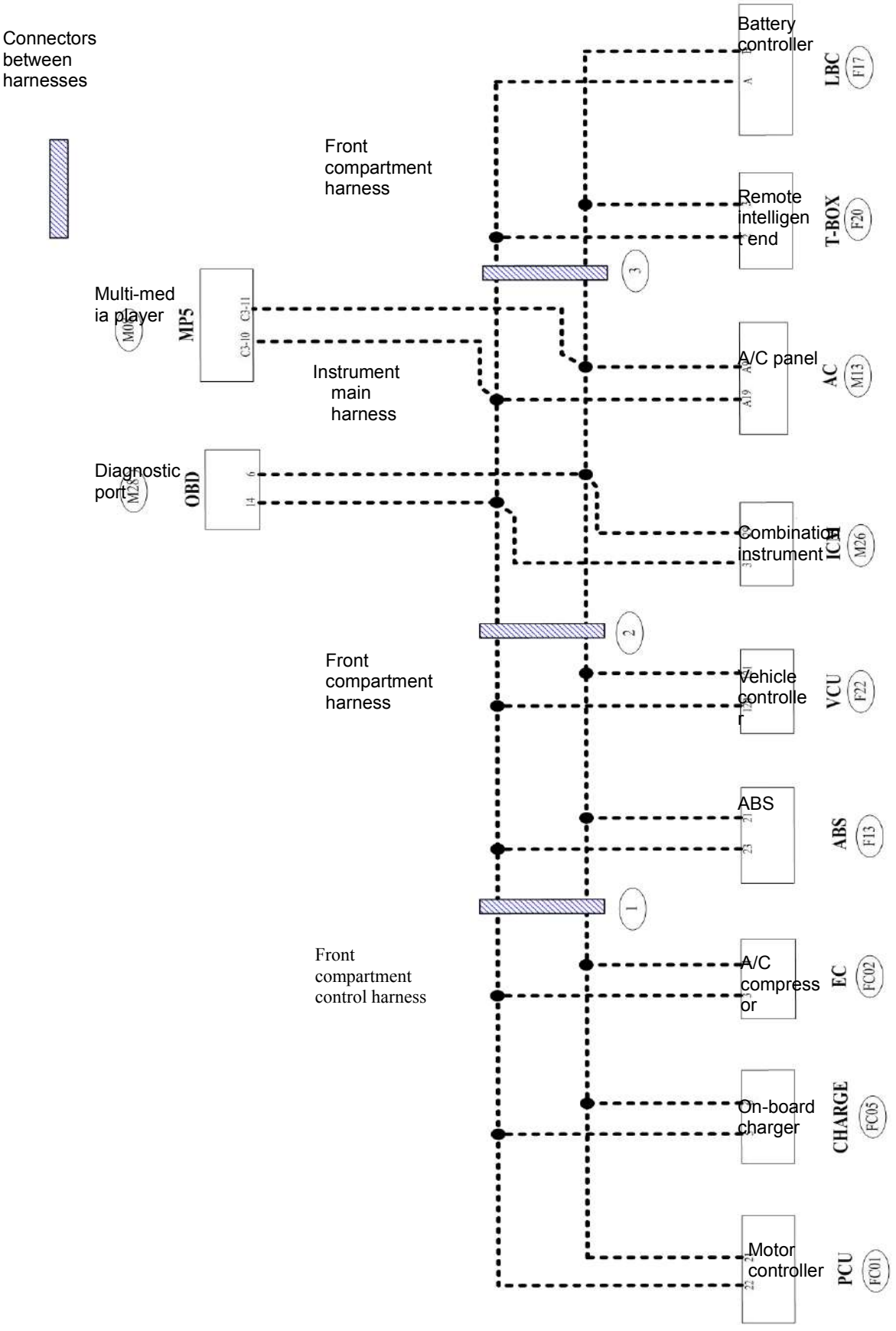
If the diagnostic tool cannot diagnose the system properly please check the following items.

Symptom	Check item
Diagnostic tool cannot access all systems	Check the power supply and ground circuit of diagnostic tool
Diagnostic tool cannot access an individual system (other systems can be accessed)	● Power supply and ground circuit of system controller (for detailed circuit refer to schematic diagram for each system) ● Open or short circuit between the system and diagnostic tool data link connector (for detailed circuit refer to schematic diagram for each system Open or short circuit CAN communication line

Note

The diagnostic tool data link connector is connected to many systems.A short in a diagnostic tool data link connector connected to a control unit in one system may affect the diagnostic tool access to other systems.

WIRING SCHEMATIC DIAGRAM OF DIAGNOSTIC TOOL CHECKING SYSTEM


Connectors between harnesses
Front compartment harness
Instrument main harness
Front compartment harness
Front compartment control harness
Multi-media player
MP5
M05
C3-10
C3-11
Diagnostic port
OBD
M28
Battery controller
LBC
F17
Remote intelligent end
T-BOX
F20
A/C panel
AC
M13
Combination instrument
ICM
M26
Vehicle controller
VCU
F22
ABS
ABS
F13
A/C compressor
EC
FC02
On-board charger
CHARGE
FC05
Motor controller
PCU
FC01

Between front compartment control harness and front compartment wiring harness

Connector No.	1
Connector Name	Connectors between wiring harness

Terminal No.	Color of wiring	Signal Name
33	G	CANLd CAN High
38	Y	CANHd CAN High

Between front compartment wiring harness and instrument CAN

Connector No.	2
Connector Name	Connectors between wiring harness

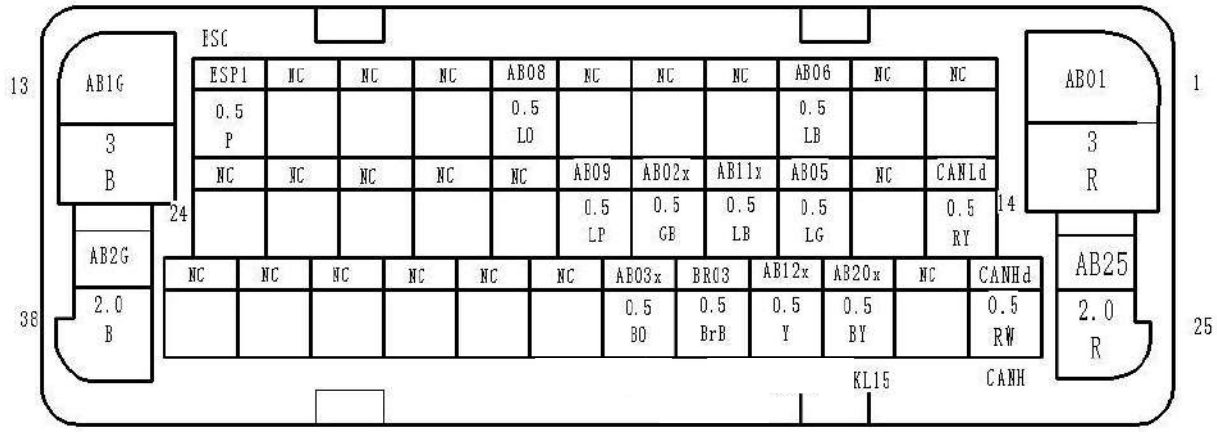
Terminal No.	Color of wiring	Signal Name
1	G	CANLd CAN High
2	Y	CANHd CAN High

Between front compartment wiring harness and instrument CAN

Connector No.	3
Connector Name	Connectors between wiring harness

Terminal No.	Color of wiring	Signal Name
10	G	CANLd CAN High
11	Y	CANHd CAN High

Connector number	F13
Connector name	ABS controller
Connector type	1-1379208-2

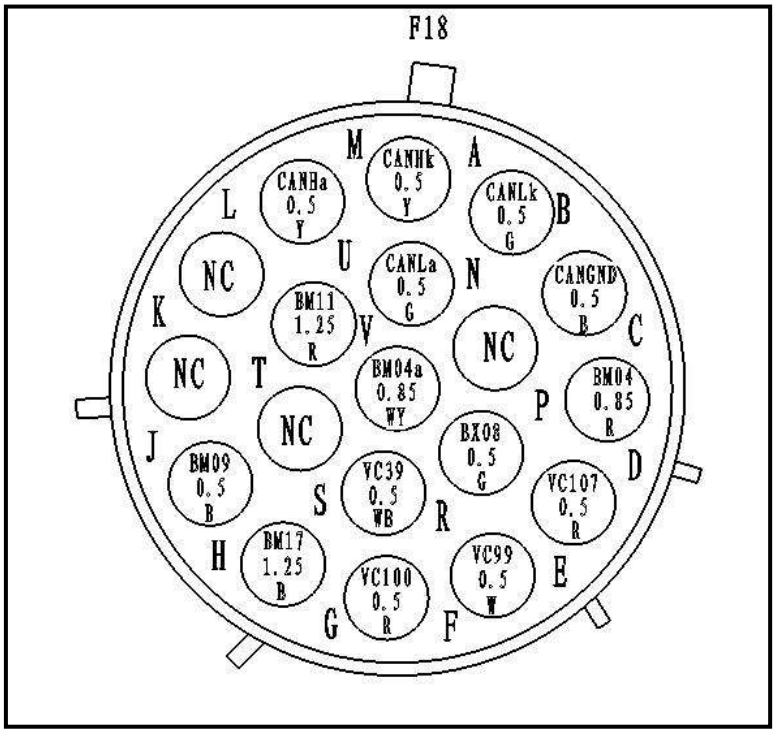


Terminal No.	Wire color	Signal name
1	R	AB01 ABS motor power supply positive
4	LB	AB06 Right Front Wheel Speed Sensor ground
8	LO	AB08 Left Front Wheel Speed Sensor
12	P	ESP1 ESC Switch
13	B	AB1G ABS motor power ground
14	RY	CANLd CAN low
16	LG	AB05 Right Front Wheel Speed Sensor signal wire
17	LB	AB11 Right Front Wheel Speed Sensor signal wire
18	GB	AB02x Left Rear Wheel Speed Sensor ground
19	LP	AB09 Left Front Wheel Speed Sensor signal wire
25	R	AB25 valve relay power supply
26	RW	CANHd CAN high
28	BY	AB20x Controller Power Supply (IG1)

29	Y	AB12x Right Rear Wheel Speed Sensor ground
30	BrB	BR03 brake light switch input
31	BO	AB03x Left Rear Wheel Speed Sensor signal wire
38	B	AB2G controller ground

Battery controller（LBC）

Connector number	F17
Connector name	LBC
Connector type	RT061619PNHEC03

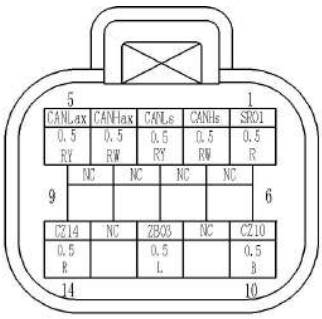


Terminal number	Wire color	Signal name
A	Y	CANHk CAN_H signal communication
B	G	CANLk CAN_L signal communication
C	B	CANGED CAN shielded ground
D	R	BM04 High level effective
E	R	VC107 B+ relay control
F	W	VC99 B+ relay control

G	R	VC100 Precharge relay control
H	B	BM17 Fan power ground
J	B	BM09 LBC power ground
M	Y	CANHa Inner CAN high
N	G	CANLa Inner CAN low
R	G	BX08 High voltage interlock signal 1
S	WB	VC39 High voltage interlock signal 2
U	R	BM11 LBC fan power supply
V	WY	BM04a LBC power

Remote intelligent terminal (T-Box)

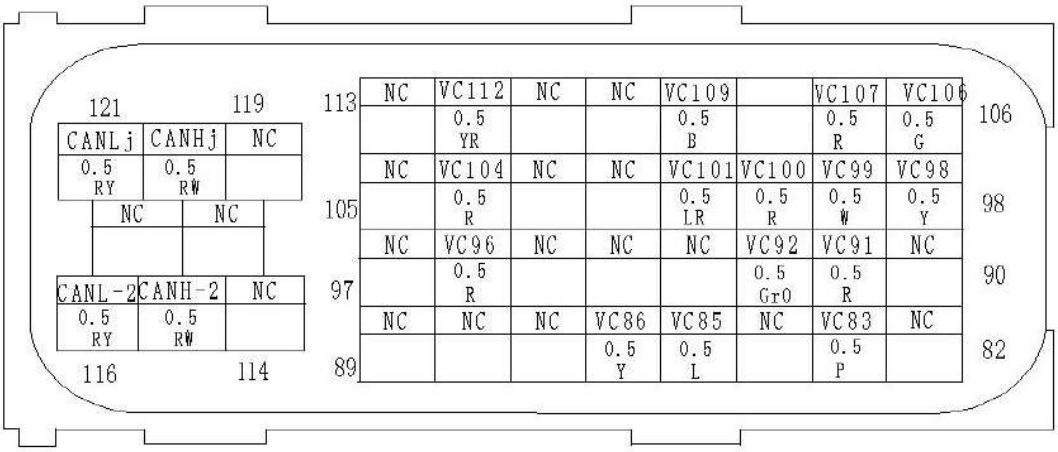
Connector number	F20
Connector name	Remote intelligent terminal
Connector type	776273-1



1	R	SR01 Remote Power supply positive
2	RW	CANHs vehicle CAN high
3	RY	CANLs vehicle CAN low
4	RW	CANHax battery internal CAN high
5	RY	CANLax Battery internal CAN low
10	B	CZ10 Remote Power supply negative
12	L	ZB03 IG2
14	R	CZ14 Remote wake-up signal

Vehicle cotroller(VCU) connector 2

Connector number	F22
Connector name	VCU Connector 2
Connector type	1473252-1

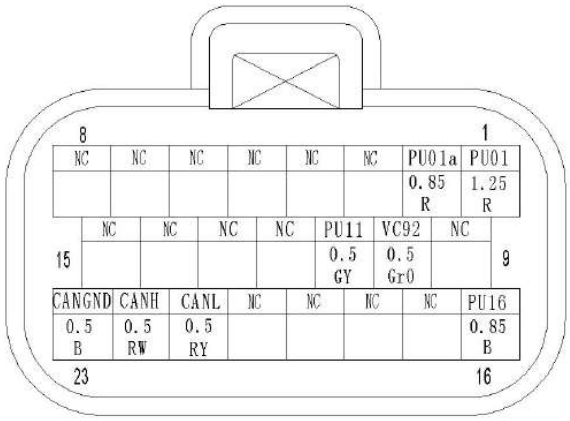


Terminal number	Line color	Signal name
83	P	VC83 Self-holding SSO control signal
85	L	VC85 Brake pedal sensor 2 ground
86	Y	VC86 Charge indicator 1 (yellow)
91	R	VC91 Fast charge relay control signal
92	GrO	VC92 DCDC enable
96	R	VC96 Brake pedal sensor 1 power
98	Y	VC98 Brake pedal sensor 2 power
99	W	VC99 Total Negative Relay Control (12V)
100	R	VC100 Precharge relay control (12V)
101	LR	VC101 AC relay control (0V)
104	R	VC104 Accelerator pedal sensor 2 power
106	G	VC106 Charge indicator 2 (green)
107	R	VC107 Main Negative Relay Control (12V)
109	B	VC109 Cooling water pump control signal
112	RY	VC112 Accelerator pedal sensor 1 power

115	RW	CANH-2
116	RY	CANL-2
120	RW	CAMHj
121	RY	CAMLj

Motor controller

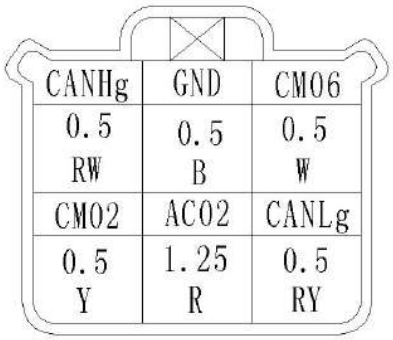
Connector number	FC01
Connector name	Motor controller
Connector type	770680-1



Terminal number	Line color	Signal name
1	R	PU01 motor controller 12V power supply positive
2	R	PU01a motor controller 12V power supply positive
10	GrO	VC92 DCDC enable
11	GY	PU11 DCDC failure feedback
16	B	PU16 motor controller 12V power supply negative
21	RY	CANL CAN_L signal communication
22	RW	CANH CAN_H signal communication
23	B	CANGED CAN shielded ground

Air conditioning compressor controller

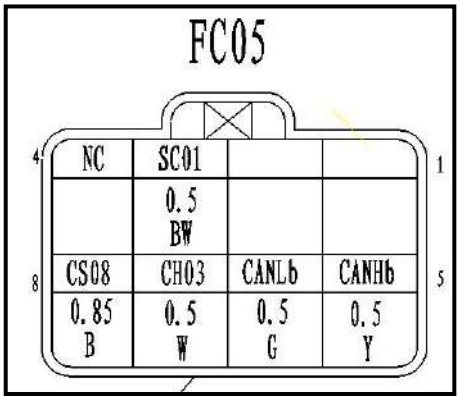
Connector number	FC02
Connector name	compressor controller
Connector type	194180010



Terminal No.	Wire color	Signal name
1	W	CM06 solenoid valve 1 relay 12 power supply positive
2	B	CND 12V power supply negative
3	RW	CANHg CAN_H signal communication
4	RY	CANLg CAN_L signal communication
5	R	AC02 compressor controller ON power
6	Y	CM02 solenoid valve 1 relay 12 power supply positive

on-board charger

Connector number	FC05
Connector name	Charger
Connector type	PB625-08027

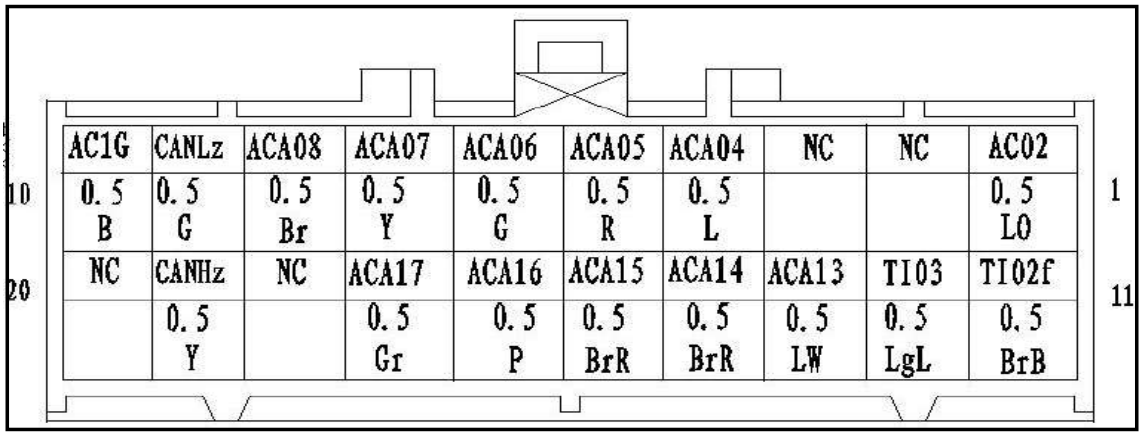


Terminal No.	Wire color	Signal name

3	BW	SC01 12V output signal(activate charger)
5	Y	CANHg CAN_H signal communication
6	G	CANLg CAN_L signal communication
7	W	CH03 output 12V wake-up signal
8	B	CS08 12V power supply negative

control panel A

Connector number	M13
Connector name	control panel A
Connector type	HS'G:172850-2

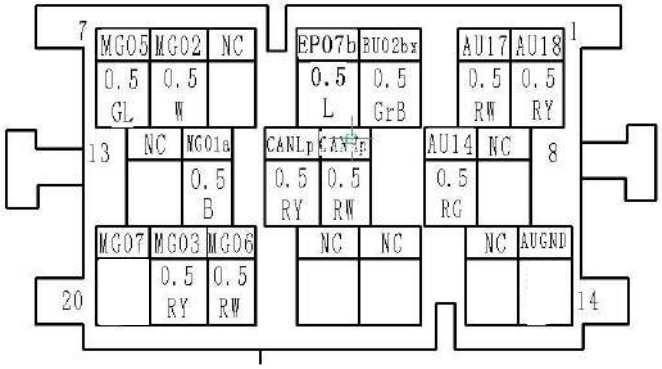


Terminal No.	Wire color	Signal name
1	LO	AC02 (AC power supply)
4	L	ACA04 (mode motor positive)
5	R	ACA05 (mode motor negative)
6	G	ACA06 (sensor positive)
7	Y	ACA07（resistance adjustment control）
8	Br	ACA08 (sensor negative)
9	G	CANLz
10	B	AC1G (ground)
11	BrB	TI02f (backlight positive)
12	LgL	TI03 (backlight negative)
13	LW	ACA13 (new return air motor positive)

14	BrR	ACA14 (new return air motor negative)
15	BrR	ACA15 (temperature motor negative)
16	P	ACA16 (Temperature Motor adjustment)
17	Gr	ACA17 (temperature motor positive)
19	Y	CANHz

MP5C3 interface

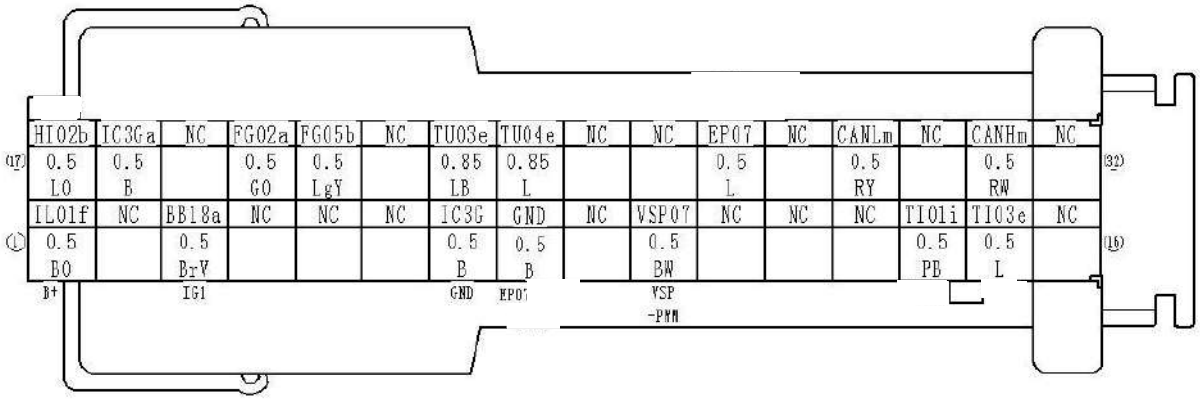
Connector number	M03
Connector name	MP5C3 interface
Connector type	HG'S:2005071-2



Terminal No.	Wire color	Signal name
3	GrB	BU02bx (reverse signal)
6	W	MG02 (Microphone control)
10	RW	CANHp
11	RY	CANLp
18	RW	MG06 (MIC input)
19	RY	MG03 (MIC signal ground)
20	Shield	MG07 (MIC shielded ground)

Electrical instrument A connector

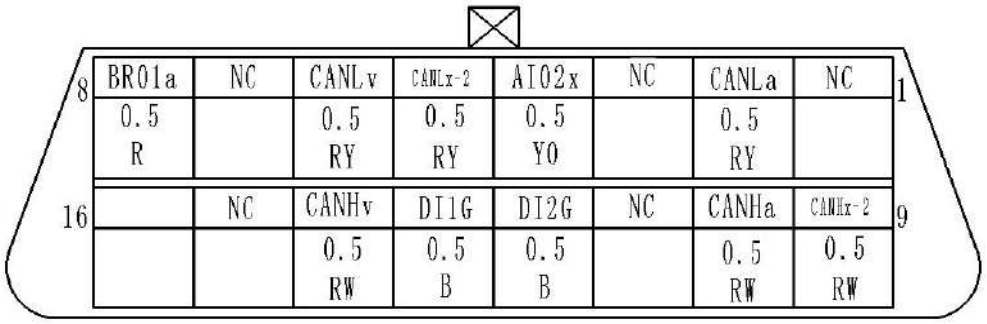
Connector number	M26
Connector name	Electrical instrument A connector
Connector type	HS'G:1719057-2



Terminal No.	Wire color	Signal name
1	BO	IL01 B+
3	BrV	BB18a IG1
7	B	IC3G GND
8	B	GND EP07 shielded ground
10	BW	VSP07 VSP/-PWM
14	PB	TI01i Back light +
15	L	TI03e Back light -
17	LO	HI02b Highlight +
18	B	IC3Ga high beam light-
20	GO	FG02a front fog lamp +
21	LgY	FG05b rear fog lights +
23	LB	Turn left at +
24	L	Turn right at +
27	L	EP07 speed output
29	RY	CANLm CANL

Diagnostic mouth

Connector number	M18
Connector name	Diagnostic mouth
Connector type	179631-1



Terminal number	Line color	Signal name
2	RY	CANLa high voltage battery internal CAN low
4	YO	AI02x airbag diagnosis
5	RY	CANLx-2 fast charge CAN low
6	RY	CANLv vehicle CAN low
8	R	BR01a Brake signal
9	RW	CANLx-2 fast charge CAN high
10	RW	CANHa high voltage battery internal CAN high
12	B	DI2G ground
13	B	DI1G ground
14	RW	CANHv vehicle CAN high

Power Battery System

Safety Precaution

Safety Precaution

Instruction

Please follow the instructions to ensure safety and proper service. These instructions are not introduced separately in each chapter.

Precautions for the electrical technicians who use medical electronic devices

Prohibit operation

Warning:

- **Strongly magnetic components have been assembled on this vehicle.**
- **Technicians shouldn't operate electronic pacemaker or other medical electronic devices in this vehicle, or the functions of medical devices may be affected by strong magnetic components.**

Precautions for normal charging

Warning:

- **If technicians are using cardiac pacemaker, cardioverter, defibrillator or other medical electronic devices, please check whether these devices are functional before normal operations.**
- **During normal charging, medical electronic devices may be affected by electromagnetic waves. Technicians shouldn't enter into passenger compartment (trunk included) when they are using cardiac pacemaker, cardioverter, defibrillator or other medical devices.**

Communication equipment operation precautions

- **If the technicians use medical electronic devices such as cardiac pacemaker, cardioverter or defibrillator and other medical electronic equipment, please keep enough distance with the communication devices.**
- **The electromagnetic wave of the remote intelligent terminal may affect the function of the medical device such as cardiac pacemaker,**

cardioverter, defibrillator and other medical electronic devices.

- **If the technician uses the medical device such as cardiac pacemaker, multiplexer, defibrillator and other medical electronic equipment, the electromagnetic wave of the remote intelligent terminal may affect the function of the device.** The possible effect of the remote intelligent terminal on the medical electronic devices must be checked by the manufactures of the medical electronic devices .

Inspection of key points before the maintenance

The high-voltage system may automatically operate. Please confirm the remote air conditioning and fixed-time charging haven't been set before the maintenance.

Attention:

If remote air-conditioning or fixed-time charging is set, the high voltage system will run automatically even the switch is turned off.

Precautions of auxiliary restraint system "airbag" and "seat belt pretension"

The supplemental restraint system such as "air bag" and "seat belt pretension", used along

with a front seat belt, can reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual front air bags. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

Warning:

Always observe the following items for preventing accidents' happening:

1 **Please avoid the failure of the auxiliary restraint system, and the risk causing the casualties will increase in the collision accidents after**

the failure. All maintenance can only be operated by the DR authorized distributors.

2 **Non-standard maintenance on auxiliary restraint system, including non-standard disassembly and installation, may lead to accidental triggering of the auxiliary restraint system and personal injury. For removal of air bag module, please refer to "SRS AIR BAG".**

3 **Do not use any electrical test devices to test any circuit of the auxiliary restraint system unless these tests are in the instructions described in the service manual. The wire harness and connectors of the auxiliary restraint system should adopt to yellow or orange color.**

Precautions when using power tools(pneumatic or electric) and hammer

- When the power-supply switch is turned on, do not use the power tools or hammer to operate the sensor auxiliary area while approaching the air-bag diagnosis sensor and other sensors of the airbag system. Severe vibrations may activate these sensors, which will ignite the airbag and cause severe injury.
- When using power tools or a hammer, turn the key in the "LOCK" position, unplug the cathode of 12V lead-acid battery and wait at least 1 minute for maintenance.

Precautions of removing the 12V battery

When removing the 12V battery, turn the power switch to "ON", and then to "OFF".

Note:

- The automatic 12V battery charge function may start even when the power switch is at "LOCK"position.
- After the key turns from ON to LOCK, the auto-charging function of 12V battery will not launch.

Precautions of high-voltage

Warning:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**

- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress. Before operations on high-voltage system, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to turn to "ON" or "START".**

High voltage cables and safety signs

High-voltage cables are orange.Power packs and other high-voltage components are securely marked. Do not touch these cables and components.

Treatment of high voltage cable terminals

When the high-voltage cable connector is unplugged, wrap it immediately with an insulating tape.

Regulations on workers with medical electronic devices

The vehicle contains parts that contain powerful magnets. If a person who is

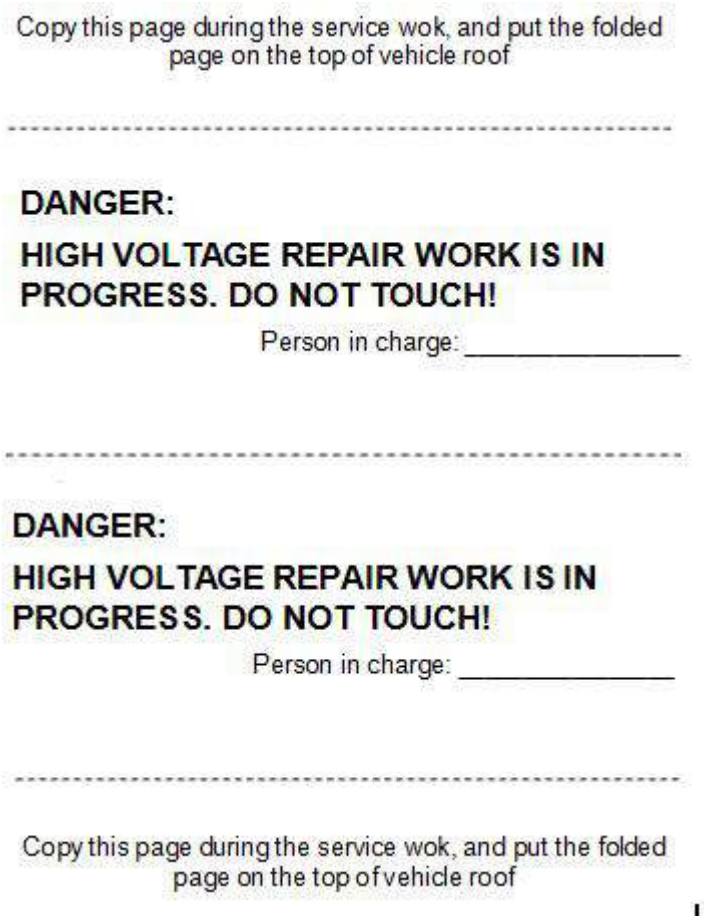
wearing a pacemaker or
other medical device is close to these parts, the medical device may be affected by the magnets. Such
persons must not perform work on the vehicle.

PROHIBITED ITEMS TO CARRY DURING THE WORK

Because this vehicle uses components that contain high voltage and powerful magnetism, due not carry any
metal products which may cause short circuits, or any magnetic media (cash cards, prepaid cards, etc.) which
may be damaged on your person when working.

Place the warning sign saying "High voltage parts under maintenance, do not touch"

Before maintaining the high-pressure parts, please place “High voltage parts under maintenance, do not touch” Warning sign on apparent position to remind other staff.


Copy this page during the service wok, and put the folded page on the top of vehicle roof

DANGER:

HIGH VOLTAGE REPAIR WORK IS IN PROGRESS. DO NOT TOUCH!

Person in charge: _____

DANGER:

HIGH VOLTAGE REPAIR WORK IS IN PROGRESS. DO NOT TOUCH!

Person in charge: _____

Copy this page during the service wok, and put the folded page on the top of vehicle roof

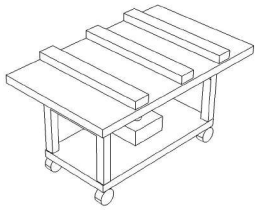
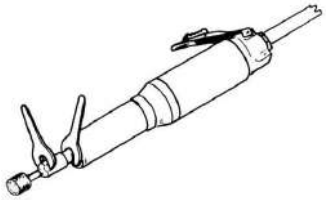
Note：

When the part is replaced, or when a label has been damaged, be sure to stamp the new product label on the same position and direction.

Preparation work

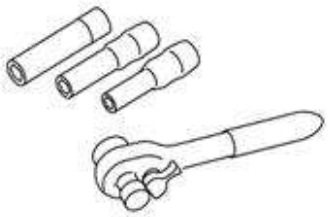
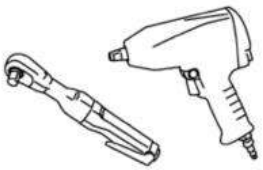
Preparation

Special tools

Tool name		Use description
Voltage Balancing Equipment		Voltage balance
Battery's lifting table		Battery Lifter
Grinding machine		Polished battery cell

Normal tools

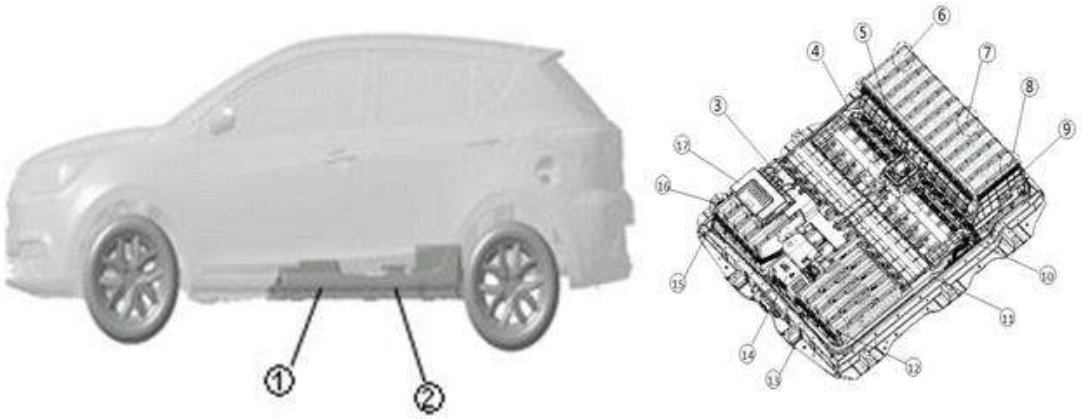
Tool name		Use description
Insulated gloves (To ensure the protection of an electricity of 1000V / 300A)		Disassembly and assembly of the high voltage parts
Leather gloves (Using leather gloves that can tighten the wrist)		1. Disassembly and assembly of high voltage parts 2. Protect insulated gloves

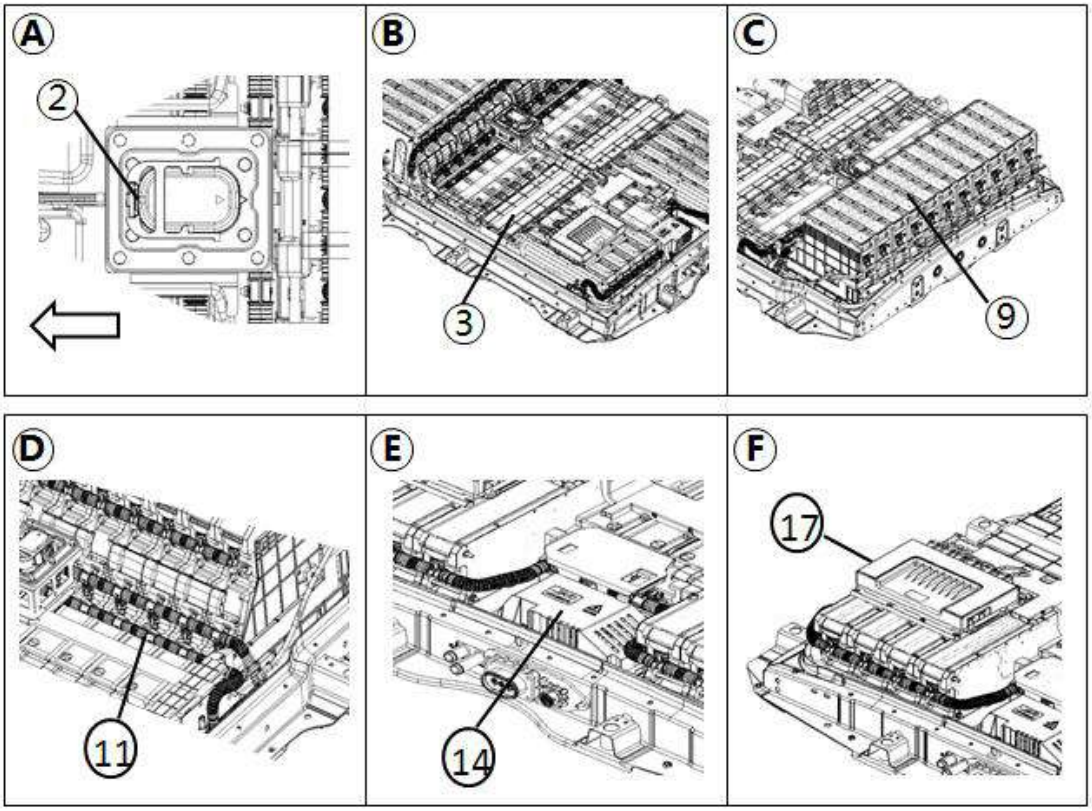
Insulated shoes		Disassembly and assembly of the high voltage parts
Protection glasses		Disassembly and assembly of the high voltage parts Prevent flares and protect eyes while repairing circuits
Insulated caps		Disassembly and assembly of the high voltage parts
Insulation Tester (Megohm meter)		Measuring voltage and insulation resistance
Energy-saving wrench		Module assembly
Electric wrench		Disassembly of spare parts

System Instructions

Components

Components' positions





A. Rear seat foot position (middle part) B. right-front position of battery assembly C. Rear position of battery assembly D. Middle position of battery assembly E. Front position of battery assembly F. Right-front position of battery assembly

⇦ : The front of the vehicle

Sequence	Component	Function
1	Power battery assembly	Refer to “Power battery assembly”section
2	Service switch;	Refer to “Service Switch”Section
3	Left-front module assy	Refer to “left-front module assy” section
4	Temperature sensor 7	Refer to “Temperature Sensor”Section
5	Temperature sensor 1	Refer to “Temperature Sensor”Section
6	Temperature sensor 5	Refer to “Temperature Sensor”Section
7	Temperature sensor 4	Refer to “Temperature Sensor”Section
8	Temperature sensor 3	Refer to “Temperature Sensor”Section
9	Rear module assy	Refer to “rear module assy” section
10	Temperature sensor 8	Refer to “Temperature Sensor”Section
11	Quick-plug pipeline assy	Refer to “quick-plug pipeline assy”section
12	Temperature sensor 2	Refer to “Temperature Sensor”Section
13	Right-front module assy	Refer to “right-front module assy” section
14	Battery cut off unit	Refer to “Battery Cut Off Unit”Section
15	Temperature	Refer to “Temperature Sensor”Section

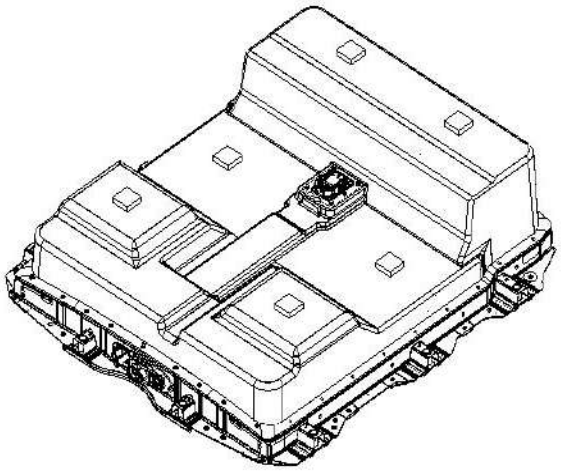
	sensor 6	
16	Temperature sensor 9	Refer to “Temperature Sensor”Section
17	Battery controller	Refer to “Battery controller”Section

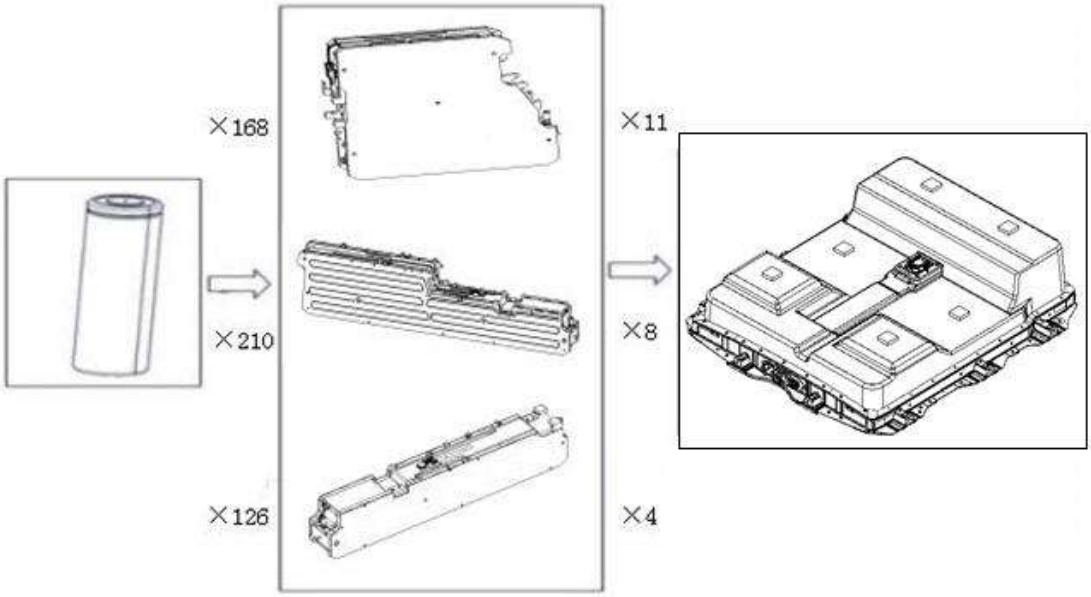
Power Battery assembly

1 Power battery assembly is installed under the vehicle body.

2 power battery assy includes left-front module assy, right-front module assy, rear module assy, battery controller (LBC), battery disconnect unit (BDU), maintenance switch assy, quick-plug pipeline assy and other components.

3 both left-front and right-front module assy include 4 modules of 42 multiple circuits & 5 series circuits and 2 modules of 42 multiple circuits & 3 series circuits. The rear module assy are made by 11 modules of 42 multiple circuits & 4 series circuits.





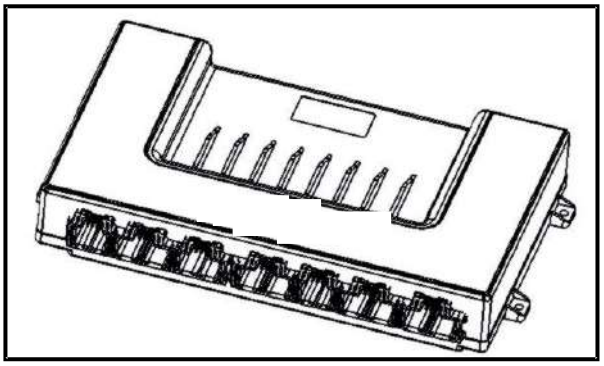
Battery controller（LBC）

1 Battery controller is installed inside of battery assembly;

2.Battery Controller is the core component of a battery management system, which monitor the voltage,

current, temperature of battery cells and vehicle information and the high voltage system insulation and

report to VCU, VCU control battery to charge and discharge by given information;



The main function of the battery controller

1 Check the battery status

① Cell voltage

② Temperature

③ Current

④ High voltage insulation

⑤ Total voltage

⑥ Status of monitor board

2 Balance battery voltage

3 Prevent overcharge and over discharge

4 Prevent over-current

5 Prevent thermal out-control

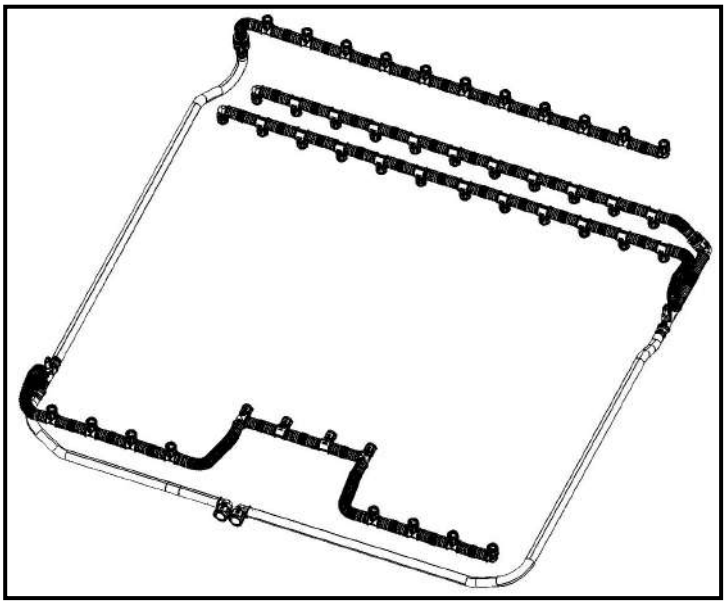
6 Prevent high voltage short circuit

7 Activate vehicle controller unit (VCU)

Quick-plug pipeline assy

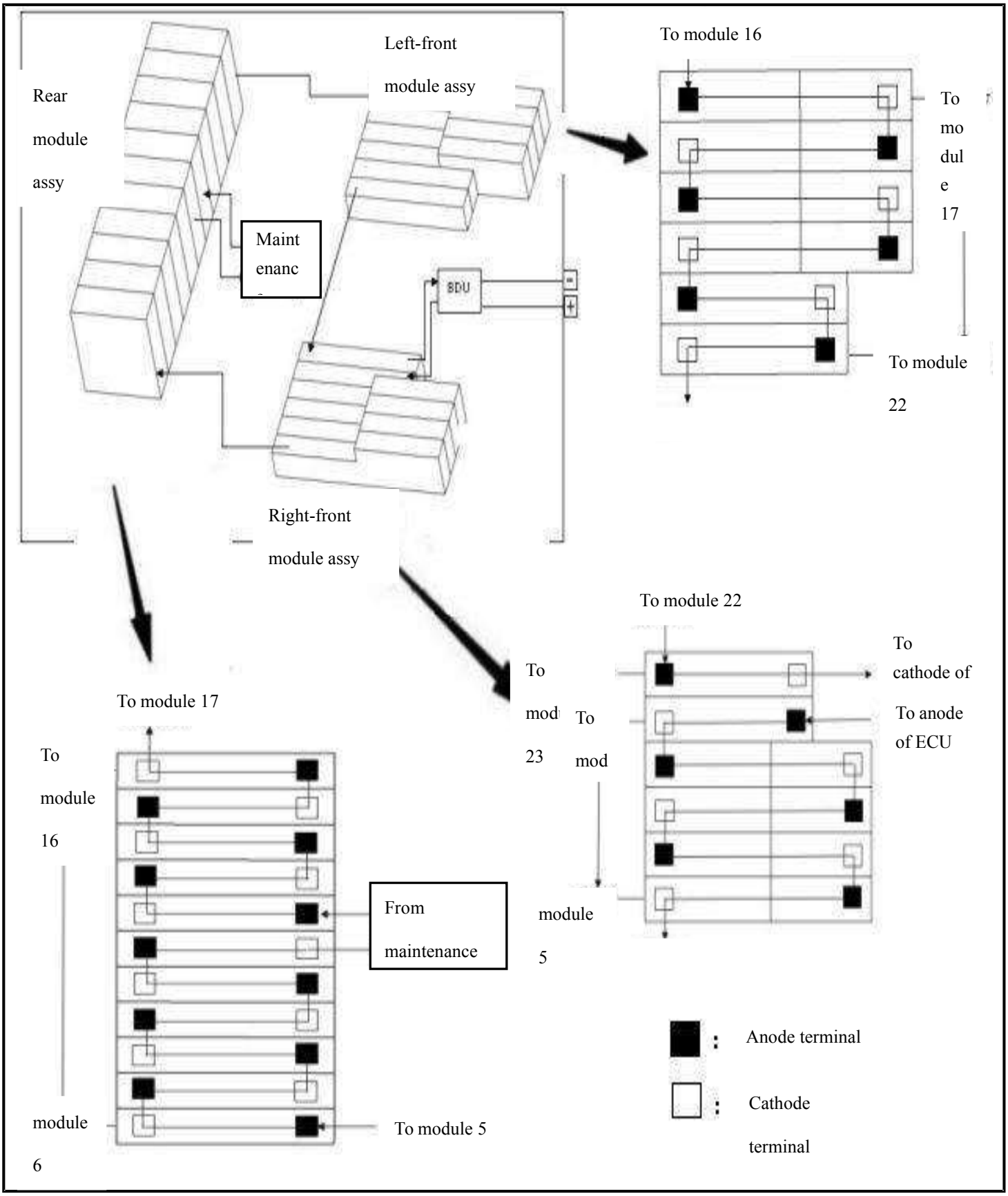
1 quick-plug pipeline assy is assembled inside power battery assy. It includes quick-plug pipeline assy for water-supply, quick-plug pipeline assy for water-exhaust and quick-plug pipeline I;

2 the function of quick-plug pipeline assy is to connect liquid-cooling flat tube inside the module, so that the flow can be allocated evenly.



Module

Power battery assy includes three modules: left-front module assy, right-front module assy and rear module assy.


Rear
module
assy
Left-front
module assy
Maint
enanc
BDU
To module 16
To
mo
dul
e
17
To module
22
Right-front
module assy
To module 22
To
cathode of
To anode
of ECU
To
mod
23
To
mod
module
5
To module 17
To
module
16
From
maintenance
module
6
To module 5
: Anode terminal
: Cathode
terminal

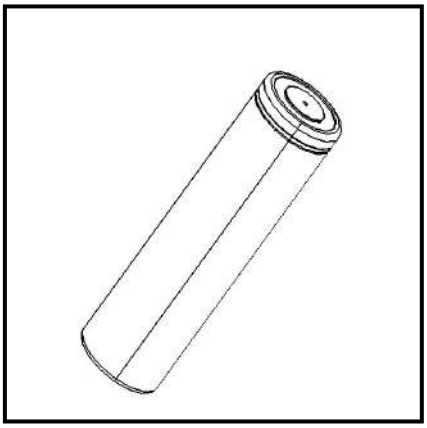
Battery cell

18650 cylindrical battery cell production technology is mature, which is a standard model of the product with the following characteristics:

1 High energy density

2 Low internal resistance and low heat releasing, which can improve battery life and power;

3 Small, flexible installation.



Temperature Sensor

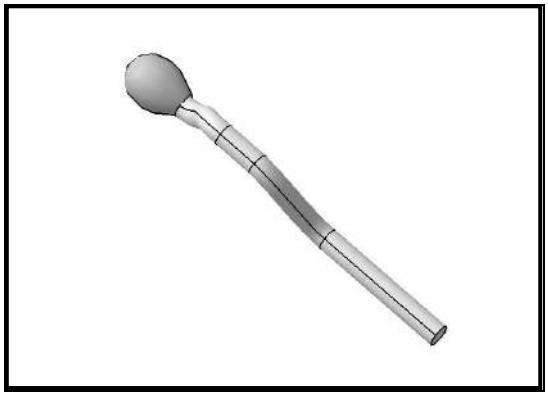
Battery assembly has eight internal temperature sensor,

1 Battery cell temperature sensor (5 units) is fixed on the surface of the battery cell by clip;

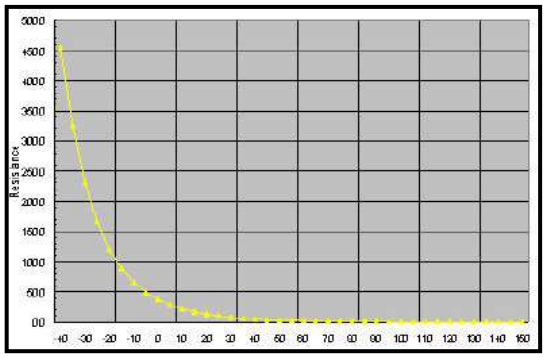
2 Air temperature sensor (1 unit) is fixed into the holddown groove of BDU upper housing;

3 Evaporator temperature sensor (1 unit) is fixed to the refrigerant evaporator tube surface;

4 Heater temperature sensor (1) is fixed inside the heater.



The resistance value of the temperature sensor decreases while temperature increasing.



Battery Distribute Unit (BDU)

1 BDU is mounted on the front of the central power battery assembly, consists with the main contactor, precharge contactors, heating contactors, heat fuse, current sensors and pre-charge resistance.

① Main contactor control the connection between the power and high-voltage system;

② Precharge contactor can prevent high-voltage circuit instantaneous overcurrent at the moment the key turn on;

③ Fuse protector can protect main circuit, and prevent damage on battery group caused by short-circuit.

④ Current sensor measures the current in high voltage circuits. The battery capacity is calculated by the

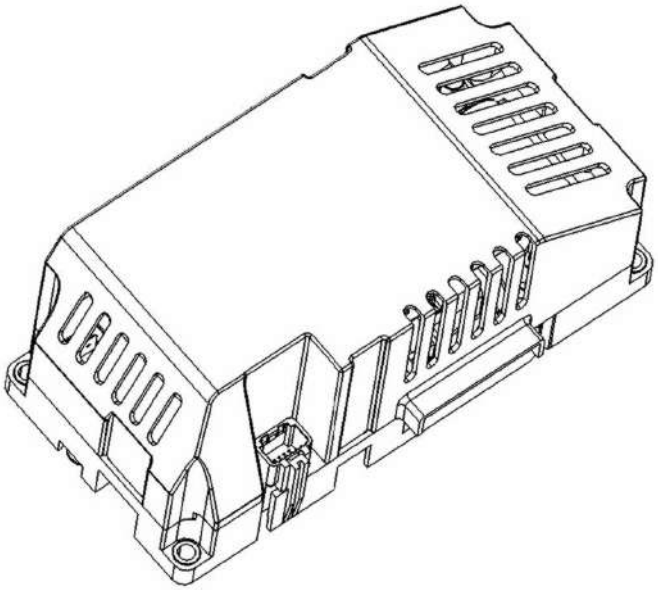
VCU.

2 When the system fails, VCU disconnect high voltage main contactor based on the fault level, to protect the

vehicle electrical safety.

3 BDU is installed on the output side of power battery, connect with power battery high voltage output with

bronze array. As the main contactor is closed and discharging, power battery assembly supplies the electrical energy to every high voltage components in the vehicle;as energy is recycled or battery is charging,the exterior unit will supply electrical energy to power battery assembly.



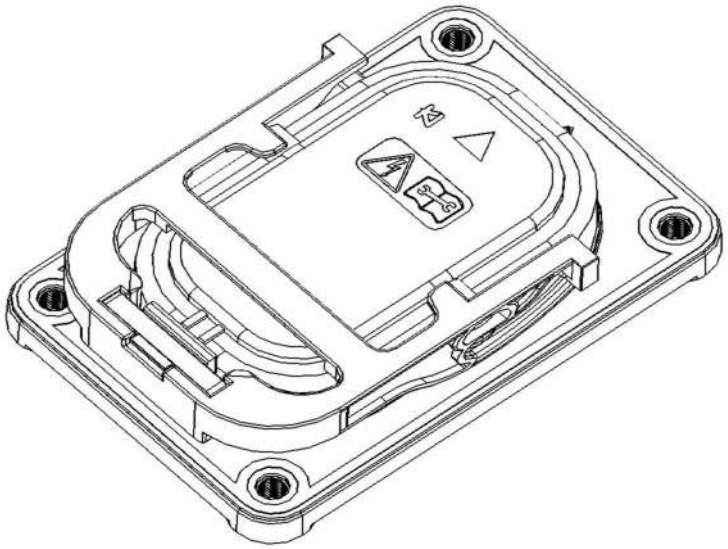
Service switch;

1 Service switch is located in the middle of the surface of the battery assembly, open bottom end of the

central passage carpet cover and the service switch can be found and operated.

2 Before the high-voltage parts for inspection and maintenance, disconnect the service switch can ensure

the high voltage disconnected.



Warning:

When operating the service switch must wear insulated protective equipment.

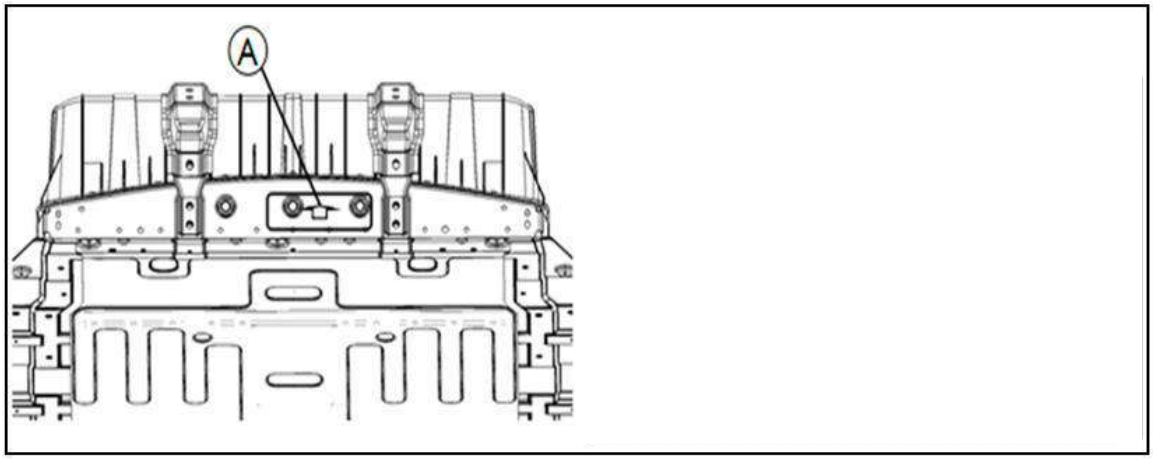
High risk identification

1 "Warning" label is stuck on the locations shown in Figure;

2 After replacement parts to ensure "Warning" label is stuck in the original location.

Power Battery assembly

“Warning” label is attached to the rear of the battery assembly.

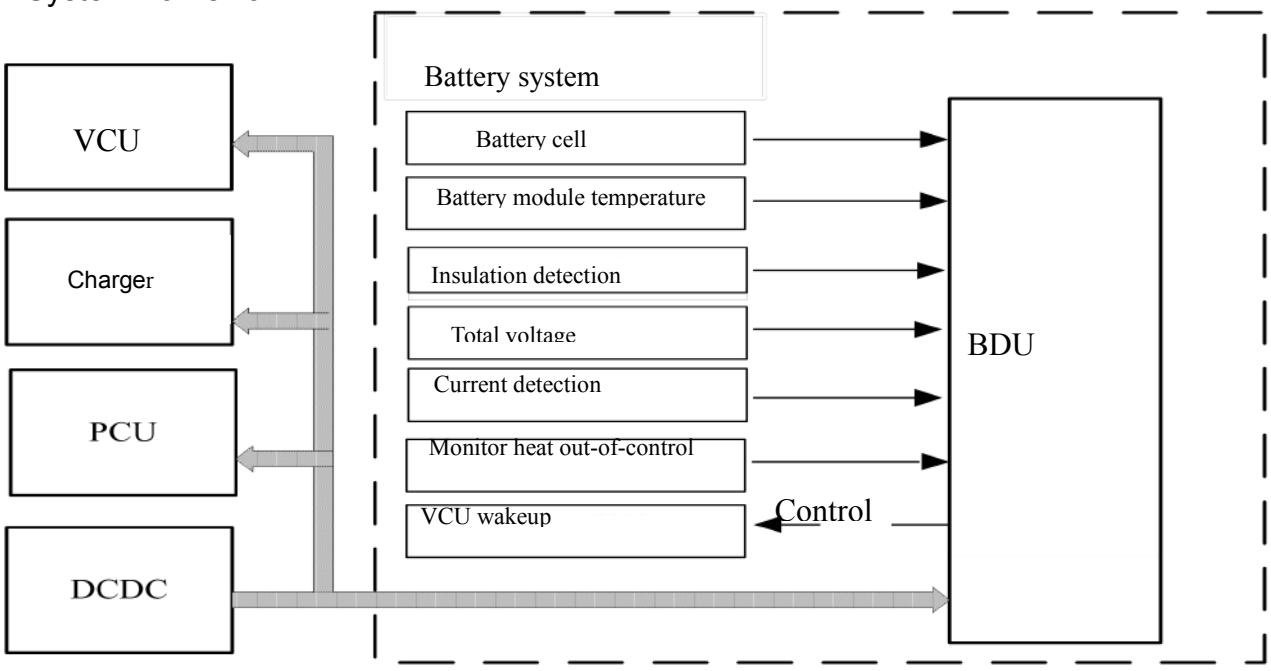


⇦ : vehicle's front end

System

System Instructions

System framework



Input and output signal list

Input signal list

Transmission unit	Signal name	
Vehicle controller	Vehicle CAN	Malfunction Diagnosis signal
		Malfunction clear signal

Output signallist

Transmission unit	Signal name	
Vehicle controller	Vehicle CAN	Highest cell voltage signal
		Minimum cell voltage signal
		Highest cell voltage position signal
		Lowest cell voltage position signal
		The maximum temperature signal
		The lowest temperature signal
		The maximum temperature position signal

		The lowest temperature position signal
		Insulation resistance signal
		Signal of heat out-of-control status
		Battery assembly current signal
		Service switch voltage interlock signal

Instruction

Battery controller functions mainly includes the following:

1 Monitor battery assembly status and report to VCU, prevent over voltage, over discharge, over current and other fault.

2 In the charge-discharge process, if fault such as over voltage, over discharge, over current happen, to
detect faults timely and requires VCU to disconnect the mains contactor.

3 Balancing the battery voltage consistency in its best condition, to avoid affecting the voltage is too large for the charge and discharge capacity.

4 Te s ti ng and service switch interlock circuit state determines whether the connection is normal, and report
to the VCU, when the high voltage interlock loop fails, the vehicle can not be powered on properly.

5 Detect battery assembly insulation status, and report to VCU, when the insulating state can not meet the
requirements, the vehicle will not power up.

Battery protection

The battery needs to be charge or discharged in a reasonable voltage range, once beyond the range, either too low or too high will damage the battery. To

avoid damage , battery controller detects the voltage of each single cell information and send it to VCU, VCU ensure them work within a reasonable voltage range.

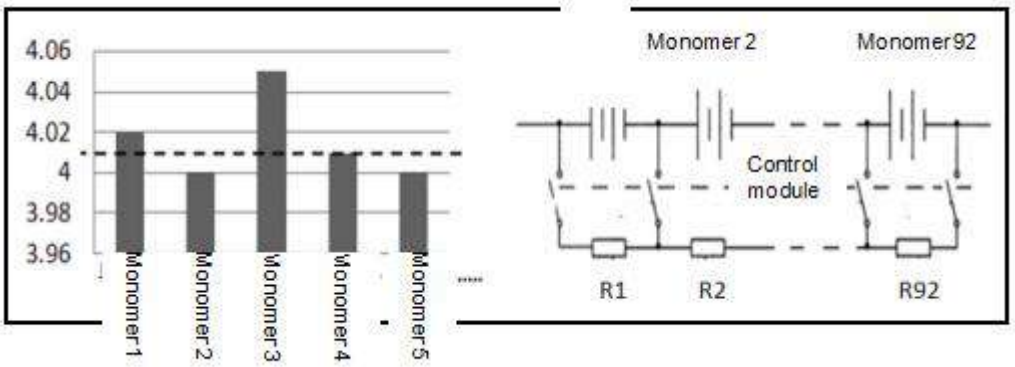
Items	Control Strategy	Operating conditions
The voltage over-current protection	Control the charging current	When the cell voltages reach to the maximum charging voltage, the charging current progressive control
	Turn off the main contactor	Current, the cell voltage exceeds the upper limit, and the time exceeds the predetermined time
Over-discharge Protection	Control the discharge current	Cell voltages reach to the discharge lower limit, the progressive control of the discharge current
	Turn off the main contactor	Cell voltage is below the lower limit of the discharge cut-off voltage, and more than a predetermined time
Over-temperature Protection	Control the discharge current	When the temperature is reach to the limit, and gradually control the charge and discharge currents
	Turn off the main contactor	When the temperature exceeds the limit, and more than a predetermined time

Balancing function

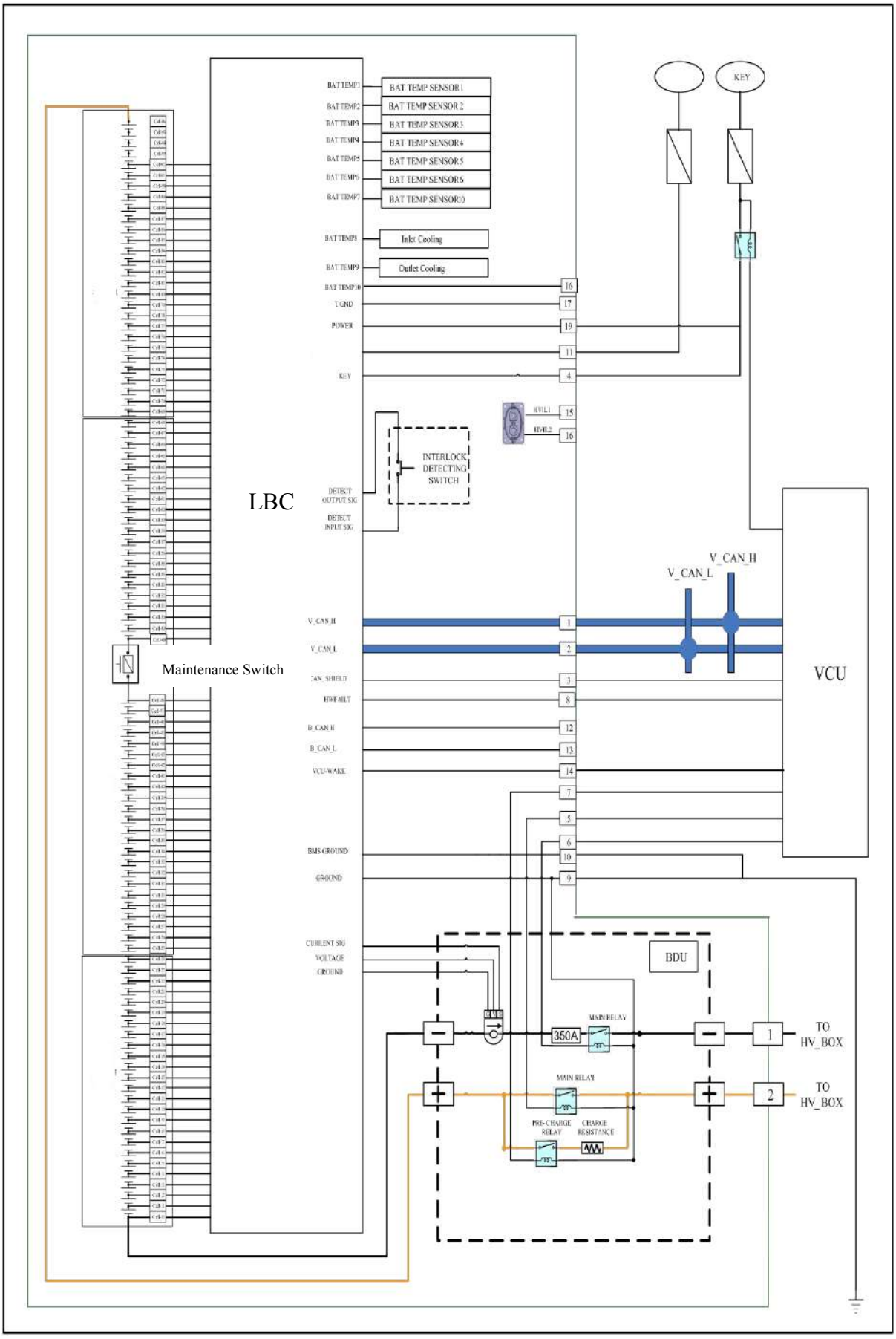
The balancer can adjust the battery cell to target value, the controller detects the battery cell voltage

information, and turn on the balancing switch , forms a discharge circuit, reducing the high-voltage battery cell

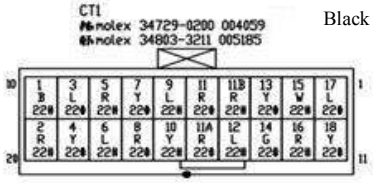
charging current until its voltage down to the same level with other battery cells.



System circuit diagram

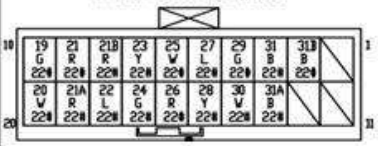


CT1
Molex 34729-0200 004059
Molex 34803-3211 005185
Black

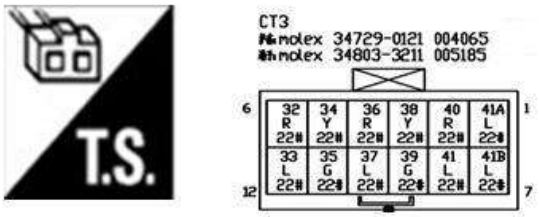


CT1	
Terminal number	Function instruction
1	Cell-V16
2	Cell-V14
3	Cell-V12
4	Cell-V10
5	Cell-V10
6	Cell-V8
7	Cell-V6
8	Cell-V4
9	Cell-V2
10	Cell-V0
11	Cell-V17
12	Cell-V15
13	Cell-V13
14	Cell-V11
15	Cell-V9
16	Cell-V7
17	Cell-V5
18	Cell-V3
19	Cell-V1
20	Cell-V1

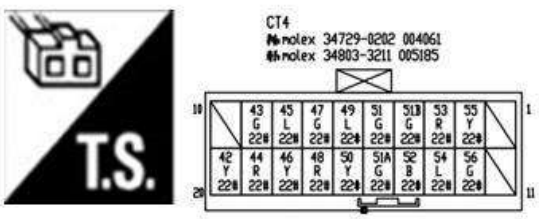
CT2
Molex 34729-0203 005184
Molex 34803-3211 005185
Gray



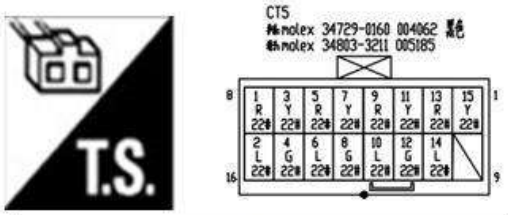
CT2	
Terminal number	Function instruction
1	/
2	Cell-V29
3	Cell-V29
4	Cell-V28
5	Cell-V26
6	Cell-V24
7	Cell-V22
8	Cell-V20
9	Cell-V20
10	Cell-V18
11	/
12	/
13	Cell-V30-
14	Cell-V29
15	Cell-V27
16	Cell-V25
17	Cell-V23
18	Cell-V21
19	Cell-V00
20	Cell-V19



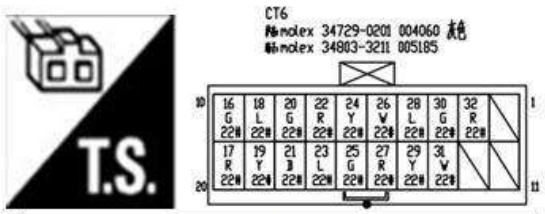
CT3	
Terminal number	Function instruction
1	Cell-V39
2	Cell-V38
3	Cell-V36
4	Cell-V34
5	Cell-V32
6	Cell-V30
7	Cell-V39
8	Cell-V39
9	Cell-V37
10	Cell-V35
11	Cell-V33
12	/



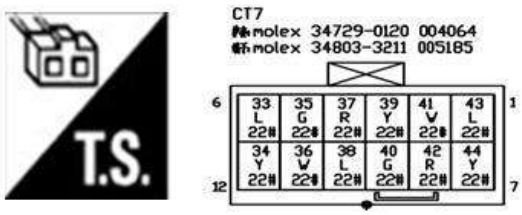
CT4	
Terminal number	Function instruction
1	/
2	Cell-V52
3	Cell-V50
4	Cell-V49
5	Cell-V49
6	Cell-V47
7	Cell-V45
8	Cell-V43
9	Cell-V41
10	/
11	/
12	Cell-V53
13	Cell-V51
14	Cell-V50-
15	Cell-V49
16	Cell-V48
17	Cell-V46
18	Cell-V44
19	Cell-V42
20	Cell-V40



CT5	
Terminal number	Function instruction
1	Cell-V68
2	Cell-V66
3	Cell-V64
4	Cell-V62
5	Cell-V60
6	Cell-V58
7	Cell-V56
8	Cell-V54
9	/
10	Cell-V67
11	Cell-V65
12	Cell-V63
13	Cell-V61
14	Cell-V59
15	Cell-V57
16	Cell-V55

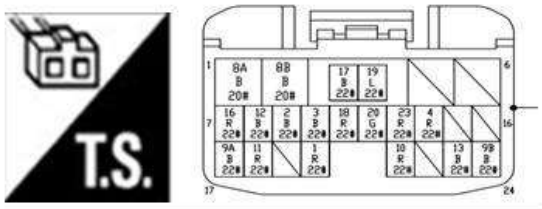


CT6	
Terminal number	Function instruction
1	/
2	Cell-V84
3	Cell-V82
4	Cell-V80
5	Cell-V78
6	Cell-V76
7	Cell-V74
8	Cell-V73
9	Cell-V71
10	Cell-V69
11	/
12	/
13	Cell-V83
14	Cell-V81
15	Cell-V79
16	Cell-V77
17	Cell-V75
18	Cell-V74-
19	Cell-V72
20	Cell-V70

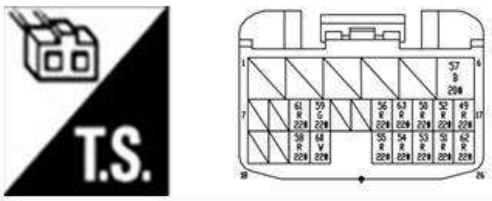


CT7	
Terminal number	Function instruction
1	Cell-V95
2	Cell-V93
3	Cell-V91
4	Cell-V89
5	Cell-V87
6	Cell-V85
7	Cell-V96
8	Cell-V94
9	Cell-V92
10	Cell-V90
11	Cell-V88
12	Cell-V86

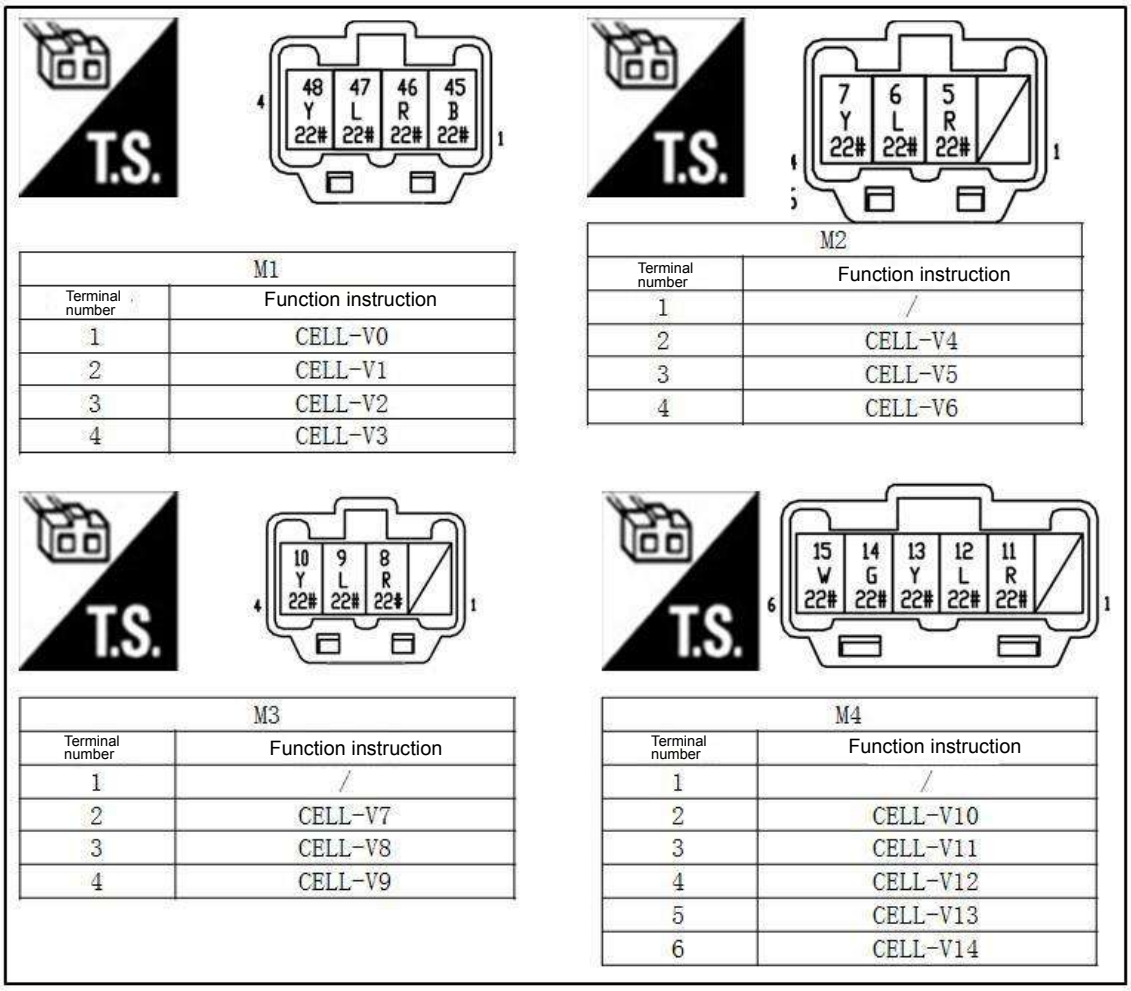
J1	
Terminal number	Function instruction
1	V_CAN_H
2	V_CAN_L
3	V_CAN Blocking
4	KEY
5	B+_Relay+
6	B-_Relay+
7	Pre Charge_Relay+
8	FAN_GND
9	BMS_GND
10	HWFLT
11	Tsensor+
12	B-CAN-H
13	B-CAN-L
14	Wakeup signal
15	HVIL+
16	HVIL-
17	T-sensor-
18	Constant power
19	BMS POWER



CT8	
Terminal number	Function instruction
1	/
2	/
3	GND(HALL)
4	HALL+
5	/
6	/
7	BMS POWER
8	B CANL
9	VCANL
10	/
11	POWER(HALL)
12	HALL-
13	12V Continue
14	Key
15	/
16	/
17	BMS GND
18	B CANH
19	/
20	V CANH
21	HWFAULT
22	/
23	VCU-drive
24	FAN GND



CT9	
Terminal number	Function instruction
1	/
2	/
3	/
4	/
5	/
6	T-GND
7	/
8	/
9	BMTI+
10	HVIL+
11	/
12	/
13	T10
14	T7
15	T6
16	T4
17	T2
18	/
19	/
20	BMTI-
21	HVIL-
22	T9
23	T8
24	T5
25	T3
26	T1



M1	
Terminal number	Function instruction
1	CELL-V0
2	CELL-V1
3	CELL-V2
4	CELL-V3

M2	
Terminal number	Function instruction
1	/
2	CELL-V4
3	CELL-V5
4	CELL-V6

M3	
Terminal number	Function instruction
1	/
2	CELL-V7
3	CELL-V8
4	CELL-V9

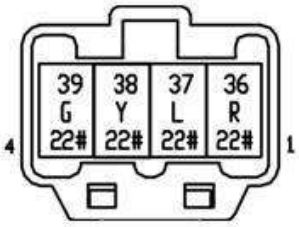
M4	
Terminal number	Function instruction
1	/
2	CELL-V10
3	CELL-V11
4	CELL-V12
5	CELL-V13
6	CELL-V14

M5	
Terminal number	Function instruction
1	/
2	CELL-V15
3	CELL-V16
4	CELL-V17
5	CELL-V18
6	CELL-V19

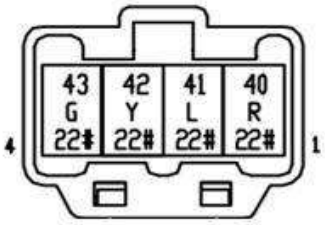
M6	
Terminal number	Function instruction
1	/
2	CELL-V20
3	CELL-V21
4	CELL-V22
5	CELL-V23
6	CELL-V24

M7	
Terminal number	Function instruction
1	CELL-V25
2	CELL-V26
3	CELL-V27
4	CELL-V28
5	CELL-V29
6	/
7	T2-
8	T2+

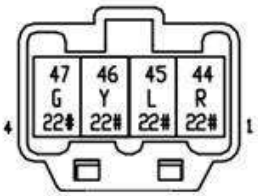
M8	
Terminal number	Function instruction
1	CELL-V30-
2	CELL-V30
3	CELL-V31
4	CELL-V32
5	CELL-V33
6	/
7	T3-
8	T3+



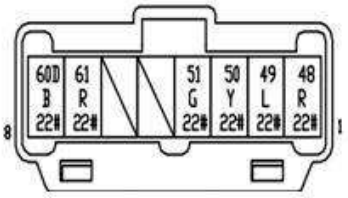
M9	
Terminal number	Function instruction
1	CELL-V34
2	CELL-V35
3	CELL-V36
4	CELL-V37



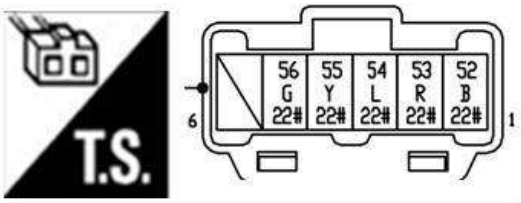
M10	
Terminal number	Function instruction
1	CELL-V38
2	CELL-V39
3	CELL-V40
4	CELL-V41



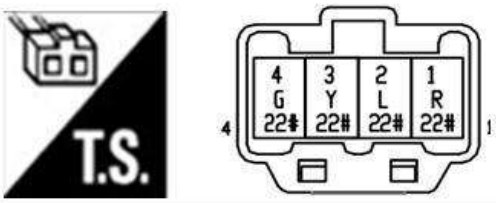
M11	
Terminal number	Function instruction
1	CELL-V42
2	CELL-V43
3	CELL-V44
4	CELL-V45



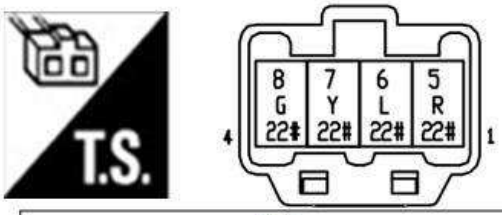
M12	
Terminal number	Function instruction
1	CELL-V46
2	CELL-V47
3	CELL-V48
4	CELL-V49
5	/
6	/
7	T4-
8	T4+



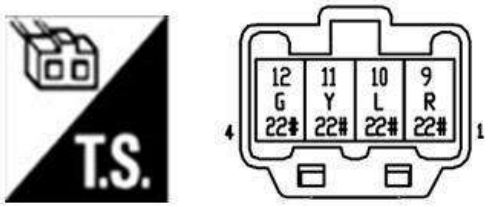
M13	
Terminal number	Function instruction
1	CELL-V50-
2	CELL-V50
3	CELL-V51
4	CELL-V52
5	CELL-V53
6	CELL-V54



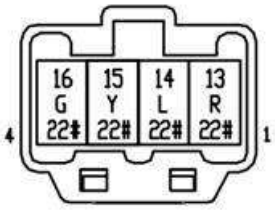
M14	
Terminal number	Function instruction
1	CELL-V54
2	CELL-V55
3	CELL-V56
4	CELL-V57



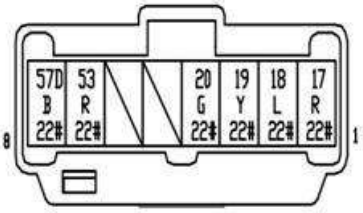
M15	
Terminal number	Function instruction
1	CELL-V58
2	CELL-V59
3	CELL-V60
4	CELL-V61



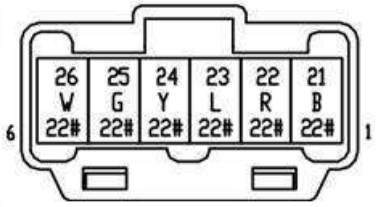
M16	
Terminal number	Function instruction
1	CELL-V62
2	CELL-V63
3	CELL-V64
4	CELL-V65



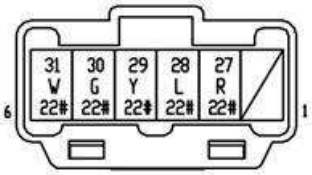
M17	
Terminal number	Function instruction
1	CELL-V66
2	CELL-V67
3	CELL-V68
4	CELL-V69



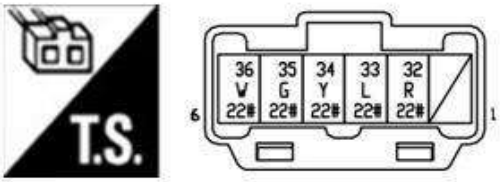
M18	
Terminal number	Function instruction
1	CELL-V70
2	CELL-V71
3	CELL-V72
4	CELL-V73
5	/
6	/
7	T5+
8	T5-



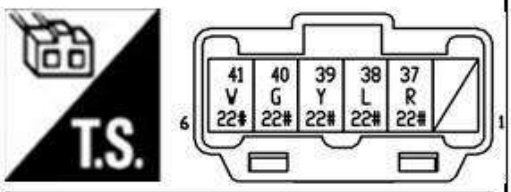
M19	
Terminal number	Function instruction
1	CELL-V74-
2	CELL-V74
3	CELL-V75
4	CELL-V76
5	CELL-V77
6	CELL-V78



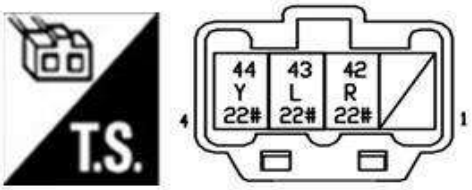
M20	
Terminal number	Function instruction
1	/
2	CELL-V79
3	CELL-V80
4	CELL-V81
5	CELL-V82
6	CELL-V83



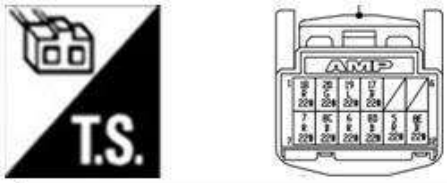
M21	
Terminal number	Function instruction
1	/
2	CELL-V84
3	CELL-V85
4	CELL-V86
5	CELL-V87
6	CELL-V88



M22	
Terminal number	Function instruction
1	/
2	CELL-V89
3	CELL-V90
4	CELL-V91
5	CELL-V92
6	CELL-V93

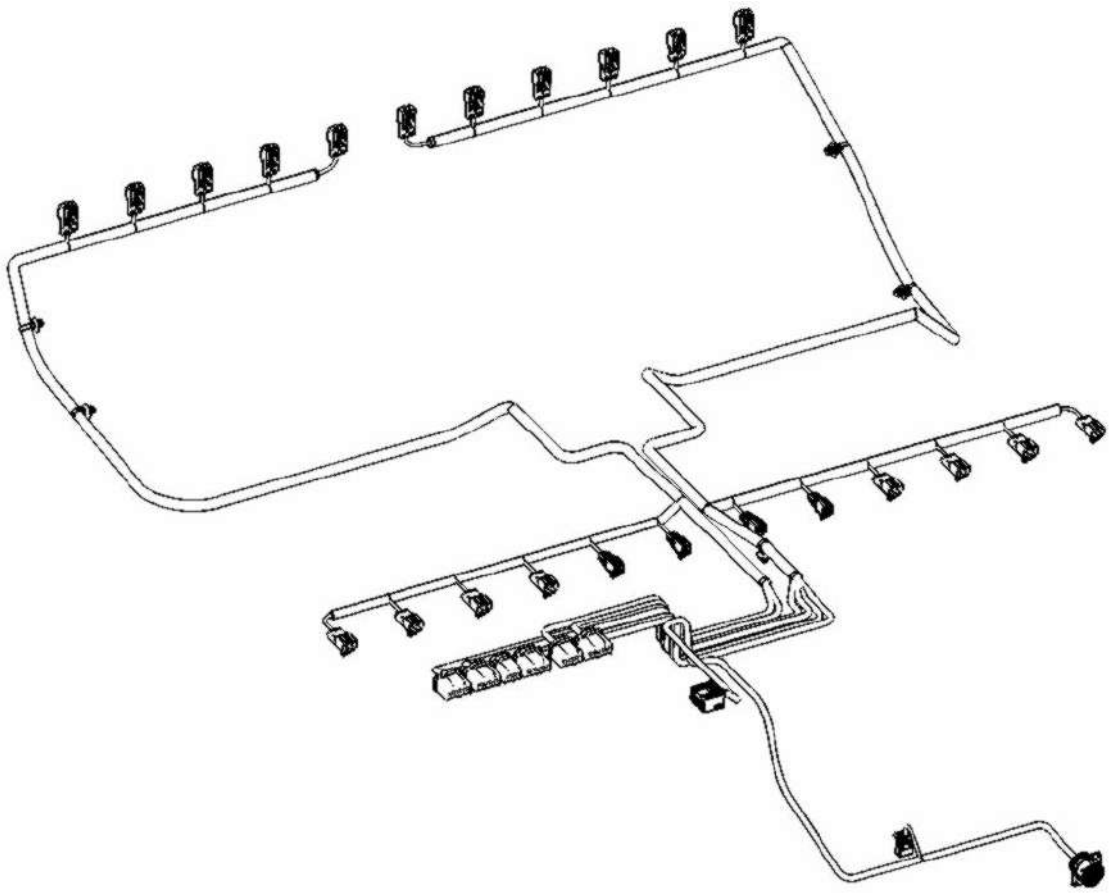


M23	
Terminal number	Function instruction
1	/
2	CELL-V94
3	CELL-V95
4	CELL-V96



J2			
Terminal number	Function instruction	Terminal number	Function instruction
1	POWER(HALL	7	B- Relay
2	HALL+	8	Relay-GND
3	HALL-	9	B+ Relay
4	GND(HALL)	10	Relay-GND
5	Pre-relay	11	/
6	Relay-GND	12	/

Wiring harness arrangement



Operation Precautions

Power battery assembly

1 To extend battery life, avoid large rate charging;

2 Use the slow charge mode charging;

3 Avoid emergency deceleration or rush acceleration;

4 Avoid direct sunlight and stay away from heat.

Storage battery assembly

- Horizontal;
- Avoid double-stacked;
- Do not place battery assembly on the ground by direct contact, placed on the rubber mat;
- Away from water;
- Prevent debris falling on the battery assembly;
- Do not place the battery assembly outdoors, avoid direct sunlight.

System diagnosis

EV diagnostic tool functions

"EV diagnostic tool -LBC" to be completed by the following functions.

The main function

Items	function
Cell voltage inquiry	Quick and accurate query cell number and the corresponding voltage
Monomer temperature inquiry	Quick and accurate query temperature number and its corresponding temperature
System self-test	Quick Query system self-test results and fault conditions
Data Detection	Displays the current battery assembly input and output data
Faults diagnosis	Display fault code (DTC)

Accessibility Features

Items	Method	Triggering conditions
Fault data record	Save time and read the fault battery power system parameter information	Battery system fails

LBC diagnostic information

Power Battery System

Power Battery System

Test value based on the diagnostic tool

Caution：

Cell voltage of Battery cell number 02-96 and 01 are the same when SOC is 5% and 95%. Temperature range of battery 2/3/4/5/6/7 can be regarded as the same with battery 1.

Inspection item	Condition		Reference value / status
Current	READY	The vehicle is stationary	Within ±5A
12V low voltage system	READY		11V-15mV
Insulated low-voltage pulse	READY		0.2MΩ-10MΩ
Service switch interlock	READY	Connection with service switch	With High voltage
	READY	Disconnect the service switch	No high voltage
Cell voltage 01	READY	SOC5%	3000mV-3400mV
		SOC95%	4010mV-4100mV
Power Battery total voltage	READY	SOC5%	288V-326V
		SOC95%	385V-393V
Power battery temperature 1	READY (vehicle	Ambient temperature	20-40℃ (Power battery temperature)

	stationary)	25 ℃	
Temperature 8	READY (vehicle stationary)	Ambient temperature 25 ℃	20-40℃ (water inlet's temperature)
Temperature 9	READY (vehicle stationary)	Ambient temperature 25 ℃	20-40℃ (water outlet's temperature)
Temperature 10	READY (vehicle stationary)	Ambient temperature 25 ℃	20-40℃ (heater temperature)

Security – Failure

When VCU detect fault in battery assembly, VCU will protect the battery assembly by controlling the power

input and output, for different fault types and failure mode, the process is different.

Safety-failure mode

Mode A: forbid DC charging

Mode B: forbid AC charging

Mode C: forbid driving

Model D: cut off the high voltage

Safety-failure list

DTC	Failed list	Processing type				Other processing methods
		A	B	C	D	
P31E4-P31C9	LBC hardware failure					Battery fault indicator
P31BD	EEPROM Malfunction					Battery fault indicator
P31B2	Critical insulation malfunction			×	×	Battery fault indicator
P31AE	Power battery single cell voltage is too high	×	×			Battery fault indicator
P31AD	Power battery single cell voltage is too high			×		
P31AB	Battery cell temperature is excessively low					
P31AA	The battery temperature is too high					Limp

P31A9	Battery discharge current is too large					Battery fault indicator
P31A8	Malfunction of Battery Charging Over-current					Battery fault indicator
P31A7	Malfunction of total voltage severe under-voltage					
P31A6	Malfunction of excessively high total voltage	×	×			Battery fault indicator
P31A3	Power battery single cell voltage is too low	×	×		×	Battery fault indicator
P317D	Single body spray explosion	×				Battery fault indicator
P317C	Still single-body self-discharge check_100Ω					
P317B	Still single-body self-discharge check_50Ω					
P316E	The high voltage interlock failure					Battery fault indicator
P315D	Insulation malfunction					
P312F	No PWM signal change during insulation check					Battery fault indicator
P312E	Insulation check system short-circuit GND					Battery fault indicator

P312D	Insulation check system short-circuit VCC					Battery fault indicator
P312C	SHORT CIRCUIT ERROR OF TEMPERATURE SENSOR AND GND					Battery fault indicator
P312B	SHORT CIRCUIT ERROR OF TEMPERATURE SENSOR AND VCC					Battery fault indicator
P312A	TWO-PATH INCONSISTENCE ERROR OF CURRENT SENSOR					Battery fault indicator
P311F	Alert of battery cell's dynamic voltage difference					
P3179	Fire	×	×			Battery fault indicator
P3177	12V power supply is excessively high					
P3176	12V power supply is excessively low					Limp
P3160	Battery temperature imbalance					
P3147	Static voltage difference of cell is too					

	large					
P3146	Battery cell dynamic voltage difference is excessively high	×				
P3139	Mis-closing of balance					
P3138	Mis-opening of balance					Battery fault indicator
P3137	MISMATCHING ERROR OF CELL VOLTAGE AND TOTAL VOLTAGE					
P3134	Loosening of cell voltage acquisition cable					Battery fault indicator
P3133	BATTERY CELL VOLTAGE INSPECTION ERROR-AD TRANSFER ERROR					Battery fault indicator
P3129	SHORT CIRCUIT ERROR OF CURRENT SENSOR AND GND					Battery fault indicator
P3128	SHORT CIRCUIT ERROR OF CURRENT SENSOR AND VCC					Battery fault indicator

DTCindex

DTC		Failure Name
228	P31E4	LBC hardware failure
227	P31E3	
226	P31E2	
225	P31E1	
224	P31E0	
223	P31DF	
222	P31DE	
221	P31DD	
220	P31DC	
219	P31DB	
218	P31DA	
217	P31D9	
216	P31D8	
215	P31D7	
214	P31D6	
213	P31D5	
212	P31D4	

211	P31D3	
210	P31D2	
209	P31D1	
208	P31D0	
207	P31CF	
206	P31CE	
205	P31CD	
204	P31CC	
203	P31CB	
202	P31CA	
201	P31C9	
189	P31BD	EEPROM Malfunction
178	P31B2	Critical insulation malfunction
174	P31AE	Power battery single cell voltage is too high
173	P31AD	Power battery single cell voltage is too high
171	P31AB	Battery cell temperature is excessively low
170	P31AA	The battery temperature is too high
169	P31A9	Battery discharge current is too large
168	P31A8	Malfunction of Battery Charging

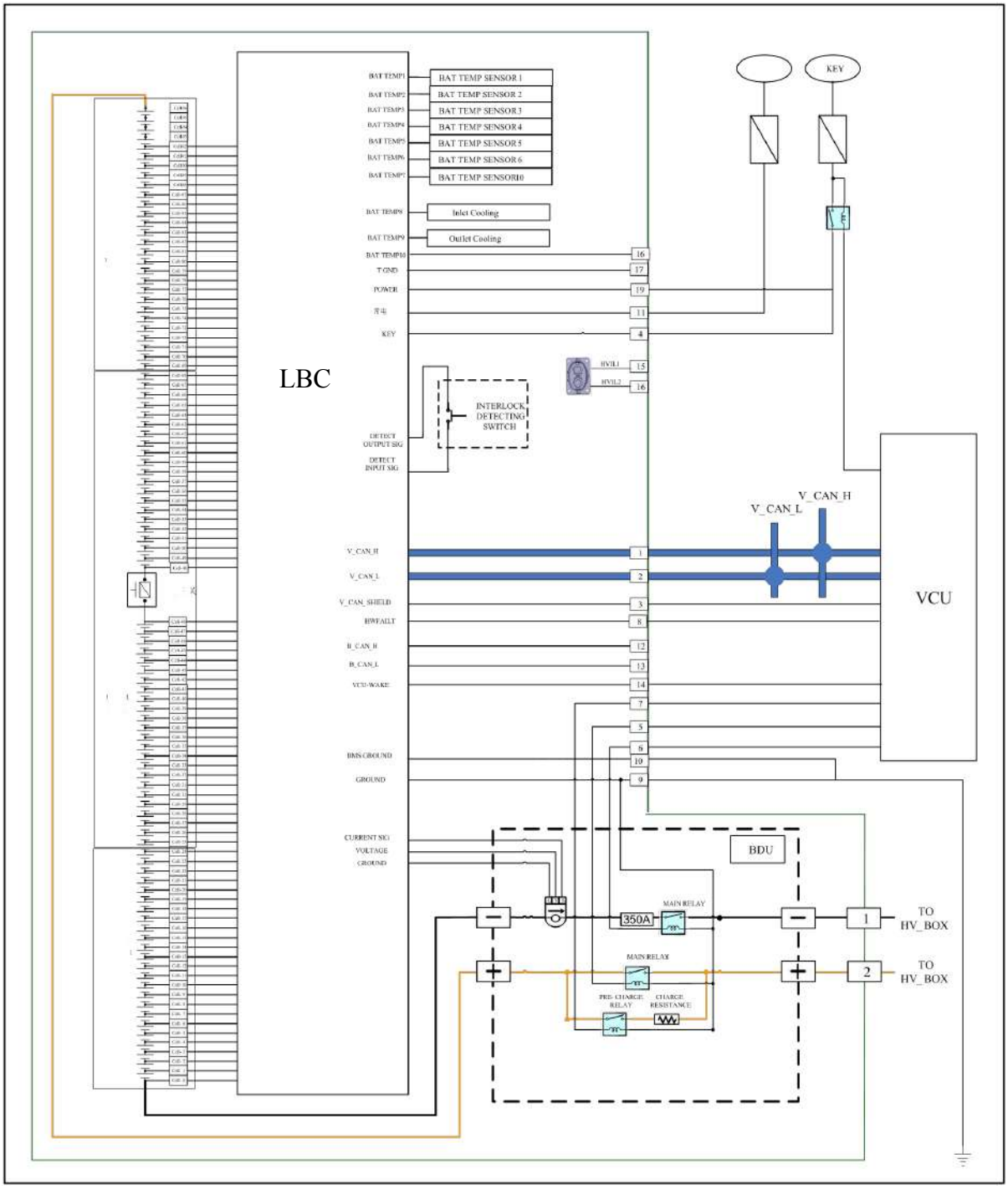
		Overcurrent
167	P31A7	Malfunction of total voltage severe under-voltage
166	P31A6	Malfunction of excessively high total voltage
163	P31A3	Power battery single cell voltage is too low
125	P317D	Single body spray explosion
124	P317C	Still single-body self-discharge check_100Ω
123	P317B	Still single-body self-discharge check_50Ω
121	P3179	Fire
119	P3177	12V power supply is excessively high
118	P3176	12V power supply is excessively low
110	P316E	The high voltage interlock failure
96	P3160	Battery temperature imbalance
93	P315D	Insulation malfunction
71	P3147	Static voltage difference of cell is too large
70	P3146	Battery cell dynamic voltage difference is excessively high
57	P3139	Mis-closing of balance
56	P3138	Mis-opening of balance
55	P3137	MISMATCHING ERROR OF CELL VOLTAGE AND TOTAL VOLTAGE

52	P3134	Loosening of cell voltage acquisition cable
51	P3133	BATTERY CELL VOLTAGE INSPECTION ERROR- AD TRANSFER ERROR
47	P312F	No PWM signal change during insulation check
46	P312E.	Insulation check system short-circuit GND
45	P312D.	Insulation check system short-circuit VCC
44	P312C.	SHORT CIRCUIT ERROR OF TEMPERATURE SENSOR AND GND
41	P3129.	SHORT CIRCUIT ERROR OF CURRENT SENSOR AND GND
40	P3128.	SHORT CIRCUIT ERROR OF CURRENT SENSOR AND VCC
31	P311F.	Alert of battery cell's dynamic voltage difference

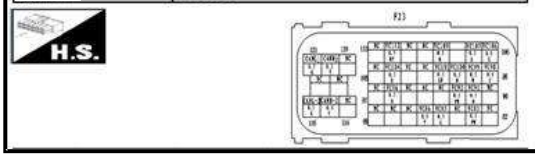
Harness Diagram

VCU

Harness Diagram



	F24
	VCU
	1473252-1



	F18
	LBC
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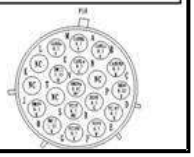


Terminal	Wire	Wire	Signal name		Terminal	Wire	Wire	Signal name
83	PW	0.5	VC83 Self-holding SSO control		A	Y	0.5	CANHk CAN-H signal
85	L	0.5	VC85 Brake pedal sensor 2		B	G	0.5	CANHk CAN-H signal
86	Y	0.5	VC86 charging indicator 1		C	B	0.5	CANGED CAN shielded
91	R	0.5	VC91 Fast charge relay control		D	R	0.85	BM04 High level
92	PW	0.5	VC92 DCDC enable		E	R	1.25	VC107 B+ relay control
96	R	0.5	VC96 Brake pedal sensor 1		F	W	0.5	VC99 B+ relay control
98	Y	0.5	VC96 Brake pedal sensor 2		G	R	0.5	VC100 pre-charge relay
99	W	0.5	VC99 Total Negative Relay		H	B	0.5	BM17 Fan power ground
100	R	0.5	VC100 pre-charge relay		J	B	0.5	BM09 LBC power ground
101	LR	0.5	VC101 AC relay control (0V)		M	Y	0.5	CANHa Inner CAN high
104	R	0.5	VC104 Accelerator pedal		N	G	0.5	CANLa Inner CAN low
106	G	0.5	VC106 charging indicator 2		R	G	0.5	BX08 high-voltage
107	R	0.5	VC107 Main positive Relay		S	WB	0.5	VC39 high-voltage
109	B	0.5	VC109 Cooling water pump		U	R	1.25	BM11 LBC fan power
112	RY	0.5	VC112 Accelerator pedal		V	WY	0.85	BM04a LBC power
115	Y	0.5	CANH-2					
116	G	0.5	CANL-2					
120	Y	0.5	CAN（H）					
121	G	0.5	CAN（L）					

Basic check

Diagnostic and maintenance workflow

Work process

Detailed flow

1. Obtain symptom information

Use the Diagnostic Worksheet to ask the customer for details about the symptoms (status and environment at the time of the accident / failure). (Please refer to the following. "Diagnostic working list")

>> Go to step 2

2. Detect DTC

1. Check DTC
2. If DTC display, perform the following steps.

- Record DTC.
- Study the relationship between the cause of the fault detected by the DTC and the symptoms described by the customer. (Symptom table is useful. Please refer to "Symptom comparison table")

3. 3. Review the relevant maintenance records for more information.

Has the customer already described the symptoms and have already detected the DTC?

Symptoms described and DTC has been displayed >> Go to step 3

Symptoms described, yet DTC hasn't been displayed. >> Go to step 4

No description or DTC displayed. >> Go to step 5

3. Confirm symptoms

Try to diagnose the symptoms described by the customer.
Also check the normal operation and the relevant symptoms on "safety - failure" mode list. Refer to "Safety-failure" mode list The "Diagnostic

Worksheet" is helpful in verifying the failure.

Verify the relevance of symptoms and conditions that trigger the failure

>> Go to step 5

4. Confirm symptoms

Try to diagnose the symptoms described by the customer.

Also check the normal operation and the "safety - failure" mode sheet related symptoms relevant to “safety-failure” mode list. Refer to “Safety-failure” mode list

“Diagnostic worksheet”is helpful to confirm the malfunction.

Verify the relevance of symptoms and conditions that trigger the failure

>> Go to step 6

5. Execute the DTC confirmation step

Execute "DTC confirmation procedure" for the displayed DTC, and then confirm that the DTC is detected again.

Caution：

- If DTC hasn’t been checked again, freezing data will be helpful to check failures.
- If no relevant failure check procedure is listed in maintenance manual, please check spare parts’ function.

If spare parts’ function is abnormal,please refer to “DTC check procedure” for details

Whether DTC is detected ?

Yes >> Go to step 7.

No >> Check according to “failure simulation test”

6. Check the system failure through the symptom table

According to the "symptom table", the fault diagnosis system is diagnosed based on the symptoms confirmed in step 4, and the method of the fault diagnosis is determined based on the possible causes and symptoms.

Is there symptomatic description?

Yes >> Go to step 7.

No>> Using diagnostic tools to monitor the data of relevant sensors.

7. Check the defective parts by means of the diagnostic procedure

Check the defective parts by means of the diagnostic procedure

Is there a faulty part?

Yes >> Go to step 8.

No>> Using diagnostic tools to monitor the data of relevant sensors.

8. repair or replace faulty parts

1. 8.repair or replace faulty parts
2. 2. After completing the repair and replacement work, reconnect the parts or connectors that were disconnected during the troubleshooting process.
3. Check DTC If DTC is displayed, erase it.

   >> Go to step 9

9. Final check

When the DTC is detected in step 3, perform the "DTC confirmation step" or "Full function check" again, and then confirm that the fault has been properly repaired. If the symptoms are described by the customer, confirm the symptoms identified by referring step 4 and step 5, and check that the symptoms described by the user are not detected.

Whether DTC is detected ?

Abnormal (DTC detected) >> Go to 7

Symptoms reappear >> Go to 4

No detection >> Clear DTC before delivering vehicle to customer

Diagnostic working list

Instruction

Error information of charging system can be acquired by understanding working conditions correctly.

Generally, customer has his own judging standard on the failure. Therefore, by consulting user's description on failure or problem, technicians can understand failure better. All error information can be classified by applying diagnostic working list.

Diagnostic working list

<table>
<tr><td colspan="6">Diagnostic working list</td></tr>
<tr><td colspan="2" rowspan="3">Owner Name</td><td>Fault Date</td><td></td><td>VIN</td><td></td></tr>
<tr><td>Useful life</td><td></td><td>Maintenance Date</td><td></td></tr>
<tr><td>Mileage</td><td></td><td></td><td></td></tr>
<tr><td colspan="2" rowspan="5">Faults</td><td colspan="4">□Cannot turn "ready" “ready” □Warning light on □Power limitation light on</td></tr>
<tr><td colspan="4">□Wading * □Noise * □Vibration * □Impact * □Gear noise *</td></tr>
<tr><td colspan="4">□Unable to travel * □Slow Acceleration * □Torque is small * □Radio noise *</td></tr>
<tr><td colspan="4">□Charge disabled □Other **:Detailed description</td></tr>
<tr><td colspan="4">Detailed breakdown:</td></tr>
<tr><td colspan="2">Frequency</td><td colspan="4">□Always □one-time □Sometimes (times / day) □Other</td></tr>
<tr><td colspan="2">Charging state</td><td colspan="4">□Full power □Half power □Low Power</td></tr>
<tr><td rowspan="4">Weather Condition</td><td></td><td colspan="4">□No effect</td></tr>
<tr><td>Weather</td><td colspan="4">□Clear □Partly cloudy □rainy □Snow □Others ()</td></tr>
<tr><td>Temperature</td><td colspan="4">□Hot □Warm □Cool □Cold □Temperature (℃)</td></tr>
<tr><td>Humidity</td><td colspan="4">□High □Medium □Low □Humidity (%)</td></tr>
</table>

Road Conditions	□No effect □City □Highway □Suburbs
	□Flat road □Collision □When turning (left / right)
	□Other
Gear Mode	□No effect
	□N Gear □R Gear □D Gear
Travel Mode	□No effect
	□Switch ON → OFF ON→OFF □Switch OFF → ON OFF→ON □READY
	□Driving □Slow down □Before parking □After parking □D shift(after stopping)
	□Charging □Other
	□Vehicle speed (km / h)
When the fault disappears	□Disappear when driving □Disappear When parking □Disappear When selecting drive mode
	□Disappear after KEY OFF □Disappear when charging is stopped □Always exist
	□Other
Other	

Replace the battery assembly follow-up work

Description

When the battery assembly is replaced, VCU battery status information must be updated.

Battery cell charge equalization

Instruction

When a battery cell is not normal, we need to replace the battery pack. After the replacement, we need to

charge the new cell to balance it, and make it equal with other battery cells.

Work Steps

1. Check the target voltage value

Use diagnostic tool to read the battery cell voltage.

1. KEY ON
2. Read data.
3. Check the highest cell voltage and the corresponding position number.

Target voltage value: the highest cell voltage.

2. Check the cell voltage

Caution：

- **This work needs to be performed at 0-40 ° C ambient temperature.**

Cell voltage is lower than the target voltage value, go to step 4.

The cell voltage is higher than the target voltage value, go to step 3.

3. Cell voltage discharge

Caution：

- This work needs to be performed at 0-40 ° C ambient temperature.

Use balancer to discharge the cell voltage to 3.0V.

Go to Step 4.

4. Cell voltage regulating

- This work needs to be performed at 0-40 ° C ambient temperature.

Charge the battery cell to target value in voltage balancer.

After finish, go to step 5.

5.Check the module voltage

Removed the module from the balancer.

Use a multimeter to check the voltage and verify.

Target voltage ± 10mV.

Go to Step 6.

6.Check the cell voltage

After the battery assembly is installed, check the replaced cell voltage value.

Voltage differential to target value: ± 40mV.

Inspection End.

DTC / Circuit Diagnosis

P31E4 to P31C9 LBC hardware failure

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P31E4 to P31C9	LBC hardware failure	Failure happens on LBC hardware controller	● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Replace LBC

1. Replace the LBC, refer to the "Dismantling and assembling of battery assembly-LBC"

P31BD EEPROM Fault

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P31BD	EEPROM Malfunction	Failure occurs when recording or reading EEPROM	● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

DiagnosticSteps

1.Replace LBC

1. Replace the LBC, refer to the "Dismantling and assembling of battery assembly-LBC"

P31B2, P315D critical insulation failure, insulation failure

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P31B2	Severe Insulation malfunction	Severely low insulation resistance value between high voltage system and low voltage system	● Wiring harness with high voltage ● Power battery ● LBC
P315D	Insulation malfunction	insulating resistance value between vehicle's high-voltage system and low-voltage system is low.	● Wiring harness with high voltage ● Power battery ● LBC

DTC diagnostic procedures

1. Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**

- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Detect the insulation of battery assembly

Use megohmmeter to measure the insulating state of service plug, and judge if it is the internal high

voltage insulation error of battery.

Check if the result is normal.

Yes >> Go to step 2.

No >> Go to step 3.

2. Check the vehicle insulation status of the high voltage system

1. Turn the key to "LOCK" or pull out.

2. Use insulation gauge to measure the resistance value between high voltage and low voltage system, and

refer to the “High voltage distribution system - Diagnosis - Insulation fault diagnosis."

Check if the result is normal.

YES >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC"

NO >> Refer to reference document to handle the failures, if it is serious insulation failure, go to step 4,

otherwise the detection end.

3. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

3. Check the inner insulation of the battery assembly.

4. Clear DTC

1.Turn the key to ON.

2.Use the diagnosis tool to clear the fault code.

P31AE cell voltage is excessively high

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P31AE	Power battery single cell voltage is too high	The cell voltage exceeds the allowable working voltage range	● VCU ● Battery cell ● LBC ● High voltage copper ● Wire harness or connector

DTC diagnostic procedures

1. Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before**

starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P3134 >> Go to "P3134- diagnostic process."

No >> Go to step 2

2. Use the "EV diagnostic tool 'Check the battery cell information

1. Check the highest cell voltage and the corresponding number.

2. Check vehicle’s remote-control data, and confirm whether the battery cell has high voltage during charging, and low voltage during discharging?

Yes, go to step 3 and check the flexible connection or collector plate on the cell’s position

NO >> Replace VCU, refer to the "Electric vehicle control system - Removal and installation -VCU".

3. Removal of Power Battery Assembly&check flexible connection

1. Turn the key to "LOCK" or pull out the key.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

3.Search for the cell position in the battery module according to the battery cell number, refer to "Removal and

installation of Battery assembly-Module layout ", refer to the "battery assembly dismantling and assembling -modular layout."

4. Dismantle the module assembly, identify abnormal flexible connection on the cell.

P31AD cell voltage is excessively low

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P31AD	Voltage of battery cell is too low	Cell voltage is lower than the allowed work voltage range	● Battery cell ● LBC ● User habits

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >>Check finished.

Diagnostic steps

1.Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P3134 >> Go to "P3134- diagnostic process."

Detected P3146 >> Go to "P3146- diagnostic process."

Detected P3147 >> Go to "P3147- diagnostic process."

Detected P31A3 >> Go to "P31A3- diagnostic process."

No >>check complete. Confirm whether most battery cells' voltage is based on normal value?

Yes >>charge the battery group by recovering programs

No, please replace abnormal battery cell. Please refer to “disassembly and installment of battery cell”

P31AB BATTERY TEMPERATURE TOO LOW

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P31AB	Battery cell temperature is excessively low	Power battery temperature too low signal	● Cold weather ● Long time parking ● Temperature sensor failure

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

DiagnosticSteps

1.Confirm whether it is caused by user's improper driving habits

1. Check "Electric vehicle control system - Diagnostics Worksheet" to confirm the vehicle was parked at a low

temperature environment for a long time on hold?

Yes >> Detection is finished.

No >> Go to step 2.

2.Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

NO >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

P31AA BATTERY TEMPERATURE TOO HIGH

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P31AA	The battery temperature is too high	Power battery temperature is excessively high	● Drive motor or VCU ● Battery cell ● Fan ● Temperature Sensor ● Environment temperature ● Large current discharge ● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

DiagnosticSteps

1.Confirm whether it is caused by the improper driving habit of user

1. Check out the “Electric vehicle control system - diagnostics Worksheet" to confirm whether the vehicle was

large-current discharged for at a high temperature environment?

Yes >> Detection is finished.

No >> Go to step 2.

2. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P3179 >> Go to "P3179- diagnostic process."

NO >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

P31A9 serious battery discharge over-currentfault

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P31A9	Battery discharge current is excessive	Power battery discharge current exceeds the normal operating range	• Current Sensors • Wiring harness with high voltage • LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation**

protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P3128 >> Go to "P3128- diagnostic process."

Detected P3129 >> Go to "P3129- diagnostic process."

No >> Go to step 2

2. Check whether the battery assembly service switch fuse is normal

1. Remove the service switch connector, refer to the "Overview - High voltage safety."

2. Measured service switch fuses conduction with multimeter .

Multimeter positive lead	Multimeter negative lead	Whether conducted
One end of service plug	The other end of service plug	Conducted

Check whether conducted or not?

YES >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

NO >> Replace service switch connector, go to step 3.

3. Check whether high voltage cable is short-circuited

1. Check whether the high voltage cable is short-circuited.

Short-circuit detected?

Yes >> Replace the vehicle high voltage cable.

No >> Go to step 4.

4. Remove the battery assembly to check whether the power battery assembly short-circuited

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

3. Detailed examination of the battery assembly for shorts.

Short-circuit detected?

Yes >>Repair or replace the failure high-voltage parts.

NO >> INSPECTION END

Malfunction of Battery Charging critical over-current

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P31A8	Critical over-current during battery's charging	Over-current when Charging or discharging braking energy recovery	● Battery cell ● Current Sensors ● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation**

protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1.Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P3128 >> Go to "P3128- diagnostic process."

Detected P3129 >> Go to "P3129- diagnostic process."

No >> Go to step 2.

2.Check whether the battery assembly service switch fuse is normal

1. Remove the service switch connector, refer to the "Overview - High voltage safety."

2. Measured service switch fuses conduction with multimeter .

Multimeter positive lead	Multimeter negative lead	Whether conducted
One end of service plug	The other end of service plug	Conducted

Check whether conducted or not?

YES >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

NO >> Replace service switch connector, go to step 3.

3.Check whether high voltage cable is short-circuited

1. Check whether the high voltage cable is short-circuited.

Short-circuit detected?

Yes >> Replace the vehicle high voltage cable.

No >> Go to step 4.

4. Remove the battery assembly to check whether the power battery assembly short-circuited

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

3. Check the battery assembly for short-circuit.

Short-circuit detected?

Yes >>Repair or replace the failure high-voltage parts.

NO >> INSPECTION END

Malfunction of P31A7 total voltage's critical under-voltage

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P31A7	Total pressure under-voltage	The total voltage is excessively low, outside the normal voltage range	● LBC ● User habits

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P3137 >> Go to "P3137- diagnostic process."

NO >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

Malfunction of P31A6 total voltage's critical over-voltage

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P31A6	The total voltage is excessively high	During charging, the total voltage is excessively high, out of normal range	● VCU ● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P31AE >> Go to "P31AE- diagnostic process."

Detected P3137 >> Go to "P3137- diagnostic process."

NO >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

Malfunction of P31A3 Battery single cell's critically-low voltage

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P31A3	Power battery single cell voltage is too low	Battery cell voltage is too low to reach the damaging threshold value	● Long time parking ● Battery cell ● LBC ● VCU

DTC diagnostic procedures

1. Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance**

switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Confirm whether it is caused by the improper driving habit of user

1. Check out the "power battery system - diagnostics Worksheet", check whether the vehicle was parked at a

lower SOC environment for a long time?

Yes >> Go to step 3.

No >> Go to step 2.

2. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P3179 >> Go to "P3179- diagnostic process."

Detected P3134 >> Go to "P3134- diagnostic process."

P3138 is detected >> GO TO “P3138-diagnosis flow”.

NO >> Replace VCU, refer to the "Electric vehicle control system - Removal and installation -VCU".

3. Use the "EV diagnostic tool 'Check the battery cell information

1. Discover lowest single cell voltage and the corresponding number.

4. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

3. Search for the cell position in the battery module according to the battery cell number, refer to "Removal and

installation of Battery assembly-Module layout ", refer to the "battery assembly dismantling and assembling -modular layout."

4. Dismantling the module assembly, identify abnormal monomer and replacement, refer to the "dismantling

and assembling the battery cell."

5. Clear DTC

1.Turn the key to ON.

2.Use the diagnosis tool to clear the fault code.

P317D Single cell spray explosion

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P317D	Single body spray explosion	LBC detect thermal instability failure	● Battery cell

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation**

protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

2. Detect failure cell

1. Check each battery cell if there is a negative electrode lug fuse blown.

2. Replace the faulty battery cell, refer to the "dismantling and assembling the battery cell."

3. Clear DTC

1.Turn the key to ON.

2.Use the diagnosis tool to clear the fault code.

P317C/P317B static cell's self-discharge check 100Ω/50Ω

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P317C	Still single-body self-discharge check_100Ω	Single cell's self-discharge	● Battery cell
P317B	Still single-body self-discharge check_50Ω	Single cell's self-discharge	● Battery cell

DTC diagnostic procedures

1. Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance**

switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

2. Detect failure cell

1. Check each battery cell to confirm whether single-cell self-discharge exists.

2. Replace the faulty battery cell, refer to the "dismantling and assembling the battery cell."

3. Clear DTC

1.Turn the key to ON.

2.Use the diagnosis tool to clear the fault code.

P3179 fire

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3179	Fire	Fires on single cell is detected by LBC	● Battery cell

DTC diagnostic procedures

1. Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

2. Detect failure cell

1. Check each battery cell if there is a negative electrode lug fuse blown.

2. Replace the faulty battery cell, refer to the "dismantling and assembling the battery cell."

3. Clear DTC

1.Turn the key to ON.

2.Use the diagnosis tool to clear the fault code.

P3177 12V lead-acid cell voltage is excessive

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3177	P3177 12V lead-acid cell voltage is excessive	12V lead-acid cell voltage is below 18V	● DC/DC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves,**

shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P0A94 >> Go to "electric vehicle control system -P0A94- diagnostic process."

No >> Go to step 2.

2. Check 12V battery voltage

1: Place the key in the "LOCK" position

2 open the front cabin cover.

3. Use multimeter to test the voltage of 12V battery

Multimeter positive lead	Multimeter negative lead	Voltage value
12V Lead-Acid battery positive	12V Lead-Acid battery negative	Approximate 12V

Is test results normal?

YES >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

NO >> Replace the motor controller assembly, refer to the "electric vehicle drive system - removal and

installation - motor controller."

P3176 12V lead-acid cell voltage is excessively low

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3176	P3176 12V lead-acid cell voltage is excessively low	12V battery voltage is below 9V	● 12V battery ● Harness、connector ● DC/DC ● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P0A94 >> Go to "electric vehicle control system -P0A94- diagnostic process."

Detected P0AA4 >> Go to "electric vehicle control system - P0AA4- diagnostic process."

Detected P0AA1 >> Go to "electric vehicle control system -P0AA1- diagnostic process."

No >> Go to step 2.

2. Check 12V battery voltage

1: Place the key in the "LOCK" position

2 open the front cabin cover.

3. Use multimeter to test the voltage of 12V battery

Multimeter positive lead	Multimeter negative lead	Voltage value
12V Lead-Acid battery positive	12V Lead-Acid battery negative	Approximate 12V

Is test results normal?

Yes >> Go to step 3.

No >> Go to step 4

3. Check whether the low voltage cable of 12V battery is conducted

Check harness for failure.

<table>
<tr><td colspan="2">Multimeter positive lead</td><td>Multimeter negative lead</td><td>Voltage value</td></tr>
<tr><td colspan="3">KEY signal</td><td rowspan="6">Approximate 12V</td></tr>
<tr><td>Connector</td><td>Terminal number</td><td rowspan="2">Ground</td></tr>
<tr><td>F18</td><td>D</td></tr>
<tr><td colspan="3">LBC Power Supply Signal</td></tr>
<tr><td>Connector</td><td>Terminal number</td><td rowspan="2">Ground</td></tr>
<tr><td>F18</td><td>V</td></tr>
</table>

Check if the result is normal.

YES >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

NO >> Repair or replacement harness

4. Check the conduction between 12V battery to DCDC

1.Check the conduction between 12V battery to DCDC.

Check if the result is normal.

Yes >> Detection is finished.

NO >> Repair or replace the relevant connecting components.

P316E HIGH VOLTAGE INTERLOCKING ERROR

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P316E	The high voltage interlock failure	High voltage interlock signal on the service switch is not detected	● Service switch; ● Harness ● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Confirm the service switch is plugged in

1. Confirm the service switch is plugged in and locked.

Check if the result is normal.

Yes>>Plug in service switch,detection finished.

No >> Go to step 2.

2.Service switch interlock signal PIN needle damage

1.Unplug the service switch connector, confirm the service switch high voltage interlock sign pin is conducted.PIN

Check if the result is normal.

Yes>>Replace service switch plug, detection finished.

No >> Go to step 3.

3. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

4. Check the conduction of the high voltage interlock cable between the service switch pedestal to the battery controller.

1.Use the multimeter to check the conduction of the high voltage interlock cable between the service switch

pedestal to the battery controller.

Multimeter positive lead		Multimeter negative lead		Whether conducted
Connector	Terminal number	Connector	Terminal number	Conduction
CT6	106	CT6	107	

Check whether conducted or not?

YES >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

NO >> Replace the failure cable.

P3160 unbalanced battery temperature fault

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3160	Power battery temperature is imbalanced	LBC detected battery temperature is not balanced	● Temperature sensor ● Fan ● User habits

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Confirm whether it is caused by user's improper driving habits

1.Refer to "Power Battery System - Diagnosis Worksheet" to confirm whether the battery is high current

discharged in high temperature environment for a long time.

Yes >> Detection is finished.

No >> Go to step 2.

2.Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

No >> Detection finished.

P3147 CELL STATIC DIFFIRENTIAL PRESSURE TOO LARGE

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3147	Static differential of cell is too large	LBC detected the static differential of cell is too large LBC	● LBC ● High voltage connecting the copper bar ● Battery cell ● Voltage sample harness

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the**

inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P3134 >> Go to "P3134- diagnostic process."

P31AD is detected >> GO TO “P31AD-diagnosis flow”.

P31AB is detected >> GO TO “P31AB-diagnosis flow”.

No >> Go to step 2.

2. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Check the serial number and voltage of abnormal battery cell.

3. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

1.Plug out the sampling harness of abnormal battery cell voltage, use multimeter to measure the corresponding sampling terminal of harness terminal, refer to “System Instruction-System-System Circuit Diagram”.

Multimeter positive lead	Multimeter negative lead	Whether it is consistent with the measured value of LBC.

Corresponding terminal of cell number.	The corresponding terminal of prior cell number.	Consistent（±10mV）

Check if the result is normal.

YES >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

NO >> Replace battery cell, refer to the "dismantling and assembling the battery cell."

P3146 Battery cell dynamic voltage difference is excessively high

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3146	Battery cell dynamic voltage difference is excessively high	LBC detected dynamic battery cell voltage is too large	• LBC • High voltage connecting the copper bar • Battery cell • Voltage sample harness

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P3147 >> Go to "P3147- diagnostic process."

Detected P3134 >> Go to "P3134- diagnostic process."

NO >> Go to step 2, refer to the "Dismantling and assembling of power battery

assembly-LBC".

2. Use the "EV diagnostic tool 'Check the battery cell information

1. Check the abnormal battery cell voltage and corresponding number.

3. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

4. Check whether the high voltage connecting copper barfixing bolt is loosed near the abnormal cell

1. Check whether the high voltage connecting copper bar fixing bolt is loosed near the abnormal cell

Test results normal?

YES >> Repair or replace the corresponding high-voltage connector copper bar.

NO >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

P3139 Mis-closing of balance

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3139	Mis-closing of balance	Balanced Control Circuit Failure	● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 10 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Replace LBC

1.Replace the LBC; please refer to “disassembly and assembly of battery pack-LBC”.

P3138 Mis-opening of balance

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3138	Mis-opening of balance	Balanced Control Circuit Failure	● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 10 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Replace LBC

1.Replace the LBC; please refer to “disassembly and assembly of battery pack-LBC”.

2.Use the "EV diagnostic tool 'Check the battery cell information

1. Check the highest cell voltage and the corresponding number.

2.Inquire whether abnormal cell exists or not

Check if the result is normal.

Yes >> Detection is finished.

No >> Go to step 3

3.Remove the battery assembly to replace the abnormal battery cell

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

3.Search for the cell position in the battery module according to the battery cell number, refer to "Removal and

installation of Battery assembly-Module layout ", refer to the "battery assembly dismantling and assembling -modular layout."

4. Dismantling the module assembly, identify abnormal monomer and replacement, refer to the "dismantling

and assembling the battery cell."

P3137 MISMATCHING ERROR OF CELL VOLTAGE AND TOTAL VOLTAGE

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3137	Mismatching error of cell voltage and total voltage	LBC detected there is obvious deviation between cell voltage and total voltage	• LBC

DTC diagnostic procedures

1. Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 10 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1. Replace LBC

1.Replace the LBC; please refer to “disassembly and assembly of battery pack-LBC”.

P3134 LOSSENING ERROR OF CELL VOLTAGE ACQUISITION CABLE

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3134	Loosening error of cell voltage acquisition cable	Poor contact of LBC cell acquisition cable	● LBC ● Voltage acquisition cable

DTC diagnostic procedures

1. Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation**

protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the power switch ON and wait for 10s or more.

2.Read LBC temperature information.

3.Check the voltage and series number of abnormal cell.

2. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

3. Check the voltage acquisition harness

1.Find corresponding voltage acquisition connector according to the cell series number, and refer to “System description-system-system diagrams”.

2.Check if the connectors between module (M) and main harness (CT), LBC (J) and main harness.

Is it normal?

Yes>> repair or replace relative voltage acquisition harness.

NO >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

P3133CELL VOLTAGE INSPECTION ERROR- AD TRANSFER ERROR

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3133	Voltage inspection error-AD transfer error	LBC cell voltage detected there is error during AD transferring	● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 10 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Replace LBC

1.Replace the LBC; please refer to “disassembly and assembly of battery pack-LBC”.

P312F Insulation Detection Circuit

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P312F	Malfunction of Insulation inspection	The amplitude of LBC collector's insulation inspection voltage value remains unchanged	● LBC

DTC diagnostic procedures

1. Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 10 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1. Replace LBC

1.Replace the LBC; please refer to "disassembly and assembly of battery pack-LBC".

P312E Insulation Detection Fault

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P312E	Malfunction of Insulation inspection	LBC collector's insulation inspection voltage value is near 0V	● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the power switch ON and wait for 5min or more.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Replace LBC

1.Replace the LBC; please refer to "disassembly and assembly of battery pack-LBC".

P312D Insulation Detection Fault

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P312D	Malfunction of Insulation inspection	LBC collector's insulation inspection voltage value is near 5V power voltage.	● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the power switch ON and wait for 5min or more.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Replace LBC

1.Replace the LBC; please refer to "disassembly and assembly of battery pack-LBC".

P312C temperature sensor fault

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P312C	Temperature sensor failure	LBC check the voltage value of battery temperature sensor is near 0V	● Wire harness or connector ● Temperature sensor ● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 10 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation**

protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the power switch ON and wait for 10s or more.

2.Read LBC temperature information.

Is there a displayed value of temperature sensor quite large?

Yes >> confirm the series number of abnormal sensor, and GO TO 2.

NO >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

2. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

3. Detect harness

1.Check the state of corresponding harness or connector of abnormal temperature sensor series number.

Check if the result is normal.

Yes >> Go to step 4

No>> back to normal connection.

4. Check the temperature sensor

Refer to “Components inspection”.

Check if the result is normal.

Yes>> GO TO 5.

No >> replace the abnormal temperature sensor.

Components inspection

1. Check the temperature sensor

1.Remove the temperature sensor.

2.Use multimeter to measure the resistance value in two ends of abnormal temperature sensor.

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	96	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	97	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	98	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table

CT7	99	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	100	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	101	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	102	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	103	CT7	104	

Temperature	Resistance value (Ω)
-20℃	75K
0℃	28K

25℃	10K
45℃	4.9K

Check if the result is normal.

Yes>> inspection end.

No >> replace the abnormal temperature sensor.

P312B temperature sensor fault

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P312B	Temperature sensor failure	LBC collector's inspection shows the voltage of battery temperature sensor is near the voltage value of 5V power.	● Wire harness or connector ● Temperature sensor ● LBC

DTC diagnostic procedures

1. Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 10 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before**

starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the power switch ON and wait for 10s or more.

2.Read LBC temperature information.

Is there a displayed value of temperature sensor quite large?

Yes >> confirm the series number of abnormal sensor, and GO TO 2.

NO >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

2. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

3. Detect harness

1.Check the state of corresponding harness or connector of abnormal temperature sensor series number.

Check if the result is normal.

Yes >> Go to step 4

No>> back to normal connection.

4. Check the temperature sensor

Refer to “Components inspection”.

Check if the result is normal.

Yes>> GO TO 5.

No >> replace the abnormal temperature sensor.

Components inspection

1. Check the temperature sensor

1.Remove the temperature sensor.

2.Use multimeter to measure the resistance value in two ends of abnormal temperature sensor.

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	96	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	97	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	98	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal	Connector	Terminal	Refer to temperature

	number		number	table
CT7	99	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	100	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	101	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	102	CT7	104	

Multimeter positive lead		Multimeter negative lead		Resistance value (Ω)
Connector	Terminal number	Connector	Terminal number	Refer to temperature table
CT7	103	CT7	104	

Temperature	Resistance value (Ω)
-20℃	75K

0℃	28K
25℃	10K
45℃	4.9K

Check if the result is normal.

Yes>> inspection end.

No >> replace the abnormal temperature sensor.

P312A current sensor fault

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P312A	Current Sensor fault	Deviation of measuring value at two inspection paths of current sensor is too big	● Wire harness or connector ● Current Sensors ● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the**

inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Removal of Power Battery Assembly1.Put the key on LOCK or unplug it.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

2. Check the connection

1.Check if the connection of harness or connectors between LBC and BDU (current sensor) is normal.

Check if the result is normal.

Yes>> GO TO 3.

No>>reconnect them.

3. Check the conduction of harness

1.Check the conduction of current sensor.

Multimeter positive lead		Multimeter negative lead		Connectivity
BDU(Current Sensor)		LBC		
Connecto r	Terminal number	Connector	Terminal number	
15326815	A	1318756-1 （J5）	12	Conduction
	B		11	
	C		3	
	D		4	

Check if the result is normal.

Yes >> Go to step 4

No >>Repair the harness or connector.

4. Replace LBC

1.Replace the LBC; please refer to “disassembly and assembly of battery pack-LBC”.

5. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the power switch ON and wait for 10s or more.

2.Read LBC temperature information.

Does the error still exist?

Yes>> change the BDU, and refer to “disassembly and assembly of battery pack-BDU”.

NO >> INSPECTION END

P3129 current sensor fault

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3129.	Current Sensor fault	Voltage of current sensor is abnormal, which is lower than normal value.	● Wire harness or connector ● Current Sensors ● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

2. Check the connection

1.Check if the connection of harness or connectors between LBC and BDU (current sensor) is normal.

Check if the result is normal.

Yes>> GO TO 3.

No>>reconnect them.

3. Check the conduction of harness

1.Check the conduction of current sensor.

Multimeter positive lead		Multimeter negative lead		Connectivity
BDU(Current Sensor)		LBC		
Connector	Terminal number	Connector	Terminal number	
15326815	A	1318756-1 （J5）	12	Conduction
	B		11	
	C		3	
	D		4	

Check if the result is normal.

Yes >> Go to step 4

No >>Repair the harness or connector.

4. Replace LBC

1.Replace the LBC; please refer to “disassembly and assembly of battery pack-LBC”.

5. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the power switch ON and wait for 10s or more.

2.Read LBC temperature information.

Does the error still exist?

Yes>> change the BDU, and refer to “disassembly and assembly of battery pack-BDU”.

NO >> INSPECTION END

P3128 current sensorfault

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P3128.	Current Sensor fault	Voltage of current sensor is abnormal, which is higher than normal value.	● Wire harness or connector ● Current Sensors ● LBC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

2. Check the connection

1.Check if the connection of harness or connectors between LBC and BDU (current sensor) is normal.

Check if the result is normal.

Yes>> GO TO 3.

No>>reconnect them.

3. Check the conduction of harness

Check the resistance value of coolant temperature sensor

Multimeter positive lead		Multimeter negative lead		Connectivity
BDU(Current Sensor)		LBC		
Connector	Terminal number	Connector	Terminal number	
15326815	A	1318756-1 （J5）	12	Conduction
	B		11	
	C		3	
	D		4	

Check if the result is normal.

Yes >> Go to step 4

No >>Repair the harness or connector.

4. Replace LBC

1.Replace the LBC; please refer to “disassembly and assembly of battery pack-LBC”.

5. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the power switch ON and wait for 10s or more.

2.Read LBC temperature information.

Does the error still exist?

Yes>> change the BDU, and refer to “disassembly and assembly of battery pack-BDU”.

NO >> INSPECTION END

P311F CELL STATIC DIFFIRENTIAL PRESSURE TOO LARGE

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible reasons for failure
P311F.	Alert of battery cell's dynamic voltage difference	LBC detected the static voltage of cell is too large	● LBC ● High voltage connecting the copper bar ● Battery cell ● Voltage sample harness

DTC diagnostic procedures

1. Perform DTC confirmation procedure

1.Turn the key to "ON" , wait for more than 2 seconds.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Check out the "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance**

switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Turn the key to ON.

2. Check the diagnostic results.

Whether detected other DTC?

Detected P3134 >> Go to "P3134- diagnostic process."

P31AD is detected >> GO TO “P31AD-diagnosis flow”.

P31AB is detected >> GO TO “P31AB-diagnosis flow”.

No >> Go to step 2.

2. Use the "EV diagnostic tool" inquiry LBC diagnostic service information

1.Check the serial number and voltage of abnormal battery cell.

3. Removal of Power Battery Assembly

1. Turn the key to "LOCK" or pull out.

2. Remove the battery assembly, refer to "Removal and installation of battery assembly-Battery assembly".

1.Plug out the sampling harness of abnormal battery cell voltage, use multimeter to measure the corresponding sampling terminal of harness terminal, refer to “System Instruction-System-System Circuit Diagram”.

Multimeter positive lead	Multimeter negative lead	Whether it is consistent with the measured value

		of LBC.
Corresponding terminal of cell number.	The corresponding terminal of prior cell number.	Consistent（±10mV）

Check if the result is normal.

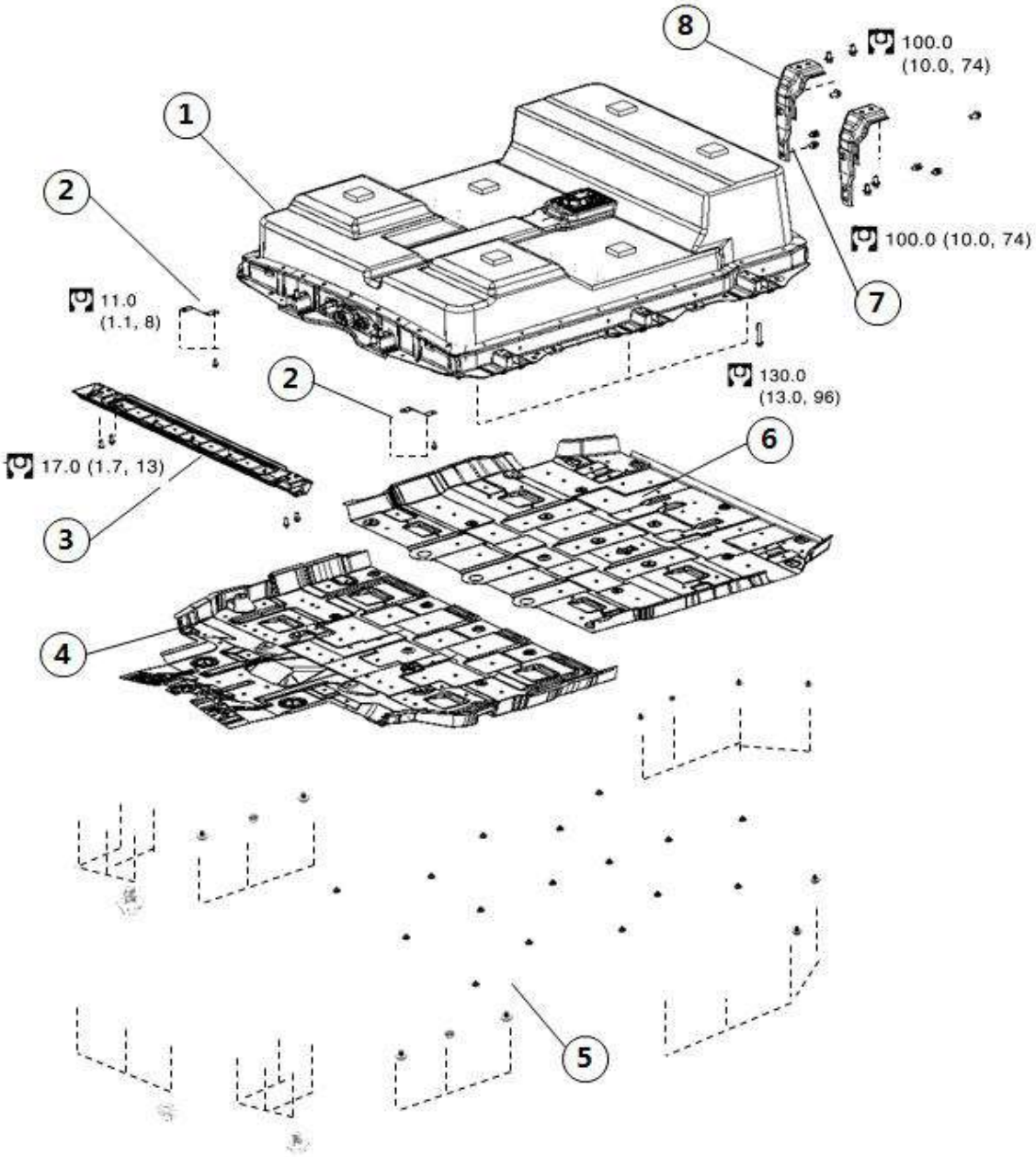
YES >> Replace LBC, refer to the "Dismantling and assembling of battery assembly-LBC".

NO >> Replace battery cell, refer to the "dismantling and assembling the battery cell."

Powerbattery Assembly’sDisassembly and assembly

Power battery assembly

Exploded view



1. Power cell assy 2.iso-electrical connection bonding 3. Cell anti-collision beam 4. Power cell assy’s lower guard plate I

5. Plastic split cotter pin 6. Power cell assy's lower guard plate II 7. Power cell assy’s mounting bracket I

8. Power cell assy's mounting bracket II

: N·m (kg-m,ft-lb)

Power cell assy's disassemblyand assembly

Warning:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress. Before operations on high-voltage system, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to turn to "ON" or "START".**

Refer to:

Power battery assembly "High Voltage Precautions".

Removal of Power battery assembly

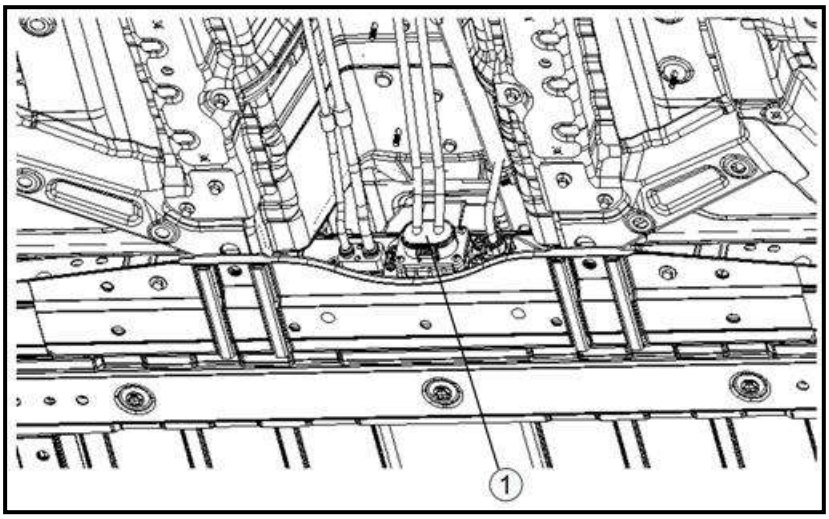
Warning:

Before operating high-voltage system Refer to "Overview - How to disconnect high voltage".

1 Open the front hatch, and get the coolants according to the “maintenance routine” for air conditioner system.

2 After lifting the vehicle, remove the anti-collision beam, lower guard plate Ⅰ and Ⅱ.

3 Pull out the high voltage cable connector ① of battery pack.

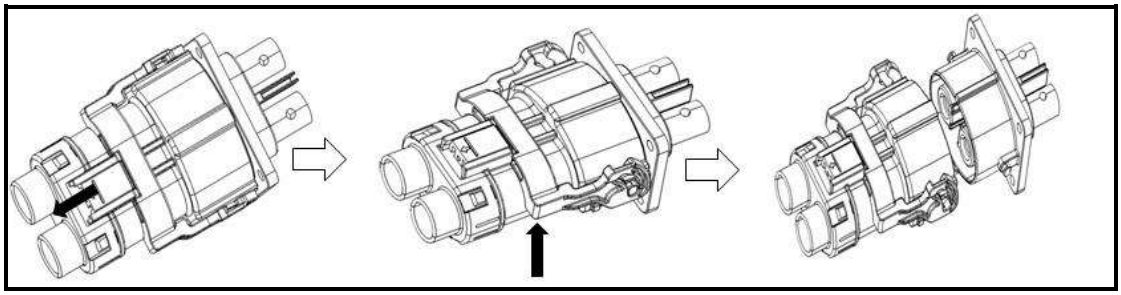


Warning:

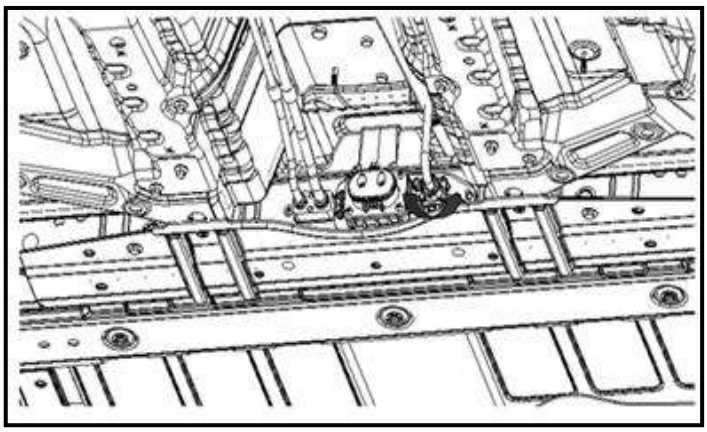
To prevent hazards during disassembly, please be sure to wear protective gear.

To prevent shock hazard, be sure to wrap high voltage socket with insulated tape immediately after disassemble the battery pack.

Pull out the high voltage cable connector according to the following steps



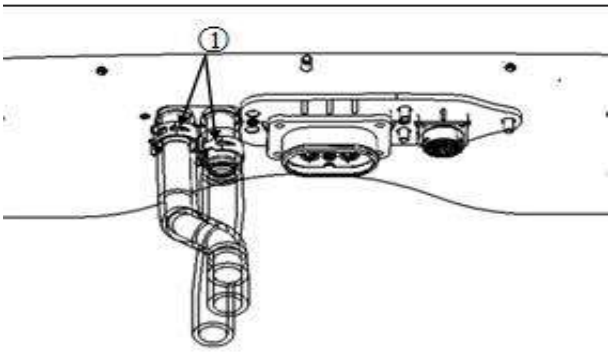
4 Rotate metal sleeve anticlockwise to pull out low-voltage harness connector.



Warning:

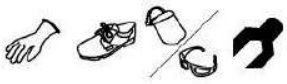
To prevent hazards during disassembly, please be sure to wear protective gear.

5 Remove the clamp ① between cell's water inlet&outlet aluminium pedestal and cell's water-pipe connecting pipe

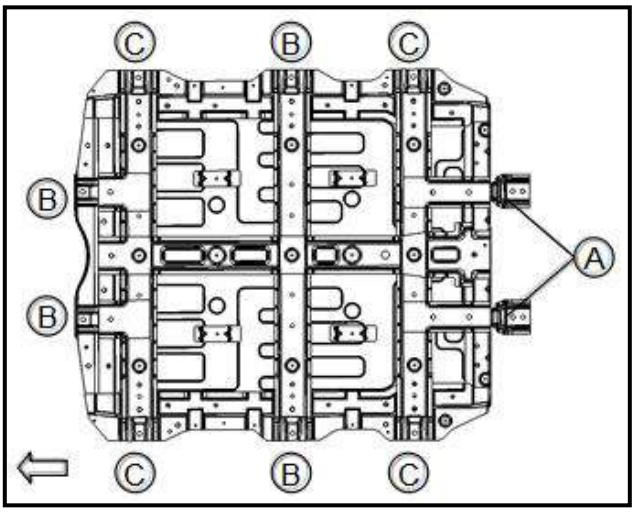


Warning:

· **To prevent hazards during disassembly, please be sure to wear** protective gear.



6 Remove the mounting bolts of battery pack as the picture showed.And remove the A Bolt first.



⇦The front of the vehicle

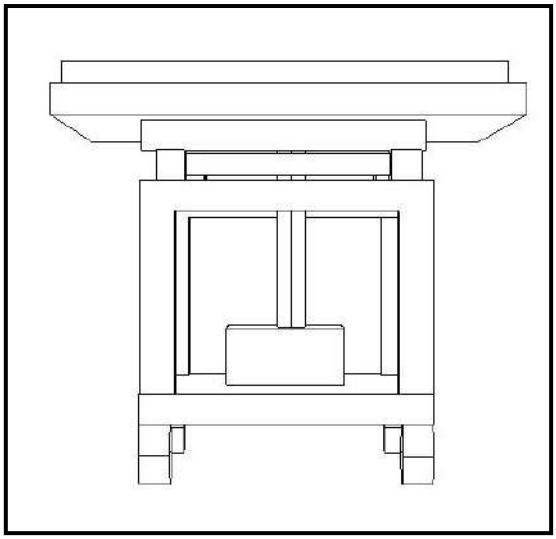
Warning:

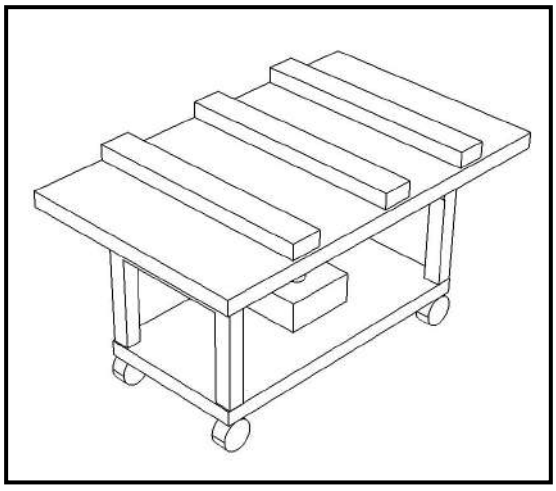
To prevent hazards during disassembly, please be sure to wear protective gear.

Warning:

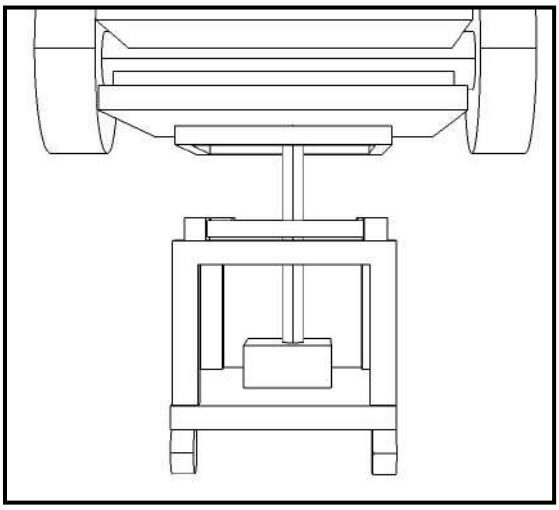
DO NOT remove four C Bolts in the above picture.

7 Put the tray on the surface of lifting device.





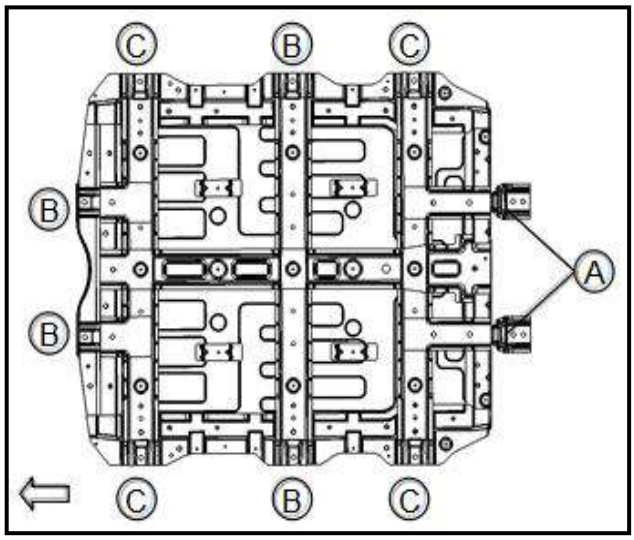
8 Lift up the tray to the lower surface of battery and make them slightly contacted with each other.



Caution：

·Use transporting fixing bolts to fix the tray and battery pack.

9 Remove the mounting bolts of battery pack as the picture showed. And remove the B Bolt first.



⇦The front of the vehicle

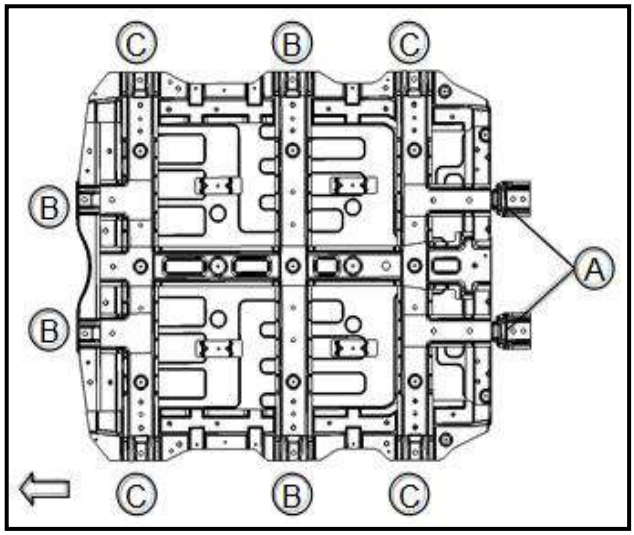
Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

Warning:

DO NOT remove four C Bolts in the above picture.

10 Remove the fixing C Bolts of battery pack.。

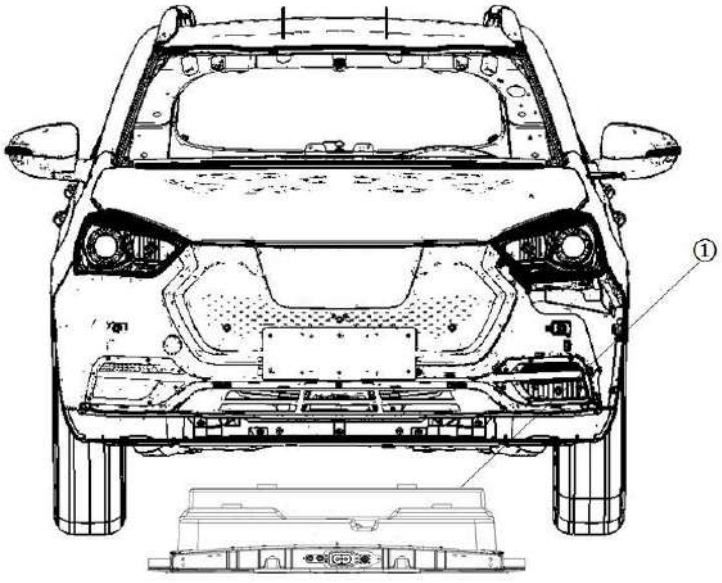


⇦The front of the vehicle

Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

11 Lower down the tray and remove the battery pack ① from the vehicle.



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

Installation of Power battery assembly

1 When replace a new battery pack, please refer to the following steps.

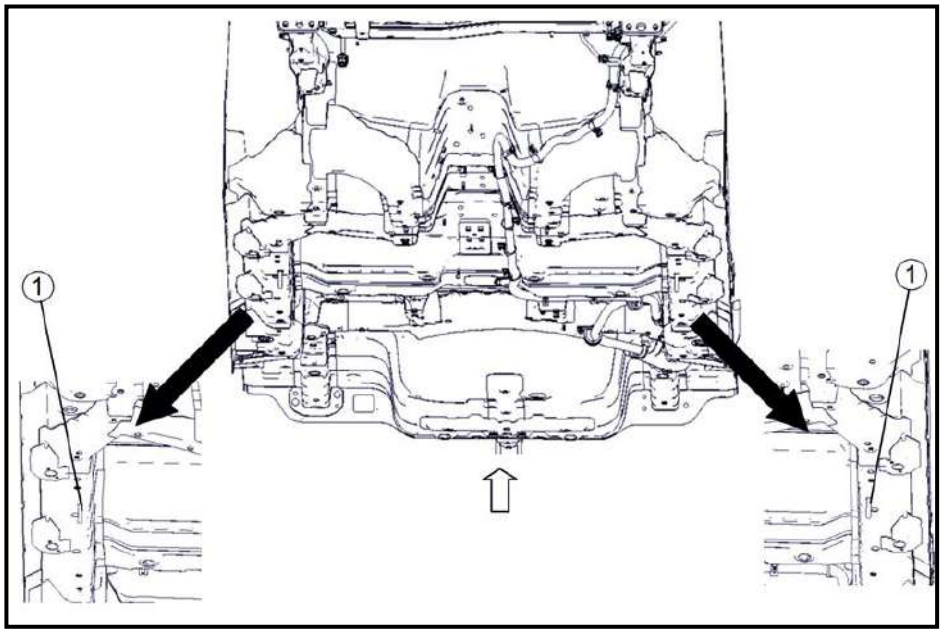
①Write down the replacing date on the sealed package of new battery pack.

②Divide the sealing strip with tracking date into two pieces, and stick on the battery pack and “Battery

Replace Record Sheet” respectively.

③Fill in the “Battery Replace Record Sheet”.

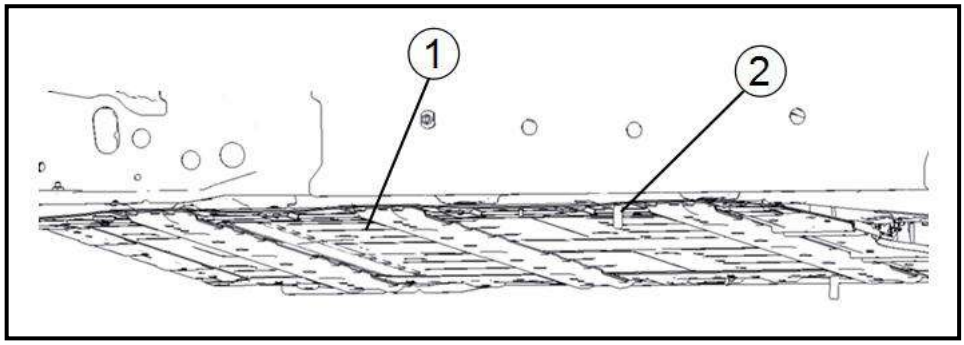
2 Mount two alignment pins ① in the position as shown in the picture.



⇦: The front of the vehicle

3 Mount the battery in the vehicle body.

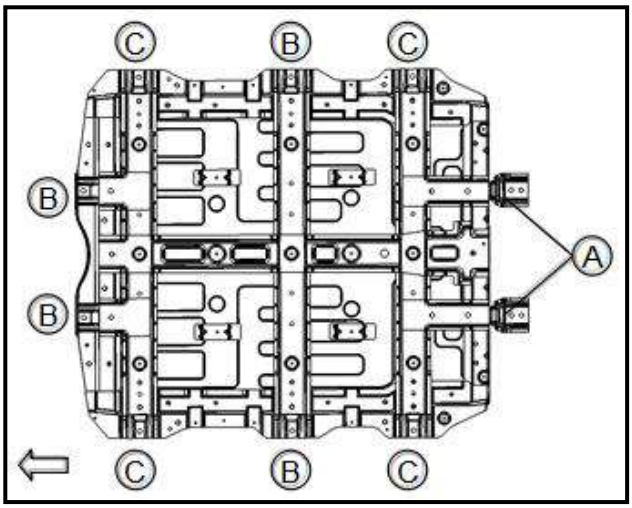
Aligning the battery pack ① with alignment pins ②.



Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

4 Mount fixing C bolts and remove the tray.



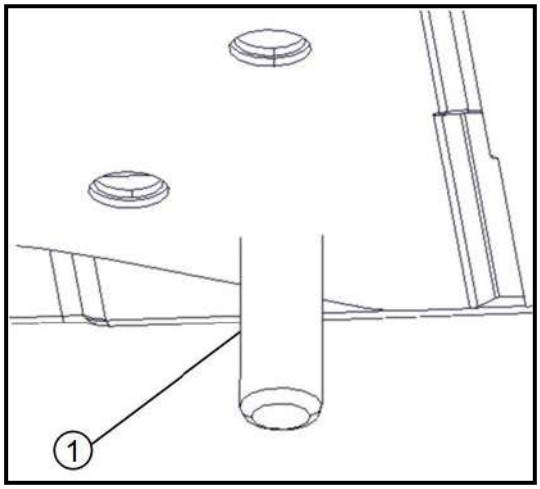
The front of the vehicle

Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

5 Remove the alignment pins from the vehicle body.

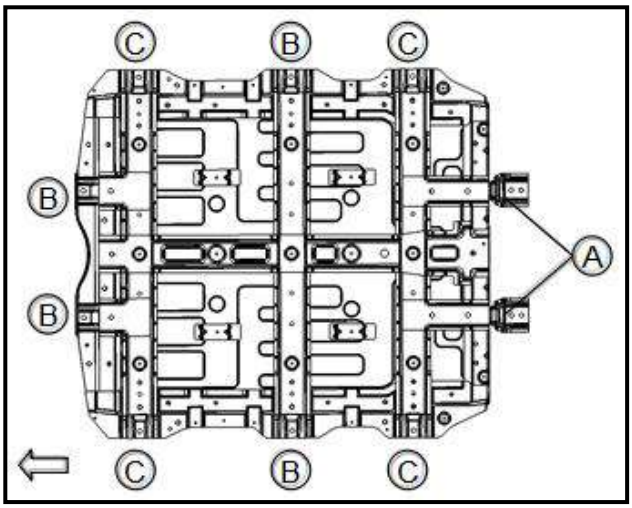
If the alignment pin ① is too tight to remove, please use a wrench to dismount.



Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

6 Mount fixing B Bolt of battery pack.

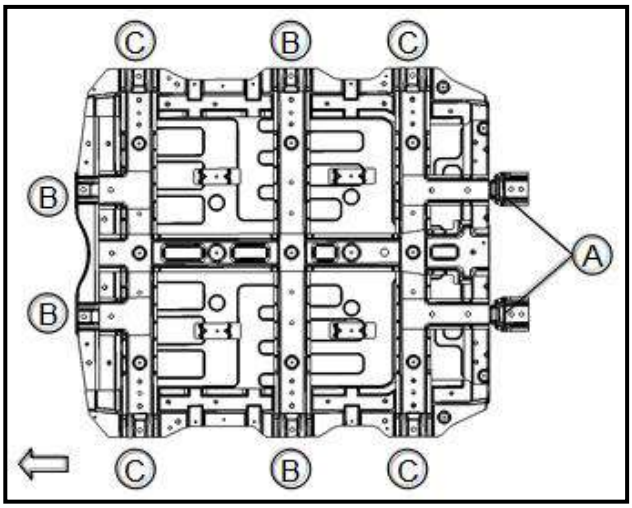


The front of the vehicle

Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

7 Mount fixing A Bolt of battery pack.



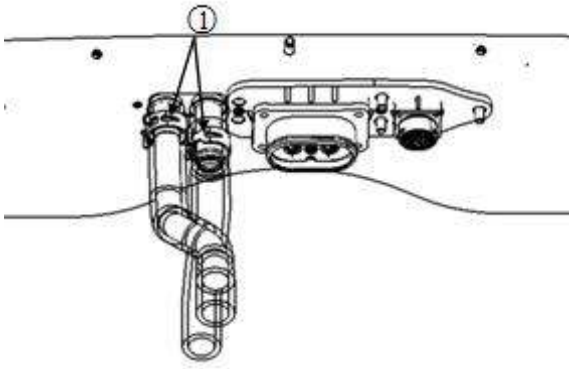
The front of the vehicle

Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

8 Rotate metal sleeve clockwise and insert the sleeve into low-voltage harness connector. Stop the insertion when the clicking sound appears.

9 Assemble the clamp ① between water-pipe assy's flange and external pipelines.

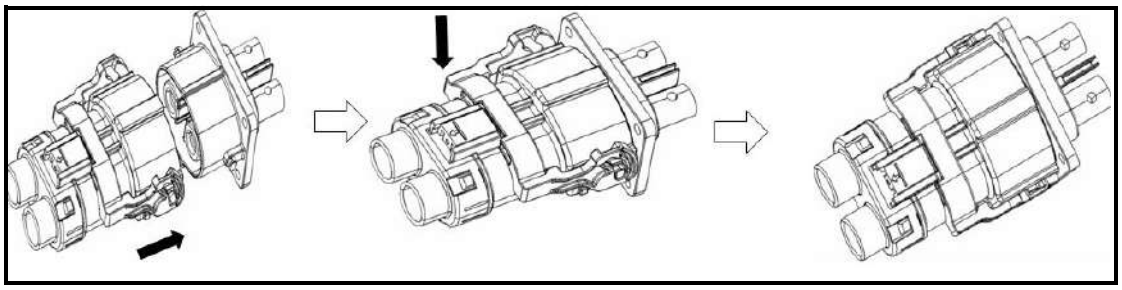


Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

10 Mount the high voltage cable connector.

Connect the high voltage cable connector according to the following steps.



Warning:

To prevent hazards during assembly, please be sure to wear

protective gear.

11 Mount the lower protecting base Ⅰ and Ⅱ of battery.

12 Install cell's anti-collision beam.

13 Lower down the vehicle and fill the coolants according to the "maintenance routine" for air conditioner system.

14 Install the service switch Refer to "Overview - How to disconnect high voltage".

Inspection

Equipotential test

After mounting the battery pack, use multimeter to measure the resistance between battery housing and

vehicle body.

Warning:

To prevent hazards during inspection, please be sure to wear protective gear.

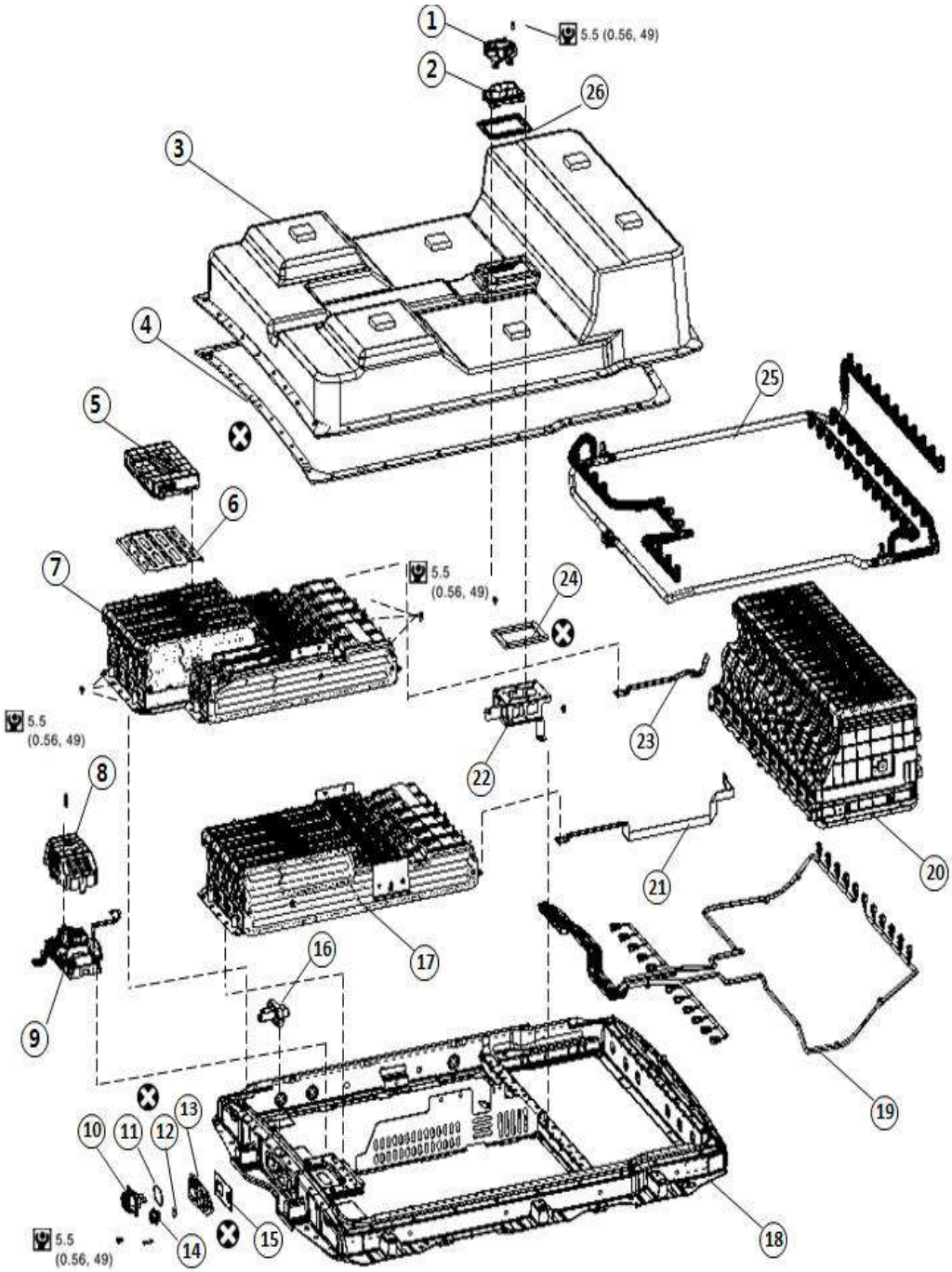
Standard : ≤0.1Ω.

Removal and Installation of Power Battery Assembly

Power battery assembly

Explosive view

Power battery assembly

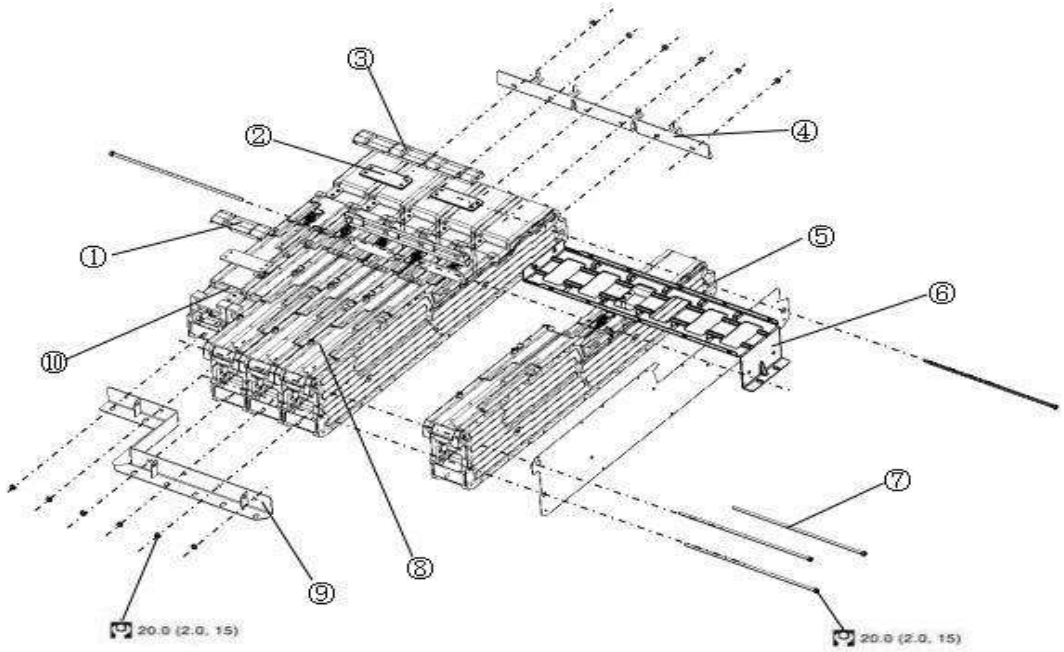


1. Service switch plug 2. Service switch socket 3. Upper housing assy
4. Sealer pad 5.LBC 6. LBC bracket
7. Right-front module assy 8.BDU upper housing 9. BDU pedestal
10. High-voltage harness connector 11. Sealer pad of high-voltage connector 12.sealer pad of low-voltage connector
13. High-voltage pedestal 14.low-voltage harness connector 15.sealer pad of high-voltage connector
16. Water pipe flange 17.left-front module assy 18.lower housing
19. Low-voltage harness assy 20. Rear module assy 21.flexible connection between modules
22. Fixing bracket of service switch 23. flexible connection between modules 24.sealer pad of fixing bracket of service switch
25. Quick-plug pipeline assy 26.stiffening plate of service switch

: Need to be replaced in every service time

: N·m (kg-m,ft-lb)

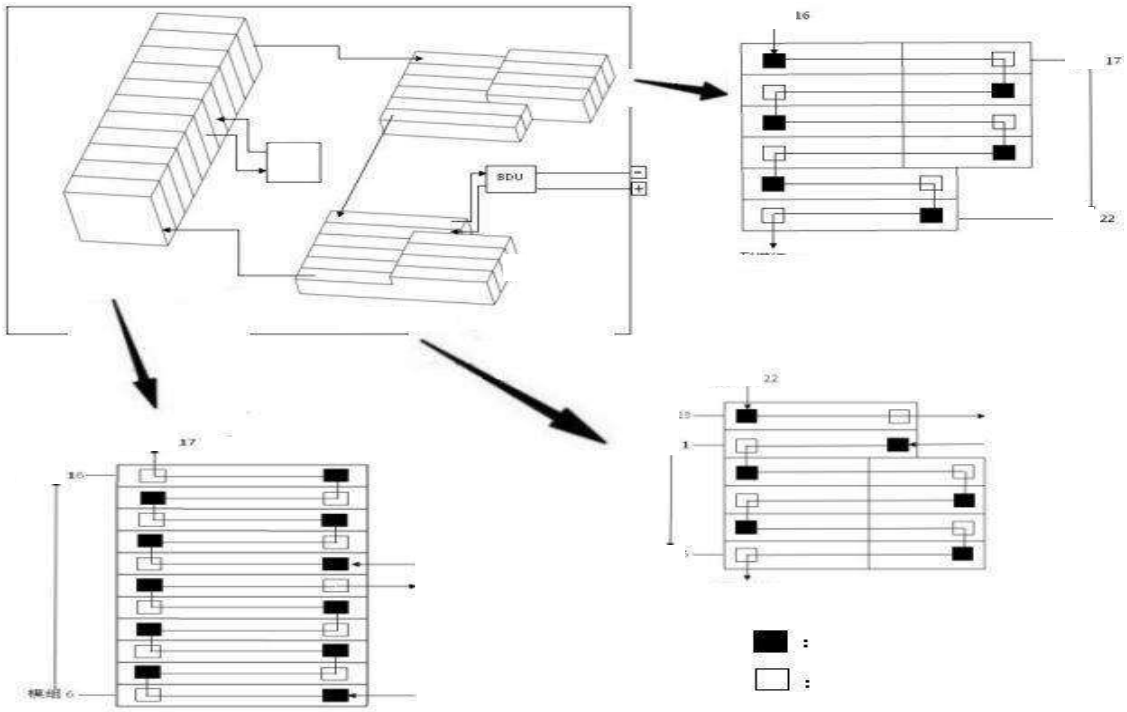
Left-front module assy



Right-26-series high-voltage guard cover I 2.copper bar of flexible connection between modules 3.Right-26-series high-voltage guard cover Ⅱ 4.right fixing parts of right-26-series 5.monitoring plate of thermal run-away 6.module's pressing plate 7.pull rod of right-26-series 8. 5-Series cell module 9.left fixing parts of right-26-series 10.3-series cell module

: N·m (kg-m,ft-lb)

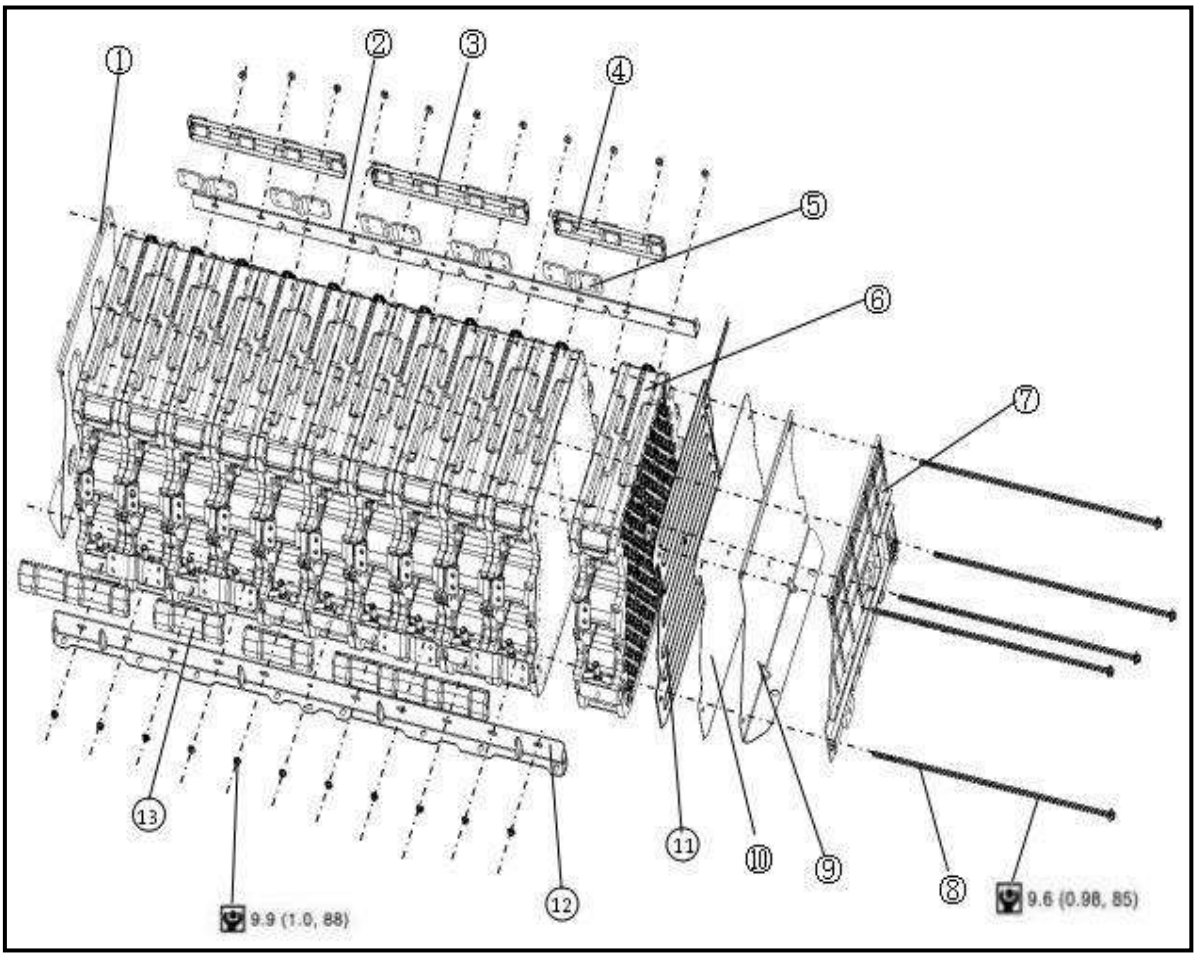
Module Layout



FRONT LEFT MODULE		
Module number	Module type	Serial number
17	42P5S	68&72
18	42P5S	73&77
19	42P5S	78&82
20	42P5S	83&87
21	42P3S	88&90
22	42P3S	91&93

FRONT RIGHT MODULE		
Module number	Module type	Serial number
23	42P3S	94&96
1	42P3S	1&3
2	42P5S	4&8
3	42P5S	9&13
4	42P5S	14&18
5	42P5S	19&23

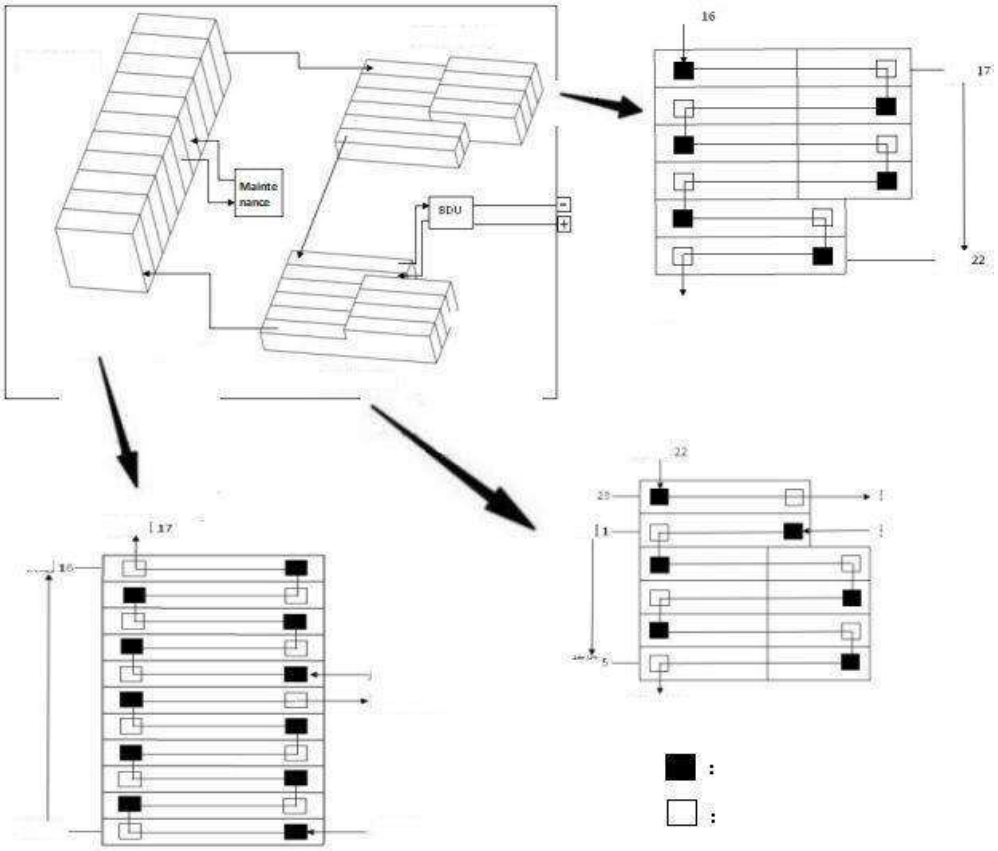
Rear module assy



1. 44-Series outer cover plate I 2. 44-Series right fixing parts 3. 44-Series high-voltage guard cover I 4. 44-Series high-voltage guard plate II 5.copper bar of flexible connection betwenn modules 6. 4-Series cell module 7. 44-Series outer cover board II 8. 44-Series pull rod 9. 44-Series end plate 10. Epoxy plate 11. Monitor board of thermal runaway 12. 44-Series left fixing parts 13. 44-Series high-voltage guard cover III

: N·m (kg-m,ft-lb)

Module Layout



REAR MODULE		
Module number	Module type	Serial number
6	42P4S	24&27
7	42P4S	28&31
8	42P4S	32&35
9	42P4S	36&39
10	42P4S	40&43
11	42P4S	44&47
12	42P4S	48&51
13	42P4S	52&55
14	42P4S	56&59
15	42P4S	60&63
16	42P4S	64&67

BDU

BDU Disassembly and assembly

Warning:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress. Before operations on high-voltage system, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to turn to "ON" or "START".**

Work Environment for Disassembly and Assembly of Power Battery Assembly

1 Must be an indoor environment

The work environment must be able to be isolated from the outside by shutters or other means to prevent

the intrusion of rain, snow, sand, and other substances.

The environment must be ventilated and prevent the entry of sweat during work, and also prevent condensation from occurring as a result of high temperature and humidity.

2 No entry of foreign materials

In addition to being indoors, the environment must not permit the entry during disassembly work of metal powders, oil, or foreign substances resulting from causes such as servicing of other vehicles.

If there is any risk of the above, use a plastic curtain or other means to block off the work area, or take other necessary steps.

3 The floor must be dry

The floor must not become wet as a result of causes such as vehicles entering when it is raining or snowing.

4 Work Space

The size of work space should be about the size of a vehicle to assure the enough disassembly space.

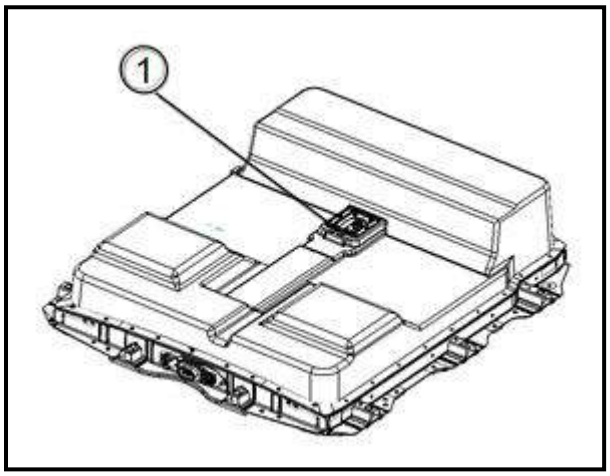
An indicating sign or other measures must be taken during the disassembly so that persons other than the

workers do not enter the work space.

BDU Removal

1 Clean the dust and pollution on the surface of battery pack.

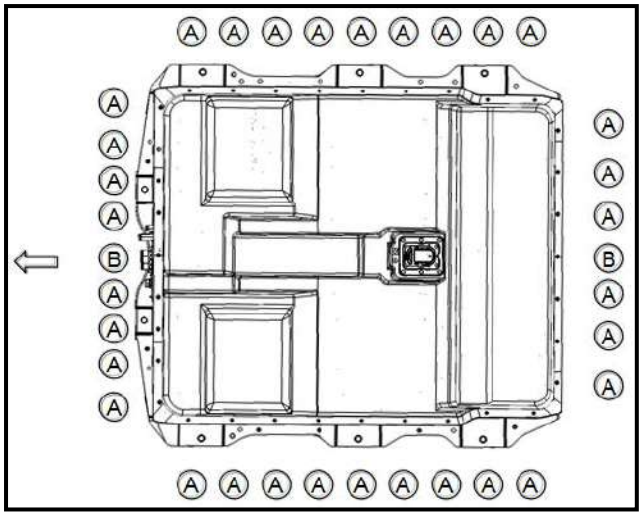
2 Remove the fixing reinforcing plate ① of service switch.



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

3 Remove the fixing bolts A and nuts B according to the sequence, then remove the upper housing of power battery pack.

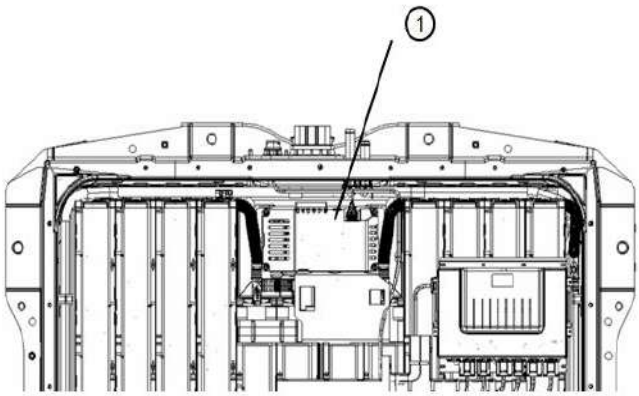


⇦The front of the vehicle

Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

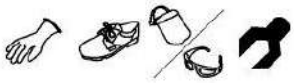
4 Plug out the BDU low voltage harness connector and remove the upper housing of BDU ①.



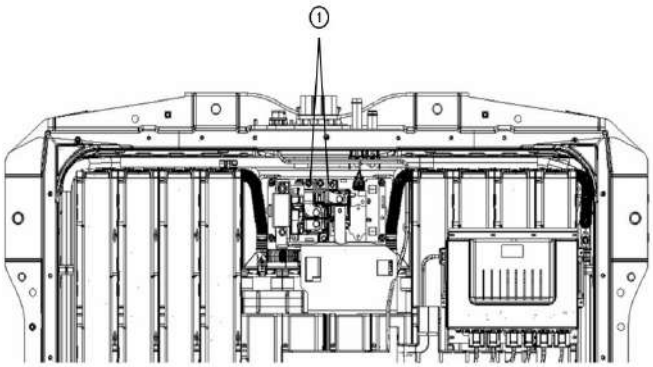
Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.



5 Remove high voltage connecting nut of BDU front end, and then cut off the flexible connection ① of high voltage output.



Danger:

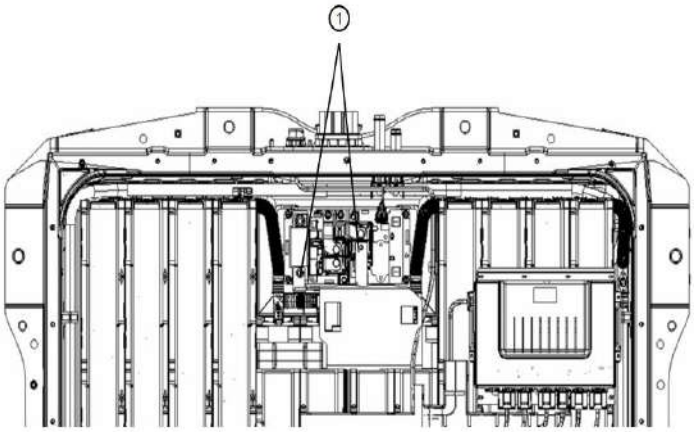
To prevent shock hazards during, please be sure to wear insulative protection gear.

Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

6 Remove high voltage connecting nut of BDU rear end, and then cut off the flexible connection ① of high voltage input.



Danger:

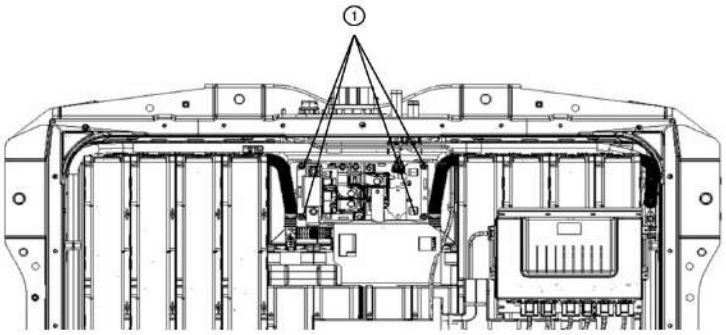
Please operate insulating protection of high voltage connection immediately after removing the high voltage connection.

Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

7 Remove the BDU fixing bolts ①, and remove the BDU foundation support.



Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

Assembly of BDU

1.Mount the BDU foundation support and fix it on lower housing with bolts.

Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

2 Mount the high voltage connecting nut of BDU rear end.

Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

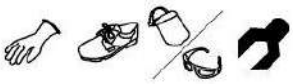
use insulating tools.

3 Mount the high voltage connecting nut of BDU front end.

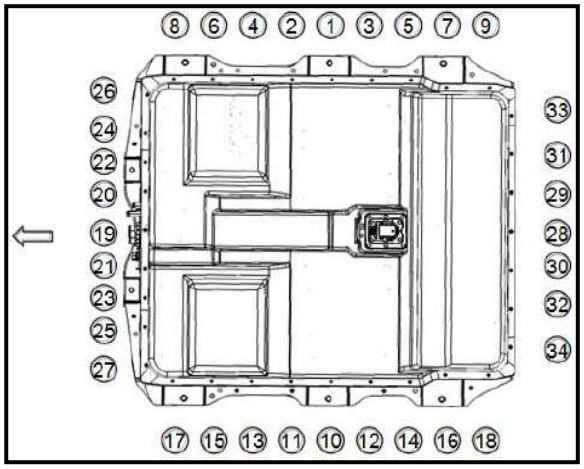
Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.



4 Tighten the fixing bolts and nuts according to the sequence in the following picture, then mount the upper housing of power battery pack.



⇦: The front of the vehicle

Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

5. Install the maintenance switch

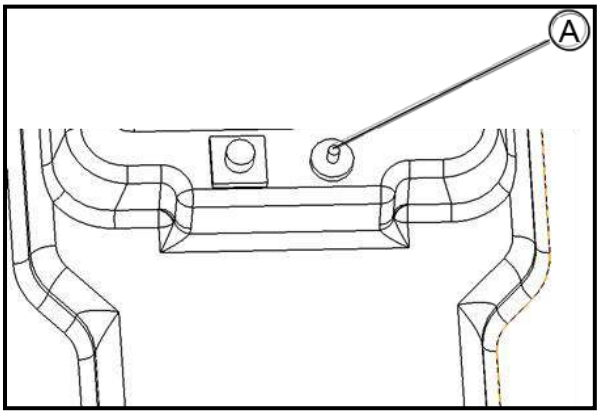
Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

BDU: check

Gas Tightness Inspection

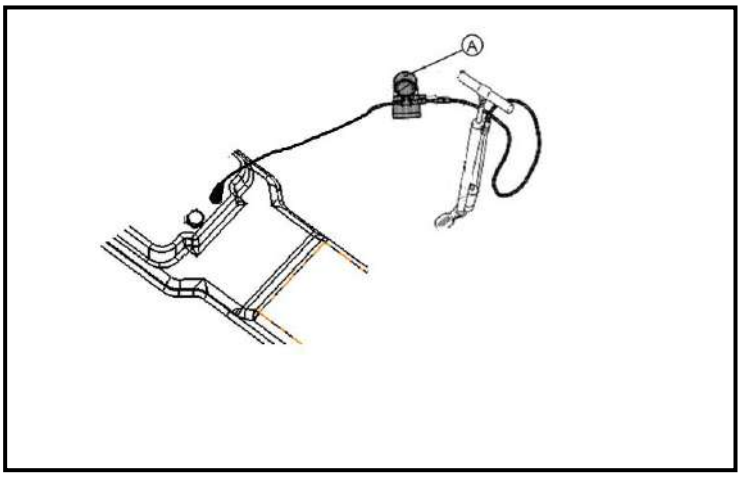
1.Remove a vent valve, and then mount the gas nozzle chuck (A).



Warning:

To prevent hazards during inspection, please be sure to wear protective gear.

2.Mount gas pressure meter (A).



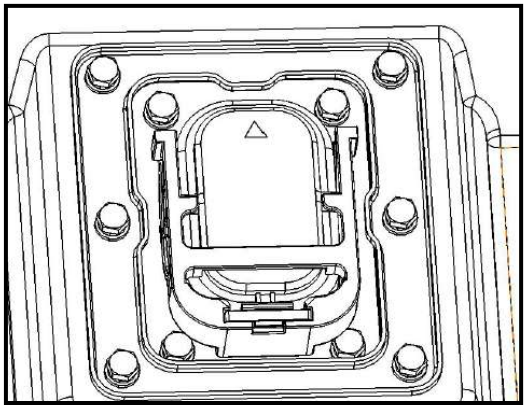
Warning:

To prevent hazards during inspection, please be sure to wear protective gear.

Caution：

Carefully operate the gas-pressure meter to prevent the falling down.

3. Install the maintenance switch



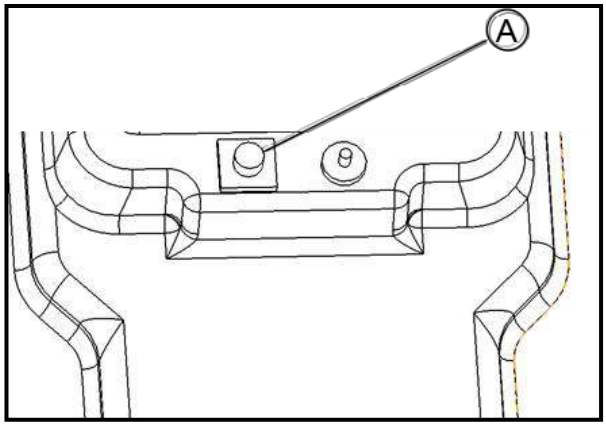
Danger:

There still will be risk of shock even you touch the high voltage components with protective

gear.

4.Use polyethylene tape (A) or other means to seal another air vent, in order to prevent the air getting

inside



Warning:

 **To prevent hazards during inspection, please be sure to wear protective gear.**

5.Add 1.6kPa air pressure into the battery to do the air tight test. Please continue for about 1 minute.

Caution：

Slowly operate the inflator during the inflating.

Do not let the air pressure exceed 1.6kPa.

Repair Limit：1.4kPa

6.If the pressure exceeds the limit, please use soapsuds to locate the leakage.

Warning:

 **To prevent hazards during inspection, please be sure to wear protective gear.**

Caution：

DO NOT let the soapsuds contact the service plug.

Equipotential test

After installation of power battery assembly, use multimeter to measure the resistance value between housing(A) and body（B）.

Standard : ≤0.1 Ω

Danger:

 To prevent hazards during inspection, please be sure to wear protective gear.

Confirm Power Battery System State

1 Install power battery assembly

2 Connect the high voltage and low voltage connections between power battery assembly and the vehicle.

3 Turn off the service switch;

4 Connect the 12V battery negative cable.

5 Turn the key to “START” gear and confirm that the vehicle works normal.

LBC

LBCDisassembly and assembly

Warning:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and**
  maintenance.
- Be sure to remove the service plug in order to
  voltage circuits before performing inspect
  voltage system harnesses and parts.
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress. Before operations on high-voltage system, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**

- **When the maintenance switch is disconnected, the key is forbidden to turn to "ON" or "START".**

Work Environment for Internal Disassembly and Assembly of Power Battery Assembly

1 Must be an indoor environment

The work environment must be able to be isolated from the outside by shutters or other means to prevent the intrusion of rain, snow, sand, and other substances.

The environment must be ventilated and prevent the entry of sweat during work, and also prevent condensation from occurring as a result of high temperature and humidity.

2 No entry of foreign materials

In addition to being indoors, the environment during disassembly must be free of metal work powders, oil, or foreign substances resulting from other vehicles.

If there is any risk of the above, use a plastic curtain or other means to block off the work area, or take other necessary steps.

3 The floor must be dry

The floor must not become wet as a result of causes such as vehicles entering when it is raining or snowing.

4 Work Space

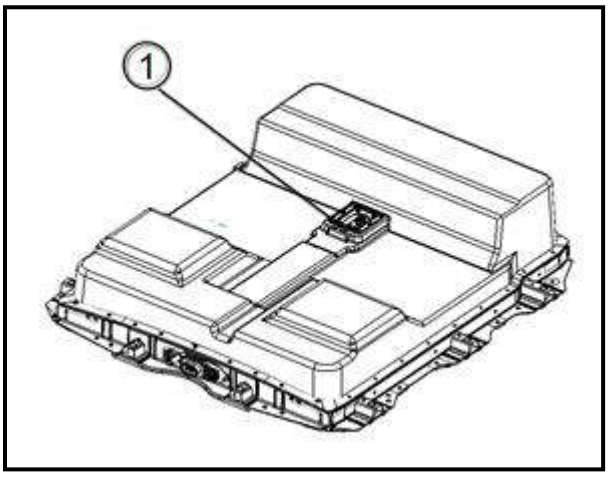
The size of work space should be about the size of a vehicle to assure the enough disassembly space.

An indicating sign or other measures must be taken during the disassembly so that persons other than the workers do not enter the work space.

Disassembly of LBC

1.Remove the battery pack, and please refer to “Disassembly and Assembly” of power battery assembly.

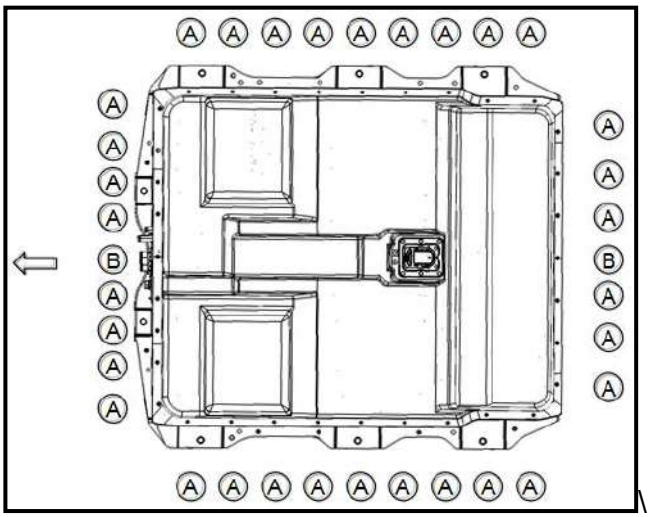
2.Remove the fixing reinforcing plate ①



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

3. Remove the fixing bolts A and nuts B according to the sequence, then remove the upper housing of power battery pack.

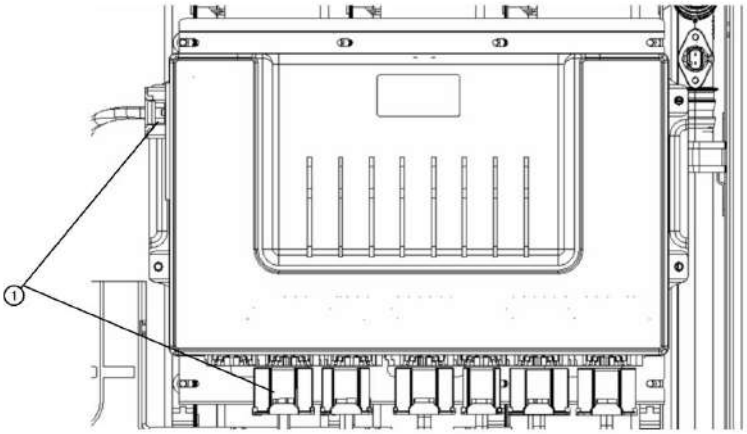


⇦The front of the vehicle

Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

4. Disconnect the LBC low-voltage harness connector ①.

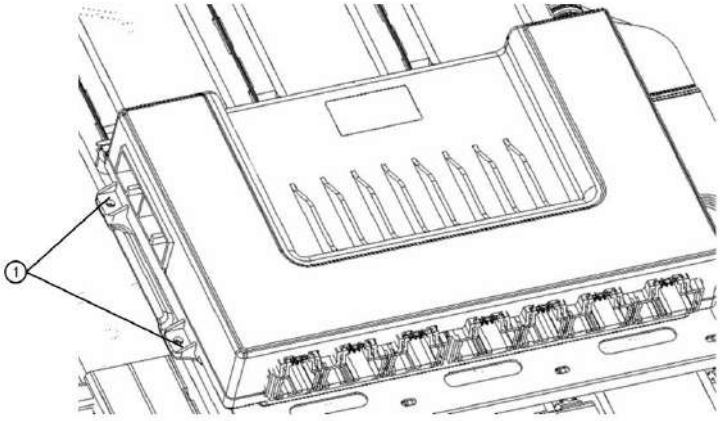


Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

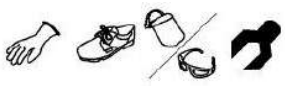
5. Removal of LBC Set Bolt①.



Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

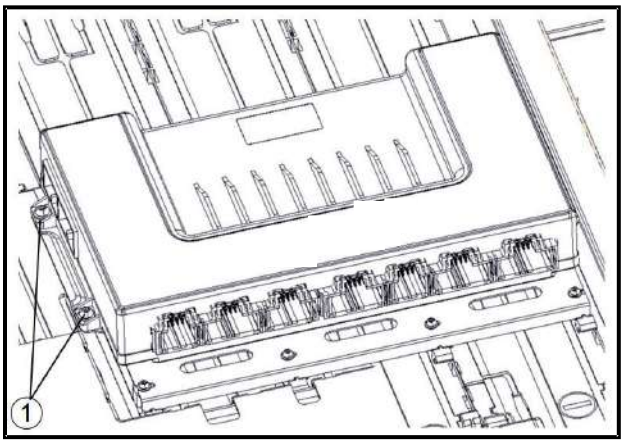


6 LBC Removal

LBC Assembly

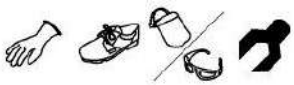
The working flow of LBC assembly is opposite to the flow of disassembly.

1 Mount the LBC fixing bolts.



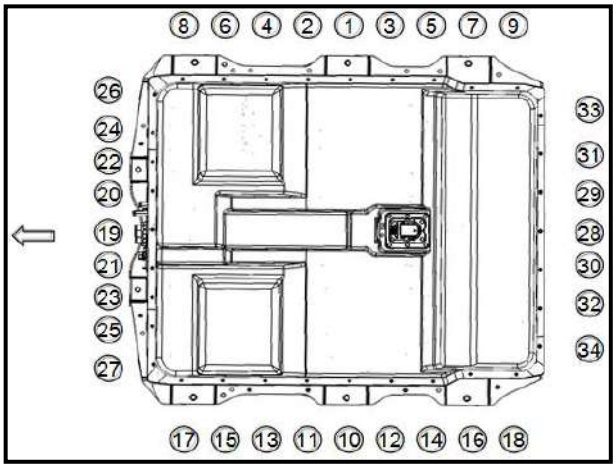
Warning:

To prevent hazards during assembly, please be sure to wear protective gear.



2 Mount the LBC low voltage harness connector.

3 Tighten the fixing bolts and nuts according to the sequence in the following picture, then mount the upper housing of power battery pack.



⇦: The front of the vehicle

Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

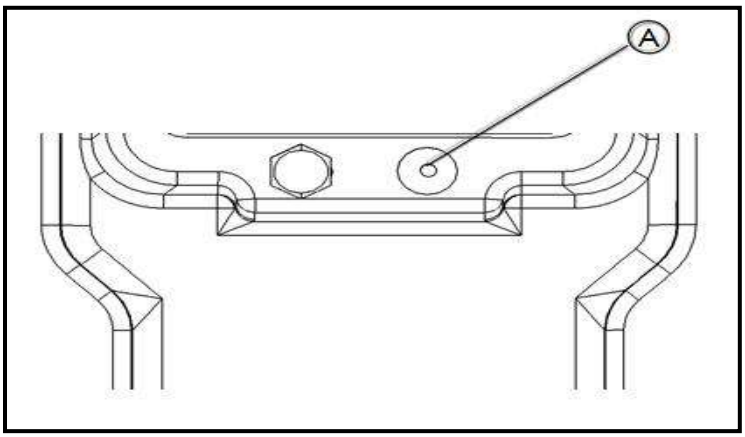
5. Install the maintenance switch

Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

Gas Tightness Inspection

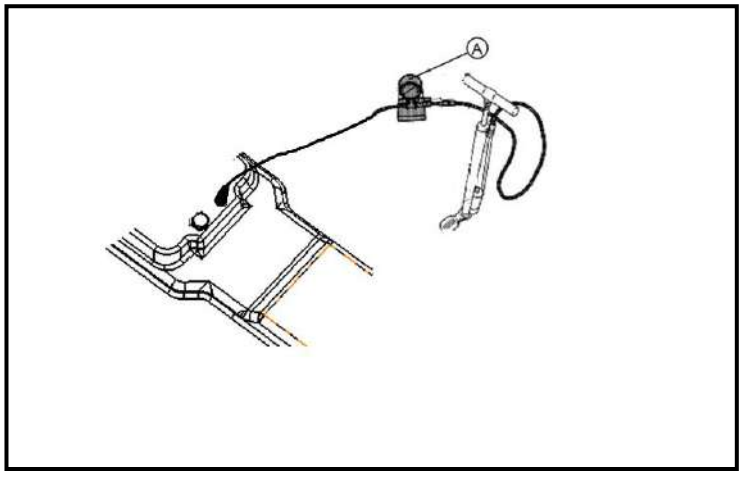
1.Remove a vent valve, and then mount the gas nozzle chuck (A).



Warning:

To prevent hazards during inspection, please be sure to wear protective gear.

2.Mount gas pressure meter (A).



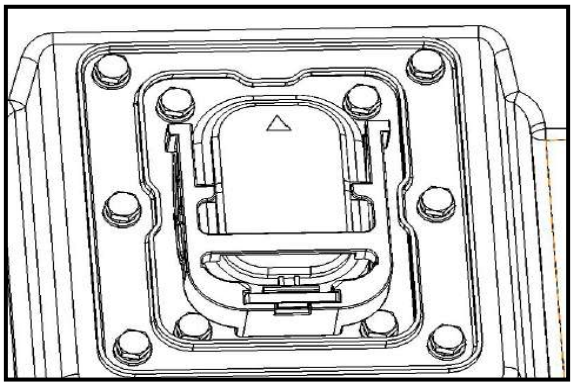
Warning:

To prevent hazards during inspection, please be sure to wear protective gear.

Caution：

Carefully operate the gas-pressure meter to prevent the falling down.

3. Install the maintenance switch



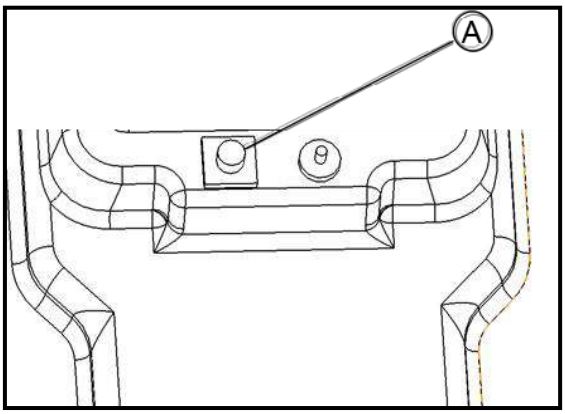
Danger:

There still will be risk of shock even you touch the high voltage components with protective

gear.

4.Use polyethylene tape (A) or other means to seal another air vent, in order to prevent the air getting

inside



Warning:

To prevent hazards during inspection, please be sure to wear protective gear.

5.Add 1.6kPa air pressure into the battery to do the air tight test. Please continue for about 1 minute.

Caution：

Slowly operate the inflator during the inflating.

Do not let the air pressure exceed 1.6kPa.

Repair Limit：1.4kPa

6.If the pressure exceeds the limit, please use soapsuds to locate the leakage.

Warning:

To prevent hazards during inspection, please be sure to wear protective gear.

Caution：

DO NOT let the soapsuds contact the service plug.

Equipotential test

After installation of power battery assembly, use multimeter to measure the resistance value between housing(A) and body（B）.

Standard **: ≤0.1** Ω

Danger:

 **To prevent hazards during inspection, please be sure to wear protective gear.**

Confirm Power Battery System State

1 Install power battery assembly

2 Connect the high voltage and low voltage connections between power battery assembly and the vehicle.

3 Turn off the service switch;

4 Connect the 12V battery negative cable.

5 Turn the key to “START” gear and confirm that the vehicle works normal.

Quick-plug pipeline assy

Disassembly and assembly of quick-plug pipeilne

Warning:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress. Before operations on high-voltage system, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to turn to "ON" or "START".**

Work Environment for Internal Disassembly and Assembly of Power Battery Assembly

1 Must be an indoor environment

The work environment must be able to be isolated from the outside by shutters or other means to prevent

the intrusion of rain, snow, sand, and other substances.

The environment must be ventilated and prevent the entry of sweat during work, and also prevent condensation from occurring as a result of high temperature and humidity.

2 No entry of foreign materials

In addition to being indoors, the environment must not permit the entry during disassembly work of metal powders, oil, or foreign substances resulting from causes such as servicing of other vehicles.

If there is any risk of the above, use a plastic curtain or other means to block off the work area, or take other necessary steps.

3 The floor must be dry

The floor must not become wet as a result of causes such as vehicles entering when it is raining or snowing.

prevent the coolant from dripping on floor during disassembly process, as the dripping will make the floor slippery.

4 Work Space

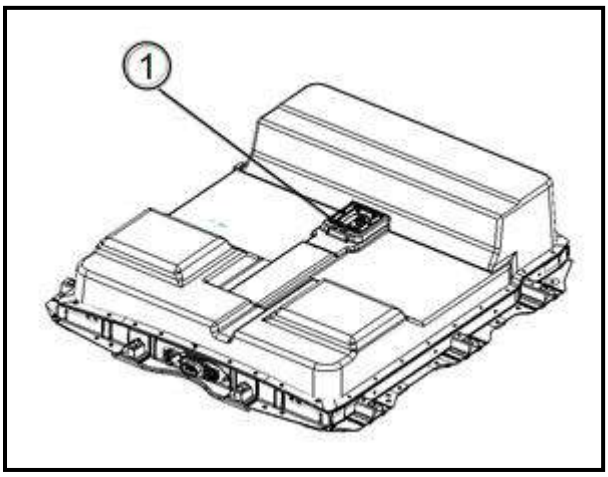
The size of work space should be about the size of a vehicle to assure the enough disassembly space.

An indicating sign or other measures must be taken during the disassembly so that persons other than the workers do not enter the work space.

Disassembly of quick-plug pipeline assy

1 Clean the dust and pollutants on the surface of power battery.

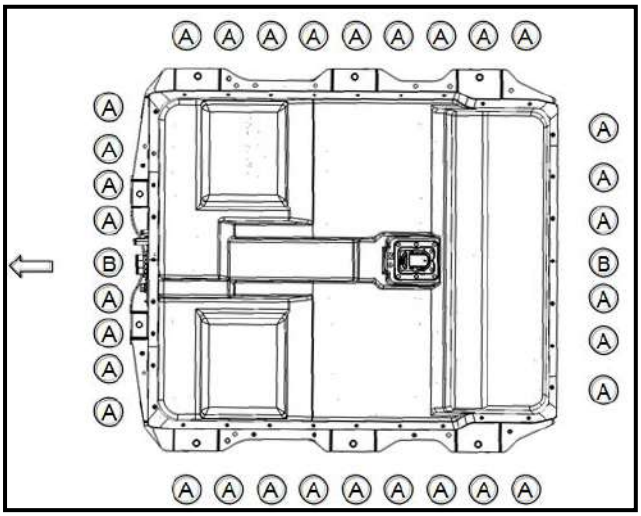
2.Remove the fixing reinforcing plate ① of service switch.



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

Remove the fixing bolts A and nuts B according to the sequence, then remove the upper housing of power battery pack.



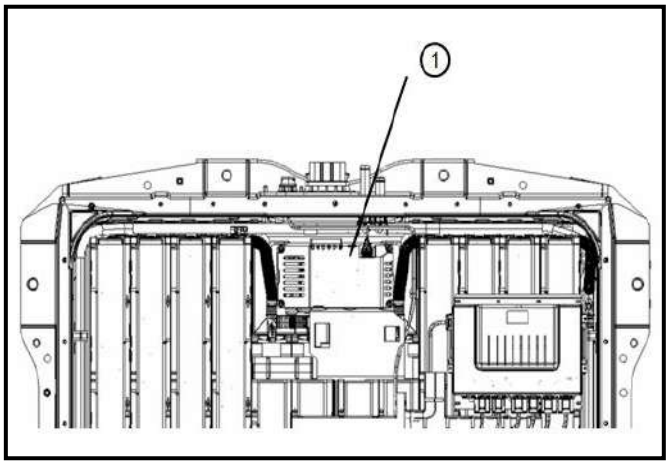
⇦ : The front of the vehicle

Warning:

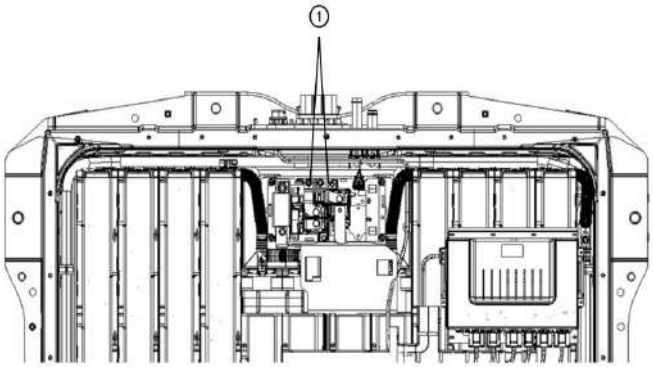
To prevent hazards during disassembly, please be sure to wear

protective gear.

4 Plug out the BDU low-voltage harness connector and remove the upper housing of BDU ①.



5 Remove high-voltage connecting nut on BDU's front end, and then cut off the flexible connection ① of high-voltage output.



Danger:

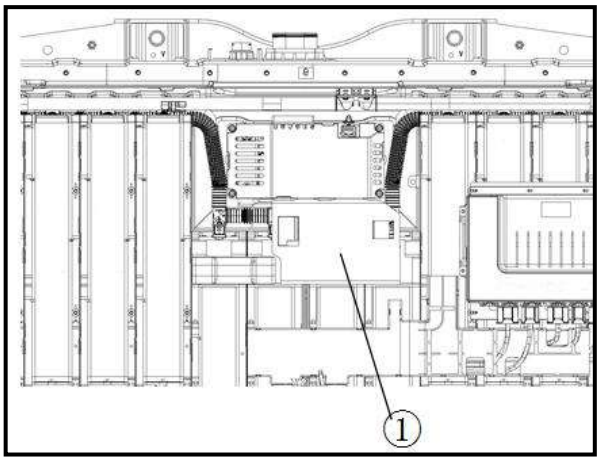
To prevent shock hazards during, please be sure to wear insulative protection gear.

Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

6 Remove the guard cover ① of high-voltage's flexible connection on BDU's rear-end.



Danger:

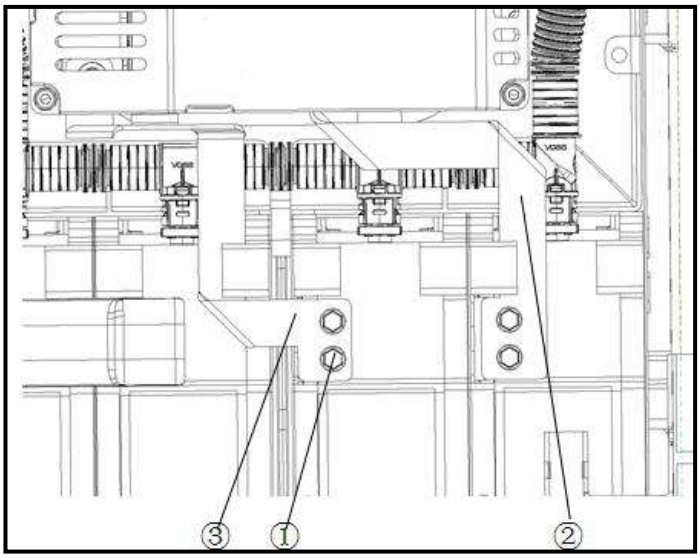
Please operate insulating protection of high voltage connection immediately after removing the high voltage connection.

Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

7 Remove the 4 fixing bolts ① of high-voltage connection on BDU rear end, then disconnect the flexible connections ②③ of high-voltage input.



Danger:

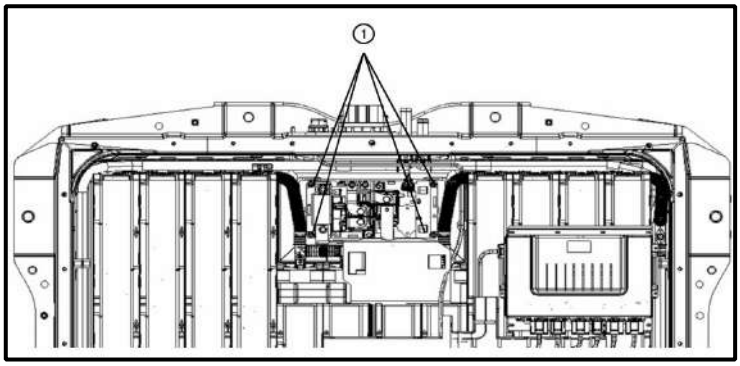
Please operate insulating protection of high voltage connection immediately after removing the high voltage connection.

Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

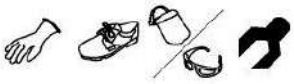
8 Remove the BDU fixing bolts ①, and dismantle the BDU pedestal support.



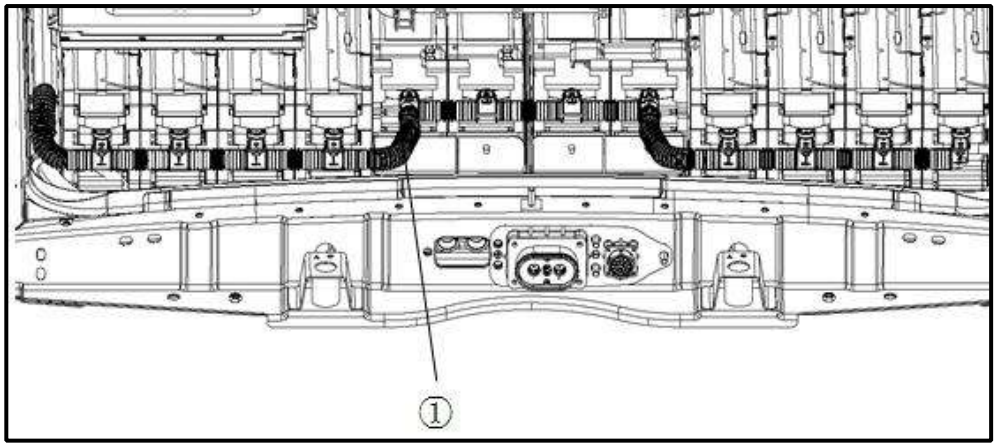
Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

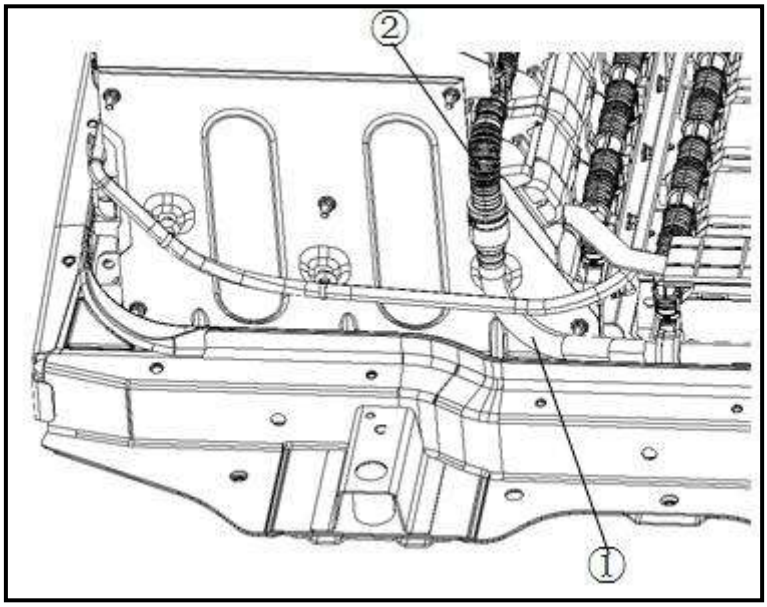
use insulating tools.



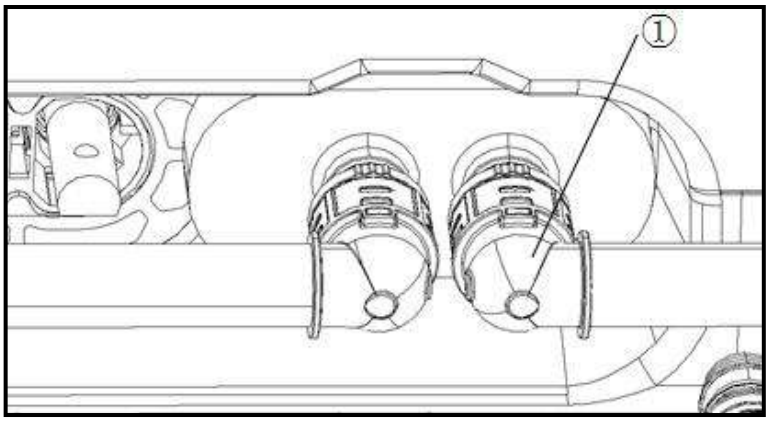
9 disconnect all second locking device of quick-plug connector, then dismantle the branch pipe ① of water-outlet quick-plug pipeline on module's front end.



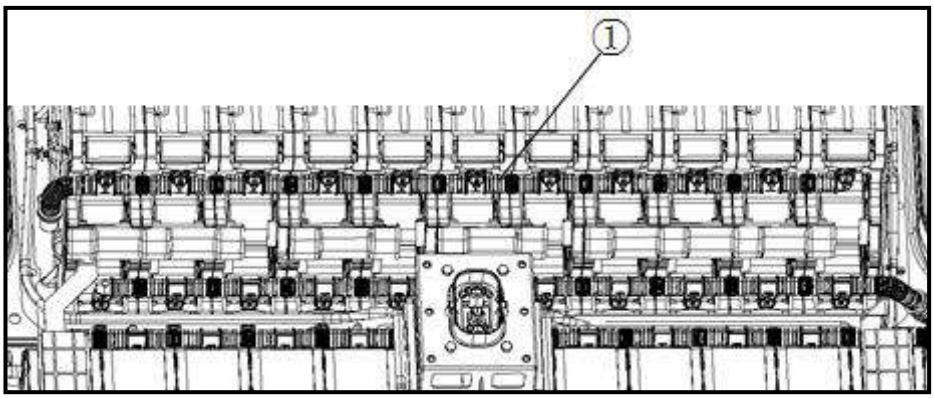
10 disconnect main pipe ① and branch pipe ② of water-outlet quick-plug pipeline.



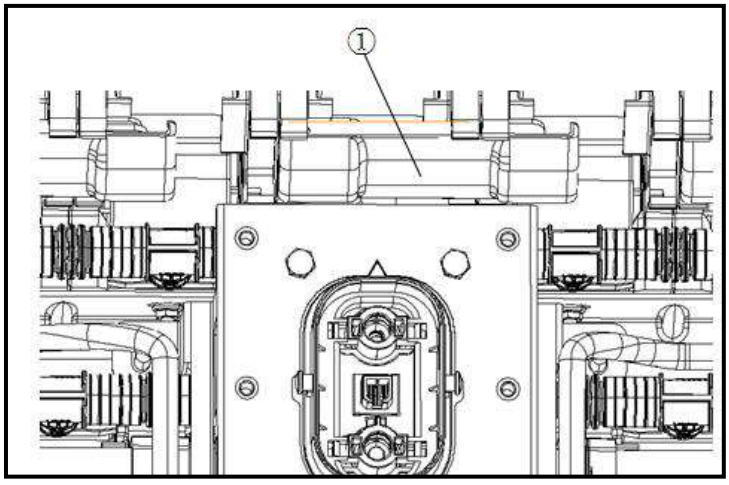
11 disconnect the connector and dismantle the main pipe ① of water-outlet quick-plug pipeline



12 disconnect all second locking device of quick-plug connector, then dismantle the branch pipe ② of water-outlet quick-plug pipeline.



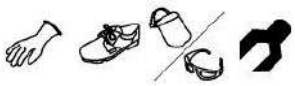
13 Remove the high-voltage guard cover ①.



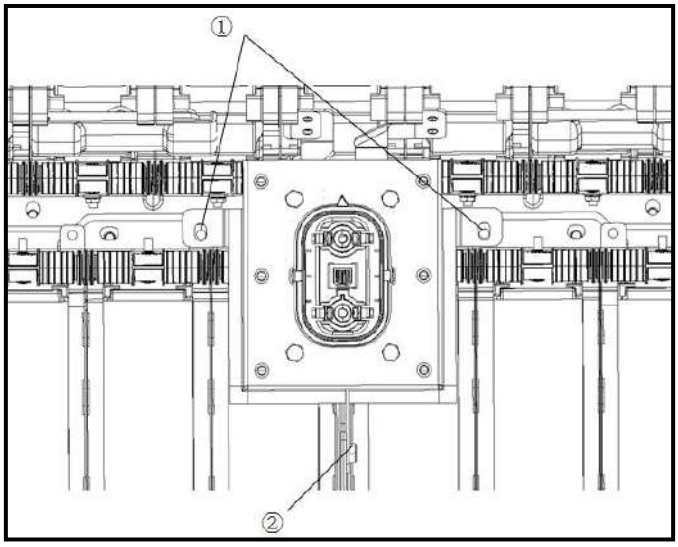
Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

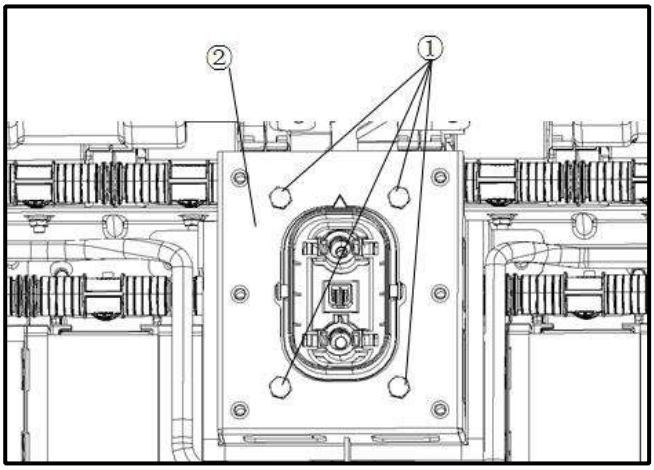
use insulating tools.



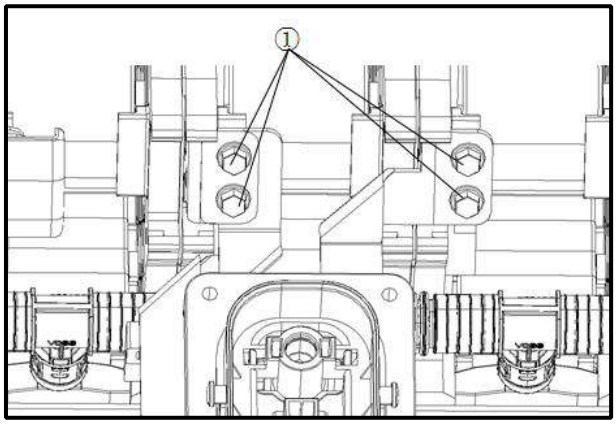
14 dismantle the mounting bolt ① and ② of service switch's bracket.



15 disassemble the mounting bolt ① of service switch, and dismantle the mounting bracket ② of service switch



16 disassemble the mounting bolt ① of service switch's flexible connection, and dismantle the service switch assy.



Danger:

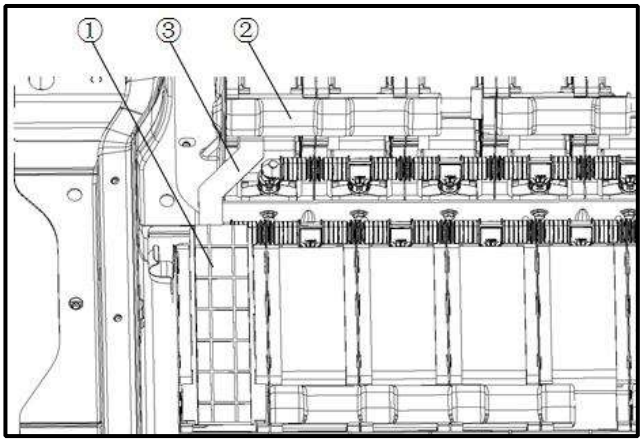
Please operate insulating protection of high voltage connection immediately after removing the high voltage connection.

Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

17 dismantle the high-voltage connecting guard plate ① and high-voltage guard cover ②.



Danger:

Please operate insulating protection of high voltage connection

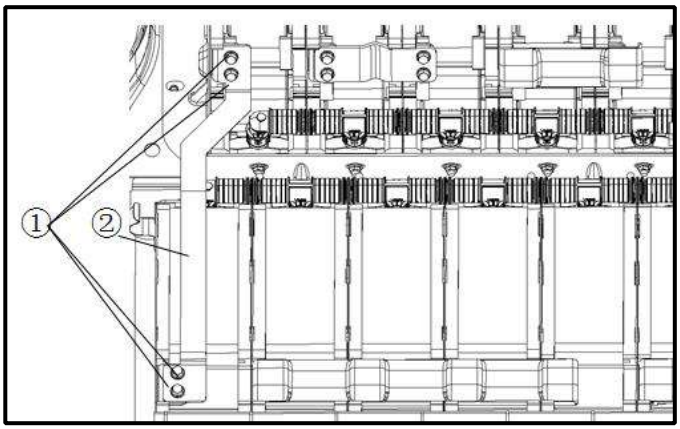
immediately after removing the high voltage connection.

Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

18 dismantle the mounting bracket ① of module high-voltage flexible connection, then disassemble the flexible connection ②.



Danger:

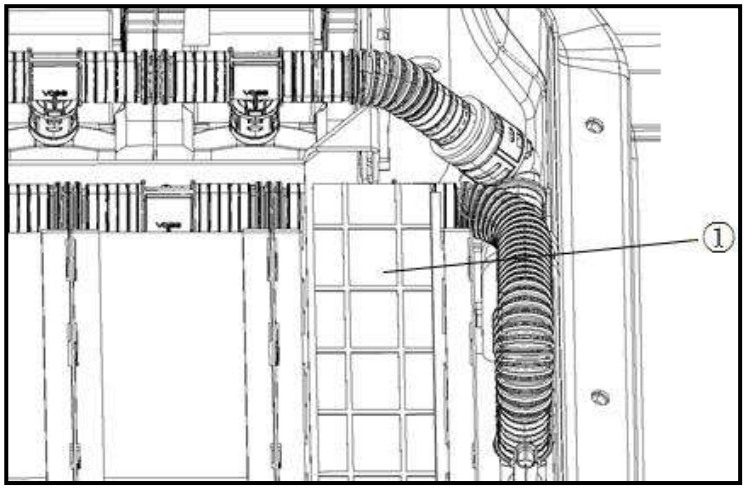
Please operate insulating protection of high voltage connection immediately after removing the high voltage connection.

Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

19 dismantle the high-voltage connecting guard plate ①.



Danger:

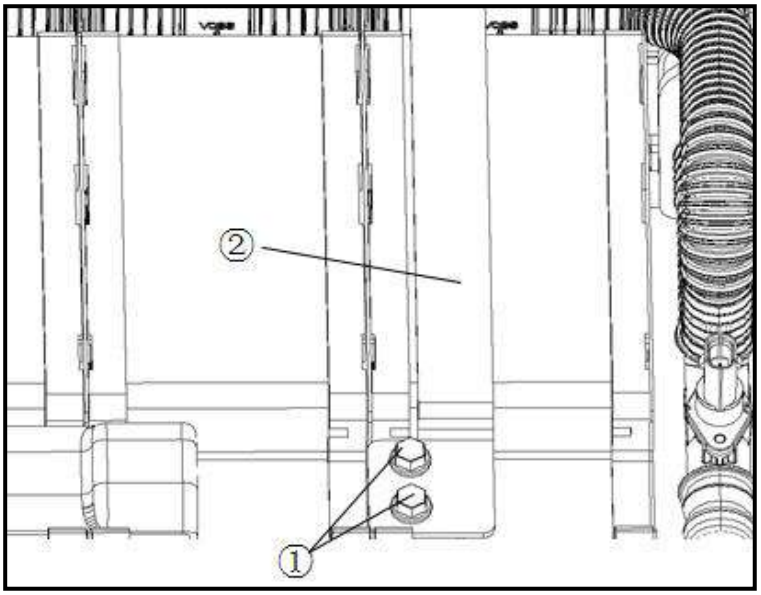
Please operate insulating protection of high voltage connection immediately after removing the high voltage connection.

Warning:

To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

20 dismantle the mounting bracket ① of module high-voltage flexible connection, then disassemble the flexible connection ②.



Danger:

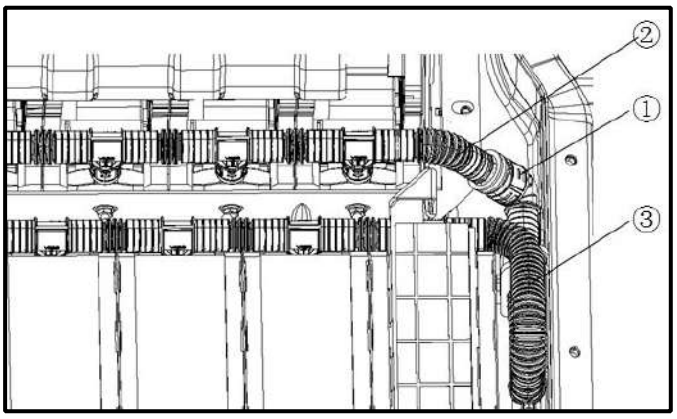
Please operate insulating protection of high voltage connection immediately after removing the high voltage connection.

Warning:

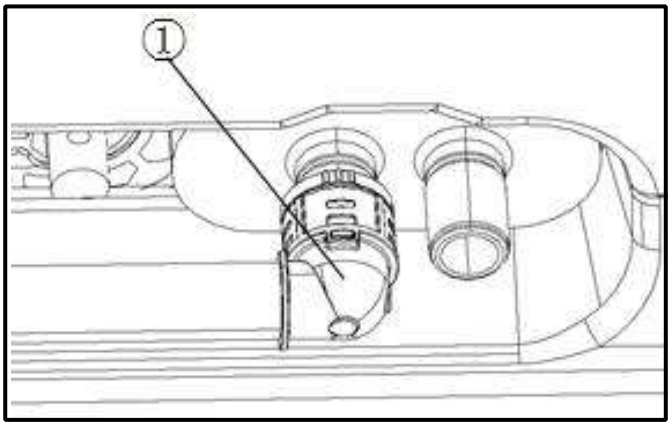
To prevent hazards during disassembly, please be sure to wear insulating protective gear and

use insulating tools.

21 dismantle the quick-plug connector ① of water-inlet quick-plug pipeline, then disconnect branch pipe ② and the main pipe ③ of water-inlet quick-plug pipeline.

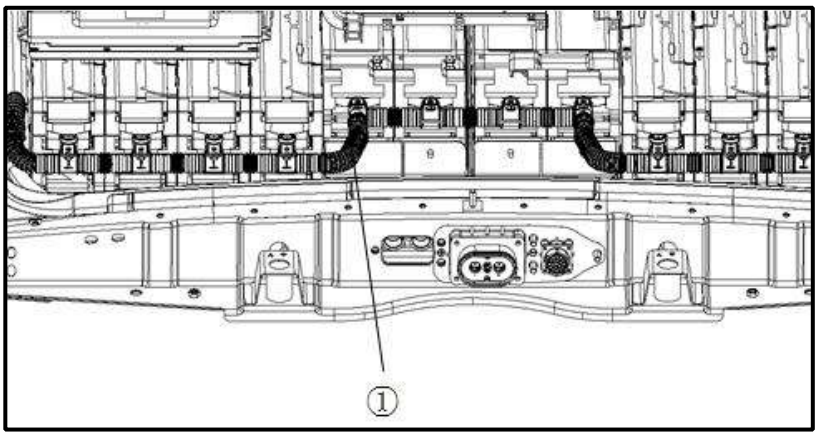


22 disconnect the connector and dismantle the main pipe ① of water-inlet quick-plug pipeline.



Assembly of quick-plug pipeline assy

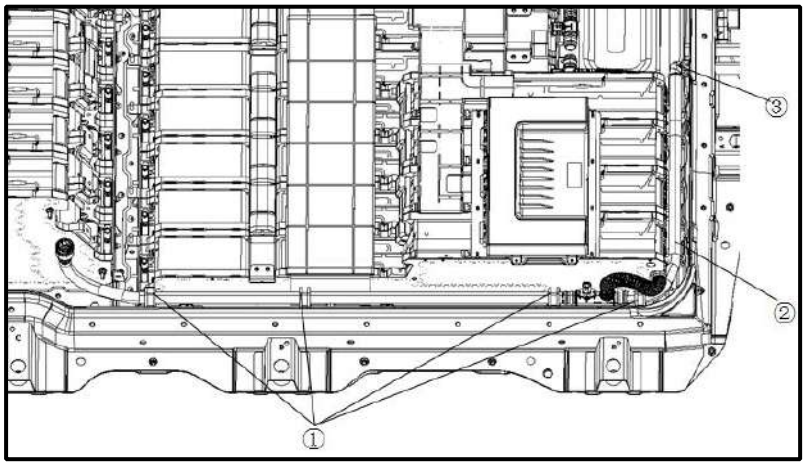
1 Pre-insert branch pipe ① into module's liquid-cooling flat tube.



Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

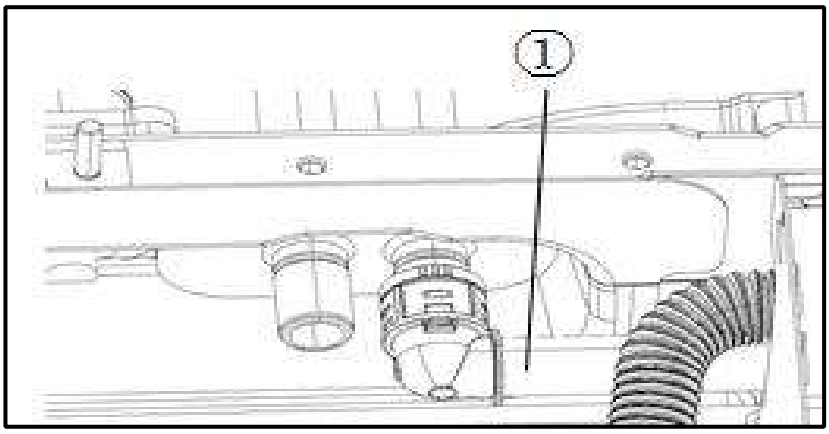
2 Assemble rubber part ① on the main pipe of water-outlet quick-plug pipeline, then mount the pipeline assy on the pipe clamp.



Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

3 assemble the quick-plug connector ① on the aluminum pedestal.



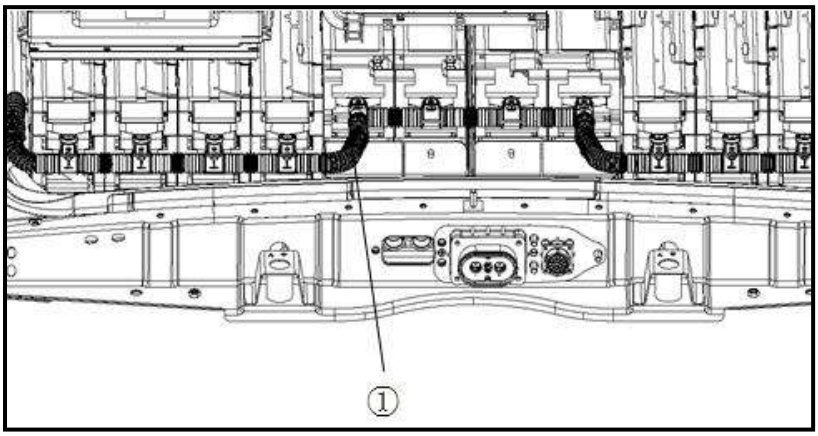
Note：

During each disassembly/assembly process, ensure the assembling is firm and tight (the clip should be clamped into snap neck).

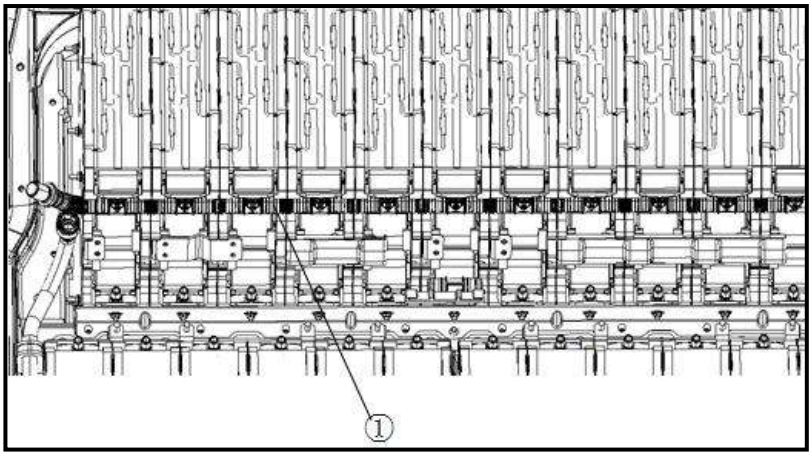
Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

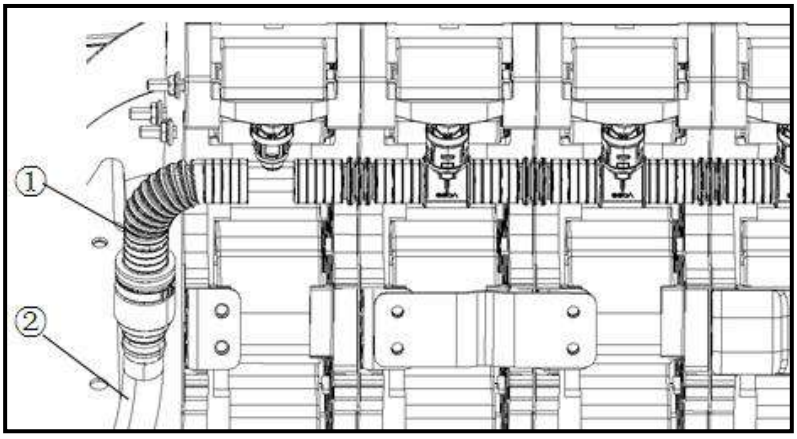
4 assemble the branch pipe ① of water-outlet quick-plug pipeline assy, then lock the locking device.



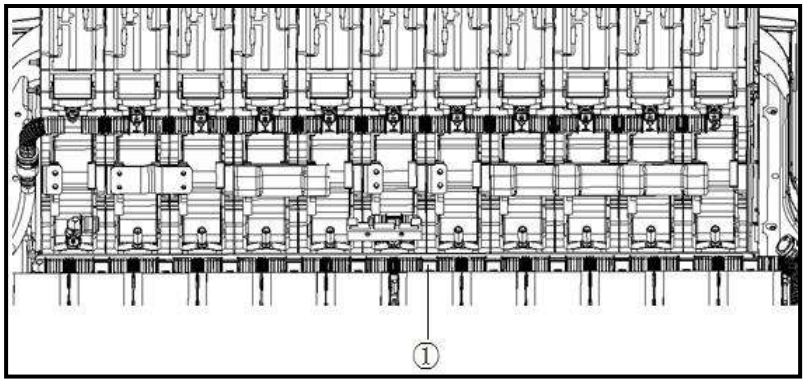
5 assemble the branch pipe ① of water-outlet quick-plug pipeline assy, then pre-insert module liquid-cooling flat tube.



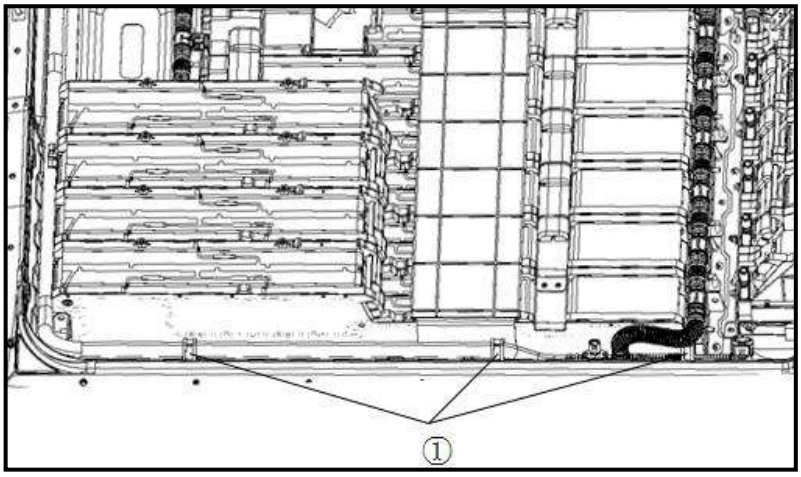
6 connect the branch pipe ①, and main pipe ② of water-outlet quick-plug pipeline assy. Then assemble the branch pipe ① and lock the locking device.



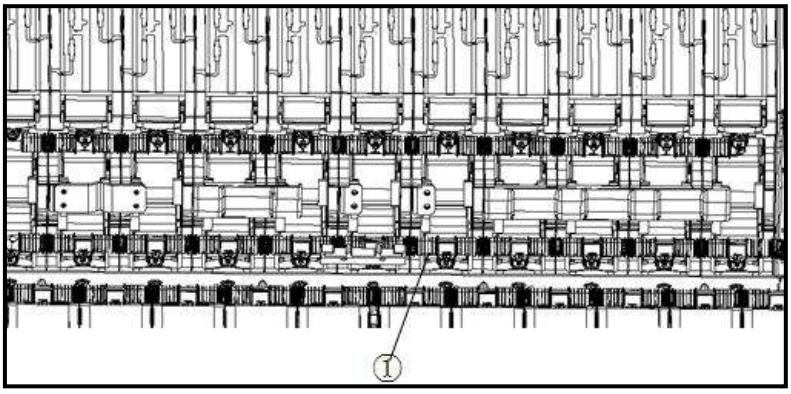
7 assemble the branch pipe ① of front module's water-inlet quick-plug pipeline.



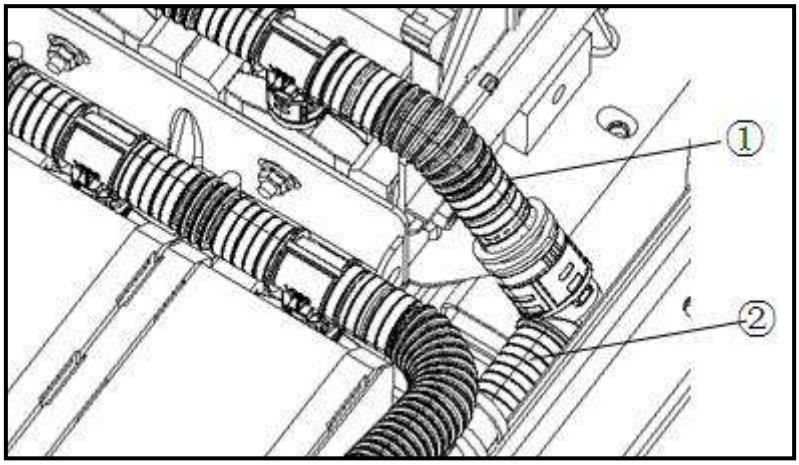
8 assemble the rubber part ① on the main pipe of water-inlet quick-plug pipeline.



9 assemble the branch pipe ① of rear module's water-inlet quick-plug pipeline assy

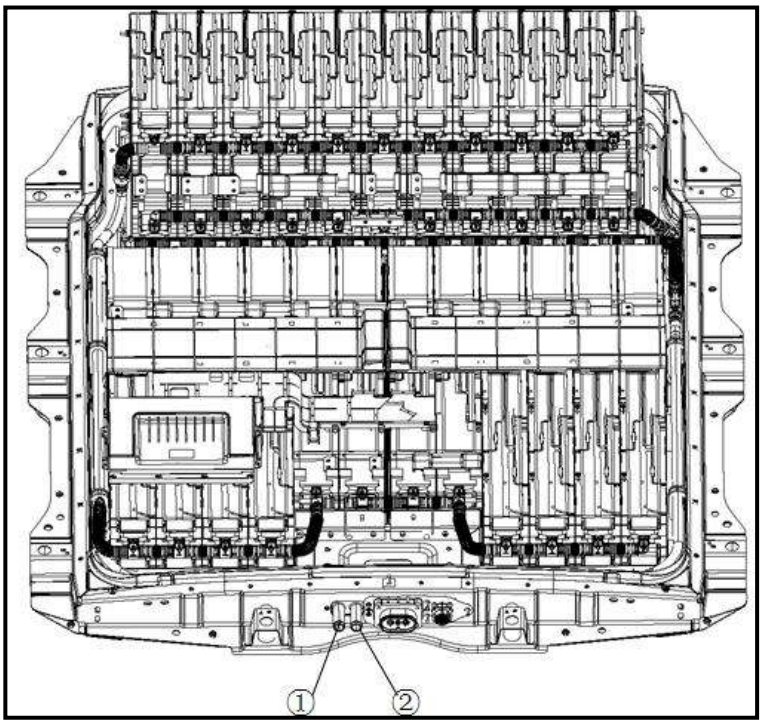


10 assemble the branch pipe ① and main pipe ② of rear module's water-inlet quick-plug pipeline assy.



Air tightness check of pipeline assy

1 assemble barometer (A).



Warning:

To prevent hazards during inspection, please be sure to wear protective gear.

Caution：

Carefully operate the gas-pressure meter to prevent the falling down.

2. Inflate quick-plug pipeline assy with air until the air pressure reaches to 250KPa. Maintain the pressure for 300 seconds, and the air-leak amount should be ≤2.73mL/min.

Caution：

· during inflating process, please operate gas-leak detecting device slowly.

· do not make pressure exceed 250KPa.

Maintenance limit: 2.73mL/min

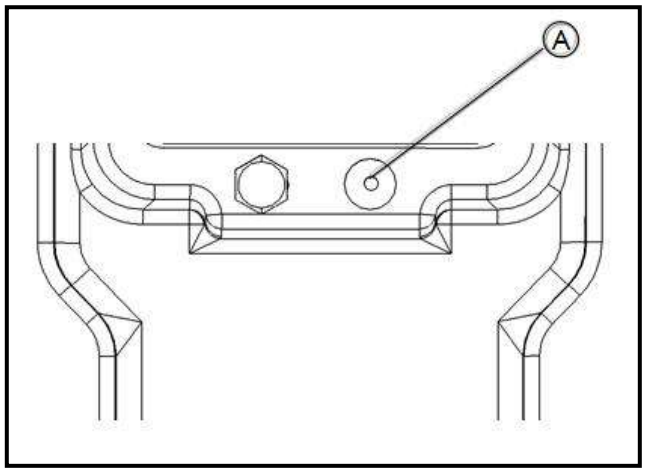
6 if the pressure exceeds limit value, please replace quick-plug pipeline assy.

Warning:

To prevent hazards during inspection, please be sure to wear protective gear.

Gas Tightness Inspection

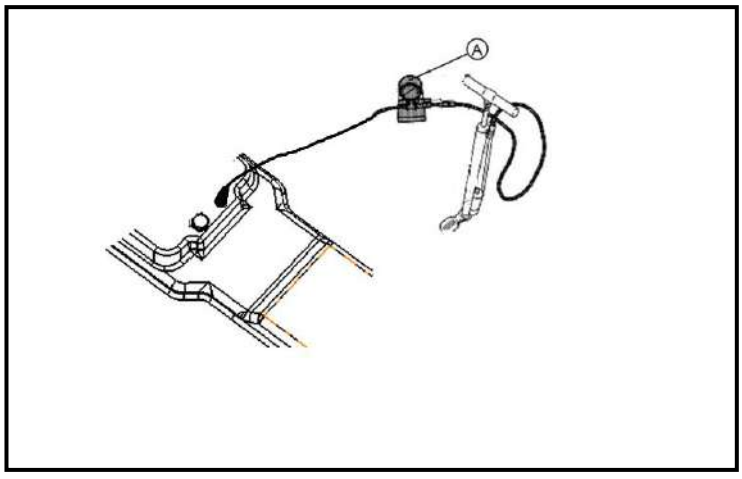
1 Remove a vent valve, and then mount the gas nozzle chuck (A).



Warning:

To prevent hazards during inspection, please be sure to wear protective gear.

2.Mount gas pressure meter (A).



Warning:

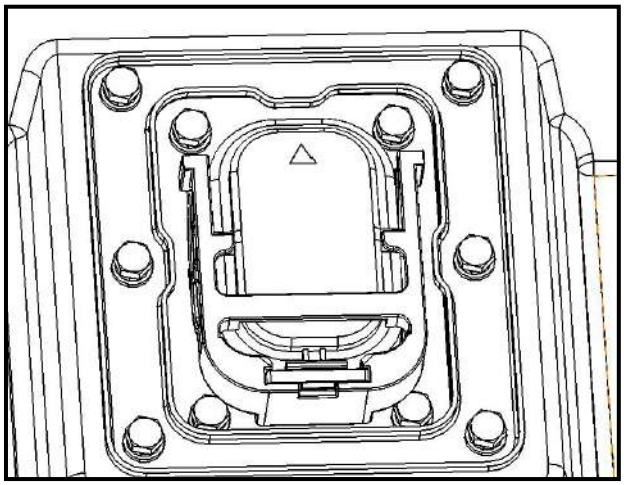
To prevent hazards during inspection, please be sure to wear

protective gear.

Caution：

Carefully operate the gas-pressure meter to prevent the falling down.

3. Install the maintenance switch



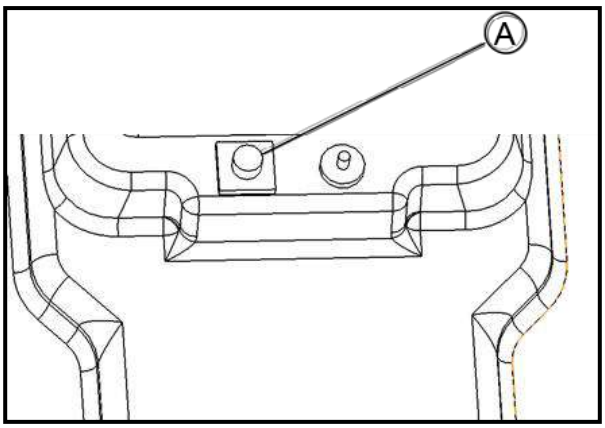
Danger:

There still will be risk of shock even you touch the high voltage components with protective

gear.

4.Use polyethylene tape (A) or other means to seal another air vent, in order to prevent the air getting

inside



Warning:

To prevent hazards during inspection, please be sure to wear protective gear.

5.Add 1.6kPa air pressure into the battery to do the air tight test. Please continue for about 1 minute.

Caution：

Slowly operate the inflator during the inflating.

Do not let the air pressure exceed 1.6kPa.

Repair Limit：1.4kPa

6.If the pressure exceeds the limit, please use soapsuds to locate the leakage.

Warning:

To prevent hazards during inspection, please be sure to wear protective gear.

Caution：

DO NOT let the soapsuds contact the service plug.

Equipotential test

After installation of power battery assembly, use multimeter to measure the resistance value between housing(A) and body（B）.

Standard **: ≤0.1** Ω

Danger:

 **To prevent hazards during inspection, please be sure to wear protective gear.**

Confirm Power Battery System State

1 Install power battery assembly

2 Connect the high voltage and low voltage connections between power battery assembly and the vehicle.

3 Turn off the service switch;

4 Connect the 12V battery negative cable.

5 Turn the key to “START” gear and confirm that the vehicle works normal.

Left-front module assy

Left-front module assy's disassemble andassembly

Warning:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress. Before operations on high-voltage system, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to turn to "ON" or "START".**

Work Environment for Internal Disassembly and Assembly of Power Battery Assembly

1 Must be an indoor environment

The work environment must be able to be isolated from the outside by shutters or other means to prevent

the intrusion of rain, snow, sand, and other substances.

The environment must be ventilated and prevent the entry of sweat during work, and also prevent condensation from occurring as a result of high temperature and humidity.

2 No entry of foreign materials

In addition to being indoors, the environment must not permit the entry during disassembly work of metal powders, oil, or foreign substances resulting from causes such as servicing of other vehicles.

If there is any risk of the above, use a plastic curtain or other means to block off the work area, or take other necessary steps.

3 The floor must be dry

The floor must not become wet as a result of causes such as vehicles entering when it is raining or snowing.

4 Work Space

The size of work space should be about the size of a vehicle to assure the enough disassembly space.

An indicating sign or other measures must be taken during the disassembly so that persons other than the workers do not enter the work space.

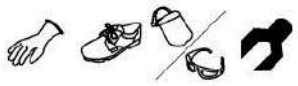
Disassembly of left-front module assy

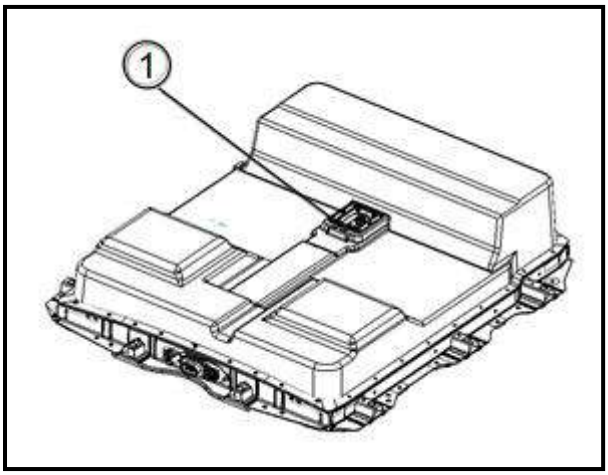
1 Clean the dust and pollutants on the surface of power battery.

2 Remove the fixing reinforcing plate ① of service switch.

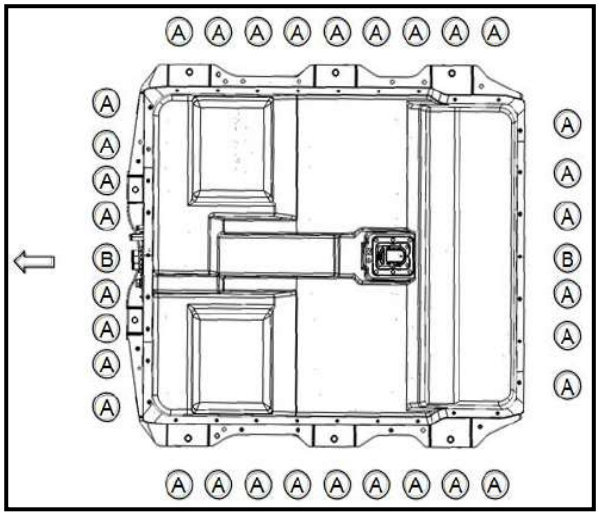
Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.





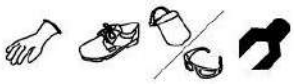
3 Please dismantle the bolt ① and nut ② by following instructions on the picture below, then dismantle the upper housing of power battery assy.



⇦ : vehicle's front-end

Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.



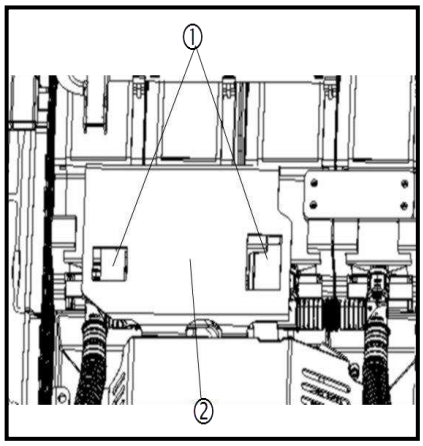
4 Disassemble BDU. Please refer to “disassembly and assembly of BDU” for details.

Danger:

There still will be risk of shock even you touch the high voltage components with protective

gear.

5 Disassemble the copper bar ① connecting left-front module and BDU, and high-voltage guard cover ②.



Danger:

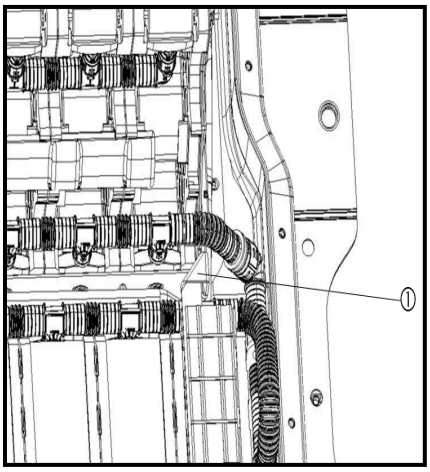
There still will be risk of shock even you touch the high voltage components with protective

gear.

Warning:

To prevent electric shock, please use insulated tape to wrap up the terminal of high-voltage connection after disassembly.

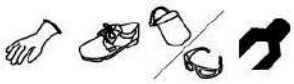
6 Disassemble the flexible connection ① between left-front module assy and rear module assy.



Danger:

There still will be risk of shock even you touch the high voltage components with protective

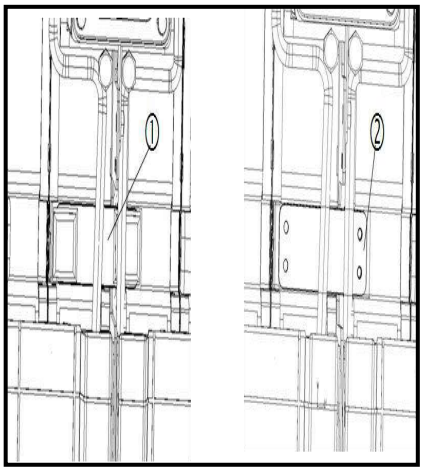
gear.



Warning:

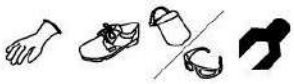
To prevent electric shock, please use insulated tape to wrap up the terminal of high-voltage connection after disassembly.

7 Disassemble the upper cover ① and flexible connection ② between left-front module assy and right module assy.



Danger:

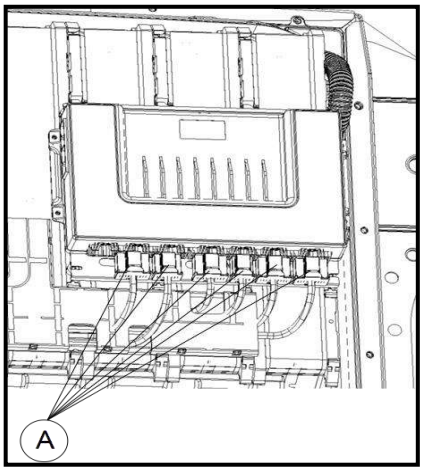
There still will be risk of shock even you touch the high voltage components with protective gear.



Warning:

To prevent electric shock, please use insulated tape to wrap up the terminal of high-voltage connection after disassembly.

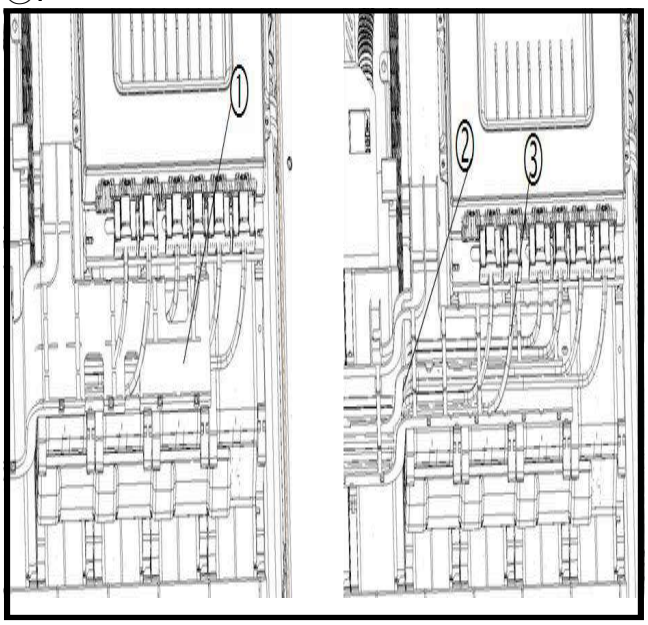
8 Plug out the connector A of LBC low-voltage harness.



Warning:

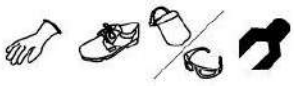
To prevent hazards during disassembly, please be sure to wear protective gear.

9 Disassemble the upper cover ① of harness fixing plate, then remove lower cover ② and low-voltage harness ③.

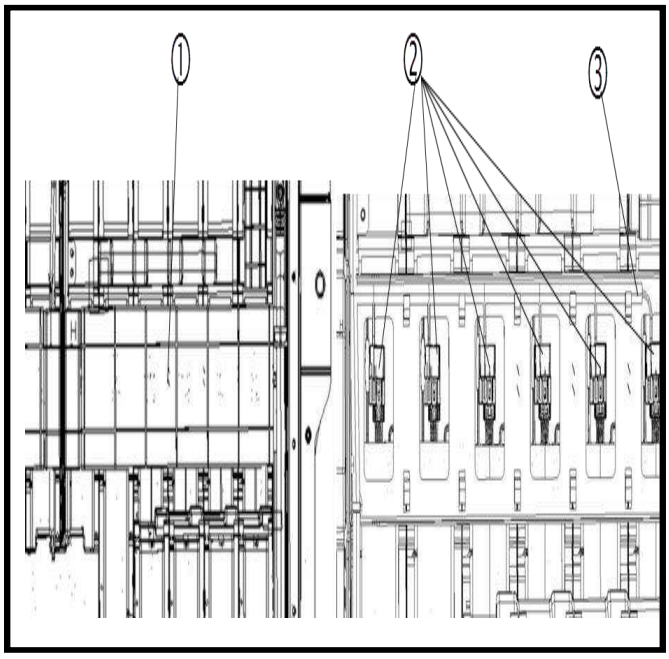


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

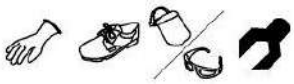


10 Disassemble the upper cover ① of harness fixing plate, then remove low-voltage harness connector ② on module's front-end and low-voltage harness ③.

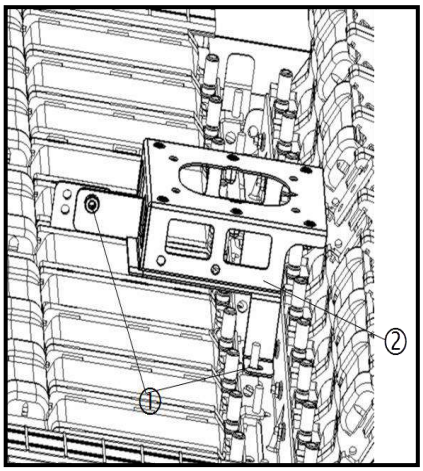


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

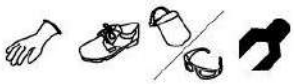


11 Disassemble fixing bolt ① of service switch bracket, and remove the bracket ② of service switch's flexible connection.

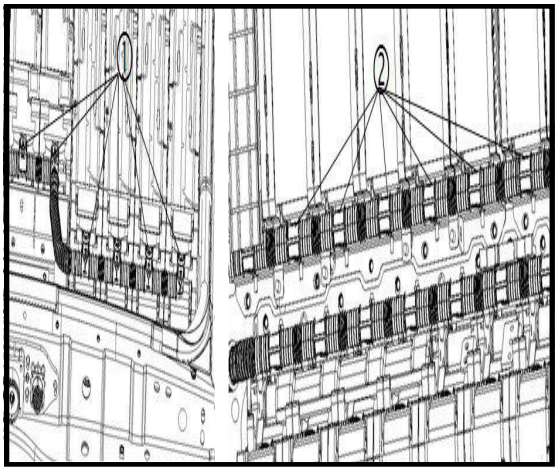


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

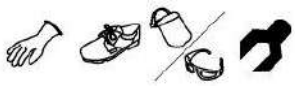


12 Disassemble left-front module's quick-plug pipeline ① on front end, and ② on rear end. Please refer to "quick-plug pipeline" for details.

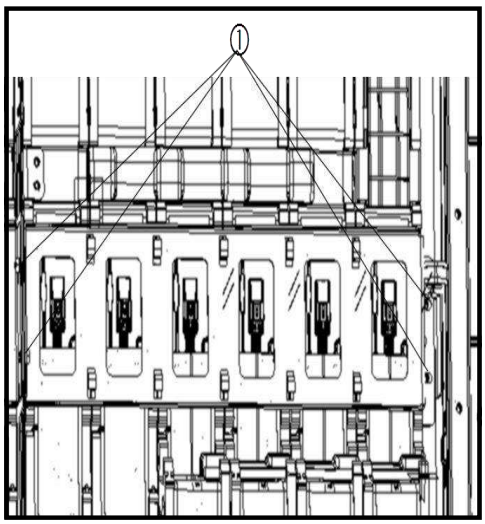


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.



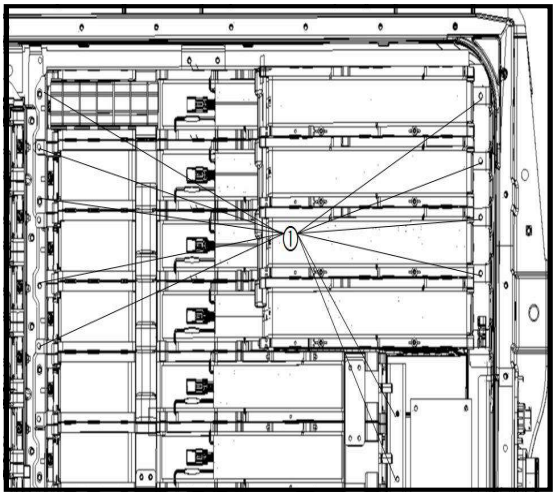
13 Disassemble fixing bolt ① of left-front module's metal plate.



Warning:

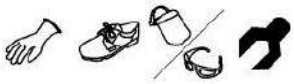
To prevent hazards during disassembly, please be sure to wear protective gear.

14 Disassemble the fixing nut ① of left-front module assy.

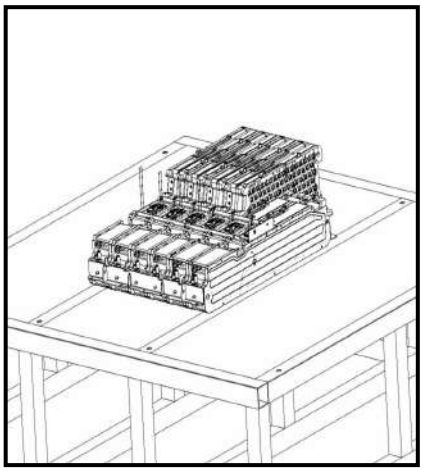


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

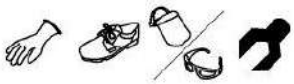


15 Remove left-front module assy, and put the module assy on workbench.



Warning:

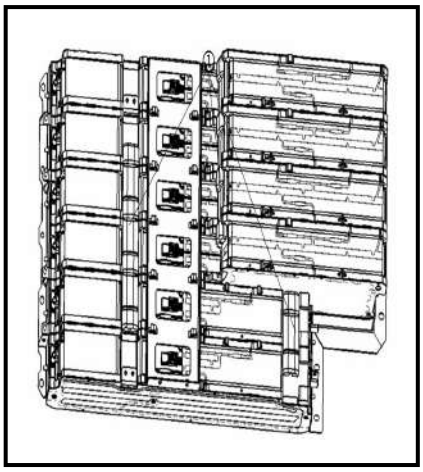
To prevent hazards during disassembly, please be sure to wear protective gear.



Make sure that a piece of insulation paper has been placed on the working table.

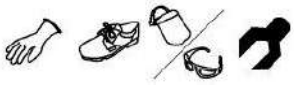
16 Disassemble the high-voltage connection of left-front module assy by following the steps below.

① Disassemble the guard cover ① of left-front module assy.



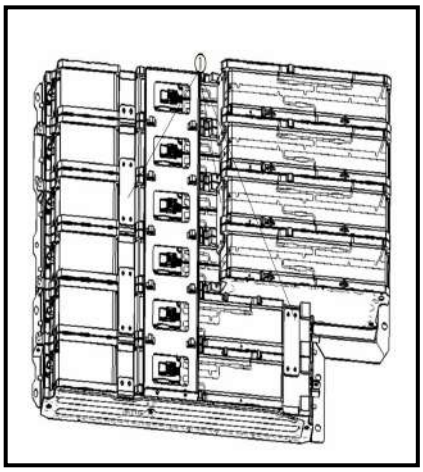
Danger:

There still will be risk of shock even you touch the high voltage components with protective gear.



Perform the operation alone. Operations by multiple people may cause electric shock.

② Disassemble the copper bar ① of module's flexible connection.

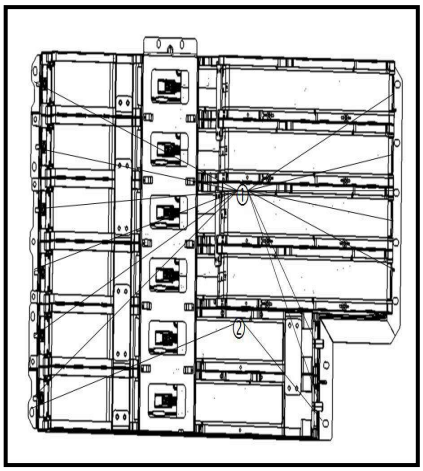


Danger:

There still will be risk of shock even you touch the high voltage components with protective gear.

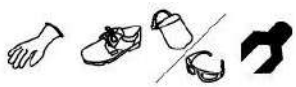
Perform the operation alone. Operations by multiple people may cause electric shock.

17 Disassemble the fixing nut ① of left-front module assy, then remove the fixing part ② on left and right side.

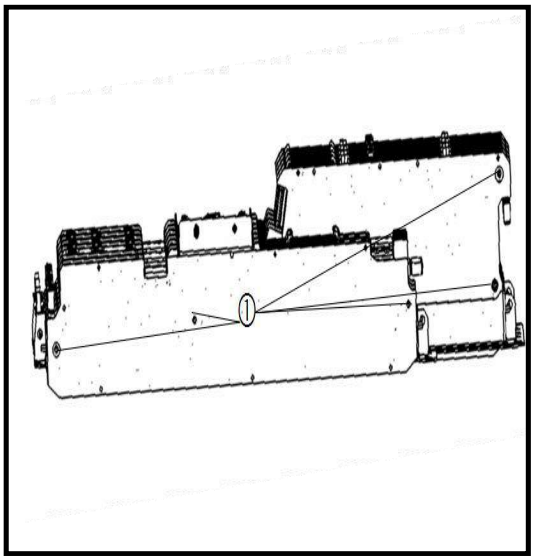


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

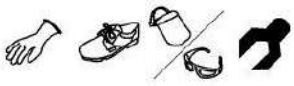


18 Disassemble the fixing nut ① of left-front module's pull rod, then remove the pull rod and the metal plate of left-front module assy.



Warning:

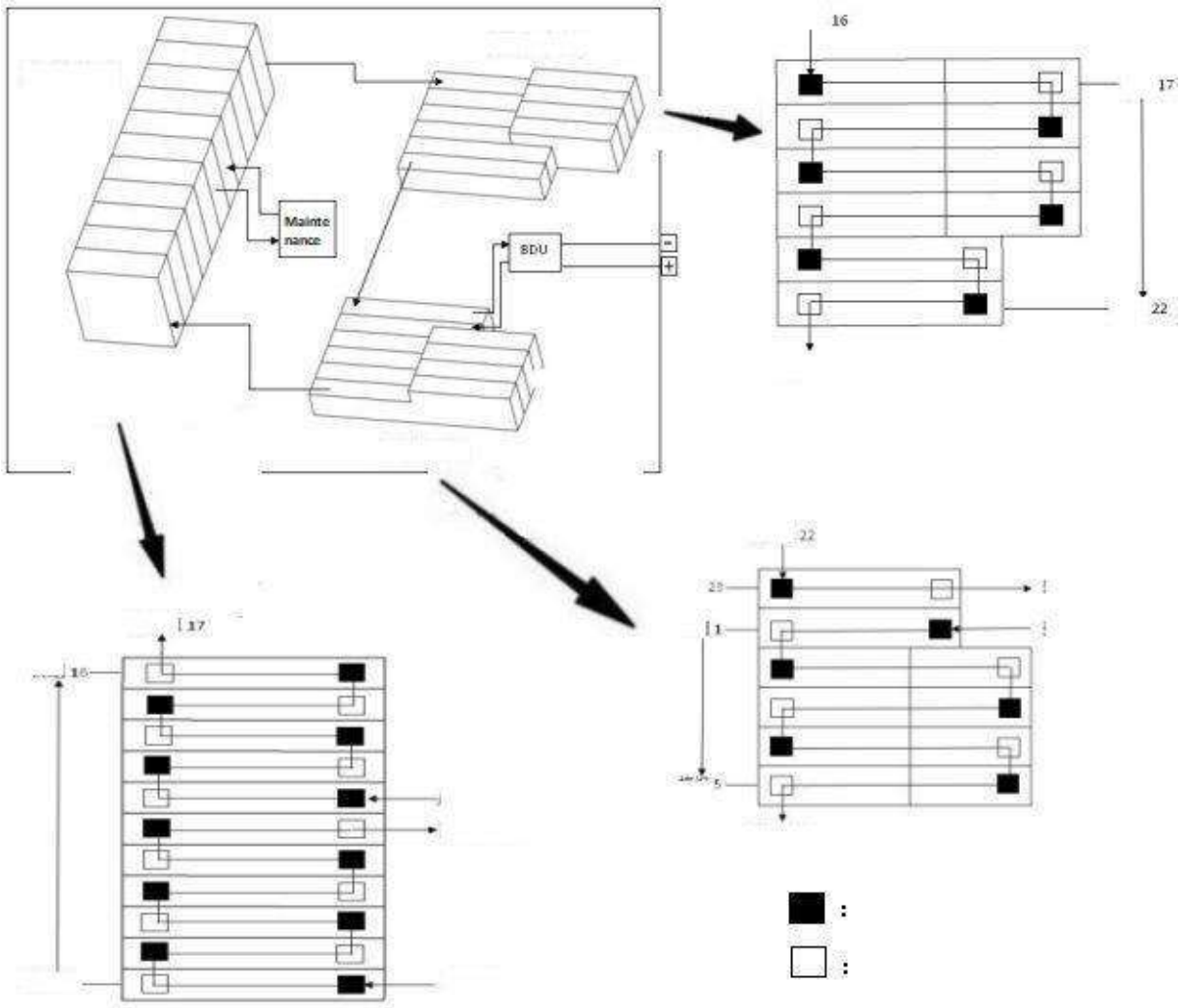
To prevent hazards during disassembly, please be sure to wear protective gear.



Installation of left-front module assy

Hint The assembling procedures of left-front module assy is opposite to the disassembling procedures.

1. Assemble left-front battery module assy according to position shown in picture, then tighten the long pull-rod on module's front and rear end.

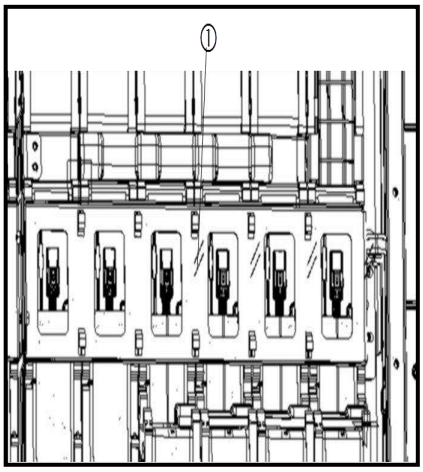


To prevent shock hazards during, please be sure to wear insulative protection gear.

Warning:

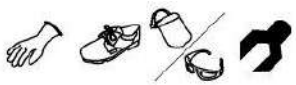
To prevent shock hazards, be sure to wrap the connection terminal with insulated tape, so as to prevent electric shock during assembling process.

2. Assemble side metal plate ① of left-front battery module.

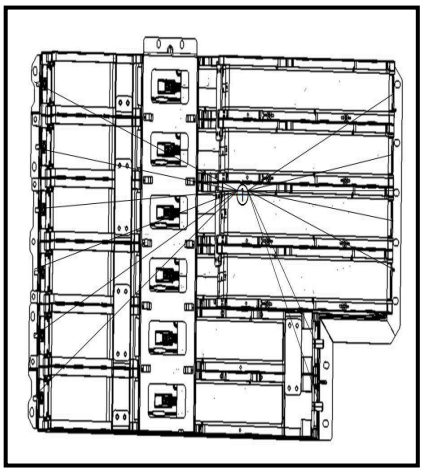


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

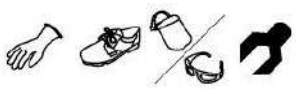


3. Assemble the fixing parts on left-front module's two sides①.

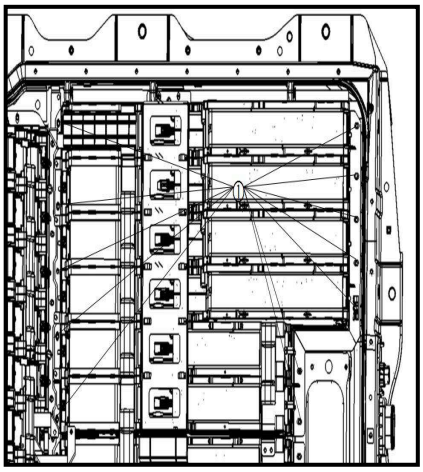


Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

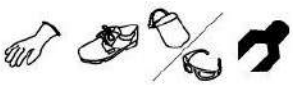


4. Assemble hexagon flange locking nut ① of non-metallic inserts on left-front module assy.

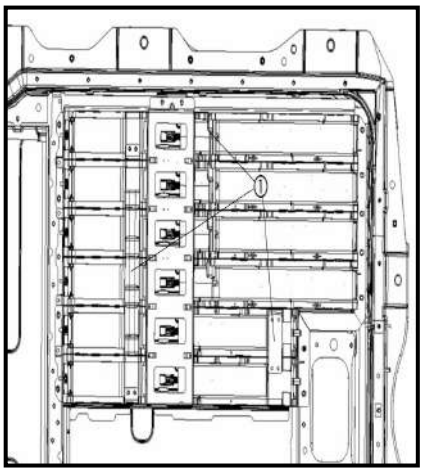


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

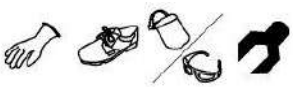


5. Assemble high-voltage guard cover and flexible connection ①.

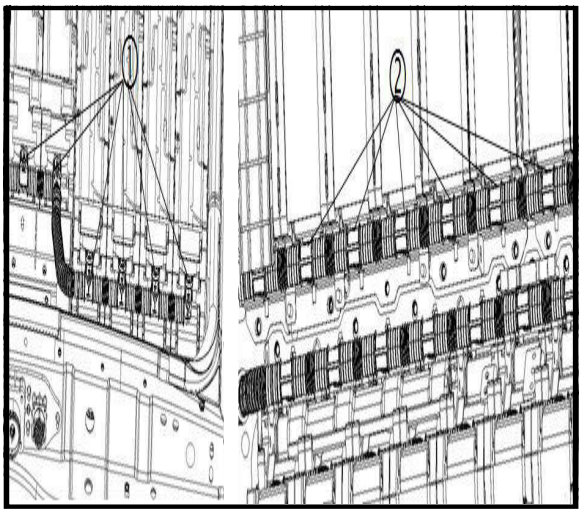


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

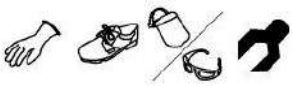


6. Assemble left-front module's quick-plug pipeline ① on front end, and ② on rear end.



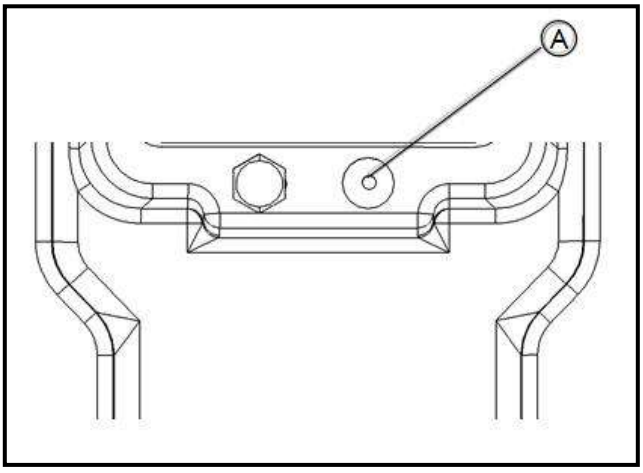
Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.



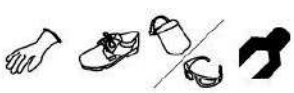
Gas Tightness Inspection

1 Remove a vent valve, and then mount the gas nozzle chuck (A).

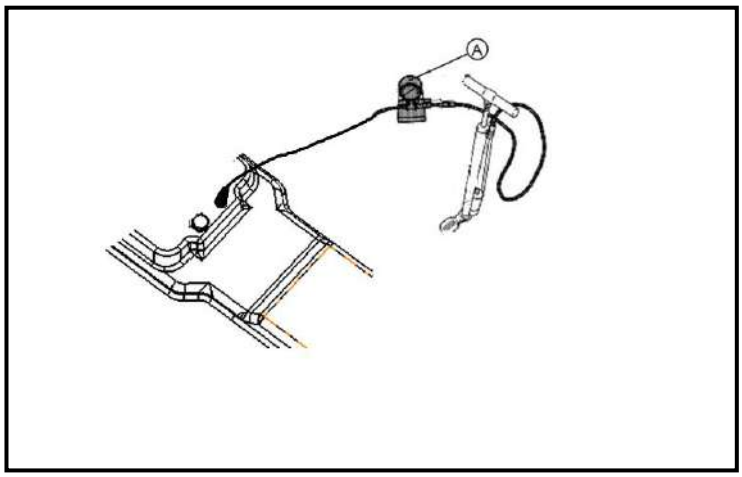


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.



2.Mount gas pressure meter (A).



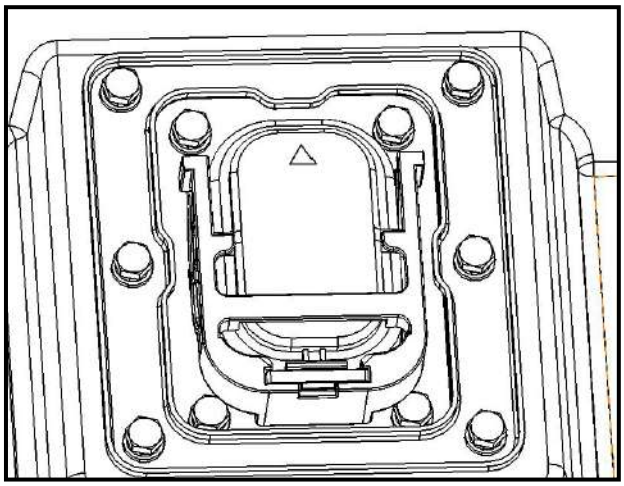
Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

Caution：

Carefully operate the gas-pressure meter to prevent the falling down.

3. Install the maintenance switch



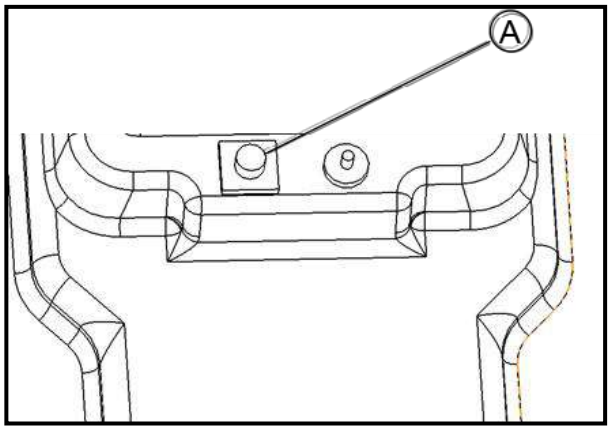
Danger:

There still will be risk of shock even you touch the high voltage components with protective

gear.

4.Use polyethylene tape (A) or other means to seal another air vent, in order to prevent the air getting

inside



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

5.Add 1.6kPa air pressure into the battery to do the air tight test. Please continue for about 1 minute.

Caution：

Slowly operate the inflator during the inflating.

Do not let the air pressure exceed 1.6kPa.

Repair Limit：1.4kPa

6.If the pressure exceeds the limit, please use soapsuds to locate the leakage.

Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

Caution：

DO NOT let the soapsuds contact the service plug.

Equipotential test

After installation of power battery assembly, use multimeter to measure the resistance value between housing(A) and body（B）.

Standard **: ≤0.1** Ω

Danger:

 **To prevent hazards during inspection, please be sure to wear protective gear.**

Confirm Power Battery System State

1 Install power battery assembly

2 Connect the high voltage and low voltage connections between power battery assembly and the vehicle.

3 Turn off the service switch;

4 Connect the 12V battery negative cable.

5 Turn the key to “START” gear and confirm that the vehicle works normal.

Rear module assy

Rear module assy's disassemblyand assembly

Warning:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress. Before operations on high-voltage system, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to turn to "ON" or "START".**

Work Environment for Internal Disassembly and Assembly of Power Battery Assembly

1 Must be an indoor environment

The work environment must be able to be isolated from the outside by shutters or other means to prevent

the intrusion of rain, snow, sand, and other substances.

The environment must be ventilated and prevent the entry of sweat during work, and also prevent condensation from occurring as a result of high temperature and humidity.

2 No entry of foreign materials

In addition to being indoors, the environment must not permit the entry during disassembly work of metal powders, oil, or foreign substances resulting from causes such as servicing of other vehicles.

If there is any risk of the above, use a plastic curtain or other means to block off the work area, or take other necessary steps.

3 The floor must be dry

The floor must not become wet as a result of causes such as vehicles entering when it is raining or snowing.

4 Work Space

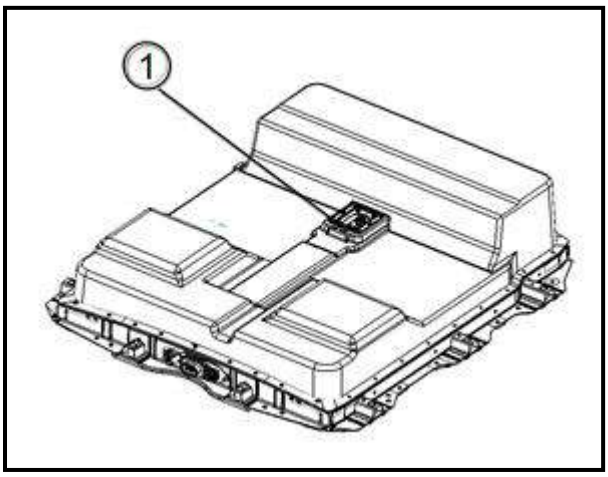
The size of work space should be about the size of a vehicle to assure the enough disassembly space.

An indicating sign or other measures must be taken during the disassembly so that persons other than the workers do not enter the work space.

Disassembly of rear module assy

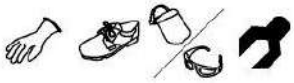
1 Clean the dust and pollutants on the surface of power battery.

2 Remove the fixing reinforcing plate ① of service switch.

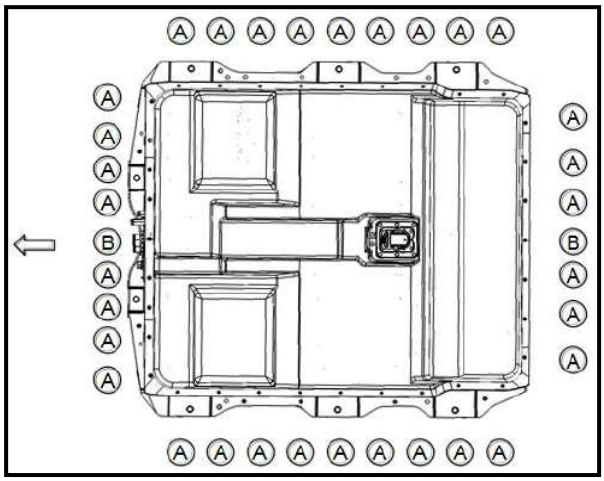


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.



3 Please dismantle the fixing bolt ① and nut ② by following instructions on the picture below, then dismantle the upper housing of power battery assy.

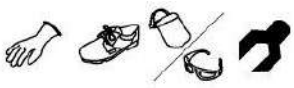


⇦ : vehicle's front-end

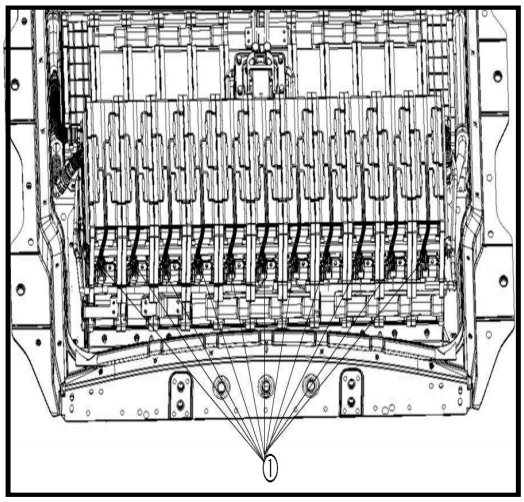
Warning:

To prevent hazards during disassembly, please be sure to wear

protective gear.



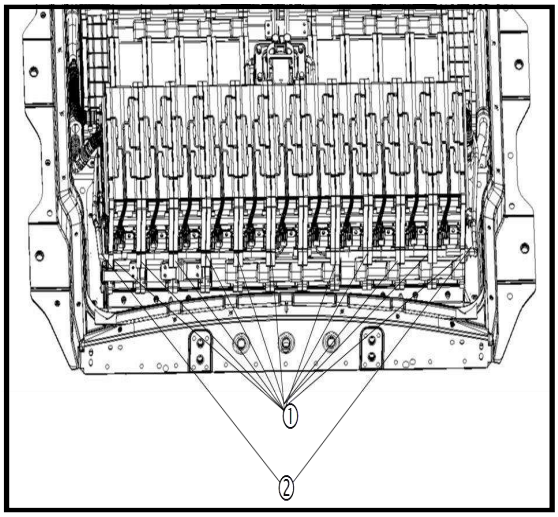
4 Pull out the low-voltage harness connector ① of rear battery module assy.



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

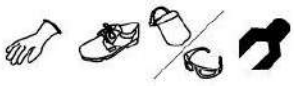
5 Remove the fixing snap joint ① of low-voltage main harness on rear module assy, then remove the low-voltage main harness ②.



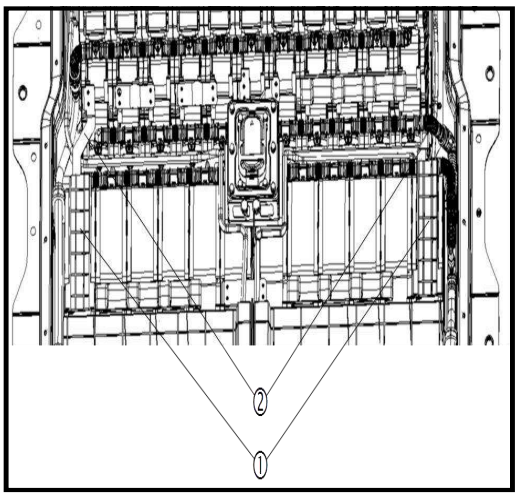
Warning:

To prevent hazards during disassembly, please be sure to wear

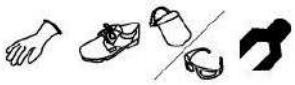
protective gear.



6 Disassemble the high-voltage guard cover ① and flexible connection ② between left-front&right-front module assy and rear module assy.



Danger:

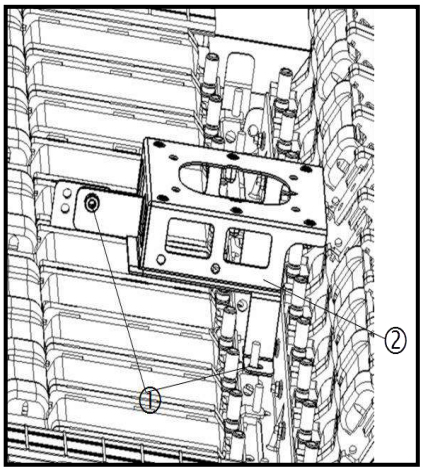
The risk of electric shock still exists even when you touch high-voltage parts with protective gear. 

Perform the operation alone. Operations by multiple people may cause electric shock.

Warning:

To prevent electric shock, please use insulated tape to wrap up the terminal of high-voltage connection after disassembly.

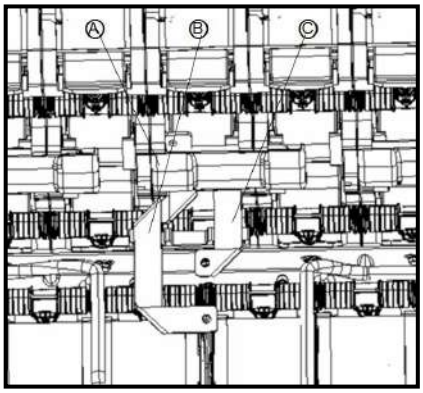
7 Disassemble fixing bolt ① of service switch bracket, and remove the bracket ② of service switch's flexible connection.



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear

8 Disassemble the high-voltage guard cover A of flexible connection between rear module assy and service switch. Then remove flexible connection B and C.



Danger:

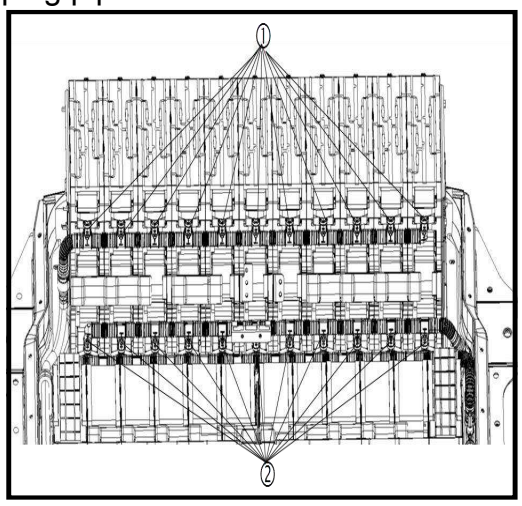
The risk of electric shock still exists even when you touch high-voltage parts with protective gear.

Perform the operation alone. Operations by multiple people may cause electric shock.

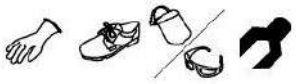
Warning:

To prevent electric shock, please use insulated tape to wrap up the terminal of high-voltage connection after disassembly.

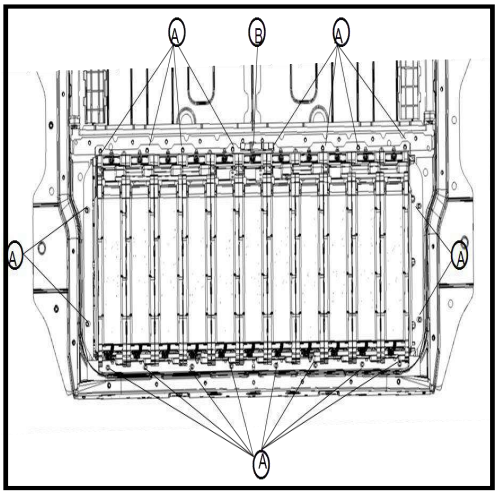
9 Disassemble the rear module's quick-plug pipeline ① on upper-end, and ② on lower-end. Please refer to "quick-plug pipeline" for details.



Warning:

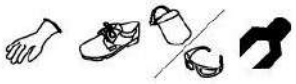
To prevent hazards during disassembly, please be sure to wear protective gear 

10 Dismantle rear module assy's fixing part and lower housing assy's fixing bolt A and B.

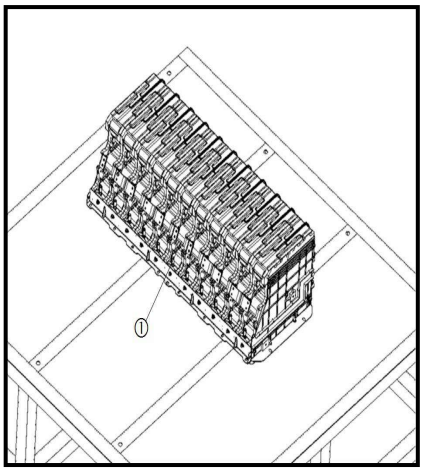


Warning:

To prevent hazards during disassembly, please be sure to wear

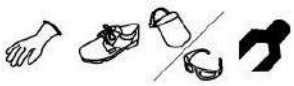
protective gear 

11 Remove rear module assy ①, then place the assy on workbench.



Warning:

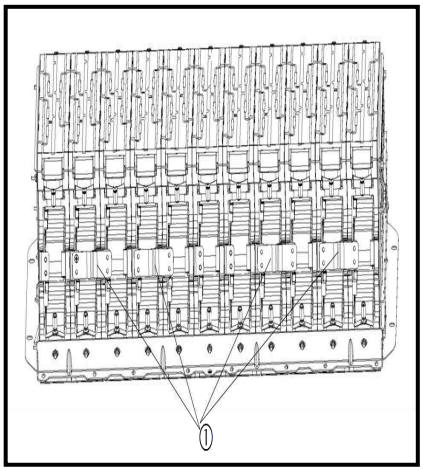
To prevent hazards during disassembly, please be sure to wear protective gear.



Make sure that a piece of insulation paper has been placed on the working table.

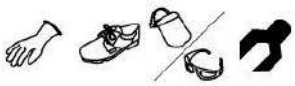
12 Please disassemble the flexible connection of rear module assy by following steps below:

① Disassemble the copper bar ① of flexible connection by dismantling the fixing bolt.



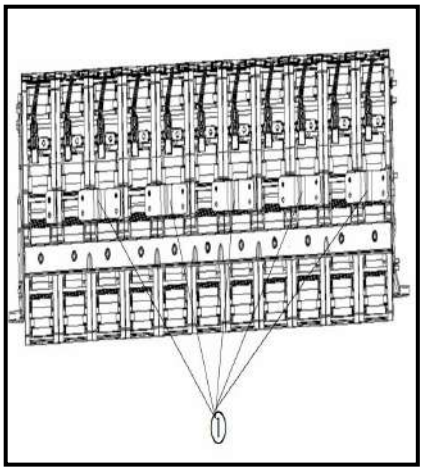
Danger:

The risk of electric shock still exists even when you touch high-voltage parts with protective gear.



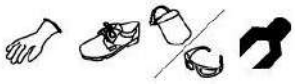
Perform the operation alone. Operations by multiple people may cause electric shock.

② Disassemble the high-voltage guard cover ① and its fixing bolt on the rear module assy, then remove the flexible connection's copper bar.



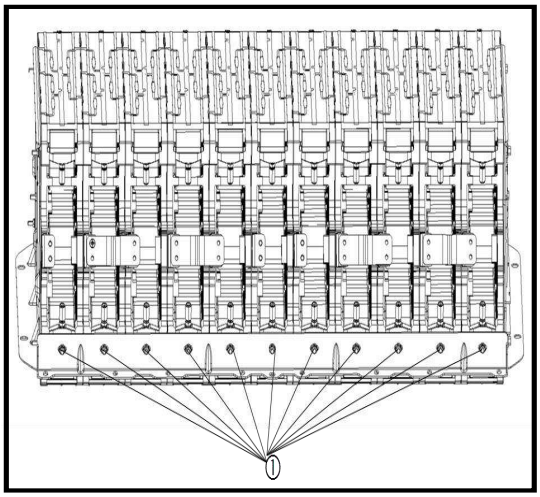
Danger:

The risk of electric shock still exists even when you touch

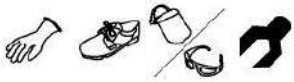
high-voltage parts with protective gear. 

Perform the operation alone. Operations by multiple people may cause electric shock.

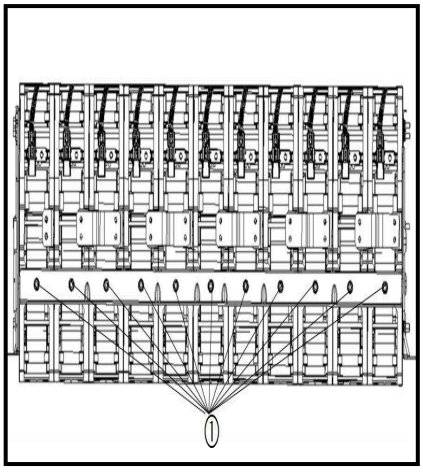
13 Disassemble the fixing nut ① of left fixing parts on rear module assy.



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear 

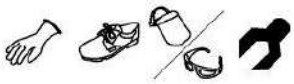
14 Disassemble the fixing nut ① of right fixing parts on rear module assy.



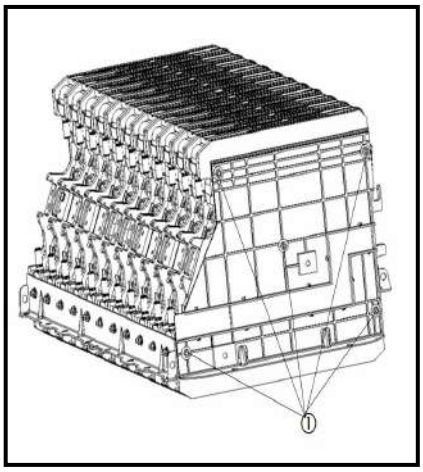
Warning:

To prevent hazards during disassembly, please be sure to wear

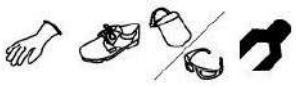
protective gear.



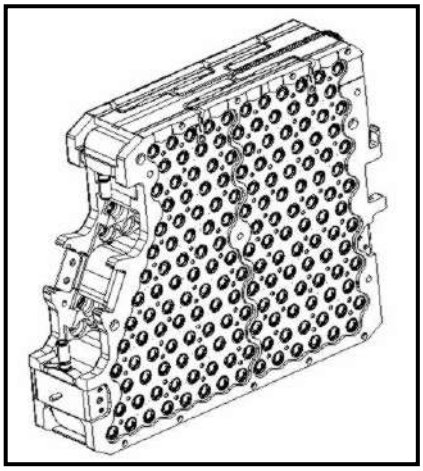
15 Disassemble the fixing nut of rear module assy's pull rod, then remove the pull-rod ①.



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear 

16 16 remove the module ①.



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear 

Assembly of rear module assy

Caution：

When replacing module assy, please perform equalizing charge to the module. Please refer to “module’s equalizing charge” for details.

1 When the module is replaced, please perform the following steps:

①Write down the replacing date on the sealed package of new battery pack.

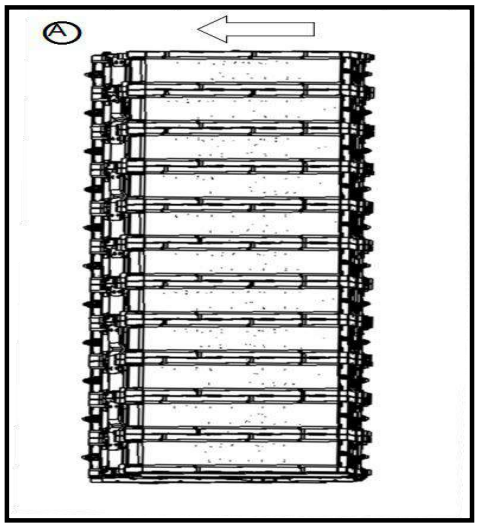
②Divide the sealing strip with tracking date into two pieces, and stick on the battery pack and “Battery

Replace Record Sheet” respectively.

③Fill in the “Battery Replace Record Sheet”.

2 Assemble the rear module assy by following steps below.

①Assemble the rear module assy by following the arrangements of module’s anode&cathode shown in picture. Then tighten the long pull-rod on module’s two sides.



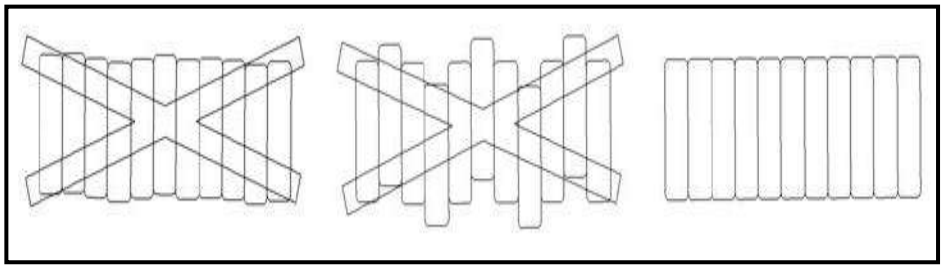
A. Rear module assy

⇦ The front of the vehicle

Warning:

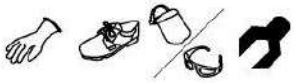
To prevent hazards during assembly, please be sure to wear protective gear.

②Check the assembling condition for battery module. Make sure the assembling process is carried out with correct installation method.

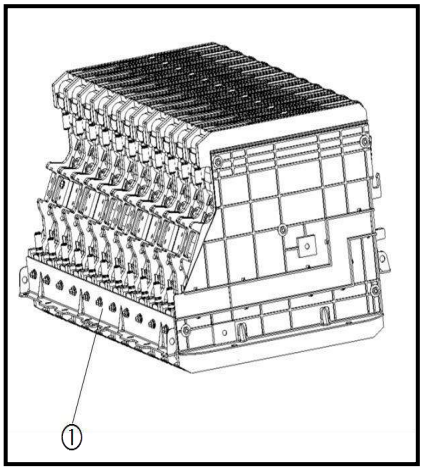


Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

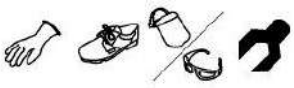


3 Fix the left fixing parts ①.

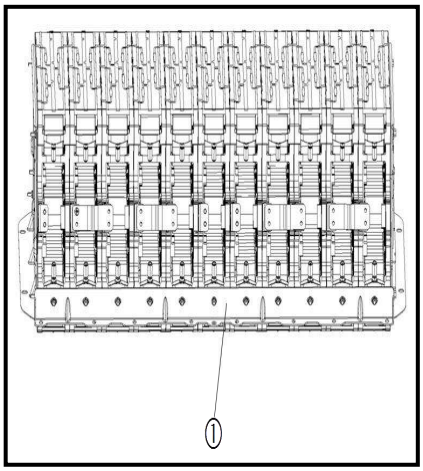


Warning:

To prevent hazards during assembly, please be sure to wear protective gear.



4 Fix the right fixing parts ①.

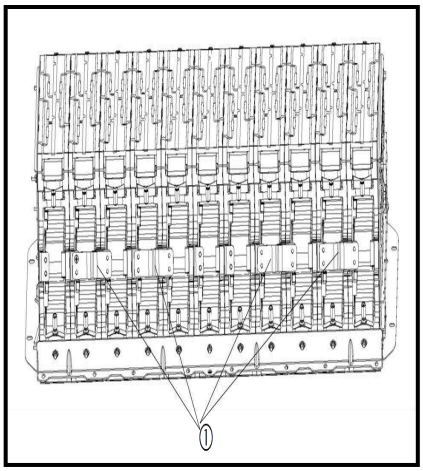


Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

5 Install the flexible connection of rear module assy according to the following steps:

①Assemble the copper bar ① of front/rear flexible connection.



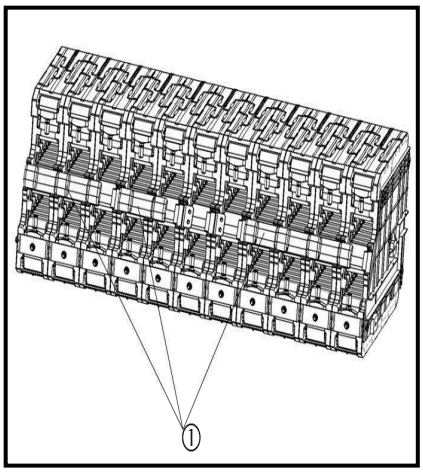
Danger:

The risk of electric shock still exists even when you touch high-voltage parts with protective gear.

Perform the operation alone. Operations by multiple people may

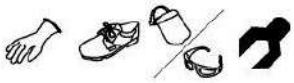
cause electric shock.

② High-voltage guard cover ① of rear flexible connection.



Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

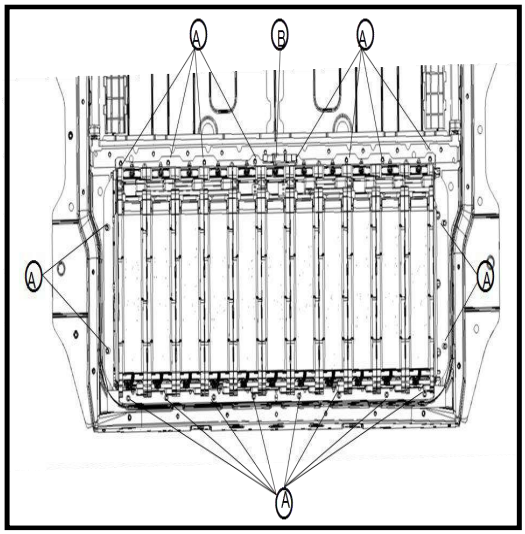


Caution：

Make sure that there is no error of mounting positions.

Make sure that the connection place is not loosening up after assembly.

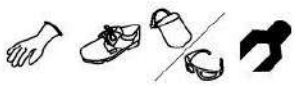
6 Assemble the bolt A and nut B of rear module assy



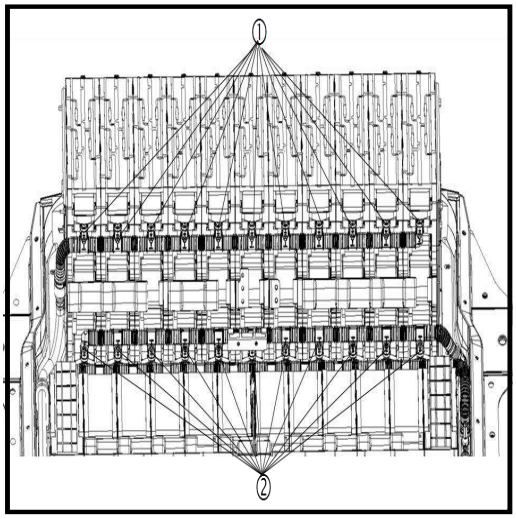
Warning:

To prevent hazards during assembly, please be sure to wear

protective gear.



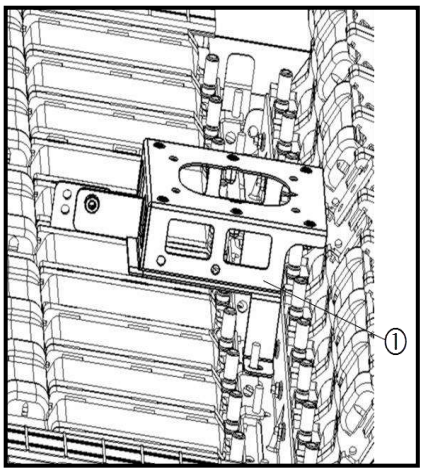
7 Assemble the rear module's quick-plug pipeline ① on upper-end, and ② on lower-end.



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

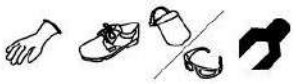
8 Assemble the bracket ① of service switch's flexible connection.



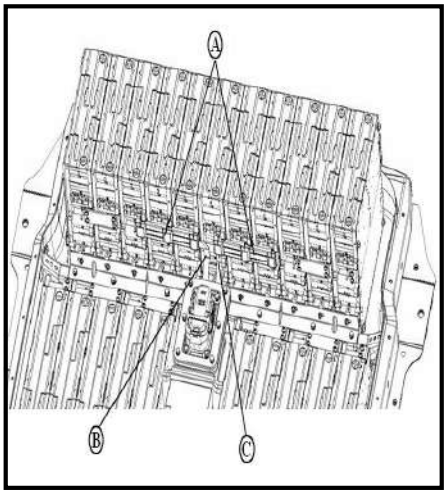
Warning:

To prevent hazards during assembly, please be sure to wear

protective gear.

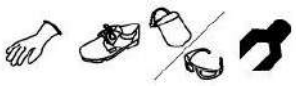


9 Assemble the connecting strip B, C and the high-voltage guard cover A on service switch



Danger:

The risk of electric shock still exists even when you touch high-voltage parts with protective gear.



Perform the operation alone. Operations by multiple people may cause electric shock.

Warning:

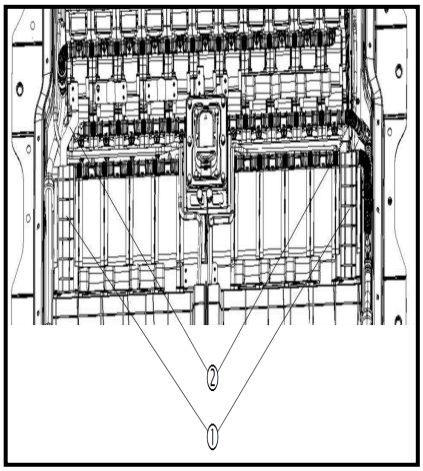
To prevent hazards during disassembly, please be sure to wear protective gear.

Caution：

Make sure that there is no error of mounting positions.

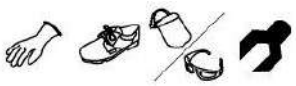
Make sure that the connection place is not loosening up after assembly.

10 Assemble the flexible connection ② and high-voltage guard cover ① of rear module assy.



Danger:

The risk of electric shock still exists even when you touch high-voltage parts with protective gear.



Perform the operation alone. Operations by multiple people may cause electric shock.

Warning:

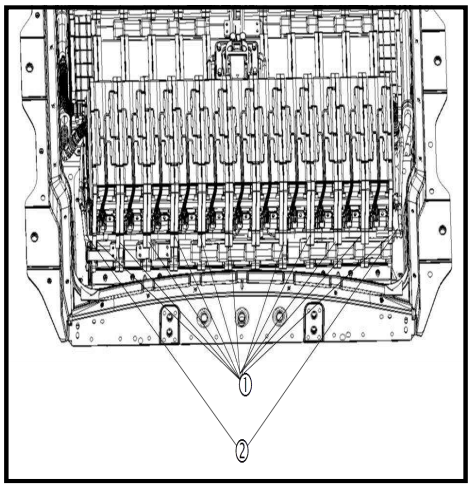
To prevent hazards during disassembly, please be sure to wear protective gear.

Caution：

Make sure that there is no error of mounting positions.

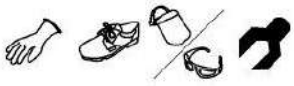
Make sure that the connection place is not loosening up after assembly.

11 Assemble the low-voltage main harness ② of rear battery module assy.

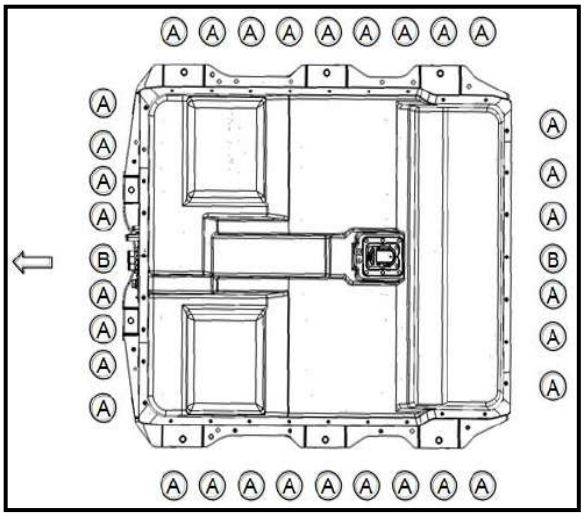


Warning:

To prevent hazards during assembly, please be sure to wear protective gear.



12 Tighten the fixing bolts and nuts according to the sequence in the following picture, then mount the upper housing of power battery pack.

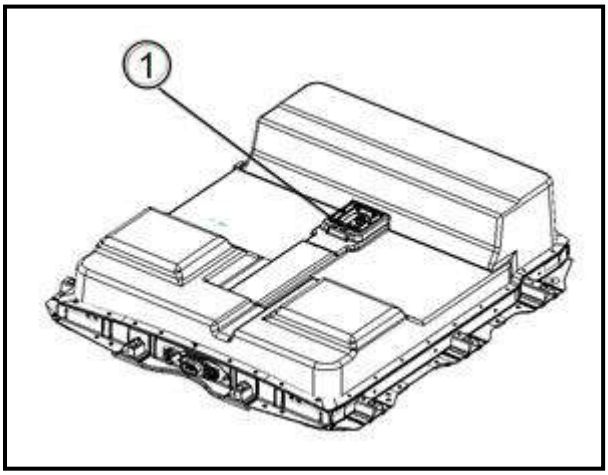


⇦ The front of the vehicle

Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

13 Install the maintenance switch's reinforcing plate.

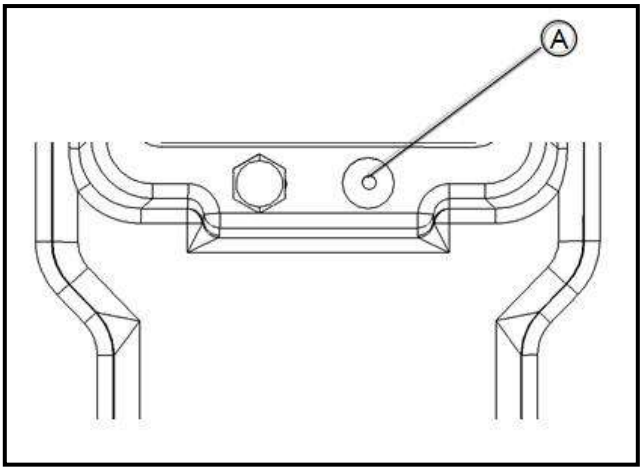


Warning:

To prevent hazards during assembly, please be sure to wear protective gear.

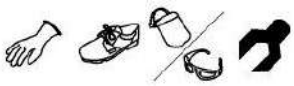
Gas Tightness Inspection

1 Remove a vent valve, and then mount the gas nozzle chuck (A).

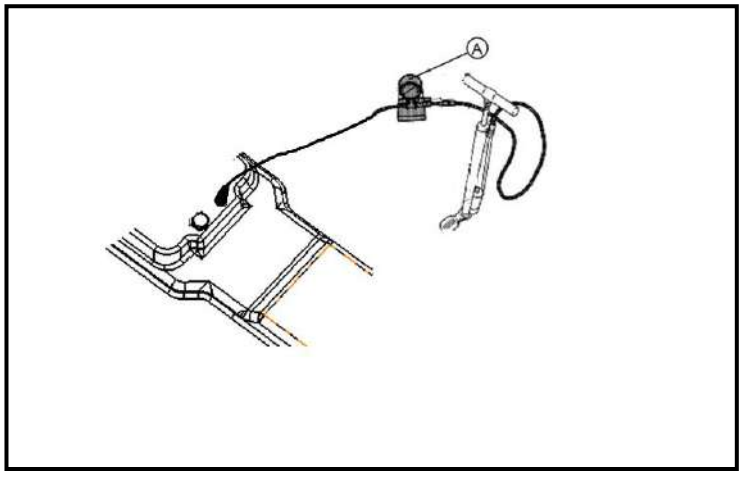


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.



2.Mount gas pressure meter (A).



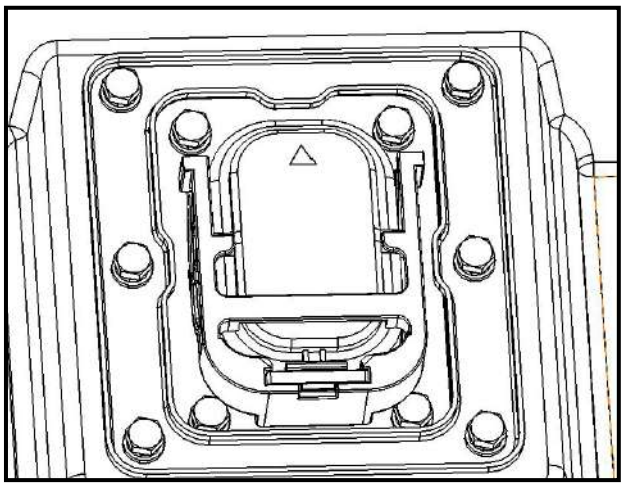
Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

Caution：

Carefully operate the gas-pressure meter to prevent the falling down.

3. Install the maintenance switch

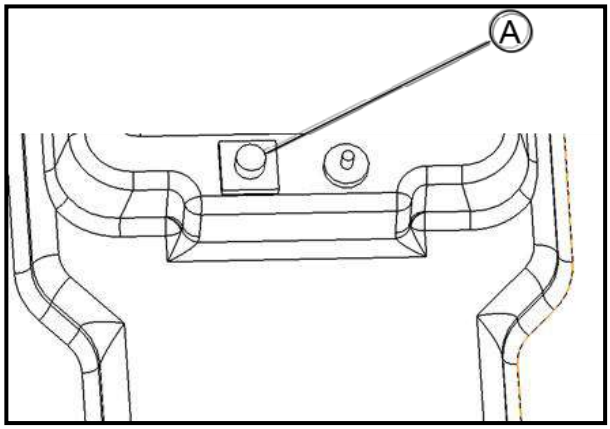


Danger:

There still will be risk of shock even you touch the high voltage components with protective gear.

4.Use polyethylene tape (A) or other means to seal another air vent, in order to prevent the air getting

inside



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

5.Add 1.6kPa air pressure into the battery to do the air tight test. Please continue for about 1 minute.

Caution：

Slowly operate the inflator during the inflating.

Do not let the air pressure exceed 1.6kPa.

Repair Limit：1.4kPa

6.If the pressure exceeds the limit, please use soapsuds to locate the leakage.

Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

Caution：

DO NOT let the soapsuds contact the service plug.

Equipotential test

After installation of power battery assembly, use multimeter to measure the resistance value between housing(A) and body（B）.

Standard **: ≤0.1** Ω

Danger:

 **To prevent hazards during inspection, please be sure to wear protective gear.**

Confirm Power Battery System State

1.Mount the battery pack.

2.Connect the high-voltage and low-voltage connections between battery and the vehicle.

3.Turn off the service switch.

4.Connect the negative terminal of 12V battery.

5.Turn the key to “START” gear and confirm that the vehicle works normal.

Disassembly and assembly of battery cell

Disassembly and assembly of battery cell

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**

Work Environment for Internal Disassembly and Assembly of Power Battery Assembly

1 Must be an indoor environment

The work environment must be able to be isolated from the outside by shutters or other means to prevent
the intrusion of rain, snow, sand, and other substances.

The environment must be ventilated and prevent
the entry of sweat during work, and also prevent condensation from occurring as a result of high

temperature and humidity.

2 No entry of foreign materials

In addition to being indoors, the environment must not permit the entry during disassembly work of metal powders, oil, or foreign substances resulting from causes such as servicing of other vehicles.

If there is any risk of the above, use a plastic curtain or other means to block off the work area, or take other necessary steps.

3 The floor must be dry

The floor must not become wet as a result of causes such as vehicles entering when it is raining or snowing.

4 Work Space

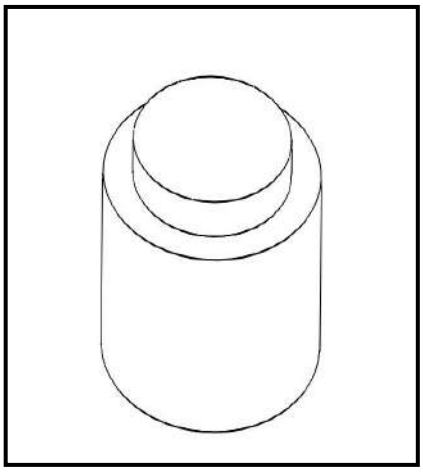
The size of work space should be about the size of a vehicle to assure the enough disassembly space.

An indicating sign or other measures must be taken during the disassembly so that persons other than the workers do not enter the work space.

Disassembly and assembly of battery cell

1 To disassemble module assy, please refer to “disassembly and assembly of left-front module assy” and “disassembly and assembly of rear module assy” for details.

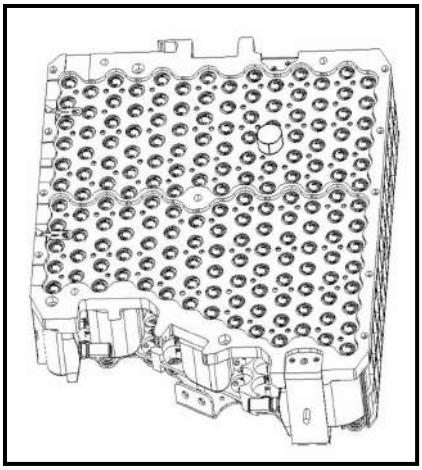
2 Prepare auxiliary line-drawing fixture for the disassembly of battery cell.



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

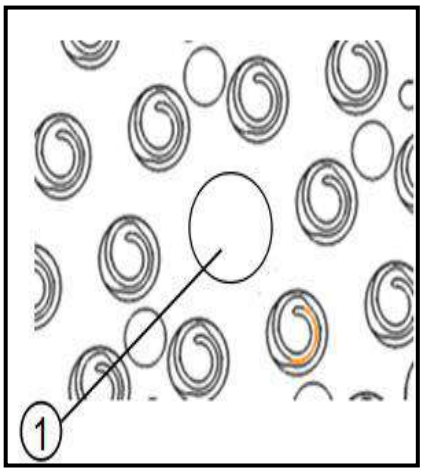
3 Place the fixture on the upper side of cell cathode’s aluminum plate hole.



Warning:

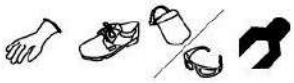
To prevent hazards during disassembly, please be sure to wear protective gear.

4 Use the auxiliary line-drawing device to draw up a round line ①.

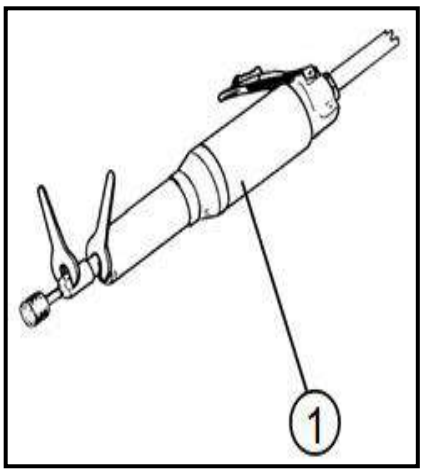


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.



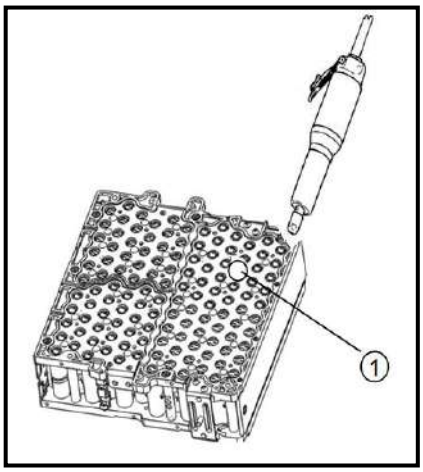
5 Prepare small sander ①.



Warning:

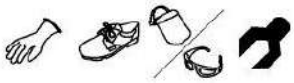
To prevent hazards during disassembly, please be sure to wear protective gear.

6 Polish the surface of the aluminum plate, ABS plate and cell under the round line ①.

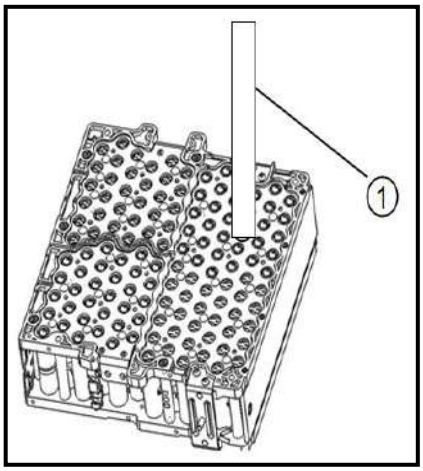


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

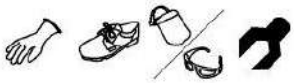


7 Use plastic stick ① and rubber hammer to pound out the battery cell from cell's anode to cathode.



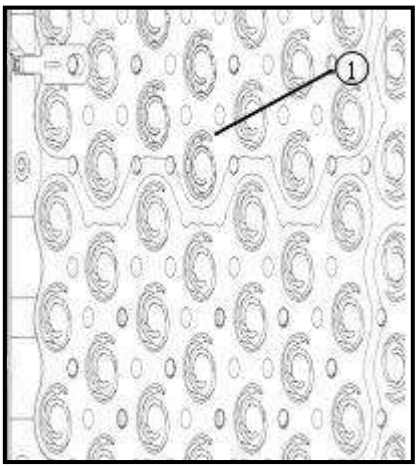
Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.



8 Apply fixing glue on the battery cell's surface, then clean the redundant glue.

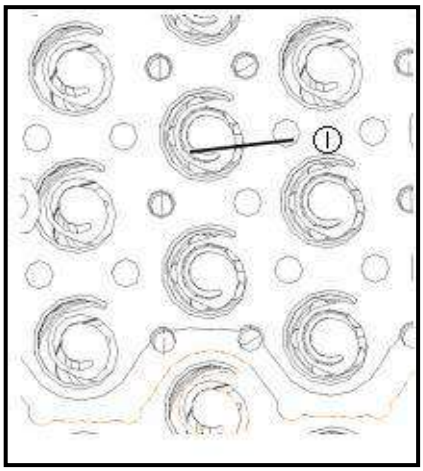
9 Use plastic stick to place electrode on the collector plate ①.



Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

10 Use laser-weld to weld up the aluminum terminal on battery cell's anode ①.

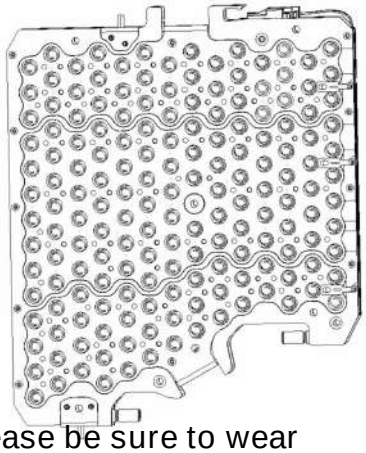


Warning:

To prevent hazards during disassembly, please be sure to wear protective gear.

11 Use laser-weld to weld up the aluminum terminal on battery cell's cathode.

12 clean the module's upper surface.



Warning:

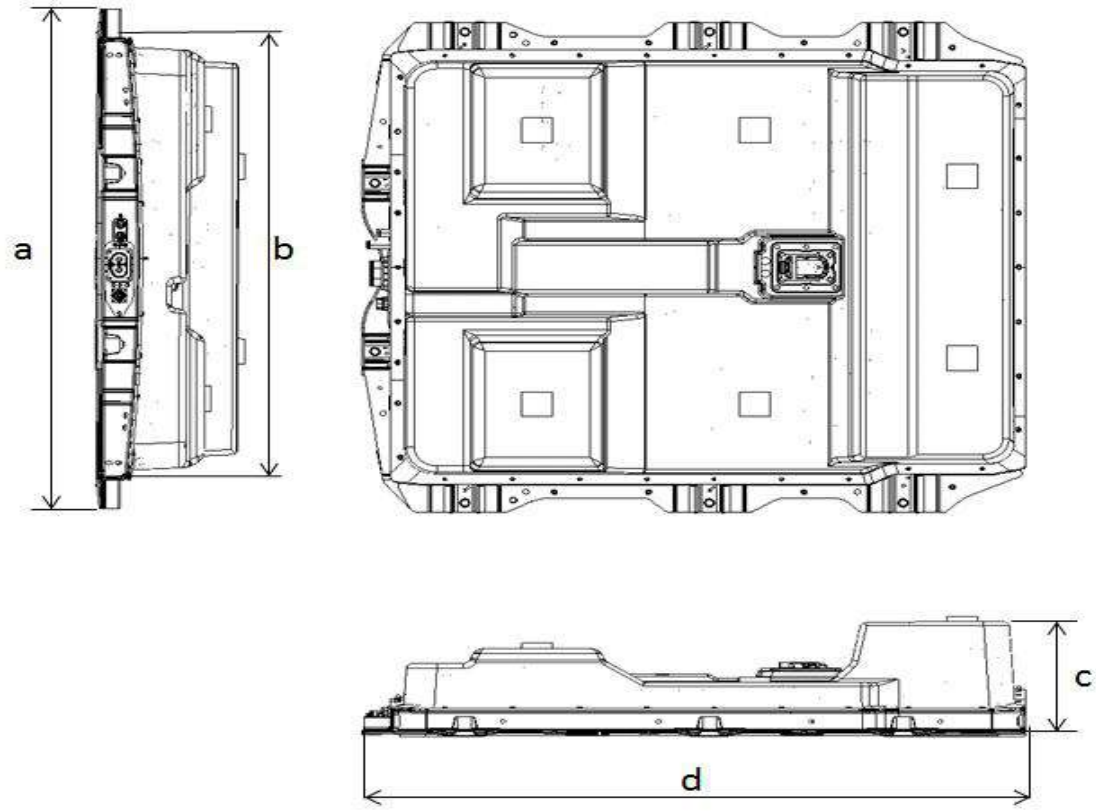
To prevent hazards during disassembly, please be sure to wear protective gear.

Maintenance data and instructions

Maintenance data and instructions

Power Battery assembly

Items	Instruction
Type	Ternary li-ion battery
Structure	42 parallel 96 series (4032 cells)
Voltage platform (V)	About 345.6
Weight (kg)	About 318



Profile Size	a（mm）	1176
	b（mm）	1039
	c（mm）	315
	d（mm）	1301

Charging system

Content

Safety Precaution

Safety Precaution

Instruction

Please follow the instructions to ensure safety and proper service. These instructions are not introduced separately in each chapter.

Precautions forthe electrical technicians who use medical electronic devices

Prohibit operation

Warning:

- **Strongly magnetic components have been assembled on this vehicle.**
- **Technicians shouldn't operate electronic pacemaker or other medical electronic devices in this vehicle, or the functions of medical devices may be affected by strong magnetic components.**

Precautions for normal charging

Warning:

- **If technicians are using cardiac pacemaker, cardioverter, defibrillator or other medical electronic devices, please check whether these devices are functional before normal operations.**
- **During normal charging, medical electronic devices may be affected by electromagnetic waves. Technicians shouldn't enter into passenger compartment (trunk included) when they are using cardiac pacemaker, cardioverter, defibrillator or other medical devices.**

Communication equipment operation precautions

- **If the technicians use medical electronic devices such as cardiac pacemaker, cardioverter or defibrillator and other medical electronic equipment, please keep enough distance with the communication devices.**
- **The electromagnetic wave of the remote intelligent terminal may affect the function of the medical device such as cardiac pacemaker,**

cardioverter, defibrillator and other medical electronic devices.

- **If the technician uses the medical device such as cardiac pacemaker, multiplexer, defibrillator and other medical electronic equipment, the electromagnetic wave of the remote intelligent terminal may affect the function of the device.** The possible effect of the remote intelligent terminal on the medical electronic devices must be checked by the manufactures of the medical electronic devices .

Inspection of key points before the maintenance

The high-voltage system may automatically operate. Please confirm the remote air conditioning and fixed-time charging haven't been set before the maintenance.

Attention：

If remote air-conditioning or fixed-time charging is set, the high voltage system will run automatically even the switch is turned off.

Precautions of auxiliary restraint system "airbag" and "seat belt pretension"

The supplemental restraint system such as "air bag" and "seat belt pretension", used along

with a front seat belt, can reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual front air bags. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

Warning:

Always observe the following items for preventing accidents' happening:

1 **Please avoid the failure of the auxiliary restraint system, and the risk causing the casualties will increase in the collision accidents after the failure. All maintenance can only be operated by the DR authorized distributors.**

2 **Non-standard maintenance on auxiliary restraint system, including non-standard disassembly and installation, may lead to accidental triggering of the auxiliary restraint system and personal injury. For removal of air bag module, please refer to "Air bag system"chapter.**

3 **Do not use any electrical test devices to test any circuit of the auxiliary restraint system unless these tests are in the instructions described in the service manual. The wire harness and connectors of the auxiliary restraint system should adopt to yellow or orange color.**

Precautions when using power tools(pneumatic or electric) and hammer

- When the power-supply switch is ON, do not use the power tools or hammer to operate the sensor auxiliary area while approaching the air-bag diagnosis sensor and other sensors of the airbag system. Severe vibrations may activate these sensors, which will ignite the airbag and cause severe injury.
- When using power tools or a hammer, turn the key in the "LOCK" position, unplug the cathode of 12V lead-acid battery and wait at least 1 minute for maintenance.

Precautions of removing the 12V battery

When removing the 12V battery, turn the power switch to "ON", and then to "OFF".

Note:

- The automatic 12V battery charge function may start even when the power switch is at "LOCK"position.
- After the key turns from ON to LOCK, the auto-charging function of 12V battery will not launch.

Precautions of high-voltage

Warning:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar**

accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress. Before operations on high-voltage system, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to turn to "ON" or "START".**

High voltage cables and safety signs

High-voltage cables are orange.Safety marks are on charging system and other high-voltage parts. Do not touch these cables or components.

Treatment of high voltage cable terminals

When the high-voltage cable connector is unplugged, wrap it immediately with an insulating tape.

Regulations on workers with medical electronic devices

The vehicle contains parts that contain powerful magnets. If a person who is wearing a pacemaker or other medical device is close to these parts, the medical device may be

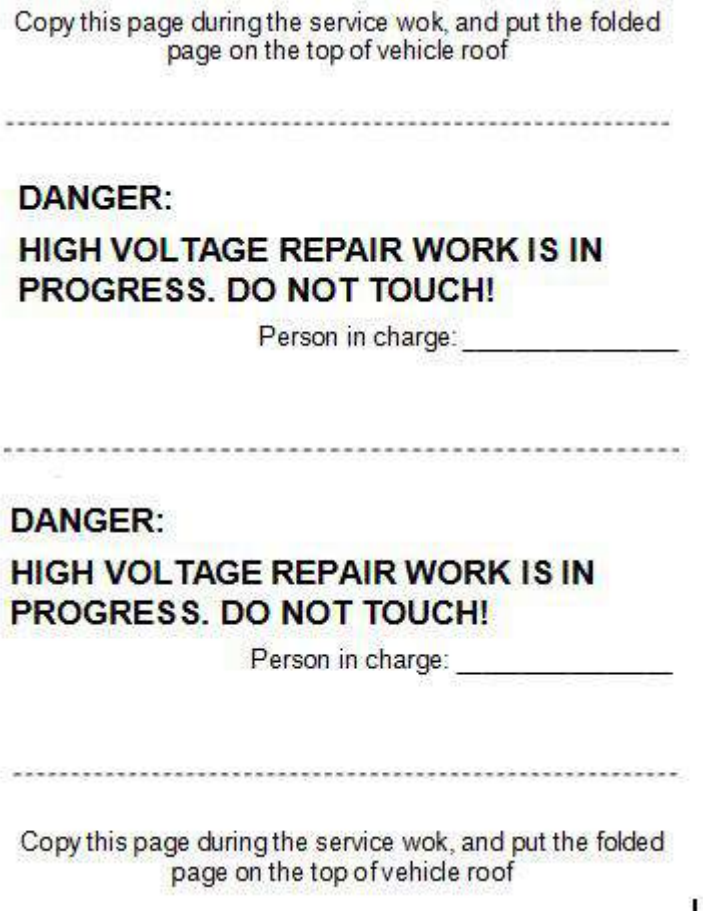
affected by the magnets. Such
persons must not perform work on the vehicle.

PROHIBITED ITEMS TO CARRY DURING THE WORK

Because this vehicle uses components that contain high voltage and powerful magnetism, due not carry any
metal products which may cause short circuits, or any magnetic media (cash cards, prepaid cards, etc.) which may be damaged on your person when working.

Place the warning sign saying "High voltage parts under maintenance, do not touch"

Before maintaining the high-pressure parts, please place “High voltage parts under maintenance, do not touch” Warning sign on apparent position to remind other staff.


Copy this page during the service wok, and put the folded page on the top of vehicle roof

DANGER:
HIGH VOLTAGE REPAIR WORK IS IN PROGRESS. DO NOT TOUCH!
Person in charge: _____

DANGER:
HIGH VOLTAGE REPAIR WORK IS IN PROGRESS. DO NOT TOUCH!
Person in charge: _____

Copy this page during the service wok, and put the folded page on the top of vehicle roof

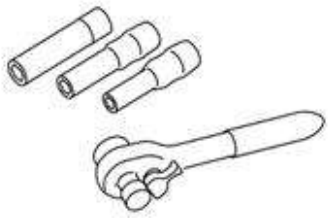
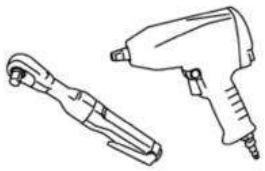
Note：

When the part is replaced, or when a label has been damaged, be sure to stamp the new product label on the same position and direction.

Preparation work

Normal tools

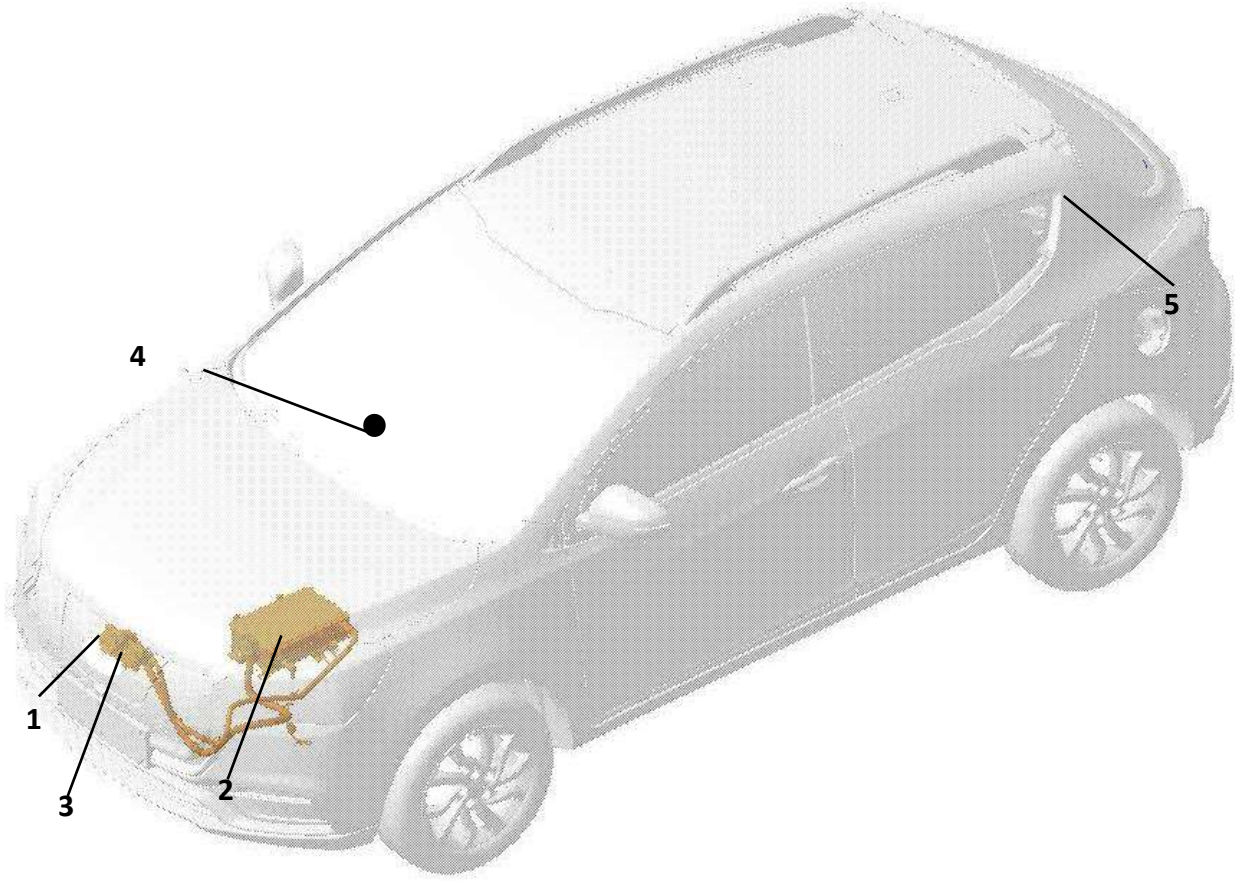
Tool name		Use description
Insulated gloves (To ensure the protection of an electricity of 1000V / 300A)		Disassembly and assembly of the high voltage parts
Leather gloves (Using leather gloves that can tighten the wrist)		1. Disassembly and assembly of high voltage parts 2. Protect insulated gloves
Insulated shoes		Disassembly and assembly of the high voltage parts
Protection glasses		Disassembly and assembly of the high voltage parts Prevent flares and protect eyes while repairing circuits
Insulated caps		Disassembly and assembly of the high voltage parts
Insulation Tester (Megohm meter)		Measuring voltage and insulation resistance

Energy-saving wrench		Module assembly
Electric wrench		Disassembly of spare parts

Systeminstruction

Components

Components' positions



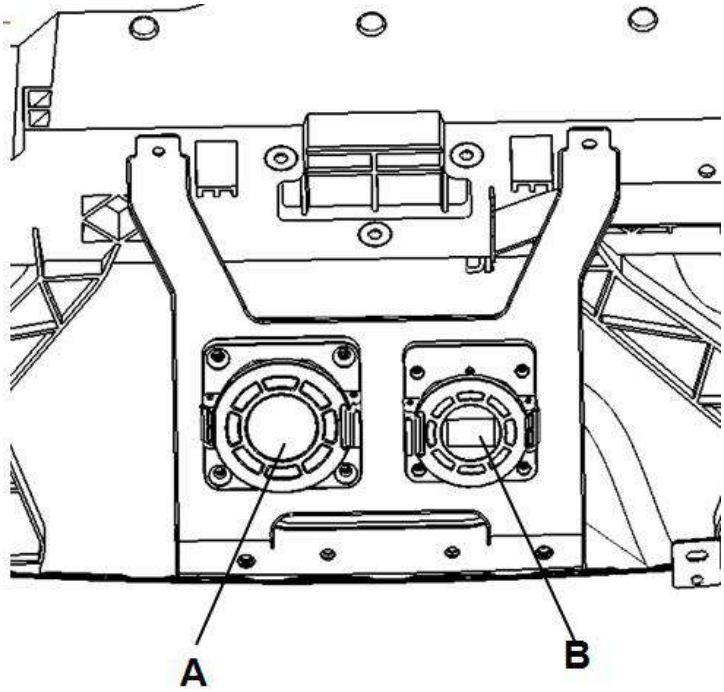
⇦ : The front of the vehicle

Sequence	Name	Function
1	DC charging socket assembly	Please refer to "DC charging socket"
2	Car Charger	Please refer to "Car charger"
3	AC charging socket assembly	Please refer to "AC charging socket"
4	Charging indicator light	Please refer to "Charging indicator light"
5	DC charging socket	Please refer to "AC charging socket assembly"

Chargingsocket

The DC charging socket assembly (A) and the AC charging socket assembly (B) are mounted on the body LOGO. When charging, according to the selected

charging type, connect the AC charging plug or DC charging plug to the corresponding charging socket, and start charging after the connection is correct. Test circuit will be generated when charging port is connected. When failure happens in connection, VCU will check the failure.

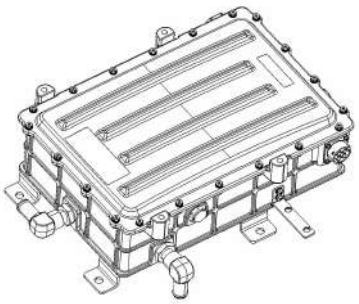


On-board charger

1 Transform the external AC power into DC for battery's charging.

2 While charging, vehicle charger will confirm charging mode according the order from VCU.

3 Filter device has been assembled inside vehicle charger, which can reduce the effect of AC network volatility.



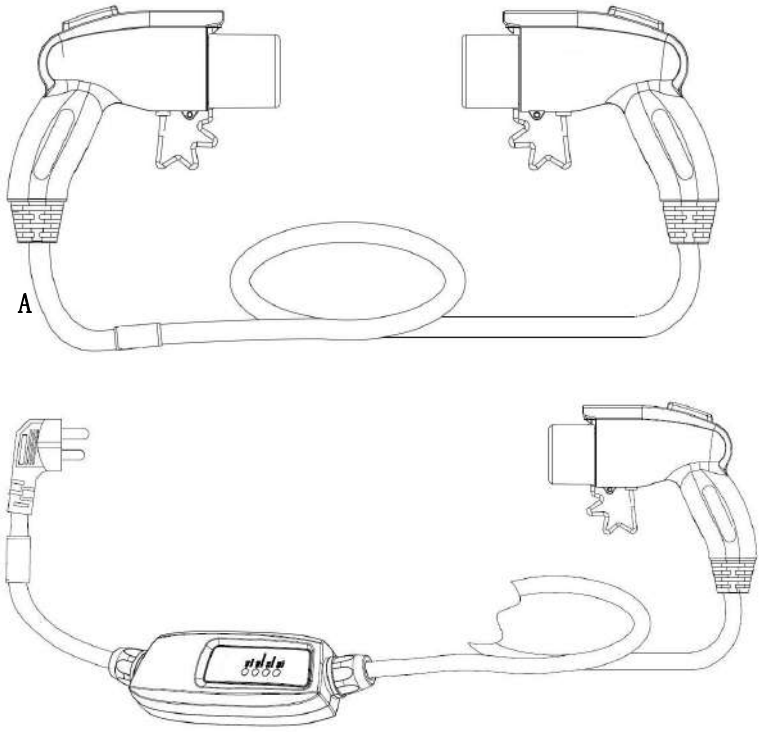
Charging indicator light

Charging indicator is assembled on instrument panel's central part, which is on front windscreen's bottom side. It can indicate different status of charging.

Serial No.	Function	Indicator's status
1	Ready for charging	Yellow light
2	In charging	Green light
3	Full charging	Green light blinks for 1 minute
4	Charging complete/uncharged	Extinguished
5	Fixed-time charging/remote charging	Yellow light blinks for 1 minute

DC charging socket

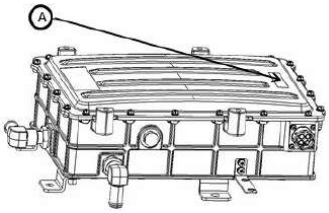
DC charging socket can connect vehicle to external power supply, including charging socket for charging pile (A) and controller box (B). This device is placed inside trunk.



Warning mark for high-voltage

1. The warning mark for high-voltage is stamped on vehicle charger's upper cover.

2. After replacing charger, please check whether the mark is on original position.



System

System Instructions

Instruction

Vehicle charger applies secondary conversion system, including PFC conversion (adjust circuit for power factor) and AC/DC rectifier. It can improve charging efficiency, accuracy and battery's lifespan.

Note:

PFC is a circuit for increasing power factor. It can improve the efficiency of transforming AC into DC.

Description of charging control

For more information on charging control, please refer to “AC charging control” and “DC charging control” sections.

Charging mode

This vehicle has AC charging mode and DC charging mode. The AC charging includes charging pile charging and household power charging, and each charging can be selected by four modes: normal mode, long-range mode, long-life mode, and low-temperature charging.

Note：

If the charging is suspended before full charging, it can be restarted.

The charging time depends on battery group’s remaining power, power supply, external temperature and battery’s lifespan. The charging time in this manual is only a nominal value, which may differ from actual time.

Charging mode		Energy level	Charging time tips *2
AC charging mode *1	Normal charging	100%	8h（25℃）
	Long-life charging	80%	7h（25℃）
	Timing charge	—	—
	Remote charging	100%	8h（25℃）
	Low temperature charging mode	100%	16h
DC charging pile		80%	1H (25℃)

*1: This charging mode is the AC pile charging. If you change it to household charging, the time will increase by about 1/3.

*2: The charging time starts when the indicator is on.

AC charging mode (normal charging)

During AC charging mode (normal charging) and fixed-time charging hasn't been set, the charging will start when charging socket is connected to charging socket.

AC charging mode (low-life charging)

In the AC charging mode (long-life charging), the power battery charge cut-off voltage will be lower than the charge cut-off voltage in the normal charge mode to increase the service life of the power battery.

AC charging mode (fixed-time charging)

During AC charging mode (fixed-time charging), the charging will start and stop according to your set.

AC charging mode (remote charging)

During AC charging mode (remote charging), the charging will start after receiving remote control signal.

AC charging mode (low temperature charging)

During AC charging mode (low-temperature charging), heating device will be activated to heat battery.

DC charging pile

DC charging mode will charge vehicle by DC charging pile. The maximum charging current differs according to battery's power and temperature. If the charging is unfinished, yet the vehicle or charging pile's setting time is up, the charging will stop.

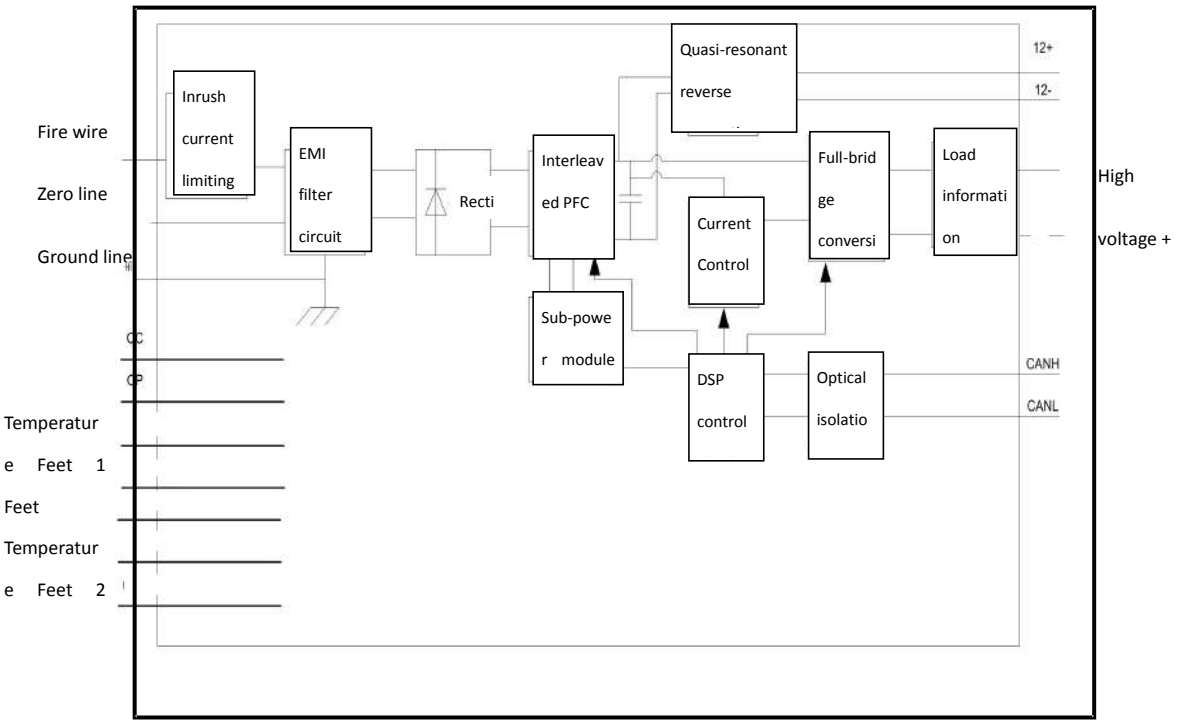
Principles and operations

Vehicle Charger

1 Vehicle charger applies Inrush current-limit circuit and EMI filter circuit to prevent DC network's fluctuation and high-frequency's interference on facility.

2 Rectifying circuit will transform the AC into DC.

3 PFC is a circuit for increasing power factor. It can improve the efficiency of transforming AC into DC. DC current will be transformed by full-bridge insulated circuit and exported to battery.



Precautions for operation

Charging system

Charging cable,Charging socket,Charging plug operation

1 Do not touchthe metal pin of charging socket and plug

2 Do not disassemble or modifycharging cable, socket and plug

3 Do not pull charging cable in brute force.

4 Do not twine cable, socket and plug.

5 Do not drag cable, socket and plug.

6 Do not put themnear heat source.

7 Fall-off or shock is prohibited.

8 Do not place heavy objects on charging cable.

Precautions for charging

1 Please use specific plug for DR vehicle only;

2. Check whether water, dust or other materials exist inside plug and socket。

Warning:

- Water, dust or foreign materials on socket and plug may cause electric shock or leakage. Pleasedo not touch socket or plug unless necessary.
- Charging plug is not allowed to use if water, dust or other materials exist on socket or plug.

3. Please check whether rust or other damage exists on charging socket and plug, and confirm the connection is tight.

Warning:

- Because leakage, electric shock, short circuit or fire may occur, if any of the above problems are found, charging is prohibited.

4. Charging is prohibited when the charging socket or charging plug is submerged.

5. Do not charge vehicle if charging cable is wrapped up.

6. Do not charge vehicle under thunderstorm weather.

7. Stop charging if abnormal smell or fog appears.

8. When charging is complete, close the charging port cover to prevent water or dust.

9. Make sure charging plug is pulled out if you need to turn the key on “READY”.

Note:

The key cannot be turned on “READY” when charging socket and plug are connected

10 To prevent fire accidents or electric shock caused by electric leakage, please use normal charging plug that is water-proof.

11 Make sure the rated current of household socket exceeds 16A

Warning:

- Using charging socket whose rated current is below standard may cause overheat or fire accidents;
- Do not usegenerator or power supplywhich hasn’t been listed in this manualfor vehicle’s charging.

Note:

Failure may happen during charging if using generator or power supply which hasn’t been listed in this manual.

12. While charging in DC, please use charging pile that is matched with vehicle.

System diagnosis (CHR)

Diagnosis function

function

Diagnostic test mode	Function
VCU identification	Read error code on vehicle charger
Data monitoring	Monitoring on VCU input and output data

CHR diagnosis information

Vehicle Charger

Ref. value

The value displayed in the diagnostic tool

Ref. value

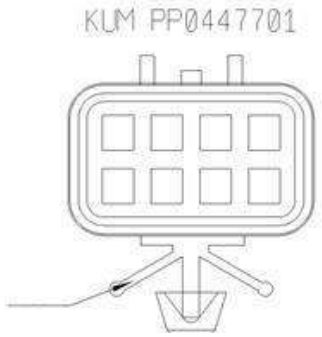
Note:

- All data listed below may differ from actual value, as these figures are calculated by vehicle charger according to the signal uploaded from relevant sensors.
- Vehicle cannot be charged while power-on.

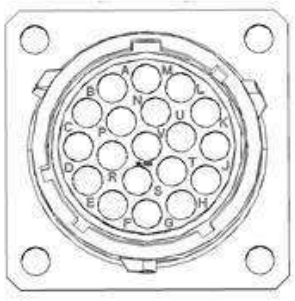
Monitoring subject	Condition		value/status
DC charging socket	Power supply	DC charging port connected	connected
		DC charging port disconnected	disconnected
Charging signal of DC charging pile	uncharged	"Start charging" button on charging pile hasn't been pressed	loose
		"Start charging" button on charging pile is pressed	pressed
DC charge wake-up signal	• uncharged • No failure exists in charging system • Charging button is pressed		0V converting to 12V
Permission signal of DC charging	• uncharged • No failure exists in charging system • Charging button is pressed		Charging pile allows signal to be sent
AC charging anode contactor	AC charging		close
	Non-DC charging		disconnected
AC charging cathode contactor	AC charging		close
	Non-DC charging		disconnected
DC charging anode contactor	DC charging		close
	Non-DC charging		disconnected
DC charging	DC charging		close

cathode contactor	Non-DC charging	disconnected
Vehicle Charger 12V wake-up	AC charging process	12V
	Non-AC charging	0V
AC charging CC signal	charging pile's connection is OK, normal charging	
	Household charging connection is OK, normal charging	
	No connection	0V
Charger's temperature	Charger's internal temperature	-40℃~85℃
Charger's output voltage	AC charging	200V~ 420V

Connector layout



Connector of AC charging socket



Connector for vehicle charger

Connector of DC charging socket

Physical value

Connector name	Terminal number	Function description		Condition	Value
		Signal name	Input/output		
Connector of AC charging socket (low voltage)	1	Thermal resistance 1	Output		
	2	Thermal resistance 2	Output		
	3	Connection confirm	Output	Vehicle has connected to	

				socket, normal charging process	
	4	Charging control confirm	Output	Vehicle has connected to socket, normal charging process	
	5	NC			
	6	Signal feedback	Output		----------
	7	12V-	Input	Vehicle door locked	12V
	8	12V+	Input	Vehicle door locked	12V-
Connector for vehicle charger (low voltage)	A	CCOUT (connect the original VCU to collect the CC resistance port)	Output	CC resistance detected	1.5K/680Ω/220Ω
	B	NC (empty foot)	Input	Constant power input	12V
	C	CP	Input	CP connection is normal	----------
	D	CC	Input	CP connection is normal	1.5K/680Ω/220Ω
	E	GND	Output	Charger is working	12V-
	F	12V output wake-up signal	Output	Charger is working	12V+

	G	CANL	Input/output	Charger is working	----------
	H	CANH	Input/output	Charger is working	----------
	J	HVIL2+	Output		
	K	HVIL2-	Output		
	L	Thermistor 1 positive terminal	Input	Charger is working	Resistance
	M	Thermistor 1 negative terminal	Input	Charger is working	Resistance
	N	NC (empty foot)			
	P	NC (empty foot)			
	R	NC (empty foot)			
	S	Electronic lock feedback 1 pin (connect the electronic lock PIN2)	Input	Charger is working	Conducted
	T	Electronic lock power supply 2 pin (connect the electronic lock	Input	Charger is working	12V

		PIN3)			
	U	Electronic lock power supply 1 pin (connect the electronic lock PIN1)	Input	Charger is working	12V
	V	12V constant power	Input	Constant power input	12V
Connector of DC charging socket (low voltage)	1	S+	Input/output	DC charging	----------
	2	S-	Input/output	DC charging process	----------
	3	NC		----------	----------
	4	CC2	Input	Charging connection test	2.3V-2.7V
	5	A+	Output	DC charging process	12V+
	6	A-	Output	DC charging process	12V-

Safety-failed list

Safety-failed list

If failure happens in vehicle charger, please refer to “safety-failed list” for solution. The solution methods are different with respect to different failures and failure modes.

Failure mode

Mode A: charging prohibited, failure can be cleared automatically

Mode B: charging prohibited, failure can be cleared automatically after rebooting.

Mode C: charging prohibited, failure cannot be cleared and vehicle charges needs replacement.

Mode D: vehicle charger outputs power in rated power or below, with DTC uploaded.

Safety-failed list

DTC	Failed list	Reason for failure	mode			
			A	B	C	D
P3301	AC over-voltage	220V DC under-voltage	×			
P3302	AC under-voltage	220V DC over-voltage	×			
P3303	Battery over-voltage	Battery over-voltage		×		
P3304	Battery under-voltage	Battery under-voltage		×		
P3305	PFC under-voltage	Internal PFC voltage is too low			×	
P3306	PFC over-voltage	Internal PFC voltage is too high			×	
P3307	Over-temperature	Charger temperature is too high	×			

P3308	Output over-current	Charger's output current is too high		×		
P3309	Temperature sensor failed	Charger's temperature sensor is broken				×
P330a	VCU cannot receive messages	Abnormal communication	×			
P330b	Abnormal current order	Abnormal VCU current order				×
P330c	Abnormal voltage order	Abnormal VCU voltage order				×
P330d	Abnormal CC loop	CC loop circuit cannot check resistance or resistance is abnormal	×			
P330e	Abnormal CP loop	CP loop circuit's duty ratio is abnormal	×			
P330f	Electronic lock unlock failure	Electronic lock unlock error				×
P3310	Electronic lock locking failure	Electronic lock locking error				×
P3311	AC charging socket over temperature	Temperature is too high	×			
P3312	AC charging socket temperature abnormal	Temperature sensor failure				×

DTC index

DTC	Failure Name	Failure Light
P3301	AC over-voltage	——
P3302	AC under-voltage	——
P3303	Battery over-voltage	——
P3304	Battery under-voltage	——
P3305	PFC under-voltage	——
P3306	PFC over-voltage	——
P3307	over-temperature	——
P3308	Output over-current	——
P3309	Temperature sensor failure	——
P330a	VCU cannot receive messages	——
P330b	Abnormal current order	——
P330c	Abnormal voltage order	——
P330d	Abnormal CC loop	——
P330e	Abnormal CP loop	——
P330f	Electronic lock unlock failure	——
P3310	Electronic lock locking failure	——
P3311	AC charging socket over temperature	——
P3312	AC charging socket temperature abnormal	——

Instruction of indicators on control box

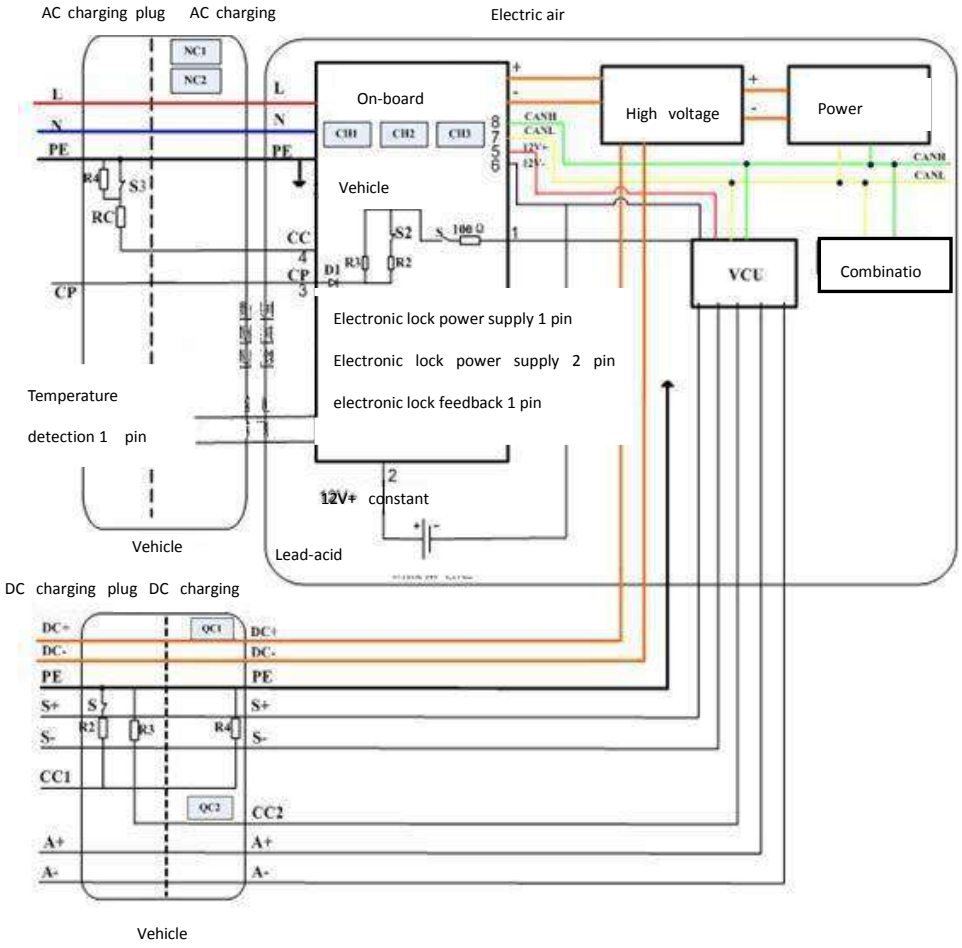
Instruction of indicators on control box					
Status	Power (red light)	Connected (green light)	Charging (blue light)	Error (yellow light)	
1	extinguis	extingui	extingui	extinguis	No power

	hed	shed	shed	hed	
2	Keep lighting	extingui shed	extingui shed	extinguis hed	Power hasn't been connected
3	Keep lighting	Keep lighting	flicker	extinguis hed	charging
4	Keep lighting	Keep lighting	Keep lighting	extinguis hed	Half-connected (S2 disconnected for 10 seconds continuously)
5	Keep lighting	Keep lighting	extinguis hed	Keep lighting	Communication error
6	Keep lighting	flicker	flicker	extinguis hed	first-time over-current protection
7	Keep lighting	Keep lighting	flicker	Keep lighting	Second-time over-current protection
8	Keep lighting	flicker	flicker	Keep lighting	Electric leakage protection
9	Keep lighting	extinguis hed	extinguis hed	flicker	Over-voltage/under-voltage protection
10	Keep lighting	Keep lighting	Keep lighting	Keep lighting	Overheat protection
11	Keep lighting	extingui shed	extingui shed	Keep lighting	Leakage self-inspection protection

Harness Diagram

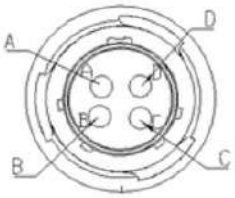
Charging system

Diagram



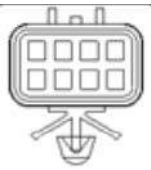
Charging system

Connector number	NC1
Connector name	AC charging socket assembly high voltage plug
Connector type	RT06164SNHEC03



Terminal No.	Wire color	Wire diameter	Signal name
A		6	AC power supply (L)
B		6	Neutral (N)
C		6	Ground line (PE)

Connector number	NC2
Connector name	AC charging socket assembly low voltage plug
Connector type	PP0447701

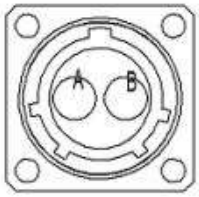


Terminal No.	Wire color	Wire diameter	Signal name
1		0.75	Temperature control 1 (WK1)
2		0.75	Temperature control 2 (WK2)
3		0.75	Charging connection confirm (CC)
4		0.75	Charging control confirm (CP)
5			
6		0.5	12V-(electronic lock power negative)
7		0.5	Electronic lock signal control harness
8		0.5	12V+(Electronic lock power positive)

Connector number	CH1
Connector name	On-board charger high voltage input connector
Connector type	DY3F1203SNF

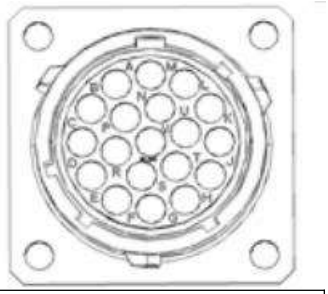
Terminal No.	Wire color	Wire diameter	Signal name
A	Red	2.5	AC power supply (L)
B	Yellow	2.5	Neutral (N)
C	Black	2.5	Ground line (PE)

Connector number	CH2
Connector name	On-board charger high voltage output connector
Connector type	DY3F1002SNF



Terminal No.	Wire color	Wire diameter	Signal name
A	Red	2.5	Positive
B	Black	2.5	Negative

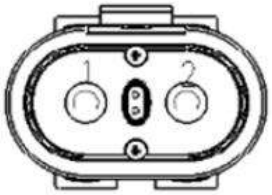
Connector number	CH3
Connector name	Connector for vehicle charger (low voltage)
Connector type	RT001619SN03



Terminal No.	Wire color	Wire diameter	Signal name
A		0.5	CCOUT (connect the original VCU to collect the CC resistance port)
B		0.5	NC (empty pin)
C		0.5	CP
D		0.5	CC
E		0.5	GND
F		0.5	12V output wake-up signal
G		0.5	CANL
H		0.5	CANH
J		0.5	HVIL2
K		0.5	HVIL2
L		0.5	Thermistor 1 positive terminal

M		0.5	Thermistor 1 negative terminal
N		0.5	NC (empty pin)
P		0.5	NC (empty pin)
R		0.5	NC (empty pin)
S		0.5	Electronic lock feedback 1 pin (connect the electronic lock PIN2)
T		0.5	Electronic lock power supply 2 pin (connect the electronic lock PIN3)
U		0.5	Electronic lock power supply 1 pin (connect the electronic lock PIN1)
V		0.5	12V constant power

Connector number	QC1
Connector name	DC charging socket high voltage input connector
Connector type	GYHB-2-150E



Terminal No.	Wire color	Wire diameter	Signal name
1	Red	6	DC +
2	Black	6	DC -

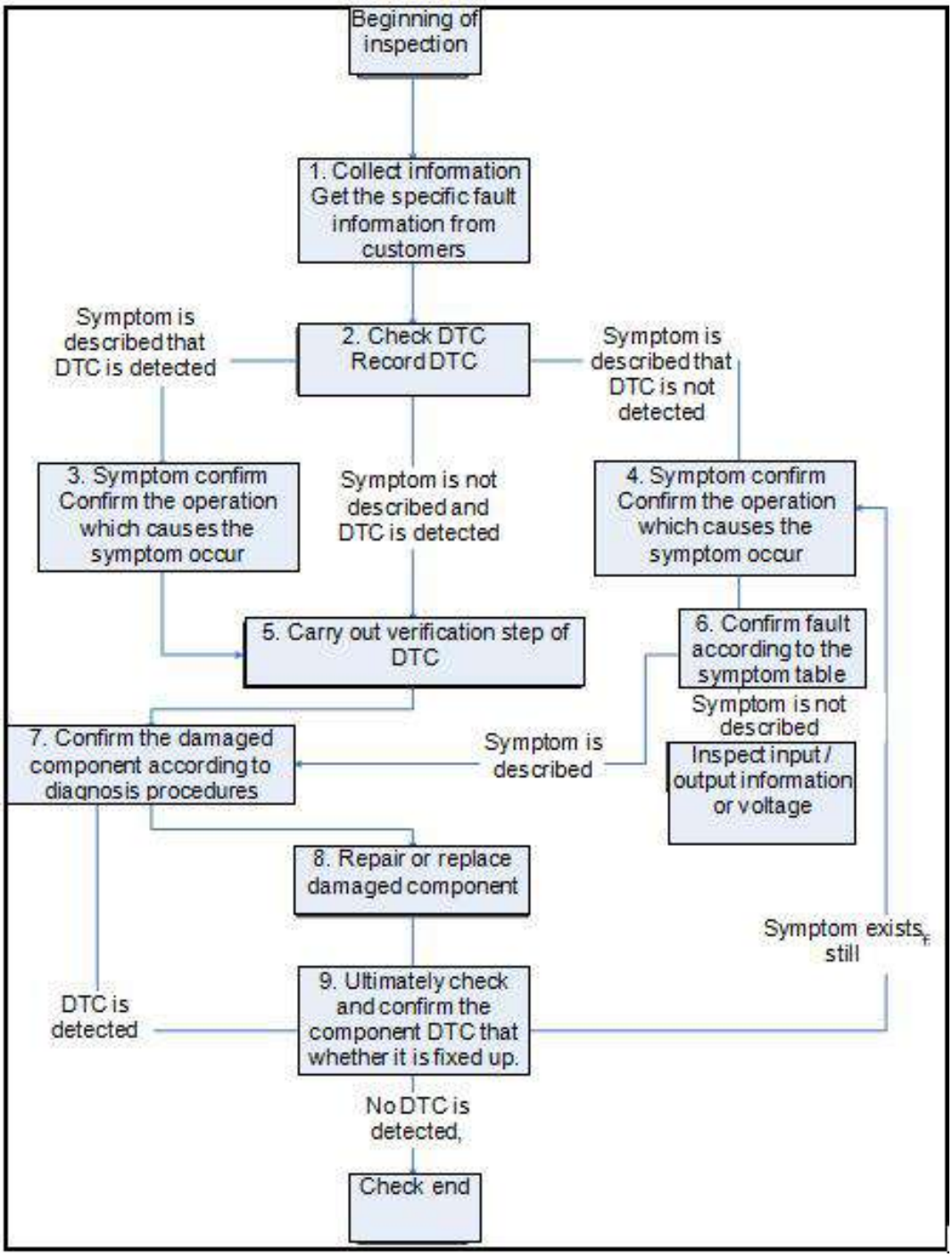
Connector number	QC1
Connector name	Connector of DC charging socket (low voltage)
Connector type	AMP174262-2

Terminal No.	Wire color	Wire diameter	Signal name
1		0.5	S+
2		0.5	S-
3		0.5	NC
4		0.5	CC2
5		0.5	A+
6		0.5	A-

Basic check

Diagnosis and preparation

Work Procedures



Procedures of diagnosis and repair

1. Obtain symptom information

Use the Diagnostic Worksheet to ask the customer for details about the symptoms (status and environment at the time of the accident / failure). (Refer to the below. "Diagnostic working list")

>> Go to step 2

2. Check the DTC of on-board charger

1.Check the DTC of on-board charger.

If DTC is detected, please carry out operations below:

-Record DTC and freeze the data

- Check the relationship between the failure reason detected by the DTC and the symptoms described by the customer.

3. Review the relevant maintenance records for more information.

Has the customer already described the symptoms and have already detected the DTC?

Fault described and DTC has been displayed. >> Go to step 3

Symptoms described, yet DTC hasn't been displayed. >> Go to step 4

No description or DTC displayed. >> Go to step 5

3. Confirm symptoms

Try to diagnose the symptoms described by the customer.

Also check the normal operation and the relevant symptoms on "safety - failure" mode list. Refer to "Safety-failure" mode list The "Diagnostic Worksheet" is helpful in verifying the failure.

Verify the relevance of symptoms and conditions that trigger the failure

>> Go to step 5

4. Confirm symptoms

Try to confirm the symptoms described by the customer.

Refer to "safety-failure" list Please refer "safety-failure" list

Verify the relevance of symptoms and conditions that trigger the failure

Yes >> Go to step 6

5. Execute the DTC confirmation step

Execute "DTC confirmation procedure" for the displayed DTC, and then confirm whether the DTC is detected again.

Note:

- If DTC hasn't been checked again, freezing data will be helpful to check failures.
- If no relevant failure check procedure is listed in maintenance manual, please check spare parts' function.

If spare parts' function is abnormal,please refer to "DTC check procedure" for details

Whether DTC is detected ?

Yes>> GO to step 7.

No >> Check according to "failure simulation test"

6.Check the system failure through the symptom table

According to the "symptom table", the fault diagnosis system is diagnosed based on the symptoms confirmed in step 2, and the method of the fault diagnosis is determined based on the possible causes and symptoms.

Has the failure been described?

Yes>> GO to step 7.

No>> Using diagnostic tools to monitor the data of relevant sensors.

7.Check the failed parts by means of the diagnostic procedure

Check the defective parts by means of the diagnostic procedure

Is there a faulty part?

Yes>> GO to step 8.

No>> Using diagnostic tools to monitor the data of relevant sensors.

8.Replace or repair the faulty part

Replace or repair the faulty part

After repair or replacement of faulty part, please connect the spare part with diagnostic system and check again.

Check DTC and clear if the DTC is detected.

>> Go to step 9.

9.Final check

When the DTC is detected in step 2, perform the "DTC confirmation step" or "Full function check" again, and then confirm that the fault has been properly repaired. If the symptoms are described by the customer, confirm the symptoms identified by referring step 3 and step 4, and check that the symptoms described by the user are not detected.

Whether DTC is detected ?

Abnormal (DTC detected) >> Go to 7

Symptoms reappear >> Go to 4

No detection >> Clear DTC before delivering vehicle to customer

Diagnostic working list

Instruction

Error information of charging system can be acquired by understanding working conditions correctly.

Generally, customer has his own judging standard on the failure. Therefore, by consulting user's description on failure or problem, technicians can understand failure better. All error information can be classified by applying diagnostic working list.

Note:

- Some conditions may cause DTC detected

Diagnostic working list

Diagnostic working list					
Customer Name		License plate number		Registration date	
		Vehicle model			
Acceptance date		VIN could be obtained from the ECU.		Mileage	Kilometer (km)

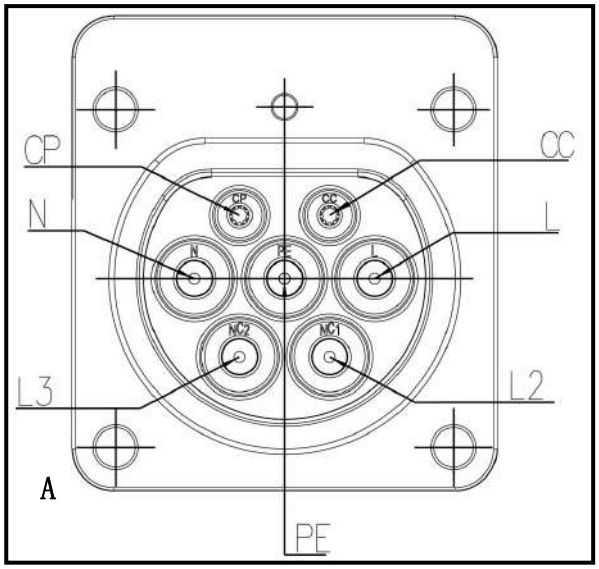
problem	group	Feedback	
Condition of vehicle failure	R / Q / N / O	Driving （R） DC charging（Q） AC charging（N） Other (O)	
Symptom	R	" READY" lamp indicator off Bad Driving Jitter Unable to travel Excessive noise Insufficient braking force Powerless acceleration High consumption Switch failure Warning light on Mode cannot be cut off Other	
		Detailed syndrome	
		Instrument indication information	
		Power consumption	km/Kw.h

		Remaining power	
	Q,N	Cannot charge Charge interrupted Slow charging Fixed-time charging unavailable Remote charging unavailable Cannot be charged immediately Other	
		Detailed syndrome	
		DC charging pile display information (if any)	
	O	A/C unavailable Poor A/C performance Battery capacity loss Other	
		Detailed syndrome	
The road condition / state when the fault occurred	R/O	Ordinary road highway mountain road bumpy road flat road uphill downhill steering other	
	Q/N/O	Charging initial charging process charging finished after setting charging time (not charging yet) Fixed-time charging process remote charging process Other	
Driving conditions	R	When the system is on When the "READY" lamp indicator on (when the vehicle is in parking) When the vehicle is running When the vehicle is accelerating Vehicle running in constant speed When the vehicle is taxing When the vehicle is braking Just before the vehicle is stopped Just after the vehicle is stopped The key is placed in the "LOCK" or pulled out When AC is on When mode change Other	
		Vehicle speed	Km
		The acceleration pedal position	
DC charging pile	Q	DC charging pile	In line with the national standard DC charging pile (ver. 2015) Not in line with the national standard DC charging pile (ver. 2015)
		Position	
		DC charging pile set	
		Other	
Household power outlet	N	In line with the national standard socket (ver. 2015) Not in line with the national standard socket (ver. 2015)	

<table>
<tr><td rowspan="4"></td><td rowspan="4"></td><td>Position</td><td></td></tr>
<tr><td>Voltage</td><td>V</td></tr>
<tr><td>Fuse current</td><td>A</td></tr>
<tr><td>Other information</td><td></td></tr>
<tr><td>Remaining power</td><td>Q/N/O</td><td colspan="2">With remaining power Without remaining power</td></tr>
<tr><td>Gears / operations</td><td>R</td><td colspan="2">D R N ECO operating method (→)</td></tr>
<tr><td rowspan="2">Environmental conditions</td><td rowspan="4">R / Q / N / O</td><td>Weather</td><td></td></tr>
<tr><td>Temperature</td><td>℃</td></tr>
<tr><td>Occurrence frequency</td><td colspan="2">Always Once Sometimes （happened for times） Other</td></tr>
<tr><td>Fault recovery condition</td><td colspan="2">After the key is in the "OFF" or pulled out Replace the 12V battery or harness Gear shift During the driving READY Other</td></tr>
<tr><td colspan="4">【Memorandum】</td></tr>
</table>

Regular Maintenance

Charging socket assembly



Check

Checking method

Eye-check on following items:

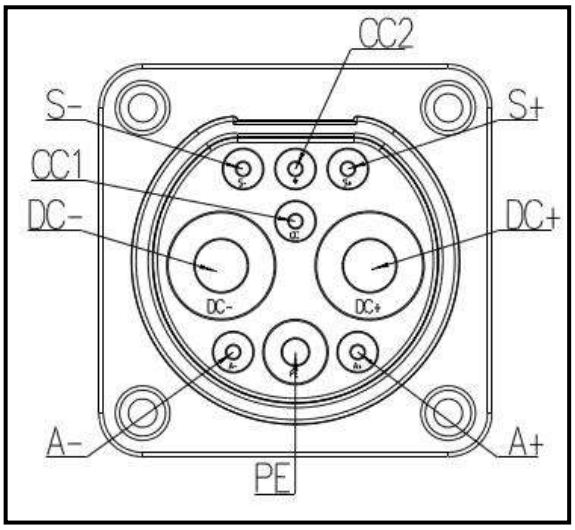
- Whether crackle exists.
- Whether dust/foreign material exists.
- Whether damage exists.
- Whether sealing ring is normal.

Note:

- Compulsory check to ensure no breakage exists on sealing ring.
- Sealing ring must be placed inside socket port.

Processing charging socket assembly

- Clean charging socket.
- Replace socket if sealing ring is broken.
- Replace socket if port cover is damaged.
- Replace socket if AC and DC charging socket is damaged,



Test socket's insulation resistance

- Disconnect the high-voltage circuit.
- Test the insulation resistance between AC charging socket (A) L, N and PE. The resistance should exceed 20MΩ

B

- Test the insulation resistance between DC charging socket (B) L, N and PE. The resistance should exceed 20MΩ

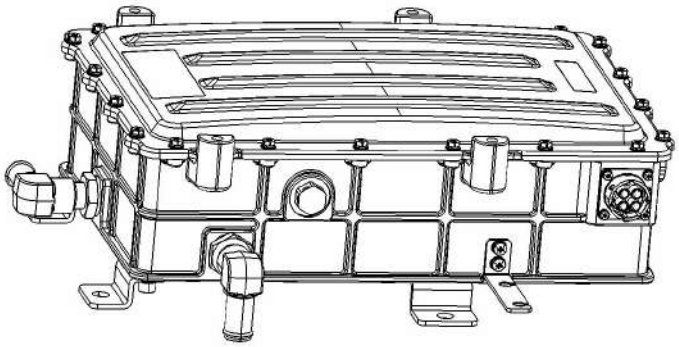
Warning:

- Please use tramegger with range exceeding 500V to test the resistance.

On-board charger

Warning:

- As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.
- Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.
- Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.
- Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.



Pre-operation

Warning:

- Cut off the high-voltage circuit and test the voltage
- Disconnect the high-voltage of power battery

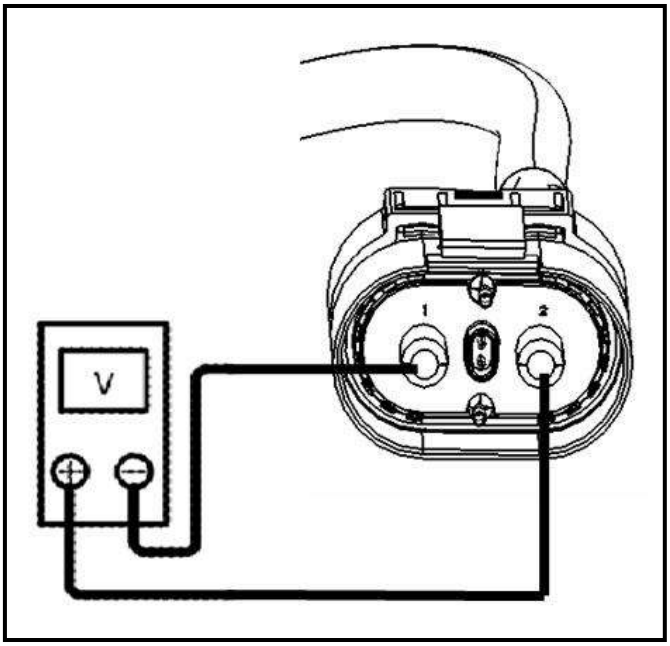
Danger:

- Electric shock may occur if touching high-voltage part without proper protection

Warning:

Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.

Standard: 5V or under 5V

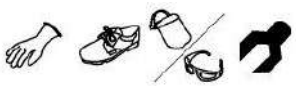


Test insulated resistance of vehicle charger

- Disconnect the high-voltage connection of vehicle charger
- Test the insultated resistance between input/output port and charger's shell. The resistance should exceed 20MΩ.

Danger:

Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.



DTC/Diagnostics on circuit

Charging connection and grounded circuit

Diagnostic Procedure

1 Check the fuse

Check if the following fuses are blown.

Fuse position	Fuse type
High voltage junction box	AC charging fuse
	DC charging fuse

Check if the fuses are blown.

Normal >>Change the fuse.

No >>go to step 2

2 Check whether vehicle charger is grounded

1. Place the key in the "LOCK".

2. Disconnect the high-voltage connector of vehicle charger

3. Check whether connection between charger's connector and ground is fluent.

+		-	Conduction
Vehicle Charger			
Connector	Pin		
CH1	C	Ground	Yes

Whether it is conducted

Yes >>go to step 3

No >>repair or replace the failed connector

3 **Test insulated resistance of vehicle charger**

1. Test insulated resistance of vehicle charger

+		-	>20MΩ (500V test)
Vehicle Charger			
Connector	Pin		

CH1	A or B	Ground	Yes
CH2	1 or 2		Yes

Check if the result is normal.

Yes >>go to step 4

No >>repair or replace the failed vehicle charger

4 Check whether AC charging socket is conducted

1. Check whether AC charging socket is conducted

+		Socket port	Whether conducted
AC charging socket			
Connector	Pin		
NC1	L	L	Yes
	N	N	
	PE	PE	
NC2	CC	CC	
	CP	CP	

Whether it is conducted ?

Yes >>go to step 5

No >>repair or replace the failed AC charging socket

5 Test the wake-up signal of vehicle charger

1. Connect vehicle charger's high-voltage connector and disconnect the low-voltage connector

2. Connect AC charging socket

3. Test the voltage between wake-up signal pin and ground

+		-	Voltage
Car Charger			
Connector	Pin		
CH3	F	Ground	12V

Check if the result is normal.

Yes >>go to step 6

No >>repair or replace the failed vehicle charger

6 Test CAN communication signal of vehicle charger

1. Connect vehicle charger's high-voltage connector and disconnect the low-voltage connector

2. Connect AC charging socket

3. Test the voltage between CANH and CANL

+		-		Voltage
Car Charger		Vehicle Charger		
Connector	Pin	Connector	Pin	
CH3	G	CH3	H	Around 0.3V

Check if the result is normal.

Yes >> Detection is finished.

No >>repair or replace the failed vehicle charger

P3301 220V AC input over-voltage

instruction

220V AC power will supply energy for vehicle charger. Unstable AC power may affect vehicle charger's performance.

DTC logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3301.	220V AC input over-voltage	Vehicle charger detects that AC current exceeds 265V acwhile charging.	● 220V AC power fluctuation ● Hardware failure on vehicle charger

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

1.Check whether 220V AC power is over-voltage

1.Check whether 220V AC power is over-voltage

Yes >> Replace vehicle charger.

No >> No failure on vehicle charger.

Confirm conditions

1. Confirm AC power is normal

2. Confirm vehicle can be charged normally

Note:

During charging, charger will cut off output if 220V AC power is over-voltage; the charger will back to normal working when AC power is restored.

P3301 220V AC input under-voltage

instruction

220V AC power will supply energy for vehicle charger. Unstable AC power may affect vehicle charger's performance.

DTC logic

DTC check logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3302.	220V AC input under-voltage	Vehicle charger detects that AC current is below 85±8V ac while charging.	● 220V AC power fluctuation ● Hardware failure on vehicle charger

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Check whether 220V AC power is under-voltage

1.Check whether 220V AC power is under-voltage.

Yes >> Replace vehicle charger.

No >> No failure on vehicle charger.

Confirm conditions

1. Confirm AC power is normal

2. Confirm vehicle can be charged normally

Note:

During charging, charger will cut off output if 220V AC power is under-voltage;

the charger will back to normal working when AC power is restored.

P3303 The on-board charger output is over-voltage

Instruction

The on-board charger has output capacity (200V~420V). If vehicle charger detects the output port's voltage exceeds its output capacity, the charger will shut down output automatically and protect its hardware.

DTC logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3303.	Vehicle charger's output is over-voltage	Vehicle charger detects that output voltage exceeds 420V	● Power battery is over-voltage ● Hardware failure on vehicle charger

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm whether power battery is over-voltage

1.Confirm whether power battery is over-voltage

Yes >> Replace vehicle charger.

No >> No failure on vehicle charger.

Confirm conditions

1. Confirm power battery is normal.

2. Confirm vehicle can be charged normally.

P3304 The on-board charger output is under-voltage

Instruction

The on-board charger has output capacity (200V~420V). If vehicle charger detects the output port's voltage is lower than its output capacity, the charger will shut down output automatically and protect its hardware.

DTC logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3304.	Vehicle charger's output is under-voltage	Vehicle charger detects that AC current is below 200V dc while charging.	● Power battery is under-voltage ● Hardware failure on vehicle charger

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Check whether power battery is over-voltage

1.Check whether power battery is under-voltage.

Yes >> Replace vehicle charger.

No >> No failure on vehicle charger.

Confirm conditions

1. Confirm power battery is normal.

2. Confirm vehicle can be charged normally

P3305 vehicle charger PFC is over-voltage

instruction

When under normal charging, vehicle charger's PFC output voltage has a certain range (330V~410V). When vehicle charger detects PFC output voltage exceeds 410V, vehicle charge will shut down output automatically and protect its hardware.

DTC logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3305.	P3305 vehicle charger PFC is over-voltage	Vehicle charger detects that PFC output voltage exceeds 410V dc	● Hardware failure on vehicle charger

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm the on-board charger DTC P3305

1.**Confirm whether the on-board charger DTC is P3305.**

Yes >> Replace vehicle charger.

No >> Diagnosis finished.

Confirm conditions

1. Confirm vehicle can be charged normally

P3306 The on-board charger PFC is under-voltage

Instruction

When under normal charging, the on-board charger PFC output voltage has a certain range (330V~410V). When vehicle charger detects PFC output voltage is lower than 330V, vehicle charge will shut down output automatically and protect its hardware.

DTC logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3306.	Vehicle charger PFC is under-voltage	Vehicle charger detects that PFC output voltage is lower than 350V dc	● Hardware failure on vehicle charger

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm the on-board charger DTC P3306

1.**Confirm whether the on-board charger DTC is P3306.**

Yes >> Replace vehicle charger.

No >> Diagnosis finished.

Confirm conditions

1. Confirm vehicle can be charged normally

P3307 The on-board charger is over-temperature

Instruction

The on-board charger normal working temperature ranges from -40℃~85℃.

The charger will shut down output if the actual temperature is out of range so as to protect its hardware.

DTC logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3307	Vehicle charger over-temperature	Vehicle charger detects that self-temperature exceeds 85℃.	● The fuel pump does not work. ● Coolant is used up. ● Hardware failure on vehicle charger

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm the on-board charger DTC P3307

1.**Confirm whether the on-board charger DTC is P3307.**

Yes >> Go to step 2.

No >> Diagnosis finished.

2.Check if the water pump works normally

1.Check if the water pump works normally.

Yes >> Go to step 3.

No >> Replace the water pump.

3. Confirm whether the coolant is used up

1.Confirm whether the coolant is used up

Yes >> Add the coolant.

No >> Replace vehicle charger

Confirm conditions

1. Confirm whether vehicle can be charged normally

P3308 On-board charger output over-current

Instruction

If output current exceeds a certain extent, vehicle charger will shut down its output so as to protect hardware.

DTC logic

DTC check logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3308	Vehicle charger output over-current	The on-board charger detects that average output current exceeds 24A within 100ms while charging	● Fluctuation of power grid ● Hardware failure on vehicle charger

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm the on-board charger DTC P3308

1.**Confirm whether the on-board charger DTC is P3308.**

Yes >> Go to step 2

No >> Diagnosis finished.

2.Confirm whether power grid is stable

2.Confirm whether power grid is stable.

Yes >> Replace vehicle charger.

No >> Replace power supply.

Confirm conditions

1. Confirm the vehicle can be charged normally

P3309 The on-board charger temperature sensor failure

Instruction

The on-board charger will transfer the temperature information to charger's controller through temperature sensor. If temperature exceeds a certain range, vehicle charger will limit power output or stop working. At the same time, the on-board charger sends the temperature information to the VCU, and the VCU controls the start and stop of the pump according to the temperature information of the on-board charger, so that the on-board charger works in an appropriate temperature range.

DTC Logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3309	Failure on charger temperature sensor	Confirm vehicle charger's DTC is P3309 while charging	● Short or open circuit exist on temperature sensor

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm the on-board charger DTC P3309

1.**Confirm whether the on-board charger DTC P3309**

Yes >> Replace vehicle charger.

No >> diagnosis finished.

Confirm conditions

1. Confirm whether vehicle can be charged normally

P330a cannot receive VCU message

instruction

Vehicle charger cannot receive VCU message before charging. Charger has no output and wake-up signal will not close, with uploading “VCU message cannot received”

DTC logic

DTC check logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P330a	VCU cannot receive messages	Charger cannot receive VCU message within 3 min even when wake-upsignal exists.	● Poor connection on connector

DTC check method

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm the on-board charger DTC P330a

1.**Confirm whether the on-board charger DTC is P330a.**

Yes >> Check whether there is poor connection on connector.

No >> diagnosis finished.

Confirm conditions

1. Confirm whether vehicle can be charged normally

P330b Abnormal VCU current order

Instruction

Vehicle charger will adjust output current according to the order from VCU if working normally. If the order from VCU has exceeded charger's output capacity, the charger will upload failure of abnormal VCU current order.

DTC logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P330b.	Abnormal order from VCU	The order of VCU current has exceeded 24A while charging	● VCU failure

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm the on-board charger DTC P330b

1.Confirm whether the on-board charger DTC is P330b

Yes >> Replace the on-board charger.

No >> Diagnosis finished.

Confirm conditions

1. Confirm vehicle can be charged normally

2. Confirm vehicle charger will not upload P330b

P330c Abnormal VCU voltage order

Instruction

Vehicle charger will adjust output voltage according to the order from VCU if working normally. If the order from VCU has exceeded charger's output capacity, the charger will upload failure of abnormal VCU voltage order.

DTC logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P330c.	Abnormal current order from VCU	The order of VCU voltage has exceeded 420V while charging	● VCU failure

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm vehicle charger DTC P330c

1.**Confirm vehicle charger DTC is P330c**

Yes >> Check VCU messages

No >> Diagnosis finished.

Confirm conditions

1. Confirm vehicle can be charged normally

2. Confirm vehicle charger will not upload P330c

P330d Abnormal resistance of CC circuit

Instruction

CC resistance is abnormal or cannot be detected while vehicle charger is working. Vehicle charger will upload failure of CC loop circuit abnormal.

DTC Logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P330d	Abnormal CC loop circuit	When the on-board charger is powered on or during normal operation, no CC resistance or abnormal CC resistance can be detected within 3 minutes	● Poor connection on CC circuit ● Failure on vehicle charger

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm the on-board vehicle charger DTC P330d

1. Confirm whether vehicle charger DTC is P330d

Yes >>go to step 2

No >> diagnosis finished.

2.confirm whether poor connection exists in CC circuit

1.confirm whether poor connection exists in CC circuit

Yes>>replace AC charging socket or plug

No >> Replace vehicle charger

Confirm conditions

1. Confirm vehicle can be charged normally

2. Confirm vehicle charger will not upload P330d

P330e CP loop circuit is abnormal

Instruction

When the on-board charger is powered on or during normal operation, the duty cycle of the CP circuit is abnormal, and the on-board charger reports an abnormal CP circuit fault.

DTC Logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P330e.	Abnormal CP loop circuit	When the car charger is powered on or during normal operation, no CP duty cycle or abnormal duty cycle can be detected within 3 minutes	● Poor connection on CC loop circuit ● Charging pile failure ● Vehicle charger failure

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm vehicle charger's DTC is P330e

1. Confirm whether vehicle charger's DTC is P330e

Yes >>go to step 2

No >> diagnosis finished.

2.Confirm whether poor connection exists in CP loop circuit

1.Confirm whether poor connection exists in CP loop circuit

Yes>>replace AC charging socket or plug

No >>go to step 3

3.Check if the charging pile works normally

1.Check if the charging pile works normally.

Yes >> Replace vehicle charger.

No >> Replace charging pile.

Confirm conditions

1. Confirm vehicle can be charged normally

2. Confirm vehicle charger will not upload P330e

P330f Electronic lock unlock failure

Instruction

The on-board charger unlocks the electronic lock according to the key unlock request signal. If the electronic lock cannot be unlocked, the on-board charger reports the electronic lock unlocking fault.

DTC Logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P330f	Electronic lock unlock failure	Electronic lock unlock error	● Circuit connection abnormal ● Electronic lock locking failure ● Vehicle charger fialure

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm vehicle charger DTC is P330f

1. Confirm whether vehicle charger DTC is P330f

Yes >>go to step 2

No >> diagnosis finished.

2.Confirm whether the low-voltage line connection is abnormal.

1.Confirm whether the low-voltage line connection is abnormal.

Yes >> Replace or repair low-voltage line.

No >> Go to step 3.

3.Confirm whether the electronic lock is abnormal

1.Confirm whether the electronic lock is abnormal.

Yes>> Replace the electronic lock.

No >> Replace vehicle charger.

Confirm conditions

1. Confirm vehicle can be charged normally

2. Confirm vehicle charger will not upload P330f.

P33010 Electronic lock locking failure

Instruction

The on-board charger is based on the key unlock request signal or the electronic lock when the power is turned on. If the electronic lock cannot be locked, the on-board charger reports the electronic lock locking fault.

DTC Logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3310	Electronic lock locking failure	Electronic lock locking error	● Circuit connection abnormal ● Electronic lock locking failure ● Vehicle charger failure

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm vehicle charger DTC P3310

1.Confirm whether the vehicle charger DTC is P3310.

Yes >> Go to step 2.

No >> Diagnosis finished.

2.Confirm whether the low-voltage line connection is abnormal.

1.Confirm whether the low-voltage line connection is abnormal.

Yes >> Replace or repair low-voltage line.

No >>go to step 3

3.Confirm whether the electronic lock is abnormal

1.Confirm whether the electronic lock is abnormal.

Yes>> Replace the electronic lock.

No >> Replace vehicle charger

Confirm conditions

1. Confirm vehicle can be charged normally

2. Confirm vehicle charger will not upload P3310.

P3311 AC charging socket over temperature

Instruction

The normal operating temperature of the AC charging socket is -40°C~100°C. The outlet exceeds this temperature range. The on-board charger will shut down the output and protect the charging socket.

DTC Logic

DTC diagnosis logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3311	AC charging socket over temperature	When charging, the on-board charger detects that the temperature of the AC charging socket exceeds 100°C.	● Low voltage circuit line abnormal ● Socket abnormal ● Vehicle charger failure

DTC Diagnostic Procedure

1.Perform DTC confirmation procedure

1.At least 10S entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1.Confirm vehicle charger DTC P3311

1.Confirm whether the vehicle charger DTC is P3311.

Yes >> Go to step 2

No >> Diagnosis finished.

2.Confirm whether the low-voltage line connection is abnormal.

1.Confirm whether the low-voltage line connection is abnormal.

Yes >> Replace or repair low-voltage line.

No >>go to step 3

3.Confirm whether the socket is abnormal

1.Confirm whether the socket is abnormal.

Yes>> Replace the socket.

No >> Replace the vehicle on-board charger.

Confirm conditions

1. Confirm whether vehicle can be charged normally

2. Confirm vehicle charger will not upload P3311.

P3312 AC charging socket temperature sensor fault

Instruction

The normal working temperature of the AC charging socket is -40°C~100°C. When the socket temperature sensor is abnormal, the on-board charging device reduces the power output.

DTC Logic

DTC check logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3312	AC charging socket temperature sensor failure	Vehicle charger DTC is P3312 while charging	● Short or open circuit exists on temperature sensor

DTC Diagnostic Procedure

1. Perform DTC confirmation procedure

1.At least 10s entering into the AC charging mode.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Faults diagnosis

1. Confirm vehicle charger DTC P3312

1.Confirm whether the on-board charger DTC is P3312.

Yes>> Replace the AC charging socket.

No >> Diagnosis finished.

Confirm conditions

1. Confirm whether vehicle can be charged normally

System diagnosis

Vehicle Charger

Symptom list

Symptom	The check items as following:	Solutions
Charging instantly, cannot be executed	No output exists in external power supply	Confirm whether output exists in external power If timing device is equipped on external power, the output power will exist only within timing range.
	Incorrect connection of charging plug	Confirm whether charging plug connects correctly
	Connector hasn't been connected properly	Confirm charging connector is connected properly
	The vehicle is in charging state	Confirm the key is on "LOCK" before charging
	AC charging and DC charging are both connected	Either AC charging or DC charging will be OK Note: AC charging and DC charging cannot proceed simultaneously
	Timing switch has been set	Press down timing switch
	Power battery is full	No Action

		Note: if power battery is full, the charging will not proceed If power battery is full, charging will stop automatically
	The battery temperature is too high	Confirm battery temperature is lower than 65℃
	12V lead-acid battery needs feed	Charging battery
	Vehicle failure	Check VCU error code

Symptom	The check items as following:	Solutions
Charging instantly, cannot be executed	No output exists in external power supply	Confirm whether output exists in external power If timing device is equipped on external power, the output power will exist only within timing range.
	Incorrect connection of charging plug	Confirm whether charging plug connects correctly
	Connector hasn't been connected properly	Confirm charging connector is connected properly

	The vehicle is in charging state	Confirm the key is on “LOCK” before charging
	AC charging and DC charging are both connected	Either AC charging or DC charging will be OK Note: AC charging and DC charging cannot proceed simultaneously
	Power battery is full	No Action Note: if power battery is full, the charging will not proceed If power battery is full, charging will stop automatically
	The battery temperature is too high	Confirm battery temperature is lower than 65℃
	12V lead-acid battery needs feed	Charging battery
	Vehicle failure	Check VCU error code
	The set start-charging time is later than finish-charging time	Set correct time for start-charging and finish-charging
	The set start-charging time is earlier than current time	Set start-charging time later than current time
	The set finish-charging time is earlier than current time	Set finish-charging time later than current time
	Error date and time on	Confirm the date and

	timer	time on timer are correct
	Fixed-time charging hasn't been set	Set fixed-time charging

Symptom	The check items as following:	Solutions
Remote charging cannot be executed	No output exists in external power supply	Confirm whether output exists in external power If timing device is equipped on external power, the output power will exist only within timing range.
	Incorrect connection of charging plug	Confirm whether charging plug connects correctly
	Connector hasn't been connected properly	Confirm charging connector is connected properly
	The vehicle is in charging state	Confirm the key is on "LOCK" before charging
	Power battery is full	No Action Note: if power battery is full, the charging will not proceed If power battery is full, charging will stop automatically
	Power battery temperature too high	Confirm battery temperature is lower

		than 65℃
	12V lead-acid battery needs feed	Charging battery
	Vehicle failure	Check VCU error code
	Vehicle cannot receive charging signal	Confirm phone signal exists at your current position Confirm phone signal exists at vehicle's position

Symptom	The check items as following:	Solutions
Charging interrupted	No output from external power	Confirm whether output exists in external power Confirm the breaker is closed If timing device is equipped on external power, the output power will exist only within timing range.
	Finish-charging time is up	Proceed normal charging Note: when timing charging is set, the charging will stop when finish time is up, even the battery hasn't been fully charged.

	Power battery temperature too high	Confirm battery temperature is lower than 65℃
	Vehicle failure	Check VCU error code
DC charging cannot be executed	Connector hasn't been connected properly	Confirm mcharging connector is connected properly
	The vehicle is in charging state	Confirm the key is on "LOCK" before charging
	Power battery temperature too high	Confirm battery temperature is lower than 65℃
	Power battery is full	No Action Note: if power battery is full, the charging will not proceed If power battery is full, charging will stop automatically
	12V lead-acid battery needs feed	Charging battery
	Vehicle failure	Check VCU error code

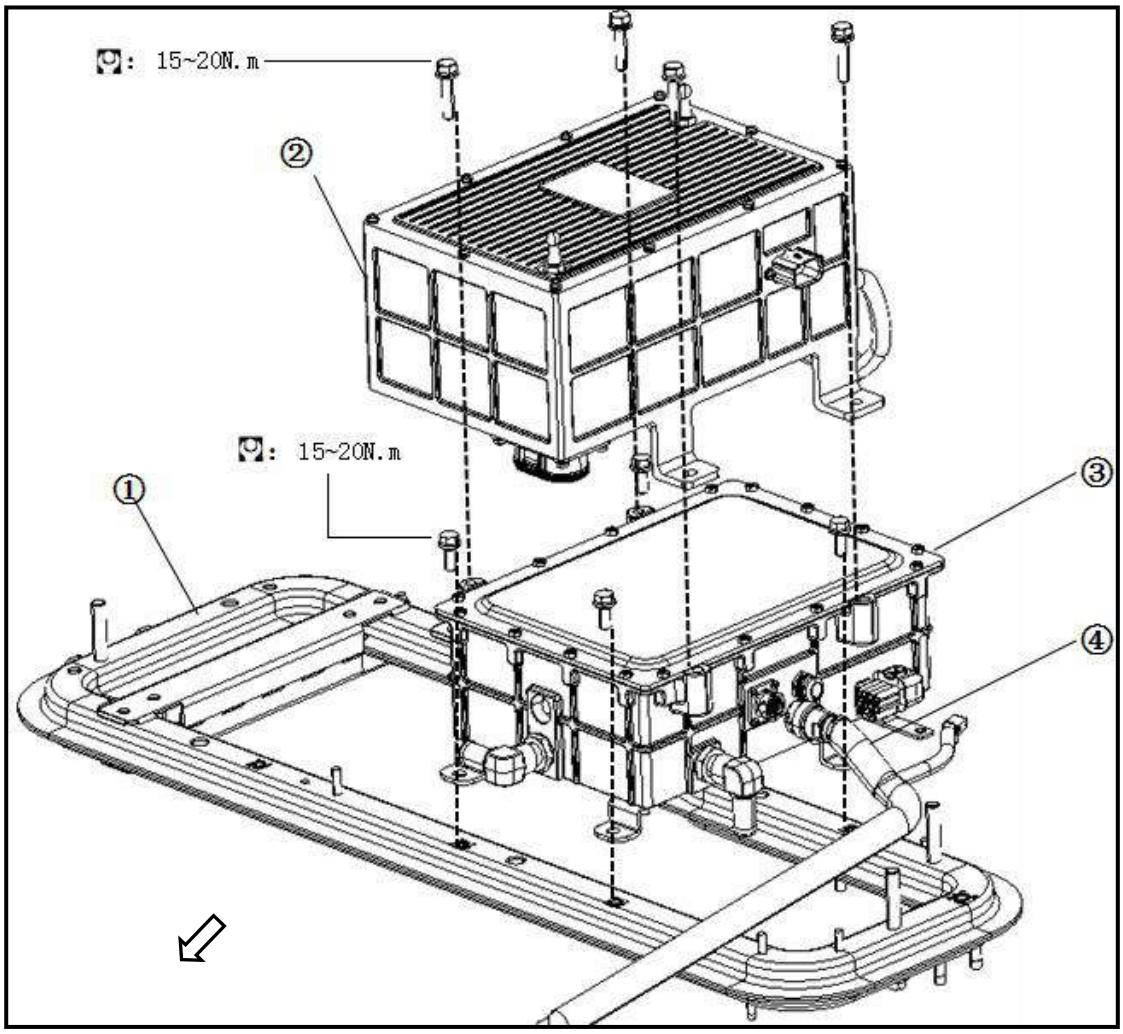
Symptom	The check items as following:	Solutions
DC charging interrupted	AC charging and DC charging are both connected	Either AC charging or DC charging will be OK Note: AC charging and DC charging cannot proceed simultaneously

	Power battery temperature too high	Confirm battery temperature is lower than 65℃
	Vehicle failure	Check VCU error code

Disassembly and installment

On-board charger

Exploded view



: The front of the vehicle

: N·m

1.Power assembly joist 2.High-voltage terminal box 3.Vehicle charger4.AC charging socket assembly

Disassembly and assembly of vehicle charger

Warning:

- **Electric vehicles contain a high voltage battery, There is a risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to**

follow the correct work procedures when performing inspection and maintenance.

- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress. Before operations on high-voltage system, be sure to wear insulation protection equipment, including gloves, shoes and glasses.
- Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.
- When the maintenance switch is disconnected, the key is forbidden to turn to "ON" or "START".

Disassembly

Warning:

Before operating high-voltage system Refer to "Overview - How to disconnect high voltage".

⇦: The front of the vehicle

Warning:

Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.

Charger's disassembly procedures are as follow:

1. Check the high voltage circuit voltage.

① Disconnect all high-voltage harness connectors around the high-voltage junction box.

Warning:

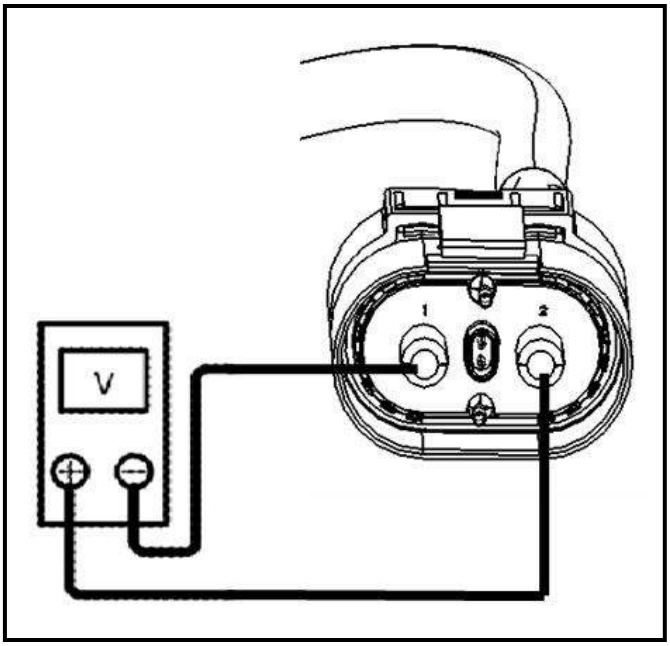
Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.

② test the voltage between high-voltage connector's pins

Warning:

Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.

Standard: 5V or under 5V



Attention：

Please use multimeter with measuring range exceeding 500V while testing voltage

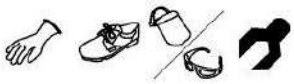
2. For disassembly of high-voltage junction box, please refer to "Disassembly and assembly of high-voltage junction box"

3. Drain the coolant inside the radiator. Refer to the "Cooling System" in chassis maintenance.

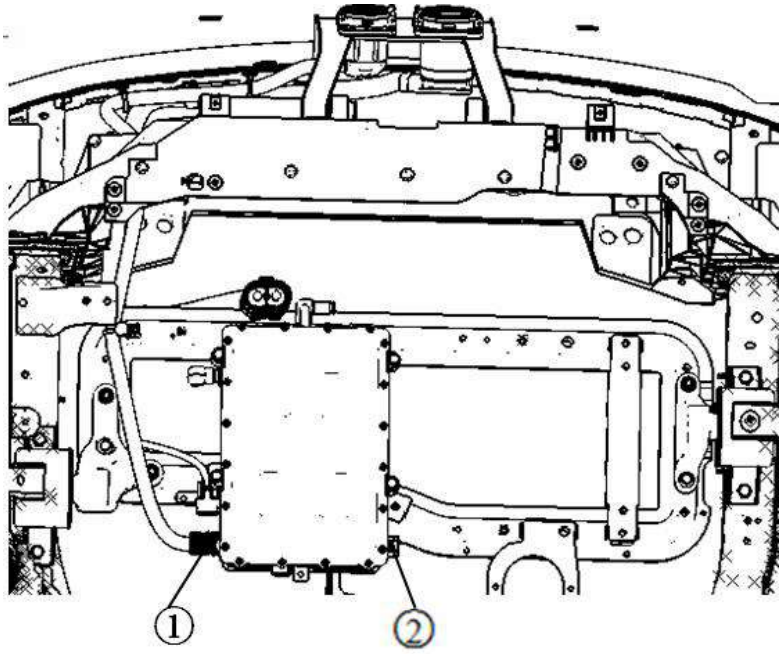
4. Remove the cooling water pipe from the on-board charger. Refer to the "Cooling System" in chassis.

Warning:

Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.



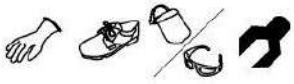
5. Disconnect the high-voltage cable input connector ① and output connector ② of the car charger. Rotate the connector housing counterclockwise to release the plug and socket. Pull the plug horizontally out of the socket.



⇦ : The front of the vehicle

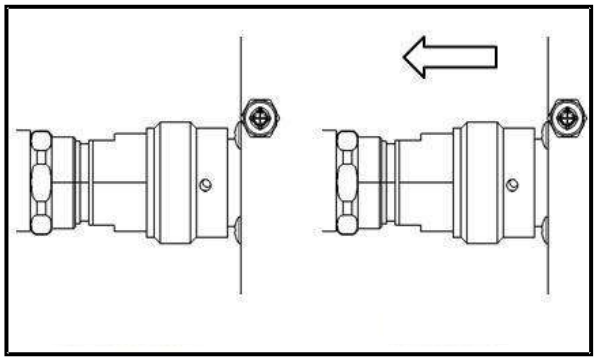
Warning:

 Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.

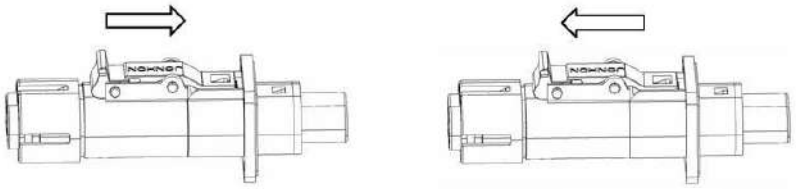


After unplugging the connector, wrap it with insulating tape to prevent the connector pins from being exposed.

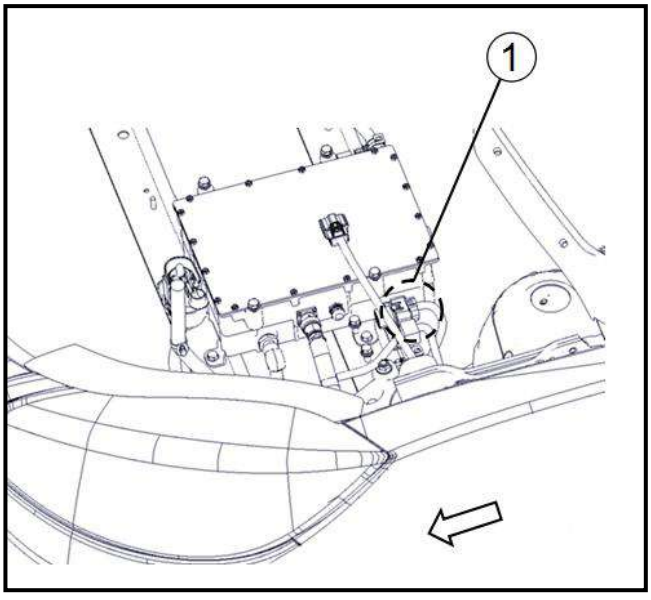
- Unplug high-voltage input connector by following procedures marked in picture below



- Unplug high-voltage output connector by following procedures marked in picture below

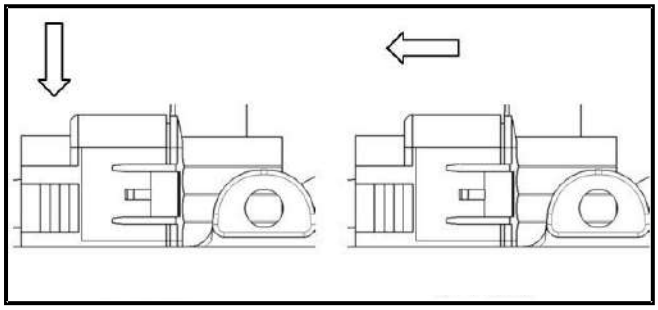


6. Disconnect low-voltage harness connector①, press snap joint, loosen socket and plug, then pull out plug from socket.



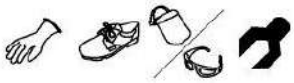
⇦: The front of the vehicle

- Unplug low-voltage harness connector by following procedures marked in picture below

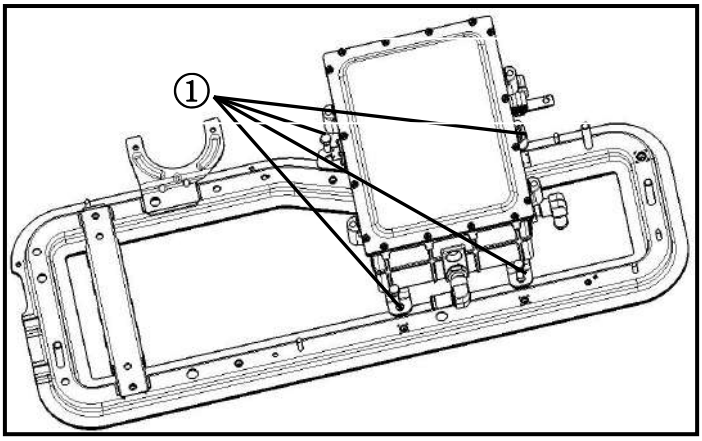


Warning:

Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.

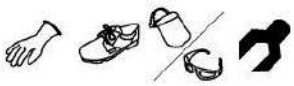


7. Disassemble fixing bolt① of vehicle charger

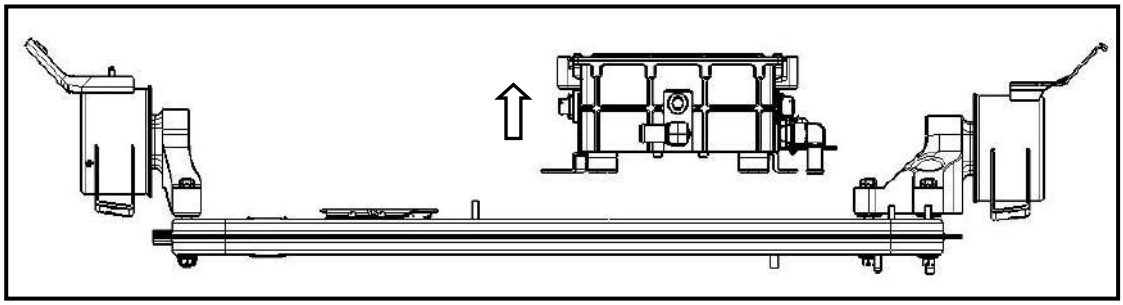


Warning:

Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.

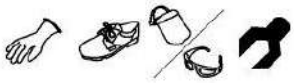


8. Remove vehicle charger from power assembly joist



Warning:

Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.

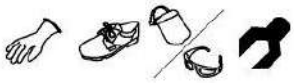


assembly

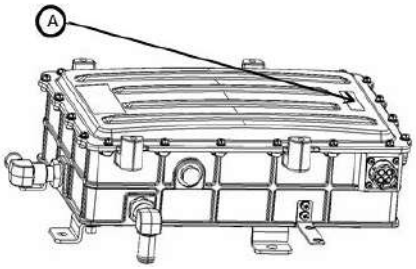
Assembly procedure is opposite to disassembly procedures

Warning:

Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.



After replacing charger, please check whether the mark (A) is on original position.



check

Test after assembly

When the installation of the on-board charger assembly is finished,test the resistance of

charger and ground. Ensure the charger's functions are normal.

Warning:

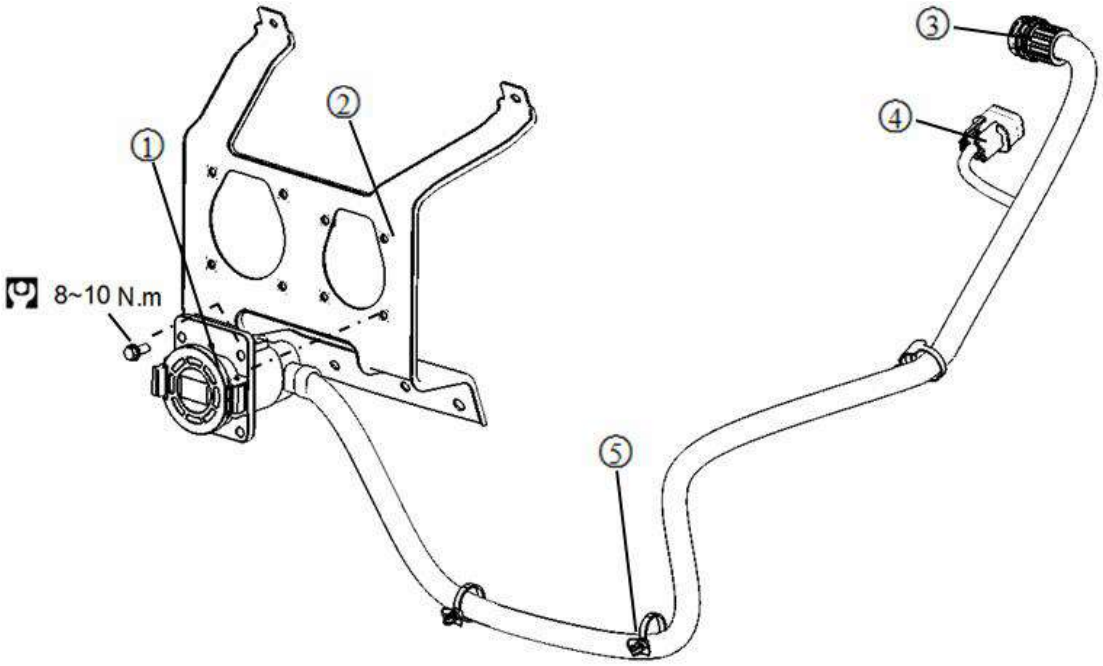
 Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.

The resistance between charger and ground: 0.1Ω

If the result cannot match the standard, please check whether damage, oil stain, or whether stains and other conducting material exist on bolts Clean all foreign materials on vehicle charger if any

AC charging socket assembly

Exploded view



1. AC charging socket 2. Charging socket support 3. High-voltage connector
4. Low-voltage connector 5. Fixing strip

: N·m

Disassembly and assemblyof AC charging socket

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**

- **Make sure that other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**

Attention：

When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".

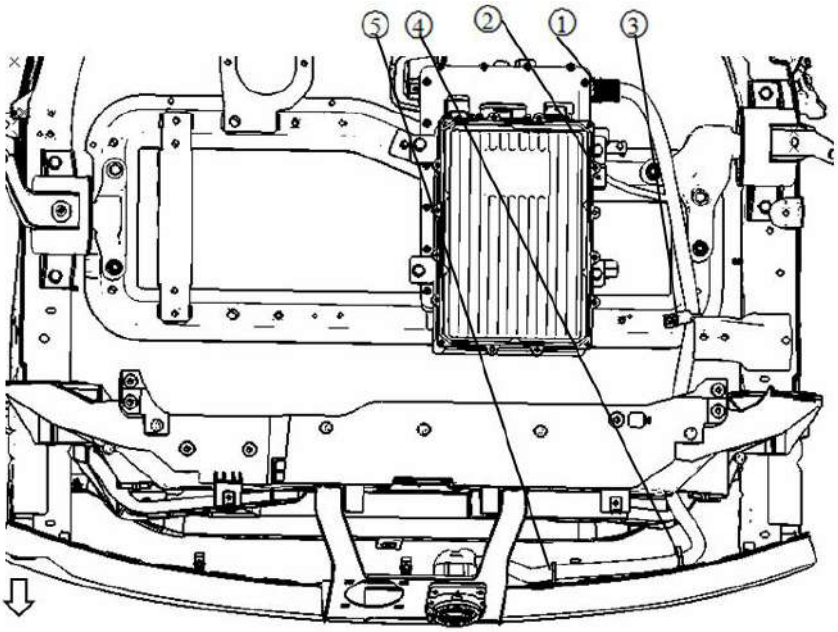
Disassembly

Warning:

Before operating high-voltage system Refer to "Overview - How to disconnect high voltage".

1 Please refer to “disassembly and assembly of front bumper” in vehicle body chapter for disassembling the front bumper.

2 Pull out the high-voltage cable connector 1 and the low-voltage connector 2.



⇦ ： The front of vehicle

3 Remove the fixing straps 3, 4, and 5.

4 Disassemble fixing bolt of AC charging socket.

Warning:

Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.

assembly

Assembly procedures of AC charging socket is opposite to disassembly procedures

confirmation

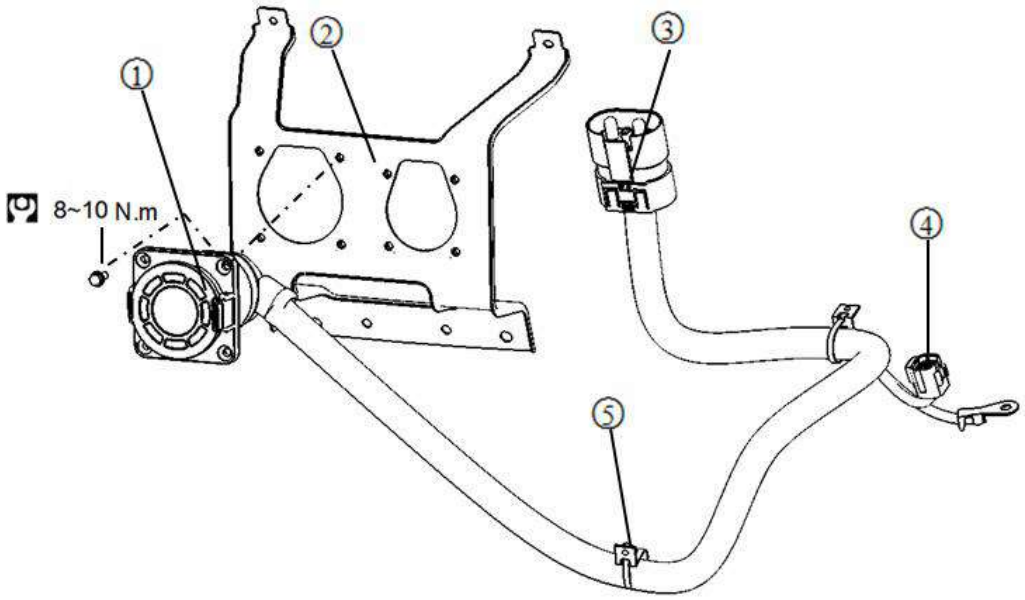
After assembly of AC charging socket finished, please check whether charging can proceed normally

Danger:

Make sure to wear protective equipments before disassembly so as to prevent potential damage during disassembly and assembly. 

DC charging socket assembly

Exploded view



1. AC charging socket2. Charging socket support 3. High-voltage connector

4. Low-voltage connector 5. Fixing strip

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**

Disassembly and assembly of DC charging socket

Warning:

Refer to "Overview - How to disconnect high voltage".

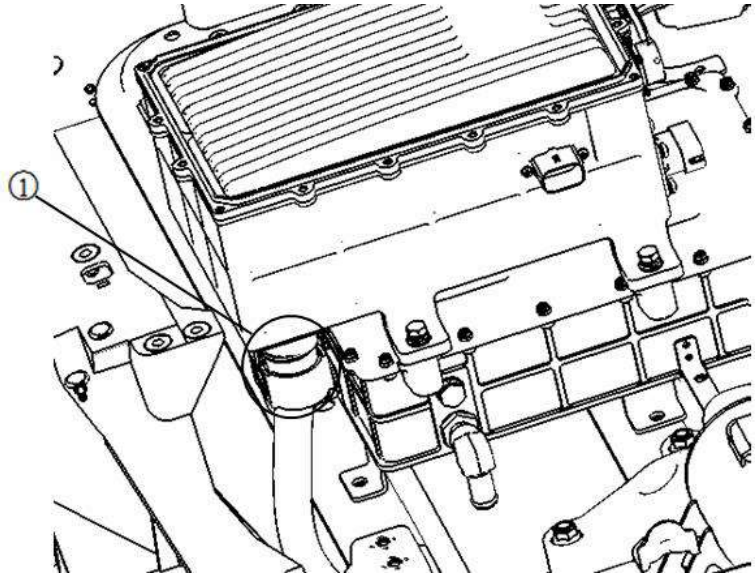
Disassembly

1. After lifting up vehicle, disassemble power battery assembly. Please refer to "disassembly of power battery" for details

Warning:

To prevent hazards during disassembly, please be sure to wear protective equipments.

2. Pull out high-voltage connector①.

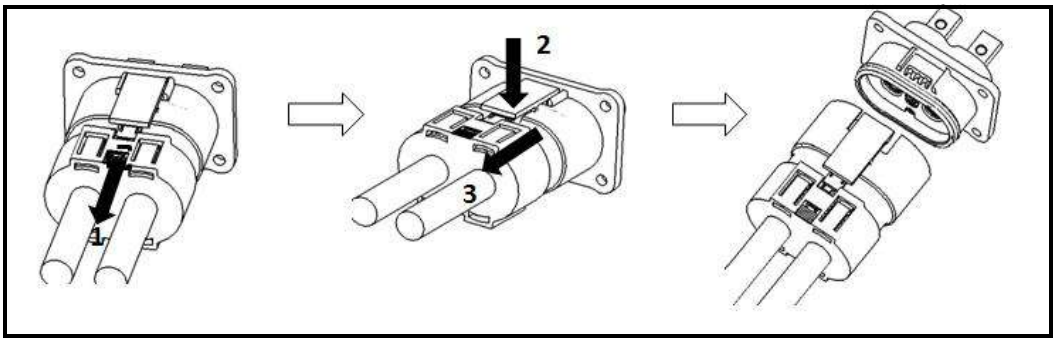


⇦ : vehicle front

Warning:

To prevent hazards during disassembly, please be sure to wear protective equipments.

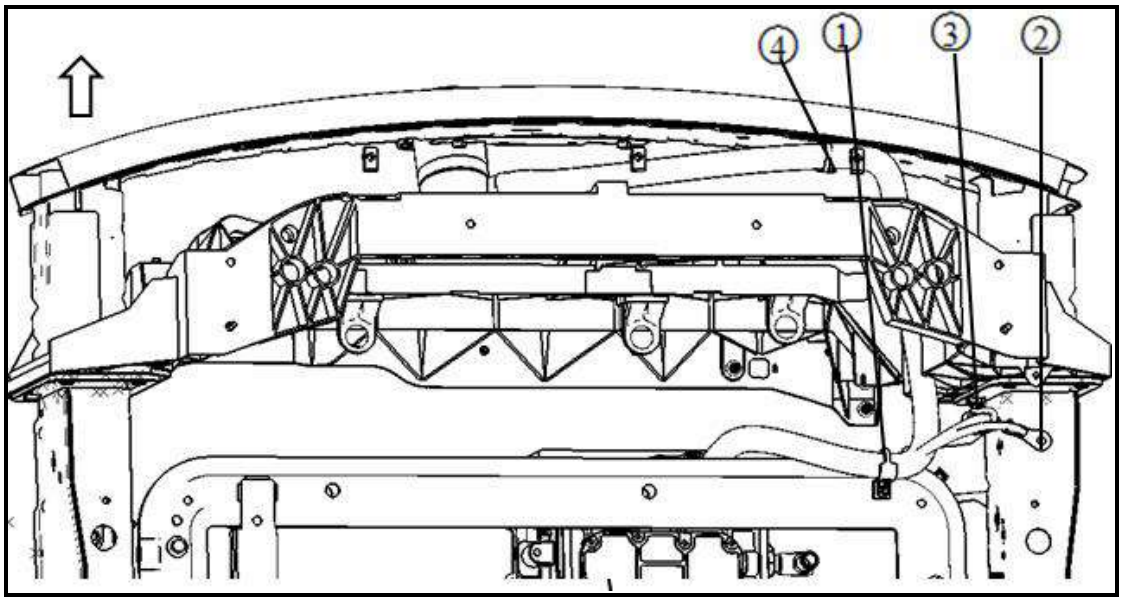
Pull out the high voltage cable connector according to the following steps



Warning:

To prevent hazards during disassembly, please be sure to wear protective equipments.

3. Remove the DC charging socket assembly strip 1, then remove the ground bolt 2, then pull out the 6-pin low-voltage plug, and finally remove the strip 4.

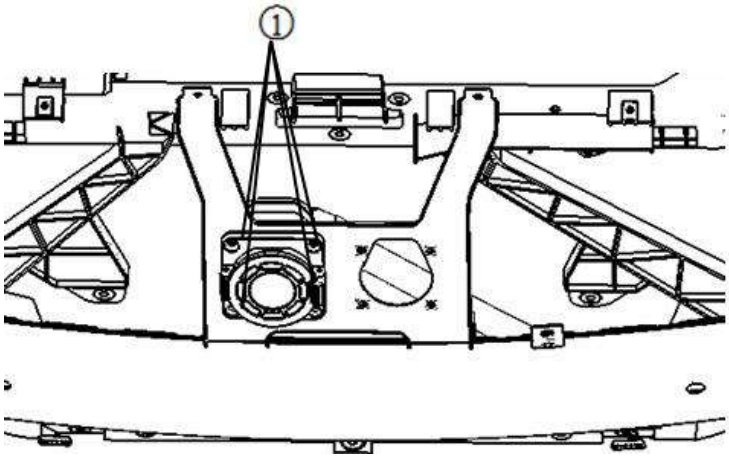


⇦ The front of the vehicle

Warning:

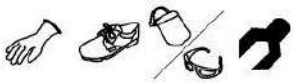
To prevent hazards during disassembly, please be sure to wear protective equipments.

Remove the DC charging socket assembly fixing bolt ① and pull out the DC charging cable.



Warning:

Ensure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.



Installation

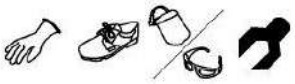
Assembly procedures of DC charging socket is opposite to disassembly procedures

Confirmation

After assembly of DC charging socket finished, please check whether charging can proceed normally

Danger:

Make sure to wear protective equipments before disassembly so as to prevent potential damage during disassembly.



Battery Cooling System

Safety precaution

Preventive measure for the electrical technicians who use medical electronic devices

Prohibitions

Warning:

● The vehicle has components with strong magnetic.

● If the technician needs to use medical electronic devices, for example, the automatic electronic defibrillator, then he can not operate in the vehicle, otherwise, the function of the device may be effected by the strong magnetic components.

Regular Charge Precaution

Warning:

● If the technician uses medical devices such as cardiac pacemaker, cardiovertor, cardiac defibrillator, etc., the function of the devices must be checked before starting a normal operation.

● In a regular charging operation, electronic medical devices may be effected by the electromagnetic waves. Technicians using a medical device, such as cardiac pacemaker, cardiovertor, cardiac defibrillator , etc., should not enter the passenger cabin(including baggage cabin).

Communication equipment operation precautions

● Technicians using a electronic medical device, such as cardiac pacemaker, cardiovertor, cardiac defibrillator, etc, should keep a safe distance from the communication equipment.

● The electromagnetic wave of the remote intelligent terminal may effect the function of medical electronic devices such as cardiac pacemaker,cardioverter, cardiac defibrillator, , etc.

●The electromagnetic wave of the remote intelligent terminal may effect the function of devices when technicians using a electronic medical device, such as cardiac pacemaker, cardiovertor, cardiac defibrillator, etc. The possible effect of remote intelligent terminal on electronic medical device must be inspected by the

manufacture of the electronic medical device .

Key points inspection before maintenance

The high-voltage system may automatically operate. Please confirm the remote air conditioning and fixed-time charging haven't been set before the maintenance.

Attention：

● If the remote air conditioning and fixed time charging have been set, the high pressure system will automatically operate even if the switch is in closed state.

Precautions concerning the auxiliary restraint system "airbag" and "seat belt pretension"

Auxiliary restraint system "airbag" and "seat belt pretension" can be used together with the front seat safety belt which can reduce the hurt on the driver and front row passenger in a collision Auxiliary restraint system includes safety belt and airbags for driver and co-driver. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

Warning:

In order to avoid accidents, please obey the following instructions:

In order to avoid failure of the auxiliary restraint system which may increase the possibility of casualty in an collision All the reparation can only be operated by the DR authorized distributors.

Nonstandard reparation of the auxiliary restraint system, including nonstandard disassembly and assembly, may accidentally activate the auxiliary restraint system and cause personal injury. Disassembly of the airbag module refers to the chapter of "airbag system".

● Do not use any electrical test devices to test any circuit of the auxiliary restraint system except operations described in the service manual. The wire harness and connectors of the auxiliary restraint system should use yellow color or orange color.

Precautions when using power tools (air or electric) and hammers.

● When the power switch is at ON position, do not use power tools or the hammer to

operate on the sensor accessory areas which are close to the airbag diagnose sensor and other sensors of the airbag system. Violent vibrations may activate these sensors, ignite the airbag and cause serious damage.

● When using a power tool or a hammer, rotate the key to LOCK gear, plug off the negative terminal of the 12V lead-acid storage battery, wait for at least one minute, then start the maintenance.

Precaution for Removing 12V Battery

When removing the 12V battery, turn the power switch to “ON” at first, and then to “OFF”.

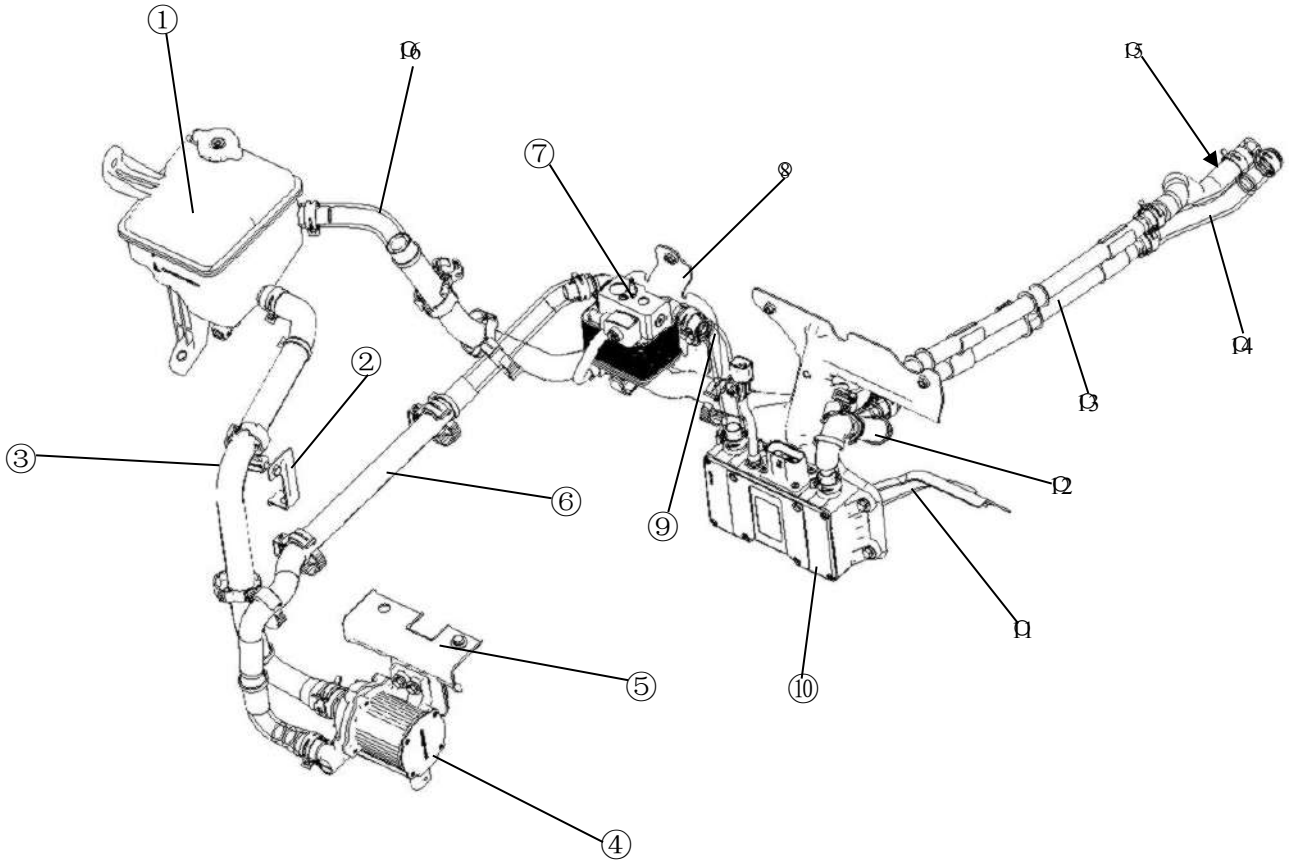
Note:

● Even if the key is at the “LOCK” gear, the automatically charging function of 12V battery may still launch.

● After the key rotates from “ON” to “LOCK”, the the automatically charging function of 12V battery can not launch.

System description

Components layout



1 Expansion kettle 2 Inlet tube bracket of battery water pump 3 Inlet tube of battery pump

4 Cooling water pump 5 Electronic water pump bracket 6 Outlet tube of battery pump

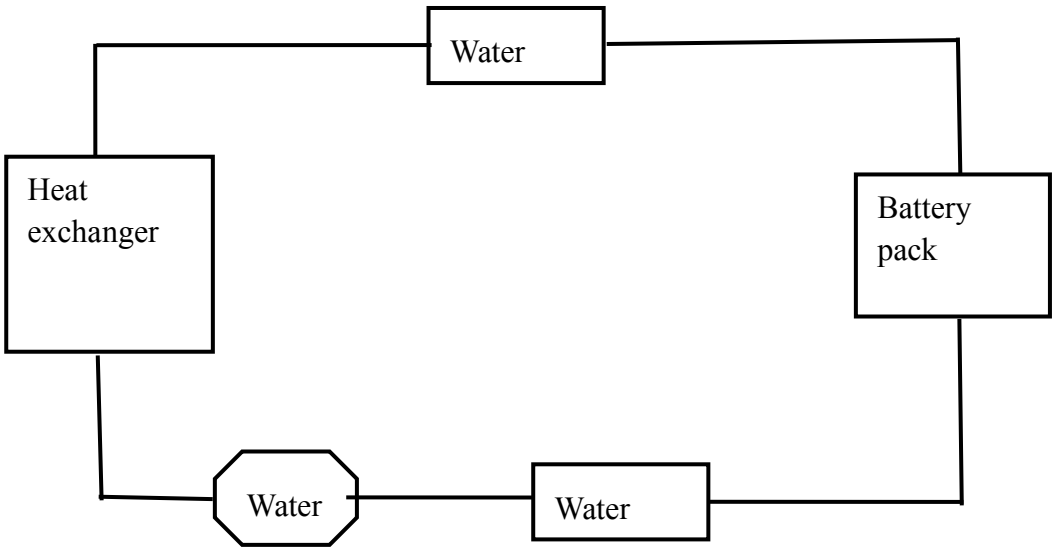
7 Battery cooler 8 Bracket of battery cooler 9 outlet tube of battery cooler

10 Water heater 11 Bracket of water heater 12 Outlet tube of water heater

13 Aluminum connecting tube 14. Water inlet pipe of battery 15. Water outlet pipe of battery

16. Inlet tube of expansion kettle

System principle



Basic inspection

1 Check whether the coolant is filled up. If not ,please fill up. Please refer to the chapter “maintenance-cooling system”.

Warning:

Do not open the filling port of the expansion kettle assembly when the temperature of the coolant is very high in case of hurt caused by spilt coolant.

2 Start the cooling pump and touch the shell of the pump to check whether there is continuous vibration. If not, please repair or replace it.

Malfunction Diagnosis

Analysis of overheating or undercooling

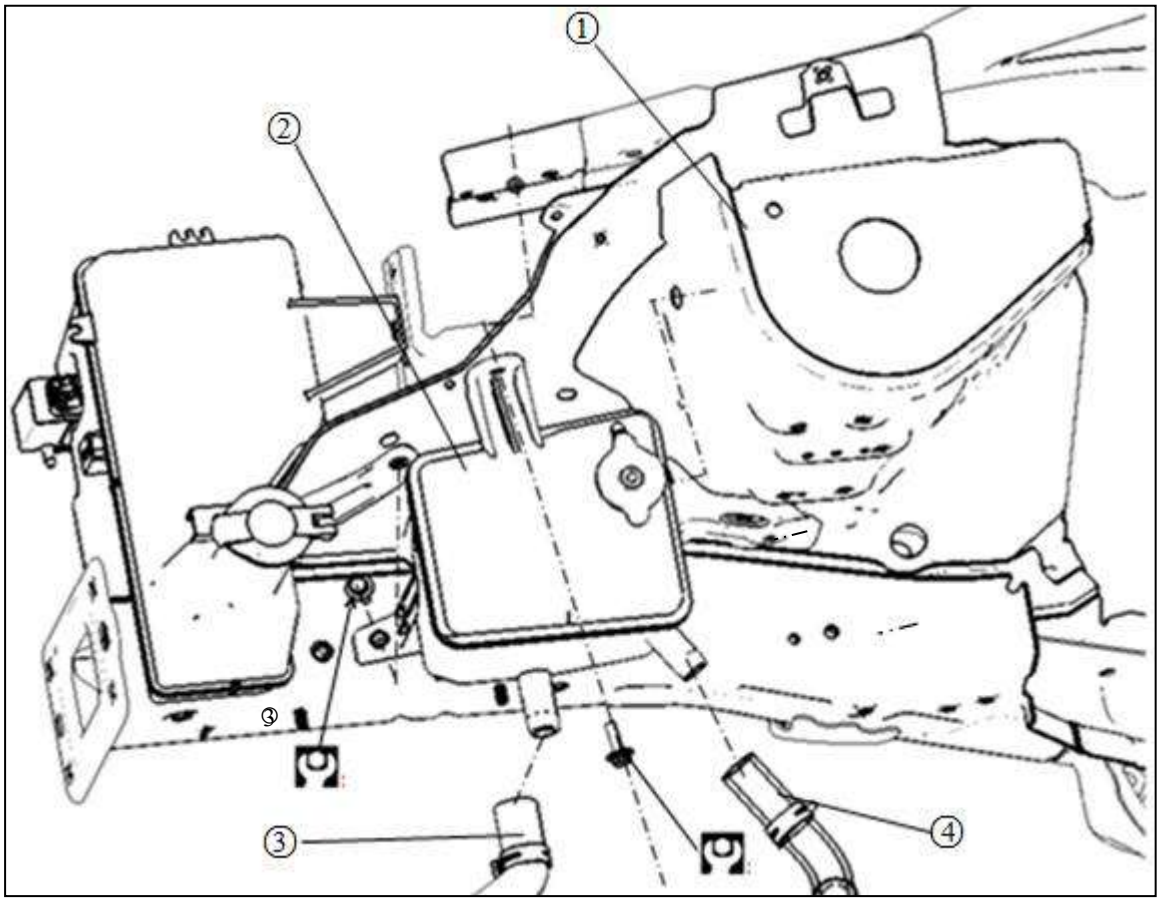
	Symptom		Inspection items	
Cooling system components failure	Bad cooling	Water pump failure	Cooling water pump breakdown	
			Power supply of cooling water pump	
		Battery cooler breakdown	Dust or paper jammed	
			Mechanical damage	

		Cooling pipe plug	Excessive foreign matter (rust, dirt, sand, etc.)	
	Bad cooling	Water pump failure	Cooling water pump breakdown	
			Power supply of cooling water pump	
		Water heater failure	Water heater breakdown	
			Power supply of water heater	
	Incorrect coolant type			
	Inferior coolant		Viscous coolant	
	Insufficient coolant	Coolant leakage	Coolant hose	**Clamps loose**
				Hose ruptured
			Cooling water pump	Poor sealing
			Expansion kettle	Expansion kettle is damaged
			Water heater	Water heater breakdown
			Battery cooler	Battery cooler breakdown

Disassembly and assembly

Expansion kettle

Explosive view



1 Right carling in the engine compartment 2 Expansion kettle 3 Inlet tube of battery pump 4 Inlet tube of expansion kettle

: N·m

Disassembly and assembly

Disassembly

Warning:

Do not remove the expansion kettle lid soon after pulling up in case of serious scald caused by high temperature coolant split out from the filling port of the expansion kettle.

1.Empty coolant Please refer to the chapter “maintenance-cooling system”.

Note：

Operate when power battery temperature is low.

2 Unplug the connector of the expansion kettle.

Attention：

- Please keep from being scratched on hands when unplugging the connector.
- **Keep the connector from spilt coolant . If there are coolant on the connector, wipe clean immediately.**

3. Disassemble the inlet tube of battery pump and inlet tube of expansion kettle.

4. Disassemble the bolts of the expansion kettle, take down the expansion kettle.

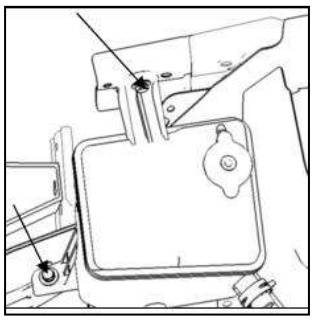
● Tightening torque:7~11N·m

Attention：

Keep the cooling pump from falling down or violent impact.

Otherwise, please replace it.

Disassemble the bolts of the cooling pump and detach the pump and the bracket.



● Tightening torque:7～11N·m

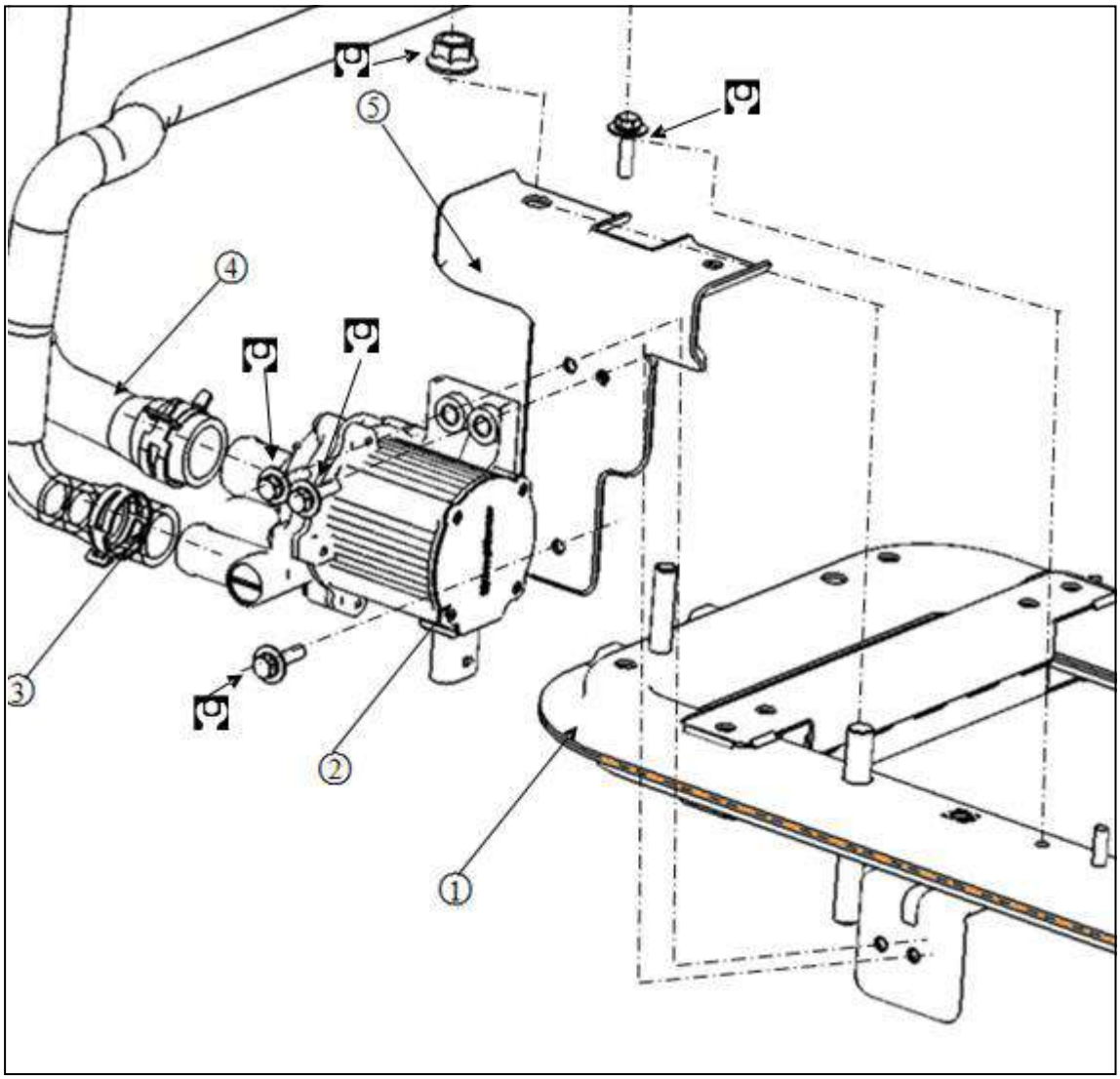
Assembly

Install in the reverse order of the disassemble procedures .

Please hold the cooling pump steadily with a hand when installing the outlet tube of the battery water pump and outlet tube of the battery cooler

Electronic coolant pump

Explosive view



1 Power assembly joist 2 Cooling pump 3 Inlet tube of battery water pump 4 outlet tube of battery water pump

5 Electronic water pump bracket

: N·m

Disassembly and assembly

Disassembly

Warning:

Do not remove the expansion kettle lid soon after pulling up in case of serious scald caused by high temperature coolant split out from the filling port of the expansion kettle.

1.Emptying coolant Please refer to the chapter “maintenance-cooling system”.

Note：

Operate when power battery temperature is low.

2 Unplug the connector of the cooling pump.

Attention：

- **Please keep from being scratched on hands when unplugging the connector.**
- **Keep the connector and high voltage components from spilt coolant . If there are coolant on the connector, wipe it clean immediately.**

3 Disassemble the inlet and outlet tube of battery pump.

Disassemble the bolts and nuts of the cooling pump bracket and detach the pump and the electronic water pump bracket.

Tightening torque of nuts:85-90 N·m ,Tightening torque of bolts:7-11 N·m.

Attention：

Keep the cooling pump from falling down or violent impact. **Otherwise, please replace it.**

Disassemble the bolts of the cooling pump and detach the pump and the bracket.

● Tightening torque:7～11N·m

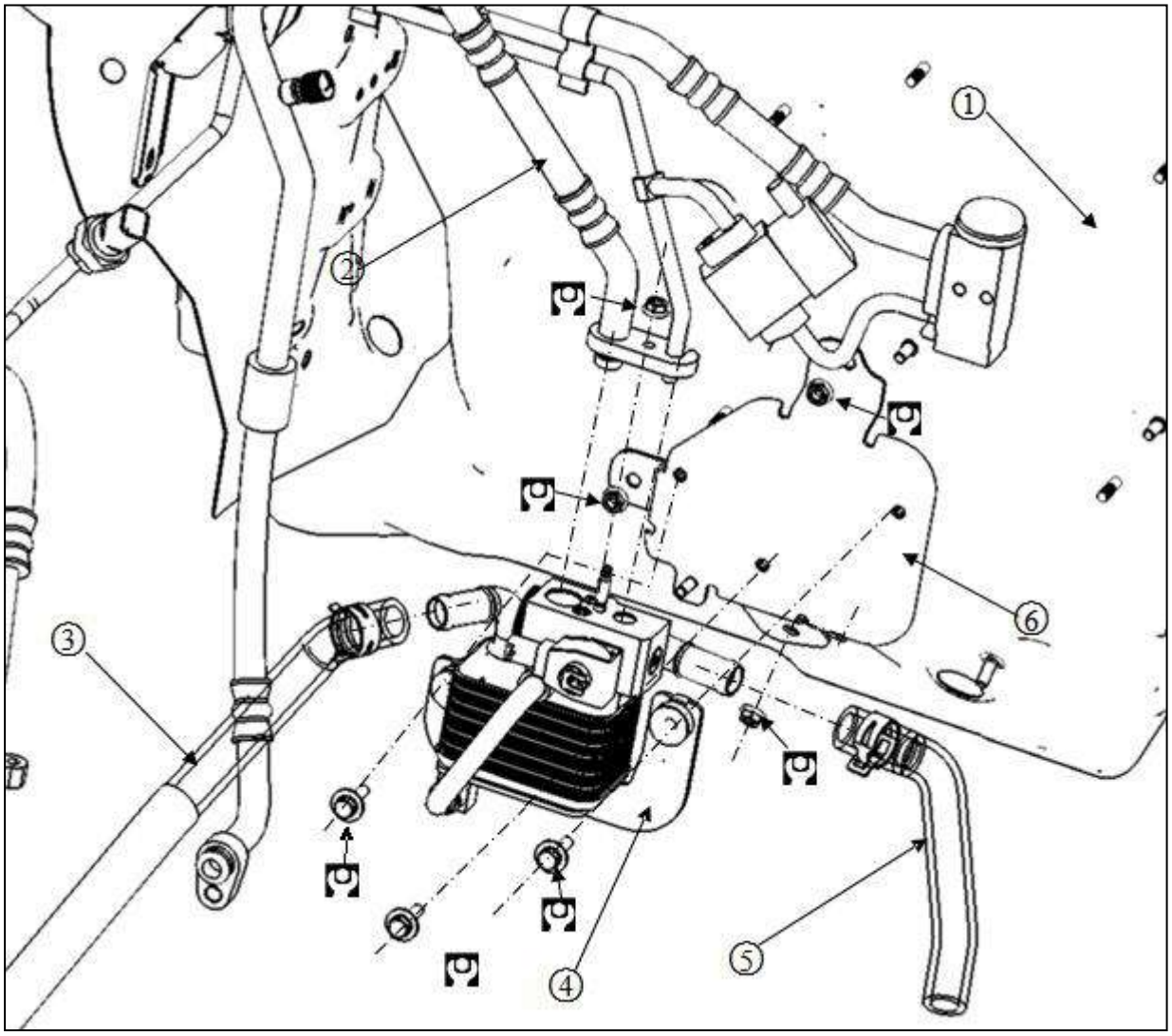
Assembly

Note：

Please hold the cooling pump steadily with a hand when installing the inlet and outlet tube of the cooling pump .

Battery cooler

Explosive view



1 Front board assembly 2 pipeline and expansion valve assembly 3 outlet tube of battery water pump 4 battery cooler

5 outlet tube of battery cooler 6 battery cooler bracket

: N·m

Disassembly and assembly

Disassembly

Warning:

Do not remove the expansion kettle lid soon after pulling up in case of serious scald caused by high temperature coolant split out from the filling port of the expansion kettle.

1.Emptying coolant Please refer to the chapter “maintenance-cooling system”.

Note：

Operate when power battery temperature is low.

2 Unplug the connector of the cooling pump.

Attention：

- **Please keep from being scratched on hands when unplugging the connector.**
- **Keep the connector and high voltage components from spilt coolant . If there are coolant on the connector and high voltage components, wipe it off immediately.**

3 Disassemble the outlet tube of battery water pump and outlet tube of battery cooler

4 Disassemble the nuts of the battery cooler bracket and take off the battery cooler and the bracket.

Tightening torque of nuts:7-11 N·m ,Tightening torque of bolts:7-11 N·m.

Attention：

Keep the cooling pump from falling down or violent impact. **Otherwise, please replace it.**

Disassemble the bolts of the battery cooler bracket and detach the battery cooler and the bracket.

- Tightening torque:7～11N·m

Assembly

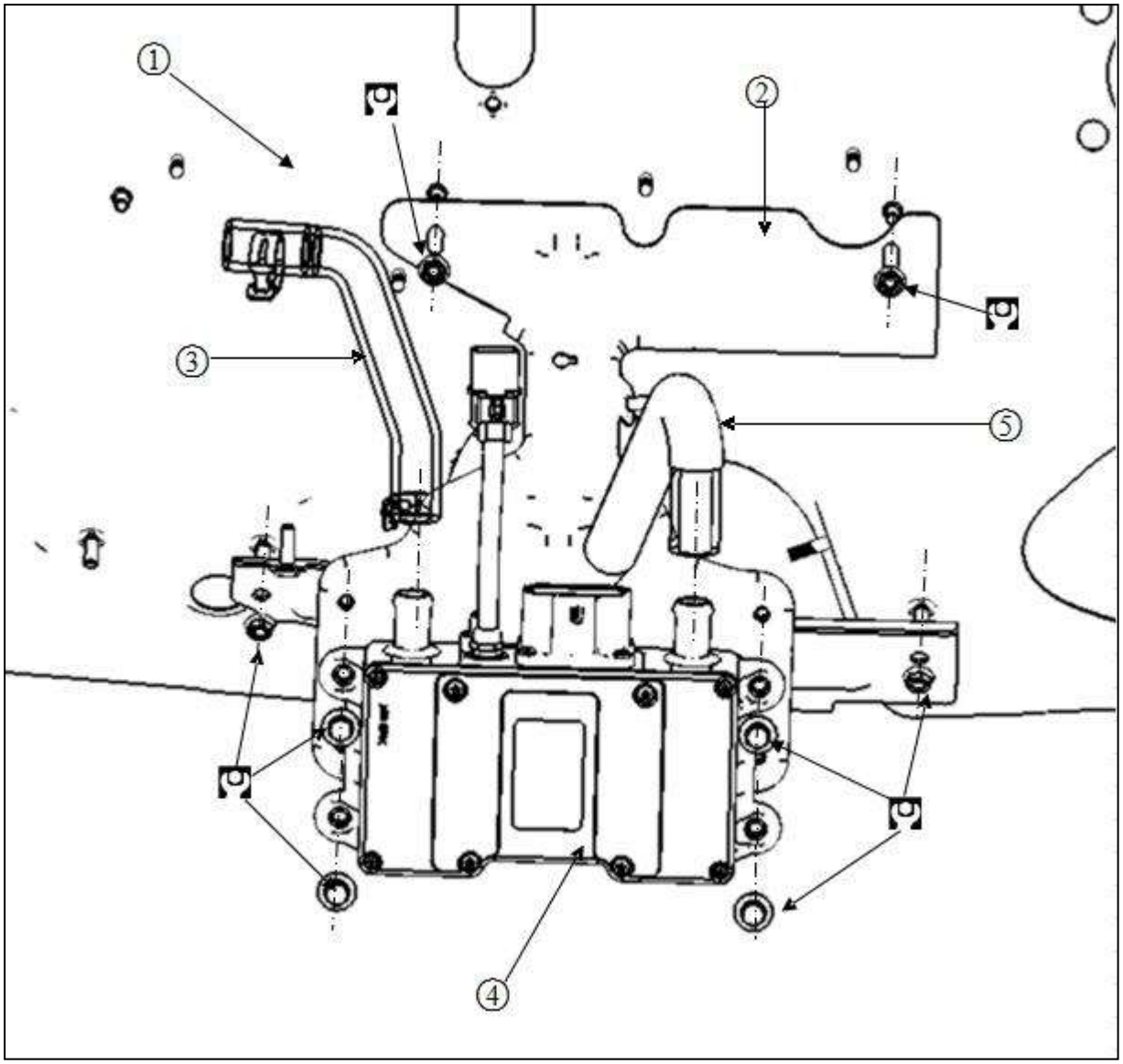
Install in the reverse order of the disassemble procedures .

Note：

Please hold the cooling pump steadily with a hand when installing the outlet tube of the battery water pump and outlet tube of the battery cooler

Water heater

Explosive view



1 Front board assembly 2 water heater bracket 3 outlet tube of battery cooler 4 water heater

5 outlet tube of water heater

: N·m

Disassembly and assembly

Disassembly

Warning:

Do not remove the expansion kettle lid soon after pulling up in case of serious scald caused by high temperature coolant split out from the filling port of the expansion kettle.

1.Empty coolant Please refer to the chapter “maintenance-cooling system”.

Note：

Operate when power battery temperature is low.

2 Unplug the connector of the water heater.

Attention：

- **Please keep from being scratched on hands when unplugging the connector.**
- **Keep the connectors and high voltage components from spilt coolant. If there are coolant on the connector and high voltage components, wipe it off immediately.**

3 Disassemble the outlet tube of battery cooler and outlet tube of water heater

4 Disassemble the nuts of the water heater bracket and take off the battery cooler and the battery cooler bracket.

Tightening torque of nuts:7-11 N·m ,Tightening torque of bolts:7-11 N·m.

Attention：

Keep the cooling pump from falling down or violent impact. **Otherwise, please replace it.**

Disassemble the bolts of the battery cooler bracket and detach the battery cooler and the battery cooler bracket.

- Tightening torque:7～11N·m

Assembly

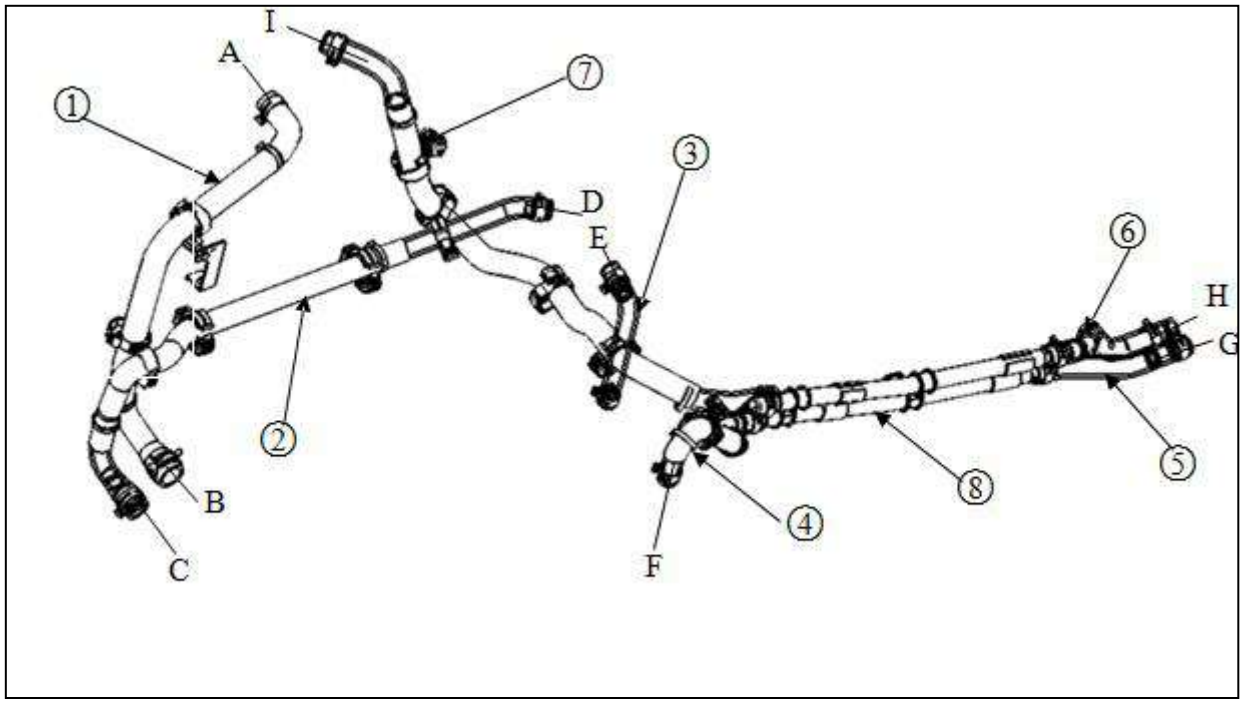
Install in the reverse order of the disassemble procedures .

Note：

Please hold the cooling pump steadily with a hand when installing the outlet tube of the battery water pump and outlet tube of the battery cooler

Cooling water pipeline

Components layout



1 Inlet tube of battery water pump 2 Outlet tube of battery water pump 3 Outlet tube of battery cooler

4 Outlet tube of water heater 5 Water inlet tube of battery 6.Water outlet tube of battery

7 Inlet tube of expansion kettle

A Expansion kettle B Coolant pump C Coolant pump D Battery cooler

E Battery cooler F Water heater G Power battery assembly H Power battery assembly

I Expansion kettle

: N·m

Reparation data and specification

Coolant

Coolant filling amount (L)	≈8
Expansion kettle volume (L)	1.4

Electric Vehicle Control System

Operation Precautions

Precautions for maintenance personnel carrying medical electronic equipment

Prohibit Operations

Warning:

- Ferromagnetic parts have been applied on the vehicle.
- A person using a medical device such as a pacemaker may not operate the vehicle because the drive motor carries high pressure and strong magnetic, which may affect the function of the medical device.

Precautions for normal charging

Warning:

- If a person uses a medical electric device such as an implantable cardiac pacemaker or an implantable cardioverter defibrillator, the possible effects on the devices must be checked with the device manufacturer before starting the charge operation.
- The radiated electromagnetic wave generated by DC/DC that is under normal operation may have an influence on medical electronic equipments.The people who use implanted heart pacemaker or implanted heart defibrillatorshould stay away from it as DC/DC is working (luggage compartment included).

operation precautions for communication equipments

Warning:

- The electromagnetic wave of the remote intelligent terminal (TBOX) may affect the function of the medical device such as cardiac pacemaker, cardioverter, defibrillator and other medical electronic devices.
- The electromagnetic wave of the remote intelligent terminal (TBOX) may affect medical electronic devices other than cardiac pacemaker, cardioverter, defibrillator. Therefore, for people who is using other medical electronic device, please check with device’s manufacturer for the potential effects of TBOX before using.

The Items need to be inspected before maintenance work starts

Precautions of supplemental restraint system (SRS), "airbag" and "seat belt pretension"

- The supplemental restraint system such as “air bag” and “seat belt pretension” can reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch input and airbag module. SRS can confirm whether to release airbag by seat belt switch, or to release one airbag only. The decision depends on the emergency incident’s degree and whether the safety belt is tightened.
- Precautions for the maintenance of SRS has been listed in the “airbag” and “safety belt” part.

Warning:

To prevent incidents, please pay attention to following aspects

- In prevent SRS from losing efficacy, the maintenance of airbag shall be carried out by operators of DR or technicians authorized by airbag’s manufacturer.
- Improper maintenance, including incorrect disassembling&assembling of SRS, will make SRS unable to start and cause personal injury. For disassembly of spiral harness and airbag module, please see “safety airbag” part for details.
- Do not test SRS with electronic devices with any type of circuit, unless the SRS needs to be repaired manually. SRS cable uses harness with yellow or orange color.

Precautions of using power tools (pneumatic or electric) and hammer

Warning:

Pay attention to the following items in case of accidents happening

- As you conduct the operation near to air bag sensor or other air bag system sensor, please turn off the power supply,avoid using pneumatic or electric tools or knocking the sensor with hammer. The large vibration is able to start the sensor and open air bag, which may cause serious injuries.
- As you use pneumatic or electric tools and hammer, please turn off the power supply, disconnect low voltage power supply with 12V, wait for three minutes, then make use of these tools.

Precautionary measures in removing the 12V battery:

Beforeremoving the 12V battery, turn the power switch to “ON”, and then to “LOCK”.

Note：

- The automatic 12V battery charge function may start even when the power switch is at “LOCK”position.
- After the key rotates from “ON” to “LOCK”, the automatically charging function of 12V battery can not launch.

Precautions For High Pressure

Warning:

- As the electric car is with the high-voltage power battery, if the high-pressure system is improperly handled, it will be risky to have the high-voltage electric shock, leakage and the occurrence of similar accidents. Be sure to use the correct work flow during inspection and maintenance.
- Before inspecting and servicing the high pressure system and its protection, make sure that the service switch has been disconnected to cut off the high voltage power supply.
- Insulation protection equipment, including insulated gloves, insulated shoes and face shields, should be worn before maintenance work on high pressure systems.
- High-pressure system overhaul personnel has responsibilities to ensure that other people will not contact the car. When the repair work is suspended, please cover the high-pressure portion with insulating material to prevent other people from contacting.

Note：

- In the ready state, the repair switch must not be disconnected.
- High voltage protection and equipment confirmation
- High voltage corrugated pipe and connector are orange. The orange label “High Voltage” is on high voltage battery holder and other high voltage equipments . Do not have contact with these high voltage protected parts.
- Wrap up the high-voltage connector and terminal with insulated tape after removing high-voltage connector.

Precautions for the staff who use electronic medical appliances

Warning:

- The vehicle has strong magnetic components,If technical personnel use medical electronic equipment, such as electronic pacemaker, can't operate in the car, otherwise, the function of the electronic equipment may be affected by strong magnetic components.

The items that shall be avoided in using during repair work.

- As the vehicle carries high-voltage and ferromagnetic parts, do not use metal parts in case of short-circuit, or magnetic things (such as bank cards, prepaid card,etc.) These items may be damaged if you take them with you during maintenance process.

Place a sign "Danger! High-voltage area, please keep distance! " .

- In order to attract other staff's attention, during high-voltage system maintenance, please set a mark reminding "Do not touch it! High voltage work is in process"

Copy this page during the service wok, and put the folded page on the top of vehicle roof

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DANGER:

HIGH VOLTAGE REPAIR WORK IS IN PROGRESS. DO NOT TOUCH!

Person in charge: _____

DANGER:

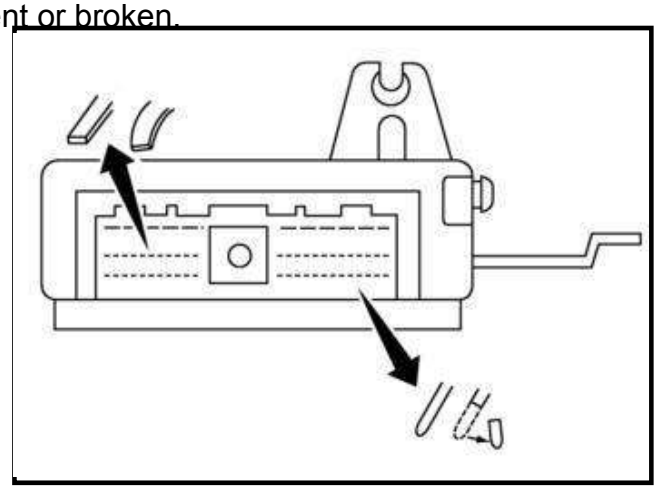
HIGH VOLTAGE REPAIR WORK IS IN PROGRESS. DO NOT TOUCH!

Person in charge: _____

Copy this page during the service wok, and put the folded page on the top of vehicle roof

General Precautions

- Do not disassemble VCU or DC / DC boxes.
- When connecting or disconnecting the VCU from the harness, be careful not to damage the terminal pins (bend or break). When reconnecting the harness end plug, check whether the terminal pins are bent or broken.



Preparation work

Common maintenance tool

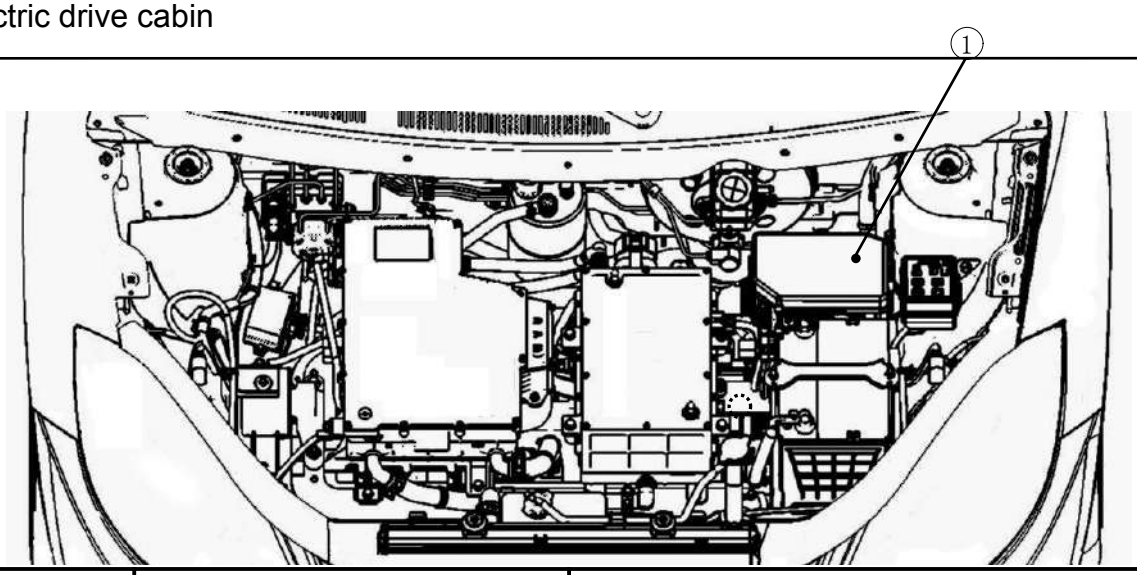
Tool name		Use description
Insulated gloves (To ensure the protection of an electricity of 1000V / 300A)		Disassembly and assembly of the high voltage parts
Leather gloves (Using leather gloves that can tighten the wrist)		1. Disassembly and assembly of high voltage parts 2. Protect insulated gloves
Insulated shoes		Disassembly and assembly of the high voltage parts
Protective goggles (ANSI Z87.1)		1.Remove and install the high voltage parts 2. Check the wire to prevent the fire splash, protect the eyes
Insulated caps		Disassembly and assembly of the high voltage parts
Insulation Tester (Megohm meter)		Measure the insulation resistance

System Instructions

Components

Components position

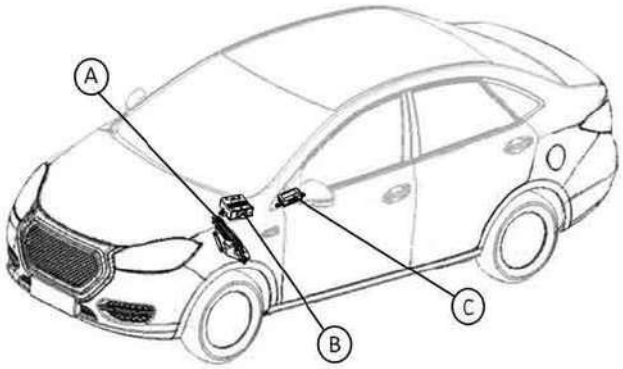
Electric drive cabin

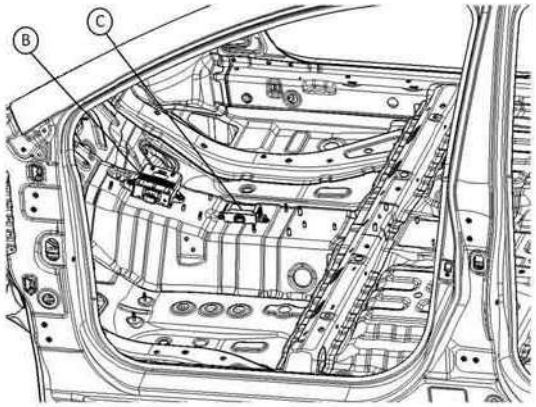


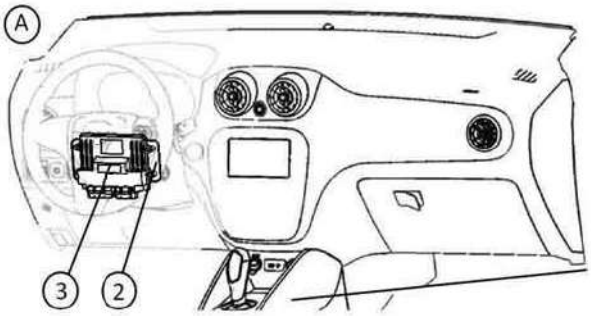
Number	part	Function
1	DC charging relay	DC charging relay is integrated in the high-voltage junction box inside. VCU pulls up DC charging relay when in DC charging, and connects the DC charging pile positive and power battery
2	A/C relay	The A / C relay is controlled by the VCU and supplies power to the air conditioning control panel and the compressor controller
3	M/C relay	The M / C relay is controlled by VCU and supplies power to PCU, LBC, condenser fan, electronic cooling water pump and battery fan
4	Electronic coolant pump	Electronic coolant pump provides circulating pressure to the coolant. VCU can control coolant pump's rotating speed

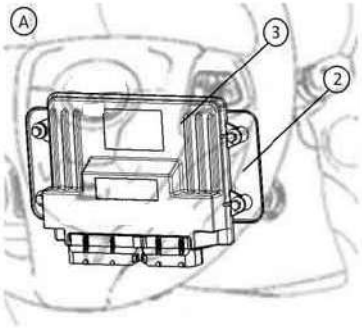
		by PWM signal based on vehicle speed and coolant temperature.
5	Cooling fan	The condenser fan is controlled by the VCU. When the air conditioner is switched on or the high voltage cooling circuit needs to be cooled, the VCU controls the speed of the condenser fan through the PWM signal
6	Water temperature sensor	VCU can monitor the temperature of coolant in high-pressure cooling system through water-temperature sensor. The sensor's value of resistance changes with the change of temperature. The VCU will figure out coolant temperature according to the collected data.
7	PCU	Transmit the DC power of the power battery into AC power, and the implementation of the VCU torque command to complete the torque output
8	12V battery	Provides power for low voltage systems
9	Reversing light relay	When gearbox is at reverse gear, VCU will receive the gear signal and light up the reverse lamp by controlling reverse lamp's relay.
10	Car Charger	Transmit the external access AC power into DC for the power battery charge
11	Air conditioning compressor controller	Control air conditioning compressor speed based on the crew cabin and power battery cooling requirements

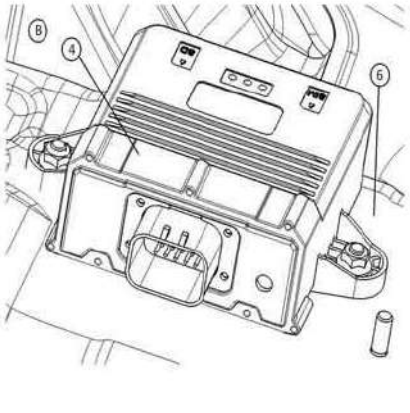
Crew cabin

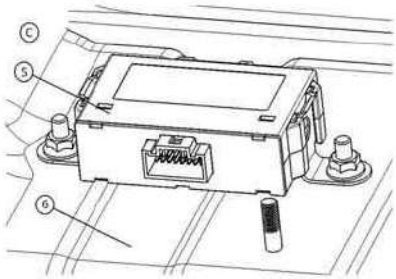












A vehicle controller B remote intelligent terminal C low-voltage distribution controller

Number	part	Function
1	instrument	Display vehicle basic information, fault lights, indicator lights, statement tips. See the "instrument" section
2	Timing charge switch	By operating this switch, the user can

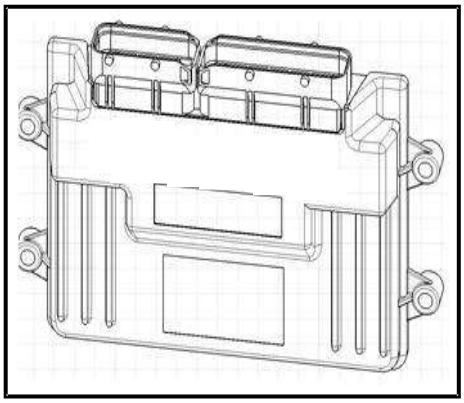
		activate remote charging and regular charging.
3	Remote intelligent terminal	Real-time monitoring of vehicle safety information; users can remote control terminal remote control function
4	Pedestrian warning controller	When a vehicle is moving at low speed, it can make alarming sound to draw pedestrian’s attention.
5	Low voltage distribution controller	The low-voltage distribution controller receives the key "ON" signal, remote wake-up signal, DC charge wake-up signal or AC charging wake-up signal, supplies power for VCU, VSP, A / C relay, M / C relay and charge indicator. VCU can control the power down time through the low voltage distribution controller.
6	Accelerator pedal position sensor	The accelerator pedal position sensor is integrated in the accelerator pedal to convert the driver's pedal position signal into a voltage signal and send it to the VCU.
7	The brake pedal position sensor	The brake pedal position sensor is integrated in the brake pedal to convert the driver's pedal position signal into a voltage signal and send it to the VCU.
8	Brake switch	The brake switch is integrated in the brake pedal to convert the driver's pedal position signal into a voltage signal and send it to the VCU.

9	Battery controller	
10	Shift control mechanism	Collect the signal that the driver is operating on the gearshift mechanism
11	Parking brake (EPB)	Please use parking brake when you need to park your vehicle.
12	SPORT button	Collect the signal of driver's choice of driving mode
13	MP5	Receive the vehicle energy flow sent by VCU, energy consumption, gear and other information and display
14	Air conditioning panel controller	Collecting the driver operation on the temperature, air flow and other information, and control fans, compressors and so on
15	High voltage positive relay	High voltage positive relay is integrated inside the power pack. **When the power battery is charged or discharged, the VCU turns on or off the high voltage circuit positive pole to the power battery by pulling or disconnecting the high voltage positive relay**
16	High voltage negative relay	High voltage negative relay is integrated inside the power pack. **When the power battery is charged or discharged, the VCU turns on or off the high voltage circuit negative pole to the power battery by pulling or disconnecting the high voltage negative relay**
17	Precharge relay	The precharge relay is integrated inside the power pack. In order to avoid the impact of instantaneous high voltage on the high-pressure components, VCU

		needs to pull precharge relay before pulling the high-voltage positive relay

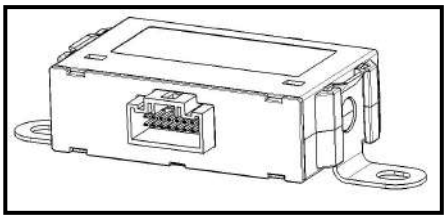
VCU

VCU (Vehicle Controller Unit)judges the current state of operation of the vehicle and reasonably control vehicle behavior through a variety of sensors and the feedback of the controller information.



Low voltage distribution controller

The low-voltage distribution controller receives the key "ON" signal, remote wake-up signal, DC charge wake-up signal or AC charging wake-up signal, supplies power for VCU, VSP, A / C relay, M / C relay and charge indicator. VCU can control the power down time through the low voltage distribution controller.



M/C relay

The M / C relay is controlled by VCU and supplies power to PCU, LBC, condenser fan, electronic cooling water pump and battery fan

A/C relay

The A / C relay is controlled by the VCU and supplies power to the air conditioning control panel and the compressor controller

High voltage positive relay

High voltage positive relay is integrated inside the power pack. **When the power battery is charged or discharged, the VCU turns on or off the high voltage circuit positive pole to the power battery by pulling or disconnecting the high voltage positive relay**

High voltage negative relay

High voltage negative relay is integrated inside the power pack. **When the power battery is charged or discharged, the VCU turns on or off the high voltage circuit negative pole to the power battery by pulling or disconnecting the high voltage negative relay**

Precharge relay

The precharge relay is integrated inside the power pack. In order to avoid the impact of instantaneous high voltage on the high-pressure components, VCU needs to pull precharge relay before pulling the high-voltage positive relay

DC charging relay

DC charging relay is integrated in the high-voltage junction box inside. VCU pulls up DC charging relay when in DC charging, and connects the DC charging pile positive and power battery

The acceleration pedal position sensor

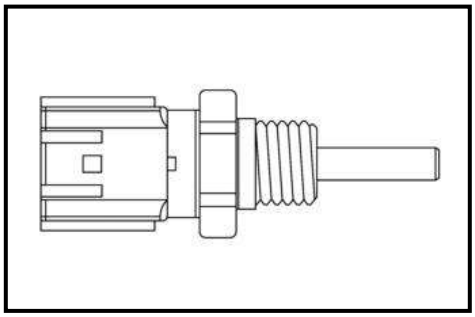
The accelerator pedal position sensor is integrated in the accelerator pedal to convert the driver's pedal position signal into a voltage signal and send it to the VCU.

The brake pedal position sensor

The brake pedal position sensor is integrated in the brake pedal to convert the driver's pedal position signal into a voltage signal and send it to the VCU.

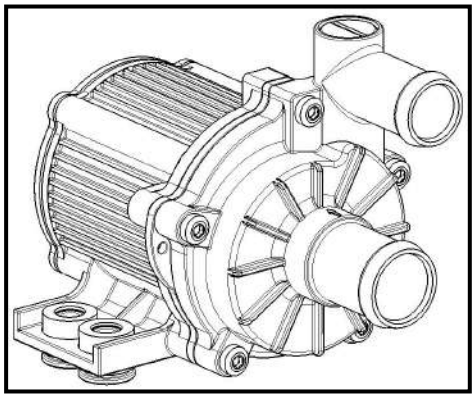
Water temperature sensor

VCU can monitor the temperature of coolant in high-pressure cooling system through water-temperature sensor. The sensor’s value of resistance changes with the change of temperature. The VCU will figure out coolant temperature according to the collected data.



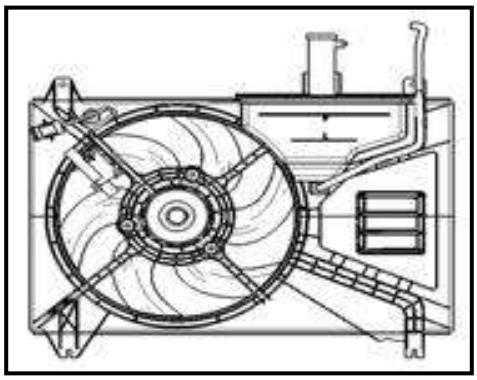
Electronic coolant pump

Electronic coolant pump provides circulating pressure to the coolant. VCU can control coolant pump’s rotating speed by PWM signal based on vehicle speed and coolant temperature.



Cooling fan

The condenser fan is controlled by the VCU. When the air conditioner is switched on or the high voltage cooling circuit needs to be cooled, the VCU controls the speed of the condenser fan through the PWM signal

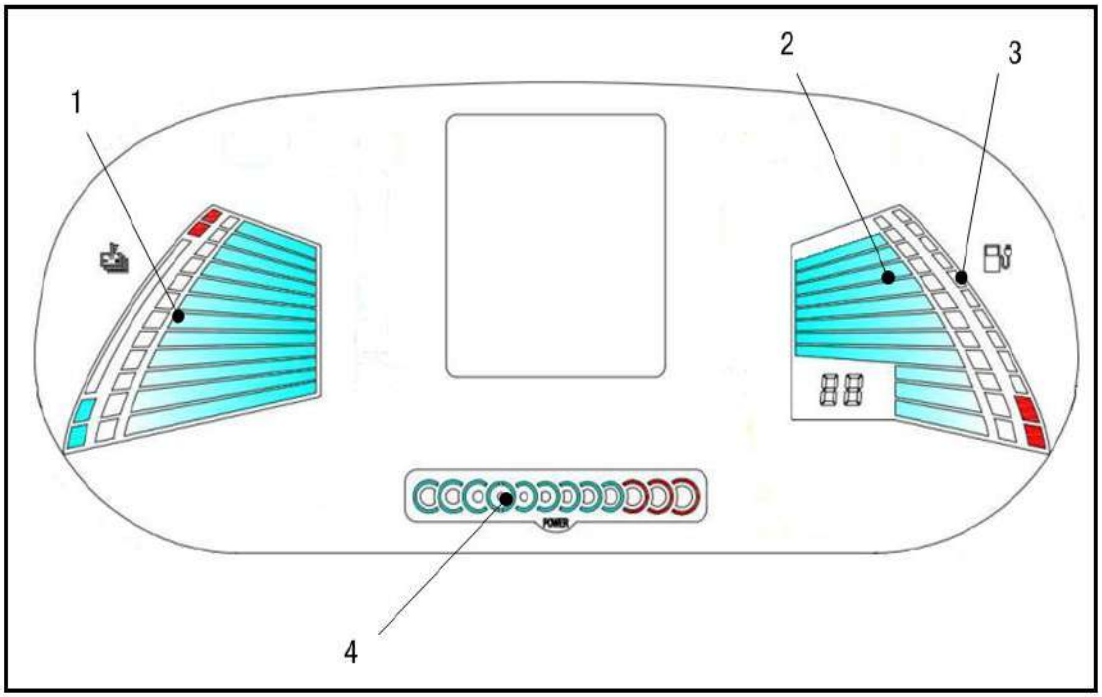


Pedestrian warning system

This system, by controlling electric honk, can make different alarming sound to draw driver and pedestrian's attention when vehicle is in different status.

Condition		Action
Charging cable connected		Beep one time
charging started		Beep twice
Vehicle moving forward	Vehicle speed≦30km/h	Beep's volume will increase with vehicle speed's increasing
	Vehicle speed＞30km/h	No beeping
Vehicle reversing		Keep beeping

Electric instrumentation



The VCU controls the information and warning lights and indicators in the following electric instrument.

Power battery

1 Power battery thermometer

The VCU receives the temperature signal from the power cell of the LBC and sends the information to the electric instrument and displays it.

2 Power battery power meter

The VCU calculates the power signal of the battery and sends the data to the electric instrument and displays it.

3 Power battery available capacity table

The VCU calculates the available power information of the battery and sends the information to the electric instrument and displays it.

4 Power meter

The VCU calculates the motor's power and sends the information to the electric instrument and displays it.

Warning and indicator light

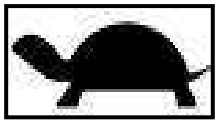
READY indicator light

The VCU communicates the control signal to the electric instrument via CAN communication. When the key is rotated to "START" and the vehicle or component is not faulty, the indicator light is on, indicating that the vehicle has been turned on and the vehicle is ready in a running state.

Condition	Display status
The key is rotated to "START" and the vehicle and components are not faulty	Constant light on
Except for this situation	Extinguished

Limit power indicator light

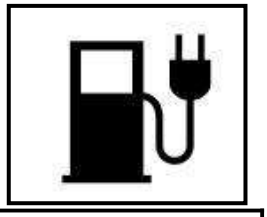
When the power battery is low or the vehicle is in limit power mode, this indicator light is on. The VCU communicates the control signal to the electric instrument via CAN communication.



Condition	status
The key is placed in the "ON" for power self-test	Flash for 2 seconds
When the key is set to "ON" or rotated to "START", the power battery is low or the vehicle is in limit power mode	Constant light on
Except for this situation	Extinguished

Charging indicator light

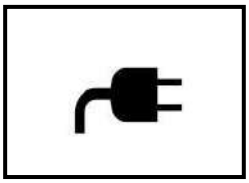
The charging indicator lights when the battery is running low; or during the charging process, the key is set to "ON" and the charge indicator lights. VCU would send control signal to the instrument via CAN communication when the VCU detects a low power or during charging.



Condition	status
The key is placed in the "ON" for power self-test	Flash for 2 seconds
When the key is placed in the "ON" or rotated to "START", and vehicle power is too low	Constant light on
When the vehicle is in the charging state, and the key is placed in "ON"	Constant light on
Except for this situation	Extinguished

Charging line connection indicator light

When the charging cable is connected with a charging pile or a household charging plug, and the key is placed at “ON”， the charging cable connection indicator lights on. VCU would send control signal to the instrument via CAN communication when the VCU detects charging cable connection.

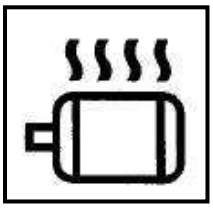


Condition	status
The key is placed in the "ON" for power self-test	Flash for 2 seconds
When the charging cable is connected to a charging pile or a household charging plug and the key is placed in the "ON"	Constant light on
Except for this situation	Extinguished

Motor fault warning light

When the key is placed in the "ON" gear, the motor fault indicator will be on if failure exists in motor. Please contact the DR authorized dealers

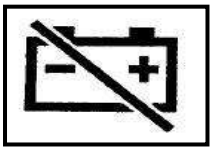
. VCU receives the fault information sent by the PCU and transmits the control signal to the instrument through CAN communication.



Condition	Status
The key is placed in the "ON" for power self-test	Flash for 2 seconds
When the key is placed in the "ON" or rotated to "START", and the motor is faulty	Constant light on
Except for this situation	Extinguished

High voltage cut off indicator light

When vehicle collision occurs, or safety failure exists in the power battery, VCU will cut off high-voltage and the high-voltage cut-off indicator will be on. The vehicle can not move at this status, please contact DR authorized dealers. VCU would send control signal to the instrument via CAN communication when the VCU detects high voltage relay cut off.

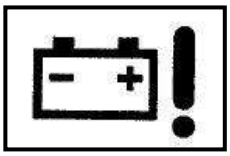


Condition	Status
The key is placed in the "ON" for power self-test	Flash for 2 seconds
When vehicle collision occurs, safety failure exists in the power battery, and the high-voltage is cut off.	Constant light on
Except for this situation	Extinguished

Battery fault indicator light

When the power battery failure occurs and the power battery failure warning light is on,

please contact the DR authorized dealers. VCU receives the LBC report fault through the CAN communication to send the control signal to the instrument.



Condition	Status
The key is placed in the "ON" for power self-test	Flash for 2 seconds
When the power battery is faulty	Constant light on
Except for this situation	Extinguished

Vehicle control system

Pure electric drive system description

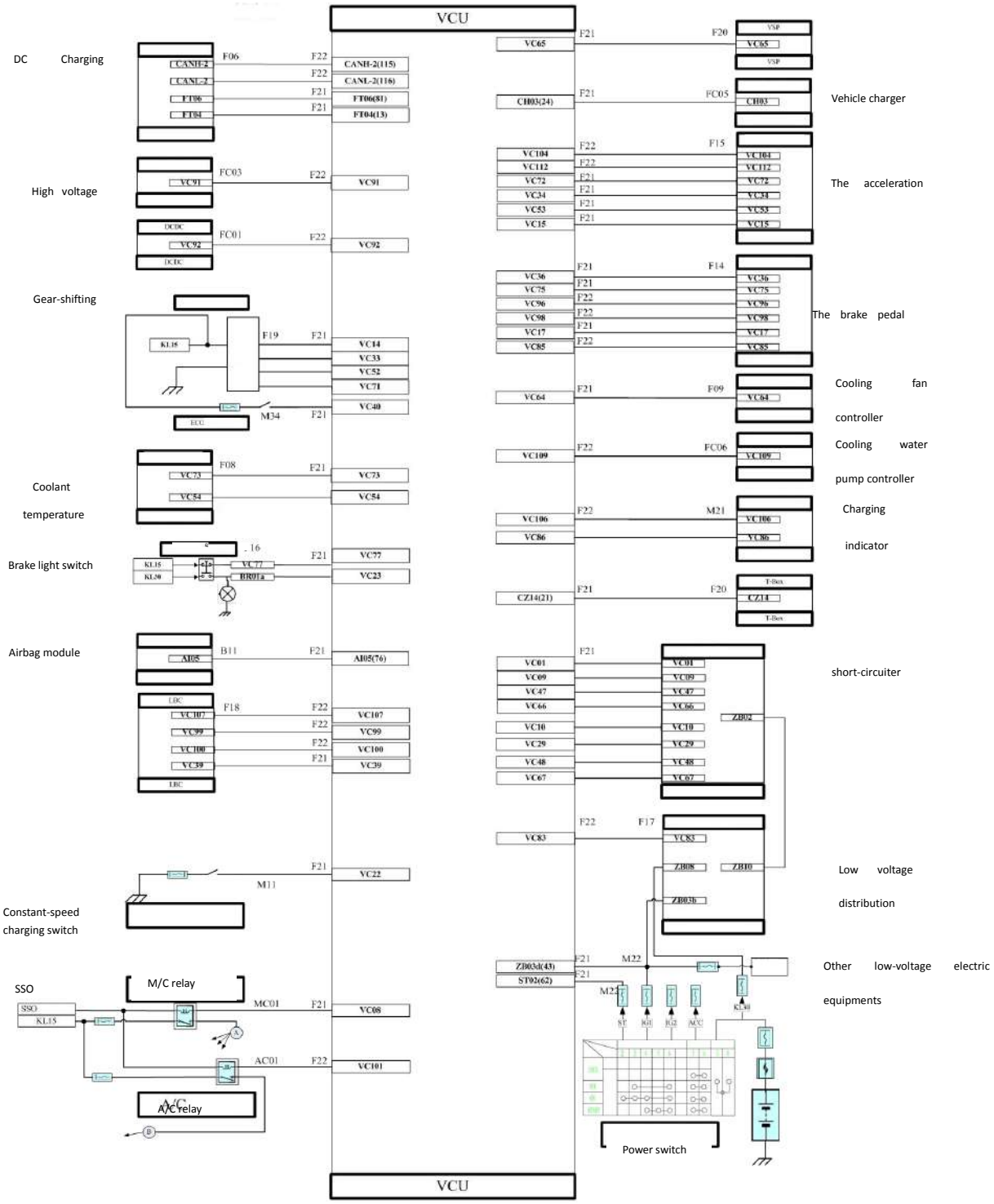
Vehicle control system overview

- Battery energy is a vehicle power storage unit, and is provided in the form of direct current directly to the high voltage power supply system, and transmits the power into a voltage of 13V-15V via DC / DC to supply power to low-voltage system.
- VCU receives the information of each part, synthetically judges the whole vehicle state, realizes the coordinated control of the system.

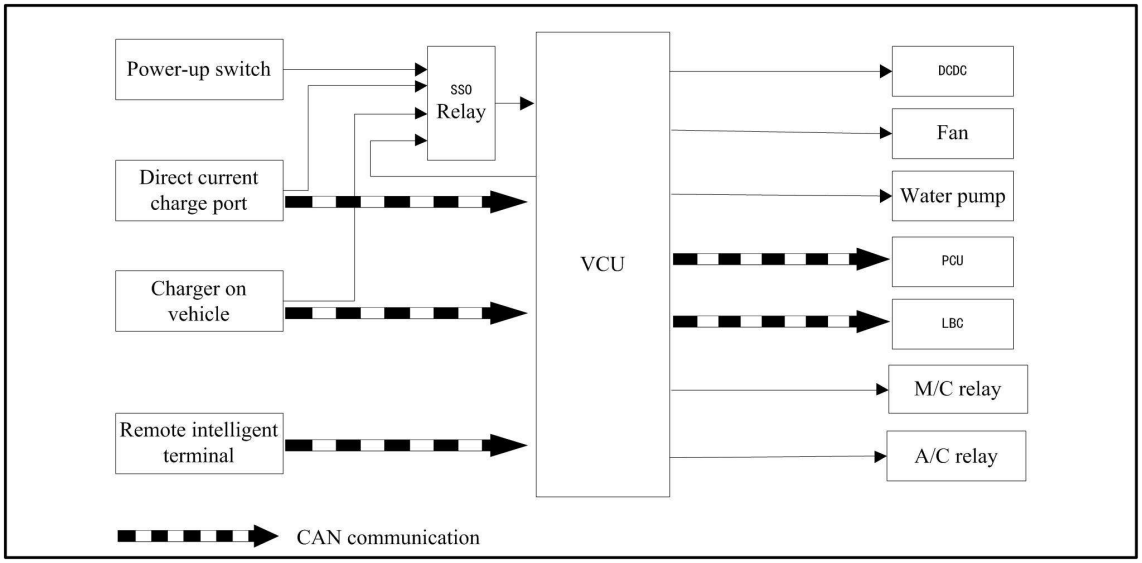
Control function list

Function	Description
System start control	Refer to“System start control”
High voltage power supply control	Refer to“High voltage power supply control”
Motor drive control	Refer to“Motor drive control”
Energy recovery control	Refer to“Energy recovery control”
S-mode control	Refer to “S-mode control”
AC charging control	Refer to “AC charging control”
DC charging control	Refer to “DC charging control”
High-voltage cooling control	Refer to“High-voltage cooling control”
Battery thermal management control	Refer to “Battery thermal management control”
Power cut off control	Refer to “Power cut off control”
12V battery automatic charge control	Refer to “12V battery automatic charge control”
Remote control	Refer to “Remote control”

VCU system block diagram



System start control



System instructions

System principle

Input and output signal list

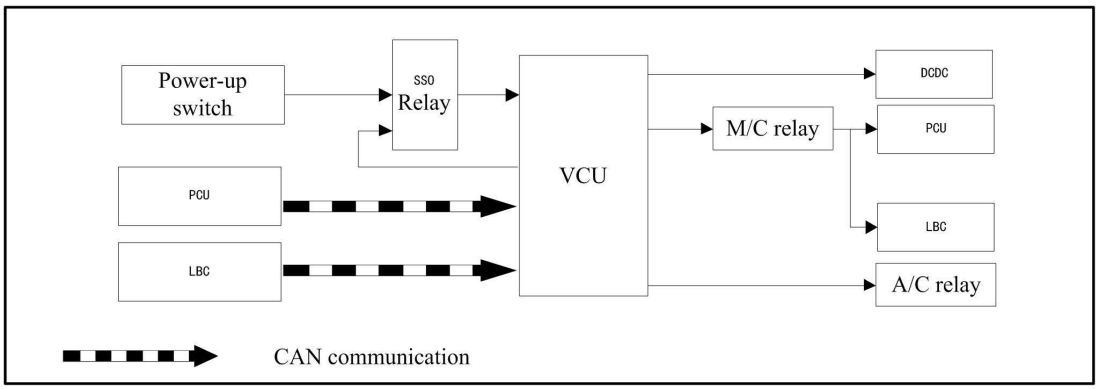
Output signal / controller	Signal name	Input part	Signal type
Power switch	ON/START/OFF signal	VCU	Voltage
Car Charger	AC charge wake-up signal		Voltage
DC charging pile	DC charge wake-up signal		Voltage
Remote intelligent terminal	Remote wake-up		CAN and voltage
	Remote air conditioner		CAN and voltage
	Remote charging		CAN and voltage
	winter pre-heating		CAN and voltage
VCU	DC/DC enabled	DC/DC	Voltage
	High voltage relay command	LBC	CAN

	Motor related commands	PCU	CAN
	Start / cut off	Fan	Voltage
	Start / cut off	Water pump	Voltage

System start control

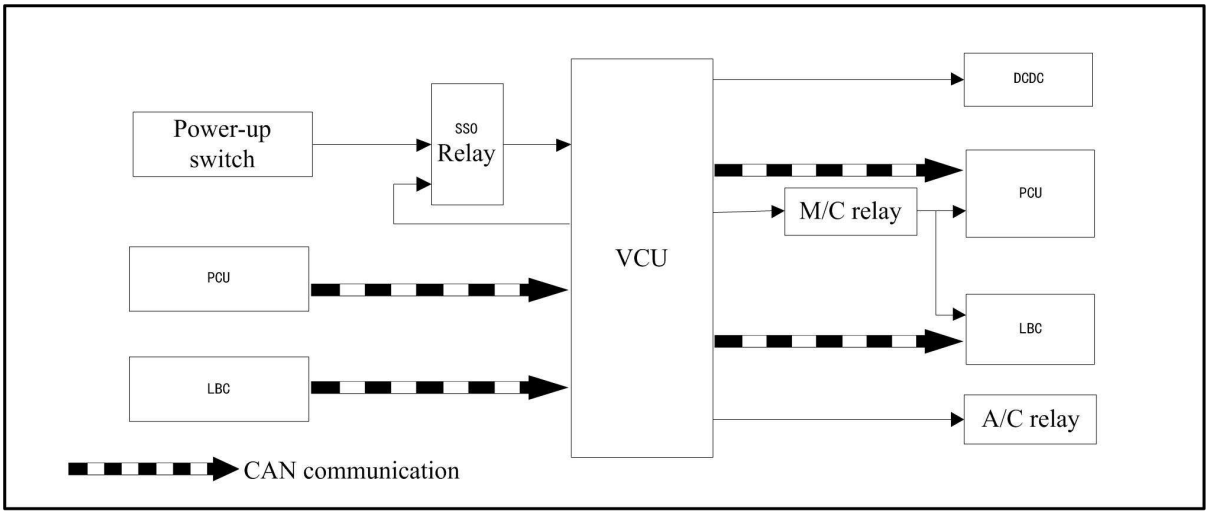
VCU acquisition sensor signal controls vehicle control system start and stop. VCU can also control its own power-down time through a low-voltage distribution controller.

Vehicle start (KEY ON)



When the key is placed in the "ON" to wake VCU, VCU control M / C relay to supply power to the motor controller and battery controller. VCU transmits the relevant control commands to complete the vehicle system to start through CAN communication.

READY mode



Turn the key to the "START", and the VCU transmits the associated control command to PCU and LBC via CAN communication, thus the vehicle is in a traveling ready state.

Note：

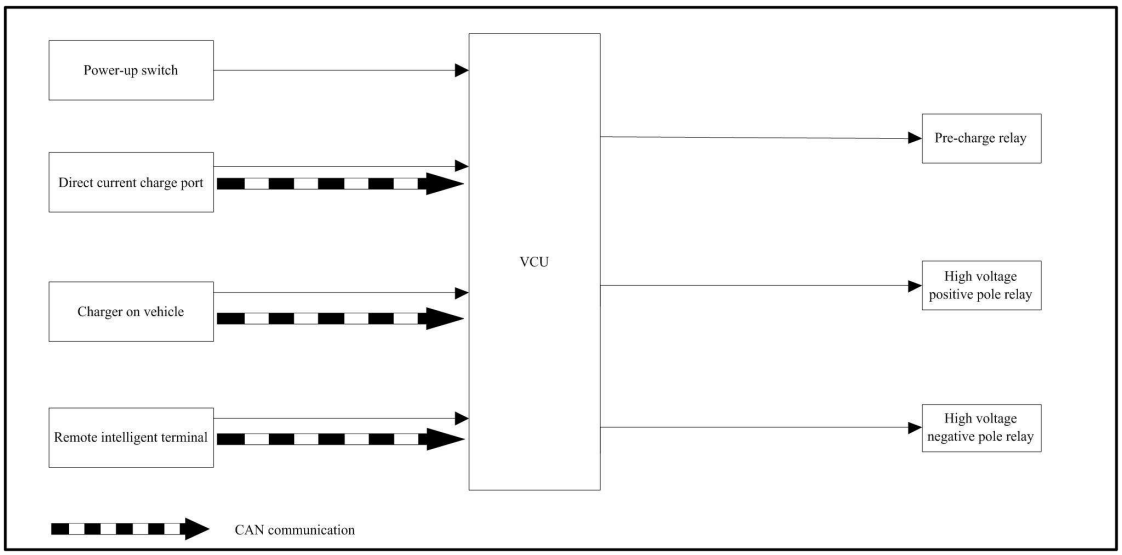
VCU prohibits the vehicle into the READY mode in the following circumstances

- The charging connection cable is connected
- Power battery power is too low and other serious failures
- Vehicle control system 12V serious undervoltage and other serious failures

High voltage power supply control

System instructions

System principle



Input and output signal list

Output signal / controller	Signal name	Input part	Signal type
Power switch	ON/START/OFF signal	VCU	Voltage
DC charging pile	Brake signal		Voltage
	The brake pedal position sensor		Voltage
Car Charger	AC charge wake-up signal		Voltage
Remote intelligent terminal	Remote wake-up		CAN and voltage
	Remote air conditioner		CAN and voltage
	Remote charging		CAN and voltage

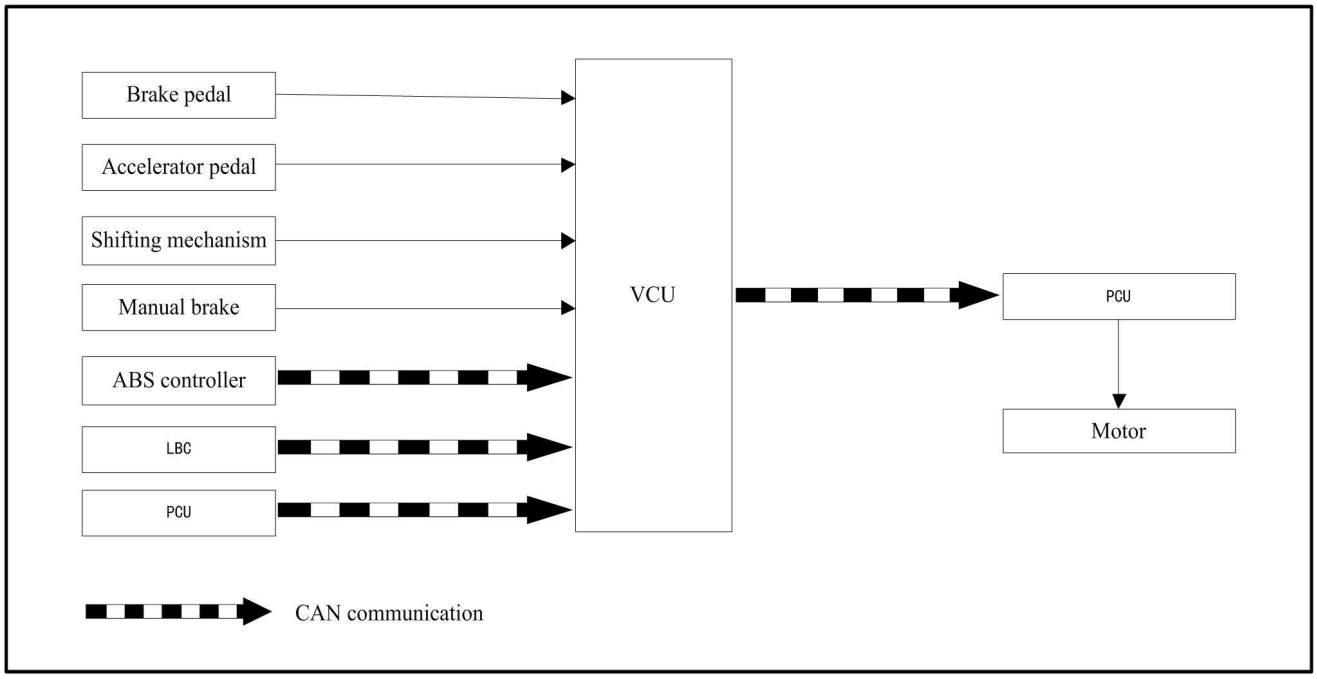
Description

After the vehicle controller receives a wake up signal from the power switch, the DC charging pile, vehicle charging machine or a remote intelligent terminal, directly controls the high voltage relay or off, to complete the high pressure system on or off.

Motor drivecontrol

System instructions

System block diagram



Input and output signal list

Input signal/controller	Signal name	Input component	Signal type
Brake Pedal	Brake switch signal	VCU	Voltage
	Brake pedal position signal		Voltage
Accelerator pedal	acceleration pedal position signal		Voltage
Brake Pedal	Brake switch signal		Voltage
EPB	EPB state signal		Voltage
ABS controller	ABS working state signal		CAN
	ABS fault state signal		
LBC	Battery related signal		
VCU	Motor related order	PCU	

Description

PCU can transform the DC from power battery into AC which can be applied by DC. Then the motor will finish the torque output.

VCU can figure out vehicle's target torque based on accelerator pedal's position

signal, gear signal and vehicle speed signal. Then VCU will send order of torque demand to PCU through CAN communication.

The output limit and output stop request list.

Demand ECU	Restrict reason	Limit power prompt	Conditions
PCU	IGBT over heated	Yes	IGBT over heated
	TM over heated	Yes	TM over heated
	PCU over heated	Yes	PCU over heated
	Message lost	Yes	VCU not receiving PCU messages
LBC	Total pressure under-voltage	Yes	When the total battery voltage is low
	Thermal instability	Yes	Thermal instability
	Temperature is too high	Yes	Cell temperature is too high
	Message lost	Yes	VCU not receiving PCU messages
VCU	Acceleration / brake signal is unreasonable	Yes	Acceleration / brake pedal sensor signal is abnormal
DCDC	Power supply is abnormal	Yes	Battery power is less than 11V

Energy recoverycontrol

System instructions

energy recovery means during vehicle's coasting or braking process, the motor will change from driving state to power-generating state, and transform vehicle's kinetic energy into electric energy, and store the electric energy into power battery. Meanwhile, the vehicle can use revolving resistance during energy recovery as part of braking force

so as to brake and reduce speed.

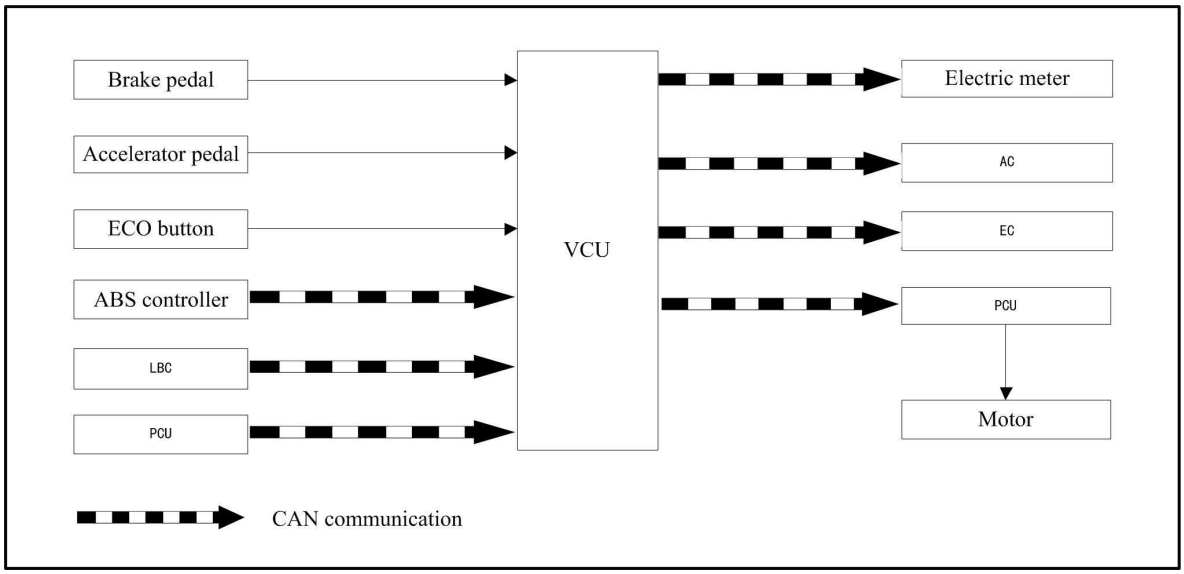
When the vehicle is coasting or braking, the VCU calculates the energy recovery power according to the ABS status, the power battery status, the brake pedal position signal, and vehicle's decelerating need. Then VCU will send the command to the motor controller to start the energy recovery. VCU can calculate the maximum charging amount according to the maximum charging power signal of power battery. VCU can calculate appropriate motor braking power and confirm energy-recovering amount according to driver's operation on brake pedal. Then VCU will send the target torque to motor controller.

Note：

When the battery power or the speed is too high or low and vehicle has failure, VCU will stop the energy recovery. At this time, the deceleration may become weak when driver is releasing accelerator pedal.

S-mode control

System Instructions



Input and output signal list

Input signal/controller	Signal name	Input component	Signal type
Brake Pedal	Brake switch signal	VCU	Voltage
	Brake pedal position signal		Voltage

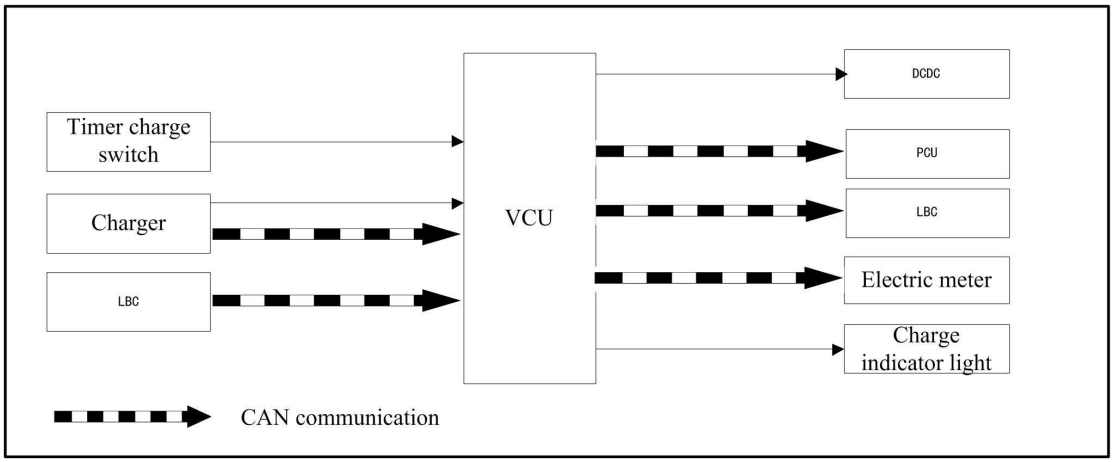
Accelerator pedal	Pedal open degree signal		Voltage
ECO button	ECO signal		Voltage
ABS controller	ABS working state signal		CAN
	ABS fault state signal		
VCU	Motor related order	PCU	
	Power limitation order	AC	CAN
	Power limitation order	EC	CAN

Instruction

VCU decides whether to switch into SPORT mode according to motor status, accelerator/brake pedal status, A/C status, parking status and SPORT command.

In SPORT mode, vehicle's accelerating and power performance will be enhanced.

AC chargingcontrol



Input and output signal list

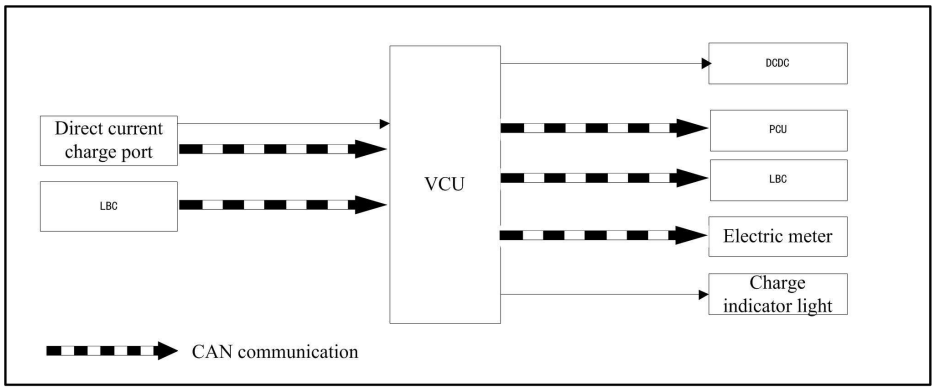
Input signal/controller	Signal name	Input component	Signal type
MP5	Timing charging switch signal	VCU	CAN
LBC	Power battery total voltage		CAN
	Signal power battery highest voltage		CAN

	Signal power battery lowest voltage		CAN
	Signal power battery highest temperature		CAN
	Signal power battery lowest temperature		CAN
Charger on vehicle	Alternating current charge rouse signal		Voltage
	Charger state		CAN
VCU	Charge current order	Charger on vehicle	CAN
	Charge voltage order		CAN
	Charge indicator light order	Charge indicator light	Voltage

Description

When the VCU judges the vehicle in the charging mode and pulls the M / C relay, VCU would send charging current command to the vehicle charger according to the power battery charging power and the state of the vehicle charger. At the same time, the car charger pulls AC charging relay, and VCU pulls system high voltage positive relay and high voltage negative relay, and then power battery starts to charge.

DC charging control



Input and output signal list

Input signal/controller	Signal name	Input component	Signal type
Direct current charge port	Direct charge rouse signal	VCU	Voltage
	Direct current charge device state		CAN
LBC	Power battery total voltage		CAN
	Signal power battery highest voltage		CAN
	Signal power battery lowest voltage		CAN
	Signal power battery highest temperature		CAN
	Signal power battery lowest temperature		CAN
VCU	Charge current order	Direct current charge device	CAN
	Charge voltage order		CAN
	Charge indicator light order	Charge indicator light	Voltage

Description

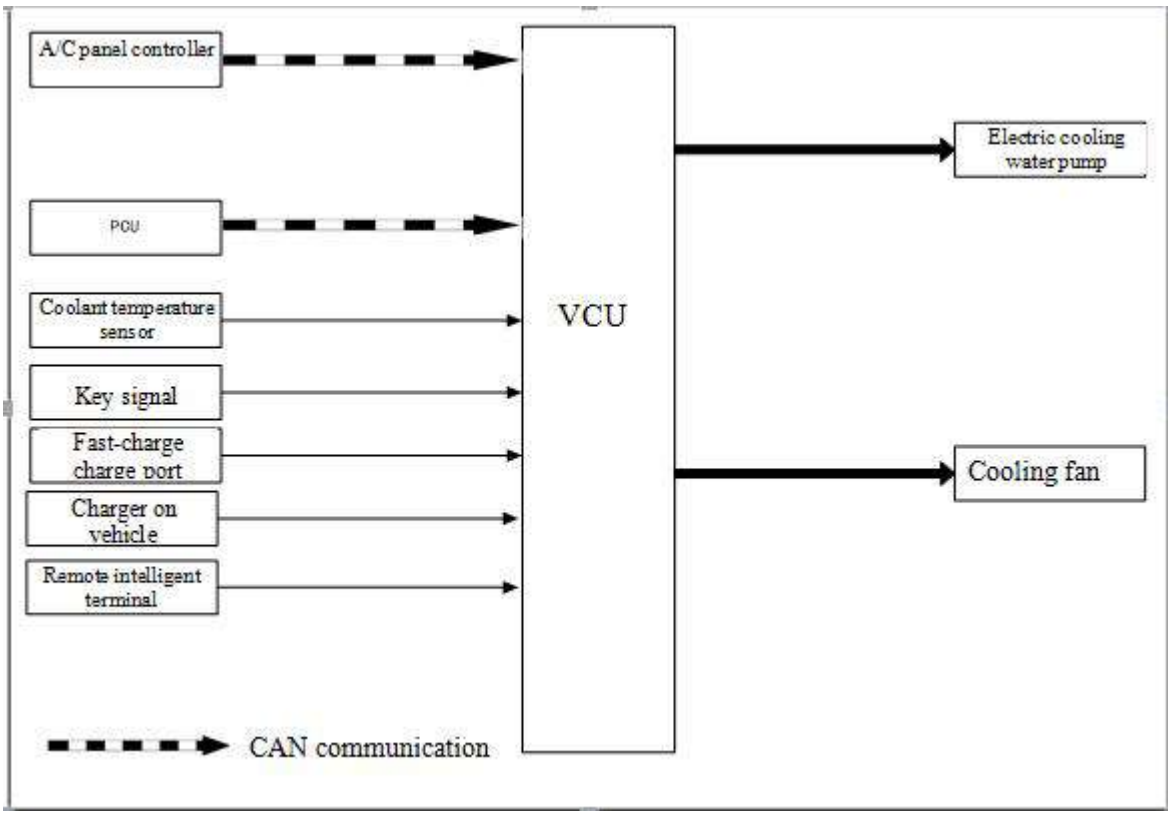
When the DC charging device interface is connected to the DC charging charging port of the vehicle, the DC charging device sends the charging wake-up signal to the VCU, VCU would pull the M / C relay and send charge current command according to the state of the rechargeable power of the power battery and the state of the vehicle charger. At the same time, VCU pulls AC charging relay, system high voltage positive relay and high voltage negative relay, and then power battery starts to charge.

High-voltage cooling control

System Instructions

VCU controls electronic coolant pump and fan according to multiple sensor signal and controller’s communication signal.

System principle



Electronic coolant pump

Control description

when vehicle is moving, VCU will control electronic coolant pump's rotating speed by sending PWM signal, based on the temperature of motor, PCU, IGBT, coolant and the signal of vehicle speed. When vehicle is in AC charging status, VCU will control electronic coolant pump's rotating speed by sending PWM signal, based on temperature of coolant and vehicle charger. when vehicle is in DC charging status, VCU will control electronic coolant pump's rotating speed by sending PWM signal, based on the temperature of coolant. The details are indicated in following list.

The vehicle is in running state

Unit:%

Working condition	Coolant temperature	Vehicle speed	
		Vehicle speed≦80km/h	Vehicle speed＞80km/h

Non-limit working condition (motor temperature＜120℃ and PCU temperature＜70℃ and IGBT temperature＜75℃)	＞40℃	65	65
	≦40℃	30	65
Limit working condition (motor temperature≧120℃ or PCU temperature≧70℃ or IGBT temperature≧75℃)	＞40℃	98	98
	≦40℃	98	98

The vehicle is in AC charging state

Unit:%

Coolant temperature	Vehicle charger temperature		
	≦55℃	55℃＜ Temperature ≦80℃	＞80℃
＞60℃	98	98	98
≦60℃	10 (Stop)	30	98

The vehicle is in DC charging state

Unit:%

Coolant temperature	Duty cycle

＞60℃	98
≦60℃	20

Note：

When PWM signal is 10, electronic coolant pump will stop working.

Safety-failure mode

If failure is detected by electronic coolant pump, the controlling strategy of coolant pump can be indicated in the following list.

Malfunction ID	Failure Name	Solutions for malfunction
1	Temperature protection of electronic coolant pump's controller	The coolant pump controller detects that: a) controller temperature is 125℃: coolant pump works in derated status (70% of normal rotating speed); 135℃: coolant pump stops working; lower than 125℃: coolant pump restores to normal working status. B) controller temperature＜-40℃, coolant pump stops working; when controller temperature≧-40℃ is detected, the coolant pump will restore normal working.
2	Locked-rotor protection of electronic coolant pump	When locked-rotor current exceeds set value, or the electromotive force is 0, the coolant pump will stop working; When the failure is eliminated, the coolant pump will restore working.
3	Dry-grinding protection of electronic coolant pump	Judge of coolant pump's rotating speed and input current: a) if the system detects that rotating speed of electronic coolant pump ＞4000rpm, and current≤1.5A last for 30 seconds, the coolant pump will switch into limping mode, b) limping mode: the coolant pump will work in constant speed of 2500rpm. If the coolant pump's current ≥1A is detected for more than 10 seconds, the water pump will

		restore normal working status. (BW needs to confirm the feasibility of this method. If feasible, should verify the whole vehicle.)
4	Short-circuit between control input end of coolant pump and ground	Coolant pump will switch into emergency working status nmax, and restore normal working status when the failure is eliminated.
5	Short-circuit between control input end of coolant pump and power supply.	Coolant pump will switch into emergency working status nmax, and restore normal working status when the failure is eliminated.
6	Open-circuit of input end of coolant pump	Coolant pump will switch into emergency working status nmax, and restore normal working status when the failure is eliminated.
7	Absolute error of PWM input frequency is too large	Coolant pump will switch into emergency working status nmax, and restore normal working status when the failure is eliminated.
8	Over-voltage/ over-current/ under-voltage protection of coolant pump	A) over-current: if pump's working current ＞45A is detected, the pump will stop working; when the fault-clearing of over-current is detected, the pump will restore working. B) over voltage: if pump's working voltage ＞18V is detected, the pump will stop working; when the fault-clearing of over-voltage is detected, the pump will restore working. C) under-voltage: if pump's working voltage ＜8V is detected, the pump will stop working; when the fault-clearing of under-voltage is detected, the pump will restore working.

Cooling fan control

Control description

VCU sends different duty ratio signals to control the rotating speed of cooling fan, by judging request signal of A/C fan, motor temperature, PCU temperature, IGBT temperature, coolant temperature and vehicle speed. The rotating speed of cooling fan, which is judged by VCU, is the maximum value selected from requests of compressor power, coolant temperature, motor temperature, PCU temperature and IGBT temperature. The details are indicated in following list.

The vehicle is in running state

Unit:%

Compressor power (kW)	Speed (km / h)			
	0-20	20-50	50-80	80 or above
1.5kw or above	85	100	100	100
1.3Kw or below	65	55	55	0 (Stop)

Unit: %

Coolant temperature	Speed (km / h)			
	0-20	20-50	50-80	80 or above
Above 60℃	100	100	100	100
55℃＜ Temperature ≦60℃	65	65	65	0 (Stop)
≦55℃	0 (Stop)	0 (Stop)	0 (Stop)	0 (Stop)

Unit: %

Motor temperature≧120℃ or PCU temperature≧75℃ or IGBT temperature≧70℃	100
Motor temperature＜120℃ and PCU temperature＜75℃ and IGBT temperature ＜70℃)	0 (Stop)

The vehicle is in charging state

Unit:%

Compressor power (kW)	Duty cycle
A/C is on (1.5kw or above)	85
A/C is off (1.3Kw or below)	65
Air conditioning off	0 (Stop)

Unit: %

Coolant temperature	Duty cycle
Above 60℃	100
55℃＜ Temperature ≦60℃	65
≦55℃	0 (Stop)

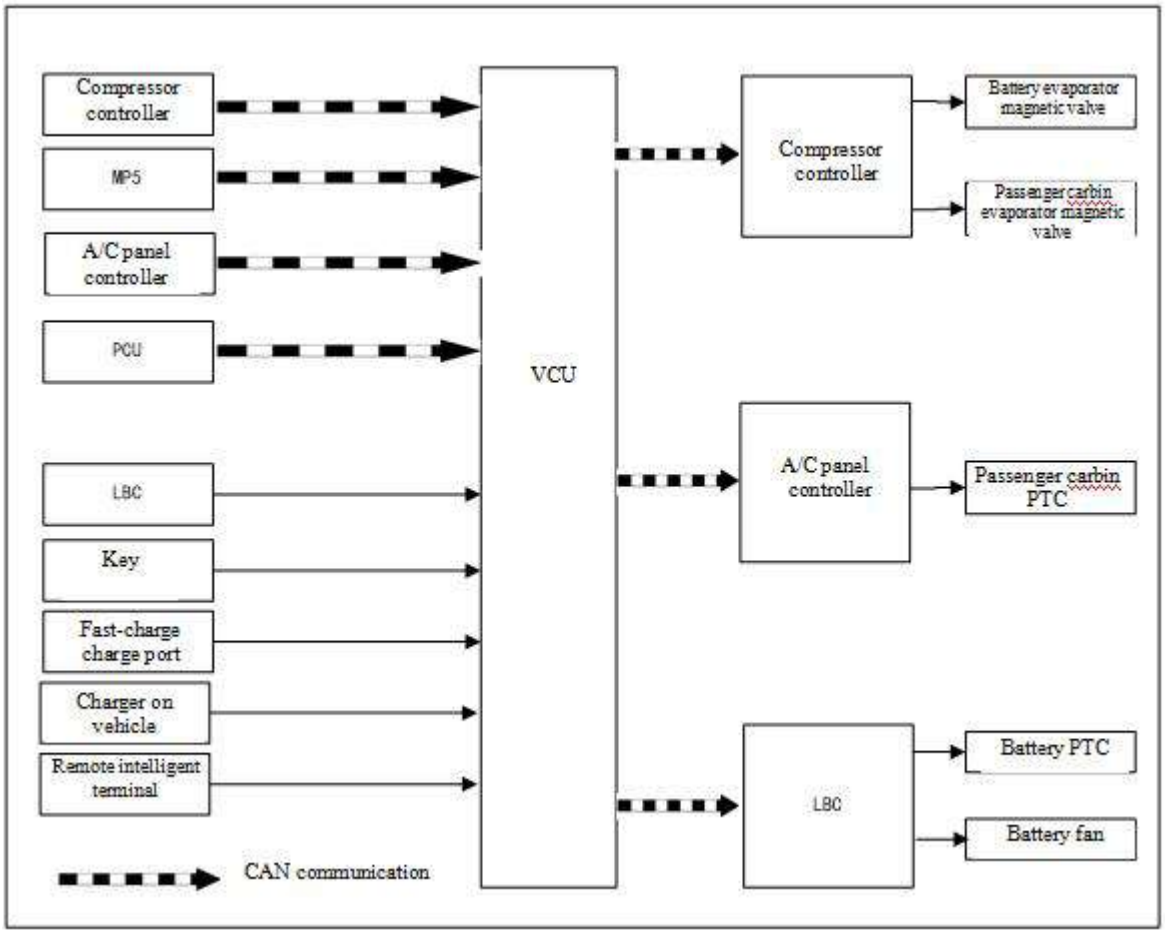
Note:

- According to the input and output linear curve set by the condenser fan, when the condenser fan receives the PWM signal as 0, the condenser fan stops working.

Battery thermal management control

System instructions

System principle



Description

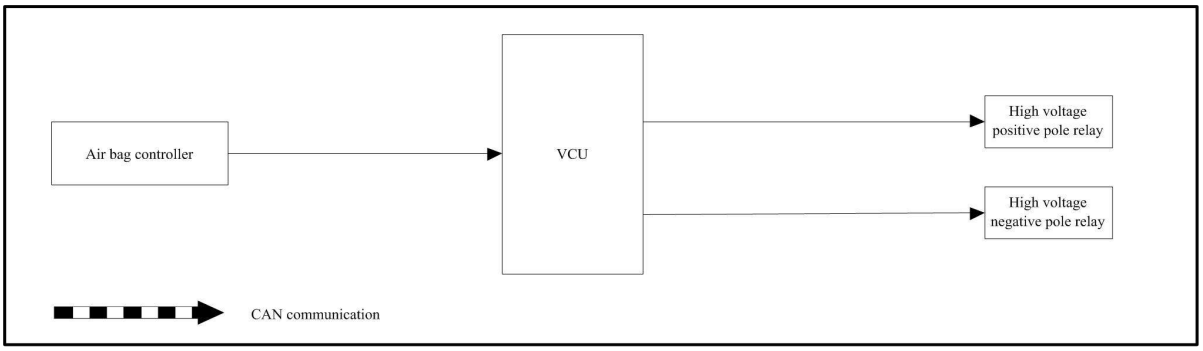
In the case of low/high temperature of power battery, VCU will heat or refrigerate power battery according to vehicle mode, fault handling, noise reduction strategy, ambient temperature and battery temperature. VCU can control the water-heater and battery chiller according to battery cell's highest/lowest temperature, so as to heat/refrigerate the battery, and guarantee that battery is always at optimal working temperature range.

Battery thermal management system adopts dual evaporator structure design, respectively, for the crew cabin and power battery.

Power cut-off control

System description

System principle



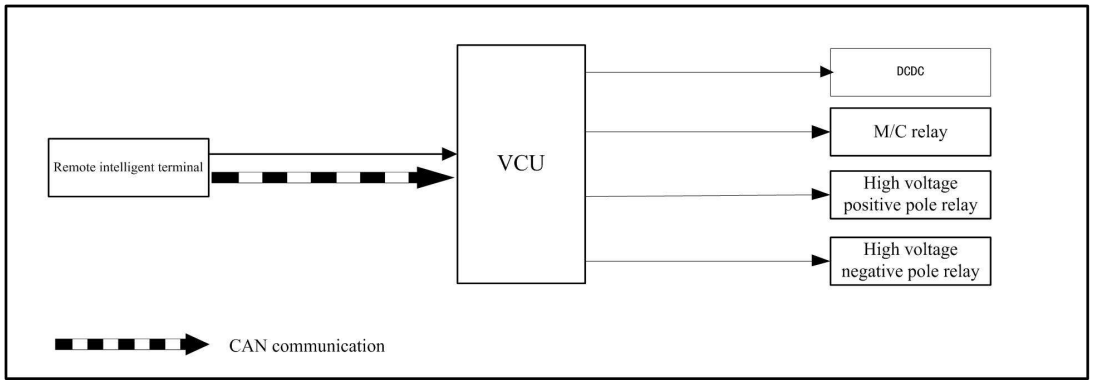
Description

- The electric vehicle uses the high-voltage power. When the vehicle suffers from collision or critical fault (the insulation fault, the power battery over-temperature/over-voltage, the power motor over-current/overheat and so on), the VCU will cut off the relay on the high-voltage circuit in order to ensure crews' safety.

12V battery automatic charge control

System description

System principle



Description

12V battery automatic charge control function is to prevent the 12V battery voltage

due to a long time placement resulting in low voltage impact of vehicle start. The remote intelligent terminal automatically wakes up the vehicle controller every 60 hours. After the vehicle controller receives the 12V charging instruction of the remote intelligent terminal, it controls the high voltage power supply and the power battery charges the 12V battery through the DCDC.

Note:

When the 12V battery is charging automatically, the charging indicator flashes in yellow color.

When the system is in the 12V battery automatic charging, the power switch start and charge will lead 12V automatic charging function to exit.

Control description

When vehicle placement time is more than 60 hours, VCU controls DCDC to charge 12V battery for 15 minutes.

The 12V automatic charging function will be exited and remote intelligent terminal timing will be cleared if any of the following conditions are met:

- When the key is placed in the "ON" or rotated to "START"
- Start DC or AC charging
- Start remote air conditioning or remote charging

Note:

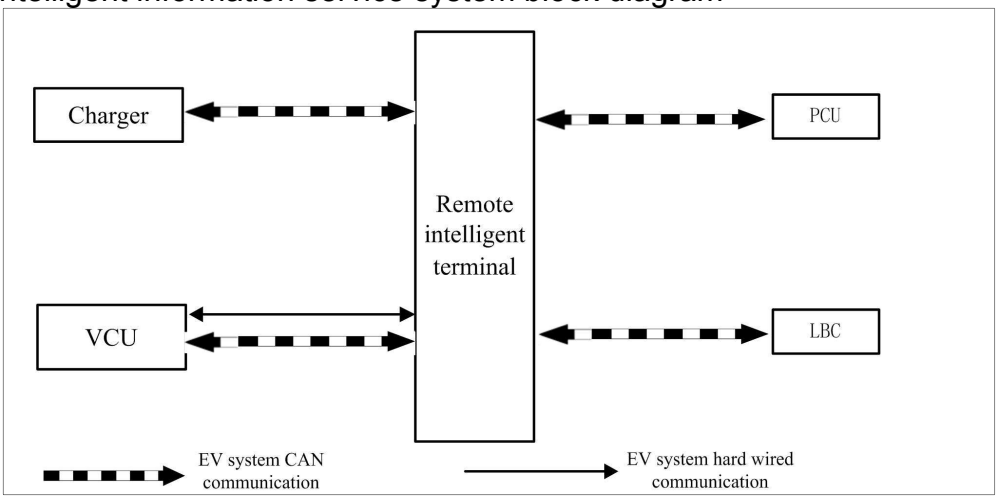
When the 12V battery is automatically charging, the power switch is turned on or off, 12V battery charging will stop.

Remote control

Users use the smartphone to transmit remote control commands through the GPRS/SMS network communication to the vehicle remote intelligent terminal, so as to control vehicle-related components and achieve remote query, remote A/C control or charging.

D R**Remote Intelligent Information Service System**

remote intelligent information service system block diagram



CAN bus communication

Input signal list

Input part	Signal name
Vehicle controller	Remote air conditioning status
	Remote charging status
	Charge plug status
	Air conditioning on reference remaining mileage
	Air conditioning off reference remaining mileage
	Slow charge complete remaining time
	DC charge complete remaining time
	Remaining power
	Function working condition of pre-heating
	Elapsed time of preheating

Output signal list

Output part	Signal name
Vehicle controller	Remote air conditioning on / off command
	Remote charging on / off command
	Remote query command
	Remote wake-up command
	Remote winter preheating on/off command

Remote air conditioner

Before driving or after parking, through the DR new energy information service center, the use of smartphones can remotely control air conditioning. The implementation of remote air conditioning control could be realized where the vehicle is under the wireless signal cover.

Air conditioning on

working principle

● Users operate air conditioning on with smart phones ;

● Mobile phone sends data to the remote intelligent terminal through SMS;

● The remote intelligent terminal receives the instruction and is awakened;

● **The remote intelligent terminal wakes up the vehicle controller through the hard line signal and sends the remote air conditioner opening command through the CAN bus.**

● The vehicle controller is awakened and starts air conditioning. The vehicle controller sends the vehicle controller status signal and the air conditioning status signal to the remote intelligent terminal through the CAN bus;

● DR New Energy Information Service Center receives the air conditioning status feedback from the remote intelligent terminal and informs the user of the operation result.

Air conditioning off

working principle

● Users operate air conditioning off with smart phones ;

● Mobile phone sends data to the remote intelligent terminal through SMS;

● The remote intelligent terminal receives commands to send remote air conditioning off commands through the CAN bus;

● The vehicle controller turns off the air conditioning. The vehicle controller sends the

vehicle controller status signal and the air conditioning status signal to the remote intelligent terminal through the CAN bus;

● DR New Energy Information Service Center receives the air conditioning status feedback from the remote intelligent terminal and informs the user of the operation result.

Remote charge (immediate charge/timing charge)

Before driving or after parking, through the DR new energy information service center, the use of smartphones can remotely control charging. The remote charging control is performed when the charging cable must be connected to the vehicle and the vehicle must be in a place where the wireless signal can cover it.

Charging start

working principle

● Users operate charging start with smartphones ;

● Mobile phone sends data to the remote intelligent terminal through SMS;

● The remote intelligent terminal receives the instruction and is awakened;

● **The remote intelligent terminal wakes up the vehicle controller through the hard line signal and sends the remote charging start command through the CAN bus.**

The vehicle controller sends the vehicle controller status signal and the charging status signal to the remote intelligent terminal through the CAN bus;

● DR New Energy Information Service Center receives the charging status feedback from the remote intelligent terminal and informs the user of the operation result.

Timing charge

working principle

● Users operate timing charging start with smartphones ;

● Mobile phone sends data to the remote intelligent terminal through SMS;

● The remote intelligent terminal receives the command and start countdown;

● After the completion of the timer, the remote intelligent terminal provides the hard line

signal to the vehicle controller and sends the remote charging close command through the CAN bus.

The vehicle controller sends the vehicle controller status signal and the charging status signal to the remote intelligent terminal through the CAN bus;

● DR New Energy Information Service Center receives the charging status feedback from the remote intelligent terminal and informs the user of the operation result.

Charging end

working principle

● Users operate charging end with smartphones ;

● Mobile phone sends data to the remote intelligent terminal through SMS;

● The remote intelligent terminal receives the command;

● The remote intelligent terminal receives commands to send remote charging end commands through the CAN bus;

The vehicle controller sends the vehicle controller status signal and the charging end status signal to the remote intelligent terminal through the CAN bus;

● DR New Energy Information Service Center receives the charging status feedback from the remote intelligent terminal and informs the user of the operation result.

Winter pre-heating

Before starting vehicle or after parking, the user can use smartphone to remotely control winter pre-heating (high/low gear optional) through DR new-energy information service center. Furthermore, the user can set time for using vehicle, and the vehicle can automatically start pre-heating battery pack and A/C in advance (system set temperature: 20℃) The vehicle must be connected to charging cable, and parked within the range where the wireless signal can cover.

Turn on winter pre-heating

Working principle

● Users select winter pre-heating function on smartphones;

● Users select winter pre-heating function on smartphones, then choose the pre-heating level and set time for using vehicle;

● Mobile phone sends data to the remote intelligent terminal through SMS;

● The remote intelligent terminal receives the command and is awakened. Then it will judge the set time for vehicle-using;

① if the set time for vehicle-using is instant awakening, the winter pre-heating will be activated immediately

② if the set time for vehicle-using is not instant awakening, VCU will judge the heating time and figure out the second awakening time. Then VCU will wait for second awakening and then activate pre-heating;

● The remote intelligent terminal wakes up the vehicle controller through the hard line signal and sends the winter pre-heating turn-on command through the CAN bus.

● The vehicle controller is awakened, starts heating battery pack and turns on A/C. The vehicle controller sends its own status signal to the remote intelligent terminal through the CAN bus;

● DR New Energy Information Service Center receives the winter pre-heating status' feedback from the remote intelligent terminal and informs the user of the operation result.

Turn off winter pre-heating

Working principle

● the user use smartphone to select "turn off winter pre-heating" (the heating will be turned off automatically when heating time has reached to 1h and temperature has reached to specified gear);

● Mobile phone sends data to the remote intelligent terminal through SMS;

● The remote intelligent terminal receives commands to send remote air conditioning turn-off commands through the CAN bus;

● The vehicle controller turns off the winter pre-heating. The vehicle controller sends its own status signal to the remote intelligent terminal through the CAN bus;

● DR New Energy Information Service Center receives the winter pre-heating status' feedback from the remote intelligent terminal and informs the user of the operation result.

Remote query

Before driving or after parking, through the DR new energy information service center, the use of smartphone can query the current state of the vehicle. The implementation of remote query could be realized where the vehicle is under the wireless signal cover.

Working principle

● Use the smartphone to remotely query the vehicle status;

● Mobile phone sends data to the remote intelligent terminal through SMS;

● The remote intelligent terminal receives the instruction and is awakened;

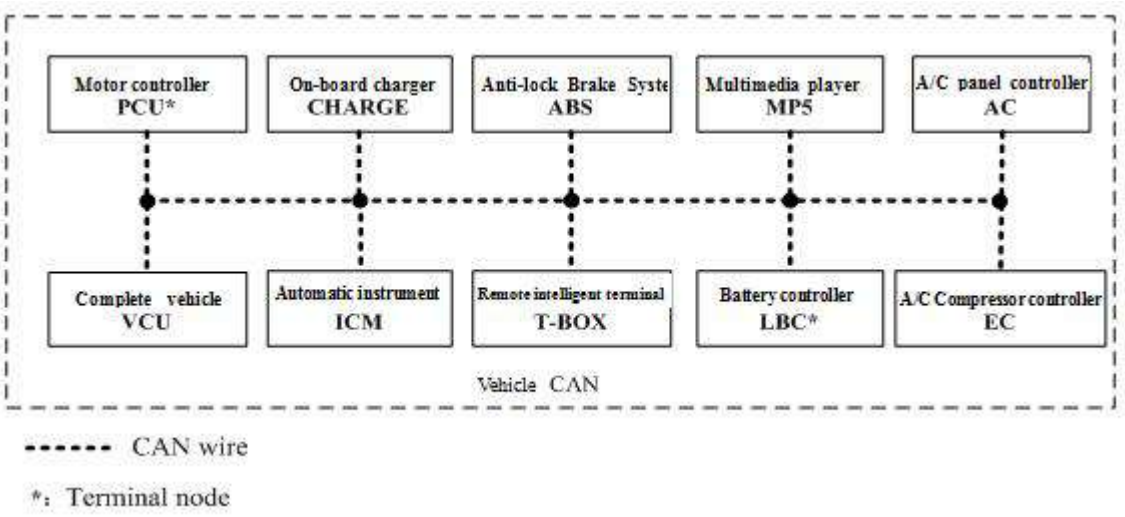
● **The remote intelligent terminal wakes up the vehicle controller through the hard line signal and sends the remote query command through the CAN bus.**

● The vehicle controller is awakened and starts other controllers, and the vehicle controller sends the vehicle controller status signal and the vehicle status signal to the remote intelligent terminal through the CAN bus;

● DR New Energy Information Service Center receives the vehicle status feedback from the remote intelligent terminal and informs the user of the operation result.

CAN communication

System description



CAN (Controller Area Network) is a real-time serial communication channel. The vehicle multi-channel communication channel has high communication speed and high fault tolerance. There are multiple controllers on the vehicle that share information with each other. Each controller is connected by two communication lines (CAN-H line and CAN-L line). Each controller can send or receive data, but only selectively receive the required data.

Online Diagnostic (OBD) System

Diagnostic description

The online diagnostic system is used to detect vehicle failure. Vehicle failure is stored in the VCU as a DTC, and diagnostic information is obtained through a diagnostic tool.

Diagnostic System (VCU)

Diagnostic tool function

Function

Diagnostic test mode	Function

ECU identifier	Readable ECU hardware version number and software version number
Self-diagnosis	Quickly read and erase the diagnostic results
Data monitoring	Read VCU input and output data
Work support	This mode uses diagnostic tools to provide technical personnel with operational hints to make them faster and more efficient

When the VCU memory is erased, the diagnostic fault code information is cleared;

Work support mode

Work item

Work item	Condition	Usage
Replace the VCU and write the data	In this mode, data is written to the VCU from the new energy vehicle diagnostic tool	Used when replace VCU
Write VIN code (manual)	Write the VIN code to the VCU	Used when write the VIN code to the VCU

Self-diagnostic mode

Self-diagnosis item

To read the DTC, refer to the "DTC Index"

How to clear DTC

- Press the new energy vehicle diagnostic tool to clear the DTC button, turn the key to the "LOCK" block, wait 10s and turn the key to "ON" to clear the DTC.
- Use the diagnostic tool to confirm the presence of DTCs in other controllers.

Data monitoring mode

Monitoring items

Monitoring items	unit	Description
Vehicle speed	Km/h	Displays the current vehicle speed
Mileage	Km	Display the total mileage of the vehicle by the instrument, with the range 0 to 16777215
12V battery voltage	V	Displays the 12V battery acquisition voltage
5V power supply filtering	V	Displays the 5V voltage value collected by VCU
Key state	KEY OFF/KEY ON/KEY START	Displays the key state: KEY OFF indicates that the key is in KEY OFF state KEY ON indicates that the key is in KEY ON state KEY START indicates that the key is in KEY START state
Gear position	R/N/D	Displays the current gearshift gear: R stands for reverse gear N stands for neutral gear D stands for forward gear
Water pump PWM	%	Displays the PWM signal duty cycle sent by the VCU to the pump controller
Fan PWM	%	Displays the PWM signal duty cycle sent by the VCU to the fan unit
Brake switch state	Brake / no brake	Display the status of the brake switch: Brake indicates that the brake pedal has been pressed No brake indicates that the brake pedal has not been pressed
Brake light status	Lights off / lights on	Display the status of the brake light: Lights off indicates that the brake light is off

		Lights on indicates that the brake light is on
Accelerator pedal 1 opening	%	Displays the ratio of the depth of the accelerator pedal 1
Accelerator pedal 2 opening	%	Displays the ratio of the depth of the accelerator pedal 2
Brake pedal 1 opening	%	Displays the ratio of the depth of the brake pedal 1
Brake pedal 2 opening	%	Displays the ratio of the depth of the brake pedal 2
Coolant temperature	℃	Displays the temperature of the coolant with the range of -40 ° C to 210 ° C
SSO enabled	Enable / disable	Displays the state where the VCU sends SSO enabled: Enable indicates the SSO enable Disable indicates the SSO disable
S-mode switch status	Enable / disable	Display the status of the S-mode switch: Enable indicates the S-mode switch is pressed Disable indicates the S-mode switch is not pressed
DCDC hardwired enabled	Enable / disable	Displays DCDC hardwire status: Enable indicates DCDC hardwire is enabled Disable indicates DCDC hardwire is disabled
Hand brake signal	With a signal / no signal	Displays the status of the handbrake signal: With a signal indicates with a handbrake signal No signal indicates no handbrake signal
Instant charging switch signal (current status belongs to trigger signal)	Enable / disable	Displays immediate charge switch signal status Enable indicates the immediate charge switch is pressed Disable indicates the immediate charge switch is

		not pressed
VCU failure	Normal / failure	Display VCU current status that VCU sends to PCU: Normal indicates VCU is normal Failure indicates VCU is failed
High voltage interlocking state	Normal / fault	Displays the high voltage interlock signal status: Normal indicates that the high voltage interlock signal is normal Fault indicates that the high voltage interlock signal is faulty
M/C relay enable	Enable / disable	Displays the status of the VCU control MC relay command: Enable indicates that the MC relay is engaged Disable indicates that the MC relay is disconnected
AC relay enable	Enable / disable	Displays the status of the VCU control AC relay command: Enable indicates that the AC relay is engaged Disable indicates that the AC relay is disconnected
High voltage main relay enable	Enable / disable	Displays the status of the VCU control high voltage main relay command: Enable indicates that the high voltage main relay is engaged Disable indicates that the high voltage main relay is disconnected
High voltage main negative relay enable	Enable / disable	Displays the status of the VCU control high voltage main negative relay command: Enable indicates that the high voltage main

		negative relay is engaged Disable indicates that the high voltage main negative relay is disconnected
High voltage pre-charge relay enable	Enable / disable	Displays the status of the VCU control high voltage pre-charge relay command: Enable indicates that the high voltage pre-charge relay is engaged Disable indicates that the high voltage pre-charge relay is disconnected
Direct charge relay enabled	Enable / disable	Displays the status of the VCU control direct charge relay command: Enable indicates that the direct charge relay is engaged Disable indicates that the direct charge relay is disconnected
VCU mode	OFF_MODE/ STAND_BY_ MODE/NOR MAL_MODE/ AC_CHARG E_MODE/DC _CHARGE_ MODE/FAILS AFE_MODE	Display VCU operating mode: OFF_MODE indicates power down mode STAND_BY_MODE indicates the wait mode NORMAL_MODE indicates normal mode AC_CHARGE_MODE indicates the AC charging mode DC_CHARGE_MODE indicates the DC charging mode FAILSAFE_MODE Indicates the failure mode
VCU_Sub1_1	STANDBY_M ODE/POWE RED_MODE/ POWERDO	Displays the status of VCU sub mode 1_1: STANDBY_MODE indicates the wait mode POWERED_MODE indicates power-up mode POWERDOWN_MODE indicates power down

	WN_MODE	process mode
VCU_Sub2_1	POWERUP_MODE/READY_MODE/RUN_MODE	Displays the status of VCU sub mode 2_1: POWERDOWN_MODE indicates power up process mode READY_MODE indicates READY tripable mode RUN_MODE indicates the operating mode
VCU_Sub1_2	AC_CHARGE_POWERUP_MODE/AC_CHARGE_PROCESS_MODE/AC_CHARGE_POWERDOWN_MOD	Displays the status of VCU sub mode 1_2: AC_CHARGE_POWERUP_MODE indicates the AC charging wait mode AC_CHARGE_PROCESS_MODE indicates the AC charging process mode AC_CHARGE_POWERDOWN_MODE indicates the AC charging power down mode
VCU_Sub1_3	DC_CHARGE_POWERUP_MODE/DC_CHARGE_PROCESS_MODE/DC_CHARGE_POWERDOWN_MOD	Displays the status of VCU sub mode 1_3: DC_CHARGE_POWERUP_MODE indicates the DC charging wait mode DC_CHARGE_PROCESS_MODE indicates the DC charging process mode DC_CHARGE_POWERDOWN_MODE indicates the DC charging power down mode
VCU_Sub1_4	REMOTE_INQUIRE_MODE/REMOTE_AIR_CONTROL_MODE/	Displays the status of VCU sub mode 1_4: REMOTE_INQUIRE_MODE indicates the remote query mode REMOTE_AIR_CONTROL_MODE indicates the remote air conditioner mode

	REMOTE_CHARGE_MODE/REMOTE_POWERDOWN_MODE	REMOTE_CHARGE_MODE indicates the remote charging mode REMOTE_POWERDOWN_MODE Indicates the remote power down mode
SOC	%	Display power battery status with range 0% to 100%
SOE	%	Displays the proportion of the remaining energy of the power battery with the range of 0% to 100%
SOH	%	Display power battery life status with range 0% to 100%
Reference residual mileage	Km	Displays the remaining mileage that the current vehicle can refer to
AC ON remaining mileage	Km	Displays VCU sent to the T-BOX if the air conditioning is turned on, the vehicle remaining mileage, the range is 0 ~ 150KM
AC OFF remaining mileage	Km	Displays VCU sent to the T-BOX if the air conditioning is turned off, the vehicle remaining mileage, the range is 0 ~ 150Km
Remote wake-up command	Enable / disable	Displays the status of the remote wake-up signal: Enable indicates there is a remote wake-up signal Disable indicates there is no remote wake-up signal
Remote charging command	Initial value / reserved / remote	Displays that the T-BOX sends the command to the VCU after receiving the remote charging request sent by the owner:

	charging request / no remote charging request	The initial value represents the default value for initialization Reserved means that the value is reserved Remote charging request indicates that the owner has a remote charging request No remote charging request indicates that the owner has no remote charging request
Remote air conditioner command	Initial value / reserved / remote air conditioner request / no remote air conditioner request	Displays that the T-BOX sends the command to the VCU after receiving the remote air conditioner request sent by the owner: The initial value represents the default value for initialization Reserved means that the value is reserved No remote air conditioner request indicates that the owner has no remote air conditioner request Remote air conditioner request indicates that the owner has Remote air conditioner request
12V battery charging command	Initial value / no charging command / charging command / reserved	Displays when the vehicle is stationary for 60 hours, T-BOX automatically wakes up, sends the flag to the VCU, requires VCU to charge the lead-acid battery: The initial value represents the default value for initialization No charging command indicates no 12V battery charging command Charging command indicates there is 12V battery charging command Reserved means that the value is reserved
Remote read vehicle	Initial value /	Displays that the T-BOX sends the command to

status request	reserved / remote read vehicle status request / no remote read vehicle status request	the VCU after receiving the remote read vehicle status request sent by the owner: The initial value represents the default value for initialization Reserved means that the value is reserved Remote read vehicle status request indicates that the owner sends a remote query request No remote read vehicle status request indicates that the owner does not send a remote query request
Remote operation status	Initial value / remote operation process / VCU remote operation end	Displays the current remote operating status of the VCU after receiving the remote request sent by T-BOX: The initial value represents the default value for initialization The remote operation indicates that a remote operation is being performed VCU remote operation end indicates VCU feedback remote operation end
Remote air conditioning status	Initial value / on / fault and turn off / off	Displays remote air conditioning current working status VCU sent to the T-BOX : The initial value represents the default value for initialization On indicates that the air conditioner is on Fault and off indicates that the air conditioner is faulty and off Off indicates that the air conditioner is off
Charge plug status	Not inserted / inserted not	Displays the status of the charging cable that the VCU sends to the T-BOX:

	charged / charged / other	Not inserted indicates that the charger plug is not inserted; Inserted not charged indicates that the charger plug is inserted, but not charged; Charged indicates that the charger plug is inserted and charged; Other indicates the reserved
Remote charging status	Initial value / on / fault and turn off / off	Displays remote charging current working status VCU sent to the T-BOX : The initial value represents the default value for initialization On indicates that charging starts Faulty and off indicates a charging fault and is turned off Off indicates the charging is turned off
Remote air conditioning demand temperature	°C	Displays that the T-BOX receives the remote air-conditioning request sent by the owner, sends the air conditioner temperature command set by the owner to the VCU, the temperature range is 0 ~ 30 ° C
VCU power down command bit	Initial value / power down command	Displays the command whether to end the remote operation that VCU sends to the T-BOX : The initial value represents the default value for initialization Power down command indicates that the VCU has a power down command Other indicates the reserved
Motor target torque	Nm	Displays the target torque command sent by the VCU to the motor

Motor actual torque	Nm	Displays the actual torque output of the motor
Motor actual speed	rpm	Displays the actual speed of the motor
High voltage power state	High voltage power on complete / no high voltage power on	Displays high voltage power on status VCU sent: High voltage power on complete indicates the high voltage power on is completed No high voltage power on indicates the high voltage power on is not completed
Motor controller IGBT temperature	℃	Displays the temperature of the motor controller IGBT with the range of -40 ° C to 210 ° C
Motor controller temperature	℃	Displays the temperature of the motor controller with the range of -40 ° C to 210 ° C
Motor temperature	℃	Displays the temperature of the motor with the range of -40 ° C to 210 ° C
TM motor IGBT command	Gate ON/ Gate OFF	Displays TM motor IGBT command that VCU sent: Gate ON indicates that the VCU is sent command to the IGBT Gate OFF indicates that the VCU is sent OFF command to the IGBT
IGBT state	Gate ON/ Gate OFF	Display TM motor current IGBT command: Gate ON indicates that the IGBT is currently operating Gate OFF indicates that the IGBT is currently cut off
TM motor current steering command	Idle / forward / reverse	Displays the current steering command sent by the VCU to the motor: Idle indicates that the VCU is sent idle command to the motor Forward indicates that the VCU is sent forward

		command to the motor Reverse indicates that the VCU is sent reverse command to the motor
Motor current steering command	Idle / forward / backward / reserved	Displays the current actual steering of the motor: Idle indicates that the motor idles Forward indicates that the motor is forward Reverse indicates that the motor is backward Reserved indicates the reservation
TM motor bus voltage value	V	Displays TM bus voltage value
Power battery voltage	V	Displays the current voltage of the power battery
Power battery current	A	Displays the current value of the power battery
Maximum single cell voltage	mV	Displays power battery maximum single cell voltage
Minimum single cell voltage	mV	Displays power battery minimum single cell voltage
Minimum single cell temperature	℃	Displays power battery maximum temperature
Maximum single cell temperature	℃	Displays power battery minimum temperature
Power Battery No. 1 sensor sensitivity temperature	°C	Displays the temperature value collected by the No.1 temperature sensor in the BMS
Power Battery No. 2 sensor sensitivity temperature	°C	Displays the temperature value collected by the No.2 temperature sensor in the BMS
Power Battery No. 3 sensor sensitivity temperature	°C	Displays the temperature value collected by the No.3 temperature sensor in the BMS

Minimum temperature sensitivity of power battery	—	Displays the minimum temperature sensor temperature of the battery sent by the BMS to the VCU, with the range of 0 to 15
Maximum temperature sensitivity of power battery	—	Displays the maximum temperature sensor temperature of the battery sent by the BMS to the VCU, with the range of 0 to 15
Maximum single cell voltage cell number	—	Display battery cell number corresponding to the maximum cell voltage
Minimum single cell voltage cell number	—	Display battery cell number corresponding to the minimum cell voltage
Maximum battery cell internal resistance	Milliohm	Displays maximum internal resistance of the battery cell, with the resistance range from 0 to 25.5 milliohms
Battery pack internal resistance	Milliohm	Displays the internal resistance of the battery pack, with the resistance range from 0 ~ 2550.0 milliohms
Insulation resistance	Megaohm	Displays the insulation resistance of the high voltage circuit
Battery thermal management operation mode	Charge heating / charge slow-cooling / ambient charge / discharge precooling / discharge cooling /	Displays the operating mode of the battery thermal management VCU sent to MP5: Charge heating indicates that the battery thermal management mode is charge heating mode; charge slow-cooling indicates that the battery thermal management mode is charge slow-cooling mode; Ambient charge indicates that the battery thermal management mode is ambient charge

	ambient discharge / charge preheating / charge fast-cooling / winter preheating	mode; Discharge precooling indicates that the battery thermal management mode is discharge precooling mode; Discharge cooling indicates that the battery thermal management mode is discharge cooling mode; Ambient discharge indicates that the battery thermal management mode is ambient discharge mode; Charge preheating indicates that the battery thermal management mode is charge preheating mode; charge fast-cooling indicates that the battery thermal management mode is charge fast-cooling mode; Winter preheating indicates that the battery thermal management mode is winter preheating mode;
Charging ampere-hour	AH	Displays power battery cumulative charge an hours
Discharging ampere-hour	AH	Displays power battery cumulative discharge an hours
Release energy	WH	Displays power battery cumulative release energy
Charged energy	WH	Displays power battery cumulative charged energy
BMS operation mode	Default / run / hibernate /	Displays the BMS operation mode Default indicates the default value

	fault	Run indicates that the BMS is in run mode Dormant indicates that BMS is in dormant mode Fault indicates that the BMS is in fault mode
Hardware fault status bit	Initialization success/hardware fault false positives	Displays the hardware fault line status bits that the BMS sends to VCU: initialization success indicates that the BMS hardware fault line can be trusted false hardware fault indicates that BMS hardware fault line is unreliable Other indicates the BMS hardware fault line is unreliable
Battery evaporator solenoid valve command	ON/ OFF	Displays the battery evaporator solenoid valve command VCU sent: ON indicates that VCU sends turn-on command to battery evaporator solenoid valve OFF indicates that VCU sends turn-off command to battery evaporator solenoid valve Other indicates the reserved
Battery steam solenoid valve status	ON/ OFF	Displays the battery evaporator solenoid valve status that AC compressor sent: ON indicates that the battery evaporator solenoid valve is on OFF indicates that the battery evaporator solenoid valve is off Other indicates the reserved
The remote crew cabin evaporator open command	ON/ OFF	Displays the crew cabin evaporator open command sent by the VCU: ON indicates that the crew cabin evaporator is on

		OFF indicates that the crew cabin evaporator is off Other indicates the reserved
Air conditioning crew cabin evaporator solenoid valve status	ON/ OFF	Displays crew cabin evaporator solenoid valve status that air conditioning compressor feedback to the VCU: ON indicates that the crew cabin evaporator solenoid valve is on OFF indicates that the crew cabin evaporator solenoid valve is off Other indicates the reserved
Condenser fan request	OFF / low grade/ high grade	Displays the condenser fan's speed request sent by the compressor controller to the VCU: OFF indicates that the condenser fan's request is off Low grade indicates that the condenser fan's request is in low mode High grade indicates that the condenser fan's request is in high mode
Blower operating status	ON/ OFF	Displays the blower running status that sent by the air conditioner panel : On indicates that the blower is on Off indicates that the blower is off
Battery evaporator temperature	°C	Displays the temperature at which the battery sends the cooling temperature to the battery evaporator in the range -40 ° C to 125 ° C
Battery PTC temperature	°C	Displays the temperature at which the battery sends the cooling temperature to the PTC in the range -40 ° C to 125 ° C

Battery cooling temperature demand	°C	Displays the battery cooling temperature requirements sent by the VCU to the compressor, in the range -40 ° C to 125 ° C
No open the solenoid valve	Allow/Prohibit	Displays no open the crew cabinet solenoid and PTC command that VCU sends to compressor controller: Allow indicates the passenger compartment allow the solenoid valve and PTC to open Prohibit indicates the passenger compartment not allow the solenoid valve and PTC to open Other indicates the reserved
Battery fan ON command 1	Fan on / fan off	Displays battery fan 1's turn-on command sent by VCU to the BMS: Fan on indicates that the VCU sends the fan 1 open command Fan off indicates that the VCU sends the fan 1 off command Other indicates the reserved
Battery fan ON command 2	Fan on / fan off	Displays battery fan 2's turn-on command sent by VCU to the BMS: Fan on indicates that the VCU sends the fan 2 open command Fan off indicates that the VCU sends the fan 2 off command Other indicates the reserved
Battery fan flag	Fan off / Fan 1 On / Fan 2 On / Fan 1 and Fan 2	Displays the switch status of the battery fans 1 and 2 fed back to the VCU by the BMS: Fan off indicates that the fan 1 and fan 2 are off Fan 1 on indicates that the fan 1 is on

	are on at the same time	Fan 2 on indicates that the fan 2 is on Fan 1 and Fan 2 are on at the same time indicates fan 1 and fan 2 are on at the same time
Battery PTC open command	Heater on / heater off	Displays battery PTC open command that VCU sent to the BMS: Heater on indicates that the VCU requests battery PTC to turn on Heater off indicates that the VCU requests battery PTC to turn off Other indicates the reserved
Battery PTC working status	Heater on / heater off	Displays the switch status of the battery PTC fed back to the VCU by the BMS: Heater on indicates that the battery PTC is currently on Heater off indicates that the battery PTC is currently off Other indicates the reserved
AC charge wake-up signal	Enable / disable	Displays the status of the AC charge wake-up signal: Enable indicates there is a AC charge wake-up signal Disable indicates there is no AC charge wake-up signal
AC high voltage side output current	A	Displays the output current value of the high voltage side of the charger
AC charging current command	A	Displays AC charging current value that VCU sent to charger
AC high voltage side output voltage value	V	Displays the output voltage value of the high voltage side of the charger

AC charging maximum allowable charge voltage	V	Displays AC charging maximum allowable charge voltage that VCU sent to charger
AC charging remaining time	Minute	Displays the time required that the VCU send to the T-BOX, based on the current remaining power with AC charging mode in the range of 0-1000 minutes
AC charging stop charging command	Allow charge / stop charge	Displays AC charging stop command that VCU sent to charger: Charge allowed indicates charger's charging process is available Stop charging indicates stopping the charger to charge
AC charger status	Charger stand by/charging operation/shut down	Displays charger current operating status: charger stand by indicates that the charger is in charging complete mode, but the plug is unplugged charging operation indicates that the charger is in charging mode shut down indicates that the charger is in charging off mode
DC charge wake-up signal	Enable / disable	Displays the status of the DC wake-up signal: Enable indicates there is a DC charge wake-up signal Disable indicates there is no DC charge wake-up signal
DC charge on command	ON/ OFF	Displays DC charging on command VCU sent to the charging pile : ON indicates that the VCU sends turn-on

		command to the charging pile OFF indicates that the VCU sends turn-off command to the charging pile
DC charging current command	A	Displays DC charging current value that VCU sent to charging pile
DC charging maximum allowable charge voltage	V	Displays DC charging maximum allowable charge voltage that VCU sent to charging pile
DC high voltage side output voltage value	V	Displays the output voltage value of the high voltage side of the charging pile
DC high voltage side output current	A	Displays the output current value of the high voltage side of the charging pile
DC charge full flag	Full / not full	Displays the DC charge full flag that VCU sent: Full indicates that VCU sends DC charging is full Not full indicates that VCU sends DC charging is not full
DC charger status	Charger stand by/charging operation/shut down	Displays the DC charge pile working status: charger stand by indicates that the charge pile is in charging complete mode, but the plug is unplugged charging operation indicates that the charge pile is in charging mode shut down indicates that the charge pile is in charging off mode
DC charging remaining time	Minute	Displays the time required that the VCU send to the T-BOX, based on the current remaining power with DC charging mode in the range of 0-1000 minutes
AC charger operating	℃	Displays charger operating temperature in a

temperature		range -40-210 ℃
Air conditioning limit power command (%)	%	Displays the percentage of VCU sent to the air conditioner limit power command
Prohibit compressor start command	Allow/Prohibit	Displays prohibit start command VCU sent to compressor : Allow indicates that the VCU sends a compressor start allow command Prohibit indicates that the VCU sends a compressor start prohibit command Other indicates the reserved
Environment temperature	℃	Displays the ambient temperature detected by the air conditioning controller
User demand temperature	°C	Display the user request temperature that air conditioner panel controller sent to the compressor: Temperature range is from 16 ° C to 32 ° C, other reserved
Interior temperature	°C	Displays the Interior temperature values sent by the air panel, in the range of -30 ° C to 50 ° C
Compressor working status	ON/ OFF	Displays the compressor working status that air conditioning compressor feedback to the VCU: On indicates that the compressor is on Off indicates that the compressor is off Other indicates the reserved
Compressor speed	rpm	Displays the compressor speed that air conditioning compressor feedback: The range is 0 ~ 4500; other reserved
A/C system normal	Fault / no fault	Display system operating status sent by compressor :

		Fault indicates that the compressor system is faulty No fault indicates that the compressor system is not faulty
Air conditioner command	Invalid / defrost / effect	Display the user request command for the air conditioning panel: Invalid indicates that the user request command is invalid Defrost indicates that the user request command is defrost Effect indicates that the user request command is effect Other indicates the reserved
The passenger air flow limit command	Off / 1/2/3/4/5/6/7 / other	Displays the passenger compartment blower air flow limit command that VCU sent to the air conditioning panel controller : Off indicates the blower is turned off 1 indicates that the blower air flow request is 1 grade; 2 indicates that the blower air flow request is 2 grade; 3 indicates that the blower air flow request is 3 grade; 4 indicates that the blower air flow request is 4 grade; 5 indicates that the blower air flow request is 5 grade; 6 indicates that the blower air flow request is 6 grade;

		7 indicates that the blower air flow request is 7 grade; Other indicates the reserved
Compressor motor missing phase	Fault / no fault	Displays compressor motor missing phase status: Fault indicates that the compressor motor is missing phase No fault indicates that the compressor motor is not missing phase
The air conditioning controller output overload	Fault / no fault	Displays the air conditioning controller output overload status: Fault indicates that the air conditioner controller has output overload fault No fault indicates that the air conditioner controller not has output overload fault
Air conditioning controller overheat	Fault / no fault	Displays the air conditioning controller overheat status: Fault indicates that the air conditioner controller has overheat fault No fault indicates that the air conditioner controller not has overheat fault
The air conditioning controller output short circuit	Fault / no fault	Displays the air conditioning controller output short circuit status: Fault indicates that the air conditioner controller has output short circuit fault No fault indicates that the air conditioner controller not has output short circuit fault
Air conditioning input DC undervoltage	Fault / no fault	Displays air conditioning input DC undervoltage (<= 200V) status:

		Fault indicates that there is an air conditioner input DC undervoltage fault No fault indicates that there is no air conditioner input DC undervoltage fault
Air conditioning input DC overvoltage	Fault / no fault	Displays air conditioning input DC overvoltage (<= 400V) status: Fault indicates that there is an air conditioner input DC overvoltage fault No fault indicates that there is no air conditioner input DC overvoltage fault
Rear defrost state	Invalid / valid	Displays the status of AC panel control rear defrost Invalid indicates that the defrost function is invalid Valid indicates that the defrost function is valid Other indicates the reserved
PTC on status	—	Displays the PTC open status command sent by the air conditioning panel controller: 0 indicates invalid; 1 indicates that PTC is on 1; 2 indicates that PTC is on 2;
Whether ABS is working	Work / no work	Displays ABS report whether is currently working: Work indicates that ABS is in working condition No work indicates that ABS is not in working condition
Whether ABS is operating properly	Normal / fault	Displays whether ABS is operating properly Normal indicates ABS is operating normally Fault indicates ABS is faulty

Whether EBD is operating properly	Normal / fault	Displays whether EBD is operating properly Normal indicates EBD is operating normally Fault indicates EBD is faulty
Motor controller fault code	—	Displays the current fault code reported by the motor controller with a range of 0 to 255
Battery management system fault code	—	Displays the current fault code reported by the battery management system with a range of 0 to 255
Vehicle control system fault code	—	Displays the current fault code reported by the vehicle controller with a range of 0 to 255
Charger fault	—	Displays the current fault code reported by the charger with a range of 0 to 255

VCU diagnostic information

Reference value

The value displayed in the diagnostic tool

Note:

1.Memo data as the reference value;

2.As part of the display value is collected by the VCU sensor signal and obtained through the calculation, so it has difference with the actual signal, parameters and operation.

Monitoring projects	Condition	value/status
Vehicle speed	Turn the drive wheel and compare the meter tachometer indication value	And is basically the same as the instrument tachometer
Mileage	Key is at ON	0~16777215
12V battery voltage	Key is at ON	13 – 15 V
	READY	13 – 15 V

5V power supply filtering	Key is at ON		0-5V
Key state	The key at "LOCK" or pull out;		Key off
	Key is at ON		KEY ON
	The key is rotated to "START"		Key start
Gear position	Key is at ON	Shift lever: R	R
		Shift lever: N	N
		Shift lever: D or S	D
Water pump PWM	The key at "LOCK" or pull out;	Water pump stop working	10%
	Key is at ON	Water pump speed 1000~5000rpm	30%-98%
	READY	Water pump speed 1000~5000rpm	30%-98%
	DC charge	Water pump speed 400~5000rpm	20%-98%
	AC charge	Water pump speed 0~5000rpm	10%-98%
Fan PWM	The key at "LOCK" or pull out;	Fan stop working	0%
	Key is at ON	Fan speed 0~2400rpm	0-100%
	READY	Fan speed 0~2400rpm	0-100%
	DC charge	Fan speed 0~2400rpm	0-100%
	AC charge	Fan speed 0~2400rpm	0-100%
Brake switch state	Brake pedal: pressed		No brake
	Brake pedal: released		Brake
Brake light status	Brake pedal: released		No brake

	Brake pedal: pressed		Brake
Accelerator pedal 1 opening	Key is at ON	Accelerator pedal: pressed totally	95%-100%
		Accelerator pedal: released totally	0%-5%
Accelerator pedal 2 opening	Key is at ON	Accelerator pedal: pressed totally	95%-100%
		Accelerator pedal: released totally	0%-5%
Brake pedal 1 opening	Key is at ON	Brake pedal: pressed totally	95%-100%
		Brake pedal: released	0%-5%
Brake pedal 2 opening	Key is at ON	Brake pedal: pressed totally	95%-100%
		Brake pedal: released	0%-5%
Coolant temperature	Vehicle READY 2 minutes later		-40-210°C
SSO enabled	Power down process: ON → OFF		Enable
	Other		Disable
S-mode switch	S-mode switch is unpressed		None
	S-mode switch is pressed		Yes
DCDC hardwired enabled	The key at "LOCK" or pull out; Power down process: ON → OFF		Disable
	Key is at ON		Enable
Handbrake signal	Handbrake released		Handbrake down
	Handbrake up		Handbrake up
Immediate charge switch signal	Key is at ON	The immediate charge switch: pressed	ON
		The immediate charge	OFF

		switch: released	
VCU failure	VCU operation is normal		Normal
	VCU operation is abnormal		Failure
High voltage interlocking state	The high voltage interlock signal is normal		Normal
	The high voltage interlock signal is faulty		Malfunction
M/C relay enable	READY		Engaged
	Key is at ON		Engaged
	The key at "LOCK" or pull out;		Cut off
AC relay enable	READY		Engaged
	Key is at ON		Engaged
	The key at "LOCK" or pull out;		Cut off
High voltage main relay enable	READY		Engaged
	Key is at ON		Engaged
	The key at "LOCK" or pull out;		Cut off
High voltage main negative relay enable	READY		Engaged
	Key is at ON		Engaged
	The key at "LOCK" or pull out;		Cut off
High voltage pre-charge relay enable	READY		Engaged
	Key is at ON		Engaged
	The key at "LOCK" or pull out;		Cut off
Direct charge relay enabled	DC status		Engaged
	Other		Cut off
VCU mode	Remote query		STAND_BY_MODE
	Key is at ON		NORMAL_MODE
	AC charge		AC_CHARGE_MODE
	DC charge		DC_CHARGE_MODE
VCU_Sub1_1	Key is at ON		STANDBY_MODE

	Key is at ON	POWERED_MODE
	The key at "LOCK" or pull out;	POWERDOWN_MODE
VCU_Sub2_1	Key is at ON	POWERUP_MODE
	READY	READY_MODE
	READY, and in the D gear or R gear	RUN_MODE
VCU_Sub1_2	AC charging gun inserted	AC_CHARGE_POWERUP_MODE
	AC charging gun inserted	AC_CHARGE_PROCESS_MODE
	AC charging gun unplugged	AC_CHARGE_POWERDOWN_MODE
VCU_Sub1_3	DC charging gun inserted	DC_CHARGE_POWERUP_MODE
	DC charging gun inserted	DC_CHARGE_PROCESS_MODE
	DC charging gun unplugged	DC_CHARGE_POWERDOWN_MODE
VCU_Sub1_4	Remote query	REMOTE_INQUIRE_MODE
	Remote air conditioner control	REMOTE_AIR_CONTROL_MODE
	Remote charging control	REMOTE_CHARGE_MODE
	Remote operation end	REMOTE_POWERDOWN_MODE
SOC	Key is at ON	0-100%
	Charging status	0-100%
SOE	Key is at ON	0-100%
	Charging status	0-100%

SOH	Key is at ON	0-100%
	Charging status	0-100%
Reference residual mileage	Key is at ON	0～180km
AC ON remaining mileage	Air conditioning on	0～-150km
AC OFF remaining mileage	Air conditioning off	0～-150km
Remote wake-up command	Remote operation	Enable
	No remote operation	Disable
Remote charging request	No remote charging request	2
	Remote charging request	3
Remote air conditioner request	No remote air conditioner request	2
	Remote air conditioner request	3
Winter pre-heating request	Winter pre-heating request available (instant turn-on)	2
	Winter pre-heating request available (not instant turn-on)	1
	Winter pre-heating request unavailable	0
12V battery charging command	Without vehicle stationary for 60 hours	1
	Vehicle stationary for 60 hours	2
Remote read vehicle status request	No remote read vehicle data request	2
	Remote read vehicle data request	3
Remote operation status	Remote operation	Remote operation process
	Remote operation complete	Remote operation end
Remote air conditioning status	Remote air conditioning is successful	Remote air conditioning on

	Remote air conditioning is completed	Remote air conditioning off
Charge plug status	Charging gun unplugged	The charger plug is not inserted
	Charging gun inserted	The charger plug is inserted but not charging
	Charging gun inserted	The charger plug is inserted and charging
Remote charging status	Charging gun inserted	Charging completed, plug unplugged
	Charger plug inserted	Charging process
	Charger unplugged	OFF
Remote air conditioning demand temperature	Remote air conditioning on	0-30°C
VCU power down command bit	Remote operation end	Power down command
	Other	Other
Motor target torque	READY	0-215Nm
Motor actual torque	READY	0-215Nm Based on the accelerator pedal opening
Motor actual speed	Speed is 0 km/h	0rpm
	Speed is 60km/h	3600rpm (around)
High voltage power state	No high voltage power on	No high voltage power on

	High voltage power on completed	High voltage power on completed
Motor controller IGBT temperature	Key is at ON	-40-210℃
Motor controller temperature	Key is at ON	-40-210℃
Motor temperature	Key is at ON	-40-210℃
PCU IGBT command	VCU sends IGBT off command	Gate OFF
	VCU sends IGBT on command	Gate ON
IGBT state	Actual operating status of PCU IGBT	Gate OFF (refer to PCU IGBT command)
	Actual operating status of PCU IGBT	Gate ON (refer to PCU IGBT command)
TM motor current steering command	READY, and in the D gear	Forward
	READY, and in the R gear	Backward
Motor current steering	The drive wheel rotates forward	Forward
	The drive wheel rotates backward	Backward
TM motor bus voltage value	Key is at ON	0-1003.98V
Power battery voltage	Key is at ON	276-377.2V
Power battery current	READY Electrical load: no load	0-10A
Maximum single cell voltage	Key is at ON	0-5000mv
	Charging status	0-5000mv
Minimum single cell voltage	Key is at ON	0-5000mv
	Charging status	0-5000mv
Minimum single cell temperature	Key is at ON	-40-125°C
	Charging status	-40-125°C

Maximum single cell temperature	Key is at ON	-40-125°C
	Charging status	-40-125°C
Power Battery No. 1 sensor sensitivity temperature	Key is at ON	-40-125°C
Power Battery No. 2 sensor sensitivity temperature	Key is at ON	-40-125°C
Power Battery No. 3 sensor sensitivity temperature	Key is at ON	-40-125°C
Minimum temperature sensor number of power battery	Key is at ON	0-15
Maximum temperature sensor number of power battery	Key is at ON	0-15
Maximum single cell voltage cell number	Key is at ON	0-92
	Charging status	0-92
Minimum single cell voltage cell number	Key is at ON	0-92
	Charging status	0-92
Maximum battery cell internal resistance	Key is at ON	0-255mΩ
Battery pack internal resistance	Key is at ON	0-2550mΩ

Insulation resistance	Key is at ON	0~650MΩ
	Charging status	0~650MΩ
Battery thermal management operation mode	Charging status	Charging slow-cooling
	Charging state	Normal-temperature charge
	READY	Discharging cooling
	READY	Normal-temperature discharge
	READY	Charging precooling
	Charging state	Charging fast-cooling
	Charging state	Charging preheat
	Charging status	Charging heating
Charging ampere-hour	Charging status	0-70Ah
Discharging ampere-hour	Key is at ON	0-70Ah
Release energy	Key is at ON	0-24kwh
Charged energy	Charging status	0-24kwh
Battery controller operating mode	Power on process: OFF → ON Charge power on process: OFF → ON	Initialization
	Key is at ON/ charge status	Operating
Hardware fault status bit	BMS hardware fault line trusted	Initialization successful
	BMS hardware failure line is not trusted	Hardware failure false positives
Battery evaporator solenoid valve command	According to the battery thermal management mode	OFF
	According to the battery thermal management mode	ON
Battery steam	According to the battery thermal	OFF

solenoid valve status	management mode	
	According to the battery thermal management mode	ON
The remote crew cabin evaporator open command	No remote air conditioning refrigeration request	OFF
	Remote air conditioning refrigeration request	ON
Air conditioning crew cabin evaporator solenoid valve status	No remote air conditioning refrigeration command	OFF
	Remote air conditioning refrigeration command	ON
Condenser fan request	Air conditioning not on	OFF
	Air conditioning on	Low grade/ high grade
Blower operating status	MP5 air volume is not turned on	OFF
	MP5 air volume is turned on	ON
Battery evaporator temperature	Key is at ON	-40-125°C
	Charging status	-40-125°C
Battery PTC temperature	Key is at ON	-40-125°C
	Charging status	-40-125°C
Battery cooling temperature demand	Key is at ON	-40-125°C
No open the solenoid valve	Charging state, the battery cell voltage is low	OFF
	Other	ON
Status of chiller solenoid valve	According to the battery thermal management mode	ON
	According to the battery thermal	OFF

	management mode	
Duty cycle of battery's water pump	Rotating speed of battery's water pump is 0~4000rpm	0-100%
Battery PTC open command	According to the battery thermal management mode	ON
	According to the battery thermal management mode	OFF
Battery PTC working status	According to the battery PTC open command	ON
	According to the battery PTC open command	OFF
AC charge wake-up signal	AC charging gun inserted	Enable
	AC charging gun unplugged	Disable
AC high voltage side output current	AC charging status	0-10A
AC charging current command	AC charging status	0-10A
AC high voltage side output voltage value	AC charging status	276-377.2V
AC charging maximum allowable charge voltage	Long-distance charging mode	388V
	Normal charging mode	384V
	Long-lifespan charging mode	384V
	Low temperature charging mode	384V
AC charging remaining time	AC charge	0-1000 minutes
AC charging stop charging command	AC charging gun unplugged	Stop charging
	AC charger inserted	Charge allowable

DC charge wake-up signal	DC charging gun inserted	Enable
	DC charging gun unplugged	Disable
DC charge on command	DC charging gun unplugged	Stop charging
	DC charger inserted	Charge allowable
DC charging current command	DC charger status	0-35A
DC charging maximum allowable charge voltage	DC charger status	384V
DC high voltage side output voltage value	DC charger status	0-750V
DC high voltage side output current	DC charger status	0-400A
DC charge full flag	DC charge end	Charge full
	DC charging status	Not charging full
DC charging remaining time	DC charge	0-1000 minutes
AC charger operating temperature	Charging status	-40-210℃
Air conditioning limit power command (%)	Key is at ON	0-100%
Prohibit compressor start command	Power down process: ON → OFF	Not start
	Key is at ON	Start
	READY	Start
Environment	Key is at ON	Displays based on the

temperature			current ambient temperature
User demand temperature	Air conditioning on		16-32°C
Interior temperature	Key is at ON		-40-125°C
Compressor working status	Key is at ON		OFF
	READY	Air conditioning not on	OFF
		Air conditioning on	ON
Compressor speed	Key is at ON		0
	READY	Air conditioning not on	0
		Air conditioning on	0-4500
A/C system normal	Normal		No fault
	Fault		There is fault
Air conditioner command	There is air conditioning defrost request		Defrosting
	No air conditioning defrost request		Valid / invalid
The passenger air flow limit command	No air flow command		OFF
	The air volume request is 1 grade		1
	The air volume request is 2 grade		2
	The air volume request is 3 grade		3
	The air volume request is 4 grade		4
	The air volume request is 5 grade		5
	The air volume request is 6 grade		6
	The air volume request is 7 grade		7
Compressor motor missing phase	Normal		No fault
	Fault		There is fault
The air conditioning controller output overload	Normal		No fault
	Fault		There is fault

Air conditioning controller overheat	Normal	No fault
	Fault	There is fault
The air conditioning controller output short circuit	Normal	No fault
	Fault	There is fault
Air conditioning input DC undervoltage	Normal	No fault
	Fault	There is fault
Air conditioning input DC overvoltage	Normal	No fault
	Fault	There is fault
Rear defrost state	Rear defrost operation: operate	ON
	Rear defrost operation: no operate	OFF
PTC on status	Air conditioning heating is not on	Invalid
	Air conditioning heating is on	PTC 1 grade is on
	Air conditioning heating is on	PTC 2 grade is on
Whether ABS is working	Not using	Inactive
	Using	Active
Whether ABS is operating properly	Normal	ABS Normal
	Malfunction	ABS Failed
Whether EBD is operating properly	Normal	EBD Normal
	Malfunction	EBD Failed
Motor controller fault code	Key is at ON	0-255
Motor controller fault code	Key is at ON	0-255
	Charging	0-255
Vehicle control system fault code	Key is at ON	0-255
	Charging	0-255
Charger fault code	Charging	0-255

Monitoring subject	Condition		value/status
Vehicle speed	Turn the drive wheel and compare the meter tachometer indication value		And is basically the same as the instrument tachometer
12V battery voltage	Key is at ON		13 – 15 V
	READY		13 – 15 V
5V power supply filtering	Key is at ON		0-5V
Key state	The key at "LOCK" or pull out;		Key off
	Key is at ON		KEY ON
	The key is rotated to "START"		Key start
Gear position	Key is at ON	Shift lever: R	R
		Shift lever: N	N
		Shift lever: D or S	D
Water pump PWM	The key at "LOCK" or pull out;	Water pump stop working	10%
	Key is at ON	Water pump speed 1000~5000rpm	30%-98%
	READY	Water pump speed 1000~5000rpm	30%-98%
	DC charging	Water pump speed 400~5000rpm	20%-98%
	Slow charging	Water pump speed 0~5000rpm	10%-98%
Fan PWM	The key at "LOCK" or pull out;	Fan stop working	0%

	Key is at ON	Fan speed 0~2400rpm	0-100%
	READY	Fan speed 0~2400rpm	0-100%
	DC charging	Fan speed 0~2400rpm	0-100%
	Slow charging	Fan speed 0~2400rpm	0-100%
Brake switch state	Brake pedal: pressed		No brake
	Brake pedal: released		Brake
Brake light status	Brake pedal: released		No brake
	Brake pedal: pressed		Brake
Accelerator pedal 1 opening	Key is at ON	Accelerator pedal: pressed totally	95%-100%
		Accelerator pedal: released totally	0%-5%
Accelerator pedal 2 opening	Key is at ON	Accelerator pedal: pressed totally	95%-100%
		Accelerator pedal: released totally	0%-5%
Brake pedal 1 opening	Key is at ON	Brake pedal: pressed totally	95%-100%
		Brake pedal: released	0%-5%
Brake pedal 2 opening	Key is at ON	Brake pedal: pressed totally	95%-100%
		Brake pedal: released	0%-5%
Coolant temperature	Vehicle READY 2 minutes later		-40-210°C
SSO enabled	Power down process: ON → OFF		Enable
	Other		Disable
S-mode switch	S-mode switch is unpressed		None

	S-mode switch is pressed		Yes
DCDC hardwired enabled	The key at "LOCK" or pull out; Power down process: ON → OFF		Disable
	Key is at ON		Enable
Handbrake signal	Handbrake released		Handbrake down
	Handbrake up		Handbrake up
Timing charge switch signal	Key is at ON	Timing charge switch: pressed	ON
		Timing charge switch: unpressed	OFF
VCU failure	VCU operation is normal		Normal
	VCU operation is abnormal		Failure
M/C relay enable	READY		Engaged
	Key is at ON		Engaged
	The key at "LOCK" or pull out;		Cut off
AC relay enable	READY		Engaged
	Key is at ON		Engaged
	The key at "LOCK" or pull out;		Cut off
High voltage anode relay enable	READY		Engaged
	Key is at ON		Engaged
	The key at "LOCK" or pull out;		Cut off
High voltage cathode relay enable	READY		Engaged
	Key is at ON		Engaged
	The key at "LOCK" or pull out;		Cut off
High voltage pre-charge relay enable	READY		Engaged
	Key is at ON		Engaged
	The key at "LOCK" or pull out;		Cut off
DC charger relay	DC charging status		Engaged

enabled	Other	Cut off
VCU mode	Remote query	STAND_BY_MODE
	Key is at ON	NORMAL_MODE
	Slow charging	AC_CHARGE_MODE
	DC charging	DC_CHARGE_MODE
VCU_Sub1_1	Key is at ON	STANDBY_MODE
	Key is at ON	POWERED_MODE
	The key at "LOCK" or pull out;	POWERDOWN_MODE
VCU_Sub2_1	Key is at ON	POWERUP_MODE
	READY	READY_MODE
	READY, and in the D gear or R gear	RUN_MODE
VCU_Sub1_2	Slow charging plug is plugged in	AC_CHARGE_POWERUP_MODE
	Slow charging plug is plugged in	AC_CHARGE_PROCESS_MODE
	Slow charging plug is unplugged	AC_CHARGE_POWERDOWN_MODE
VCU_Sub1_3	DC charging plug is plugged in	DC_CHARGE_POWERUP_MODE
	DC charging plug is plugged in	DC_CHARGE_PROCESS_MODE
	DC charging plug is unplugged	DC_CHARGE_POWERDOWN_MODE
VCU_Sub1_4	Remote query	REMOTE_INQUIRE_MODE
	Remote air conditioner control	REMOTE_AIR_CONTROL_MODE
	Remote charging control	REMOTE_CHARGE_M

		ODE
	Remote operation end	REMOTE_POWERDOWN_MODE
SOC	Key is at ON	0-100%
	Charging status	0-100%
SOE	Key is at ON	0-100%
	Charging status	0-100%
SOH	Key is at ON	0-100%
	Charging status	0-100%
Remaining power of high-voltage battery	Based on Remaining energy of battery	0-100%
Reference residual mileage	Key is at ON	0～180km
AC ON remaining mileage	Air conditioning on	0～-150km
AC OFF remaining mileage	Air conditioning off	0～-150km
Remote wake-up command	Remote operation	Enable
	No remote operation	Disable
Remote charging request	No remote charging request	2
	Remote charging request	3
Remote air conditioner request	No remote air conditioner request	2
	Remote air conditioner request	3
12V battery charging command	Without vehicle stationary for 60 hours	1
	Vehicle stationary for 60 hours	2
Remote read vehicle status	No remote read vehicle data request	2
	Remote read vehicle data request	3

request		
Remote operation status	Remote operation	Remote operation process
	Remote operation complete	Remote operation end
Remote air conditioning status	Remote air conditioning is successful	Remote air conditioning on
	Remote air conditioning is completed	Remote air conditioning off
Status of remote charging plug	Charging plug is unplugged	The charger plug is not inserted
	DC charging plug is inserted	The charger plug is inserted but not charging
	DC charging plug is inserted	The charger plug is inserted and charging
Remote charging status	DC charging plug is plugged	Charging completed, plug unplugged
	DC charging plug is plugged	Charging process
	Charging plug is unplugged	Off
Remote air conditioning demand temperature	Remote air conditioning on	0-30°C
VCU power down command bit	Remote operation end	Power down command
	Other	Other
Motor target torque	READY	0-215Nm
Motor actual torque	READY	0-215Nm Based on the accelerator pedal

		opening
Motor actual speed	Speed is 0 km/h	0rpm
	Speed is 60km/h	3600rpm (around)
High voltage power state		No high voltage power on
		High voltage power on completed
Motor controller IGBT temperature	Key is at ON	-40-210℃
Motor controller temperature	Key is at ON	-40-210℃
Motor temperature	Key is at ON	-40-210℃
Motor torque limit	READY	0-100Nm
PCU IGBT command		Gate OFF
		Gate ON
IGBT state	Actual operating status of PCU IGBT	Gate OFF (refer to PCU IGBT command)
	Actual operating status of PCU IGBT	Gate ON (refer to PCU IGBT command)
TM motor current steering command	READY, and in the D gear	Forward
	READY, and in the R gear	Backward
Motor current steering	The drive wheel rotates forward	Forward
	The drive wheel rotates backward	Backward
TM motor bus voltage value	Key is at ON	0-1003.98V
Voltage of high-voltage	Key is at ON	276-377.2V

battery		
Current of high-voltage battery	READY Electrical load: no load	0-10A
Maximum single cell voltage	Key is at ON	0-5000mv
	Charging status	0-5000mv
Minimum single cell voltage	Key is at ON	0-5000mv
	Charging status	0-5000mv
Minimum single cell temperature	Key is at ON	-40-125°C
	Charging status	-40-125°C
Maximum single cell temperature	Key is at ON	-40-125°C
	Charging status	-40-125°C
Sensor temperature of high-voltage battery 1	Key is at ON	-40-125°C
Sensor temperature of high-voltage battery 2	Key is at ON	-40-125°C
Sensor temperature of high-voltage battery 3	Key is at ON	-40-125°C
Minimum temperature sensor number of power battery	Key is at ON	0-15
Maximum	Key is at ON	0-15

temperature sensor number of power battery		
Maximum single cell voltage cell number	Key is at ON	0-92
	Charging status	0-92
Minimum single cell voltage cell number	Key is at ON	0-92
	Charging status	0-92
Maximum battery cell internal resistance	Key is at ON	0-255mΩ
Battery pack internal resistance	Key is at ON	0-2550mΩ
Insulation resistance	Key is at ON	0~650MΩ
	Charging state	0~650MΩ
Battery thermal management operation mode	Charging status	Charging insulation
	Charging status	Charging cooling
	Charging status	Normal-temperature charge
	READY	Discharging cooling
	READY	Normal-temperature discharge
	Charging status	Charging preheat
	Charging status	Charging precooling
	Charging status	Charging terminal insulation
	Charging status	Charging terminal ambient temperature

Charging ampere-hour	Charging status	0-70Ah
Discharging ampere-hour	Key is at ON	0-70Ah
Release energy	Key is at ON	0-24kwh
Charged energy	Charging status	0-24kwh
LBC operation mode	Power on process: OFF → ON Charge power on process: OFF → ON	Initialization
	Key is at ON/ charge status	Operating
Battery evaporator solenoid valve command	According to the battery thermal management mode	OFF
	According to the battery thermal management mode	ON
Battery steam solenoid valve status	According to the battery thermal management mode	OFF
	According to the battery thermal management mode	ON
The remote crew cabin evaporator open command	No remote air conditioning refrigeration request	OFF
	Remote air conditioning refrigeration request	ON
Air conditioning crew cabin evaporator solenoid valve status	No remote air conditioning refrigeration command	OFF
	Remote air conditioning refrigeration command	ON
Condenser fan request	Air conditioning not on	OFF
	Air conditioning on	Low grade/ high grade
Blower operating	MP5 air volume is not turned on	OFF

status	MP5 air volume is turned on	ON
Battery evaporator temperature	Key is at ON	-40-125°C
	Charging status	-40-125°C
Battery PTC temperature	Key is at ON	-40-125°C
	Charging status	-40-125°C
Battery cooling temperature demand	Key is at ON	-40-125°C
No open the solenoid valve	Charging state, the battery cell voltage is low	OFF
	Other	ON
Battery fan ON command 1	According to the battery thermal management mode	ON
	According to the battery thermal management mode	OFF
Battery fan ON command 2	According to the battery thermal management mode	ON
	According to the battery thermal management mode	OFF
Battery fan flag	According to the battery fan on command	OFF
	According to the battery fan on command	Fan 1 on
	According to the battery fan on command	Fan 2 on
	According to the battery fan on command	Fan 1 and fan 2 on at the same time
Battery PTC open command	According to the battery thermal management mode	ON

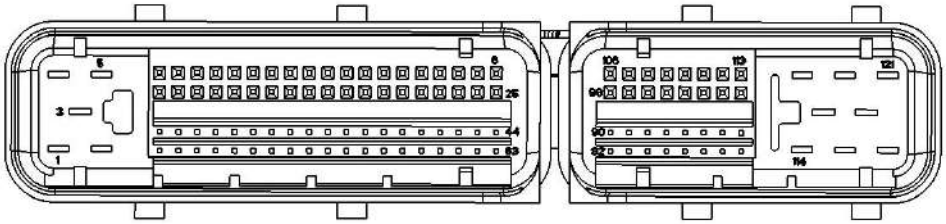
	According to the battery thermal management mode	OFF
Battery PTC working status	According to the battery PTC open command	ON
	According to the battery PTC open command	OFF
Slow-charge wakeup signal	Slow charging plug is plugged in	Enable
	Slow charging plug is unplugged	Disable
Output current of slow-charging high-voltage end	Charge status of slow charging	0-10A
Current command of slow charging	Charge status of slow charging	0-10A
Output voltage value of slow-charging's high-voltage end	Charge status of slow charging	276-377.2V
Maximum charging voltage of slow charging	Long-distance charging mode	Below 388V
	Normal charging mode	Below 384V
	Long-lifespan charging mode	Below 384V
	Low temperature charging mode	Below 384V
Remaining time of slow charging	Slow charging	0-1000 minutes
Stop-charging command of slow charging	Slow charging plug is unplugged	Stop charging
	Slow charging plug is plugged in	Charge allowable
DC charge wake-up signal	DC charging plug is plugged in	Enable
	DC charging plug is unplugged	Disable
Turn-on command	DC charging plug is unplugged	Stop charging

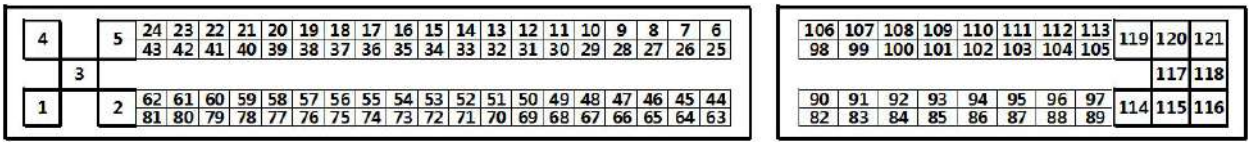
of DC charging	DC charging plug is plugged in	Charge allowable
Permission signal of DC charging	DC charging plug is unplugged	Stop charging
	DC charging plug is plugged in	Charge allowable
Current command of DC charging	DC charging status	0-35A
Maximum allowable charge voltage of DC charging	DC charging status	384V
Output voltage of DC charging's high-voltage end	DC charging status	0-750V
Output current of DC charging's high-voltage end	DC charging status	0-400A
Position of DC charging's full status	DC charging is complete	Charge full
	DC charging status	Not charging full
Remaining time of completing DC charging	DC charging	0-1000 minutes
Working temperature of charger	Charging state	-40-210℃
Air conditioning limit power command (%)	Key is at ON	0-100%
Prohibit compressor start	Power down process: ON → OFF	Not start
	Key is at ON	Start

command	READY		Start
Environment temperature	Key is at ON		Displays based on the current ambient temperature
User demand temperature	Air conditioning on		16-32°C
Interior temperature	Key is at ON		-40-125°C
Compressor working status	Key is at ON		OFF
	READY	Air conditioning not on	OFF
		Air conditioning on	ON
Compressor speed	Key is at ON		0
	READY	Air conditioning not on	0
		Air conditioning on	0-4500
A/C system normal	Normal		No fault
	Fault		There is fault
Compressor motor missing phase	Normal		No fault
	Fault		There is fault
The air conditioning controller output overload	Normal		No fault
	Fault		There is fault
Air conditioning controller overheat	Normal		No fault
	Fault		There is fault
The air conditioning controller output short circuit	Normal		No fault
	Fault		There is fault
Air conditioning input DC	Normal		No fault
	Fault		There is fault

undervoltage		
Air conditioning input DC overvoltage	Normal	No fault
	Fault	There is fault
Rear defrost state	Rear defrost operation: operate	ON
	Rear defrost operation: no operate	OFF
PTC on status		Invalid
		PTC 1 grade is on
		PTC 2 grade is on
Whether ABS is working	Not using	Inactive
	Using	Active
Whether ABS is operating properly	Normal	ABS Normal
	Malfunction	ABS Failed
Whether EBD is operating properly	Normal	EBD Normal
	Malfunction	EBD Failed
Motor controller fault code	Key is at ON	0-255
Battery management system fault code	Key is at ON	0-255
	Charging	0-255
Fault code of vehicle controller	Key is at ON	0-255
	Charging	0-255
Charger fault code	Charging	0-255

VCU harness connector port layout



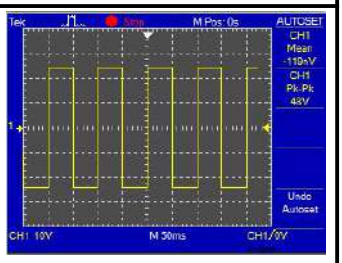


VCU port and reference value

Terminal number		Description		Condition	Measured value (approximate)
+	-	Signal name	Input/output		
1	——	VCU grounding	——	——	——
8	GND	MC relay low side drive	Output	The key at "LOCK" or pull out;	12V battery voltage (13-14 V)
				Key is at ON gear.	0V (approximate)
9	——	VCU grounding	——	——	——
10	GND	Battery power supply	Input	Key is at ON gear.	12V battery voltage (13-14 V)
12	GND	Charging power check	Input	Vehicle is under slow-charging	PWM signal Amplitude: +12V, frequency: 1 KHz Duty cycle: 1% - 100%
13	GND	Charging connection status	Input	The vehicle is connected to the slow charging piles by means of a charging plug	1.953 – 2.096 V
				The vehicle is connected to the home power supply via a charging plug	2.928 – 3.072 V
				The vehicle is connected to the DC charging charging pile via a charging plug	2.425 – 2.575 V
14	GND	Gear voltage signal 1	Input	· Key is at ON gear · The shift lever hangs to the "D" gear	1.3 – 1.9 V
				· Key is at ON gear · The shift lever hangs to the "R" gear	2.9 – 3.4 V
				· Key is at ON gear · The shift lever hangs	2.9 – 3.4 V

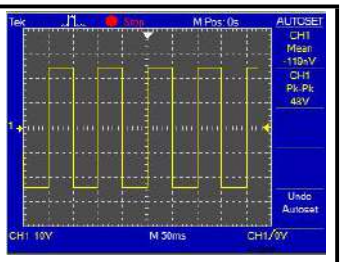
				to the "N" gear	
15	72	Accelerated pedal opening 2	Input	· Key is at ON gear · Accelerator pedal not pressed	0.375 V (approximate)
				· Key is at ON gear · Accelerator pedal totally pressed	2.225 V (approximate)
17	75	Brake pedal opening 2	Input	· Key is at ON gear · Brake pedal not pressed	0.375 V (approximate)
				· Key is at ON gear · Brake pedal totally pressed	1.92 V (approximate)
21	GND	Remote wake-up	Input	TBOX issues a remote wake-up request	12V battery voltage (13-14 V)
				TBOX no issues a remote wake-up request	0 V
22	GND	Immediate charge cancellation request	Input	The immediate charge switch pressed	0 V
				The immediate charge switch released	5.16 V (approximate)
23	GND	Brake light on	Input	· Key is at ON gear · Brake pedal not pressed by driver	0 V
				· Key is at ON gear · Brake pedal pressed by driver	12V battery voltage (13-14 V)
24	GND	Slow charge wake-up signal	Input	The vehicle is connected to the slow charging piles or home power by means of a charging plug	12V battery voltage (13-14 V)
				The vehicle is not connected to the slow charging piles or home power by means of a charging plug	0 V
27	GND	Reversing light relay drive	Output	· Key is at ON gear · The shift lever hangs to the "R" gear	0 V
				· Key is at ON gear · The shift lever hangs	12V battery voltage (13-14 V)

				to the "R" gear The shift lever hangs to the "R" gear	
29	GND	Battery power supply	Input	Key is at ON gear.	12V battery voltage (13-14 V)
33	GND	Gear voltage signal 2	Input	· Key is at ON gear · The shift lever hangs to the "D" gear	2.9 – 3.4 V
				· Key is at ON gear · The shift lever hangs to the "R" gear	2.9 – 3.4 V
				· Key is at ON gear · The shift lever hangs to the "N" gear	1.3 – 1.9 V
34	72	Accelerated pedal opening 1	Input	· Key is at ON gear · Accelerator pedal not pressed	0.75 V (approximate)
				· Key is at ON gear · Accelerator pedal totally pressed	4.45 V (approximate)
36	75	Brake pedal opening 1	Input	· Key is at ON gear · Brake pedal not pressed	0.75 V (approximate)
				· Key is at ON gear · Brake pedal totally pressed	3.84 V (approximate)
39	GND	High voltage interlock	Input	· Key is at ON gear · High voltage wire harness connection is normal	12V battery voltage (13-14 V)
				· Key is at ON gear · High voltage wire harness connection is abnormal	0 V
40	GND	S-mode switch	Input	· Key is at ON gear S-mode switch is pressed	12V battery voltage (13-14 V)
				· Key is at ON gear · S-mode switch is released	0 V
41	GND	LBC failure	Input	· Key is at ON gear · failure exists in LBC	0 V
				· Key is at ON gear	3.18 V (approximate)

				· no failure exists in LBC	
43	GND	Key is at ON gear	Input	Key is at ON gear.	12V battery voltage (13-14 V)
47	——	VCU grounding	——	——	——
48	GND	Battery power supply	Input	Key is at ON gear.	12V battery voltage (13-14 V)
52	GND	Gear voltage signal 3	Input	· Key is at ON gear · The shift lever hangs to the "D" gear	1.3 – 1.9 V
				· Key is at ON gear · The shift lever hangs to the "R" gear	1.3 – 1.9 V
				· Key is at ON gear · The shift lever hangs to the "N" gear	1.3 – 1.9 V
53	——	Accelerated pedal opening 2 loop	——	——	——
54	73	Water temperature sensor	Input	Key is at ON gear.	0.455 – 5 V
62	GND	The key is rotated to "START"	Input	The key is rotated to "START"	12V battery voltage (13-14 V)
64	GND	Cooling fan control	Output	The vehicle is in running state	 Duty cycle: 55% - 100%
				· The vehicle is in charging state · Air conditioning on	Duty cycle: 65% - 100%
65	GND	Pedestrian warning	Input		
66	——	VCU grounding	——	——	——
67	GND	Battery power supply	Input	Key is at ON gear.	12V battery voltage (13-14 V)
71	GND	Gear voltage signal 4	Input	· Key is at ON gear · The shift lever hangs to the "D" gear	2.9 – 3.4 V
				· Key is at ON gear · The shift lever hangs to the "R" gear	1.3 – 1.9 V

				· Key is at ON gear · The shift lever hangs to the "N" gear	2.9 – 3.4 V
72	——	Accelerated pedal opening 1 loop	——	——	——
73	——	Water temperature sensor signal loop	——	——	——
75	——	Brake pedal opening 1 loop	——	——	——
76	GND	Airbag	Input	· Key is at ON gear · The collision output signal is valid	0 V
				· Key is at ON gear · The collision output signal is invalid	6.8 (approximate)
77	GND	Brake switch	Input	· Key is at ON gear · Brake pedal not pressed by driver	12V battery voltage (13-14 V)
				· Key is at ON gear · Brake pedal pressed by driver	0 V
79	GND	Handbrake	Input	· Key is at ON gear · Handbrake up	0 V
				· Key is at ON gear · Handbrake not pull up	1.83 V (approximate)
81	GND	DC charge wake-up	Input	The vehicle is connected to the DC charging pile via a charging plug	12V battery voltage (13-14 V)
				The vehicle is not connected to the DC charging pile	0 V
83	GND	Self-holding SSO control signal	Output	Key is at ON gear.	0 V
				The key is placed in the "LOCK" block or 1 second (approximate) after pull out	12V battery voltage (13-14 V)
85	——	Brake pedal opening 2 loop	——	——	——
86	GND	Charge indicator 1 (yellow)	Output	The vehicle is connected to the fast / slow charging piles or household power	4.8 V (approximate, continuous)

				supply via a charging plug	
				The immediate charge off switch pressed	4.8V (approximate, jump)
				Other conditions	0 V
91	GND	DC charging relay control	Output	· The key at "LOCK" or pull out The vehicle is connected to the DC charging pile via a charging plug, with card to confirm the vehicle into the DC charging process\	12V battery voltage (13-14 V)
				Other conditions	0 V
92	GND	DCDC enable	Output	Key is at ON gear.	12V battery voltage (13-14 V)
96	1	Brake pedal sensor 1 powered	Output	Key is at ON gear.	5 V ± 0.1 V
98	1	Brake pedal sensor 2 powered	Output	Key is at ON gear.	5 V ± 0.1 V
99	GND	Total negative relay control (12V)	Output	Key is at ON gear.	12V battery voltage (13-14 V)
100	GND	Precharge relay control (12V)	Output	Key is at ON gear.	12V battery voltage (13-14 V)
101	GND	AC relay control	Output	· Air conditioning on request is valid	0 V
				· Air conditioning on request is invalid	12V battery voltage (13-14 V)
104	1	Accelerator pedal sensor 2 powered	Output	Key is at ON gear.	5 V ± 0.1 V
106	GND	Charge indicator 2 (green)	Output	DC charging or slow charging process	4.8 V (approximate, continuous)
				DC charging or slow charging process completed	4.8V (approximate, jump)
				Other conditions	0 V
107	GND	Total positive relay control (12V)	Output	Key is at ON gear.	12V battery voltage (13-14 V)

109	GND	Cooling water pump control signal	Output	The vehicle is in running state	 Duty cycle: 30% - 98%
				The vehicle is in AC charging state	Duty cycle: 20% - 98%
				The vehicle is in DC charging state	Duty cycle: 10% - 98%
112	1	Accelerator pedal sensor 1 powered	Output	Key is at ON gear.	5 V ± 0.1 V
115	1	DC Charging CAN-2H	Input/output	VCU power on	Check for CAN messages
116	1	DC Charging CAN-2L			
120	1	Vehicle CAN-1H			
121	1	Vehicle CAN-1H			

Safety-failure mode

Safety-failure mode type

- Type A:DC charging is prohibited
- Type A: AC charging is prohibited
- Type C: prohibit driving
- Type D: cut off the high voltage

Safety-failure mode list

DTC	Processing type				Other processing methods
	A	B	C	D	
P0642			×		
P0643			×		
P0A02					

P0A03						
P0A8D		×	×	×	×	
P0A8E		×	×	×	×	
P0A94	Case 1	×	×	×	×	
	Case 2					Limp mode
P0AA1						
P0AA4		×	×	×	×	
P0AA0						Limp mode
P2122						Respond to another way
P2123						Respond to another way
P2127						Respond to another way
P2128						Respond to another way
P2138	Case 1			×		
	Case 2					Limp mode
P3012		×	×	×	×	
P3013		×	×	×	×	
P3015		×	×	×	×	
P3016		×	×	×	×	
P3017		×	×	×	×	
P3010					×	
P3006				×		
P3007				×		
P3008				×		

P3009				×		
P300C	Case 1	×	×	×	×	
	Case 2					Limp mode
P300D	Case 1	×	×	×	×	
	Case 2					Limp mode
P300E	Case 1	×	×	×	×	
	Case 2					Limp mode
P300F	Case 1	×	×	×	×	
	Case 2					Limp mode
	Case 3					
P301F		×				
P3020			×			
P3014		×	×	×	×	
P3011		×	×	×	×	
P301A		×	×	×	×	
P301B		×	×	×	×	

DTC detection priority table

If some DTC are displayed at the same time, check them in the order in the following list of priorities.

Priority	DTC	Failure Name
1	P0642, P0643	VCU chip power supply failure
	P0A8D，P0A8E	VCU power supply failure
	P3010	Vehicle collision failure
	P0A94	DC/DC failure
	P3015, P3016, P3017	High voltage loop failure
	P3014	M/C relay failure

2	P2122	Accelerator pedal first sensor failure
	P2123	Accelerator pedal first sensor failure
	P2127	Accelerator pedal second sensor failure
	P2128	Accelerator pedal second sensor failure
	P3012	Motor controller failure
	P3013	Battery controller failure
	P0AA1	High voltage positive relay failure
	P0AA4	High voltage negative relay failure
	P0AA0	High voltage pre-charge relay failure
	P3006, P3007, P3008, P3009	Shift control mechanism failure
	P3011	The high voltage interlock failure
3	P2138	Accelerator pedal ratio failure
	P300C, P300D, P300E	Battery controller message missing fault
	P300F	Motor controller message-missing fault
	P301F	Charger controller message-missing fault
	P3020	Charger pile message-missing fault
	P0A02，P0A03	Coolant temperature sensor fault
	P301A	High voltage loop failure
	P301B	Air conditioning compressor high
		voltage circuit failure

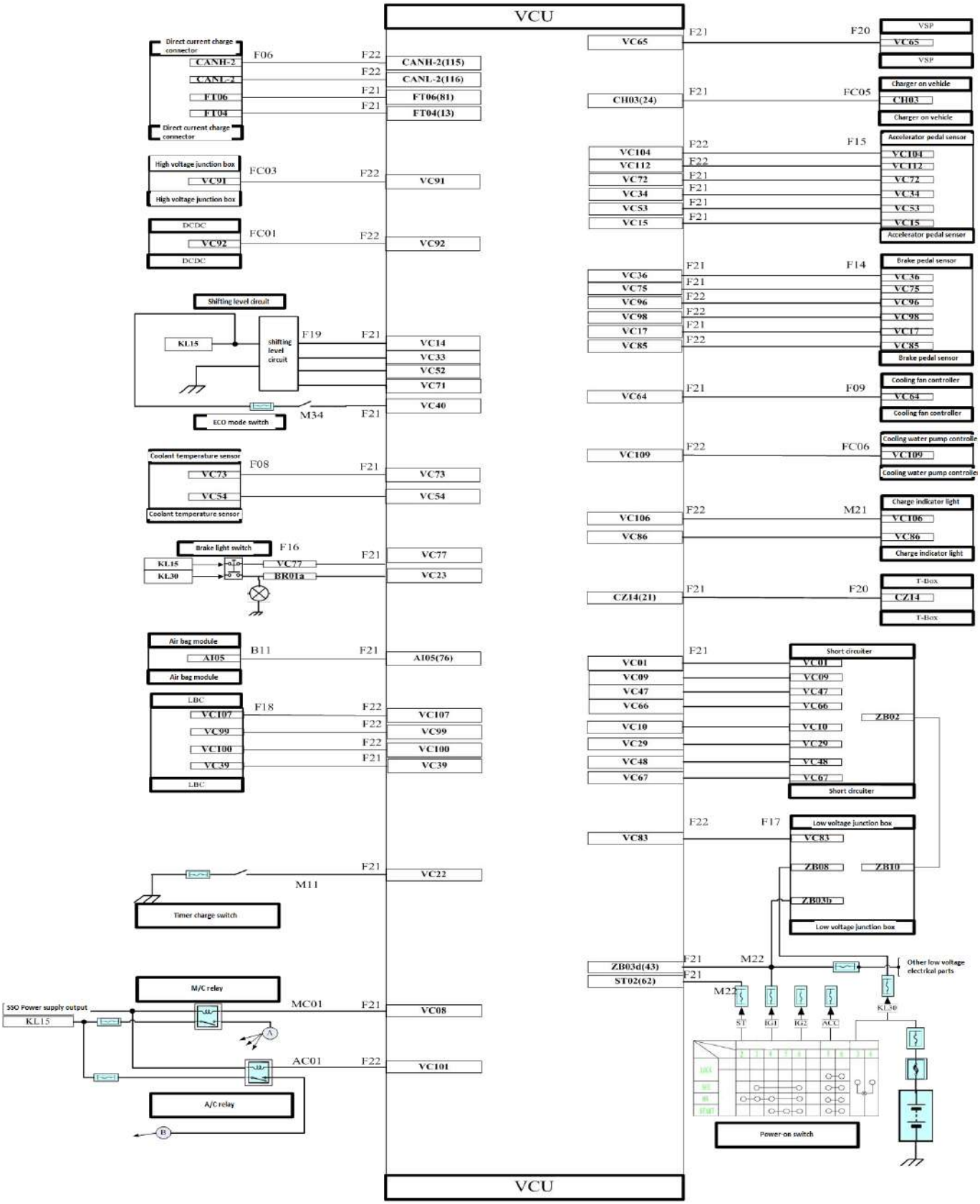
DTC index

DTC	Failure Name	Failure Light
P0642	VCU chip power supply failure	The system fault light
P0643	VCU chip power supply failure	The system fault light
P0A02	Coolant temperature sensor fault	—
P0A03	Coolant temperature sensor fault	—
P0A8D	VCU power supply failure	Battery fault indicator light
P0A8E	VCU power supply failure	Battery fault indicator light
P0A94	DC/DC failure	Battery fault indicator light
P0AA1	High voltage positive relay failure	—
P0AA4	High voltage negative relay failure	The system fault light
P0AA0	High voltage pre-charge relay failure	The system fault light
P2122	Accelerator pedal first sensor failure	The system fault light
P2123	Accelerator pedal first sensor failure	The system fault light
P2127	Accelerator pedal second sensor failure	The system fault light
P2128	Accelerator pedal second sensor failure	The system fault light
P2138	Accelerator pedal ratio failure	The system fault light
P3012	Motor controller failure	The motor fault light
P3013	Motor controller failure	Battery fault indicator light
P3015	High voltage loop failure	The system fault light
P3016	High voltage loop failure	The system fault light
P3017	High voltage loop failure	The system fault light

P3010	Vehicle collision failure	The system fault light
P3006	Shift control mechanism failure	Shift fault light
P3007	Shift control mechanism failure	Shift fault light
P3008	Shift control mechanism failure	Shift fault light
P3009	Shift control mechanism failure	Shift fault light
P300C	Battery controller message-missing fault	Battery fault indicator light
P300D	Battery controller message missing fault	Battery fault indicator light
P300E	Battery controller message-missing fault	Battery fault indicator light
P300F	Motor controller message missing fault	The motor fault indicator
P301F	Charger controller message-missing fault	—
P3020	Charger pile message-missing fault	—
P3014	M/C relay failure	The system fault light
P3011	The high voltage interlock failure	The system fault light
P301A	High voltage loop failure	The system fault light
P301B	Air conditioning compressor high voltage circuit failure	The system fault light

Electrical principle of control system

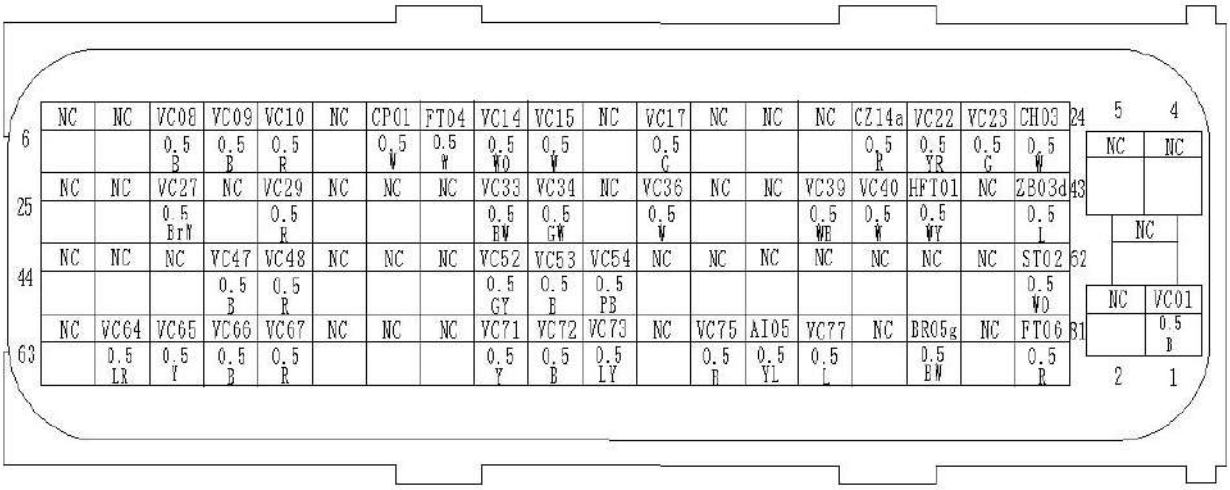
Control system principle diagram



Partsconnector

VCU connector 1

Connector number	F21
Connector name	VCU plug-in 1
Connector type	1473244-1

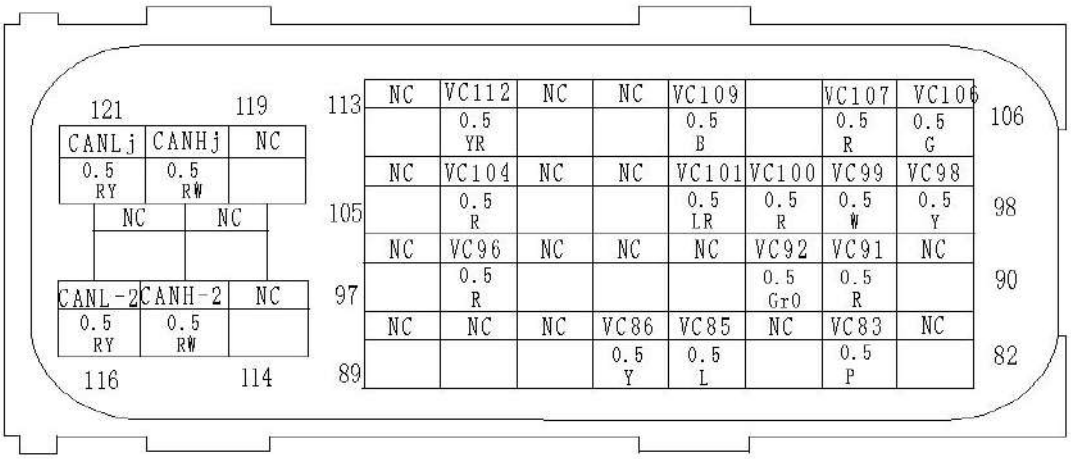


Terminal number	Line color	Signal name
1	B	VC01 Power supply ground
8	B	VC08 M/C relay control
9	B	VC09 Power supply ground
10	R	VC10 Power supply positive
12	W	CP01 Charging power check
13	W	FT04 Charging connection status signal
14	WO	VC14 Electronic shift switch signal 1
15	W	VC15 signal output 2
17	G	VC17 Brake signal output 2
21	R	CZ14a Remote wake-up signal
22	YR	VC22 request signal of canceling instant charging

23	G	VC23 Brake light turn-on signal
24	W	CH03 Slow charging wake up signal
27	BrW	VC27 Reversing lamp relay control signal
29	R	VC29 Power supply positive
33	BW	VC33 Electronic shift switch signal 2
34	GW	VC34 signal output 1
36	W	VC36 Brake signal output 1
39	WB	VC39 High voltage interlock signal 2
40	W	VC40 S-mode switch signal
41	WY	HFT01 LBC fault signal
43	L	ZB03d IG1
47	B	VC47 Power supply ground
48	R	VC48 Power supply positive
52	GY	VC52 Electronic shift switch signal 3
53	B	VC53 accelerator pedal power supply negative
54	PB	VC54 water temperature sensor
62	WO	ST02 KEY START signal
64	LR	VC64 control signal of cooling fan
65	Y	VC65 VCU hardline data input
66	B	VC66 Power supply ground
67	R	VC67 Power supply positive
71	Y	VC71 Electronic shift switch signal 4
72	B	VC72 accelerator pedal power supply negative
73	LY	VC73 water temperature sensor signal
75	B	VC75 brake pedal power supply negative
76	YL	AI05 Airbag release signal (0V)
77	L	VC77 Brake switch status signal
79	BW	BR05g handbrake signal
81	R	FT06 fast-charging wake up signal

VCU connector 2

Connector number	F22
Connector name	VCU Connector 2
Connector type	1473252-1

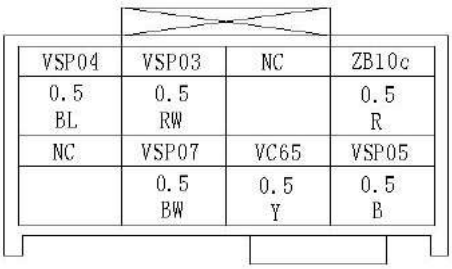


Terminal number	Line color	Signal name
83	P	VC83 Self-holding SSO control signal
85	L	VC85 brake pedal sensor 2 ground
86	Y	VC86 Charge indicator 1 (yellow)
91	R	VC91 Fast charge relay control signal
92	GrO	VC92 DCDC enable
96	R	VC96 Brake pedal sensor 1 power-supply
98	Y	VC98 Brake pedal sensor 2 power-supply
99	W	VC99 Total Negative Relay Control (12V)
100	R	VC100 Precharge relay control (12V)
101	LR	VC101 AC relay control (0V)

104	R	VC104 Accelerator pedal sensor 2 power-supply
106	G	VC106 Charge indicator 2 (green)
107	R	VC107 Main positive Relay Control (12V)
109	B	VC109 Cooling water pump control signal
112	RY	VC112 Accelerator pedal sensor 1 power-supply
115	RW	CANH-2
116	RY	CANL-2
120	RW	CAMHj
121	RY	CAMLj

VSP controller

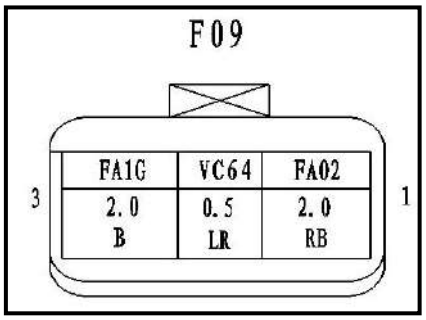
Connector number	F19
Connector name	VSP controller
Connector type	34729-0080



Terminal number	Line color	Signal name
1	R	ZB10c VSP controller power-supply positive
3	RW	VSP03 VSP honk power-supply positive
4	BL	VSP04 VSP honk power-supply negative
5	B	VSP05 VSP power-supply negative
6	Y	VC65 VCU hardline data input
7	BW	VSP07 VSP work signal feedback

Connector of cooling fan

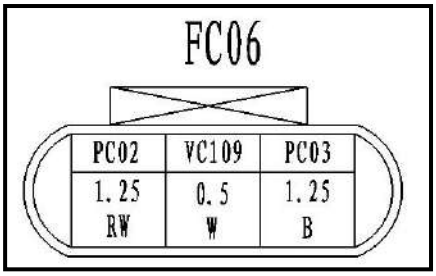
Connector number	F09
Connector name	Cooling fan
Connector type	MG642925-5



Terminal No.	Wire color	Signal name
1	RB	FA02 Fan power-supply is positive
2	LR	VC64 Fan control signal
3	B	FA1G Fan power-supply is negative

Connector of the electronic coolant pump.

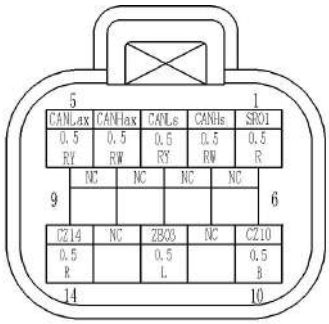
Connector number	FC06
Connector name	Electronic coolant pump
Connector type	282087-1



Terminal number	Line color	Signal name
1	B	PC03 coolant pump power-supply negative
2	W	VC109 PWM control signal
3	RW	PC02 coolant pump power-supply positive

Connector of remote intelligent terminal

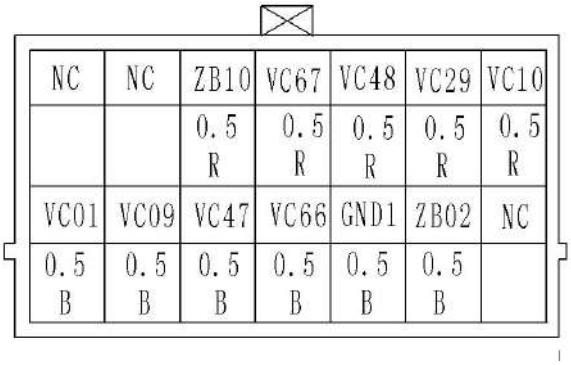
Connector number	F20
Connector name	Remote intelligent terminal
Connector type	776273-1



Terminal number	Line color	Signal name
1	R	SR01 Remote Power supply positive
2	RW	CANHs vehicle CAN high
3	RY	CANLs vehicle CAN low
4	RW	CANHax battery internal CAN high
5	RY	CANLax Battery internal CAN low
10	B	CZ10 Remote Power supply negative
12	L	ZB03 IG2
14	R	CZ14 Remote wake-up signal

Connector of short-circuiter

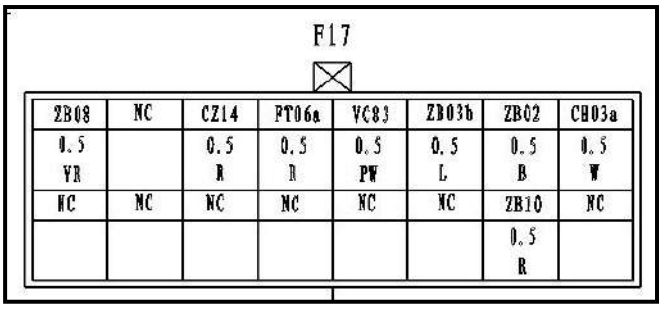
Connector number	
Connector name	Connector of short-circuiter
Connector type	MG610754



Terminal No.	Wire color	Signal name
1	R	VC10 VCU power-supply positive
2	R	VC29 VCU power-supply positive
3	R	VC48 VCU power-supply positive
4	R	VC67 VCU power-supply positive
5	R	ZB10 Power-supply positive
9	B	ZB02 power-supply negative
10	B	GND1
11	B	VC66 VCU power ground
12	B	VC47 VCU power ground
13	B	VC09 VCU power ground
14	B	VC01 VCU power ground

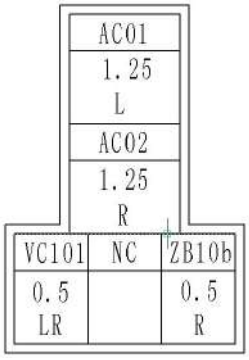
Low-voltage distributioncontroller connector

Connector number	F17
Connector name	Low voltage distribution controller
Connector type	MG610360

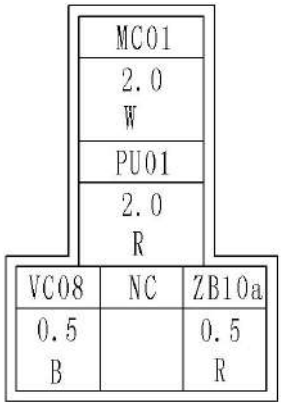


Terminal No.	Wire color	Signal name
1	W	CH03a Slow-charging wake up signal
2	B	ZB02 power-supply negative
3	L	ZB03b IG1
4	PW	VC83 SSO signal
5	R	FT06a DC charging wake-up signal
6	R	CZ14 Remote wake-up signal
8	VR	ZB08 Power supply positive
10	R	ZB10 Self-holding power supply

A/C relay

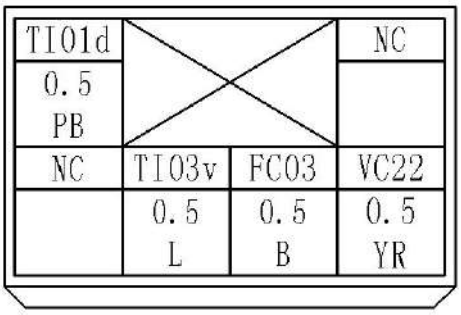


M/C relay



Connector of timing charge switch

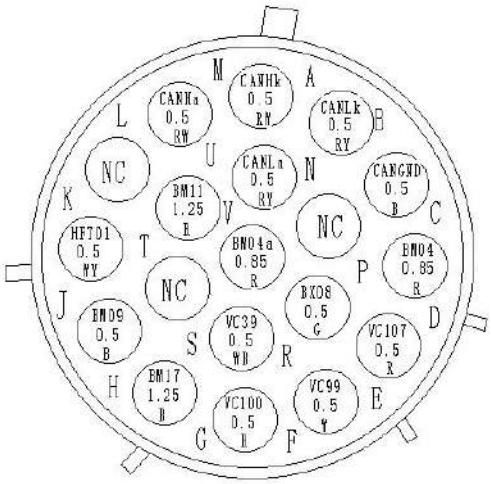
Connector number	M05
Connector name	Canceling switch of instant charging
Connector type	MG651044 (white)



Terminal No.	Wire color	Signal name
2	PB	TI01d Backlight power supply
3	YR	AC20a VCU input
4	B	FC03 ground
5	L	TI03v Back light ground

LBC connector

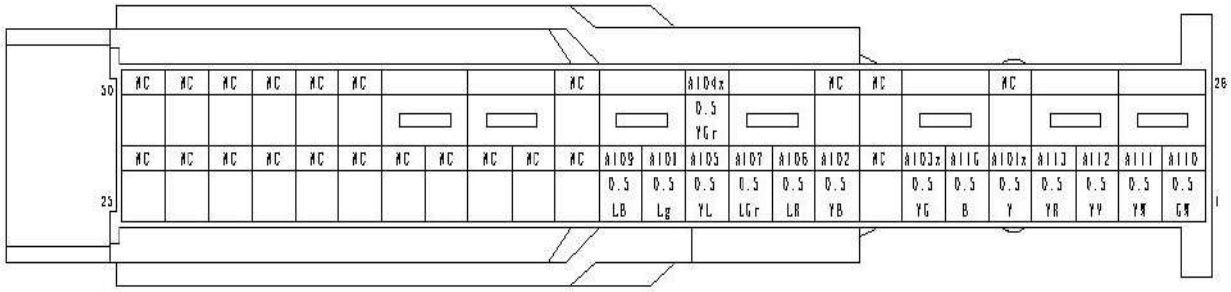
Connector number	F17
Connector name	LBC
Connector type	RT061619PNHEC03



Terminal No.	Wire color	Signal name
A	RW	CANHk CAN_H signal interaction
B	RY	CANLk CAN_L signal interaction
C	B	CANGED CAN shielded ground
D	R	BM04 High level effective
E	R	VC107 B+ relay control
F	W	VC99 B+ relay control
G	R	VC100 Precharge relay control
H	B	BM17 Fan power ground
J	B	BM09 LBC power ground
K	WY	HFT01 hardline failure feedback
M	RW	CANHa Inner CAN high
N	RY	CANLa Inner CAN low
R	G	BX08 High voltage interlock signal 1
S	WB	VC39 High voltage interlock signal 2
U	R	BM11 LBC fan power supply
V	R	BM04a LBC power

Connector of airbag module

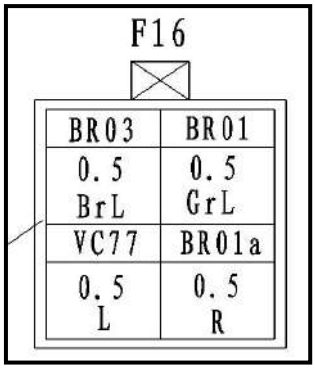
Connector number	B08
Connector name	Airbag module
Connector type	3-1393448-0（AMP) yellow



Terminal No.	Wire color	Signal name
1	GW	AI10 driver seat belt tension positive
2	YW	AI11 driver seat belt tension negative
3	YV	AI12 driver seat belt pre-tightening positive
4	YR	AI13 driver seat belt pre-tightening negative
5	Y	AI01x power supply
6	B	AI1G ground
7	YG	AI03x fault indicator
9	YB	AI02 K line
10	LR	AI06 driver-seat front airbag positive
11	LGr	AI07 driver-seat front airbag negative
12	YL	AI05 collision output 2
13	Lg	AI08 Copilot-seat front airbag positive
14	LB	AI09 Copilot-seat front airbag negative
37	YGr	AI04x collision output 1

Connector of brake lamp switch

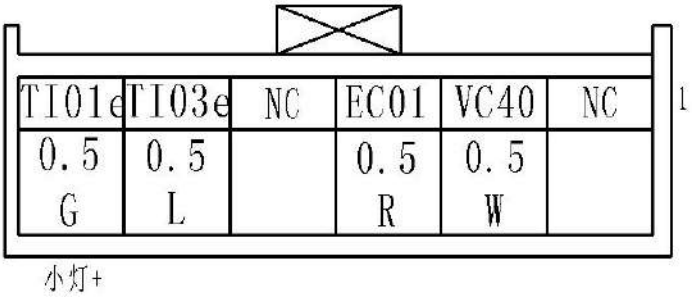
Connector number	F16
Connector name	Brake light switch
Connector type	MG610267



Terminal No.	Wire color	Signal name
1	GrL	BR01 (high) brake light power supply positive
2	BrL	BR03 (high) brake light power supply positive
3	R	BR01a Brake light status signal (12V active, indicating brake light and brake pedal depression)
4	L	VC77 Brake switch status signal (0V active, indicating brake pedal depression)

Connector of S-mode switch

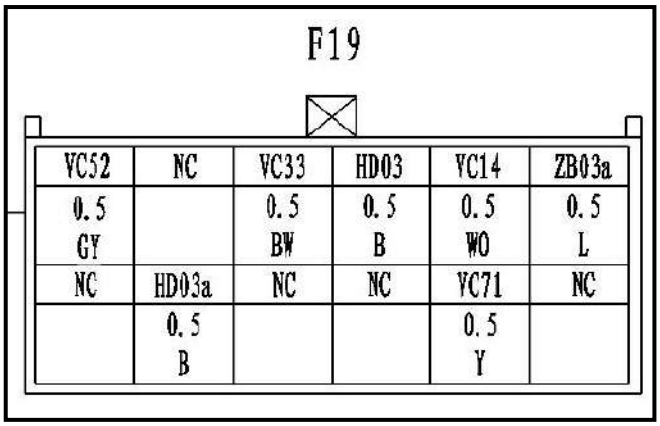
Connector number	B24
Connector name	S-mode switch
Connector type	MG653251-41（light-gray）



Terminal No.	Wire color	Signal name
2	W	VC40 control circuit
3	R	EC01 control circuit
5	L	TI03e back light -
6	G	TI01e back light +

Connector of gearshift control mechanism

Connector number	F19
Connector name	Shift control mechanism
Connector type	174045-2

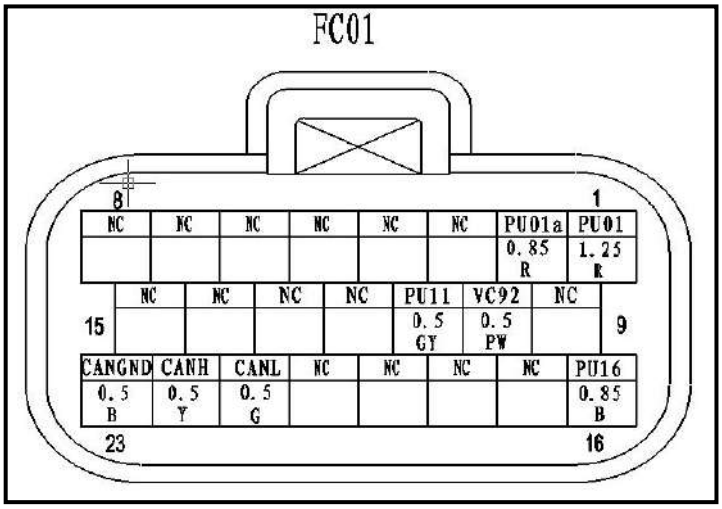


Terminal number	Line color	Signal name
1	L	ZB03a IG1
2	WO	VC14 Switch signal 1
3	B	HD03 Electronic shift power supply negative
4	BW	VC33 Switch signal 2

6	GY	VC52 Switch signal 3
8	Y	VC71 Switch signal 4
11	B	HD03a Electronic shift power-supply negative

DC/DC connector

Connector number	FC01
Connector name	Motor controller
Connector type	770680-1

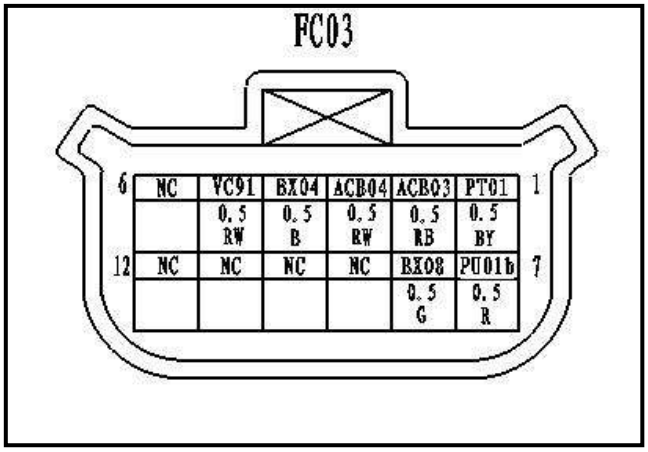


Terminal number	Line color	Signal name
1	R	PU01 motor controller 12V power supply positive
2	R	PU01a motor controller 12V power supply positive
10	PW	VC92 DCDC enable
11	GY	PU11 DCDC failure feedback
16	B	PU16 motor controller 12V power supply negative
21	G	CANL CAN_L signal interaction

22	Y	CANH CAN_H signal interaction
23	B	CANGED CAN shielded ground

Connector of high-voltage junction box

Connector number	FC03
Connector name	High voltage junction box
Connector type	33472-1201

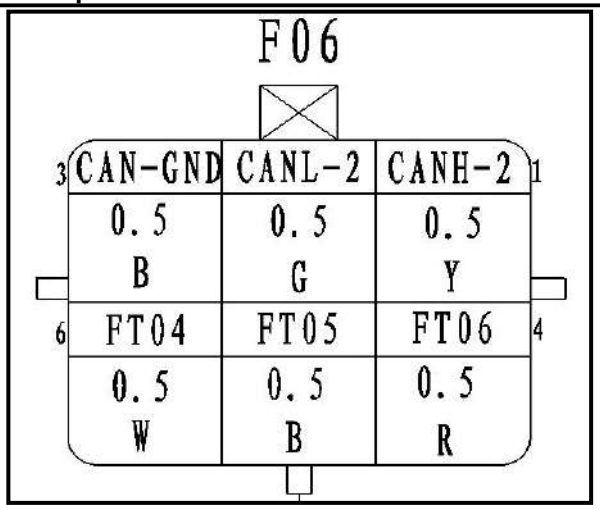


Terminal number	Line color	Signal name
1	BY	PT01 PTC relay 12V power-supply positive
2	RB	ACB03 PTC relay 1 control
3	RW	ACB04 PTC relay 2 control
4	B	BX04 DC charging relay ground connection
5	RW	VC91 DC charging relay control
7	R	PU01b 12V power positive input
8	G	BX08 junction box high-voltage interlock 12V output

Connector of DC charging port

Connector number	F06

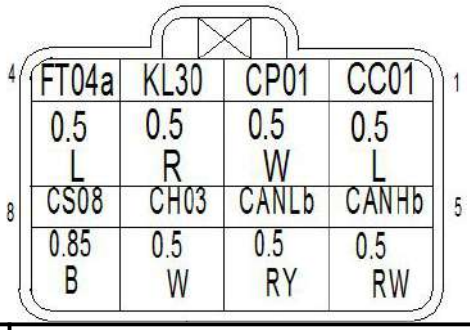
Connector name	DC Charging interface
Connector type	174264-2



Terminal number	Line color	Signal name
1	Y	CANH-2 CAN communication is high
2	G	CANL-2 CAN communication is low
3	B	CAN-GND CAN communication's ground potential
4	R	FT06 Fast charge wake up signal (12V positive)
5	B	FT05 DC charging power-supply negative
6	W	FT04 Charging connection status signal

Connector of on-board charger

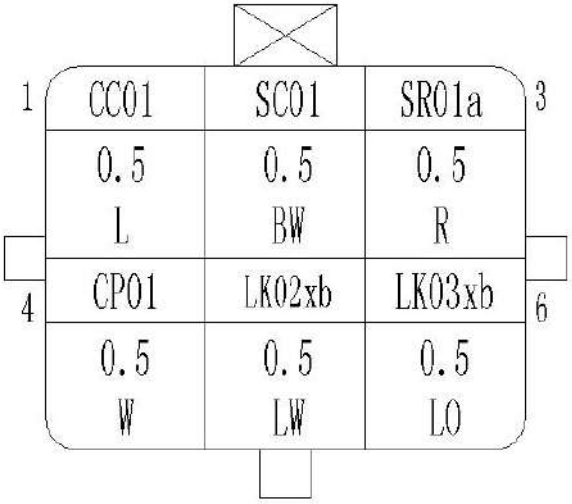
Connector number	FC05
Connector name	Car Charger
Connector type	PB625-08027



Terminal No.	Wire color	Signal name
1	L	CC01 Charging connection status confirmed
2	W	CP01 Charging power confirmed
3	R	KL30 charger power-supply
4	L	FT04a Charging status output
5	RW	CANHg CAN_H signal interaction
6	RY	CANLg CAN_L signal interaction
7	W	CH03 output 12V wake up signal
8	B	CS08 12V power-supply negative

Connector of AC charging port

Connector number	FC04
Connector name	AC charging interface
Connector type	174264-2 (black)



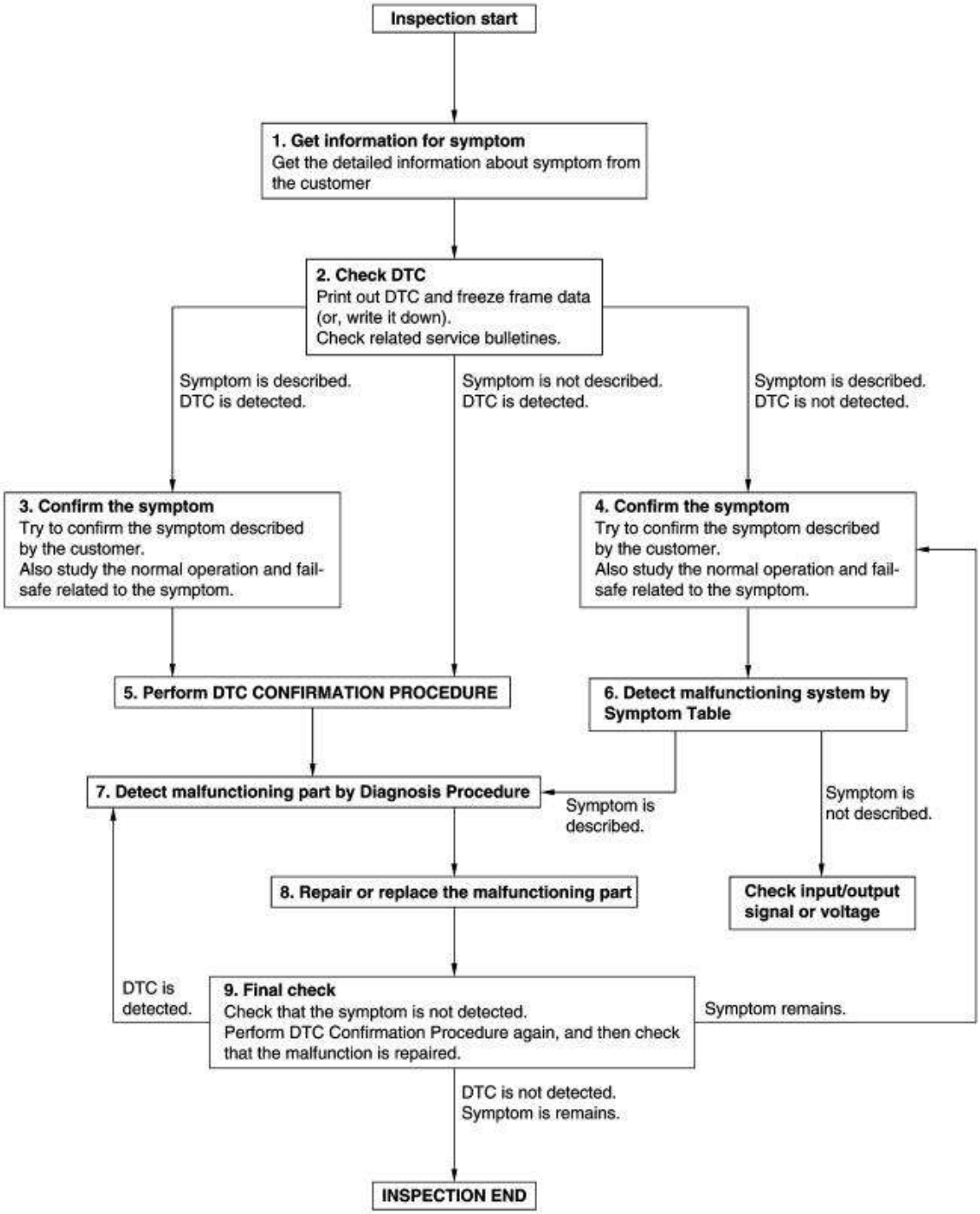
Terminal No.	Wire color	Signal name
3	R	SR01a 12V input signal(activate charger)
2	BW	SC01 12V output signal(activate charger)
1	L	CC01 Charging connection status confirm
6	LO	LK03xb charging lock signal 2 (interlock power negative)
5	LW	LK02xb charging lock signal 1 (interlock power negative)
4	W	CP01 Charging power confirmed

Basic check

Diagnostic and maintenance workflow

Work process

flow chart



Detailed flow

1. Obtain symptom information

Use the Diagnostic Worksheet to ask the customer for details about the symptoms (status and environment at the time of the accident / failure). (Refer to the below. "Diagnostic working list")

Yes >> Go to step 2

2. Detect DTC

1. DTC.

2. If DTC is displayed, perform the following steps.

- Record DTC.

- Study the relationship between the cause of the fault detected by the DTC and the symptoms described by the customer. (Symptom table is useful. Please refer to "Symptom comparison table")

3. Review the relevant maintenance records for more information.

Has the customer already described the symptoms and have already detected the DTC?

Fault described and DTC has been displayed. Yes >> Go to step 3

Describes the symptoms, does not show DTC. >> Go to step 4

No description or DTC displayed. >> Go to step 5

3. Confirm symptoms

Try to diagnose the symptoms described by the customer.

Also check the normal operation and the relevant symptoms on "safety - failure" mode list. Refer to “Safety-failure” mode list

The "Diagnostic Worksheet" is helpful in verifying the failure.

The relationship between symptoms and the state at which symptoms are detected is verified.

Yes >> Go to step 5

4. Confirm symptoms

Try to diagnose the symptoms described by the customer.

Also check the normal operation and the relevant symptoms on "safety - failure" mode

list. Refer to “Safety-failure” mode list

The "Diagnostic Worksheet" is helpful in verifying the failure.

The relationship between symptoms and the state at which symptoms are detected is verified.

Yes >> Go to step 6

5. Execute the DTC confirmation step

Execute "DTC confirmation procedure" for the displayed DTC, and then confirm that the DTC is detected again.

If two or more DTC are detected, refer to the TBD page "DTC Check Priority Table" and then determine the order of the troubleshooting.

Whether DTC is detected ?

Yes >> Go to step 7

No >> Follow the "Overview - Fault Simulation Test" to check.

6. Check the system failure through the symptom table

According to the "symptom table", the fault diagnosis system is diagnosed based on the symptoms confirmed in step 4, and the method of the fault diagnosis is determined based on the possible causes and symptoms.

Is there symptomatic description?

Yes >> Go to step 7

No >> Use the diagnostic service tool to monitor the input of the relevant sensor or check the voltage of the associated VCU pin. Please refer to the above. “Reference value”

7. Check the defective parts by means of the diagnostic procedure

Check the defective parts by means of the diagnostic procedure

Is there a faulty part?

Yes >> Go to step 8

No >> Use the diagnostic service tool to monitor the input of the relevant sensor or check the voltage of the associated VCU pin. Please refer to the above. “Safety-failure mode”

8.repair or replace faulty parts

1.repair or replace faulty parts.

2. After completing the repair and replacement work, reconnect the parts or connectors that were disconnected during the troubleshooting process.

3.DTC. If there is a DTC display, clear it.

Yes >> Go to step 9

9.Final check

When the DTC is detected in step 2, perform the "DTC confirmation step" or "Full function check" again, and then confirm that the fault has been properly repaired. If the symptoms are described by the customer, refer to the symptoms identified in step 3 and step 4 to confirm that the symptoms described by the user are not detected.

Normal or abnormal ?

Abnormal (DTC detected) >> Go to 7

Abnormal (still have symptoms) >> turn to 4

normal >> Before removing the vehicle to the user, be sure to clear the DTC.

Diagnostic working list

Instruction

It may lead to a lot of EV control system failures of the driving situation. A thorough understanding of these situations can make troubleshooting easier and more accurate.

Often, each customer tends to have different feelings about the same problem. Therefore, it is important to fully understand the customer's description of the symptoms or circumstances.

Main Points
What - models and engine models When - date, failure frequency Where - traffic How - operation, weather, symptoms

In order to be able to effectively troubleshoot, it is best to use a diagnostic work order similar to the next page.

Diagnostic working list

Diagnostic working list					
Customer Name		License plate number		Registration date	
		Vehicle model			
Acceptance date		VIN could be obtained from the ECU.		Mileage	Kilo meter (km)

problem	group	Feedback	
Condition of vehicle failure	R / Q / N / O	¨ Driving （R） ¨ DC charging（Q）¨ AC charging（N） ¨ Other (O)	
Symptom	R	¨"READY" lamp indicator off¨Bad Driving¨Jitter¨Unable to travel¨Excessive noise¨Insufficient braking force¨Powerless acceleration¨High energy-consumption¨Switch failure¨Warning light on¨Mode cannot be cut off¨Other	
		Detailed symptom	
		Instrument indication information	
		Power consumption	Km / kW
		Power battery remaining power	
	Q,N	¨ Can not charge¨Charge interrupted ¨Slow charging¨ Fixed-time charging unavailable¨ Remote charging unavailable ¨ Can not be charged immediately ¨Other	
		Detailed syndrome	
		DC charging pile display information (if any)	

	O	¨A/C unavailable¨Poor A/C performance¨Battery capacity loss¨Other	
		Detailed syndrome	
The road condition / state when the fault occurred	R/O	¨ Ordinary road ¨ highway ¨ mountain road ¨ bumpy road ¨ flat road ¨ uphill ¨ downhill ¨ steering ¨Other	
	Q/N/O	¨ Charging initial ¨charging process ¨charging finished¨ after setting charging time (not charging yet) ¨ Fixed-time charging process ¨ remote charging process¨ Other	
Driving conditions	R	¨When the system is on¨When the "READY" lamp indicator on (when the vehicle is in parking)¨When the vehicle is running¨When the vehicle is accelerating ¨Vehicle running in constant speed¨When the vehicle is taxing¨When the vehicle is braking¨Just before the vehicle is stopped¨Just after the vehicle is stopped ¨The key is placed in the "LOCK" or pulled out¨When AC is on¨When mode change¨Other	
		Vehicle speed	Km
		The acceleration pedal position	
DC charging pile	Q	DC charging pile	¨In line with the national standard DC charging pile¨Not in line with the national standard DC charging pile
		Position	
		DC charging pile set	
		Other	
Household power outlet	N	¨In line with the national standard socket¨Not in line with the national standard socket	
		Position	
		Voltage	V
		Fuse current	A
		Other information	

<table>
<tr><td>Remaining battery power</td><td>Q/N/O</td><td colspan="2">¨ With remaining power¨ Without remaining power</td></tr>
<tr><td>Gears / operations</td><td>R</td><td colspan="2">¨D¨R¨N¨S¨operating method</td></tr>
<tr><td rowspan="2">environmental condition</td><td rowspan="4">R / Q / N / O</td><td>Weather</td><td></td></tr>
<tr><td>Temperature</td><td>℃</td></tr>
<tr><td>Occurrence frequency</td><td colspan="2">¨ Always ¨ Once ¨ Sometimes （happened for times） ¨ Other</td></tr>
<tr><td>Fault recovery condition</td><td colspan="2">¨After the key is in the "OFF" or pulled out¨Replace the 12V battery or harness¨Gear shift¨During the driving
¨ READY ¨ Other</td></tr>
<tr><td colspan="4">【Memorandum】</td></tr>
</table>

Replace VCU parameter read and write operations

Description

When replacing VCU, you must follow the procedure below.

Work process:

Depending on whether the contents of the VCU are saved or written, the operations performed are different. Please follow the procedure below

1.Save VCU data

1. The key at "LOCK" or pull out; wait at least 45s.

2 Turn the key to “ON”.

3． Open the DR diagnostic tool, write down the relevant VCU data.

Note:

VCU stored vehicle VIN code, SOC, SOE, SOH and long-distance charging data recorded.

>>Turn to step 2.

2.Remove VCU

1. The key at "LOCK" or pull out; wait at least 45s.

2 Remove VCU Please refer to “Disassembly and installation” section

>>Turn to step 3.

3.Write VCU data

1. Write the recorded data in the appropriate position of the diagnostic tool and write it into.

>>Turn to step 4.

4.Check DTC

1. The key at "LOCK" or pull out; wait at least 20s.

2 Turn the key to “ON”.

3.check DTC If there is a DTC display, clear it.

>> finish

Replace the power battery parameters read and write operations

Description

When the power battery is replaced, power battery capacity and other information must be reset. When the power battery pack is replaced, the power battery capacity and other data stored in the VCU are different with the actual power battery status. In this case, theVCU will be based on the wrong data to calculate the relevant parameters of the power battery. It is necessary to clear the data of the original power battery and store the new power battery data (SOC, SOE, SOH and long-term charge times) in the VCU.

Note：

If the power battery pack is not replaced, it is forbidden to clear or change the battery-related data (SOC, SOE, SOH, and long-term charge) stored in the VCU.

Vehicle VIN read and write operations

Description：

Use the new energy vehicle-specific diagnostic tool to read the vehicle VIN code or write the VIN code of the vehicle to the VCU when the VCU is replaced.

Note：

After the replacement of the VCU, the VIN code must be written.

Work process:

1.Check

Check the VIN code of the vehicle and record it

Go to step 2

2.Execute VIN code to write

1.Turn the key to ON （No READY）

2. Connect the diagnostic tool interface to the vehicle diagnostics interface to confirm that the device is connected.

3. Write the vehicle VIN code according to the diagnostic tool tip.

>> finish

Vehicle faults diagnosis

VCU power supply and ground circuit

VCU

1.Check the fuse

Check if the following fuses are blown.

Power supply	Fuse number
12V battery	Self-holding insurance (outdoor fuse box)
“ON” signal	IG 1 fuse (outdoor fuse box)

Check if the fuses are blown.

Normal >>Change the fuse.

No >> Go to step 2

2.Detect VCU ground circuit

1. Turn the key to "LOCK" or pull out;

2. Disconnect VCU connector.

3. Detect the continuity of the VCU connector and the vehicle body.

Multimeter positive lead		Multimeter negative lead	Connectivity
DC/DC			
Connector	Terminal number		
C17	1	Vehicle body ground	Conduction
	9		
	47		
	66		

Check if the result is normal.

Yes >> Go to step 3

No >> Repair or replace the fault part.

3.Detect VCU power supply

Detect the voltage difference between the VCU connector and the vehicle body.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
VCU			
Connector	Terminal number		
C17	10	Vehicle body ground	Should be the same as the 12V battery voltage
	29		
	48		
	67		

Check if the result is normal.

Yes >> Go to step 5

No >> Go to step 4

4. Detect VCU power supply circuit

1. Detect the continuity of the VCU connector and the low-voltage distribution controller connector.

Multimeter positive lead		Multimeter negative lead		Connectivity
VCU		Low voltage distribution controller		
Connector	Terminal number	Connector	Terminal number	
C17	10	C14	10	Conduction
	29			
	48			
	67			

2. Also check whether the connector is short circuit to ground.

Check if the result is normal.

Yes >> Check the battery voltage

No >> Repair or replace the fault part.

5. Check the power supply of the key signal

1.Turn the key to ON.

2.Detect the voltage difference between the VCU connector and the vehicle body ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
VCU			
Connector	Terminal number		
C17	43	Vehicle body ground	11-14 V

Check if the result is normal.

Yes >> checking is finished.

No >> Go to step 6.

6. Check the power supply of the key signal

1. Turn the key to "LOCK" or pull out;

2. Detect the continuity of the VCU connector and the fuse.

Multimeter positive lead		Multimeter negative lead	Connectivity
VCU			
Connector	Terminal number		
C17	43	IG 1 fuse (outdoor fuse box)	Conduction

3. Also check whether the connector is short circuit to ground.

Check if the result is normal.

Yes >> Check the battery power supply circuit.

No >> Repair or replace the fault part.

P0642, P0643 VCU chip power supply failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P0642	VCU chip power supply failure	The VCU diagnosed that the chip supply voltage was lower than 4.6V.	● VCU hardware
P0643		The VCU diagnoses that the chip supply voltage is higher than 5.6V.	

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to ON.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Detect the accelerator pedal first sensor supply voltage

1. Turn the key to "LOCK" or pull out;

2. Disconnect the accelerator pedal connector;

3.Turn the key to ON.

4. Measure the voltage between the accelerator pedal supply the first sensor and the ground.

Multimeter positive lead		Multimeter negative	Voltage value
Accelerator pedal first sensor		lead	(approx.)
Connector	Terminal number		
F15	2	Ground	5V

Check if the result is normal.

Yes >> Go to step 4

No >> Go to step 2

2.Detect VCU power supply and ground

Perform VCU power supply and ground detection. Refer to "Electric vehicle control system - VCU power supply and grounding circuit".

Check if the result is normal.

Yes >> Go to step 3

No >> Repair or replace the fault

3.Check whether the component harness supplied by the VCU is short circuit

1. Turn the key to "LOCK" or pull out;

2. Disconnect VCU connector ；

3.Turn the key to ON.

4. Detect the voltage between the accelerator pedal sensor, the brake pedal sensor, the water temperature sensor, the CC signal and ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Accelerator pedal first sensor			
Connector	Terminal number		
F15	2	Ground	0V

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Accelerator pedal second sensor			
Connector	Terminal number		
F15	1	Ground	0V

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Brake pedal first sensor			
Connector	Terminal number		
F14	C	Ground	0V

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Brake pedal first sensor			
Connector	Terminal number		
F14	D	Ground	0V

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Water temperature sensor			
Connector	Terminal number		
F08	2	Ground	0V

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
CC signal			
Connector	Terminal number		
F21	13	Ground	0V

Check if the result is normal.

Yes >> Check if the sensor is short circuit to ground

No >> Repair or replace the fault part

4. Detect intermittent faults

Detect intermittent faults

Check if the result is normal.

No >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the fault part

P0A02，P0A03 coolant temperature sensorfault

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P0A02	Coolant temperature sensor fault	VCU detects that voltage of coolant temperature sensor is less than 0.1V for 2.5 seconds.	● Wire harness or connector. ● Coolant temperature sensor
P0A03		VCU detects that voltage of coolant temperature sensor exceeds 4.9V for 2.5 seconds.	

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to ON.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1. Check power-supply voltage of coolant temperature sensor

1. Turn the key to "LOCK" or pull out;

2. Disconnect coolant temperature sensor connector;

3.Turn the key to ON.

4. Detect the voltage between the sensor's power-supply end and vehicle body's ground end.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Coolant temperature sensor			
Connector	Terminal number		
F08	2	Vehicle body ground	5V

Check if the result is normal.

Yes >> Go to step 2

No >> Go to step 4

2. Check ground connection of coolant temperature sensor

Check the voltage between the sensor and vehicle body's ground end.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Coolant temperature sensor			
Connector	Terminal number		
F08	1	Vehicle body ground	0V

Check if the result is normal.

Yes >> Go to step 3

No >> Repair or replace the fault

3. Check the resistance value of coolant temperature sensor

Check the resistance value of coolant temperature sensor

Multimeter positive lead		Multimeter negative lead		Resistance value (approximate)
Coolant temperature sensor		Coolant temperature sensor		
Connector	Terminal number	Connector	Terminal number	
F08	2	F08	1	20kΩ

Is test results normal?

Yes >> Go to step 3

No >> Go to step 6

4. Detect VCU output of 5V power-supply

1. Turn the key to "LOCK" or pull out;

2. Disconnect VCU connector ；

3.Turn the key to ON.

4. Check the voltage between the sensor's power-supply end and vehicle body's ground end.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
VCU provides power to coolant temperature sensor			
Connector	Terminal number		
F21	54	Vehicle body ground	5V

Check if the result is normal.

Yes >> Go to step 5

No >> Repair or replace the fault

5. Detect VCU power supply and ground

Perform VCU power supply and ground detection. Yes >> Refer to "Diagnostic Procedure" below.

Is test results normal?

Yes >> Replace VCU

No >> Repair or replace the VCU power-supply harness.

6. Detect intermittent faults

Detect intermittent faults

Check if the result is normal.

No >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the fault part

P0A8D, P0A8E VCU power supply failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P0A8D	VCU power supply failure	VCU detects its power supply less than 10V for more than 10 seconds.	● Wire harness or connector. ● DC/DC
P0A8E		VCU detects that its power supply is higher than 16V for more than 25.5 seconds.	

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to ON.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Detects DC / DC output voltage

1.Turn the key to ON.

2. Detect the voltage between the DC / DC output and ground.

Multimeter positive lead	Multimeter negative lead	Voltage value (approx.)
DC/DC		

Connector	Terminal number		
-	-	Ground	13V

Check if the result is normal.

Yes >> Go to step 2

No >> Go to step 4

2. Detects the output voltage of the low voltage distribution controller

1. Turn the key to "LOCK" or pull out;

2. Disconnect the connector between low-voltage distribution controller and VCU;

3.Turn the key to ON.

4. Detect the voltage between the low-voltage distribution controller connector and ground;

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Low voltage distribution controller			
Connector	Terminal number		
F17	10	Ground	13V

Check if the result is normal.

Yes >> Go to step 5

No >> Go to step 3

3. Detects the input voltage of the low voltage distribution controller

1. Turn the key to "LOCK" or pull out;

2. Disconnect the low-voltage distribution controller connector;

3.Turn the key to ON.

4. Detect the voltage between the low-voltage distribution controller connector and ground;

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Low voltage distribution controller			
Connector	Terminal number		
F17	8	Ground	13V

Check if the result is normal.

Yes >> Repair or replace the low voltage distribution controller

No >> Repair or replace the wiring between the low voltage distribution controller and its fuse

4. Detects VCU's DC / DC enable output

1. Turn the key to "LOCK" or pull out;

2. Disconnect VCU connector ；

3.Turn the key to ON.

2. Detect the voltage between VCU and the DC / DC enable output and ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
VCU			
Connector	Terminal number		
F22	92	Ground	13V

Check if the result is normal.

Yes >> Replace DC / DC

No >> Replace VCU

5. Detect intermittent faults

Detect intermittent faults

Check if the result is normal.

No >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the fault part

P0A94 DC/DC failure

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P0A94	DC/DC failure	VCU detects that its power supply is lower than 11V for more than 2.5 seconds.	● Wire harness or connector ● DC/DC

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to ON.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Detects DC / DC output voltage

1.Turn the key to ON.

2. Detect the voltage between the DC / DC output and ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
DC/DC			
Connector	Terminal number		
F22	92	Ground	13V

Check if the result is normal.

Yes >> Go to step 2

No >> Go to step 4

2.Detects the output voltage of the low voltage distribution controller

1. Turn the key to "LOCK" or pull out;

2. Disconnect the connector between low-voltage distribution controller and VCU;

3.Turn the key to ON.

4. Detect the voltage between the low-voltage distribution controller connector and ground;

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Low voltage distribution controller			
Connector	Terminal number		
F17	10	Ground	13V

Check if the result is normal.

Yes >> Go to step 5

No >> Go to step 3

3. Detects the input voltage of the low voltage distribution controller

1. Turn the key to "LOCK" or pull out;

2. Disconnect the low-voltage distribution controller connector;

3.Turn the key to ON.

4. Detect the voltage between the low-voltage distribution controller connector and ground;

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Low voltage distribution controller			
Connector	Terminal number		
F17	8	Ground	13V

Check if the result is normal.

Yes >> Repair or replace the low voltage distribution controller

No >> Repair or replace the wiring between the low voltage distribution controller and its fuse

4. Detects VCU's DC / DC enable output

1. Turn the key to "LOCK" or pull out;

2. Disconnect VCU connector ；

3.Turn the key to ON.

2. Check the voltage between VCU and the DC / DC enable output and ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
VCU			
Connector	Terminal number		
F22	92	Ground	13V

Check if the result is normal.

Yes >> Replace DC / DC

No >> Replace VCU

5.Detect intermittent faults

Detect intermittent faults

Check if the result is normal.

No >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the fault part

P0AA4 High-voltage positive relay failure

DTC Logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P0AA1	High voltage positive relay failure	When the high-voltage positive relay is disconnected only, the motor controller's feedback voltage doesn't reduce.	● Wire harness or connector ● High-voltage positive relay (inside the power pack)

DTC diagnostic procedures

1.Execute the DTC confirmation step

1.The key at "LOCK" or pull out; wait at least 100s.

2.Turn the key to ON.

3. DTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Detect harness

1. Turn the key to "LOCK" or pull out;

2. Disconnect VCU harness connector.

3. Detect the voltage of the VCU harness connector and body ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
VCU harness connector			
Connector	Terminal number		
F22	107	Vehicle body ground	0V

Check if the result is normal.

Yes >> Check whether the high voltage positive relay is bonded.

No >> Repair or replace the VCU harness.

P0AA4 High voltage negative relay failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P0AA4	High voltage negative relay failure	When only the pre-charge relay is engaged, the motor controller feedback voltage is higher than a certain value.	● Wire harness or connector ● High voltage negative relay (inside the power pack)

DTC diagnostic procedures

1.Execute the DTC confirmation step

1.The key at "LOCK" or pull out; wait at least 100s.

2.Turn the key to ON.

3. DTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Detect harness

1. Turn the key to "LOCK" or pull out;

2. Disconnect VCU harness connector.

3. Detect the voltage of the VCU harness connector and body ground.

Multimeter positive lead		Multimeter negative	Voltage value
VCU harness connector		lead	(approx.)
Connector	Terminal number		
F22	99	Vehicle body ground	0V

Check if the result is normal.

Yes >> Check whether the high voltage negative relay is bonded.

No >> Repair or replace the VCU harness.

P0AA0 High voltage pre-charge relay failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P0AA0	High voltage pre-charge relay failure	When only the pre-charge relay is engaged, the motor controller feedback voltage is higher than a certain value.	● Wire harness or connector. ● High voltage negative relay (inside the power pack)

DTC diagnostic procedures

1.Execute the DTC confirmation step

1.The key at "LOCK" or pull out; wait at least 100s.

2.Turn the key to ON.

3. DTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Detect harness

1. Turn the key to "LOCK" or pull out;

2. Disconnect VCU harness connector.

3. Detect the voltage of the VCU harness connector and body ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
VCU harness connector			
Connector	Terminal number		
F22	100	Vehicle body ground	0V

Check if the result is normal.

Yes >> Check whether the high voltage negative relay is bonded.

No >> Repair or replace the VCU harness.

P2122，P2123 Accelerator pedal first sensor failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P2122	Accelerator pedal first sensor short circuit to ground	VCU detects the accelerator pedal first sensor signal voltage is too low.	● Harness or connector (accelerator pedal first sensor circuit open or shorted) ● Accelerator pedal first sensor
P2123	Accelerator pedal first sensor short circuit to battery	VCU detects the accelerator pedal first sensor signal voltage is too high.	

DTC diagnostic procedures

1.Execute the DTC confirmation step

1.Turn the key to ON.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Detection finished.

Diagnostic steps

1.Detect the accelerator pedal first sensor supply voltage 1

1. Turn the key to "LOCK" or pull out;

2. Check diagnostic results.

3.Turn the key to ON.

4.Detect the accelerator pedal first sensor supply voltage

Accelerator pedal first sensor			Voltage value (approx.)
Connector	Multimeter positive lead	Multimeter negative lead	
	Terminal number		
F15	2	3	5V

Check if the result is normal.

Yes >> Go to step 6

No >> Go to step 2

2.Detect the accelerator pedal first sensor supply voltage 2

Detect the accelerator pedal first sensor positive power supply

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Accelerator pedal first sensor			
Connector	Terminal number		
F15	2	Ground	5V

Check if the result is normal.

Yes >> Go to step 4

No >> Go to step 3

3.Detect the accelerator pedal first sensor positive power supply harness

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU harness connector.

3.Detect the accelerator pedal first sensor positive power supply harness.

Multimeter positive lead		Multimeter negative lead		Connectivity
Accelerator pedal first sensor		VCU		
Connector	Terminal number	Connector	Terminal number	
F15	2	F23	112	Conduction

4. Also check whether the harness is shorted to power or ground.

Check if the result is normal.

Yes >>Detect low-voltage distribution controller power supply.

No >> Repair or replace the accelerator pedal.

4.Check the negative power-supply harness of accelerator pedal first sensor

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU harness connector.

3.Detect the accelerator pedal first sensor negative power supply harness

Multimeter positive lead		Multimeter negative lead		Connectivity
Accelerator pedal first sensor		VCU		
Connector	Terminal number	Connector	Terminal number	
F15	3	F22	72	Conduction

4. Also check whether the harness is shorted to power.

Check if the result is normal.

Yes>> GO to step 5.

No >> Repair or replace the accelerator pedal.

5.Check VCU negative power-supply circuit

Detect VCU negative power supply circuit

Multimeter positive lead		Multimeter negative lead	Connectivity
VCU			
Connector	Terminal number		
F22	1	Ground	Conduction

	9		
	47		
	66		

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Refer to "VCU Check Procedure" below.

6. Check the output harness of accelerator pedal first sensor

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU harness connector.

3.Detect the accelerator pedal first sensor output harness

Multimeter positive lead		Multimeter negative lead		Connectivity
Accelerator pedal first sensor		VCU		
Connector	Terminal number	Connector	Terminal number	
F15	4	F22	34	Conduction

4. Also check whether the harness is shorted to power or ground.

Check if the result is normal.

Yes>> GO to step 7.

No >> Repair or replace the accelerator pedal.

7. Check the accelerator pedal first sensor

According to "Component detection (accelerator pedal first sensor)".

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the accelerator pedal. Refer to the accelerator pedal dismantling guide.

Component detection (accelerator pedal first sensor)

Detect the accelerator pedal first sensor

1. Turn the key to "LOCK" or pull out.

2. Reconnect all disconnected harness connectors.

3.Turn the key to ON.

4. Check the voltage of the VCU connectors under the following conditions:

VCU			Condition		Voltage value (V)
Connector	Multimeter positive lead	Multimeter negative lead			
	Terminal number	Terminal number			
F22	34	Ground	Accelerator pedal	Full release	0.75±0.1
				Full pressed	4.45±0.2
	15			Full release	0.375±0.1
				Full pressed	2.225±0.2

Check if the result is normal.

Yes >> Detection is finished.

No >> Replace the accelerator pedal. Refer to the “accelerator pedal dismantling guide”.

P2127，P2128 Accelerator pedal second sensor failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P2127	Accelerator pedal second sensor short circuit to ground	VCU detects the accelerator pedal second sensor signal voltage is too low.	● Harness or connector (accelerator pedal second sensor circuit open or shorted) ● Accelerator pedal second sensor
P2128	Accelerator pedal second sensor short circuit to battery	VCU detects the accelerator pedal second sensor signal voltage is too low.	

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to ON.

2. Check diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Detection finished.

Diagnostic steps

1.Detect the accelerator pedal second sensor supply voltage 1

1. Turn the key to "LOCK" or pull out the key.

2. Check diagnostic results.

3.Turn the key to ON.

4.Detect the accelerator pedal first sensor supply voltage.

Accelerator pedal second sensor			
Connector	Multimeter positive lead	Multimeter negative lead	Voltage value (approx.)
	Terminal number		
F15	1	5	5V

Check if the result is normal.

Yes >> Go to step 6

No >> Go to step 2

2. Detect the accelerator pedal second sensor positive supply voltage 2

Detect the accelerator pedal second sensor positive power supply

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Accelerator pedal second sensor			
Connector	Terminal number		
F15	1	Ground	5V

Check if the result is normal.

Yes >> Go to step 4

No >> Go to step 3

3. Detect the accelerator pedal second sensor positive power supply harness

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU harness connector.

3. Detect the accelerator pedal second sensor positive power supply harness.

Multimeter positive lead		Multimeter negative lead		Connectivity
Accelerator pedal second sensor		VCU		
Connector	Terminal number	Connector	Terminal number	
F15	1	F23	104	Conduction

4. Also check whether the harness is shorted to power or ground.

Check if the result is normal.

Yes >> Detect the self-sustaining relay power supply.

No >> Repair or replace the harness.

4. Check the accelerator pedal second sensor negative power-supply harness

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU harness connector.

3.Detect the accelerator pedal second sensor negative power supply harness

Multimeter positive lead		Multimeter negative lead		Connectivity
Accelerator pedal second sensor		VCU		
Connector	Terminal number	Connector	Terminal number	
F15	5	F22	53	Conduction

4. Also check whether the harness is shorted to power.

Check if the result is normal.

Yes >> Go to step 5

No >> Repair or replace the harness.

5. Check VCU negative power-supply circuit

Detect VCU negative power supply circuit

Multimeter positive lead		Multimeter negative lead	Connectivity
VCU			
Connector	Terminal number		
F22	1	Ground	Conduction
	9		
	47		
	66		

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Refer to "VCU Check Procedure" below.

6. check the accelerator pedal second sensor output harness

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU harness connector.

3. Detect the accelerator pedal second sensor output harness

Multimeter positive lead		Multimeter negative lead		Connectivity
Accelerator pedal second sensor		VCU		
Connector	Terminal number	Connector	Terminal number	
F15	6	F22	15	Conduction

4. Also check whether the harness is shorted to power or ground.

Check if the result is normal.

Yes >> Go to step 7

No >> Repair or replace the harness.

7. check the accelerator pedal second sensor

According to "Component detection (accelerator pedal second sensor)".

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the accelerator pedal. Refer to the accelerator pedal dismantling guide.

Component detection (accelerator pedal second sensor)

Detect the accelerator pedal second sensor

1. Turn the key to "LOCK" or pull out.

2. Reconnect all disconnected harness connectors.

3.Turn the key to ON.

4. Check the voltage of the VCU connectors under the following conditions:

VCU			Condition	Voltage value (V)
Connector	Multimeter positive lead	Multimeter negative		

		lead			
	Terminal number	Terminal number			
F22	34	1	Accelerate pedal	Full release	0.75±0.1
				Full pressed	4.45±0.2
	15			Full release	0.375±0.1
				Full pressed	2.225±0.2

Check if the result is normal.

No >> Detection finished.

No >> Replace the accelerator pedal. Refer to the “accelerator pedal dismantling guide”.

P2138 Accelerator pedal ratio failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P2138	Accelerator pedal ratio failure	VCU diagnoses the abnormal acceleration pedal first and second sensor signals at the same time	● Harness or connector (accelerator pedal first or second sensor circuit open or shorted) ● The acceleration pedal sensor

DTC diagnostic procedures

1.Perform DTC confirmation procedure

1.Turn the key to ON.

2. Check the diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Detection finished.

Diagnostic steps

1.Detect VCU power supply circuit

1. Turn the key to "LOCK" or pull out the key.

2. Disconnect VCU harness connector.

3. Detect the connectivity of the VCU harness connector and ground.

Multimeter positive lead		Multimeter negative lead	Connectivity
VCU			
Connector	Terminal number		

F22	1	Ground	Conduction
	9		
	47		
	66		

Check if the result is normal.

Yes >> Go to step 2

No >> Repair or replace the VCU harness.

2. Detect the accelerator pedal signal circuit

1. Disconnect the accelerator pedal sensor harness connector.

2. Detect the connectivity of the accelerator pedal sensor to the end.

The acceleration pedal sensor			Connectivity
Connector	Multimeter positive lead	Multimeter negative lead	
	Terminal number		
F15	4	6	Conduction

Check if the result is normal.

Yes >> Go to step 3

No >> Repair or replace the accelerator sensor harness.

3. Detect the accelerator pedal sensor

Refer to “Component detection (accelerator pedal sensor)”

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Replace the accelerator pedal.

Component detection (accelerator pedal sensor)

1. Detect the accelerator pedal sensor

1. Turn the key to "LOCK" or pull out.

2. Reconnect all disconnected harness connectors.

3.Turn the key to ON.

4. Check the voltage of the VCU connectors under the following conditions:

VCU			Condition		Voltage value (V)
Connector	Multimeter positive lead	Multimeter negative lead			
	Terminal number	Terminal number			
F22	34	1	Accelerate pedal	Full release	0.75±0.1
				Full pressed	4.45±0.2
	15			Full release	0.375±0.1
				Full pressed	2.225±0.2

Check if the result is normal.

No >> Detection finished.

No >> Replace the accelerator pedal. Refer to the “accelerator pedal dismantling guide”.

P3012 Motor controller failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3012	Motor controller failure	When the MC relay is engaged, the motor controller does not send a message.	● Wire harness or connector ● Motor controller

DTC diagnostic procedures

1.Execute the DTC confirmation step

1.The key at "LOCK" or pull out; wait at least 5s.

2.Turn the key to ON.

3.CheckDTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Detects motor controller power supply

1. Disconnect the motor controller harness connector.

2.Turn the key to ON.

3. Detect the voltage of the VCU harness connector and body ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
The motor controller harness connector			
Connector	Terminal number		
FC01	1 and 2	Vehicle body ground	12V

Check if the result is normal.

Yes >> Replace the motor controller

No >> Repair or replace the motor controller supply harness.

P3013 Motor controller failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3013	Motor controller failure	When the MC relay is engaged, the motor controller does not send a message.	● Wire harness or connector ● Battery controller

DTC diagnostic procedures

1.Execute the DTC confirmation step

1.The key at "LOCK" or pull out; wait at least 5s.

2.Turn the key to ON.

3.CheckDTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Detect motor controller power supply

1. Disconnect the battery controller harness connector.

2.Turn the key to ON.

3. Detect the voltage of the VCU harness connector and body ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
The battery controller harness connector			
Connector	Terminal number		
F17	V	Vehicle body ground	12V

Check if the result is normal.

Yes >> Replace the battery controller

No >> Repair or replace the battery controller supply harness.

P3015, P3016, P3017 High voltage circuit fault

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3015	High voltage loop failure	The following conditions last for 0.2 seconds: ● Power battery current above 5A ● The motor controller feedback voltage is less than 24V ● Pre-charging in process	● High voltage wiring harness ● High voltage junction box
P3016		The following conditions last for 0.5 seconds: ● Power battery current below 5A ● The motor controller feedback voltage is less than 24V ● Pre-charging in process	● High voltage wiring harness ● High voltage junction box
P3017		The following conditions last for 0.5 seconds: ● Power battery voltage and motor controller feedback voltage difference is higher than 100V ● Precharging process	● High voltage wiring harness ● High voltage junction box ● Battery controller

DTC diagnostic procedures

1. Execute the DTC confirmation step

1.The key at "LOCK" or pull out; wait at least 100s.

2.Turn the key to ON.

3.Check DTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1.Preparation

Warning:

Disconnect the high voltage circuit, see "Overview - High voltage disconnection process"

Detect the high voltage circuit voltage. (After the internal motor capacitance discharge)

Disconnect the high voltage harness connector at the end of the battery pack.

DANGER: If you do not wear the appropriate protective equipment and touch the

high-voltage parts, it will produce electric shock hazard.

Detect the high voltage circuit voltage.

DANGER: If you do not wear the appropriate protective equipment and touch the high-voltage parts, it will produce electric shock hazard.

Note：

For high voltage measurements,please use a tool that can detect more than 500V.

>> Go to step 2

2.Detect DTC

Check other DTCs.

Are there any other DTCs?

Yes >> Check DTC. Refer to "VCU fault citation".

No >> Go to step 3.

3.Check the power battery self-test results

Check the power battery self-test results with the detection tool.

Whether DTC is detected ?

Yes >> Check DTC. Refer to "LBC fault citation".

No >> Go to step 4

4.Check the motor self-test results

Check the motor self-test results with the detection tool.

Whether DTC is detected ?

Yes >> Check DTC. Refer to "PCU fault citation".

No >> Go to step 5

5.Check the vehicle charger self-test results

Check the vehicle charger self-test results with the detection tool.

Whether DTC is detected ?

Yes >> Check DTC. Refer to "OBC fault citation".

No >> Go to step 6

6. Check the air conditioning compressor self-test results

Check the motor self-test results with the detection tool.

Whether DTC is detected ?

Yes >> Check DTC. Refer to "Air conditioning compressor failure reference".

No >> Go to step 7

7. Check the high voltage circuit fuse

1. Disconnect all high-voltage harness connectors around the high-voltage junction box.

2. Measure the continuity of the high voltage positive pole and the circuit on the power battery of the high voltage junction box.

Whether the internal high voltage junction box is turned on?

Yes >>Check finished.

No >>Replace high voltage junction box.

P3010 Vehicle crash failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3010	Vehicle collision failure	The VCU receives the collision signal sent by the airbag controller.	● The airbag was exploded ● Airbag crash sensor ● VCU

DTC diagnostic procedures

1. Execute the DTC confirmation step

Check if the airbag is exploded?

Yes >> Refer to "Airbag activation".

No >> Go to step 2.

2.Execute the DTC confirmation step

1.The key at "LOCK"; wait at least 20s.

1.The key at "ON"; wait at least 5s.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

1.Replace the airbag controller

Replace the airbag controller

Whether DTC is detected ?

Yes >> Replace VCU

No >>Check finished.

P3006, P3007, P3008, P3009 Shift mechanism failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3006	Shift the first signal is abnormal	VCU diagnosis shift the first signal voltage is not within a reasonable range.	● Wire harness or connector ● Shift mechanism ● VCU
P3007	Shift the second signal is abnormal	VCU diagnosis shift the second signal voltage is not within a reasonable range.	
P3008	Shift the third signal is	VCU diagnosis shift the third signal voltage is not	

	abnormal	within a reasonable range.	
P3009	Shift the forth signal is abnormal	VCU diagnosis shift the forth signal voltage is not within a reasonable range.	

DTC diagnostic procedures

1.Execute the DTC confirmation step

"D" or "R" gear detection:

1. Tighten the handbrake.

1.The key at "LOCK" or pull out; wait at least 5s.

3.Turn the key to ON.

4. Place the gear shife in "D" or "R".

5. Check diagnostic results.

Whether DTC is detected ?

Yes >> Go to the following "Diagnostic steps".

No >> Detection finished.

Diagnostic steps

Tip: Before performing the diagnosis, please check whether the 12V battery voltage is normal. If normal, please implement the following steps; otherwise ensure that 12V battery power supply after the normal diagnosis.

1.Check the power-supply voltage 1 of 12V battery to the shift mechanism

1. Turn the key to "LOCK" or pull out.

2. Disconnect the gearshift connector.

3.Turn the key to ON.

4. Detect the voltage between the connector terminals of the shift mechanism.

Shift mechanism			Voltage value
Connector	Multimeter positive	Multimeter negative	(around)

	lead	lead	
	Terminal number		
F18	1	3	12V

Check if the result is normal.

Yes >> Go to step 6

No >> Go to step 2

2. Check the shift mechanism supply voltage 2

Detect the voltage between the shift mechanism positive and body ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
Shift mechanism			
Connector	Terminal number		
F18	1	Vehicle body ground	12V

Check if the result is normal.

Yes >> Go to step 3.

No >> Repair or replace the fault part.

3. Check 12V battery to the shift mechanism power supply circuit

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU connector.

3. Detection of 12V battery to the shift mechanism power supply circuit insurance "fuse" situation.

Multimeter positive lead		Multimeter negative lead		Connectivity
Front cabin fuse box		Front cabin fuse box		
Connector	Terminal number	Connector	Terminal number	
ER16#	1	ER16#	2	Conduction

Check if the result is normal.

Yes >> Go to step 4

No >> Repair or replace the fault part.

4. Check 12V battery to the shift mechanism power supply circuit harness

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU connector.

3.Detect 12V battery to the shift mechanism power supply circuit.

Multimeter positive lead		Multimeter negative lead		Connectivity
Shift mechanism		Front cabin fuse box		
Connector	Terminal number	Insurance	Terminal number	
F18	1	ER16#	1	Conduction

4. Also check whether the harness is shorted to power or ground.

Check if the result is normal.

Yes >>Detect low-voltage distribution controller power supply.

No >>repair or replace the failed parts。

5. Detection of gearshift mechanism grounding circuit

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU connector.

3.Detect the gearshift mechanism grounding circuit.

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
Shift mechanism			
Connector	Terminal number		
F18	1	Vehicle body ground	12V

4. Also check whether the harness is shorted to power.

Check if the result is normal.

Yes>> GO to step 6.

No >> Repair or replace the fault part.

6. Check of shift mechanism terminal 5V power supply 1

1. Turn the key to "LOCK" or pull out.

2. Detect the 5V supply voltage of the shift mechanism terminal.

Multimeter positive lead		Multimeter negative lead		Voltage value (around)
Shift mechanism		Shift mechanism		
Connector	Terminal number	Connector	Terminal number	
F18	2	F18	3	5V
	4			
	6			
	8			

4. Also check whether the harness is shorted to power.

Check if the result is normal.

Yes>> GO to step 7.

No >> Repair or replace the fault part.

7. Check of shift mechanism terminal 5V power supply 2

1. Turn the key to "LOCK" or pull out.

2. Detect the 5V supply voltage of the shift mechanism.

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
Shift mechanism			
Connector	Terminal number		
F18	2	Vehicle body ground	5V
	4		
	6		
	8		

4. Also check whether the harness is shorted to power.

Check if the result is normal.

Yes>> GO to step 8.

No >> Repair or replace the fault part.

8. Check of shift mechanism sensor output circuit

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU connector.

3.Detect shift mechanism forth sensor output circuit.

Multimeter positive lead		Multimeter negative lead		Connectivity
Shift mechanism		VCU		
Connector	Terminal number	Connector	Terminal number	
F18	2	F23	14	Conduction
	4		33	Conduction
	6		52	Conduction
	8		71	Conduction

4. Also check whether the harness is shorted to power or ground.

Check if the result is normal.

Yes>> GO to step 9.

No >> Repair or replace the fault part.

9.Check gearshift mechanism

Refer to "Component Detection (Shift Mechanism)" below.

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the fault part. Refer to the shift mechanism dismantling guide.

Component Detection (Shift Mechanism)

Detect the shift mechanism first sensor

1. Turn the key to "LOCK" or pull out.

2. Reconnect all disconnected harness connectors.

3.Turn the key to ON.

4. Check the voltage of the VCU connectors under the following conditions:

VCU			Condition		Voltage value (V)
Connector	Multimeter positive lead	Multimeter negative lead			
	Terminal number	Terminal number			
F23	14	Ground	Shift mechanism	D gear	1.75±0.5%
	33				3.20±0.5%
	52				1.75±0.5%
	71				3.20±0.5%
	14			"R" gear	3.20±0.5%
	33				3.20±0.5%
	52				1.75±0.5%
	71				1.75±0.5%

Check if the result is normal.

Yes >> Detection is finished.

No >> Replace shift mechanism. Refer to the shift mechanism dismantling guide.

Tip: shift mechanism output signal has four. If you want to confirm the other three, the method are the same.

P300C，P300D，P300E Battery controller message-missing fault

Note: Before checking this fault, check the MC relay fault and the CAN line fault first.

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P300C P300D P300E	Battery controller message-missing fault	After the battery controller is initialized, the packets sent by the vehicle controller are lost.	• LBC • VCU

DTC diagnostic procedures

1.Execute the DTC confirmation step

1.Turn the key to ON.

2.Check DTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Detection finished.

Diagnostic steps

1.Detect DTC

Perform VCU self-diagnosis function. Refer to the electric vehicle control system. “Diagnostic tool function”.

Is there any other DTC other than P300C, P300D, P300E detected?

Yes >> Replace VCU. Refer to electric vehicle control system. “VCU: disassembly and assembly”.

No >> Replace LBC. Refer to the power battery control system. “LBC: disassembly and assembly”.

P300F Motor controller message-missing fault

Note: Before checking this fault, check the MC relay fault and the CAN line fault first.

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P300F	Motor controller message missing fault	After the battery controller is initialized, the packets sent by the vehicle controller are lost.	● PCU ● VCU

DTC diagnostic procedures

1.Execute the DTC confirmation step

1.Turn the key to ON.

2.Check DTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Detection finished.

Diagnostic steps

1.Detect DTC

Perform VCU self-diagnosis function. Refer to the electric vehicle control system. “Diagnostic tool function”.

Is there any other DTC other than P300E detected?

Yes >> Replace VCU Refer to electric vehicle control system. “VCU: disassembly and assembly”.

No >> Replace PCU. Refer to the power battery control system. “LBC: disassembly and assembly”.

P301F Car charger controller message loss fault

Note: Check the CAN line before checking this fault.

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P301F	Charger controller message-missing fault	After the battery controller is initialized, the packets sent by the vehicle controller are lost.	● Car Charger ● VCU

DTC diagnostic procedures

1.Execute the DTC confirmation step

1. Connect the portable charging harness to the AC charging pile or household power outlet.

2.Check DTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Detection finished.

Diagnostic steps

1.Detect DTC

Perform VCU self-diagnosis function. Refer to the electric vehicle control system. “Diagnostic tool function”.

Is there any other DTC other than P301F detected?

Yes >> Replace VCU Refer to electric vehicle control system. “VCU: disassembly and assembly”.

No >> Replace OBC. Refer to the car charger control system. “OBC: disassembly and assembly”.

P3020 Charger pile message-missing fault

Note: Check the CAN line before checking this fault.

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3020	Charger pile message-missing fault	After the charging pile is initialized, the packets sent by the vehicle controller are lost.	● Charging pile ● VCU

DTC diagnostic procedures

1.Execute the DTC confirmation step

1. Connect the portable charging harness to the AC charging pile.

2.Check DTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Detection finished.

Diagnostic steps

1.Detect DTC

Perform VCU self-diagnosis function. Refer to the electric vehicle control system. “Diagnostic tool function”.

Is there any other DTC other than P3020 detected?

Yes >> Replace VCU Refer to electric vehicle control system. “VCU: disassembly and assembly”.

No >> Replace charging pile.

P3014 M/C relay

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3014	M/C relay failure	After the key is placed in the "ON" block, the VCU detects that the LBC and PCU have not sent a message to the CAN bus.	● Wire harness or connector ● Fuse ● M/C relay

DTC diagnostic procedures

1.Execute the DTC confirmation step

1.Turn the key to ON.

2. Check diagnostic results.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Detection finished.

Diagnostic steps

1.Check of M / C relay control circuit

1. Turn the key to "LOCK" or pull out.

2. Remove M/C relay.

3. Detect the M / C relay connector pin voltage

M/C relay connector			Voltage value (approx.)
Multimeter	Multimeter positive lead	Multimeter negative lead	
	Terminal number		
Connector number	2	3	0V

4.Turn the key to ON.

5. Detect the M / C relay connector pin voltage

M/C relay connector			Voltage value (approx.)
Multimeter	Multimeter positive lead	Multimeter negative lead	
	Terminal number		
Connector number	2	3	12V battery voltage

Check if the result is normal.

Yes >> Go to step 9

No >> Go to step 2

2. Detection of M / C relay power supply -1

Detects the voltage between the M / C relay connector pin and the vehicle body ground

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
M/C relay			
Connector	Terminal number		
F15	2	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes>> GO to step 6.

No >> Go to step 3

3. Detect the fuse

1.Remove M/C relay fuse.

2.Check if the fuses are blown.

Check if the result is normal.

Yes >> Go to step 4

No >> Replace the fuse.

4. Detection of M / C relay power supply -2

Check the voltage between the fuse connector and the vehicle body

Multimeter positive lead	Multimeter negative lead	Voltage value (approx.)
Fuse terminal	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes>> GO to step 5.

No >> Detects the circuit between the low-voltage distribution controller output and M/C.

5. Detection of M / C relay power supply -1

1. Detect the harness connection between the M / C relay connector and the fuse

Multimeter positive lead	Multimeter negative lead		Connectivity
	M/C relay		
	Connector	Terminal number	
Fuse terminal	F22	2	Conduction

2. Check harness for continuity with power supply and ground.

Check if the result is normal.

Yes >> Go to "routine check".

No >> Repair or replace the fault part.

6. Check of M/C relay control signal circuit

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU harness connector.

3. Detect the connection between the M / C relay connector terminal and the VCU connector terminal.

Multimeter positive lead		Multimeter negative lead		Connectivity
M/C relay		VCU		
Connector	Terminal number	Connector	Terminal number	
F15	1	F22	34	Conduction

4. Also check whether the harness is shorted to power or ground.

Check if the result is normal.

Yes >> Go to step 7.

No >> Repair or replace the fault part.

7. Check VCU power supply circuit

Detect the voltage difference between the VCU connector and the vehicle body.

Multimeter positive lead		Multimeter negative lead	Connectivity
VCU			
Connector	Terminal number		
F21	1	Vehicle body ground	Conduction
F21	9		
F21	47		
F21	66		

Check if the result is normal.

Yes >> Go to step 8.

No >> Repair or replace the fault part.

8. Fault simulation test

Refer to "Overview - Fault simulation test"

Check if the result is normal.

Yes >> Replace VCU.

No >> Repair or replace the fault part.

9. Detection of M / C relay power supply -3

Detects the voltage between the M / C relay connector pin and the vehicle body ground

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
M/C relay			
Connector	Terminal number		
MC01	3	Ground	12V battery voltage

Check if the result is normal.

Yes >> Go to step 11.

No >> Go to step 10

10. Detection of M / C relay power supply -2

1. Detect the harness connection between the M / C relay connector and the fuse

Multimeter positive lead	Multimeter negative lead		Connectivity
	M/C relay		
	Connector	Terminal number	
Fuse terminal	MC01	3	Conduction

2. Check harness for continuity with power supply and ground.

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the fault part.

11. Check M / C relay

Check if the result is normal.

Yes >> Detection is finished.

No >> Repair or replace the fault part.

Component detection (M / C relay)

Detection of M / C relay

1. Turn the key to "LOCK" or pull out.

2. Remove M/C relay.

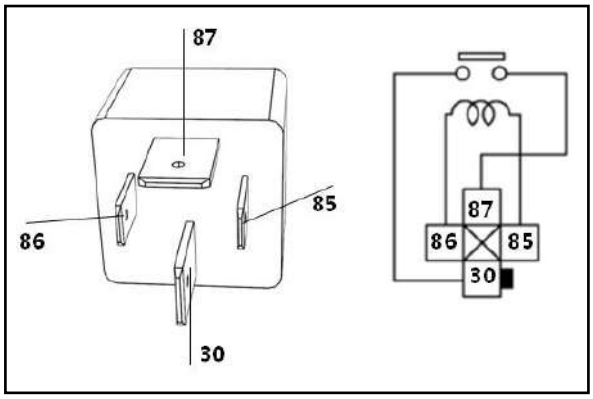
3. Check the continuity of the pins of the M / C relay.

Interface	Condition	Connectivity
Interface 3 and 5	Pin 1 and 2 has direct current	Conduction
	No direct current	No conduction

Check if the result is normal.

Yes >> Detection is finished.

No >> Replace the M/C relay.



P3011 High voltage interlock fault

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P3011	The high voltage interlock failure	After the MC relay is engaged, the VCU diagnoses the high voltage interlock signal for a low level for 2.5 seconds.	● Wire harness or connector ● High voltage harness or connector

DTC diagnostic procedures

1.Execute the DTC confirmation step

1.The key at "ON"; wait at least 5s.

2.Check DTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system**

operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.

- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1. Preparation

Warning:

Disconnect the high voltage circuit, see "Overview - High voltage disconnection process"

Detect the high voltage circuit voltage. (After the internal motor capacitance discharge)

1.Disconnect the high voltage harness connector at the end of the battery pack.

DANGER: If you do not wear the appropriate protective equipment and touch the high-voltage parts, it will produce electric shock hazard.

2.Detect the high voltage circuit voltage.

DANGER: If you do not wear the appropriate protective equipment and touch the high-voltage parts, it will produce electric shock hazard.

Note：

For high voltage measurements,please use a tool that can detect more than 500V.

>> Go to step 2

2. Check the installation of the high-voltage harness connector

Check the high voltage wiring harness and power battery between the high-voltage wiring harness wear and withdrawal of the needle situation.

Note：

When reconnecting the high-voltage harness connector, the plugs are aligned with each other and slowly tighten them.

Check if the result is normal.

Yes >> Go to step 3

No >> Repair or replace the fault part.

3. Detect power battery low voltage harness power supply

1. Disconnect the battery low voltage harness connector.

2.Turn the key to ON.

3.Detect power battery low voltage harness power supply

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
Battery low voltage harness connector.			
Connector	Terminal number		
F18	V	Vehicle body ground	12V

Check if the result is normal.

Yes >> Go to step 7

No >> Go to step 4

4. Detect high-voltage junction box low-voltage wire harness power supply

1: Place the key in the "LOCK".

2. Disconnect the high-voltage junction box low-voltage harness connector.

3.Turn the key to ON.

4.Detect high-voltage junction box low-voltage wire harness power supply

Multimeter positive lead		Multimeter negative lead	Voltage value (approx.)
The high-voltage junction box low-voltage harness connector.			
Connector	Terminal number		
FC03	7	Vehicle body ground	12V

Check if the result is normal.

Yes >> Go to step 5

No >> Go to step 6

5. Detect power battery low voltage harness circuit

1: Place the key in the "LOCK".

2.Detect power battery low voltage harness circuit

Multimeter positive lead		Multimeter negative lead		Connectivity
The high-voltage junction box low-voltage harness connector.		Battery low voltage harness connector.		
Connector	Terminal number	Connector	Terminal number	
FC03	8	F18	R	Conduction

Check if the result is normal.

Yes >> Replace high voltage junction box.

No >> Repair or replace the fault part.

6. Detect high-voltage junction box low-voltage wire harness circuit

1: Place the key in the "LOCK".

2.Detect power battery low voltage harness circuit

Multimeter positive lead		Multimeter negative lead		Connectivity
The high-voltage junction box low-voltage harness connector.		M/C relay		
Connector	Terminal number	Connector	Terminal number	
FC03	8	-	PU01	Conduction

Check if the result is normal.

Yes >> Refer to "M / C Relay Diagnostic Procedure".

No >> Repair or replace the fault part.

7. Detect power battery low voltage circuit

1: Place the key in the "LOCK".

2. Disconnect VCU connector.

3.Detect power battery low voltage circuit.

Multimeter positive lead		Multimeter negative lead		Connectivity
Power battery connector		VCU connector		
Connector	Terminal number	Connector	Terminal number	
F18	R	F21	39	Conduction

Check if the result is normal.

Yes >> Replace the power battery.

No >> Repair or replace the fault part.

P301A High voltage loop failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P301A	High voltage loop failure	When the key is set to "ON", the motor controller feedback voltage is abnormal.	● High voltage harness or connector ● High voltage junction box ● PCU

DTC diagnostic procedures

1.Execute the DTC confirmation step

1.The key at "ON"; wait at least 5s.

2.Check DTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**
- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1.Preparation

Warning:

Disconnect the high voltage circuit, see "Overview - High voltage disconnection process"

Detect the high voltage circuit voltage. (After the internal motor capacitance discharge)

1.Disconnect the high voltage harness connector at the end of the battery pack.

DANGER: If you do not wear the appropriate protective equipment and touch the high-voltage parts, it will produce electric shock hazard.

2.Detect the high voltage circuit voltage.

DANGER: If you do not wear the appropriate protective equipment and touch the high-voltage parts, it will produce electric shock hazard.

Note：

For high voltage measurements,please use a tool that can detect more than 500V.

>> Go to step 2

2.Check the installation of the high-voltage harness connector

Check the PCU high-voltage wire harness head wear and withdrawal needle situation.

Note：

When reconnecting the high-voltage harness connector, the plugs are aligned with each other and slowly tighten them.

Check if the result is normal.

Yes >> Go to step 3

No >> Repair or replace the fault part.

3.Check the fuse situation in the high voltage junction box

1. Disconnect the high voltage junction box and the power battery terminal high voltage wiring harness.

2. Check the PCU circuit fuse in the high voltage junction box.

Check if the result is normal.

Yes >> Replace PCU.

No >>Replace high voltage junction box.

P301B Air conditioning compressor high voltage circuit failure

DTC logic

DTC diagnostic logic

DTC number	Failure Name	DTC diagnostic conditions	The possible causes for failure
P301B	Air conditioning	When the key is set to	● High voltage harness or

	compressor high voltage circuit failure	"ON", the AC compressor feedback voltage is abnormal.	connector ● High voltage junction box ● Air conditioning compressor controller

DTC diagnostic procedures

1.Execute the DTC confirmation step

1.The key at "ON"; wait at least 5s.

2.Check DTC.

Whether DTC is detected ?

Yes >> Refer to "Diagnostic Procedure" below.

No >> Check finished.

Diagnostic steps

Warning:

- **As the electric vehicle contains a high voltage battery, if the high pressure components and vehicles are handled incorrectly, there is a risk of electric shock, shock, leakage or similar accidents, so be sure to follow the correct procedures to check and maintain.**
- **Before the maintenance switch is disconnected, the key must be placed in the "LOCK" or unplugged.**
- **Check or maintain the high pressure system before disconnecting the service switch. And no one is allowed to turn off the maintenance switch during the inspection and maintenance process. Before starting the high voltage system operation, be sure to wear insulation protection equipment, including gloves, shoes and glasses.**
- **Make sure other people will not touch the vehicle while service personnel is operating high-pressure system. When maintenance work is suspended, the high-voltage part should be under insulation protection to prevent other people from touching.**

- **When the maintenance switch is disconnected, the key is forbidden to "ON" or "START".**

1.Preparation

Warning:

Disconnect the high voltage circuit, see "Overview - High voltage disconnection process"

Detect the high voltage circuit voltage. (After the internal motor capacitance discharge)

1.Disconnect the high voltage harness connector at the end of the battery pack.

DANGER: If you do not wear the appropriate protective equipment and touch the high-voltage parts, it will produce electric shock hazard.

2.Detect the high voltage circuit voltage.

DANGER: If you do not wear the appropriate protective equipment and touch the high-voltage parts, it will produce electric shock hazard.

Note：

For high voltage measurements,please use a tool that can detect more than 500V.

>> Go to step 2

2.Check the installation of the high-voltage harness connector

Check the AC compressor high-voltage wire harness head wear and withdrawal needle situation.

Note：

When reconnecting the high-voltage harness connector, the plugs are aligned with each other and slowly tighten them.

Check if the result is normal.

Yes >> Go to step 3

No >> Repair or replace the fault part.

3. Check the fuse situation in the high voltage junction box

1. Disconnect the high voltage junction box and the power battery terminal high voltage wiring harness.

2. Check the high-voltage junction box air conditioning compressor circuit fuse situation.

Check if the result is normal.

Yes >>Replace the air conditioning compressor.

No >>Replace high voltage junction box.

Cooling fan

Component function detection

1. Detect the cooling fan function

Reference

1.Turn the key to ON.

2. Open air conditioning refrigeration.

3. Detect the cooling fan function.

Check if the result is normal.

Yes >> Detection is finished.

No >> Refer to "Diagnostic Flow" on the next page.

Diagnostic steps

1. Check the cooling fan control module power supply

1. Turn the key to "LOCK" or pull out.

2. Disconnect the cooling fan control module connector.

3. Turn the key to ON.

4. Detect the voltage between the cooling fan control module connector and ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
Cooling fan control module			
Connector	Terminal number		
F09	1	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes >> Go to step 10.

No >> Go to step 2.

2. Detect battery power supply

1. Turn the key to "LOCK" or pull out.

2. Remove the cooling fan relay.

3. Check the voltage between the cooling fan relay connector and ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
Cooling fan relay.			
Connector	Terminal number		
ER07	85	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes >> Go to step 3.

No >> Check the battery power supply circuit.

3. Detection of M / C relay output voltage 1

1. Turn the key to ON.

2. Check the voltage between the cooling fan relay connector and ground.

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
Cooling fan relay.			
Connector	Terminal number		
ER07	KI30	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes >> Go to step 8.

No >> Go to step 4.

4. Detect the fuse

1. Turn the key to "LOCK" or pull out.

2. Unplug the ESF11 fuse.

3. Check if the fuse is blown.

Check if the result is normal.

Yes >> Go to step 5.

No >> Replace the fuse.

5. Detection of M / C relay output voltage 2

1. Turn the key to ON.

2. Detect the voltage between the fuse connector and ground.

Multimeter positive lead	Multimeter negative lead	Voltage value (around)
ESF11	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes >> Go to step 7.

No >> Go to step 6.

6. Detection of M / C relay output circuit

1. Turn the key to "LOCK" or pull out.

2. Remove M/C relay.

3. Detect the connectivity of the M / C relay connector and the wire between the fuse.

Multimeter positive lead		Multimeter negative lead	Connectivity
M/C relay			
Connector	Terminal number		
ER08	30	ESF11	Conduction

4. Check whether the ground is short or shorted to the power supply.

Check if the result is normal.

Yes >> Detects the M / C relay circuit.

No >> Repair or replace the problem parts.

7. Detect the cooling fan control module power supply circuit

1. Turn the key to "LOCK" or pull out.

2. Detect the continuity of the circuit between the cooling fan relay connector and the safety connector.

Multimeter positive lead		Multimeter negative lead	Connectivity
Cooling fan relay			
Connector	Terminal number		
EF07	30	ESF11	Conduction

3. Check whether the ground is short or shorted to the power supply.

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the problem parts.

8. Check the cooling fan relay to ground circuit

1. Turn the key to "LOCK" or pull out.

2. Detect the continuity of the circuit between the cooling fan relay connector and the ground.

Multimeter positive lead		Multimeter negative lead	Connectivity
Cooling fan relay			
Connector	Terminal number		
EF07	87	Vehicle body ground	Conduction

Check if the result is normal.

Yes >> Go to step 9.

No >> Repair or replace the fault parts.

9. Check the cooling fan relay

Refer to "Component detection (cooling fan relay)".

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Replace the cooling fan relay.

10. Check the cooling fan relay

Check the cooling fan relay Refer to "Component detection (cooling fan relay)".

Check if the result is normal.

Yes >> Go to step 11.

No >> Replace the faulty cooling fan motor.

11. Detect the cooling fan control signal circuit

1. Disconnect VCU connector.

2. Detect the continuity of the circuit between the cooling fan control module connector and the VCU connector.

Multimeter positive lead		Multimeter negative lead		Connectivity
Cooling fan control module		VCU		
Connector	Terminal number	Connector	Terminal number	Conduction
F09	VC64	F21	VC64	

3. Simultaneously detect whether the circuit is short to the ground or shorted to the power supply.

Check if the result is normal.

Yes >> Go to step 12.

No >> Repair or replace the fault parts.

12. Replace the cooling fan control module

1.Replace the cooling fan control module.

2.Finish the component function detection. Refer to "Electric vehicle control system - Component function detection"

Check if the result is normal.

Yes >> Detection is completed.

No >> Repair or replace the fault parts.

Component detection (cooling fan relay)

1. Detect the cooling fan relay

1. Turn the key to "LOCK" or pull out.

2. Disconnect the cooling fan control module connector.

3. Provide cooling fan control module connector terminal small battery voltage, as shown

below, the detection of work

Cooling fan control module			Phenomenon
Motor Connector	Terminal		
	Small battery positive	Small battery negative	
F09	FA02	FA1G	Cooling fan operation

Check if the result is normal.

Yes >> Detection is completed.

No >> Replace the faulty cooling fan motor.

1. Check the cooling fan relay

1. Turn the key to "LOCK" or pull out.

2. Remove the cooling fan relay.

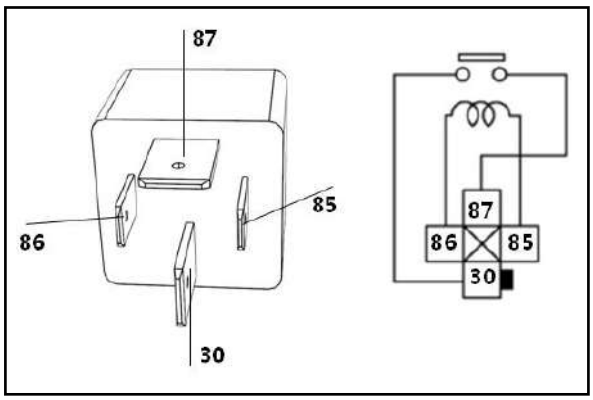
3. Detect the continuity of the circuit between the cooling fan relay connector under the following situation.

Terminal	Case	Connectivity
KL30	provide 12V DC supply voltage to pin 12 and pin 87	Conduction
87	No DC power supply available	No conduction

Check if the result is normal.

Yes >> Detection is completed.

No >> Replace the cooling fan relay.



M/C relay

Faults diagnosis flow

1. Check of M / C relay control circuit

1. Turn the key to "LOCK" or pull out.

2. Remove M/C relay.

3. Detect the M / C relay connector pin voltage

M/C relay connector			Voltage value (around)
Multimeter	Multimeter positive lead	Multimeter negative lead	
	Terminal number		
Connector number	2	3	0V

4.Turn the key to ON.

5. Detect the M / C relay connector pin voltage

M/C relay connector			Voltage value (around)
Multimeter	Multimeter positive lead	Multimeter negative lead	
	Terminal number		
Connector number	2	3	12V battery voltage

Check if the result is normal.

Yes >> Go to step 9

No >> Go to step 2

2. Detection of M / C relay power supply -1

Detects the voltage between the M / C relay connector pin and the vehicle body ground

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
M/C relay			
Connector	Terminal number		

-	-	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes>> GO to step 6.

No >> Go to step 3

3. Detect the fuse

1.Remove EF13 fuse.

2.Check if the fuses are blown.

Check if the result is normal.

Yes >> Go to step 4

No >> Replace the fuse.

4. Detection of M / C relay power supply -2

Check the voltage between the fuse connector and the vehicle body

Multimeter positive lead	Multimeter negative lead	Voltage value (around)
Fuse terminal	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes>> GO to step 5.

No >> Detects the low-voltage distribution controller output to the circuit between M / C.

5. Check of M / C relay power supply -1

1. Detect the harness connection between the M / C relay connector and the fuse

Multimeter positive lead	Multimeter negative lead		Connectivity
	M/C relay		
	Connector	Terminal number	
Fuse terminal	F22	2	Conduction

2. Check harness for continuity with power supply and ground.

Check if the result is normal.

Yes >> Go to "routine check".

No >> Repair or replace the fault part.

6. Check of M/C relay control signal circuit

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU harness connector.

3. Detect the connection between the M / C relay connector terminal and the VCU connector terminal.

Multimeter positive lead		Multimeter negative lead		Connectivity
M/C relay		VCU		
Connector	Terminal number	Connector	Terminal number	
F15	1	F22	34	Conduction

4. Also check whether the harness is shorted to power or ground.

Check if the result is normal.

Yes>> GO to step 7.

No >> Repair or replace the fault part.

7. Check VCU power supply circuit

Detect the voltage difference between the VCU connector and the vehicle body.

Multimeter positive lead		Multimeter negative lead	Connectivity
VCU			
Connector	Terminal number		
F21	1	Vehicle body ground	Conduction
F21	9		
F21	47		
F21	66		

Check if the result is normal.

Yes>> GO to step 8.

No >> Repair or replace the fault part.

8. Fault simulation test

Refer to "Overview - Fault simulation test"

Check if the result is normal.

Yes >> Replace VCU.

No >> Repair or replace the fault part.

9. Detection of M / C relay power supply -3

Detects the voltage between the M / C relay connector pin and the vehicle body ground

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
M/C relay			
Connector	Terminal number		
-	MC01	Ground	12V battery voltage

Check if the result is normal.

Yes>> GO to step 11.

No >> Go to step 10

10. Check of M / C relay power supply -2

1. Detect the harness connection between the M / C relay connector and the fuse

Multimeter positive lead	Multimeter negative lead		Connectivity
	M/C relay		
	Connector	Terminal number	
Fuse terminal	-	MC01	Conduction

2. Check harness for continuity with power supply and ground.

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the fault part.

11. Check M / C relay

Check if the result is normal.

Yes >> Detection is finished.

No >> Repair or replace the fault part.

Component detection (M / C relay)

Detection of M / C relay

1. Turn the key to "LOCK" or pull out.

2. Remove M/C relay.

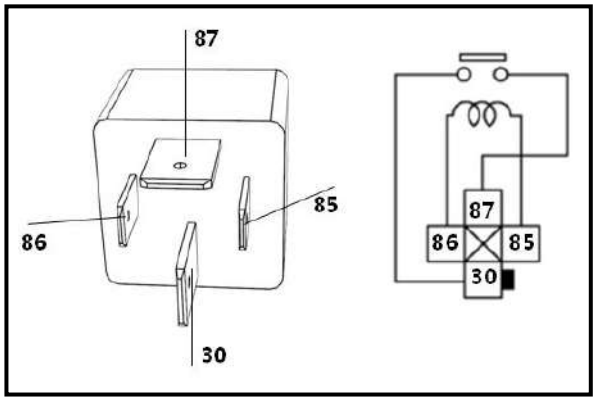
3. Check the continuity of the pins of the M / C relay.

Interface	Condition	Connectivity
Interface 3 and 5	Pin 1 and 2 has direct current	Conduction
	No direct current	No conduction

Check if the result is normal.

Yes >> Detection is finished.

No >> Replace the M/C relay.



Low voltage distribution controller

Diagnostic steps

1.Detect the fuse

1. Turn the key to "LOCK" or pull out.

1.Remove EF01 fuse.

2.Check if the fuses are blown.

Check if the result is normal.

Yes>> GO to step 2.

No >> Replace the fuse.

2.Detect the fuse

1. Turn the key to "LOCK" or pull out.

1.Remove EF01 fuse.

2.Check if the fuses are blown.

Check if the result is normal.

Yes >> Go to step 3.

No >> Replace the fuse.

3.Check low-voltage distribution controller power supply

Detect the voltage between the low-voltage distribution controller connector and ground;

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
Low voltage distribution controller			
Connector	Terminal number		
F17	8	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes >> Go to step 4

No >> Go to step 6

4.Check low-voltage distribution controller control signal

Detect the voltage between the low-voltage distribution controller connector and ground;

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
Low voltage distribution controller			
Connector	Terminal number		
F17	4	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes>> GO to step 5.

No >> Go to step 7

5. Check the output of the low voltage distribution controller

Detect the voltage between the low-voltage distribution controller connector and ground;

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
Low voltage distribution controller			
Connector	Terminal number		
F17	10	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Replace the faulty parts.

6. Check low-voltage distribution controller power supply circuit

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU harness connector.

3. Check the connection between the low-voltage distribution controller connector terminal and the 12V battery.

Multimeter positive lead		Multimeter negative lead	Connectivity
Low voltage distribution controller		12V battery	
Connector	Terminal number	Positive port	
F17	8		Conduction

4. Also check whether the harness is shorted to power or ground.

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the fault part.

7. Check low-voltage distribution controller control signal circuit

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU harness connector.

3. Check the connection between the low-voltage distribution controller connector terminal and the 12V battery.

Multimeter positive lead		Multimeter negative lead		Connectivity
Low voltage distribution controller		VCU		
Connector	Terminal number	Connector	Terminal number	
F17	10	F21	10	Conduction

4. Also check whether the harness is shorted to power or ground.

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the fault part.

A/C relay

Diagnostic steps

1. Check A / C relay control circuit

1. Turn the key to "LOCK" or pull out.

2. Remove A/C relay.

3. Detect the A / C relay connector pin voltage

A/C relay connector			Voltage value (around)
Connector	Multimeter positive lead	Multimeter negative lead	
	Terminal number		
ER09	KL30	87	0V

4.Turn the key to ON.

5. Detect the A / C relay connector pin voltage

A/C relay connector			Voltage value (around)
Multimeter	Multimeter positive lead	Multimeter negative lead	
	Terminal number		
ER09	KL30	87	12V battery voltage

Check if the result is normal.

Yes >> Go to step 8

No >> Go to step 2

2. Check A/C relay power supply -1

Detect the voltage between the A / C relay connector pin and the vehicle body ground

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
A/C relay			
Connector	Terminal number		

ER09	KL30	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes>> GO to step 5.

No >> Go to step 3

3. Detect the fuse

1.Remove EF05 fuse.

2.Check if the fuses are blown.

Check if the result is normal.

Yes >> Go to step 4

No >> Replace the fuse.

4. Check A/C relay power supply -2

Check the voltage between the fuse connector and the vehicle body

Multimeter positive lead	Multimeter negative lead	Voltage value (around)
Fuse terminal	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes>> GO to step 5.

No >> Detect the low-voltage distribution controller output to the circuit between A / C.

5. Check A / C relay power supply loop -1

1. Detect the harness connection between the A / C relay connector and the fuse

Multimeter positive lead	Multimeter negative lead		Connectivity
	A/C relay		
	Connector	Terminal number	
Fuse terminal	ER09	KL30	Conduction

2. Check harness for continuity with power supply and ground.

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the fault part.

6. Check A / C relay control signal circuit

1. Turn the key to "LOCK" or pull out.

2. Disconnect VCU harness connector.

3. Detect the connection between the A / C relay connector terminal and the VCU connector terminal.

Multimeter positive lead		Multimeter negative lead		Connectivity
A/C relay		VCU		
Connector	Terminal number	Connector	Terminal number	
ER09	85	F22	VC101	Conduction

4. Also check whether the harness is shorted to power or ground.

Check if the result is normal.

Yes>> GO to step 7.

No >> Repair or replace the fault part.

7. Check VCU power supply circuit

Detect the voltage difference between the VCU connector and the vehicle body.

Multimeter positive lead		Multimeter negative lead	Connectivity
VCU			
Connector	Terminal number		
F15	VC10	Vehicle body ground	Conduction
F15	VC29		
F15	VC48		
F15	VC67		

Check if the result is normal.

Yes>> GO to step 8.

No >> Repair or replace the fault part.

8. Fault simulation test

Refer to "Overview - Fault simulation test"

Check if the result is normal.

Yes >> Replace VCU.

No >> Repair or replace the fault part.

9. Check A/C relay power supply -3

Detect the voltage between the A / C relay connector pin and the vehicle body ground

Multimeter positive lead		Multimeter negative lead	Voltage value (around)
A/C relay			
Connector	Terminal number		
ER09	85	Vehicle body ground	12V battery voltage

Check if the result is normal.

Yes>> GO to step 11.

No >> Go to step 10

10. Check A / C relay power supply loop -2

1. Detect the harness connection between the A / C relay connector and the fuse

Multimeter positive lead	Multimeter negative lead		Connectivity
	A/C relay		
	Connector	Terminal number	
Fuse terminal	ER09	85	Conduction

2. Check harness for continuity with power supply and ground.

Check if the result is normal.

Yes >> Refer to "Overview - Fault simulation test".

No >> Repair or replace the fault part.

11. Check A / C relay

Check if the result is normal.

Yes >> Detection is finished.

No >> Repair or replace the fault part.

Component detection (A / C relay)

Detection of A / C relay

1. Turn the key to "LOCK" or pull out.

2. Remove A/C relay.

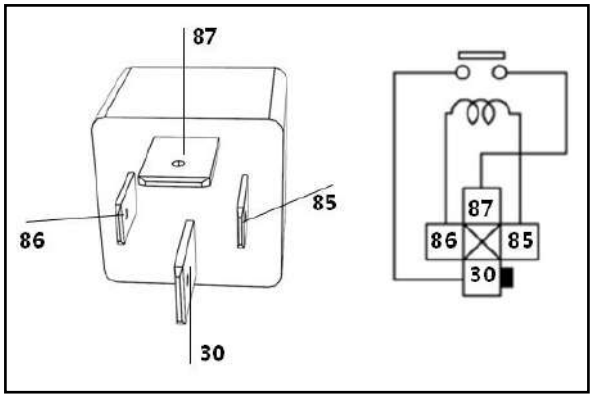
3. Check the continuity of the pins of the A / C relay.

Interface	Condition	Connectivity
KL30 and 87 ports	Pin 85 and 86 has direct current	Conduction
	Pin 85 and 86 has no direct current	No conduction

Check if the result is normal.

Yes >> Detection is finished.

No >> Replace the A/C relay.



Timing charge switch

Faults diagnosis flow

1.Check the function of the timer charging switch backlight

1. Turn the key to "LOCK" or pull out.

2. Open the combination switch backlight switch.

3.Check the function of the timer charging switch backlight.

Check if the result is normal.

Yes >> Refer to step 6.

No >> Refer to step 2.

2. Check the power supply of the timer charging switch backlight

Check the voltage between the timing charge switch and the ground.

Multimeter positive lead		Multimeter negative lead	Voltage value
Timing charge switch			
Connector	Terminal number		
M11	3	Ground	12V battery voltage

Check if the result is normal.

Yes >> Refer to step 5.

No >> Refer to step 3.

3.Check the fuse

1. Turn the key to "LOCK" or pull out.

2. Close the combination switch backlight switch.

3. Unplug #IF02 fuse.

4. Check whether the fuse is blown.

Check if the result is normal.

Yes >> Refer to step 4.

No >> Replace the original circuit after the fuse is repaired.

4. Check the power supply circuit of the timer charging switch backlight

1.Disconnect timing charge switch connector.

2. Check the connection between the timer charging switch connector and the safety connector.

Multimeter positive lead		Multimeter negative lead	Connectivity
Timing charge switch			
Connector	Terminal number		
M11	3	# IF02 fuse port	Conduction

Check if the result is normal.

Yes >> Check the battery power supply circuit.

No >> Repair or replace the fault part.

5. Check the power supply circuit of the timer charging switch

1. Turn the key to "LOCK" or pull out.

2. Close the combination switch backlight switch.

3. Disconnect timing charge switch connector.

4. Check the connection between the timer charging switch connector and ground.

Multimeter positive lead		Multimeter negative lead	Connectivity
Timing charge switch			
Connector	Terminal number		
M11	1	Ground	Conduction

Check if the result is normal.

Yes >> Replace the timer charge switch.

No >> Repair or replace the fault part.

6. Check the ground circuit of the timer charging switch

1. Turn the key to "LOCK" or pull out.

2. Close the combination switch backlight switch.

3. Disconnect timing charge switch connector.

4. Check the connection between the timer charging switch connector and ground.

Multimeter positive lead		Multimeter negative lead	Connectivity
Timing charge switch			
Connector	Terminal number		
M11	4	Ground	Conduction

Check if the result is normal.

Yes >> Refer to step 9.

No >> Refer to step 7.

7. Check the fuse

1. Unplug #IF02 fuse.

2. Check whether the fuse is blown.

Check if the result is normal.

Yes >> Refer to step 8.

No >> Replace the fuse.

8. Check the power supply circuit of the timer charging switch

Check the connection between the timer charging switch connector and the safety connector.

Multimeter positive lead		Multimeter negative lead	Connectivity
Timing charge switch			
Connector	Terminal number		
M11	3	# IF02 fuse port	Conduction

Check if the result is normal.

Yes >> Check the battery power supply circuit.

No >> Repair or replace the fault part.

9. Check the signal circuit of the timer charging switch

1. Disconnect VCU connector.

2. Check the connection between the timer charging switch connector and VCU.

Multimeter positive lead		Multimeter negative lead		Connectivity
Timing charge switch		VCU		
Connector	Terminal number	Connector	Terminal number	
M11	2	F23	22	Conduction

3. Also check the ground and the short circuit to the power supply situation.

Check if the result is normal.

Yes >> Refer to step 10.

No >> Repair or replace the fault part.

10. Check the timer charging switch

Actuator check. Refer to the following EVC-parts check (timing charge switch)

Check if the result is normal.

Yes >> checking is finished.

No >> Replace the timer charge switch.

Parts detection (timing charge switch)

1. Check the timer charging switch

1. Turn the key to "LOCK" or pull out.

2. Disconnect timing charge switch connector.

3. Check the connection between the timing charge switch connector under the following conditions.

Terminal number	Condition		Connectivity
1 and 2	Timing charge switch	Plug in	No conduction
		Loose	Conduction

Check if the result is normal.

Yes >> checking is finished.

No >> Replace the timer charge switch.

Symptom diagnosis

Electric Vehicle Control System

Symptom Checklist

Note:

Before using the symptom checklist, use the diagnostic service tool to self-test the VCU.

If a DTC is detected, perform the appropriate diagnostic procedure.

symptom		Possible reasons
Can not enter the vehicle ready state, "Ready" light is not lit.		Key "start" signal is abnormal
		Gear is not at "N" position
		Charging harness connection
		Power battery power is too low
Can not drive	The motor can not output power normally	Gear is not at "N" position
		Accelerator pedal is not pressed
		Brake pedal is pressed
		ABS abnormal
		Motor self - limiting power
		Dischargeable battery power reduction
	Motor can output power (you can view the electric instrument "power meter")	Handbrake up
		Brake pedal is pressed
Energy consumption is too large	Driving resistance is too large	Tire air pressure too low
		The tire size is not correct
		Handbrake is not fully released
	AC energy consumption is too large	The set temperature is too high
		The set temperature is too low
	Annex energy consumption is too large	The customer installs additional electronic equipment
No power down		Low voltage distribution controller bonding

		With charge wake-up signal
		With remote wake-up signal
The brake energy recovery function is turned off	——	The vehicle speed is too high or too low
	——	The accelerator pedal is depressed
	——	Braking process
	——	The VCU has received information about the ABS's turning off braking energy recovery function.
	VCU detects the relevant battery information	The chargeable power is too low
		Power battery single cell voltage is too high
		Power battery cell temperature is too high or too low
		Power battery temperature sensor failure
		Power battery total voltage is too high
		Power battery SOC is too high
AC charging failure	——	Key is at ON gear.
	——	Timer charging has been set
	——	DC charging plug is inserted
	——	Car Charger fault
	Battery status is not suitable for charging	Power battery temperature is too high or too low
		Power battery is full
		Power battery available capacity is low
Power battery is not full	——	Power battery temperature is too high or too low
	——	Energy consumption during the charging process is too large
Remote charging function is disabled	——	Key is at ON gear.

Timer charging function is disabled	——	VCU not receive the T-BOX wake-up signal
	——	The vehicle is outside the communication service area
	——	Phone and remote server communication failure
	——	DC charging harness connected to DC charging pile
	Battery status is not suitable for charging	Power battery temperature is too high or too low
		Power battery is full
DC/ AC charging failure	——	Key is at ON gear.
	——	Both DC and AC charging cables are plugged in
	Battery status is not suitable for charging	Power battery temperature is too high or too low
		Power battery is full
Remote air conditioning function is disabled	——	The vehicle is outside the communication service area
	——	Phone and remote server communication failure
	——	Key is at ON gear.
	——	Power battery power is too low
	——	A/C System failure

Disassembly and installation

General precautions

1. Before replacing the vehicle controller, record the SOC, SOE, SOH and long-distance charging times which are displayed on the diagnostic service tool. After VCU replacement, use the diagnostic service tool to set the SOC, SOE, SOH and long-distance charging times according to the recorded data. After successful setup, power off and then power on to ensure that settings and storage are successful.

2. After replacing VCU, use the diagnostic service tool to clear the storage mileage variable, to ensure that the normal correction after SOH.

3. Before replacing the instrument, record the instrument display mileage, instrument replacement, and then use the diagnostic service tool in accordance with the data just recorded, set the vehicle mileage.

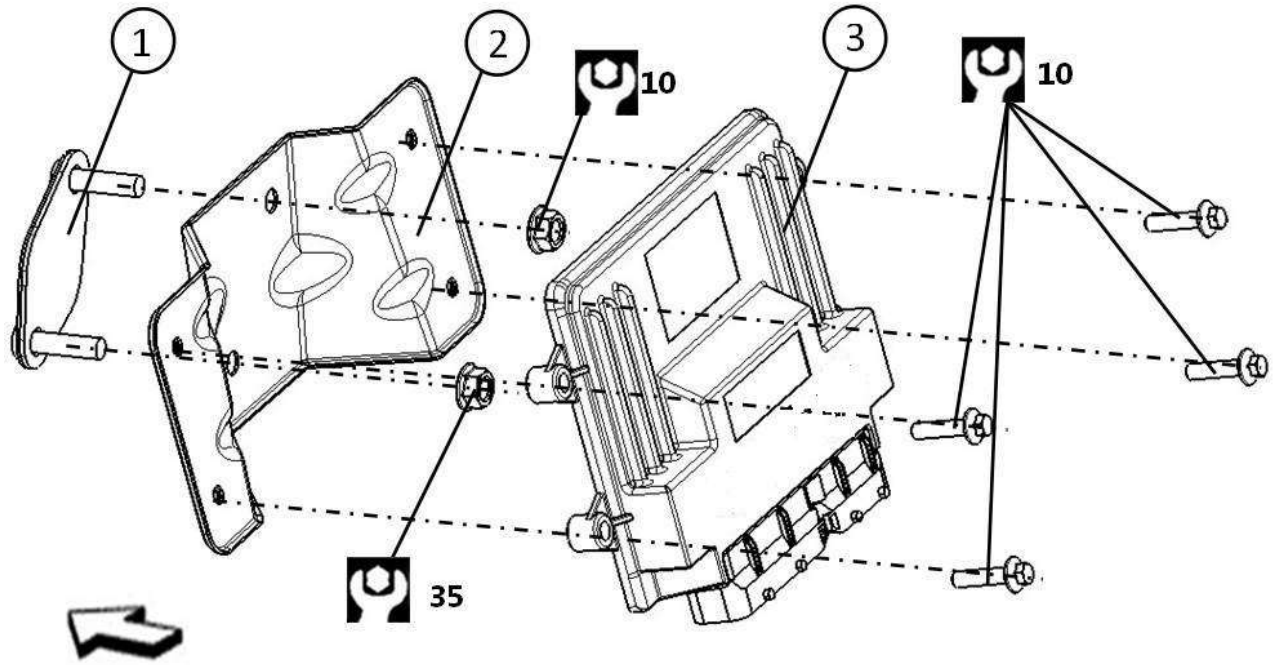
4. If the battery module is replaced, SOH is calculated on the basis of a stroke of 750 km per hour and a 0.1% SOH drop, and SOH is set by the diagnostic service tool.

5. If there is a serious failure maintained in DR shop, the stored fault code needs to becleared with diagnostic service tools, then the vehicle can run. Please check the following list for faults of LBC and VCU that need to be cleared.

LBC faults that need to be cleared

Serial No.	Faults code	Fault description
1	163	Critical fault of single cell under-voltage
2	178	Critical insulation malfunction
3	120	Primary malfunction of Thermal Instability
4	121	Secondary Malfunction of Thermal Instability

VCU



1 TCU bracket nut plate　　2：VCU bracket　　3：VCU

The body front

Dismantling process

1 Turn off the power switch, wait for more than 20 seconds;

2 Disconnect 12 lead acid battery negative connection terminal;

3 Remove the dashboard;

4 Disconnect VCU connector.

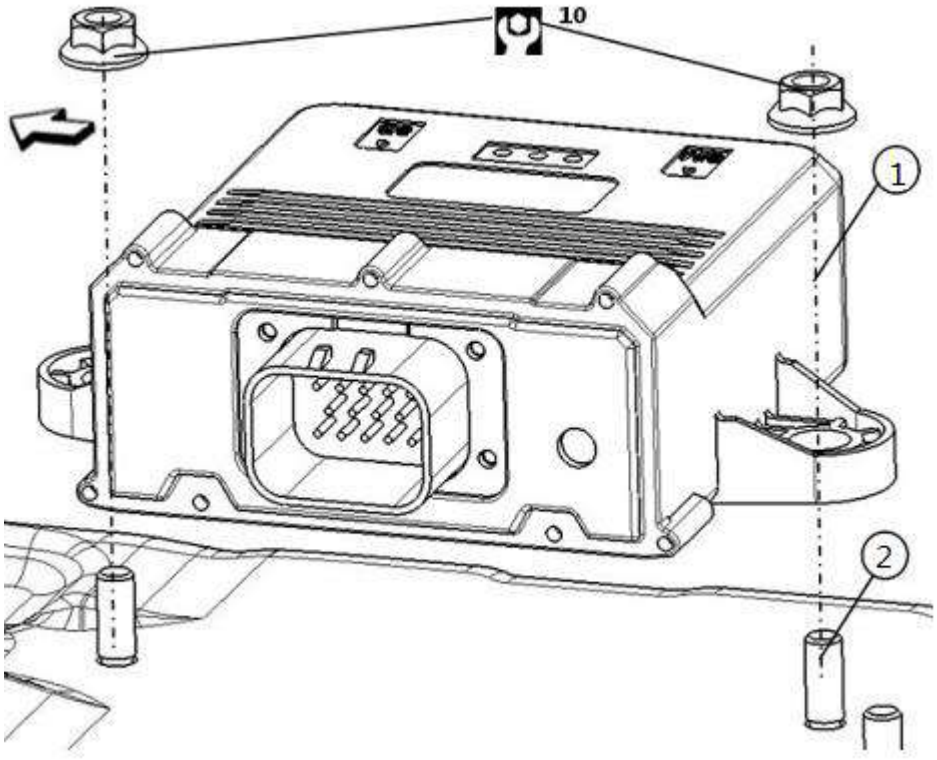
5 Disassemble the VCU mounting bolts;

6 Remove VCU;

7 Disassemble VCU bracket and the nuts on TCU bracket nut plate

8 Remove the VCU bracket from the front panel of the vehicle, and remove the nut plate on TCU bracket

Remote intelligent terminal



1Remote intelligent terminal 2 vehicle frame

⇦ The body front

Dismantling process

1 Turn off the power switch, wait for more than 20 seconds;

2 Disconnect 12 lead acid battery negative connection terminal;

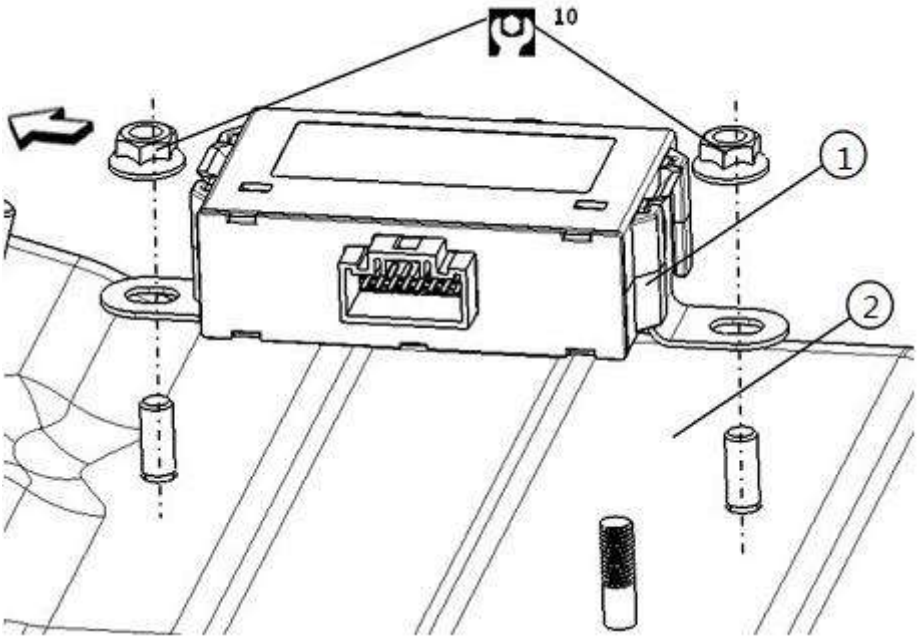
3 Remove the central access panel;

4 Disconnect the remote intelligent terminal connector;

5 Remove the mounting nut of the remote intelligent terminal;

6 Remove the remote intelligent terminal from the vehicle frame;

Low voltage distribution controller



1 low-voltage distribution controller 2 vehicle frame

⇦ The body front

Dismantling process

1 Turn off the power switch, wait for more than 20 seconds;

2 Disconnect 12 lead acid battery negative connection terminal;

3 Remove the central access panel;

4 Disconnect the low-voltage distribution controller connector;

5 Remove the mounting nut of the low voltage distribution controller;

6 Remove the low voltage distribution controller from the vehicle frame;

Electrical Vehicle Traction Motor System

Precaution

Precaution for Technicians Using Medical Electric

Operation Prohibition

Warning:

Parts with strong magnet are used in this vehicle.

Technicians using a medical electric device such as pacemaker must never perform operation on the vehicle, as magnetic field can affect the device function by approaching to such parts.

Normal Charge Precaution

Warning:

If a technician uses a medical electric device such as an implantable cardiac pacemaker or an implantable cardioverter defibrillator, the possible effects on the devices must be checked with the device manufacturer before starting the charge operation.

As radiated electromagnetic wave generated by on board charger at normal charge operation may effect medical electric devices, a technicians using a medical electric device such as implantable cardiac pacemaker or an implantable cardioverter defibrillator must not enter the vehicle compartment (including luggage room) during normal charge operation.

Remote Communication System Operation Precaution

Warning:

Electromagnetic wave of TBOX (Remote Intelligent Terminal) might affect the function of the implantable medical electric device.

If a technician uses other medical electric device than implantable cardiac pacemaker or implantable cardioverter defibrillator, the electromagnetic wave of TBOX might affect the function of the device. The possible effects on the device must be checked with the device manufacturer before TBOX use.

Point to Be Checked Before Starting Maintenance Work

High voltage system may start automatically. It is required to check that the timer air conditioner and timer charge are not set before starting maintenance work.

Note:

If the timer air conditioner or timer charge is set, the high voltage system starts automatically even when the power switch is in OFF state.

Precaution for Supplement Restraint System (SRS) “Air Bag” and “Seat Belt Pre-tensioner”

The Supplemental Restraint System such as “Air Bag” and “Seat Belt Pre-tensioner”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt and driver’s air bag, front passenger’s air bag. Information necessary to service the system safety is included in the “Air Bag System” and “Seat Belt” of this Service Manual.

Warning:

Always observe the following items for preventing accidental activation:

To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized DR dealer.

Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Air Bag Module, see “Air Bag System”.

Never use electrical test equipment on any circuit related to SRS unless instructed to in this Workshop Manual. SRS wiring harnesses can be identified by yellow or orange harnesses or harness connectors.

Precaution When Using Power Tools (Air or Electric) and Hammers

When working near the Air Bag Diagnosis Sensor or other Air Bag System sensors with the power switch "ON", never use air or electric power tools or strike near the sensors with a hammer. Heavy vibration could activate the sensors and deploy the air bag, possibly causing serious injury.

When using air or electric power tools or hammers, always switch the power switch to "OFF", disconnect the 12V battery negative electrode, and wait at least 1 minute before performing any service.

Precaution for Removing 12V Battery

Before removing 12V battery, turn power switch to "ON", and then to "LOCK".

Note:

- The automatic 12V battery charge control may start even when the power switch is in "OFF" state.
- The automatic 12V battery charge control does not start when the power switch is turned "ON" --> "LOCK".

High Voltage Precaution

Warning:

Because electrical vehicle contains a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

Be sure to turn ignition switch to "LOCK" or pull it off before disconnecting maintenance switch.

Disconnect maintenance switch before checking or maintaining high voltage system, and forbid anybody close maintenance switch during check and maintenance. Be sure to ware insulating protective equipment including glove, shoes and face shield before beginning work on the high voltage system.

Ensure that other persons do not touch the vehicle when maintenance personnel operating high voltage system. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.

Note:

Forbid turning ignition switch to "ON" or "START" after maintenance switch being disconnected.

High voltage harness and equipment identification.

The color of high voltage harness is orange, there is safety identification on power battery assembly and other high voltage devices. Don't carelessly touch these harnesses and parts.

After taking down high voltage harness, immediately insulate disconnected high voltage connectors terminals with insulating tape.

Regulations on Workers with Medical Electronics

Warning:

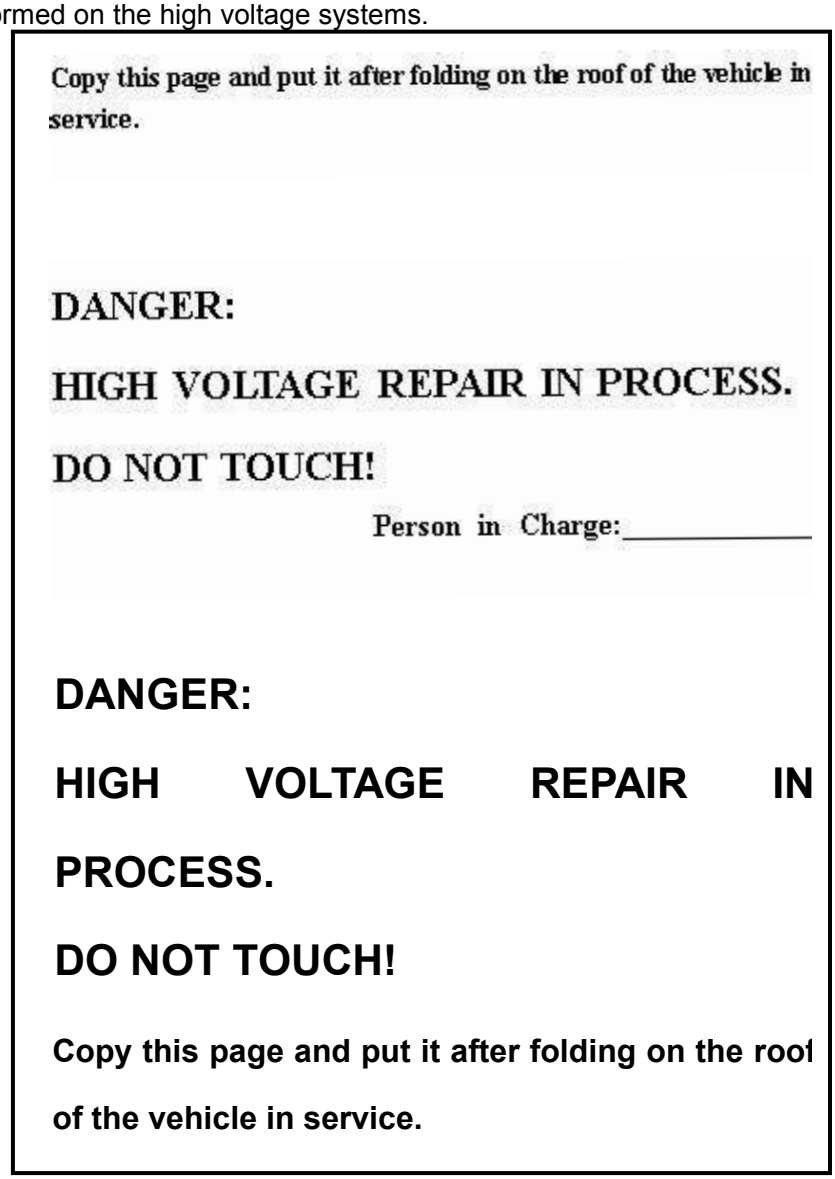
The vehicle contains parts that contain powerful magnets. If a person who is wearing a pacemaker or other medical device is close to these parts, the medical device may be affected by the magnets. Such person must not perform work on the vehicle.

Prohibited Items to Carry During Work

Because this vehicle uses components that contain high voltage and powerful magnetism, due not carry any metal products which may cause short circuits, or any magnetic media (cash cards, prepaid cards, etc.) which may be damaged on your person when working.

Posting a sign of “Danger! High voltage area. Keep out”

To call the attention of other workers, indicate “High voltage work in process. Do not touch!” on vehicles where work is being performed on the high voltage systems.



General Precaution

1) It’s forbidden to remove VCU or DC/DC box.
2) When connecting or disconnecting VCU and wiring harness, pay attention not to damage terminal pin (bended or broken off). When connecting wiring harness connector, check whether terminal pin is bended or broken off.

Take care when handling the traction motor inverter so that dust, dirt, and other substances do not enter into the inside from the opening.

Preparation

General Service Tools

Tool name		Description
Insulated gloves (Guaranteed insulation performance for 1000V/300A)		Removing and installing high voltage components
Leather gloves (Use leather gloves that can fasten the wrist tight)		1. Removing and installing high voltage components 2. Protect insulated gloves
Insulated safety shoes		Removing and installing high voltage components
Safety glasses (ANSI Z87.1)		1. Removing and installing high voltage components 2. To protect eye from the spatter on the work to electric line
Insulated helmet		Removing and installing high voltage components
Insulation resistance tester (Multitester)		Measuring voltage and insulation resistance

System Description

Description

The traction motor contains a compact, lightweight, high output, high efficiency “Permanent Magnet Synchronous Motor” (PMSM).

The traction motor inverter is a device which converts DC power from the power battery to AC power, and drives the traction motor. At the same time, it can converts kinetic energy that wheel rotates into electric energy (AC converts into DC) to charge power battery.

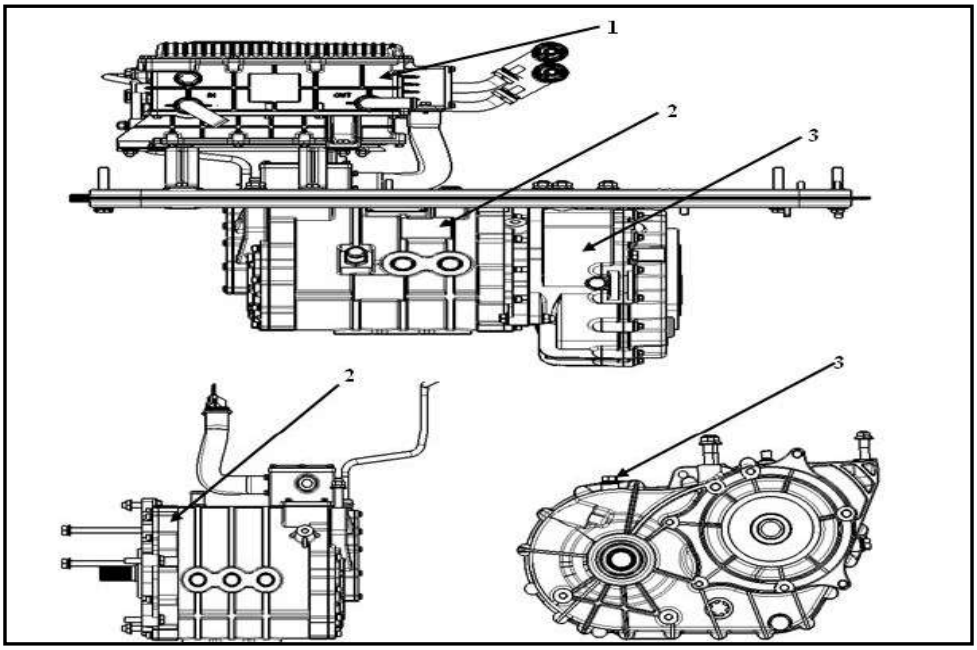
DC/DC is intergrated in traction motor controller, its function is to convert high voltage of battery to low voltage to supply power for vehicle low voltage system.

Traction Motor Specifications

Max torque	270Nm
Max output power	85kW
Max working speed	9000rpm
Cooling type	Water cooling type

Component Parts

Component Parts Location



Component Description

No.	Component	Function
1	Traction motor controller	Converts DC of power battery into AC, and carries out VCU torque instruct, complets torque output, refer to “Traction motor controller”
2	Traction motor	Torque output actuator, refer to “Traction motor”
3	Decelerator	Decelerate motor and increase torque

Traction Motor Controller (PCU)

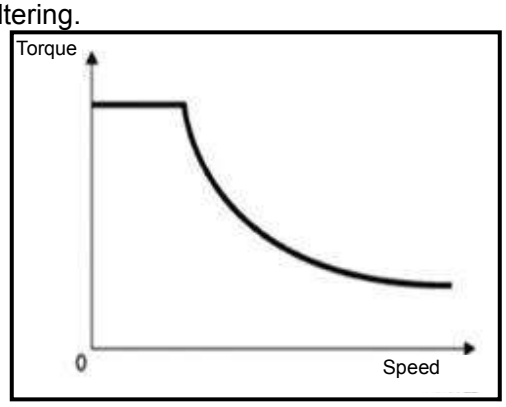
Traction motor controller is installed in engine compartment, using CAN communication control, and drives traction motor by receiving torque instruct sent by VCU and collected traction motor position signal.

Traction motor controller controls energy transmission between power battery and traction motor, and its hardware system mainly consists of auxiliary power supply circuit, control circuit, drive circuit, protection circuit, IGBT module. Software control is the core of traction motor controller, mainly controls PWM wave signal output by vector control algorithm, realizes torque limit output according to traction motor external characteristic curve graph, realizes positive and negative rotation of traction motor and torque control according to sampling of current and rotor position signal and filtering.

Traction Motor

The traction motor contains an “Interior Permanent Magnet Synchronous Motor (IPMSM)”. A permanent magnet is embedded inside the rotor core, and the rotating magnetic field generated by the stator coil is used to generate rotational torque.

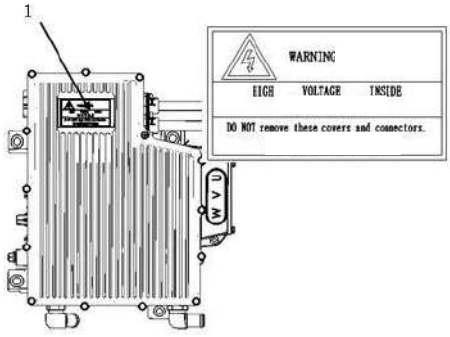
The traction motor is able to generate torque even when the vehicle is stopped, and outputs maximum drive torque when the vehicle starts moving in order to provide good initial acceleration. Torque and speed characteristics is shown as right picture



High Voltage Warning Label

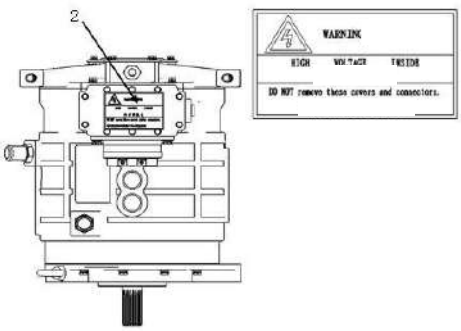
High voltage warning label is stuck on each component parts below.

When replacing component parts make sure to stick it on original position.



Traction Motor Controller

The high voltage warning label (1) is stuck on the top of traction motor controller



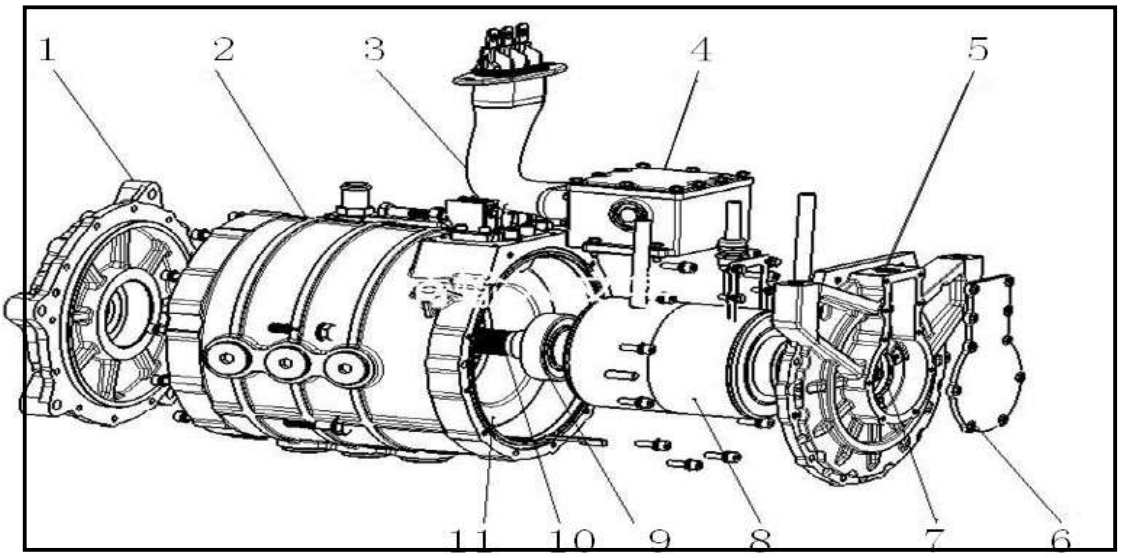
Traction motor

The high voltage warning label (2) is stuck on the top of traction motor

Structure and Operation

Structure Drawing

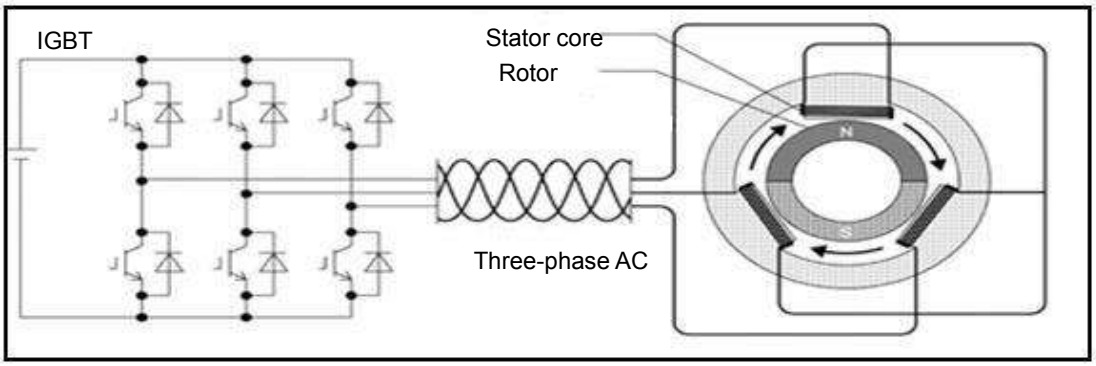
Traction Motor Mechanism



1. Front end cover	2. Housing	3. Three-phase wire	4. Junction box
5. Rear end cover	6. Rotary transformer end cover	7. Rotary transformer	8. Rotor
9. Bearing	10. Shaft	11. Stator	

Operation Description

Operation Principle



When three-phase AC current is applied to the stator coil, a rotating magnetic field is generated. This rotating magnetic field pulls on the permanent magnet inside the rotor core, generating rotational torque that is synchronized with the rotating magnetic field.

In order to generate optimal rotor rotation, judgments regarding the position (angle) of the permanent magnet within the rotor core and the timing of current application to the coil are necessary. For this purpose, the traction motor resolver and current sensor are used in order to continually detect the rotating position of the rotor and control the timing of current application to the coil.

System

Traction Motor Controller System Description

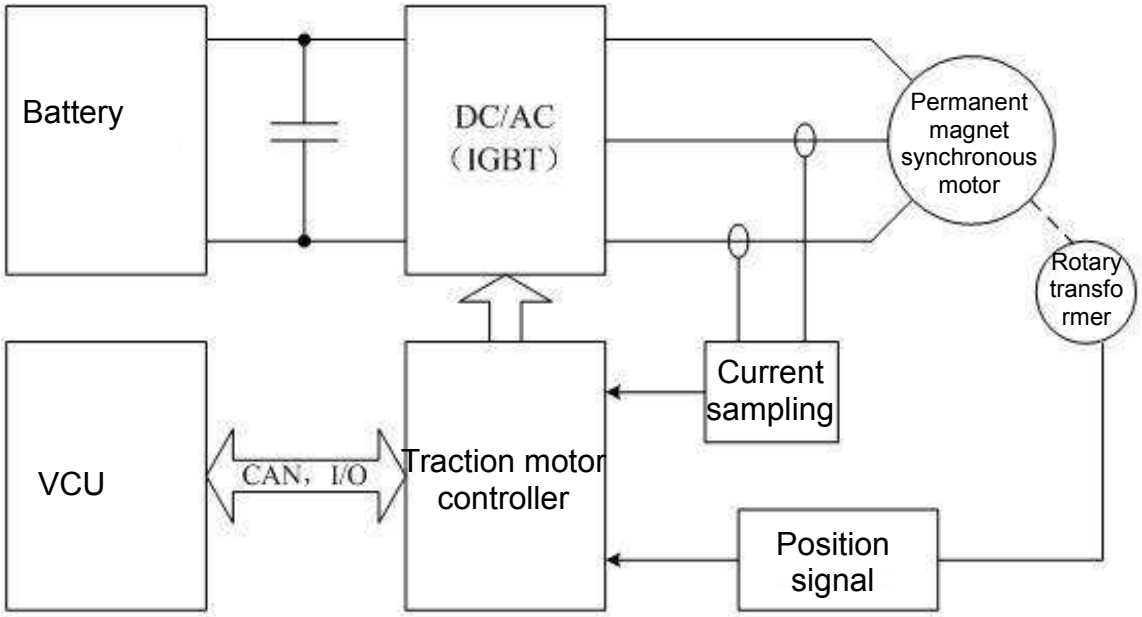
The traction motor controller controls the traction motor based on the target motor torque signal transmitted by EV system CAN from the VCU.

Traction motor controller converts DC power from battery to AC power, and drives traction motor accurately based on resolver detection signal and current sensor detection signal.

At deceleration, traction motor is used as generator. It converts kinetic energy generated by rotary motion of tires (AC power) to electric energy (DC power) and charges battery.

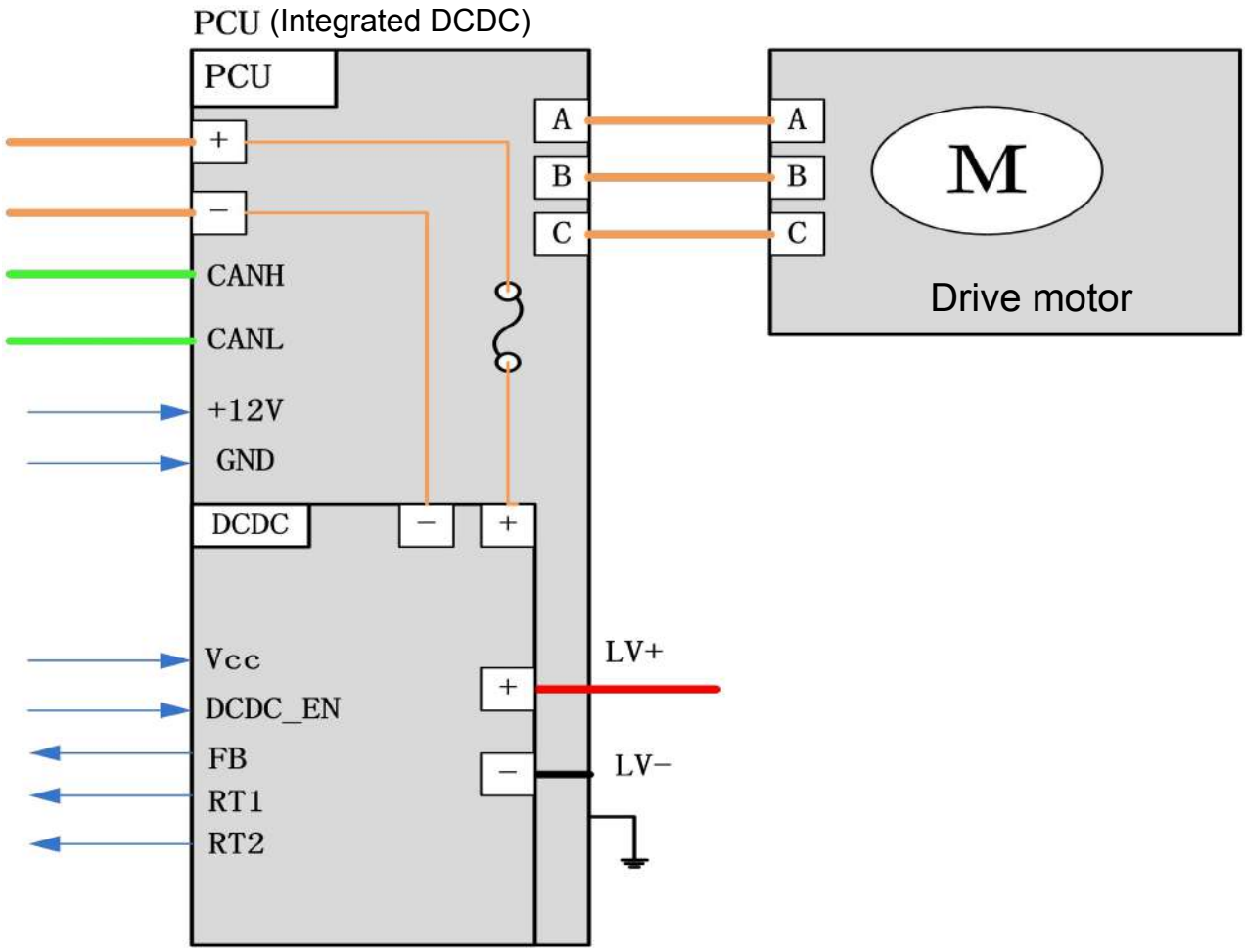
If malfunction is detected, the system enters fail-safe mode.

System Diagram



Component	Signal Name
VCU	● Transmits mainly the following signals to VCU via EV system CAN: – Motor speed signal – Motor torque – Input high voltage signal – Motor direction – Motor status – IGBT state – Motor temperature – -Traction motor controller temperature – IGBT temperature ● Receives mainly the following signal from PCU via EV system CAN: – Target motor torque signal – Motor request direction – Motor request state – IGBT request state

Principle Schematic



Fail-Safe Mode

No.	Fault Name	DTC	Vehicle Behavior
1	Traction motor overspeed fault	A2	Stop traction motor
2	Traction motor overcurrent fault	A3	Stop traction motor
3	High voltage overvoltage fault	A4	Stop traction motor
4	High voltage undervoltage fault	A5	Stop traction motor
5	Traction motor overtemperature fault	A6	Stop traction motor
6	Traction motor controller overtemperature fault	A7	Stop traction motor
7	Low voltage power supply undervoltage	A8	Stop traction motor
8	IGBT fault	A9	Stop traction motor
9	Traction motor rotary transformer fault	AA	Stop traction motor
10	CAN communication fault	B2	Stop traction motor
11	IGBT overtemperature fault	B3	Stop traction motor
12	W-phase current sensor circuit fault	E8	Stop traction motor
13	V-phase current sensor circuit fault	E9	Stop traction motor
14	U-phase current sensor circuit fault	EA	Stop traction motor
15	W-phase current sensor self-check fault	EB	Stop traction motor
16	V-phase current sensor self-check fault	EC	Stop traction motor
17	U-phase current sensor self-check fault	ED	Stop traction motor
18	Traction motor low voltage power supply fault	F3	Stop traction motor
19	Traction motor input miss phase	F4	Stop traction motor
20	Traction motor overspeed warning	51	9500rpm-10000rpm Torque load shedding linear from 100%-0%
21	Traction motor overcurrent warning	52	After 550A, torque reduce to 70%, 570A reduce to 0%
22	High voltage overvoltage warning	53	400V-420V Torque load shedding linear from 100%-0%
23	High voltage undervoltage warning	54	240V-220V Torque load shedding linear from 100%-0%

No.	Fault Name	DTC	Vehicle Behavior
24	Traction motor overtemperature warning	55	170℃-180℃ Torque load shedding linear from 100%-0%
25	Traction motor controller overtemperature warning	56	85℃-95℃ Torque load shedding linear from 100%-0%
26	IGBT overtemperature warning	59	95℃-115℃ Torque load shedding linear from 100%-0%
27	Locked-rotor state	2F	——
28	Voltage check circuit fault	30	——
29	Data storing abnormal	31	——
30	IGBT temperature check circuit fault	32	——
31	Traction motor temperature sensor self-check fault	AB	——
32	Traction motor controller temperature sensor fault	EE	Speed less than 50rpm, torque more than 100Nm, Reduce IGBT switch frequency to 5KHz

Protection Control

When temperature of traction motor inverter or traction motor components rises, the traction motor inverter temporarily enters a protective control state in order to protect the system. It automatically returns to the normal status if the safety is secured.

Condition	Control	Normal return condition
Traction motor is overheated	Traction motor output torque is limited accrording to the traction motor temperature	Traction motor temperature drops
Traction motor controller is overheated	Traction motor output torque is limited accrording to the traction motor controller temperature	Traction motor controller temperature drops
IGBT is overheated	Traction motor output torque is limited accrording to IGBT temperature	IGBT temperature drops
When traction motor speed is very low, IGBT temperature is too high	Reduce IGBT switch frequency. Note: traction motor electromagnetic noise increases at the same time	·Torque drops; ·Traction motor speed increases

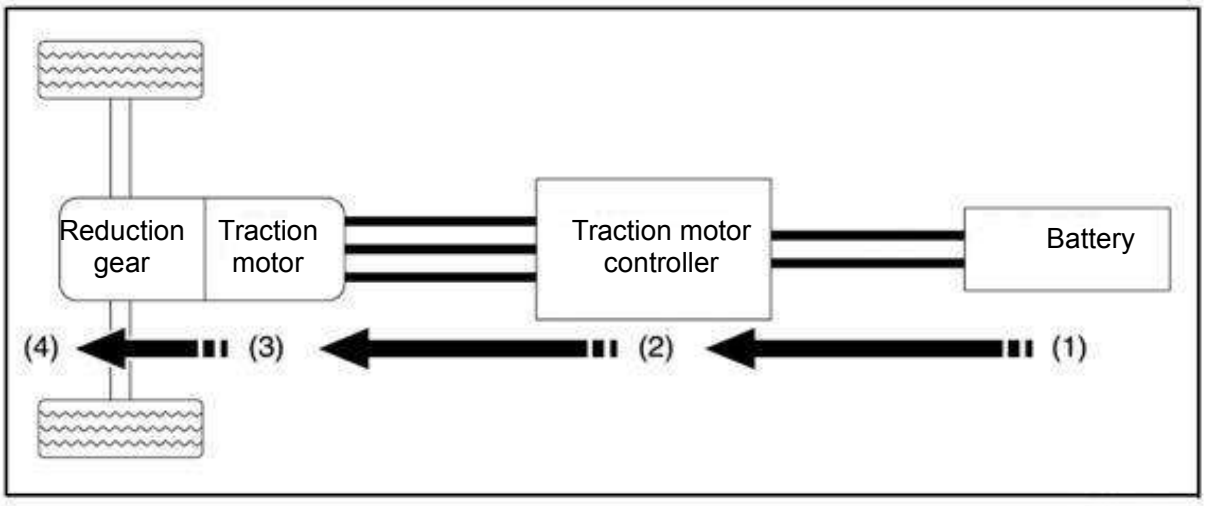
Traction Motor Power Control

System Description

The traction motor controller applies AC power to the traction motor according to the target motor torque signal calculated by VCU in order to generate drive force.

Operating Principle

Energy Flow



When the traction motor controller receives the target motor torque signal from the VCU via EV system CAN.

(4)		(3)		(2)		(1)
The drive torque from the traction motor is output as kinetic energy	⇦	The AC power from the traction motor controller is converted to magnetic energy and a rotating magnetic field is created in order to generate drive torque	⇦	The traction motor inverter (IGBT) switches in order to convert the DC power from the battery to AC power	⇦	The DC power from the battery is input to the traction motor controller

Traction Motor Generation Control

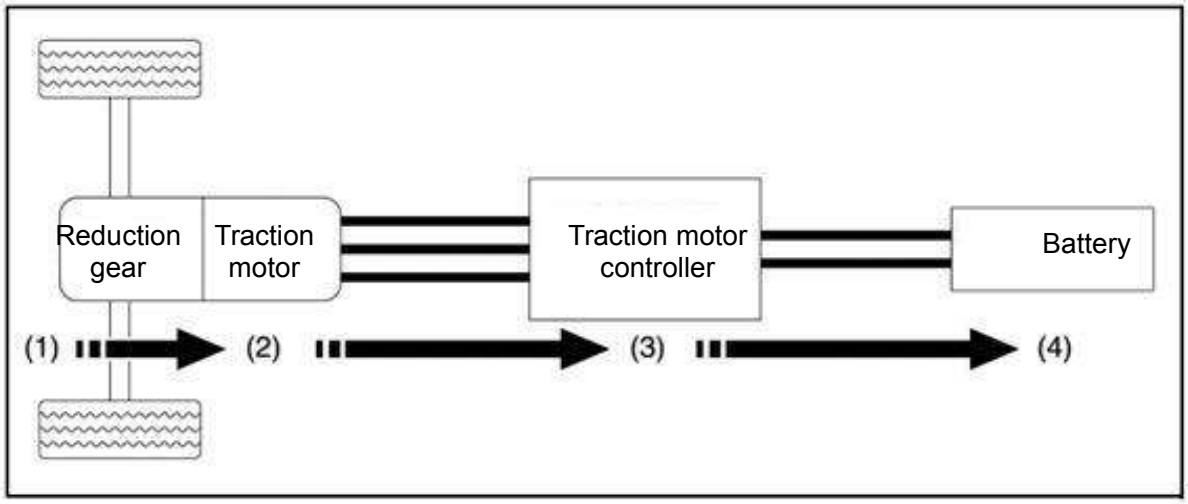
System Description

During deceleration, the traction motor controller drives the traction motor to function as a generator based on the regenerative torque command signal sent via EV system CAN from the VCU, converting the kinetic torque generated by rotation of the tires into electrical energy. The converted electrical energy charges the battery.

The regenerative torque that is generated when the traction motor is driven as a generator can be used as braking force, reducing the burden on the service brakes.

Operating Principle

Energy Flow



When the traction motor controller receives the regenerative torque command signal from the VCU via EV system CAN

(1)		(2)		(3)		(4)
The kinetic energy generated by rotation of the tires operates the traction motor as a generator	⇨	Rotation of the traction motor generates AC power	⇨	The traction motor controller (IGBT) switches in order to convert the AC power from the traction motor to DC power	⇨	The DC power regenerated by the traction motor controller is used to charge the battery

Diagnosis System (Traction Motor Controller)

Diagnosis Description

DR diagnosis service system is an on-board trouble diagnosis system which can read related information about components. The square frame shown below is related information about EV system.

DTC of traction mtoro controller is displayed in vehicle state 2 in diagnosis service system. The square frame shown below is traction motor controller DTC.

History faults of traction motor controller are displayed in PCU diagnosis service panel in diagnosis service system. Shown below is related information of traction motor controller fault. Specific operation is first click ñRead fault codeò, thus history fault type can be read from DTC list; and then click ñRead freeze frameò, thus related information of fault can be displayed out. Clicking ñClear fault codeòcan clear history fault.

The followings are the representated explanation meaning when history fault is detected and displayed.

Monitored item	Remarks
Traction motor overspeed	Traction motor speed too high
Phase current overcurrent	Traction motor speed high
IGBT fault	IGBT module fault
Traction motor is overheated	Traction motor temperature is too high
Traction motor controller is overheated	Traction motor controller temperature is too high
Generatrix undervoltage	Generatrix voltage too low
CAN communication warning	CAN communication fault
Traction motor overspeed warning	Traction motor speed is very high
Phase current overcurrent warning	Traction motor three-phase current is very large
IGBT temperature warning	IGBT temperature is very high
Traction motor temperature warning	Traction motor temperature is very high
Traction motor controller temperature warning	Traction motor controller temperature is very high
Generatrix undervoltage warning	Generatrix voltage is very low
DTC	Fault code
Traction motor temperature sensor fault	Traction motor temperature check circuit fault
Traction motor controller temperature sensor fault	Traction motor controller temperature check circuit fault
IA current sensor self-check fault	IA-phase current sensor self-check fault
IC current sensor self-check fault	IC-phase current sensor self-check fault
12V undervoltage	Traction motor controller power supply voltage is too low
Generatrix overvoltage	Generatrix voltage is too high
Min temperature of traction motor	Display detected min temperature of traction motor
Traction motor temperature	Display detected traction motor temperature
Max temperature of traction motor	Display detected max temperature of traction motor
Order torque	Display torque value sent byVCU
Inner order torque	Display torque order value of traction motor controller
Torque limited ratio %	Display output torque limited ratio
PWM cut-off request	0 OFF 1-2 output lock 3 ON
Min temperature of traction motor controller	Display detected min temperature of traction motor controller

Monitored item	Remarks
Traction motor controller temperature	Display inner temperature of traction motor controller
Max temperature of traction motor controller	Display detected max temperature of traction motor controller
Order D shaft current	Display traction motor D shaft current order value
Traction D shaft current	Display detected D shaft current value
Traction motor working direction	0 Idling 1 Forward 2 Backward 3 Undefined
Traction motor controller state	0 Idling 1 Power-driven 2 Generation 3 Regulating speed
IGBT temperature	Display inner temperature of traction motor controller
Order Q shaft voltage	Display traction motor Q shaft voltage order value
Order D shaft voltage	Display traction motor D shaft voltage order value
Order Q shaft current	Display traction motor Q shaft current order value
Traction motor Q shaft current	Display detected Q shaft current value
Discharge request	0 Not request 3 Request
Discharge state	0 Not discharge state 1-2 Undefined 3 Discharge state
Battery total voltage	Display battery voltage transmited via CAN from battery management system (Read from battery message)
Traction motor input voltage	Display high voltage input to traction motor controller
U-phase current	Display detected value of U-phase current
V-phase current	Display detected value of V-phase current
W-phase current	Display detected value of W-phase current
Sum of three-phase current	Display total value of detected traction motor current (U, V, W-phase)
High voltage power on state	0 not high voltage power on 1-2 Power on failure 3 Power on complete
Traction motor speed	Display traction motor speed
Phase angle	Display rotor position rotating angle
Carrier wave frequency	Display carrier wave frequency
Phase sequence mode	Display phase value of traction motor controller

DTC

Note: Operate the power switch from OFF to ON.

Traction motor controller memorizes DTC.

The procedure to erase DTC from traction motor controller memory is described in “Disgnosis description: System description”.

Connect vehicle diagnosis connector, power on controller, and read monitoring data to ensure fault reason.

For traction motor system, corresponding DTCs are shown in below list. Note: 1st class is serious fault, come down to personal safety, must disconnect high voltage; 2nd class is normal fault, must do corresponding protection, but vehicle can drive; 3rd class is general fault, record fault, don't do any strategic treatment.

No.	Fault class	DTC	Fault description	Fault name
1	1st fault	F4	Phase current detected not match calculated value	Traction motor input missing phase
2	1st fault	F3	Drive chip power supply voltage lower than 15V	Drive low voltage power supply fault
3	1st fault	ED	Zerodrift too large (1.65V±0.1V)	U-phase current sensor self-check fault
4	1st fault	EC	Zerodrift too large (1.65V±0.1V)	V-phase current sensor self-check fault
5	1st fault	EB	Zerodrift too large (1.65V±0.1V)	W-phase current sensor self-check fault
6	1st fault	EA	Open circuit or short circuit	U-phase current sensor circuit fault
7	1st fault	E9	Open circuit or short circuit	V-phase current sensor circuit fault
8	1st fault	E8	Open circuit or short circuit	W-phase current sensor circuit fault
9	1st fault	A2	Traction motor speed>10000r/min	Traction motor overspeed fault
10	1st fault	A3	Traction motor three-phase current≥570A	Traction motor overcurrent fault
11	1st fault	A4	Generatrix voltage≥420V	High voltage overvoltage fault
12	1st fault	A5	Generatrix voltage≤220V	High voltage undervoltage fault
13	1st fault	A6	Traction motor temperature≥180℃	Traction motor overtemperature fault
14	1st fault	A7	PCU temperature≥95℃	Traction motor controller overtemperature fault
15	1st fault	B3	IGBT temperature≥115℃	IGBT overtemperature fault
16	1st fault	A8	Low voltage power supply lower than 9V	Low voltage power supply undervoltage
17	1st fault	A9	Drive chip report overvoltage/overcurrent	IGBT fault
18	1st fault	AA	Rotary transforming decoding chip fault	Traction motor rotary transformer fault
19	1st fault	B2	Not receive signal in 1.2s	CAN communication fault
20	2nd fault	51	9500rpm-10000rpm Load shedding from 100%-0%	Traction motor overspeed warning

No.	Fault class	DTC	Fault description	Fault name
21	2nd fault	52	Torque decreases to 70% when 550A	Traction motor overcurrent warning
22	2nd fault	53	400V-420V Load shedding from 100%-0%	High voltage overvoltage warning
23	2nd fault	54	240V-220V Load shedding from 100%-0%	High voltage undervoltage warning
24	2nd fault	55	170℃-180℃ Load shedding from 100%-0%	Traction motor overtemperature warning
25	2nd fault	56	85℃-95℃ Load shedding from 100%-0%	Traction motor controller overtemperature warning
26	2nd fault	59	95℃-115℃ Load shedding from 100%-0%	IGBT overtemperature warning
27	3rd fault	EE	Exceed normal range (0.065V-3.3V)	Traction motor controller temperature sensor fault
28	3rd fault	32	Open circuit or short circuit	IGBT temperature detected circuit fault
29	3rd fault	31	Data can be read or written in	Data storage abnormal
30	3rd fault	30	Exceed normal range (0-3.3V)	Voltage detected circuit fault
31	3rd fault	AB	Exceed normal range (0-3.28V)	Traction motor temperature sensor self-check fault
32	3rd fault	2F	Speed less than 50rpm, torque more than 100Nm, decrease switch frequency to 5KHz	Locked rotor state

Traction Motor Controller Diagnosis Information

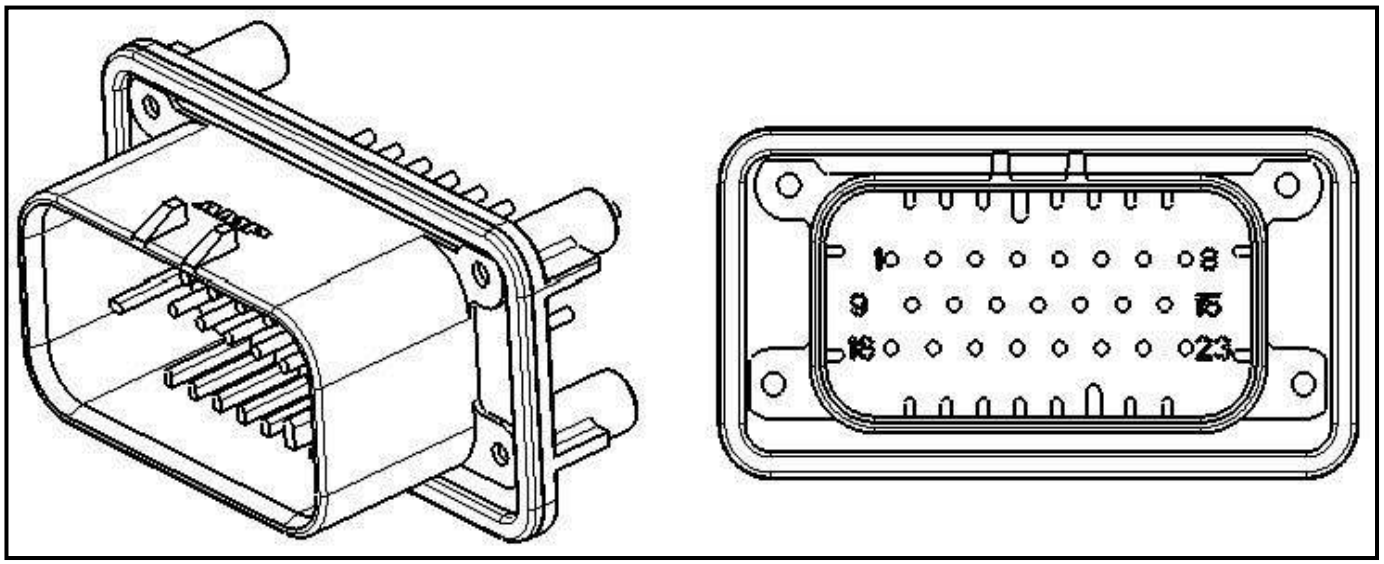
Traction Motor Controller

Reference Value

Monitor Item	Condition	Value/Status
Traction motor temperature	READY(stop the vehicle)	Almost same as coolant temperature
	During driving	The value changes along with acceleration/ deceleration
Traction motor controller temperature	READY(stop the vehicle)	Almost same as coolant temperature
	During driving	The value changes along with acceleration/ deceleration
IGBT temperature	READY(stop the vehicle)	Almost same as coolant temperature
	During driving	The value changes along with acceleration/ deceleration
12V voltage	KEYON	13 – 15 V
High voltage input	READY(stop the vehicle)	220V-420 V
	During driving	
Command torque	During driving	The value changes along with acceleration/ deceleration
Traction motor speed	READY(stop the vehicle)	0
	During driving	The value changes along with acceleration/ deceleration
Switch frequency	READY(stop the vehicle)	10KHZ
	During driving	10KHZ/5KHZ

Terminal Layout

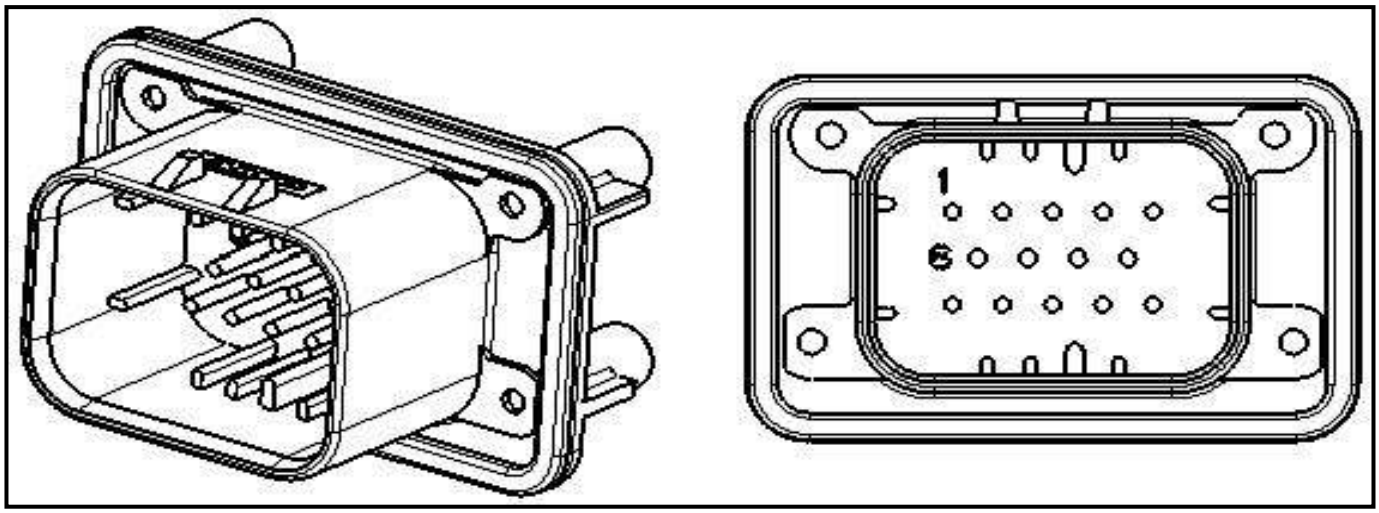
23 PIN



Terminal No.		Description	
		Signal Name	Input/Output
1	12V	12V power supply	——
2	12V	12V power supply	——
3	——	——	——
4	——	——	——
5	——	——	——
6	——	——	——
7	——	——	——
8	——	——	——
9	——	——	——
10	DCDC_EN	DCDC enable signal	Input
11	DCDC_FB	DCDC fault signal	Output
12	DCDC_RT1	DCDC thermal resistor	Output
13	DCDC_RT2	DCDC thermal resistor	Output
14	——	——	——
15	——	——	——
16	GND_12V	12V power supply GND	——

Terminal No.		Description	
		Signal Name	Input/Output
17	GND_12V	12V power supply GND	——
18	——	——	——
19	——	——	——
20	——	——	——
21	CANL	PCU CANL	Input/Output
22	CNAH	PCU CANH	Input/Output
23	CANshield	CAN shield GND	——

14 PIN



Terminal No.		Description	
		Signal Name	Input/Output
1	S4	Rotary transforming signal	Input
2	NTC_GND	Traction motor temperature	——
3	S2	Rotary transforming signal	Input
4	NTC	Traction motor temperature	——
5	S1	Rotary transforming signal	Input
6	232IN	Write connector	Input
7	S3	Rotary transforming signal	Input
8	232OUT	Write connector	Output
9	——	——	——
10	BOOTEN	Write connector	——
11	——	——	——
12	CAN_GND	Write connector	——
13	R1	Rotary transforming signal	Output
14	R2	Rotary transforming signal	Output

Fault Protection

No.	Fault name	DTC	Vehicle behavior
1	Traction motor overspeed fault	A2	Stop traction motor
2	Traction motor overcurrent fault	A3	Stop traction motor
3	High voltage overvoltage fault	A4	Stop traction motor
4	High voltage undervoltage fault	A5	Stop traction motor
5	Traction motor overtemperature fault	A6	Stop traction motor
6	Traction motor controller overtemperature fault	A7	Stop traction motor
7	Low voltage power supply undervoltage	A8	Stop traction motor
8	IGBT fault	A9	Stop traction motor
9	Traction motor rotary transformer fault	AA	Stop traction motor
10	CAN communication fault	B2	Stop traction motor
11	IGBT overtemperature fault	B3	Stop traction motor
12	W-phase current sensor circuit fault	E8	Stop traction motor
13	V-phase current sensor circuit fault	E9	Stop traction motor
14	U-phase current sensor circuit fault	EA	Stop traction motor
15	W-phase current sensor self-check fault	EB	Stop traction motor
16	V-phase current sensor self-check fault	EC	Stop traction motor
17	U-phase current sensor self-check fault	ED	Stop traction motor
18	Traction motor low voltage power supply fault	F3	Stop traction motor
19	Traction motor input missing phase	F4	Stop traction motor
20	Traction motor overspeed warning	51	9500-10000Torque load shedding linear from 100%-0%
21	Traction motor overcurrent warning	52	Decrease power 70% when 550A
22	High voltage overvoltage warning	53	400V-420V Torque load shedding linear from 100%-0%
23	High voltage undervoltage warning	54	240V-220V Torque load shedding linear from 100%-0%

No.	Fault name	DTC	Vehicle behavior
24	Traction motor overtemperature warning	55	170-180℃Torque load shedding linear from 100%-0%
25	Traction motor controller overtemperature warning	56	85-95℃Torque load shedding linear from 100%-0%
26	IGBT overtemperature warning	59	95℃-115℃Torque load shedding linear from 100%-0%
27	Locked rotor state	2F	——
28	Voltage detected circuit fault	30	——
29	Data storage abnormal	31	——
30	IGBT temperature detected circuit fault	32	——
31	Traction motor temperature sensor self-check fault	AB	——
32	Traction motor controller temperature sensor fault	EE	Speed less than 50rpm, torque more than 100Nm, Decrease IGBT switch to 5KHz

Protection Control

When temperature of traction motor inverter or traction motor components rises, the traction motor inverter temporarily enters a protective control state in order to protect the system. It automatically returns to the normal status if the safety is secured.

Condition	Control	Normal return condition
Traction motor is overheated	Traction motor output torque is limited according to the traction motor temperature	Traction motor temperature drops
Traction motor controller is overheated	Traction motor output torque is limited according to the traction motor controller temperature	Traction motor controller temperature drops
IGBT is overheated	Traction motor output torque is limited according to IGBT temperature	IGBT temperature drops
IGBT temperature is too high when traction motor speed is very low	Decrease IGBT switch frequency. Note: traction motor electromagnetic noise increases at this time	·Torque drops; ·Traction motor speed increases

DTC Inspection Priorit Chart

If some DTCs are displayed at the same time, perform inspections one by one based on the priority as per thefollowing list.

Priority	DTC	Fault name
1	A2	Traction motor overspeed fault
2	A3	Traction motor overcurrent fault
3	A4	High voltage overvoltage fault
4	A5	High voltage undervoltage fault
5	A6	Traction motor overtemperature fault
6	A7	Traction motor controller overtemperature fault
7	A8	Low voltage power supply undervoltage
8	A9	IGBT fault
9	AA	Traction motor rotary transformer fault
10	B2	CAN communication fault
11	B3	IGBT overtemperarure fault
12	E8	W-phase current sensor circuit fault
13	E9	V-phase current sensor circuit fault
14	EA	U-phase current sensor circuit fault
15	EB	W-phase current sensor self-check fault
16	EC	V-phase current sensor self-check fault
17	ED	U-phase current sensor self-check fault
18	F3	Traction motor low voltage power supply fault
19	F4	Traction motor input missing phase
20	51	Traction motor overspeed warning
21	52	Traction motor overcurrent warning
22	53	High voltage overvoltage warning
23	54	High voltage undervoltage warning
24	55	Traction motor overtemperature warning
25	56	Traction motor controller overtemperature warning

Priority	DTC	Fault name
26	59	IGBT overtemperature warning
27	2F	Locked rotor state
28	30	Voltage detected circuit fault
29	31	Data storage abnormal
30	32	IGBT temperature detected circuit fault
31	AB	Traction motor temperature sensor self-check fault
32	EE	Traction motor controller temperature sensor fault

DTC Index

DTC	Fault name	Fault light
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A4	High voltage overvoltage fault	——
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A6	Traction motor overtemperature fault	——
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DTC	Fault name	Fault light
2F	Locked rotor state	——
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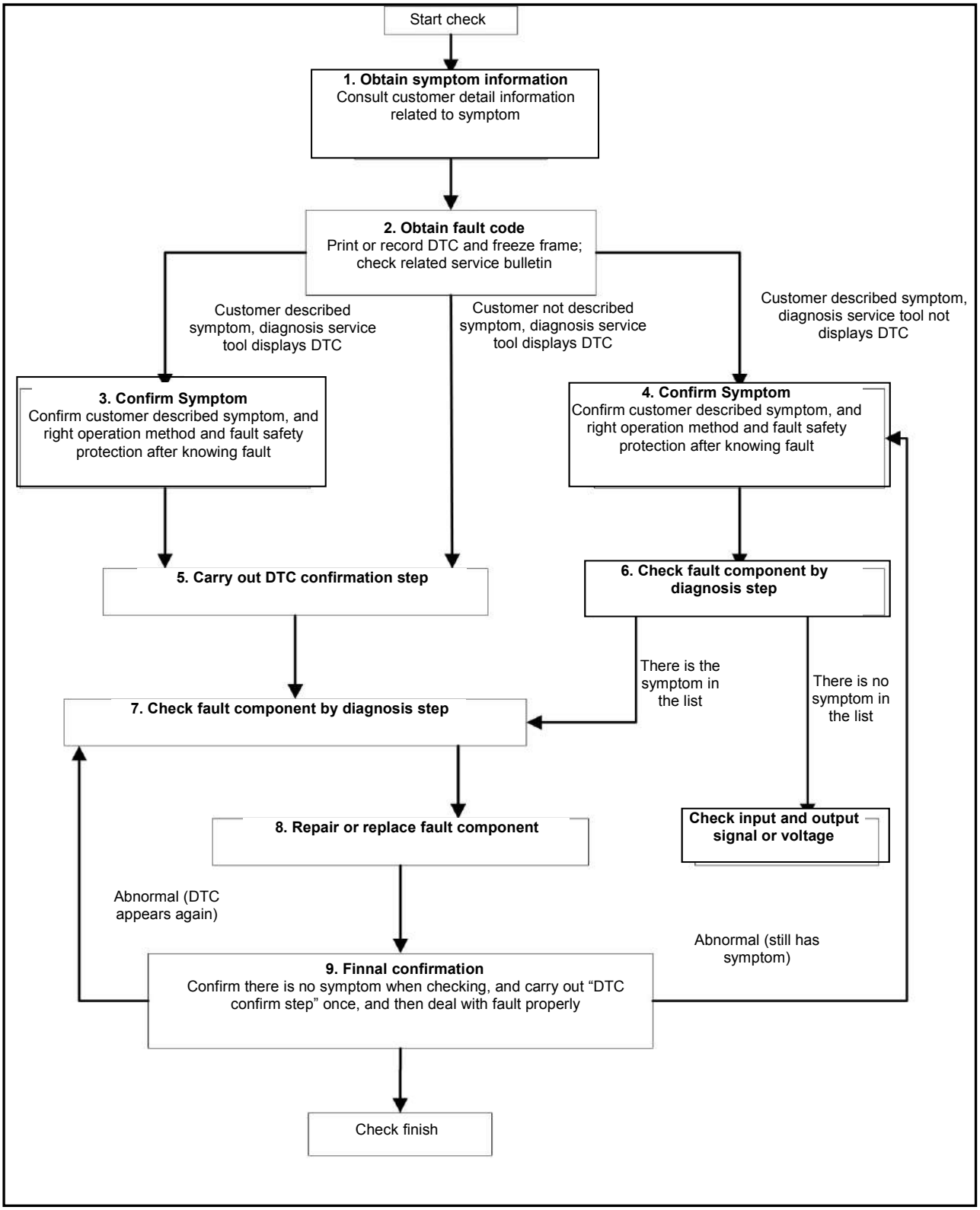
AB	Traction motor temperature sensor self-check fault	——
EE	Traction motor controller temperature sensor fault	——

Basic Inspection

Diagnosis and Repair Work Flow

Work Flow

Flow Chart



Detail Procedure

1. Obtain symptom information

Use "Diagnostic Worksheet" for more information related symptoms (accident/failure occurs when the state and the environment) to customer inquiries. (Please refer to “Diagnostic Worksheet” below).

>>Go to step 2

2. Check DTC

1. Check DTC
2. If display DTC, excute the following steps

- Record DTC
- Research on the Relationship between failure reason and customer description. (Symptom table is useful. See "Symptom Chart")

3. Check the associated maintenance records to get more information.

Whether customers have described the symptoms and has been detected DTC?

It describes the symptoms, and showed DTC. >> Go to 3.

It describes the symptoms but no DTC. >> Go 4.

No description and no DTC. >> Go to 5.

3. Confirm symptoms

Try to confirm the symptoms with the description from the customer.

Check the normal operation and fault protection associated symptoms. See "Fail-Safe."

"Diagnostic Worksheet" is very helpful to verify the fault.

Relationship status to detect symptoms between symptoms and verified.

>>Go to step 5

4. Confirm symptom

Try to confirm the symptoms with the description from the customer.

Check the normal operation and fault protection associated to the symptoms. See "Fail-Safe."

"Diagnostic Worksheet" is helpful to verify the failure.

Relationship status to detect symptoms between symptoms and verified.

>>Go to step 6

5. Perform DTC confirmation procedure

"DTC Confirmation Procedure" and confirm DTC is detected again.

If there are two or more DTC detected, please refer to "DTC Check priority list" on page TBD and decide the order of fault diagnosis.

DTC detected?

Yes >> Go to step 7

No >> Refer to "Troubleshooting about intermittent issues" to check.

6. Check the failure symptom control system

Refer to "Symptoms Checklist," based on the confirmed failure symptoms in step 4 and possible causes,

confirm the final troubleshooting methods.

Is there symptoms description?

Yes >> Go to step 7

No >> Use diagnostic tools to monitor the input information and services related to sensor or check the voltage of VCU pins. Please refer to “Reference value” above.

7. Check the fault component

Check the fault system according to diagnosis steps

Is there fault part?

Yes >> Go to step 8

No >> Use diagnostic tools to monitor the input information and services related to sensor or check the voltage-dependent VCU pins. Please refer to “Safe-Fail” mode above.

8. Repair or replace the defective parts

1. Repair or replace defective parts.
2. After finish repairing or replacement, reconnect the components or connectors.
3. Check the DTC. If DTC is displayed, clear it.

>> Go to step 9

9. Finally check

When detected DTC in step 2, perform "DTC Confirmation Procedure" or "Overall Function Check" again and confirm the fault has been properly repaired. If the symptoms described by the customer, referring to steps 3 and 4 in the diagnosis of symptoms, confirmed that the symptoms described by the user is not detected.

Normal or abnormal?

Abnormal (detect DTC) >> Go to step 7

Abnormal (still failure) >> Go to step 4

Normal >> Before returned vehicle to user, clear the DTC.

Diagnosis Worksheet

Instruction

EV control system could failure caused by a lot of drive situation. Fully aware of these situation can make troubleshooting more quickly and accurately.

Generally, each customer has different feeling to the same fail. Therefore, to fully understand the customer's description of symptoms is very important.

To solve problem efficiently, diagnosis worksheet is recommended to use.

Key Point

What——Vehicle model and engine type
When——Date, fault frequency
Where——Road condition
How——Operating condition, weather condition, symptom

Diagnosis Worksheet

Diagnosis Worksheet					
Customer Name		License Plate No.		Register Date	
		Vehicle Model			
Receive Date		VIN		Mileage	Km(mileage)

<table>
<tr><th>Fault</th><th>Series</th><th colspan="2">Feedback Information</th></tr>
<tr><td>Failure Condition</td><td>R/Q/N/O</td><td colspan="2">☐ Drive (R) ☐ DC charge (Q) ☐ AC charge (N) ☐ Others (O)</td></tr>
<tr><td rowspan="11">Failure Symptom</td><td rowspan="5">R</td><td colspan="2">☐ “READY” light off ☐ Driving performance poor ☐ Vibration ☐ Can not drive ☐ Noise
☐ Lack brake force ☐ Lack acceleration ☐ Large energy consumption ☐ Switch failure
☐ Warning light on ☐ Mode can’t be cut off ☐ Others
( )</td></tr>
<tr><td>Detail description</td><td></td></tr>
<tr><td>Meter indicating information</td><td></td></tr>
<tr><td>Electrical energy consumption</td><td>Km/Kw</td></tr>
<tr><td>SOC
Power battery remained power</td><td></td></tr>
<tr><td rowspan="3">Q,N</td><td colspan="2">☐ Can’t charge ☐ Charge interrupt ☐ Charge too slow ☐ Can’t timing charge
☐ Can’t remote charge ☐ Can’t immediate charge ☐ Others
( )</td></tr>
<tr><td>Detail description</td><td></td></tr>
<tr><td>DC charge port LCD information (if there)</td><td></td></tr>
<tr><td rowspan="2">O</td><td colspan="2">☐ A/C disale ☐ A/C inefficient ☐ Battery failure ☐ Others
( )</td></tr>
<tr><td>Detail description</td><td></td></tr>
<tr><td rowspan="2">Failure road condition/state</td><td>R/O</td><td colspan="2">☐ Normal road ☐ High way ☐ Mountain road ☐ Rough road ☐ Flat road ☐ Uphill
☐ Downhill ☐ Left/right turning
☐ Others
( )</td></tr>
<tr><td>Q/N/O</td><td colspan="2">☐ Start charging ☐ During charge ☐ After charge
☐ After setting timing charge (not start charging)
☐ During timing charge ☐ During remote charge ☐ Others
( )</td></tr>
</table>

<table>
<tr><th>Fault</th><th>Series</th><th colspan="2">Feedback Information</th></tr>
<tr><td rowspan="3">Driving condition</td><td rowspan="3">R</td><td colspan="2">☐ When system starts ☐ When “READY” light on (parking) ☐ When vehicle driving
☐ When vehicle accelerating ☐ When vehicle in constant speed ☐ When vehicle slipping
☐ When vehicle braking ☐ Just before parking ☐ Just after parking
☐ Key to “LOCK” or after being pulled out ☐ When A/C opens ☐ When mode switching
☐ Others
( )</td></tr>
<tr><td>Vehicle speed</td><td>Km</td></tr>
<tr><td>Accelerator pedal position</td><td></td></tr>
<tr><td rowspan="4">DC charge port</td><td rowspan="4">Q</td><td>DC charge port</td><td>☐ Accord with national standard DC charge port
☐ Not accord with national standard DC charge port</td></tr>
<tr><td>Position</td><td></td></tr>
<tr><td>DC charge port setting</td><td></td></tr>
<tr><td>Others</td><td></td></tr>
<tr><td rowspan="5">Household power supply plug</td><td rowspan="5">N</td><td colspan="2">☐ Accord with national standard plug ☐ Not accord with national standard plug</td></tr>
<tr><td>Position</td><td></td></tr>
<tr><td>Voltage</td><td>V</td></tr>
<tr><td>Fuse current</td><td>A</td></tr>
<tr><td>Other information</td><td></td></tr>
<tr><td>SOC</td><td>Q/N/O</td><td colspan="2">☐ Yes ☐ No
( )</td></tr>
<tr><td>Gear position/operation</td><td>R</td><td colspan="2">☐ D ☐ R ☐ N ☐ S ☐ Operating method (→)</td></tr>
<tr><td rowspan="2">Environment condition</td><td rowspan="3">R/Q/N/O</td><td>Weather</td><td></td></tr>
<tr><td>Temperature</td><td>℃</td></tr>
<tr><td>Occur frequency</td><td colspan="2">☐ Always ☐ Once ☐ Sometimes (happened times before) ☐ Others</td></tr>
</table>

Fault	Series	Feedback Information
		( )
Failure recovery condition		☐ Key to “LOCK” or after being pulled out ☐Replace 12V battery or wiring harness ☐ Gear position shifting ☐ During driving ☐ READY ☐ Others ( )
【Memo】		

Traction Motor Fault and Circuit Diagnosis

A2 Traction Motor Overspeed Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
A2	Traction motor overspeed fault	Traction motor speed more than 10000rpm	Low load or idling Traction motor Traction motor controller

DTCConfirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check traction motor rotary transforming signal

1. Turn key to “OFF”
2. Disconnect maintenance switch
3. Disconnect low voltage 14-pin connector, check resistance value of rotary transforming wire

Pin No.	Signal Name	Resistance value
5	S1	≤50Ω
7	S3	
3	S2	≤50Ω
1	S4	
13	R1	≤50Ω
14	R2	

Whether check result is normal?

Normal >>Turn to step 2

Abnormal >>Replace traction motor

2. Check whether is controller check fault

1. Replace traction motor controller
2. Connect maintenance switch
3. Turn key to “ON”
4. Check diagnosis result

Whether detected DTC?

Yes >>Replace traction motor

No >>Check finish

A3 Traction Motor Overcurrent Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
A3	Traction motor overcurrent fault	Traction motor-phase current exceed 570A	Traction motor Traction motor controller

DTCConfirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check traction motor rotary transforming signal wire

1. Turn key to “OFF”
2. Disconnect maintenance switch
3. Disconnect low voltage 14-pin connector, check resistance value of rotary transforming wire

Pin No.	Signal Name	Resistance value
5	S1	≤50Ω
7	S3	
3	S2	≤50Ω
1	S4	
13	R1	≤50Ω
14	R2	

Whether check result is normal?

Normal >>Turn to step 2

Abnormal >>Replace traction motor

2. Check whether is controller fault

1. Replace traction motor controller
2. Connect maintenance switch
3. Turn key to “ON”
4. Check diagnosis result

Whether detected DTC?

Yes >>Replace traction motor

No >>Check finish

A4 High Voltage Overvoltage Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
A4	High voltage overvoltage fault	Check input voltage exceed 420V	Power battery Main relay disconnected when recycling energy Traction motor controller

DTCConfirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check high voltage input

Check input voltage of high voltage.

Whether is overvoltage?

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check voltage of power battery

Check output voltage of power battery.

Whether is overvoltage?

Yes >>Check power battery

No >>Replace traction motor controller

A5 High Voltage Undervoltage Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
A5	High voltage undervoltage fault	Check input voltage lower than 220V	Power battery Traction motor controller

DTCConfirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check high voltage input

Check input voltage of high voltage.

Whether is undervoltage?

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check voltage of power battery

Check output voltage of power battery.

Whether is undervoltage?

Yes >>Check power battery

No >>Replace traction motor controller

A6 Traction Motor Overtemperature Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
A6	Traction motor overtemperature fault	Traction motor temperature 180℃	Water pump Cooling pipeline is blocked Coolant is not enough Traction motor Traction motor controller

DTCConfirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check water pump

Whether work normally?

Yes >>Turn to step 2

No >>Replace water pump

2. Check coolant

Whether is enough?

Yes >>Turn to step 3

No >>Fill full coolant

3. Check traction motor temperature sensor signal

1. Turn key to “OFF”
2. Disconnect maintenance switch
3. Disconnect low voltage 14-pin connector,Check traction motor temperature sensor signal Resistance value。

Pin No.	Signal Name	Resistance value
2	NTC_GND	1.196kΩ±3%
4	NTC	

Whether check result is normal?

Normal >>Replace traction motor

Abnormal >>Turn to step 4

4. Check resistance value of temperature sensor signal wire in outlet terminal of traction motor low voltage

Disconnect low voltage connector of traction motor, and check resistance value of traction motor temperature sensor signal wire.

Pin No.	Signal Name	Resistance value
2	NTC_GND	1.196kΩ±3%
4	NTC	

Whether check result is normal?

Normal >>Replace connecting wiring harness of traction motor and traction motor controller

Abnormal >>Replace traction motor

A7 Traction Motor controller Overtemperature Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
A7	Traction motor controller overtemperature fault	Traction motor controller temperature exceed 95℃	Water pump Cooling pipeline is blocked Coolant is not enough Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check water pump

Whether work normally?

Yes >>Turn to step 2

No >>Replace water pump

2. Check coolant

Whether is enough?

Yes >>Replace traction motor controller

No >>Fill full coolant

A8 Low Voltage Power Supply Undervoltage

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
A8	Low voltage power supply undervoltage	Low voltage power supply lower than 9V	Battery DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery voltage

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

A9 IGBT Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
A9	IGBT FAULT	Drive chip report overvoltage/ overcurrent	Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

AA Traction Motor Rotary Transformer Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
AA	Traction motor rotary transformer fault	Rotary transforming decoding chip report fault	Exteral wiring harness DCDC Traction motor Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check traction motor rotary transforming signal

1. Turn key to “OFF”
2. Disconnect maintenance switch
3. Disconnect low voltage 14-pin connector, check resistance value of rotary transforming wire

Pin No.	Signal Name	Resistance value
5	S1	≤50Ω
7	S3	
3	S2	≤50Ω
1	S4	
13	R1	≤50Ω
14	R2	

Whether check result is normal?

Normal >>Turn to step 2

Abnormal >>Replace traction motor

2. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace traction motor controller

3. Check battery

Whether is lower than 9V

Yes >>Turn to step 4

No >>Replace low voltage connecting wiring harness

4. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 5

No >>Replace DCDC

5. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

B2 CAN Communication Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
B2	CAN communication fault	Controller not receives VCU signal in 1.2s	Exteral wiring harness VCU Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check VCU instruct transmission

Whether is normal?

Yes >>Turn to step 2

No >>Replace VCU

2. Check CAN communication wiring harness

Whether connection is normal?

Yes >>Replace traction motor controller

No >>Replace low voltage connecting wiring harness

B3 IGBT Overtemperature Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
B3	IGBT overtemperature fault	IGBT temperature exceed 115℃	Water pump Cooling pipeline is blocked Coolant is not enough Traction motor controller

DTCConfirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check water pump

Whether work normally?

Yes >>Turn to step 2

No >>Replace water pump

2. Check coolant

Whether is enough?

Yes >>Replace traction motor controller

No >>Fill full coolant

E8 W-phase Current Sensor Circuit Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
E8	W-phase current sensor circuit fault	Circuit detected fault	Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

E9 V-phase Current Sensor Circuit Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
E9	V-phase current sensor circuit fault	Circuit detected fault	Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

EA U-phase Current Sensor Circuit Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
EA	U-phase current sensor circuit fault	Circuit detected fault	Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

EB W-phase Current Sensor Self-check Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
EB	W-phase current sensor self-check fault	Zerodrifting too large	Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

EC V-phase current sensor self-check fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
EC	V-phase current sensor self-check fault	Zerodrifting too large	Exteral wiring harness DCDC Traction motor controller

DTCConfirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

ED U-phase Current Sensor Self-check Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
ED	U-phase current sensor self-check fault	Zerodrifting too large	Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

F3 Traction Motor Low Voltage Power Supply Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
F3	Traction motor low voltage power supply fault	Drive chip power supply volage lower than 15V	Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

F4 Traction Motor Input Sissing Phase

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
F4	Traction motor input missing phase	Traction motor at least one phase not output	High voltage three-phase wire Traction motor Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Turn to step 3

3. Check history fault

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check traction motor

1. Turn key to “OFF”
2. Disconnect maintenance switch
3. Remove high voltage three-phase wire, check resistance value between phases

Three-phase wiring harness		Resistance value
Terminal		
U	V	≤30mΩ
V	W	
W	U	

Whether check result is normal?

Normal >>Turn to step 2

Abnormal >>Replace traction motor

2. Check high voltage three-phase wire

Check whether connection of each wire is conductive

Yes >>Replace traction motor controller

No >>Replace high voltage three-phase wire

51 Traction Motor Overspeed Warning

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
51	Traction motor overspeed warning	Traction motor speed more than 9500rpm	Low load or idling Traction motor Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check traction motor rotary transforming signal

1. Turn key to “OFF”
2. Disconnect maintenance switch
3. Disconnect low voltage 14-pin connector, check resistance value of rotary transforming wire

Pin No.	Signal Name	Resistance value
5	S1	≤50Ω
7	S3	
3	S2	≤50Ω
1	S4	
13	R1	≤50Ω
14	R2	

Whether check result is normal?

Normal >>Turn to step 2

Abnormal >>Replace traction motor

2. Check whether is controller check fault

1.Replace traction motor controller

2. Connect maintenance switch
3. Turn key to “ON”
4. Check diagnosis result

Whether detected DTC?

Yes >>Replace traction motor

No >>Check finish

52 Traction Motor Overcurrent Warning

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
52	Traction motor overcurrent warning	Traction motor-phase current exceed 550A	Traction motor Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check traction motor rotary transforming signal wire

1. Turn key to “OFF”
2. Disconnect maintenance switch
3. Disconnect low voltage 14-pin connector, check resistance value of rotary transforming wire

Pin No.	Signal Name	Resistance value
5	S1	≤50Ω
7	S3	
3	S2	≤50Ω
1	S4	
13	R1	≤50Ω
14	R2	

Whether check result is normal?

Normal >>Turn to step 2

Abnormal >>Replace traction motor

2. Check whether is controller fault

1.Replace traction motor controller

2. Connect maintenance switch
3. Turn key to “ON”
4. Check diagnosis result

Whether detected DTC?

Yes >>Replace traction motor

No >>Check finish

53 High Voltage Overvoltage Warning

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
53	High voltage overvoltage warning	Check input voltage exceed 400V	Power battery Main relay disconnected when recycling energy Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check high voltage input

Check input voltage of high voltage.

Whether is overvoltage?

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check voltage of power battery

Check output voltage of power battery.

Whether is overvoltage?

Yes >>Check power battery

No >>Replace traction motor controller

54 High Voltage Undervoltage Warning

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
54	High voltage undervoltage warning	Check input voltage lower than 240V	Power battery Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check high voltage input

Check input voltage of high voltage.

Whether is undervoltage?

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check voltage of power battery

Check output voltage of power battery.

Whether is undervoltage?

Yes >>Check power battery

No >>Replace traction motor controller

55 Traction Motor Overtemperature Warning

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
55	Traction motor overtemperature warning	Traction motor temperature exceed 170℃	Water pump Cooling pipeline is blocked Coolant is not enough Traction motor Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check water pump

Whether work normally?

Yes >>Turn to step 2

No >>Replace water pump

2. Check coolant

Whether is enough?

Yes >>Turn to step 3

No >>Fill full coolant

3. Check traction motor temperature sensor signal

1. Turn key to “OFF”
2. Disconnect maintenance switch
3. Disconnect low voltage 14-pin connector, and check resistance value of traction motor temperature sensor signal wire

Pin No.	Signal Name	Resistance value
2	NTC_GND	1.196kΩ±3%
4	NTC	

Whether check result is normal?

Normal >>Replace traction motor

Abnormal >>Turn to step 4

4. Check resistance value of temperature sensor signal wire in outlet terminal of traction motor low voltage

Disconnect low voltage connector of traction motor, and check resistance value of traction motor temperature sensor signal wire.

Pin No.	Signal Name	Resistance value
2	NTC_GND	1.196kΩ±3%
4	NTC	

Whether check result is normal?

Normal >>Replace low voltage connecting wiring harness of traction motor and traction motor controller

Abnormal >>Replace traction motor

56 Traction Motor Controller Overtemperature Warning

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
56	Traction motor controller overtemperature warning	Traction motor controller temperature exceed 85℃	Water pump Cooling pipeline is blocked Coolant is not enough Traction motor controller

DTCConfirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check water pump

Whether work normally?

Yes >>Turn to step 2

No >>Replace water pump

2. Check coolant

Whether is enough?

Yes >>Replace traction motor controller

No >>Fill full coolant

59 IGBT Overtemperature Warning

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
59	IGBT overtemperature warning	IGBT temperature exceed 95℃	Water pump Cooling pipeline is blocked Coolant is not enough Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check water pump

Whether work normally?

Yes >>Turn to step 2

No >>Replace water pump

2. Check coolant

Whether is enough?

Yes >>Replace traction motor controller

No >>Fill full coolant

2F Locked Rotor State

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
2F	Locked rotor state	Traction motor in locked rotor state	Extremely low speed, large torque output Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

30 Voltage Detected Circuit Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
30	Voltage detected circuit fault	Control panel voltage detected exceed range	Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

31 Data Storage Abnormal

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
31	Data storage abnormal	EEPROM data can't be read or written	Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to "ON"
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to "Diagnosis step"

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to "DCDC Electrical equipment inspection"

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

32 IGBT Temperature Detected Circuit Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
32	IGBT temperature detected circuit fault	Open circuit or short circuit	Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

AB Traction Motor Temperature Sensor Self-check Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
AB	Traction motor temperature sensor self-check fault	Control panel voltage detected exceed range	Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

EE Traction Motor Temperature Sensor Self-check Fault

DTC Logic

DTC Diagnosis Logic

DTC NO.	Fault name	DTC Diagnosis Condition	Possible reason
EE	Traction motor controller temperature sensor fault	Control panel voltage detected exceed range	Exteral wiring harness DCDC Traction motor controller

DTC Confirmation Procedure

1. Carry out DTC confirmation procedure

1. Turn key to “ON”
2. Check diagnosis result

Whether detected DTC?

Yes >>Refer to “Diagnosis step”

No >>Check finish

Diagnosis Step

1. Check low voltage input of traction motor controller

Whether is lower than 9V

Yes >>Turn to step 2

No >>Replace traction motor controller

2. Check battery

Whether is lower than 9V

Yes >>Turn to step 3

No >>Replace low voltage connecting wiring harness

3. Check DCDC

Refer to “DCDC Electrical equipment inspection”

Whether works normally?

Yes >>Turn to step 4

No >>Replace DCDC

4. Check connecting wiring harness between DCDC and battery

Whether connection is normal?

Yes >>Replace battery

No >>Replace connecting wiring harness

DC/DC Fault

Fault Logic

DC/DC Fault Diagnosis Logic

Fault appearance	Fault name	Diagnosis Condition	Possible reason
Indicating light on dashboard 	DC/DC fault	DC/DC doesn't work	23pin low voltage wiring harness Traction motor controller high voltage connector

Fault Confirmation Procedure

1. Carry out fault confirmation procedure

1. Turn key to "ON"

After 2.6s, check whether DC/DC output voltage is 13-15V.

Whether DC/DC output voltage is lower than 13V?

Yes >>Refer to "Diagnosis step"

No >>Check finish

Diagnosis Step

1. Open DR diagnosis service system, check DC/DC hardware enable

Whether is 1

Yes >>Turn to step 2

No >>Check whether VCU is normal?

2. Check generatrix voltage value of traction motor controller

Whether is higher than 200V

Yes >>Replace DC/DC

No >>Check whether battery system is normal, and check whether high voltage relay is actuated

Traction Motor Insulation Resistance Value Inspection

Component Description

Warning:

Because electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.

Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.

Be sure to wear insulating protective equipment consisting of glove, shoes and glasses/face shield before beginning work on the high voltage system.

Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.

1. Ready

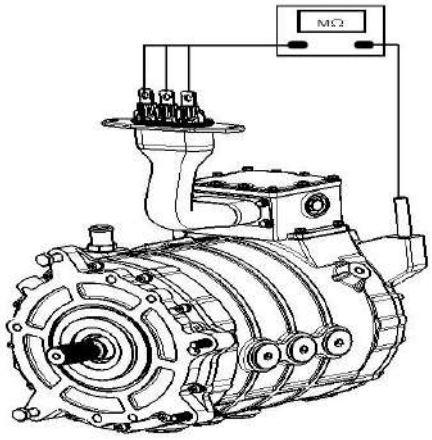
Warning: First cut off high voltage part, and check high voltage return circuit.

Separate high voltage component and power battery, refer to “Removal and installation”.

Check voltage of traction motor controller positive and negative electrode wire, standard is ≤5V.

2. Check traction motor insulation resistance value

Remove traction motor, refer to “Removal and installation”.



Regulate gear position of high voltage insulation inspection device to 1000V, and check insulation resistance value of traction motor three-phase to housing.

Check requirement

Measure each phase insulation resistance of traction motor three-phase (U-phase, V-phase, W-phase). Require insulation resistance value all to be more than or equal to 20MΩ.

Three-phase wire	Grounding	Resistance value
U-phase	Housing	≥20MΩ
V-phase		
W-phase		

Traction Motor Controller Insulation Resistance Value Inspection

Component Description

Warning:

Because electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.

Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.

Be sure to wear insulating protective equipment consisting of glove, shoes and glasses/face shield before beginning work on the high voltage system.

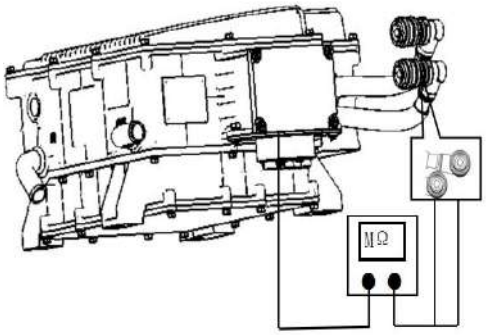
Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.

1. Ready

Warning: First cut off high voltage part, and check high voltage return circuit.

Separate high voltage component and power battery, refer to “Removal and installation”.

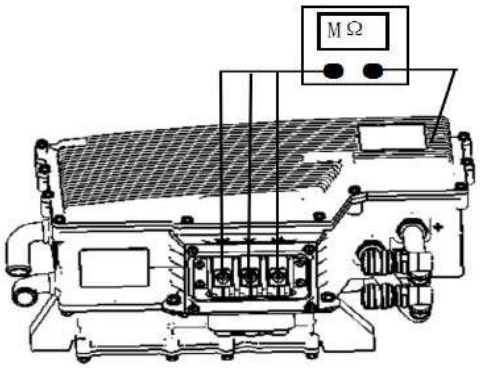
Check voltage of traction motor controller positive and negative electrode wire, standard is ≤5V.



2. Check traction motor controller insulation resistance value

Remove traction motor controller, refer to "Removal and installation".

Regulate gear position of high voltage insulation inspection device to 1000V, and check insulation resistance value of generatrix wire to housing and three-phase to housing.



Check requirement

Traction motor controller		Grounding	Insulation resistance value standard
Name	Terminal		
High voltage generatrix	Generatrix +	Traction motor controller housing	≥20MΩ
	Generatrix -	Traction motor controller housing	≥20MΩ
High voltage three-phase connector	U-phase		
	V-phase		
	W-phase		

Symptom Diagnosis

Electromagnetic Noise

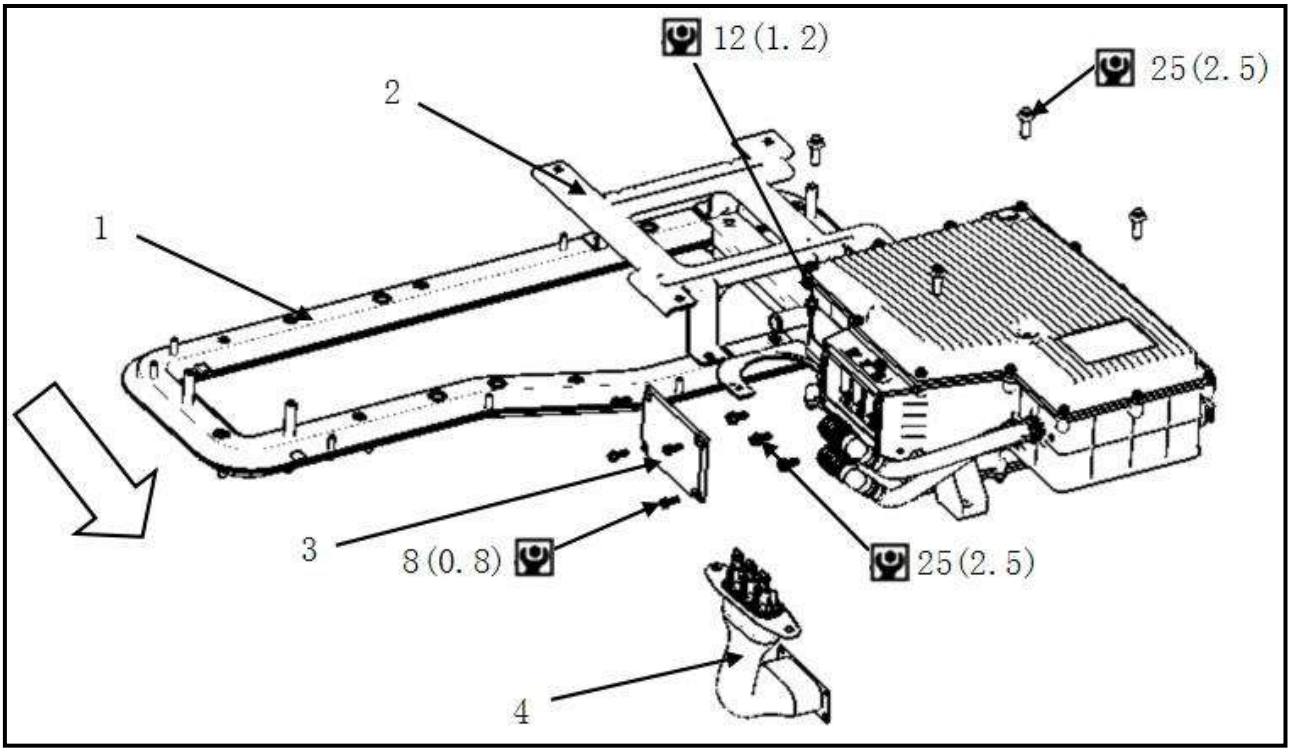
Description

The electromagnetic noise of the traction motor may become more noticeable when accelerating on a steep slope (large output torque). This occurs when the IGBT switching frequency is lowered by the traction motor inverter due to high temperature of the IGBT inside the traction motor inverter. This does not indicate a problem with the traction motor inverter characteristics or control.

Removal and Installation

Traction Motor Controller

Exploded View



1. Cross beam 2. Traction motor controller bracket 3.Three-phase wire cover 4.Three-phase wire

⇦: vehicle right ahead side

: N·m (kg-m)

Removal and Installation

Warning:

Because electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.

Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.

Be sure to wear insulating protective equipment consisting of glove, shoes and glasses/face shield before beginning work on the high voltage system.

Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.

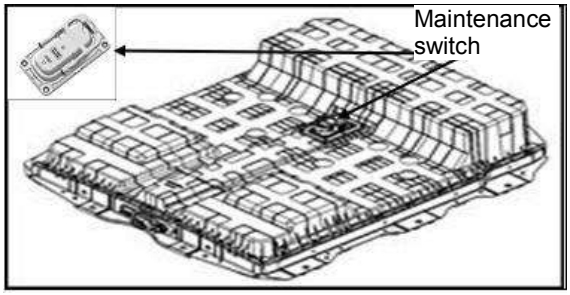
CAUTION:

There is the possibility of a malfunction occurring if the vehicle is changed to READY status while the service plug is removed. Therefore do not change the vehicle to READY status unless instructed to do so in the Service Manual.

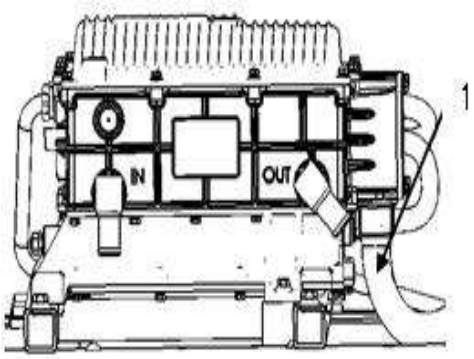
Removal:

Steps for replacing controller

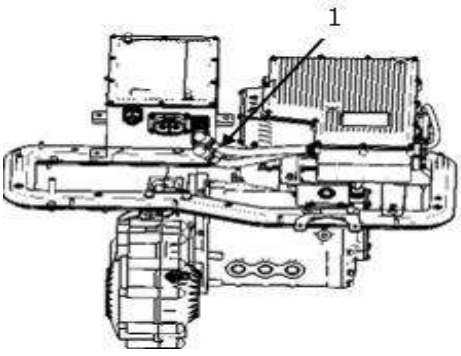
1. Cut off vehicle high voltage, disconnect battery maintenance switch, as shown picture below



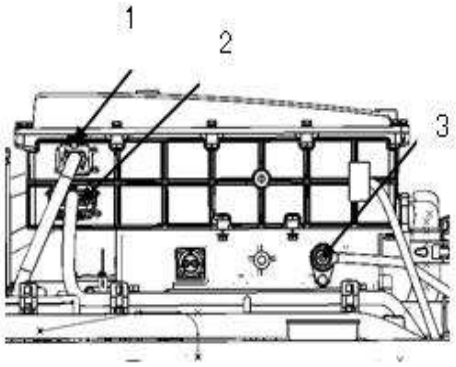
2. Open front compartment cover, and check traction motor system
3. Disconnect positive and negative electrode generatrix connector



1. Positive and negative generatrix
4. Disconnect three-phase wire connector

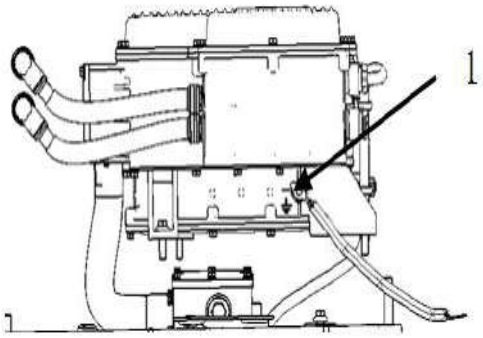


1. Three-phase wire
5. Disconnect low voltage connector



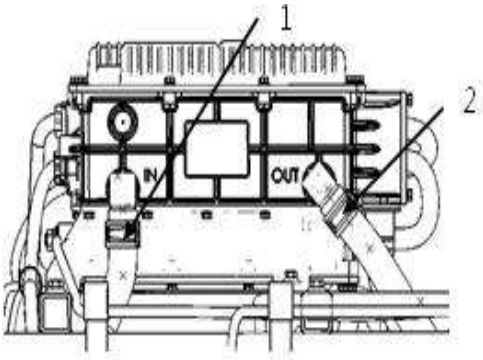
1. 14-pin low voltage connector 2. 23-pin low voltage connector 3. DCDC output terminal

6. Remove DCDC grounding



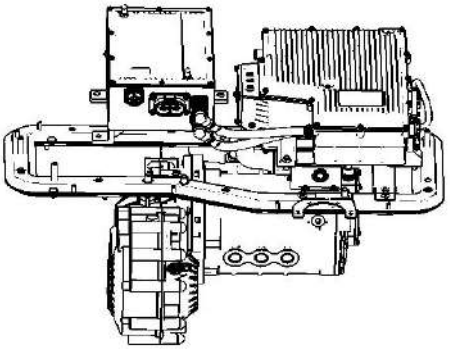
1. DCDC grounding

7. Remove inlet/outlet water pipe

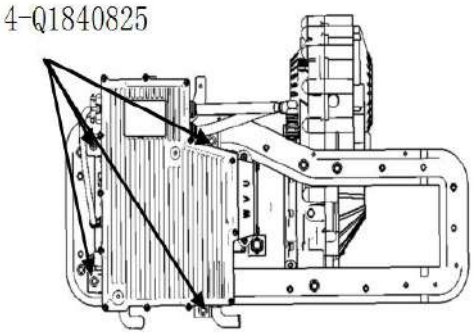


1. Inlet water pipe 2. Outlet water pipe

8. Remove controller fixed bolts, and complete replacement of traction motor controller



Installation: Install according to the contrary sequence of removal.



Inspection after Installation

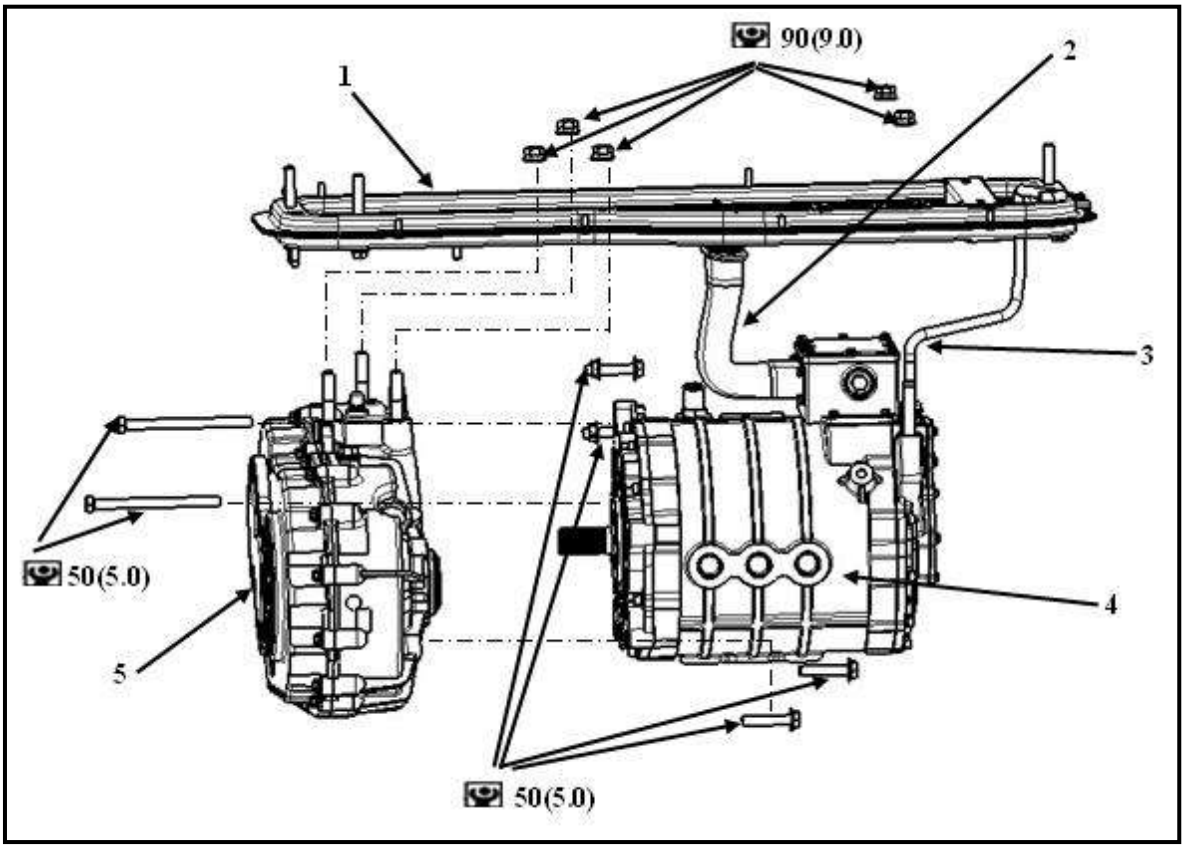
Check all bolts are connected well, whether there is missing bolt or bolt not being tightened according to the requirement.

After installing traction motor controller, measure resistance between traction motor controller and vehicle body, and check equipotential. Requirement: Traction motor controller –Ground Resistance≤0.1Ω

If result deviates from standard values, check that no paint, oil, dirt, or other substance is adhering to bolts or conductive mounting parts. If any such substance is adhering, clean the surrounding area and remove the substance.

Traction Motor

Exploded View



1. Cross beam 2. Three-phase wire 3. Rotate transformer wire 4. Traction motor 5. Decelerator

: N·m (kg-m)

Removal and Installation

Warning:

Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

Technicians using a medical electric device such as pacemaker must never perform operation on the vehicle, as magnetic field can affect the device function by approaching to such parts.

Due to traction motor has high voltage and strong magnetic, don't use things with magnetic (such as bank card etc.) when check and maintenance, it may be damaged if carry these things when maintenance.

Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts. Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.

Be sure to wear insulating protective equipment consisting of glove, shoes and glasses/face shield before beginning work on the high voltage system.

Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.

Caution:

There is the possibility of a malfunction occurring if the vehicle is changed to READY status while the service plug is removed. Therefore do not change the vehicle to READY status unless instructed to do so in the Service Manual.

Removal

Warning:

Discharge decelerator gear oil before removing power assembly. Refer to "Decelerator".

Follow the steps below to remove, and install according to the contrary steps.

Installation

Warning:

Be sure to reinstall high voltage harness clips in their original positions. If a clip is damaged, replace it with a new clip before installing.

Before installing traction motor and decelerator assembly, should use lubricant to lubricate traction motor shaft spline, and at the same time fill lubricant (min 8.5g (0.3oz), max 20g (0.7oz)) to decelerator input shaft (inner spline).

When installing traction motor and decelerator assembly, don't damage or miss installing O-type sealing ring. Besides, sealing ring is quick-wear part, need to replace new sealing ring.

If traction motor was replaced, apply high voltage warning label, refer to "High voltage warning label".

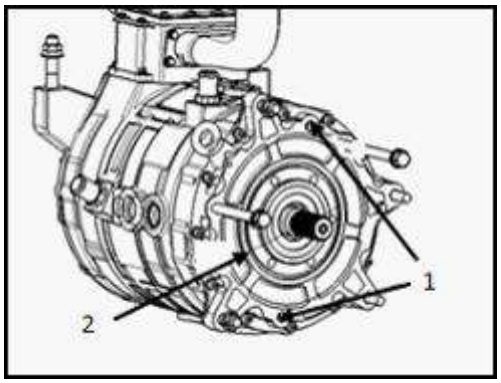
1. Inspection Before Installation

1) Traction motor should be connected to three-phase wire, signal wire, and equipped with connector, and wiring harness and connector should be no damage; traction motor three-phase wire and low voltage wiring harness insulation satisfy with that insulation resistance value ≥20MΩ when DC1000V.

2) There is no sundries in traction motor housing, and there is no abvious processing defect.

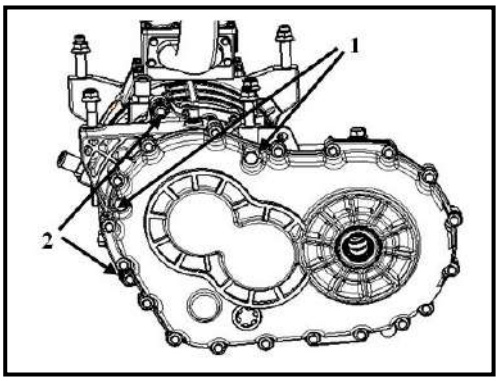
2. Installation of traction motor and decelerator assembly

1) Install sealing ring to sealing ring groove of traction motor, decelerator locating pin aligning to locating pin on traction motor, and aligning to install, and decelerator assembly connects to traction motor by spline.

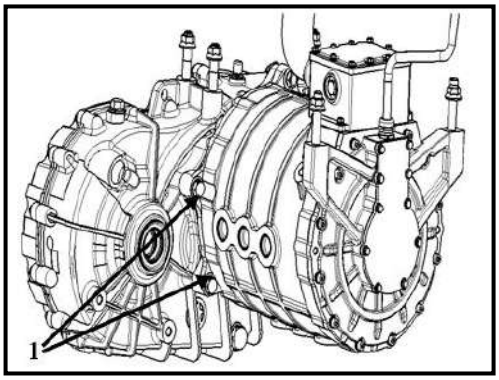


1. Locating pin hole 2. Sealing ring

2) Align 6 holes between traction motor and decelerator, connect to decelerator by tightening with 2 bolts assembly 1 (Bolt Q15010130, spring washer Q40310, flat washer Q40110 assembly), bolt (Q1841050) and 2 nuts (Q33010) and 2 bolts (Q1841050), tighten torque: 45~50Nm, as shown below

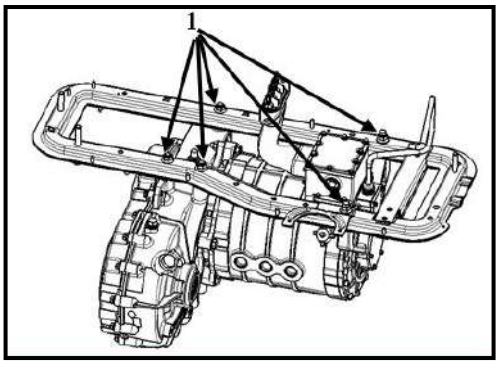


1. Bolt Q15010130, spring washer Q40310, flat washer Q40110
2. Bolt Q1841050, nut Q33010



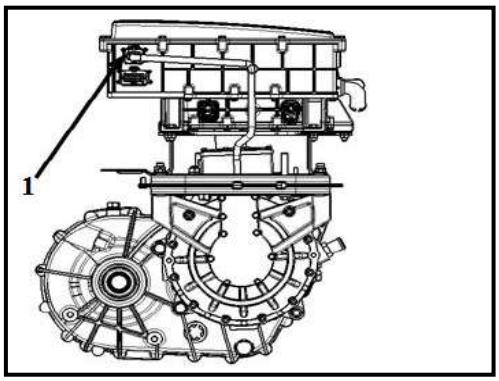
1. Bolt Q1841050, nut Q33010
3. Installation of traction motor and decelerator assembly with cross beam

1) Align 5 holes on cross beam to 5 double-screw bolts of traction motor and decelerator assembly and install, and install 5 hexgon flange tightening nut (Q33012) and tighten, tighten torque: 85~90Nm.



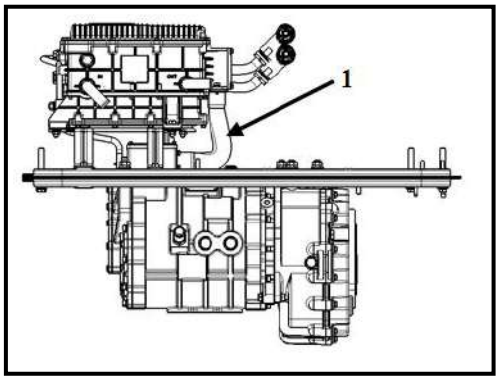
1. Nut Q33012

4. Connect rotary transformer connector side.



1. Rotary transformer connector

5. Controller junction box connects to high voltage three-phase wire.



1. High voltage three-phase wire

6. Add and fill lubricant to decelerator after traction motor assembly is installed on vehicle, lubricant requirement refer to “Decelerator”.

Inspection after Installation

Check all bolts are connected well, whether there is missing bolt or bolt not being tightened according to the requirement.

After installing traction motor controller, measure resistance between traction motor controller and vehicle body, and check equipotential. Requirement: Traction motor controller –Ground Resistance≤0.1Ω

If result deviates from standard values, check that no paint, oil, dirt, or other substance is adhering to bolts or conductive mounting parts. If any such substance is adhering, clean the surrounding area and remove the substance.

Motor controller insulation resistance detection

Components Description

Warning:

- WARNING: Because of hybrids and electric vehicles are equipped with high-voltage power batteries, there is a high risk of high-voltage electric shock, leakage, and similar accidents if the high-pressure system is handled improperly. Ensure that the correct work flow is followed during inspection and maintenance.

Before inspecting and servicing the high pressure system and its protection, make sure that the service switch has been disassembled to cut off the high voltage power supply.

- Ensure that the maintenance switch is removed in your bag or carried on the body, so as not to repair the work of other people inadvertently put the maintenance switch plug.
- Insulation protection equipment, including insulated gloves, insulated shoes and face shields, should be worn before maintenance work on high pressure systems.
- During the high-pressure system overhaul, personnel responsibility must be specified in order to ensure that other people will not contact the car. When the repair work is suspended, please cover the high-pressure portion with insulating material to prevent other people from contacting.

1 ready

WARNING: First cut off the high voltage section and then detect the high voltage circuit.

- Separate the high voltage components from the power battery, see "Removal and Installation".
- Detection of motor controller positive and negative bus voltage, the standard ≤ 5V.

2 Motor controller insulation resistance detection

- Remove the motor controller, see "Removal and Installation".
- The stall of the high-voltage insulation detector stalls should be switched to 1000V when detecting the insulation resistance of the bus to the shell and the three-phase line the shell.

Testing requirements

Motor controller		Ground point	Insulation resistance
Name	Terminal		

			standard
High voltage female line	Female line positive	Motor controller shell	≥20MΩ
	Female line negative		
High pressure three phase interface	U phase		
	V phase		
	W phase		

Symptom diagnosis

Electromagnetic noise

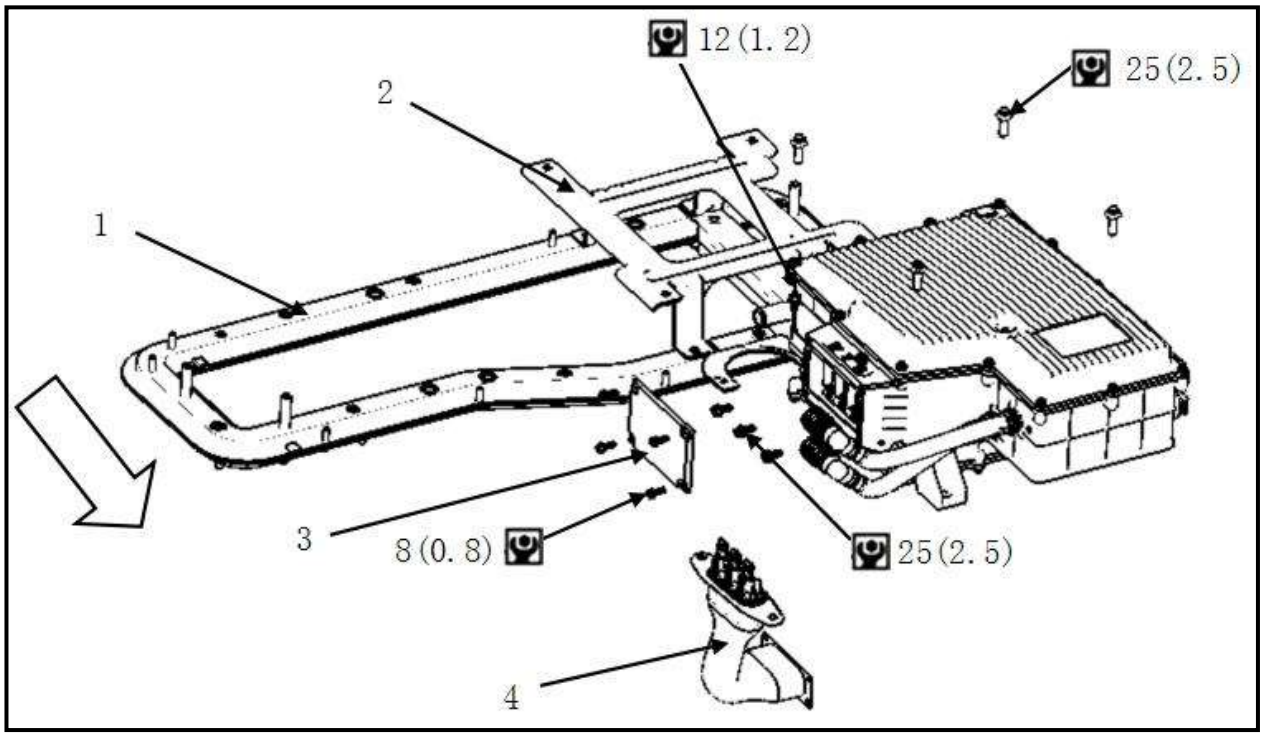
Description

The electromagnetic noise of the drive motor becomes more pronounced when the high torque is output at very low speed. When this case occurs, the motor controller will reduce the frequency of IGBT conversion, then the situation will appear. This does not mean that there is a problem with the characteristics or control of the motor controller.

Disassembly and installment

Motor controller

Explosive view



1.Beam 2.bracket of the drive controller 3.Three-phase line cover plate 4.Three-phase line

⇦: The front of the vehicle

: N·m (kg-m)

disassembly and installment

Warning:

- Since hybrids and electric vehicles usually contain high-voltage batteries, if high-voltage components and vehicles are handled incorrectly, there is a risk of electric shock, leakage, or similar incidents. Be sure to follow the correct working procedures when performing inspections and maintenance.
- Be sure to place the maintenance switch in your own pocket to avoid the mis-operation of other staff during the maintenance process leading to the conduction of the high voltage circuit.
- Insulation protection equipment, including insulated gloves, insulated shoes and face shields,

should be worn before maintenance work on high pressure systems.

- Overhaul personnel has responsibilities to ensure that other people will not contact the car. When the repair work is suspended, please cover the high-pressure portion with insulating material to prevent other people from contacting.

Note：

When the maintenance switch is removed, switching the vehicle to the READY state may cause malfunction. So do not change the vehicle to READY state unless instructed to do so in the service manual.

Demolition

Steps of replacing the controller

1. Cut off the vehicle high voltage, the battery maintenance switch off, as shown below, the maintenance switch will be unplugged.

2. Open the front hatch and check the electric drive system

3. Remove the positive and negative bus connections

1. Positive and negative female line

4. Remove the positive and negative bus connections

1. Three-phase line

5. Unplug the low voltage connector

1. 14Pin low voltage connector 2. 23Pin low voltage connector 3. DCDC output connecting rod

(6) Remove DCDC ground

(1)DCDC ground

7) remove the water inlet and outlet pipe

1. Water inlet pipe 2. Water outlet pipe

8. Remove the controller fixing bolts and complete the motor controller replacement.

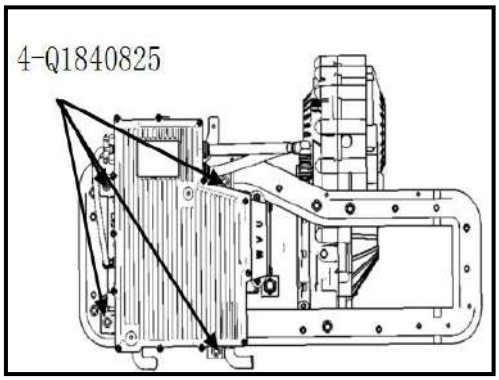
Installation

The installation is carried out in the opposite way of disassembly.

Detection after installation

- Check whether the bolts are connected reliably, whether they are missing bolts or bolts are not tightened as required.
- After installing the motor controller, measure the resistance between the motor controller and the body, check whether the potential.

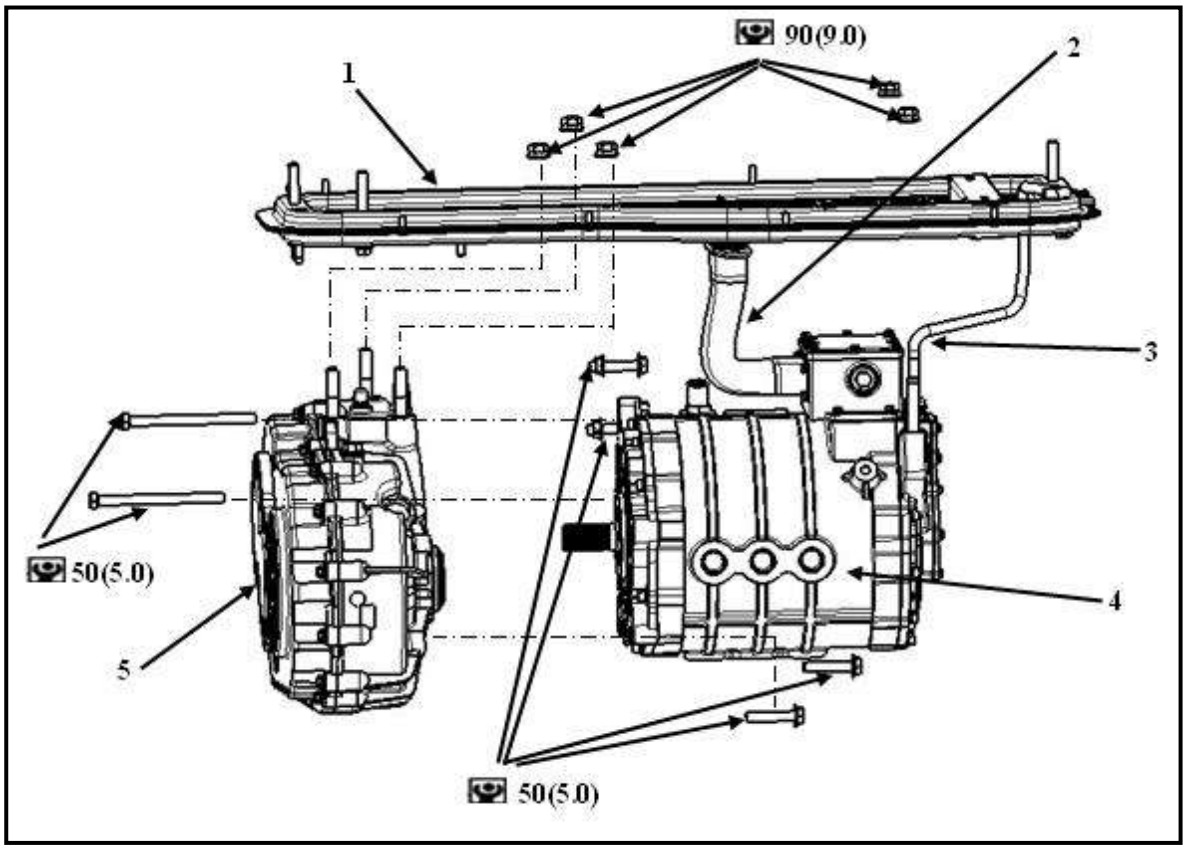
Requirements: Motor controller to ground resistance ≤ 0.1Ω



If the results deviate from the standard values, check for paint, oil, dust, or other substances attached to bolts or conductive parts. If any of these substances are attached, clean the surrounding area and remove impurities.

Motor

Exploded view



1. Power train joist 2. Three-phase line 3. Rotary transformer wire 4 Drive motor

: N·m (kg-m)

Disassembly and Assembly

Warning:

- Since hybrids and electric vehicles usually contain high-voltage batteries, if high-voltage components and vehicles are handled incorrectly, there is a risk of electric shock, leakage, or similar incidents. Be sure to follow the correct working procedures when performing inspections and maintenance.
- A person using a medical device such as a pacemaker may not operate the vehicle because the drive motor carries high pressure and strong magnetic, which may affect the function of the medical device.
- As the drive motor carries high pressure and strong magnetic, check and repair do not use magnetic things (such as bank cards, etc.), these items carried in the body to do maintenance may also be damaged.

- Be sure to remove the high pressure service switch before performing high voltage system harness and component inspection or repair. Ensure that the maintenance switch is removed in your bag or carried on the body, so as not to repair the work of other people inadvertently put the maintenance switch plug.
- Before starting to operate the high pressure system, wear insulation protection equipment, including insulated gloves, insulated shoes and face shields.
- Overhaul personnel has responsibilities to ensure that other people will not contact the car. When the repair work is suspended, please cover the high-pressure portion with insulating material to prevent other people from contacting.

Attention:

When the maintenance switch is removed, switching the vehicle to the READY state may cause malfunction. So do not change the vehicle to READY state unless instructed to do so in the service manual.

Demolition

Warning

- It is necessary to release the reducer gear oil before removing the power train. Refer to the reducer assembly.

Disassembly mode Refer to the following mounting section to install the reverse step to disassemble.

Installation

Warning

- It is necessary to install the high pressure wire bundle belt normally. If the bundle belt is damaged, replacement before installing new.
- Before installing the drive motor and reducer assembly, apply grease lubrication to drive the motor shaft spline while injecting grease (minimum 8.5 g (0.3 ounce), up to 20 g (0.7 ounce) to the reducer input shaft Spline).
- Do not damage and drop O-ring when installing drive motor and gear unit assembly. In addition, the seal is a consumable part, each need to be replaced from the new assembly

before the new ring.

- If the drive motor is replaced, a high voltage warning mark is affixed at the A position, refer to the "High Voltage Warning Mark".

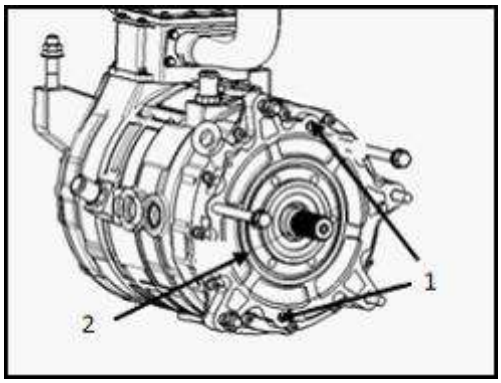
1. Verify the following before assembling

1) The drive motor should be connected with three-phase line, rotary transformer wire, and equipped with connectors, and wiring harness and connectors are not damaged; drive motor three-phase line and rotary transformer insulation to meet the DC1000V insulation resistance ≥ 20MΩ.

2) drive the motor housing face clean no debris, no obvious processing defects.

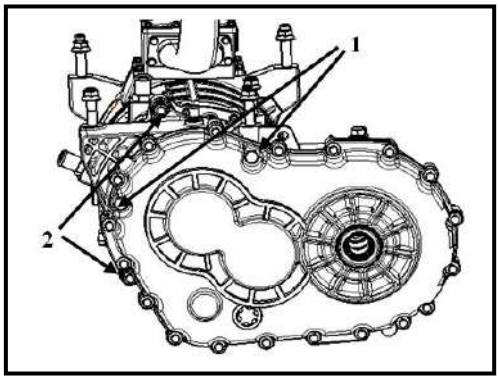
2. Assemble the drive motor and gear unit assembly

1）Install the sealing ring into the sealing ring of the drive motor, the reducer locating pin is aligned with the locating pin hole on the driving motor, the alignment position assembly and the reducer assembly are connected with the driving motor through spline.

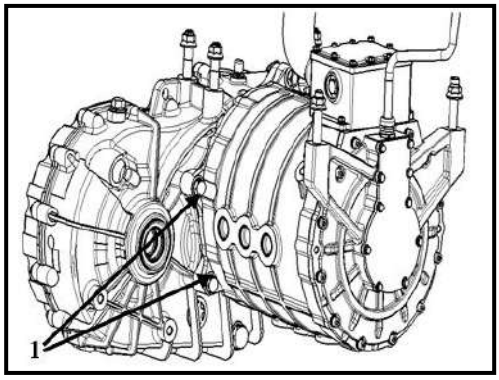


1. Locate pin hole 2. Seal ring

2）(Bolt Q15010105, spring pad Q40110, flat pad Q40110 combination) 1, bolt assembly 2 (bolt Q15010105, spring pad Q40310, flat pad Q40110 combination), the bolt assembly 1, bolts (Q1841050) plus nut (Q33010) combination of two and bolts (Q1841050) 2 will drive motor and reducer connection fastening, tightening torque ■ 45 ~ 50Nm, as shown below



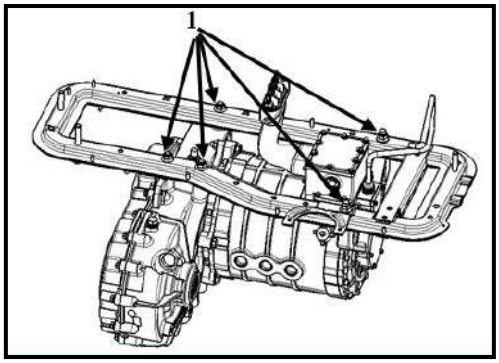
2. Bolt Q15010105, spring pad Q40310, flat pad Q40110



1. Bolt Q1841050, nut Q33010

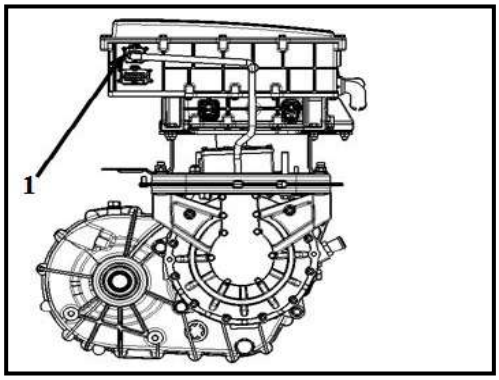
3. Assemble the drive motor and gear unit assembly

1) Assemble the 5 holes on the power assembly joists to the 5 stud alignment positions of the drive motor and gear unit assembly, and install the five hexagonal flange lock nuts (Q33012) and tighten and tighten Torque ■ 85 ~ 90Nm.



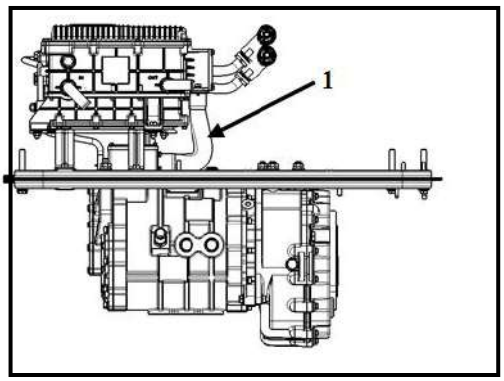
1.Nut Q33012

3.The controller is plugged into the rotary transformer connector.



1. Rotary transformer wire connector

The controller terminal box connects the three-phase line.



1. Detection of high voltage three-phase line

6. Power train installed on the vehicle after the need to add fuel to the reducer, refueling requirements see reducer assembly.

Detection after installation

- Check whether the bolts are connected reliably, whether they are missing bolts or bolts are not tightened as required.
- After installing the drive motor, measure the resistance between the drive motor and the body, check whether it is equipotential.

  Requirements: Motor housing resistance to ground ≤ 0.1Ω

  If the results deviate from the standard values, check for paint, oil, dust, or other substances attached to bolts or conductive parts. If any of these substances are attached, clean the surrounding area and remove impurities.

Controller Area Network CAN

Safety Precaution

Introduction

Please abide by the following precaution measures, to ensure carrying out maintenance service safely and correctly.

Precaution for engineer using medical electronics

Forbidden operation

Warning

- **The vehicle has strong magnetic parts.**
- **If an engineer uses medical electronic device, such as electronic pacemaker, it is forbidden for him to operate on the vehicle. Otherwise, the function of the electronic device may be affected by the strong magnetic parts.**

Precaution for normal charge

Warning

- **If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, the device can be only be used after its function being checked and confirmed before starting normal operations.**
- **During normal charge operation, the medical electronic device may be affected by electromagnetic wave. An engineer who uses medical electronic devices including heart pacemaker, cardioverter, defibrillator cannot enter passenger compartment (including trunk).**

Precaution for communication device operation

- **If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, please keep enough distance with communication device.**
- **The function of medical electronic devices including heart pacemaker, cardioverter, defibrillator may be affected by the electromagnetic wave of remote intelligent terminal.**
- **If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, the electromagnetic wave of remote intelligent terminal may affect its function. It is mandatory to request the medical electronic device manufacturer to check and confirm the possible effect on medical electronic device when using remote intelligent terminal.**

High-voltage preventive measure

Warning

- **The electric vehicle has a high-voltage battery. If the operation on the vehicle and high-voltage parts is incorrect, there are risks of leakage of electricity, electric shock, or similar accidents. Thus, it is mandatory to follow correct procedures to check and maintain.**
- **Before disconnect repair switch, please put the key on "LOCK" position or unplug the key.**
- **Disconnect repair switch before checking or maintaining high-voltage system. It is forbidden to close repair switch during the process of checking and maintenance. Before starting the operation on high-voltage system, be sure to wear insulated protection equipment, including gloves, shoes, and glasses.**
- **When a technician is operating high-voltage system, please ensure no one touching the vehicle. When there is no maintenance operation, please take insulated protection on the high-voltage sections to prevent anyone touching.**

- **When repair switch disconnects, it is forbidden that the key is at "ON" position or switched to "START" position.**

High-voltage cable and safety sign

The color of high-voltage cable is orange and there are safety signs on the power battery assembly and other high-voltage parts. Do not touch these cables and parts.

Handling of high-voltage cable terminal

When the connector of high-voltage cable is plugged out, please use insulated adhesive tape to bind up immediately.

Regulation for a person wearing medical electronic device

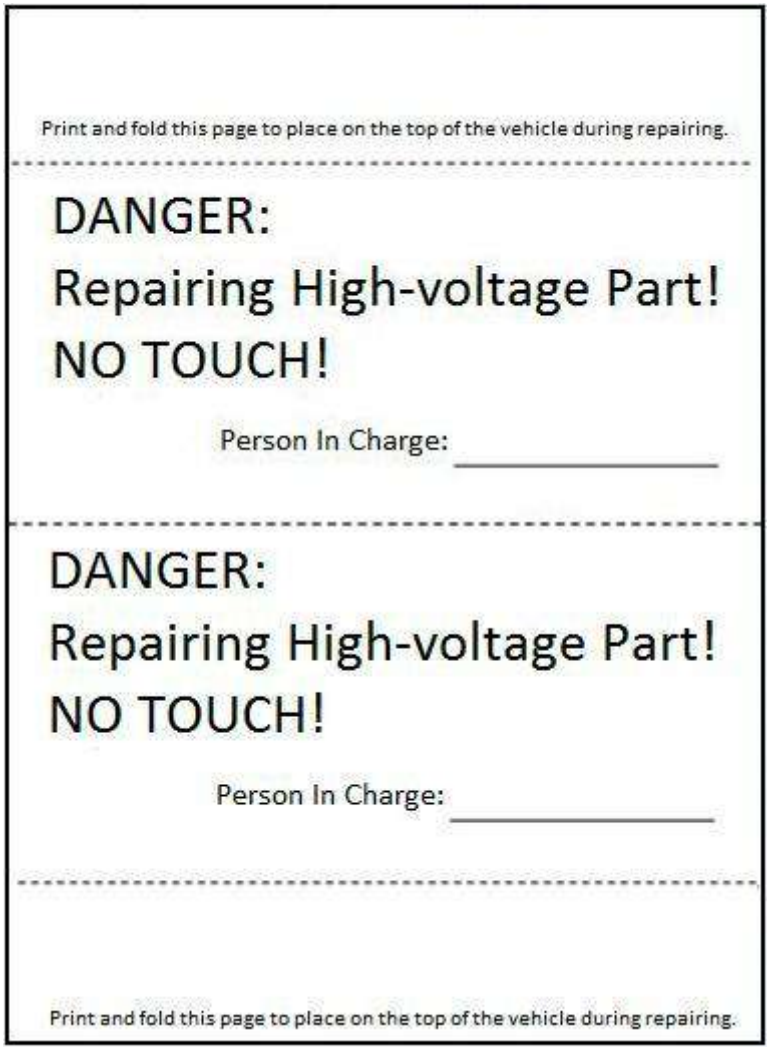
The vehicle has strong magnetic parts. If an engineer uses medical electronic device, such as electronic pacemaker, its function may be affected by strong magnetic parts. Thus, these people cannot carry out repair work.

Forbidden accompanying article during work

The vehicle has strong magnetic parts. Thus, during work it is forbidden to take metal articles which may cause short circuit or magnetic articles such us various bank cards which may be damaged.

Place “Repairing High-voltage Parts, No Touch!” warning sign

Before repairing high-voltage parts, please place “Repairing High-voltage Parts, No Touch” warning sign on the prominent position of the repaired vehicle to remind other people.



Attention

If the part has high-voltage sign, please paste a new sign in the same position and direction when replacing high-voltage part or the sign is damaged.

Precaution for supplemental restraint system "airbag" and "safety belt pretension"

Supplemental restraint system “airbag” and “safety belt pretension” is used together with front seat safety belts, which can reduce the damage to the driver and front passenger during collision. Supplemental restraint system consists of safety belt, driver airbag, and front passenger airbag. The detailed information of supplemental restraint system is included in the chapters of airbag system and seat safety belt.

Warning

In order to avoid accidents, please abide by the following content:

- **To avoid the failure of supplemental restraint system and considering that the risk of physical injuries will increase during collision if the system fails, all the service must be executed by DR authorized dealer.**
- **Non-normative maintenance of supplemental restraint system including non-normative removal and installation may result in accidental trigger of the system and cause physical injuries. Regarding the method of removing airbag module, please refer to Airbag System chapter.**
- **Except for the operations in the service manual, please do not use electrical test device to test any circuit of supplemental restraint system. The color of harness and connector of supplemental restraint system is yellow or orange.**

Precaution for using power tool (pneumatic or electric) and hammer

- When power switch is at “ON” position and approach airbag diagnosis sensor or other sensors of airbag system, please do not use power tools or hammer on the sensor part area. Violent vibration may trigger these sensors and airbag to cause serious injuries.
- When using power tools or hammer, put the key at “LOCK” position, unplug the negative pole of 12V lead-acid battery, wait at least one minute, and then start maintenance.

Precaution for removing 12V battery

Before removing 12V battery, turn the key to “ON” position, and then turn to “LOCK” position.

Reminder

- Though the key is at “LOCK” position, auto-recharge function of 12V battery may activate.
- After the key turns from “ON” to “LOCK”, auto-recharge function of 12V battery will not activate.

Precaution for malfunction diagnosis

Attention

- Do not impose 7V or higher voltage on the measuring terminal.
- When using measuring device, the voltage of its terminal should be 7V or lower.
- Before checking circuit, be sure to turn the key to “LOCK” position, and disconnect the negative pole of 12V battery.

Precaution for harness maintenance

- Weld the damaged section, and use tape to bind.

Reminder

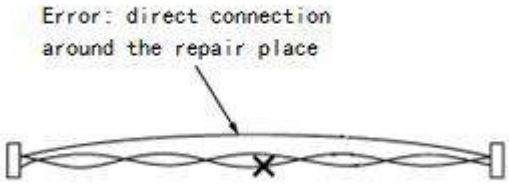
- The worn length of twisted-pair cable should be less than 110mm.

Correct: welding and wrapping with tape

- Do not circle the damaged part to connect a sub-line.

Reminder

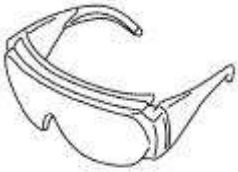
- Circling the damaged part to connect may result in the communication malfunction of CAN.



- If shield line of CAN communication line has malfunction, please replace the harness.

Preparation work

Common maintenance tool

Tool name		Description
Insulated glove (defend against 1000V/300A)		Remove and install high-voltage parts
Leather glove (use leather glove to tighten hands)		1. Remove and install high-voltage parts 2. Protect insulated glove
Insulated shoe		Remove and install high-voltage parts
Protective glass (ANSI Z87.1)		1. Remove and install high-voltage parts 2. Protect eyes from splashing blaze during checking wire
Insulated cap		Remove and install high-voltage parts
Insulated tester (multimeter)		Measure voltage and insulated resistance

Basic Principle of Controller Area Network CAN

CAN communication system

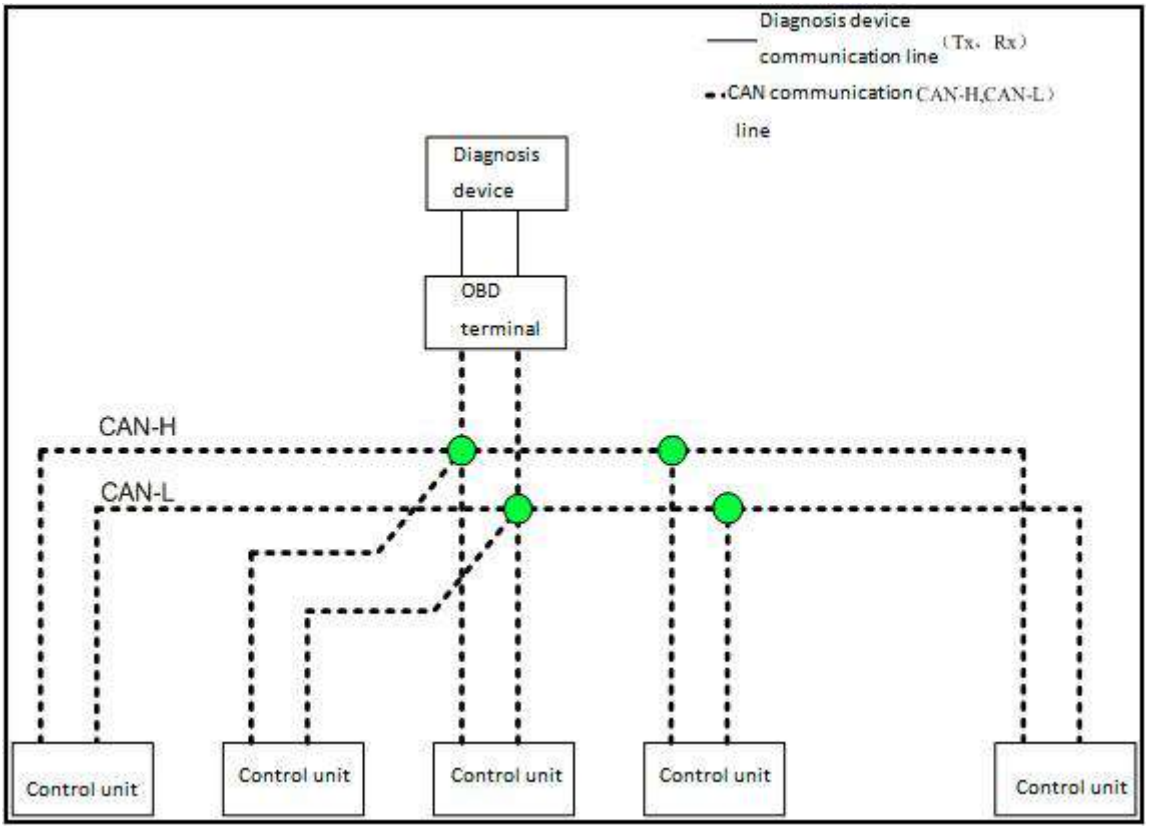
CAN communication system description

CAN (Controller Area Network) is real-time serial communication channel, and vehicle multiple-line communication channel with high communication efficiency and high fault-tolerant ability. A vehicle has many controllers which share information mutually. Each controller consists of two communication lines (CAN-H line and CAN-L line). Each controller can send or receive data, but only receive the needed data selectively.

CAN communication diagnosis

CAN communication diagnosis description

System schematic diagram



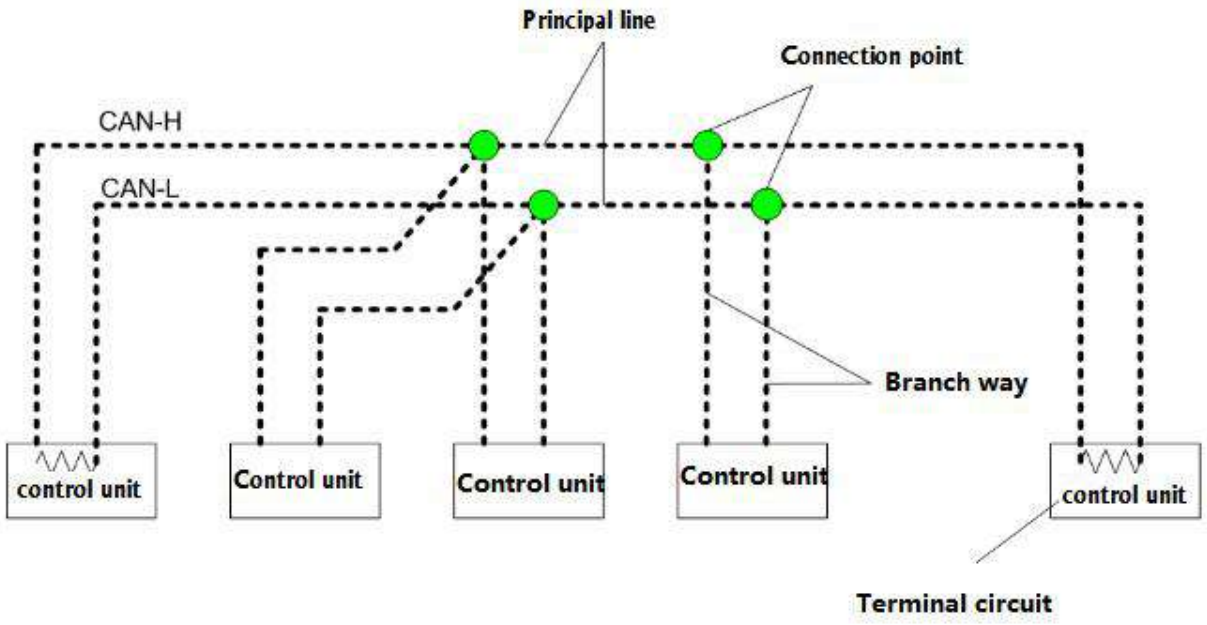
Name	Harness	Description
CAN diagnosis CAN	CAN-H CAN-L	Communicate with diagnosis device. (CAN-H and CAN-L are used for control and diagnosis.)

Description

CAN diagnosis is a method of using CAN communication line which connects diagnosis tool and controller to diagnose.

CAN malfunction diagnosis CAN

Part description



Formation	Description
Main line	A communication line connecting points
Sub-line	A communication line connecting point and controller
Connection point	A point between sub-line and main line
Terminal return circuit	Return circuit (resistance) throughout CAN communication system

Malfunction of CAN communication system CAN

- CAN line open circuit (CAN-H, CAN-L, or two lines disconnect at the same time)
- CAN line short circuit (short circuit to ground, two communication lines short circuit, or short circuit with other harness)
- Malfunction of connection point's control circuit connecting with CAN communication line.

Phenomenon when CAN communication system has malfunction

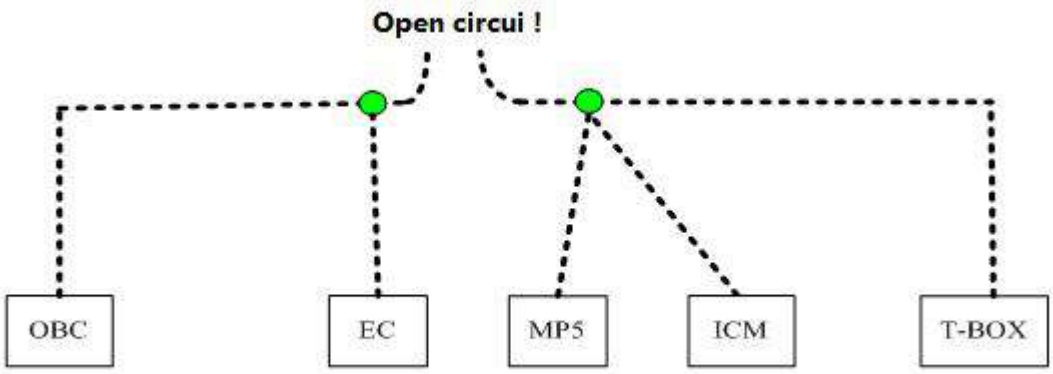
In CAN communication system, many controllers send and receive signals mutually. When CAN communication line has malfunction, the connecting controller cannot send or receive signals. In such circumstance, the controller will have malfunction or enters failure safety mode.

Malfunction example

Reminder

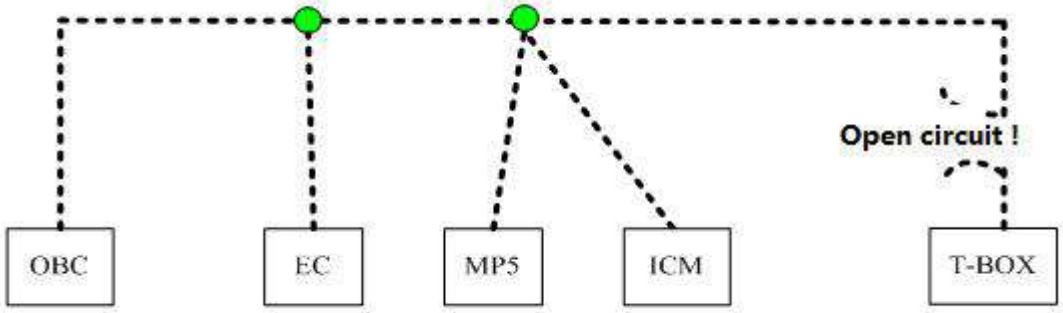
- In different malfunctions of CAN communication lines, the failure modes of vehicle's controller will be different.

Example: Main line between VCU and AC opens circuit.



Controller name	Main phenomenon
OBC	Unable to charge.
EC	Press down A/C switch, A/C does not work.
MP5	● Unable to show energy flow. ● Unable to show gear position. ● Unable to show in interior temperature.
ICM	● Power battery coulombmeter, thermometer, health meter does not show. ● System malfunction lamp is ON. ● READY lamp is not working.
T-BOX	The functions of remote air conditioner, remote charging, remote inquiry fail.

Example: T-BOX sub-line opens circuit



Controller name	Main phenomenon
OBC	Remote charging fails.
EC	Press down A/C switch, A/C does not work.
MP5	No abnormal phenomenon.
ICM	System malfunction lamp is ON.
T-BOX	The functions of remote air conditioner, remote charging, remote inquiry fail.

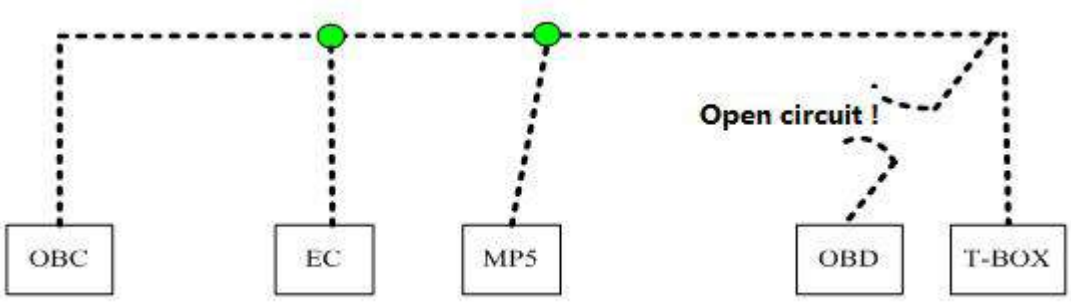
Reminder

The following malfunctions cannot be diagnosed by CAN communication diagnosis method. Please

diagnose the following malfunctions according to malfunction phenomenon.

Malfunction	Malfunction phenomenon
OBD sub-line opens circuit.	No abnormal phenomenon.
CAN-H and CAN-L line short circuit.	Controllers connecting with CAN communication system enter failure safety mode or fail.

Example: OBD sub-line opens circuit.

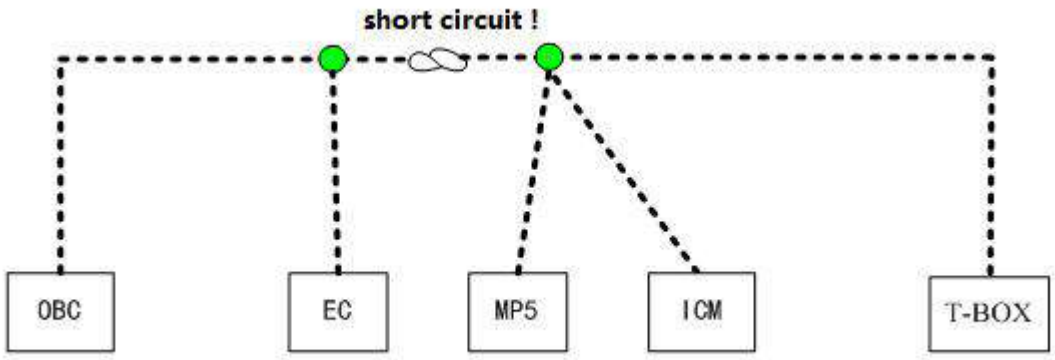


Controller name	Main phenomenon
OBC	No abnormal phenomenon.
EC	
MP5	
T-BOX	

Reminder

When OBD sub-line opens circuit, the sending and receiving of CAN communication signals will not be affected. Thus, there is no abnormal phenomenon, but please repair the circuit.

Example: CAN-H, CAN-L line short circuit.



Controller name	Main phenomenon
OBC	Unable to charge.
EC	Press down A/C switch, A/C does not work.
MP5	● Unable to show energy flow.

	● Unable to show gear position. ● Unable to show in interior temperature.
ICM	● Power battery coulombmeter, thermometer, health meter does not show. ● System malfunction lamp is ON. ● READY lamp is not working.
T-BOX	The functions of remote air conditioner, remote charging, remote inquiry fail.

CAN diagnosis of using diagnosis service tool

Rear the basic reason in light of following information when using diagnosis service tool for CAN diagnosis.

- System response
- Controller diagnosis information
- Self-diagnosis

Self-diagnosis

When communication signal cannot be sent or received through CAN communication line, the relevant DTC of CAN communication will be shown on the screen of diagnosis service tool.

Reminder

The following chart describes CAN related DTC.

DTC	Self-diagnosis item (shown on diagnosis service tool)	DTC judgment condition	Check
P300C	Battery controller message lost	When VCU cannot receive battery controller CAN signal for 5 seconds or more.	Check battery controller
P300D	Battery controller message lost		
P300E	Battery controller message lost		
P300F	Electric motor controller message lost	When VCU cannot receive electric motor controller CAN signal for 5 seconds or more.	Check electric motor controller

How to use CAN communication signal chart

CAN communication signal chart shows the sent and received signals between controllers. This chart is very useful to find the basic reason of malfunction phenomenon related with signal, which can be checked through sent unit and received unit.

For example, the electricity value is not displayed,

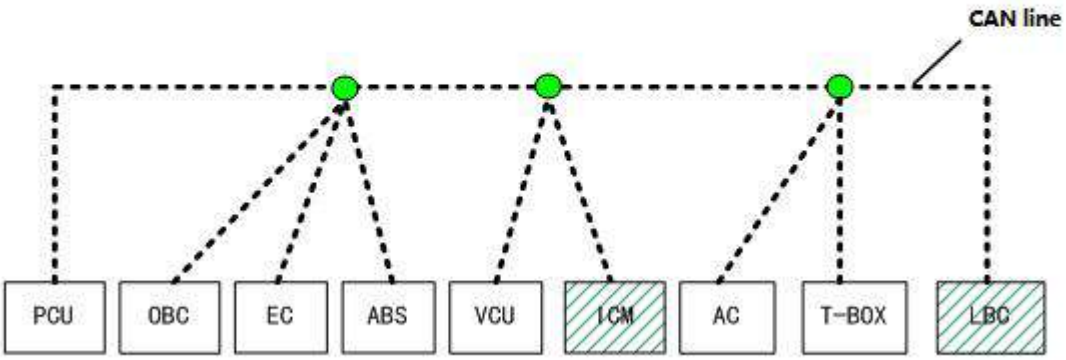
but there is no warning light to light up.

T: sends R: reception

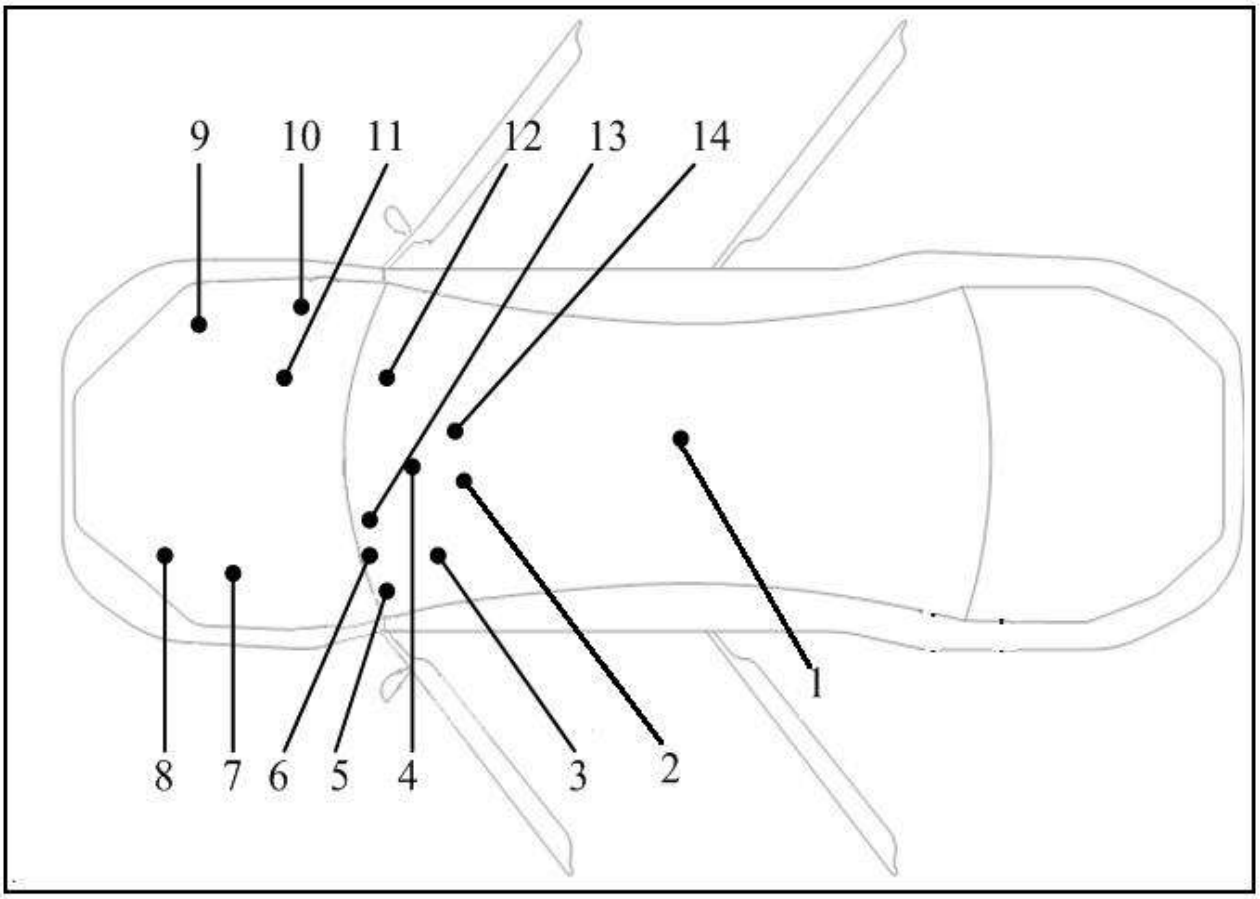
Signal name	Vehicle CAN system								
	T-BOX	PCU	LBC	CHR	ICM	AC	EC	ABS	MP5
Key state			R						
Recharge wake-up signal state			R						
Battery voltage value	R		T		R				
Battery current value	R		T		R				
Battery level			T		R				
Positive pole main contactor position			T						
Negative main contactor position			T						
Pre charging angle contact position			T						
DCDC angle contact position			T						

Communication interruption between LBC and ICM

The check list shows that the fault occurs between LBC and ICM (shadow area)



System Introduction
Components

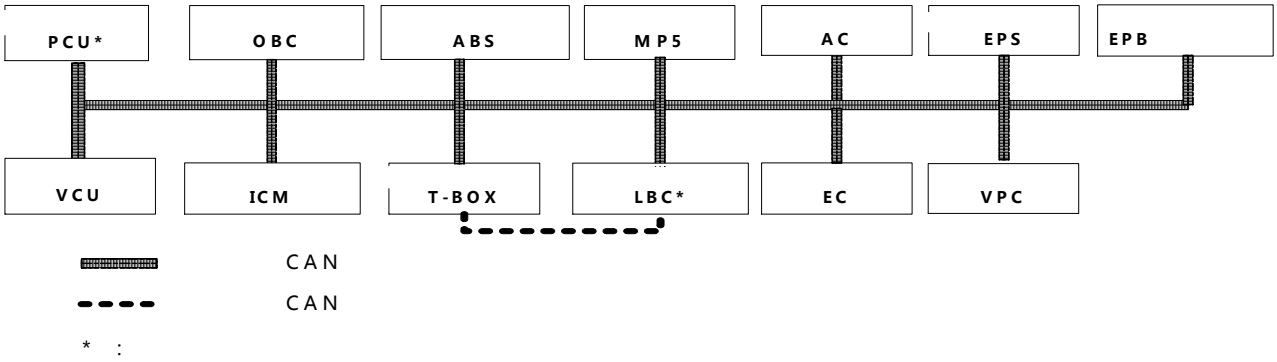


1.Battery management system
2. TBOX (remote intelligent terminal)TBOX
3.Whole vehicle controller
4.MP5
5.Diagnosis terminal
6.Electronic instrument
7. ABS controller
8.On-board charger
9.Electric motor controller
10.Compressor controller
11. Vacuum pump controller
12.Air conditioner panel controller
13. EPS controller
14. BCM

Controller Area Network CAN

CAN communication system description

CAN communication system chart

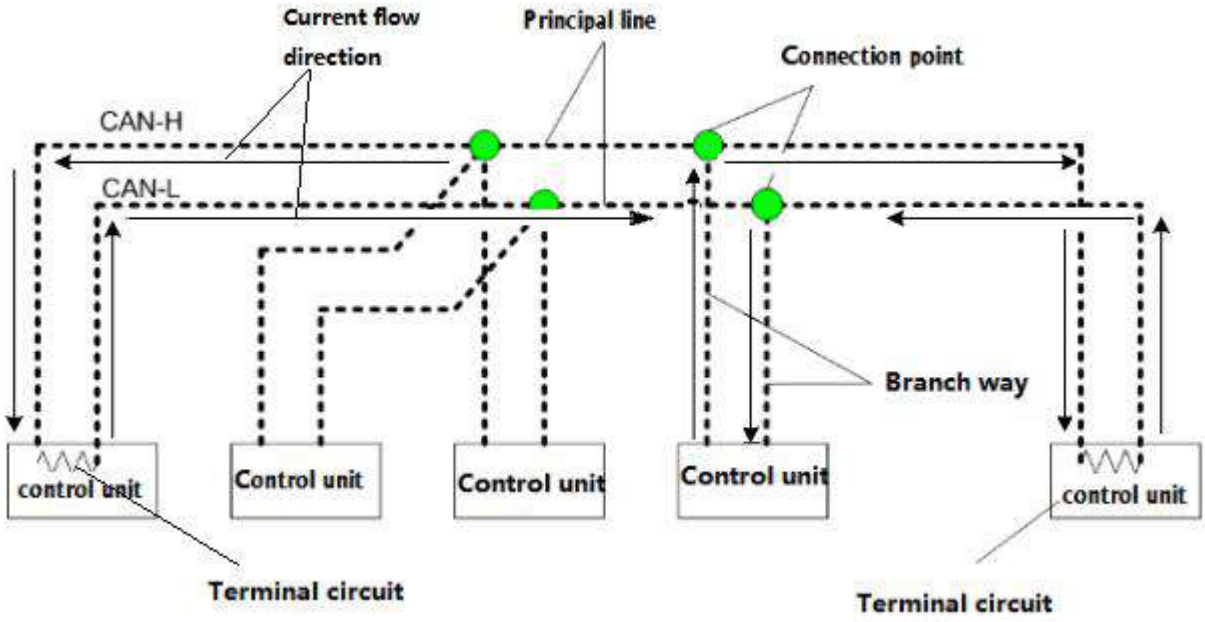


Introduction

- CAN (Controller Area Network) is real-time serial communication channel, and vehicle multiple-line communication channel with high communication efficiency and high fault-tolerant ability. A vehicle has many controllers which share information mutually. Each controller consists of two communication lines (CAN-H line and CAN-L line). Each controller can send or receive data, but only receive the needed data selectively.
- This vehicle has two controller area networks. One is whole vehicle CAN, and the other is internal CAN.

CAN communication signal overview CAN

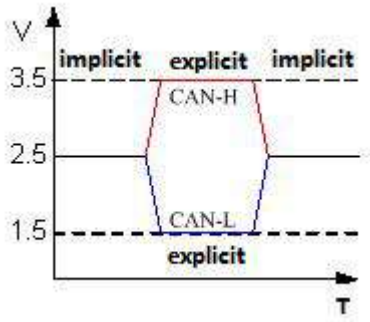
- CAN communication system consists of two terminal resistances to form a return circuit. When sending CAN signal, the current moves to CAN-H line through controller sending terminal, then moves to CAN-L line through terminal resistance, and then return to controller receiving terminal.



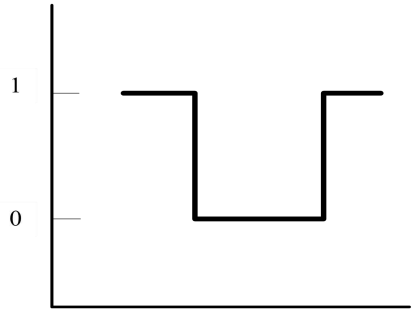
- The current moves respectively through CAN-H and CAN-L, and produces voltage decrease when going through terminal resistance, and forms electric potential difference between CAN-H and CAN-L.

Reminder

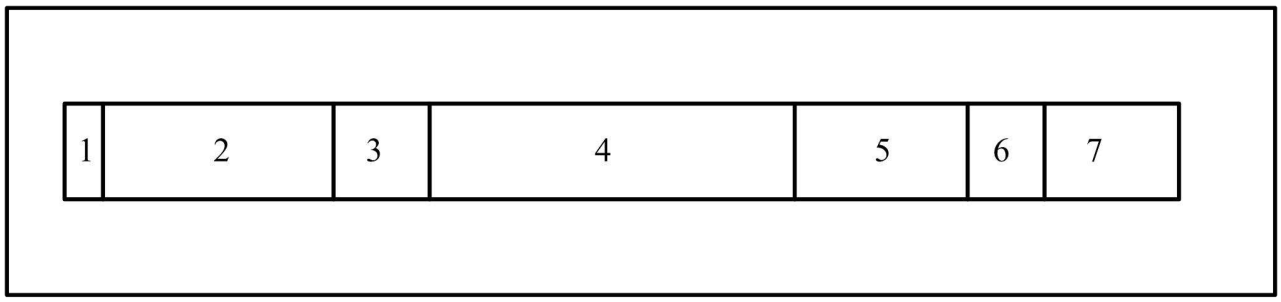
- signal with no current going through is called “recessiveness”, and A signal with current going through is called “dominance”.



The system generates digital signal through the produced electric potential difference.



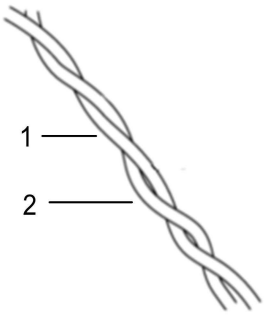
Composition of CAN communication signal (message)



SN	Section name	Description
1	Start-of-frame (1 bit)	The start of frame transmission.
2	Arbitration field (11 bit)	Determine the priority of message.
3	Control field (6 bit)	Represent the quantity of signals.
4	Data field (0-64 bit)	Show data.
5	CRC verification field (16 bit)	Used for CRC verification, to ensure signal being sent and received normally.
6	ACK response field (2 bit)	Receive completed field, and send to signal sending unit
7	End-of-frame (7 bit)	The end of frame transmission.

CAN communication harness

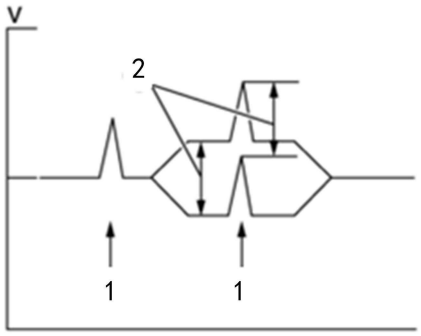
CAN communication harness is a twisted pair consisting of CAN-H (1) and CAN-L (2), and has excellent anti-interference capability.



Reminder

As the differential voltage between CAN-H and CAN-L when the system goes through is transferred into digital signal and the two lines are designed into twisted-pair structure, CAN communication system has anti-interference capability.

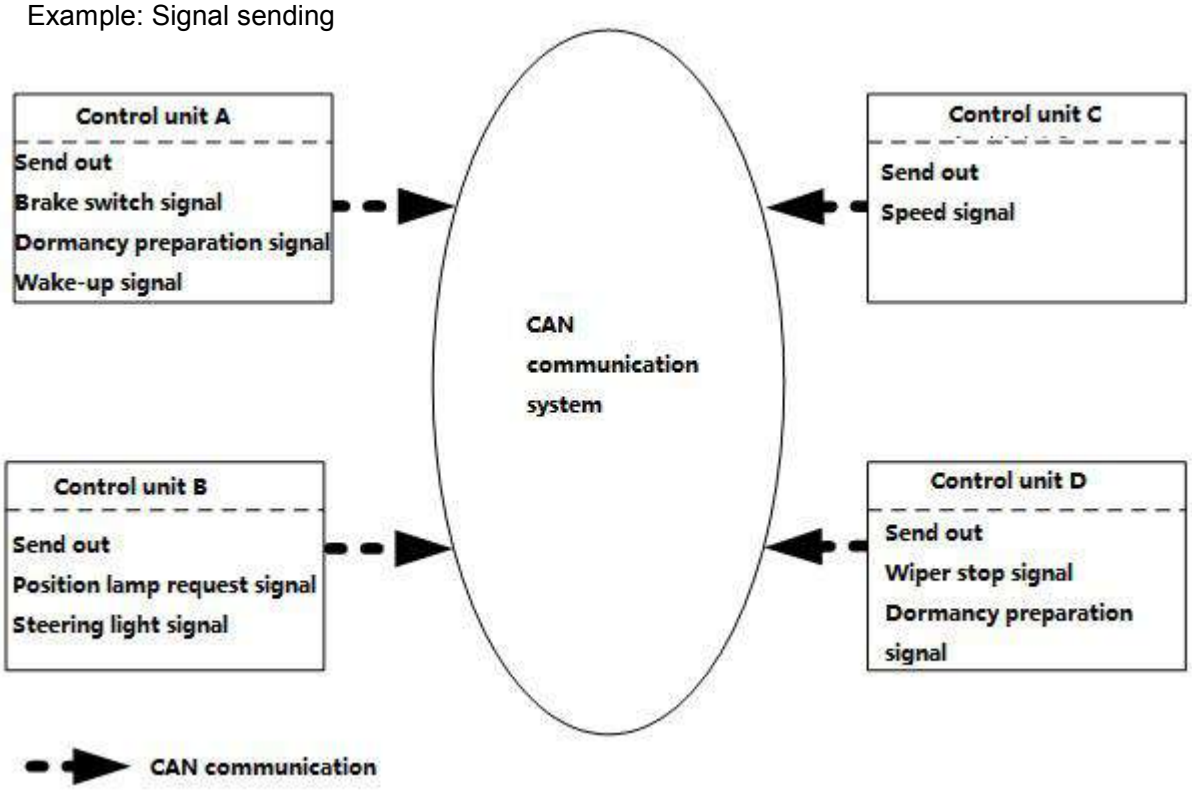
As CAN-H line and CAN-L line are twisted together, when interference (1) happens, voltage change occurs and at the same time voltage difference (2) also results in the same voltage change. Thus, the lines receive interference at the same time, to ensure differential voltage does not change.



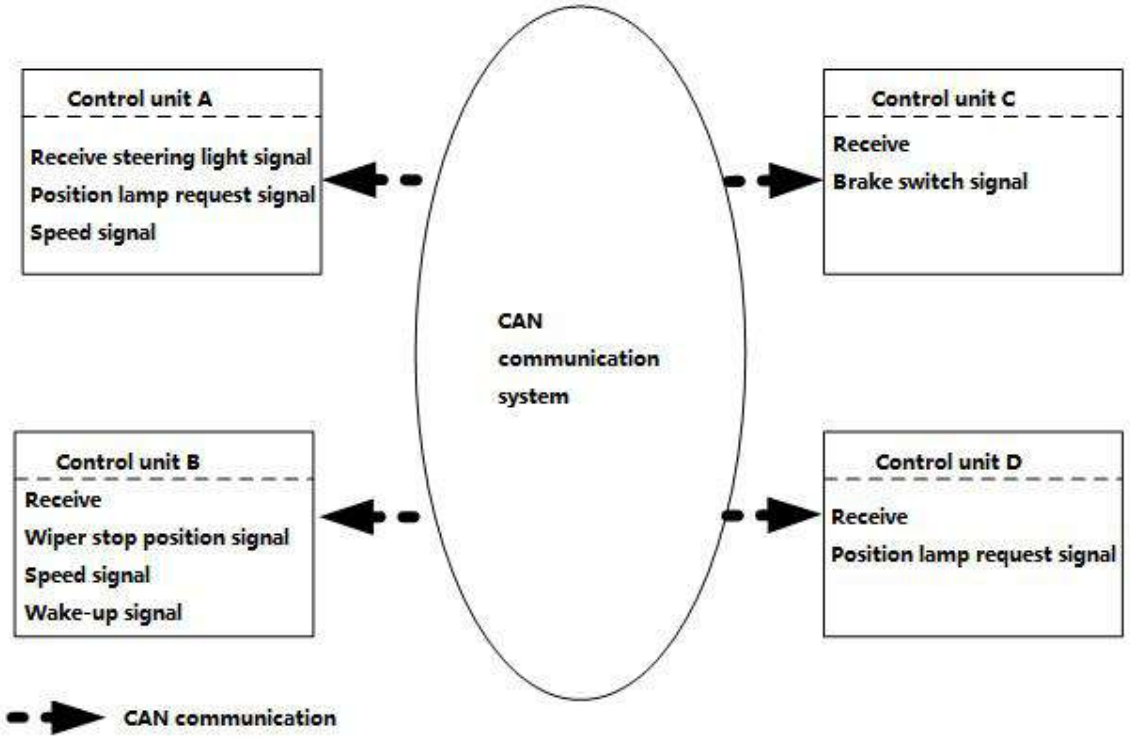
CAN communication signal

Each controller in CAN communication system sends signal through CAN communication control circuit, and receive the needed signal from other controller.

Example: Signal sending



- Example: signal receiving

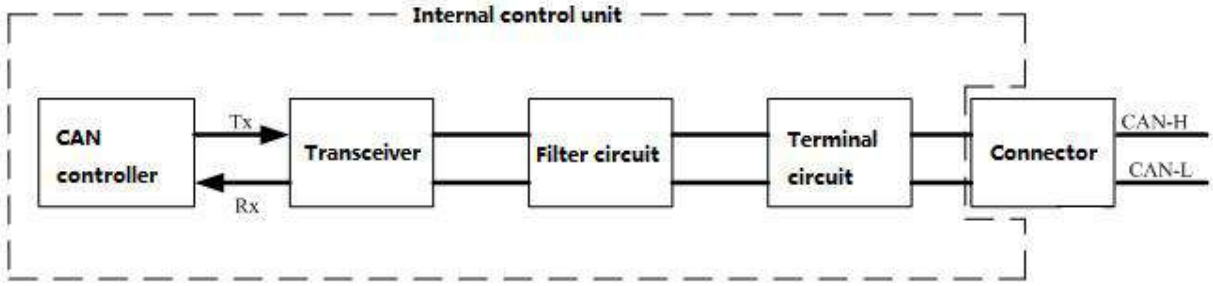


Reminder

The above signal names and signal communication are only for reference. For CAN communication signals of this vehicle, please refer to *CAN Communication Signal Chart*.

CAN communication control circuit

CAN communication control circuit is integrated into the controller and used for receiving and sending CAN communication signals.



Tx: sending

Rx: reception

Composition	Description
CAN controller	Control the sending and receiving of CAN communication signals and monitor malfunctions.
Transceiver	Conduct the transfer between digital signal and CAN communication signal.
Filter circuit	Eliminate the noise of CAN communication signal.
Terminal circuit (include terminal resistance 120Ω)	Generate electric potential difference between CAN-H and CAN-L.

*：Terminal circuit is only in the control points of two terminals of harness.

CAN communication system specification sheet

Describe the composition of CAN communication system points.

Reminder

Use CAN communication system specification sheet by referring to “Malfunction diagnosis procedure.”

Whole Vehicle CAN System	
VCU	×
PCU	×
LBC	×
OBC	×
ICM	×
T-BOX	×
AC	×
EC	×
ABS	×
MP5	×
EPS	×
BCM	×
VPC	×

CAN communication signal chart

Use this chart by referring to “How to use CAN communication signal chart”.

Reminder

Refer to “English abbreviation illustration chart”.。

T: Sent R: Received

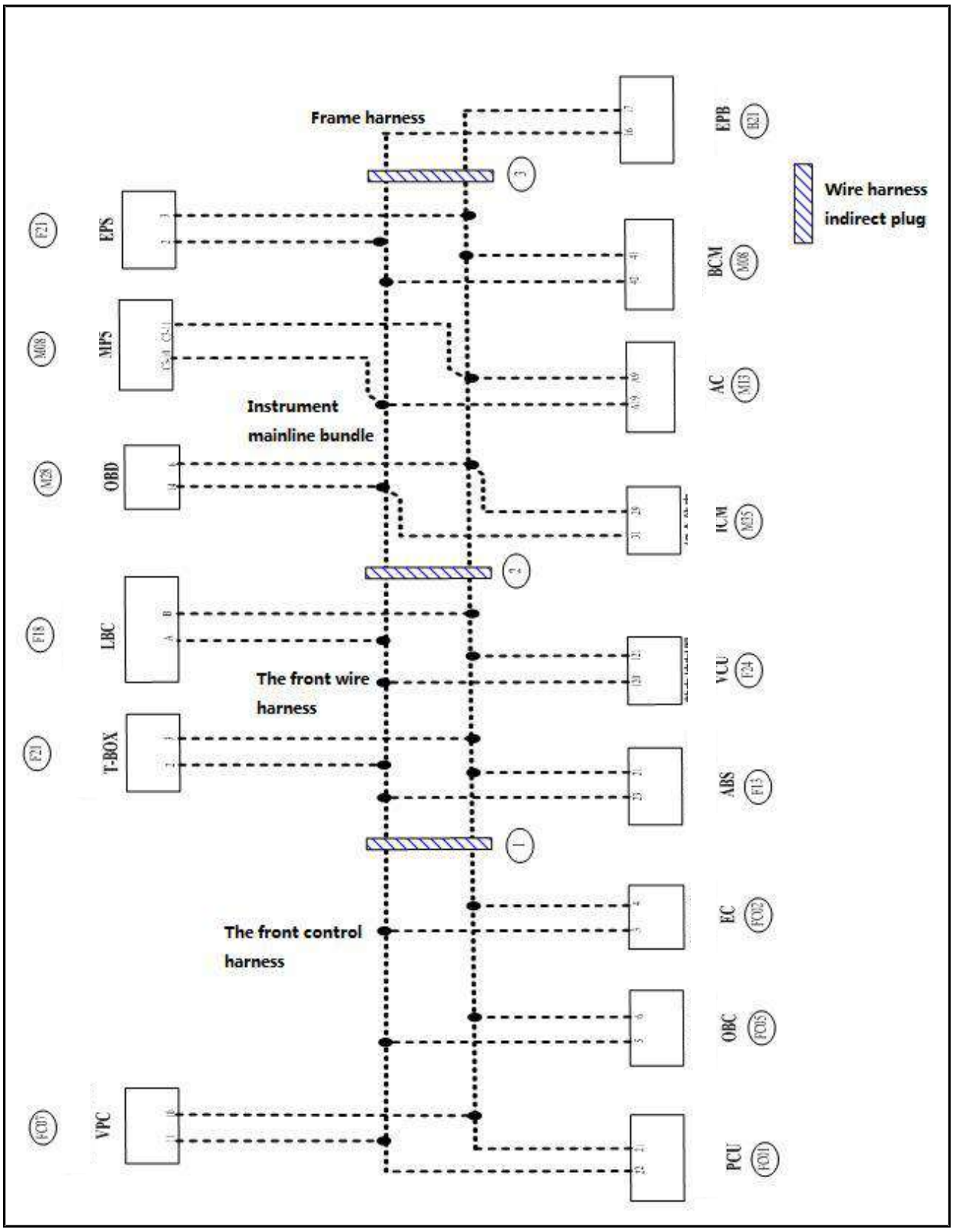
Signal Name	Whole Vehicle CAN System												
	T-BOX	PCU	LBC	OBC	ICM	AC	EC	BCM	VPC	EPS	ABS	MP5	VCU
			R										T
Main positive pole relay active signal			R										T
Main negative pole relay active signal			R										T
Charging wake-up signal			R										T
Power battery quantity of electricity signal			T										R
	R				R								T
Power battery set current value signal			T										R
	R				R								T
Power battery set current voltage signal			T										R
	R				R								T
Battery full status signal			T										R
Battery work mode signal			T										R
Stop charging signal				R									T
Charging current order signal				R									T
Charging status signal				T									R
High voltage terminal output current value signal				T									R
High voltage terminal output voltage value signal				T									R
Charger working temperature signal				T									R
Electric motor rotation speed order signal		R											T
Electric motor target torque signal		R											T
Electric motor temperature signal		R											T
Electric motor controller temperature signal		R											T
TM electric motor current status signal TM		T											R
Electric motor actual rotation speed signal		T											R
Reply electric motor rear torque signal		T											R
Click rotation speed signal		T			R								

Signal Name	Whole Vehicle CAN System												
	T-BOX	PCU	LBC	OBC	ICM	AC	EC	BCM	VPC	EPS	ABS	MP5	VCU
S signal			R		R							R	T
Electric motor malfunction indication lamp signal					R								T
High-voltage malfunction indication lamp signal					R								T
12V battery charging indication lamp signal					R								T
System malfunction indication lamp signal					R								T
Tortoise lamp signal					R								T
READY lamp signal READY					R								T
Charging status indication lamp signal					R								T
Power battery OFF lamp signal					R								T
Key position signal					R								T
Gear position signal					R								T
Diagnosis malfunction code signal					R								T
Buzz signal					R								T
Energy flow status signal					R								T
Charging start signal					R								T
Remaining mileage signal	R											R	T
Average energy consumption signal												R	T
Instant energy consumption signal												R	T
Air conditioner ON energy consumption signal												R	T
Energy recycle signal												R	T
Charging mode signal												R	T
Forbidden low temperature charging signal												R	T
Air conditioner working signal						R						T	
Target temperature set signal						R						T	
Air conditioner blowing rate set signal						R						T	
Air conditioner mode set signal						R						T	
Remote air conditioner request temperature signal	R					R						T	
Power battery maintenance reminder signal Maintenance reminder signal	R											T	
Air filter maintenance reminder signal	R											T	
Other maintenance reminder signal	R											T	

Electronic principle chart

CAN system

System harness chart



Between front compartment control harness and front compartment harness

Plug number	1
Plug name	Plug between lines

Terminal number	Line color	Signal name
33	G	CANLd CAN High
38	Y	CANHd CAN High

Between front compartment harness and dashboard main harness

Plug number	2
Plug name	Plug between lines

Terminal number	Line color	Signal name
1	G	CANLd CAN High
2	Y	CANHd CAN High

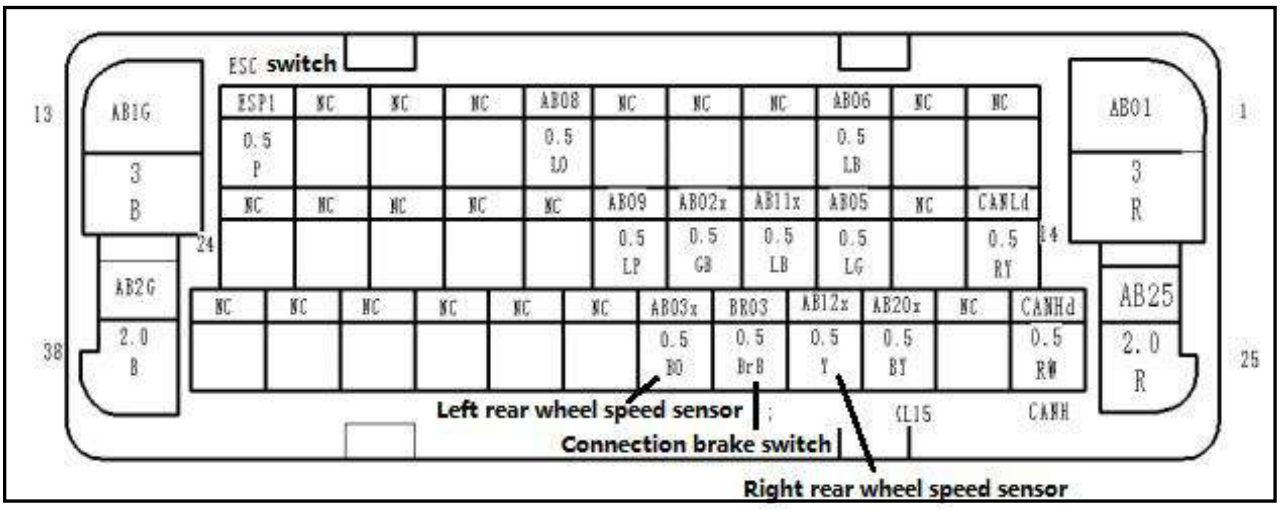
Between front compartment harness and dashboard main harness

Plug number	3
Plug name	Plug between lines

Terminal number	Line color	Signal name
10	G	CANLd CAN High
11	Y	CANHd CAN High

ABS controller

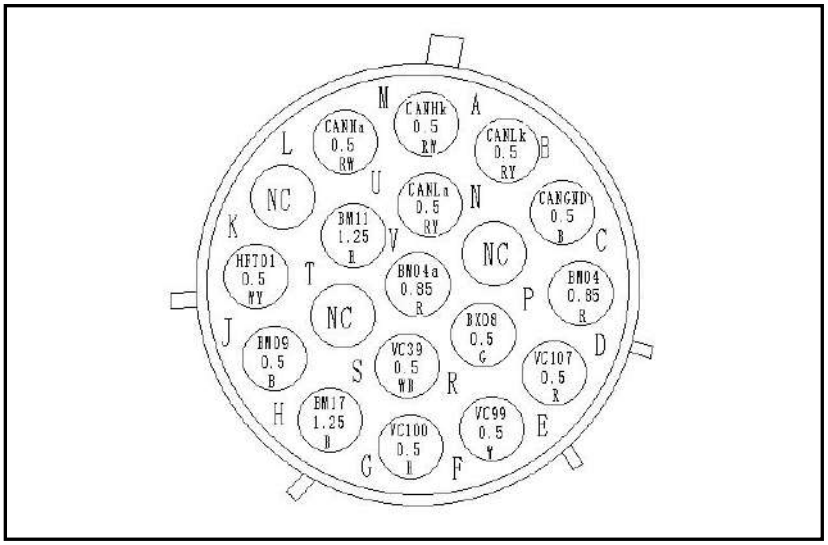
Plug number	F13
Plug name	ABS controller
Plug model	1-1379208-2



Terminal number	Line color	Signal name
1	R	AB01 ABS electric motor electric source positive
4	LB	AB06 Front right wheel speed sensor ground
8	LO	AB08 Front left wheel speed sensor ground
12	P	ESP1 ESC switch
13	B	AB1G ABS electric motor electric source ground
14	RY	CANLd CAN low
16	LG	AB05 Front right wheel speed sensor signal line
17	LB	AB11 Rear right wheel speed sensor signal line
18	GB	AB02x Rear left wheel speed sensor ground
19	LP	AB09 Front left wheel speed sensor signal line
25	R	AB25 Valve relay electric source
26	RW	CANHd CAN high
28	BY	AB20x Controller electric source (IG1)
29	Y	AB12x Rear right wheel speed sensor ground
30	BrB	BR03 Brake lamp switch input
31	BO	AB03x Rear left wheel speed sensor signal line
38	B	AB2G Controller ground line

LBC

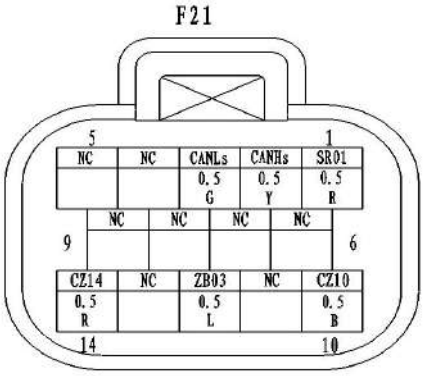
Plug number	F17
Plug name	LBC
Plug model	RT061619PNHEC03



Terminal number	Line color	Signal name
A	Y	CANHk CAN_H signal interaction
B	G	CANLk CAN_L signal interaction
C	B	CANGND CAN shield grounding
D	R	BM04 High level effectiveness
E	R	VC107 B+ relay control
F	W	VC99 B+ relay control
G	R	VC100 Precharge relay control
H	B	BM17 Fan battery
J	B	BM09 LBC battery
M	Y	CANHa Internal CAN High
N	G	CANLa Internal CAN low
R	G	BX08 High-voltage interlocking signal 1
S	WB	VC39 High-voltage interlocking signal 2
U	R	BM11 LBC fan battery
V	WY	BM04a LBC battery

T-BOX

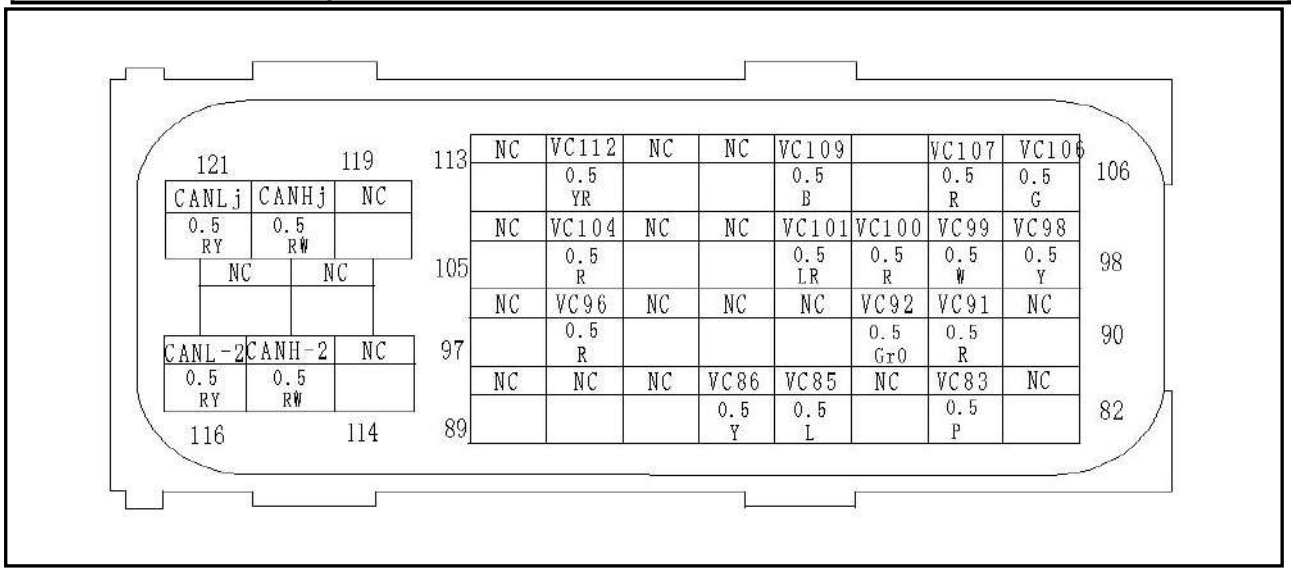
Plug number	F20
Plug name	Remote intelligent terminal
Plug model	776273-1



Terminal number	Line color	Signal name
1	R	SR01 T-BOX battery positive
2	Y	CANHs CAN_H signal interaction
3	G	CANLs CAN_L signal interaction
10	B	CZ10 T-BOX battery negative
12	L	ZB03 IG2
14	R	CZ14 Remote awakening signal

VCU plug 2 VCU

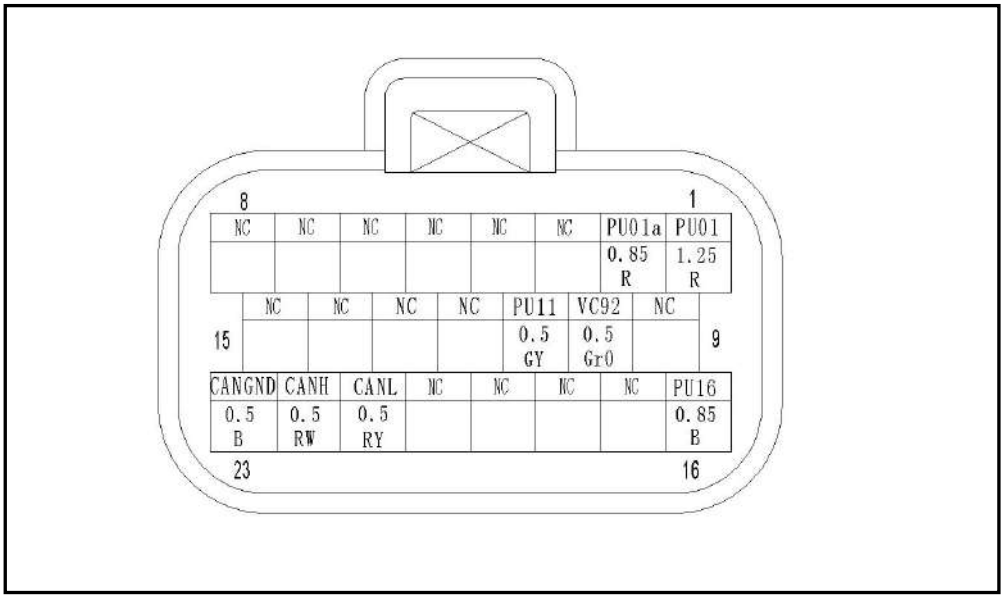
Plug number	F22
Plug name	VCU plug 2
Plug model	1473252-1



Terminal number	Line color	Signal name
83	P	VC83 Self-maintaining SSO control signal
85	L	VC85 Brake pedal sensor 2 ground
86	Y	VC86 Charging indication lamp 1 (yellow)
91	R	VC91 Fast-charging relay control signal
92	GrO	VC92 DCDC enabled
96	R	VC96 Brake pedal sensor 1 power supply
98	Y	VC98 Brake pedal sensor 2 power supply
99	W	VC99 General negative relay control (12V)
100	R	VC100 Precharge relay control (12V)
101	LR	VC101 AC relay control (0V)
104	R	VC104 Acceleration pedal sensor 2 power supply
106	G	VC106 Charging indication lamp 2 (green)
107	R	VC107 General positive relay control (12V)
109	B	VC109 Cooling pump control signal
112	RY	VC112 Acceleration pedal sensor 1 power supply
115	RW	CANH-2
116	RY	CANL-2
120	RW	CAMHj
121	RY	CAMLj

Electric motor controller

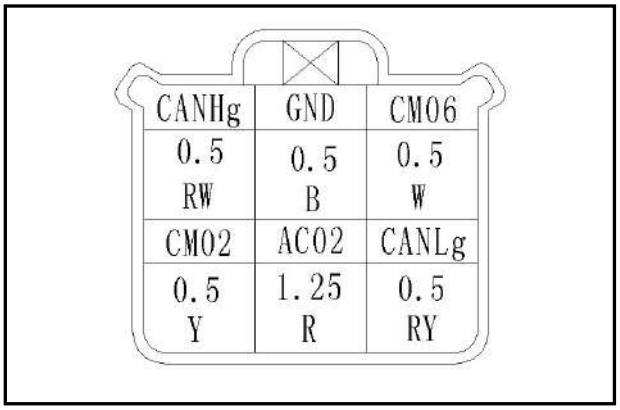
Plug number	FC01
Plug name	Electric motor controller
Plug model	770680-1



Terminal number	Line color	Signal name
1	R	PU01 Electric motor controller 12V battery positive
2	R	PU01a Electric motor controller 12V battery positive
10	PW	VC92 DCDC Possible
11	GY	PU11 DCDC Malfunction feedback
16	B	PU16 Electric motor controller 12V battery negative
21	G	CANL CAN_L Signal interaction
22	Y	CANH CAN_H Signal interaction
23	B	CANGND CAN Shielding ground

Compressor controller

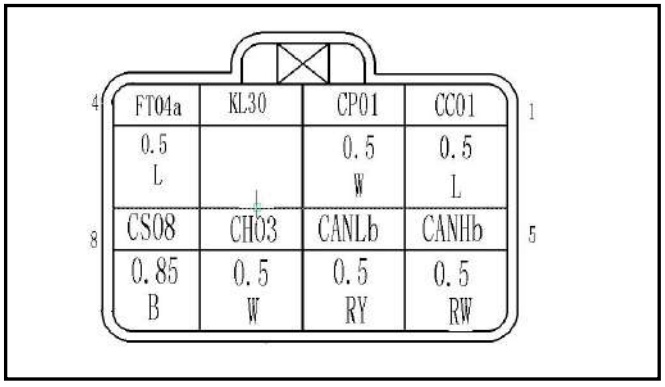
Plug number	FC02
Plug name	Compressor controller
Plug model	194180010



Terminal number	Line color	Signal name
1	W	CM06 Electromagnetic valve 1 Relay 12 Battery positive
2	B	CND 12V battery negative
3	RW	CANHg CAN_H Signal interaction
4	RY	CANLg CAN_L Signal interaction
5	R	AC02 compressor controller ON
6	Y	CM02 Electromagnetic valve 1 Relay 12 Battery positive

On-board charger

Plug number	FC05
Plug name	On-board charger
Plug model	PB625-08027

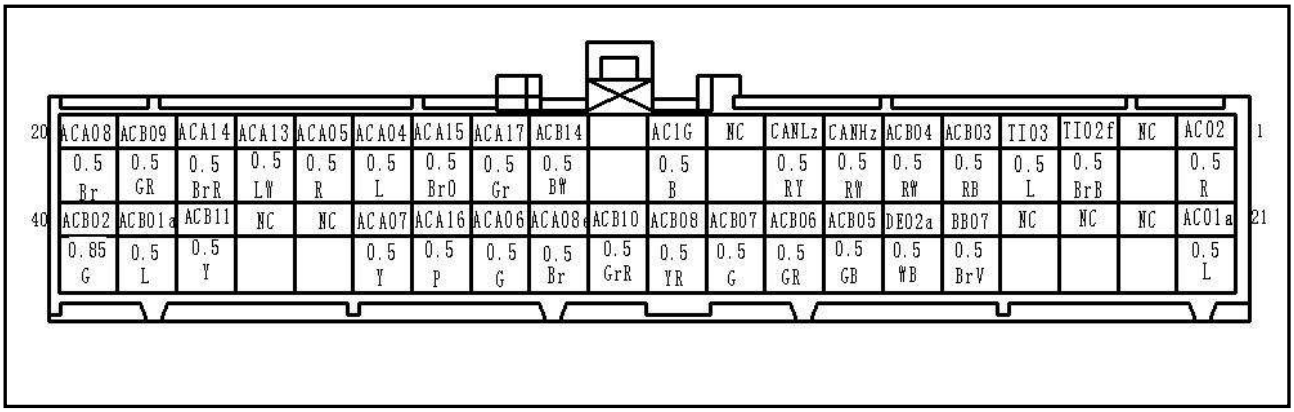


Terminal number	Line color	Signal name
1	L	CC01 Charging connection status confirmation
2	W	CP01 Charging power confirmation
3	BW	KL30 Charger electric source
4	L	FT04a Charging status output
5	RW	CANHb CAN_H signal interaction

6	RY	CANLb CAN_L signal interaction
7	W	CH03 Output 12V wake-up signal
8	B	CS08 12V battery negative

Air conditioner panel

Plug number	M13
Plug name	Air conditioner panel
Plug model	HS'G:172850-2

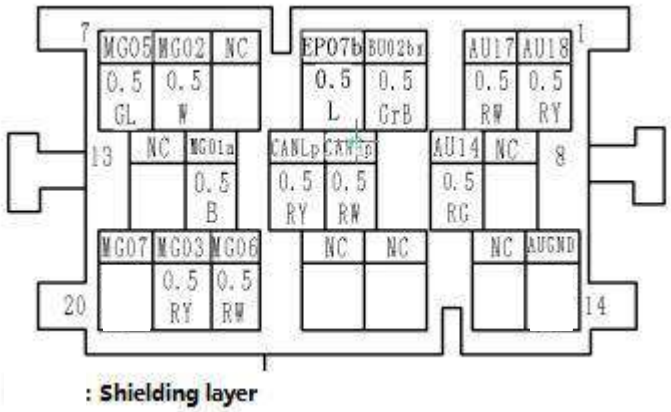


Terminal number	Line color	Signal name
1	R	AC02 IGN2
3	BrR	TIO2f Backlight positive pole
4	L	TI03 Backlight negative pole
5	RB	ACB03 PTC open first line
6	RW	ACB04 PTC open second line
7	RW	CANHz CAN high
8	RY	CANLz CAN low
10	B	AC1G Whole vehicle power ground wire
12	BW	ACB14 Ventilating fan-
13	Gr	ACA17 Temperature motor positive
14	BrO	ACA15 Temperature motor negative
15	L	ACA04 Mode electric motor positive
16	R	ACA05 Mode electric motor negative
17	LW	ACA13 New air return motor+
18	BrR	ACA14 New air return motor-
19	GR	ACB09 Evaporator temperature sensor+
20	Br	ACA08 Sensor and electric motor reference ground
21	L	AC01a BATT+

Terminal number	Line color	Signal name
25	BrV	BB07 Rear defrost request
26	WB	DE02a Rear defrost feedback
27	GB	ACB05 PTC temperature switch positive
28	GR	ACB06 PTC temperature switch negative
29	G	ACB07 PTC temperature sensor+
30	YR	ACB08 PTC temperature sensor-
31	GrR	ACB10 Outside temperature sensor+
32	Br	ACA08e 5V reference voltage
33	G	ACA06 Temperature motor position
34	P	ACA16 Mode motor position
35	Y	ACA07 GND
38	Y	ACB11 Interior temperature sensor+
39	L	ACB01a Blower start signal
40	G	ACB02 Air speed regulator (Stepless speed regulation)

MP5C3 interface

Plug number	M08
Plug name	MP5C3 interface
Plug model	HG'S:2005071-2

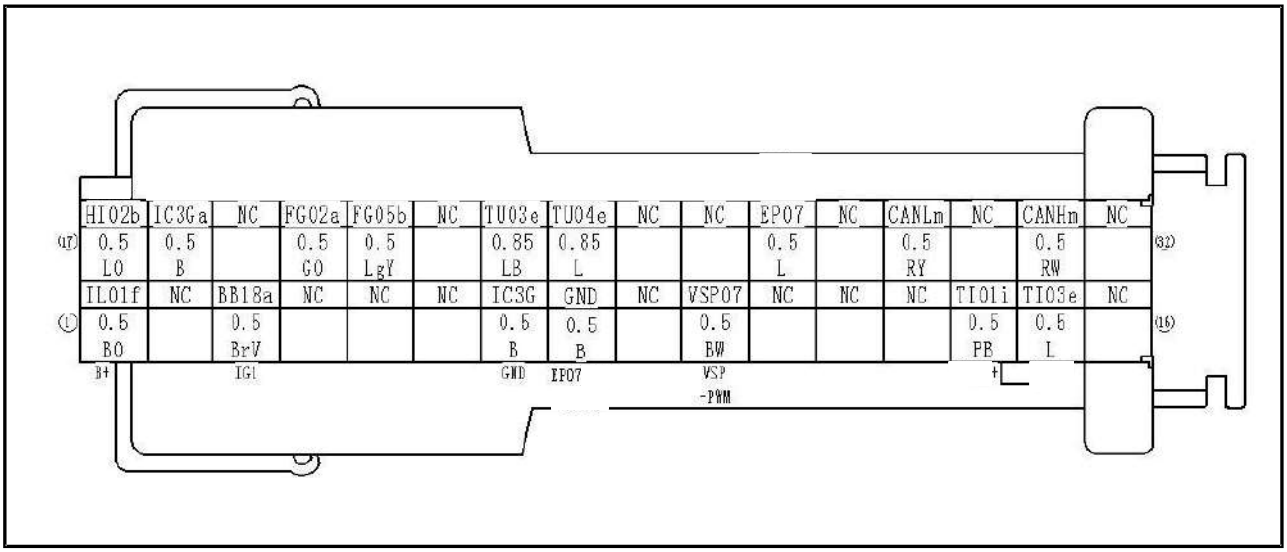


Terminal number	Line color	Signal name
1	RY	AU18 Reverse video ground
2	RW	AU17 Reverse video signal
3	GrB	BU02bx Reverse check signal
4	L	EP07b Vehicle speed signal
6	W	MG02 Microphone control
7	GL	MG05 Vehicle speed signal

9	RG	AU14 Line control ground-2 (left)
10	RW	CANHp CAN high
11	RY	CANLp CAN low
12	B	MG01a Microphone electric source ground
14	Shielding	AUGND
18	RW	MG06 MIC input
19	RY	MG03 MIC signal ground
20	Shielding	MG07 MIC shielding ground

Electrical instrument A interface

Plug number	M26
Plug name	Electrical instrument A interface
Plug model	HS'G:1719057-2（Blue）

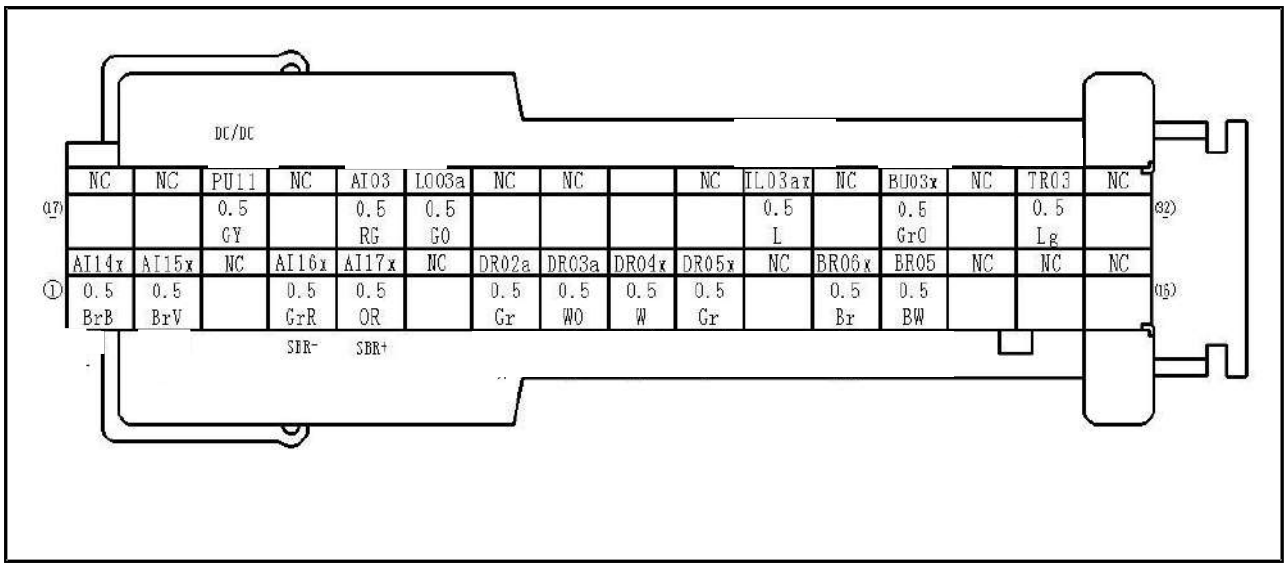


Terminal number	Line color	Signal name
1	BO	IL01 B+
3	BrV	BB18a IG1
7	B	IC3G GND
8	B	GND EP07 shielding ground
10	BW	VSP07 VSP/-PWM
14	PB	TI01i Backlight +
15	L	TI03e Backlight -
17	LO	HI02b High beam+
18	B	IC3Ga High beam--

Terminal number	Line color	Signal name
20	GO	FG02a Front fog lamp+
21	LgY	FG05b Rear fog lamp+
23	LB	TU03e Turn left +
24	L	TU04e Turn right +
27	L	EP07 Vehicle speed output
29	RY	CANLm CANL
31	RW	CANLm CANH

Electrical instrument B

Connector number	M17
Connector name	Combination instrument B interface
Connector model	HS'G:1719057-1（Green）

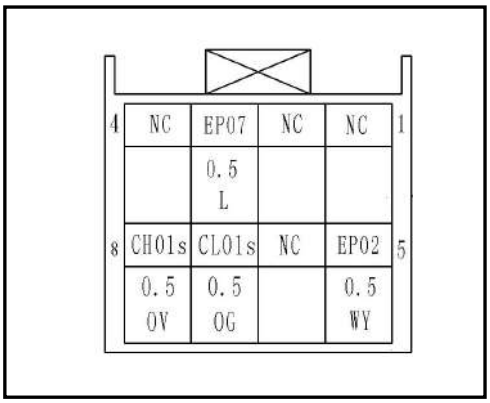


Terminal number	Line color	Signal name
1	BrL	AI14x Main safety belt- -
2	BrY	AI15x Sub safety belt- -
4	GrR	AI16x SBR-
5	OR	AI17x SBR+
7	Gr	DR02a Left front door open-
8	WO	DR03a Right front door open-
8	W	DR04x Left rear door open-
9	Gr	DR05x Right rear door open-
11	Br	BR06x Brake liquid level
12	BrW	BR05 Hand bake-
18	GY	PU11 DC/DC failure

Terminal number	Line color	Signal name
20	YG	AI03 Airbag failure
21	GO	LO03a Low beam
24	Y	EP06 EPS failure
26	L	IL03ax Trunk lamp-
29	GrO	BU03x Buzzer
31	Lg	TR03 TRIP switch

EPS module signal

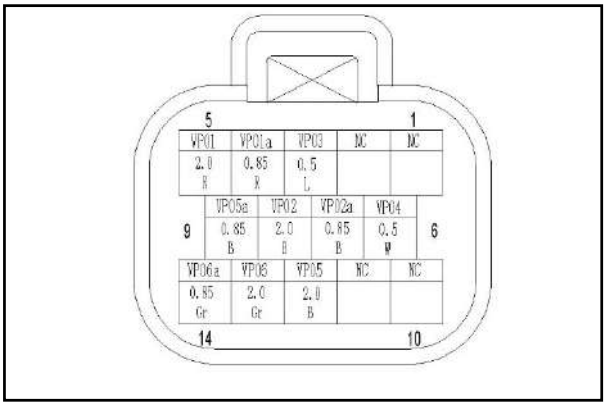
Connector number	M06
Connector name	EPS module signal
Connector model	1379659-3(AMP)



Terminal number	Line color	Signal name
3	L	EP07 Speed signal
5	WY	EP02 Electrical source
7	OG	CL01s CAN low
8	OV	CH01s CAN high C

Vacuum pump controller

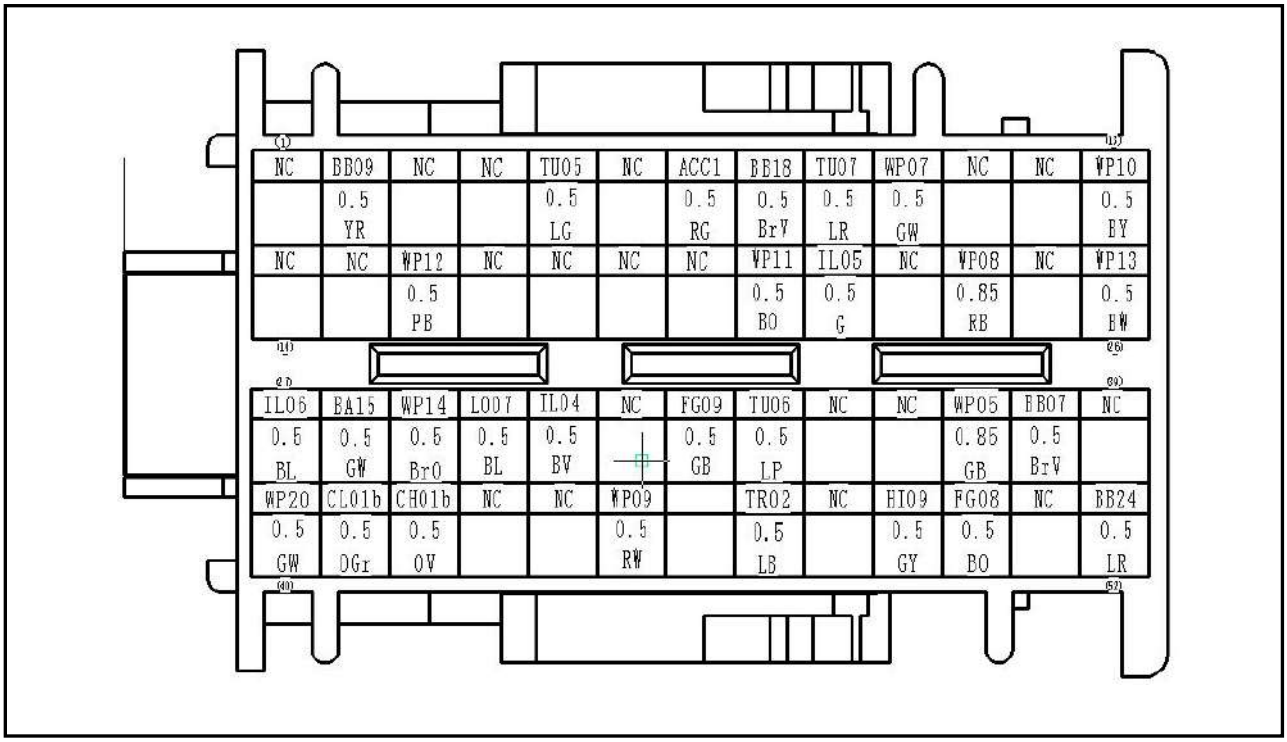
Connector number	FC07
Connector name	Vacuum pump controller
Connector model	282087-1



Terminal number	Line color	Signal name
3	L	VP03 Connect pressure switch
4	R	VP01a Electrical source, vacuum pump relay supply
5	R	VP01 Electrical source, vacuum pump relay supply
6	W	VP04 Connect pressure switch
7	B	VP02a Controller ground
8	B	VP02 Controller ground
9	B	VP05a Connect vacuum pump motor ground
10	RY	CANL
11	RW	CANH
12	B	VP05 Connect vacuum pump motor ground
13	Gr	VP06 Connect vacuum pump motor electrical source
14	Gr	VP06a Connect vacuum pump motor electrical source

Body control module C1

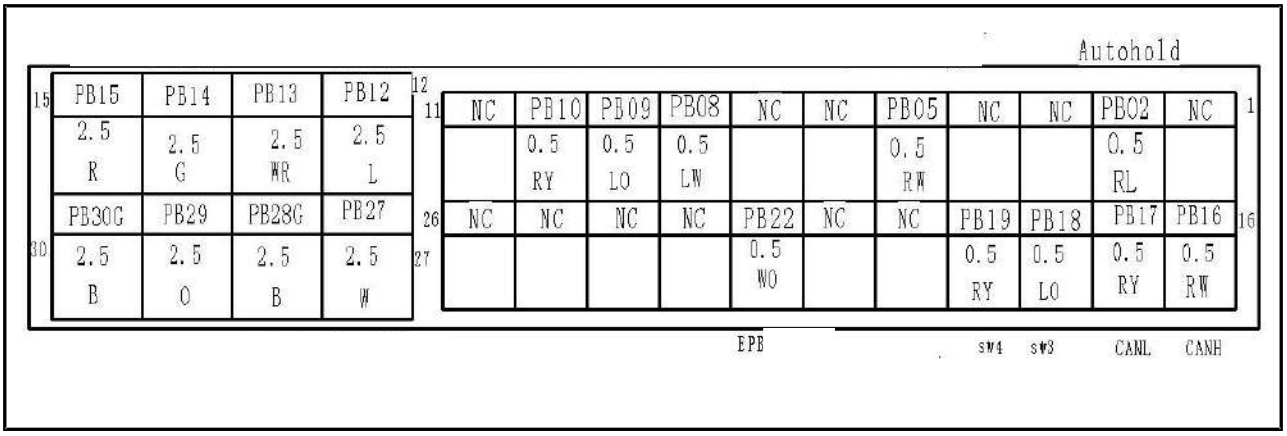
Connector number	M08
Connector name	Body control module C1
Connector model	284972-1（Black）



Terminal number	Line color	Signal name
2	YR	BB09 IG2 electrical source
5	LG	TU05 Left turn lamp switch
7	RG	ACC1 ACC electrical source
8	BrV	BB18 IG1 electrical source
9	LR	TU07 Warning lamp switch
10	GW	WP07 Rear wiper switch
13	BY	WP10 Front wiper high speed switch
16	PB	WP12 Front wiper low speed switch
21	BO	WP11 Front wiper intermediate switch
22	G	IL05 Key plug-in switch
24	RB	WP08 Front water-spray switch
26	BW	WP13 Front wiper connect switch
27	BL	IL06 Key hole lamp
28	GW	BA15 Electrical window relay
29	BrO	WP14 Wipe intermediate adjustment ground
30	BL	LO07 Low beam switch
31	BV	IL04 Small lamp switch
33	GB	FG09 Rear fog lamp switch
34	LP	TU06 Right turn lamp switch
37	GB	WP05 Rear water-spray switch
38	BrV	BB07 Rear defrost switch
40	GW	WP20 Rear wiper relay
41	OGr	CL01b CAN low
42	OV	CH01b CAN high
45	RW	WP09 Wipe intermediate adjustment signal
47	LB	TR02 Tail door unlock switch
49	GY	HI09 High beam switch
50	BO	FG08 Front fog lamp switch
52	LR	BB24

EPB controller (if equipped)

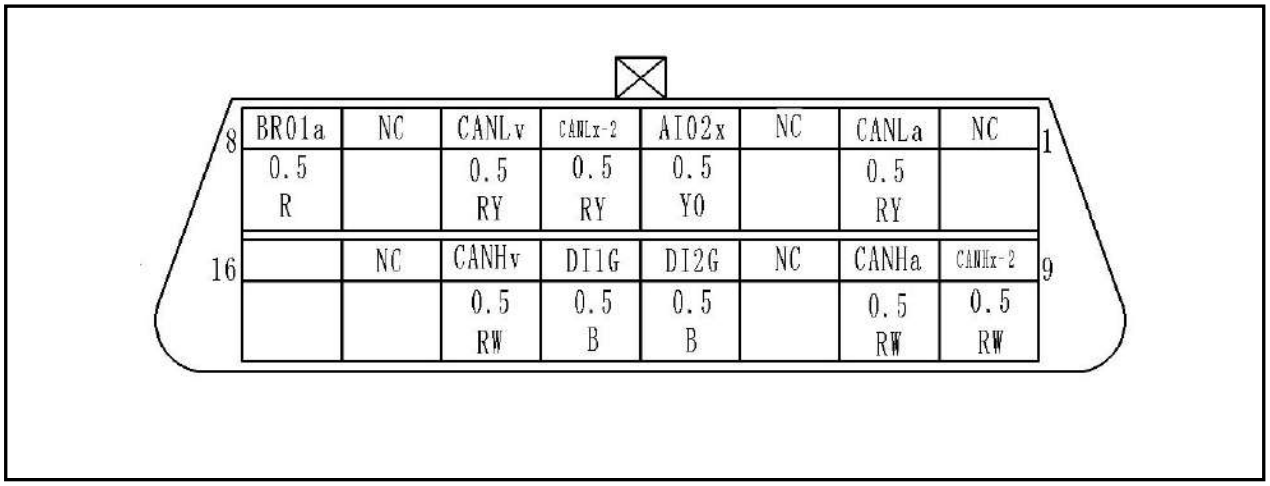
Connector number	B21
Connector name	EPB controller
Connector model	MG640337-5



Terminal number	Line color	Signal name
2	RL	PB02 Autohold signal Autohold
5	RW	PB05 Autohold lamp signal
8	LW	PB08 Indicator lamp signal
9	LO	PB09 SW1
10	RY	PB10 SW2
12	L	PB12 Right electrical motor electrical source
13	WR	PB13 Always power
14	G	PB14 Left electrical motor electrical source
15	R	PB15 Always power
16	RW	PB16 CANH
17	RY	PB17 CANL
18	LO	PB18 SW3
19	RY	PB19 SW4
22	WO	PB22 Control IGN electrical source
27	W	PB27 Right electrical motor electrical source-
28	B	PB28G Right electrical motor ground
29	O	PB29 Left electrical motor electrical source-
30	B	PB30G Left electrical motor ground

Diagnosis interface

Plug number	M28
Plug name	Diagnosis interface
Plug model	HS'G: DJ7163-1.8-21

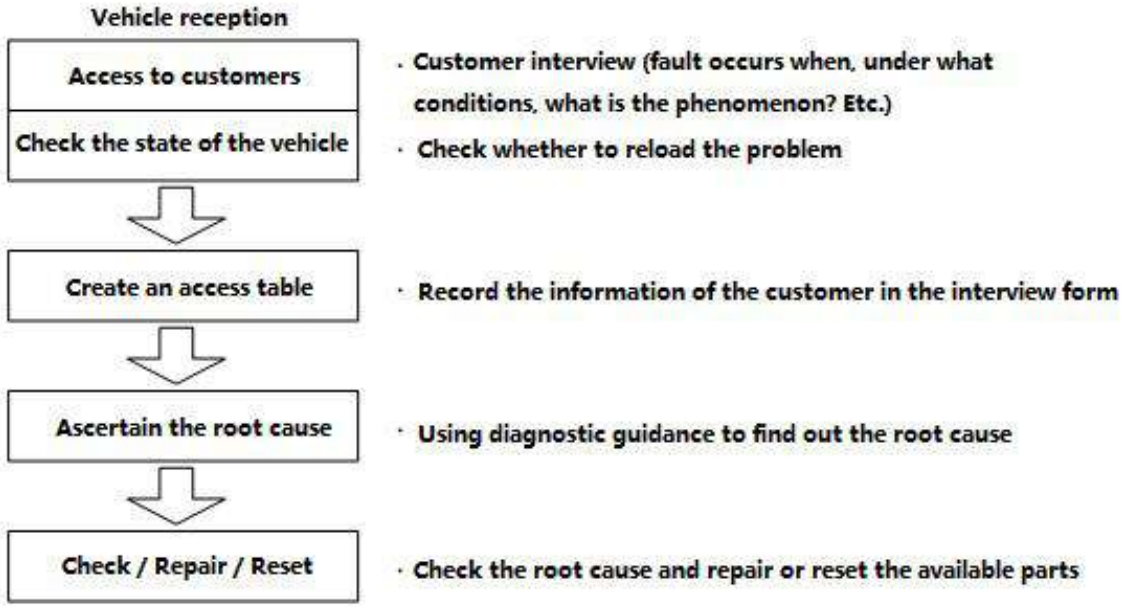


Terminal number	Line color	Signal name
2	RY	CANLa High voltage battery internal CAN low
4	YO	AI02x Airbag diagnostics
5	RY	CANLx-2 Fast charging CAN low
6	RY	CANLv Whole vehicle CAN low
8	R	BR01a Brake signal
9	RW	CANHx-2 Fast charging CAN high
10	RW	CANHa High voltage battery internal CAN high
12	B	DI2G Ground
13	B	DI1G Ground
14	RW	CANHv Whole vehicle CAN high

Basic Check

Malfunction diagnosis procedure

Malfunction diagnosis procedure chart



Malfunction diagnosis procedure

Customer visit

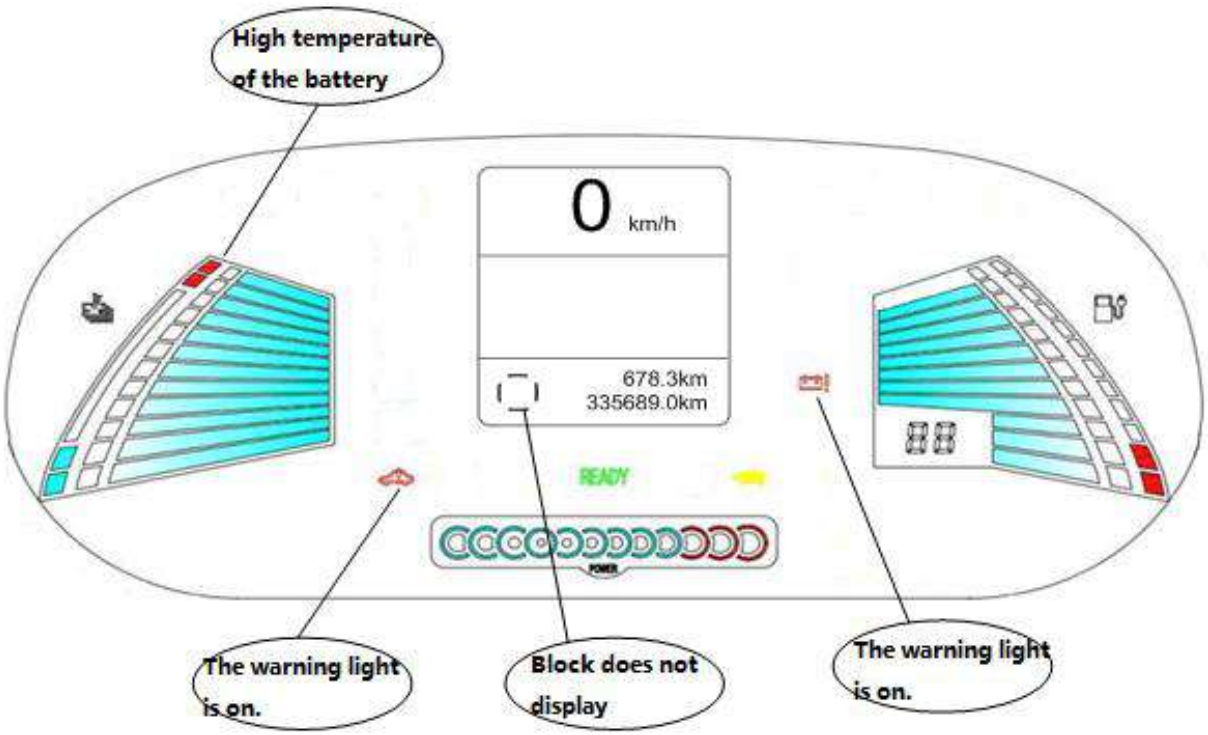
Customer visit is very important for checking the fundamental reasons of CAN communications system malfunctions, and helps to know the status and symptom of the vehicle.

Key points during visit

- What: part name What
- When: date, frequency When
- Where: road condition, venue Where
- Condition: drive condition, environment
- Result: malfunction phenomenon

Reminder for checking defaulted part

- Please check the defaulted part and relevant non-defaulted part.
- When CAN communication system has malfunctions, many controllers may enter the “Failure-Safety” mode.
- Observe dashboard to find the fundamental reasons, as dashboard is very obvious for customers to see malfunctions.
- As very easily recognized, electrification dashboard plays an important role in checking the fundamental reasons. Most of the displayed signals are from CAN messages sent by vehicle parts. Please check as following:



Check the status of the vehicle.

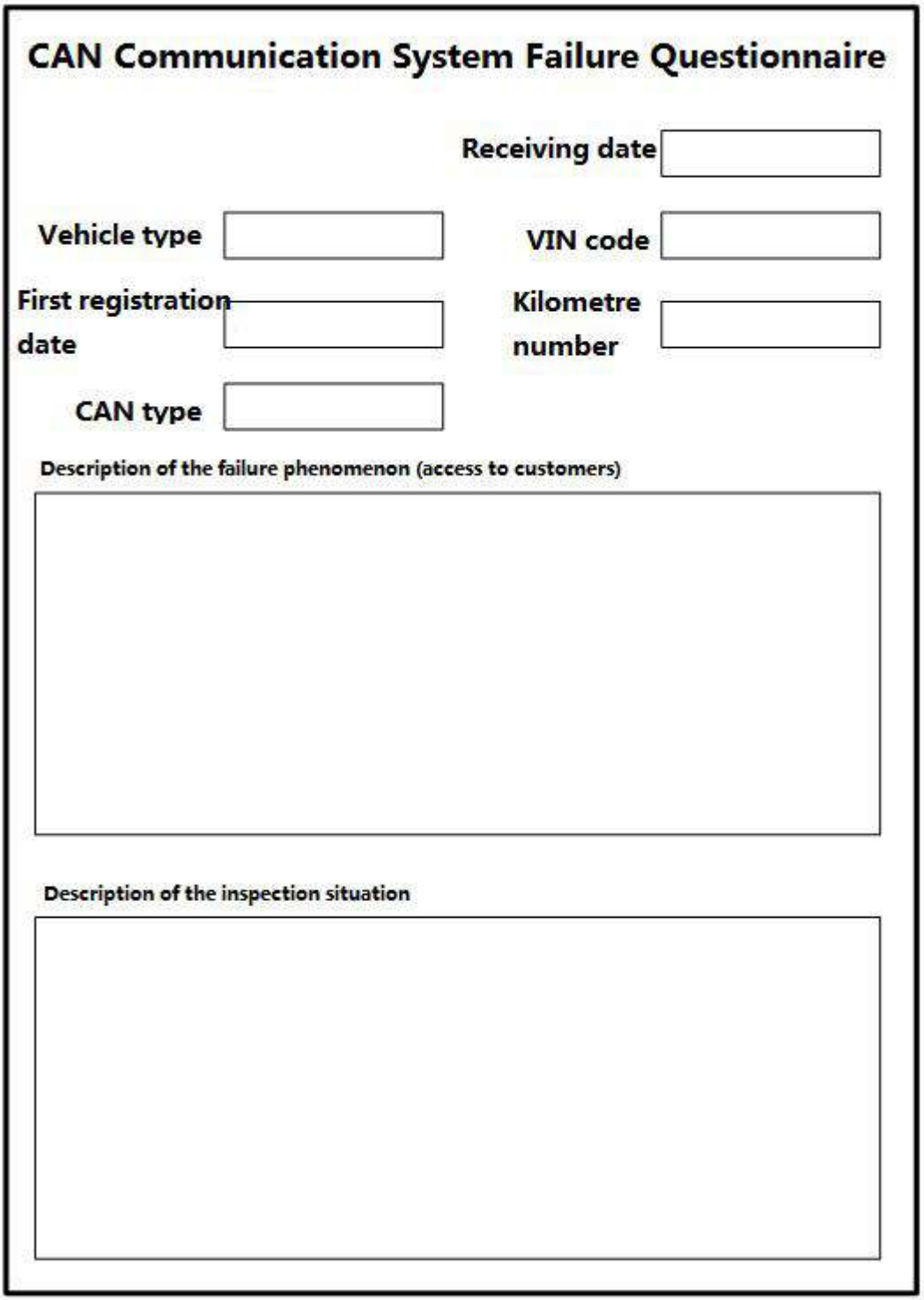
Check whether the malfunction occurs again.

Reminder:

When the malfunction occurs again, please do not turn off the switch. Otherwise, the malfunction may recover automatically and it is difficult to find fundamental reason.

Create malfunction questionnaire

Fill out the following chart according to malfunction phenomenon described by customer, vehicle status, checking situation.



CAN Communication System Failure Questionnaire

Receiving date

Vehicle type | VIN code

First registration date | Kilometre number

CAN type

Description of the failure phenomenon (access to customers)

Description of the inspection situation

Confirm fundamental reason

Confirm the fundamental reason according to CAN diagnosis service tool malfunction solutions.

How to use this manual

How to use this chapter

Information

- This part describes the basic knowledge of CAN communication system, and malfunction diagnosis methods.

Malfunction diagnosis procedure, please refer to “Malfunction diagnosis procedure chart”.

List of abbreviations

Abbreviations of controller names in this chapter

Abbreviation	Name
AC	Air conditioner panel controller
OBC	On-board charger
EC	Air conditioner compressor controller
ICM	Electric instrument
LBC	Battery controller
OBD	On-board diagnostics
PCU	Motor controller
T-BOX	Remote intelligent terminal
VCU	Vehicle controller
MP5	Multimedia player
ABS	Anti-lock brake system
BCM	Body control module
EPB (If equiped)	Electrical parking brake
EPS	Electronic power steering
VPC	Vacuum pump controller

Malfunction diagnosis

Malfunction function table

Principle line

Title	Reference
Principle line circuit between VCU and ABS	See below
Principle line circuit between AC and OBD	See below

Branch line

Title	Reference
VCU branch line	See below
PCU branch line	See below
LBC branch line	See below
OBC branch line	See below
ICM branch line	See below
ABS branch line	See below
AC branch line	See below
EC branch line	See below
T-BOX branch line	See below
MP5 branch line	See below

Short circuit

Title	Reference
CAN circuit	See below

Principle line circuit between VCU and ABS

Diagnosis method

1. Check connector

1. Turn key to “LOCK” position or plug out.
2. Disconnect 12V battery negative pole wire.
3. Check whether wire connector 1 is damaged, bended, or loose (connector side and wire side).

   Normal or abnormal?

   Normal >> turn to 2.

   Abnormal >> repair terminal or connector.

2. Check wire connectivity

1. Disconnect connectors of following parts.

   - VCU

   - Wire connector F28

2. Check connectivity between VCU connector and wire connector.

VCU connector		Wire connector		Connectivity
Connector	Terminal	Connector	Terminal	
F22	121	F28	1	Breakover
	120		2	Breakover

Normal or abnormal?

Normal >> turn to 3.

Abnormal >> repair principle wire between VCU and wire connector F28.

3. Check wire connectivity

1. Disconnect connectors of following parts.

- ABS

- Wire connector 1.

2. Check connectivity between ABS connector and wire connector.

ABS connector		Wire connector		Connectivity
Connector	Terminal	Connector	Terminal	
F13	21	F29	33	Breakover
	23		38	Breakover

Normal or abnormal?

Normal >> connect all connectors and diagnose again. Refer to “CAN Communication System-Malfunction diagnostics chart”.

Abnormal >> repair principle wire between ABS and wire connector F29.

Principle line circuit between AC and OBD

Diagnosis method

1. Check connector

1. Turn key to “LOCK” position or plug out.
2. Disconnect 12V battery negative pole wire.
3. Check whether wire connector 1 is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2. Check wire connectivity

1 Disconnect connectors of following parts.

- AC
- Wire connector M43

2. Check connectivity between AC connector and wire connector.

AC connector		Wire connector		Connectivity
Connector	Terminal	Connector	Terminal	
M26	31	M43	2	Breakover
	29		1	Breakover

Normal or abnormal?

Normal >> turn to 3.

Abnormal >> repair principle wire between AC and wire connector M43.

3. Check wire connectivity

1. Disconnect connector of wire connector F28.
2. Check connectivity between OBD connector and wire connector.

OBD connector		Wire connector		Connectivity
Connector	Terminal	Connector	Terminal	
M28	14	F28	11	Breakover
	6		10	Breakover

Normal or abnormal?

Normal >> connect all connectors and diagnose again. Refer to “CAN Communication System-Malfunction diagnostics chart”.

Abnormal >> repair principle wire between OBD and wire connector F28.

VCU branch line

Diagnosis method

1 Check connector

1. Turn key to “LOCK” position or plug out.

2. Disconnect 12V battery negative pole wire.

3. Check whether VCU terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2. Check whether wire circuit opens

1. Disconnect VCU connector.

2. Check VCU wire connector terminal resistance value.

VCU wire connector V			Resistance value (Ω)
Connector No.	Terminal No.		
F22	121	120	54 ～ 66

Normal or abnormal?

Normal >> turn to 3.

Abnormal >> repair VCU branch line.

3. Check electricity supply and ground circuit

Check VCU electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.

Normal or abnormal?

Normal (current malfunction) >> replace VCU. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in VCU branch line.

Abnormal >> repair electricity supply and ground circuit.

PCU branch line

Diagnosis method

1. Check connector

1. Turn key to “LOCK” position or plug out.

2. Disconnect 12V battery negative pole wire.

3. Check whether PCU terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2. Check whether wire circuit opens

1. Disconnect PCU connector.。

2. Check PCU wire connector terminal resistance value.

PCU wire connector			Resistance value
Connector No.	Terminal No.		
FC01	21	22	108 132

Normal or abnormal?

Normal >> turn to 3.

Abnormal >> repair PCU branch line.

3. Check electricity supply and ground circuit

Check PCU electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.

Normal or abnormal?

Normal (current malfunction) >> replace PCU. Refer to “Electric Control System-removal and installation”

Normal (past malfunction)>> Malfunction is detected in PCU branch line.

Abnormal >> repair electricity supply and ground circuit.

LBC branch line

Diagnosis method

Warning

- The electric vehicle has a high-voltage battery. If the operation on the vehicle and high-voltage parts is incorrect, there are risks of leakage of electricity, electric shock, or similar accidents. Thus, it is mandatory to follow correct procedures to check and maintain.
- Before checking and maintaining high-voltage system and its insulation, be sure that repair switch is disconnected, to cut off high-voltage electrical source.
- Before starting the operation on high-voltage system, be sure to wear insulated protection equipment, including gloves, shoes, and glasses.
- When checking high-voltage system, please clarify the responsibility of each staff and ensure no one touching the vehicle. When there is no maintenance operation, please take insulated protection on the high-voltage sections to prevent anyone touching.

Caution:

- Under READY status, it is forbidden to disconnect maintenance switch.

1. Check connector

1. Turn key to “LOCK” position or plug out.

2. Disconnect 12V battery negative pole wire.

3 Check whether LBC terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2

Abnormal >> repair terminal or connector.

2. Check whether wire circuit open

1. Disconnect LBC connector.

2 Check LBC wire connector terminal resistance value.

LBC wire connector			Resistance value (Ω)
Connector No.	Terminal No.		
F17	A	B	108 ～ 132

Normal or abnormal?

Normal >> turn to 3.

Abnormal >> repair LBC branch line.

3.Preparation

Warning:

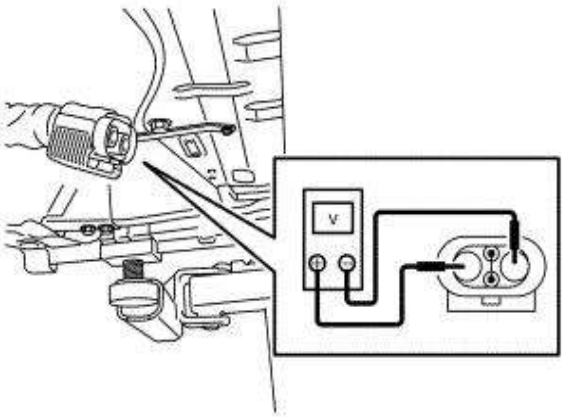
Disconnect high-voltage circuit! Refer to "Overview-how to disconnect high-voltage".

1. Check high-voltage circuit voltage.

Disconnect power battery high-voltage connector. Refer to "Power Battery System-removal and installation".

Danger: There is electric shock hazard if you ouch high-voltage component without wearing respective protection equipment.

2. Measure high-voltage wire terminal voltage.



Danger: There is electric shock hazard if you ouch high-voltage component without wearing respective protection equipment.

Caution:

When measuring voltage, please use test equipment which can measure voltage is 500V or above.

>>turn to 4.

4. Check electricity supply and ground circuit

Check LBC electricity supply and ground circuit. Refer to "Electric Control System-diagnosis method".

Normal or abnormal?

Normal >> turn to 5.

Abnormal >> repair electricity supply and ground circuit.

5. Check whether wire circuit opens

1. Remove LBC. Refer to “Power Battery System”.

2. Check the connectivity of power battery communication wire connector terminal (wire connector between power battery and LBC). Refer to “Power Battery System-circuit”.

Vehicle communication line		Connectivity
Power battery wire connector terminal	LBC terminal	
Terminal No.	Terminal No.	
M	1	Breakover
N	2	Breakover

Normal or abnormal?

Normal (current malfunction) >> replace LBC. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in LBC branch line.

Abnormal >> repair power battery communication wire.

OBC branch line
Diagnosis method

1 Check connector

1. Turn key to “LOCK” position or plug out.
2. Disconnect 12V battery negative pole wire.
3. Check whether OBC terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2. Check whether wire circuit opens

1. Disconnect OBC connector.
2. Check OBC wire connector terminal resistance value.

OBC wire connector			Resistance value
Connector No.	Terminal No.		
FC05	5	6	54 66

Normal or abnormal?

Normal >> replace OBC.

Abnormal >> repair OBC branch line

3. Check electricity supply and ground circuit

Check OBC electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.

Normal or abnormal?

Normal (current malfunction) >> replace OBC. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in OBC branch line.

Abnormal >> repair electricity supply and ground circuit.

ICM branch line
Diagnosis method

1. Check connector

1. Turn key to “LOCK” position or plug out.
2. Disconnect 12V battery negative pole wire.
3. Check whether ICM terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2. Check whether wire circuit opens

1. Disconnect ICM connector.

2. Check ICM wire connector terminal resistance value

ICM wire connector			Resistance value (Ω)
Connector No.	Terminal No.		
M26	29	31	54 ～ 66

Normal or abnormal?

Normal >> Replace ICM.

Abnormal >> repair ICM branch line.

3. Check electricity supply and ground circuit

Check ICM electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.

Normal or abnormal?

Normal (current malfunction) >> replace ICM. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in ICM branch line.

Abnormal >> repair electricity supply and ground circuit.

ABS branch line
Diagnosis method

1. Check connector

1. Turn key to “LOCK” position or plug out.

2. Disconnect 12V battery negative pole wire. 3. Check whether ABS terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?？

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2. Check whether wire circuit opens

1. Disconnect ABS connector.

2. Check ABS wire connector terminal resistance value.

ABS wire connector			Resistance value
Connector No.	Terminal No.		
F13	21	23	54 66

Normal or abnormal?

Normal >> replace ABS.

Abnormal >> repair ABS branch line.

3. Check electricity supply and ground circuit

Check ABS electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.。

Normal or abnormal?

Normal (current malfunction) >> replace ABS actuator and controller. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in VCU branch line.

Abnormal >> repair electricity supply and ground circuit.

AC branch line AC

Diagnosis method

1. Check connector

1. Turn key to “LOCK” position or plug out.

2. Disconnect 12V battery negative pole wire.

3. Check whether AC terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2. Check whether wire circuit opens

1. Disconnect AC connector.

2. Check AC wire connector terminal resistance value.

AC wire connector			Resistance value (Ω)
Connector No.	Terminal No.		
M13	9	19	54 ～ 66

Normal or abnormal?

Normal >> replace AC.

Abnormal >> repair AC branch line.

3. Check electricity supply and ground circuit

Check AC electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.

Normal or abnormal?

Normal (current malfunction) >> replace AC actuator and controller. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in AC branch line.

Abnormal >> repair electricity supply and ground circuit.

EC branch line

Diagnosis method

1. Check connector

1 Turn key to “LOCK” position or plug out.

2 Disconnect 12V battery negative pole wire.

3 Check whether EC terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2. Check whether wire circuit opens

1. Disconnect EC connector.

2. Check EC wire connector terminal resistance value.

EC wire connector			Resistance value
Connector No.	Terminal No.		
FC02	3	4	54 66

Normal or abnormal?

Normal >> replace EC.

Abnormal >> repair EC branch line.

3. Check electricity supply and ground circuit

Check EC electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.

Normal or abnormal?

Normal (current malfunction) >> replace EC actuator and controller. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in EC branch line.

Abnormal >> repair electricity supply and ground circuit.

EPS branch line

Diagnosis method

1. Check connector

1. Turn key to “LOCK” position or plug out.
2. Disconnect 12V battery negative pole wire.
3. Check whether EPS terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2. Check whether wire circuit opens

1. Disconnect EPS connector.
2. Check EPS wire connector terminal resistance value.

EPS wire connector			Resistance value（Ω）
Connector No.	Terminal No.		
M06	8	7	54 ～ 66

Normal or abnormal?

Normal >> replace EPS.

Abnormal >> repair EPS branch line.

3 Check electricity supply and ground circuit

Check EPS electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.

Normal or abnormal?

Normal (current malfunction) >> replace EPS actuator and controller. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in EPS branch line.

Abnormal >> repair electricity supply and ground circuit.

BCM sub-line
Diagnosis method

1. Check connector

1. Turn key to “LOCK” position or plug out.

2. Disconnect 12V battery negative pole wire.

3. Check whether BCM terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2. Check whether wire circuit opens

1. Disconnect BCM connector.

2. Check BCM wire connector terminal resistance value.

BCM wire connector			Resistance value
Connector No.	Terminal No.		
M08	41	42	54 66

Normal or abnormal?

Normal >> replace BCM.

Abnormal >> repair BCM branch line.

3. Check electricity supply and ground circuit

Check BCM electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.

Normal or abnormal?

Normal (current malfunction) >> replace BCM actuator and controller. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in BCM branch line.

Abnormal >> repair electricity supply and ground circuit.

VPC sub-line
Diagnosis method

1. Check connector

1. Turn key to “LOCK” position or plug out.
2. Disconnect 12V battery negative pole wire.
3. Check whether VPC terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2 Check whether wire circuit opens

1 Disconnect VPC connector.

2. Check VPC wire connector terminal resistance value.

VPC wire connector			Resistance value
Connector No.	Terminal No.		
FC07	10	11	54 66

Normal or abnormal?

Normal >> replace VPC.

Abnormal >> repair VPC branch line.

3. Check electricity supply and ground circuit

Check VPC electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.

Normal or abnormal?

Normal (current malfunction) >> replace VPC actuator and controller. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in VPC branch line.

Abnormal >> repair electricity supply and ground circuit.

EPB sub-line

Diagnosis method

1. Check connector

1. Turn key to “LOCK” position or plug out.
2. Disconnect 12V battery negative pole wire.
3. Check whether EPB terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2. Check whether wire circuit opens

1. Disconnect EPB connector.
2. Check EPB wire connector terminal resistance value.

EPB wire connector			Resistance value (Ω)
Connector No.	Terminal No.		
B21	16	17	54 ～ 66

Normal or abnormal?

Normal >> replace EPB.

Abnormal >> repair EPB branch line.

3. Check electricity supply and ground circuit

Check EPB electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.

Normal or abnormal?

Normal (current malfunction) >> replace EPB actuator and controller. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in EPB branch line.

Abnormal >> repair electricity supply and ground circuit.

T-BOX branch line
Diagnosis method

1. Check connector

1. Turn key to “LOCK” position or plug out.
2. Disconnect 12V battery negative pole wire.
3. Check whether T-BOX terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2 Check whether wire circuit opens

1 Disconnect T-BOX connector.

2 Check T-BOX wire connector terminal resistance value.

T-BOX wire connector			Resistance value
Connector No.	Terminal No.		
FC02	3	4	54 66

Normal or abnormal?

Normal >> replace T-BOX.

Abnormal >> repair T-BOX branch line.

3. Check electricity supply and ground circui

Check T-BOX electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.

Normal or abnormal?

Normal (current malfunction) >> replace T-BOX actuator and controller. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in T-BOX branch line.

Abnormal >> repair electricity supply and ground circuit.

MP5 branch line
Diagnosis method

1 Check connector

1. Turn key to “LOCK” position or plug out.
2. Disconnect 12V battery negative pole wire.
3. Check whether MP5 terminal and connector is damaged, bended, or loose (connector side and wire side).

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2 Check whether wire circuit opens

1. Disconnect MP5 connector.
2. Check MP5 wire connector terminal resistance value.。

MP5 wire connector			Resistance value
Connector No.	Terminal No.		
M08	C3-10	C3-11	54 66

Normal or abnormal?

Normal >> replace MP5.

Abnormal >> repair MP5 branch line.

3. Check electricity supply and ground circuit

Check MP5 electricity supply and ground circuit. Refer to “Electric Control System-diagnosis method”.

Normal or abnormal?

Normal (current malfunction) >> replace MP5 actuator and controller. Refer to “Electric Control System-removal and installation”.

Normal (past malfunction)>> Malfunction is detected in mp5 branch line.

Abnormal >> repair electricity supply and ground circuit.

CAN circuit

Diagnosis method

1. Check connector

1. Turn key to “LOCK” position or plug out.
2. Disconnect 12V battery negative pole wire.
3. Disconnect all CAN controller connectors. Regarding LBC connectors, refer to “Power Battery System-LBC removal and installation”.
4. Check whether EC terminal and connector is damaged, bended, or loose (connector side and wire side).。

Normal or abnormal?

Normal >> turn to 2.

Abnormal >> repair terminal or connector.

2. Check wire connectivity (short circuit)

Check OBD connector terminal connectivity.

OBD connector			Connectivity
Connector No.	Terminal No.		
M28	14	6	Not conducted

Normal or abnormal?

Normal >> turn to 3.

Abnormal >> check wire and repair.

3. Check wire connectivity (short circuit)

Check ground connectivity of OBD plug terminal.

OBD plug		Ground connection	Connectivity
Plug number	Terminal number		
M28	14	Ground connection	Non-conducting
	6		Non-conducting

Normal or abnormal?

Normal >> turn to 4.

Abnormal >> check and repair wire.

4. Check PCU and LBC terminal circuit

1. Remove PCU.
2. Check PCU terminal resistance value.

PCU		Resistance value ()
Terminal number		
21	22	54 66

3 Remove LBC. Refer to “Power battery system-LBC removal and installation”.

4. Check LBC terminal resistance value.

LBC		Resistance value (Ω)
Terminal number		
A	B	108 ～ 132

Normal or abnormal?

Normal >> turn to 5.

Abnormal >> replace PCU or LBC.

5. Check malfunction phenomenon

Connect all plugs. Check whether malfunction phenomenon in the list repeats.

Check result

Repeat >> turn to 6.

No repeat >> restart diagnosis. Follow previous diagnosis method to check.

6. Check controller

1. Turn key to “LOCK” position or plug out.
2. Disconnect 12V battery negative pole wire.
3. Disconnect one controller plug in CAN.

Reminder:

PCU and LBC consist of terminal resistance. Please check other controller first.

4. Connect 12V battery negative pole wire. Check whether malfunction phenomenon in the list repeats.

Reminder:

Though there is malfunction in controller, do not mix with other malfunctions.

Check result

Repeat >> check plug. Follow above method to check other controllers.

No repeat >> replace plug disconnected controller.

Decelerator Assembly

Safety Precaution

Precaution for Technicians Using Medical Electric

Operation Prohibition

Warning:

- Parts with strong magnet are used in this vehicle.
- Technicians using a medical electric device such as pacemaker must never perform operation on the vehicle, as magnetic field can affect the device function by approaching to such parts.

Normal Charge Precaution

Warning:

- If a technician uses a medical electric device such as an implantable cardiac pacemaker or an implantable cardioverter defibrillator, the possible effects on the devices must be checked with the device manufacturer before starting the charge operation.
- As radiated electromagnetic wave generated by on board charger at normal charge operation may effect medical electric devices, a technicians using a medical electric device such as implantable cardiac pacemaker or an implantable cardioverter defibrillator must not enter the vehicle compartment (including luggage room) during normal charge operation.

Precaution at Telematics System Operation

1 If a technician uses implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), please keep enough distance from communication device.

2 The electromagnetic wave of TCU might affect the function of the implantable cardiac pacemaker or the implantable cardioverter defibrillator (ICD), when using the service, etc.

3 If a technician uses other medical electric devices than implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), the electromagnetic wave of TCU might affect the function of the device. The possible effects on the devices must be checked with the device manufacturer before TCU use.

Point to Be Checked Before Starting Maintenance Work

High voltage system may start automatically. It is required to check that the timer air conditioner and timer charge are not set before starting maintenance work.

Note:

If the timer air conditioner or timer charge is set, the high voltage system starts automatically even when the power switch is in OFF state.

Precaution for Supplement Restraint System (SRS) “Air Bag” and “Seat Belt Pre-tensioner”

The Supplemental Restraint System such as “Air Bag” and “Seat Belt Pre-tensioner”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt and driver’s air bag, front passenger’s air bag. Information necessary to service the system safety is included in the “Air Bag System” and “Seat Belt” of this Service Manual.

Warning:

Always observe the following items for preventing accidental activation:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized DR dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Air Bag Module, see “Air Bag System”.

- Never use electrical test equipment on any circuit related to SRS unless instructed to in this Workshop Manual. SRS wiring harnesses can be identified by yellow or orange harnesses or harness connectors.

Precaution When Using Power Tools (Air or Electric) and Hammers

- When working near the Air Bag Diagnosis Sensor or other Air Bag System sensors with the power switch “ON”, never use air or electric power tools or strike near the sensors with a hammer. Heavy vibration could activate the sensors and deploy the air bag, possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the power switch to “OFF”, disconnect the 12V battery negative electrode, and wait at least 1 minute before performing any service.

High Voltage Precaution

Warning:

- Because electrical vehicle contains a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to turn ignition switch to “LOCK” or pull it off before disconnecting maintenance switch.
- Disconnect maintenance switch before checking or maintaining high voltage system, and forbid anybody close maintenance switch during check and maintenance. Be sure to ware insulating protective equipment including glove, shoes and face shield before beginning work on the high voltage system.
- Ensure that other persons do not touch the vehicle when maintenance personnel operating high voltage system. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.

Forbid turning ignition switch to “ON” or “START” after maintenance switch being disconnected.

High Voltage Harness and Equipment Identification

The color of high voltage harness is orange, there is safety identification on power battery assembly and other high voltage devices. Don’t carelessly touch these harnesses and parts.

Handling of High Voltage Harness and Terminals

Immediately insulate disconnected high voltage connectors terminals with insulating tape.

Regulations on Workers with Medical Electronics

The vehicle contains parts that contain powerful magnets. If a person who is wearing a pacemaker or other medical device is close to these parts, the medical device may be affected by the magnets. Such person must not perform work on the vehicle.

Prohibited Items to Carry During Work

Because this vehicle uses components that contain high voltage and powerful magnetism, due not carry any metal products which may cause short circuits, or any magnetic media (cash cards, prepaid cards, etc.) which may be damaged on your person when working.

Posting a sign of “Danger! High voltage area. Keep out”

To call the attention of other workers, indicate “High voltage work in process. Do not touch!” on vehicles where work is being performed on the high voltage systems.

DANGER:

HIGH VOLTAGE REPAIR IN PROCESS.

DO NOT TOUCH!

Person in Charge:_____

Copy this page and put it after folding on the roof of the vehicle in service.

Precaution for Removing 12V Battery

Before removing 12V battery, turn power switch to “ON”, and then to “LOCK”.

Note:

The automatic 12V battery charge control may start even when the power switch is in “OFF” state.

- The automatic 12V battery charge control does not start when the power switch is turned “ON” --> “LOCK”.

General Precaution

- Pay attention not to let dust or other small items get into the controller from opening when removing controller.

Preparation

General Service Tools

Tool name		Description
Insulated gloves (Guaranteed insulation performance for 1000V/300A)		Removing and installing high voltage components
Leather gloves (Use leather gloves that can fasten the wrist tight)		1. Removing and installing high voltage components 2. Protect insulated gloves
Insulated safety shoes		Removing and installing high voltage components
Safety glasses (ANSI Z87.1)		1. Removing and installing high voltage components 2. To protect eye from the spatter on the work to electric line
Insulated helmet		Removing and installing high voltage components
Insulation resistance tester (Multitester)		Measuring voltage and insulation resistance

System Description

Function and Structure

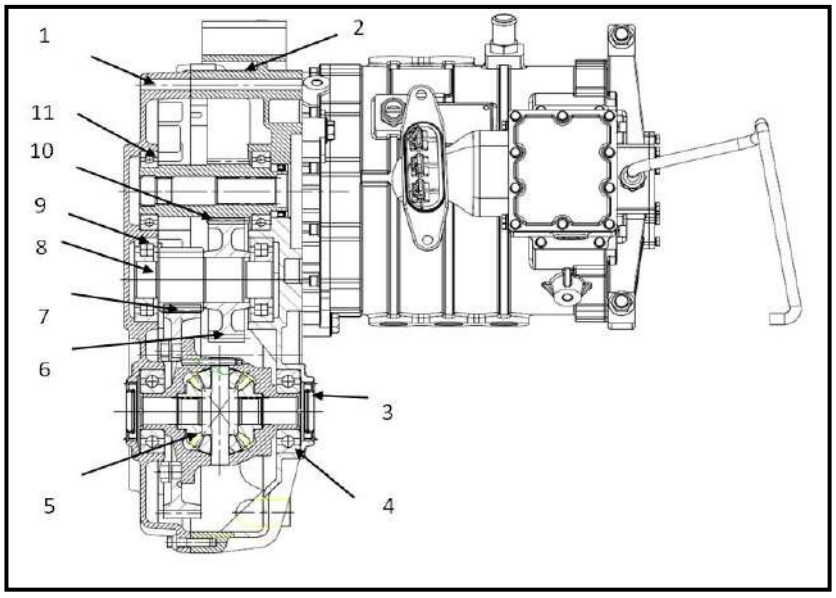
Function Instruction

Decelerator locates between drive motor and drive axle, mainly transmits driving force from drive motor to drive axle, and it can also reduce the speed and let left and right drive wheel rotate in different speed, thus vehicle can turn and drive on uneven roads.

Structure Instruction

Decelerator is single ratio decelerator with mid-axle, mainly constructed by input gear, middle gear, output gear and left/right housing cover. Other components are oil filling plug, oil draining plug and vent plugs. Drive motor power output shaft directly connects with decelerator input shaft by spline.

Sectional View



1. Left housing
2. Right housing
3. Differential oil seal
4. Differential bearing
5. Differential
6. Middle shaft driven gear
7. Middle shaft gear
8. Middle shaft
9. Middle shaft bearing
10. Input shaft gear
11. Input shaft bearing

Removal and Installation

Warning:

- The electric vehicle contains power battery assembly, if handling the high voltage components and vehicle improperly, there is risk for electric shock, leakage or other accidents. When performing inspections and maintenance, follow the correct procedures.
- Ensure to disconnect maintenance switch before performing component inspections and maintenance.
- Before operating high voltage system, be sure to wear insulated protective equipment including gloves, shoes and face shield.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.

Warning:

- There is the possibility of a malfunction occurring if the vehicle is changed to READY status while the maintenance switch is removed. Therefore do not change the vehicle to READY status unless instructed to do so in the Workshop Manual.
- Because the vehicle uses components that contain powerful magnetism, person using a medical electric device such as pacemaker must never operate the vehicle, as magnetic field can affect the device function by approaching to such parts.

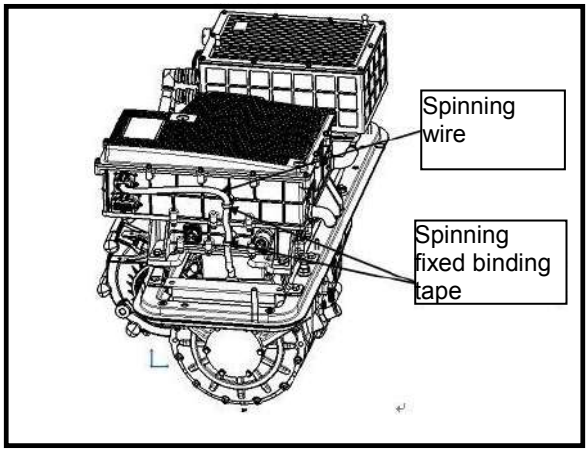
Removal

Warning:

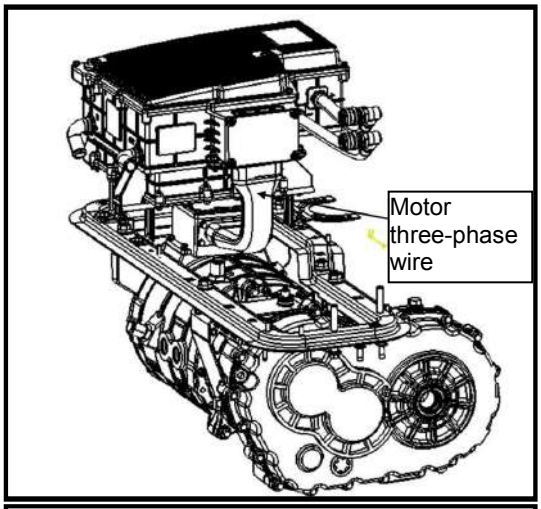
- Disconnect high voltage, and cut off high voltage circuit.

To prevent shock hazards, be sure to put on insulating protective device before beginning work on high voltage system.

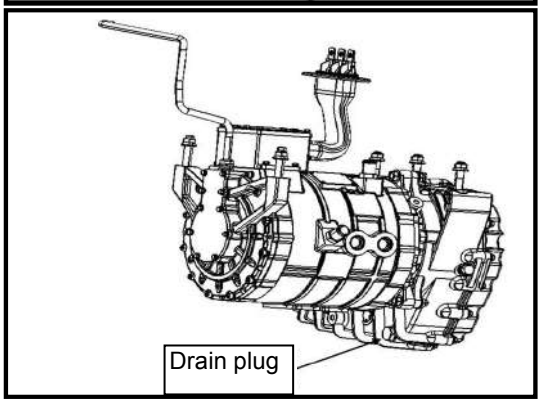
① Disconnect spinning wire connector and spinning fixed binding tape being connected to controller.



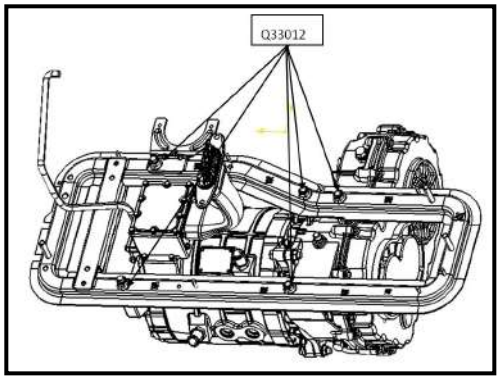
② Disconnect three-phase wire being connected to motor;



③ Discharge decelerator gear oil;



④ Remove 5 nuts on crossbeam, and remove drive motor and decelerator assembly from crossbeam;

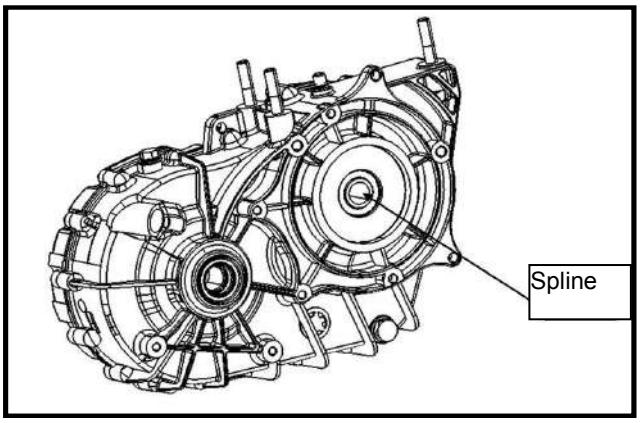


⑤ Remove drive motor from the assembly;

Installation

Warning:

- Vehicle in minimum temperature≥-40℃, decelerator lubricant uses 75W/90 GL-4 gear oil, and it's forbidden to mixed use other type lubricant;
- Failure that caused by not according to requirement to fill proper decelerator gear oil is not in the range of warranty;
- When filling oil, vehicle should be placed in flat road;
- Before installing decelerator and drive motor, use lubricant to lubricate surrounding shaft spline, and fill lubricant at the same time (minimum 8.5g, maximum 20g to decelerator input shaft (inner spline)). When installing, be careful not damage sealing ring.



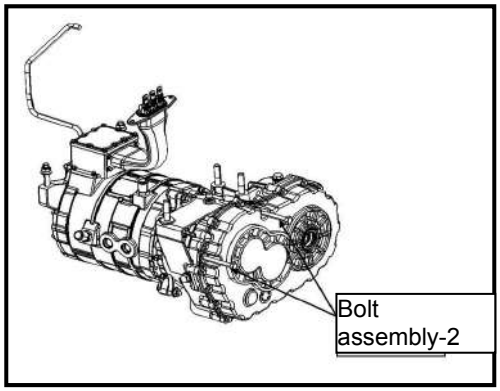
Check the following items before installation

- Fitting end surface of decelerator and motor is clean and there is no sundries, and there is no obvious processing defects;
- There should be decompression valve on decelerator and there is no damage;
- Decelerator oil seal should be well, if damaged, replace new;
- Decelerator housing should be no damage, there is no oil leaking in all parts; if leaking, replace decelerator assembly.

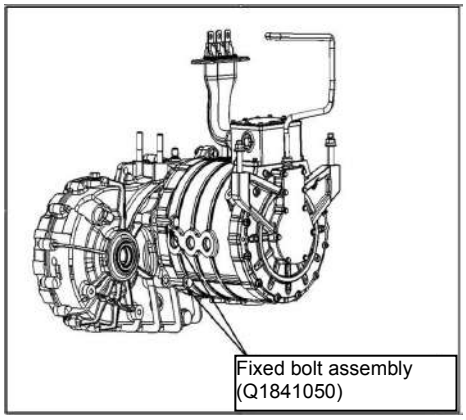
Installation of accelerator and drive motor

① Install O-type ring to end surface groove of drive motor, evenly spread lubricant to drive motor spline to avoid spline rusted, and place decelerator flat, align output shaft of drive motor to decelerator input spline and insert, slowly rotate and drop to fit. Adjust position, and rotate to right position (locating by locating pin);

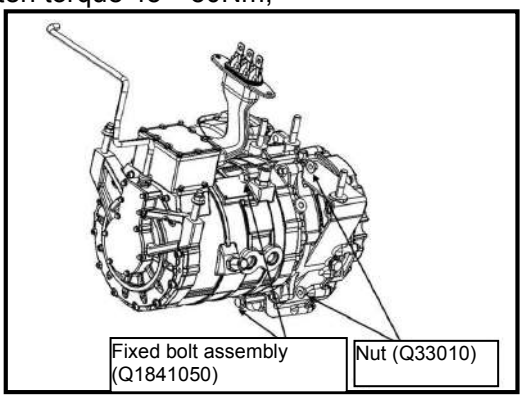
② Use bolt assembly 2 (Bolt Q15010130, spring washer Q40310, flat gasket Q40110 assembly), 2 connect and tighten decelerator assembly and driving motor, tighten torque 45～50Nm. Pay attention that bolt should cross through the direction from decelerator to motor when installing;



③ Use 2 bolts (Q1841050) cross through the direction from motor to decelerator, and connect and tighten decelerator assembly and drive motor, tighten torque 45～50Nm;

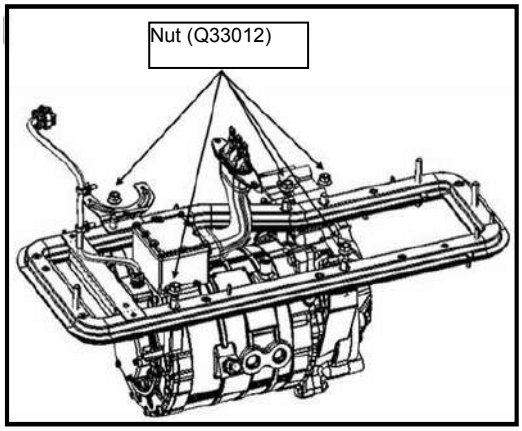


④ Use 2 bolts (Q1841050) cross through the direction from motor to decelerator, and use 2 nuts (Q33010) connect and tighten decelerator assembly and drive motor, tighten torque 45～50Nm;



Connection of motor and decelerator assembly and crossbeam

① After pre-installing motor and decelerator assembly, cross 5 bolts through 5 vent holes on power assembly crossbeam, and use 5 nuts (Q33012) to connecting tighten, tighten torque is 85～90Nm.



Check the following items after installation

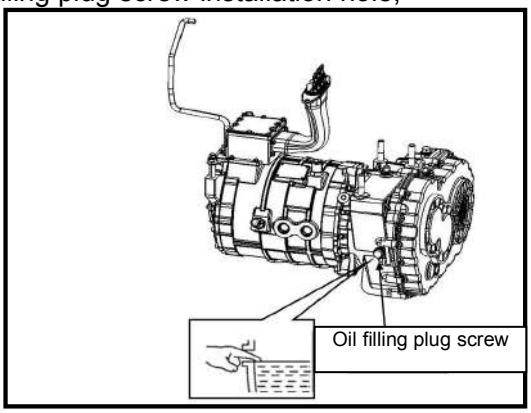
① There should be oil in decelerator;

② Whether decelerator oil filling plug screw M16×1.5 (Tighten torque 30～40Nm), oil discharging plug screw M18×1.5 (Tighten torque 35～45Nm) is tightened well, if not, please tighten.

Gear Oil

Detection of Oil Level

① Remove oil filling plug screw, check whether oil is full by oil filling plug screw installation hole;

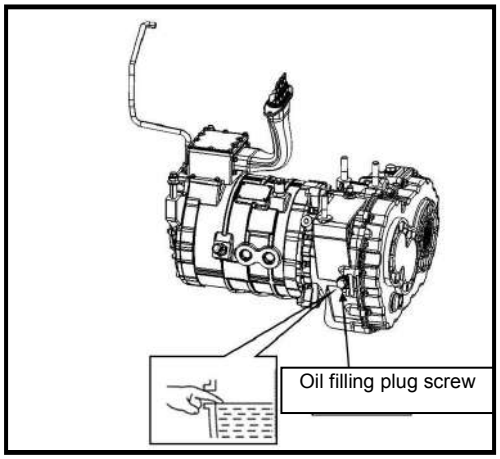


② Should spread screw thread sealant before installing oil filling plug screw, and tighten bolt according to

required tighten torque (Tighten torque is 30～40Nm).

Fill Oil

① Remove oil filling plug screw, fill new gear oil until oil level close to oil inlet port getting to specified height, about $2.7^{+0.3}_{0}$ L.

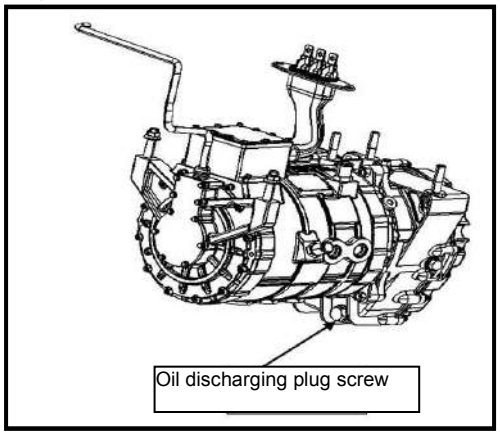


Discharge Oil

① Remove oil filling plug screw;

② Remove oil discharging plug screw, and discharge gear oil;

③ Should spread screw thread sealant before installing oil filling plug screw and oil discharging plug screw, tighten according to specified tighten torque (Oil filling plug screw tighten torque 30～40Nm, oil discharging plug screw tighten torque 35～45Nm).



Electrical Instrument

Safety Precaution

Introduction

Please abide by the following precaution measures, to ensure carrying out maintenance service safely and correctly.

Precaution for engineer using medical electronics

Forbidden operation

Warning:

- **The vehicle has strong magnetic parts.**
- **If an engineer uses medical electronic device, such as electronic pacemaker, it is forbidden for him to operate on the vehicle. Otherwise, the function of the electronic device may be affected by the strong magnetic parts.**

Precaution for normal charge

Warning:

- **If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, the device can be only be used after its function being checked and confirmed before starting normal operations.**
- **During normal charge operation, the medical electronic device may be affected by electromagnetic wave. An engineer who uses medical electronic devices including heart pacemaker, cardioverter, defibrillator cannot enter passenger compartment (including trunk).**

Precaution for communication device operation

- **If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, please keep enough distance with communication device.**
- **The function of medical electronic devices including heart pacemaker, cardioverter, defibrillator may be affected by the electromagnetic wave of remote intelligent terminal.**
- **If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, the electromagnetic wave of remote intelligent terminal may affect its function. It is mandatory to request the medical electronic device manufacturer to check and confirm the possible effect on medical electronic device when using remote intelligent terminal.**

Critical point check before maintenance

As high-voltage system may automatically activate, please confirm not setting remote air conditioning or timed charging before maintenance.

Caution:

If setting remote conditioning or timed charging, high-voltage system may also automatically start working even though the switch is OFF.

Precaution for supplemental restraint system "airbag" and "safety belt pretension"

Supplemental restraint system “airbag” and “safety belt pretension” is used together with front seat safety belts, which can reduce the damage to the driver and front passenger during collision. Supplemental restraint system consists of safety belt, driver airbag, and front passenger airbag. The detailed information of supplemental restraint system is included in the chapters of airbag system and seat safety belt.

Warning:

In order to avoid accidents, please abide by the following content:

- **To avoid the failure of supplemental restraint system and considering that the risk of physical injuries will increase during collision if the system fails, all the service must be executed by DR authorized dealer.**
- **Non-normative maintenance of supplemental restraint system including non-normative removal and installation may result in accidental trigger of the system and cause physical injuries. Regarding the method of removing airbag module, please refer to Airbag System chapter.**

- **Except for the operations in the service manual, please do not use electrical test device to test any circuit of supplemental restraint system. The color of harness and connector of supplemental restraint system is yellow or orange.**

Precaution for using power tool (pneumatic or electric) and hammer

- When power switch is at “ON” position and approach airbag diagnosis sensor or other sensors of airbag system, please do not use power tools or hammer on the sensor part area. Violent vibration may trigger these sensors and airbag to cause serious injuries.
- When using power tools or hammer, put the key at “LOCK” position, unplug the negative pole of 12V lead-acid battery, wait at least one minute, and then start maintenance.

Precaution for removing 12V battery

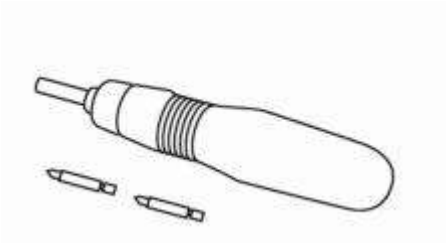
Before removing 12V battery, turn the key to “ON” position, and then turn to “LOCK” position.

Reminder:

- Though the key is at “LOCK” position, auto-recharge function of 12V battery may activate.
- After the key turns from “ON” to “LOCK”, auto-recharge function of 12V battery will not activate.

Preparation work

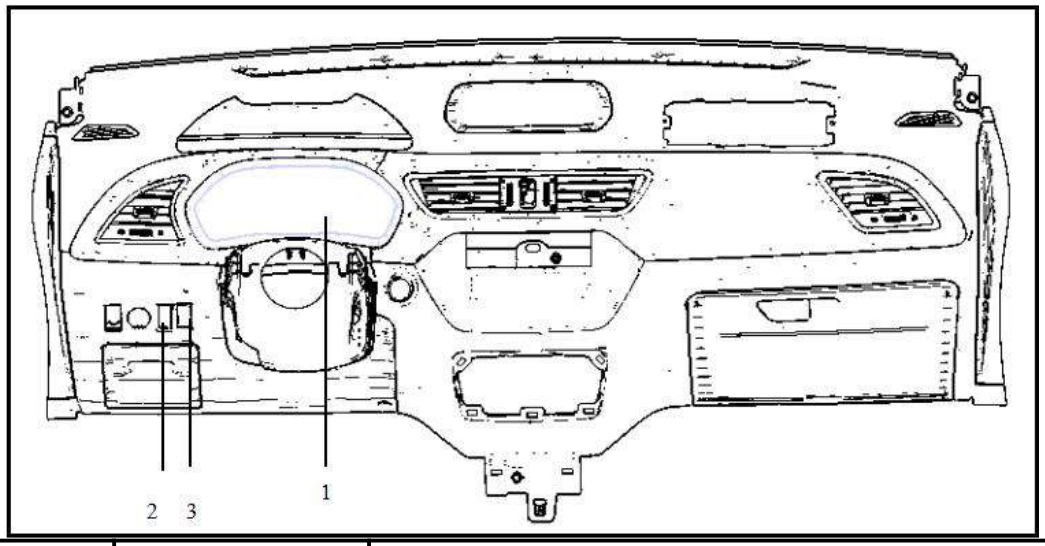
General tool

Tool name	Description
Power tool 	Loosen bolt

Constituent component

Electrical Instrument-

Part position



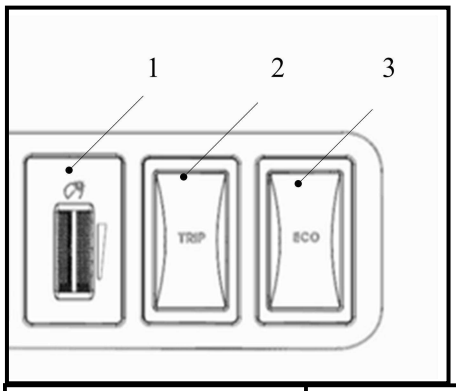
SN	Part name	Description
1	Electrical Instrument-	Refer to “Electrical instrument system-constituent component”
2	Light control switch	Refer to “Electrical instrument system-control switch”
3	TRIP switch	Refer to “Electrical instrument system-control switch”

Electrical instrument controls following items through each controller CAN signal, switch signal and sensor signal.

- Vehicle speed meter
- Battery meter
- Battery available capacity meter
- Battery temperature meter
- Power meter
- Odometer
- Indicator lamp
- Warning lamp
- Instrument illumination control
- Information display

Instrument control switch

Instrument control switch is located at the left side of switch group on cluster and controls following functions.



SN	Switch name	Description
1	Backlight adjustment knob	Adjust instrument backlight.
2	TRIP switch	Reset electrical instrument tripmeter.
3	ECO switch	ECO mode selection switch.

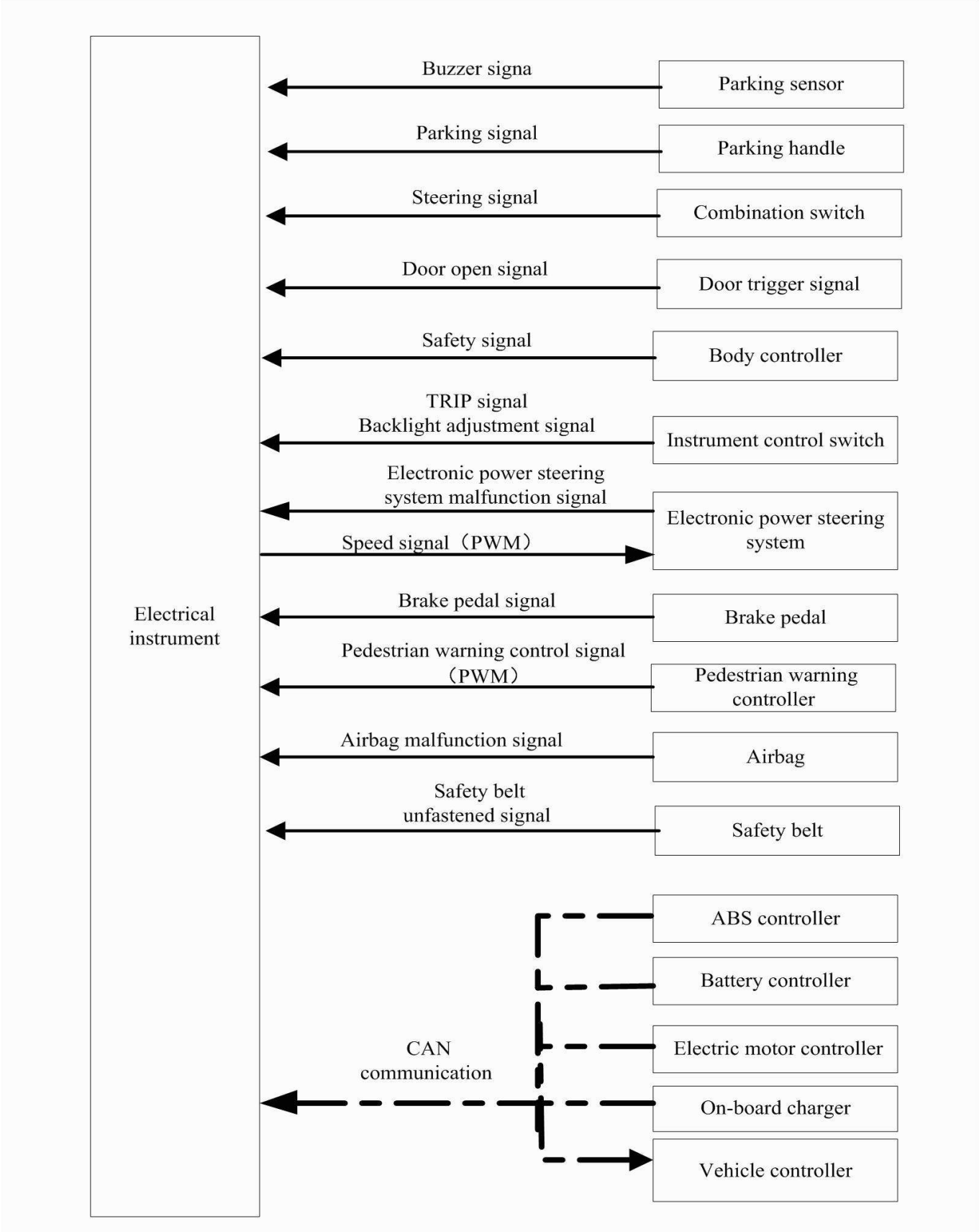
- Send following signals to electrical instrument

- Backlight adjustment knob signal
- TRIP reset switch signal
- ECO trigger switch

Electrical instrument system

Electrical instrument introduction

System schematic diagram



Electrical instrument input signal (CAN communication)

Signal source	Signal name
ABS controller	ABS malfunction warning lamp signal
Vehicle controller	Electric motor malfunction warning lamp signal
	Battery malfunction warning lamp signal
	System malfunction warning lamp signal
	Limit power indicator lamp signal
	High voltage cut-off indicator lamp signal
	READY indicator lamp signal
	Average electricity consumption signal
	Energy flow signal
	Remainder range signal
	Battery capacity signal
	Battery temperature signal
	Battery available capacity signal
	Electric motor power signal
	Gear information signal
	ECO gear signal
	Charging wire connection indicator lamp signal
	Charging status indicator lamp signal
Electric motor controller	Tachograph signal

Electrical instrument output signal (CAN communication)

Receive signal component	Signal name
Vehicle controller/remote intelligent terminal	Total mileage

Electrical instrument output signal

Receive signal component	Signal name
Electronic power steering system controller	Speed signal
Acoustical signal	Door open warning signal
	Vehicle running warning signal
	Safety belt unfastened signal
	Critical CAN signal lost alarm

Description

Electrical Instrument-

- Electrical instrument collects signals from control unit, switch and sensor, and controls following functions.

- Travel mileage display

- Warning lamp

- Indicator lamp

- Electrical instrument backlight control

- Electrical instrument effect function

- Information display

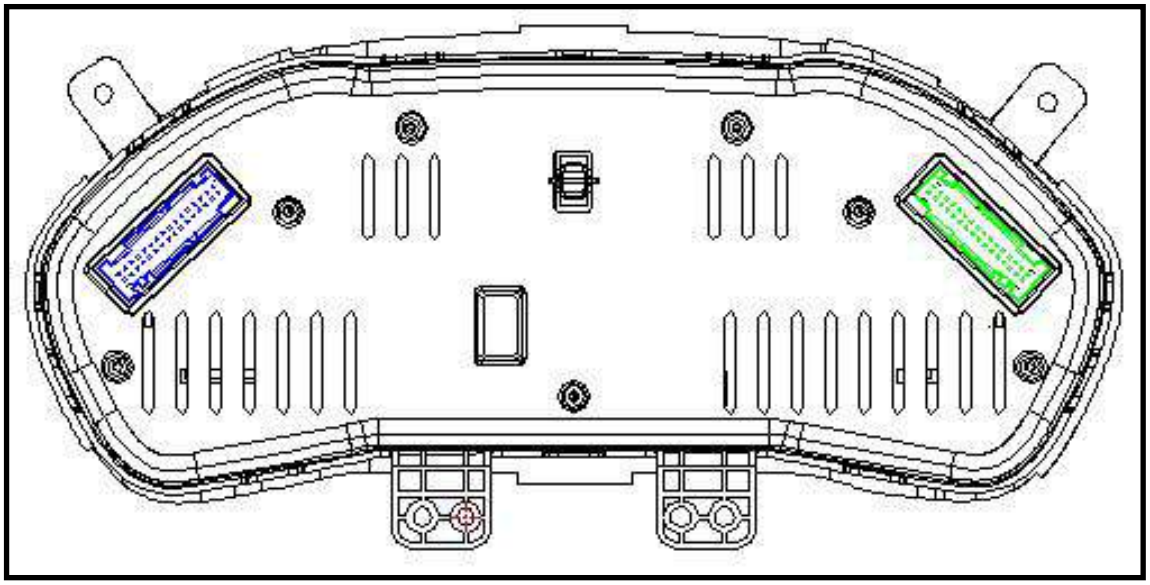
- Electrical instrument has buzzer function and can send alarm sound.

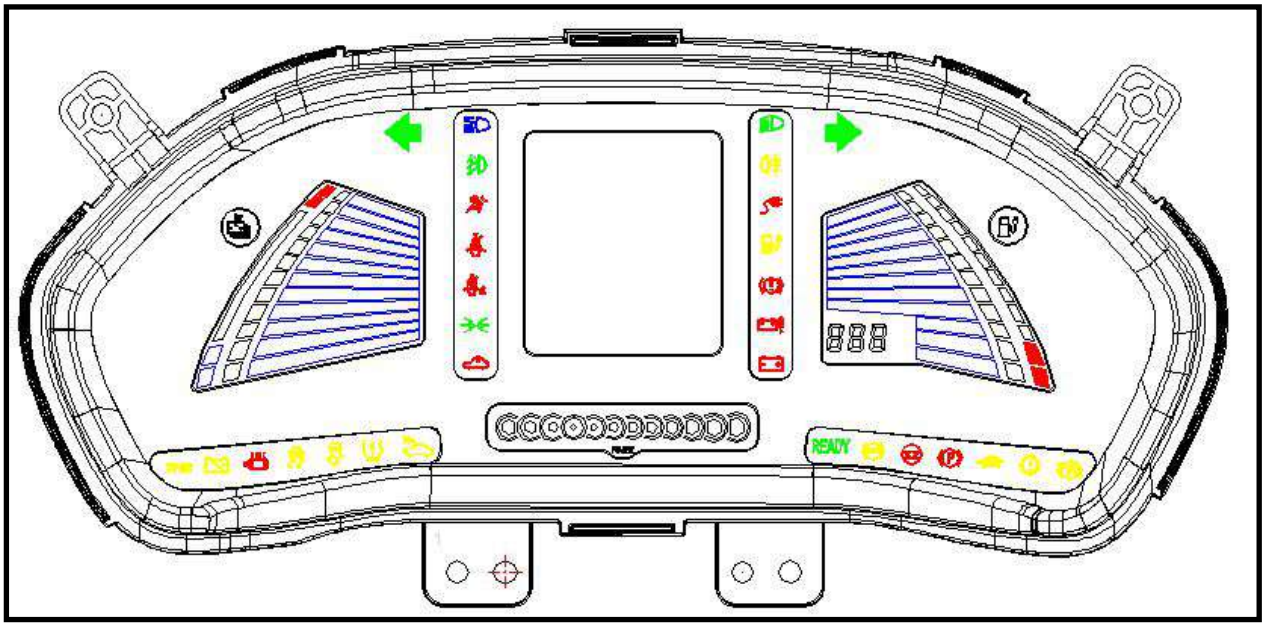
Electrical instrument function list

System		Description
Measuring meter	Battery temperature meter	Display power battery temperature.
	Battery meter	Display power battery remainder capacity.
	Battery available capacity meter	Display power battery available capacity.
	Electric motor power meter	Display following power situation. - Current electric motor power - Maximum electric motor output power - Maximum energy recovery power
	Speedometer	Display current speed.
Instrument	Instrument illumination control	Control display backlight.

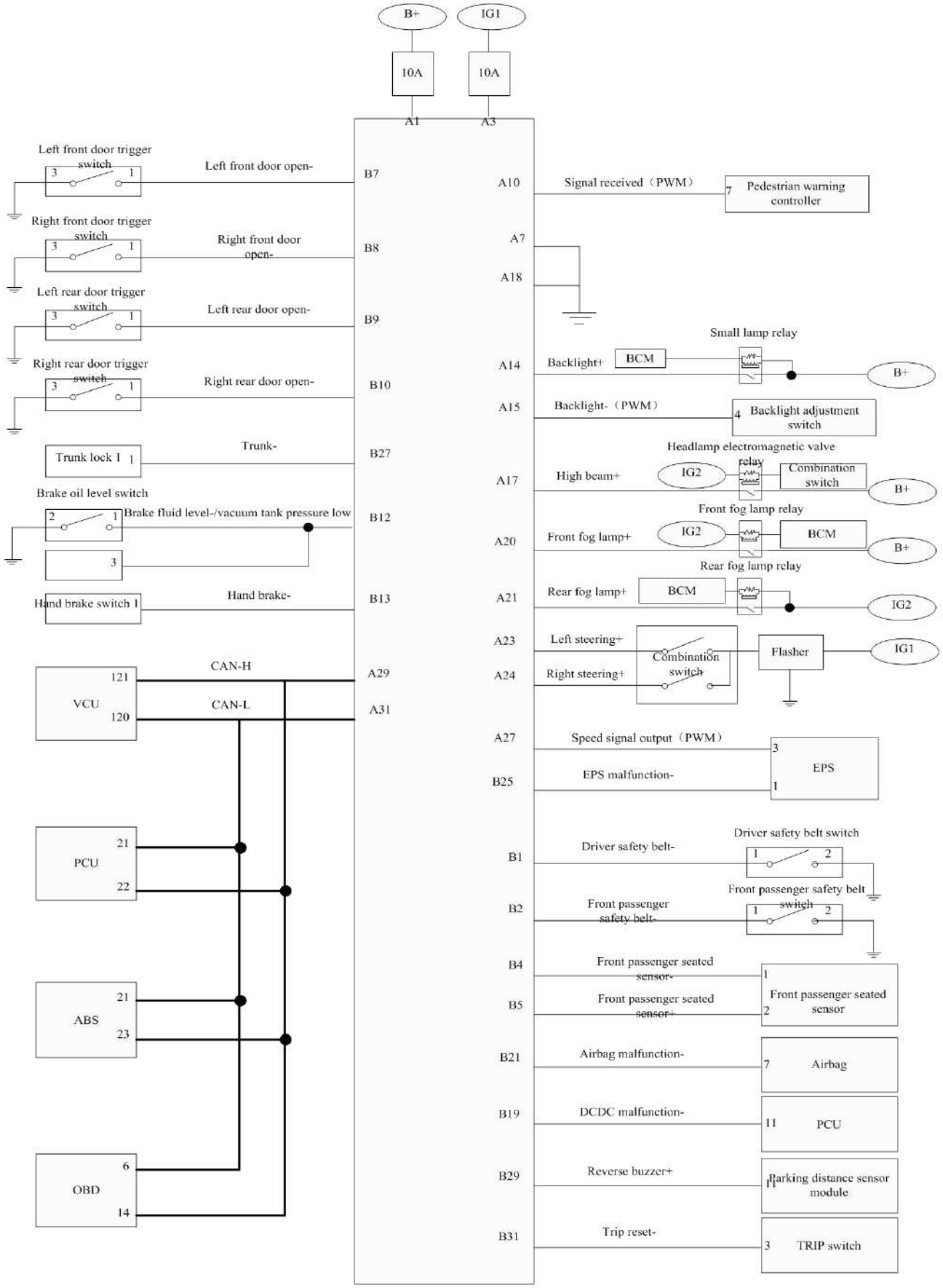
System		Description
illumination control	function	
Indicator lamp	Instrument control indicator lamp function	Control instrument indicator lamp display.
READY function	READY indicator lamp	When the vehicle is in travelling status, READY indicator lamp is always ON.
Information display	Total mileage display	Display total mileage.
	TRIP mileage display	Display trip mileage.
	Gear display	Display gear (including ECO gear).
	Average energy consumption	Display average energy consumption.
	Energy flow display	Display energy flow direction and status.
	Door open display	Display when any door opens.
Statement reminder	Vehicle-in-danger, vehicle pull-over, trouble lamp, leave immediately	Display when the vehicle is under potential safety risk.
	Limit power mode	Display when vehicle enters limit power status.
	Vehicle failure, vehicle pull-over	Display when vehicle needs to be pulled over.
	Battery temperature extremely high	Display when power battery temperature is extremely high.
	Battery temperature extremely low	Display when power battery temperature is extremely low.
	Go to DR showroom for maintenance!	Display when vehicle need maintenance.
	Charging wire connecting!	Display when the key is at ON position and charging wire is being connected.
	Turn back to N gear, then READY.	Display when the key is turned to “START” at D or N gear.
	Press brake pedal	Display before shifting gear.
	Release hand brake	Display when it is necessary to release hand brake.

Electrical instrument layout





Electrical instrument electrical schematic diagram



Electrical instrument failure-safety

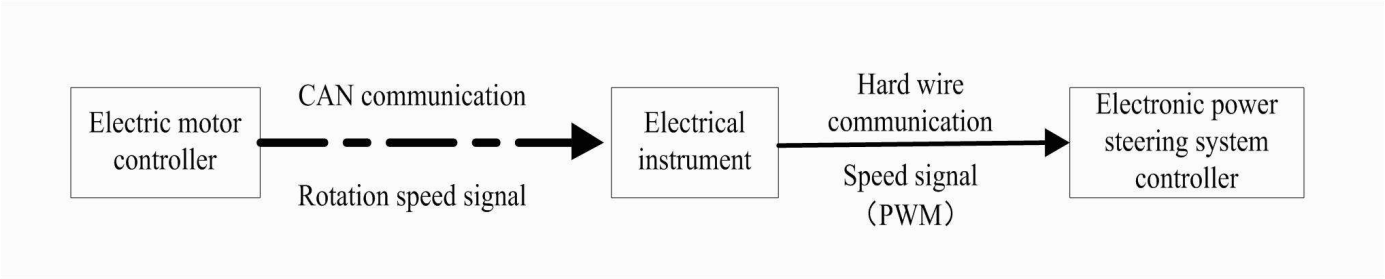
“Failure-safety” mode list

When malfunction occurs in CAN communication between electrical instrument and other controllers, trouble shooting will be activated.

<table>
<tr><th colspan="2">Function</th><th>Strategy</th></tr>
<tr><td colspan="2">Speedometer</td><td rowspan="5">Do not display.</td></tr>
<tr><td colspan="2">Battery temperature meter</td></tr>
<tr><td colspan="2">Battery meter</td></tr>
<tr><td colspan="2">Battery available capacity meter</td></tr>
<tr><td colspan="2">Electric motor power meter</td></tr>
<tr><td rowspan="4">Liquid crystal display</td><td>Gear</td><td>Display “N” gear.</td></tr>
<tr><td>TRIP mileage</td><td rowspan="2">Record lost during this vehicle operation.</td></tr>
<tr><td>Total mileage</td></tr>
<tr><td>Energy flow</td><td>Display vehicle parking interface.</td></tr>
<tr><td>Warning lamp/indicator lamp</td><td>ABS malfunction warning lamp signal</td><td rowspan="10">Indicator lamp goes out.</td></tr>
<tr><td rowspan="3">Front fog lamp</td><td>Electric motor malfunction warning lamp signal</td></tr>
<tr><td>Battery malfunction warning lamp signal</td></tr>
<tr><td>System malfunction warning lamp signal</td></tr>
<tr><td rowspan="5">Average energy consumption</td><td>Limit power indicator lamp signal</td></tr>
<tr><td>High voltage cut-off indicator lamp signal</td></tr>
<tr><td>READY indicator lamp signal</td></tr>
<tr><td>Charging wire connection indicator lamp signal</td></tr>
<tr><td>Charging status indicator lamp signal</td></tr>
</table>

Speedometer

System schematic diagram



Description

- Electrical instrument receives electric motor controller rotation speed signal and calculates into speed signal. Vehicle speed value is displayed on instrument.
- Electrical instrument sends calculated speed signal value to electronic power steering system controller, which adjusts steering power according to speed signal value.

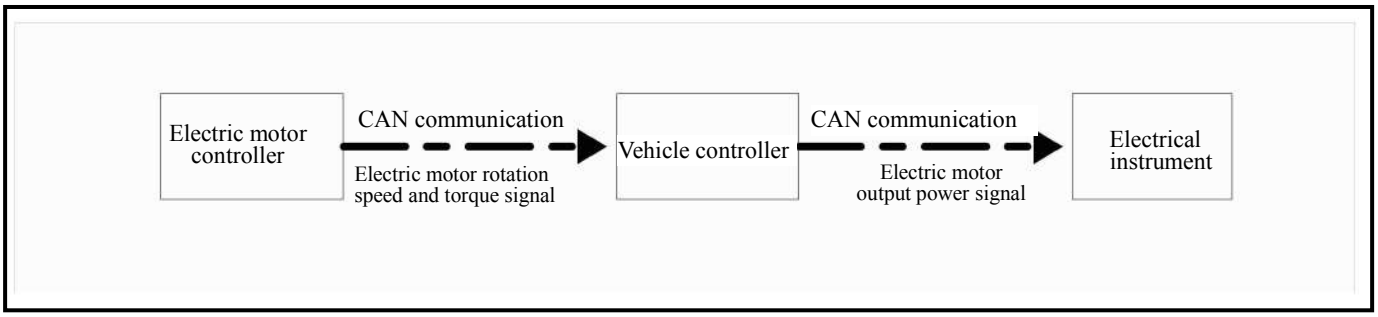
Signal path

Signal name	Signal path
Speed signal	Electric motor controller (rotation speed signal)→Electrical instrument (speed signal)→Electronic power steering system controller

Power meter

Power meter system description

System schematic diagram



Description

- Power level can be displayed on electrical instrument power meter

- Current electric motor power

- Electric motor maximum output power

- Maximum energy recovery power

- Electric motor controller transmits electric motor rotation speed and torque data to vehicle controller through CAN communication. Vehicle controller calculates electric motor power value.
- Vehicle controller transmits electric motor power to electrical instrument for display.

- Current electric motor power signal value

- Electric motor maximum output power signal value

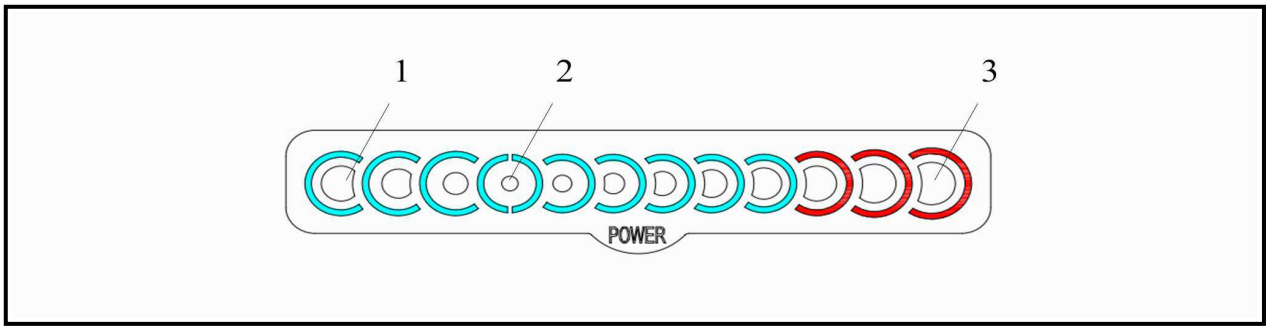
- Maximum energy recovery power signal value

- Based on CAN signal received from vehicle controller, power value is displayed on instrument power meter.

Signal path

Signal name	Signal path
Current electric motor power signal value	Electric motor controller (Electric motor rotation speed and torque signal)→Vehicle controller (Electric motor output power signal)→Electrical instrument
Electric motor maximum output power signal value	
Maximum energy recovery power signal value	

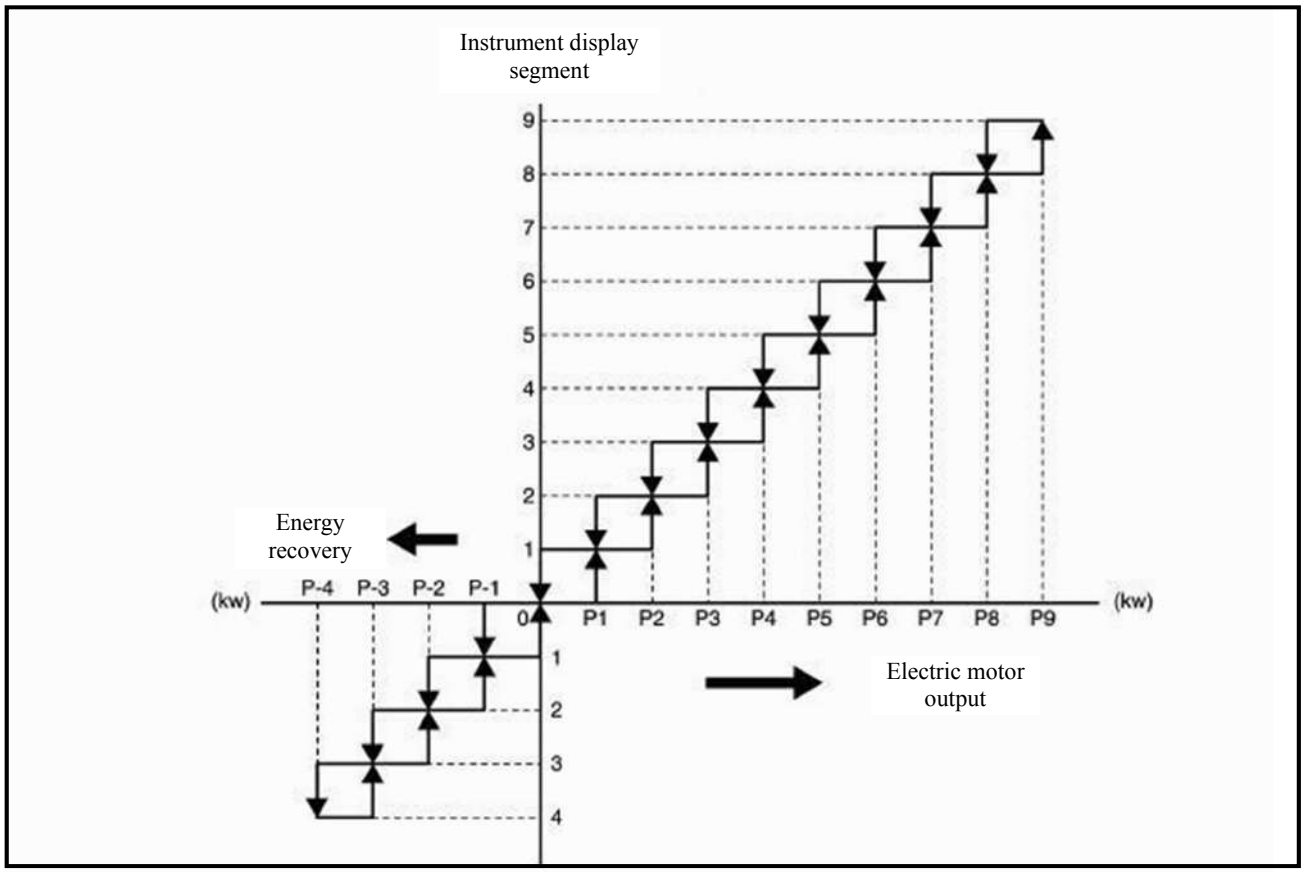
Electrical instrument power meter function list



	Function	Description	Signal name
1	Current electric motor power	Black round dot displays current electric motor power and energy recovery power.	Electric motor power signal
2	Maximum electric motor output power	Display maximum energy recovery power.	Fixed value
3	Maximum energy recovery power	Display maximum electric motor output power.	Fixed value

Display bar parameter comparison table

Electrical instrument power meter display/go-out segment



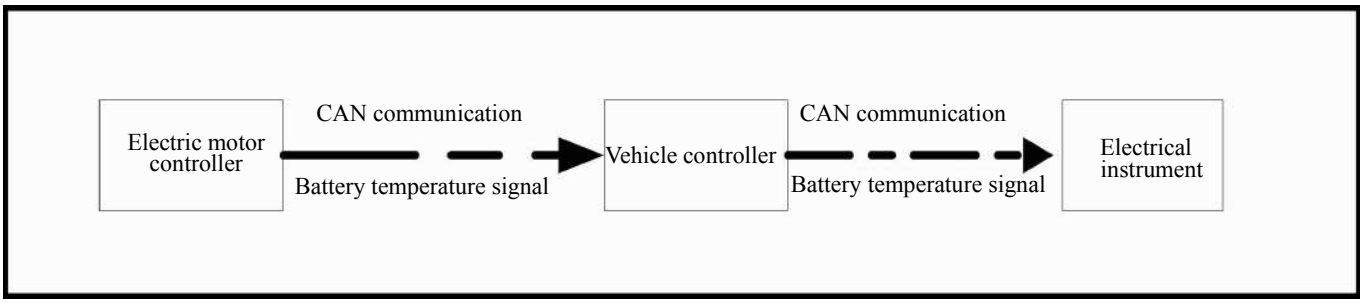
Power meter display segment number and power value table

Display segment number		Power（kw）	-
9	Electric motor output power	72	P9
8		64	P8
7		56	P7
6		48	P6
5		40	P5
4		32	P4
3		24	P3
2		16	P2
1		8	P1
0	-	0	0
1	Energy recovery	6	P-1
2		12	P-2

Display segment number		Power（kw）	-
3		18	P-3
4		24	P-4

Battery temperature meter

System schematic diagram



Description

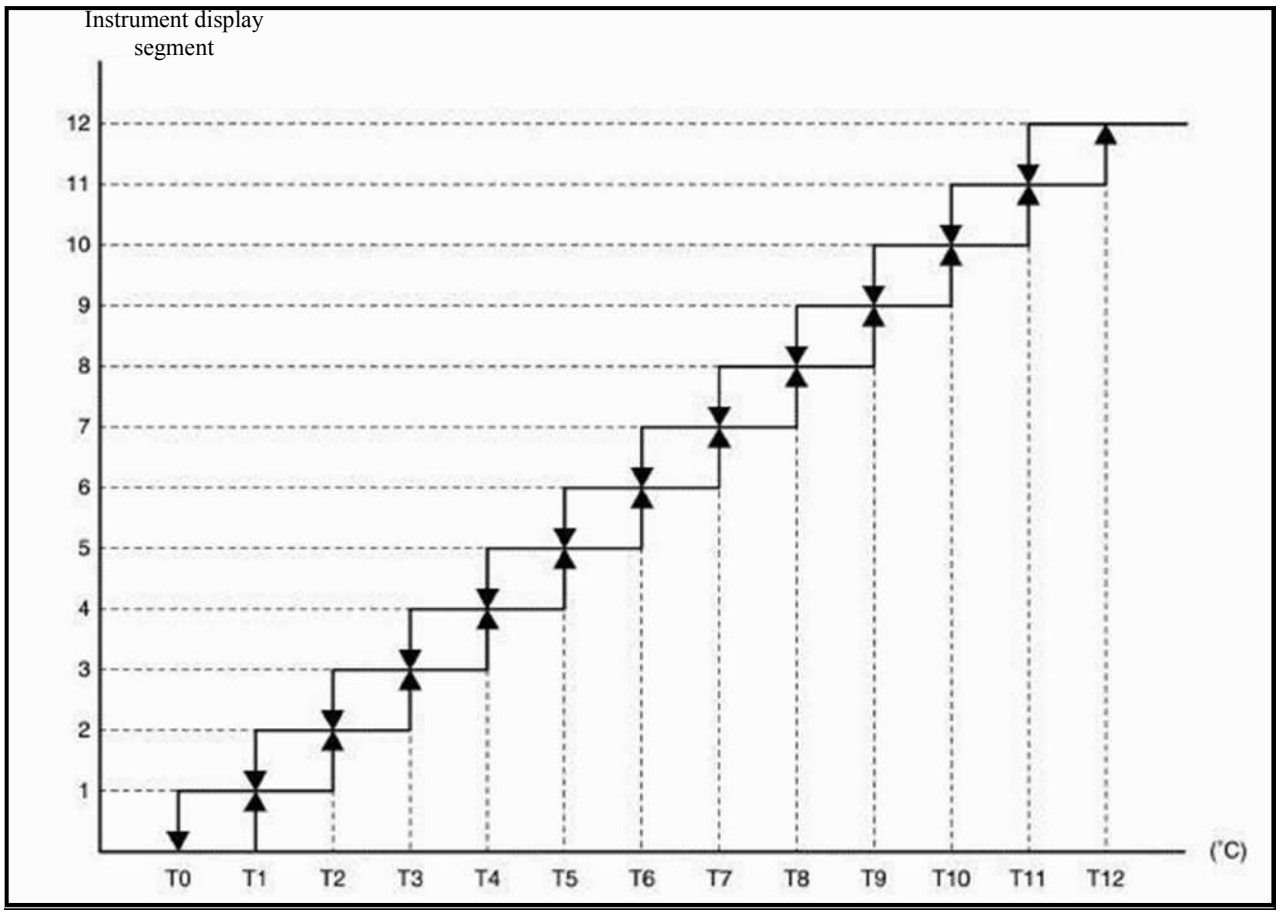
- Battery controller transmits battery temperature signal to vehicle controller through CAN communication. After dealing with the signal, vehicle controller transmits battery temperature signal to electrical instrument through CAN signal. Electrical instrument displays battery temperature information on battery temperature meter.
- Electrical instrument displays battery temperature information on battery temperature meter.

Signal path

Signal name	Signal path
Battery temperature signal	Battery controller (battery temperature signal)→Vehicle controller→Electrical instrument

Display bar parameter comparison table

Power battery temperature meter display/go-out segment



Relation between battery temperature meter display segment and battery temperature

Display segment	Temperature（°C）	-
12	60	T12
11	57.5	T11
10	55	T10
9	52.5	T9
8	50	T8
7	36.8	T7
6	23.5	T6
5	10.3	T5
4	-3	T4
3	-6	T3
2	-9	T2

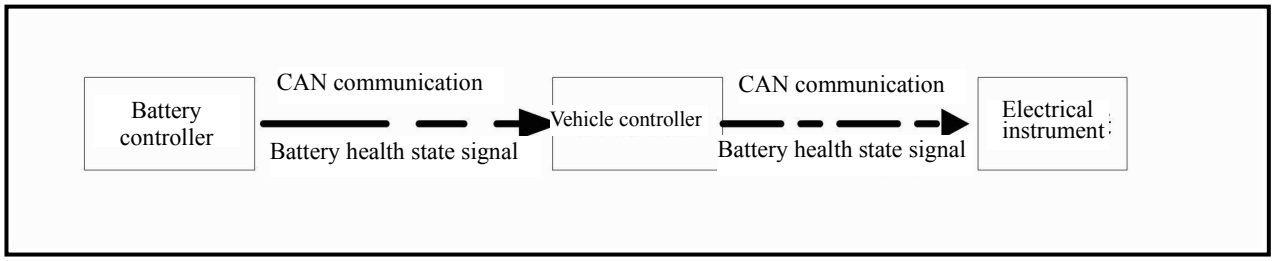
Display segment	Temperature（°C）	-
1	-12	T1
0	-15	T0

Reminder:

Battery temperature displayed on battery temperature meter varies according to power battery available capacity.

Power battery available capacity meter

Power battery available capacity meter system description



Description

- Battery controller transmits battery available capacity signal to vehicle controller through CAN communication. After dealing with the signal, vehicle controller transmits battery available capacity signal to electrical instrument through CAN signal. Electrical instrument displays battery temperature information on battery temperature meter.
- Electrical instrument displays battery available capacity information on battery available capacity meter.

Reminder:

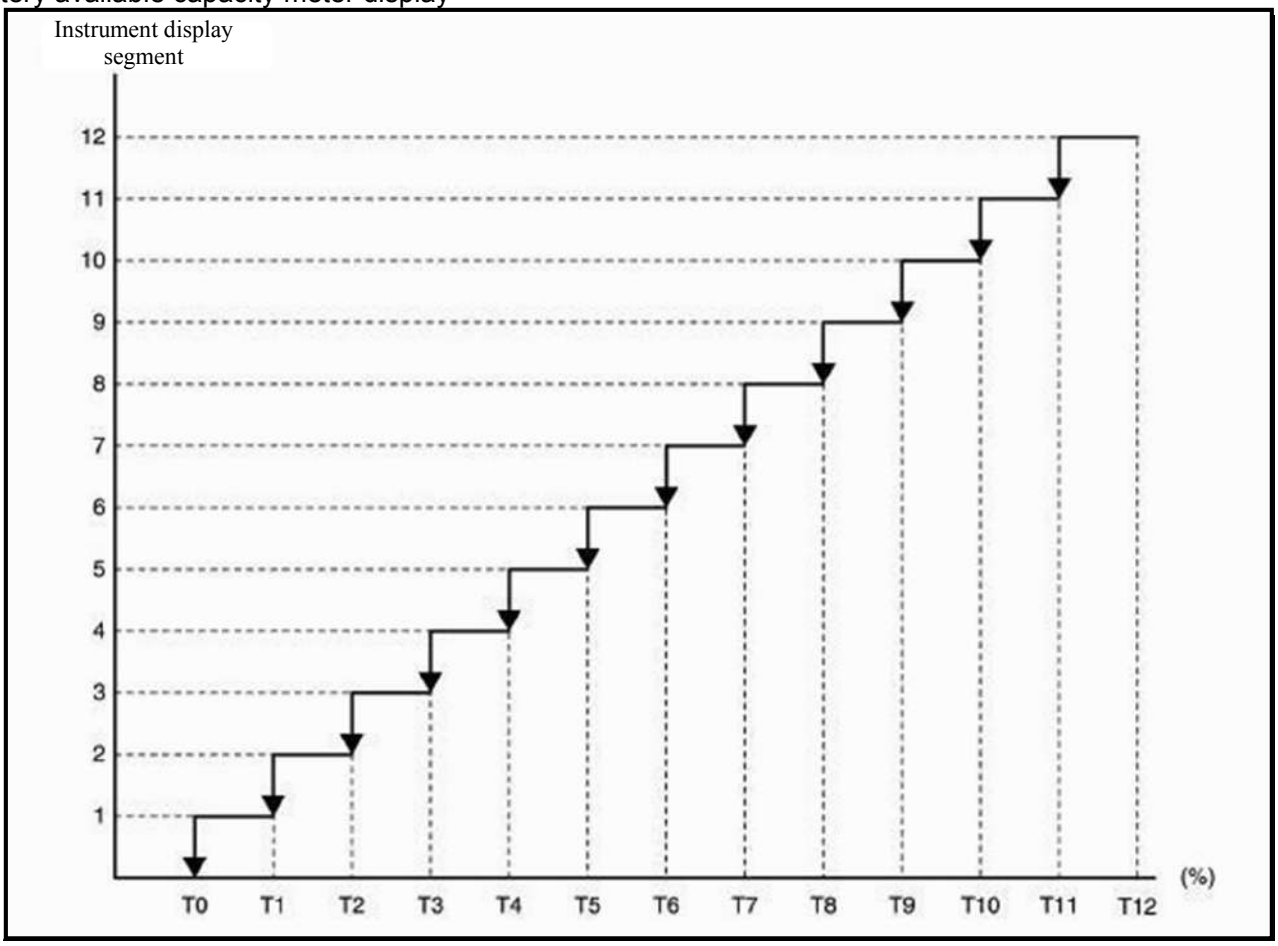
When power battery decays, its energy decreases.

Signal path

Signal name	Signal path
Battery available capacity signal	Battery controller (battery available capacity signal)→Vehicle controller→Electrical instrument

Display bar parameter comparison table

Battery available capacity meter display



Relation between battery available capacity meter display and battery available capacity:

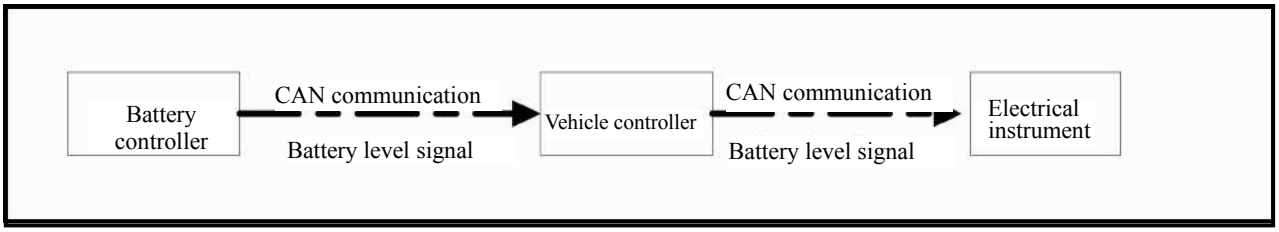
Display segment	Battery available capacity (%)	-
12	Over 85	T12
11	85	T11
10	78.75	T10
9	72.5	T9
8	66.25	T8
7	60	T7
6	53.75	T6
5	47.5	T5
4	41.25	T4
3	35	T3
2	28.75	T2

Display segment	Battery available capacity (%)	-
1	22.5	T1
0	16.25	T0

Power battery capacity meter

Power battery capacity meter system description

System schematic diagram



Description

- Battery controller transmits battery capacity signal to vehicle controller through CAN communication. After dealing with the signal, vehicle controller transmits battery capacity signal to electrical instrument through CAN signal. Electrical instrument displays battery capacity information on battery capacity meter.
- Power battery capacity value is displayed on battery capacity meter.

Reminder:

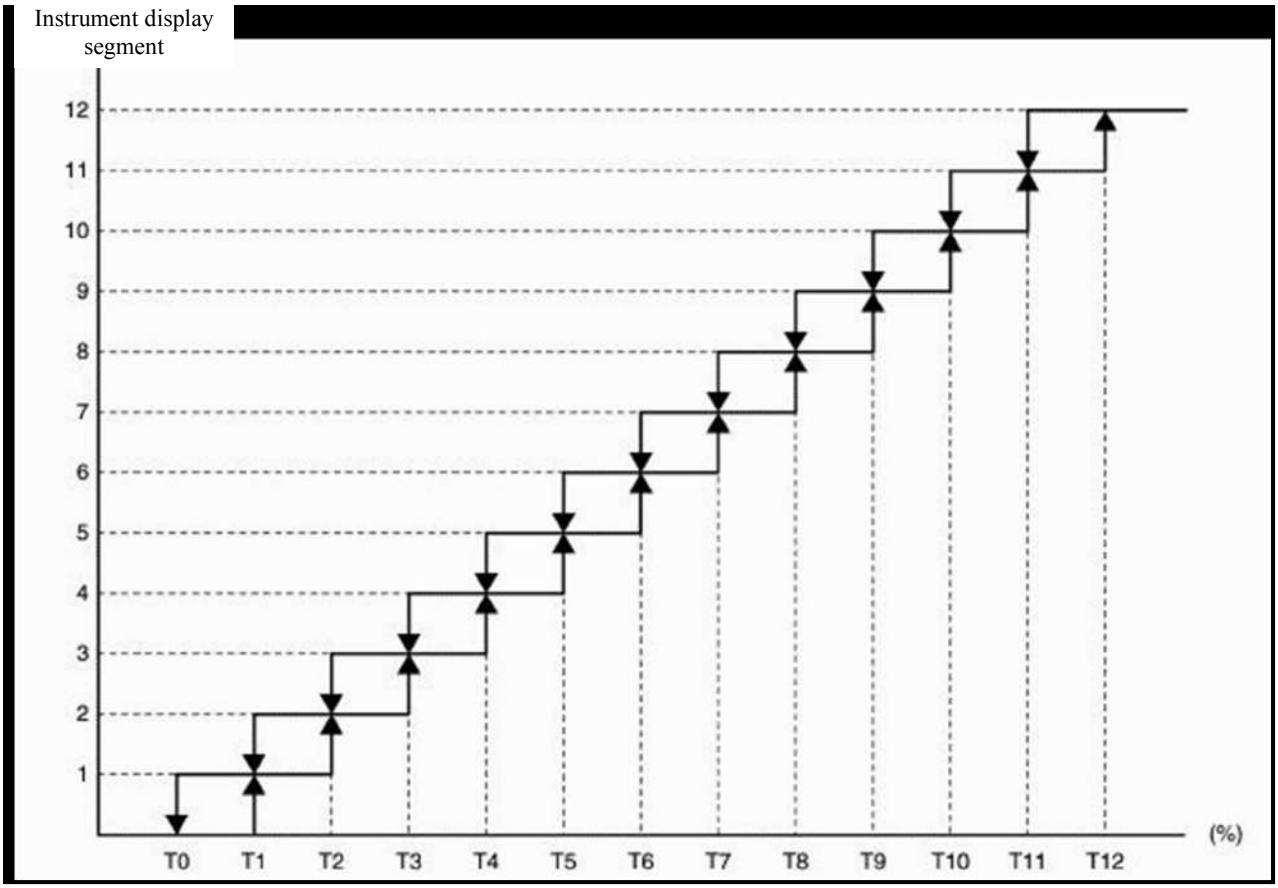
- Power battery available capacity is displayed in percentage of full battery capacity.
- When power battery temperature changes, power battery volume may change. Thus, power battery available capacity may change.

Signal path

Signal name	Signal path
Battery capacity signal	Battery controller (battery capacity signal)→Vehicle controller→Electrical instrument

Display bar parameter comparison table

Battery meter display



Relation between battery meter display segment and battery capacity:

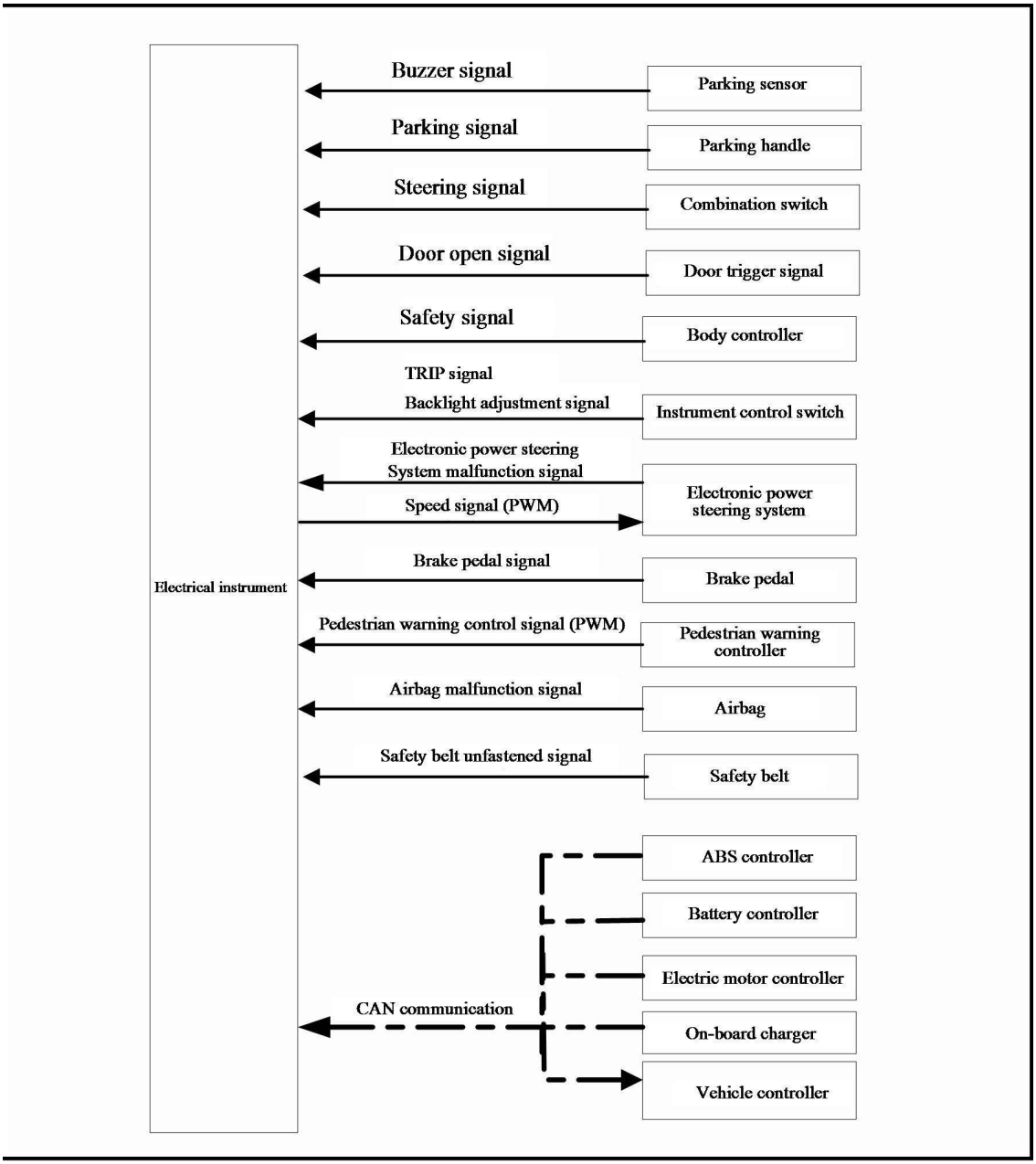
Display segment	Battery capacity（%）	-
12	96	T12
11	88	T11
10	80	T10
9	72	T9
8	64	T8
7	56	T7
6	48	T6
5	40	T5
4	32	T4
3	24	T3
2	16	T2
1	8	T1

Display segment	Battery capacity（%）	-
0	0	T0

Indicator lamp and warning lamp

Indicator lamp and warning lamp system description

System schematic diagram



Electrical instrument input signal (CAN communication)

Transmitting component	Signal name
ABS controller	ABS malfunction warning lamp signal
Vehicle controller	Electric motor malfunction warning lamp signal
	Battery malfunction warning lamp signal
	System malfunction warning lamp signal
	Limit power indicator lamp signal
	High voltage cut-off indicator lamp signal
	READY indicator lamp signal
	Charging wire connection indicator lamp signal
	Charging status indicator lamp signal

Electrical instrument output signal (CAN communication)

Receiving component	Signal name
Vehicle controller	Total mileage signal

Description

The illumination and go-off of red indicator lamp and yellow indicator lamp are displayed on electrical instrument.

The red indicator lamp displayed on electrical instrument is listed as following:

- Trunk indicator lamp
- Door open indicator lamp
- Safety belt warning lamp
- Airbag warning lamp
- Electronic power steering indicator lamp
- Hand brake indicator lamp
- Electric motor malfunction warning lamp
- Battery malfunction warning lamp
- System malfunction warning lamp
- Charging wire connection indicator lamp

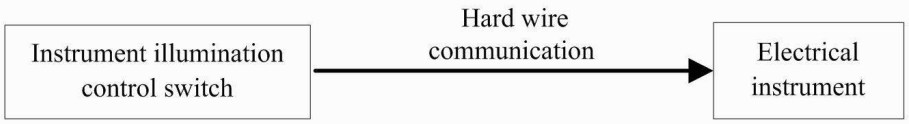
The yellow indicator lamp displayed on electrical instrument is listed as following:

- Rear fog lamp indicator lamp
- Front fog lamp indicator lamp
- VSP indicator lamp
- ABS malfunction warning lamp
- Limit power indicator lamp
- High voltage cut-off indicator lamp
- Charging status indicator lamp

Electrical instrument illumination control

Electrical instrument system description

System schematic diagram



Description

Control instrument illumination based on following signals

- Position lamp switch
- Backlight lamp adjustment signal

Based on following conditions, electrical illumination can be divided into night mode and day mode.

Condition			Instrument illumination
Instrument illumination switch	Position lamp switch	Outside: bright*	Day mode
		Inside: dark*	Night mode
	Low beam lever	Outside: bright*	Day mode
		Inside: dark*	Night mode
	OFF	Day mode*	Day mode

The operation of light control knob can adjust display brightness of electrical instrument.

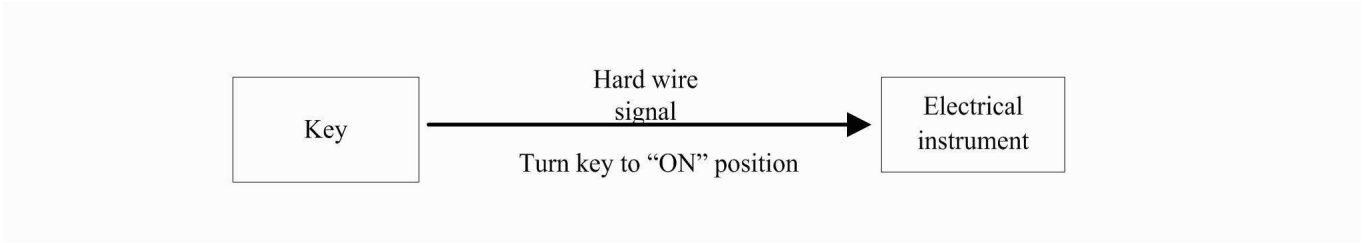
Signal path

Signal name	Signal path
Instrument illumination switch signal	Instrument illumination switch (illumination signal)→Electrical instrument

Electrical instrument display effect function

Electrical instrument display effect function system description

System schematic diagram



Description

Boot display effect

When turning key to "ON" position, the start of electrical instrument has following effect:

- Power meter
- Battery available capacity meter
- Battery meter
- Battery temperature meter

Electrical instrument "ON" position display effect

Electric instrument control logic at ON gear as following:

Control content	Control logic
Power meter	Display effect shows as following sequence: 1 Display bar becomes bright step by step, until whole line bright 2 Display bar goes off step by step, until whole line goes off 3 Display fully goes off. Display respective value according the current received data.
Battery available capacity meter	
Battery meter	
Battery temperature meter	

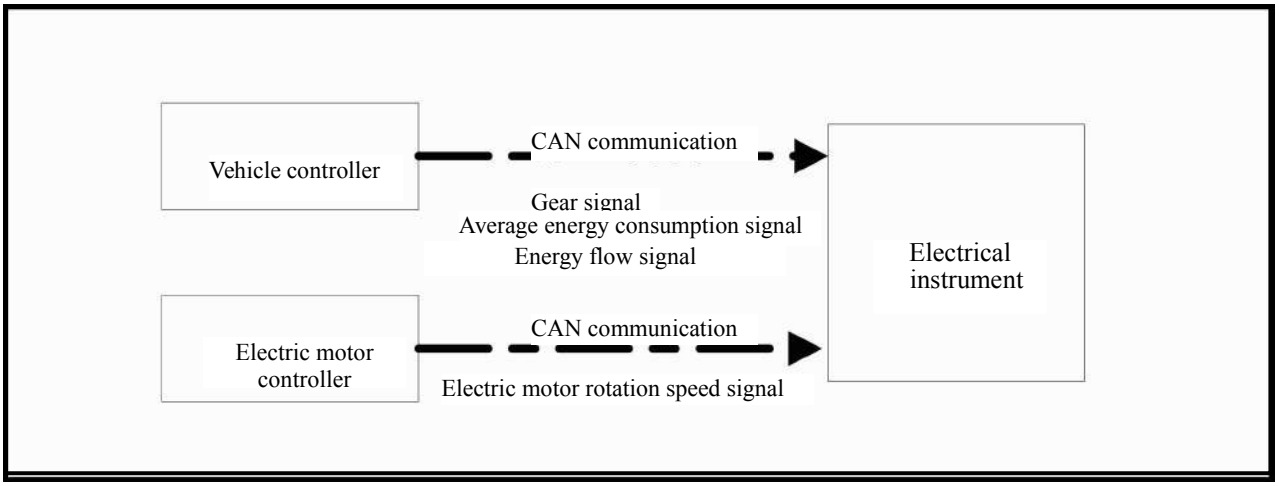
Reminder:

If the key is turned from "ON" position to "LOCK" position or "ACC" position during starting up, display effect will stop accordingly.

Information display

Information display system description

System schematic diagram



Electrical instrument input signal (CAN communication)

Signal source	Signal name
Vehicle controller	Gear information signal
	Average energy consumption signal
	Energy flow signal
Electric motor controller	Electric motor rotation speed signal

Description

Liquid crystal display on electrical instrument displays vehicle information.

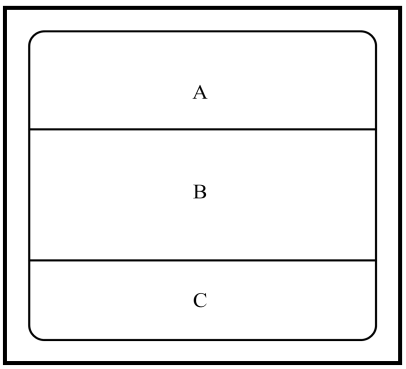
Display information signal comes from vehicle controller and electric motor controller.

Based on received signal, electrical instrument liquid crystal display shows following information:

- Speed display
- Gear display
- Average consumption display
- Energy flow display
- TRIP mileage display
- Total mileage display

Information display screen is divided into A, B, C sections. Each section shows different content according to the necessity of display content. There is also section combination.

Display section	Display content
A	Speed display
B	Energy flow display
	Warning tip display
C	Gear
	TRIP mileage
	Total mileage
A+B	Door open display
B+C	Charging information display



Charging time display

Based on following signal, electrical instrument displays charging time.

Signal name	Signal path
Reminding charging time signal	Vehicle controller (reminder charging time signal)

Tip reminder

Electrical instrument produces break-off, and shows respective warning, reminder and maintenance tips according to relevant component or switch signal.

When break-off condition is satisfied, generally displayed information will be shifted to warning information.

Type	Displayed tip
Mode type	Display limit power mode warning
Status type	Display power battery temperature extreme high warning
	Display power battery temperature extreme low warning
	Display charging completed warning
	Display charging wire connection warning
	Display release hand brake warning
	Display press brake pedal warning
	Display door open warning
warningWarning type	Display go to DR showroom for maintenance
	Display gear shift warning

Type	Displayed tip
	Display driver warning
	Display vehicle malfunction and pullover warning

Limit power mode warning

When power battery level is low or the vehicle is under limit power mode, limit power mode is displayed.

Electrical instrument displays or does not display “limit power mode” according to following signal.

Signal name	Signal path
Limit power mode signal	Vehicle controller (CAN signal)→Electrical instrument

Power battery temperature extreme high warning

When power battery temperature is extremely high, “battery temperature extreme high” is displayed.

Signal name	Signal path
Power battery temperature extreme high signal	Vehicle controller (CAN signal)→Electrical instrument

Power battery temperature extreme low warning

When power battery temperature is extremely low, “battery temperature extreme low” is displayed.

Signal name	Signal path
Power battery temperature extreme low signal	Vehicle controller (CAN signal)→Electrical instrument

Charging completed warning

When power battery charging is completed, “charging is completed” is displayed.

Signal name	Signal path
Power battery charging completed signal	Vehicle controller (CAN signal)→Electrical instrument

Charging wire connection warning

When power battery charging wire is connected, please start the vehicle and turn the key to “ON” position. “Charging wire is connected” is displayed.

Signal name	Signal path
Power battery charging wire connection signal	Vehicle controller (CAN signal)→Electrical instrument

Release hand brake warning

When it is necessary to remind customer to release hand brake, “Release hand brake” is displayed.

Signal name	Signal path
Release hand brake warning signal	Vehicle controller (CAN signal)→Electrical instrument

Press brake pedal warning

When it is necessary to remind customer to press brake pedal, “Press brake pedal” is displayed.

Signal name	Signal path
Press brake pedal warning signal	Vehicle controller (CAN signal)→Electrical instrument

Door open warning

When any door opens or trunk opens, door open image is displayed.

Signal name	Signal path
Door open signal	Door contact switch→Electrical instrument

Go to DR showroom for maintenance warning

When the vehicle needs go to DR distributor for maintenance, “Go to DR showroom for maintenance” is displayed.

Signal name	Signal path
Maintenance warning signal	Vehicle controller (CAN signal)

Gear shift warning

When the vehicle needs travelling and gear shift lever is not at “N” position, “Turn back to “N” position and then “READY” is displayed.

Signal name	Signal path
Gear shift warning signal	Vehicle controller (CAN signal)

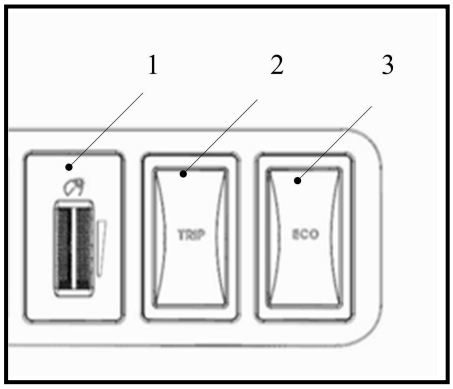
Driver warning

When the vehicle is under potential safety risk and it is necessary to remind the driver, “Vehicle-in-danger, vehicle pull-over, trouble lamp, leave immediately” or “Vehicle failure, vehicle pull-over” is displayed.

Signal name	Signal path
Driver warning signal	Vehicle controller (CAN signal)

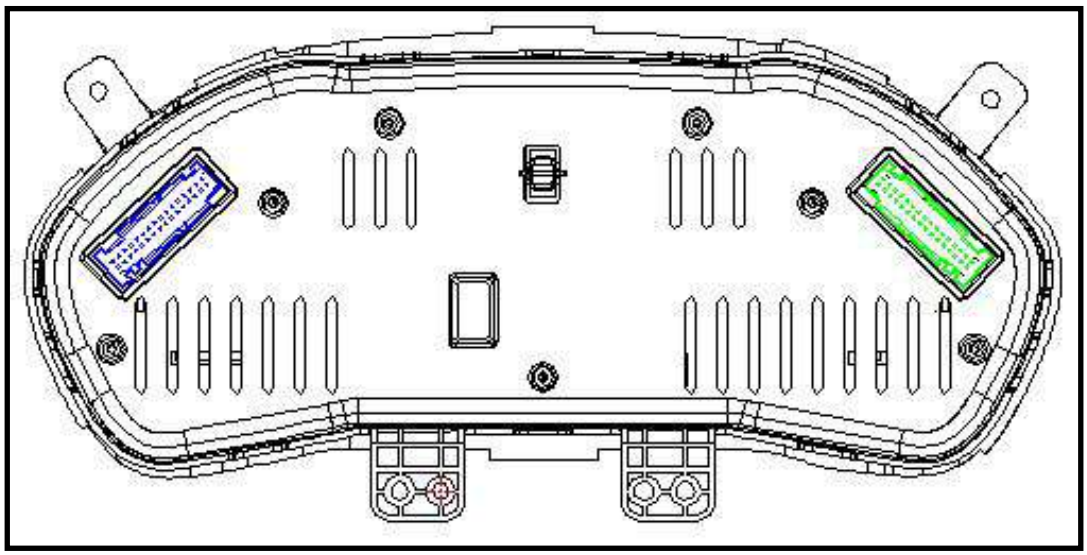
Operation

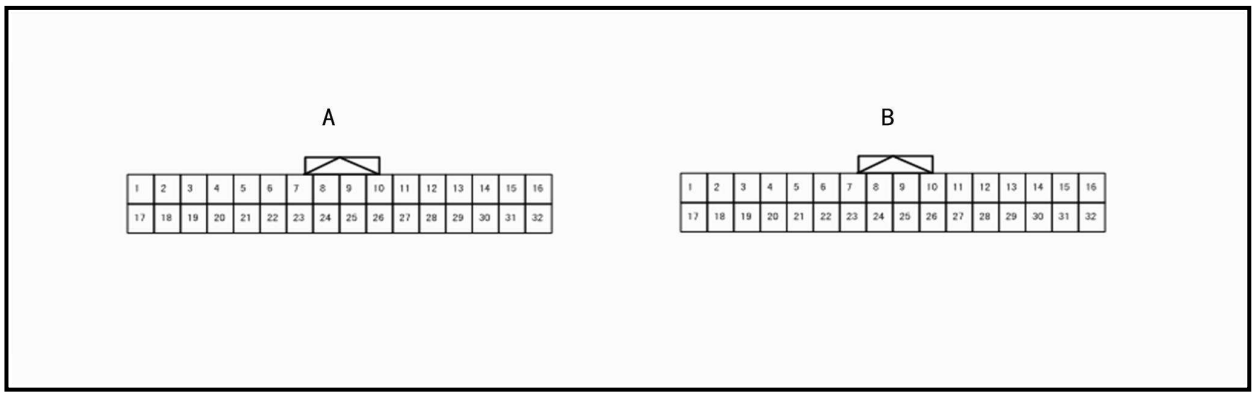
Switch name and function



SN	Switch name	Operation	Description
1	Illumination control	Finger press	Pull roller upward or downward to adjust instrument backlight.
2	TRIP		Press TRIP switch for 3 seconds to reset TRIP mileage.
3	ECO		At “D’ gear, press ECO switch. Gear shows “ECO”, and the vehicle enters economy mode.

Connector layout





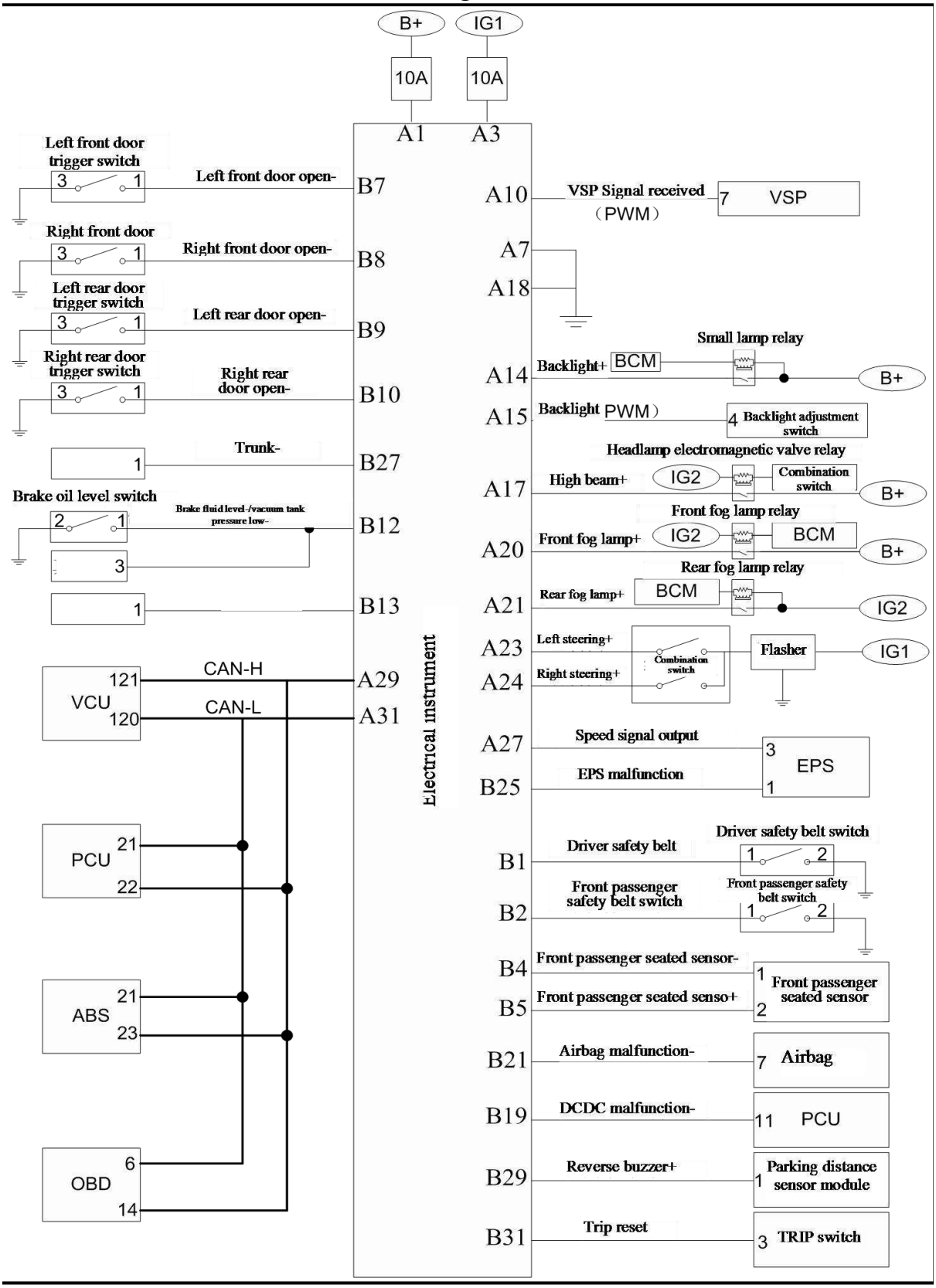
Instrument connector terminal definition

Pin number		Description		Condition	Value
+	-	Signal name	Input/output		
A1	GND	Constant power supply	Input	KEY ON	12V battery voltage
A3	GND	Ignition electric source	Input	KEY ON	12V battery voltage
A7	GND	GND	Input	KEY ON	0V
A10	GND	Receive VSP signal	Input	KEY ON	PWM signal
A14	GND	Position lamp	Input	KEY ON	12V
A14	GND	Backlight lamp control signal	Input	KEY ON	PWM signal
A17	GND	High beam 1	Input	KEY ON	0V
A18	GND	High beam 2	Input	KEY ON	12V
A20	GND	Front fog lamp indicator lamp	Input	KEY ON	12V

A21	GND	Rear fog lamp indicator lamp	Input	KEY ON	12V
A23	GND	Left steering indicator lamp	Input	KEY ON	12V
A24	GND	Right steering indicator lamp	Input	KEY ON	12V
A27	GND	Speed signal	Output	KEY ON	PWM signal
A29	GND	CANL	-	KEY ON	-
A31	GND	CANH	-	KEY ON	-
B1	GND	Main safety belt indicator lamp	Input	KEY ON	0V
B2	GND	Sub safety belt indicator lamp	Input	KEY ON	0V
B4	GND	Pilot seat sensor +	Input	KEY ON	0V
B5	GND	Pilot seat sensor -	Input	KEY ON	PWM signal
B7	GND	Left front door open signal	Input	KEY ON	0V
B8	GND	Right front door open signal	Input	KEY ON	0V
B9	GND	Left rear door open signal	Input	KEY ON	0V
B8	GND	Right rear door open signal	Input	KEY ON	12V
B12	GND	Low brake level	Input	KEY ON	0V
B13	GND	Hand brake signal	Input	KEY ON	0V
B19	GND	Charging and discharging indication	Input	KEY ON	0V
B21	GND	Airbag warning lamp	Input	KEY ON	0V
B25	GND	Low beam indicator lamp	Input	KEY ON	0V
B27	GND	Trunk indicator lamp	Input	KEY ON	0V
B29	GND	Reverse buzzer signal	Input	KEY ON	PWM signal
B31	GND	TRIP reset signal	Input	KEY ON	PWM signal

Electrical instrument electrical schematics

Electrical instrument electrical schematic diagram



Malfunction diagnosis

Electrical Instrument-

Diagnosis procedure

1. Check fuse

Check whether following fuses are burned out.

Power supply	Fuse number
12V battery	Self-contained fuse (outside fuse box)
ON position signal	IG1 fuse IG1 (outside fuse box)

Check whether the result is normal?

Yes >> Replace fuse.

No >> Step 2.

2. Check power supply circuit

Check electric potential difference between electric instrument harness terminal connector and ground wire.

<table>
<tr><td colspan="2">Multimeter positive pole</td><td>Multimeter negative pole</td><td rowspan="2">Key position</td><td rowspan="2">Magnitude of voltage</td></tr>
<tr><td colspan="2">ICM</td><td rowspan="4">Ground</td></tr>
<tr><td>Connector</td><td>Terminal number</td><td rowspan="3">M26</td></tr>
<tr><td rowspan="2">1</td><td>LOCK</td><td rowspan="2">12V battery voltage</td></tr>
<tr><td>3</td><td>ON</td></tr>
</table>

Check whether the result is normal?

Yes >> Step 3.

No >> Check the harness between electrical instrument and fuse.

3. Check grounding circuit

1. Turn the key to “LOCK” position or pull out the key.

2. Disconnect electrical instrument connector.

3. Check the connectivity between electric instrument harness terminal connector and ground wire.

<table>
<tr><td colspan="2">Multimeter positive pole</td><td rowspan="3">Multimeter negative pole</td><td rowspan="3">Connectivity</td></tr>
<tr><td colspan="2">ICM</td></tr>
<tr><td>Connector</td><td>Terminal number</td></tr>
<tr><td>M26</td><td>7</td><td>Ground</td><td>Conduction</td></tr>
</table>

Check whether the result is normal?

Yes >> Checking is finished.

No >> Repair harness or connector.

Instrument control switch circuit

Diagnosis procedure

1.Check electrical instrument input signal

1. Turn the key to “ON” position.

2. Check the voltage between following terminals and electrical instrument.

Electrical Instrument-			Condition	Voltage
Connector	Port number			
	Multimeter positive pole	Multimeter negative pole		
M36	31	Ground	Press “TRIP” switch.	0V
			Except above situation.	12V
M26	14	15	Rotate dimmer knob to maximum value.	12V
			Rotate dimmer knob to maximum value	0V

Check whether the result is normal?

Yes >> Checking is finished.

No >> Step 2.

2. Check instrument control switch circuit

1. Turn the key to “LOCK” position or pull out the key;

2. Disconnect instrument control switch connector and electrical instrument connector;

3. Check the connectivity between electric instrument harness terminal connector and instrument control switch harness terminal.

Multimeter positive pole		Multimeter negative pole		Connectivity
ICM		“TRIP” switch		
Connector	Terminal number	Connector	Terminal number	
M36	31	M33	3	Conduction

Multimeter positive pole		Multimeter negative pole		Connectivity
ICM		Dimming switch		
Connector	Terminal number	Connector	Terminal number	
M26	15	M32	4	Conduction

Multimeter positive pole	Multimeter negative pole	Connectivity

VCU		“ECO” Switch		
Connector	Terminal number	Connector	Terminal number	
F21	40	M34	3	Conduction

4. Check the connectivity between electric instrument harness terminal connector and instrument control switch harness terminal.

Multimeter positive pole		Multimeter negative pole	Connectivity
ICM			
Connector	Terminal number		
M26	7	Ground	Conduction

Check whether the result is normal?

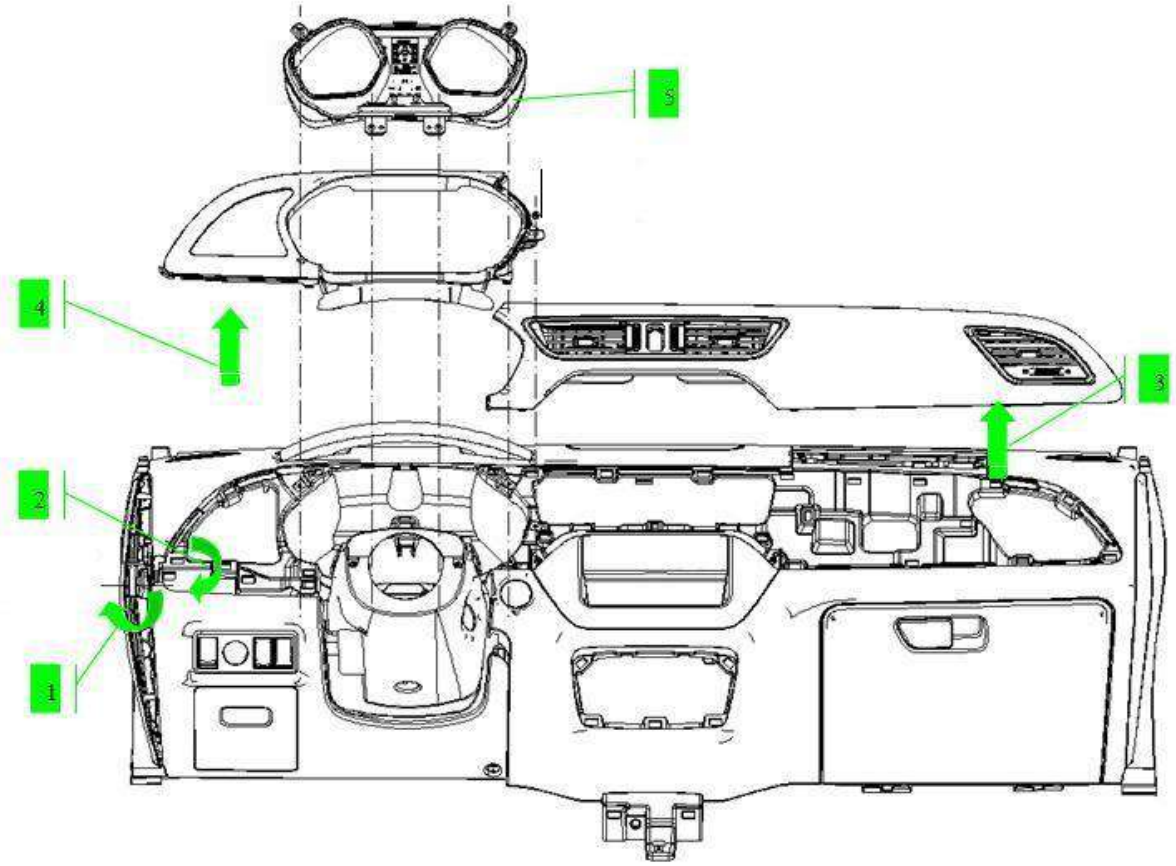
Yes >> Checking is finished.

No >> Repair harness or connector.

Removal and installation

Electrical Instrument-

Exploded view



Disassembly and installation

Demolition

1. Remove the left lower guard plate.

Lift up the guard plate through the dismantling hole of the left lower guard plate and remove the 1 screw inside.

2、Disassemble the lower guard plate

3、Remove the dashboard light strips

Lift the dashboard light strip and pull it out

4、Remove the instrument lower guard

Remove the fixing screw of the instrument panel and pull out the shield

5, remove the instrument cluster

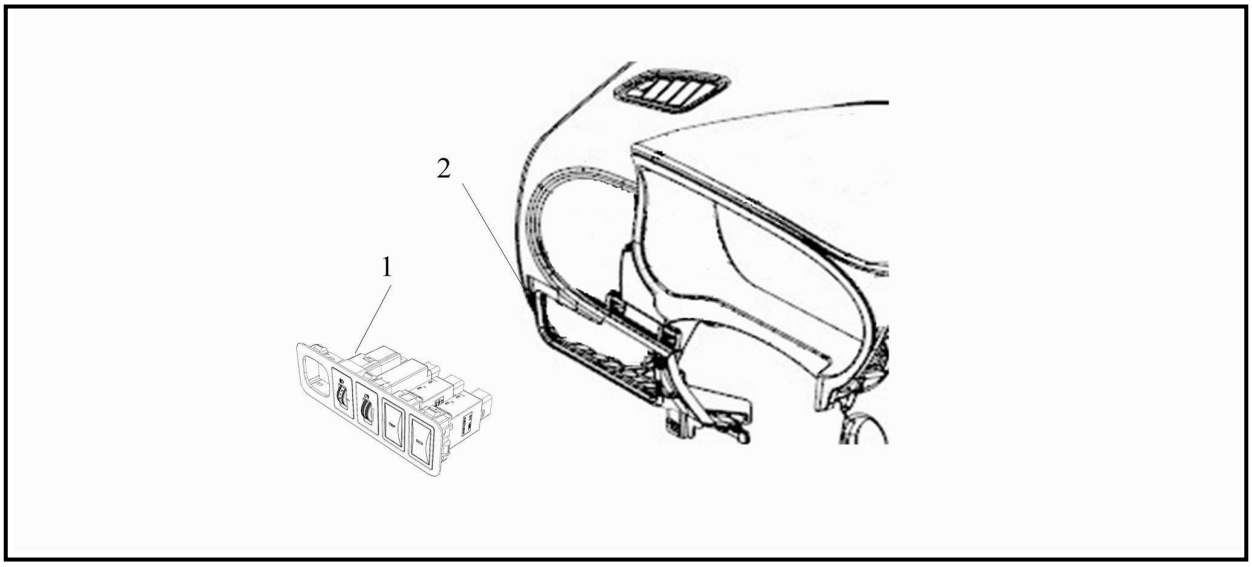
Remove the four mounting screws from the meter, pull the meter out, and unplug the connector.

installation

Assemble in the reverse order of removal.

Control switch

Explosive view



1 Control switch assembly 2 Dashboard

Removal and installation

Removal

1 Remove control switch assembly;

2 Remove connector;

3 Remove control switch.。

Installation

Please follow the reversed sequence of removal to install.

Air Conditioner System

Safety precaution

Precautions for normal charging

Warning：

- **If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, the device can be only be used after its function being checked and confirmed before charging.**

1. **During normal charging operation,an engineer who uses medical electronic devices including heart pacemaker, cardioverter, defibrillator cannot enter passenger compartment (including trunk).**

High-voltage preventive measure

Warning ：

- **The electric vehicle has a high-voltage battery. If the operation on the vehicle and high-voltage parts is incorrect, there are risks of leakage of electricity, electric shock, or similar accidents. Thus, it is mandatory to follow correct procedures to check and maintain.**
- **Before disconnecting repair switch, please put the key on "LOCK" position or unplug the key.**
- **Disconnect repair switch before checking or maintaining high-voltage system. It is forbidden to close repair switch during the process of checking and maintenance. Before starting the operation on high-voltage system, be sure to wear insulated protection equipment, including gloves, shoes, and glasses.**
- **When a technician is operating high-voltage system, please ensure no one touching the vehicle. When there is no maintenance operation, please take insulated protection on the high-voltage sections to prevent anyone touching.**
- **When repair switch is disconnected, it is forbidden to put the key at "ON" position or turn to "START" gear.**

High-voltage cable and safety sign

The color of high-voltage cable is orange and there are safety signs on the power battery assembly and other high-voltage parts. Do not touch these cables and parts.

Handling of high voltage terminals

When the connector of high-voltage cable is plugged out, please use insulated adhesive tape to bind up immediately.

Regulation for a person wearing medical electronic device

The vehicle has strong magnetic parts. If an engineer uses medical electronic device, such as electronic pacemaker, its function may be affected by strong magnetic parts. Thus, these people cannot carry out repair work.

Forbidden accompanying article during work

The vehicle has strong magnetic parts. Thus, during work it is forbidden to take metal articles which may cause short circuit or magnetic articles such us various bank cards which may be damaged.

Place "Repairing High-voltage Parts, No Touch!" warning sign

Before repairing high-voltage parts, please place "Repairing High-voltage Parts, No Touch" warning sign on the prominent position of the repaired vehicle to remind other people.

Precaution for removing 12V battery

Before removing 12V battery, turn the key to “ON” position, and then turn to “LOCK” position

Reminder ：

- Though the key is at “LOCK” position, auto-recharge function of 12V battery may activate.
- After the key turns from “ON” to “LOCK”, auto-recharge function of 12V battery will not activate.

Precaution for supplemental restraint system "airbag" and "safety belt pretension"

Supplemental restraint system “airbag” and “safety belt pretension” is used together with front seat safety belts, which can reduce the damage to the driver and front passenger during collision. Supplemental restraint system consists of safety belt, driver airbag, and front passenger airbag. The detailed information of supplemental restraint system is included in the chapters of airbag system and seat safety belt.

Warning :

In order to avoid accidents, please abide by the following content:

- **To avoid the failure of supplemental restraint system and considering that the risk of physical injuries will increase during collision if the system fails, all the service must be executed by DR authorized dealer.**
- **Non-normative maintenance of supplemental restraint system including non-normative removal and installation may result in accidental trigger of the system and cause physical injuries. Regarding the method of removing airbag module, please refer to Airbag System chapter.**
- **Except for the operations in the service manual, please do not use electrical test device to test any circuit of supplemental restraint system. The color of harness and connector of supplemental restraint system is yellow or orange.**

Precaution for using power tool (pneumatic or electric) and hammer

- When power switch is at “ON” position and approach airbag diagnosis sensor or other sensors of airbag system, please do not use power tools or hammer on the sensor part area. Violent vibration may trigger these sensors and airbag to cause serious injuries.
- When using power tools or hammer, put the key at “LOCK” position, unplug the negative pole of 12V lead-acid battery, wait at least one minute, and then start maintenance.

Cautions for R-134a

Warning：

- **The coolant R-12 and R-134a should not be mixed used, otherwise the electrical compressor may operate abnormally. In order to make sure coolant R-134a being pure and recyclable, use a filling device to refill or reclaim the coolant according to the process specified on the coolant label.**
- **The R-134a air conditioner system requires specialized compressor lubricant. If non-specialized lubricant is used, it may cause the electrical compressor to work abnormally.**
- **It is prohibited to put the R-134a exposed in the air.**

Attention：

- **When dismantling the refrigerating circuit parts of the air conditioner, seal the refrigerating circuit connectors of each parts immediately in order to avoid the moisture in the air entering the refrigerating circuit.**
- **The sealing lid can only be removed when installing the refrigerating circuit parts of the air conditioner system and all components should be installed as soon as possible in order to avoid the moisture in the air entering the refrigerating circuit.**
- **The compressor lubricant should be sealed securely otherwise it will be useless when moisture absorbed.**
- **Do not inhale coolant or vaporous compressor lubricant otherwise it will cause discomfort to eyes, nose and throat. Use special tool to reclaim refrigerant. If there is leakage of the conditioner system, the repairing place should be in open air. Any other question about the safety and health of refrigerant, please refer to the manufacturer of the coolant and compressor lubricant.**
- **The compressor lubricant is forbidden to get in touch with polystyrene which may make it ineffective.**

Contamination of refrigerant

If the refrigerant is not pure, please take below measures:

- Explain to consumer that it is forbidden to release refrigerant which will contaminate the atmosphere.
- Recycling polluted refrigerant may damage the recycling equipment and contaminate the coolant in the device.
- Use special refrigerant filling device to reclaim and refill the refrigerant and do not reclaim polluted refrigerant. The handling of refrigerant must abide by local rules and regulations. As for replacing the parts of cooling system, please refer to related chapter in maintenance manual.

Normal precautions for refrigerant

Warning：

- **It is forbidden to release refrigerant in the air. Please use special recycling equipment to release refrigerant.**
- **It is required to wear eyes and hand protective equipment during operation relating to refrigerant and air conditioner system.**
- **Do not keep refrigerant stored in more than 52℃ temperature.**
- **Do not use open flame to burn refrigerant tank. Put the refrigerant tank in warm water if heating is needed.**
- **Do not throw or press the refrigerant tank.**
- **Do keep the refrigerant away from open flame because it will release poisonous gas.**
- **Make sure the working place is with good ventilation otherwise the refrigerant will inhale oxygen in the air and cause personnel to suffocate.**
- **Do not make pressure or leakage test for repairing equipment of R-134a and air conditioner system filled with compressed air. The mixture of R-134a and air is combustible and it will cause personal injury or property loss in the event of burning. Please consult the refrigerant manufacturer for more safety information.**

Precautions for dye leakage inspection

- The air conditioner system does not contain fluorescent leakage detection dye.
- Do not use fluorescent leakage detection dye in the air conditioner system.

Precautions for compressor lubricant

- It is required to use specialized compressor lubricant RL168H for the air conditioner system otherwise it will cause malfunction of the air conditioner system.
- Do not use recycling and filling device of normal lubricant refrigerant.
- The recycling and filling device of conventional lubricant refrigerant can only be used for the vehicle after thoroughly and clean rinse.

Precautions for electrical compressor maintenance

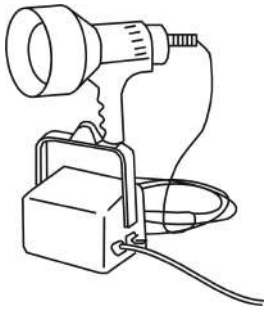
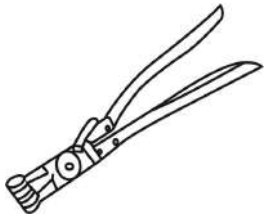
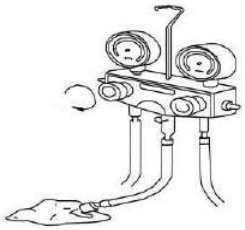
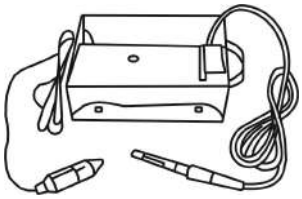
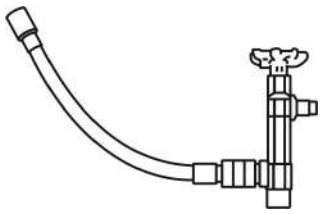
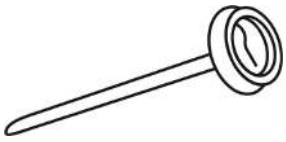
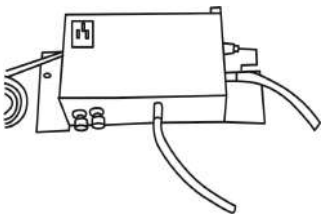
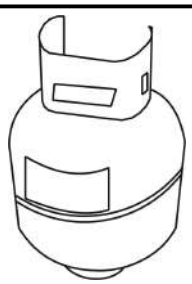
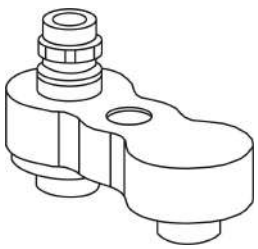
- The intake and exhaust vent of the compressor should be installed sealing-plug to avoid any entrance of air or impurities.
- After the compressor is removed, please place it in same state as it is installed on the vehicle.
- The compressor needs to operate for more than two minutes after installation.

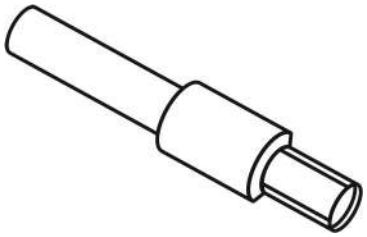
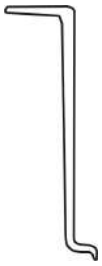
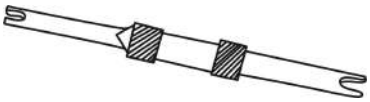
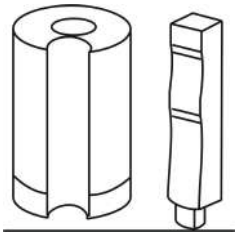
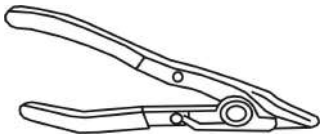
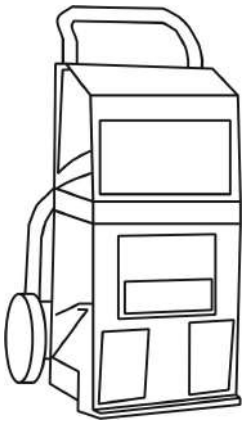
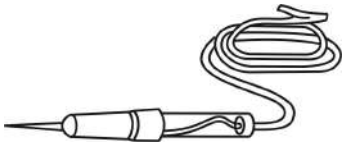
Preparation work

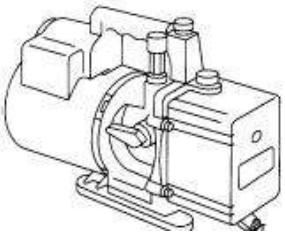
Lubricant and refrigerant

Name	Function	Remark
Refrigerant R-134a	Used for refrigeration cycle	
Compressor lubricant RL68H	Compressor lubricant	

Special tool

Name	Picture	Name	Picture
Digital multimeter		High strength invisible lamp	
Remover Plier		Triple table	
Halogen leakage detector		Tracer color syringe	
Tracer color R134a		Microthermometer	
Positive current brake valve		Sealing protective equipment	
Refillable recycling tank of fifty pounds		Pressure test adapter	

Lip shape sealing removal tool for air conditioning system		O-ring sealing removal tool	
Valve core removal and installation tool		O-ring sealing installation	
Spring card plier		Spring card plier	
Refrigerant recycling, regeneration and refilling system		Passive test lamp	
Heating gun		Insulated gloves	

Insulated shoes		Aspirator bump	

System introduction

Introduction

- The refrigerating system adopts environmental dual steaming electrical air conditioning system and attach no destruction to ozone.
- The air conditioning system is composed of blower unit, refrigerating unit and heating unit.
- The air conditioning system adopts one-piece electrical vortex compressor.
- The heating system adopts electrical heater.

Specification

One-piece electrical compressor

Serial number	Technique index		Unit	Parameter value
1	Compressor	Motor model	/	Permanent magnet synchronous motor
2		Operating voltage range	V	220-312-400
3		Rated /Highest rotating speed	rpm	3420/5000
4		Rated wattage	kW	1.5
5		Peak power	kW	2.5
6		Rated current	A	4.5
7		Maximum operating current	A	7
8		Insulation resistance	/	1000Vdc，50MΩ，25℃（without refrigerant ） 1000Vdc，≥20MΩ，25℃（Fill 400g refrigerant ）
9		Operating environment temperature	℃	-20～85
10		Refrigerating capacity	kW	3.0
11		Energy efficiency ratio COP		2.2
12		Designed lifetime	km	10/15
13		Noise	dB	≤68
14		Over-current protection setting	A	7
15		Over-voltage protection setting	V	400
16		Low-voltage protection setting	V	220
17		Over-warm protection setting of controller	℃	82
18		Direct current busbar voltage range	V	220～400
19		Insulating resistance to vehicle	MΩ	≥100

20		Preventive requirement	/	IP67
21		Operating environment temperature	℃	-20～85
22		Cooling method	/	Use refrigerant to cool

Condenser

Effective core size W×H×D（mm）	619×361×16
Fin spacing （mm）	1.7
Fin quantity	37
Front part area （㎡）	0.223

Evaporator

Effective core size W×H×D（mm）	218×211×80
Fin spacing （mm）	1.7
Tube place number	17
Front part area （㎡）	0.0459

Refrigerant

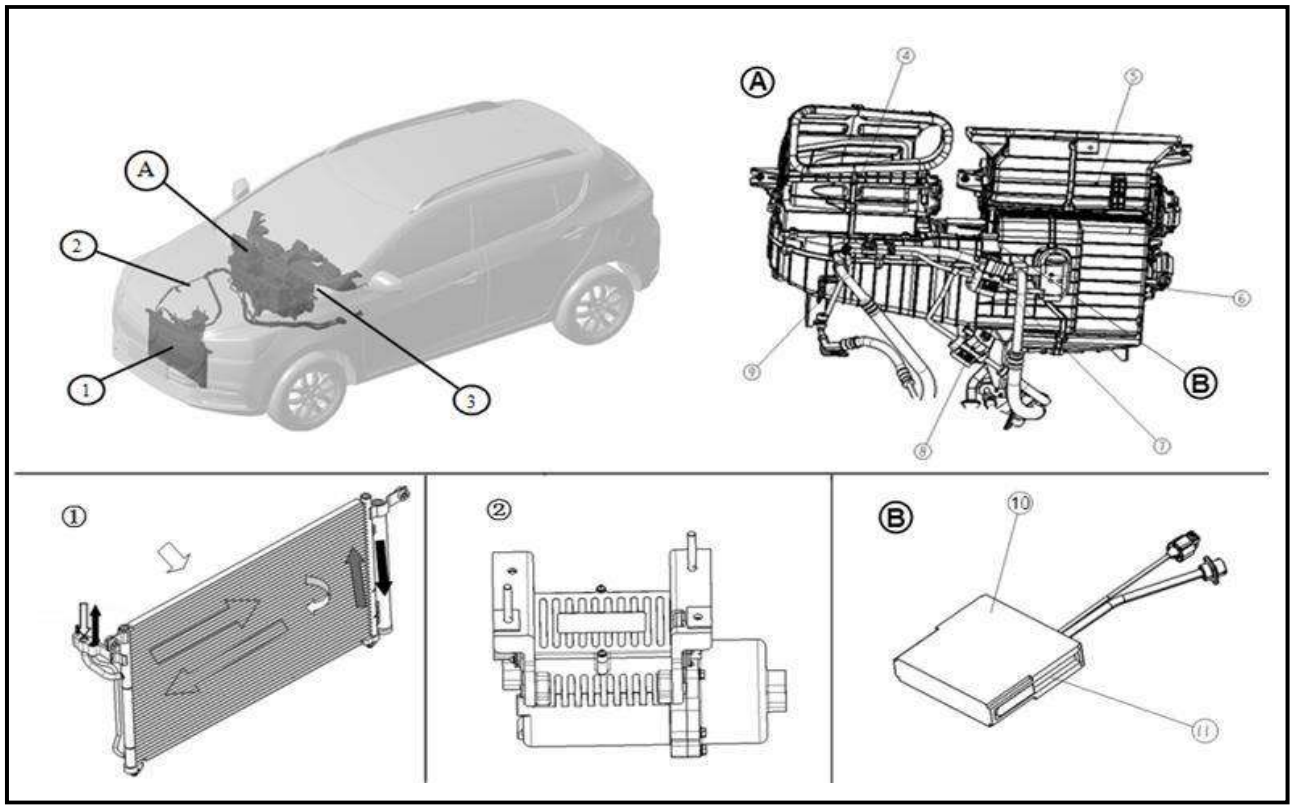
Name	HFC-134a
Usage amount (g)	400

Electrical heater

Battery voltage （v）	331
Output wattage （kW）	2.5
Volume （cm³）	350

Components

Air conditioning system layout

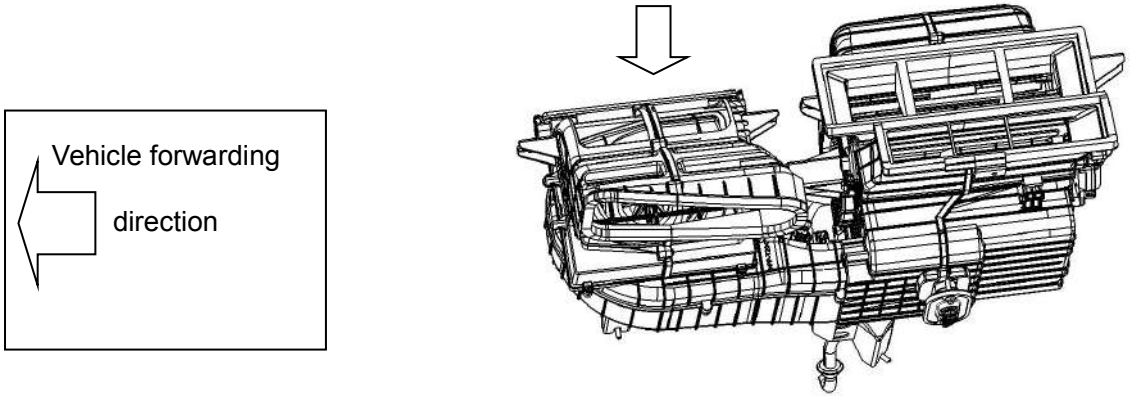


Serial number	Component name	Function
1	Condenser	Tool cool high temperature high voltage gas refrigerant discharged by compressor into high voltage low temperature liquid refrigerant
2	One-piece compressor	The vortex disc is driven by motor to provide power to refrigeration cycle
3	Air conditioner controller	The air conditioner controller receives request signal from touch panel and signal of interior and exterior temperature to control the operation of air conditioning system actuator.
4	Blower assembly	The blower is composed of motor and fan. It provides motor to air conditioning system air circulation
5	Evaporator	Refrigerant is transferred from frost to gas and absorb heat inside the vehicle.
6	Expanding valve	It makes liquid refrigerant in high voltage to frost liquid in low voltage so as to save energy, lower temperature and decrease voltage.
7	Solenoid valve in crew compartment	It controls connection and disconnection of the air conditioner refrigeration circulation.
8	Solenoid valve in battery	It controls connection and disconnection of battery refrigeration circulation.
9	Triple pressure switch	It opens or closes pressure switch according to pressure value of air conditioner refrigeration circulation to protect air conditioning pressure.
10	Temperature sensor	It detects temperature signal and send to air conditioning sensor.
11	Electrical heater	PTC core is heated after connected to electricity and the blower sends hot wind to crew compartment.

Air conditioner mainframe

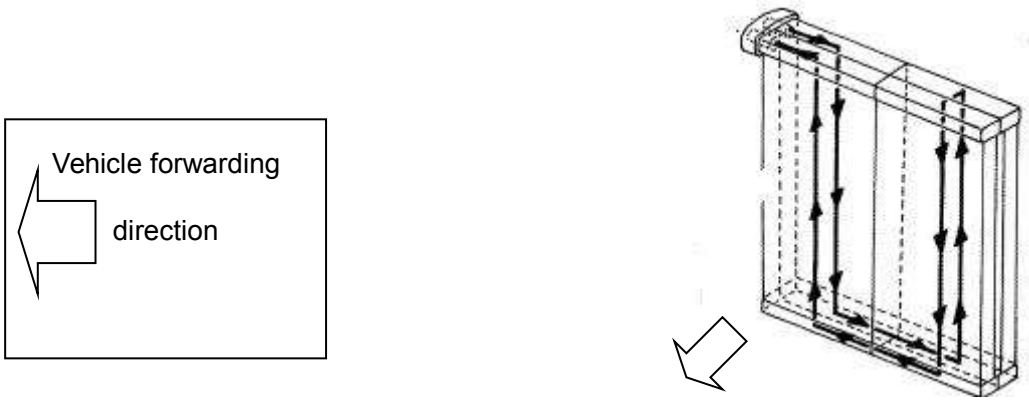
Blower

The blower is composed of motor and fan. It provides motor to air conditioning system air circulation. Air conditioner inside and outside air is controlled by interior and exterior gas button. In interior cycle, it inhales air from side inlet of air conditioner host. In exterior, it inhales air from vehicle front end shied lid.



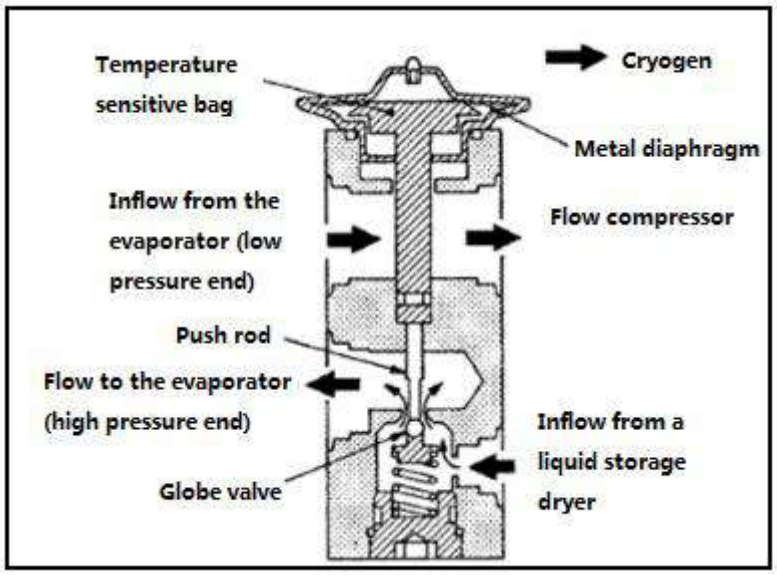
Evaporator

Liquid refrigerant with throttling and depressurization is heated and boiled in evaporator. The refrigerant absorbs heat in the air while the blower consistently sends cooled air to crew compartment to lower the temperature.



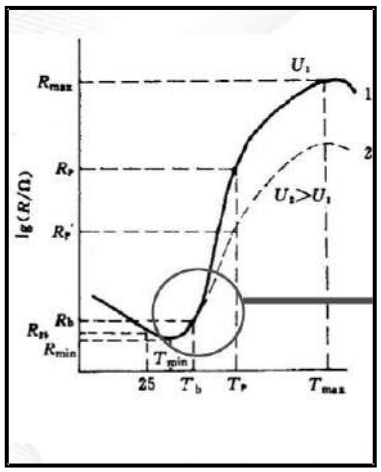
Expanding valve

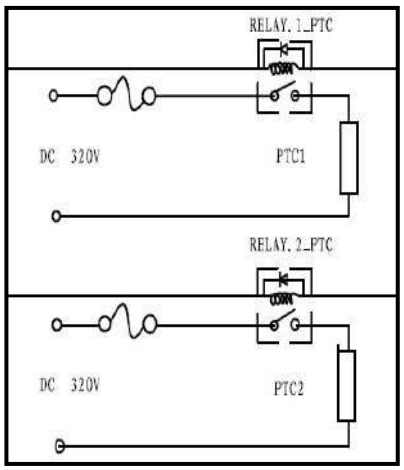
High pressure refrigerant discharged from reservoir dryer outflows through holes of expanding valve. It changes from liquid state into low pressure mist state after sharp expansion. Except throttling and depressurization, the expanding valve can also regulate refrigerant flow according to refrigerant overheat size of evaporator outlet.



Electrical heater

Electrical heater is composed of positive temperature coefficient thermal ceramic resistance. When the temperature exceeds a certain value, electrical resistance value increases with temperature rise in a jumping step. The temperature of the electrical heater surface is stable in a constant range.



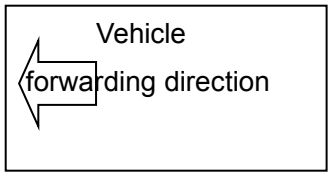


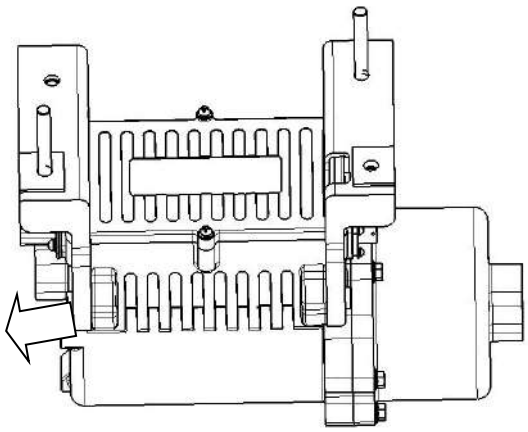
Reminder ：

Electrical heater is composed of two groups of corrugated aluminum semiconductor material which can be opened separately or simultaneously so as to achieve economical or comfortable heating.

One-piece electrical compressor

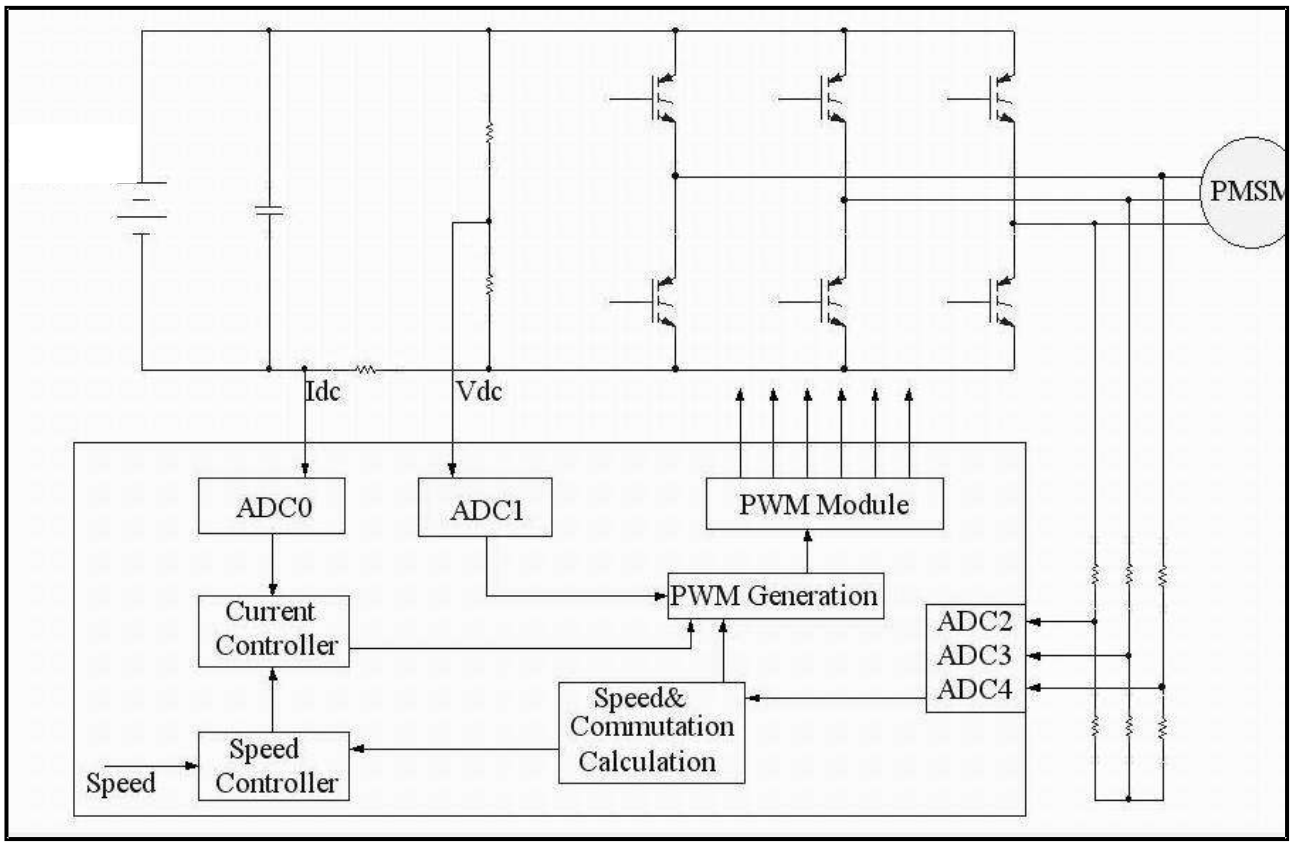
The type of compressor is electrical vortex. Compressor controller and compressor are integrated. The controller regulates electrical compressor rotating speed through IPM module inverter. It also owns function of over-current and low voltage auto-detection and protection.



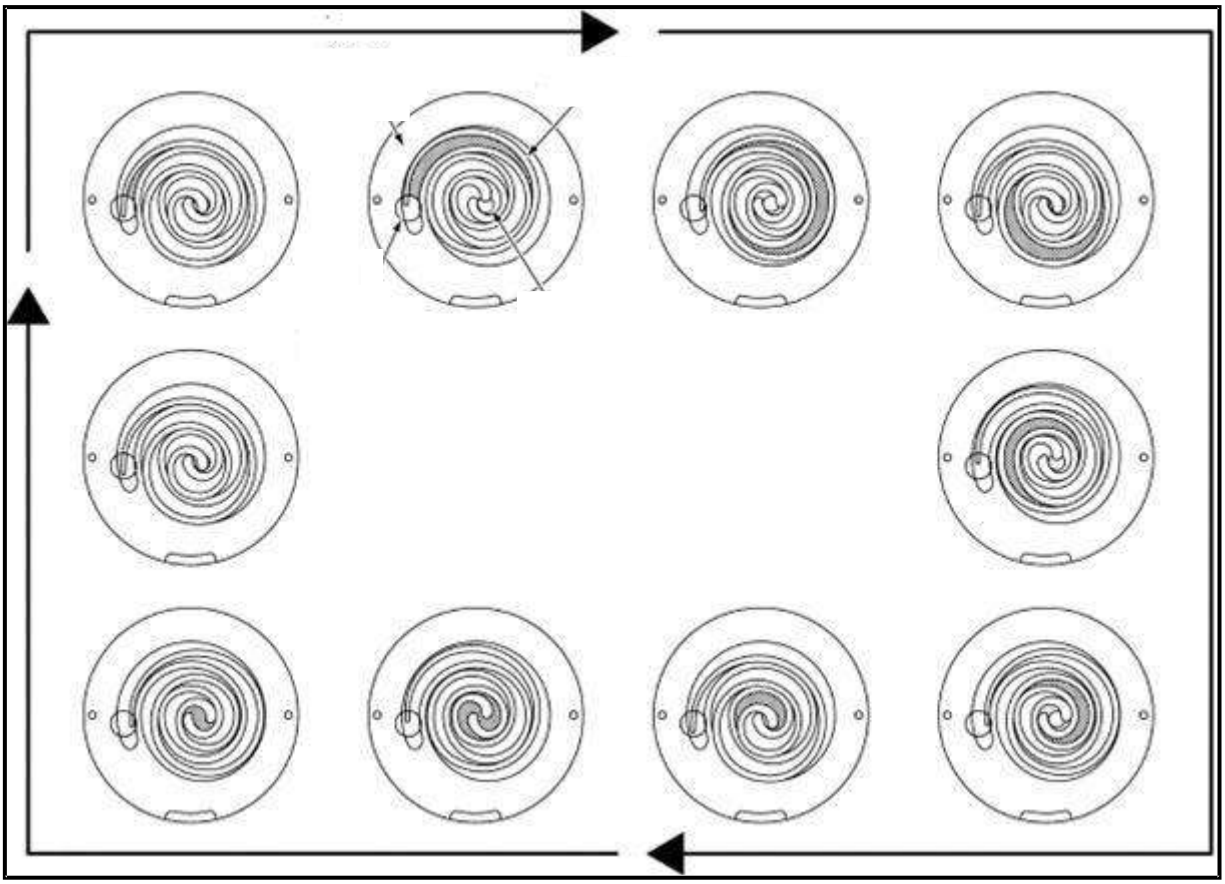


Reminder：

- **IPM module is composed of IGBT and intelligent power unit which drives and protect s circuit encapsulation.**
- **IGBT (Insulated Gate Bipolar Transistor) is a semiconductor device in which a small voltage drives high voltage and large current.**

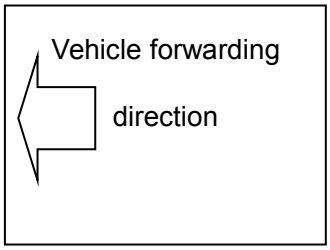


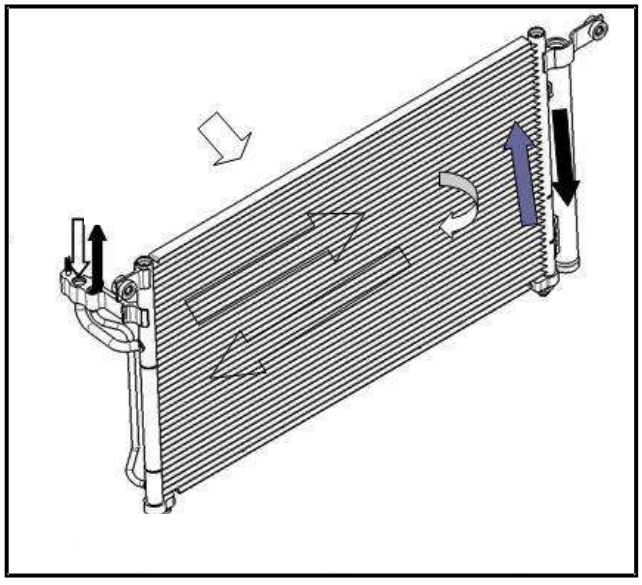
The compressor drives the vortex in translational rotation through the rotation of motor itself so as to achieve suction and discharge of refrigerant.



Condenser

The condenser is composed of parallel flow condenser and reservoir dryer. The reservoir and condenser are integrated. The parallel condenser is a heating exchange device in which a flat tube and fin are integrated. The function of condenser is cooling high temperature high voltage refrigerant steam discharged by the compressor and condenses it into liquid. The heat released by refrigerant steam is blown away by the surrounding air into atmosphere.





Refrigerant and compressor lubricant

Refrigerant：The used refrigerant is HFC-134a which does not contain chlorine to damage atmospheric ozone layer.

Compressor lubricant：The used compressor lubricant is RL168H which is a kind of ester with high insulation performance.

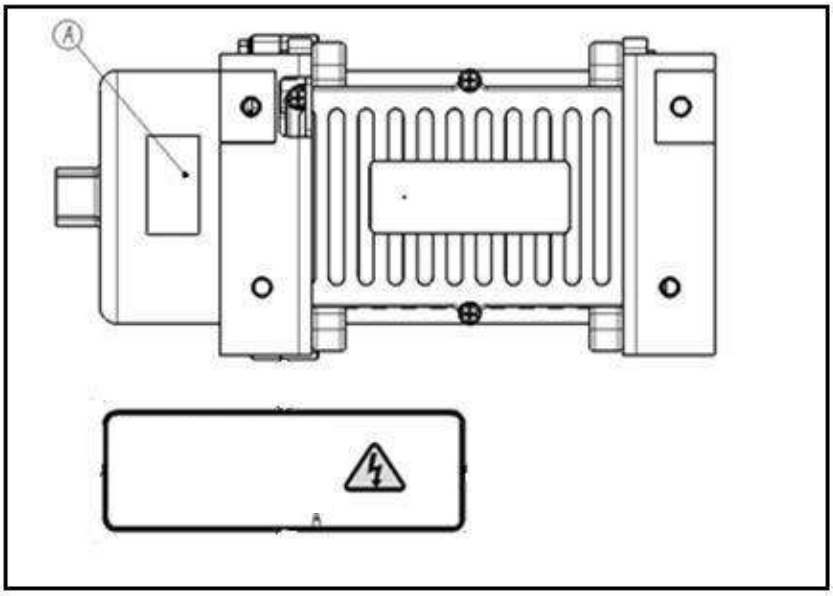
Reminder：

- **HFC：Hydro Fluoro Carbon**
- **RL：Refrigeration Lubricant**

Warning signs for high voltage

It is required to stick high voltage warning signs on the electrical air conditioner compressor shell.

Make sure the warning sign is stuck on the original position after replacing electrical air conditioner compressor.

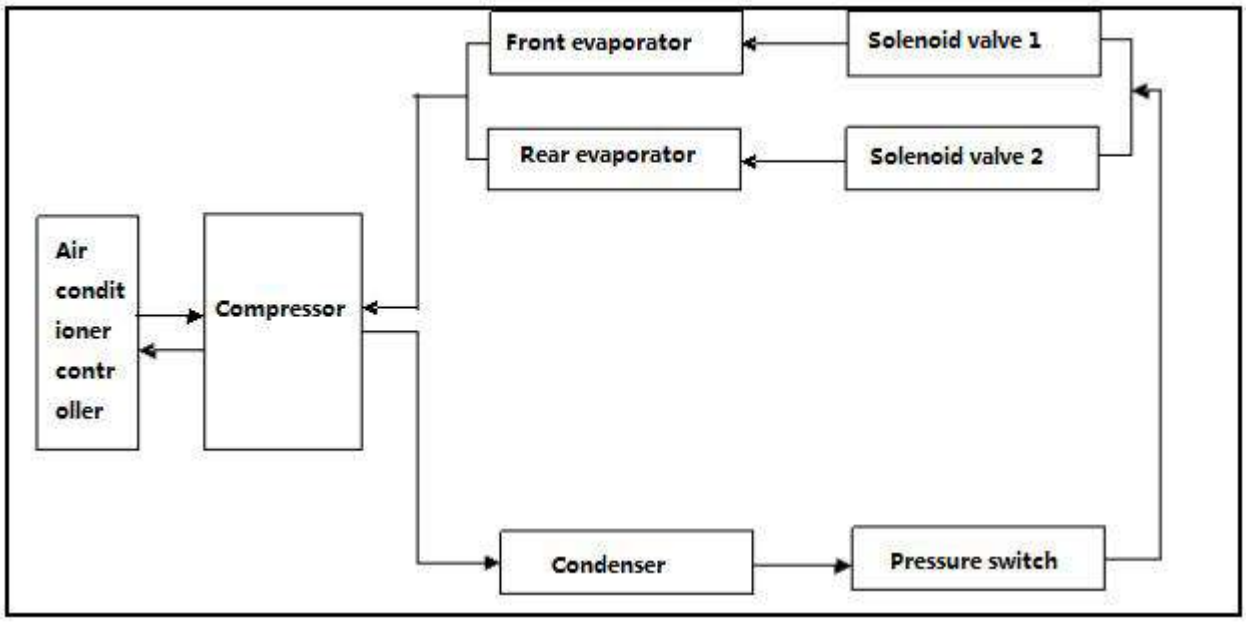


System

Refrigeration system

Refrigeration principle

The air conditioning system is composed of electrical compressor, condenser, front evaporator, triple unit pressure switch, rear evaporator, magnetic valve, air conditioner controller, pipes and other components. It consists of two refrigeration circuit. Each refrigeration circuit is controlled by magnetic valve.



Refrigeration system protection

Triple unit pressure switch

- When the refrigeration pressure is abnormal, the triple unit pressure switch feedback pressure signal so as to close refrigeration system and protect the system.
- When the pressure of the high voltage terminal is more than 3.2MPa, the triple unit pressure switch feedback pressure signal to close refrigeration system.
- When the pressure of the high voltage terminal is lower than 0.2MPa, the triple unit pressure switch feedback pressure signal to close refrigeration system.

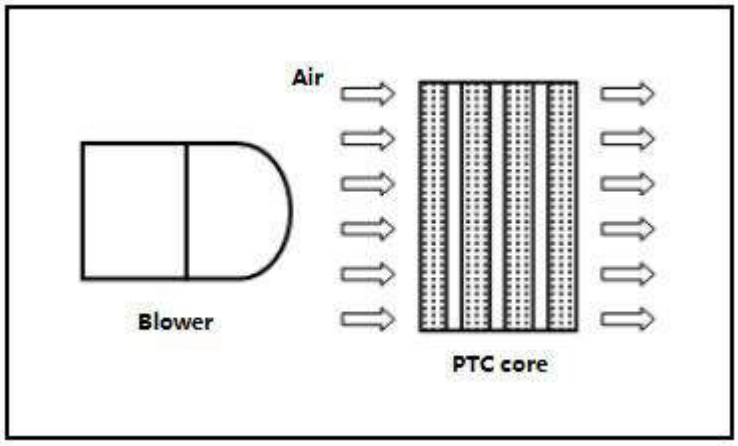
Reminder ：

- **The pressure value is read directly from pressure gauge.**
- **The triple unit pressure switch is installed on pipe of the condenser discharging terminal.**

Heating system

Heating system principle

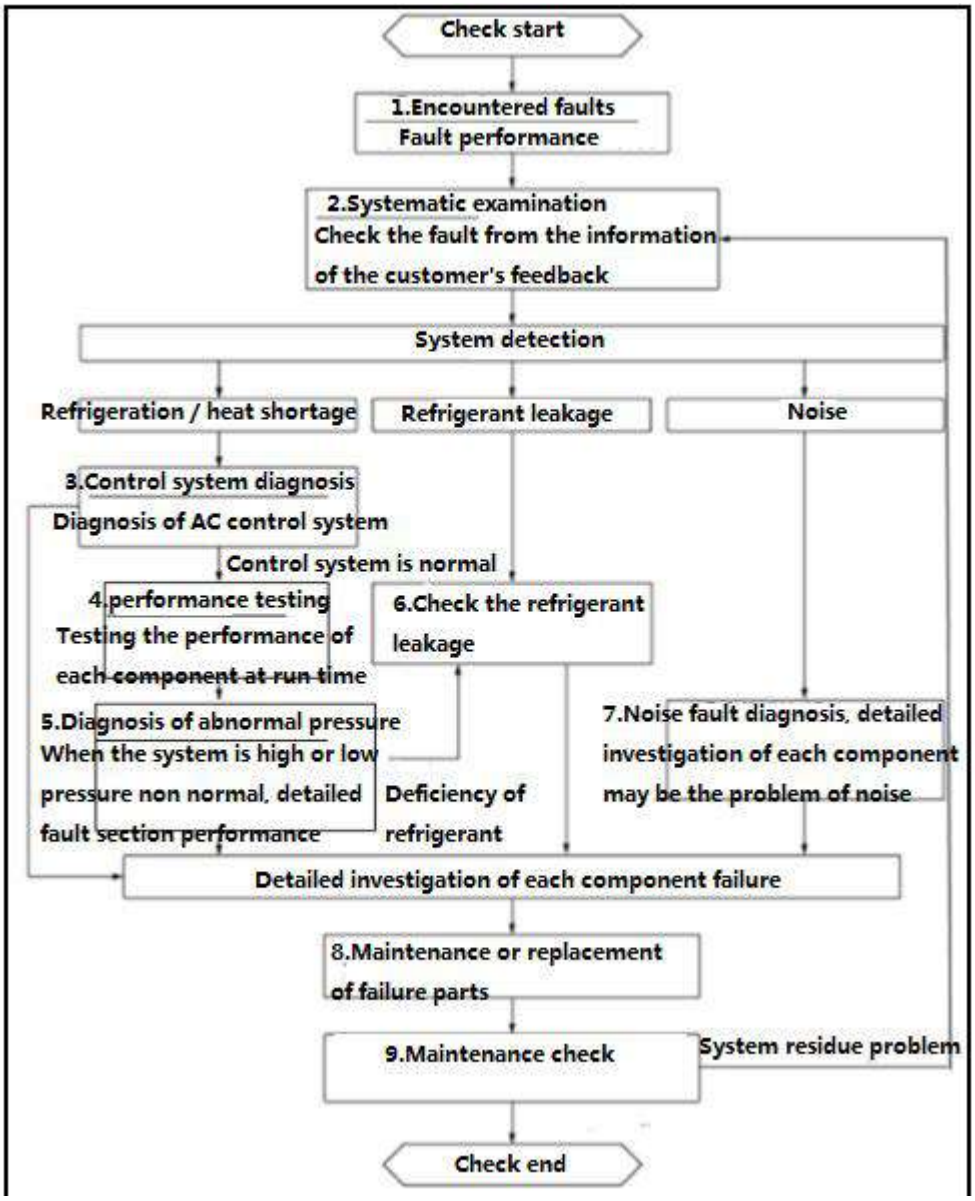
Heating system is composed of blower and PTC electrical heater core. Under the action of the blower, the outside air heats the core through electrical heater and exchanges heat with air to raise the air temperature and reaches the purpose of heating.



Basic inspection

Diagnosis and maintenance procedure

Malfunction diagnosis procedure



System leakage inspection

The air conditioning system is usually detected by vacuum detection method.

Vacuum detection method：

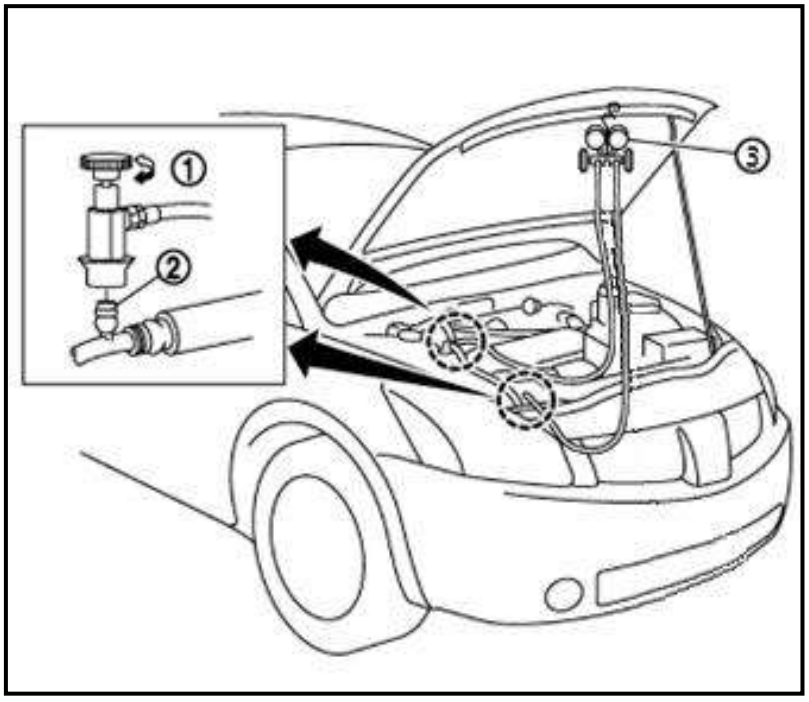
1 Connect the intermediate refrigeration pipe to vacuum pump and open the vacuum and high and low voltage switch of the table set.

2 The system vacuum time lasts more than thirty minutes.

3 When the system is finished vacuum, hold it for fifteen minutes.

4 Observe if there is any rebound of the high and low voltage pointer. No rebound indicates no leakage in the system. If there is backing up, it is required to detect if any connector is leaked.

5 After leakage detection is finished, close the switches of the table set first and then close vacuum pump. Remove intermediate refrigeration pipe.



1 Closing valve 2 Refrigerant refilling port 3 Triple unit table

Pressure state analysis

Phenomenon and state	Analysis of cause	Countermeasures
High voltage is high Low voltage is high	Refrigeration loop is mixed with air	Re-vacuumize and refill refrigerant
	Refrigerant refilling is redundant	Discharge spare refrigerant
	Lubricant is redundant	Discharge spare lubricant
	Condenser heat dissipation is poor.	Clean dirt on condenser surface or replace condenser.
	Cooling fan works abnormally.	Repair or replace cooling fan
High voltage is low Low voltage is low	Refrigerant refilling is insufficient	Add refrigerant.
	Refrigerant is leaked	Repair or replace leaked components
	O-ring is damaged.	Replace O-ring
High voltage is normal Low voltage is high	Expanding valve is over-opened or damaged	Adjust expanding valve opening or replace expanding valve.
	Refrigerant refilling is redundant	Discharge spare refrigerant
	Compressor is failed.	Replace compressor.
High voltage is normal Low voltage is low	Refrigerant refilling is insufficient.	Add refrigerant.
	Expanding valve is icy blocked.	Replace reservoir dryer bottle.
	Evaporator is dirty or internally blocked.	Clean or replace evaporator.
High voltage is low Low voltage is high	Compressor efficiency is reduced.	Repair or replace compressor.
	Expanding valve is over-opened.	Adjust expanding valve opening or replace expanding valve.
High voltage is low Low voltage is negative pressure	After engine stops, low pressure increases significantly, and system is blocked by ice.	Replace reservoir dryer bottle.
	After downtime, low voltage rises slowly and system is blocked.	Detect blocked parts and replace components.

Periodic maintenance

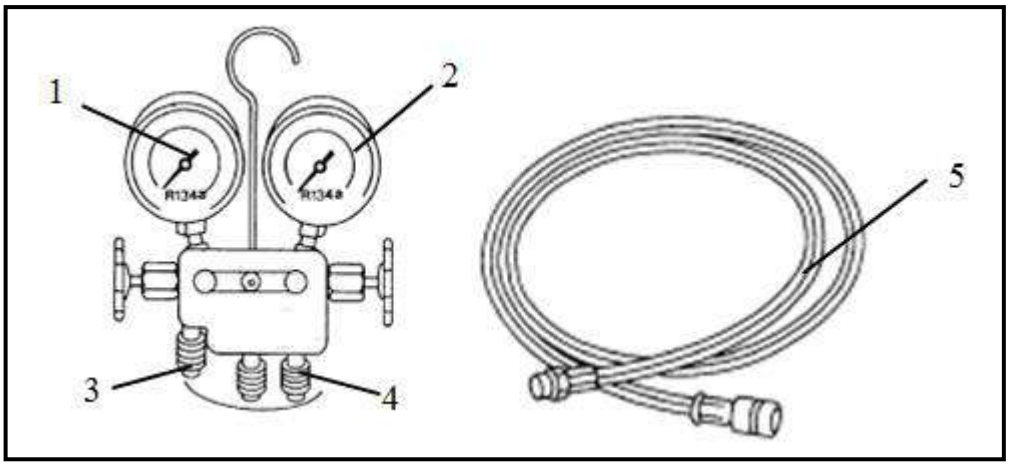
Refrigeration system

Inspect air conditioning system periodically and confirm if any leakage in the refrigeration loop and refill refrigerant timely.

Condition	Reference pressure
Outside temperature 30 35 Wind speed at seven gear and internal circulation	Low voltage 0.1MPa 0.3MPa High voltage 1.0MPa 1.8MPa

Reminder

- **Use pressure triple table to detect refrigeration system loop.**
- **When temperature is high, liquid pipe pressure is possibly more than 1.8MPa.**
- **If any malfunction occurs, please refer to basic inspection.**



1 Low voltage meter（blue）

2 High voltage meter (red)

3 Low voltage manual valve (L0)

4 High voltage side manual valve (HI)

5 Triple meter hose

Attention ：

- **Pressure table should be maintained carefully and kept clean. It is required to prevent the tube from water and dirt when it is not used. Exhaust the inside air when it is used.**
- **It is required to tighten the connector between the pressure table and hose manually. It is prohibited to tighten it by tools.**

Refrigerant refilling

Warning ：

- **It is prohibited to use high pressure mouth to refill separately.**
- **It is prohibited to press refrigerant refilling valve core manually.**

Reminder：

- **The high pressure mouth is on the thinner pipe connected to the condenser. The low pressure mouth is on the thicker pipe connected to the evaporator.**
- **Make sure that the refrigerant refilling machine is with certain amount of R-134a.**

Normal refrigerant refilling method

1 Use special refrigerant refilling machine.

2 Twist off high and low pressure refilling mouth sealing lid of the pipe.

3 Loosen the switching valve of the refrigerant high and low pressure refilling mouth.

4 Connect refrigerant refilling machine with high and low pressure refilling mouth of the air conditioning pipe.

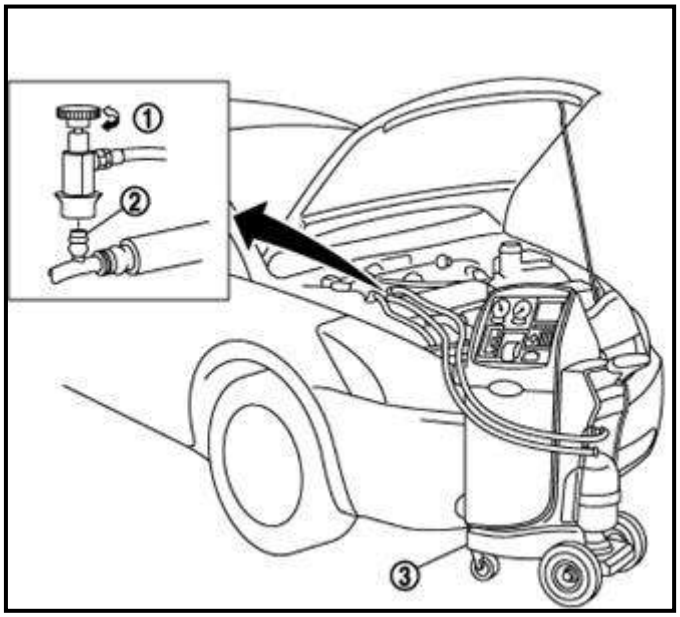
5 Turn on refrigerant refilling machine and turn the high and low pressure refilling switch at “OPEN” gear.

6 Operate it according to refrigerant refilling procedure.

Reminder：

- **Vacummize for more than fifteen minutes and keep the pressure for leakage detection.**
- **When connecting the hose, check whether the sealing ring is damaged. Replace it if it is damaged.**
- **When connecting the joints, tighten it with moderate force. Heavy power will damage the sealing ring and cause refrigerant leakage.**

7 After refilling is finished, remove the refrigerant refilling machine and tighten the sealing lid of the high and low pressure refilling month.



1 Closing valve 2 Refrigerant refilling mouth 3 Refrigerant refilling machine

Simple refilling method

1 Switch off sealing lid of the high and low pressure refilling moth.

2 Loosen switching valve of the triple table high and low pressure refilling mouth.

3 Connect triple table high and low pressure pipe with air conditioning pipe high and low pressure refilling mouth.

4 Connect triple table liquid pipe and vacuum pump suction part. Open triple table high and low pressure valve.

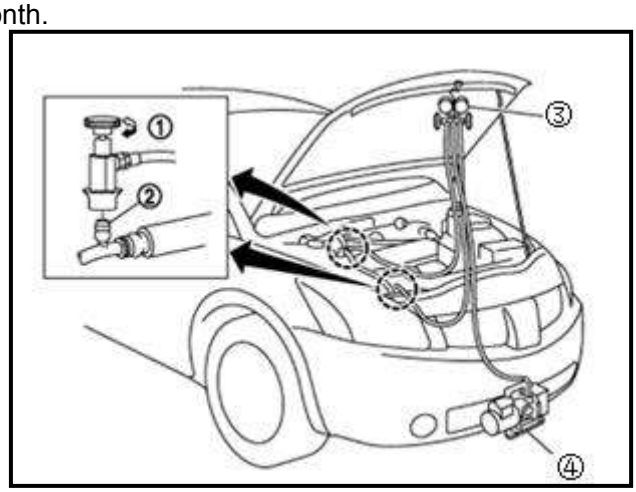
5 Vacuumize for more than fifteen minutes and keep pressure for leakage detection.

6 Close triple table high and low pressure valve and remove vacuum pump from triple table liquid pipe.

7 Connect triple table liquid pipe and refrigerant reservoir.

8 Switch on refrigerant reservoir and refill refrigerant from triple table high and low pressure valve.

9 After refilling is finished, remove the refrigerant refilling machine and tighten the sealing lid of the high and low pressure refilling month.

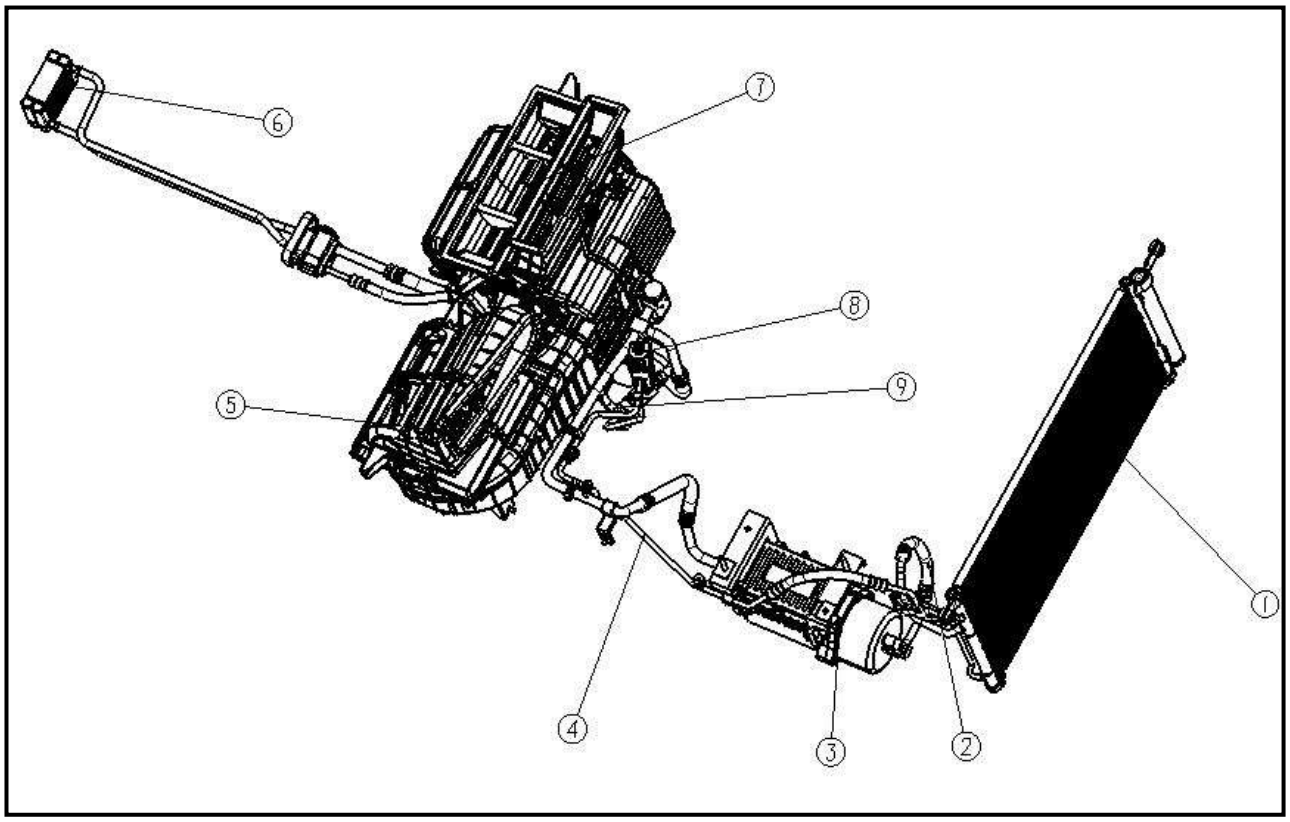


1 Closing valve 2 Refrigerant refilling mouth 3 Triple meter 4 Vacuum pump

Reminder：

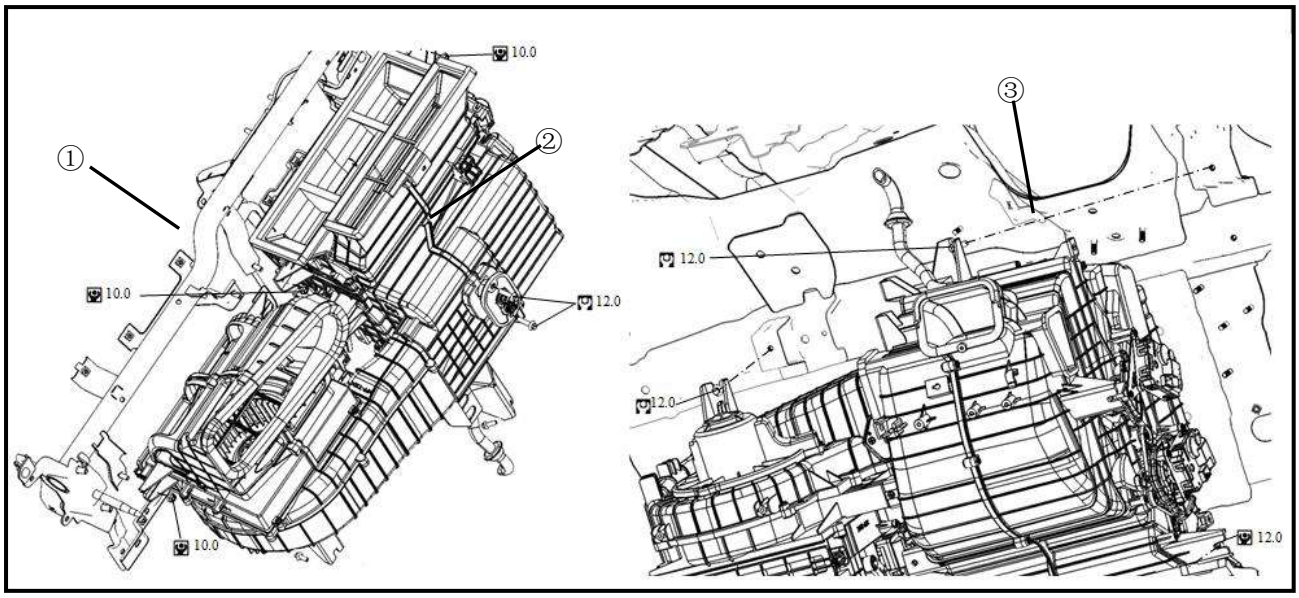
- **During refilling process, turning on the compressor can shorten the refilling time.**
- **When using simple refilling method, please pay attention to refill a certain amount.**

Removal and installation



1	Condenser	2	Exhaust pipe assembly
3	Integrated compressor assembly	4	Pipe and expanding valve assembly
5	Blower evaporator assembly	6	Battery evaporator
7	Heating equipment	8	Crew compartment magnetic valve
9	Battery magnetic valve		

Air conditioner host assembly



1 Dashboard frame 2 Air conditioner host 3 Front dash plate

Removal

1. Use refrigerant in recycling system of refrigerant specialized recycling equipment.
2. Pull out air conditioner host related connectors.
3. Remove dashboard assembly, please refer to chapter of “Dashboard”.
4. Remove fixing nut between air conditioner host and dashboard frame.
5. Open front compartment and remove fixing bolt of expanding valve.
6. Remove connecting bolt between air conditioner host and vehicle.
7. Remove air conditioner host.

Installation

Install it in reverse order of removal.

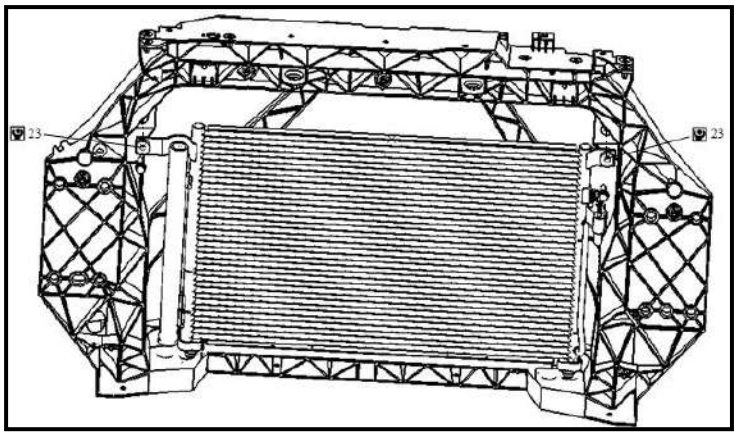
Condenser

Removal

1 Use refrigerant in recycling system of refrigerant specialized recycling equipment.

2 Remove pipe bolt connected to condenser.

3 Remove fixing bolt of condenser.



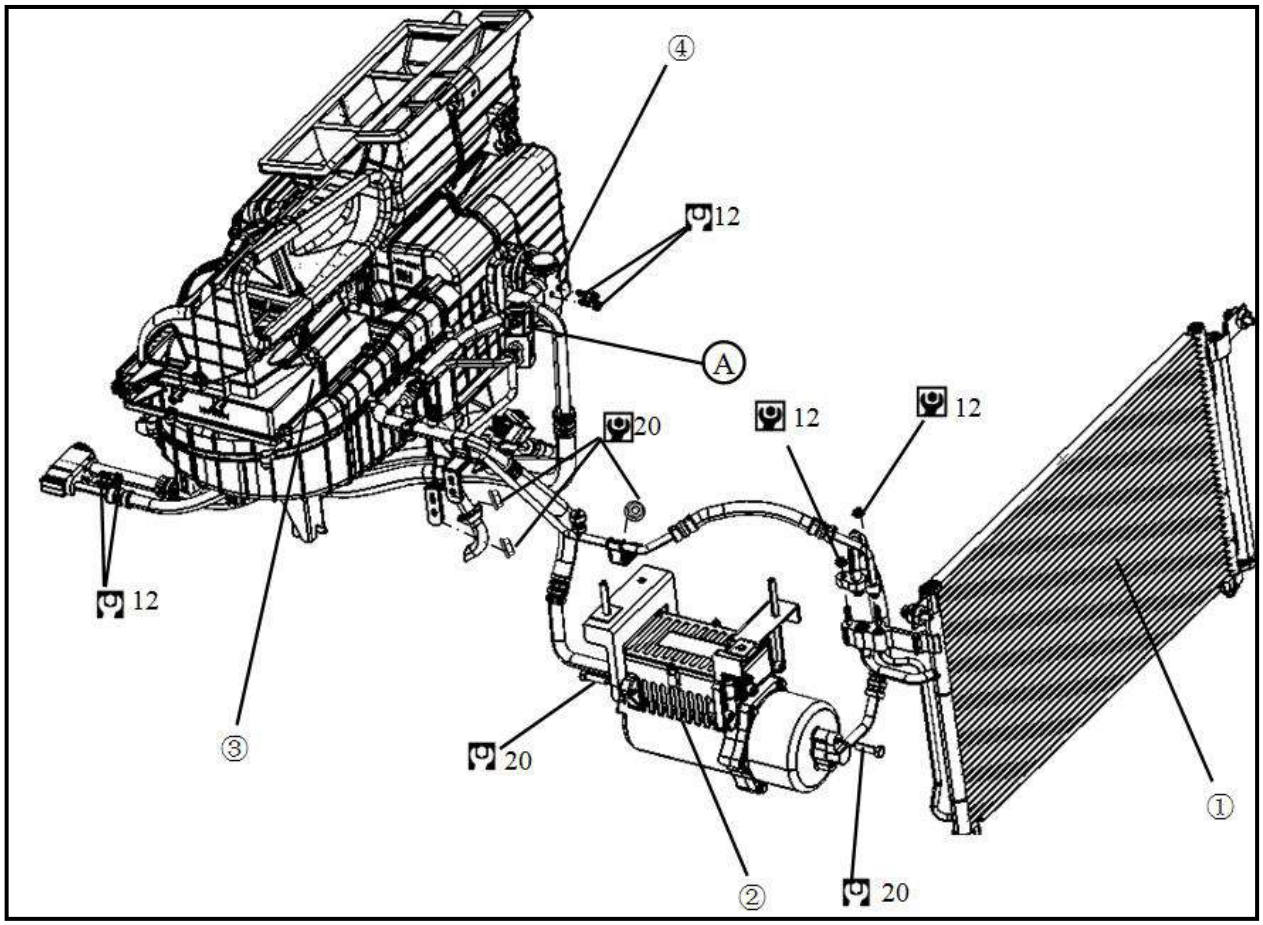
4 Remove fixing gasket between condenser and lower suspension.

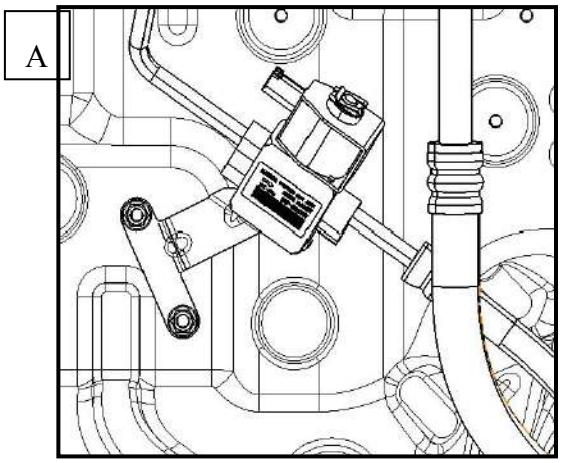
5 Remove condenser.

Installation

Install it in reverse order of removal.

Air conditioner pipeline





1 Condenser 2 Compressor 3 Air conditioner host 4 Expanding valve

Removal

1 Use refrigerant in recycling system of refrigerant specialized recycling equipment.

2 Pull out connectors between triple pressure switch and magnetic valve.

3 Remove connecting bolt of pipeline connector.

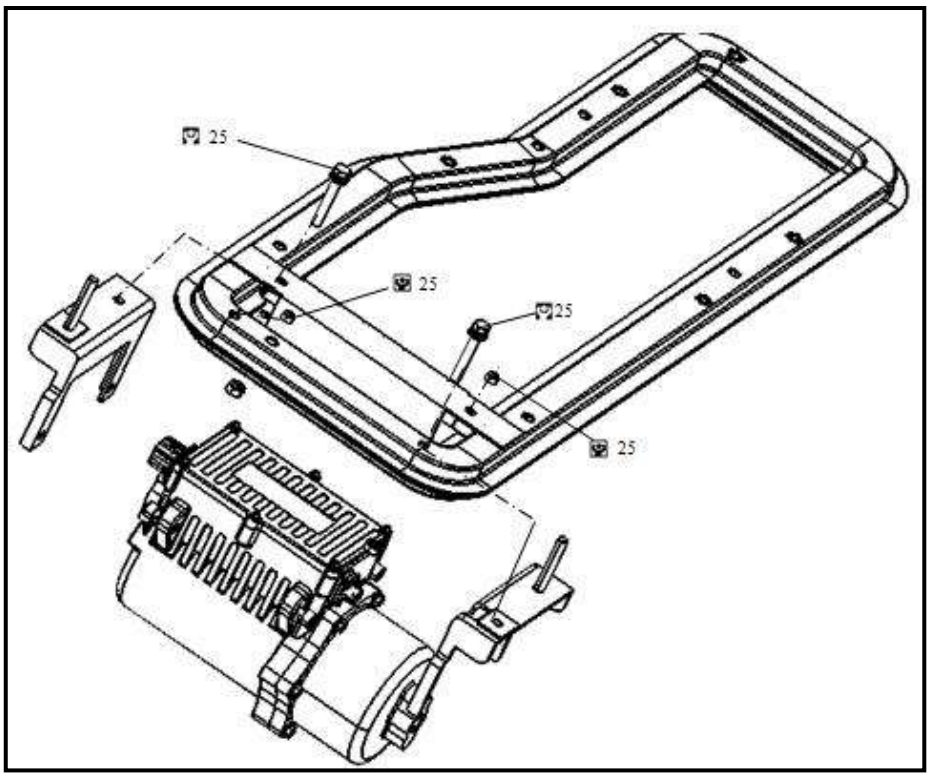
4 Remove fixing nut of magnetic valve.

5 Remove air conditioner pipeline.

Installation

Install it in reverse order of removal.

Electrical compressor



Removal

1 Use refrigerant in recycling system of refrigerant specialized recycling equipment.

2 Pull out high and low voltage connectors of electrical compressor.

3 Remove connecting bolt related to compressor.

4 Remove fixing but of compressor bracket.

5 Remove compressor assembly.

Installation

Install it in reverse order of removal.

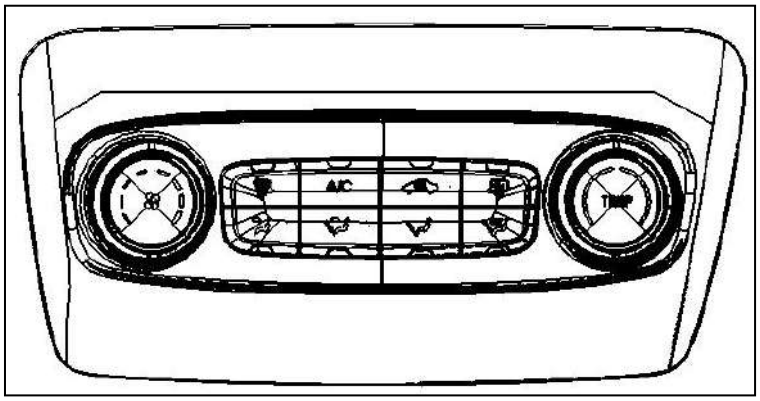
Air conditioner controller

Removal

1 Unclench air conditioner controller assembly.

2 Disconnect air conditioner controller harness connector.

3 Take down air conditioner controller.



Disassembling and assembling

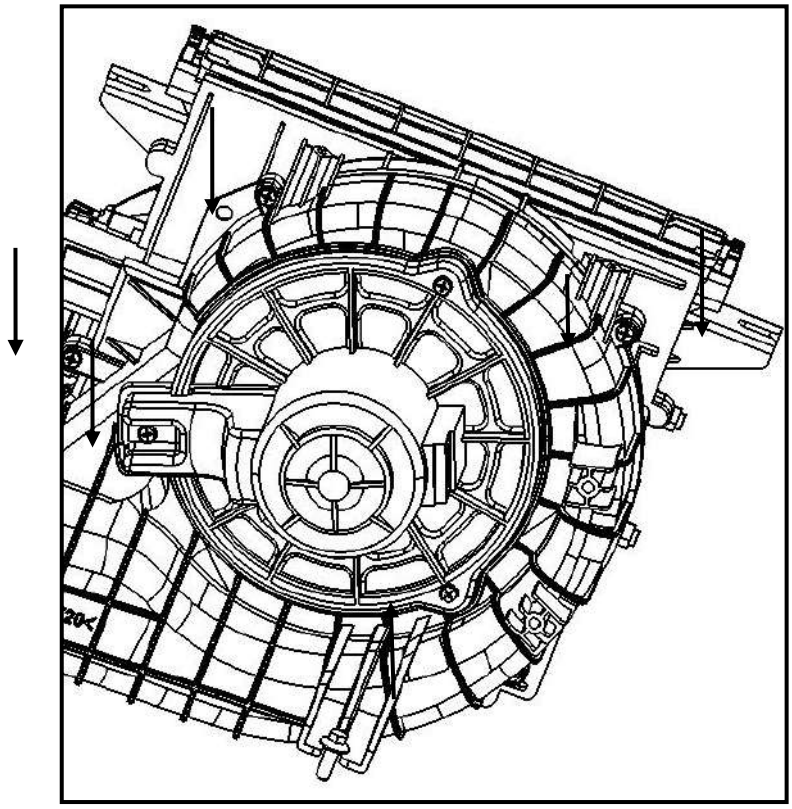
Air conditioner host

Air conditioner host is composed of blower, temperature damper motor, module damper motor, internal and external air damper motor, speed regulating module, electrical heater and other parts.

Blower

Disassembling

1 Remove fixing bolt of blower.



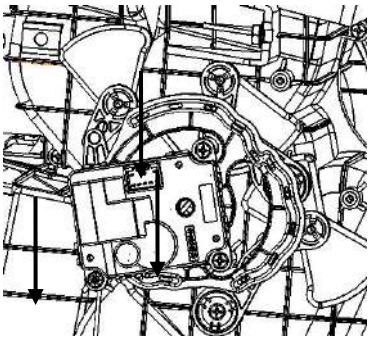
2 Remove blower assembly.

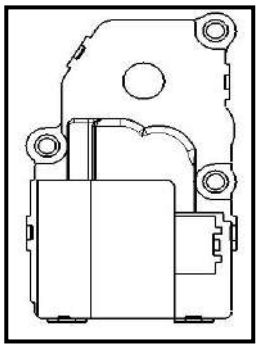
3 Installation

4 Install it in reverse order of removal.

Temperature controlling motor

1 Remove fixing bolt of temperature controlling motor.





2 Remove temperature controlling motor.

Installation

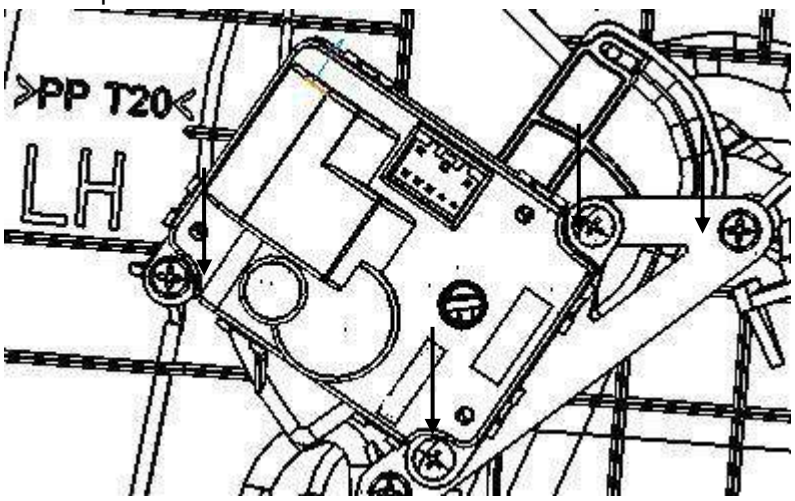
Install it in reverse order of removal.

Module damper motor

Removal

1 Remove fixing screw of module damper motor.

2 Remove module damper motor.



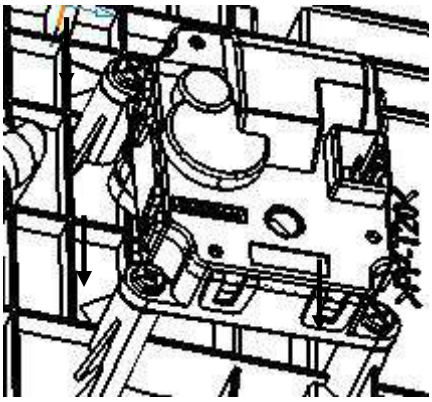
Installation

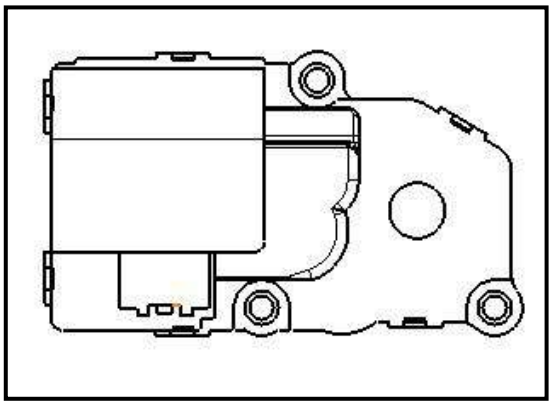
Install it in reverse order of removal.

Internal and external air damper motor

Removal

- Remove fixing screw of internal and external damper motor.
- Remove internal and external damper motor.





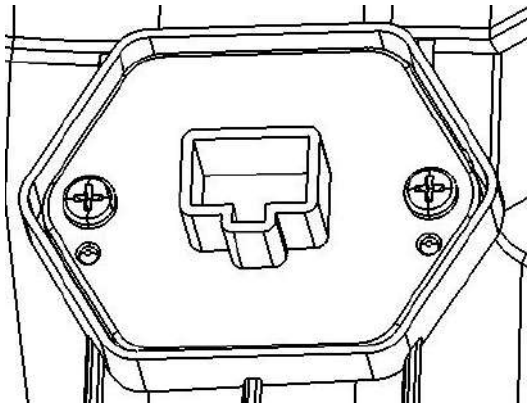
Installation

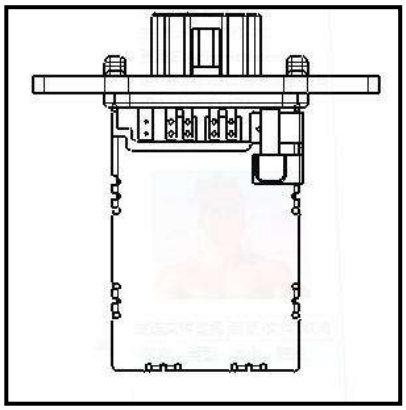
Install it in reverse order of removal.

Speed regulating module

Removal

1 Pull out harness connectors of speed regulating module and remove two fixing screw.





2 Remove speed regulating module.

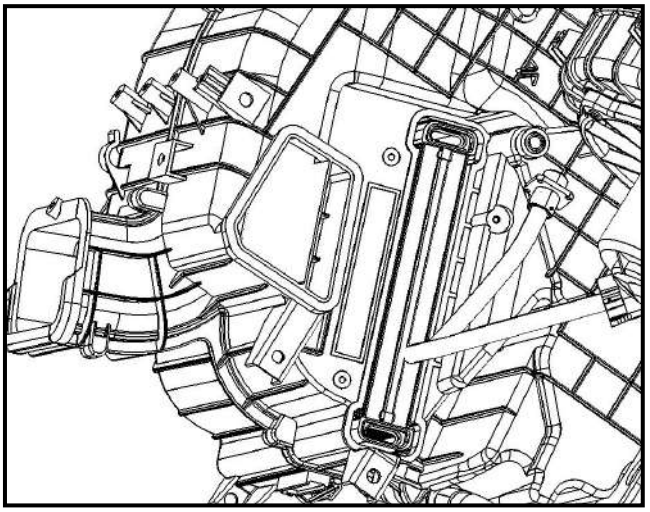
3 Installation

4 Install it in reverse order of removal.

Electrical heater

Removal

1 Remove high voltage cable fixing buckle of electrical heater.



2 Remove electrical heater.

Installation

Install it in reverse order of removal.

Maintenance data and specification

Electrical compressor

Model	TZ-EWX-032S
Type	Electrical scroll compressor

Refrigerant

Name	HFC-134a
Amount of usage (g)	400

Compressor lubricant

Name	RL68H
Amount of usage (ml)	120

Air conditioning control system

Safety precaution

Precautions for normal charging

Warning:

1 If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, the device can be only be used after its function being checked and confirmed before charging.

During normal charge operation, an engineer who uses medical electronic devices including heart pacemaker, cardioverter, defibrillator cannot enter passenger compartment (including trunk).

High-voltage preventive measure

Warning:

The electric vehicle has a high-voltage battery. If the operation on the vehicle and high-voltage parts is incorrect, there are risks of leakage of electricity, electric shock, or similar accidents. Thus, it is mandatory to follow correct procedures to check and maintain.

Before disconnecting repair switch, please put the key on "LOCK" position or unplug the key.

Disconnect repair switch before checking or maintaining high-voltage system. It is forbidden to close repair switch during the process of checking and maintenance. Before starting the operation on high-voltage system, be sure to wear insulated protection equipment, including gloves, shoes, and glasses.

When a technician is operating high-voltage system, please ensure no one touching the vehicle. When there is no maintenance operation, please take insulated protection on the high-voltage sections to prevent anyone touching.

When repair switch disconnects, it is forbidden that the key is at "ON" position or switched to "START" position.

High-voltage cable and safety sign

The color of high-voltage cable is orange and there are safety signs on the power battery assembly and other high-voltage parts. Do not touch these cables and parts.

Handling of high voltage terminals

When the connector of high-voltage cable is plugged out, please use insulated adhesive tape to bind up immediately.

Regulation for a person wearing medical electronic device

The vehicle has strong magnetic parts. If an engineer uses medical electronic device, such as electronic pacemaker, its function may be affected by strong magnetic parts. Thus, these people cannot carry out repair work.

Forbidden accompanying article during work

The vehicle has strong magnetic parts. Thus, during work it is forbidden to take metal articles which may cause short circuit or magnetic articles such us various bank cards which may be damaged.

Place “Repairing High-voltage Parts, No Touch!” warning sign

Before repairing high-voltage parts, please place “Repairing High-voltage Parts, No Touch” warning sign on the prominent position of the repaired vehicle to remind other people.

Precaution for removing 12V battery

Before removing 12V battery, turn the key to “ON” position, and then turn to “LOCK” position

Reminder:

Though the key is at “LOCK” position, auto-recharge function of 12V battery may activate.

After the key turns from “ON” to “LOCK”, auto-recharge function of 12V battery will not activate.

Precaution for supplemental restraint system "airbag" and "safety belt pretension"

Supplemental restraint system “airbag” and “safety belt pretension” is used together with front seat safety belts, which can reduce the damage to the driver and front passenger during collision. Supplemental restraint system consists of safety belt, driver airbag, and front passenger airbag. The detailed information of supplemental restraint system is included in the chapters of airbag system and seat safety belt.

Warning:

In order to avoid accidents, please abide by the following content:

To avoid the failure of supplemental restraint system and considering that the risk of physical injuries will increase during collision if the system fails, all the service must be executed by DR authorized dealer.

Non-normative maintenance of supplemental restraint system including non-normative removal and installation may result in accidental trigger of the system and cause physical injuries. Regarding the method of removing airbag module, please refer to Airbag System chapter.

Except for the operations in the service manual, please do not use electrical test device to test any circuit of supplemental restraint system. The color of harness and connector of supplemental restraint system is yellow or orange.

Precaution for using power tool (pneumatic or electric) and hammer

When power switch is at “ON” position and approach airbag diagnosis sensor or other sensors of airbag system, please do not use power tools or hammer on the sensor part area. Violent vibration may trigger these sensors and airbag to cause serious injuries.

1）When using power tools or hammer, put the key at “LOCK” position, unplug the negative pole of 12V lead-acid battery, wait at least one minute, and then start maintenance.

Cautions for R-134a

Warning:

1 The coolant R-12 and R-134a should not be mixed used, otherwise the electrical compressor may operate abnormally. In order to make sure the coolant R-134a being pure and recyclable, use a filling device to refill or reclaim the coolant according to the process specified on the coolant label.

The R-134a air conditioner system requires specialized compressor lubricant. If non-specialized lubricant is used, it may cause the electrical compressor to work abnormally.

2 It is prohibited to put the R-134a exposed in the air.

Attention:

3 When dismantling the refrigerating circuit parts of the air conditioner, seal the refrigerating circuit connectors of each parts immediately in order to avoid the moisture in the air entering the refrigerating circuit.

4 The sealing lid can only be removed when installing the refrigerating circuit parts of the air conditioner system and all components should be installed as soon as possible in order to avoid the moisture in the air entering the refrigerating circuit.

5 The compressor lubricant should be sealed securely otherwise it will be useless when moisture absorbed.

6 **Do not inhale coolant or vaporous compressor lubricant otherwise it will cause discomfort to eyes, nose and throat. Use special tool to reclaim refrigerant. If there is leakage of the conditioner system, the repairing place should be in open air. Any other question about the safety and health of refrigerant, please refer to the manufacturer of the coolant and compressor lubricant.**

7 **The compressor lubricant is forbidden to get in touch with polystyrene which may make it ineffective.**

Contamination of refrigerant

If the refrigerant is not pure, please take below measures: Explain to consumer that it is forbidden to release refrigerant which will contaminate the atmosphere.

Recycling polluted refrigerant may damage the recycling equipment and contaminate the coolant in the device.

Use special refrigerant filling device to reclaim and refill the refrigerant and do not reclaim polluted refrigerant. The handling of refrigerant must abide by local rules and regulations. As for replacing the parts of cooling system, please refer to related chapter in maintenance manual.

Normal precautions for refrigerant

Warning:

It is forbidden to release refrigerant in the air. Please use special recycling equipment to release refrigerant.

It is required to wear eyes and hand protective equipment during operation relating to refrigerant and air conditioner system.

Do not keep refrigerant stored in more than 52℃ temperature.

Do not use open flame to burn refrigerant tank. Put the refrigerant tank in warm water if heating is needed.

Do not throw or press the refrigerant tank.

Do keep the refrigerant away from open flame because it will release poisonous gas.

Make sure the working place is with good ventilation otherwise the refrigerant will inhale oxygen in the air and cause personnel to suffocate.

Do not make pressure or leakage test for repairing equipment of R-134a and air conditioner system filled with compressed air. The mixture of R-134a and air is combustible and it will cause personal injury or property loss in the event of burning. Please consult the refrigerant manufacturer for more safety information.

Precautions for dye leakage inspection

1 The air conditioner system does not contain fluorescent leakage detection dye.

2 Do not use fluorescent leakage detection dye in the air conditioner system.

Precautions for compressor lubricant

It is required to use specialized compressor lubricant RL168H for the air conditioner system otherwise it will cause malfunction of the air conditioner system.

Do not use recycling and filling device of normal lubricant refrigerant.

The recycling and filling device of conventional lubricant refrigerant can only be used for the vehicle after thoroughly and clean rinse.

Precautions for electrical compressor maintenance

The intake and exhaust vent of the compressor should be installed sealing-plug to avoid any entrance of air or impurities.

After the compressor is removed, please place it in same state as it is installed on the vehicle.

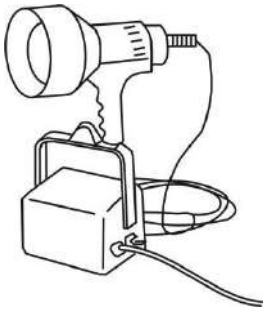
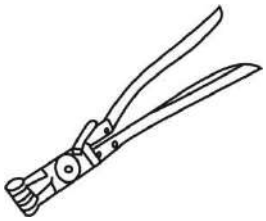
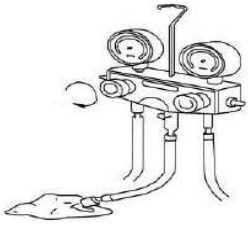
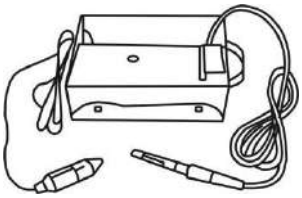
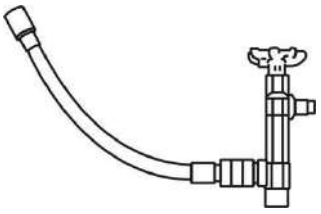
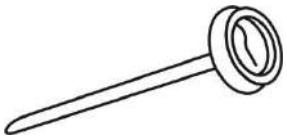
The compressor needs to operate for more than two minutes after installation.

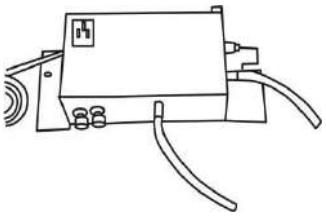
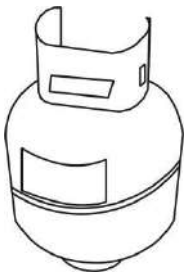
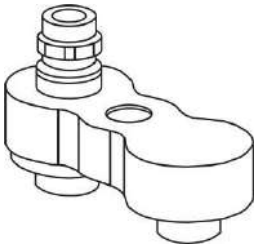
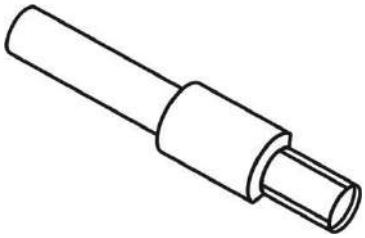
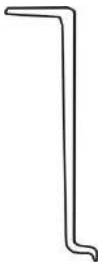
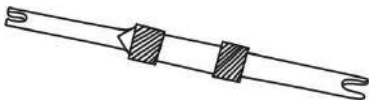
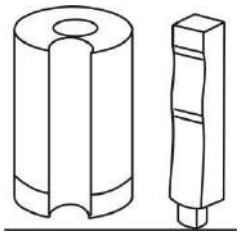
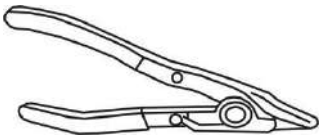
Preparation work

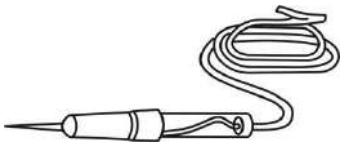
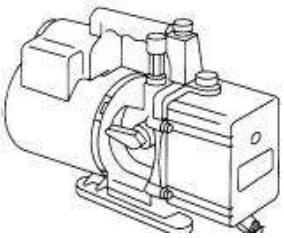
Lubricant and refrigerant

Name	Function	Remark
Refrigerant R-134a	Used for refrigeration cycle	
Compressor lubricant RL68H	Compressor lubricant	

Special tool

Name	Picture	Name	Picture
Digital multimeter		High strength invisible lamp	
Remover Plier		Triple table	
Halogen leakage detector		Tracer color syringe	
Tracer color R134a		Microthermometer	

Positive current brake valve		Sealing protective equipment	
Refillable recycling tank of fifty pounds		Pressure test adapter	
Lip shape sealing removal tool for air conditioning system		O-ring sealing removal tool	
Valve core removal and installation tool		O-ring sealing installation tool	
Spring card plier		Spring card plier	

Refrigerant recycling, regeneration and refilling system		Passive test lamp	
Heating gun		Insulated gloves	
Insulated shoes		Aspirator bump	
Safety helmet	 Safety glass		

System introduction

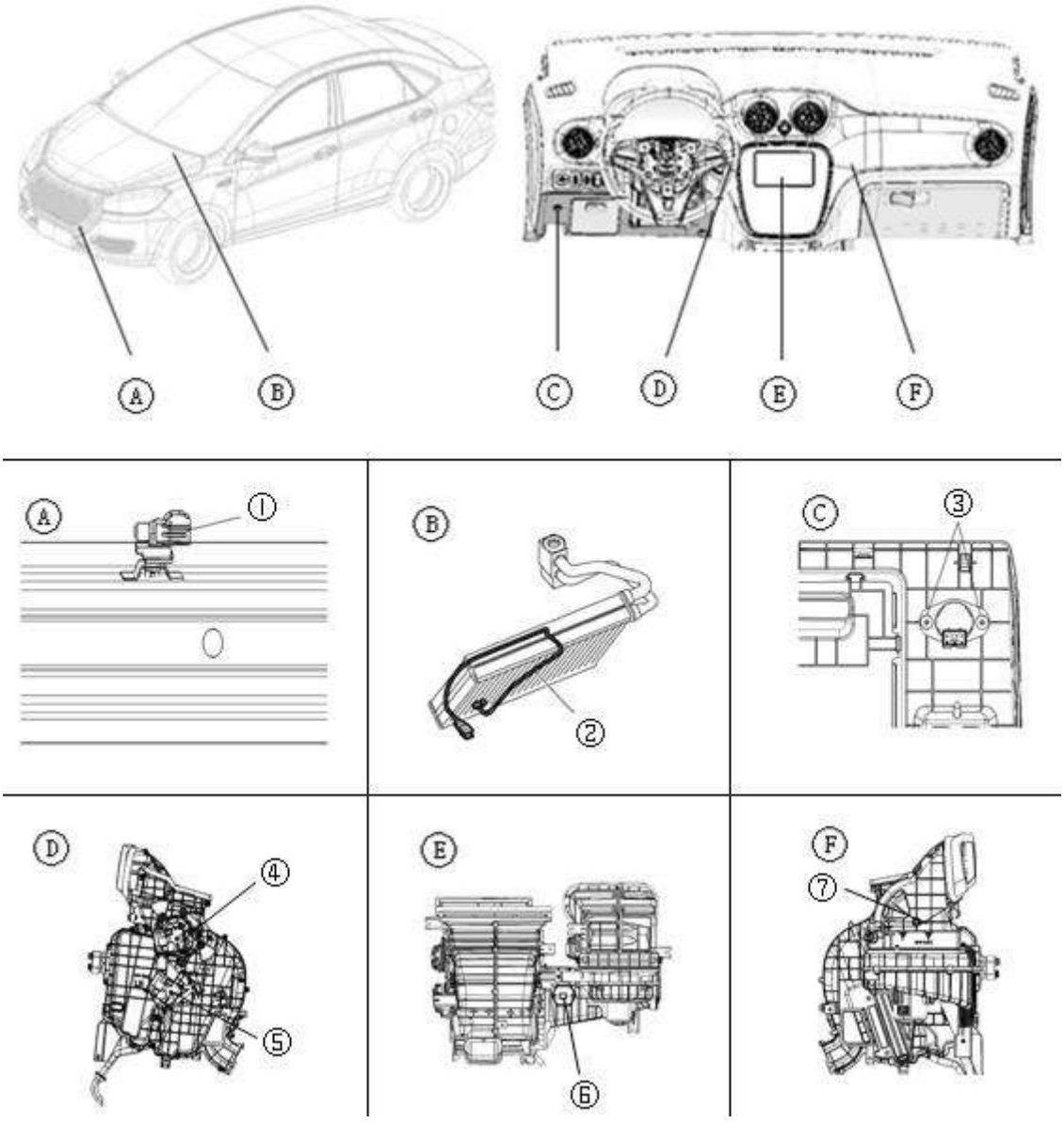
Introduction

The vehicle adopts environmental dual steaming electrical air conditioning system.

The vehicle adopts air conditioning system with the core of compressor controller and air conditioner controller.

Components

Air conditioner controlling system layout



A Environment temperature sensor B Evaporator C Internal temperature sensor D Left side of air conditioner host E Rear side of air conditioner host F Right side of air conditioner host

Component introduction

Serial number	Component name
1	Environment temperature sensor
2	Evaporator surface temperature sensor
3	Internal temperature sensor
4	Module motor
5	Temperature motor
6	Speed regulating module
7	New air return motor

Module motor

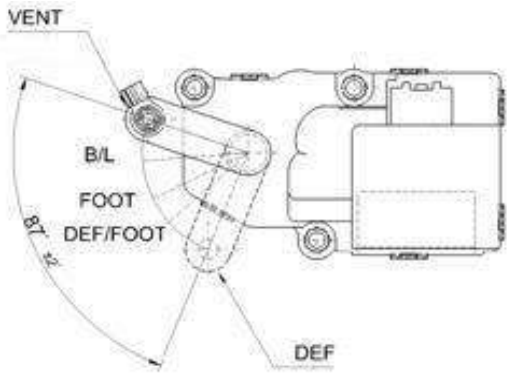
Introduction

Module motor is installed on the left side of electrical heater shell.

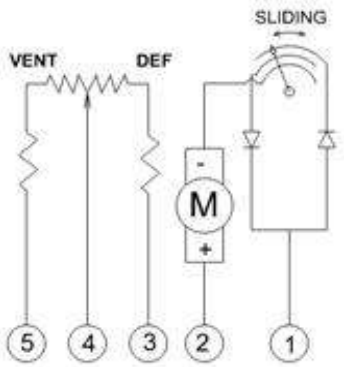
When module button is changed, it feedbacks module signal to air conditioner controller which takes control of module motor and regulates damper position.

When module motor is started, it feedbacks voltage difference to air conditioner controller which takes action against signal. When module damper reaches required position, module motor stops working.

Operating principle



Wiring diagram



Temperature motor

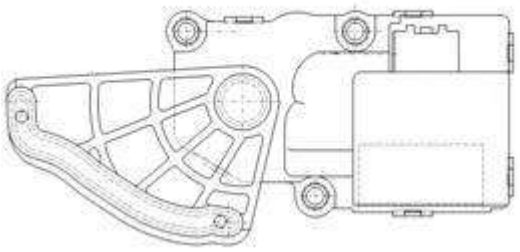
Introduction

Temperature motor is installed on lower side of electrical heater shell.

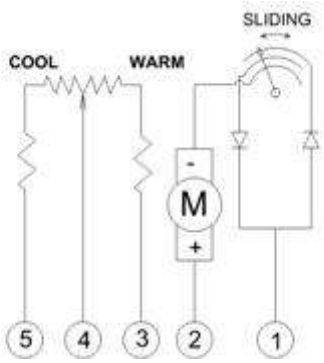
When temperature button is changed, it feedbacks module signal to air conditioner controller which takes control of module motor and regulates damper position.

When temperature motor is started, it feedbacks voltage difference to air conditioner controller which takes action against signal. When mixed damper reaches required position, temperature motor stops working.

Operating principle



Wiring diagram



New air return motor

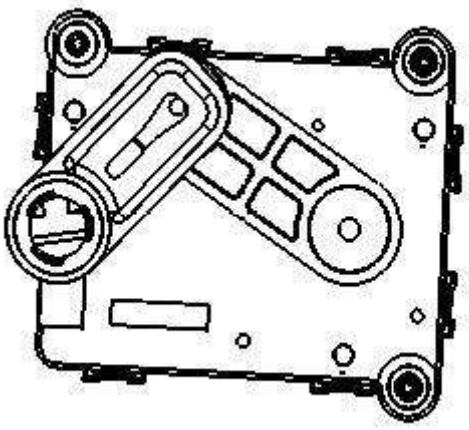
Introduction

New air return motor is installed on inside and outside air inlet duct of evaporator blower.

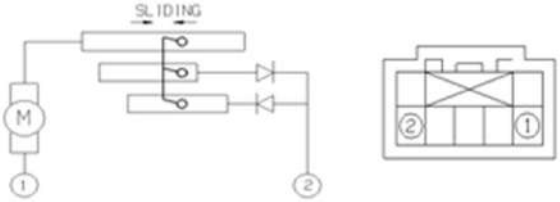
When new air return button is changed, it feedbacks new air return request signal to air conditioner controller which takes control of new air return motor and regulates new air return damper position.

When new air return motor is started, it feedbacks voltage difference to air conditioner controller which takes action against signal. When new air return damper reaches required position, new air return motor stops working.

Operating principle



Wiring diagram



▷Operation method

Input voltage		Output direction (install datum)
Terminal 1	Terminal 2	
+	−	FRESH (CCW)
−	+	RECIR (CW)

Blower motor

Introduction

The motor drives fan rotation to provide required airflow volume.

Specification

Rotating direction	Clockwise direction
Fan size	Φ147mm×76.2mm
Motor diameter	Φ68mm
Motor rating	234W

Detection

The anode terminal can be added any voltage. The cathode requires inspection after grounded. Normally, the blower rotational speed increases with high voltage.

Expanding valve

Introduction

Expanding valve is installed on inlet of evaporator.

High pressure refrigerant outflowing from reservoir dryer ejects through expanding valve holes. It changes from liquid state to low pressure mist sate after sharp expansion.

Except throttling and depressurization, the expanding valve can also regulate refrigerant flow according to refrigerant overheat size of evaporator outlet.

Specification

Type	H type
Volume	1.5RT
Opening	1.6mm

Attention:

When expanding valve cover is off, electrical driving compartment transfers heat to heating package. That causes the expanding valve pressure to rise and a large amount of refrigerant to flow into evaporator. If the refrigerant cannot be vaporized thoroughly, liquid refrigerant will flow into compressor and damage it.

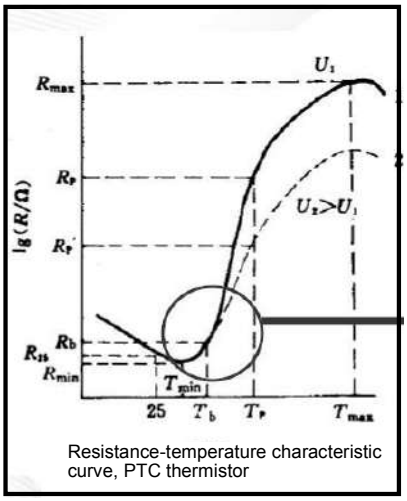
Electrical heater assembly

Introduction

Electrical heater is composed of positive temperature coefficient thermal ceramic resistance. When the temperature exceeds a certain value, electrical resistance value increases with temperature rise in a jumping step.

There are two levels of heating in electrical heater. The first level wattage is 1kw. The second level is with wattage of 1.5KW and working voltage of 331VDC.

Operating principle



Resistance-temperature characteristic curve, PTC thermistor

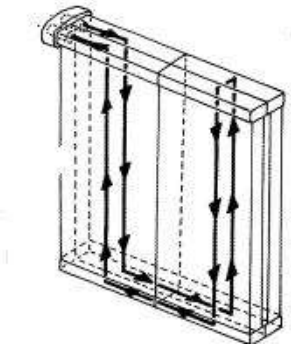
Evaporator

Introduction

Liquid refrigerant with throttling and depressurization is heated and boiled in evaporator. The refrigerant absorbs heat in the air while the blower consistently sends cooled air to crew compartment to lower the temperature.

Evaporator contains many refrigerant channel made by aluminum board welding. Each channel between two groups contains wave tropical.

Operating principle



Evaporator surface temperature sensor

Introduction

It senses surface temperature of evaporator to avoid icing.

The feature of sensor is increasing resistance with lower temperature and reducing resistance with higher temperature.

Specification

Temperature（℃）	Resistance（kΩ）	Voltage（V）
30.00	1.98	0.99
25.00	2.45	1.17
20.00	3.06	1.38
15.00	3.85	1.62
10.00	4.88	1.89
5.00	6.22	2.19
4.00	6.54	2.25
3.00	6.87	2.31
2.00	7.23	2.37
1.00	7.60	2.44
0.00	8.00	2.50
-1.00	8.42	2.56
-2.00	8.87	2.63
-3.00	9.34	2.69
-4.00	9.48	2.71
-5.00	10.37	2.82

Air conditioner filter

Introduction

The vehicle adopts pellet type air conditioner filter to remove foreign stuff and peculiar smell so as to keep a comfortable internal environment.

The replacement period of air conditioner filter is 5000-12000km. It is required to check and replace air conditioner filter regularly in areas with serous atmosphere pollution and poor road condition.

One-piece electrical compressor

Introduction

The type of compressor is electrical vortex.

The compressor controller regulates electrical compressor rotating speed through IPM module inverter. It also owns function of over-current, low voltage, over voltage, over-temperature, phase loss and other protective function.

Condenser and dryer bottle

Introduction

The function of condenser is cooling high temperature high voltage refrigerant steam from compressor.

The condenser is parallel flow condenser which contains super-cooling area and integrated with dryer bottle. Super-cooling can improve cooling performance.

During maintenance, remove the sealing cover on lower side of dryer bottle to replace silicon gel.

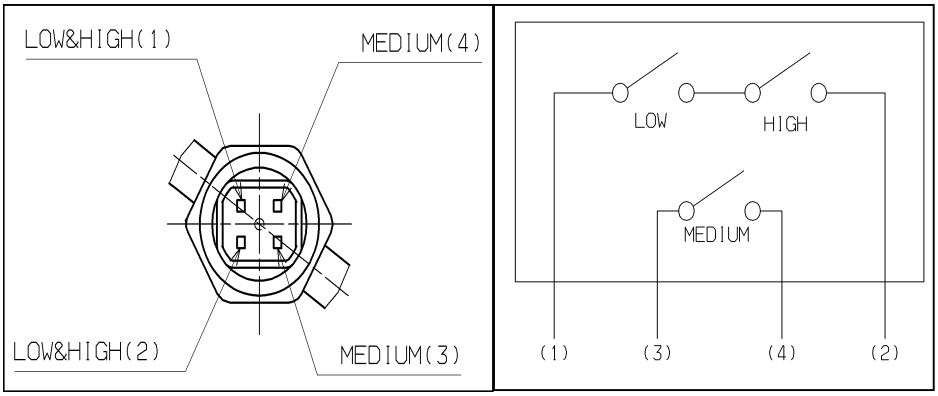
Triple unit pressure switch

Introduction

According to air conditioning system refrigerant pressure value, it turns on or off the pressure switch and sends signal to air conditioner controller.

The cooling fan changes into high rotating speed state when air conditioning system voltage reaches 1.4KW so as to prevent cooling performance decreasing by rising pressure.

Wiring diagram



Specification

Distinction	ON	OFF
High voltage	26.0（kg/㎠）	32.0（kg/㎠）
Low voltage	2.3（kg/㎠）	2.0（kg/㎠）
Medium voltage	18.0（kg/㎠）	14.0（kg/㎠）

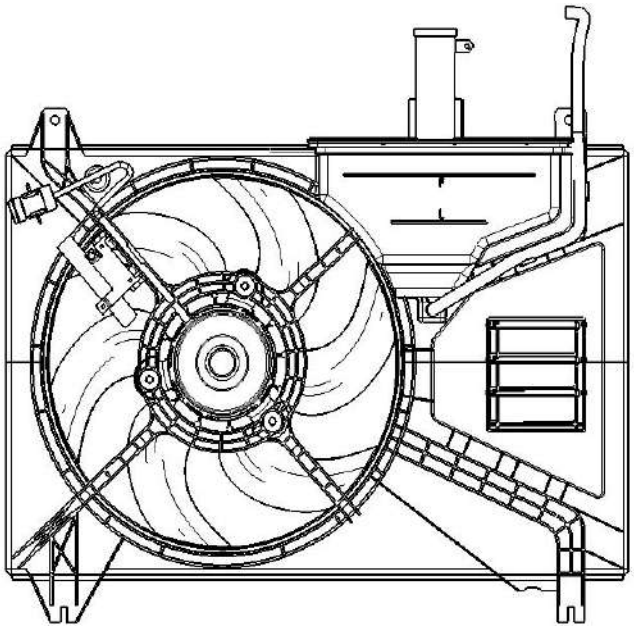
Condenser fan assembly

Introduction

Condenser fan is fixed on cooling system radiator and installed on front of electrical driving compartment.

Condenser fan is axial-flow type.

Condenser fan rotating speed is controlled by VCU and with multiple gear speed.



Refrigerant pipeline

Introduction

It connects various parts of cooling circuit together into a closed system.

Each pipe joint adopts O-ring axial sealing.

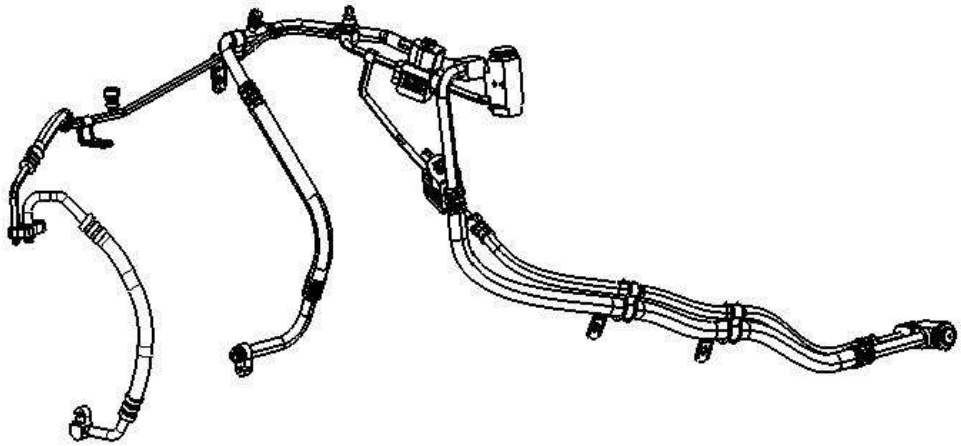
The vehicle is composed of four refrigerant pipelines.

High voltage pipe：Connect condenser and evaporator and install triple unit pressure switch.

High voltage exhaust pipe：Connect electrical compressor and condenser.

Low voltage aspirating pipe：Connect electrical compressor and evaporator.

Liquid pipe distribution line：Connect to battery compartment evaporator.



The heating unit,a water-heating type, makes use of the cooling water from engine which flows into compartment heater core body through two water heating pipes. The blower gets the air inside or outside the compartment flowing across the heater core surface and gets the temperature raised, reaching the heating purpose. The heater core structure is the same as the condenser's, adopting Parallel Flow Design. Refer to table 5 for parameters. In addition, the heater unit is integrated with the temperature, mode wind door and execution mechanism, adjusting the wind door by the motor of automatic controlling system to meet the set temperature and mode requirements. Specific control principle is stated in the next section.

Table 5

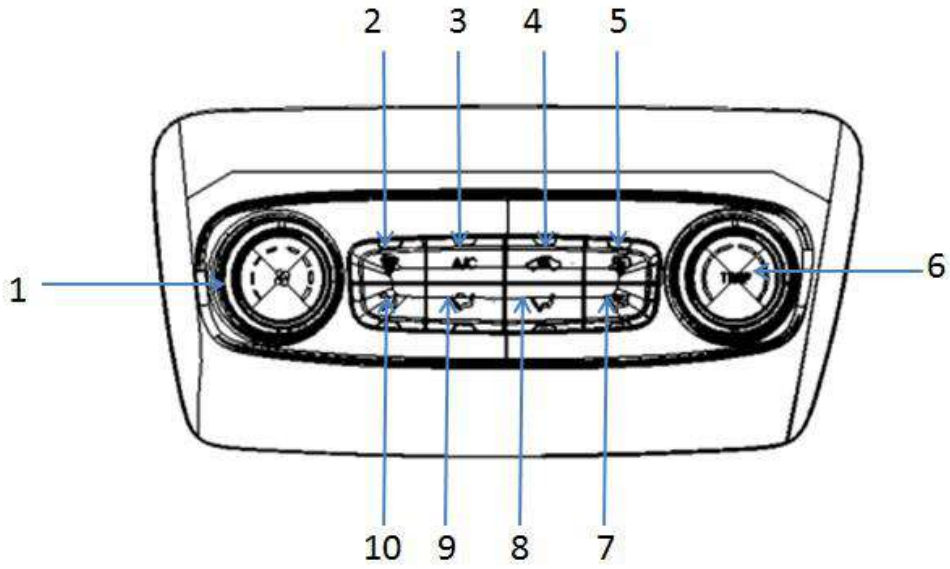
Core body dimension (WXHXD)		165x206x29
Fin clearance /fin number		1.83/2 /112
Duct/number		2.04x25.4/18
Front area		0.03399m²
Heating amount (kcal/h)/ Wind pressure difference	200m³/h	3093/7.6
	300m³/h	4380/13.1

(mmAq)	350m³/h	4925/16.0
	400m³/h	5411/19.3

Air conditioning controller

Instruction

- A/C controller collects temperature signal inside or outside vehicle and evaporator, controls A/C system actuator working.
- A/C controller and VCU、electric compressor controller interact information with CAN communication.



Controller logical function

Serial No.	Button	function	System action and display	Function relieving keying
1	Air volume rotary knob	Regulating air volume	1）Using continuously speed regulation,rotary knob is used to regulate blower air volume. 2）MP5 synchronous display 0-7 files.	Rotating to left ending,air volume decreases to 0 state,that means closing the blower.

2	Defrost keying	Regulating to defrosting mode	Key is on “ON” state,press defrosting mode keying. 1）If the blower fan speed is 0, the front defrost indicator and front panel defrost icon will be on, and the A/C indicator and snowflake icon will not be lit. 2）If the blower fan speed is greater than 0, the A/C indicator and the snowflake icon are lit, and the compressor operates. 3）Working on defrosting function, initial setting is new air. 4）Press defrosting keying repeatedly,the state keeps on	Working on defrosting function: 1)Press the A/C button, the A/C indicator and the snowflake icon are extinguished, and the compressor does not work; 2) Reduce the wind speed of the blower to 0, exit the defrost mode, the A/C indicator and the snowflake icon are extinguished, the compressor does not work; increase the wind speed of the blower to >0, restore the defrost status, and the defrost indicator is always on. 3)Press other modes,enter in other

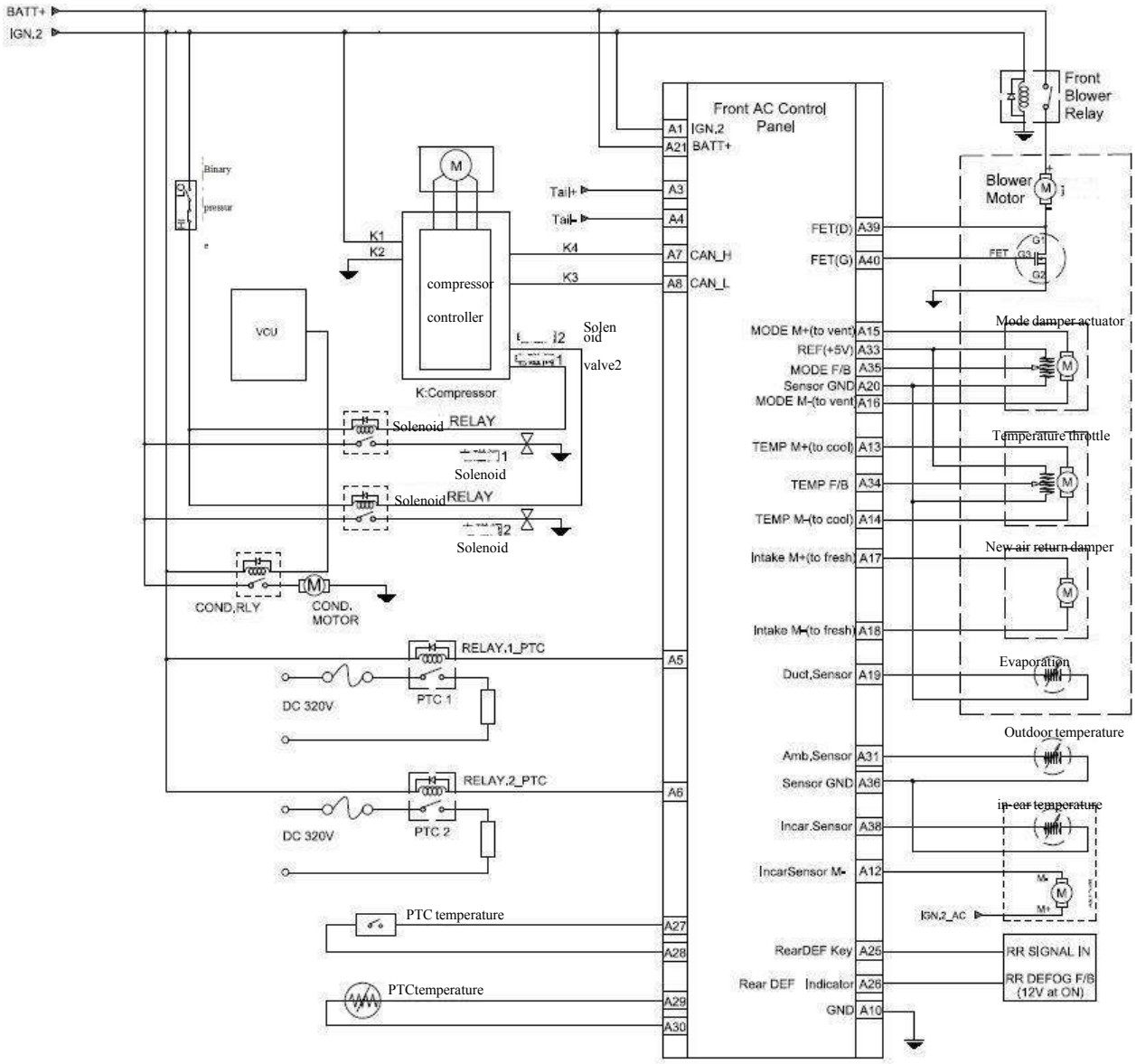
				modes,then could relieving defrosting lamp lighting state.
3	A/C button	Controls compressor on and off	1）Press the A/C key repeatedly to turn the compressor on or off, and the A/C indicator and snowflake icon change synchronously. 2）When the blower wind speed is 0, the A/C button does not respond. 3) When the defrost function is performed, the A/C is turned on by default. 4)initialization,A/C always is off 5)Under modes except defrosting,temperature rotary knob stays heating area,A/C is forbidden to start.	1)The A/C button is pressed, its indicator light goes out, and the compressor is off. 2) The blower fan speed is adjusted to 0, the A/C button indicator and the snowflake icon are extinguished, and the compressor is turned off. 3)Under modes except defrosting,temperature rotary knob stays heating area,A/C stops working.
4	return air key	Controls new and return air switch	Press return air key repeatedly,air damper doing homologous switch;indicator lamp lighting means return air state;indicator lamp extinguishing means new air state.	1）Working on defrosting or blowing feet and defrosting function, initial setting is new air. 2） 2)After the air

				conditioner is turned on, the return air state is the state before the air conditioner was turned off last time.
5	Rear defrosting key	Controls rear defrosting on and off	Press the rear defrost button repeatedly to turn the defrost on or off； In the rear defrost operation, the indicator and the rear defrost icon on the touch panel light up	nothing to do with air conditioning function
6	Temperature rotary knob	Regulating mode	1)Operating temperature rotary knob to regulate temperature air damper for temperature regulation. 2)The setting temperature increases in 1℃/every time,maximum temperature 32℃,minimum temperature 16℃. 3)The key is in the "ON" position, blower >0 position, the temperature knob is turned to the heating area, PTC is turned on, the air conditioner starts heating 4) If the blower fan speed is 0, the front defrost indicator and the front panel defrost icon will be lit, and the A/C indicator and the snowflake icon will not be lit. If the blower fan speed	1) The temperature button can be freely set in the power-on state. 2) The blower fan speed is adjusted to 0, and the air conditioner heating is turned off.

			is adjusted to >0 in this case, the A/C lamp and the snowflake icon will light up again and the compressor will operate.	
7	Blowing face keying	Regulating to blowing face mode	Press the keying,switch mode air damper to blowing face position;blowing feet indicator lamp lights,A/C、in-out air state remain the same	3)Press other modes,enter in other modes,then could relieving present state.
8	Blowing face/feet Button	Regulating to blowing face/feet mode	Press the keying,switch mode air damper to blowing face position;blowing feet indicator lamp lights,A/C、in-out air state remain the same	3)Press other modes,enter in other modes,thenvcould relievingvpresent state.
9	Blowing feet keying	Regulating to blowing feet mode	Press the keying,switch mode air damper to blowing face position;blowing feet indicator lamp lights,A/C、in-out air state remain the same	3)Press other modes,enter in other modes,then could relieving present state.
10	Blowing feet/defrosting Button	Regulating to blowing feet/defrosting	Press the keying,switch mode air damper to blowing feet/defrosting position;blowing feet/defrosting indicator lamp lights,A/C、in-out air state remain the same	3)Press other modes,enter in other modes,then could relieving present state.

System principle

System framework



Compressor controlling

Controlling principle

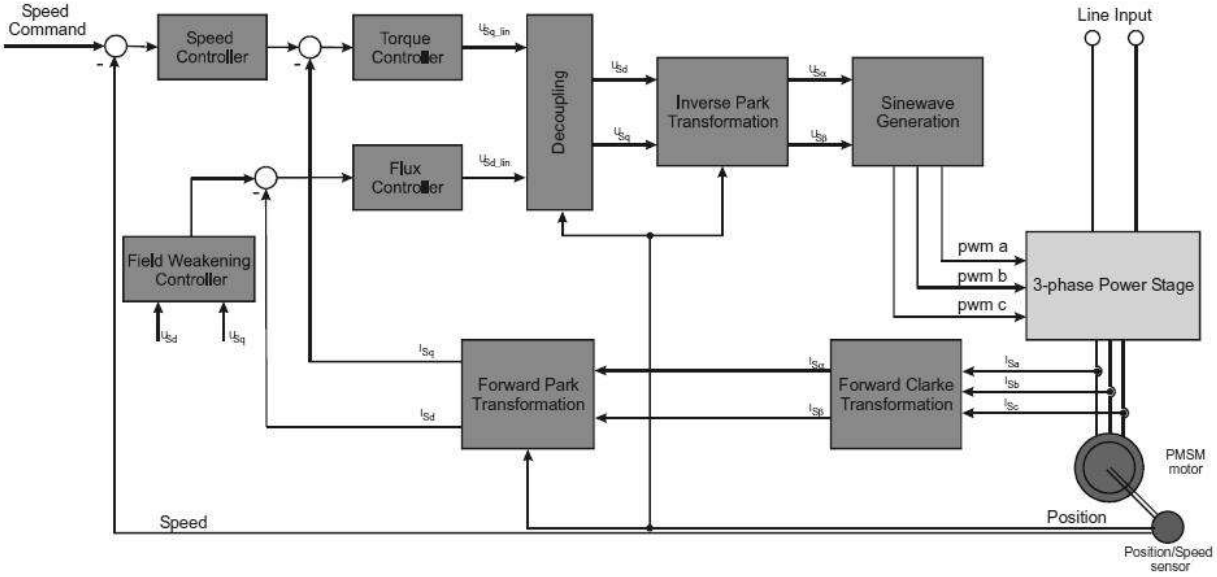
Air conditioner controller receives compressor opening request signal from touch panel.

Air conditioner controller checks whether the blower is open. If the blower is open, it regulates compressor rotating speed according to setting temperature and environment temperature.

When difference value between set temperature and environment temperature is more than 2℃ , compressor will operate at full speed. When difference value between set temperature and environment temperature is less or equal difference value between set temperature and environment temperature is more than 2℃, compressor enters frequency conversion.

During compressor operating process, compressor controller monitors operating state in real

time. When operating state is abnormal, compressor can handle and response promptly.



Electrical heater controlling

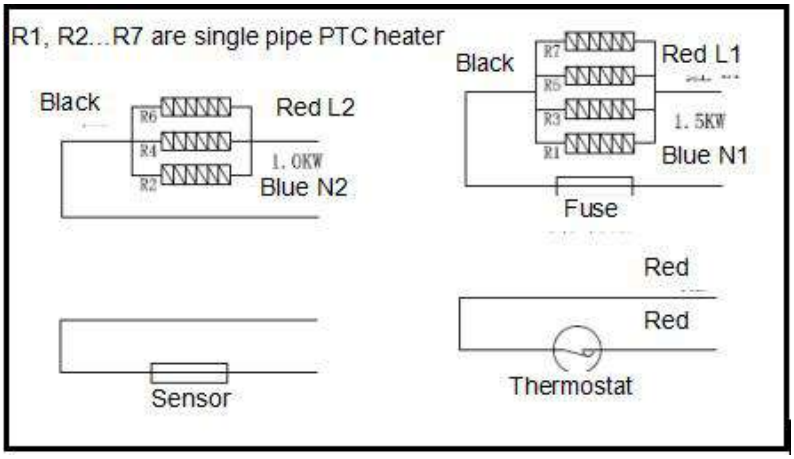
Controlling principle

There are two levels of heating in electrical heater. The first level wattage is 1KW. The second level wattage is 1.5KW.

There is temperature sensor on electrical heater surface. When temperatures sensors collects temperature above 95℃, air conditioner controller will automatically disconnect electrical heater power supply input.

There is temperature switch on electrical heater surface. When temperatures switch collects temperature above 95℃, air conditioner controller will automatically disconnect electrical heater power supply input.

When internal temperature of vehicle is above 25℃, electrical heater will not operate. When internal temperature of vehicle is between 5℃ with 25℃, electrical heater will operate at first heating level. When internal temperature of vehicle is under 5℃ , electrical heater will operate at maximum heating level.



Diagnosis

Instruction

When A/C control system breaks down.the symptoms of the A/C system should be judged first,adopt homologous methods to eliminate and maintain.

Symptom list

Compressor symptom list

Serial No.	Faults name	Faults code
1	Compressor cavity temperature is too high	1
2	Compressor cavity temperature reaches the setting value	2
3	Compressor over current	3
4	Compressor over load	4
5	input DC under voltage	5
6	input DC over voltage	6
7	Compressor cannot receive CAN signal	7

A/C controller symptom list

Serial No.	Faults name	Faults code
1	Evaporator temperature sensor feed back short out to earth	3
2	Evaporator temperature sensor feed back shut off to earth	4
3	Indoor temperature sensor feed back short out to earth	5
4	Indoor temperature sensor feed back shut off to earth	6

5	Outdoor temperature sensor feedback ground short circuit	7
6	Outdoor temperature sensor feedback ground breaking	8
7	Mode servo motor feed back short out or shut off to earth	9
8	Mode servo motor stalled	10
9	Temperature servo motor feed back short out or shut off to earth	11
10	Temperature servo motor stalled	12
11	PTC Temperature Sensor short out	13
12	PTC Temperature Sensor shut off	14

Compressor cavity temperature is too high

Description

Serial No.	Type	Conditions	Troubleshooting
1	Compressor cavity temperature is too high	IPM temperature is no less than 80 ℃	Compressor stops working

Faults diagnosis flow

1 Connect the CAN signal of compressor controller to computer system;

2 Start compressor and observe whether computer system could detect malfunction code 1 or not;

3 If checking out code 1,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 Replace compressor

2 Restart compressor,verify whether the function is normal or not;

3 If it still has some problem,please check high voltage power input circuit

Compressor cavity temperature reaches the setting value

Description

Serial No.	Name	Conditions	Troubleshooting
2	Compressor cavity temperature reaches the setting value	IPM temperature is no less than 70 ℃	Compressor runs in limited power

Faults diagnosis flow

1 Connect the CAN signal of compressor controller to computer system;

2 Start compressor and observe whether computer system could detect malfunction code 2 or not;

3 If checking out code 2,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 check whether compressor works normally or not;

2 check condenser fan works normally or not;

1 Restart compressor,verify whether the function is normal or not;

4 If it still has some problem,please check high voltage power input circuit

Compressor over current

Description

Serial No.	Name	Conditions	Troubleshooting
3	Compressor over current	Input current is more than 7A	Compressor stops working

Faults diagnosis flow

1 Connect the CAN signal of compressor controller to computer system;

2 Start compressor and observe whether computer system could detect malfunction code 3 or not;

3 If checking out code 3,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 Replace compressor

2 Restart compressor,verify whether the function is normal or not;

3 If it still has some problem,please check high voltage power input circuit

Compressor over load

Description

Serial No.	Name	Conditions	Troubleshooting
4	Compressor over load	Output power greater than 2000W	1.Compressor power is between 2000W to 2200W,compressor decrease power to work 2.Compressor power is over 2200W,compressor stops working.

Faults diagnosis flow

1 Connect the CAN signal of compressor controller to computer system;

2 Start compressor and observe whether computer system could detect malfunction code 4 or not;

3 If checking out code 4,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 Replace compressor

2 Restart compressor,verify whether the function is normal or not;

3 If it still has some problem,please check high voltage power input circuit

Input under voltage

Description

Serial No.	Type	Conditions	Troubleshooting
5	DC input under-voltage <280V	Power battery input voltage is too low	Compressor stops working

Faults diagnosis flow

1 Connect the CAN signal of compressor controller to computer system;

2 Start compressor and observe whether computer system could detect malfunction code 5 or not;

3 If checking out code 5,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 check vehicle power on voltage

2 check whether vehicle high voltage circuit is normal or not

3 Restart compressor,verify whether the function is normal or not;

4 If it still has some problem,please check whether compressor function meet requirements

Input over voltage

Description

Serial No.	Type	Conditions	Troubleshooting
6	Input DC over-voltage ≥378V	Power battery input voltage is too high	Compressor stops working

Faults diagnosis flow

1 Connect the CAN signal of compressor controller to computer system;

2 Start compressor and observe whether computer system could detect malfunction code 6 or not;

3 If checking out code 6,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 1 check vehicle power on voltage

2 Restart compressor,verify whether the function is normal or not;

3 4 If it still has some problem,please check whether compressor function meet requirements

Compressor cannot receive CAN signal

Description

Serial No.	Type	Conditions	Troubleshooting
7	Compressor cannot receive CAN signal	Compressor controller couldn’t receive communication signal in 5s or longer time.	Communication breaks down 5s,compressor stops working.

Faults diagnosis flow

1 Connect the CAN signal of compressor controller to computer system;

2 Start compressor and observe whether computer system could detect malfunction code 7 or not;

3 If checking out code 7,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 Replace compressor

2 Restart compressor,verify whether the function is normal or not;

3 If it still has some problem,please check high voltage power input circuit

Evaporator temperature sensor feed back short out to earth

Description

Serial No.	Type	Conditions	Troubleshooting
1	Evaporator temperature sensor short circuit to ground	Evaporation temperature sensor short circuit to ground, feedback is 0V.	Initial temperature is 10℃.

Faults diagnosis flow

1 Connect the CAN signal of A/C controller to computer system;

2 Start A/C and observe whether computer system could detect malfunction code 3 or not;

3 If checking out code 3,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 replace evaporator temperature sensor;

2 Restart A/C,verify whether the function is normal or not;

3 If it still has some problem,please check whether A/C function meet requirements

Evaporator temperature sensor feed back shut off to earth

Description

Serial No.	Type	Conditions	Troubleshooting
2	Evaporator temperature sensor feed back shut off to earth	Evaporation temperature sensor feedback voltage is 5.0V	Initial temperature is 10℃.

Faults diagnosis flow

1 Connect the CAN signal of A/C controller to computer system;

2 Start A/C and observe whether computer system could detect malfunction code 4 or not;

3 If a fault code 4 is detected, "Process flow" is performed; if fault code 3 is not detected, the diagnosis is completed.

treatment flow

1 replace evaporator temperature sensor;

2 Restart A/C,verify whether the function is normal or not;

3 If it still has some problem,please check whether A/C function meet requirements

Indoor temperature sensor feed back short out to earth

Description

Serial No.	Type	Conditions	Troubleshooting
3	Indoor temperature sensor feed back short out to earth	Indoor temperature sensor feedback voltage is 0V	Initial temperature is 20℃.

Faults diagnosis flow

1 Connect the CAN signal of A/C controller to computer system;

2 Start A/C and observe whether computer system could detect malfunction code 5 or not;

3 If checking out code 5,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 replace indoor temperature sensor;

2 Restart A/C,verify whether the function is normal or not;

3 If it still has some problem,please check whether A/C function meet requirements

Indoor temperature sensor feed back shut off to earth

Description

Serial No.	Type	Conditions	Troubleshooting

4	Indoor temperature sensor feed back shut off to earth	Indoor temperature sensor feedback voltage is 5.0V	Initial temperature is 20℃.

Faults diagnosis flow

1 Connect the CAN signal of A/C controller to computer system;

2 Start A/C and observe whether computer system could detect malfunction code 6 or not;

3 If checking out code 6,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 replace indoor temperature sensor;

2 Restart A/C,verify whether the function is normal or not;

3 If it still has some problem,please check whether A/C function meet requirements

Outdoor temperature sensor feedback ground short circuit

Description

Serial No.	Type	Conditions	Troubleshooting
5	Outdoor temperature sensor feedback ground short circuit	Outdoor temperature sensor feedback voltage is 0V	Initial temperature is 25℃.

Faults diagnosis flow

1 Connect the CAN signal of A/C controller to computer system;

2 Start A/C and observe whether computer system could detect malfunction code 7 or not;

3 If checking out code 7,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 Replace outdoor temperature sensor;

2 Restart A/C,verify whether the function is normal or not;

3 If it still has some problem,please check whether A/C function meet requirements

Outdoor temperature sensor feedback ground breaking

Description

Serial No.	Type	Conditions	Troubleshooting
6	Outdoor temperature sensor feedback ground breaking	Outdoor temperature sensor feedback voltage is 5.0V	Initial temperature is 25℃.

Faults diagnosis flow

1 Connect the CAN signal of A/C controller to computer system;

2 Start A/C and observe whether computer system could detect malfunction code 8 or not;

3 If checking out code 8,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 Replace outdoor temperature sensor;

2 Restart A/C,verify whether the function is normal or not;

3 If it still has some problem,please check whether A/C function meet requirements

Mode servo motor feed back short out or shut off to earth

Description

Serial No.	Type	Conditions	Troubleshooting
7	Mode servo motor feed back short out or shut off to earth	Mode motor feedback voltage is 0V	Mode motor compressor stops working

Faults diagnosis flow

1 Connect the CAN signal of A/C controller to computer system;

2 Start A/C and observe whether computer system could detect malfunction code 9 or not;

3 If checking out code 9,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 replace mode motor

2 Restart A/C,verify whether the function is normal or not;

3 If it still has some problem,please check whether A/C function meet requirements

Mode servo motor stalled

Description

Serial No.	Type	Conditions	Troubleshooting
8	Mode servo motor stalled	Motor does not move	Mode motor compressor stops working

Faults diagnosis flow

1 Connect the CAN signal of A/C controller to computer system;

2 Start A/C and observe whether computer system could detect malfunction code 10 or not;

3 If checking out code 10,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 replace mode motor

2 Restart A/C,verify whether the function is normal or not;

3 If it still has some problem,please check whether A/C function meet requirements

Temperature servo motor feed back short out or shut off to earth

Description

Serial No.	Type	Conditions	Troubleshooting
9	Temperature servo motor feed back short out or shut off to earth	Temperature motor feedback voltage is 0V	Temperature motor compressor stops working

Faults diagnosis flow

1 Connect the CAN signal of A/C controller to computer system;

2 Start A/C and observe whether computer system could detect malfunction code 11 or not;

3 If checking out code 11,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 replace mode motor

2 Restart A/C,verify whether the function is normal or not;

3 If it still has some problem,please check whether A/C function meet requirements

Temperature servo motor stalled

Description

Serial No.	Type	Conditions	Troubleshooting
10	Mode servo motor stalled	Motor does not move	Temperature motor compressor stops working

Faults diagnosis flow

1 Connect the CAN signal of A/C controller to computer system;

2 Start A/C and observe whether computer system could detect malfunction code 12 or not;

3 If checking out code 12,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 replace temperature motor;

2 Restart A/C,verify whether the function is normal or not;

3 If it still has some problem,please check whether A/C function meet requirements

PTC temperature sensor feedback ground short circuit

Description

Serial No.	Type	Conditions	Troubleshooting
11	PTC temperature sensor feedback ground short circuit	PTC temperature sensor feedback voltage is 5V	Initial temperature is 105℃.

Faults diagnosis flow

1 Connect the CAN signal of A/C controller to computer system;

2 Start A/C and observe whether computer system could detect malfunction code 13 or not;

3 If checking out code 13,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

1 replace PTC

2 Restart A/C,verify whether the function is normal or not;

3 If it still has some problem,please check whether A/C function meet requirements

PTC temperature sensor feed back shut off to earth

Description

Serial No.	Type	Conditions	Troubleshooting
12	Indoor temperature sensor feed back shut off to earth	Indoor temperature sensor feedback voltage is 0V	Initial temperature is 105℃.

Faults diagnosis flow

1 Connect the CAN signal of A/C controller to computer system;

2 Start A/C and observe whether computer system could detect malfunction code 14 or not;

3 If checking out code 14,do “treatment flow”;otherwise finish the diagnosis.

treatment flow

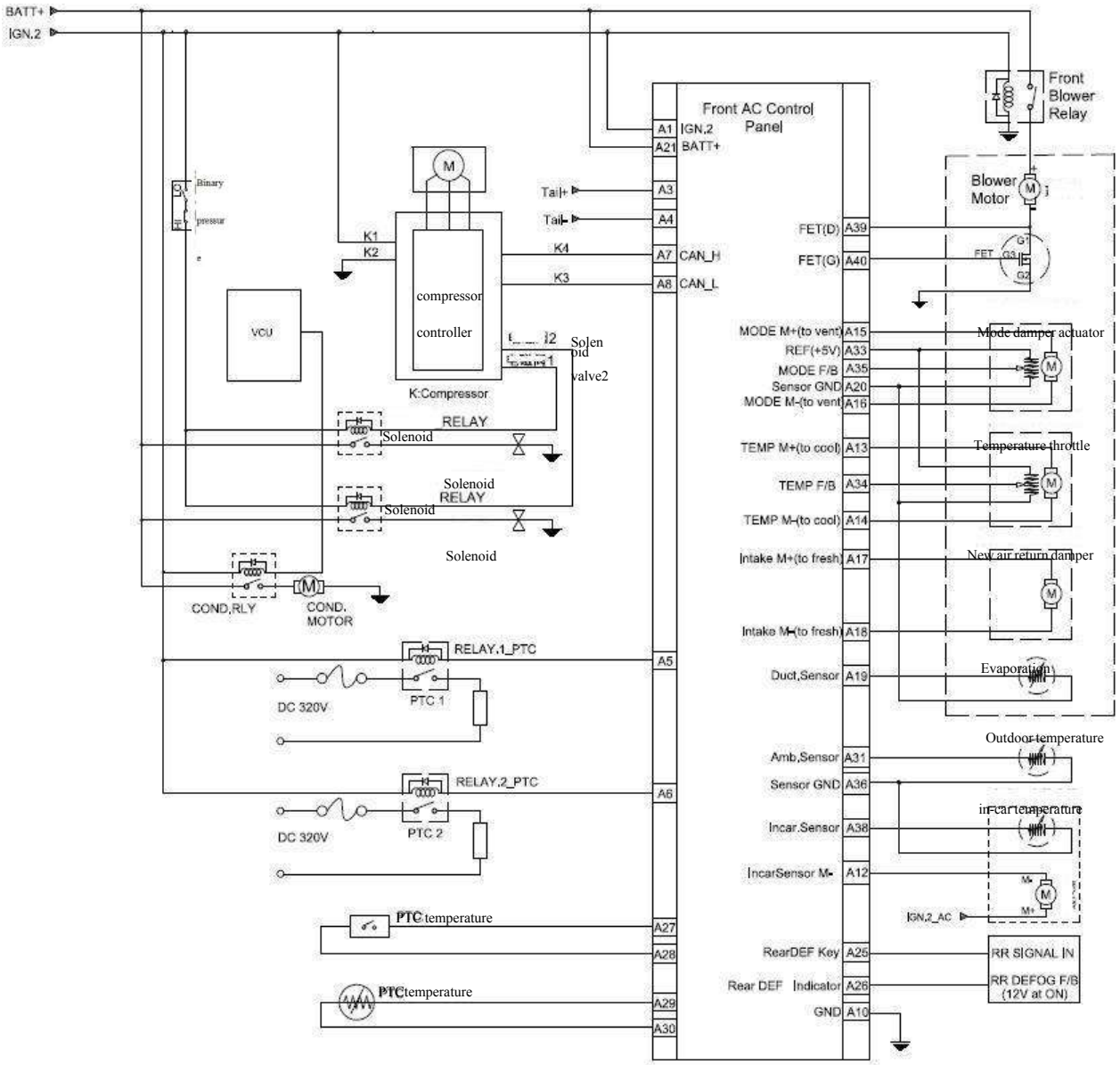
1 replace PTC

2 Restart A/C,verify whether the function is normal or not;

3 If it still has some problem,please check whether A/C function meet requirements

Wire harness framework

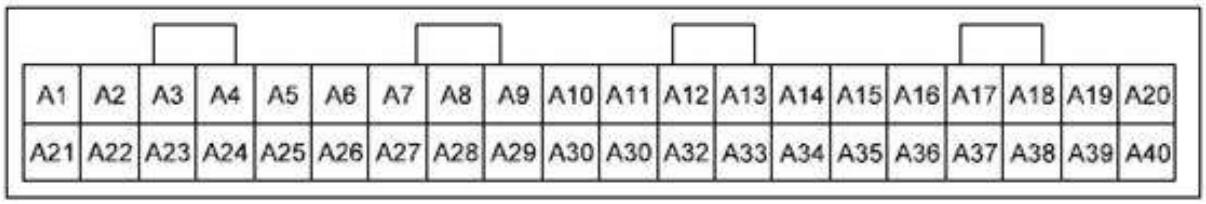
framework



Connector information

Air conditioning controller

Connector number	M13
Connector name	Air conditioning controller
Connector model	AMP1376113-1

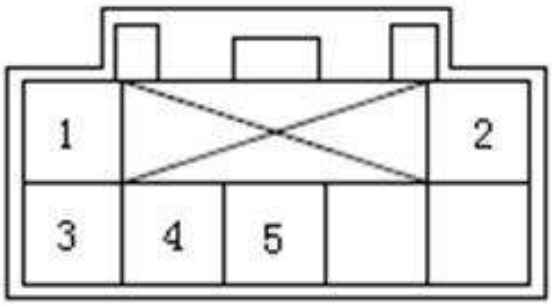


Terminal number	Wire color	Signal name
1	R	IGN2
2	null	null
3	BrB	Background light positive pole
4	L	Background light negative pole
5	RB	PTC opening first way
6	RW	PTC opening second way
7	RW	CAN high
8	RY	CAN low
9	null	null
10	B	vehicle power ground wire
11	null	null
12	BW	ventilation fan -
13	Gr	temperature motor+
14	BrO	temperature motor-
15	L	mode motor +
16	R	mode motor -

Terminal number	Wire color	Signal name
17	LW	New Return Air Motor+
18	BrR	New Return Air Motor-
19	GR	Evaporator temperature sensor +
20	Rr	sensor and motor reference ground wire
21	L	BATT+
22	null	null
23	null	null
24	null	null
25	BrV	rear defrost request
26	WB	rear defrost feedback
27	GB	PTC temperature switch+
28	GR	PTC temperature switch-
29	G	PTC Temperature Sensor +
30	YR	PTC Temperature Sensor -
31	GrR	outdoor temperature sensor+
32	Br	blank
33	G	5V reference voltage
34	P	temperature motor position
35	Y	mode motor position
36		GND
37	null	null
38	Y	outdoor temperature sensor+
39	L	Blower on signal
40	G	wind speed adjustment (continuous speed regulation)

Mode motor

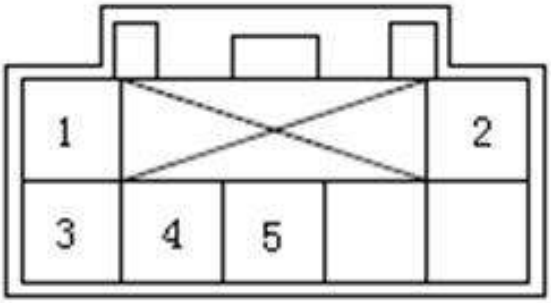
Connector number	M06
Connector name	Mode motor
Connector model	KUM PH842-07011



Terminal number	Wire color	Signal name
1	R	Mode motor power supply positive
2	YB	Mode motor power supply negative
3	YR	Mode Motor Position Signal Power Positive
4	G	Mode motor feedback voltage
5	B	Ground

temperature motor

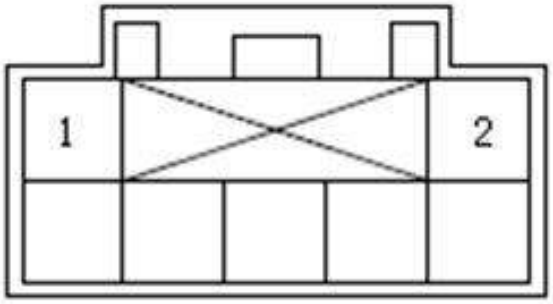
Connector number	M08
Connector name	temperature motor
Connector model	KUM PH842-07011



Terminal number	Wire color	Signal name
1	R	Temperature motor power supply positive
2	YB	Temperature motor power is negative
3	YR	Temperature motor position signal power supply is positive
4	G	Temperature motor feedback voltage
5	B	Ground

New Return Air Motor

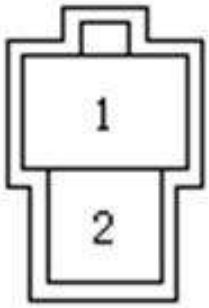
Connector number	M09
Connector name	New Return Air Motor
Connector model	KUM PH842-07011



Terminal number	Wire color	Signal name
1	BrR	New return air motor power supply
2	LW	New return air power is negative

Blower motor

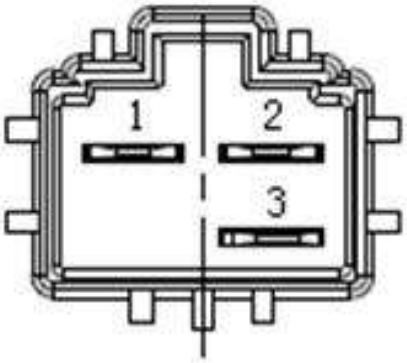
Connector number	M11
Connector name	Blower motor
Connector model	KET MG620042



Terminal number	Wire color	Signal name
1	Lg	Blower motor power is negative
2	LV	Blower motor power is positive

Speed control module

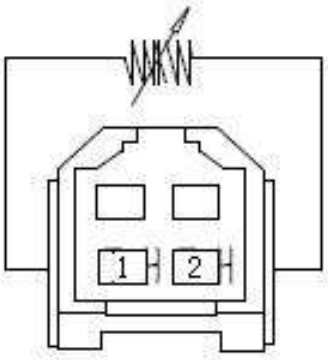
Connector number	M12
Connector name	Speed control module
Connector model	DJ 7042-6.3-21



Terminal number	Wire color	Signal name
1	L	Speed control module voltage control end
2	Lg	Speed regulator power supply negative
3	B	Speed control module power supply

Evaporator face temperature sensor

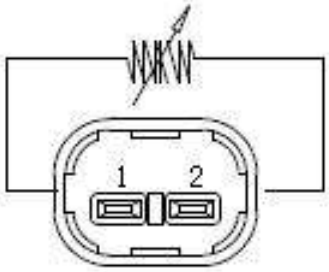
Connector number	M13
Connector name	Evaporator temperature sensor
Connector model	AMP 368545-1



Terminal No.	Wire color	Signal name
1	Br	Temperature sensor +
2	GR	Temperature sensor -

Outdoor temperature sensor

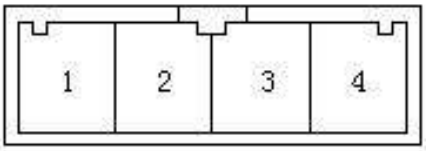
Connector number	B13
Connector name	Outdoor temperature sensor
Connector model	YAZAKI 7283-7028-30



Terminal number	Wire color	Signal name
1	Br	Temperature sensor +
2	GR	Temperature sensor -

Indoor temperature sensor

Connector number	M16
Connector name	Indoor temperature sensor
Connector model	AMP 174929-1

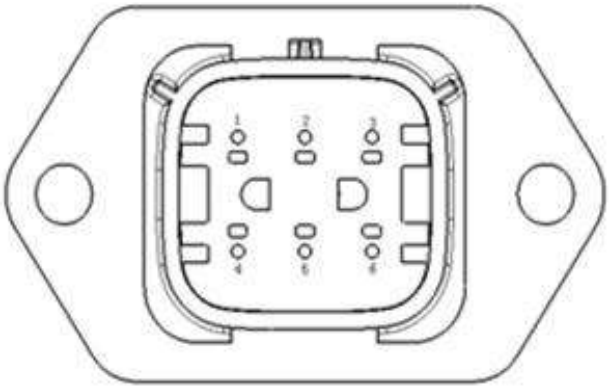


Terminal No.	Wire color	Signal name
1	Br	Indoor temperature sensor fan power supply
2	Y	Indoor temperature sensor fan power negative
3	B	Temperature sensor +
4	Y	Temperature sensor -

Electric compressor assembly

Connector number	M18
Connector name	Electric compressor assembly
Connector model	DY3F1002SNF
	MOLEX 194290044

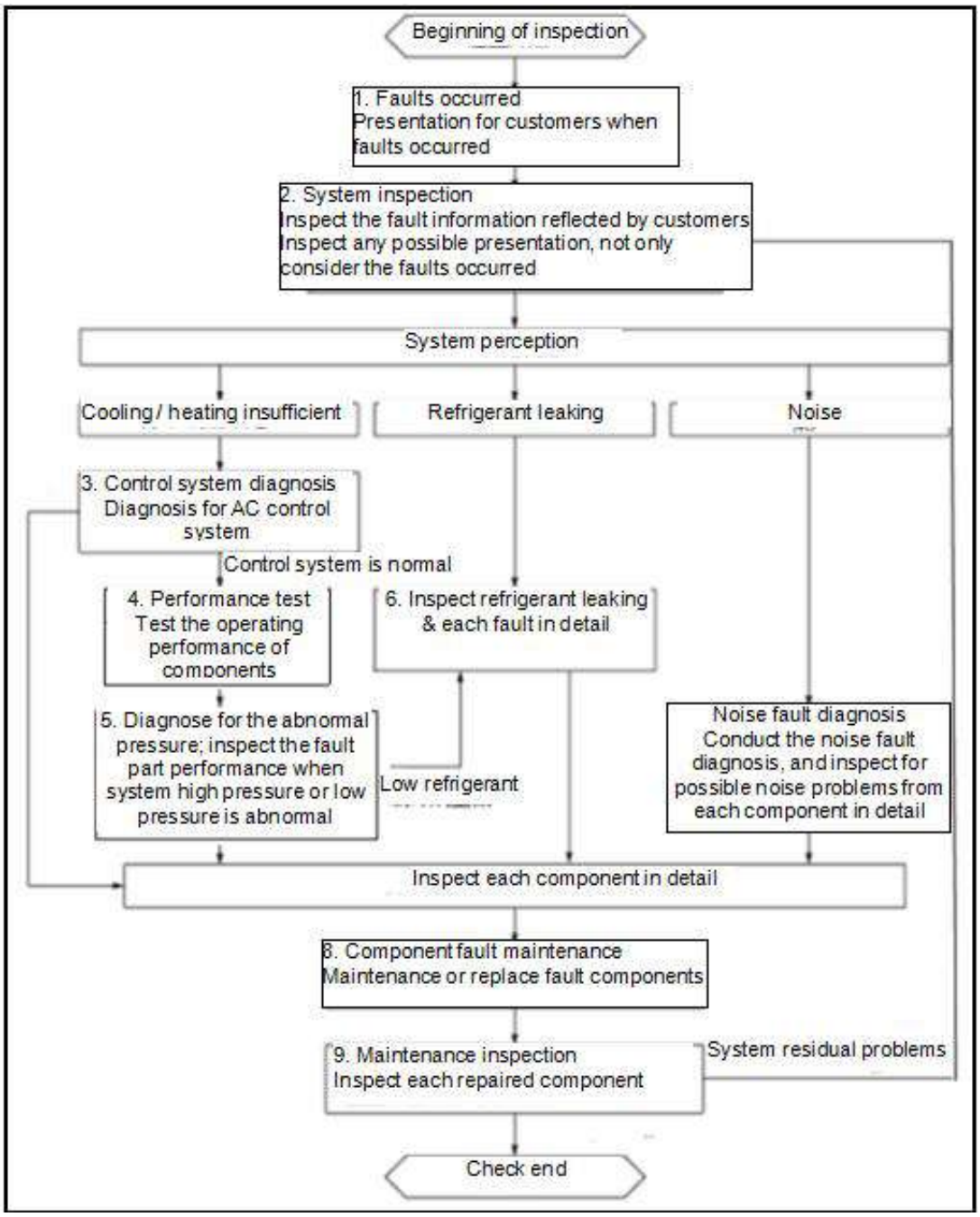
Terminal No.	Wire color	Signal name
1	R	Compressor high voltage power+
2	B	Compressor high voltage power-



Terminal No.	Wire color	Signal name
1	W	solenoid valve 1 +
2	B	Ground
3	RW	CAN_H
4	RY	CAN_L
5	R	IGN2
6	Y	solenoid valve 2 +

Basic inspection

DIAGNOSIS AND REPAIR WORK FLOW



Work process

Malfunction phenomenon	Possible cause for malfunction	Excluding method
No refrigerant in air conditioning system	Refrigerant leakage	Visual method: 1）Observe each connecting part if there is any oil which indicates possible leakage. Put soap water on suspicious part and observe if there is air bubbles. 2 ） Observe core surface of condenser and evaporator whether there is scratch, crush and damage.
		Vacuumize Vacuumize the refrigerating system and listen if there is sizzle sound which indicates leakage.
		Device inspection: 1）Use electronic leakage detector which is of high sensitivity to detect. 2）Use dye tracer to detect.
System compressor lubricant is inadequate	Replace system components and add or lesson lubricant according to regulations.	Please confirm compressor lubricant specification first. It cannot be mixed. Compressor lubricant is POE.
		After recycling refrigerant, add about 30ml compressor lubricant.
		Replace compressor and pour out all lubricant in compressor and then add 120ml compressor lubricant.
		Replace pipeline: add about 30ml compressor lubricant.
		Replace condenser: add about 60ml compressor lubricant.
		Replace evaporator: add about 50ml compressor lubricant.
		Replace silicon gel: add about 10ml compressor lubricant.

Air volume is abnormal	No air from air conditioner	Wiring malfunction: 1）Check blower motor wiring and confirm whether connectors are loosen. 2）Replace fuse if it is fell off or damaged. 3）Replace relay if it is damaged.
		Mechanical failure: 1）Replace blower if it is damaged. 2）Replace temperature damper mechanism if it is damaged and cannot be regulated to refrigerating state. 3）Replace air conditioner controller if it is damaged. 4）Replace speed regulating module if it is damaged.
	Air conditioner volume is small.	Check battery voltage whether there is short voltage.
		Check whether duct is congested and grilling is fully opened.
		Replace speed regulating module if it is damaged.
		Check whether air conditioner filter wind resistance is huge and whether it is congested by dirt and foreign stuff.
		Check whether blower motor operates in reverse direction and adjust anode and cathode of connectors.
Refrigerating failure of air conditioner	No refrigerant for system	Use test table to test, please refer to “Refrigerant leakage” for inspection.
	No air blow	Please refer to “Abnormal air volume” for inspection.
	Compressor does not work	Signal is blocked: Pressure switch is damaged and no pressure signal. Detect short connected signal ad replace air conditioner pipeline if it is damaged.
		Replace compressor if it is damaged inside.
Bad air conditioner refrigerating	Refrigerant is insufficient.	Check whether pressure is in normal range. Add refrigerant if it is insufficient.

		Check whether there is leakage in air conditioning system. Detect leaking point if needed.
	Compressor lubricant is excessive.	Pour out excessive compressor lubricant and add moderate compressor lubricant.
	Compressor does not work normally	Replace compressor if it does not reach normal operating rotating speed.
	Air volume is small	Please refer to “Abnormal air volume” for inspection.
No heating for air conditioner system	PTC does not work	The core of PTC is damaged. Replace heater assembly.
		PTC connector is poor connected. Replace heater assembly.
	No air blow of air conditioner	Please refer to “Abnormal air volume” for inspection.
	Controlling failure	Replace air conditioner controller if temperature regulating is damaged or damper cannot be regulated to maximum heating.
Abnormal sound in air conditioner system	Abnormal sound from pipe expanding valve	After air conditioner is turned on, check whether there is flowing chirps at expanding valve. Adjust or replace expanding valve.
	Abnormal sound from damper mechanism	Check whether there is resistance and tick or chuckle when adjusting damper mechanism. If there is, cost lubricant on damper mechanism or replace mechanism components.
	Abnormal sound from blower	Abnormal sound from blower shell 1）If there is booming sound, check whether blower motor is rotating in reverse direction. Replace harness or adjust connector terminal. 2）If there is chuckle or sizzle, replace blower motor. 3）If there is bang, check whether there is foreign stuff in volute. Remove it and check and handle.
		If blower is not installed firmly, there is vibration sound.
Peculiar smell in air conditioner system	Filter is with milde	Remove filter to check whether the surface is seriously polluted and replace it timely.
	Frozen water cannot be exhausted smoothly.	Frozen water cannot be exhausted thoroughly. There is water in shell which causes mildew. Replace draining pipe position.

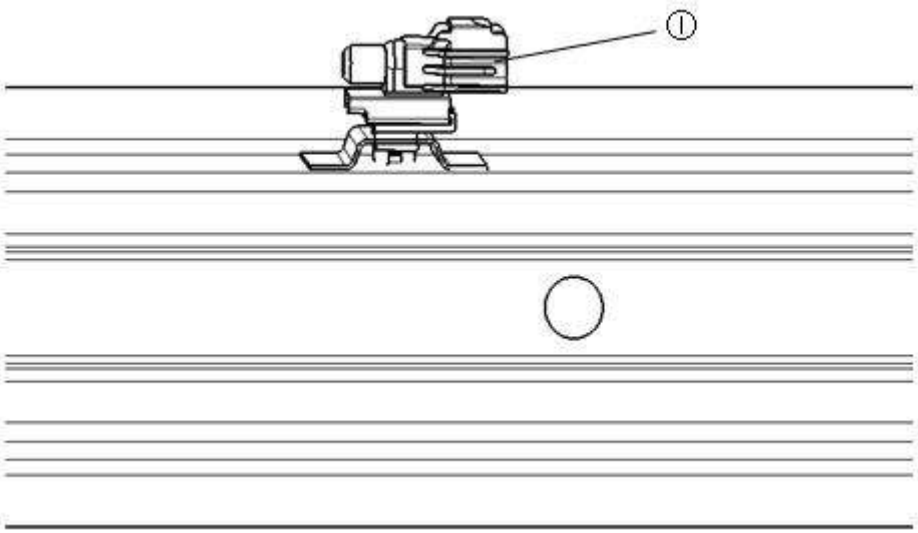
Removal and installation

Environment temperature sensor

Removal

1 Pull out environment temperature sensor ① from mounting bracket waist shape hole.

2 Disconnect connectors connected to environment temperature sensor.



Installation

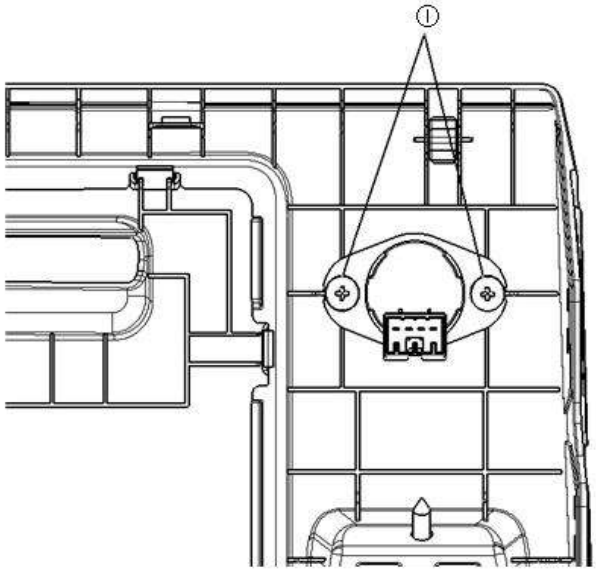
Install it in reverse order of removal.

Vehicle interior temperature sensor

Removal

1 Disconnect low voltage connectors o f vehicle internal temperature sensor.

2 Remove two fixing screws ① of vehicle internal temperature sensor.



Installation

Install it in reverse order of removal.

Evaporator surface temperature sensor

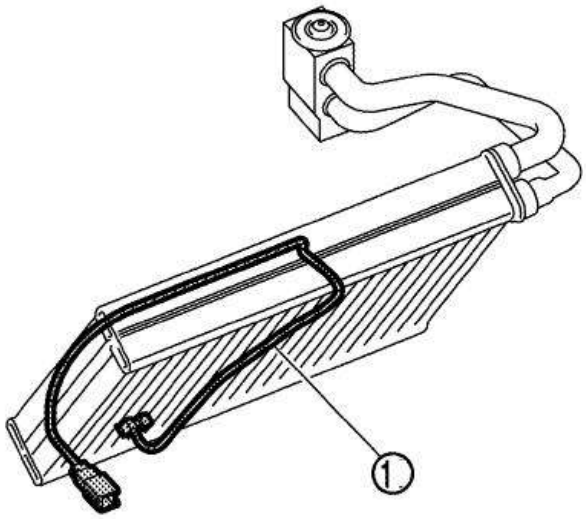
Removal

1 Pull out evaporator surface temperature sensor from evaporator surface.

Reminder:

When pulling it out, please take care to not squeeze or scratch flat tube and fin.

2 Disconnect low voltage connectors of evaporator surface temperature sensor.



Installation

Install it in reverse order of removal.

Reminder:

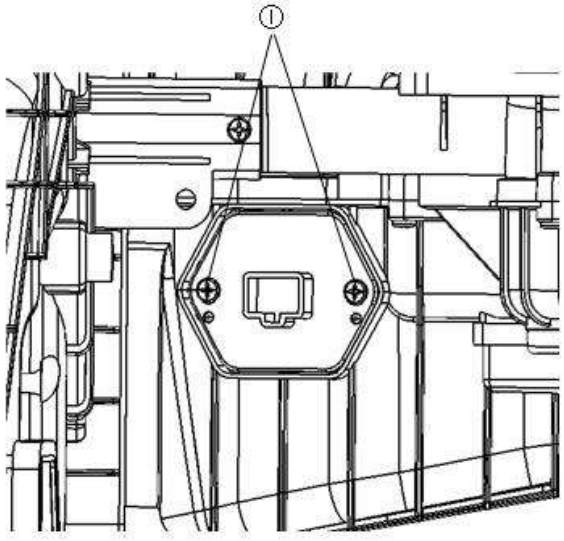
Please put the evaporator sensor at same position as the original.

Speed regulating module

Removal

1 Disconnect low voltage connectors of speed regulating module.

2 Remove two fixing screws① of speed regulating module.



Installation

Install it in reverse order of removal.

Maintenance data and specification

One-piece electrical compressor

Motor type	Permanent-magnet synchronous motor
Discharging capacity	32ml/r
Operating voltage	220-312-400V
Rated/ highest rotating speed	3420/5000rpm
Rated wattage	1.5kw
Rated current	4.5A
Maximum working current	7A
Over voltage protection	400V
Short voltage protection	220V

Electrical heater

Rated voltage	331V DC
Rated wattage	2.5KW
Wattage deviation	-5%～10%
Insulating resistance	≥100MΩ
Leaked current	＜0.5mA
Striking current	≤19A

Air conditioner controller

Operating temperature	-30℃～80℃
Operating voltage	9～16V DC
Operating current	≤2A
Controlled precision	±0.5℃
Damper controlling	Stepping motor control
Communication mode	CAN 2.0B

ventilation system

Putting warning labels of "No touch, high voltage parts are under repairing"

Before repairing the high voltage parts, put a warning label of **"No touch, high voltage parts are under repairing" at obvious position of the repaired vehicle to remind other personnel.**

Cautions for removing 12V battery

Before removing the 12V battery, turn the key to “ON” gear and then to “LOCK” gear.

Reminder:

- The automatic charging function of the 12V battery may activate even if the key is at “LOCK” gear.
- When the key is turned from “ON” to “LOCK” gear， the automatic charging function of the 12V battery will not activate.

Cautions for auxiliary restraint system of airbag and safety belt pretension

When the auxiliary restraint system of airbag and safety belt pretension is used together with the front seat belts, it can lower the damage to the driver and front-seat passenger during a collision. The auxiliary restraint system includes safety belts and airbag for driver and front-seat passenger. For the detailed information of auxiliary restraint system, please refer to section of “Airbag system” and “Seat belt”.

Warning:

In order to avoid any accident, do follow below tips:

- **In order to avoid personnel injury or death caused by failure of the auxiliary restraint system or collision after the failure, all repair work can only be executed by authorized dealer of DR.**
- **It may cause auxiliary restraint system accident and personnel injury if the auxiliary restraint system is not repaired by standard including dismantlement and installation. As for the method to remove the airbag module, you can refer to the section of “Airbag system”.**
- **Do not use electrical testing equipment to test any circuit of the auxiliary restraint system except for the operation specified in the repair manual. The wiring harness and connectors of the auxiliary restraint system are in yellow or orange.**

Cautions for using power tools(pneumatic or electric) and hammer

- When the key is at “ON” gear, do not use power tools or hammer to operate near the airbag diagnostic sensor or other sensor of the airbag system area, otherwise the vibration may activate the sensor and cause the airbag to explode which may result in severe damage.
- When using the power tools or hammer, put the key at “LOCK” gear and pull out the negative pole of the 12V lead-acid battery and then wait for at least one minute.

Cautions for R-134a

Warning:

- **The coolant R-12 and R-134a should not be mixed used, otherwise the electrical compressor may operate abnormally. In order to make sure the coolant R-134a being pure and recyclable, use a filling device to refill or reclaim the coolant according to the process specified on the coolant label.**
- **The R-134a air conditioner system requires specialized compressor lubricant. If non-specialized lubricant is used, it may cause the electrical compressor to work abnormally.**
- **It is prohibited to put the R-134a exposed in the air.**

Warning:

- **When dismantling the refrigerating circuit parts of the air conditioner, seal the refrigerating circuit connectors of each parts immediately in order to avoid the moisture in the air entering the refrigerating circuit.**
- **The sealing lid can only be removed when installing the refrigerating circuit parts of the air conditioner system and all components should be installed as soon as possible in order to avoid the moisture in the air entering the refrigerating circuit.**
- **The compressor lubricant should be sealed securely otherwise it will be useless when moisture absorbed.**
- **Do not inhale coolant or vaporous compressor lubricant otherwise it will cause discomfort to eyes, nose and throat. Use special tool to reclaim refrigerant. If there is**

leakage of the conditioner system, the repairing place should be in open air. Any other question about the safety and health of refrigerant, please refer to the manufacturer of the coolant and compressor lubricant.

- **The compressor lubricant is forbidden to get in touch with polystyrene which may make it ineffective.**

Contamination of refrigerant

If the refrigerant is not pure, please take below measures:

- Explain to consumer that it is forbidden to release refrigerant which will contaminate the atmosphere.
- Recycling polluted refrigerant may damage the recycling equipment and contaminate the coolant in the device.
- Use special refrigerant filling device to reclaim and refill the refrigerant and do not reclaim polluted refrigerant. The handling of refrigerant must abide by local rules and regulations. As for replacing the parts of cooling system, please refer to related chapter in maintenance manual.

Normal precautions for refrigerant

Warning:

- **It is forbidden to release refrigerant in the air. Please use special recycling equipment to release refrigerant.**
- **It is required to wear eyes and hand protective equipment during operation relating to refrigerant and air conditioner system.**
- **Do not keep refrigerant stored in more than 52℃ temperature.**
- **Do not use open flame to burn refrigerant tank. Put the refrigerant tank in warm water if heating is needed.**
- **Do not throw or press the refrigerant tank.**
- **Do keep the refrigerant away from open flame because it will release poisonous gas.**
- **Make sure the working place is with good ventilation otherwise the refrigerant will inhale oxygen in the air and cause personnel to suffocate.**
- **Do not make pressure or leakage test for repairing equipment of R-134a and air conditioner system filled with compressed air. The mixture of R-134a and air is combustible and it will cause personal injury or property loss in the event of burning. Please consult the refrigerant manufacturer for more safety information.**

Precautions for dye leakage inspection

- The air conditioner system does not contain fluorescent leakage detection dye.
- Do not use fluorescent leakage detection dye in the air conditioner system.

Precautions for compressor lubricant

- It is required to use specialized compressor lubricant RL168H for the air conditioner system otherwise it will cause malfunction of the air conditioner system.
- Do not use recycling and filling device of normal lubricant refrigerant.
- The recycling and filling device of conventional lubricant refrigerant can only be used for the vehicle after thoroughly and clean rinse.

Precautions for electrical compressor maintenance

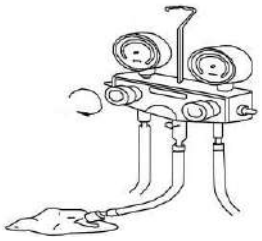
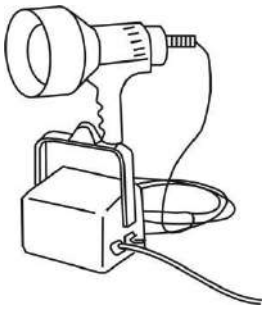
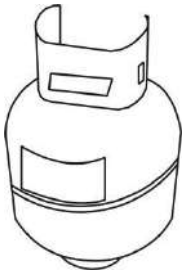
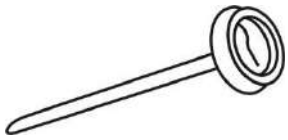
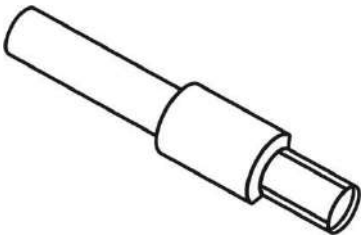
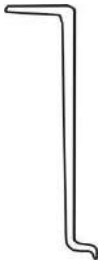
- The intake and exhaust vent of the compressor should be installed sealing-plug to avoid any entrance of air or impurities.
- After the compressor is removed, its placed state must be same with the state when it is installed on the vehicle.
- The compressor needs to operate for more than two minutes after installation.

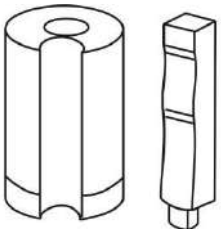
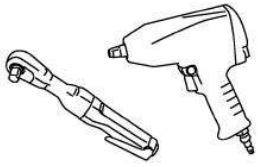
Preparation work

Lubricant refrigerant

	Usage	Remark
Refrigerant R-134a	Used for refrigeration cycle	
Compressor lubricant RL68H	Compressor lubricant	

Special tool

Tool name	Picture	Tool name	Picture
Triple table		High strength invisible lamp	
Refillable recycling tank of fifty pounds		Microthermometer	
Lip shape sealing removal tool for air conditioning system		O-ring sealing removal tool	

O-ring sealing installation tool		Refrigerant recycling, regeneration and refilling system	
Heating gun		Insulated gloves	
Insulated shoes		Motor tool	

System introduction

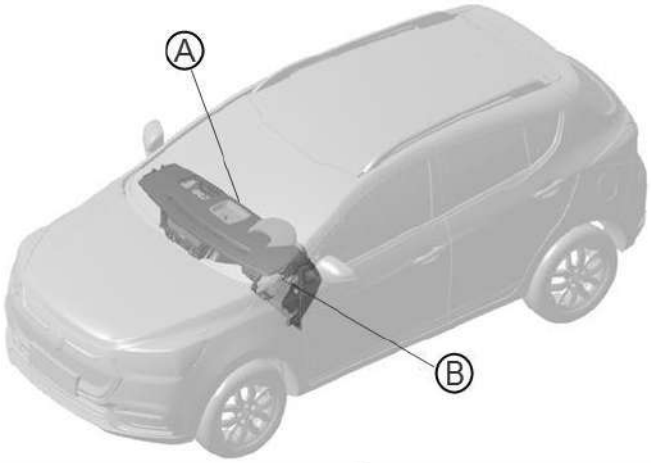
Introduction

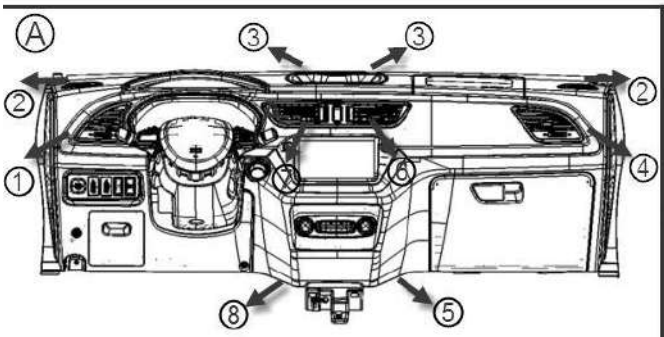
Air conditioner ventilation system is composed of blower unit, heating unit and refrigeration unit.

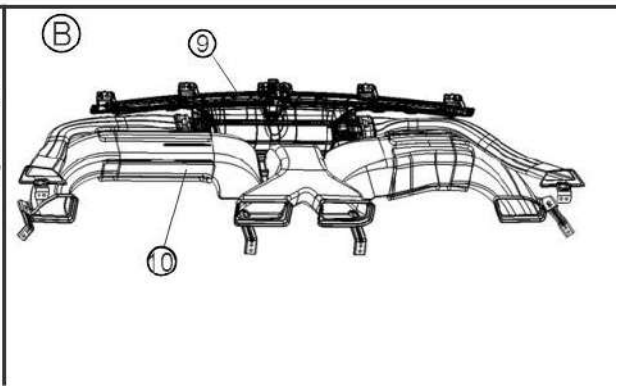
The air conditioner filter is installed above the blower motor.

Components

Ventilation system layout





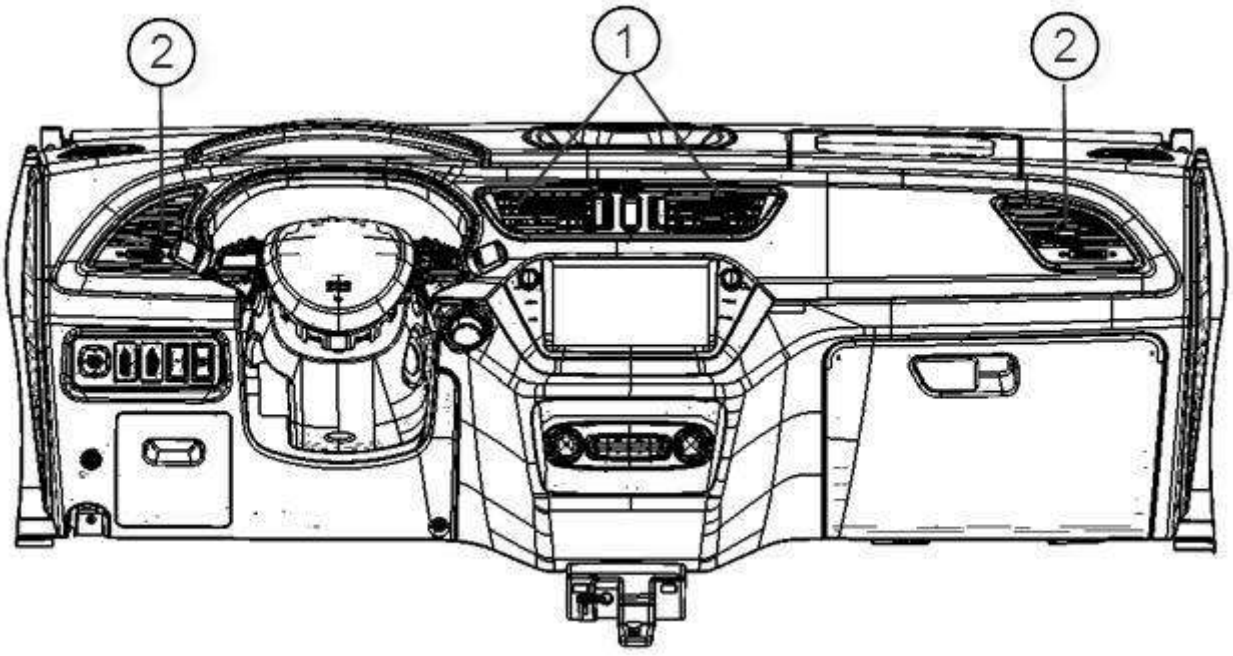


Serial number	Component name		Function
1	Ventilation opening	Left blow to face	Adjusting blowing direction of left facial side
2		Side defrost	Adjusting blowing direction of left and right window area
3		Front defrost	Adjusting blowing direction of front windshield glass
4		Right blow to face	Adjusting blowing direction of right facial side
5		Right blow to feet	Adjusting blowing direction of right area of feet

6		Right central blow to face	Adjusting blowing direction of central right facial area
7		Left central blow to face	Adjusting blowing direction of central left facial area
8		Left blow to feet	Adjusting blowing direction of left area of feet
9	Air duct assembly	Defrosting air duct	Guiding defrosting direction
10		Face blowing duct	Guiding face blowing direction

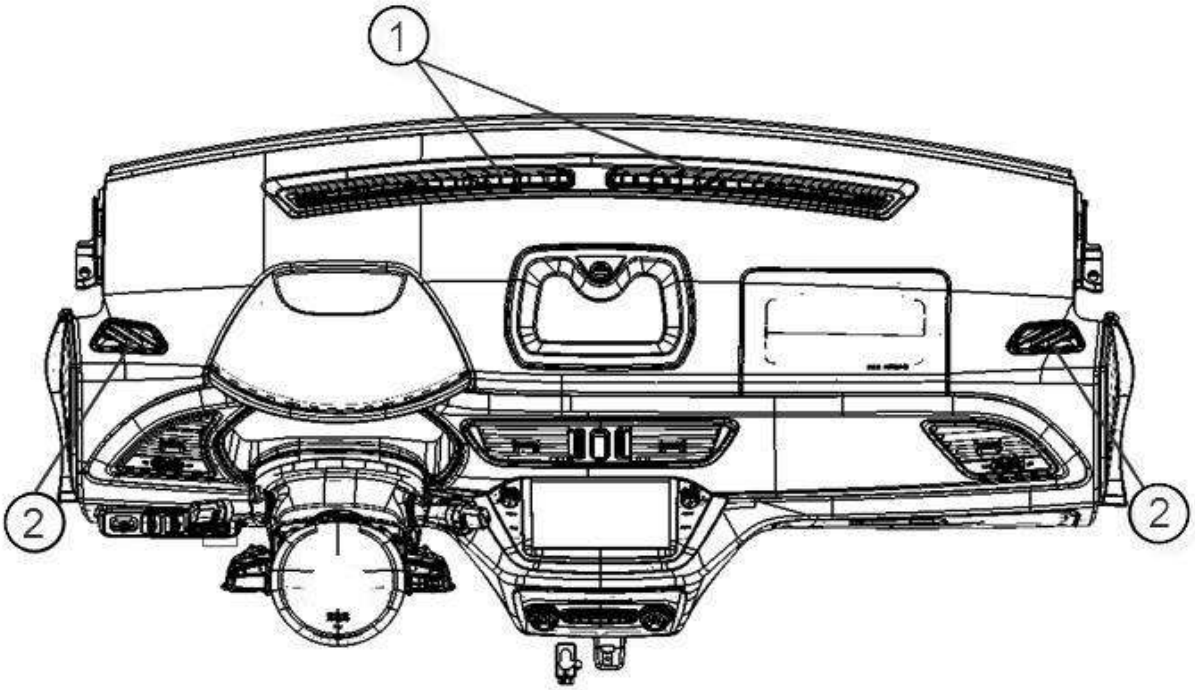
Air vent

Reversible vent with grating is installed at central position of ① and side dashboard of ②. The wind direction can be adjusted by reversing the vent.



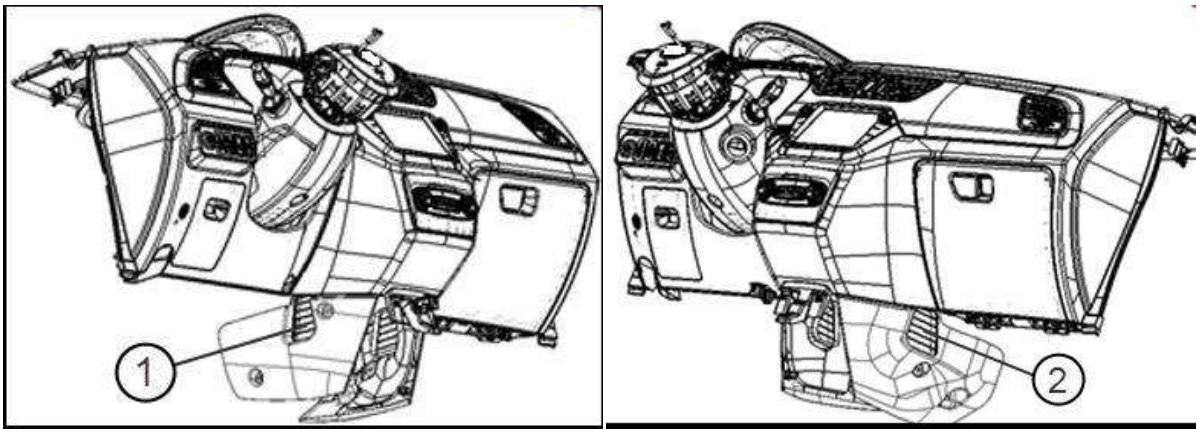
Defrosting vent

The front defrosting vent of ① is used to remove the frost on the front windshield glass. The side defrosting vent of ② is used to remove the frost on the side window glass of driver and passenger.



Feet vent

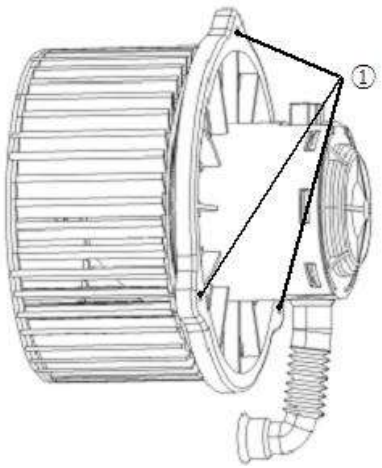
Uniformly heating the front row seat feet area.



Blower motor

The blower motor is installed at the right position of air conditioner central accessories.

Using three fixing bolt of ①for installation.



Air conditioner filter

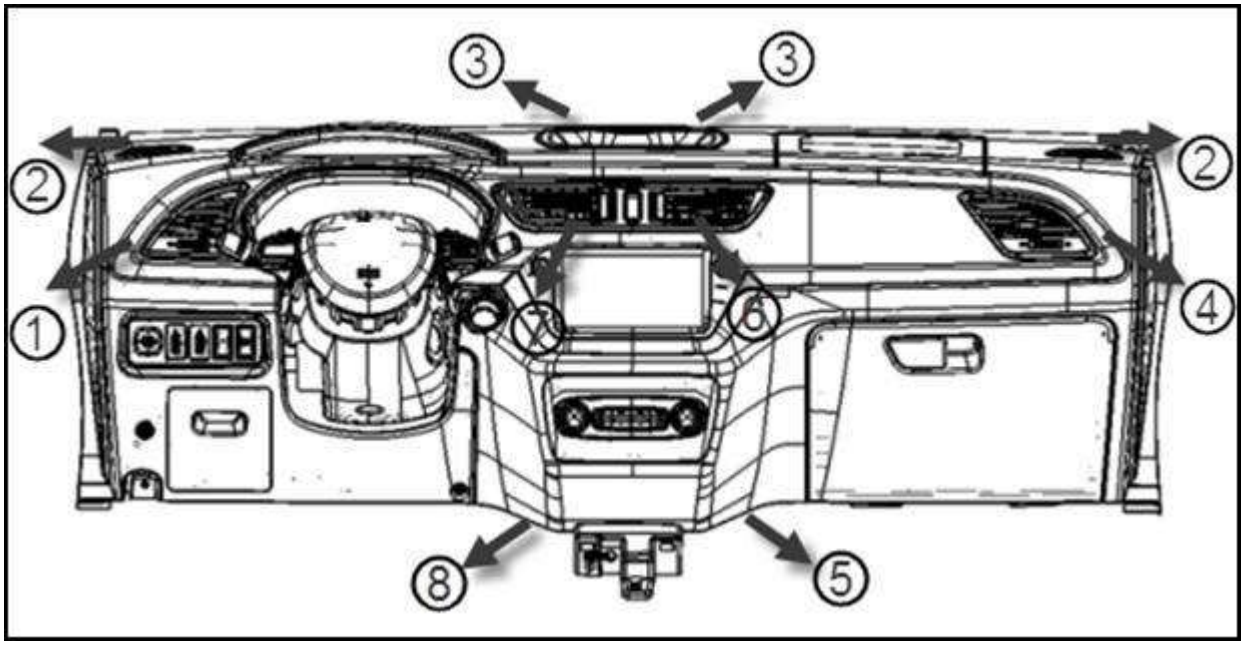
- Air conditioning filter is composed of a filter lid and filter core.
- The type of air conditioning filter is particle which can remove foreign body and abnormal smell , filter dust, pollen and other dirt so as to main a comfortable interior environment.
- If the air conditioning filter is not replaced for a long time, it can lead to block of filter, increased noise of blower, reduction of air volume. The replacement cycle is 5000km to 12000km. For those areas with severe atmosphere pollution and poor road condition, it is required to check and replace it regularly.

System

Ventilation system

Ventilation system is controlled by touch panel. For system control, please refer to chapter of “Air conditioner controlling system.

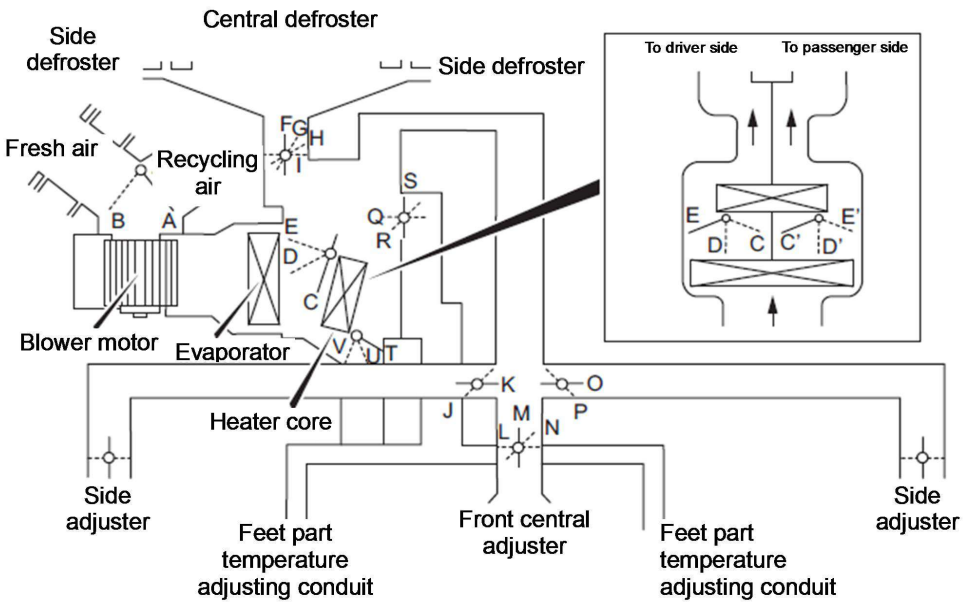
Mixture rate of vent and air flow



Module	Mixture rate of air volume(%)							
	Blow to face				Blow to feet		Defrost	
	Left side①	Left central⑦	Right central⑥	Right side④	Right side⑤	Left side⑧	Front defrost ③	Side defrost ②
	22	21	28	29	—	—	—	—
	17	10	16	17	20	20	—	—
	6	—	—	6	33	33	17	5
	5	—	—	5	25	26	31	8
	5	—	—	5	—	—	73	17

Relation between switch position and throttle position

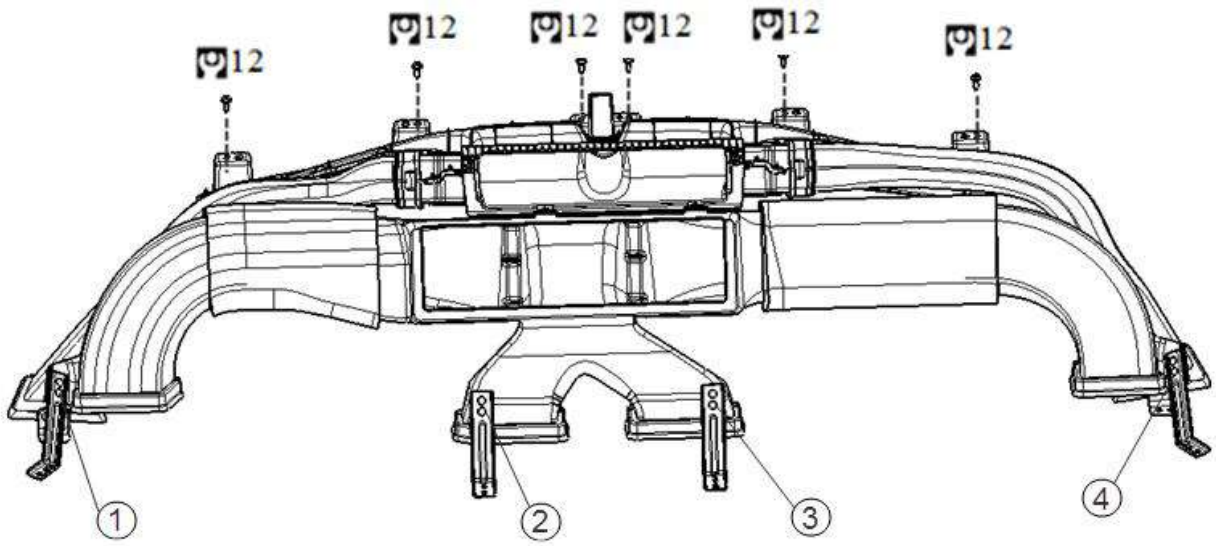
Defrosting function can be divided into front defrosting and rear defrosting. There are two specialized air vents in front defrosting. Rear defrosting is operated by heating wiring attached on the rear windshield glass.



Switch position			Throttle position				
			Defrost throttle	Blowing to face throttle	Blowing to feet throttle	Fresh air blow throttle	Mixed throttle
Module switch	Blow to face		I	M	I	—	—
	Blow to face/feet			N	R		
	Blow to feet		H	N	Q		
	Defrost/blow to feet		G	L	S		
Defrost switch			F	N	S		
Fresh air blow switch			—	—	—	A	
Interior cycling air switch						B	
Temperature controlling switch		16°C（Full cooling）				—	C
		17°C-31°C					Controlling by temperature button
		32°C（Full heating）					E

Dismantling and installation

Vent assembly



disassembly

1 Remove dashboard assembly, please refer to the chapter of “Dashboard”.

2 remove fixing screw from dashboard assembly.

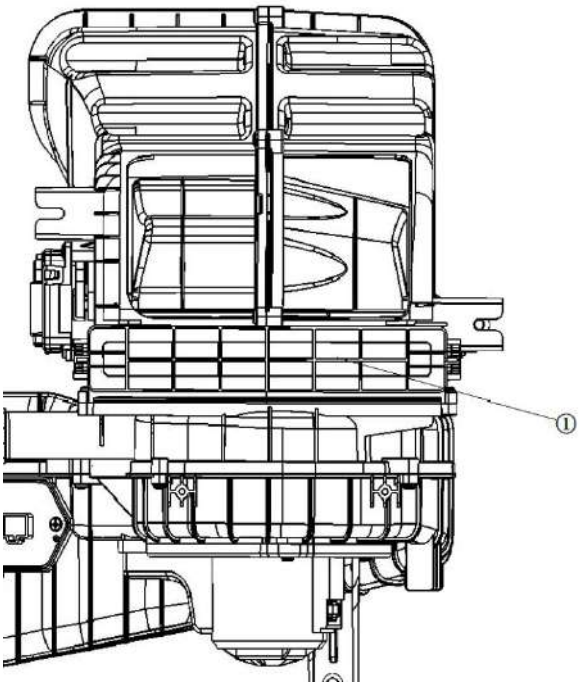
3 remove the snap 1, 2, 3, 4

4 remove air conditioner flue

Installation

Install in the reverse order of removal.

Air conditioning filter



Dismantling

1 Remove storage box.

2 Press the button of two sides of air conditioning filter lid and remove air conditioning filter lid.

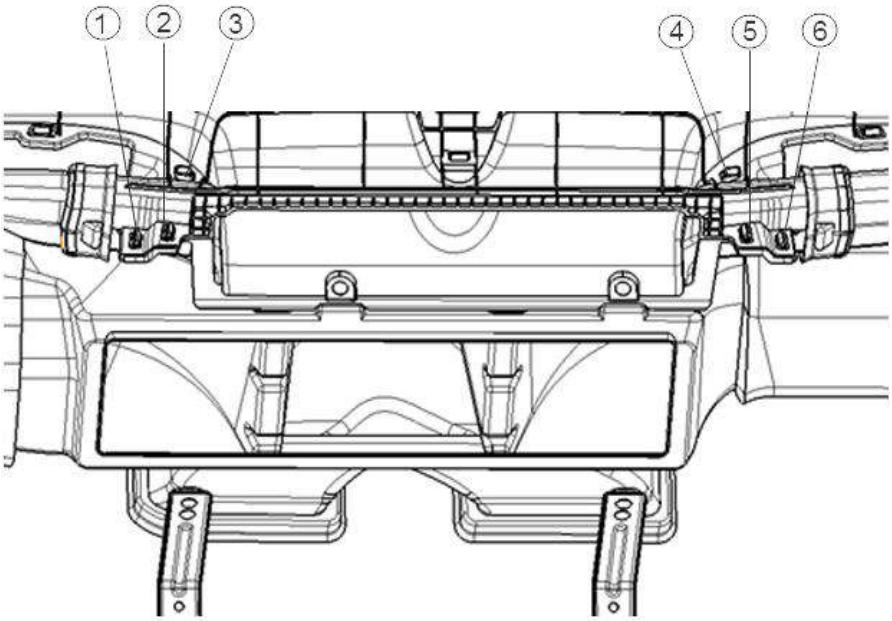
3 Take out air conditioning filter core.

Installation

Install it in reverse order of removal.

Dismantling and assembly

Defrost air flue



Disassemble

1 Remove the fixing bolt from the air duct assembly to separate the defrosting air duct and the blowing air duct.

2 remove defrost air flue from air flue assembly

Assembling

Follow the opposite sequence of the disassembly sequence.

Blow face air flue

Disassemble

1 Remove the fixing bolt from the air duct assembly to separate the defrosting air duct and the blowing air duct.

2 remove blow face air flue from air flue assembly

Assembling

Follow the opposite sequence of the disassembly sequence.

Defrosting device

Safety precaution

Precautions for normal charging

Warning:

- **If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, the device can be only be used after its function being checked and confirmed before charging.**
- **During normal charge operation, an engineer who uses medical electronic devices including heart pacemaker, cardioverter, defibrillator cannot enter passenger compartment (including trunk).**

High-voltage preventive measure

Warning:

- **The electric vehicle has a high-voltage battery. If the operation on the vehicle and high-voltage parts is incorrect, there are risks of leakage of electricity, electric shock, or similar accidents. Thus, it is mandatory to follow correct procedures to check and maintain.**
- **Before disconnecting repair switch, please put the key on "LOCK" position or unplug the key.**
- **Disconnect repair switch before checking or maintaining high-voltage system. It is forbidden to close repair switch during the process of checking and maintenance. Before starting the operation on high-voltage system, be sure to wear insulated protection equipment, including gloves, shoes, and glasses.**
- **When a technician is operating high-voltage system, please ensure no one touching the vehicle. When there is no maintenance operation, please take insulated protection on the high-voltage sections to prevent anyone touching.**
- **When repair switch disconnects, it is forbidden that the key is at "ON" position or switched to "START" position.**

High-voltage cable and safety sign

The color of high-voltage cable is orange and there are safety signs on the power battery assembly and other high-voltage parts. Do not touch these cables and parts.

Handling of high voltage terminals

When the connector of high-voltage cable is plugged out, please use insulated adhesive tape to bind up immediately.

Regulation for a person wearing medical electronic device

The vehicle has strong magnetic parts. If an engineer uses medical electronic device, such as electronic pacemaker, its function may be affected by strong magnetic parts. Thus, these people cannot carry out repair work.

Forbidden accompanying article during work

The vehicle has strong magnetic parts. Thus, during work it is forbidden to take metal articles which may cause short circuit or magnetic articles such us various bank cards which may be damaged.

Place “Repairing High-voltage Parts, No Touch!” warning sign

Before repairing high-voltage parts, please place “Repairing High-voltage Parts, No Touch” warning sign on the prominent position of the repaired vehicle to remind other people.

Precaution for removing 12V battery

Before removing 12V battery, turn the key to “ON” position, and then turn to “LOCK” position

Reminder:

- Though the key is at “LOCK” position, auto-recharge function of 12V battery may activate.
- After the key turns from “ON” to “LOCK”, auto-recharge function of 12V battery will not activate.

Precaution for supplemental restraint system "airbag" and "safety belt pretension"

Supplemental restraint system “airbag” and “safety belt pretension” is used together with front seat safety belts, which can reduce the damage to the driver and front passenger during collision. Supplemental restraint system consists of safety belt, driver airbag, and front passenger airbag. The

detailed information of supplemental restraint system is included in the chapters of airbag system and seat safety belt.

Warning:

In order to avoid accidents, please abide by the following content:

- **To avoid the failure of supplemental restraint system and considering that the risk of physical injuries will increase during collision if the system fails, all the service must be executed by DR authorized dealer.**
- **Non-normative maintenance of supplemental restraint system including non-normative removal and installation may result in accidental trigger of the system and cause physical injuries. Regarding the method of removing airbag module, please refer to Airbag System chapter.**
- **Except for the operations in the service manual, please do not use electrical test device to test any circuit of supplemental restraint system. The color of harness and connector of supplemental restraint system is yellow or orange**

Precaution for using power tool (pneumatic or electric) and hammer

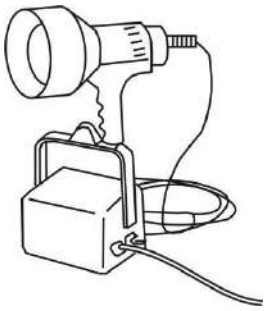
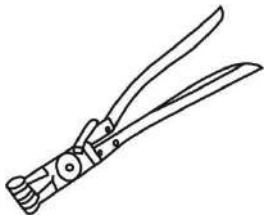
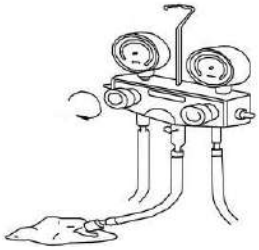
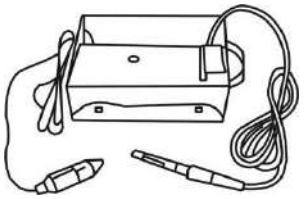
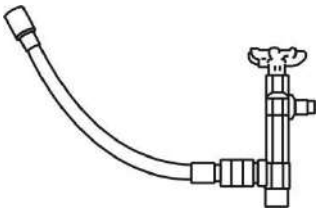
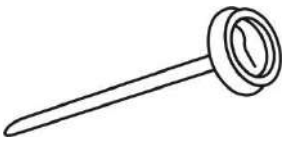
- When power switch is at “ON” position and approach airbag diagnosis sensor or other sensors of airbag system, please do not use power tools or hammer on the sensor part area. Violent vibration may trigger these sensors and airbag to cause serious injuries.
- When using power tools or hammer, put the key at “LOCK” position, unplug the negative pole of 12V lead-acid battery, wait at least one minute, and then start maintenance.

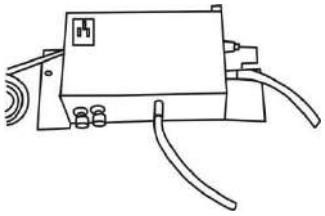
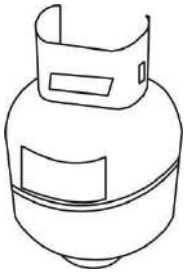
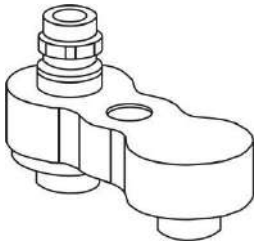
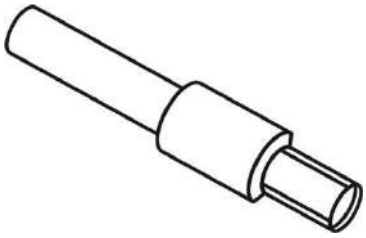
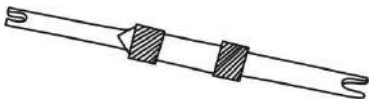
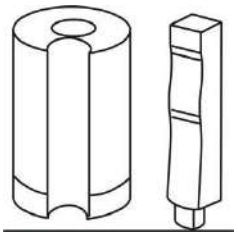
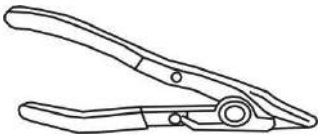
Preparation work

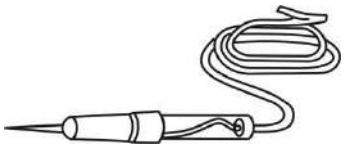
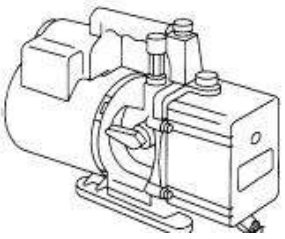
Lubricant and coolant

Name	Usage	Remark
Refrigerant R-134a	Refrigeration cycle	
Compressor lubricant RL68H	Compressor lubricant	

Special tool

Name Tool	Picture	Tool Name	Picture
Digital multimeter		High strength invisible light	
Removal pincher		Triple table	
Halogen leakage detector		Color tracer syringe	
Dye tracer R134a		Microthermometer	

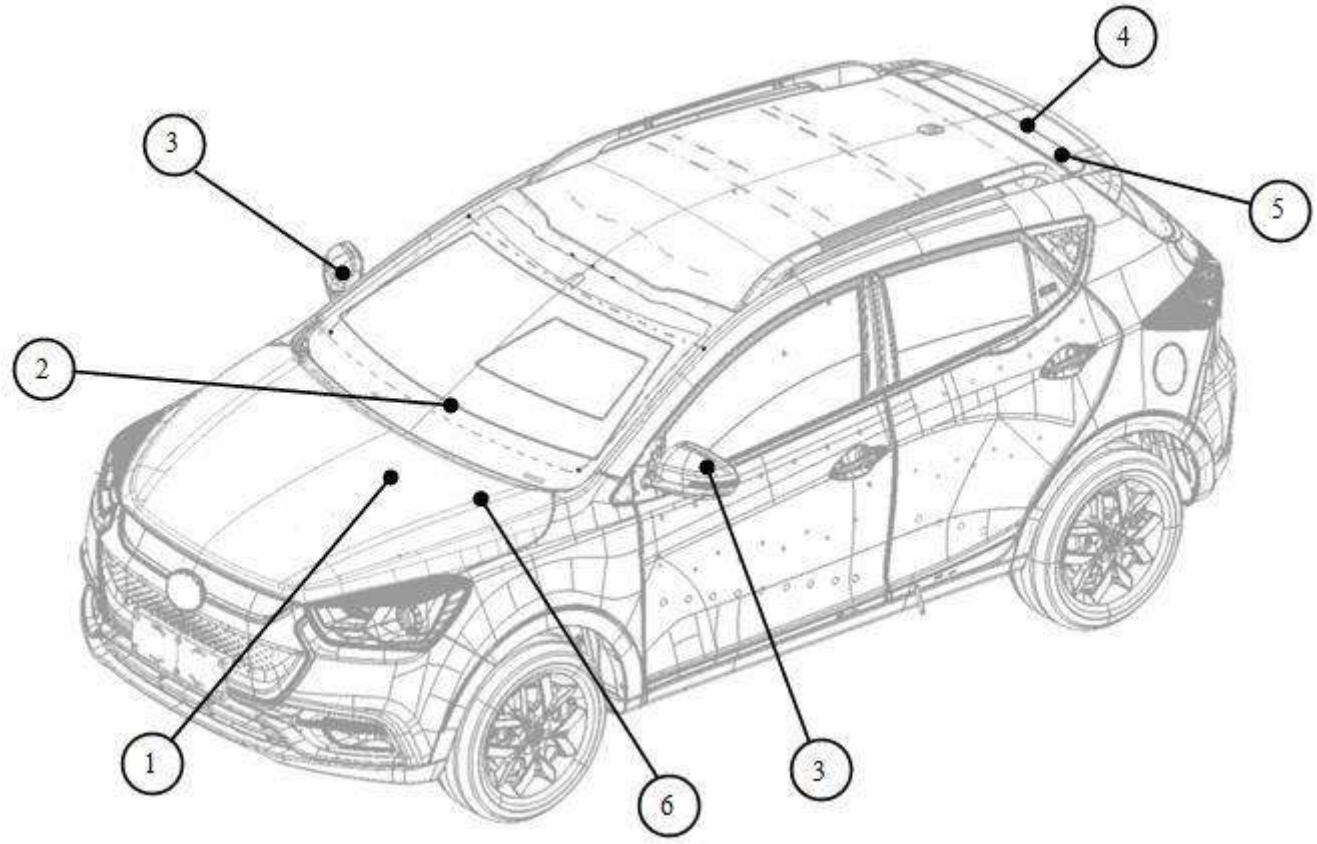
Positive flow controlling valve		Axle sealing protection equipment	
Refillable recycling tank of 50pounds		Pressure test adapter	
Lip shape seal removal tool for air conditioning system		O- ring seal removal tool	
Valve core removal and installation tool		O-ring seal installation tool	
Spring card plier		Spring card plier	

Refrigerant recycling, regeneration, filling system		Passive testing amp	
Heating gun		Insulated gloves	
Insulated shoes		Aspirator bump	

System instructions

componentparts

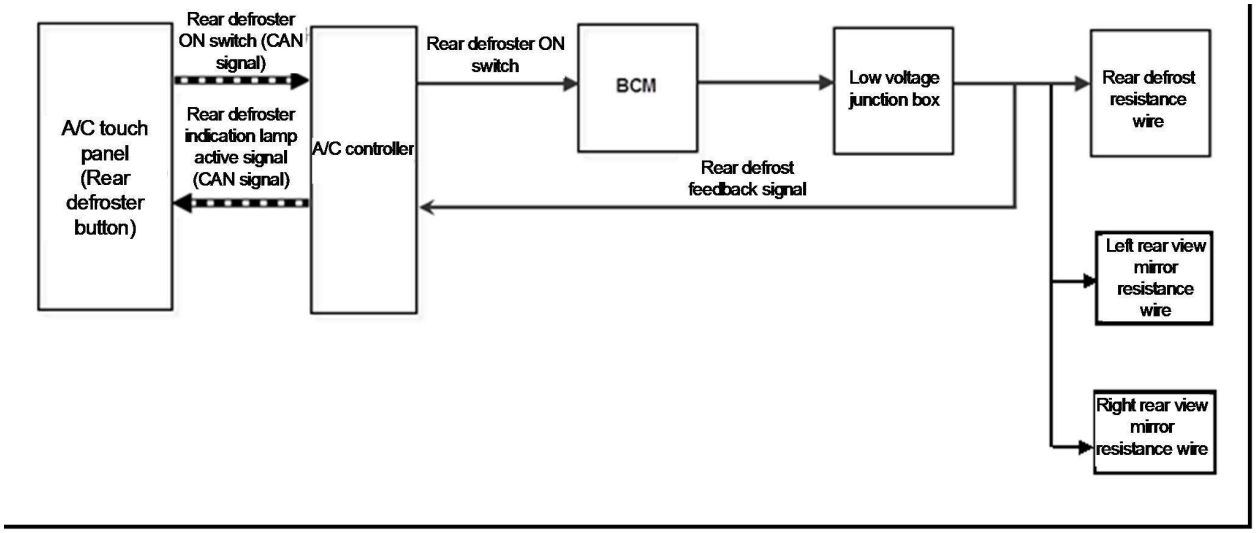
Defogger Location



Serial number	Component name	Function
1	BCM	Receive defrosting instruction, control defrosting relay in the low voltage terminal box, and execute defrosting timing control.
2	Touch panel(including rear defrosting button)	Send defrosting instruction to air conditioner controller through CAN communication, and then the indicator light is on.
3	Outside rearview mirror glass heater	To heat the glass through resistance wiring to prevent the rearview mirror from fog or frost.
4	Rear window glass heater	To heat the glass through resistance wiring to prevent the window glass from fog or frost.
5	Defrosting connector	
6	Low voltage terminal box	The defrosting relay in the low voltage terminal box is controlled by BCM.

System

System principle



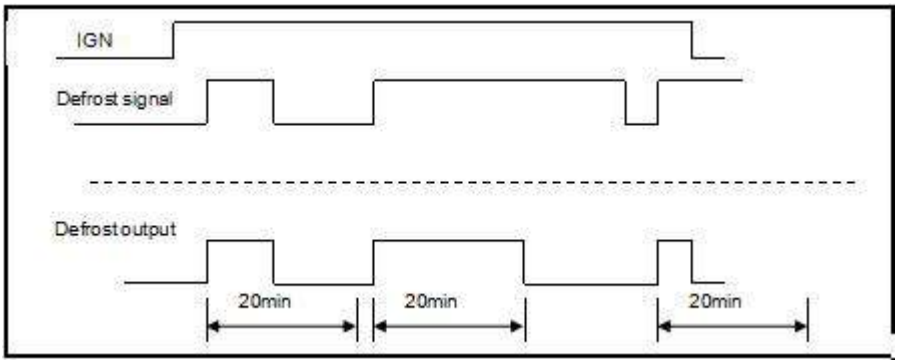
Defogger device mainly consists of rear defogging button, A/C controller, BCM, low voltage junction box, rear fogging heater, outside rearview mirror heater.

Operation Description

- A/C controller transmits rear window defogger switch signal to BCM.
- After BCM dealing, it controls defogging relay in low voltage junction box to be activated.
- After the relay is pulled in, the rear defrost heater and the exterior mirror heater start heating.
- When defogging function is on, defogging relay in low voltage junction box receives signal and feedback to A/C controller, A/C controller controls rear defogging indicating light to be on.

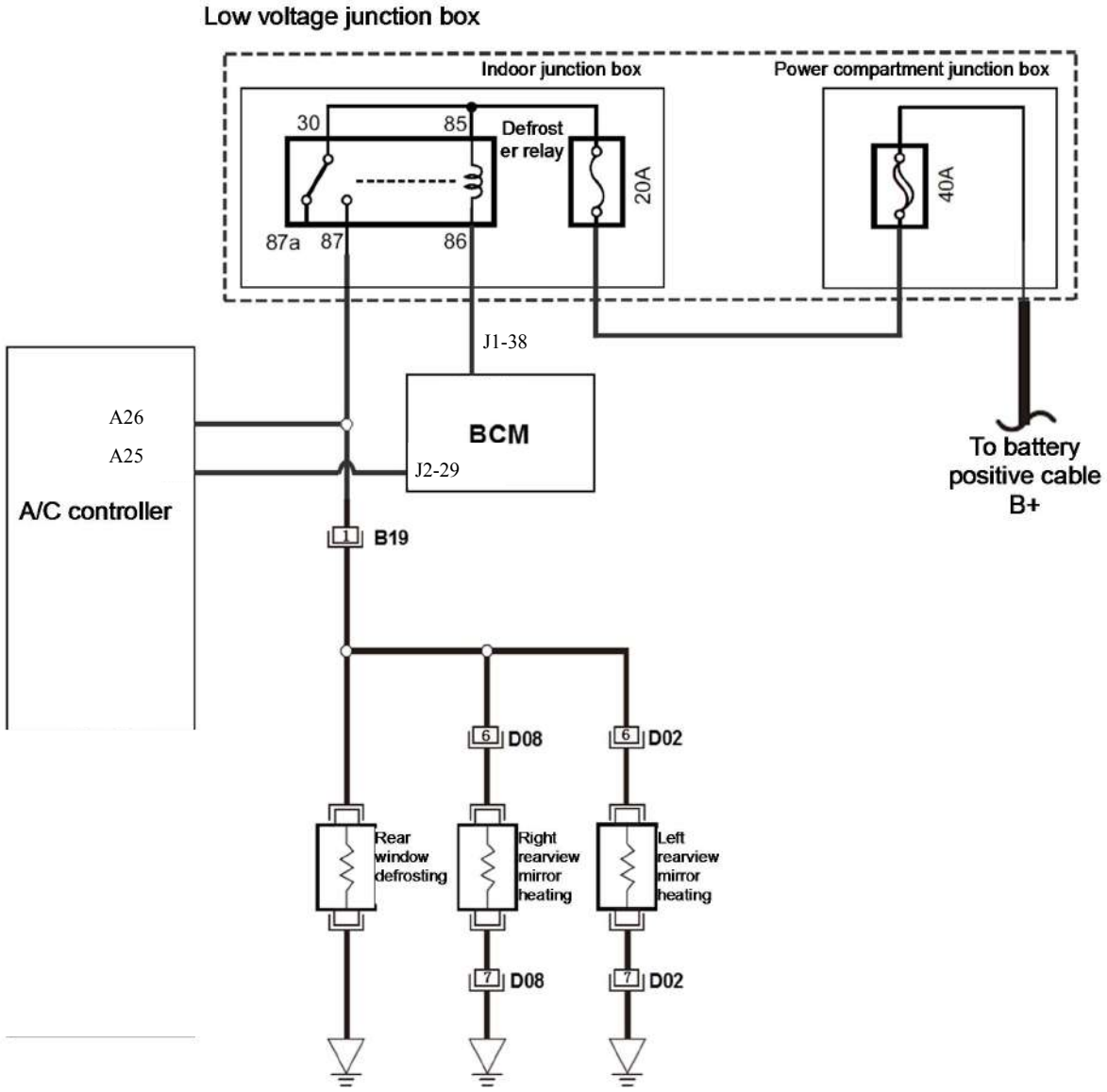
Timing function

- The BCM starts timing when the rear defrosting lamp lights. After twenty minutes, it controls to disconnect the defrosting relay in the low voltage terminal box. The defrosting stops working and rear defrosting lamp is put out.
- When the rear defrosting lamp is lit, close defrosting function manually within twenty minutes. If opening it again, the BCM starts timing.



Wire harness framework

framework



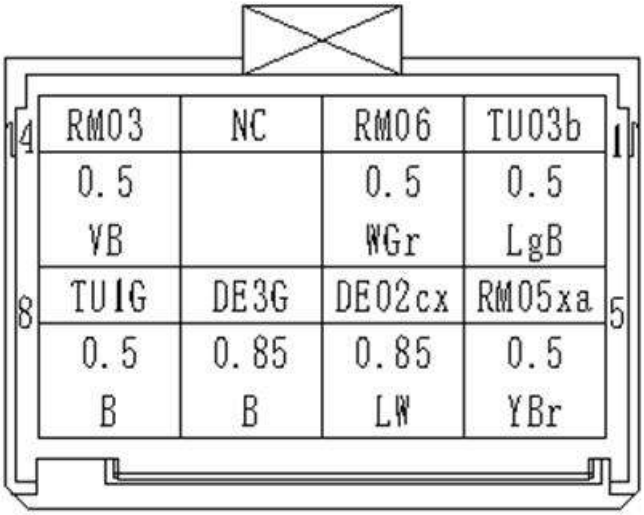
Connector information

Rear defrost heatingwire

Connector number	G14
Connector name	Rear defrost heating wire
Connector type	ST710506-3

Left front rearview mirror

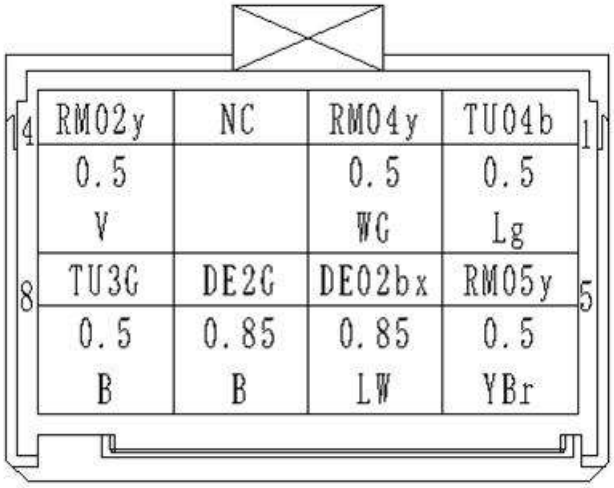
Connector number	D02
Connector name	Left front rearview mirror
Connector type	68508-0811[Molex]（black）



Terminal number	Wire color	Signal name
6	LW	DE02cx Defrosting Power Supply for Rear View Mirror
7	B	DE3G rearview mirror defrosting and grounding

Right front rearview mirror

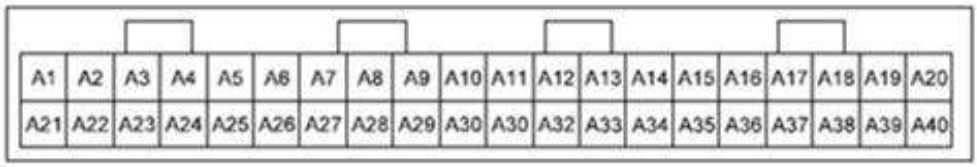
Connector number	D11
Connector name	Right front rearview mirror
Connector type	68508-0811[Molex]（black）



Terminal number	Wire color	Signal name
6	LW	DE02bx Defrosting Power Supply for Rear View Mirror
7	B	DE2G rearview mirror defrosting and grounding

Air conditioning controllerconnector

Connector number	M13
Connector name	A/C panel
Connector type	AMP1376113-1

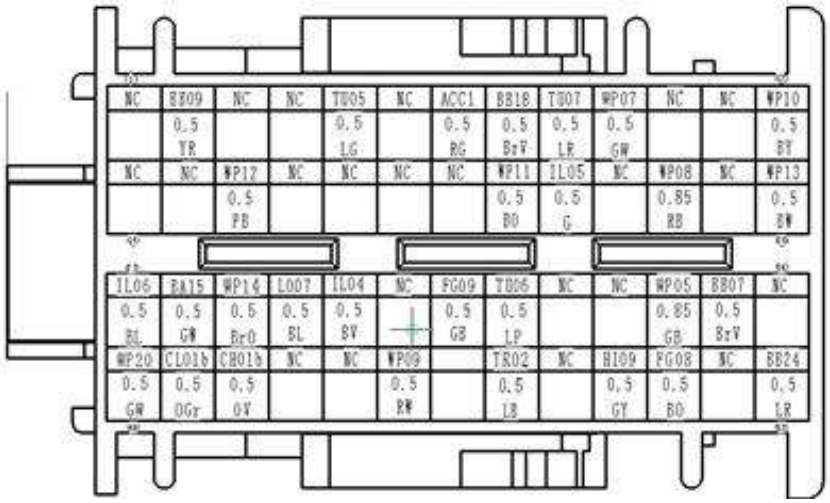


Terminal No.	Wire color	Signal name
A25	BrV	BB07 rear defrost request
A26	WB	DE02a rear defrost feedback

Body control module C1

Connector number	M08

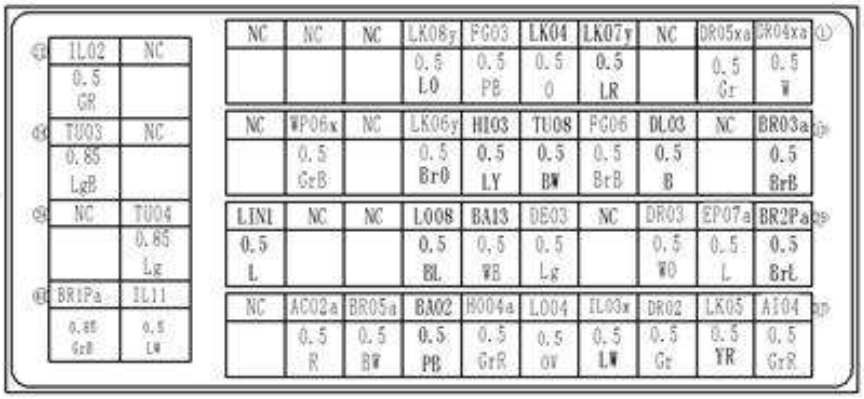
Connector name	Body control module C2
Connector type	284972-1（black）



Terminal No.	Wire color	Signal name
38	BrV	BB07

BCM C2

Connector number	M09
Connector name	Body control module C2
Connector type	316371-1(white)



Terminal number	Wire color	Signal name
29	Lg	DE03

Diagnosis

Malfunction of rear window defrosting

Diagnosis procedure

1 Check the defrosting button on the touch panel

Does it work smoothly?

If yes>>Refer to second

If no>>Repair or replace the touch panel

2 Check the defrosting relay

Does it work smoothly?

If yes>>Refer to the third

If no>>Repair or replace the defrosting relay

3 Check rear window glass heater

Does it work smoothly?

If yes>>Refer to the fourth

If no>>Refer to chapter of “Inspection and maintenance for rear window glass heater”

4 Operate again and confirm result

Does it work smoothly?

If yes>> Finish

If no>>Refer to the first.

Malfunction of outside rearview mirror glass

Diagnosis procedure

1 Check the defrosting button on the touch panel

Does it work smoothly?

If yes>>Refer to the second

If no>>Repair or replace the touch panel

2 Check the defrosting relay

Does it work smoothly?

If yes>>Refer to the third

If no>>Repair or replace the defrosting relay

3 Check the outside rearview mirror glass heater

Does it work smoothly?

If no>>Refer to the fourth

If no>>Repair or replace outside rearview mirror glass heater

4 Operate again and confirm result

Does it work smoothly?

If yes>>Finish

If no>>Refer to the first

Dismantling and installation

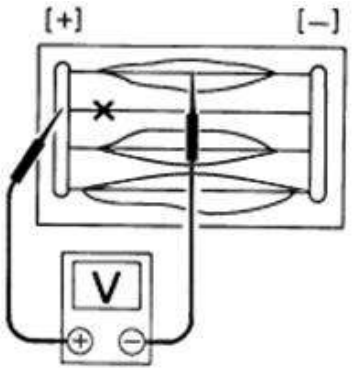
Rear window glass heater

Inspection and maintenance

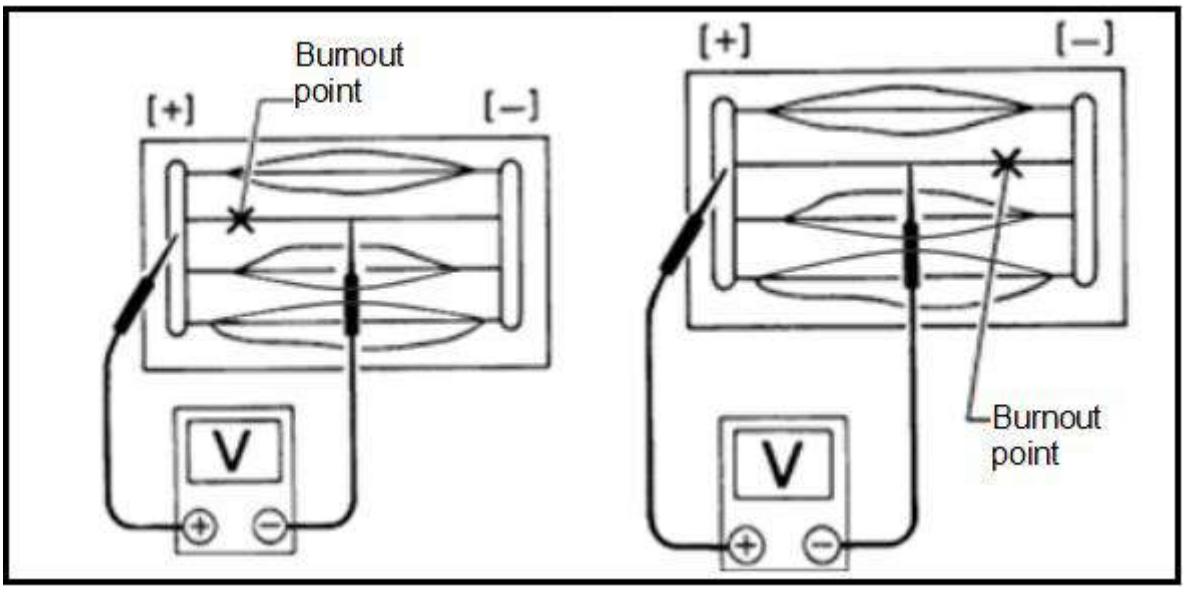
Inspection

1 Use the direct voltage of the digital multimeter.

2 Make cycling test on middle voltage of each resistance fuse. The normal voltage is 6V.



3 If the resistance fuse is burned, the multimter shows voltage of 12V or 0V.



4 To locate the burning point, move digital multimeter from left to right along the resistance fuse. When the digital multimeter pen approaches the burning point, the measured value will beat.

Maintenance

Maintenance device

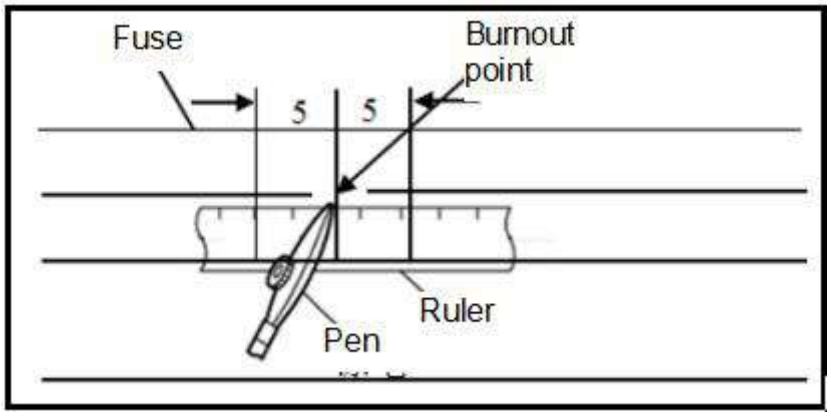
Conductive paint, ruler, pen, heating gun, alcohol, cotton cloth.

Maintenance procedure

1 Use a cotton cloth pained with alcohol to wipe the damaged resistance wire and its surrounding area.

2 Use the pen nib to dip conductive paint. (The conductive paint should be shaken evenly before it is used).

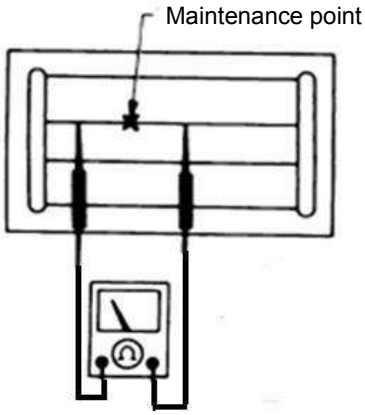
3 Put a ruler on a glass along the damaged resistance wire, slightly coat the damaged position with conductive paint by a pen nib and cover the intact resistance wire about 5mm respectively by both sides of the burning point.



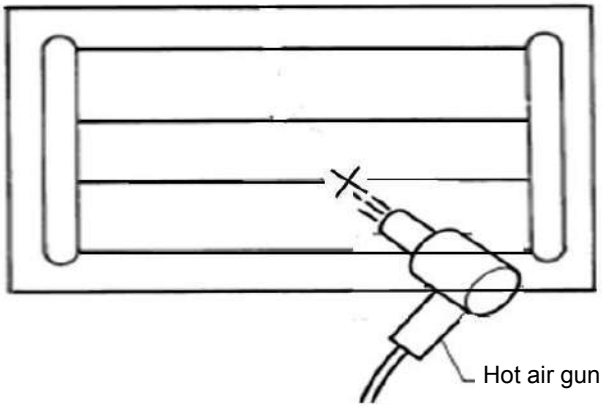
4 After maintenance is complete and conductive paint is solidified(about ten minutes), use a multimeter to check the damage repair effect.

Reminder:

When multimeter is testing, it is forbidden to touch the conductive paint repair position with hands or a tool.



5 When the test result is normal, use a heating gun to dry the repaired point. Keep the outlet of heating gun with the repaired point for more than 3cm and lasts about twenty minutes. If there is no heating gun available, you can choose to dry it by air which may last about twentyfour hours.



High voltage distribution system

Safety precaution

Precaution for normal charge

Warning:

If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, the device can be only used after its function being checked and confirmed before starting normal operations.

During normal charge operation, an engineer who uses medical electronic devices including heart pacemaker, cardioverter, defibrillator cannot enter passenger compartment (including trunk).

Precaution for high voltage

Warning:

The electric vehicle has a high-voltage battery. If the operation on the vehicle and high-voltage parts is incorrect, there are risks of leakage of electricity, electric shock, or similar accidents. Thus, it is mandatory to follow correct procedures to check and maintain.

Before disconnect repair switch, please put the key on "LOCK" position or unplug the key.

Disconnect repair switch before checking or maintaining high-voltage system. It is forbidden to close repair switch during the process of checking and maintenance. Before starting the operation on high-voltage system, be sure to wear insulated protection equipment, including gloves, shoes, and glasses.

When a technician is operating high-voltage system, please ensure no one touching the vehicle. When there is no maintenance operation, please take insulated protection on the high-voltage sections to prevent anyone touching.

When repair switch disconnects, it is forbidden that the key is at "ON" position or switched to "START" position.

High-voltage cable and safety sign

The color of high-voltage cable is orange and there are safety signs on the power battery assembly and other high-voltage parts. Do not touch these cables and parts.

Handling of high-voltage cable terminal

When the connector of high-voltage cable is plugged out, please use insulated adhesive tape to bind up immediately.

Regulation for a person wearing medical electronic device

The vehicle has strong magnetic parts. If an engineer uses medical electronic device, such as electronic pacemaker, its function may be affected by strong magnetic parts. Thus, these people cannot carry out repair work.

Forbidden accompanying article during work

The vehicle has strong magnetic parts. Thus, during work it is forbidden to take metal articles which may cause short circuit or magnetic articles such us various bank cards which may be damaged.

Place “Repairing High-voltage Parts, No Touch!” warning sign

Before repairing high-voltage parts, please place “Repairing High-voltage Parts, No Touch” warning sign on the prominent position of the repaired vehicle to remind other people.

Precaution for supplemental restraint system "airbag" and "safety belt pretension

Supplemental restraint system “airbag” and “safety belt pretension” is used together with front seat safety belts, which can reduce the damage to the driver and front passenger during collision. Supplemental restraint system consists of safety belt, driver airbag, and front passenger airbag. The detailed information of supplemental restraint system is included in the chapters of airbag system and seat safety belt.

Warning:

In order to avoid accidents, please abide by the following content:

To avoid the failure of supplemental restraint system and considering that the risk of physical injuries will increase during collision if the system fails, all the service must be executed by DR authorized dealer.

Non-normative maintenance of supplemental restraint system including non-normative removal and installation may result in accidental trigger of the system and cause physical injuries. Regarding the method of removing airbag module, please refer to Airbag System chapter.

Except for the operations in the service manual, please do not use electrical test device to test any circuit of supplemental restraint system. The color of harness and connector of supplemental restraint system is yellow or orange.

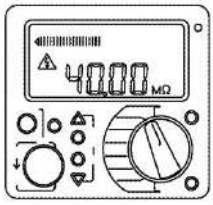
Precaution for using power tool (pneumatic or electric) and hammer

When power switch is at “ON” position and approach airbag diagnosis sensor or other sensors of airbag system, please do not use power tools or hammer on the sensor part area. Violent vibration may trigger these sensors and airbag to cause serious injuries.

When using power tools or hammer, put the key at “LOCK” position, unplug the negative pole of 12V lead-acid battery, wait at least one minute, and then start maintenance.

Preparation work

Special tool

Tool name	Tool picture	Tool name	Tool picture
Tramegger		Insulated gloves	
Digital multimeter		Insulated shoes	

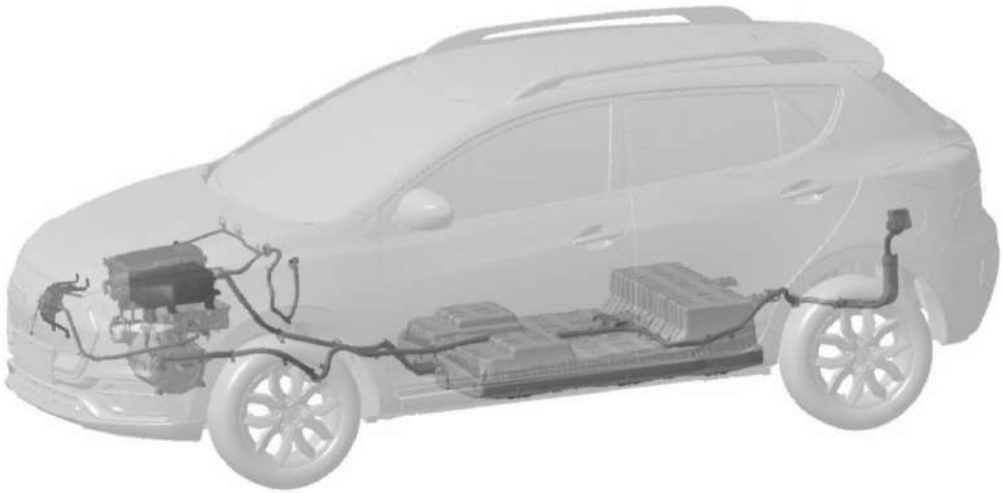
System instruction

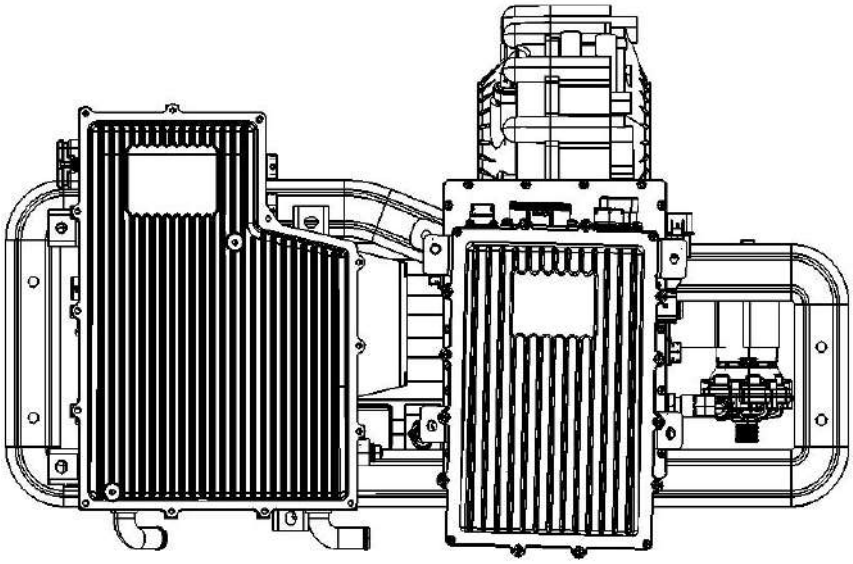
Instruction

High voltage distribution system main contains parts:high voltage connecting box、main cable and distribution cable。

Components

High voltage distribution system



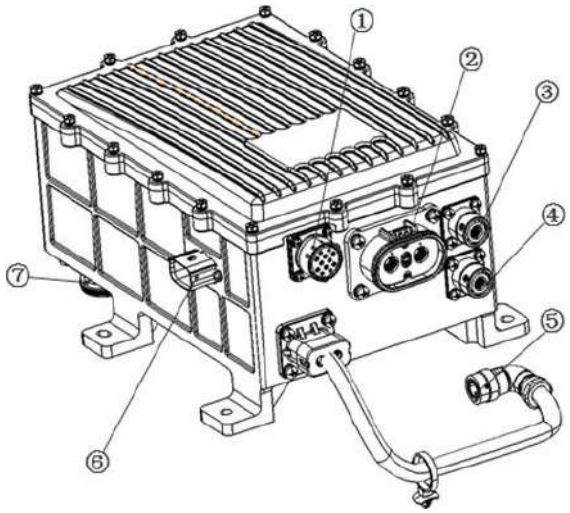


Serial No.	Component name	function

1	High voltage junction box	The electric energy of power battery assembly is distributed to the motor controller, one-piece air conditioning compressor and electric heater. Receive the electric energy of the on-board charger or the quick charging pile,deliver it to the power battery assembly
2	High voltage main cable	Deliver electric energy of power battery assembly to high voltage junction box
3	High voltage distribution cable	The power of the power battery assembly is delivered to the electric heater and the integrated air conditioner compressor.

High voltage junction box

- High-voltage junction box functions include power battery assembly power distribution, electric heater and fast charge on/off control, air conditioning system, fast charge, slow charge, motor control and other circuit overload protection.
- High voltage junction box has 6 high voltage cable connectors,fixing on on-board charger motor by 4 fixing points

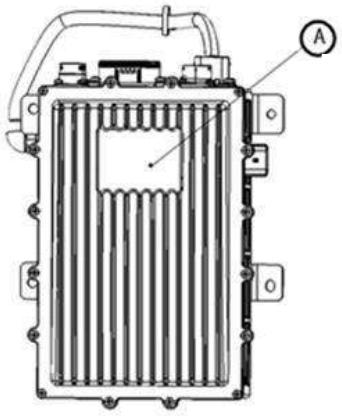


Serial No.	Parts	function
1	Air conditioning system	Connect to high voltage distribution cable to

	connector	deliver power to air conditioning system
2	Main cable connector	Connect to High voltage main cable
3	Motor Controller Connector (+)	Connect to positive pole of motor controller
4	Motor Controller Connector (-)	Connect to negative pole of motor controller
5	Car charger connector 1	connect to on-board charger
6	Low voltage connector	Realize high voltage interlocking and internal relay of high voltage junction box control
7	rapid charging connector	Connect to DC charging socket assembly

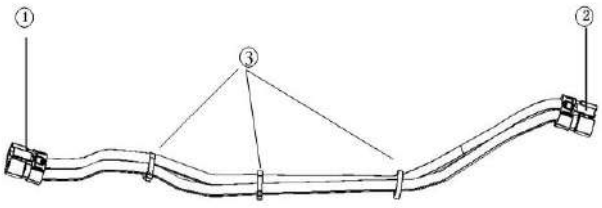
note:

- **If connector terminal is damaged,please change high voltage junction box**
- **The high voltage warning label is affixed to position A.**



High voltage main cable

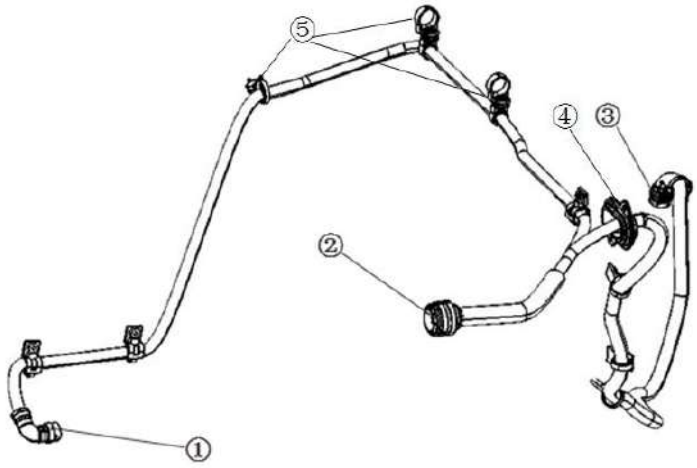
high voltage main cable delivers electric energy of power battery assembly to high voltage junction box,and it has key position fail-safe and high voltage interlock functions



Serial number	Spare parts	Function
1	Power battery assembly connector	Connecting to power battery assembly
2	Main cable connector	Connecting to high voltage junction box
3	Lathedog	Fixing high voltage main cable

High voltage distribution cable

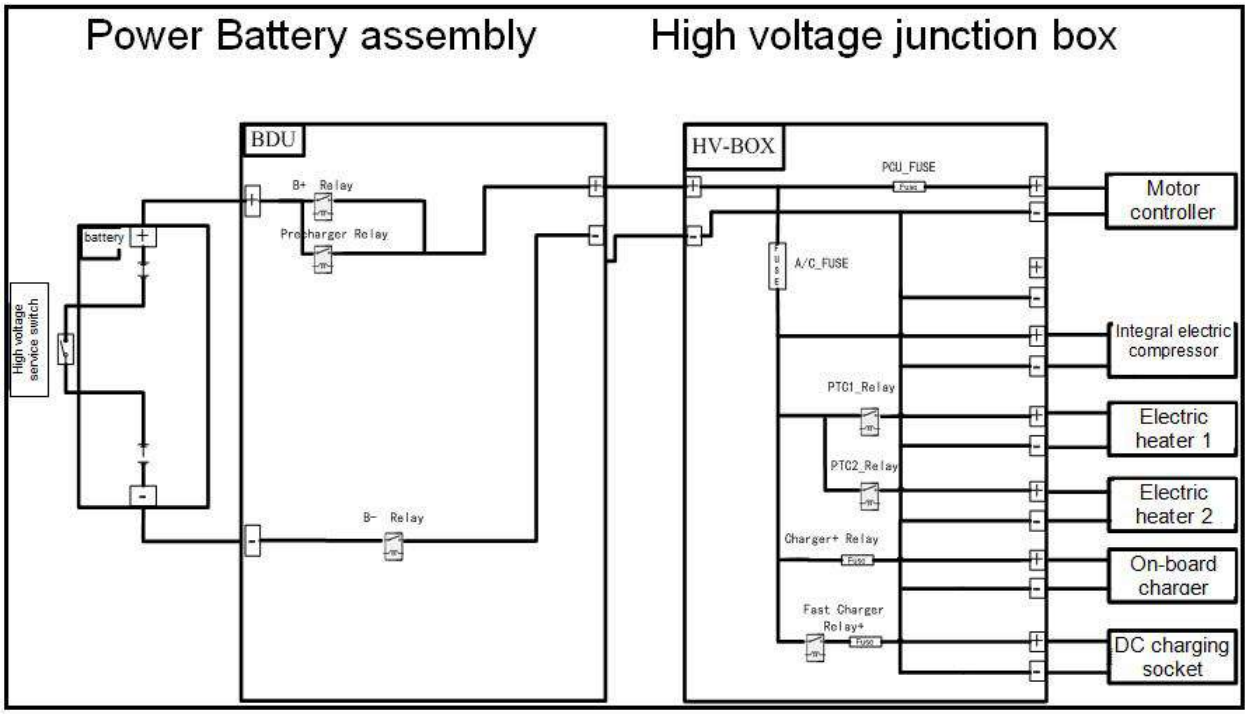
High voltage distribution cable transfers electricity of power battery assembly to electrical heater and one-piece air conditioner compressor. The connector ① is connected to one-piece air conditioning compressor. The connector ② is connected to high voltage junction box. The connector ③is connected to electrical heater.



Serial number	Spare parts	Function
1	Air conditioning system connector	Connecting to high voltage junction box to provide electricity to air conditioning system
2	One-piece air conditioner compressor connector	Connecting to one-piece air conditioner compressor
3	Electrical heater connector	Connecting to electrical heater
4	Vehicle body via hole sheath	Harness via hole protection and sealing
5	Buckle	Fixing high voltage distribution cable

System framework

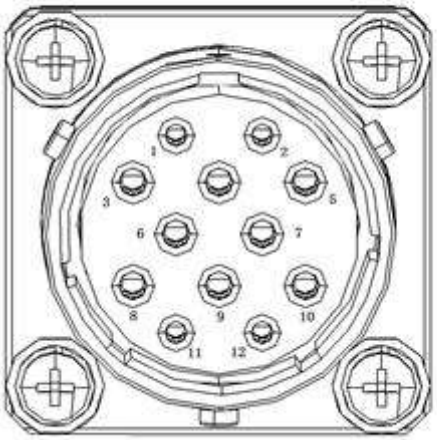
framework



Connector information

Air conditioning system connector

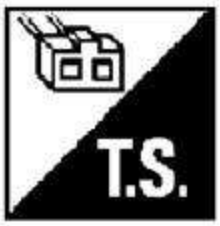
Connector name	Air conditioning system connector
Connector type	XC158/27F12K1P13

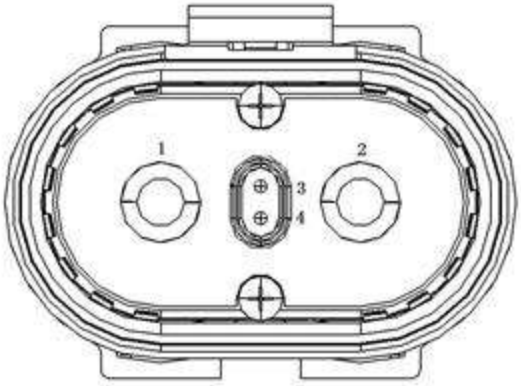


Terminal No.	Definition
1	null
2	null
3	null
4	One-piece a/c compressor+
5	Electric heater1+
6	Electric heater2+
7	null
8	One-piece a/c compressor-
9	Electric heater1-
10	Electric heater2-
11	null
12	null

Power battery assembly connector

Connector name	Power battery assembly connector
Connector type	GYHD-2-150T G001



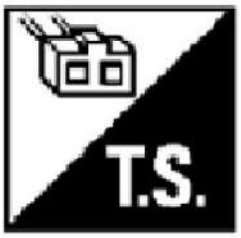


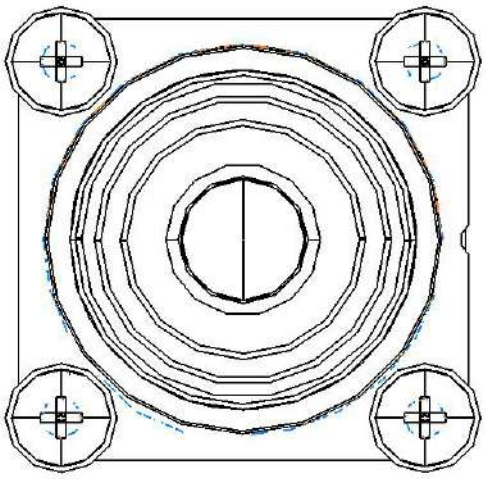
Terminal No.	Definition
1	Always positive

2	Always negative
3	High voltage interlock+
4	High voltage interlock-

Motor Controller Connector (+)

Connector name	Motor Controller Connector (+)
Connector type	CT34E-1ZJ(RE)-01E

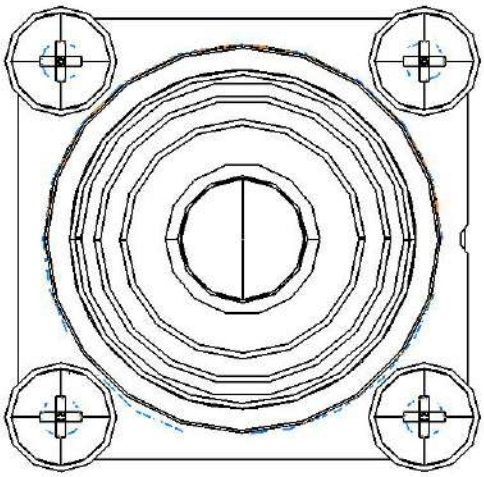




Terminal number	Definition
1	Motor controller positive pole

Motor Controller Connector (-)

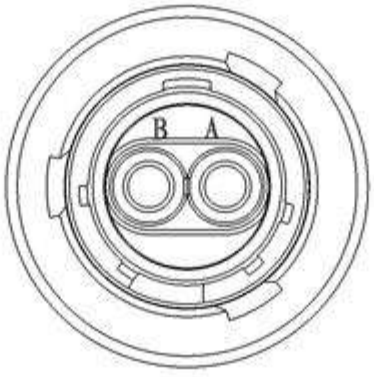
Connector name	Motor Controller Connector (-)
Connector type	CT34E-1ZJ(BK)-01E



Terminal number	Definition
1	Motor controller nagetive pole

On-board charger

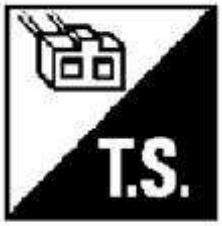
Connector name	On-board charger
Connector type	DY3T1002PNF-05

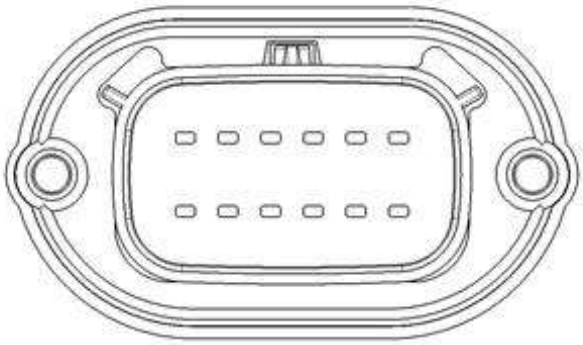


Terminal number	Definition
A	Car charger DC +
B	Car Charger DC -

Low pressure connector (socket)

Connector name	Low pressure connector (socket)
Connector type	776267-1

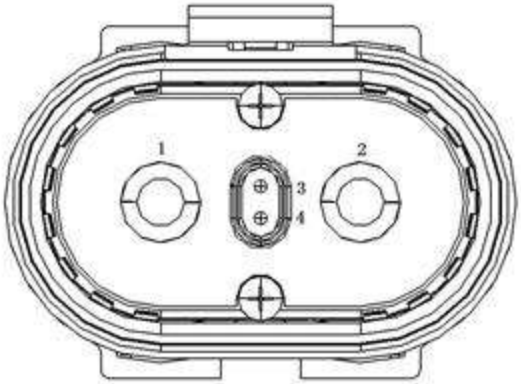




Terminal number	Definition
1	electric heater relay 12V
2	Electric heater relay 1 control signal
3	Electric heater relay 2 control signal
4	Fast charge ground
5	Fast charge control signal
6	High voltage interlock 12V
7	High voltage interlock signal
8	null
9	null
10	null
11	null
12	null

rapid charging connector

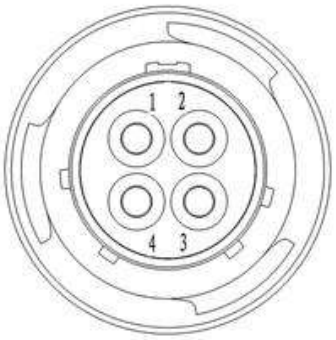
Connector name	rapid charging connector
Connector type	GYHD-2-150T G001



Terminal No.	Definition
1	Fast charge positive
2	Fast charge negative
3	null
4	null

Electric heater connector

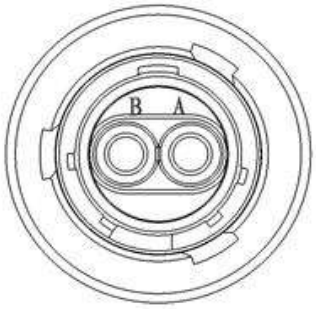
Connector name	Electric heater connector
Connector type	Y50DP-1204TJ2-11.1



Terminal No.	Definition
1	Electric heater1+
2	Electric heater1-
3	Electric heater2+
4	Electric heater2-

One-piece electric compressor connector

Connector name	One-piece electric compressor connector
Connector type	DY3T1002PNF-05



Terminal number	Definition
A	One-piece a/c compressor+
B	One-piece a/c compressor-

Diagnosis

Symptom list

Symptom	Checking list	Possible failed part
Insulation malfunction	Insulating resistance of vehicle high voltage system parts Battery controller	Overall high voltage parts Battery controller
Loop not conducting	High voltage loop fuse High voltage connector	High voltage junction box High voltage main cable High voltage distribution
Loop and short circuit	Vehicle high voltage system parts	Overall high voltage parts

Insulating malfunction diagnosis

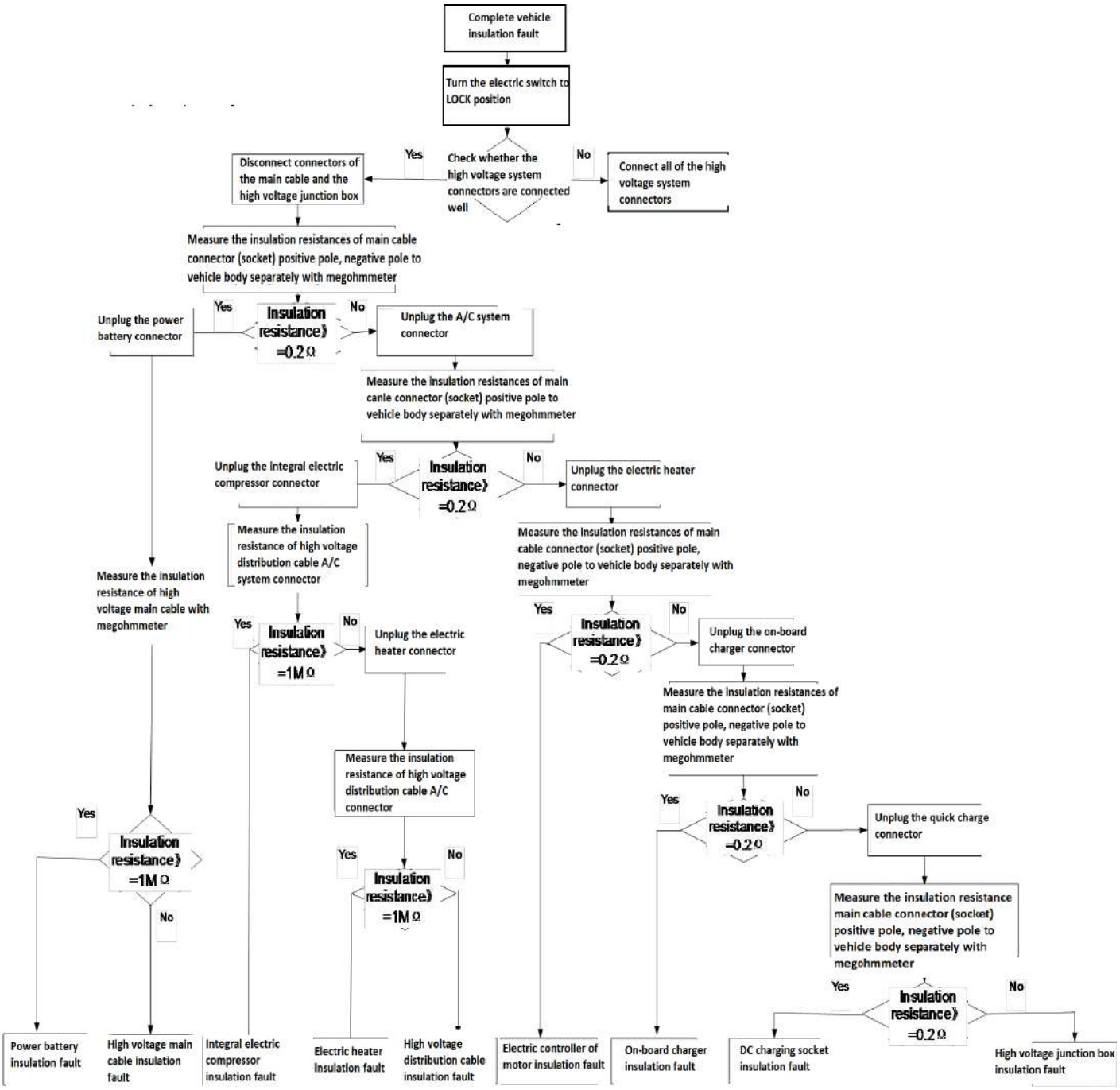
Danger:

If touching high voltage components without wearing appropriate protective device, it will cause danger of shock.

Warning:

Before inspecting or maintaining high voltage system, please follow the "High voltage disconnection"procedure in overview.

Operation procedure



Reminder:

Only when insulation malfunction is diagnosed in vehicle malfunction diagnosis, an engineer can detect insulation according to above procedure.

If insulation of whole vehicle high voltage parts is qualified after inspection according to the procedure, please check whether the battery controller is normal.

Circuit conduction inspection

Air conditioning loop continuity check

prompt:

Digital Multimeter Usage Method Reference "Overview - Circuit Inspection"

1 Check whether the high-voltage connector has a back needle, pin twist, and breakage phenomenon

YES,>>change high voltage distribution cable

NO,>>Step 2.

2 Use a digital multimeter to measure continuity between the high-voltage junction box air-conditioning system connector pins 4/5/6 and the high-voltage main cable connector (socket) pin 1

Yes,>> Finish.

No,>> circuit out of conduction(according to this chapter to change safety fuse)

Motor Controller circuit conduction inspection

Check procedure reference air conditioning circuit continuity check

On-board charger circuit continuity check

Check procedure reference air conditioning circuit continuity check

Circuit short out inspection

One-piece compressor circuit short out inspection

1 Check whether the connector of the high-voltage system has needle retreat, pin twist, and breakage

YES,>>change cable

NO,>>Step 2.

2 Disconnect the high voltage main cable connector and use a digital multimeter to measure the continuity between the positive and negative terminals of the high voltage main cable connector.

YES,>>change high voltage main cable

NO,>>Step 3.

3 Disconnect the integrated electric compressor connector and use a digital multimeter to measure the continuity between the positive and negative electrodes of the integrated electric compressor connector of the high voltage distribution cable.

Normal >>Step 4

NO,>>Step 5.

4 Disconnect the high-voltage connector of the air-conditioning system, and use a digital multimeter to measure the continuity between the positive and negative electrodes of the integrated electric compressor connector of the high-voltage distribution cable.

YES,>>high voltage distribution cable is short out, change high voltage distribution cable

NO,>>Step 5.

5 Using a digital multimeter to measure the short circuit between the positive and negative terminals of the integrated motor compressor connector

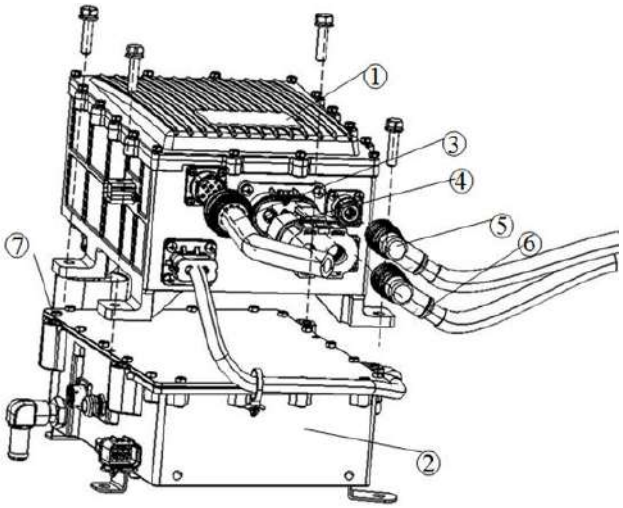
YES,>>one-piece motor compressor breaks down,change one-piece motor compressor

NO,>>finish.

Other circuit short-circuiting check Refer to Integrated compressor circuit short circuit check.

Dismantling and installation

High voltage junction box

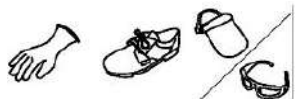


1 Direct current charging cable 2 high voltage junction box 3 High voltage distribution cable 4 High voltage main cable 5 PCU+ 6 PCU- 7 Vehicle charger motor

Removal

Danger:

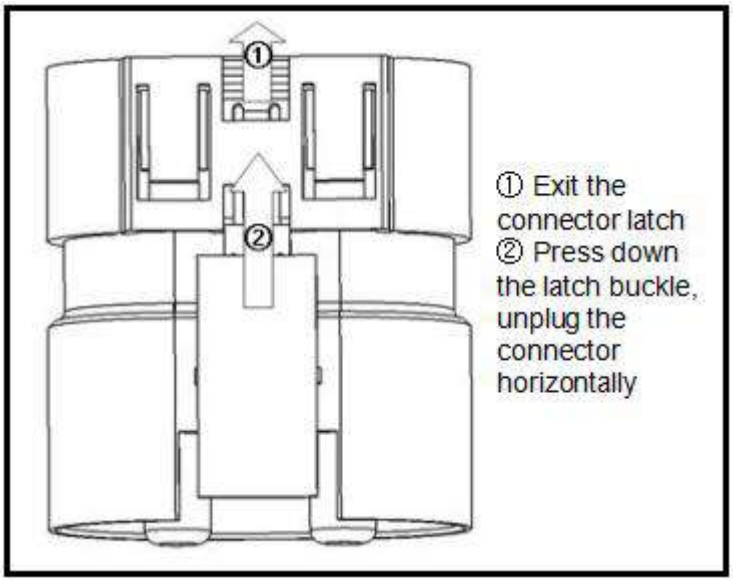
If touching high voltage components without wearing appropriate protective device, it will cause danger of shock.



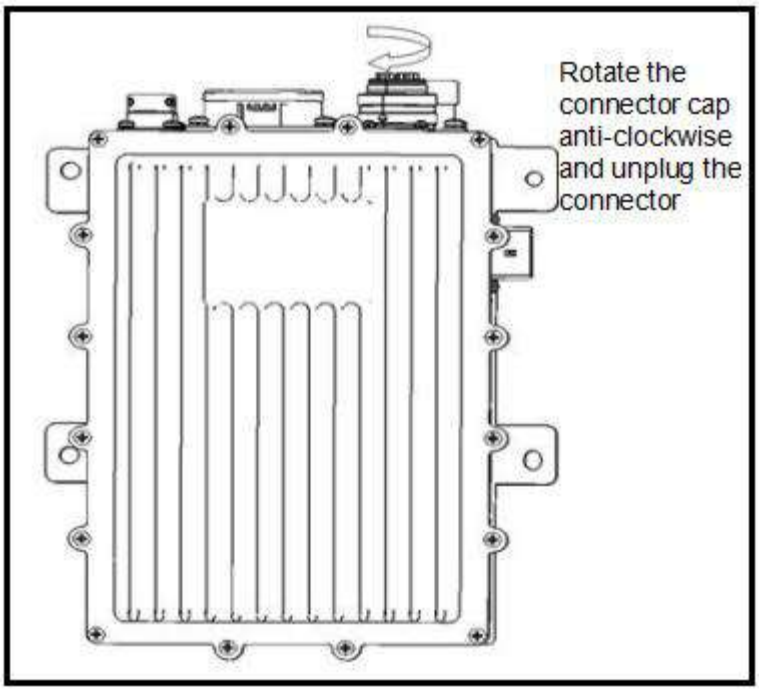
Warning:

Before checking or maintaining high voltage system, please follow procedure of "High voltage disconnection" in overview.

1 Exit the connector card lock, press the lock card and pull out the connector to main cable along horizontal direction.



2 Rotate the high voltage system connector hood in counterclockwise direction and pull out the air conditioning system connector.



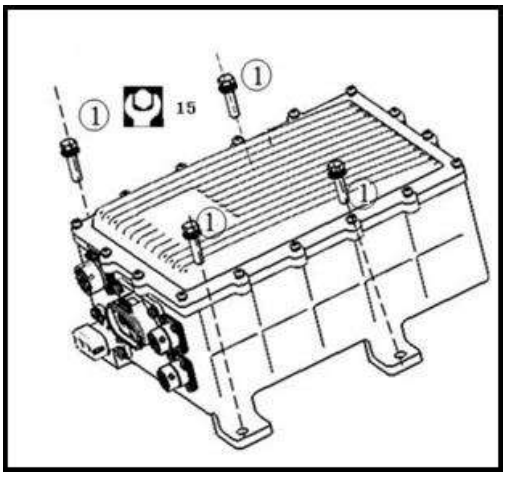
3 Pull out motor controller connector.

4 Rotate the direct current charging connector in counterclockwise direction, pull out alternating current charging connector.(The method is same as conditioning system connector).

5 Pull out alternating current charging connector.(The method is same as pulling out main cable connector).

6 Rotate the one-piece air conditioner compressor connector hood in counterclockwise direction, pull out one-piece air conditioner system connector(The method is same as air conditioning system connector).

7 Remove four fixing bolts of high voltage junction box(Q1840825）.



8 Remove high voltage junction box

Installation

Install it according to reverse order of removal.

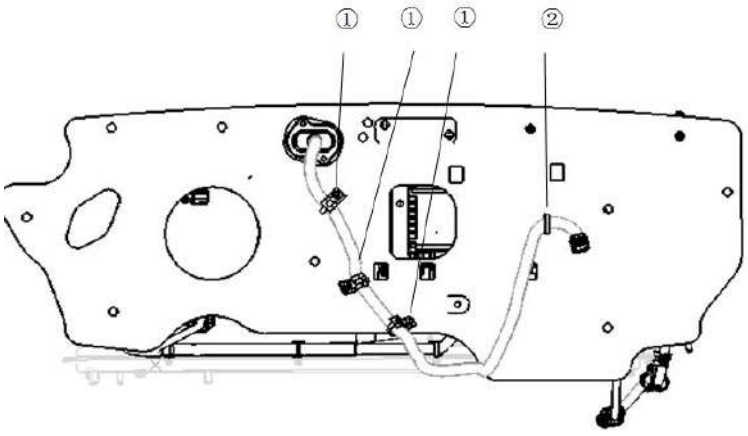
High voltage distribution cable

Removal

1 Removal auxiliary dashboard please refer to “Vehicle body system interior fascicle- dashboard”

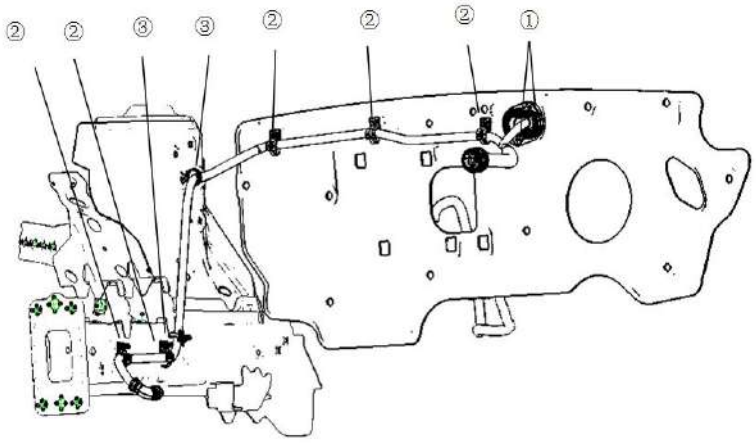
2 Pull out electrical heater connector(The method is same as air conditioning system connector)

3 Remove four fixing cable tie of high voltage cable electrical heater branch.



1 Cable tie① 2 Cable tie②

4 Remove two fixing bolt on via sheath and cable tie as well as buckle on one-piece air conditioner compressor branch of high voltage distribution cable.



1 Fixing bolt 2 Buckle 3 Carbon tie

5 Remove high voltage distribution cable

Installation

Install it according to reverse order of removal.

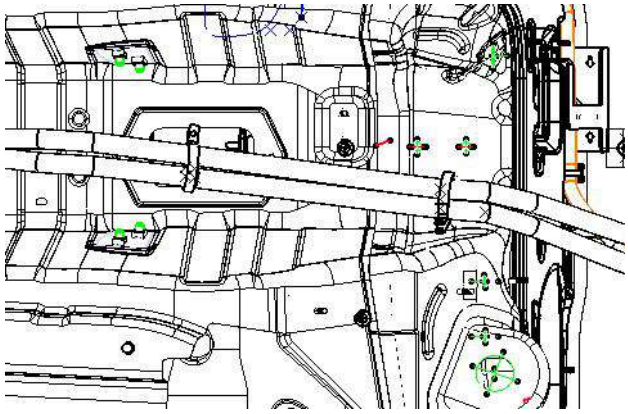
High voltage main cable

Removal

1 Lifting the vehicle, please refer to chapter of “Vehicle lifting”.

2 Pull out power battery assembly connector.(The method is same as pulling out main cable connection)

3 Remove three nut on fixing clamp of main cable.



4 Remove main cable

Installation

Install it according to reverse order of removal.

Dismantling and installation

High voltage junction box

Removal

Warning:

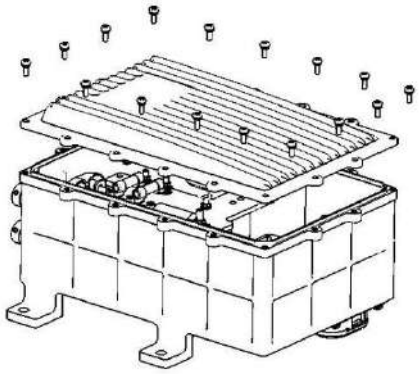
The high voltage box can only be disassembled after removal.

Reminder:

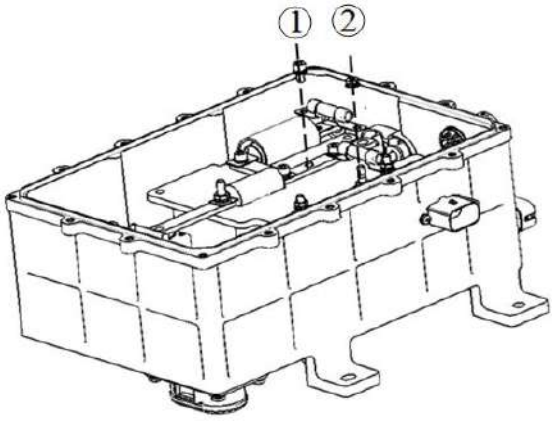
The high voltage junction box is divided into two layer, the upper layer is fuse, the lower layer is relay.

If replacement of fuse is needed, open the upper lid of high voltage box and operate. If replacement of relay is needed, it is required to remove the fuse insulating board.

1 Remove sixteen bolt of high voltage box upper lid and then take the high voltage upper lid down.

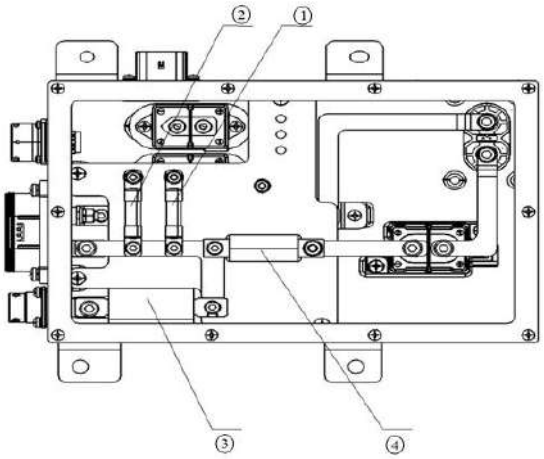


2 Remove fixing bolt and nut of air conditioner fuse.



1 Bolt 2 Nut

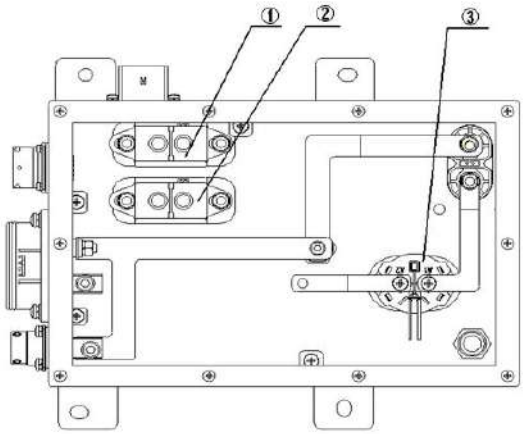
3 Remove PCU fuse, air conditioner fuse, direct current charging fuse, alternating fuse, please refer to the method of step two.



1 Air conditioner fuse 2 Direct current charging fuse 3 PCU fuse 4 Alternating charging fuse

4 Remove the upper insulating board.

5 Remove direct current charging relay and electrical heater relay.



1 PTC1 relay 2 PTC2 relay 3 Direct current charging relay

Installation

Install it according to reverse order of removal.

Maintenance data and specification

Fuse

Serial number	Loop name	Specification of fuse
1	Motor controller loop	150A 450V
2	Air conditioner loop	30A 450V
3	Alternating current charging loop	30A 450V
4	Direct current charging loop	80A 450V

Relay

Serial number	Loop name	Specification of loop
1	Electrical heater loop	40A 450V
2	Direct current charging loop	100A 450V

Pedestrian Warning System

Safety Precaution

Precaution for engineer using medical electronics

Forbidden operation

Warning：

- **The vehicle has strong magnetic parts.**
- **If an engineer uses medical electronic device, such as electronic pacemaker, its function may be affected by strong magnetic parts. Thus, these people cannot carry out repair work.**

Normal charging precaution

Warning：

- **If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, the device can be only be used after its function being checked and confirmed before starting normal operations.**
- **An engineer who uses medical electronic devices including heart pacemaker, cardioverter, defibrillator cannot enter passenger compartment (including trunk).**

Precaution for communication device operation

- **If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, please keep enough distance with communication device.**
- **The function of medical electronic devices including heart pacemaker, cardioverter, defibrillator may be affected by the electromagnetic wave of remote intelligent terminal.**
- **If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, the electromagnetic wave of remote intelligent terminal may affect its function. It is mandatory to request the medical electronic device manufacturer to check and confirm the possible effect on medical electronic device when using remote intelligent terminal.**

Inspection for key point before maintenance

The high voltage system may automatically operate, so make sure there is no setting of remote air conditioning and regular charge before maintenance.

Precaution for supplemental restraint system "airbag" and "safety belt pretension"

Supplemental restraint system “airbag” and “safety belt pretension” is used together with front seat safety belts, which can reduce the damage to the driver and front passenger during collision. Supplemental restraint system consists of safety belt, driver airbag, and front passenger airbag. The detailed information of supplemental restraint system is included in the chapters of airbag system and seat safety belt.

Warning:

In order to avoid accidents, please abide by the following content:

② **To avoid the failure of supplemental restraint system and considering that the risk of physical injuries will increase during collision if the system fails, all the service must be executed by DR authorized dealer.**

③ **Non-normative maintenance of supplemental restraint system including non-normative removal and installation may result in accidental trigger of the system and cause physical injuries. Regarding the method of removing airbag module, please refer to Airbag System chapter.**

④ **Except for the operations in the service manual, please do not use electrical test device to test any circuit of supplemental restraint system. The color of harness and connector of supplemental restraint system is yellow or orange.**

Precaution for using power tool (pneumatic or electric) and hammer

- When power switch is at “ON” position and approach airbag diagnosis sensor or other sensors of airbag system, please do not use power tools or hammer on the sensor part area. Violent vibration may trigger these sensors and airbag to cause serious injuries.
- When using power tools or hammer, put the key at “LOCK” position, unplug the negative pole of 12V lead-acid battery, wait at least one minute, and then start maintenance.

Precaution for removing 12V battery

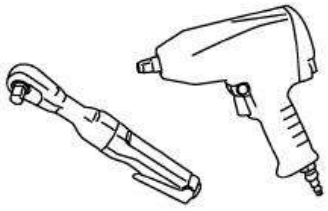
Before removing 12V battery, turn the key to “ON” position, and then turn to “LOCK” position.

Reminder：

- Though the key is at “LOCK” position, auto-recharge function of 12V battery may activate.
- After the key turns from “ON” to “LOCK”, auto-recharge function of 12V battery will not activate.

Preparation work

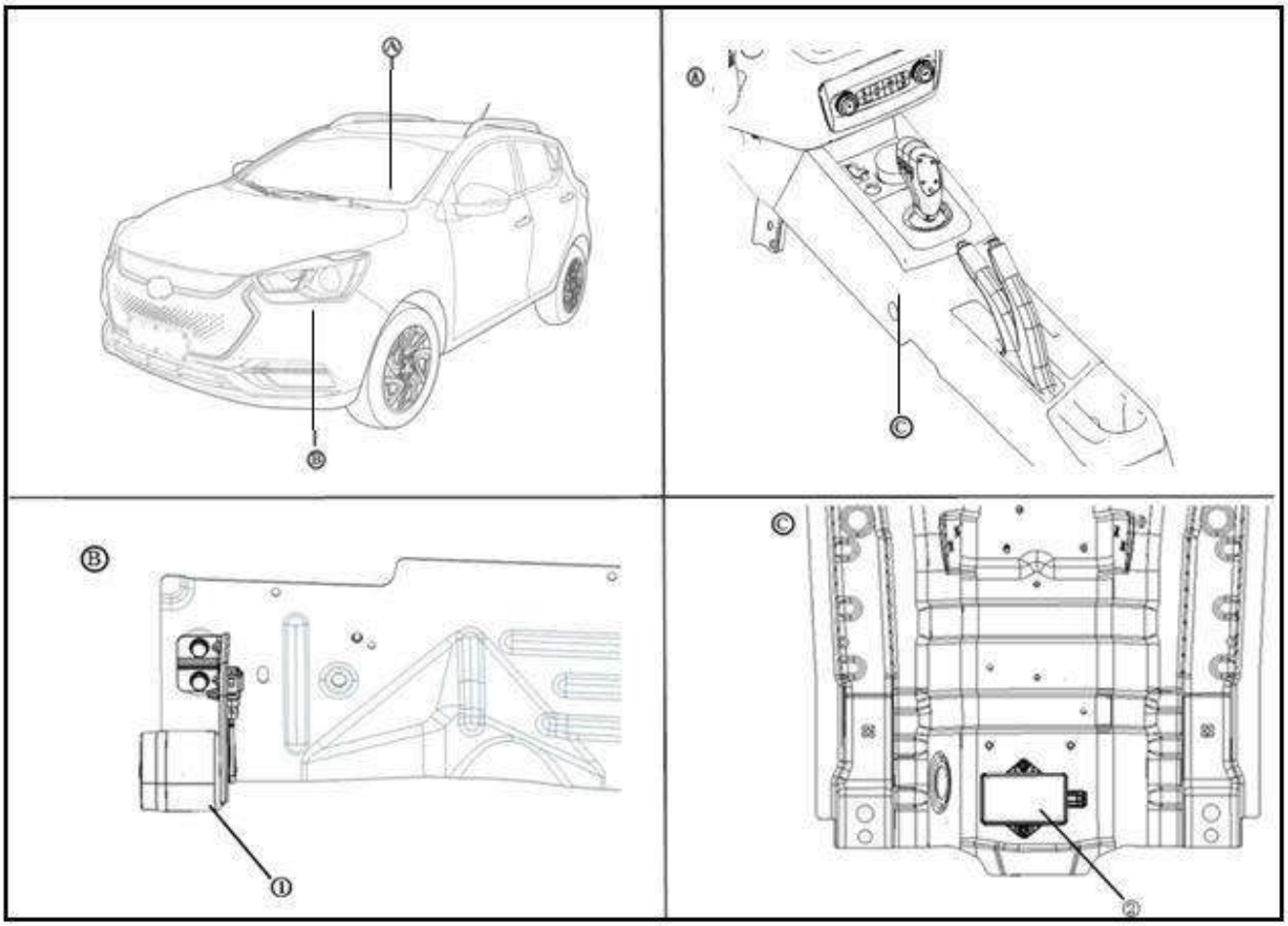
General tool

Name	Picture
Power tool	

System introduction

Components

Pedestrian warning system layout

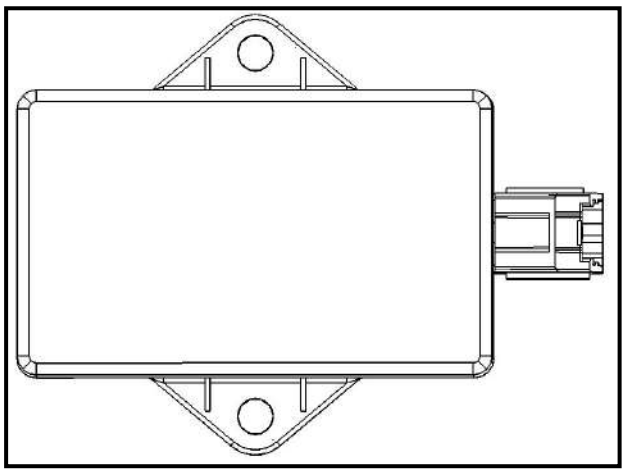


1 Pedestrian warning horn

2 Pedestrian warning controller

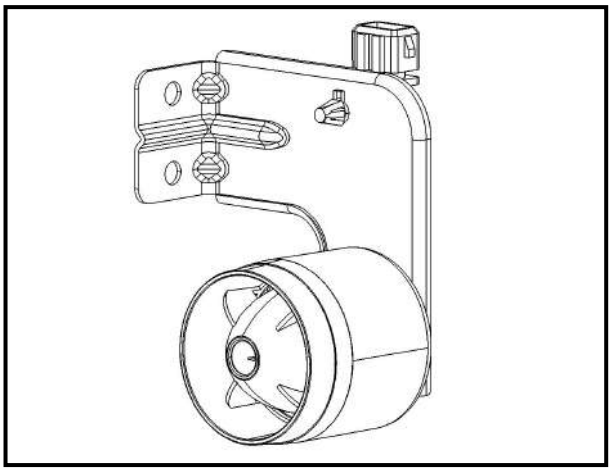
Pedestrian warning controller

- Pedestrian warning controller is installed in central channel.
- Pedestrian warning controller receives signal of speed, reversing, charging connection, charging start from vehicle control unit, judge and handle, and send corresponding sound signal to pedestrian warning horn.



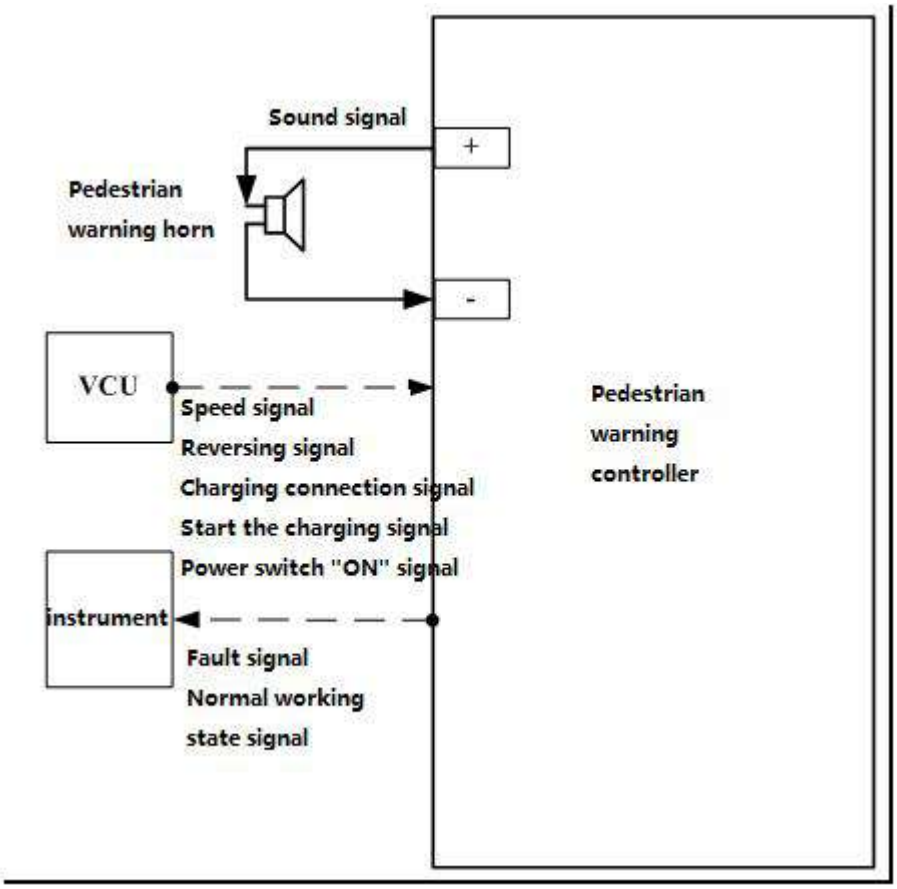
Pedestrian warning horn

- Pedestrian warning horn is installed on the vehicle front left longeron.
- Pedestrian warning horn receives and enlarges sound signal from pedestrian warning controller.



System

System principle



System introduction

Pedestrian warning controller receives following signals from vehicle control unit (VCU):

— Speed signal

— Charging connection signal

— Charging start signal

— Reversing signal

— Electric switch of “ON” signal

Pedestrian warning controller send bellowing signal to dashboard

— Malfunction signal

— Normal working state signal

System function

Pedestrian warning controller receives signal of speed, reversing, charging connection, charging start from vehicle control unit, judge and handle, and send corresponding sound signal to pedestrian warning horn.

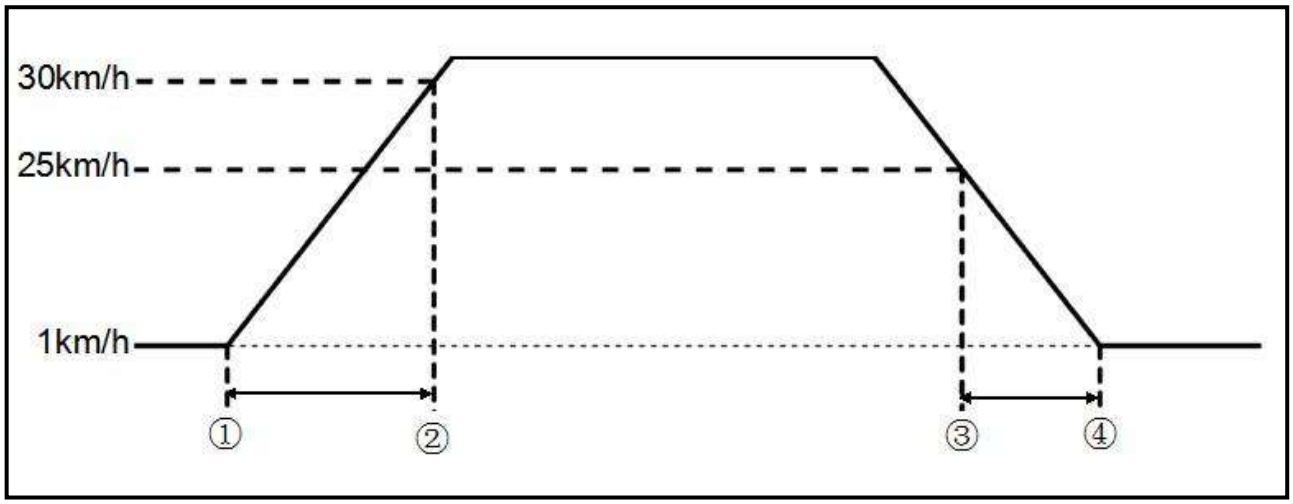
Pedestrian warning system owns function of forwarding phonation, reversing phonation, charging connection phonation, charging start phonation.

Forwarding phonation function

- The frequency of phonation when forwarding is risen with increased speed.
- When the vehicle is moving forward, VCU sends speed signal to pedestrian warning controller.

- Pedestrian warning controller receives, judges, handles signal from VCU and sends phonation signal to pedestrian warning horn.

Condition for forwarding phonation



- ①-②Vehicle speeds up from 1km/h to 30km/h and phonate.
- ③-④Vehicle reduces speed from 25km/h to 1km/h and phonate.

Reversing phonation function

- When the vehicle is reversing, phonate when the speed is above 1km/h.
- The sound is continuous tinkle.
- When the vehicle is reversing, VCU sends reversing signal to pedestrian warning controller.
- Pedestrian warning controller receives, judges, handles signal from VCU and sends phonation signal to pedestrian warning horn.

Condition for reversing phonation

- The vehicle is moving backward.
- The vehicle speed is above 1km/h.

Charging connection phonation function

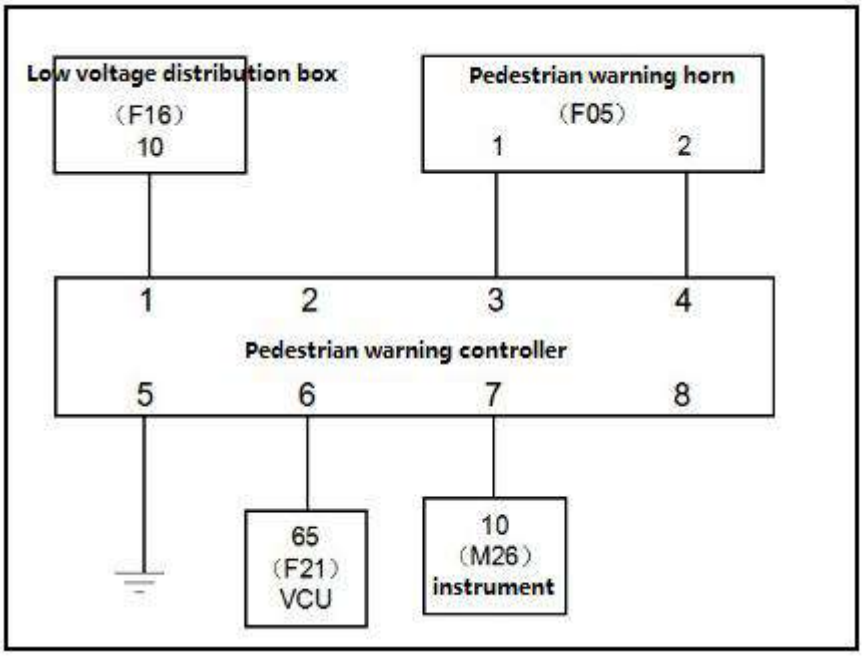
- It phonates when charging plug is inserted in vehicle charging plug.
- The sound is short beep.
- When the charging plug is inserted in vehicle charging plug, VCU sends charging connection signal to pedestrian warning controller.
- Pedestrian warning controller receives, judges, handles signal from VCU and sends phonation signal to pedestrian warning horn.

Charging start phonation function

- It phonates when the vehicle starts charging.(The charging current is more than 1A)
- The sound is short beep.
- After the vehicle starts to charge, VCU send charging signal to pedestrian warning controller.
- Pedestrian warning controller receives, judges, handles signal from VCU and sends phonation signal to pedestrian warning horn.

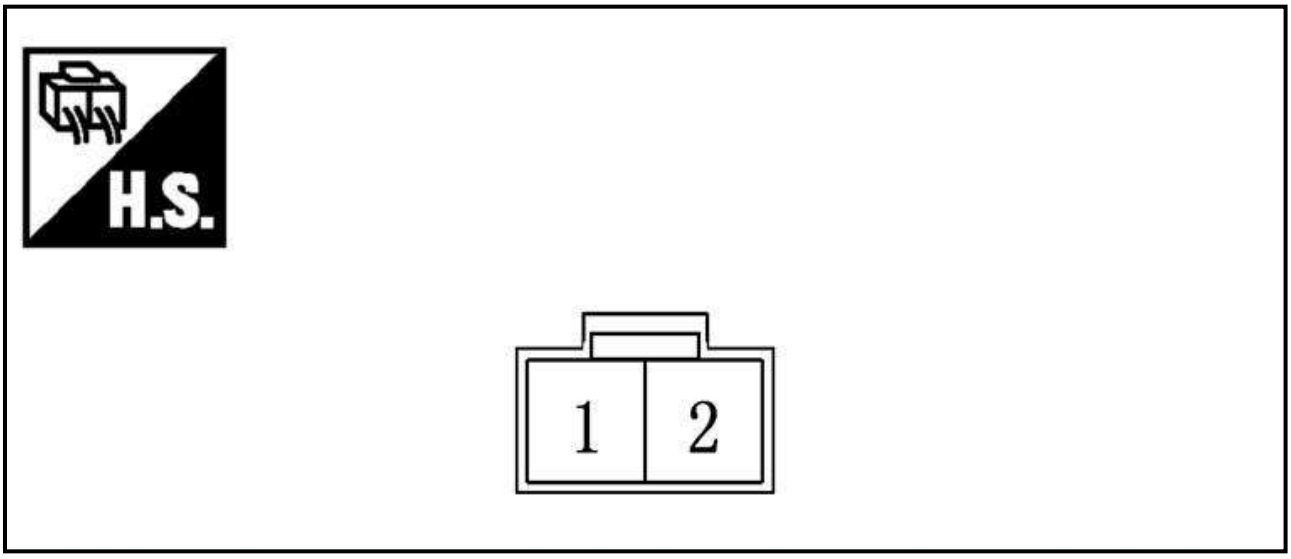
Harness framework

Harness

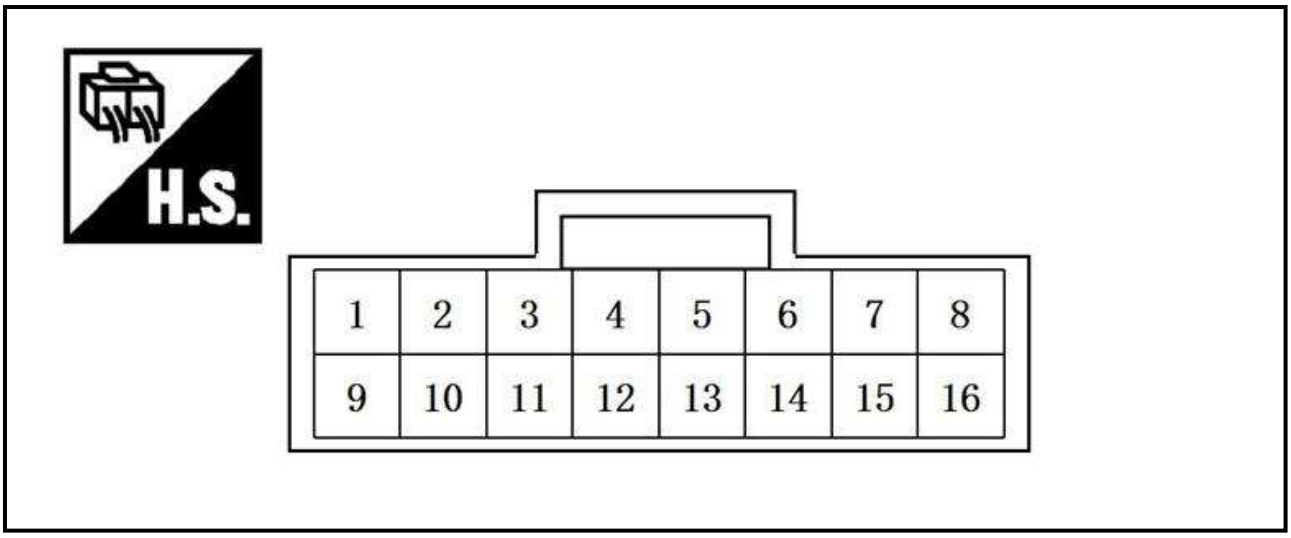


Connector information

Connector serial number	F05
Connector name	Pedestrian warning horn
Connector model	0417707

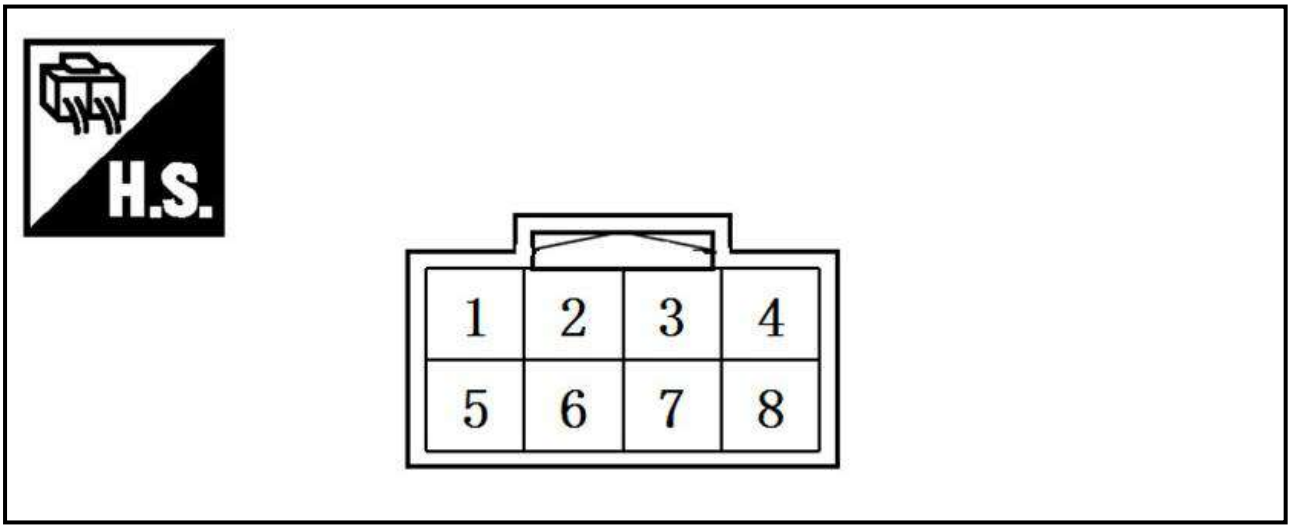


Terminal number	Line color	Signal name
1	RW	Pedestrian warning horn power source (anode)
2	BL	Pedestrian warning horn power source(cathode)
Connector serial number		F16
Connector name		Low voltage distribution box
Connector model		MG610360



Terminal serial number	Thread color	Signal name
10	R	Keeping power source another(output)

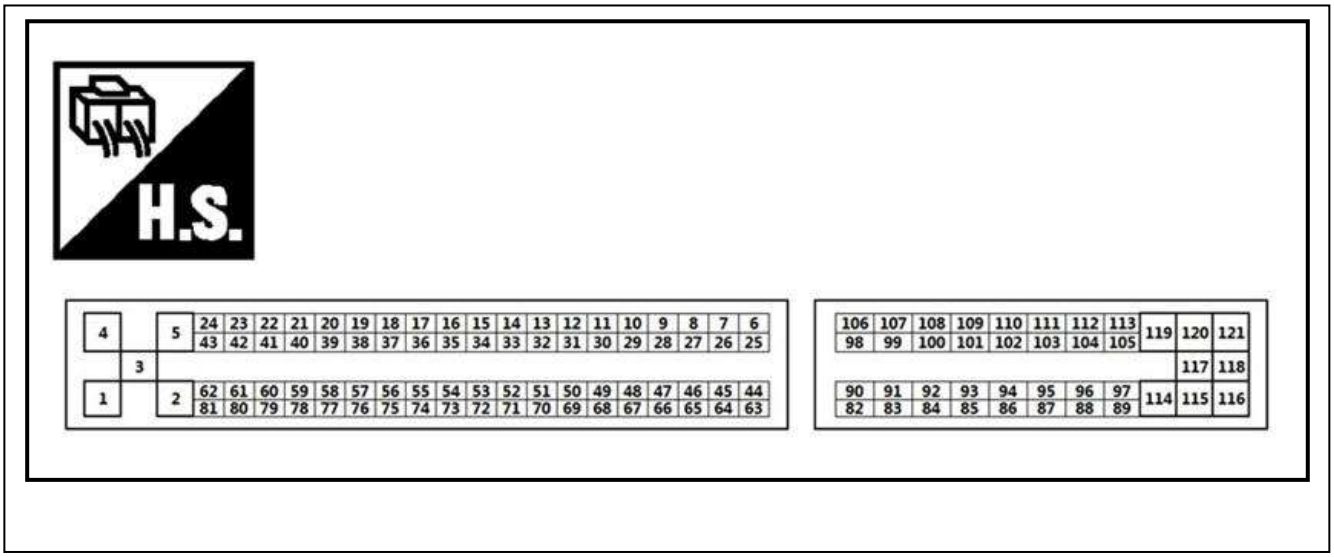
Connector serial number	F19
Connector name	Pedestrian warning controller
Connector model	34729-0080



Terminal serial number	Thread color	Signal name	Input or output	Remark
1	R	Power source anode	Input	12V
2		Empty	Empty	Empty
3	RW	Horn （+）	Output	Sound signal
4	BL	Horn （-）	Output	Ground
5	B		Output	Ground
6	Y	VCU signal (VCU sends to pedestrian warning controller ）	Input	Frequency is 5Hz PWM signal

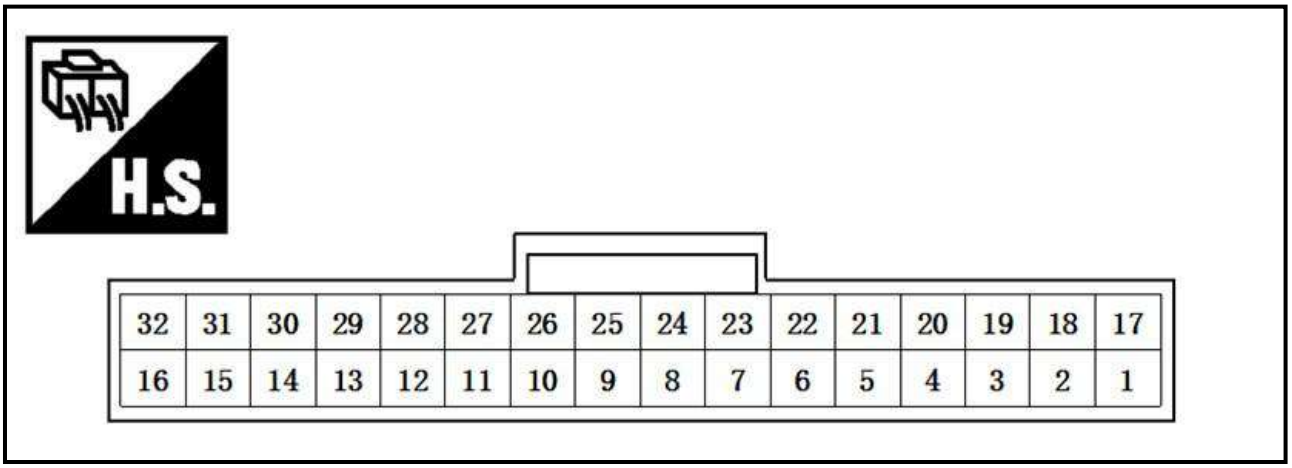
7	BW	Dashboard signal Pedestrian warning controller sends to dashboard	Output	Duty ratio is 50% PWM signal of 10Hz, 20Hz,30Hz frequency
8	Empty	Empty	Empty	Empty

Connector number	F21
Connector name	VCU connector 1



Connector model	1473244-1	
Terminal serial number	Thread color	Signal name
65	Y	VCU Hard line data input

Connector serial number	M26
Connector name	Combination instrument
Connector model	1719057-2(Blue)

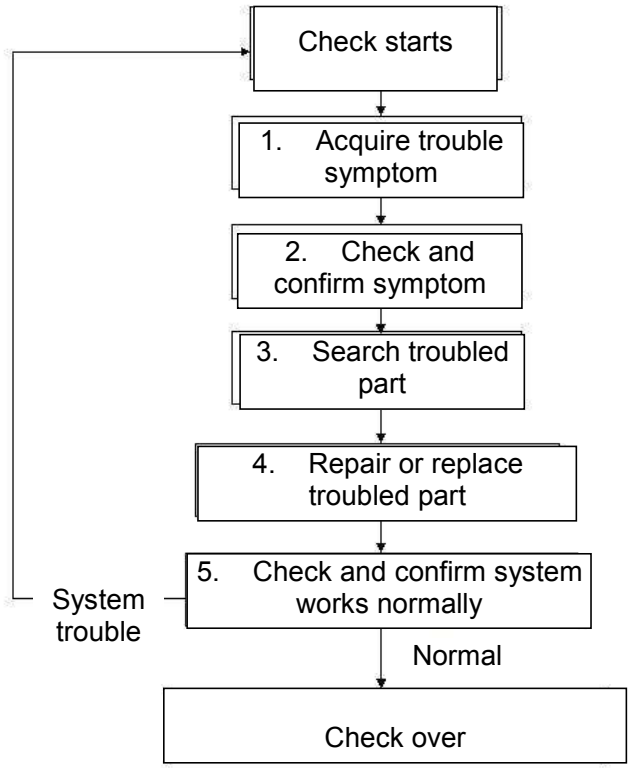


Terminal serial number	Thread color	Signal name
10	BW	Pedestrian warning system control signal

Basic inspection

Diagnosis and maintenance procedure

Operation procedure



1 Acquiring malfunction symptom

Communicate with customer to get as more as possible information of the vehicle and environment when failed.

2 Check and confirm symptom

- When the vehicle is running, check whether the pedestrian warning system failure light on the dashboard is ON.
- Confirm malfunction symptom.
- Check if there is any other malfunction.

3 Look for failed components

Judge possible failed components according to symptoms.

4 Repair or replace failed components

Repair or replace failed components

5 Check and confirm the system is working normally.

Check whether the system is working normally, if not, please repeat the procedure.

Diagnosis

Symptom list

Symptom	Checking list	Possible failed components
No phonation when forwarding at low speed	Speed signal input by VCU Pedestrian warning horn	VCU Pedestrian warning controller Pedestrian warning horn
No phonation when revsersing	Speed signal input by VCU Pedestrian warning horn	VCU Pedestrian warning controller Pedestrian warning horn
No phonation when charging connected	Charging connection signal input by VCU Pedestrian warning horn	VCU Pedestrian warning controller Pedestrian warning horn
No phonation when charging starts	Charging start signal input by VCU Pedestrian warning horn	VCU Pedestrian warning controller Pedestrian warning horn

No phonation when forwarding at low speed

1 Check if there is 12V power source input of harness terminal connector number one needle of pedestrian warning controller

If yes >>Turn to step two

If no >>Check low voltage power source input loop of pedestrian warning controller, please refer to “Ground and Loop”

2 Check whether harness terminal connector number five needle of pedestrian warning controller is connected with vehicle body(Ground)

If yes >>Turn to step three

IF no >> Check grounding loop of pedestrian warning controller, please refer to “Ground and Loop”

3 When the vehicle is forwarding at low speed, use oscilloscope to check harness terminal connector number six needle of pedestrian warning controller and confirm the PWM duty ratio of VCU is in the range of 1% to 60%.

IF yes >>Turn to step four

If no>>Check VCU output, please refer to “Vehicle malfunction diagnosis” in “Electrical vehicle controlling system”

4 Replace pedestrian warning controller and confirm whether there is phonation when forwarding at speed.

If yes>>Finish

If no>>Turn to step five

5 Replace pedestrian warning horn and confirm whether there is phonation when forwarding at low speed

If yes>>Finish

If no>>Repair harness or connector

No phonation when reversing

1 Check if there is 12V power source input of harness terminal connector number one needle of pedestrian warning controller

If yes >>Turn to step two

If no >> Check low voltage power source input loop of pedestrian warning controller, please refer to “Ground and Loop”

2 Check whether harness terminal connector number five needle of pedestrian warning controller is connected with vehicle body(Ground)

If yes >>Turn to step three

IF no >> Check grounding loop of pedestrian warning controller, please refer to “Ground and Loop”

3 When the vehicle is forwarding at low speed, use oscilloscope to check harness terminal connector number six needle of pedestrian warning controller and confirm the PWM duty ratio of VCU is in the range of 83% to 89%.

If yes >>Turn to step four

If no >> Check VCU output, please refer to “Vehicle malfunction diagnosis” in “Electrical vehicle controlling system”

4 Replace pedestrian warning horn and confirm whether there is phonation when reversing

If yes >>Finish

If no >>Turn to step five

5 Replace pedestrian warning horn and confirm whether there is phonation when reversing

If yes >>Finish

If no >>Repair harness or connector

No phonation when charging connected

1 Check if there is 12V power source input of harness terminal connector number one needle of pedestrian warning controller

If yes >>Turn to step two

If no >> Check low voltage power source input loop of pedestrian warning controller, please refer to “Ground and Loop”

2 Check whether harness terminal connector number five needle of pedestrian warning controller is connected with vehicle body(Ground)

If yes >>Turn to step three

If no >> Check grounding loop of pedestrian warning controller, please refer to “Ground and Loop”

3 When the vehicle is forwarding at low speed, use oscilloscope to check harness terminal connector number six needle of pedestrian warning controller and confirm the PWM duty ratio of VCU is in the range of 77% to 83%.

If yes >>Turn to step four

If no >> Check VCU output, please refer to “Vehicle malfunction diagnosis” in “Electrical vehicle controlling system”

4 Replace pedestrian warning horn and confirm whether there is phonation when charging connected.

If yes >>Finish

If no >>Turn to step five

5 Replace pedestrian warning horn and confirm whether there is phonation when charging connected.

If yes >>Finsh

If no >>Repair harness or connector

No phonation when charge starts

1 Check if there is 12V power source input of harness terminal connector number one needle of pedestrian warning controller

If yes >>Turn to step two

If no >> Check low voltage power source input loop of pedestrian warning controller, please refer to “Ground and Loop”

2 Check whether harness terminal connector number five needle of pedestrian warning controller is connected with vehicle body(Ground)

If yes >>Turn to step three

If no >> Check grounding loop of pedestrian warning controller, please refer to “Ground and Loop”

3 When the vehicle is forwarding at low speed, use oscilloscope to check harness terminal connector number six needle of pedestrian warning controller and confirm the PWM duty ratio of VCU is in the range of 89% to 95%.

If yes >>Turn to step four

If no >> Check VCU output, please refer to “Vehicle malfunction diagnosis” in “Electrical vehicle controlling system”

4 Replace pedestrian warning horn and confirm whether there is phonation when charging starts

If yes >>Finish

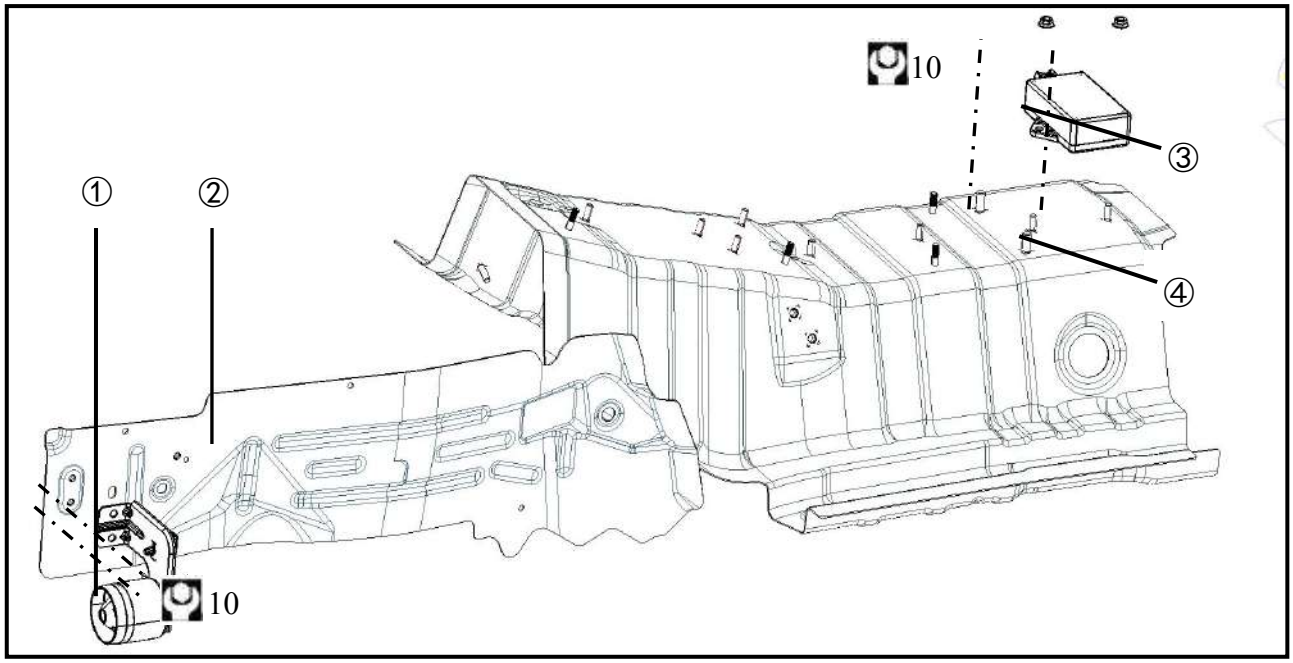
If no >>Turn to step five

5 Replace pedestrian warning horn and confirm whether there is phonation when charging starts.

If yes >>Finish

If no >>Repair harness or connector

Removal and installation



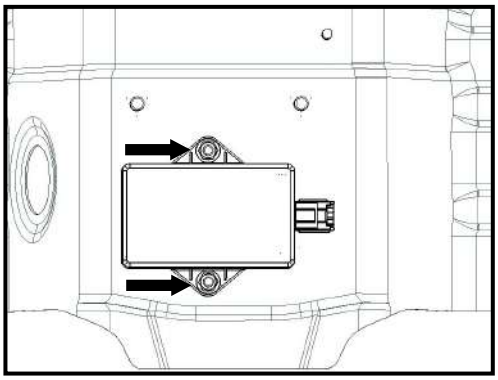
1 Pedestrian warning horn
2 Sealing board for left longeron of electric tank
3 Pedestrian warning controller
4 Central channel

Pedestrian warning controller

Removal

1 Remove auxiliary dashboard, electronic shift operator.

2 Remove two nuts ((13385-06003)) of pedestrian warning controller.



Attention ：

Try to avoid knock and scratch when removing auxiliary dashboard and electronic shift operator.

Installation

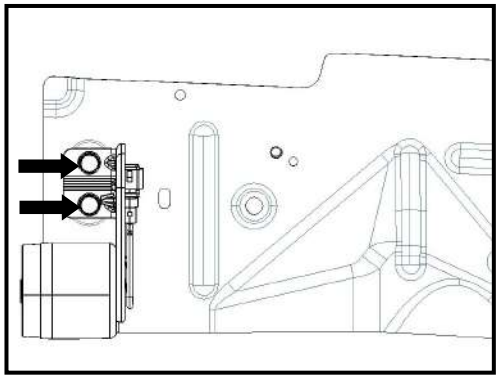
Install it according to reverse order of removal.

Pedestrian warning horn

Removal

1 Remove from bumper.

2 Remove two bolts (11293-06163) of pedestrian warning horn.



Installation

Install it according to reverse order of removal.

Grounding and looping

Safety Precaution

Introduction

Please abide by the following precaution measures, to ensure carrying out maintenance service safely and correctly.

Precaution for engineer using medical electronics

Forbidden operation

Warning:

The vehicle has strong magnetic parts.

If an engineer uses medical electronic device, such as electronic pacemaker, it is forbidden for him to operate on the vehicle. Otherwise, the function of the electronic device may be affected by the strong magnetic parts.

Precaution for normal charge

Warning:

If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, the device can be only be used after its function being checked and confirmed before starting normal operations.

During normal charge operation, the medical electronic device may be affected by electromagnetic wave. An engineer who uses medical electronic devices including heart pacemaker, cardioverter, defibrillator cannot enter passenger compartment (including trunk).

Precaution for communication device operation

If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, please keep enough distance with communication device.

The function of medical electronic devices including heart pacemaker, cardioverter, defibrillator may be affected by the electromagnetic wave of remote intelligent terminal.

If an engineer uses medical electronic devices including heart pacemaker, cardioverter, defibrillator, the electromagnetic wave of remote intelligent terminal may affect its function. It is mandatory to request the medical electronic device manufacturer to check and confirm the possible effect on medical electronic device when using remote intelligent terminal.

Critical point check before maintenance

As high-voltage system may automatically activate, please confirm not setting remote air conditioning or timed charging before maintenance.

Caution:

If setting remote conditioning or timed charging, high-voltage system may also automatically start working even though the switch is OFF.

Precaution for supplemental restraint system "airbag" and "safety belt pretension"

Supplemental restraint system “airbag” and “safety belt pretension” is used together with front seat safety belts, which can reduce the damage to the driver and front passenger during collision. Supplemental restraint system consists of safety belt, driver airbag, and front passenger airbag. The detailed information of supplemental restraint system is included in the chapters of airbag system and seat safety belt.

Warning:

In order to avoid accidents, please abide by the following content:

To avoid the failure of supplemental restraint system and considering that the risk of physical injuries will increase during collision if the system fails, all the service must be executed by DR authorized dealer.

Non-normative maintenance of supplemental restraint system including non-normative removal and installation may result in accidental trigger of the system and cause physical injuries. Regarding the method of removing airbag module, please refer to Airbag System chapter.

Except for the operations in the service manual, please do not use electrical test device to test any circuit of supplemental restraint system. The color of harness and connector of supplemental restraint system is yellow or orange.

Precaution for using power tool (pneumatic or electric) and hammer

When power switch is at “ON” position and approach airbag diagnosis sensor or other sensors of airbag system, please do not use power tools or hammer on the sensor part area. Violent vibration may trigger these sensors and airbag to cause serious injuries.

When using power tools or hammer, put the key at “LOCK” position, unplug the negative pole of 12V lead-acid battery, wait at least one minute, and then start maintenance.

Precaution for removing 12V battery

Before removing 12V battery, turn the key to “ON” position, and then turn to “LOCK” position.

Reminder:

Though the key is at “LOCK” position, auto-recharge function of 12V battery may activate.

After the key turns from “ON” to “LOCK”, auto-recharge function of 12V battery will not activate.

High-voltage preventive measure

Warning:

The electric vehicle has a high-voltage battery. If the operation on the vehicle and high-voltage parts is incorrect, there are risks of leakage of electricity, electric shock, or similar accidents. Thus, it is mandatory to follow correct procedures to check and maintain.

Before disconnect repair switch, please put the key on “LOCK” position or unplug the key.

Disconnect repair switch before checking or maintaining high-voltage system. It is forbidden to close repair switch during the process of checking and maintenance. Before starting the operation on high-voltage system, be sure to wear insulated protection equipment, including gloves, shoes, and glasses.

When a technician is operating high-voltage system, please ensure no one touching the vehicle. When there is no maintenance operation, please take insulated protection on the high-voltage sections to prevent anyone touching.

When repair switch disconnects, it is forbidden that the key is at “ON” position or switched to “START” position.

High-voltage cable and safety sign

The color of high-voltage cable is orange and there are safety signs on the power battery assembly and other high-voltage parts. Do not touch these cables and parts.

Handling of high-voltage cable terminal

When the connector of high-voltage cable is plugged out, please use insulated adhesive tape to bind up immediately.

Regulation for a person wearing medical electronic device

The vehicle has strong magnetic parts. If an engineer uses medical electronic device, such as electronic pacemaker, its function may be affected by strong magnetic parts. Thus, these people cannot carry out repair work.

Forbidden accompanying article during work

The vehicle has strong magnetic parts. Thus, during work it is forbidden to take metal articles which may cause short circuit or magnetic articles such us various bank cards which may be damaged.

Place “Repairing High-voltage Parts, No Touch!” warning sign

Before repairing high-voltage parts, please place “Repairing High-voltage Parts, No Touch” warning sign on the prominent position of the repaired vehicle to remind other people.

Attention:

If the part has high-voltage sign, please paste a new sign in the same position and direction when replacing high-voltage part or the sign is damaged.

Preparation work

Please confirm the vehicle is in OFF status before maintenance. Disconnect battery negative pole. Do not set remote air conditioning. Avoid operation with electricity when vehicle enters electricity loading mode.

Electromagnetic wave generated by controller like VCU may affect the operation of some medical apparatus and instruments such as heart pacemaker, implantable cardioverter defibrillator. Thus, the staff who wears these medical apparatus and instruments is forbidden to operate the vehicle and should keep a distance (more than 220mm) with the vehicle.

Press down interlocking piece when unplug the connector. Use force to separate connector cover and it is forbidden to pull wire. Insert connectors parallel and ensure reliable plug connection and covers are in interlocking status.

Special tool

Tool name	Description
Multimeter	Measure voltage, current, resistance, and connection status in electric circuit

System description

Constituent component

12V battery

Item	Parameter
Capacity [AH]	55
Final discharging voltage [V]	11.3
Cool start current [A]	433
Maximum charge voltage [V]	16
Recommend operating temperature range	-30 ~ +50
Recommended discharge depth	≤20%

Caution:

When whole vehicle is not in ON position for continuous 60 hours, 12V battery will be charged for 10 minutes.

Harness connector

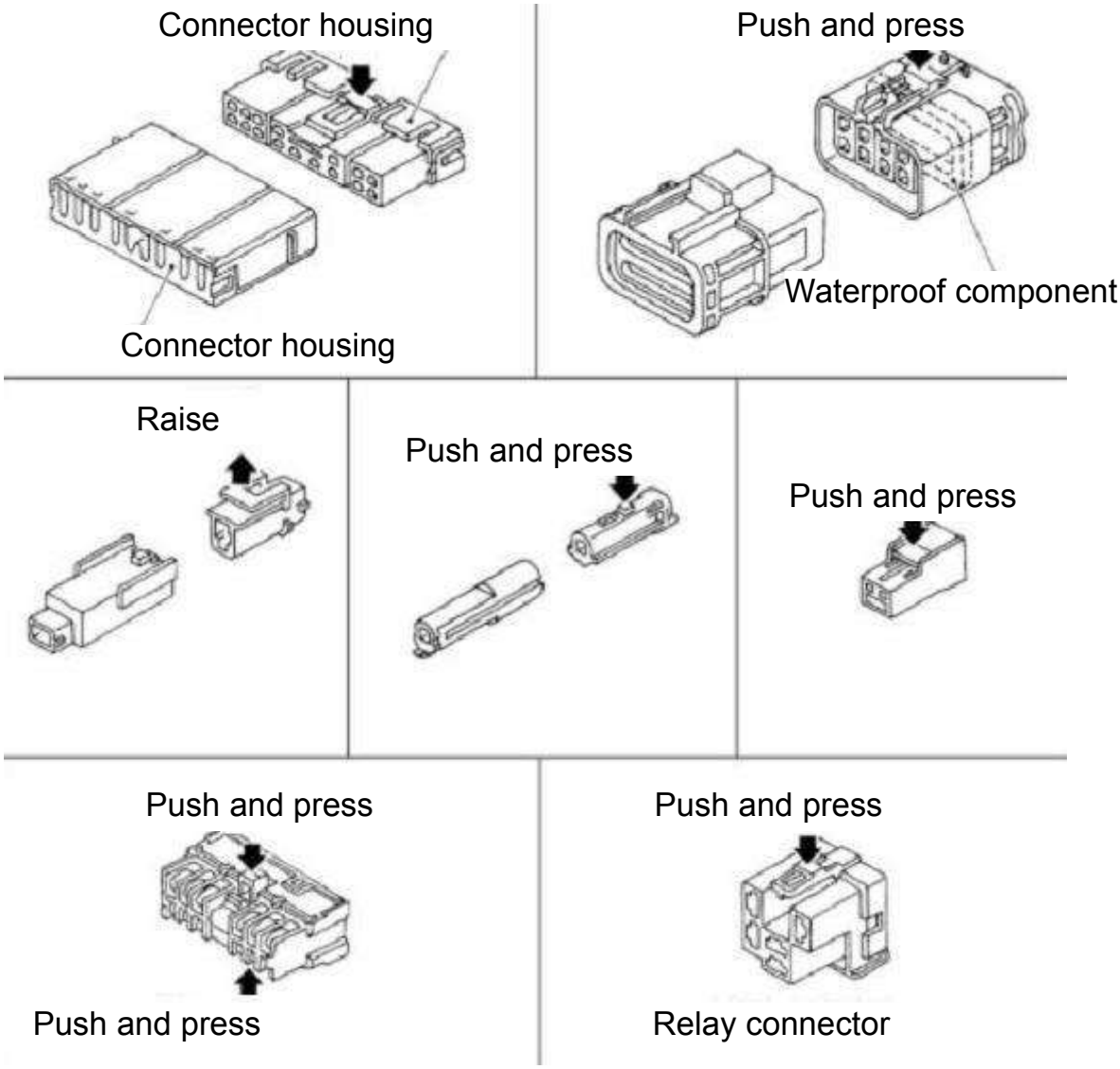
Press down interlocking piece when unplug the connector. Use force to separate connector cover and it is forbidden to pull wire. Insert connectors parallel and ensure reliable plug connection and covers are in interlocking status.

Buckle locking connector

The connection or separation between pin and box is realized through pressing or unplugging buckle. The operation is shown as following.

Warning:

In order to avoid damaging connectors, it is forbidden to pull wires when unplugging connectors.



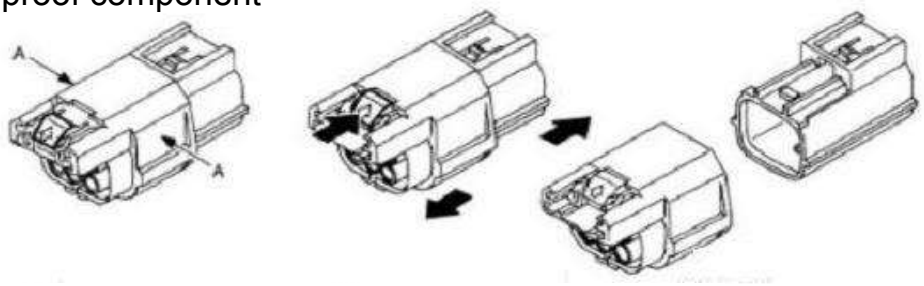
Connector body Press Water-proof connector Pull Press
Relay connector Sliding locking type

Sliding locking connector is used for component with OBD function.

Sliding locking connector can effectively prevent connector unlocking and accidental loosening.

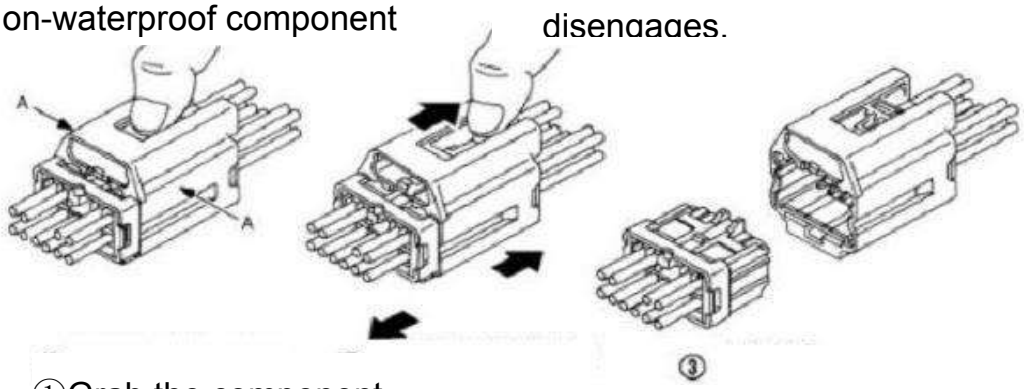
Sliding locking connector separates connector through pressing or pulling sliding piece. The operation method is as following.

Waterproof component



①Grab the component tightly ②Push and press until connector disengages. ③Separate the

Non-waterproof component



①Grab the component tightly at position A ②Get the slip sheet back and then ③Separate the

Water-proof connector

① Hold on to connector in A position. ②Press sliding piece until connector separates. ③ Unplug connector.

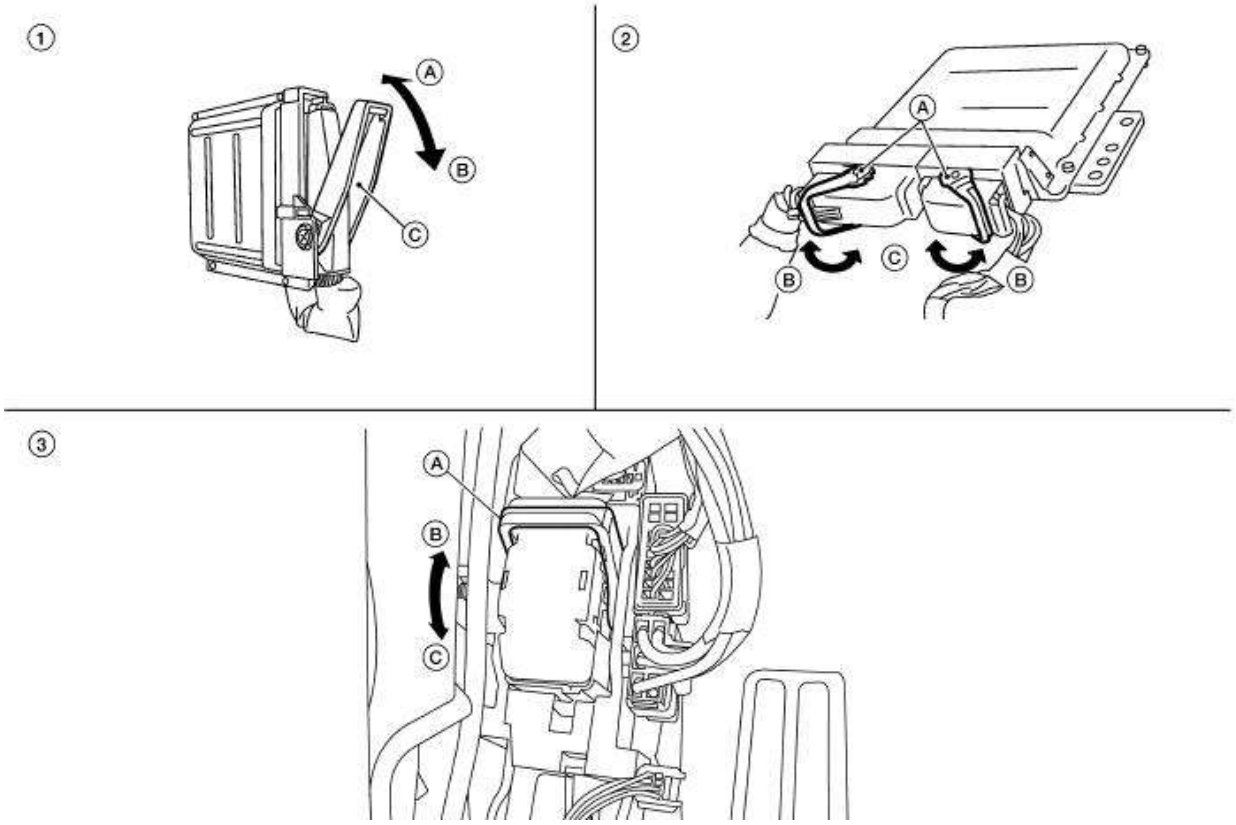
Non-water-proof connector

① Hold on to connector in A position. ②Pull sliding piece until connector separates. ③ Unplug connector.

c. Lever locking type

Lever locking connector is mainly used on controller, such as VCU, ABS, etc.

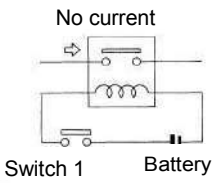
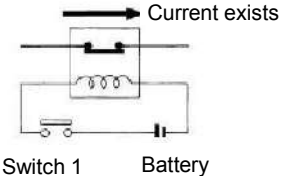
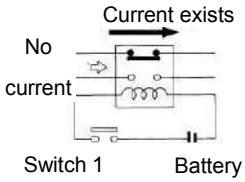
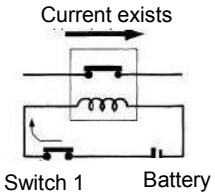
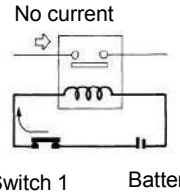
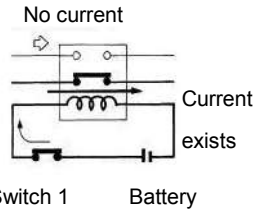
When separating or connecting connectors, please ensure lever is pulled to respective limit position. The operation method is as following.



①A. Lock B. Separate C. Lever ②A. Lever B. Lock C. Separate
③A. Lever B. Lock C. Separate

Relay

There are three types of relays: normally open type, normally closed type, mixed type. Schematic diagrams are as following:

Control switch status	Normally open type	Normally closed type	Mixed type
Disconnect（OFF）			
Connect（ON）			

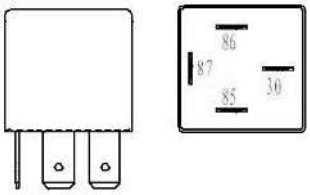
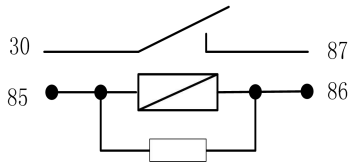
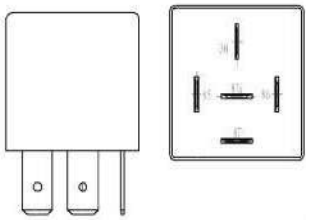
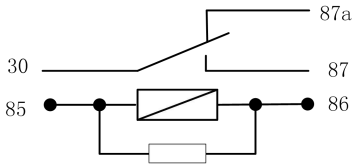
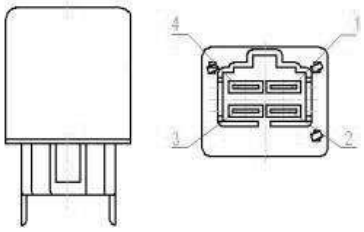
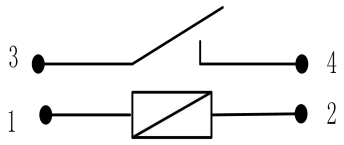
No current passed

Current passed

Switch 1

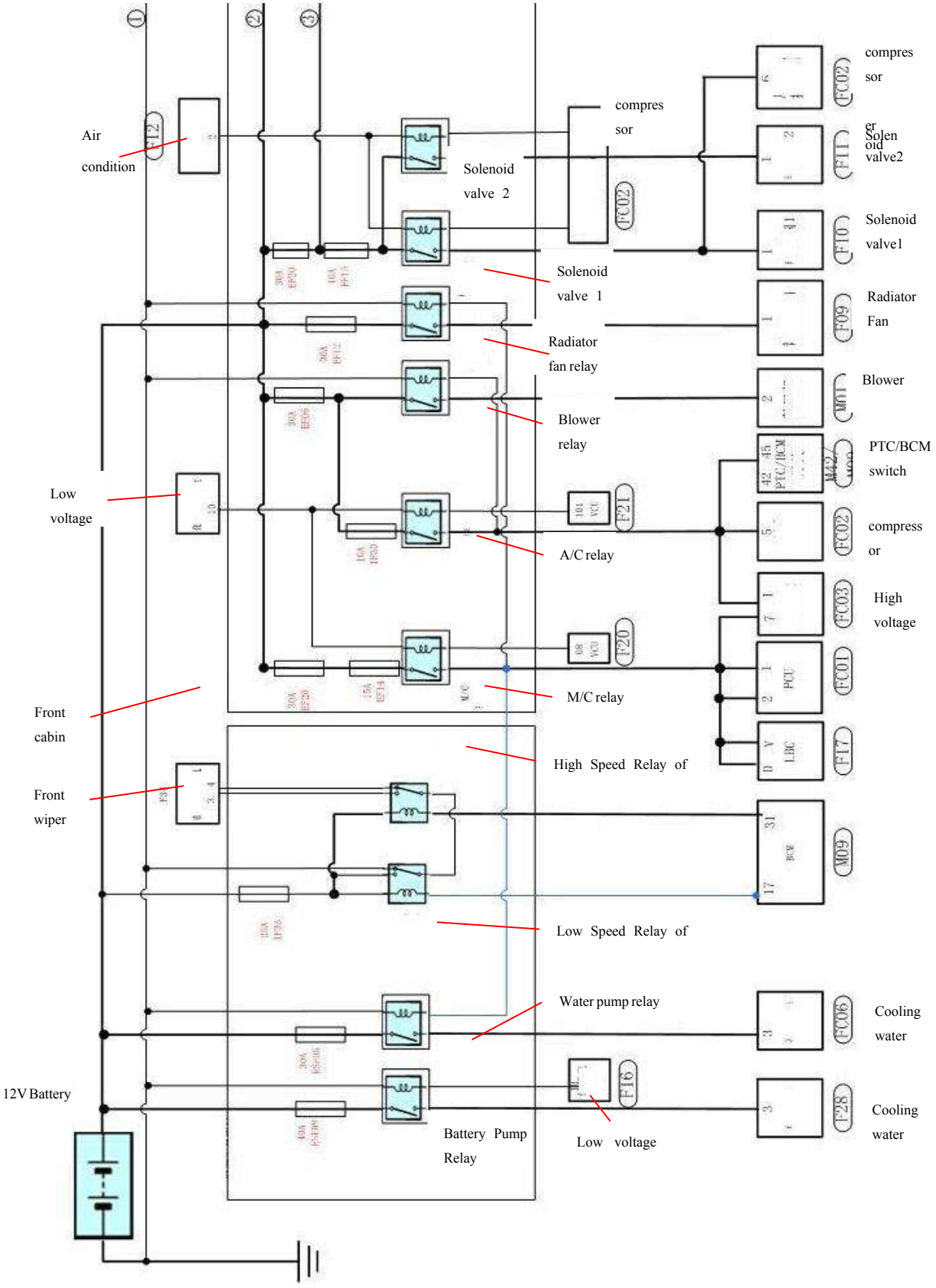
Battery

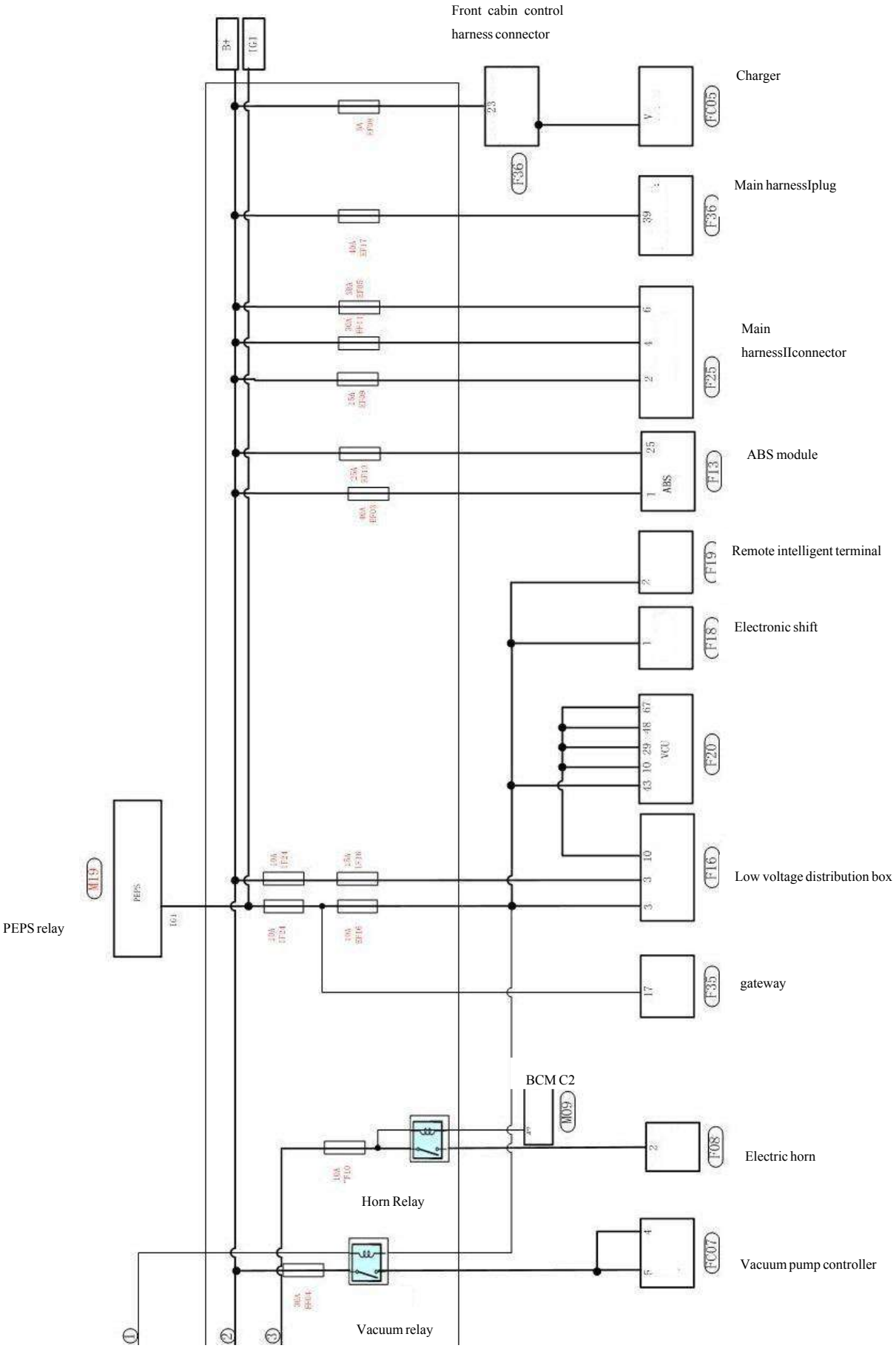
Various types of relays wiring diagrams are shown in following:

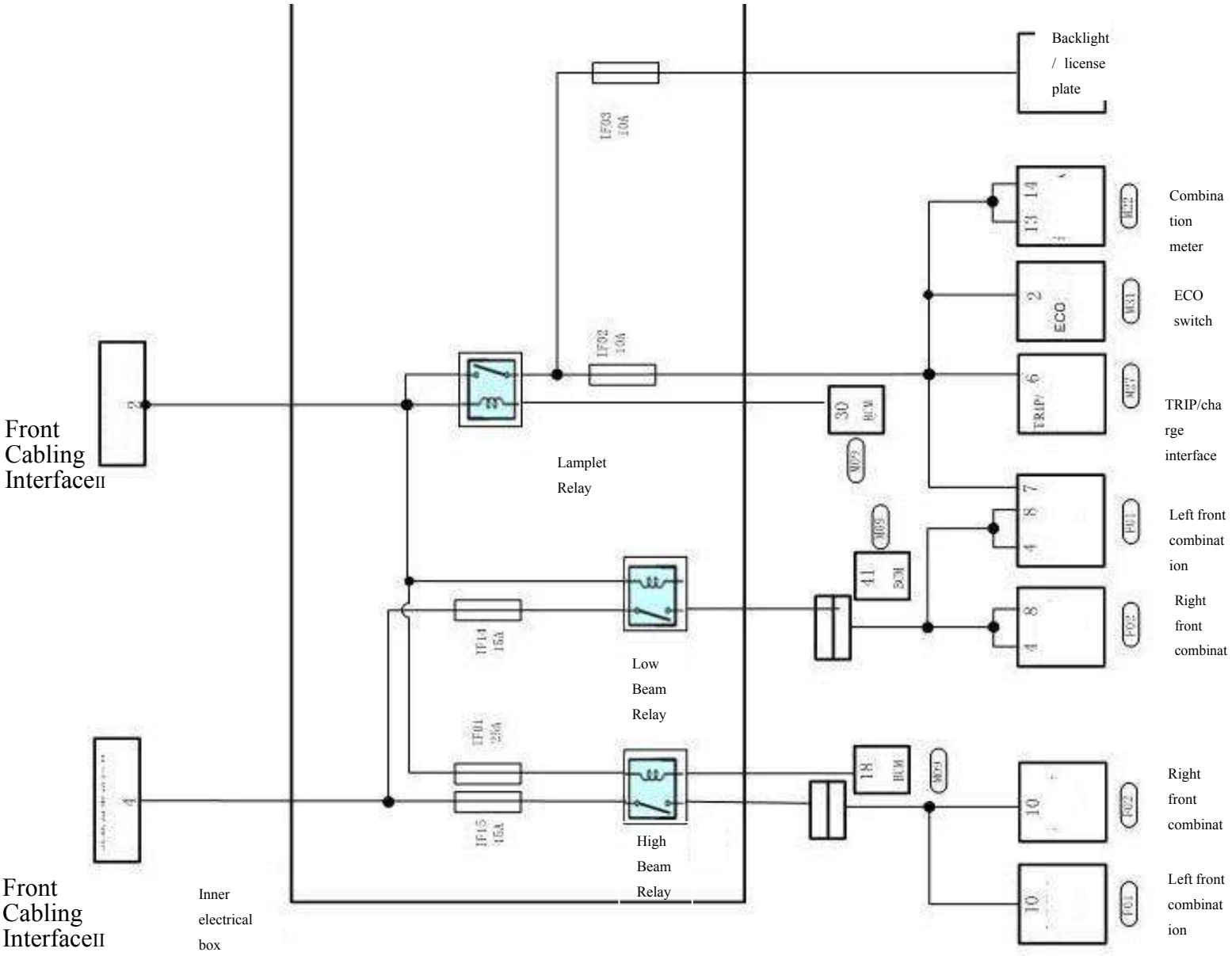
Type	Photo	Wiring diagram
Single-pole single-throw		
Single-pole double-throw		
Single-pole single-throw		

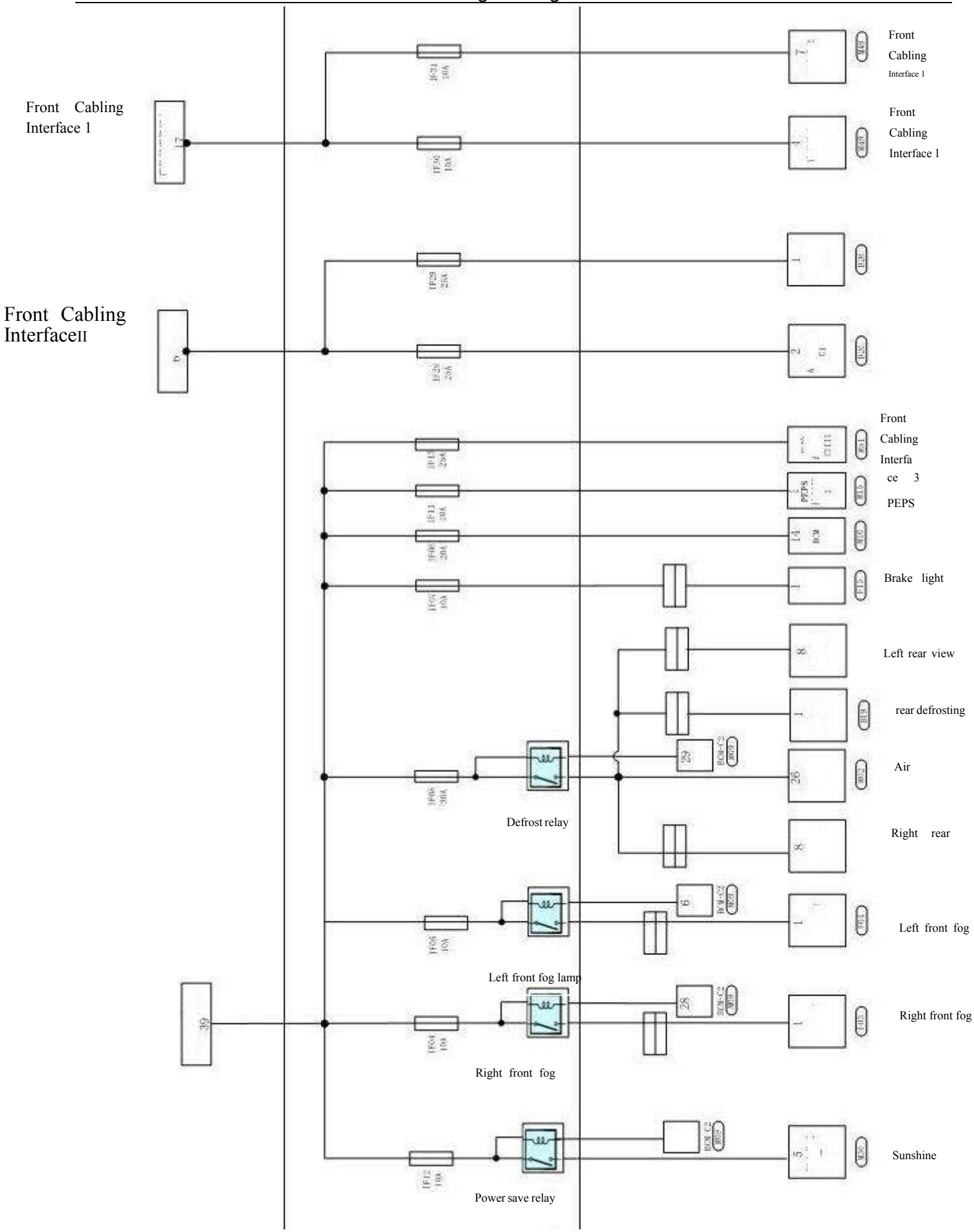
Power supply distribution

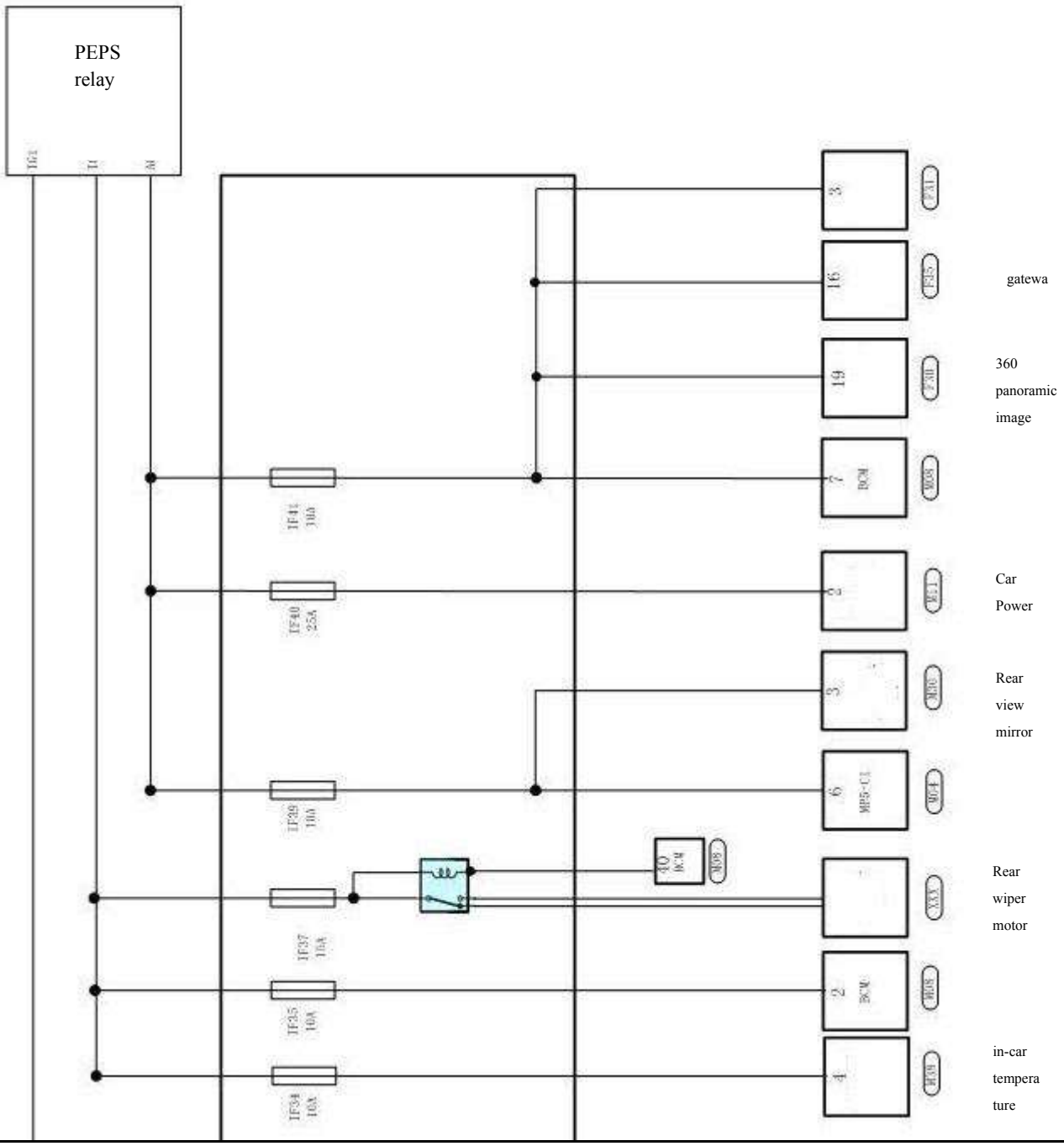
Low voltagepower distribution diagram

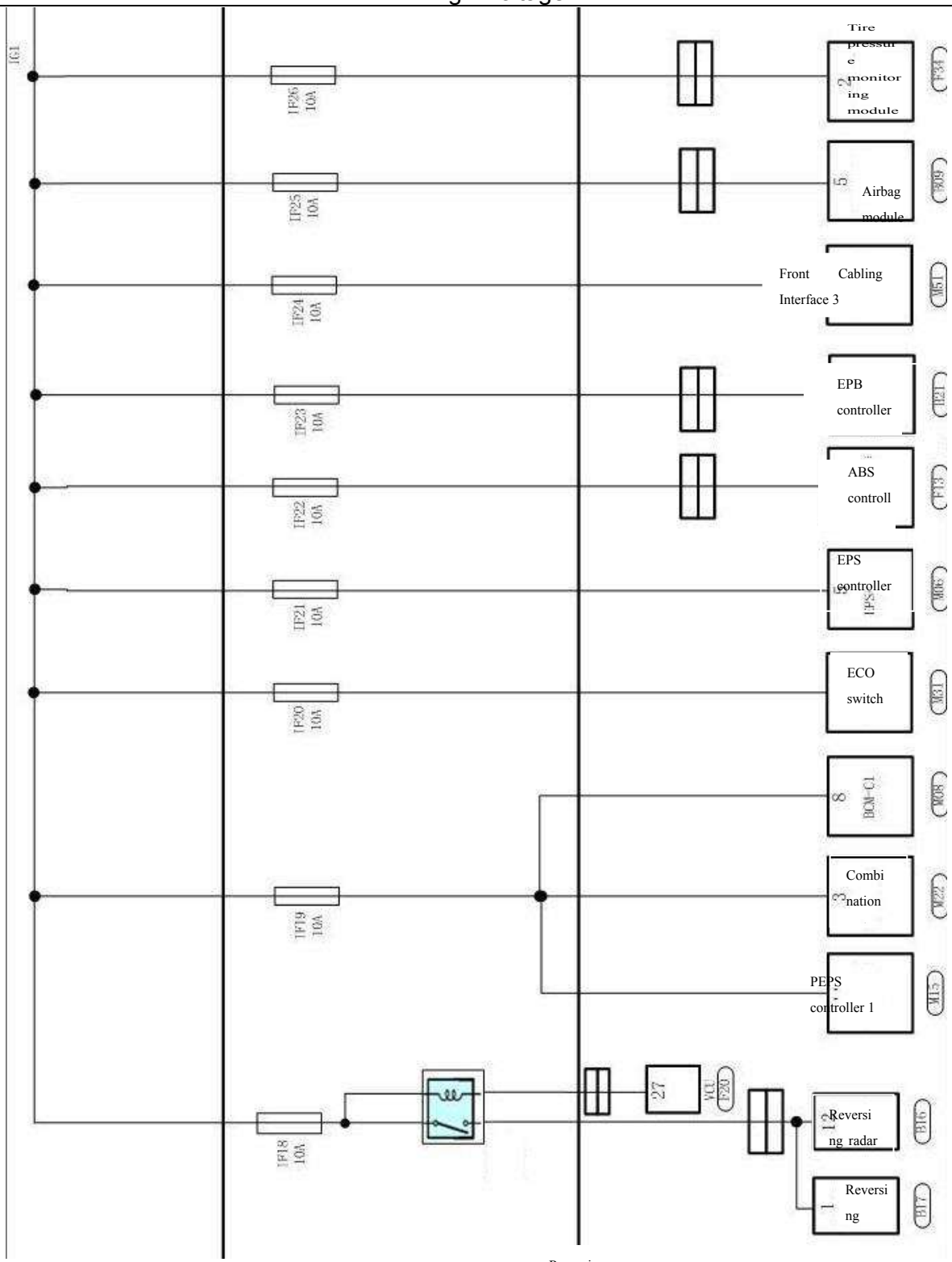



Front cabin control harness connector
B+
IG1
Charger
F36
Main harnessIplug
Main harnessIIconnector
F25
ABS module
ABS
F13
Remote intelligent terminal
F19
Electronic shift
F18
VCU
F20
Low voltage distribution box
F16
gateway
F35
PEPS relay
M19
PEPS
BCM C2
M09
Electric horn
F08
Horn Relay
Vacuum pump controller
F007
Vacuum relay


Backlight / license plate
Combination meter
ECO switch
TRIP/charge interface
Left front combination
Right front combination
Right front combination
Left front combination
Lamplet Relay
Low Beam Relay
High Beam Relay
Front Cabling InterfaceII
Front Cabling InterfaceII
Inner electrical box
ECO
TRIP/
BCM


Front Cabling Interface 1
Front Cabling Interface 1
Front Cabling Interface 1
Front Cabling InterfaceII
Front Cabling Interface 3
PEPS
Brake light
Left rear view
rear defrosting
Air
Right rear
Defrost relay
Left front fog
Left front fog lamp
Right front fog
Right front fog
Sunshine
Power save relay

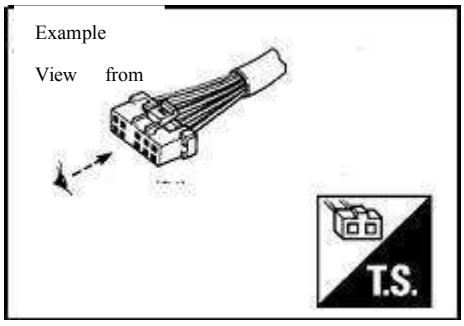

PEPS
relay
IG1
I1
M
IF41
10A
IF40
25A
IF39
10A
IF37
10A
IF35
10A
IF34
10A
3
16
19
7
6
3
6
2
4
gatewa
360
panoramic
image
Car
Power
Rear
view
mirror
Rear
wiper
motor
in-car
tempera
ture


IG1
IF26 10A
IF25 10A
IF24 10A
IF23 10A
IF22 10A
IF21 10A
IF20 10A
IF19 10A
IF18 10A
Tire pressure monitoring module
Airbag module
Front Interface 3
Cabling
EPB controller
ABS controll
EPS controller
ECO switch
BCM-G1
Combination
PEPS controller 1
Reversing radar
Reversing
in-car temperature
Reversing relay

Connector information

note:

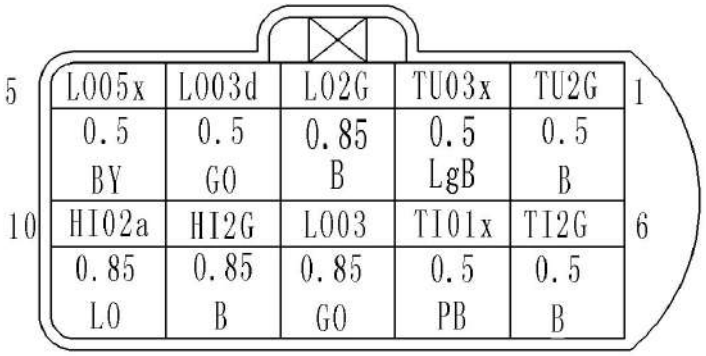
- Unless otherwise specified, the plug-in view in this section is the port side view, that is, the TS view.



Front Cabling Interface Signals

Left front combination lamp

Connector number	F01
Connector name	Left front combination lamp
Connector type	493577-1(AMP)

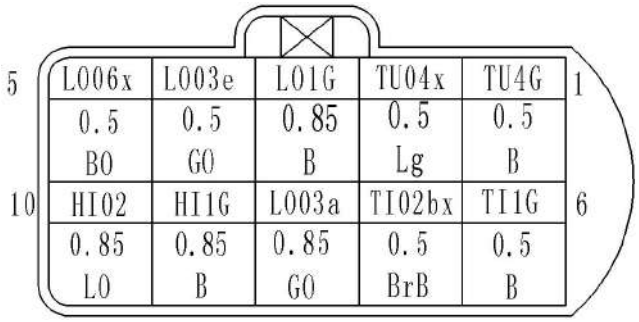


Terminal number	Line color	Signal name
1	B	TU2G turn signal negative
2	LgB	TU03x positive turn signal
3	B	LO2G low light negative
4	GO	LO03d headlight steering motor positive
5	BY	LO05x Steering Motor Signal Line
6	B	TI2G position light/steering motor negative

7	PB	TI01x position light is positive
8	GO	LO03 low beam light
9	B	HI2G high beam negative
10	LO	HI02a high beam light

Right front combination lamp

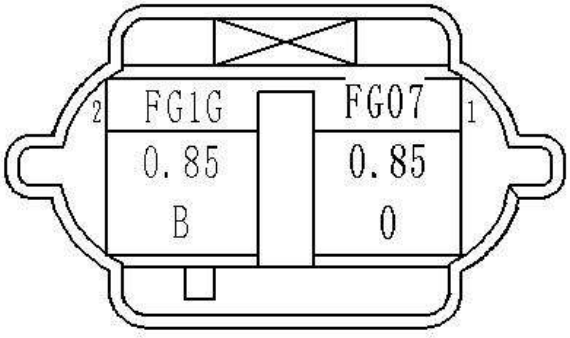
Connector number	F02
Connector name	Right front combination lamp
Connector type	493577-1(AMP)



Terminal number	Line color	Signal name
1	B	TU4G turn signal negative
2	Lg	TU04x positive turn signal
3	B	LO1G low light negative
4	GO	LO03e steering motor
5	BO	LO06x Steering Motor Signal Line
6	B	TI1G position light/steering motor negative
7	BrB	TI02bx position light positive
8	GO	LO03e low beam light positive
9	B	HI1G high beam negative
10	LO	HI02 high beam light

Right front fog lamp

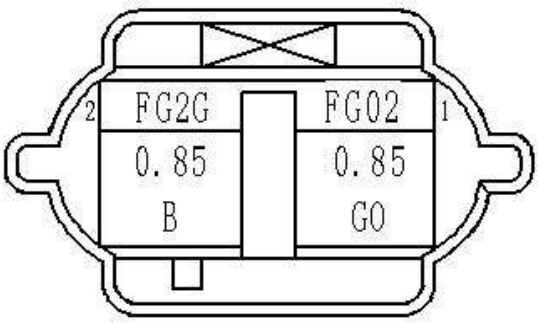
Connector number	F03
Connector name	Right front fog lamp
Connector type	240PC023S4019 [FCI]



Terminal number	Wire color	Signal name
1	O	FG07 Right front fog lamp power supply is positive
2	B	FG1G Right front fog lamp power is negative

Left front fog lamp

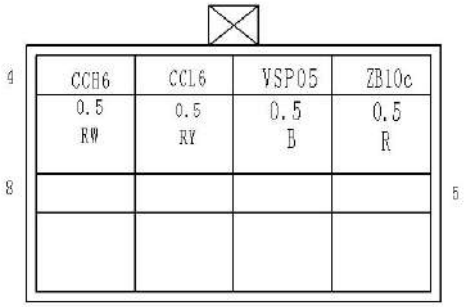
Connector number	F04
Connector name	Left front fog lamp
Connector type	240PC023S4019 [FCI]



Terminal number	Line color	Signal name
1	GO	FG02 Front Fog Lamp Power Supply Positive
2	B	FG2G left front fog lamp power is negative

VSP

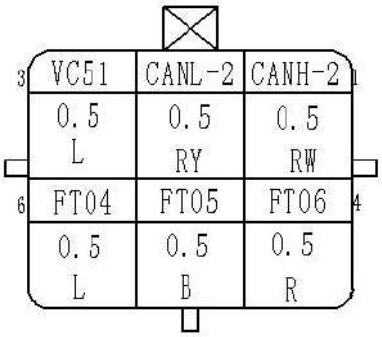
Connector number	F05
Connector name	VSP
Connector type	334724806 （MOLEX）



Terminal number	Wire color	Signal name
1	B	VSP05 VSP power-supply negative
2	R	ZB10c VSP power supply is positive
3	RW	CCH6 CAN communication high
4	RY	CCL6 CAN Communication Low

DC Charging interface

Connector number	F06
Connector name	DC Charging interface
Connector type	174264-2 （AMP）

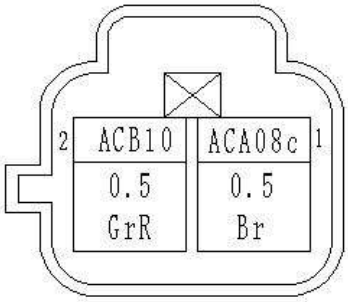


Terminal	Wire color	Signal name

number		
1	RW	CANH-2 CAN communication is high
2	RY	CANL-2 CAN communication is low
3	L	VC51 high pressure interlock
4	R	FT06 Fast charge wake up signal (12V positive)
5	B	FT05 Fast charge source negative
6	L	FT04 Charging connection status signal

Outdoor temperature sensor

Connector number	F07
Connector name	outdoor temperature sensor
Connector type	7283-7028-30

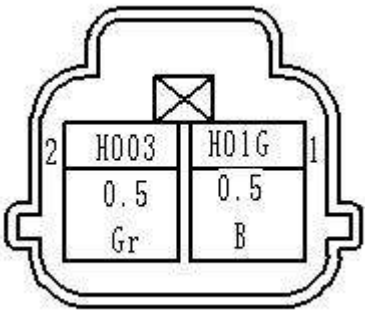


Terminal number	Wire color	Signal name
1	Br	ACA08c Outdoor Temperature Sensor Power Supply Negative
2	GrR	ACB10 Outdoor Temperature Sensor Power Supply Positive

Electric horn

Connector number	F08
Connector name	Electric horn

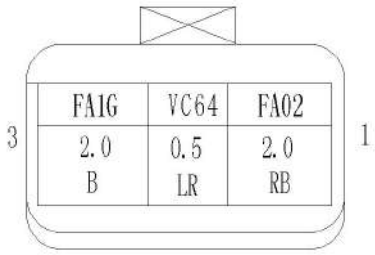
Connector type	DJ70214Y-2.2-21 [YY](gray）



Terminal number	Wire color	Signal name
1	B	HO1G Electric Horn Power Ground
2	Gr	HO03 Electric Horn Power Supply

Radiator Fan

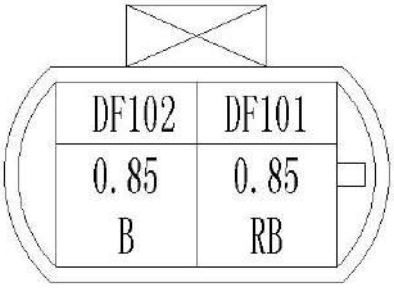
Connector number	F09
Connector name	Radiator Fan
Connector type	MG642925-5（KET）



Terminal number	Wire color	Signal name
1	RB	FA02 Fan power-supply is positive
2	LR	VC64 Fan control signal
3	B	FA1G Fan power-supply is negative

Solenoid valve1

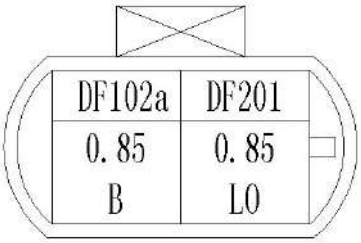
Connector number	F10
Connector name	Solenoid valve1
Connector type	1-967644-1（AMP）



Terminal number	Wire color	Signal name
1	RB	DF101 solenoid valve power supply positive
2	B	DF102 solenoid valve power supply negative

Solenoid valve2

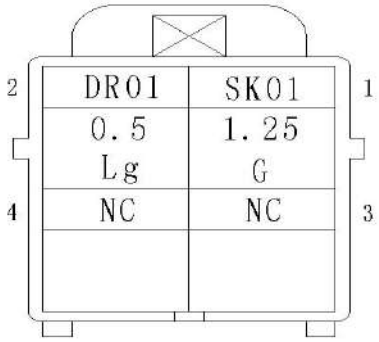
Connector number	F11
Connector name	Solenoid valve2
Connector type	1-967644-1（AMP）



Terminal number	Wire color	Signal name
1	LO	DF101 solenoid valve power supply positive
2	B	DF102 solenoid valve power supply negative

Air condition pressure switch

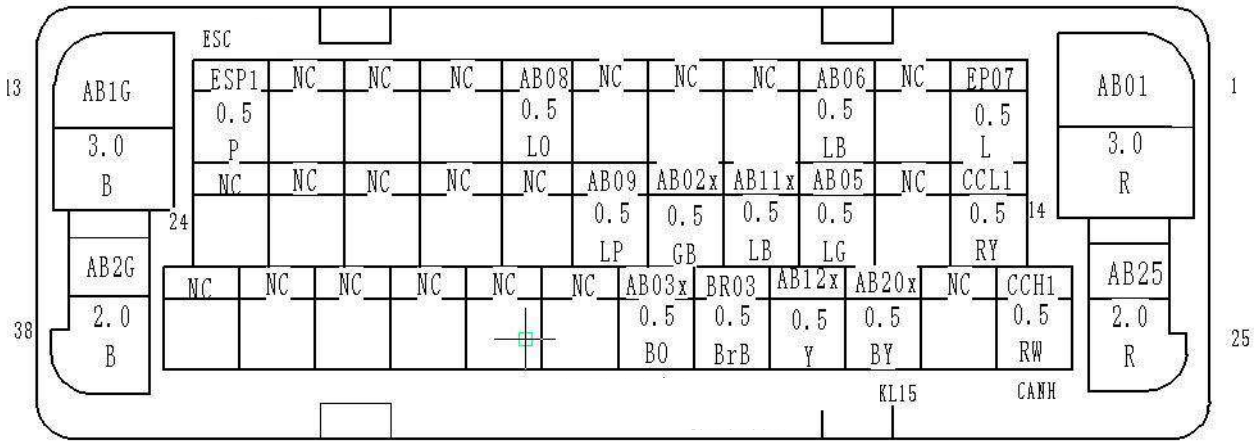
Connector number	F12
Connector name	Air condition pressure switch
Connector type	174257-2(black)(AMP)



Terminal number	Wire color	Signal name
1	G	SK01 input power supply positive
2	Lg	DR01 Air conditioning pressure switch signal

ABS module

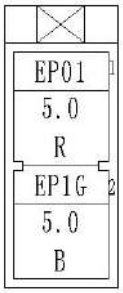
Connector number	F13
Connector name	ABS module
Connector type	1928405167 BOSCH



Terminal number	Wire color	Signal name
1	R	AB01 ABS motor power supply positive
2	L	EP07 speed signal
4	LB	AB06 Right Front Wheel Speed Sensor ground
8	LO	AB08 Left Front Wheel Speed Sensor
12	P	ESP1 ESC Switch
13	B	AB1G ABS motor power ground
14	RY	CCL1 CAN Communication Low
16	LG	AB05 Right Front Wheel Speed Sensor signal wire
17	LB	AB11x Right Front Wheel Speed Sensor signal wire
18	GB	AB02x Left Rear Wheel Speed Sensor ground
19	LP	AB09 Left Front Wheel Speed Sensor signal wire
25	R	AB25 valve relay power supply
26	RW	CCH1 CAN communication high
28	BY	AB20x Controller Power Supply (IG1)
29	Y	AB12x Right Rear Wheel Speed Sensor ground
30	BrB	BR03 brake light switch input
31	BO	AB03x Left Rear Wheel Speed Sensor signal wire
38	B	AB2G controller ground

EPS power supply

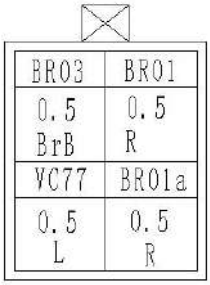
Connector number	F14
Connector name	EPS power supply
Connector type	7123-4123-30



Terminal number	Wire color	Signal name
1	R	EP01 EPS power supply positive
2	B	EP1G EPS power supply ground

Brake light switch

Connector number	F15
Connector name	Brake light switch
Connector type	MG610267

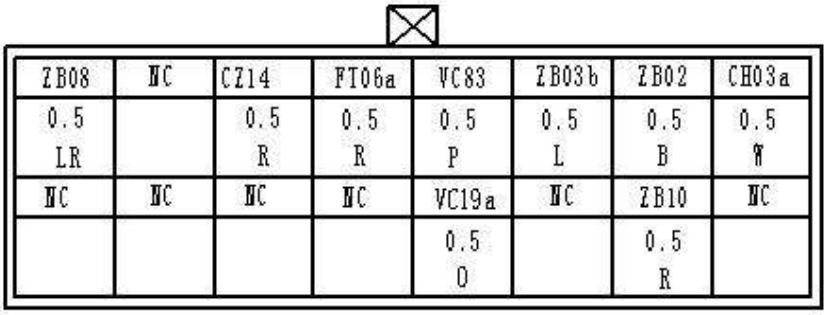


Terminal number	Wire color	Signal name
1	R	BR01 (high) brake light power supply positive
2	BrB	BR03 (high) brake light power supply positive
3	R	BR01a Brake light status signal (12V active, indicating

		brake light and brake pedal depression)
4	L	VC77 Brake switch status signal (0V active, indicating brake pedal depression)

Low voltage distribution box

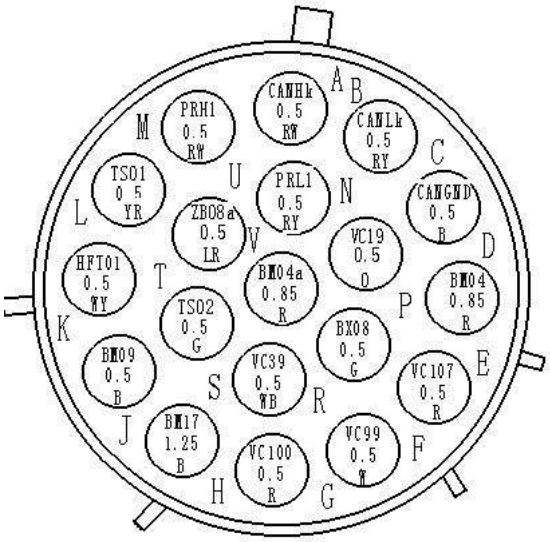
Connector number	F16
Connector name	Low voltage distribution box
Connector type	7123-7169



Terminal number	Line color	Signal name
1	W	CH03a wake up Slow charge
2	B	ZB02 Self-holding power supply negative
3	L	ZB03b IG1
4	P	VC83 VCU SSO signal
5	R	FT06a fast wake up fast charge
6	R	CZ14 Remote wake-up signal
8	LR	ZB08 Self-holding power supply positive (input)
10	R	ZB10 Self-holding power supply positive (output)
12	O	VC19a Thermal instability wake-up signal

LBC

Connector number	F17
Connector name	LBC
Connector type	RT061619PNHEC03

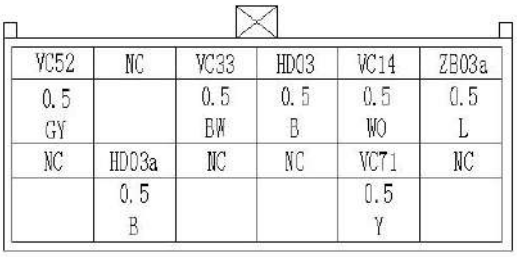


Terminal number	Wire color	Signal name
A	RW	CANHk CAN_H signal interaction
B	RY	CANLk CAN_L signal interaction
C	B	CANGED CAN shielded ground
D	R	BM04 High level effective
E	R	VC107 B+ relay control
F	W	VC99 B+ relay control
G	R	VC100 Precharge relay control
H	B	BM17 Fan power ground
J	B	BM09 LBC power ground
K	WY	HFT01 hardline failure feedback
L	YR	TS01 heater signal positive
M	RW	CANHa Inner CAN high
N	RY	CANLa Inner CAN low
P	O	VC19 thermal instability
R	G	BX08 High voltage interlock signal 1
S	WB	VC39 High voltage interlock signal 2
U	LR	ZB08a LBC Thermal Power Supply

V	R	BM04a LBC power supply is positive

Electronic shift

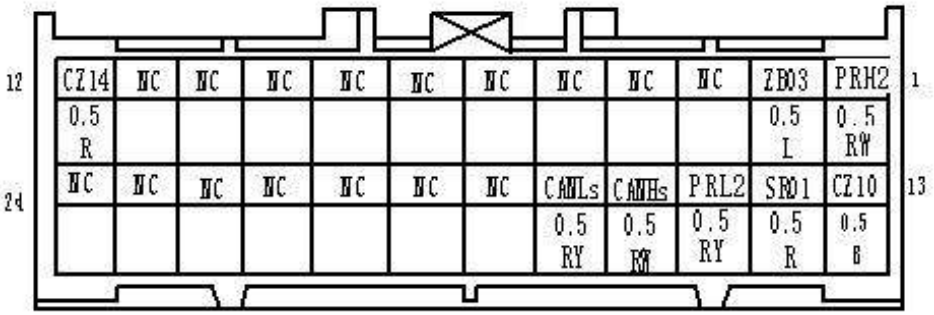
Connector number	F18
Connector name	Electronic shift
Connector type	174045-2



Terminal number	Line color	Signal name
1	L	ZB03a IG1
2	WO	VC14 Switch signal 1
3	B	HD03 Electronic shift power supply negative
4	BW	VC33 Switch signal 2
6	GY	VC52 Switch signal 3
8	Y	VC71 Switch signal 4
11	B	HD03a Electronic shift power supply negative

Remote intelligent terminal

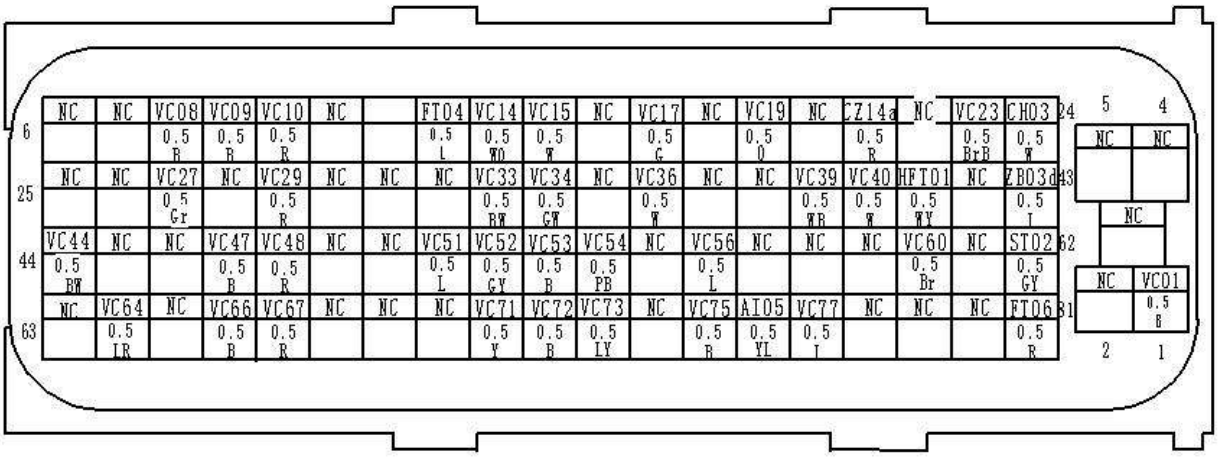
Connector number	F19
Connector name	Remote intelligent terminal
Connector type	1318917-1 AMP



Terminal number	Line color	Signal name
1	RW	PRH2 battery internal CAN high
2	L	ZB03 IG2
12	R	CZ14 Remote wake-up signal
13	B	CZ10 Remote Power supply negative
14	R	SR01 Remote Power supply positive
15	RY	PRL2 battery internal CAN low
16	RW	CANHs vehicle CAN high
17	RY	CANLs vehicle CAN low

VCU plug-in 1

Connector number	F20
Connector name	VCU plug-in 1
Connector type	1473244-1

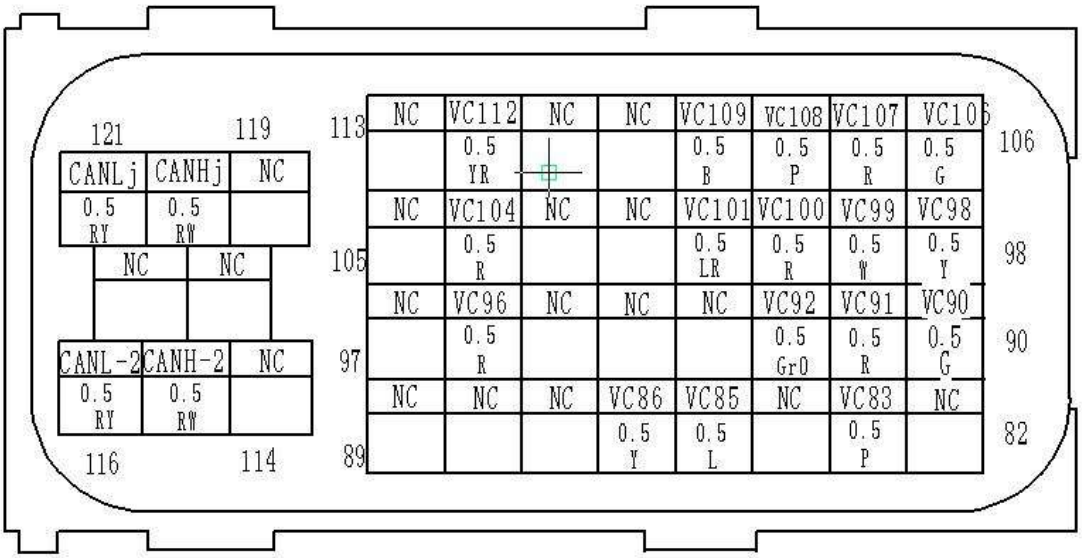


Terminal number	Line color	Signal name
1	B	VC01 Power supply ground
8	B	VC08 M/C relay control
9	B	VC09 Power supply ground
10	R	VC10 Power supply positive
13	L	FT04 Charging connection status signal
14	WO	VC14 Electronic shift switch signal 1
15	W	VC15 signal output 2
17	G	VC17 Brake signal output 2
19	O	VC19 thermal instability wake-up signal
21	R	CZ14a Remote wake-up signal
23	BrB	VC23 Brake light turn-on signal
24	W	CH03 Slow charging wake up signal
27	Gr	VC27 Reversing lamp relay control signal
29	R	VC29 Power supply positive
33	BW	VC33 Electronic shift switch signal 2
34	GW	VC34 signal output 1
36	W	VC36 Brake signal output 1
39	WB	VC39 High voltage interlock signal 2
40	W	VC40 ECO Mode Switch Signal
41	WY	HFT01 LBC fault signal
43	L	ZB03d IG1
44	BW	VC44 request signal of canceling instant charging
47	B	VC47 Power supply ground
48	R	VC48 Power supply positive
51	L	VC51 High voltage interlock signal 1

52	GY	VC52 Electronic shift switch signal 3
53	B	VC53 accelerator pedal power supply negative
54	PB	VC54 water temperature sensor
56	L	VC56 High voltage interlock signal 2
60	Br	VC60 Level sensor signal
62	GY	ST02 KEY START signal
64	LR	VC64 control signal of cooling fan
66	B	VC66 Power supply ground
67	R	VC67 Power supply positive
71	Y	VC71 Electronic shift switch signal 4
72	B	VC72 accelerator pedal power supply negative
73	LY	VC73 water temperature sensor signal
75	B	VC75 brake pedal power supply negative
76	YL	AI05 Airbag release signal (0V)
77	L	VC77 Brake switch status signal
81	R	FT06 fast-charging wake up signal

VCU plug 2

Connector number	F21
Connector name	VCU Connector 2
Connector type	1473252-1

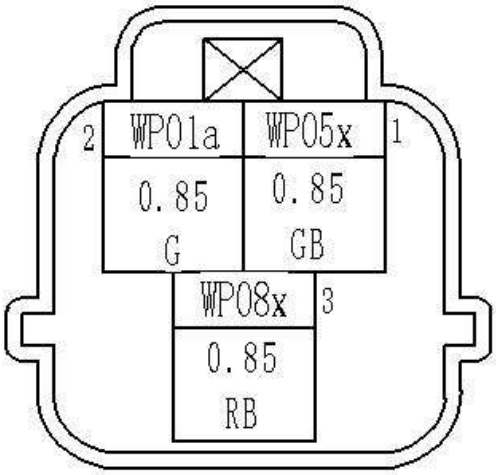


Terminal number	Line color	Signal name
83	P	VC83 Self-holding SSO control signal
85	L	VC85 brake pedal sensor 2
86	Y	VC86 Charge indicator 1 (yellow)
90	G	VC90 Battery Pump PWM Signal
91	R	VC91 Fast charge relay control signal
92	GrO	VC92 DCDC enable
96	R	VC96 Brake pedal sensor 1 power-supply
98	Y	VC98 Brake pedal sensor 2 power-supply
99	W	VC99 Total Negative Relay Control (12V)
100	R	VC100 Precharge relay control (12V)
101	LR	VC101 AC relay control (0V)
104	R	VC104 Accelerator pedal sensor 2 power-supply
106	G	VC106 Charge indicator 2 (green)
107	R	VC107 Main positive Relay Control (12V)
108	P	VC108 Fast charge relay
109	B	VC109 Cooling water pump control signal

112	RY	VC112 Accelerator pedal sensor 1 power-supply
115	RW	CANH-2
116	RY	CANL-2
120	RW	CAMHj
121	RY	CAMLj

Washing motor

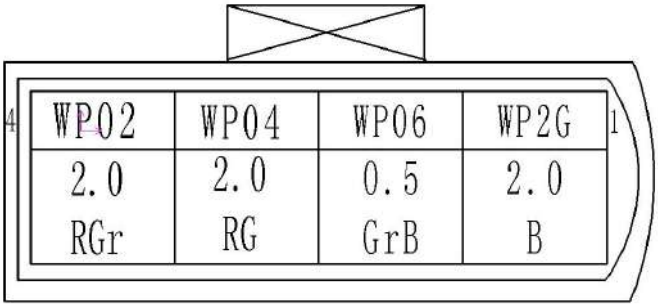
Connector number	F22
Connector name	Washing motor
Connector type	MG641362(KET)



Terminal number	Wire color	Signal name
1	GB	WP05x spray switch signal
2	G	WP01a power supply is positive
3	RB	WP08x power supply is negative

Front wiper motor

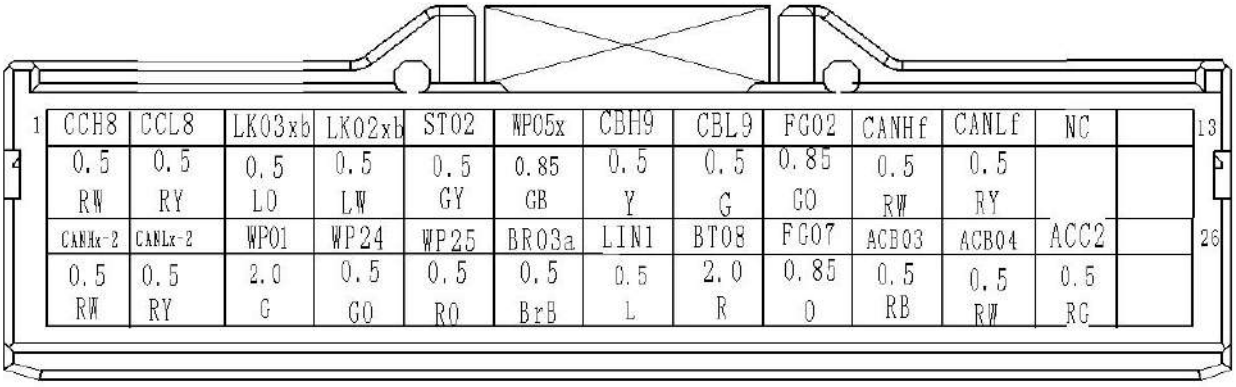
Connector number	F23
Connector name	Front wiper motor
Connector type	638245-1



Terminal number	Line color	Signal name
1	B	WP2G Power supply ground
2	GrB	WP06 control signal
3	RG	WP04 Power supply positive
4	RGr	WP02 Power supply positive

Main harness Ⅲ

Connector number	F24
Connector name	Main harness Ⅲ
Connector type	936098-1(AMP)

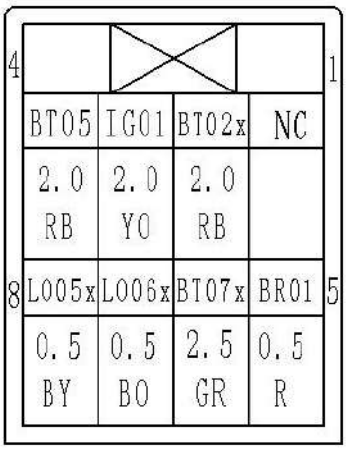


Terminal number	Line color	Signal name
1	RW	CCH8
2	RY	CCL8
3	LO	LK03xb

4	LW	LK02xb
5	GY	ST02
6	GB	WP05x
7	Y	CBH9
8	G	CBL9
9	GO	FG02
10	RW	CANHf
11	RY	CANLf
14	RW	CANHx-2
15	RY	CANLx-2
16	G	WP01
17	GO	WP24
18	RO	WP25
19	BrB	BR03a
20	L	LIN1
21	R	BT08
22	O	FG07
23	RB	ACB03
24	RW	ACB04
25	RG	ACC2

Main harness Ⅱ

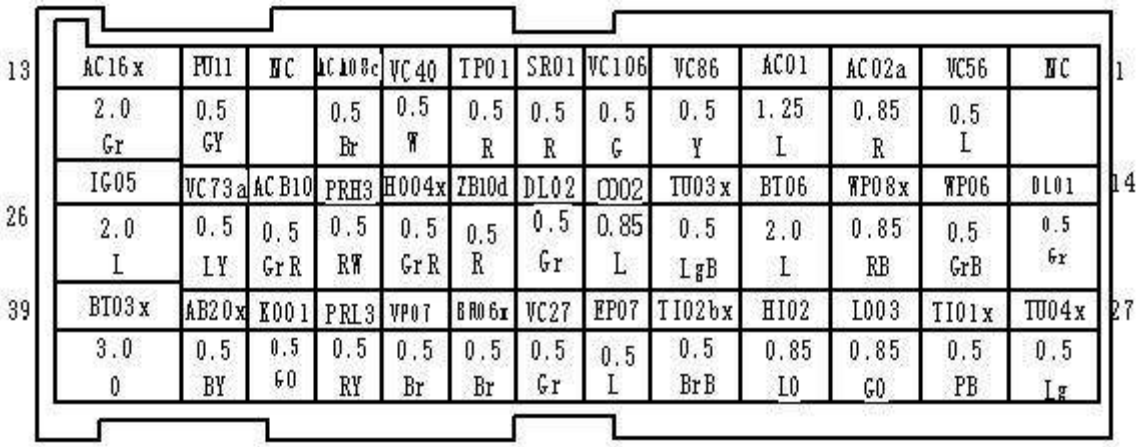
Connector number	F25
Connector name	Main harness Ⅱ
Connector type	MG610271



Terminal number	Wire color	Signal name
2	RB	BT02x
3	YO	IG01
4	RB	BT05
5	R	BR01
6	Gr	BT07x
7	BO	LO06x
8	BY	LO05x

Main harness Ⅰ

Connector number	F26
Connector name	Main harness Ⅰ
Connector type	1743089-2

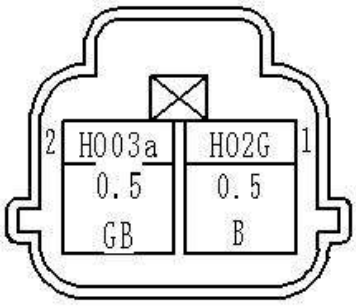


Terminal number	Line color	Signal name
2	L	VC56
3	R	AC02a
4	L	AC01
5	Y	VC86
6	G	VC106
7	R	SR01
9	R	TP01
10	W	VC40
12	GY	PU11
13	Gr	AC16x
14	Gr	DL01
15	GrB	WP06
16	RB	WP08x
17	L	BT06
18	LgB	TU03x
19	L	CO02
20	Gr	DL02
21	R	ZB10d
22	GrR	HO04x

23	RW	PRH3
24	GrR	ACB10
25	LY	VC73a
26	L	IG05
27	Lg	TU04x
28	PB	TI01x
29	GO	LO03
30	LO	HI02
31	BrB	TI02bx
32	L	EP07
33	Gr	VC27
34	Br	BR06x
35	Br	VP07
36	RY	PR13
37	GO	KO01
38	BY	AB20x
39	O	BT03x

Bass snail horn

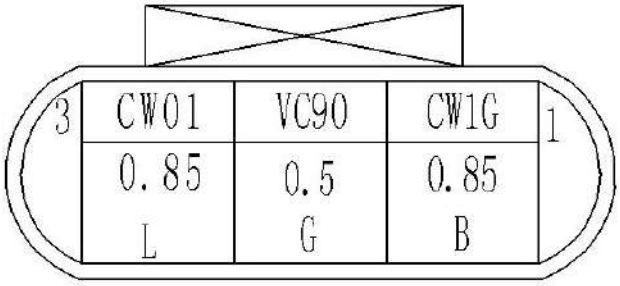
Connector number	F27
Connector name	Bass snail horn
Connector type	DJ70214Y-2.2-21[YY] (gray)



Terminal number	Wire color	Signal name
1	B	H02G horn power supply is negative
2	GB	HO03a Speaker Power Supply

Battery pump

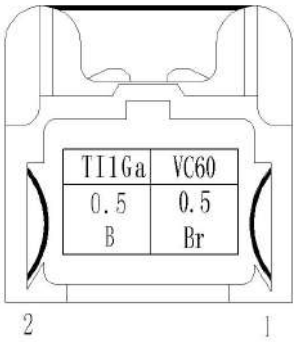
Connector number	F28
Connector name	Battery pump
Connector type	282087-1(AMP)



Terminal number	Line color	Signal name
1	B	CW1G Battery Pump Power Supply Negative
2	G	VC90 Battery Pump PWM Signal
3	L	CW01 power supply pump power supply

liquid level sensor

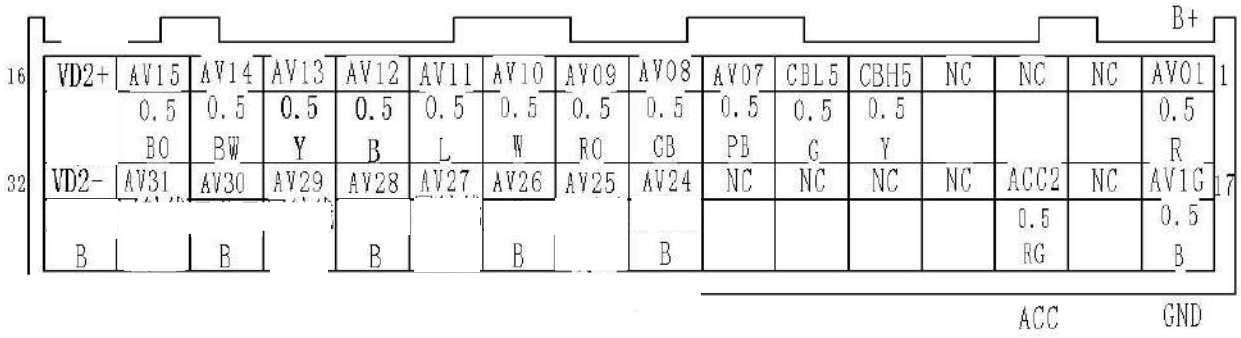
Connector number	F29
Connector name	liquid level sensor
Connector type	282189-1(AMP)



Terminal number	Line color	Signal name
1	Br	VC60 level sensor signal
2	B	TI1Ga Ground

360 panoramic camera controller

Connector number	F30
Connector name	360 panoramic camera controller
Connector type	1318747-1(AMP)

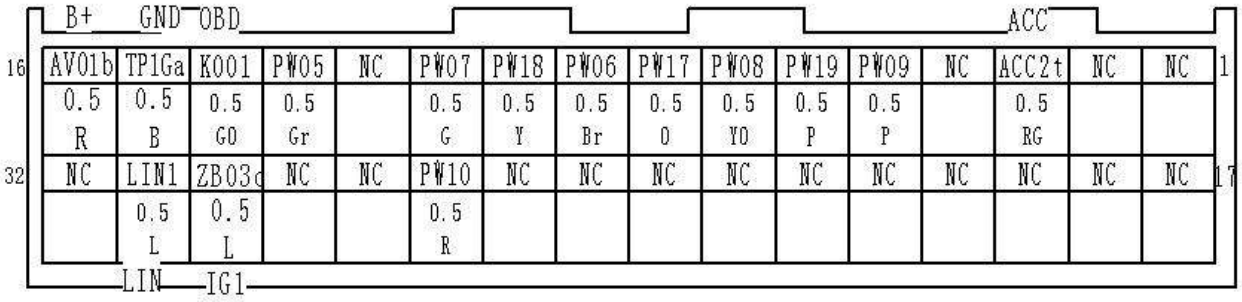


Terminal number	Line color	Signal name
1	R	AV01 Power supply positive
5	Y	CBH5 CAN communication is high
6	G	CBL5 CAN communication is low
7	PB	AV07 panoramic activation signal
8	RO	AV08 right camera input

9	W	AV09 right camera power input
10	L	AV10 left camera input
11	B	AV11 left camera power input
12	Y	AV12 front camera input
13	BW	AV13 front camera power input
14	BO	AV14 rear camera input
15		AV15 rear camera power input
16		Positive VD2+ video signal output
17	B	AV1G ground
19	RG	ACC2 power supply (ACC wakes up power)
24	B	AV24 left camera signal input
25		AV25 Left Camera Signal Input
26	B	AV26 right camera signal ground input
27		AV27 right camera signal input
28	B	AV28 front camera signal input
29		AV29 front camera signal input
30	B	AV30 rear camera signal input
31		AV31 rear camera signal input
32	B	VD2- video signal output negative

APW controller C2

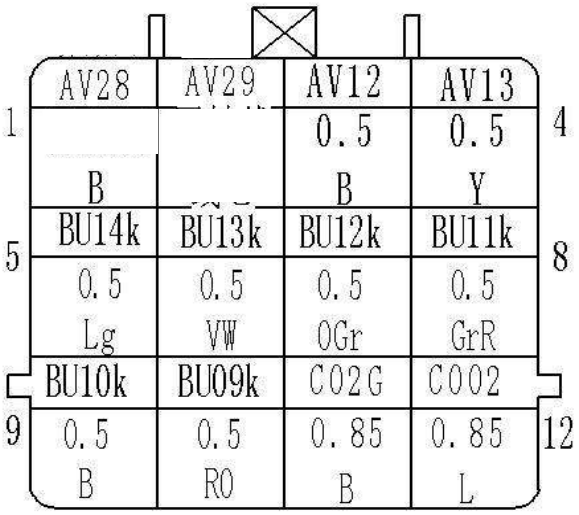
Connector number	F31
Connector name	APW controller C2
Connector type	1318747-1 AMP



Terminal number	Line color	Signal name
3	RG	ACC2t ACC
5	P	PW09 Sub-window lock button input
6	P	PW19 Sub-window right rear lift input
7	YO	PW08 Sub-window right rear lift input
8	O	PW08 Sub-window Right Rear Lift Input
9	Br	PW17 secondary window left rear lift input
10	Y	PW06 main window left rear lift input
11	G	PW18 sub-window right front lift input
13	Gr	PW07 main window right front lift input
14	GO	KO01 K-LINE
15	B	TP1Ga ground
16	R	AV01b constant current
27	R	PW10 occupant suppression indicator
30	L	ZB03c IGN electricity
31	L	LIN1 LIN-LINE

Radar harness interface

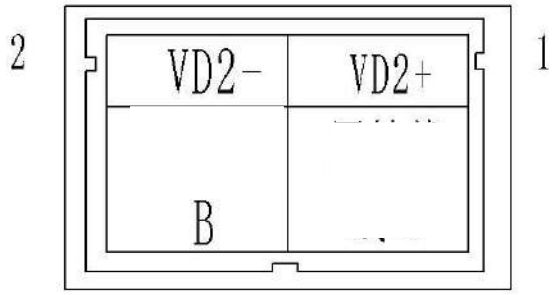
Connector number	F32
Connector name	Radar harness interface
Connector type	MW12MW [HL]



Terminal number	Line color	Signal name
1	B	AV28
2		AV29
3	B	AV12
4	Y	AV13
5	Lg	BU14k
6	VW	BU13k
7	OGr	BU12k
8	GrR	BU11k
9	B	BU10k
10	RO	BU09k
11	B	CO2G
12	L	CO02

Video signal

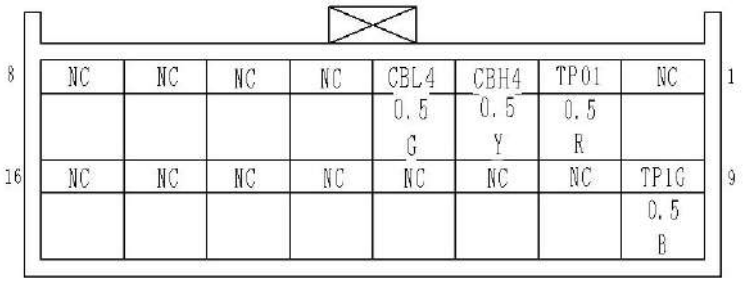
Connector number	F33
Connector name	Video signal
Connector type	3SDL02MW



Terminal number	Wire color	Signal name
1		VD2+ video signal cable core
2	B	VD2-Video Signal Line Shield

Tire pressure monitoring module

Connector number	F34
Connector name	Tire pressure monitoring module
Connector type	174046-2

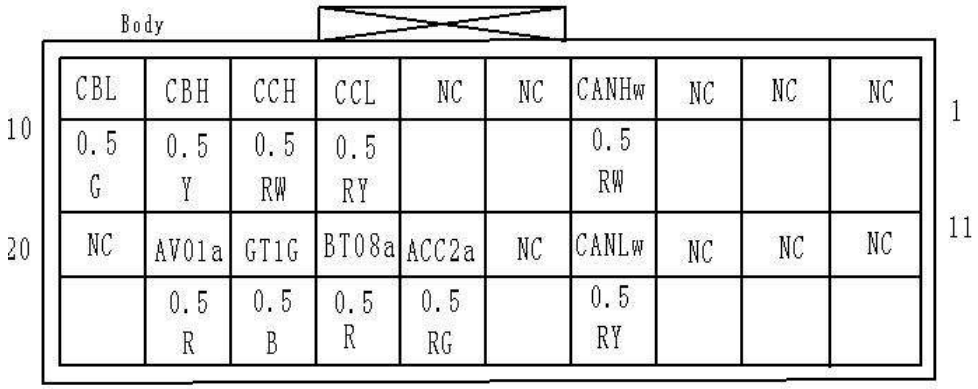


Terminal number	Line color	Signal name
2	R	TP01 power supply is positive
3	Y	CBH4 CAN Communication High
4	G	CBL4 CAN communication is low
9	B	TP1G ground

gateway

Connector number	F35

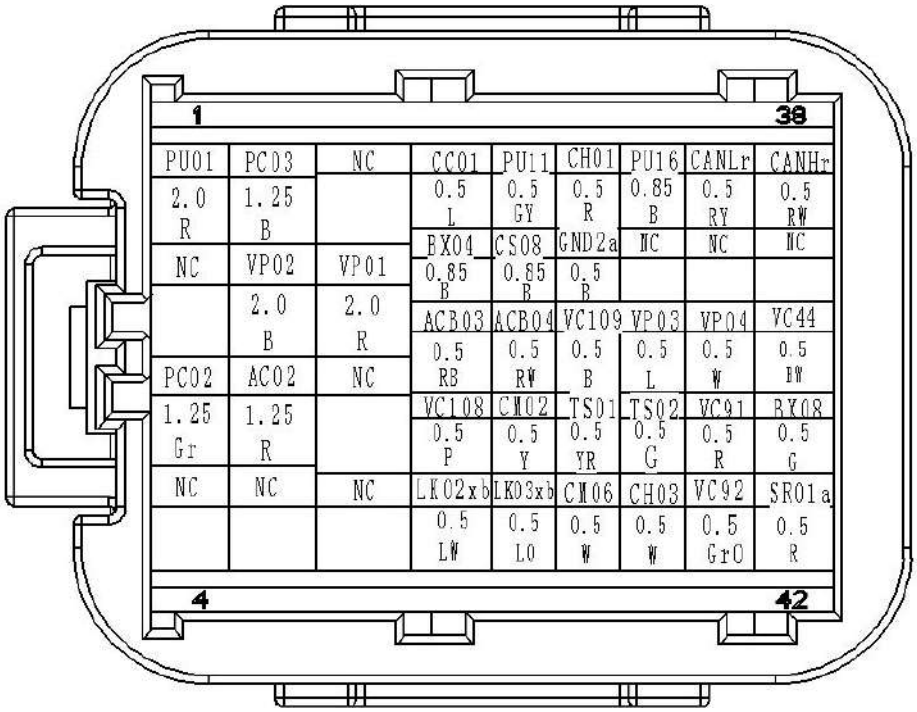
Connector name	gateway
Connector type	174047-2



Terminal number	Line color	Signal name
4	RW	CANHw EV CAN high
7	RY	CCL chassis CAN low
8	RW	CCH chassis CAN high
9	Y	CBH Body CAN Height
10	G	CBL Body CAN Low
14	RY	CANLw EV CAN Low
16	RG	ACC2a ACC
17	R	BT08a IGN electricity
18	B	GT1G ground
19	B	AV01a constant current

Front Cabin Control Harness Interface

Connector number	F36
Connector name	Front Cabin Control Harness Interface
Connector type	936429-2（AMP）



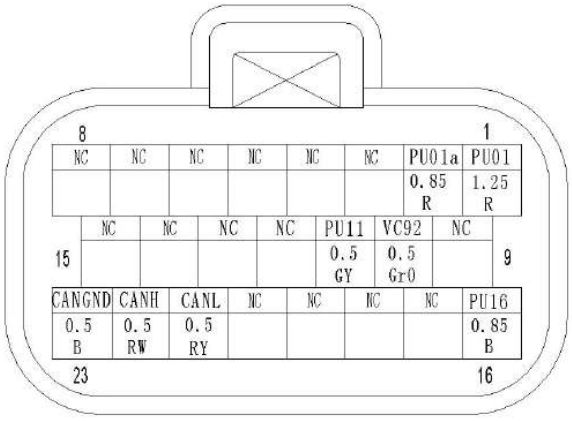
Terminal number	Line color	Signal name
1	R	PU01
3	Gr	PC02
5	B	PC03
6	B	VP02
7	R	AC02
13	L	CC01
14	B	BX04
15	RB	ACB03
16	P	VC108
17	LW	LK02xb
18	GY	PU11
19	B	CS08
20	RW	ACB04
21	Y	CM02
22	LO	LK03xb

23	R	CH01
24	B	GND2a
25	B	VC109
26	YR	TS01
27	W	CM06
28	B	PU16
30	L	VP03
31	G	TS02
32	W	CH03
33	RY	CANLr
35	W	VP04
36	R	VC91
37	GrO	VC92
38	RW	CANHr
40	BW	VC44
41	G	RX08
42	R	SR01a

Front Cabin Control Harness Interface

Motor controller

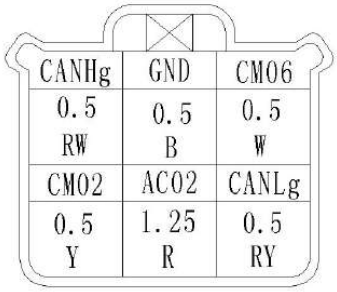
Connector number	FC01
Connector name	Motor controller
Connector type	770680-1



Terminal number	Line color	Signal name
1	R	PU01 motor controller 12V power supply positive
2	R	PU01a motor controller 12V power supply positive
10	GrO	VC92 DCDC enable
11	GY	PU11 DCDC failure feedback
16	B	PU16 motor controller 12V power supply negative
21	RY	CANL CAN_L signal interaction
22	RW	CANH CAN_H signal interaction
23	B	CANGED CAN shielded ground

compressor controller

Connector number	FC02
Connector name	compressor controller
Connector type	194180011

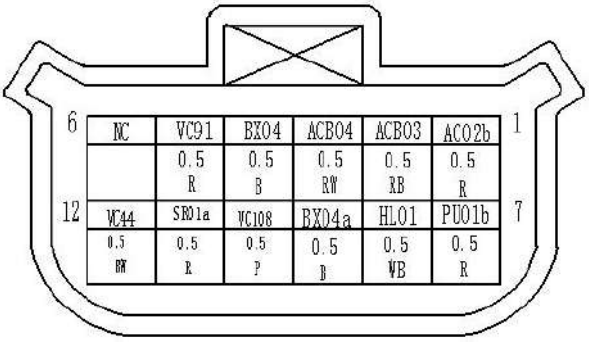


Terminal	Wire color	Signal name

number		
1	W	CM06 solenoid valve 2 relay 12 power supply positive
2	B	CND 12V power supply negative
3	RW	CANHg CAN_H signal communication
4	RY	CANLg CAN_L signal communication
5	R	AC02 compressor controller ON power
6	Y	CM02 solenoid valve 1 relay 12 power supply positive

High voltage box

Connector number	FC03
Connector name	High voltage box
Connector type	33472-1201

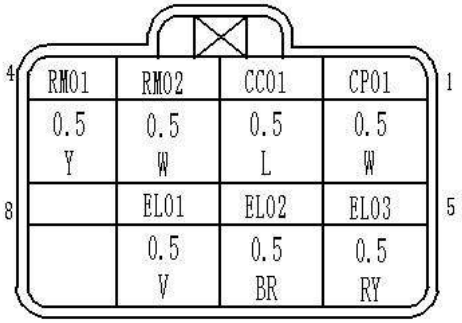


Terminal number	Line color	Signal name
1	R	AC02b PTC Relay 12V Power Supply Positive
2	RB	ACB03 PTC relay 1 control
3	RW	ACB04 PTC relay 2 control
4	B	BX04 fast charge + relay ground
5	R	VC91 fast charge + relay control
7	R	PU01b 12V power positive input

8	WB	HL01 heater power supply is positive
9	B	BX04a fast charge + relay ground
10	P	VC108 PTC1 (low)
11	R	SR01a constant current
12	BW	VC44 PTC1 (High)

AC charging interface

Connector number	FC04
Connector name	AC charging interface
Connector type	PB625-08027

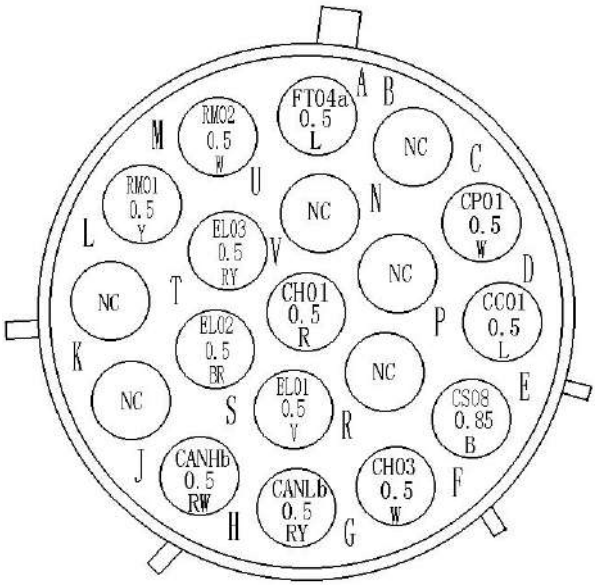


Terminal number	Wire color	Signal name
1	W	CP01 Charging power confirmed
2	L	CC01 charge connection status confirmation
3	W	RM02 Thermistor 1 Negative
4	Y	RM01 Thermistor 1 positive terminal
5	RY	EL03 electronic lock power supply 1 foot
6	BR	EL02 electronic lock power supply 2 feet
7	V	EL01 electronic lock power supply 1 foot

Car charger

Connector number	FC05

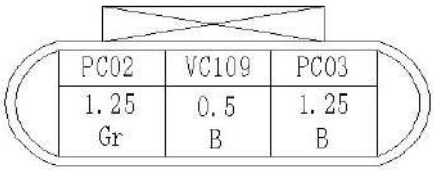
Connector name	Charger
Connector type	RT061619PNHEC03



Terminal number	Wire color	Signal name
A	L	FT04a Charging status output
C	W	CP01 Charging power confirmed
D	L	CC01 Charging connection status confirmed
E	B	CS08 12V power-supply negative
F	W	CH03 output 12V wake up signal
G	RY	CANLg CAN_L signal interaction
H	RW	CANHg CAN_H signal interaction
L	Y	RM01 Thermistor 1 positive terminal
M	W	RM02 Thermistor 1 Negative
S	V	EL01 electronic lock power supply 1 foot
T	BR	EL02 electronic lock power supply 2 feet
U	RY	EL03 electronic lock power supply 1 foot
V	R	CH01 charger power-supply

Cooling water pump

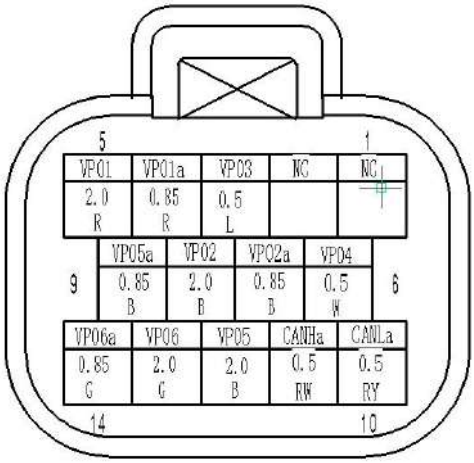
Connector number	FC06
Connector name	Cooling water pump
Connector type	282087-1



Terminal number	Line color	Signal name
1	B	PC03 coolant pump power-supply negative
2	W	VC109 PWM control signal
3	RW	PC02 coolant pump power-supply positive

Vacuum pump controller

Connector number	FC07
Connector name	Vacuum pump controller
Connector type	282087-1

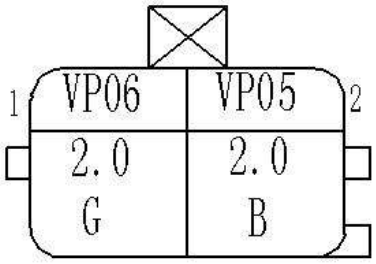


Terminal number	Line color	Signal name
3	L	VP03 pressure switch
4	R	VP01a power supply, vacuum pump relay for

5	R	VP01 power supply, vacuum pump relay for
6	W	VP04 pressure switch
7	B	VP02a controller ground
8	B	VP02 controller ground
9	B	VP05a connected to the vacuum pump motor
10	RY	CANLa CAN low
11	RW	CANHa CAN high
12	B	VP05 connected to the vacuum pump motor
13	G	VP06 connect vacuum pump motor power
14	G	VP06a connect vacuum pump motor power

Vacuum pump motor

Connector number	FC08
Connector name	Vacuum pump motor
Connector type	282-5575-10

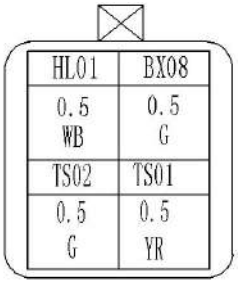


Terminal number	Wire color	Signal name
1	G	Vacuum pump motor
2	B	VP05 power supply is negative

Heater

Connector number	FC09

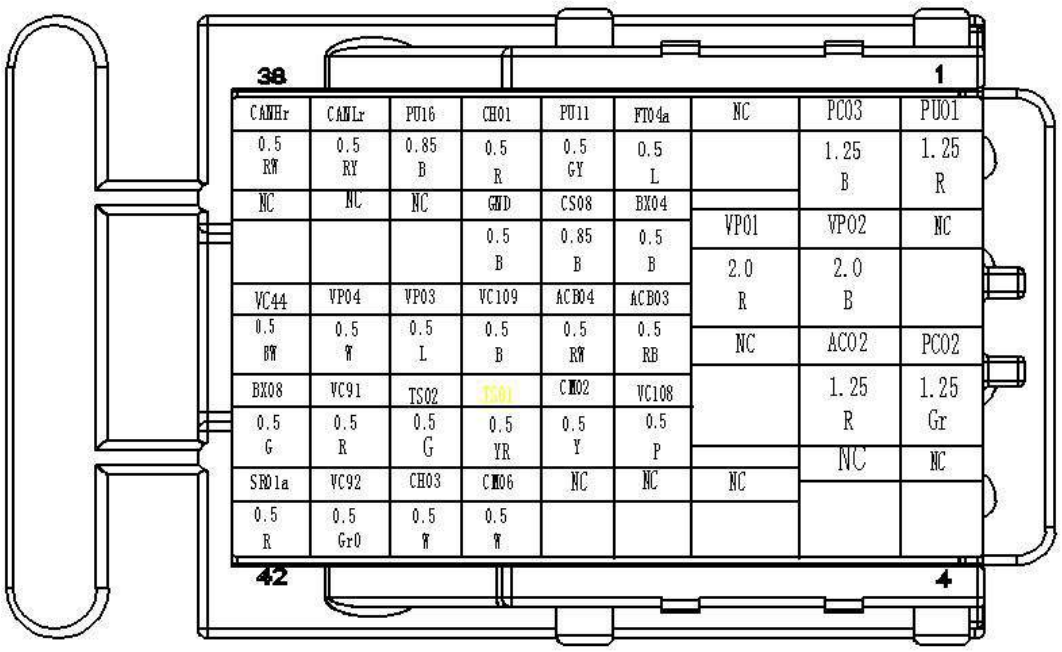
Connector name	Heater
Connector type	PB625-04027(KUM)



Terminal number	Line color	Signal name
1	G	BX08 power supply is negative
2	WB	HL01 power supply is positive
3	YR	TS01 heating signal +
4	G	TS02 heating signal -

Front Cabling Interface

Connector number	FC10
Connector name	Front Cabling Interface
Connector type	936421-2(AMP)



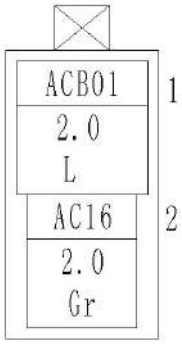
Terminal number	Line color	Signal name
1	R	PU01
3	Gr	PC02
5	B	PC03
6	B	VP02
7	R	AC02
10	R	VP01
13	L	FT04a
14	B	BX04
15	RB	ACB03
16	P	VC108
18	GY	PU11
19	B	CS08
20	RW	ACB04
21	Y	CM02
23	R	CH01
24	B	GND
25	B	VC109
26	YR	TS01
27	W	CM06
28	B	PU16
30	L	VP03
31	G	TS02
32	W	CH03
33	RY	CANLr
35	W	VP04
36	R	VC91

37	GrO	VC92
38	RW	CANHr
40	BW	VC44
41	G	RX08
42	R	SR01a

Instrument main harness interface

Blower motor

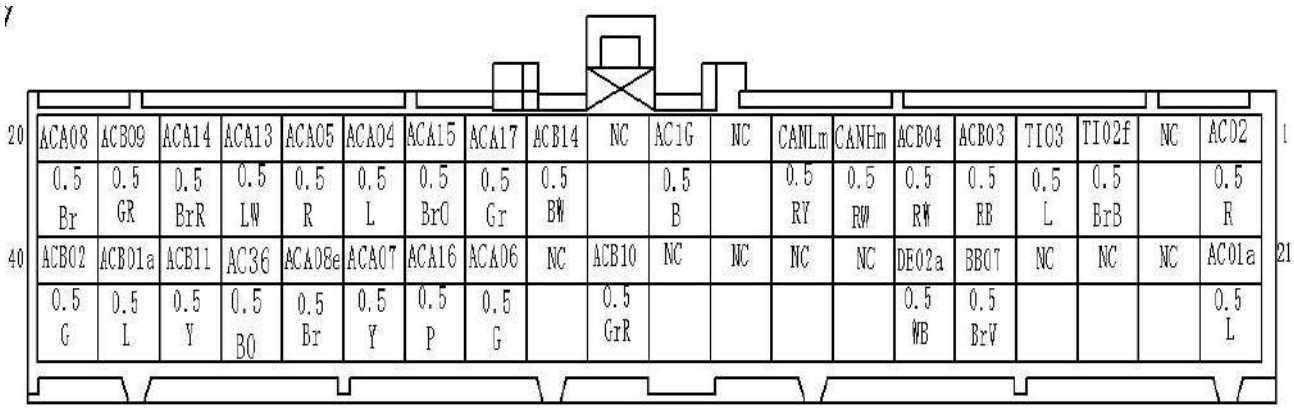
Connector number	M01
Connector name	Blower motor
Connector type	MG610043



Terminal number	Wire color	Signal name
1	L	ACB01 blower switch
2	Gr	AC16 blower motor power supply

Air conditioning controller

Connector number	M02
Connector name	Air conditioning controller
Connector type	1318389-1

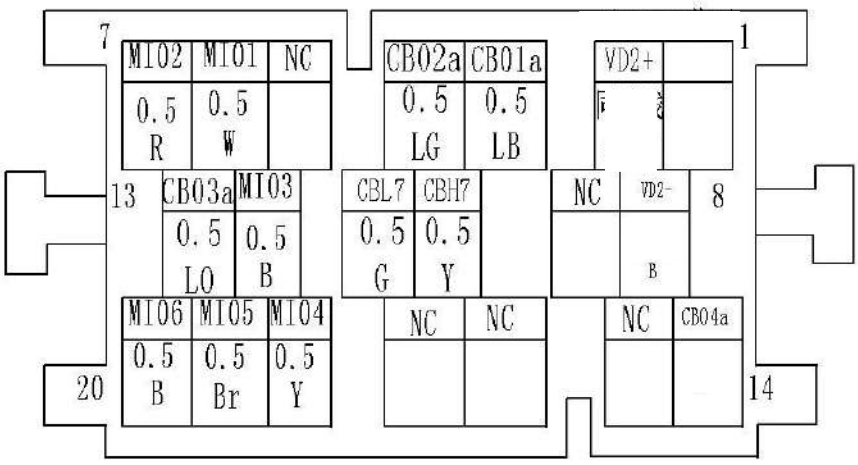


Terminal number	Line color	Signal name
1	R	AC02 IGN2
3	BrB	TIO2f backlight positive
4	L	TI03 backlight negative
5	RB	ACB03 PTC opens all the way
6	RW	ACB04 PTC turns on the way
7	RW	CANHm CAN high
8	RY	CANLm CAN low
10	B	AC1G vehicle power ground
12	BW	ACB14 ventilation fan -
13	Gr	ACA17 temperature motor positive
14	BrO	ACA15 temperature motor negative
15	L	ACA04 mode motor positive
16	R	ACA05 mode motor negative
17	LW	ACA13 new return air motor +
18	BrR	ACA14 new return air motor -
19	GR	ACB09 evaporator temperature sensor +
20	Br	ACA08 sensor and motor reference ground
21	L	AC01a BATT+
25	BrV	BB07 rear defrost request
26	WB	DE02a rear-Defrost Feedback

31	GrR	ACB10 outdoor temperature sensor +
33	G	ACA06 5V reference voltage
34	P	ACA16 temperature motor position
35	Y	ACA07 mode motor position
36	Br	ACA08e GND
37	BO	AC36 sunshine temperature sensor
38	Y	ACB11 Indoor Temperature Sensor +
39	L	ACB01a blower on signal
40	G	ACB02 wind speed adjustment (stepless speed regulation)

Sound C3

Connector number	M03
Connector name	Sound C3
Connector type	2005071-2（AMP）

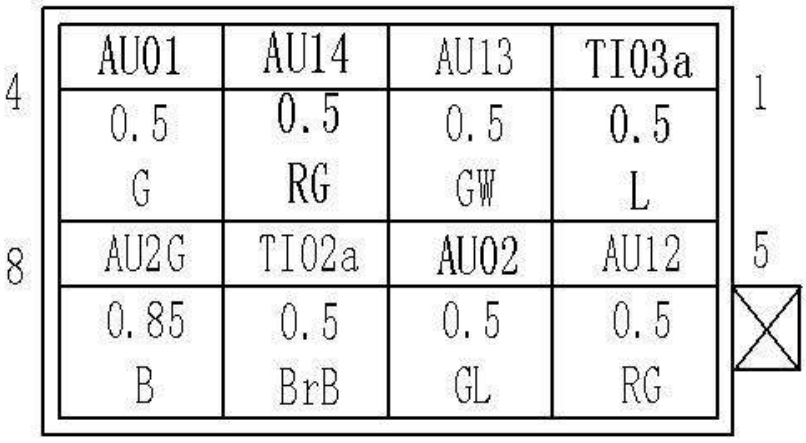


Terminal number	Line color	Signal name
2		VD2+ reverse video signal
3	LB	CB01a Drive Recorder Serial -
4	LG	CB02a Drive Recorder Serial +
6	W	MI01 mode switching pin 1

7	R	MI02 MIC Power Supply
8		VD2-Video Signal Shield
10	Y	CBH7 CAN communication is high
11	G	CBL7 CAN communication is low
12	B	MI03 MIC fly power supply
13	LO	CB03a Driving Recorder +
14		CB04a Driving Recorder Video
18	Y	MI04 MIC input
19	Br	MI05 reference signal input
20	B	MI06 MIC signal ground

Sound C1

Connector number	M04
Connector name	Sound C1
Connector type	DJ7082A-3.5-21 (Black) THB

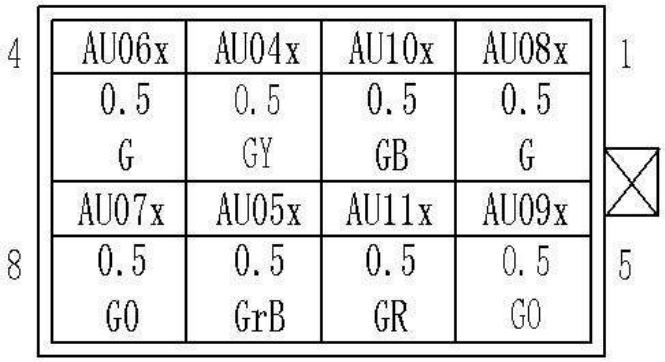


Terminal number	Wire color	Signal name
1	L	TI03a Back light -
2	GW	AU13 remote control signal

3	RG	AU14 antenna amplifier power supply
4	G	AU01 battery power
5	RG	AU12 remotely controlled
6	GL	AU02 ACC
7	BrB	TI02a Back light +
8	B	AU2G

Sound C2

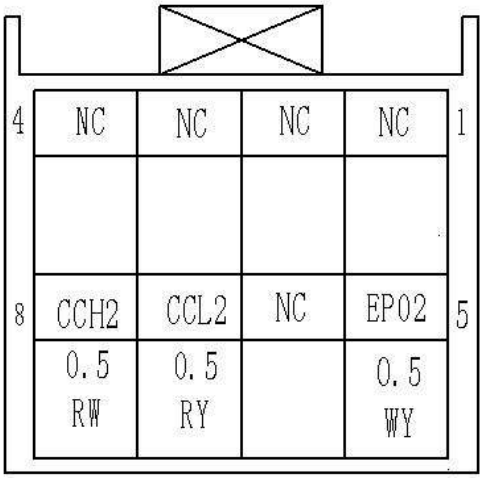
Connector number	M05
Connector name	Sound C2
Connector type	DJ7082-3.5-21 (brown) THB



Terminal number	Wire color	Signal name
1	G	AU08x Right Rear Speaker +
2	GB	AU10x Right Front Speaker+
3	GY	AU04x front left speaker +
4	G	AU06x rear left speaker +
5	GO	AU09x Right Rear Speaker -
6	GR	AU11x Right Front Speaker -
7	GrB	AU05x Front Left Speaker -
8	GO	AU07x Rear Left Speaker -

EPS module signal

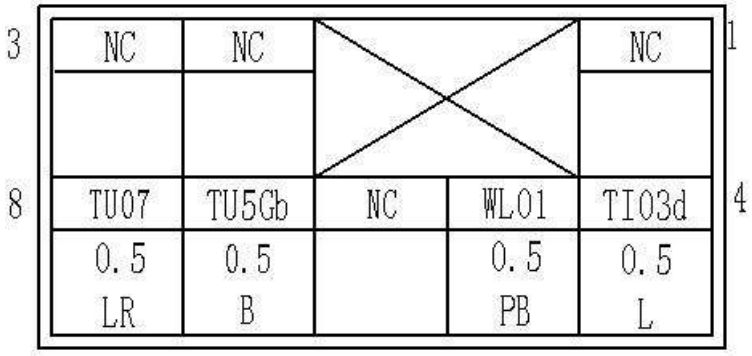
Connector number	M06
Connector name	EPS module signal
Connector type	1379659-3(AMP)



Terminal number	Line color	Signal name
5	WY	EP02 power supply
7	RY	CCL2 CAN low
8	RW	CCH2 CAN high

Dangerous alarm switch interface

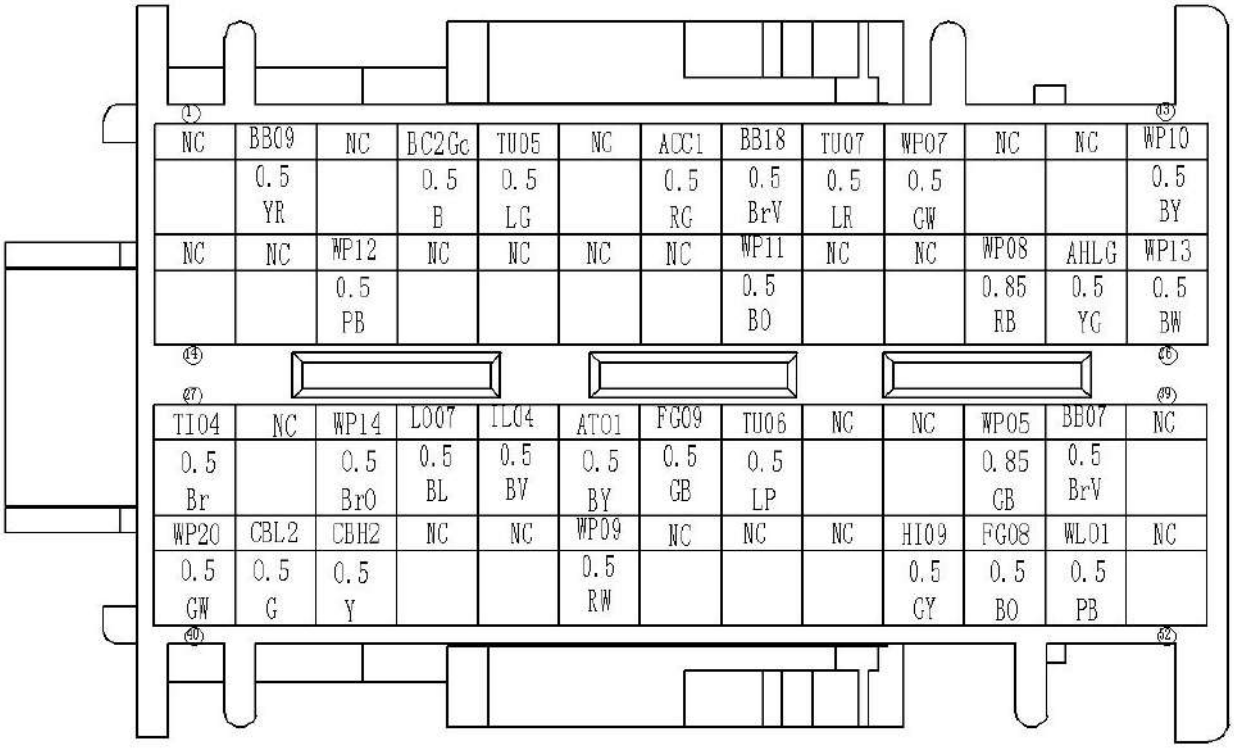
Connector number	M07
Connector name	Danger alarming light
Connector type	PP0404201(THB)



Terminal number	Line color	Signal name
4	L	TI03d Back light ground
5	PB	WL01 backlight power supply
7	B	TU5Gb ground
8	LR	TU07 f signal

Body Controller C1

Connector number	M08
Connector name	Body Controller C1
Connector type	284980-1 (black) (AMP)

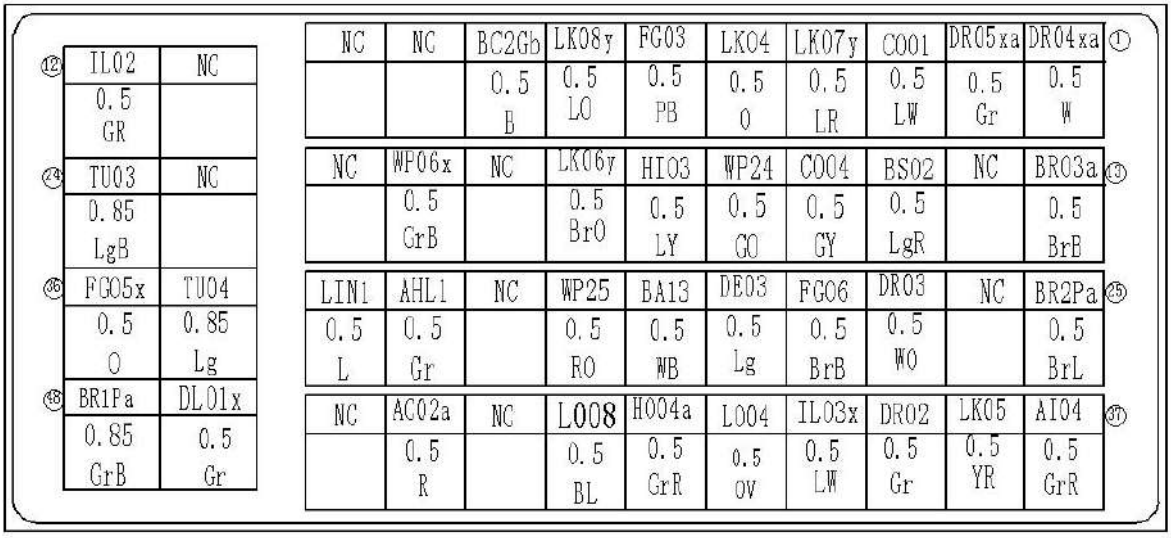


Terminal number	Wire color	Signal name
2	YR	BB09 IG2 power supply
4	B	BC2Gc signal ground

5	LG	TU05 left turn signal switch
7	RG	ACC1 ACC power supply
8	BrV	BB18 IG1 power supply
9	LR	TU07 warning light switch
10	GW	WP07 rear wiper switch
13	BY	WP10 front wiper high speed switch
16	PB	WP12 front wiper speed switch
21	BO	WP11 front wiper intermittent switch
24	RB	WP08 front spray switch
25	YG	AHLG backlight adjustment
26	BW	WP13 front wiper jog switch
27	Br	TI04 backlight
29	BrO	WP14 wiper intermittent time adjustment
30	BL	LO07 low beam switch
31	BV	IL04 Light Switch
32	BY	AT01 automatic light switch
33	GB	FG09 rear fog light switch
34	LP	TU06 right turn signal switch
37	GB	WP05 rear spray switch
38	BrV	BB07 Rear defrost switch
40	GW	WP20 Rear Wiper Relay
41	GW	CBL2 CAN low
42	G	CBH2 CAN high
45	RW	WP09 Wiper Intermittent Time Bar Adjustment Signal
49	GY	HI09 high beam switch
50	BO	FG08 front fog light switch
51	PB	WL01 Hazard warning indicator

Body Controller C2

Connector number	M09
Connector name	Body Controller C2
Connector type	2137489-1 Assembly (Black) (AMP)



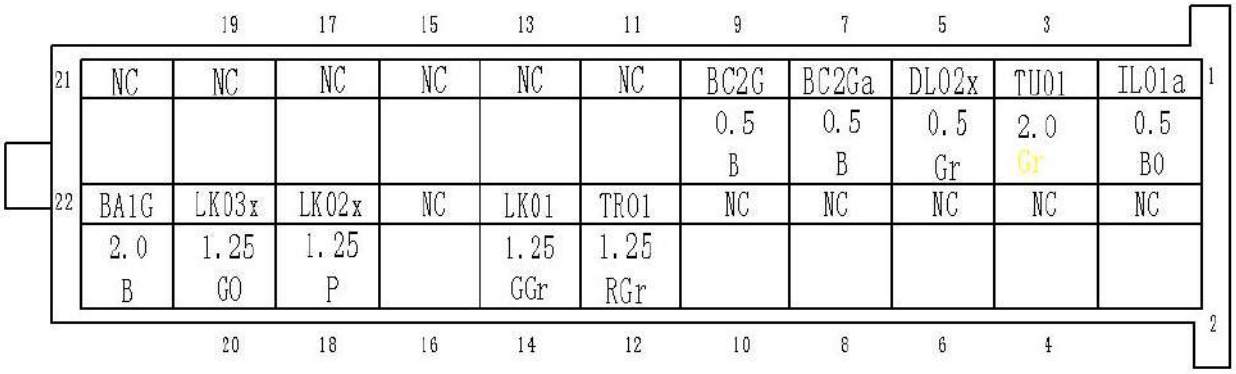
Terminal number	Wire color	Signal name
1	W	DR04xa Left Rear Door Switch
2	Gr	DR05xa right rear door switch
3	LW	CO01 charging cover switch
4	LR	LK07y mechanical unlock switch
5	O	LK04 Control unlock switch
6	PB	FG03 front fog lamp relay
7	LO	LK08y mechanical locking switch
8	B	BC2Gb signal ground
12	GR	IL02 indoor light
13	BrB	BR03a brake light switch
15	LgR	BS02 Power Saver Relay
16	GY	CO04 charging cover relay
17	GO	WP24 front wiper low speed relay

18	LY	HI03 high beam relay
19	BrO	LK06y left front door lock status
21	GrB	WP06x front wiper return switch
24	LgB	TU03 left turn signal
25	BrL	BR2Pa high position brake light
27	WO	DR03 right front door switch
28	BrB	FG06 Right front fog lamp relay
29	Lg	DE03 defrost relay
30	WB	BA13 small light relay
31	RO	WP25 front wiper high speed relay
33	Gr	AHL1 sunlight signal input
34	L	LIN1 LIN1
35	Lg	TU04 right turn signal
36	O	FG05x Rear Fog Light
37	GrR	AI04 collision signal
38	YR	LK05 central locking switch
39	Gr	DR02 left front door switch
40	LW	IL03x tailgate status switch
41	OV	LO04 low beam relay
42	GrR	HO04a Alarm Horn Relay
43	BL	LO08 high beam enable
45	R	AC02a Generator L end
47	Gr	DL01x Left Day Running Light
48	GrB	BR1Pa brake light

Body Controller C3

Connector number	M10

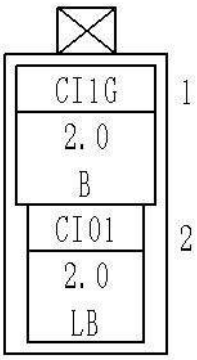
Connector name	Body Controller C3
Connector type	929504-7



1	B0	Body Controller C3
3	Gr	IL01a internal lamp power supply
5	Gr	DL02x Right Day Light
7	B	BC2Ga signal ground
9	B	BC2G signal ground
12	RGr	TR01 tailgate unlocked
14	GGr	LK01 door lock motor power supply
18	P	LK02x four-door locking motor
20	GO	LK03x 4-door unlocked motor
22	B	BA1G Power supply ground

Car Power

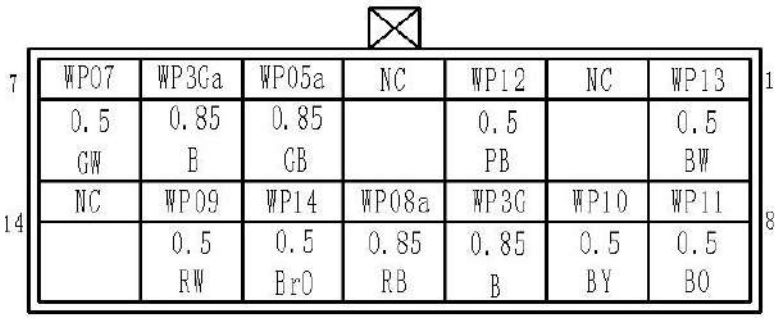
Connector number	M11
Connector name	Car Power
Connector type	0302909（THB）



Terminal number	Wire color	Signal name
1	B	CI1G GND
2	LB	CI01 ACC power supply

Combination Switch - Wiper

Connector number	M12
Connector name	Combination Switch - Wiper
Connector type	MG654021

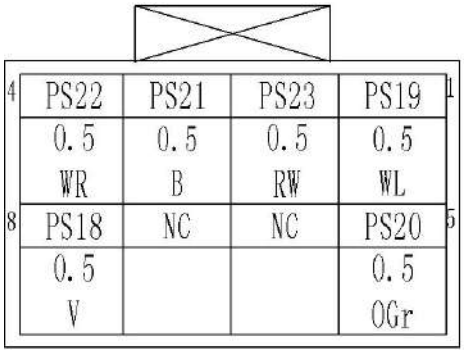


Terminal number	Wire color	Signal name
1	BW	WP13 front wiper electric switch
3	PB	WP12 front wiper speed switch
5	GB	WP05a rear spray switch
6	B	WP3Ga combination switch (wiper) ground
7	GW	WP07 rear wiper switch

8	BO	WP11 front wiper intermittent switch
9	BY	WP10 front wiper high speed switch
10	B	WP3G combination switch (wiper)
11	RB	WP08a front spray switch
12	B	WP14 wiper intermittent time adjustment
13	RW	WP09 Wiper Intermittent Time Bar Adjustment Signal

PEPS button

Connector number	M13
Connector name	PEPS button
Connector type	1376352-2

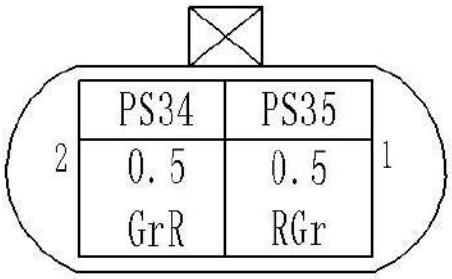


Terminal number	Line color	Signal name
1	WL	PS19 start switch signal 1
2	RW	PS23 switch ground
3	B	PS21 start switch signal 2
4	WR	PS22 white input signal
5	OGr	PS20 green light input signal
8	V	PS18 yellow light input signal

Front low-frequency antenna

Connector number	M14

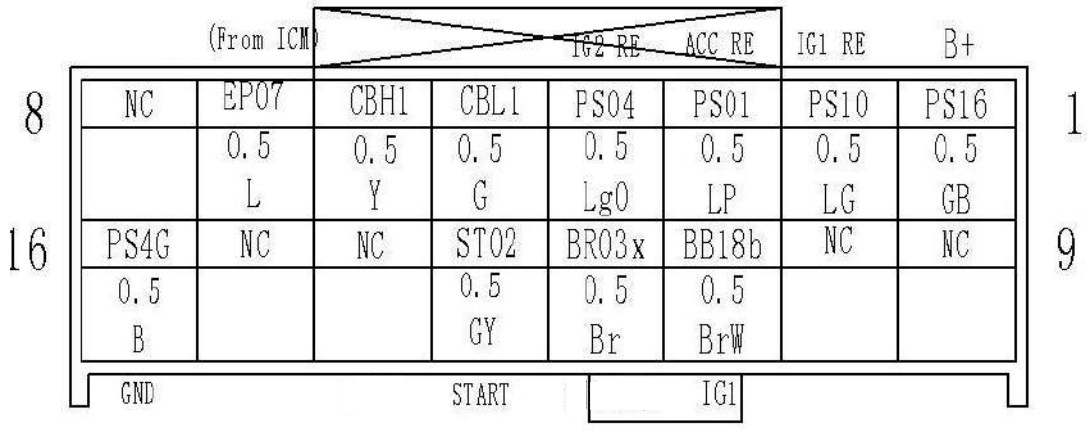
Connector name	Front low-frequency antenna
Connector type	0413902 THB



Terminal number	Wire color	Signal name
1	RGr	PS35 Front Low Frequency Antenna Positive
2	GrR	PS34 front low frequency antenna negative

PEPS controller 1

Connector number	M15
Connector name	PEPS controller 1
Connector type	34729-0161 (gray)

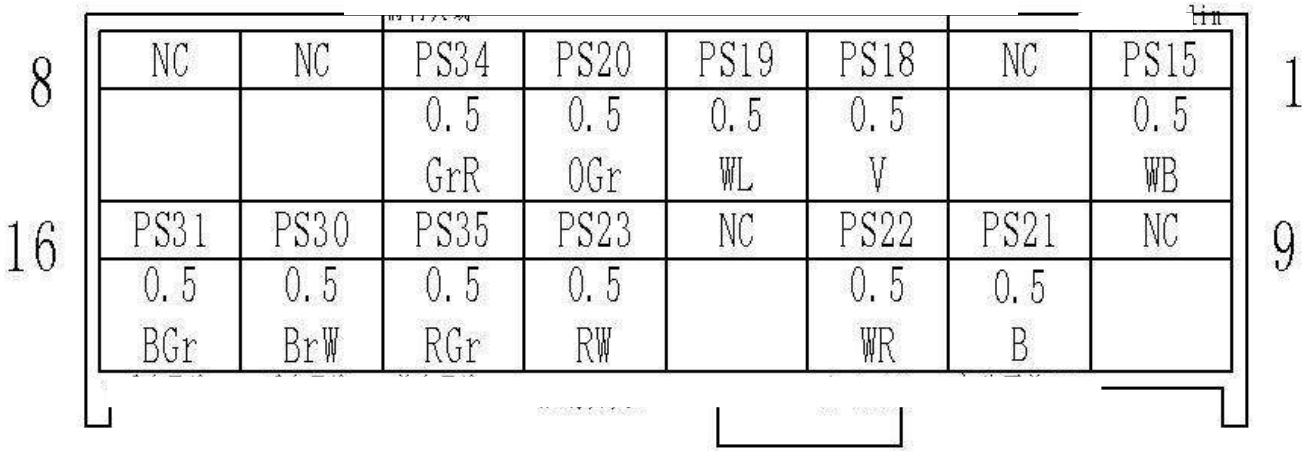


Terminal number	Wire color	Signal name
1	GB	PS16 power supply (permanent)
2	LG	PS10 IG1 Relay Drive - High
3	LP	PS01 ACC Relay Drive - High

4	LgO	PS04 IG2 Relay Drive - High
5	G	CBL1 CAN communication is low
6	Y	CBH1 CAN communication high
7	L	EP07 right front wheel speed signal
11	BrW	BB18b power supply (IG1 power)
12	Br	BR03x brake pedal signal
13	GY	ST02 start request signal
16	B	PS4G Ground

PEPS controller 2

Connector number	M16
Connector name	PEPS controller 2
Connector type	34729-0160 (black)



Terminal number	Wire color	Signal name
1	WB	PS15 Alternate Antenna Lin
3	V	PS18 Start Switch Backlight (Green)
4	WL	PS19 start switch backlight (white)
5	OGr	PS20 Start Switch Backlight (Amber)
6	GrR	PS34 Front Inner Antenna Negative

10	B	PS21 One Button Start Switch 2
11	WR	PS22 One Button Start Switch 1
13	RW	PS23 start switch 2
14	RGr	PS35 Front Inner Antenna Positive
15	BrW	PS30 rear inner antenna is negative
16	BGr	PS31 Rear Inner Antenna Positive

PEPS controller 3

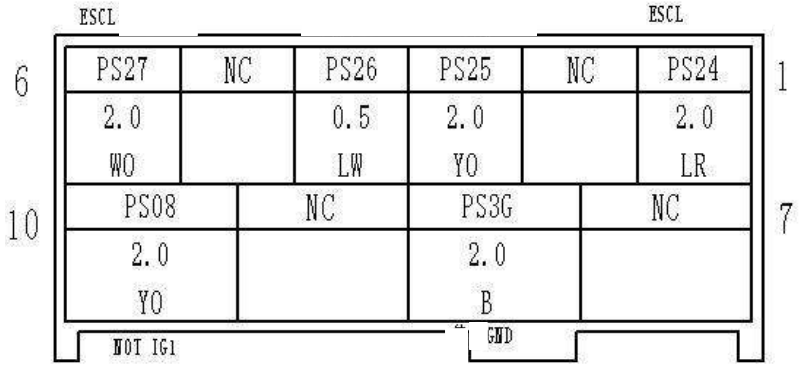
Connector number	M17
Connector name	PEPS controller 3
Connector type	34729-0080 (black)

Terminal number	Wire color	Signal name
1	LB	TR02 tailgate lock signal
2	BR	PS29 left front door handle sensor 2
3	VW	PS28 left front door handle sensor 1
4	GrBr	PS32 tail gate low frequency antenna negative
8	LgR	PS33 tail gate low frequency antenna positive

PEPS controller 4

Connector number	M18

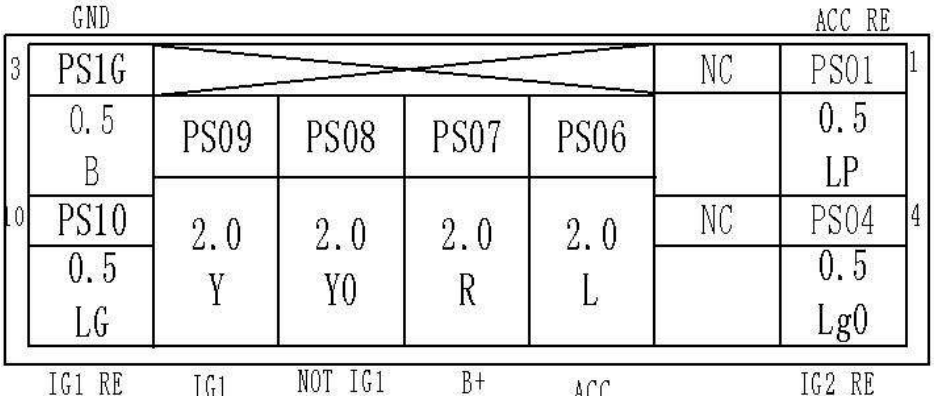
Connector name	PEPS controller 4
Connector type	31372-1000



Terminal number	Line color	Signal name
1	LR	PS24 electronic steering column lock locked
3	YO	PS25 Electronic Steering Column Lock (Power Ground)
4	LW	PS26 Electronic Steering Column Lock (LIN Communication Line)
6	WO	PS27 Electronic Steering Column Lock (Power Supply)
8	B	PS3G vehicle
10	YO	PS08 Non-IG1 Power Supply Input

PEPS relay C1

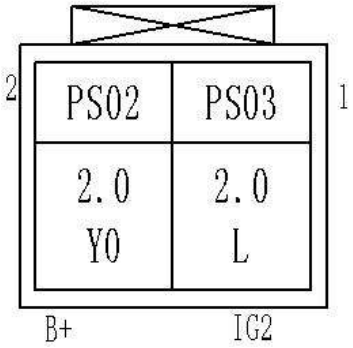
Connector number	M19
Connector name	PEPS relay C1
Connector type	936363-1



Terminal number	Line color	Signal name
1	LP	PS01 ACC Relay Drive - High
3	B	PS1G ground
4	LgO	PS04 IG2 Relay Drive - High
6	L	PS06 ACC power supply
7	R	PS07 IG1 power supply
8	YO	PS08 Non-IG1 Power Supply Input
9	Y	PS09
10	LG	PS10 IG1 Relay Drive - High

PEPS relay C2

Connector number	M20
Connector name	PEPS relay C2
Connector type	936568-2

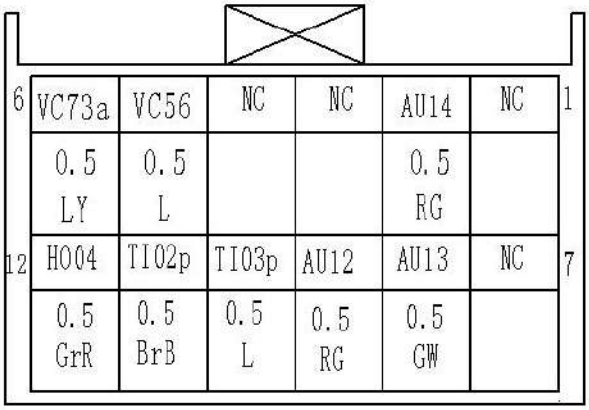


Terminal number	Line color	Signal name
1	L	PS02 IG1 electricity
2	YO	PS03 IG2 electricity

Clock Spring_Horn

Connector number	M21
Connector name	Clock Spring_Horn

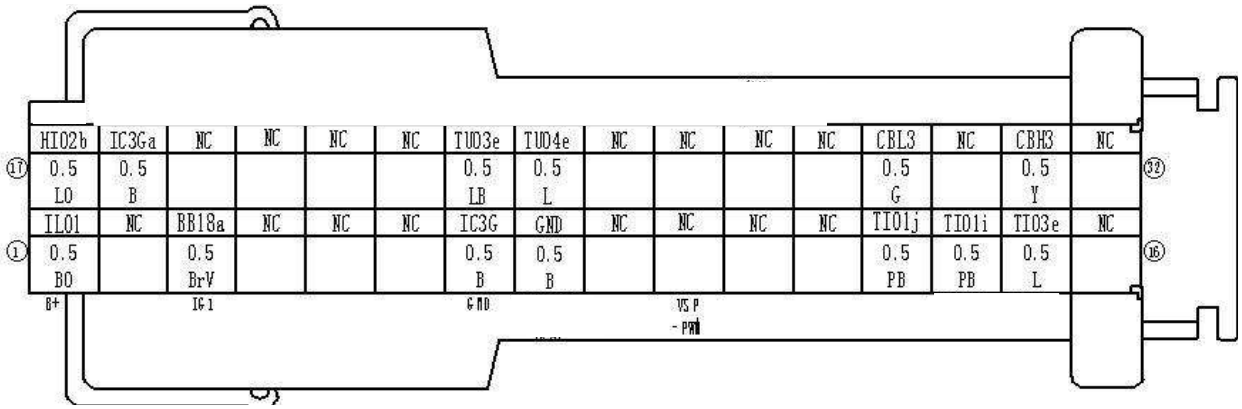
Connector type	1318774-1(AMP)



Terminal number	Line color	Signal name
2	RG	AU14 tone control + (left)
5	L	VC56 Cruise +
6	LY	VC73a Cruise -
8	GW	AU13 tone control + (right)
9	RG	AU12 Sound Control -
10	L	TI03p Backlight -
11	BrB	TI02p backlight +
12	GrR	HO04 Speaker

Combination instrument A

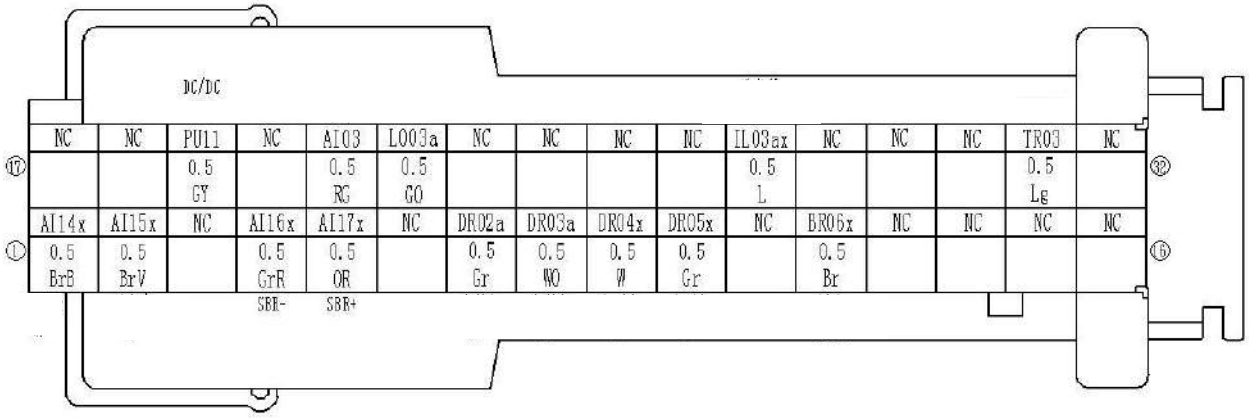
Connector number	M22
Connector name	Combination instrument A
Connector type	1719057-2(blue)



Terminal number	Line color	Signal name
1	BO	IL01 B+
3	BrV	BB18a IG1
7	B	IC3G GND
8	B	GND EP07 shielded ground
13	PB	TI01j indicator +
14	PB	TI01i Back light +
15	L	TI03e Back light -
17	LO	HI02b Highlight +
18	B	IC3Ga Highlight -
23	LB	Turn left at +
24	L	Turn right at +
29	G	CBL3 CANL
31	Y	CBH3 CANH

Combination Instrument B

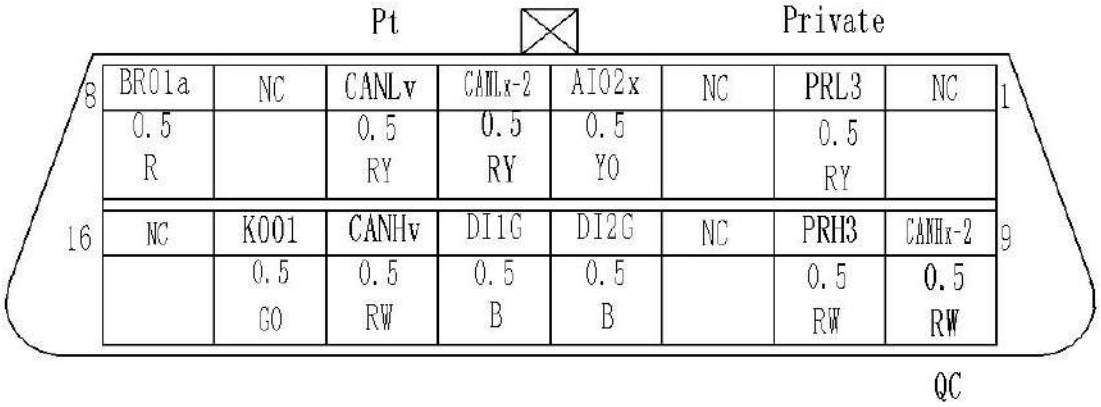
Connector number	M23
Connector name	Combination Instrument B
Connector type	1719057-1 (Green) (AMP)



Terminal number	Wire color	Signal name
1	BrL	AI14x main safety belt -
2	BrY	AI15x seat belts -
4	GrR	AI16x SBR-
5	OR	AI17x SBR+
7	Gr	DR02a left front door open -
8	WO	DR03a right front door open -
9	W	DR04x Left Rear Door -
10	Gr	DR05x right rear door open -
12	Br	BR06x brake fluid level
19	GY	PU11 DC/DC failure
21	YG	AI03 airbag failure
22	GO	LO03a low beam light
27	L	IL03ax trunk light -
31	Lg	TR03 TRIP switch

Diagnostic interface 1

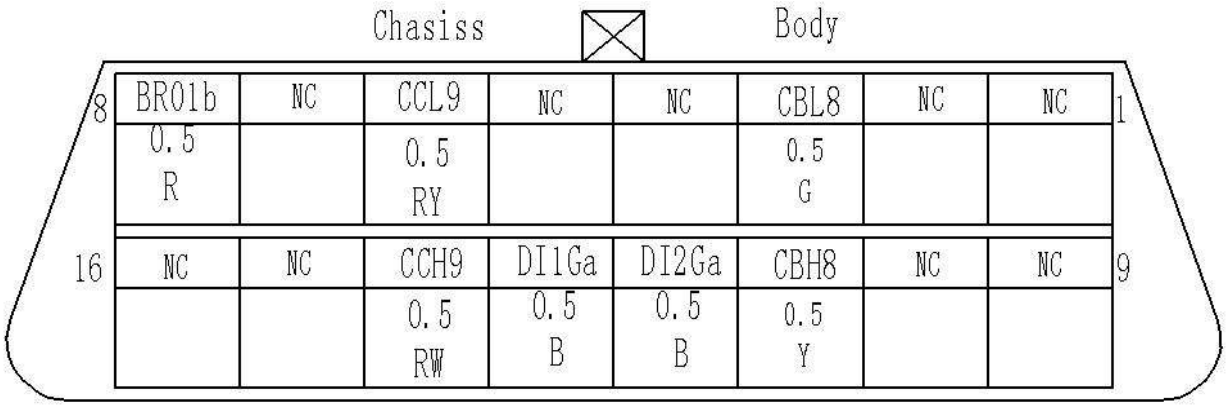
Connector number	M24
Connector name	Diagnostic interface 1
Connector type	179631-1



Terminal number	Line color	Signal name
2	RY	PRL3 High Voltage Battery Internal CAN Low
4	YO	AI02x airbag diagnosis
5	RY	CANLx-2 fast charge CAN low
6	RY	CANLv vehicle CAN low
8	R	BR01a Brake signal
9	RW	CANLx-2 fast charge CAN high
10	RW	PRH3 High Voltage Battery Internal CANH High
12	B	DI2G ground
13	B	DI1G ground
14	RW	CANHv vehicle CAN high
15	GO	KO01 Clipping Module

Diagnostic interface 2

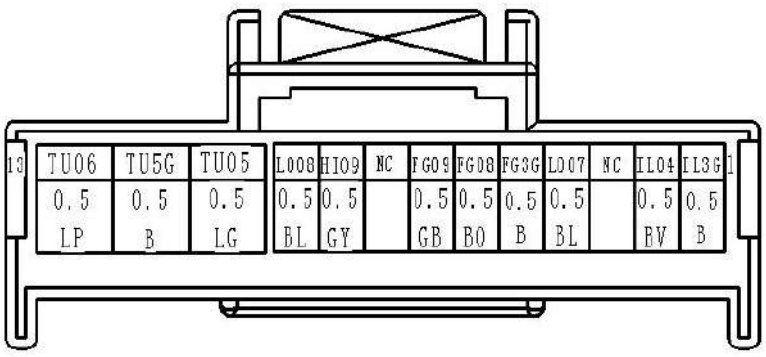
Connector number	M25
Connector name	Diagnostic interface 2
Connector type	179631-2(black)(AMP)



Terminal number	Wire color	Signal name
3	G	CBL8 Body CAN Low
6	RY	CCL9 chassis CAN low
8	R	BR01b Brake signal
11	Y	CBH8 Body CAN Height
12	B	DI2Ga ground
13	B	DI1Ga ground
14	RW	CCH9 Chassis CAN High

Combination Switch - Light

Connector number	M26
Connector name	Combination Switch - Light
Connector type	MG653912

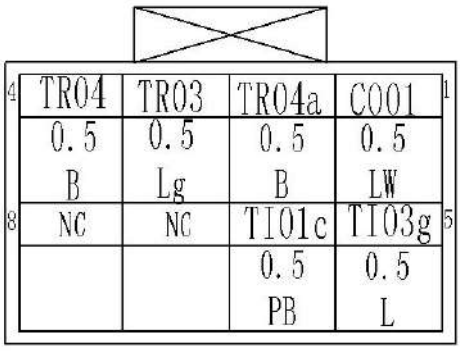


Terminal number	Wire color	Signal name

1	B	IL3G small lamp
2	BV	IL04 Light Switch
3	BY	AT01 AUTO
4	BL	LO07 low beam switch
5	B	FG3G fog lights
6	BO	FG08 front fog light switch
7	GB	FG09 rear fog light switch
9	GY	HI09 high beam switch
10	BL	LO08 Low Beam Enable
11	LG	TU05 Left turn +
12	B	TU5G right turn signal switch
13	LP	TU06 right turn +

TRIP/charging lid switch

Connector number	M27
Connector name	TRIP/charging lid switch
Connector type	1376352-2[AMP]

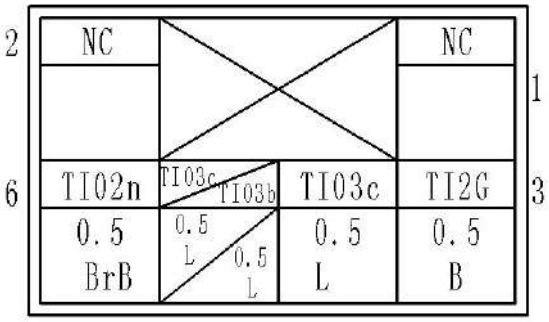


Terminal number	Wire color	Signal name
1	LW	TRIP/charging lid switch
2	B	TR04a Parking Auxiliary Circuit Ground
3	Lg	TR03 360° loop

4	B	TR04 360° loop ground
5	L	TI03g GND
6	PB	TI01c backlight input

Dimmer switch

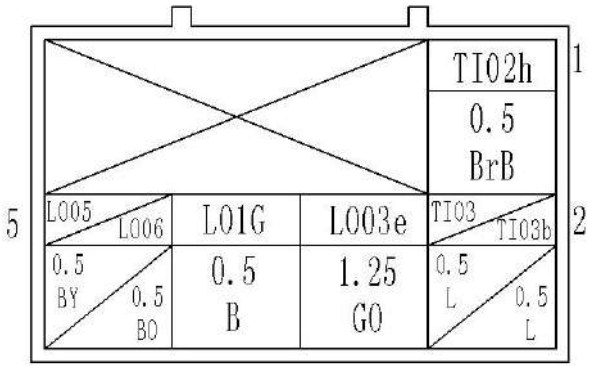
Connector number	M28
Connector name	Dimmer switch
Connector type	NTL-6BSL



Terminal number	Wire color	Signal name
4	L	TI03c backlight - (PWM pulse signal output)
5	L	TI03c/TI03b Backlight - (PWM Pulse Signal Output)
6	B	TI02n Backlight +
3	B	TI2G backlight GND

Headlight position adjustment switch

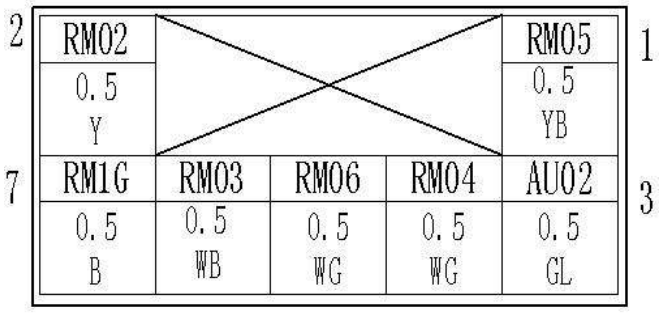
Connector number	M29
Connector name	Headlight position adjustment switch
Connector type	PH845-05010 (white)



Terminal No.	Wire color	Signal name
1	BrB	TI02h Backlight +
2	L/L	TI03/TI03b Backlight -
3	GO	LO03e IGN
4	B	LO1G
5	BY/BO	LO05/LO06 ACT+ Motor

Rear view mirror switch

Connector number	M30
Connector name	Rear view mirror switch
Connector type	PH845-07010 (white)

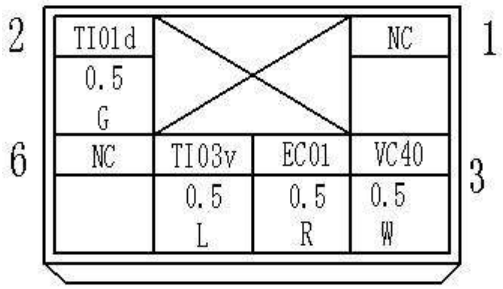


Terminal No.	Wire color	Signal name
1	YB	RM05 share
2	Y	RM02 Right Rearview Mirror
3	GL	AU02 power +
4	WG	RM04 Right Rearview Mirror
5	WG	RM03 Left Rearview Mirror

6	WB	RM03 Left Rearview Mirror
7	B	RM1G Power Supply -

ECO switch

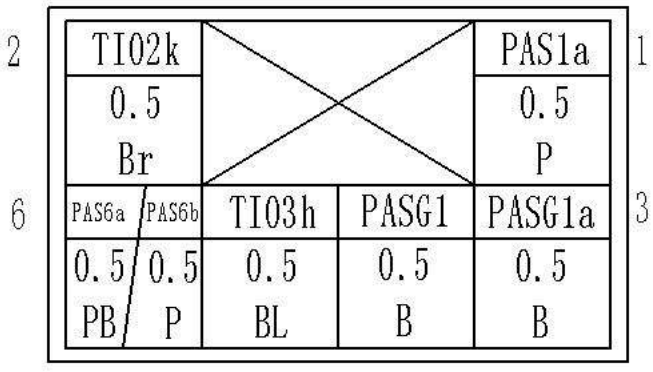
Connector number	M31
Connector name	ECO switch
Connector type	MG651044 (white)



Terminal No.	Wire color	Signal name
2	G	TI01d back light positive
3	W	VC40 12V is valid, indicating that it is in economic mode
4	R	EC01 power supply (IG1 power)
5	L	TI03v back light negative

PAS switch

Connector number	M32
Connector name	PAS switch
Connector type	MG651044-2(blue)

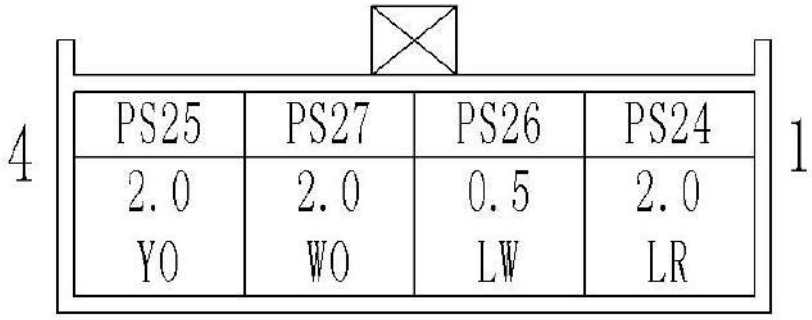


Terminal	Line color	Signal name

number		
1	P	PAS1a control signal output
2	Br	TI02k back light +
3	B	PASG1a work indicator +
4	B	PASG1 control signal input
5	BL	TI03h work indicator -
6	PB/P	PAS6a/PAS6b Backlight -

Electronic steering column lock

Connector number	M33
Connector name	Electronic steering column lock
Connector type	174922-1

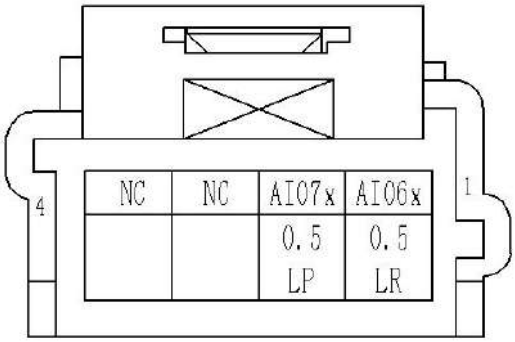


Terminal number	Line color	Signal name
1	LR	PS24 electronic steering column lock locked
2	LW	PS26 Electronic Steering Column Lock (LIN Communication Line)
3	WO	PS27 Electronic Steering Column Lock (Power Supply)
4	YO	PS25 Electronic Steering Column Lock (Power Ground)

Clock Spring_Airbag

Connector number	M34

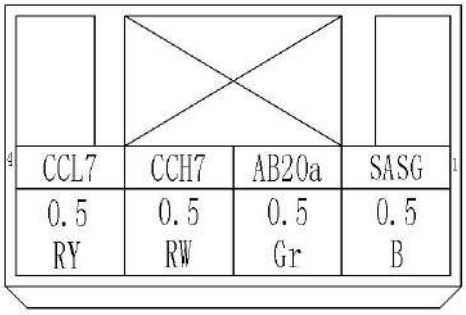
Connector name	Clock Spring_Airbag
Connector type	7283-6134-70(YAZAKI)



Terminal number	Wire color	Signal name
1	LR	AI06x Driver Front Airbag Positive
2	LP	AI07x Driver Front Airbag Negative

Corner sensor

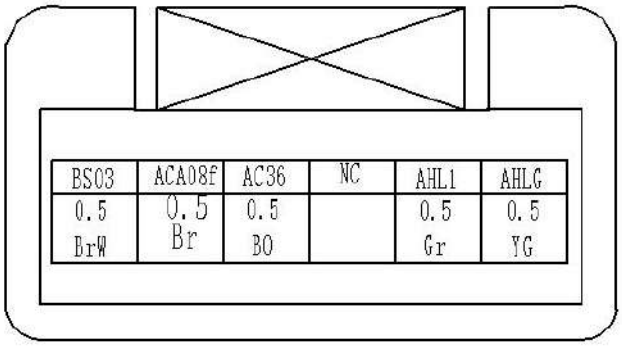
Connector number	M35
Connector name	Corner sensor
Connector type	936119-1



Terminal number	Line color	Signal name
1	B	SASG power is negative
2	Gr	AB20a Power Supply (ON)
3	RW	CCH7 CAN communication high
4	RY	CCL7 CAN Communication Low

Sunshine sensor

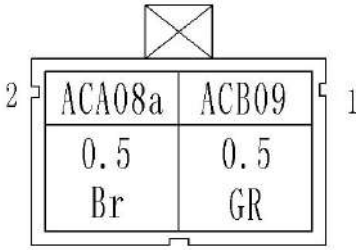
Connector number	M36
Connector name	Sunshine sensor
Connector type	7283-8660 (YAZAKI) MG651439 KET (Alternatives)



Terminal number	Wire color	Signal name
1	YG	AHLG sunshine signal output
2	Gr	AHL1 sunlight signal input
3	BO	AC36 power supply is positive
4	Br	ACA08f power supply is negative
5	BrW	BS03 power supply (permanent)

Evaporator surface sensor

Connector number	M37
Connector name	Evaporator surface sensor
Connector type	68538-1（AMP）

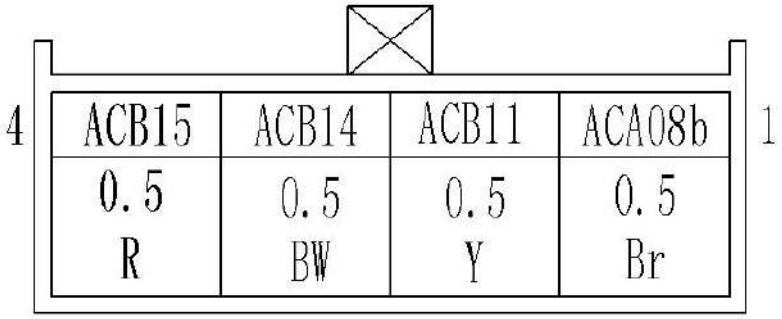


Terminal number	Line color	Signal name

1	GR	ACB09 power supply is positive
2	Br	ACA08a power supply is negative

in-car temperature sensor

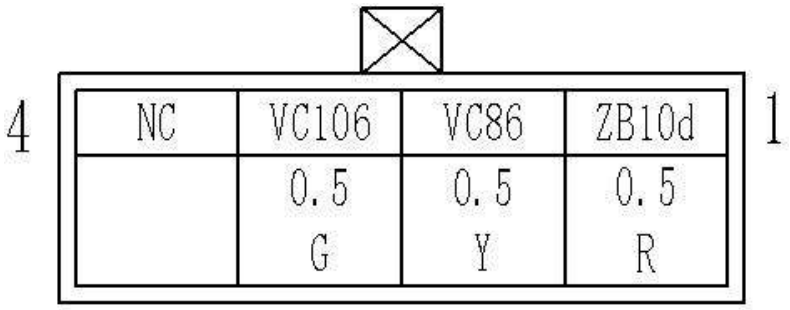
Connector number	M38
Connector name	in-car temperature sensor
Connector type	174922-1(AMP)



Terminal number	Line color	Signal name
1	Br	ACA08b power supply is negative
2	Y	ACB11 power supply is positive
3	BW	ACB14 negative fan
4	R	ACB15 power supply (IG2 power)

charging indicator

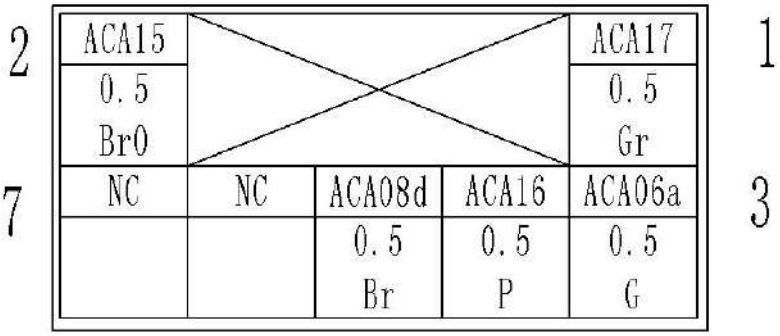
Connector number	M39
Connector name	Charging indicator light
Connector type	936119-1 (Black) (AMP)



Terminal number	Wire color	Signal name
1	R	ZB10d power supply (self-hold power)
2	Y	VC86 charge indicator 1 (yellow)
3	G	VC106 charge indicator 2 (green)

Temperature throttle actuator

Connector number	M40
Connector name	Temperature throttle actuator
Connector type	PH845-07010 (white) (KUM)

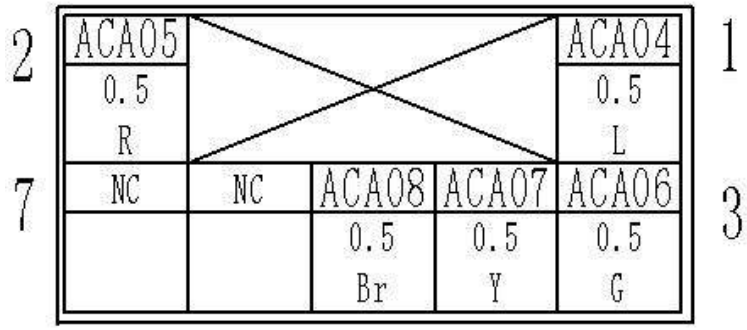


Terminal number	Wire color	Signal name
1	Gr	ACA17 temperature motor
2	BrO	ACA15 temperature motor negative
3	G	ACA06a 5V Reference Site
4	P	ACA16 temperature motor position is positive
5	Br	ACA08d temperature motor position negative

Mode control

Connector number	M41
Connector name	Mode control

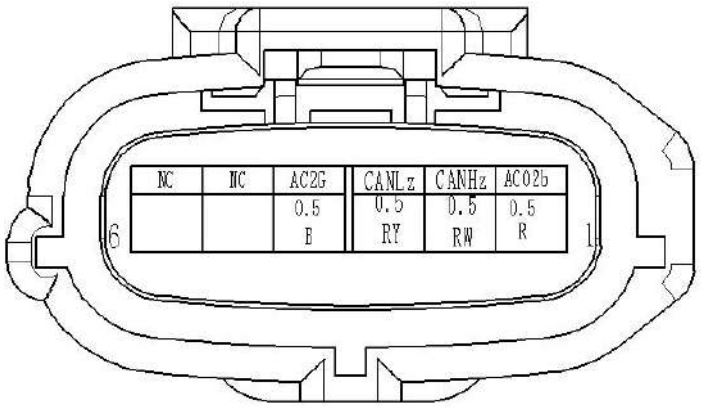
Connector type	PH845-07020(black)(KUM)



Terminal number	Wire color	Signal name
1	L	ACA04 Mode Motor Positive
2	R	ACA05 mode motor negative
3	G	ACA06 5V Reference Site
4	Y	ACA07 mode motor position is positive
5	Br	ACA08 mode motor position negative

PTC temperature switch

Connector number	M42
Connector name	PTC temperature switch
Connector type	6189-1083 (Sumitomo)

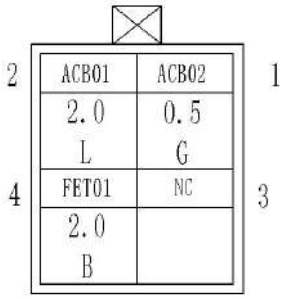


Terminal number	Wire color	Signal name

1	R	AC02b Switching power supply is ON
2	RW	CANHz CAN communication high
3	RY	CANLz CAN Communication Low
4	B	AC2G switching power supply is negative

Blower FET switch

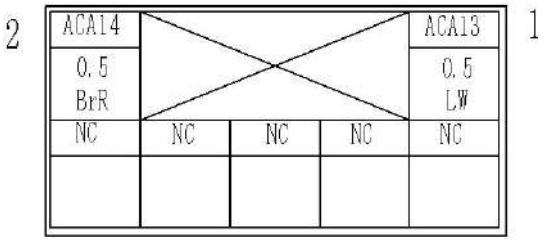
Connector number	M43
Connector name	Blower FET switch
Connector type	PP0303503(THB)



Terminal number	Wire color	Signal name
1	G	AC02 Switching power supply is ON
2	L	ACB01 blower open signal
4	B	FET01 blower FET switching ground

Internal and external circulation mode conversion actuator

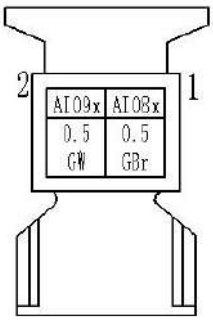
Connector number	M44
Connector name	Internal and external circulation mode conversion actuator
Connector type	PH845-07020(KUM)



Terminal number	Line color	Signal name
1	LW	ACA13 new return air motor is positive
2	BrR	ACA14 New Return Air Motor Negative

Occupant front airbag

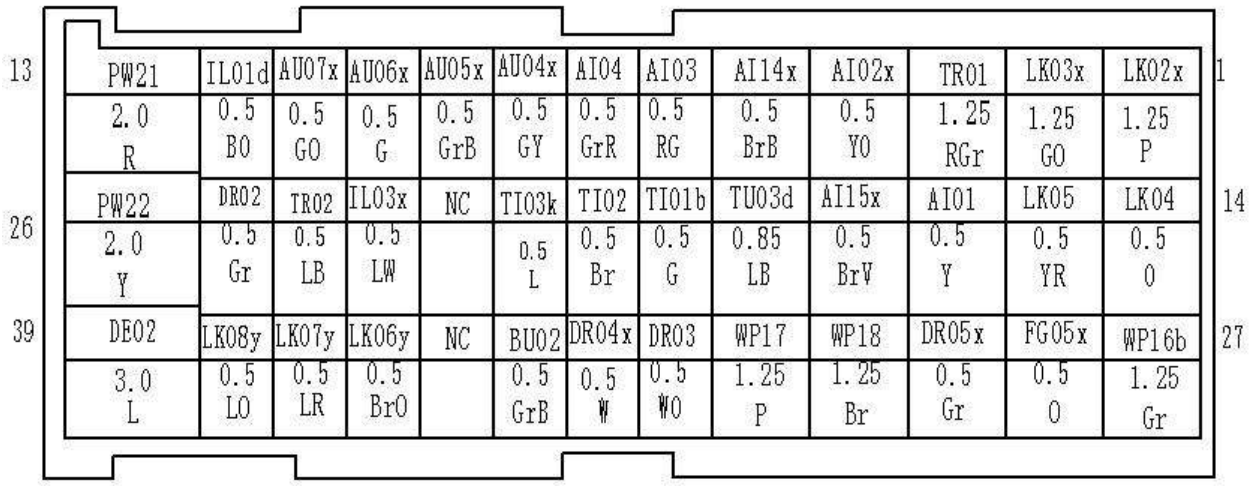
Connector number	M45
Connector name	Occupant front airbag
Connector type	1473139-1（AMP）



Terminal number	Line color	Signal name
1	GBr	AI08x Positive Passenger Airbag Positive
2	GW	AI09x occupant positive airbag negative

Body harness I

Connector number	M46
Connector name	Body harness I
Connector type	1743089-2 (black) (AMP)



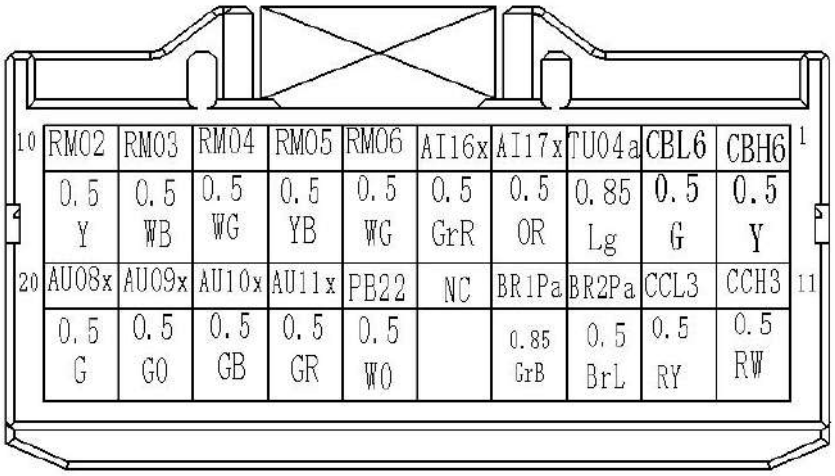
13	PW21	IL01d	AU07x	AU06x	AU05x	AU04x	AI04	AI03	AI14x	AI02x	TR01	LK03x	LK02x	1
	2.0 R	0.5 BO	0.5 GO	0.5 G	0.5 GrB	0.5 GY	0.5 GrR	0.5 RG	0.5 BrB	0.5 YO	1.25 RGr	1.25 GO	1.25 P	
	PW22	DR02	TR02	IL03x	NC	TI03k	TI02	TI01b	TU03d	AI15x	AI01	LK05	LK04	
26	2.0 Y	0.5 Gr	0.5 LB	0.5 LW		0.5 L	0.5 Br	0.5 G	0.85 LB	0.5 BrV	0.5 Y	0.5 YR	0.5 O	14
39	DE02	LK08y	LK07y	LK06y	NC	BU02	DR04x	DR03	WP17	WP18	DR05x	FG05x	WP16b	27
	3.0 L	0.5 LO	0.5 LR	0.5 BrO		0.5 GrB	0.5 W	0.5 WO	1.25 P	1.25 Br	0.5 Gr	0.5 O	1.25 Gr	

Terminal number	Wire color	Signal name
1	P	LK02x
2	GO	LK03x
3	RGr	TR01
4	YO	AI02x
5	BrB	AI14x
6	RG	AI03
7	GrR	AI04
8	GY	AU04x
9	GrB	AU05x
10	G	AU06x
11	GO	AU07x
12	BO	IL01d
13	R	PW21
14	O	LK04
15	YR	LK05
16	Y	AI01
17	BrV	AI15x
18	LB	TU03d

19	G	TI01b
20	Br	TI02
21	L	TI03k
23	LW	IL03x
24	LB	TR02
25	Gr	DR02
26	Y	PW22
27	Gr	WP16b
28	O	FG05x
29	Gr	DR05x
30	Br	WP18
31	P	WP17
32	WO	DR03
33	W	DR04x
34	GrB	BU02
36	BrO	LK06y
37	LR	LK07y
38	LO	LK08y
39	L	DE02

Body harness II

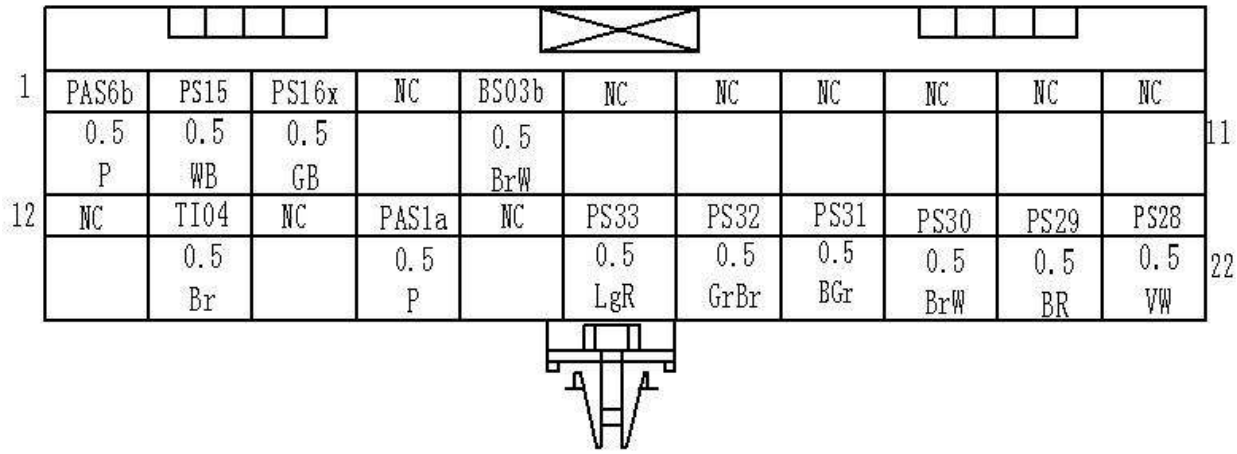
Connector number	M47
Connector name	Body harness II
Connector type	936095-1(AMP)



Terminal number	Line color	Signal name
1	Y	CBH6
2	G	CBL6
3	Lg	TU04a
4	OR	AI17x
5	GrR	AI16x
6	WG	RM06
7	YB	RM05
8	WG	RM04
9	WB	RM03
10	Y	RM02
11	RW	CCH3
12	RY	CCL3
13	Br	BR2Pa
14	GrB	BR1Pa
16	WO	PB22
17	GR	AU11x
18	GB	AU10x
19	GO	AU09x
20	G	AU08x

Body harness Ⅳ

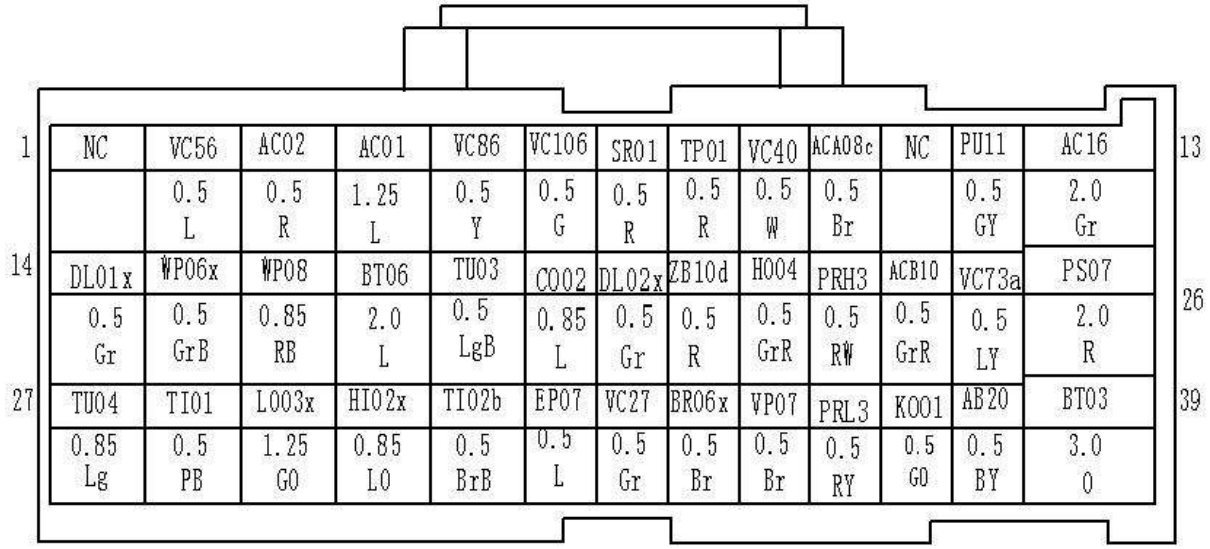
Connector number	M48
Connector name	Body harness Ⅳ
Connector type	936154-1(AMP)



Terminal number	Line color	Signal name
1	P	PAS6b
2	WB	PS15
3	GB	PS16x
5	BrW	BS03b
13	Br	TI04
15	P	PAS1a
17	LgR	PS33
18	GrBr	PS32
19	BGr	PS31
20	BrW	PS30
21	BR	PS29
22	VW	PS28

Engine harness I

Connector number	M49
Connector name	Engine harness I
Connector type	1743086-2（black）(AMP)

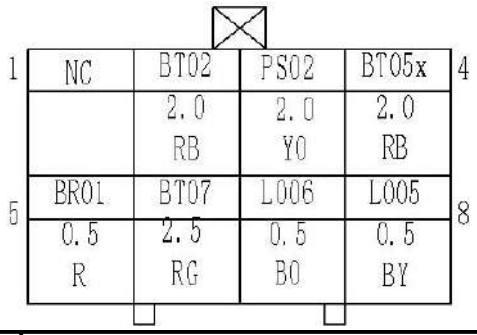


Terminal number	Wire color	Signal name
2	L	VC56
3	R	AC02
4	L	AC01
5	Y	VC86
6	G	VC106
7	R	SR01
8	R	TP01
9	W	VC40
10	Br	ACA08c
12	GY	PU11
13	Gr	AC16

14	Gr	DL01x
15	GrB	WP06x
16	RB	WP08
17	L	BT06
18	LgB	TU03
19	L	CO02
20	Gr	DL02x
21	R	ZB10d
22	GrR	HO04
23	RW	PRH3
24	GrR	ACB10
25	LY	VC73a
26	Gr	PS07
27	Lg	TU04
28	PB	TI01
29	GO	LO03x
30	LO	HI02x
31	BrB	TI02b
32	L	EP07
33	Gr	VC27
34	Br	BR06x
35	Br	VP07
36	RY	PRL3
37	GO	KO01
38	BY	AB20
39	O	BT03

Engine harness Ⅱ

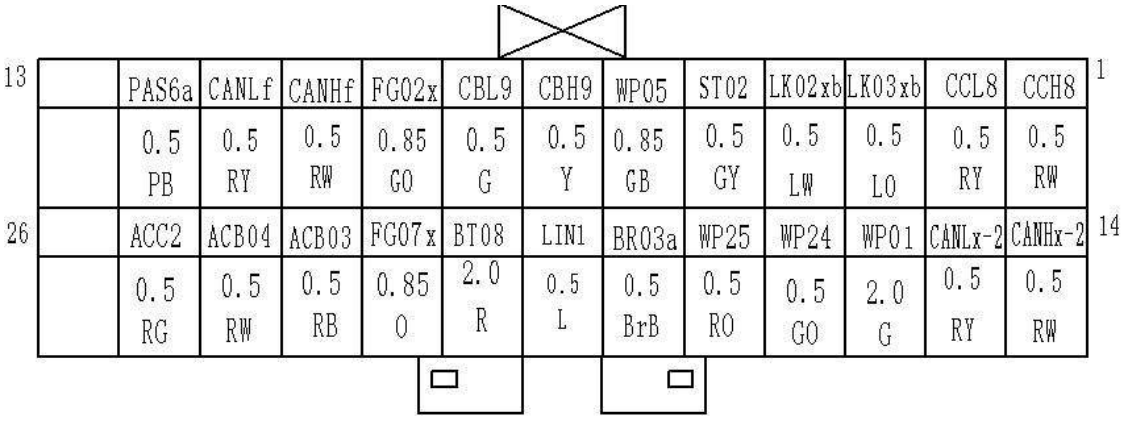
Connector number	M50
Connector name	Engine harness Ⅱ
Connector type	MG620270(white)（KET）



Terminal number	Wire color	Signal name
2	RB	BT02
3	YO	PS02
4	RB	BT05x
5	R	BR01
6	RG	BT07
7	BO	LO06
8	BY	LO05

Engine harness III

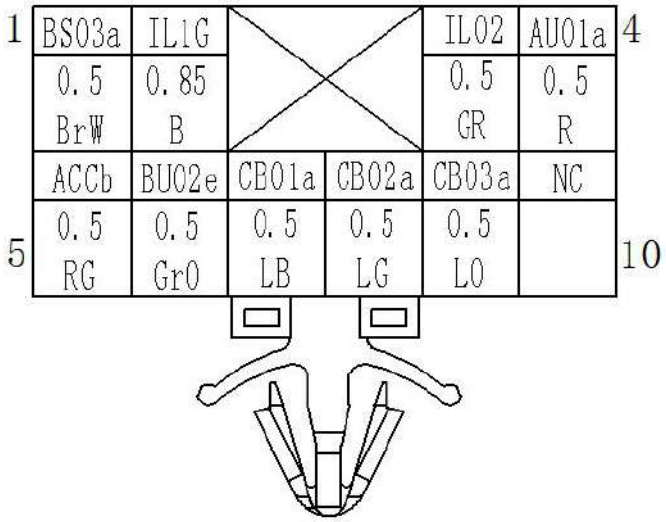
Connector number	M51
Connector name	Engine harness III
Connector type	936133-1（AMP）



Terminal number	Line color	Signal name
1	RW	CCH8
2	RY	CCL8
3	LO	LK03xb
4	LW	LK02xb
5	GY	ST02
6	GB	WP05
7	Y	CBH9
8	G	CBL9
9	GO	FG02x
10	RW	CANHf
11	RY	CANLf
12	PB	PAS6a
14	RW	CANHx-2
15	RY	CANLx-2
16	G	WP01
17	GO	WP24
18	RO	WP25
19	BrB	BR03a
20	L	LIN1
21	R	BT08
22	O	FG07x
23	RB	ACB03
24	RW	ACB04
25	RG	ACC2

Ceiling harness

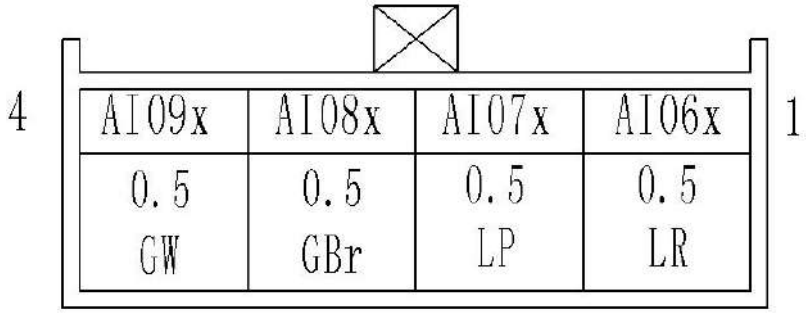
Connector number	M52
Connector name	Ceiling harness
Connector type	936129-1（Original color）[AMP]



Terminal number	Wire color	Signal name
1	BrW	BS03a
2	B	IL1g
3	GR	IL02
4	R	AU01a
5	RG	ACCb
6	GrO	BU02e
7	LB	CB01a
8	LG	CB02a
9	LO	CB03a

Airbag Connector I

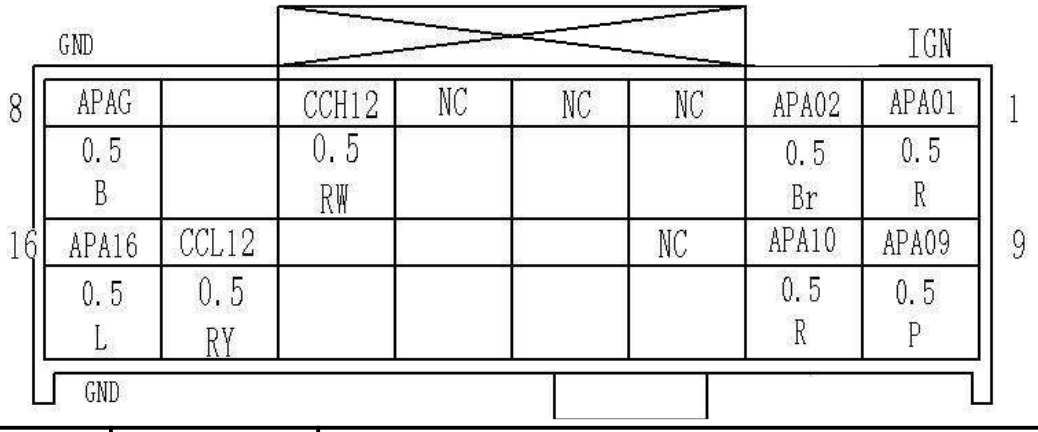
Connector number	M53
Connector name	Airbag Connector I
Connector type	174922-1(AMP)



Terminal number	Line color	Signal name
1	LR	AI06x Driver Front Airbag Positive
2	LP	AI07x Driver Front Airbag Negative
3	GBr	AI08x First Row Front Airbag Positive
4	GW	AI09x Front passenger bag negative

APA controller 1 (only semi-automatic parking models available)

Connector number	M54
Connector name	APA controller 1
Connector type	

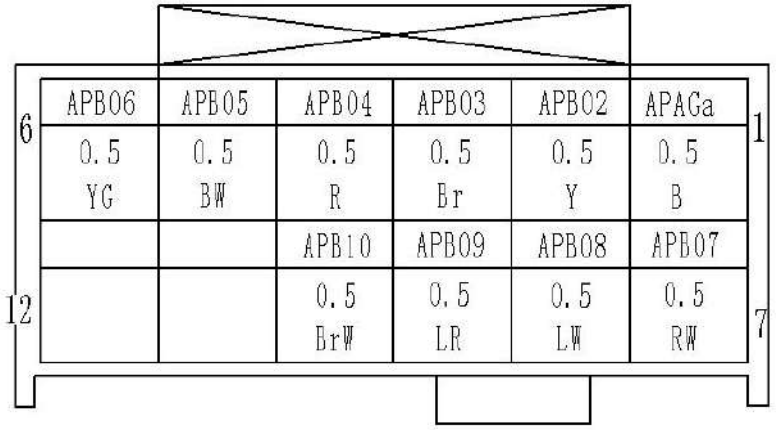


Terminal number	Wire color	Signal name
1	R	APA01 Power supply positive
2	Br	APA02 rear Buzzer Input -
6	RW	CCH12 CAN communication is high

8	B	APAG ground
9	P	APA09 parking instruction (connect switch work indicator +)
10	R	APA10 post buzzer input +
15	RY	CCL12 CAN communication is low
16	L	APA16 Parking Button Detection (One Switch Control Circuit)

APA controller 2 (only semi-automatic parking models available)

Connector number	M55
Connector name	APA controller 2
Connector type	

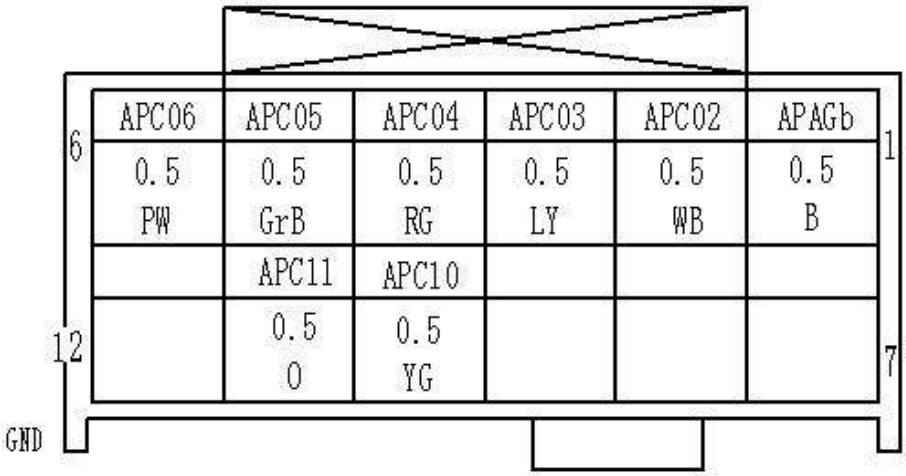


Terminal number	Wire color	Signal name
1	B	APAGa ground
2	Y	APB02 front radar power
3	Br	APB03 Front Buzzer Input -
4	R	APB04 front buzzer input +
5	BW	APB05 Rear Left Radar
6	YG	APB06 Reversing Left Front Radar
7	RW	APB07 reverse right front middle radar

8	LW	APB08 reverse right front radar
9	LR	APB09 Parking Left Front Radar
10	BrW	APB10 Parking Right Front Radar

APA controller 3 (only semi-automatic parking models available)

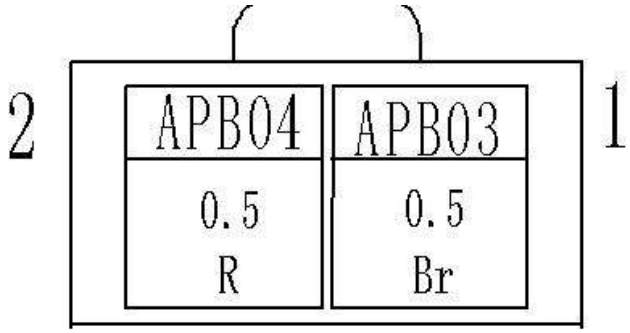
Connector number	M56
Connector name	APA controller 3
Connector type	



Terminal number	Wire color	Signal name
1	B	APAGb ground
2	WB	APC02 Rear Right Rear Radar
3	LY	APC03 Reverse Left Rear Radar
4	RG	APC04 Rear Right Rear Radar
5	GrB	APC05 Rear Left Rear Radar
6	PW	APC06 Parking Right Rear Radar
10	YG	APC10 Parking Left Rear Radar
11	O	APC11 Rear Radar Power Supply

Front buzzer (only semi-automatic parking models available)

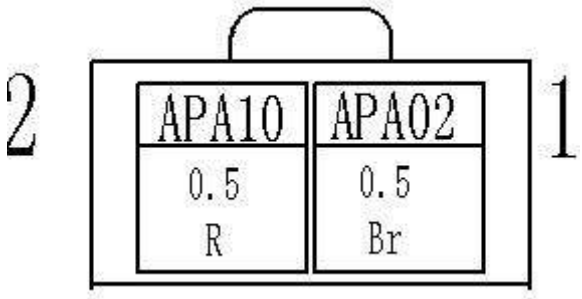
Connector number	M57
Connector name	Front Buzzer
Connector type	AMP 1534027-1



Terminal No.	Wire color	Signal name
1	Br	APB03 Front Buzzer Input -
2	R	APB04 front buzzer input +

rear buzzer (only semi-automatic parking models available)

Connector number	M58
Connector name	Front Buzzer
Connector type	AMP 1534027-1

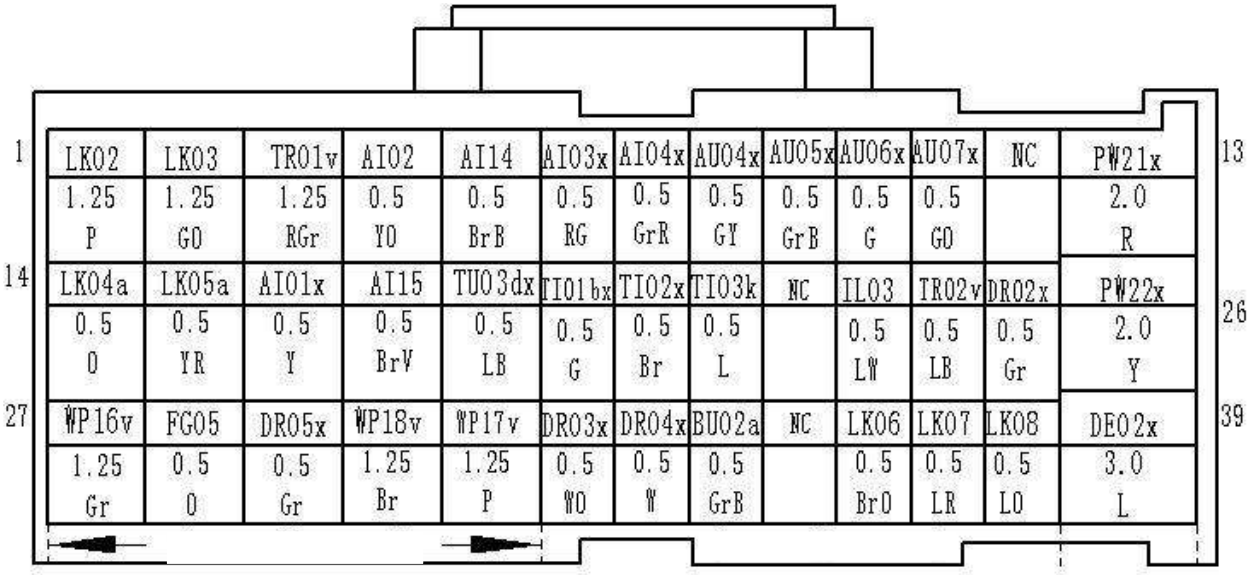


Terminal No.	Wire color	Signal name
1	Br	APA02 rear Buzzer Input -
2	R	APA10 post buzzer input +

Frame harness connector

Main harness interface I

Connector number	B01
Connector name	Main harness interface I
Connector type	1743086-2（black）(AMP)



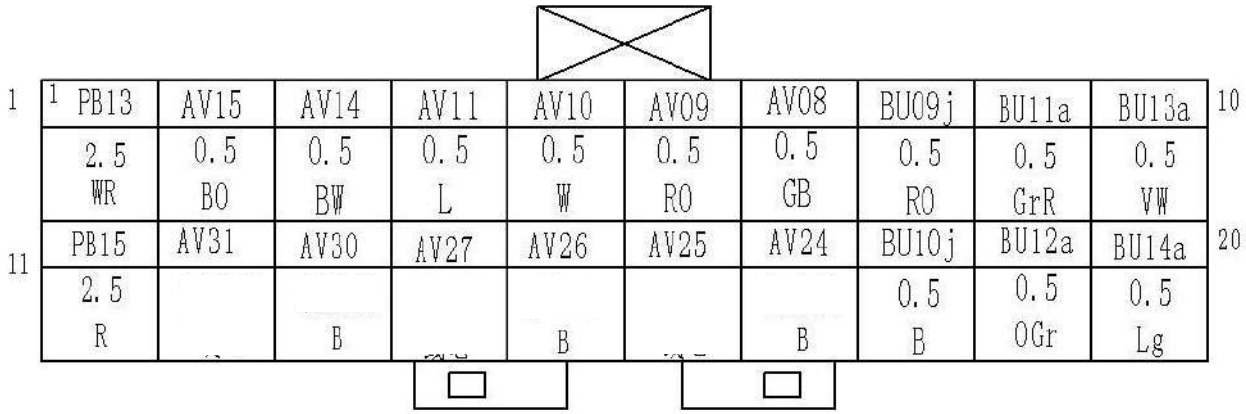
Terminal number	Wire color	Signal name
1	P	LK02
2	GO	LK03
3	RGr	TR01v
4	YO	AI02
5	BrB	AI14
6	RG	AI03x
7	GrR	AI04x
8	GY	AU04x
9	GrB	AU05x
10	G	AU06x
11	GO	AU07x
13	R	PW21x

14	O	LK04a
15	YR	LK05a
16	Y	AI01x
17	BrV	AI15
18	LB	TU03dx
19	G	TI01bx
20	Br	TI02x
21	L	TI03x
23	LW	IL03
24	LB	TR02v
25	Gr	DR02x
26	Y	PW22x
27	Gr	WP16v
28	O	FG05
29	Gr	DR05x
30	Br	WP18v
31	P	WP17v
32	WO	DR03x
33	W	DR04x
34	GrB	BU02a
36	BrO	LK06
37	LR	LK07
38	L0	LK08
39	L	DE02x

Front Cabling Interface II

Connector number	B02
Connector name	Front Cabling Interface II

Connector type	936131-1[AMP](original color)

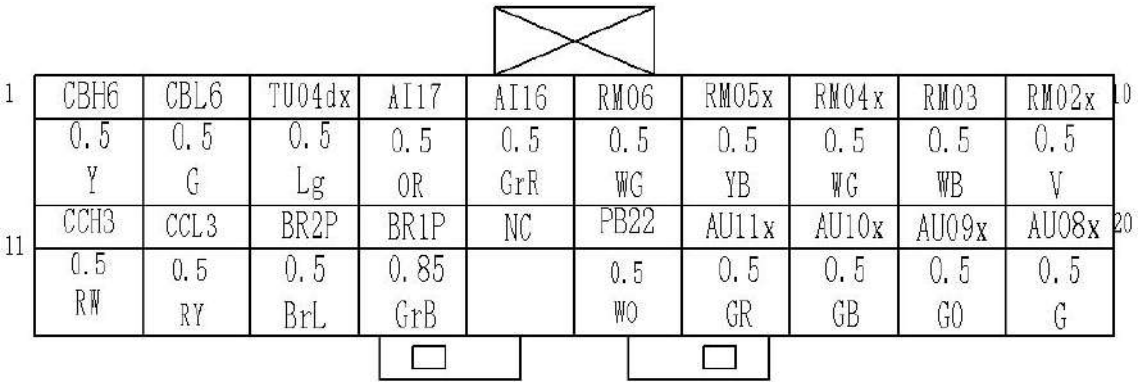


Terminal number	Wire color	Signal name
1	WR	PB13
2	BO	AV15
3	BW	AV14
4	L	AV11
5	W	AV10
6	RO	AV09
7	GB	AV08
8	RO	BU09j
9	GrR	BU11a
10	VW	BU13a
11	R	PB15
12	Coaxial wire core	AV31
13	B	AV30
14	Coaxial wire core	AV27
15	B	AV26
16	Coaxial wire	AV25

	core	
17	B	AV24
18	B	BU10j
19	OGr	BU12a
20	Lg	BU14a

Main harness interface II

Connector number	B03
Connector name	Main harness interface II
Connector type	936131-1

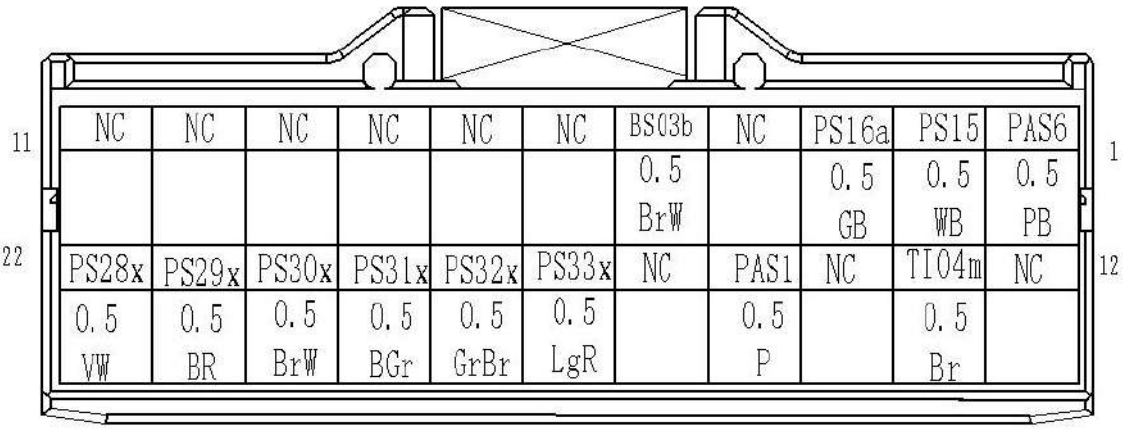


Terminal number	Line color	Signal name
1	Y	CBH6
2	G	CBL6
3	Lg	TU04dx
4	OR	AI17
5	GrR	AI16
6	WG	RM06
7	YB	RM05x
8	WG	RM04x
9	WB	RM03
10	V	RM02x
11	RW	CCH3

12	RY	CCL3
13	BrL	BR2P
14	GrB	BR1P
16	WO	PB22
17	GR	AU11x
18	GB	AU10x
19	GO	AU09x
20	G	AU08x

Main harness interface IV

Connector number	B04
Connector name	Main harness interface IV
Connector type	936151-1(AMP)

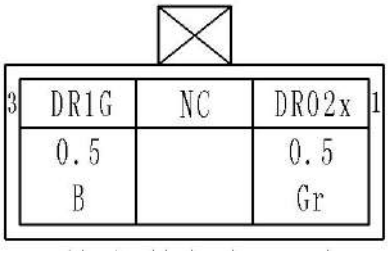


Terminal number	Line color	Signal name
1	PB	PAS6
2	WB	PS15
3	GB	PS16a
5	BrW	BS03b
13	Br	TI04m
15	P	PAS1

17	LgR	PS33x
18	GrBr	PS32x
19	BGr	PS31x
20	BrW	PS30x
21	BR	PS29x
22	VW	PS28x

Left front door contact switch

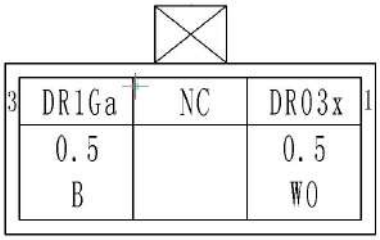
Connector number	B05
Connector name	Left front door contact switch
Connector type	MG611530



Terminal number	Wire color	Signal name
1	Gr	DR02x door open signal
3	B	DR1G ground

Right front door contact switch

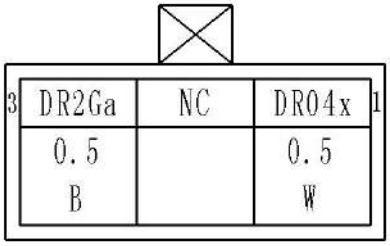
Connector number	B06
Connector name	Right front door contact switch
Connector type	MG611530



Terminal number	Wire color	Signal name
1	WO	DR03x door open signal
3	WV	DR1Ga ground

Left rear door contact switch

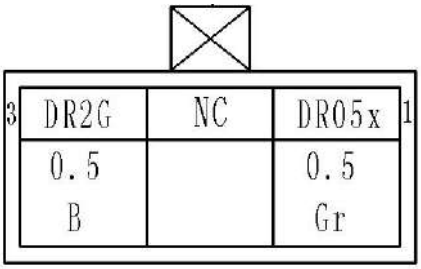
Connector number	B07
Connector name	Left rear door contact switch
Connector type	MG611530



Terminal number	Wire color	Signal name
1	W	DR04x door open signal
3	B	DR2Ga ground

Right rear door contact switch

Connector number	B08
Connector name	Right rear door contact switch
Connector type	MG611530

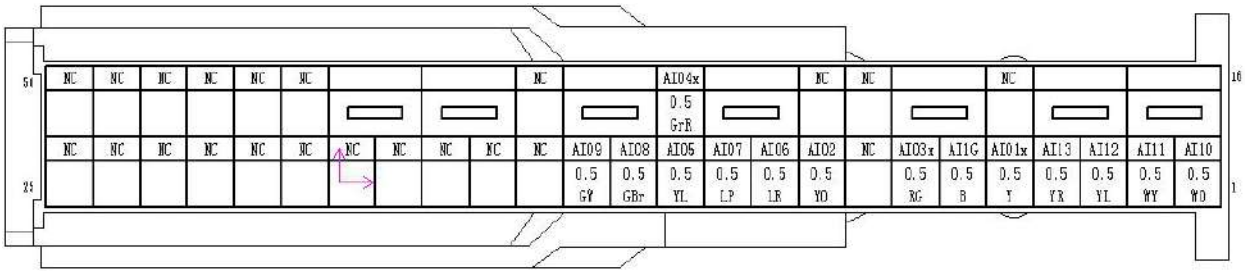


Terminal	Wire color	Signal name

number		
1	WO	DR05x door open signal
3	WV	DR2G ground

Airbag module

Connector number	B09
Connector name	Airbag module
Connector type	3-1393448-0（AMP)

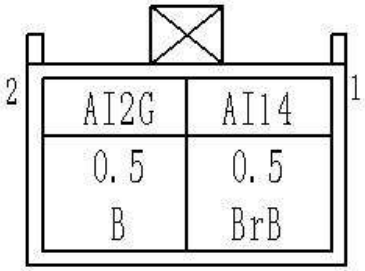


Terminal number	Wire color	Signal name
1	WO	AI10 driver seat belt tension positive
2	WY	AI11 driver seat belt tension negative
3	YL	AI12 driver seat belt pre-tightening positive
4	YR	AI13 driver seat belt pre-tightening negative
5	Y	AI01x power supply
6	B	AI1G ground
7	RG	AI03x fault indicator
9	YO	AI02 K line
10	LR	AI06 driver-seat front airbag positive
11	LP	AI07 driver-seat front airbag negative
12	YL	AI05 collision output 2

13	GBr	AI08 Front passenger's front airbag is positive
14	GW	AI09 Copilot-seat front airbag negative
37	GrR	AI04x collision output 1

Driver safety belt switch

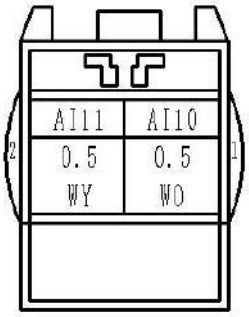
Connector number	B10
Connector name	Driver safety belt switch
Connector type	MG610392 (white)



Terminal No.	Wire color	Signal name
1	BrB	AI14 Driver safety belt switch indicator
2	B	AI2G ground

Driving belt pre-tension device

Connector number	B11
Connector name	Driving belt pre-tension device
Connector type	1612121-1

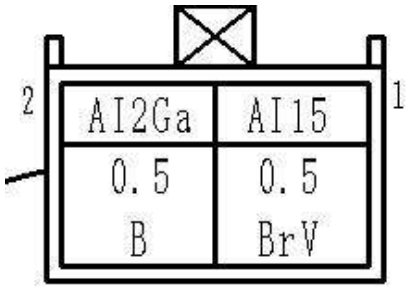


Terminal	Line color	Signal name

number		
1	WO	AI10 driver seat belt tension positive
2	WY	AI11 driver seat belt tension negative

Occupant seat belt switch

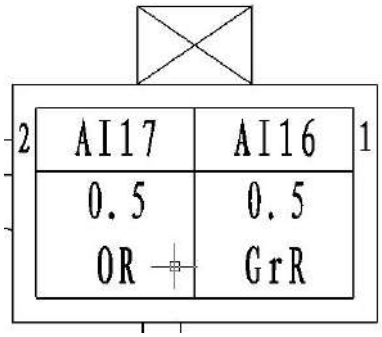
Connector number	B12
Connector name	Occupant seat belt switch
Connector type	MG610392 (white)



Terminal No.	Wire color	Signal name
1	BrV	AI15 occupant seatbelt switch indication
2	B	AI2Ga ground

Crew seating reminder sensor

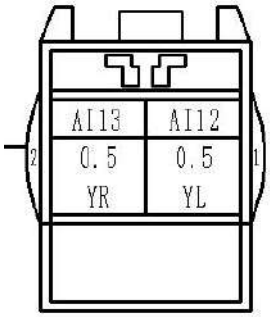
Connector number	B13
Connector name	Crew seating reminder sensor
Connector type	98817-1021（Molex)



Terminal number	Wire color	Signal name
1	GrR	AI16 occupant seating sensor negative
2	OR	AI17 occupant seating sensor positive

Vice-drive safety belt pre-tension device

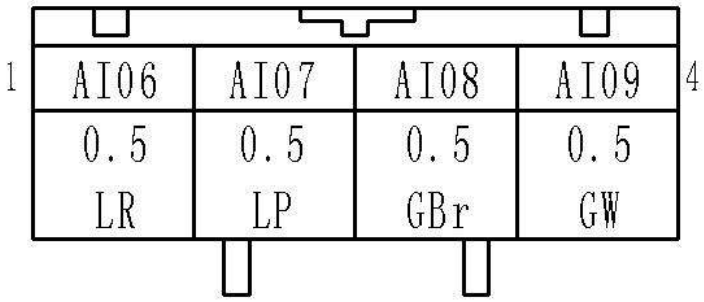
Connector number	B14
Connector name	Vice-drive safety belt pre-tension device
Connector type	1612121-1



Terminal number	Line color	Signal name
1	YL	AI12 driver seat belt pre-tightening positive
2	YR	AI13 driver seat belt pre-tightening negative

Airbag link connector I

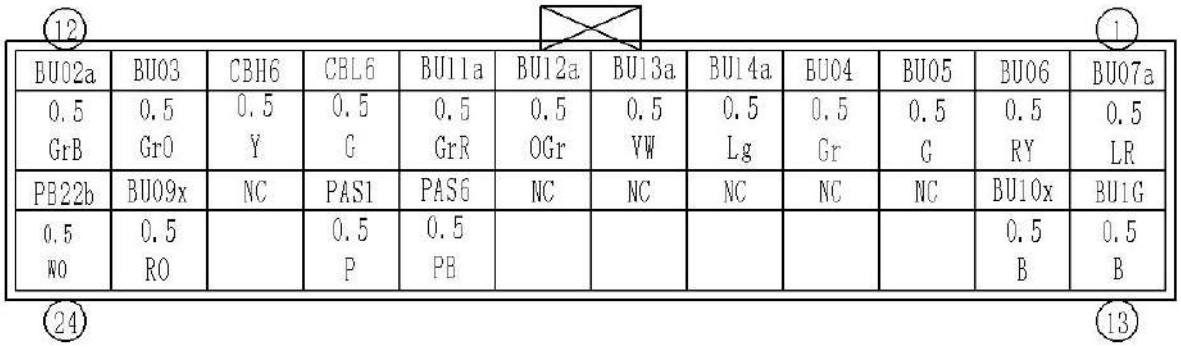
Connector number	B15
Connector name	Airbag link connector I
Connector type	174929-1



Terminal number	Line color	Signal name
1	LR	AI06 driver-seat front airbag positive
2	LP	AI07 driver-seat front airbag negative
3	GBr	AI08 Front passenger's front airbag is positive
4	GW	AI09 Copilot-seat front airbag negative

Reversing radar module

Connector number	B16
Connector name	Reversing radar module
Connector type	1318917-1（TE）

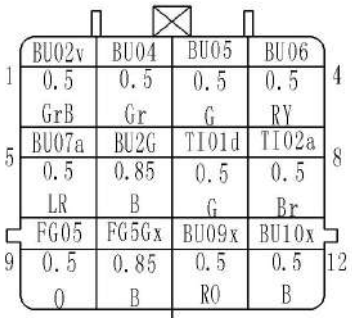


Terminal number	Wire color	Signal name
1	LR	BU07a Right Reversing Sensor Signal
2	RY	BU06 right reverse sensor signal
3	G	BU05 middle left sensor signal
4	Gr	BU04 left reversing sensor signal
5	Lg	BU14a Right Front Radar Sensor Signal
6	VW	BU13a Right front radar sensor signal
7	OGr	BU12a front left radar sensor signal
8	GrR	BU11a Left Front Radar Sensor Signal
9	G	CBL6 CAN communication is low

10	Y	CBH6 CAN Communication High
11	GrO	BU03 Buzzer
12	GrB	BU02a reverse signal
13	B	BU1G ground
14	B	BU10x sensor ground
20	PB	PAS6 LED backlight negative
21	P	PAS1 PAS control signal output
23	RO	BU09x sensor power supply
24	WO	PB22b IGN electricity

Reversing radar harness

Connector number	B17
Connector name	Reversing radar harness
Connector type	MW12MW [HL]

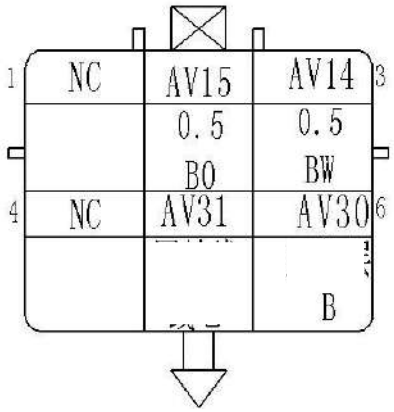


Terminal number	Wire color	Signal name
1	GrB	BU02v reverse signal
2	Gr	BU04 left reversing sensor signal
3	G	BU05 middle left sensor signal
4	RY	BU06 right reverse sensor signal

5	LR	BU07a Right Reversing Sensor Signal
6	B	BU2G sensor ground
7	G	TI01d Left Light Power Supply
8	Br	TI02a right small lamp power supply
9	O	FG05 fog lamp power supply
10	B	FG5Gx fog lights
11	RO	BU09x sensor power supply
12	B	BU10x sensor ground

Camera wiring harness

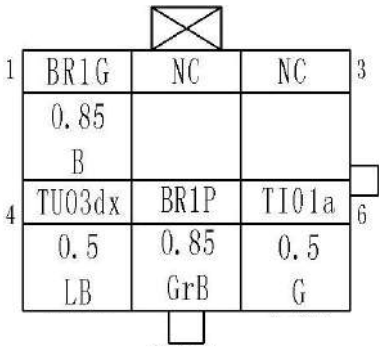
Connector number	B18
Connector name	Camera wiring harness
Connector type	MG640337-5



Terminal number	Wire color	Signal name
2	BO	AV15 rear camera power input
3	B	AV14 rear camera input
5		AV31 rear camera signal input
6	B	AV30 rear camera signal input

Left rear combination lamp

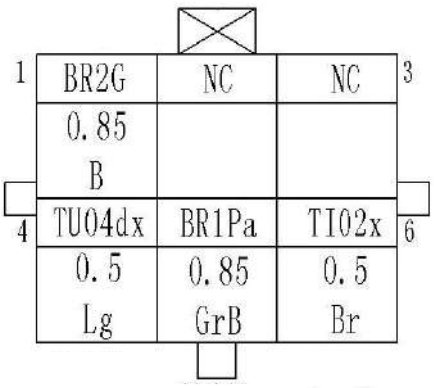
Connector number	B19
Connector name	Left rear combination lamp
Connector type	174264-2 (black)



Terminal No.	Wire color	Signal name
1	B	BR1G ground
4	LB	TU03dx left turn signal
5	GrB	BR1P brake light signal
6	G	TI01a position light signal

Right rear combination lamp

Connector number	B20
Connector name	Right rear combination lamp
Connector type	174264-2 (black)

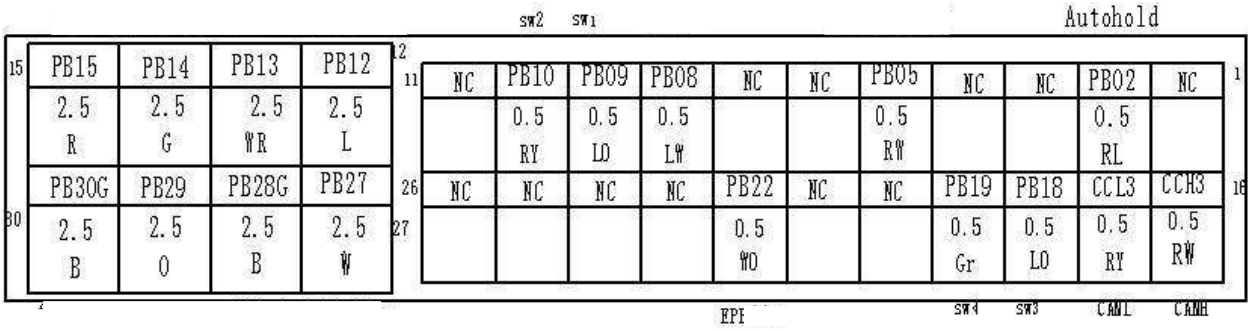


Terminal No.	Wire color	Signal name
1	B	BR2G ground

4	Lg	TU04dx right turn signal
5	GrB	BR1Pa brake light signal
6	Br	TI02x position light signal

EPB controller

Connector number	B21
Connector name	EPB controller
Connector type	1-1534353-4（AMP）

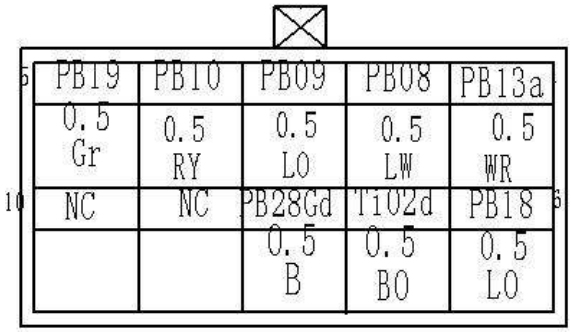


Terminal number	Wire color	Signal name
2	RL	PB02 Autohold signal
5	RW	PB05 Autohold light signal
8	LW	PB08 indicator signal
9	LO	PB09 SW1
10	RY	PB10 SW2
12	L	PB12 right motor power
13	WR	PB13 Constant electricity
14	G	PB14 left motor power supply
15	R	PB15 Constant electricity
16	RW	PB16 CANH

17	RY	PB17 CANL
18	LO	PB18 SW3
19	Gr	PB19 SW4
22	WO	PB22 Control IGN Power Supply
27	W	PB27 Right Motor Power Supply -
28	B	PB28G right motor ground
29	O	PB29 left motor power supply -
30	B	PB30G left motor ground

EPB switch

Connector number	B22
Connector name	EPB switch
Connector type	1-968636-2（AMP）

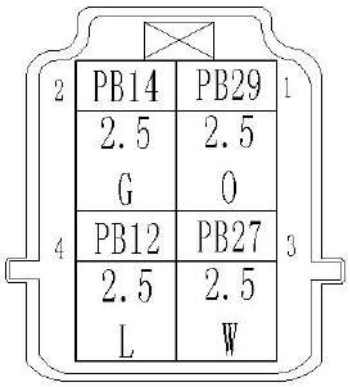


Terminal number	Wire color	Signal name
1	WR	PB13 switching power supply
2	LW	PB08 indicator signal
3	LO	PB09 SW1
4	RY	PB10 SW2
5	Gr	PB19 SW4

6	LO	PB18 SW3
7	BO	TI02d Back light +
8	B	PB28Gd

EPB motor harness connector

Connector number	B23
Connector name	EPB motor harness connector
Connector type	936254-2

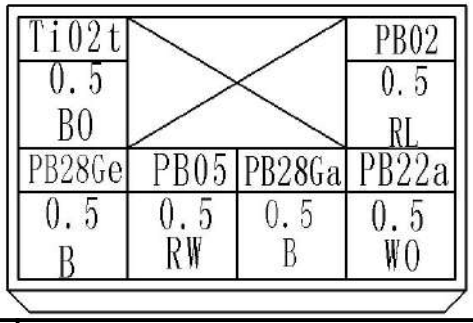


Terminal number	Line color	Signal name
1	O	PB29 left motor power supply -
2	G	PB14 left motor power +
3	W	PB27 Right Motor Power Supply -
4	L	PB12 right motor power +

Autohold switch

Connector number	B24
Connector name	Autohold switch

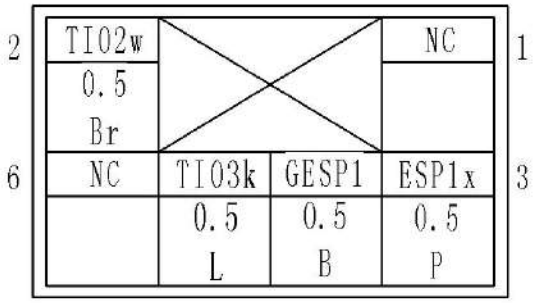
Connector type	MG651044 (white) (KET)



Terminal number	Wire color	Signal name
1	RL	PB02 Autohold switch signal
2	BO	TI02t Back light +
3	WO	PB22a Autohold lamp power supply
4	B	PB28Ga
5	RW	PB05 Autohold light signal
6	B	PB28Ge Backlight -

ESC switch

Connector number	B25
Connector name	ESC switch
Connector type	MG651044 (white)

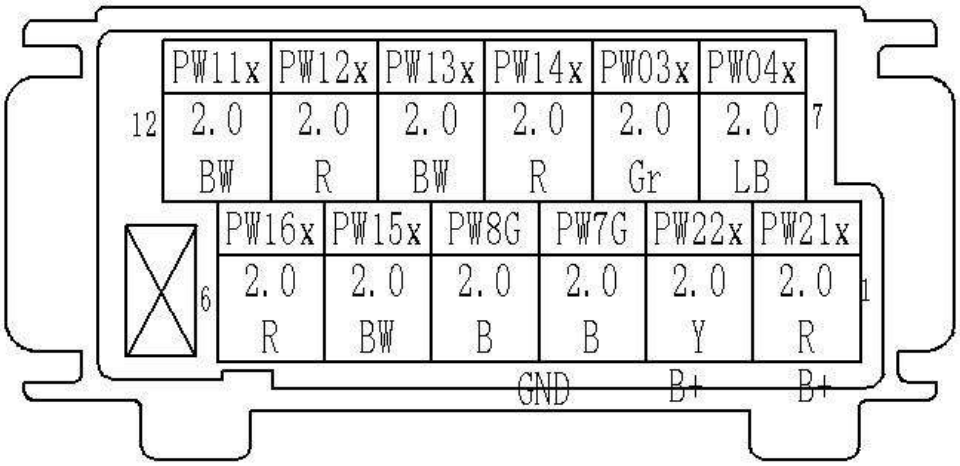


Terminal No.	Wire color	Signal name
2	Br	TI02w back light +
3	P	ESP1x ESP signal
4	B	GESP1

5	L	TI03k back light -

APW controller C1

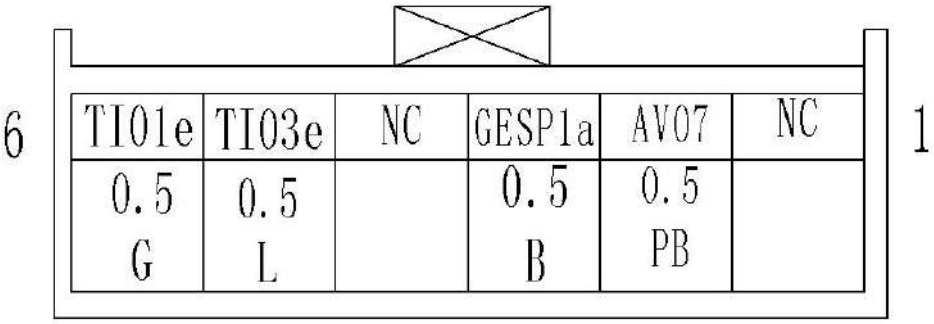
Connector number	B26
Connector name	APW controller C1
Connector type	311212058RAB HL



Terminal number	Wire color	Signal name
1	R	PW21x Constant 1
2	Y	PW22x Constant 2
3	B	PW7G ground
4	B	PW8G ground
5	BW	PW15x rear right drop
6	R	PW16x rises right rear
7	LB	PW04x rises to the left
8	Gr	PW03x left front drop
9	R	PW14x right front rising
10	BW	PW13x right front drop
11	R	PW12x rear left rise
12	BW	PW11x left rear drop

360 panoramic switch

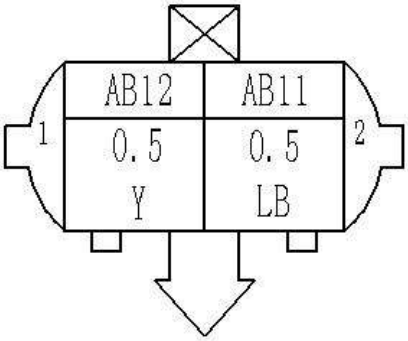
Connector number	B27
Connector name	360 panoramic switch
Connector type	MG653251-41（light-gray）



Terminal No.	Wire color	Signal name
2	PB	AV07 panorama activation button
3	B	GESP1a ground
5	L	TI03e back light negative
6	G	TI01e back light positive

ABS right rear wheel speed sensor

Connector number	B28
Connector name	ABS right rear wheel speed sensor
Connector type	MG641221-5[KET] (Black)

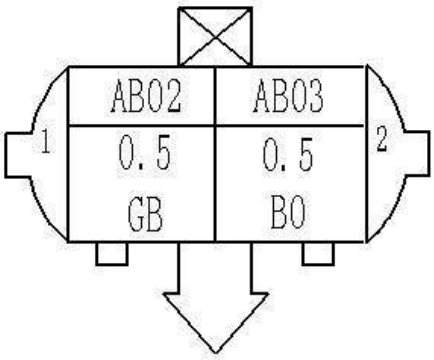


Terminal number	Wire color	Signal name

1	Y	AB12 right rear wheel speed sensor signal ground
2	LB	AB11 right rear wheel speed sensor signal

ABS left rear wheel speed sensor

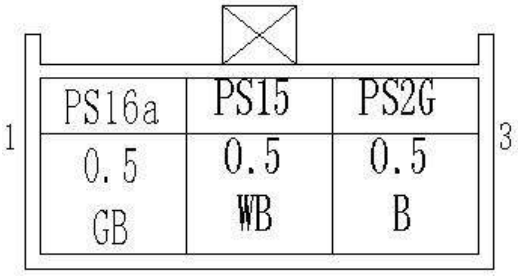
Connector number	B29
Connector name	ABS left rear wheel speed sensor
Connector type	MG641221-5[KET] (Black)



Terminal number	Wire color	Signal name
1	GB	AB02 left rear wheel speed sensor signal ground
2	BO	AB03 left rear wheel speed sensor signal

PEPS spare antenna

Connector number	B30
Connector name	PEPS spare antenna
Connector type	368500-1

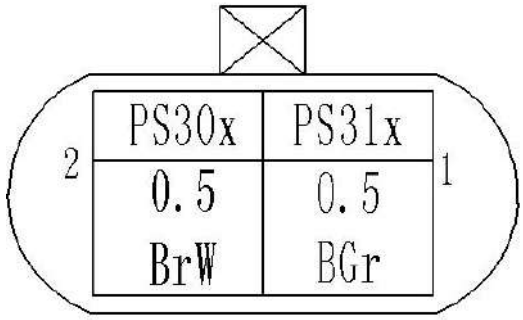


Terminal	Line color	Signal name

number		
1	GB	PS16a power supply (permanent)
2	WB	PS15 Alternate Antenna Lin
3	B	PS2G Ground

Rear low-frequency antenna

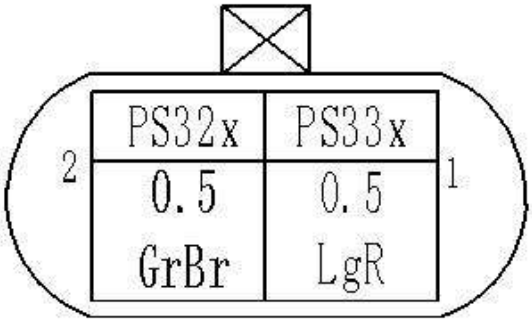
Connector number	B31
Connector name	Rear low-frequency antenna
Connector type	0413902THB(DJ7021-2-21 ZJZ）



Terminal number	Wire color	Signal name
1	BGr	PS31x Rear Low frequency antenna positive
2	BrW	PS30x Rear Low frequency antenna negative

Tail door low-frequency

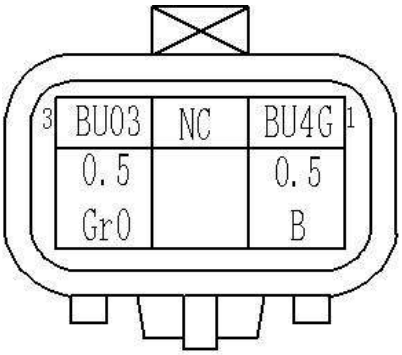
Connector number	B32
Connector name	Tail door low-frequency
Connector type	0413902THB(DJ7021-2-21 ZJZ）



Terminal number	Wire color	Signal name
1	LgR	PS33x tail gate low frequency antenna positive
2	GrBr	PS32x tail gate low frequency antenna negative

Reverse beep signal

Connector number	B33
Connector name	Reverse beep signal
Connector type	3TLC-3BL HL

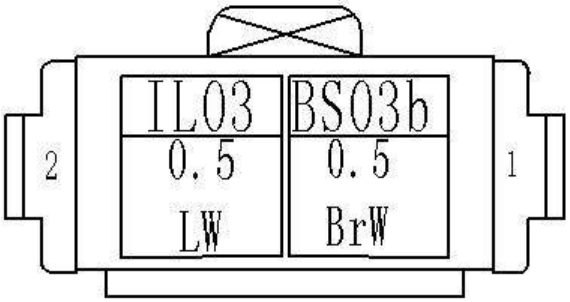


Terminal number	Wire color	Signal name
1	B	BU4G ground
3	GrO	BU03 Buzzer Positive

Luggage light connector

Connector number	B34
Connector name	Luggage light connector

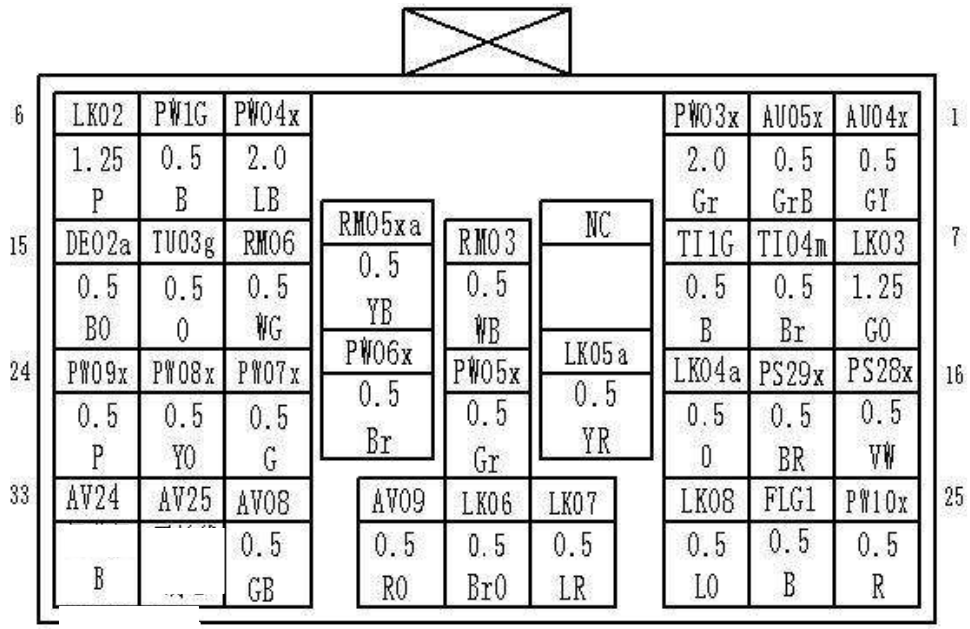
Connector type	14650.669.696(Lear)



Terminal number	Wire color	Signal name
1	BrW	BS03b trunk light positive
2	LW	IL03 trunk light negative

Left Front Door Harness

Connector number	B35
Connector name	Left Front Door Harness
Connector type	936283-1[AMP](original color)



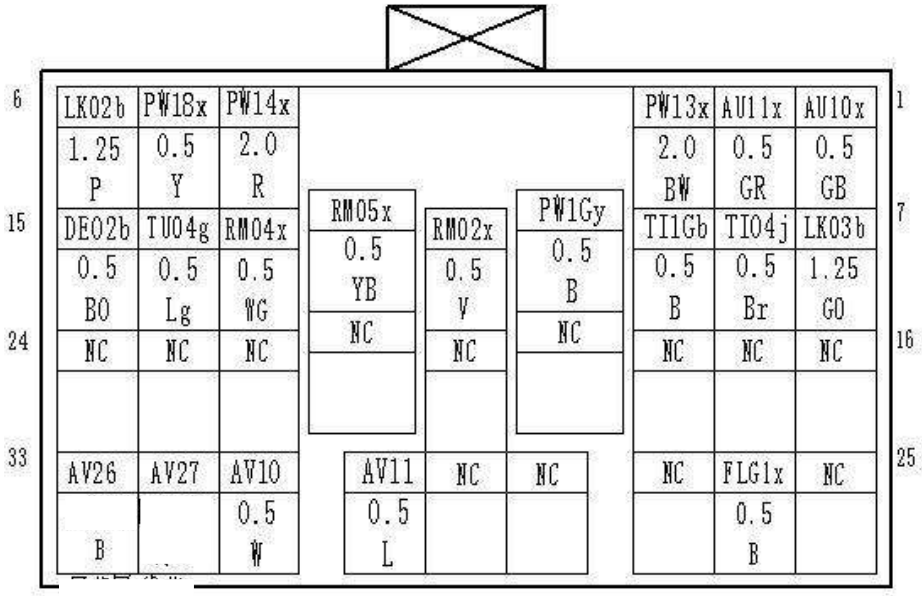
Terminal number	Wire color	Signal name
1	GY	AU04x

2	GrB	AU05x
3	Gr	PW03x
4	LB	PW04x
5	B	PW1G
6	P	LK02
7	GO	LK03
8	Br	TI04m
9	B	TI1G
11	WB	RM03
12	YB	RM05xa
13	WG	RM06
14	O	TU03g
15	BO	DE02a
16	VW	PS28x
17	BR	PS29x
18	O	LK04a
19	YR	LK05a
20	Gr	PW05x
21	Br	PW06x
22	G	PW07x
23	YO	PW08x
24	O	PW09x
25	R	PW10x
26	B	FLG1
27	LO	LK08
28	LR	LK07
29	BrO	LK06
30	RO	AV09

31	GB	AV08
32		AV25
33	B	AV24

Right Front Door Harness

Connector number	B36
Connector name	Right Front Door Harness
Connector type	936283-1[AMP](original color)

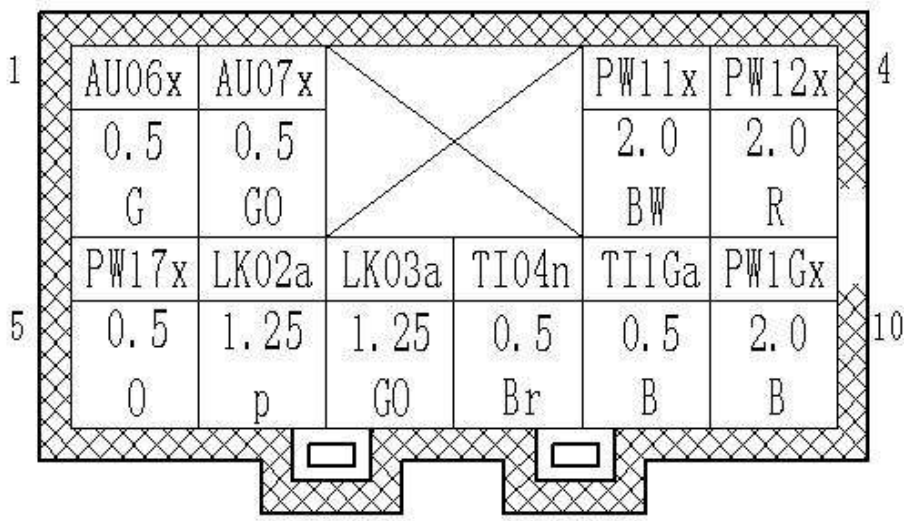


Terminal number	Wire color	Signal name
1	GB	AU10x
2	GR	AU11x
3	BW	PW13x
4	R	PW14x
5	Y	PW18x
6	P	LK02b
7	GO	LK03b
8	Br	TI04j
9	B	TI1Gb
10	B	PW1Gy

11	V	RM02x
12	YB	RM05x
13	WG	RM04x
14	Lg	TU04g
15	BO	DE02b
26	B	FLG1x
30	L	AV11
31	W	AV10
32		AV27
33	B	AV26

Left Rear Door Harness

Connector number	B37
Connector name	Left Rear Door Harness
Connector type	936129-1[AMP](original color)

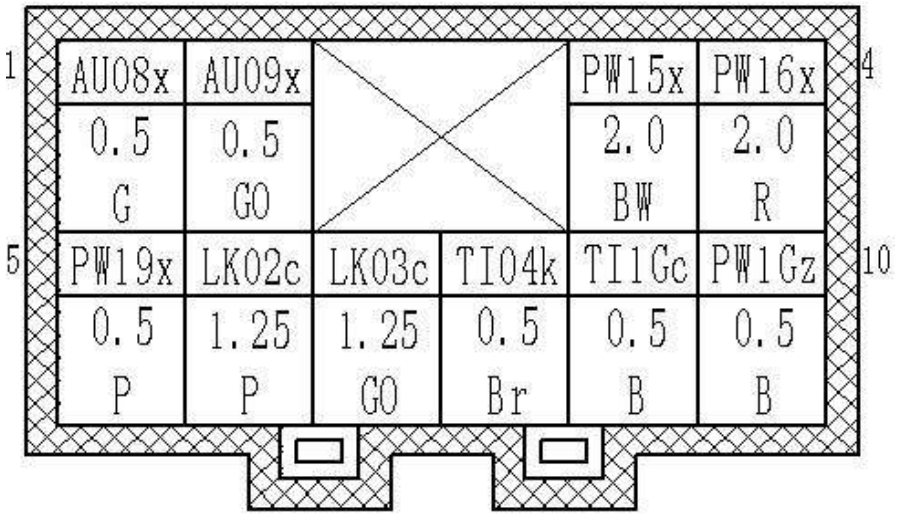


Terminal number	Wire color	Signal name
1	G	AU06x
2	GO	AU07x

3	BW	PW11x
4	R	PW12x
5	O	PW17x
6	P	LK02a
7	GO	LK03a
8	Br	TI04n
9	B	TI1Ga
10	B	PW1Gx

Right Rear Door Harness

Connector number	B38
Connector name	Right Rear Door Harness
Connector type	936129-1[AMP](original color)

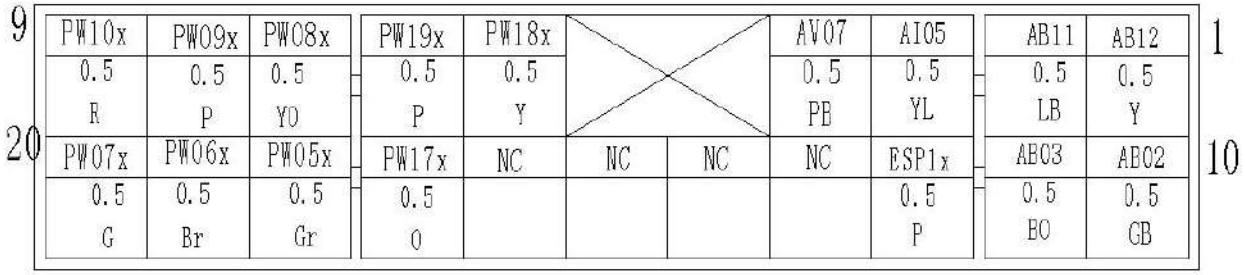


Terminal number	Wire color	Signal name
1	G	AU08x
2	GO	AU09x
3	BW	PW15x
4	R	PW16x

5	P	PW19x
6	P	LK02c
7	GO	LK03c
8	Br	TI04k
9	B	TI1Gc
10	B	PW1Gz

Front cabin harness I

Connector number	B39
Connector name	Front cabin harness I
Connector type	MG651080(white)[KET]

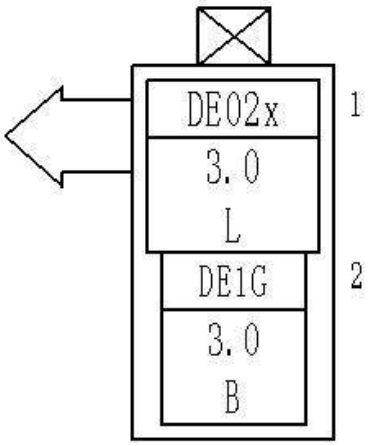


Terminal number	Wire color	Signal name
1	Y	AB12
2	LB	AB11
3	YL	AI05
4	PB	AV07
5	Y	PW18x
6	P	PW19x
7	YO	PW08x
8	P	PW09x
9	R	PW10x
10	GB	AB02
11	BO	AB03

12	P	ESP1x
17	O	PW17x
18	Gr	PW05x
19	Br	PW06x
20	G	PW07x

Tail door transition harness 1

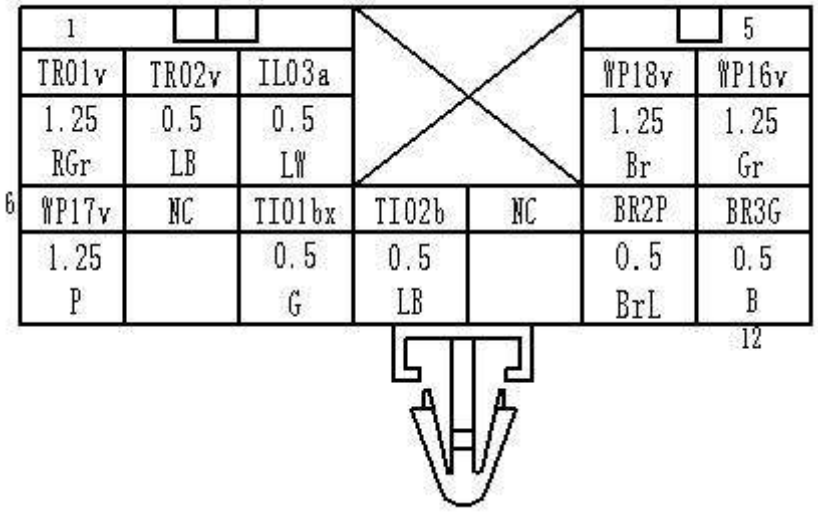
Connector number	B40
Connector name	Tail door transition harness 1
Connector type	368021-1(AMP)



Terminal number	Line color	Signal name
1	L	DE02x
2	B	DE1G

Tail door transition harness 2

Connector number	B41
Connector name	Tail door transition harness 2
Connector type	936207-1(white）(AMP)



Terminal number	Wire color	Signal name
1	RGr	TR01v
2	LB	TR02v
3	LW	IL03a
4	Br	WP18v
5	Gr	WP16v
6	P	WP17v
8	G	TI01bx
9	LB	TI02b
11	BrL	BR2P
12	B	BR3G

Ground point

Grounding point 1

Connector number	FG01
Connector name	Grounding point 1
Connector type	ST710784-3/ST710806-3

Terminal No.	Wire color	Signal name
1	B	FG1G right front fog lamp
2	B	VP02 vacuum pump controller
3	B	DF102 Solenoid valve ground
4	B	DL1Gb right day driving lights
5	B	LO1G right front low beam
6	B	TU4G right front turn signal
7	B	TI1G position lamp/motor ground
8	B	HI1G high beam
9	B	HO1G electric horn

Grounding point 2

Connector number	FG02
Connector name	Grounding point 2
Connector type	ST710782-3

Terminal number	Wire color	Signal name
1	B	AB1G ABS power ground
2	B	AB2G ABS

Grounding point 3

Connector number	FG03
Connector name	Grounding point 3
Connector type	ST710782-3

Terminal number	Wire color	Signal name
1	B	FA1G cooling fan power ground
2	B	CW1G Battery Pump Power Ground
3	B	HO2G Bass Snail Horn Power Ground

Grounding point 4

Connector number	FG04
Connector name	Grounding point 4
Connector type	ST710784-3/ST710806-3

Terminal No.	Wire color	Signal name
1	B	WP1G wiper power ground
2	B	PU16 Motor Controller Power Ground
3	B	PC05 Pump Relay Power Ground
4	B	VC51-GND High Voltage Interlock Grounding
5	B	CAN-GND CAN communication shield ground
4	B	WP2G front wiper motor power ground
5	B	BR4G brake oil level switch
6	B	GN12 Vacuum Pump Relay Control Ground
7	B	GND2 cooling fan relay control ground

Grounding point 6

Connector number	FG06
Connector name	Grounding point 6
Connector type	ST710784-3/ST710806-3

Terminal No.	Wire color	Signal name
1	B	TU2G Travel/Location Light Power Ground
2	B	FG2G Left Front Fog Lamp Power Ground
3	B	LO2G front left low beam
4	B	HI2G left front high beam
5	B	DL1Ga Daytime Driving Lights
6	B	TI2G Position Light/Motor Ground
7	B	PC03 cooling water pump ground
8	B	CS08 charger
9	B	BX04 High Voltage Junction Box Power Supply Negative
10	B	FT05 fast charge source
11	B	VSP05 VSP Controller Power Ground
12	B	CO2G reversing radar ground

Grounding point 7

Connector number	FG07
Connector name	Grounding point 7
Connector type	ST710784-3/640651BS0

Terminal No.	Wire color	Signal name
1	B	GT1G Gateway
2	B	AV1G 360 panoramic controller power ground
3	B	TP1G tire pressure monitoring module
4	B	BM09 LBC power ground
5	B	HD03 electronic shift power ground
6	B	CZ10 Car Diagnostic Instrument Power Ground
7	B	GND1 Short-circuiter power ground
8	B	BM17 LBC Fan Power Ground
9	B	EP1G EPS power ground
		VC56GND

Grounding point 8

Connector number	MG08
Connector name	Grounding point 8
Connector type	ST710853-2

Terminal number	Wire color	Signal name
1	B	PASG1 PAS Switch Ground
2	B	PS1G PEPS relay C1
3	B	IC3G Combination Meter A Power Ground

Grounding point 9

Connector number	MG09
Connector name	Grounding point 9
Connector type	ST710853-2

Terminal number	Wire color	Signal name
1	B	TR04 TRIP switch
2	B	SASG corner sensor

Grounding point 10

Connector number	MG10
Connector name	Grounding point 10
Connector type	ST710784-3/ST710507-3

Terminal No.	Wire color	Signal name
1	B	BC2G Body Control Module C1 Signal Ground
2	B	BA1G Body Control Module C1 Power Ground
3	B	AC1G AC Control Panel A Power Ground
4	B	CI1G Vehicle Power Ground

Grounding point 11

Connector number	MG11
Connector name	Grounding point 11
Connector type	ST710784-3/ST710506-3

Terminal No.	Wire color	Signal name
1	B	IL1G ceiling light
2	B	TU5G danger warning light
3	B	RM1G rearview mirror switch power supply ground
4	B	DI1G diagnostic interface power ground
5	B	DI2G diagnostic interface power ground

Grounding point 12

Connector number	MG12
Connector name	Grounding point 12
Connector type	ST710784-3/ST710806-3

Terminal No.	Wire color	Signal name
1	B	FET01 blower FET switching ground
2	B	PS4G PEPS Controller 1
3	B	VC56GND High voltage interlock shielding
4	B	PS3G PEPS Controller 4
5	B	AU2G MP5C1 power ground

Grounding point 13

Connector number	MG13
Connector name	Grounding point 13
Connector type	ST710784-3/ST710506-3

Terminal No.	Wire color	Signal name
1	B	FG3G Combination Switch (Lamp) Ground
2	B	IL3G Combination Switch (Lamp) Ground
3	B	TI2G Dimmer Switch Ground
4	B	WP3G combination switch (wiper)
5	B	LO1G headlight position adjustment switch
6	B	AC2G PTC temperature switch

Grounding point 14

Connector number	BG14

Connector name	Grounding point 14
Connector type	ST710853-2

Terminal number	Wire color	Signal name
1	B	AI1G Airbag Controller Power Ground

Grounding point 15

Connector number	BG15
Connector name	Grounding point 8
Connector type	ST710784-3 / ST710806-3

Terminal number	Wire color	Signal name
1	B	BR1G rear left combination lamp
2	B	DR1G Left Front Door Door Contact Switch Grounded
3	B	PB30G EPB left motor ground
4	B	PS2G PEPS Backup Antenna
5	B	BU2G reversing radar sensor ground
6	B	PW1Gx Left rear door switch ground
7	B	TI1G left front door touch switch ground
8	B	PW7G APW Controller C1

Grounding point 16

Connector number	BG16
Connector name	Grounding point 16
Connector type	ST710507-3/ST710784-3

Terminal No.	Wire color	Signal name

1	B	BR3G high brake light
2	B	AI2G seat belt switch ground
3	B	FLG1 left front door with iron
4	B	GESP1 ESC switch ground
5	B	PB28G EPB right motor ground
6	B	PW8G APW Controller C1

Grounding point 18

Connector number	BG18
Connector name	Grounding point 18
Connector type	ST710853-2

Terminal number	Wire color	Signal name
1	B	BR2G rear right combination lamp power ground
2	B	DR2G right rear door switch ground

Grounding point 19

Connector number	BG19
Connector name	Grounding point 19
Connector type	ST710782-3

Terminal number	Wire color	Signal name
1	B	FG5Gx rear fog lamp
2	B	BU1G reversing radar module

Grounding point 20

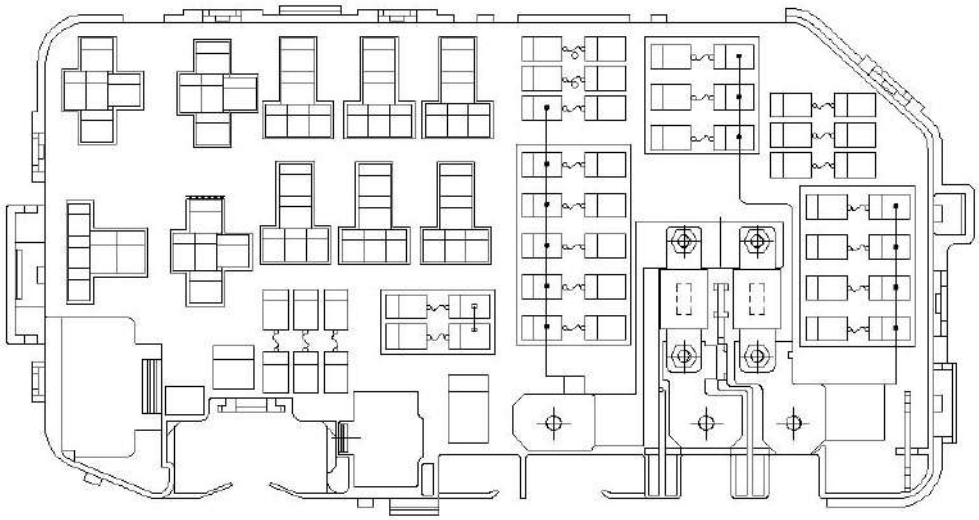
Connector number	BG20
Connector name	Grounding point 20
Connector type	ST710852-3

Terminal number	Wire color	Signal name
1	B	DE1G rear defrosting heating wire
2	B	BU4G reversing buzzer

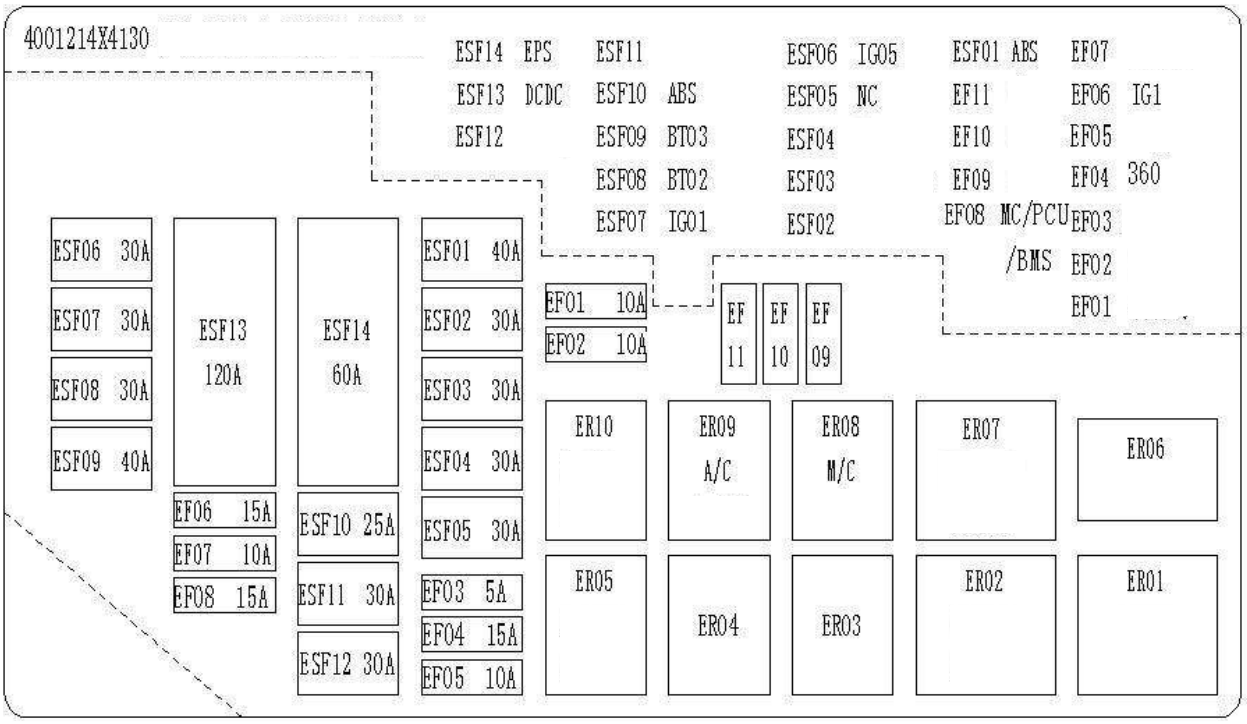
Electrical box

Outdoor Electrical Box I

Outdoor electrical box I internal relay, fuse layout

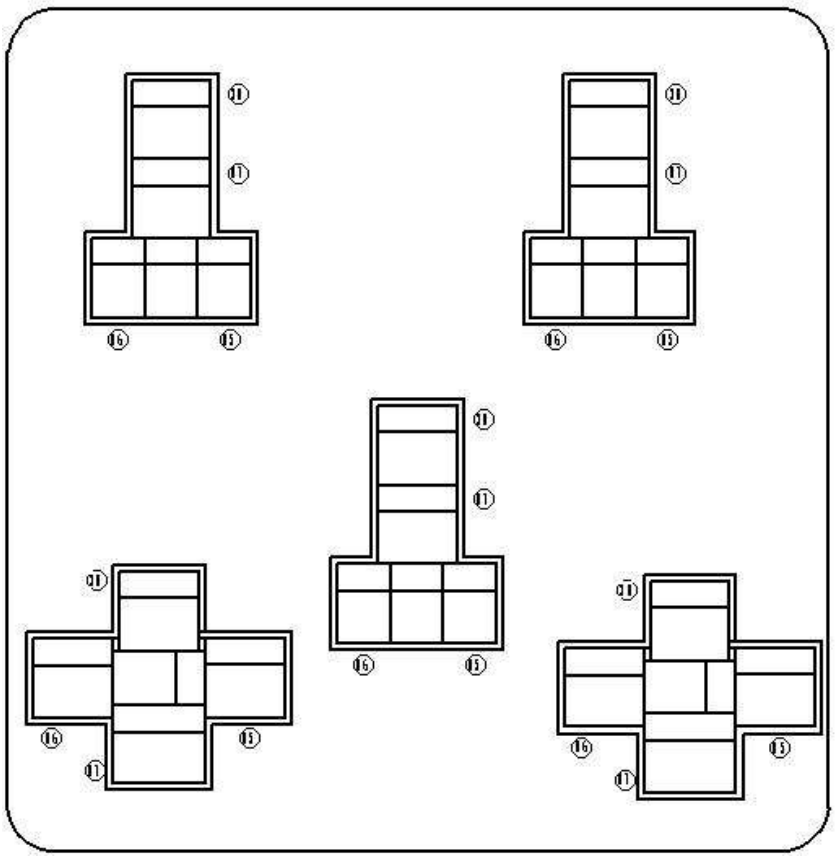


Outdoor Electrical Box I Label

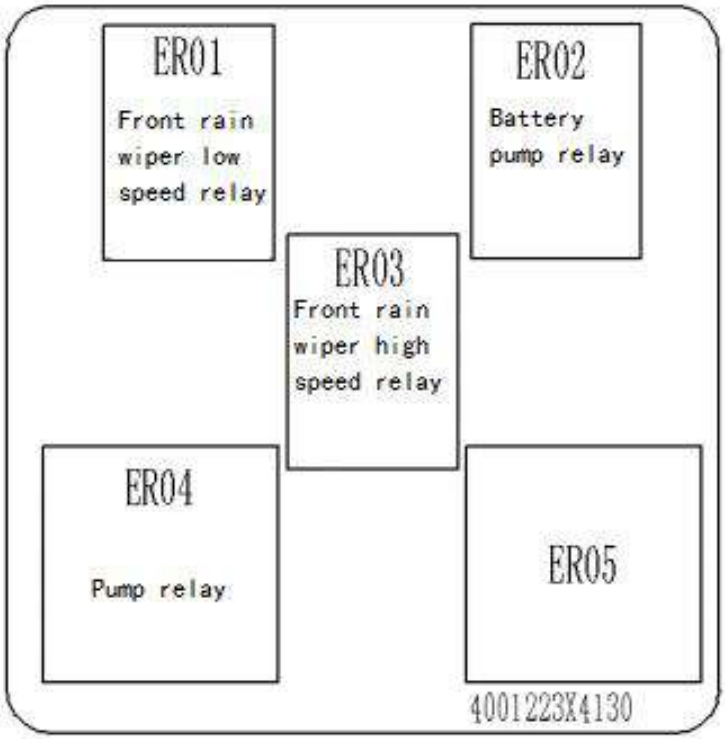


Outdoor Electrical Box II

Outdoor electrical box II internal relay layout

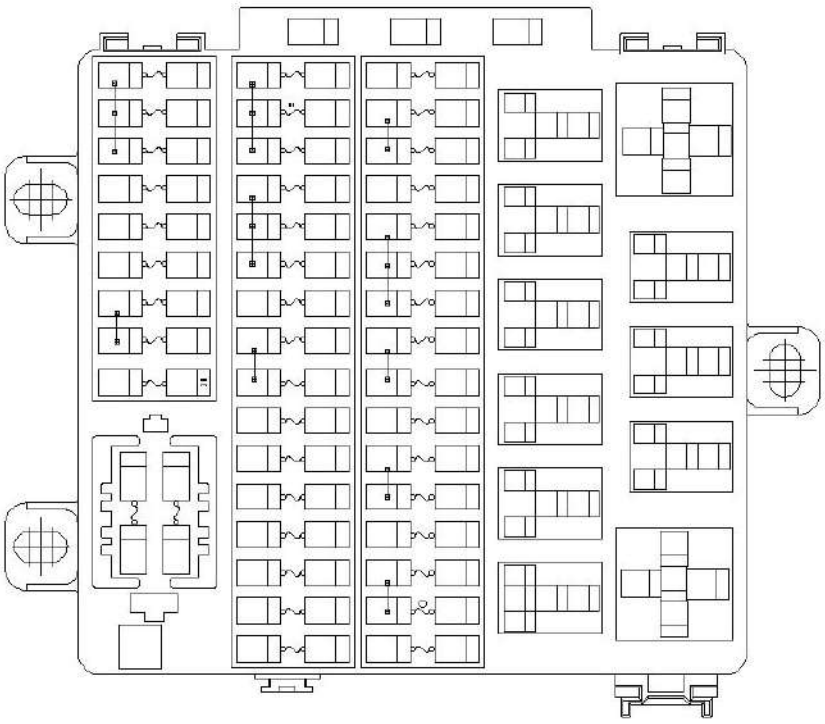


Outdoor Electrical Box II Label



Indoor electrical box

Indoor electrical box internal relay, fuse layout



Indoor electrical box label

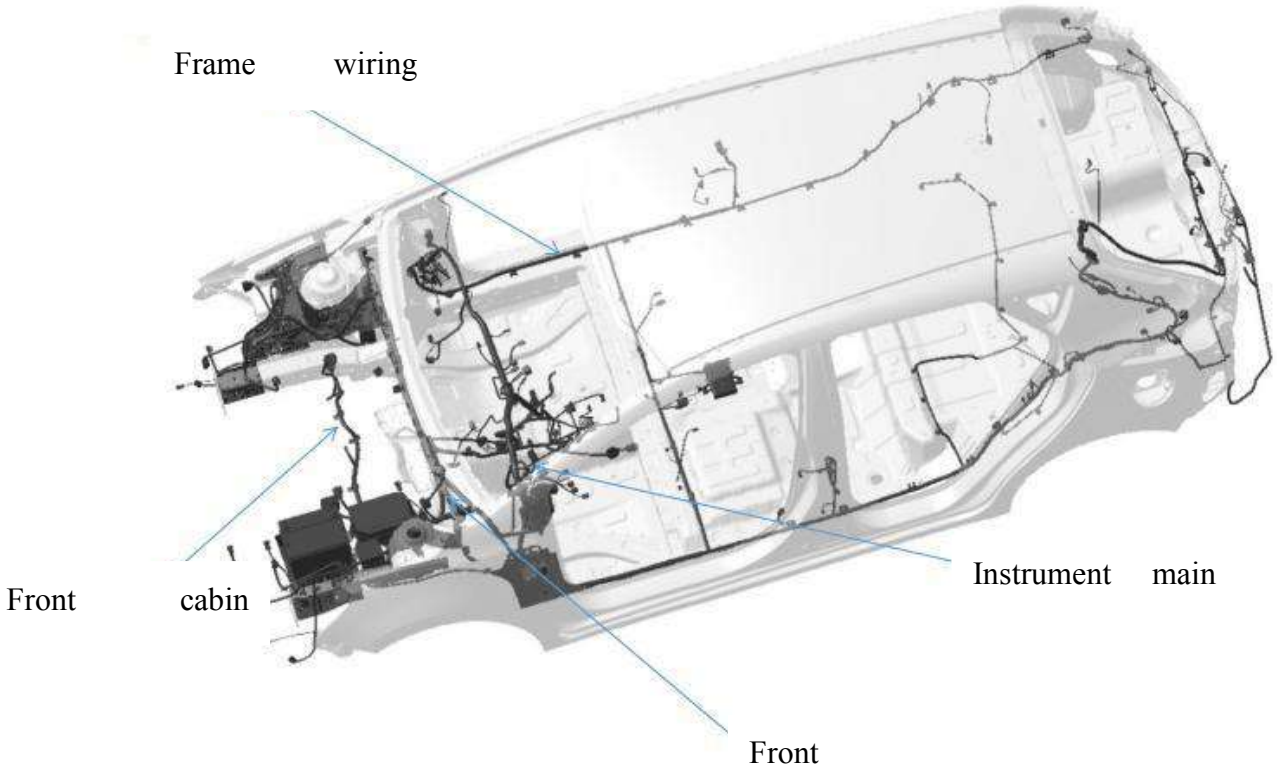
IF01 Alarm lamp	IF21 EPS	IF33		IF17		IF01 25A	IR11 Reversing lamp relay 3735909U8010	IR01	
IF02 Left small lamp	IF22 ABS	IF34	10A	IF18	10A	IF02 10A			
IF03 Right small lamp	IF23 EPB	IF35	10A	IF19	10A	IF03 10A			
IF04 FR fog lamp	IF24 IG1	IF36		IF20	10A	IF04 10A	IR10 Left front fog lamp relay 3735909U8010		
IF05 FL fog lamp	IF25 Air bag	IF37	15A	IF21	10A	IF05 10A		IR02 High headlamp relay 3735909U8010	
IF06 Lock	IF26 TPMS			IF22	10A	IF06 20A	IR09 Rear fog lamp relay 3735909U8010		
IF07 Brake light	IF27 Anti-theft start clamp	IF39	10A	IF23	5A	IF07 10A		IR03 Low headlamp relay 3735909U8010	
IF08 Defrosting	IF28 Window anti clamp	IF40	25A	IF24	10A	IF08 30A			
IF09 N/C	IF29 Window anti clamp	IF41	10A	IF25	10A	IF09	IR08 Small lamp relay 3735909U8010	IR04 Post defrosting relay 3735909U8010	
IF10 N/C	IF30 A/C			IF26	10A	IF10			
IF11 PEPS	IF31 Remote terminal	F43	IF42	IF27	10A	IF11 10A			
IF12 APW	IF32 Charging lock	10A	15A	IF28	25A	IF12 10A	IR07 Rear wiper relay 3735906U1010		
IF13 Pre wiper	IF33 N/C			IF29	25A	IF13 25A		IR05 Power saving relay 3735907U8010	
IF14 Dipped headlight	F34 Inside temperature			IF30	10A	IF14 20A	IR06		
IF15 High beam	IF35 BCM			IF31	10A	IF15 15A			
IF16 Charging cap	IF36 N/C			IF32	10A	IF16 15A			
IF17 N/C	IF37 Post wiper								
IF18 Reversing lamp	IF38 N/C	IF41	ACC						
IF19 Instrument /BCM	IF39 Sound	IF42	Sound						
IF20 ECO switch	IF40 Cigar lighter	IF43	Indoor lamp						

PN4003901X4130* according to different configuration options

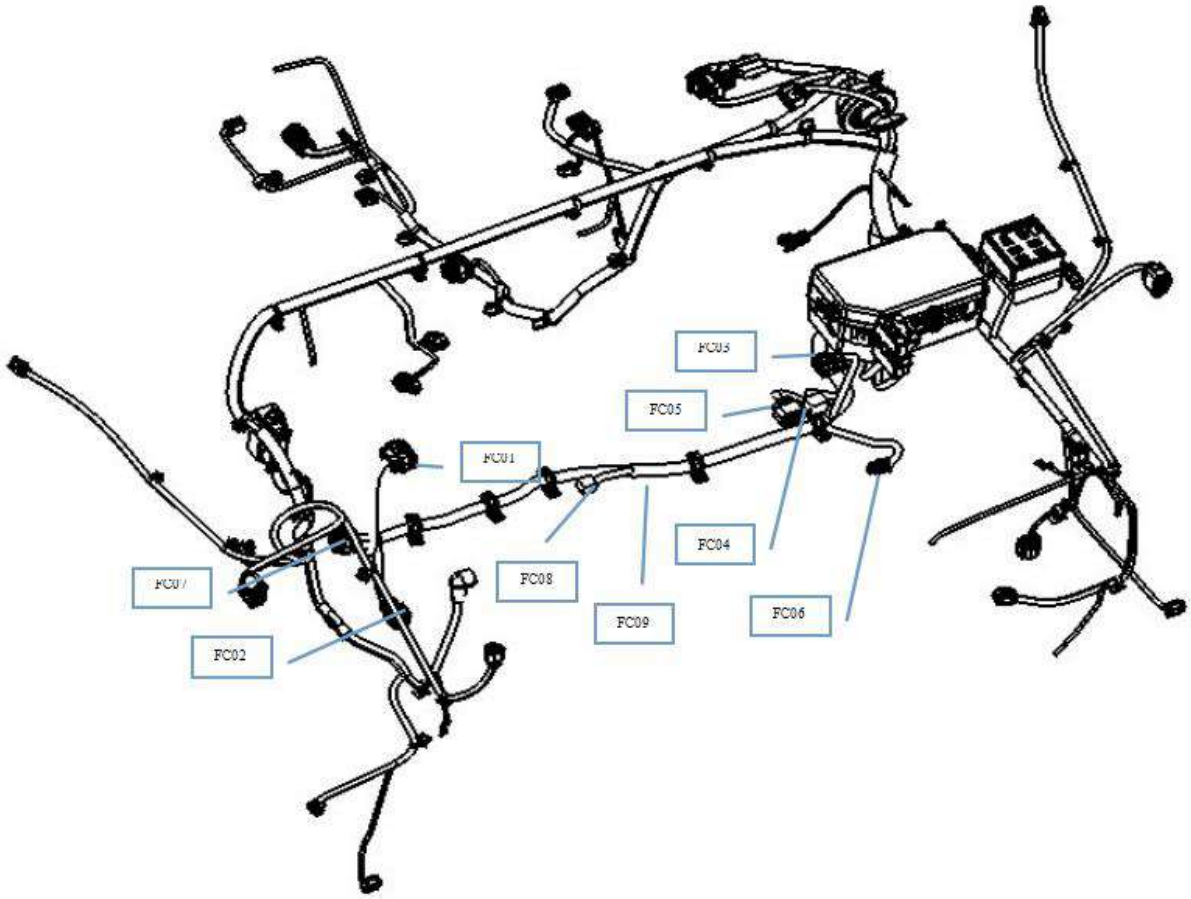
Only use the specified fuse and relay

Wiring harness arrangement

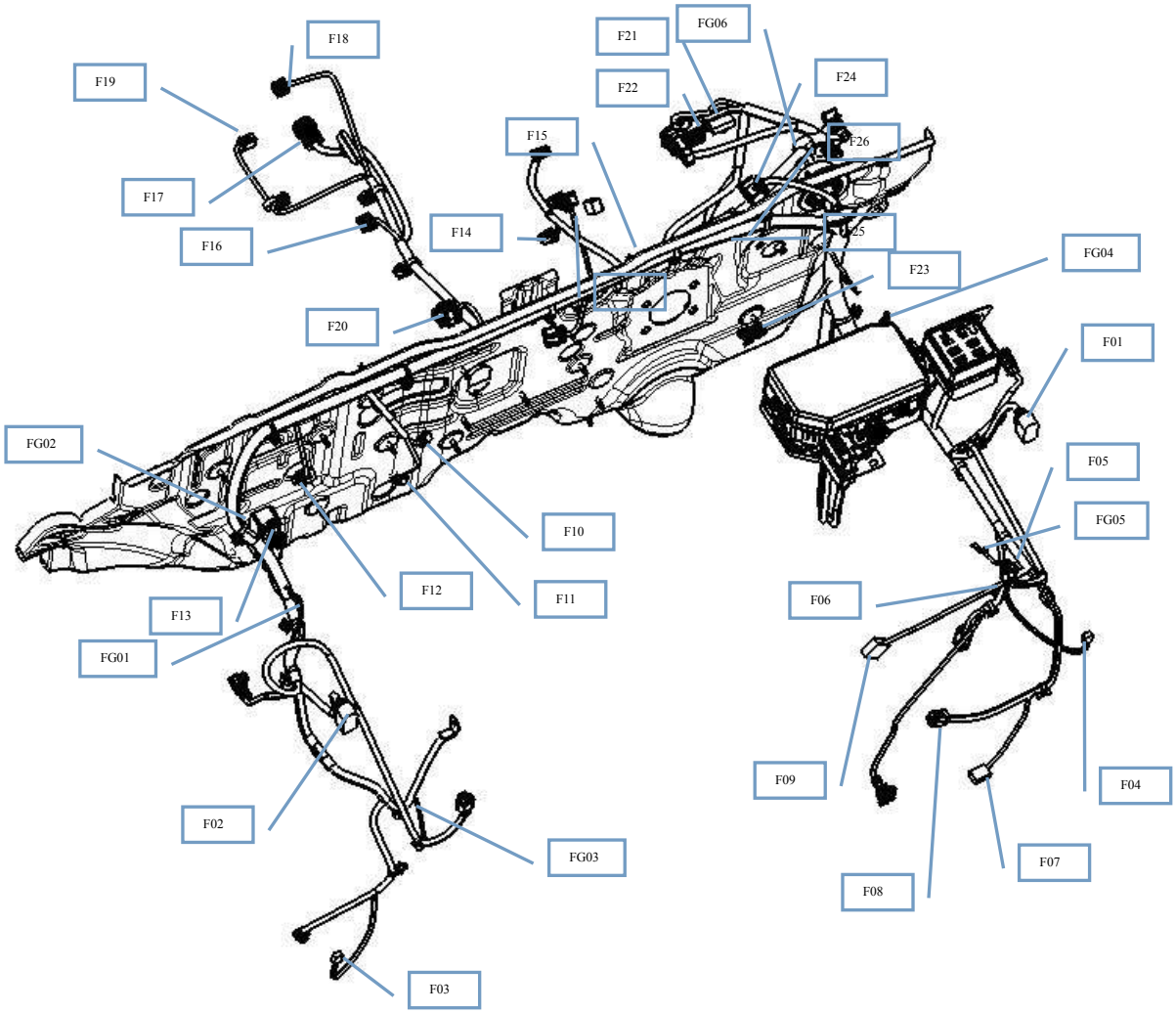
Harness layout cable



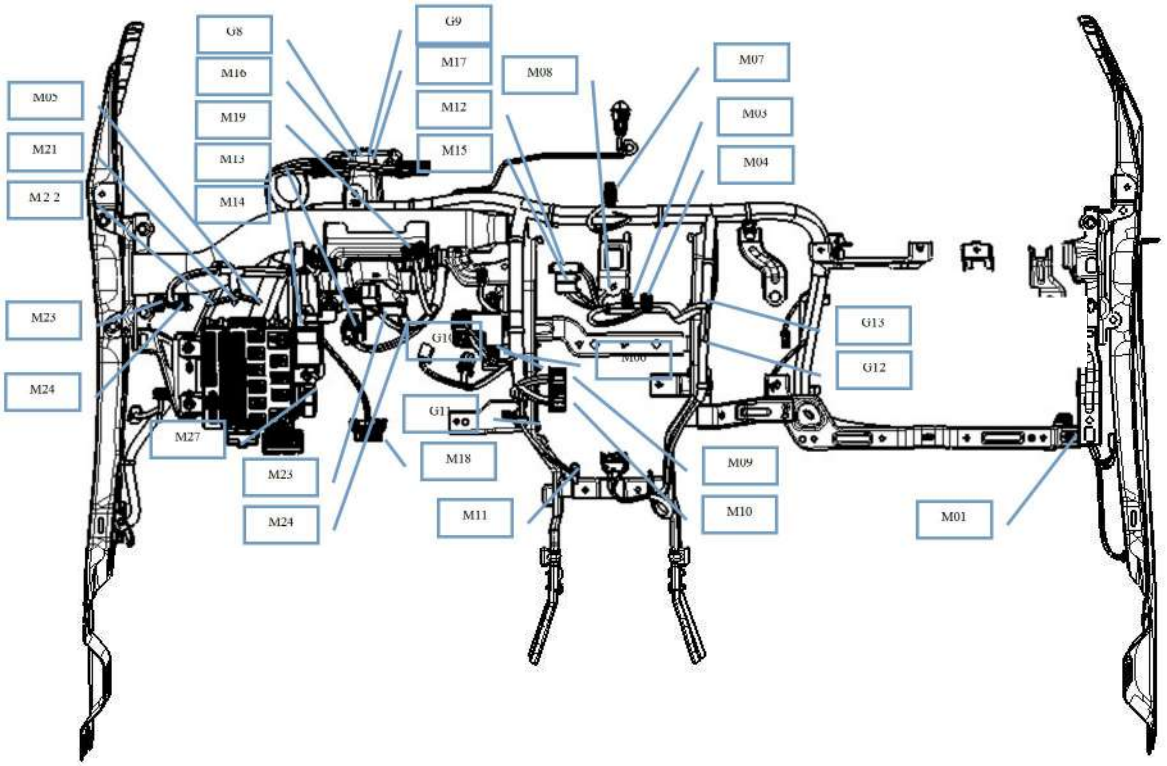
Front cabin control wiring harness



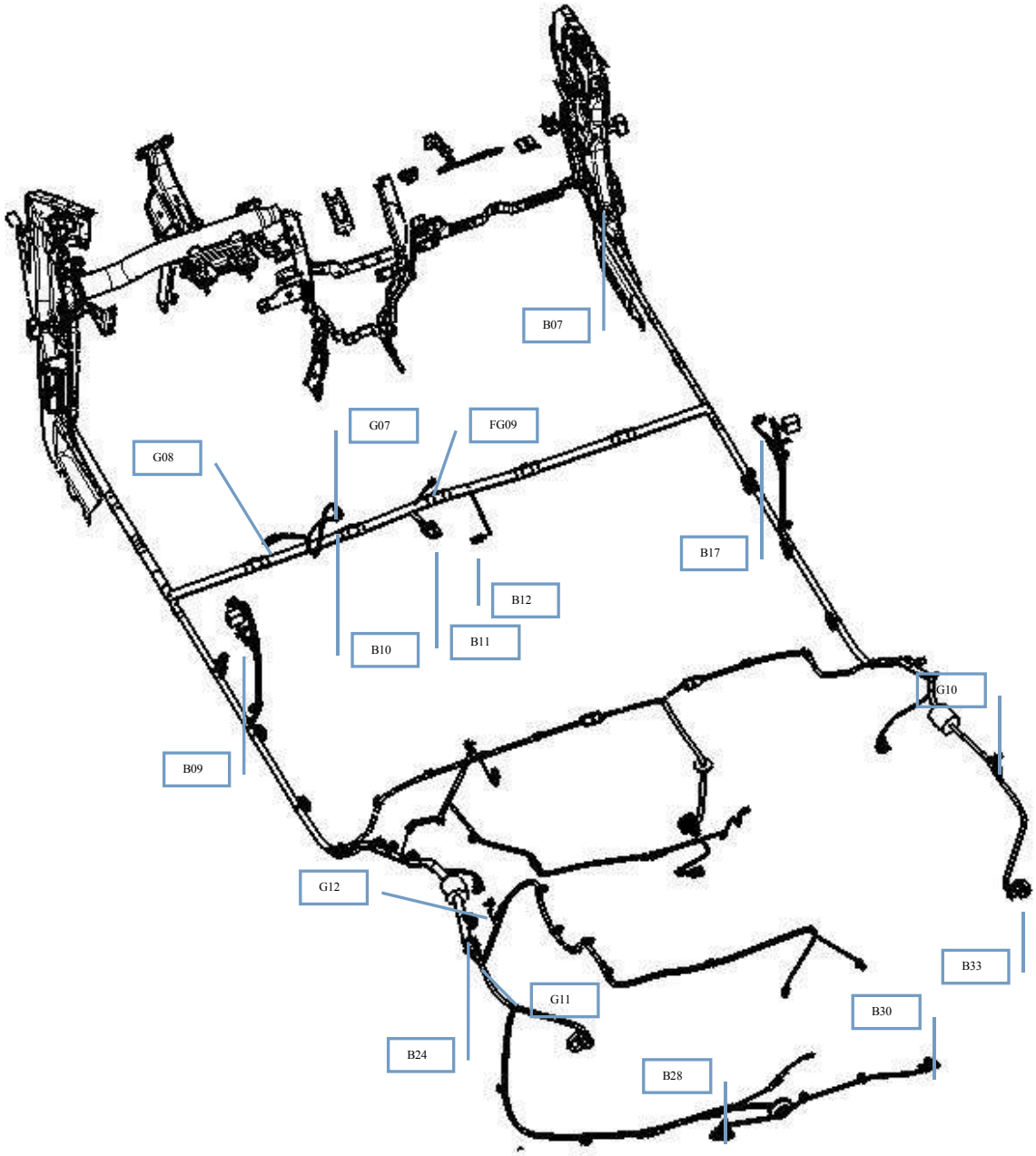
Front compartment harness



Instrument main harness



Frame wiring harness



Basic check

12V battery check

How to operate 12V battery

Warning:

If it is necessary to use external battery and wire connection to start EV system, please use 12V battery.

After connecting 12V battery, please ensure sound connection and tightening with battery pile head.

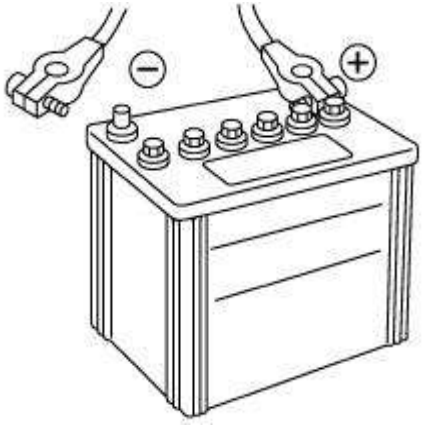
Loss of electricity prevention method

Please adopt following method to prevent the loss of electricity of 12V battery.

Keep clean and dry on the surface (especially upper surface) of 12V battery.

Battery pile head should be kept clean and connected tightly.

When vehicle has not been used for long time, please disconnect negative pole pile head of 12V battery.



12V batter charging

Warning:

Do not conduct fast charging on a complete discharged 12V battery.

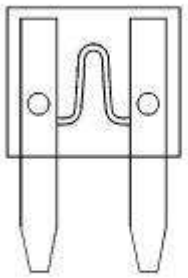
Keep 12V battery away from fire during charging.

When connecting on-board charger, please first connect harness, and then start charger. Do not start charger first. Otherwise, it may produce spark.

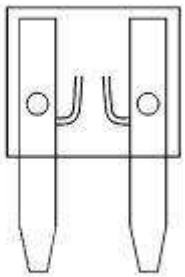
Fuse check

How to check

If fuse burns out, please ensure the malfunction which results in fuse burning has been eliminated before changing fuse.



OK



Fuse blown out

Use prescribed fuse. Do not use fuse which exceeds the specification.

Put fuse in place. It is forbidden to insert partially fuse into the installation base.

Removal and installation

12V battery

Removal and installation

Removal

Disconnect 12V battery negative pole harness.

Warning:

In order to avoid damaging vehicle parts, please first disconnect 12V battery negative pole harness.

1 Remove 12V battery positive pole pile head mounting bolt;

2 Disconnect 12V battery positive pole harness;

3 Remove battery clamp and pressure lever.

4 Remove 12V battery.

Installation

Please follow the reversed sequence of above procedure to install.

Warning:

When installing 12V battery, please carefully read following items,

To avoid damaging vehicle parts, first connect 12V battery positive pole harness.

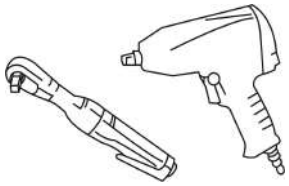
To avoid damaging the vehicle, after connecting 12V battery positive pole harness, ensure sound connection with battery.

To avoid damaging vehicle parts, check whether there is poor connection due to rust on 12V battery pile head.

Maintenance

Preparation Work

Special Tool

Tool Name	Tool Diagram	Instruction
Power Tool		Remove and Install the Bolts and Nuts

Daily Maintenance

The common maintenance is the daily inspection item during daily usage. If the vehicle needs to keep normal performance all the time, these maintenance items are very important and can be inspected by owner himself or DR authorized workshop.

Vehicle Interior

The listed maintenance items should be conducted regularly, except special instructions.

Item	
Door and Engine Hood	Check whether all the doors、engine hood、trunk lid and tailgate are able to be closed normally or not. All the plunger latches have been fastened reliably. If necessary, conduct lubrication. Confirm that after releasing the primary lock of engine hood, the second lock is still able to prevent the engine hood from opening. If the vehicle often drives on saline pavement or regions containing corrosive materials, lubrication situations should be inspected regularly
Vehicle Lamp	Confirm that the headlamp、braking lamp、tail lamp、turn signal lamp and other lighting equipment are under normal working conditions, reliable fastening. In the meanwhile, inspect the focusing function of headlamp
Tire Nut	Check the tire bolts for loss、looseness. If necessary, tighten them up again
Tire Rotation	Tire rotation should be conducted for one time in every 10,000 kilometers
Wheel	Use pressure gauge to inspect tire pressure regularly, including spare tire, especially before long journey. Adjust the pressure of each tire to regulated value. Check the tire for damage、crack or excessive wear carefully
Four-Wheel Alignment and Wheel Balance	If the vehicle deviates on even straight pavement, or uneven or abnormal tire wear has been found out, the parameters of four-wheel alignment may need to be adjusted. If the steering wheel or seat vibrates on expressway, wheel balance needs to be adjusted
Windshield	Clean the windshield periodically Check the windshield for crack or other damage in every six months
Windshield Wiper	If the wiping effect is poor, please check the wiper for crack or wear

Vehicle Exterior

The following maintenance items should be maintained periodically, for example, conducting maintenance, cleaning periodically

Item	
Warning Lamp and Buzzer	Confirm that all the warning lamps and buzzers work normally
Windshield Wiper and Washer	Check the windscreen wiper and washer for normal working condition, and wiper for no streak
Windshield Defroster	Check whether the air is able to be exhausted and inhaled through defroster outlet correctly or not as heating or A/C works
Steering Wheel	Check the free stroke of steering wheel for standard range Check the steering performance for variation, for example, large free stroke、heavy steering or abnormal sound
Seat	Check the operation device of seat direction, such as seat adjustment device, backrest regulator etc; confirm that various directions adjustment is smooth, check the headrest for smooth adjustment up and down, and headrest hasp for reliable fastening
Seat Belt	Inspect all the components of seat belt system(such as hasp 、 foundation bolt 、 adjuster and curling device) for normal working condition, smoothness, reliable installation. Check the seat belt for crack、breakage、wear or damage
Acceleration Pedal	Check the acceleration pedal for smooth operation, confirm that the acceleration pedal has not been blocked or tolerated with uneven stress. Confirm that the floor pad is far from acceleration pedal
Brake Pedal	Check the brake pedal for smooth operation, confirm that the brake pedal has appropriate distance as it has been depressed to the floor. Confirm that the floor pad is far from brake pedal
Braking	Check the vehicle for deviation during braking
Parking Brake	Check the parking brake periodically, the vehicle is able to be parked stably on the ramp by way of parking brake only

Engine Hood and Vehicle Underpart

The listed maintenance items in the following should be maintained periodically

Item	
Braking Liquid Level	Confirm that the liquid level of braking liquid reservoir is between MAX and MIN
Liquid Leakage	After the vehicle parks for certain time, check the vehicle bottom for oil leakage、water or other liquid leakage. It is a normal phenomenon that A/C drips after usage. If obvious leakage has been found out, please find out the reason and repair it immediately
Vehicle Bottom Plate	The vehicle bottom plate is often exposed to corrosive material, for example, vehicle drives on ivy pavement or pavement with large quantity of dust. It is very important to remove these substances, because these substances will lead to chassis and framework corrosion. After winter, vehicle bottom plate should be cleaned completely with water, especially for the zone easily accumulated by mud and dust

Periodic Maintenance

The following content lists the regular maintenance regulations. According to weather and air condition、different pavement condition、personal driving habit and vehicle application, increases extra maintenance or decreases maintenance intervals, please conduct periodic maintenance according to this interval time and mileage after driving for 5 years or 100,000 kilometers

Symbol description

●= check, if necessary, adjust or clean and replace ▲= replace

T= tighten as per the specified torques; Mileages/Months (whichever comes first)

Interval	Mileages（km）x 1000	3	10	20	30	40	50	60	70	80	90	100
Item	Months	3	6	12	18	24	30	36	42	48	54	60
Electrical system	Charging port	●		●		●		●		●		●
	Charging port sealing cap	●		●		●		●		●		●
	Charging line of vehicle accessories	●		●		●		●		●		●
	Compressor	●		●		●		●		●		●
	Refrigeration line	●		●		●		●		●		●
	PTC heating unit PTC	●		●		●		●		●		●
	Electronic water pump(If equipped)	●		●		●		●		●		●
	Coolant(If equipped)	●		●		▲		●		▲		●
	Cooling hose(If equipped)	●		●		●		●		●		●
	EV battery usage report	●		●		●		●		●		●
Chassis system	Electric vacuum pump , controller and vacuum tank			●		●		●		●		●

	Brake plate and brake disc			●		●		●		●		●
	Brake fluid			●		▲		●		▲		●
	Brake hose and cable			●		●		●		●		●
	Reducer gear oil	▲		▲		▲		▲		▲		▲
	Transmission axle			●		●		●		●		●
	Steering system and suspension component			●		●		●		●		●
	Tire transposition (Mileage reach first）			●		●		●		●		●
	A/C filter element			▲		▲		▲		▲		▲
	Chassis and body fixing parts			●		●		●		●		●

Recommended Fluid and Lubricant

Fluid and Lubricant

	Volume	Recommended Fluid/Lubricant
	Litre	
Retarder Oil	**1.8**	85W/90GL-5
Brake Liquid	**-**	Genuine Braking Liquid or DOT4
Loading Liquid of Tank	**3**	50% Ethylene Glycol Antifreezing Solution
Lubricating Oil of A/C Compressor	**0.12**	RL68H

Electrical System Maintenance

Battery System

Inspection Method

Visual Inspection of the Following Items

- Check battery shell for damage
- Check battery pack shell for water stain or imprints left by muddy water

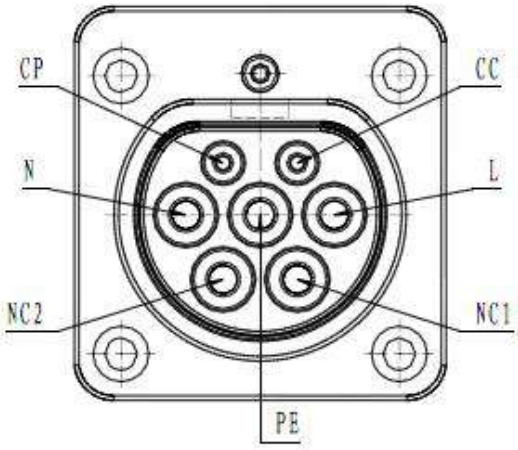
Caution:

- **Disassemble battery pack and conduct relevant inspection if the battery pack shell has been damaged;**
- **Disassemble battery pack and conduct relevant inspection if the battery pack has water stain or imprints left by muddy water; conduct cleanup work if dust or foreign matters exists in interior assembly.**

Maintenance Items					
Date:		Chassis Number:	Vehicle Number:		
NO	Test Condition	Test Item	Test Result	Result Eligibility	Verifier
1	KEY triggers ON; A/C Closed	As Vmin＞3.8V，ΔV≤50mv;when Vmin＞3.8V，ΔV≤50mv； As 3.74V≤Vmin≤3.8V，ΔV≤60mV;when 3.74V≤Vmin≤3.8V，ΔVl≤60mV； As3.55V≤Vmin≤3.74V，ΔV≤200mV;when 3.55V≤Vmin≤3.74V，ΔV≤200mV；	Tmax: Tmin: SOC： Total Voltage Vmax: No. Vmin: No. ΔV：	Yes□ No□	
2	As BMS is tested Tmin＞0℃, When BMS detects Tmin ＞0℃， Refer to test requirement of vehicle operation, conduct the test of heavy acceleration	1.Observe whether the vehicle has battery warning, battery protection(limited power) or other phenomenon or not as it is driving, record the information of individual cell 2.As SOC>30%, discharge current(3C)> 200A, ΔV＜ 200mV, it's qualified when SOC ＞30%，Discharge current (3C)>200A,ΔV<200mV is valid.	Battery Alarm/Protection： Yes□ No□ I: SOC: Vmax: No. Vmin: No. ΔV： Total Voltage：	Yes□ No□	
3	Function test of vehicle-mounted remote control terminal	1.Check whether the data of vehicle-mounted remote control terminal is normal or not as KEY ON or under charging state.	Normal Data: Yes□ NO□	Yes□ No□	Function test of vehicle-mounted remote control terminal
4	Test of Battery Charging Function	After confirming that charging cable has been connected, observe whether the charge lamp on center console is on or not, if the lamp turns green, it	V: I: SOC larger than10% Yes□ NO□	Yes□ No□	
		indicates that the charging is normal	Single Voltage Vmax: Vmin:		

Charging Port

Inspection Method



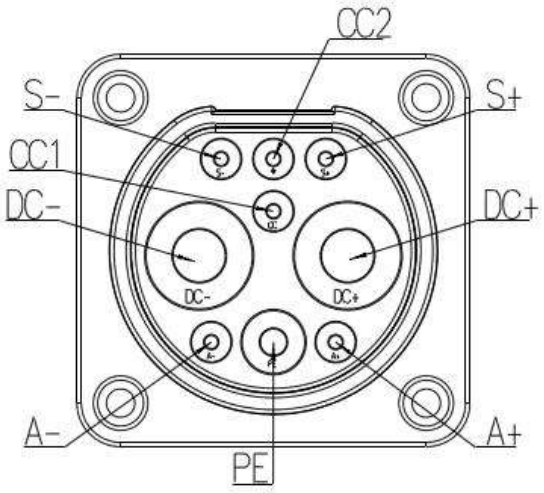
Visual Inspection of the Following Items

- Check the charging port for crack。
- Check the charging port for dust and foreign matters.
- Check the charging port for damage.

- Check whether the rubber ring in the socket works normally or not.

Caution:

- **This kind of inspection should be executed, confirm whether the rubber ring on the charging port has been disconnected or not.**
- **The rubber ring locates in the inside of port.**



Deal with charging port.

- Clean the charging port.
- If the rubber ring on the charging port has been damaged, please replace it.
- If the charging port cap has been damaged, please replace it.

- If the quick charging port and AC charging port have been damaged, please replace them.

Warning:

- In reference to measuring voltage, 500V can be measured by tester.

Inspection of Insulation Resistance of Charging Port.

- Disconnect high voltage connection.
- Inspect the insulation resistance of AC charging port L、N regarding PE, the required insulation resistance should be more than 20MΩ.
- Inspect the insulation resistance of DC-、DC+ regarding PE, the required insulation resistance should be more than 20MΩ.

Battery Charger.

Warning:

- As electrical vehicle has high-tension battery, if the treatment method regarding the vehicle is incorrect, there will be risks of electric shock、leakage. Therefore inspection execution and maintenance must be in accordance with right processing mode.
- Ensure that before removal, inspection and maintenance is under the condition that repair switch has been disconnected and high voltage circuit has been closed.
- Before conduct the operation of high voltage system, the staff must wear insulation protection equipment including glove、shoes and glasses.
- Only professional staff are able to operate high voltage, during operation, other individuals are not allowed to have contact with the vehicle.

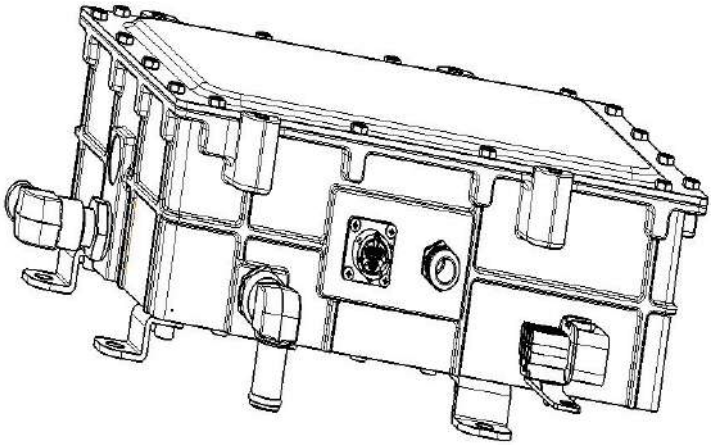
Pretreatment.

Warning:

- Disconnect repair switch from battery.

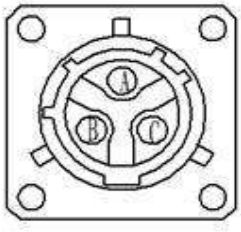
Danger:

- Electric shock will happen if the staff have not made use of protective measure as having contact with high voltage unit..

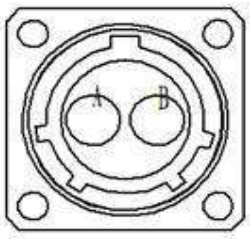


Warning:

- In reference to measuring voltage, the tester is able to measure 500V.



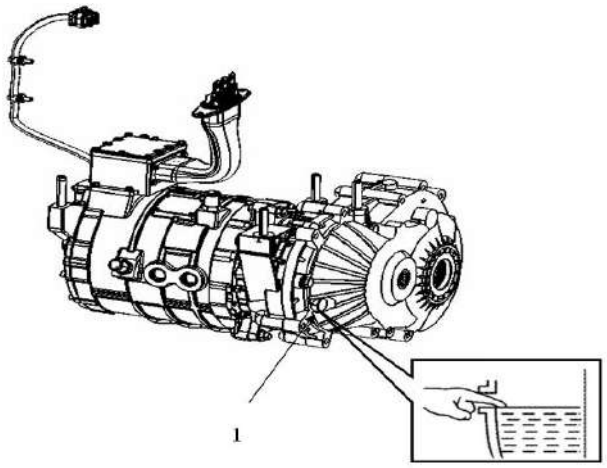
Definition of Connector Pin of High Voltage Output
A、Positive;
B、Negative
C、Grounding



Definition of Connector Pin of High Voltage Input
A、Positive;
B、Negative

Check the insulation resistance of vehicle-mounted battery charger.

- Disconnect service switch.
- Check the insulation resistance of input and output terminals regarding battery charger shell of vehicle-mounted battery charger, the required insulation resistance should be more than 20MΩ.



Speed Reducer.

Inspection of Oil Volume.

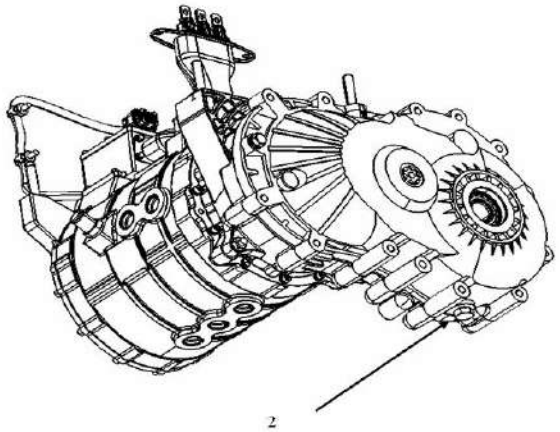
- Remove oil inlet plug (1), inspect whether the oil is full or not through mounting hole of oil inlet plug.
- Smear thread sealant before installing the oil inlet bolt, tighten up it with specified torque(tightening torque 30~40N•m).

Refuel.

Remove oil inlet plug (1). Inject new gear lubricant until the oil level is close to oil inlet and reaches regulated height, approximately $2.7^{+0.3}_{0}$ L.

Oil Drainage

- Remove oil inlet plug.
- Remove oil outlet plug (2) discharge gear lubricant.
- Smear thread sealant before installing the oil outlet bolt, tighten up it with specified torque(tightening torque 35~45N•m).



Chassis Maintenance

Wheel(Bonding Balance Weight)

Wheel Balance Adjustment

Preparation before Adjustment

- Remove the wheel that needs to be adjusted.
- Remove the old balance weight that located on the inside and outside of wheel, and remove the foreign matters on tire tread.
- For the new tire, please make use of diluent to remove the double sticky tape on the tire.

Caution:

- In the process of removing the wheel and tearing down the double sticky tape, please be careful to avoid wheel scratch.
- After tearing down the adhesive tape, remove the diluent imprint on the tire.

Adjustment of Wheel Balance.

- The adjustment process for each type of tire balance weight is different, therefore please refer to operation manual.
- If the tire balancing machine has two types of models, one is bonding balance weight, the other is embedded balance weight, please choose and confirm the embedded balance weight to adapt to steel rim, the bonding balance weight to adapt to aluminium alloy rim.

1 Stick to center hole as the guide, assemble the wheel on balancing machine, start up tire balancing machine.

2 As unbalance value of both the inside and outside appears on displayer of tire balancing machine, multiply the unbalance value of outside by 5/3 to confirm the actual weight of balance that used in practice. Then choose the balance weight of outside that is nearest to calculated value, install it on the regulated outside position, or install it on the regulated angle that is opposite to the wheel.

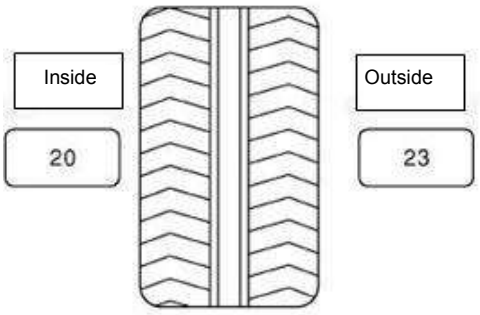
Caution:

- **Please install the outside balance weight firstly, then install the inside balance weight.**
- **Before installing the balance weight, the matching surface of wheel should be cleaned**

a The displayed unbalance value×5/3=
Counterbalance weight that needs to be installed.

Calculating Demonstration:

23g×5/3=38.33g→40g balance weight(close to calculated balance weight).



Prompt:

Attention, the ballasted weight should be close to calculated balance weight.

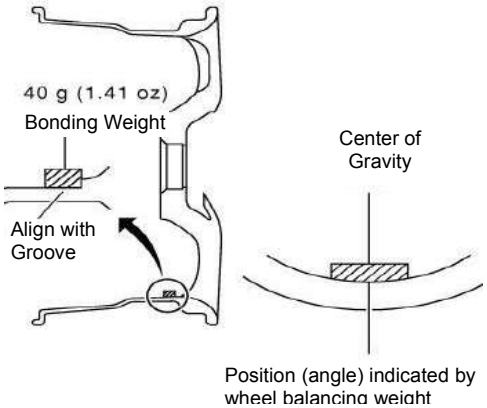
For Example:

37.4→35g

37.5→40g

b Installation Position of Balance Weight.

- Install balance weight on the position as shown in the figure.
- As installing balance weight on the driving wheel, as shown in the right figure, it should be placed in the groove of tire inwall, the balance weight center should be aligned with the position indicated by tire balancing machine(or angle)



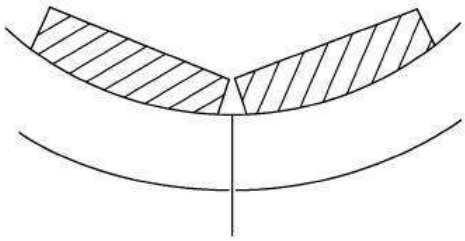
Caution:

- **Please do not reuse balance weight, replace a new one in each time.**
- **The amount of installed balance weight should not be more than three pieces**
- **Please adhere to use original balance weight.**

c. If the calculated weight of counterbalance exceeds 50g, please install the two pieces of balance weight on the same line.

Caution:

- **Please do not put the balance weight on the other balance weight.**



3 Start up tire balancing machine again.

4 According to the position(angle) indicated by wheel balancing machine, input a balance weight on the inside of driving wheel.

Caution:

- The amount of installed balance weight should not be more than three pieces.

5 Start up balancing machine. Confirm that the surplus unbalance value of both inside and outside does not exceed 5g.

Caution**:**

- **If unbalance value of any side exceeds 5g, please repeat the installation step of balance weight.**

Permissible Maximum Unbalance Value:

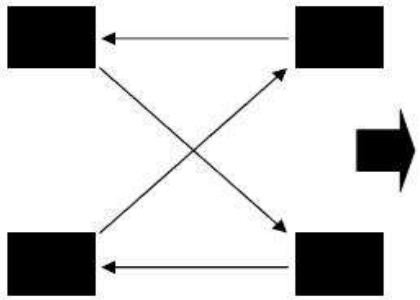
Dynamic State：Refer to“Tire”

Static State：Refer to“Tire”

Tire Rotation

1 According to the schedule of repair and maintenance in reference to tire rotation, conduct tire rotation as replace a new tire.

2 As installing the tire, tighten up the tire bolt according to the requirement of wheel and tire.



Remark：Recommended figure of tire rotation.

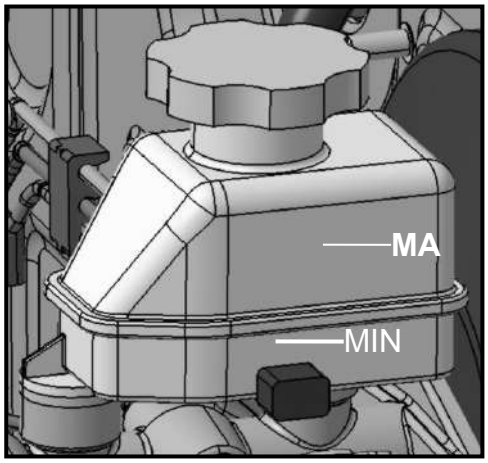
Caution:

- **During tire rotation, it is prohibited to assemble the spare tire with small size.**
- **As installing the tire, tighten up the tire bolt according to the diagonal to avoid tire distortion.**
- **Please do not exceed the tightening torque required by tire.**
- **Please use genuine nuts.**

Brake Fluid

Inspection of Braking Fluid Level Height

- Confirm that the braking fluid level height in the fluid reservoir is within regulated value(between MAX mark and MIN mark).Visual inspection around fluid reservoir for leakage.



- If the fluid level is fairly lower, please check the braking system for leakage.
- Check the inside of fluid reservoir for dust or other foreign matters, check whether the unspecified braking fluid and other oil product mixes in the braking system or not.
- Loosen the parking braking handle grip, observe whether the braking warning lamp goes out or not, please check the braking system for leakage、vacuum servo for failure、ABS for malfunction.

Inspection of Braking Pipeline

Inspection of Braking Pipeline

1 Check the braking pipeline(pipeline and joint) for crack or damage, if does, please replace the pipeline.

2 If the vehicle stays Ready state, depress the brake pedal with force of 785N(80kg) for around 5s. Check the braking fluid for leakage.

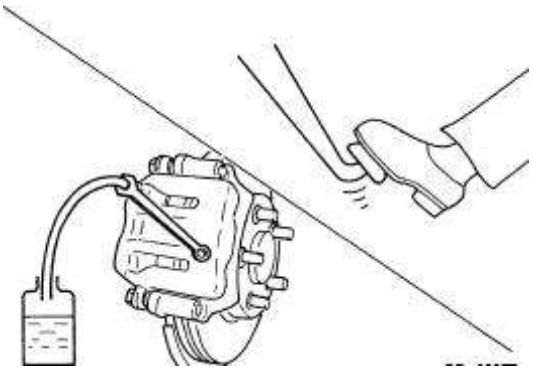
Caution:

- **If braking fluid leakage happens, please tighten up all the component joints according to specified torque again. If deformation happens, please replace the component.**

Discharge

Caution:

- **Please do not spray braking fluid on the vehicle body or other painted surface to avoid paint damage. If the braking fluid sprays on the painted surface, please clean it with water immediately. Please do not clean the braking components with water.**
- **Turn the ignition switch to OFF position and plug out the ABS connector, or take out the connector of 12V storage battery negative pole as execute the maintenance.**
- **If the braking fluid have connection with brake disc or caliper. Please wipe it clean immediately.**



1 Plug the ethylene pipe in the deflation valve.

2 Depress the brake pedal, loosen the deflation valve, then discharge the braking fluid slowly.

Reinjection

Caution:

- **Turn the ignition switch to OFF position and plug out the ABS connector, or take out the connector of 12V storage battery negative pole as execute the maintenance.**
- **If the braking fluid have connection with brake disc or caliper. Please wipe it clean immediately.**

1 Confirm that there is no foreign matter in the fluid reservoir and fill up new braking fluid.

Caution:

- **Please do not reuse the discharged braking fluid.**
- **Please do not let the unspecified braking fluid or other oil product mix in braking system.**

2 Release the deflation valve, depress the brake pedal to floor slowly, then release it. Repeat the operation in every 2 or 3s until new braking fluid discharges, then depress the brake pedal and close the deflation valve. Repeat the same operation for each wheel.

3 Air exhaust. Please refer to “Brake System Exhaust”.

Brake System Exhaust

Caution:

- **Turn the ignition key to ON position as execute this step.**
- **Monitor the braking fluid level of fluid reservoir as air exhaust.**
- **Please do not spray braking fluid on the vehicle body or other painted surface to avoid paint damage. If the braking fluid sprays on the painted surface, please clean it with water immediately. Please do not clean the braking components with water.**
- **If the braking fluid have connection with brake disc or caliper. Please wipe it clean immediately.**

1 Confirm that there is no foreign matter in the fluid reservoir and fill up new braking fluid.

Caution:

- **Please do not reuse the discharged braking fluid.**
- **Please do not let the unspecified braking fluid or other oil product mix in braking system.**

2 Insert the ethylene pipeline in the deflation valve of brake.

3 Depress the brake pedal to floor for 4 or 5 times.

4 Depress the brake pedal, release the deflation valve and discharge the air in the braking pipeline, then tighten up it.

5 Repeat the step of 3 and 4 until all the air in the braking pipeline has been discharged.

6 Tighten up the deflation valve according to regulated torque.

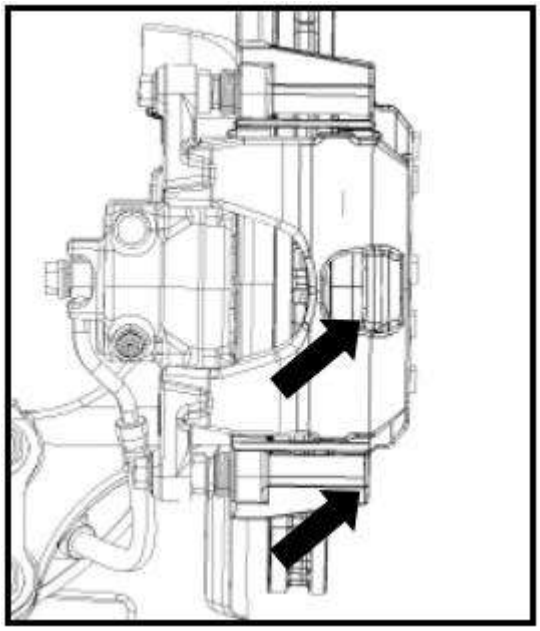
7 Repeat the step of 2 to 6, fill up the braking fluid to ensure that half of the fluid reservoir has been filled with braking fluid occasionally. Discharge the air in the braking pipeline according to the following order.

8 The deflation order of four wheels: left rear brake cylinder、left front brake cylinder、left rear brake cylinder、right front brake cylinder.

9 After discharging the air, inspect whether the braking fluid in the fluid reservoir has reached the regulated level or not.

10 Check the brake pedal, if it is not within the regulated value, please adjust it.

Disc Brake Caliper



Brake Shoe(Friction Plate)

Wear Inspection of Brake Shoe

- Inspect the brake shoe thickness from the access hole of brake cylinder

Standard thickness of front disc brake friction plate: 9.5mm

Wear limit thickness of front disc brake friction plate: 2.0mm

Standard thickness of rear disc brake friction plate: 14.7mm

Wear limit thickness of rear disc brake friction plate: 7.0mm

Adjustment

If the brake shoe has been grinded or replaced, or any abnormal crural feeling of braking, conduct the following process and try to solve it.

Caution:

- **As the braking effect has been decreased, please pay more attention to the vehicle speed.**
- **Inspect the brake shoe on the safe road and pay attention to the traffic condition.**

1 Drive the vehicle on the straight and even road.

2 Control the brake force of depressing the brake pedal, ensure that the vehicle brakes within 3～5s.

3 Drive the vehicle for certain distance to cool the braking system.

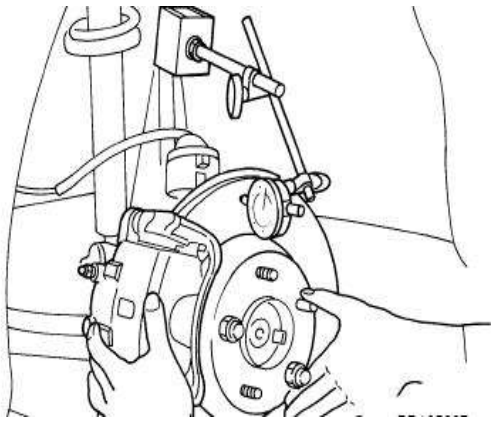
4 Repeat the step of 1～3 until the abnormal crural feeling disappears.

Brake Disc

Brake Disc Check and Adjustment

Visual Check

- Check the surface of brake disc for uneven wear、crack and serious damage. If does, please replace it.



Inspection of Jerk Value

1 Fasten the brake disc on the wheel hub.

2 Use the dial indicator to inspect the jerk value().（measurement can be conducted on the inside of brake disc edge with 10mm）

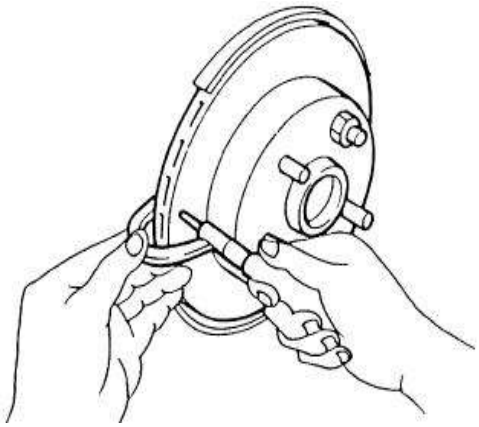
- Limit Value of Jerk Value：0.05mm

Remark: before measurement, confirm that the axial clearance of wheel bearing is within regulated value. Refer to“Inspection of Wheel Bearing”.

3 If the jerk value surpasses the regulated value, please replace it or conduct necessary processing.

Caution:

Conduct the procession as the limit thickness of wear exceeds 0.3mm. If the value is less than 0.3mm, please replace it.



Thickness Inspection

- Use the micrometer to inspect the thickness of brake disc. If the thickness is less than wear limit, please replace the brake disc.

Standard Thickness：22mm

Wear Limit：20mm

Adjustment

Please conduct the running-in of brake disc and joint surface of brake shoe as repair or replace brake disc or abnormal crural feeling appears after replacing brake shoe or driving for short distance.

- Before running-in, the braking effect is not good, please pay more attention to control the vehicle speed.
- This step is only can be executed under safe road and traffic conditions, please be careful.

1）Drive the vehicle on the straight and even road.

2）Control the brake force of depressing the brake pedal, ensure that the vehicle brakes within 3～5s.

3）Drive the vehicle for certain distance to cool the braking system.

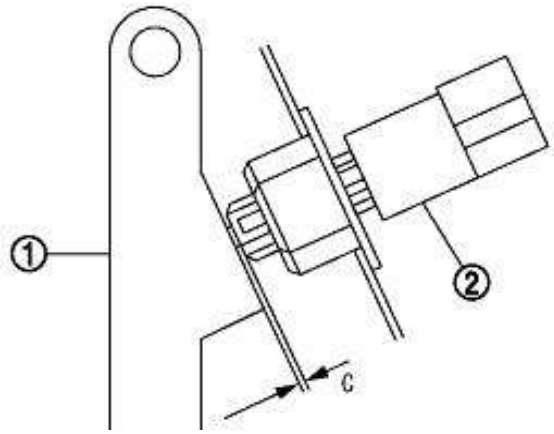
4）Repeat the step of 1～3 until the abnormal crural feeling disappears.

Brake Pedal

Inspection and Adjustment

Braking Lamp Switch

Check the clearance of brake pedal and switch nut of braking lamp



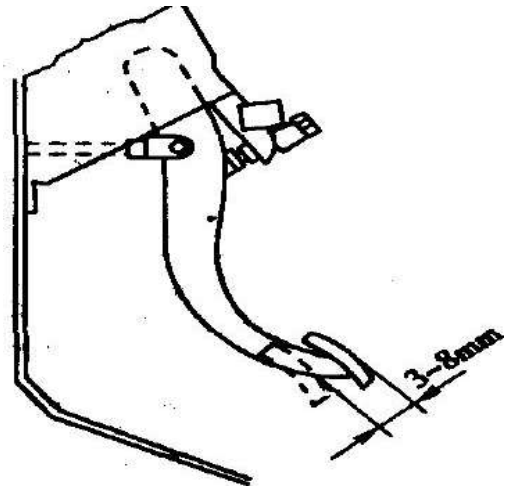
Caution:

- **The braking lamp goes out as the brake pedal released.**

Clearance adjustment of brake pedal and switch nut of braking lamp

1 Remove the underpart of instrument panel. Please refer to “Instrument Panel”.

2 Disconnect the switch connector of braking lamp, loosen the jam nut of braking lamp, release the brake pedal, rotate the switch and make the clearance switch and brake pedal stay 0.5～1.0mm.



■**Tightening Torque**：8～10N·m

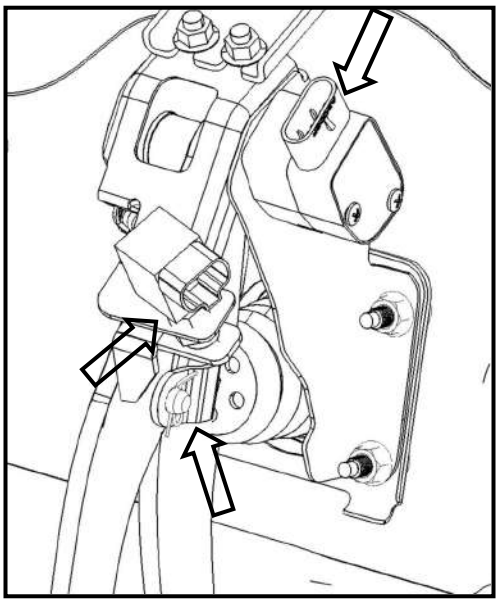
Free Stroke of Brake Pedal

Check the free stroke of brake pedal.

1 Turn the ignition key to OFF position, depress the brake pedal for 7～8 times.

2 Confirm that the vacuum of braking vacuum booster has been eliminated, depress the brake pedal with your hand.

3 Check the free stroke of brake pedal for standard range before the resistance appears.



- Standard Value：3～8mm

4 The adjustment should be conducted as the free stroke surpasses the standard range.

Caution:

- **If the free stroke is not able to be adjusted within standard range, please replace the damaged components.**

Caution:

- **During inspection, the brake pedal should be moved to your position slightly.**

Removal and Installation

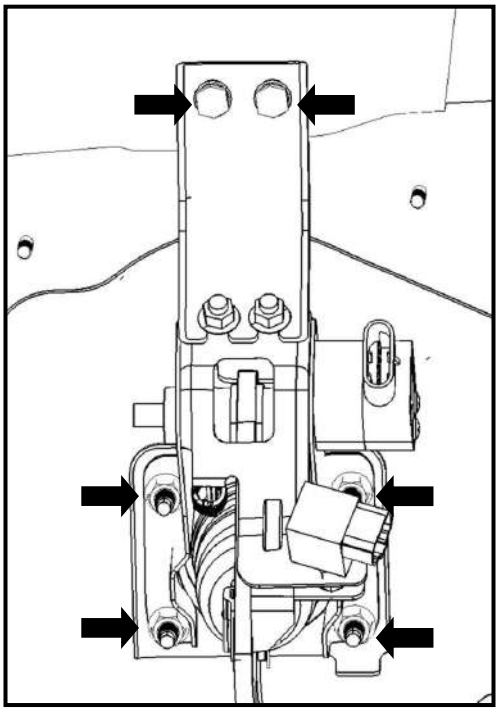
Removal

1 Remove the underpart of instrument panel. Please refer to “Instrument Panel”.

2 Disconnect the braking lamp switch and angular transducer connector.

3 Remove the connecting lockpin of braking vacuum booster, disconnect the connection with braking vacuum booster.

4 Remove the fixing bolt of brake pedal and body, braking vacuum booster.



■**Tightening Torque**：20～25 N·m

5 Pull out the brake pedal.

Inspection after removal

Brake Pedal

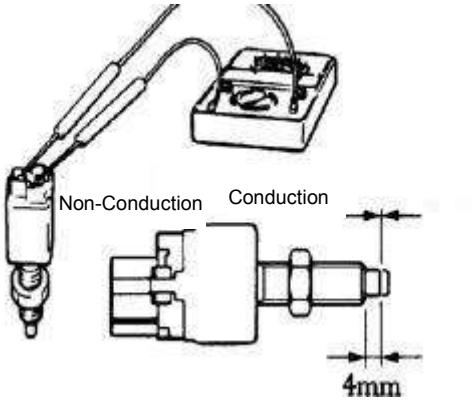
- Check the movable pin of brake pedal for wear or deformation.
- Check the brake pedal for crack、distortion or other damage.

Lockpin and Bush

- Check the lockpin and bush for damage or deformation, if does, please replace it.

Braking Lamp Switch

a. Use the multimeter to inspect the two terminals of braking lamp, check whether the braking lamp is ON or not as you press and release the sliding column of braking lamp.



b. As shown in the figure, as the sliding column has been pressed for >4mm, the terminals are not conductive and the terminals are conductive as the sliding column has been released, which indicates that the braking lamp switch works normally.

Installation

Install in the reverse order of removal.

Caution:

- **Check the operation of brake pedal for smoothness.**
- **Inspect and adjust the free stroke of brake pedal after installation.**
- **Check the clearance of brake pedal and limit switch of braking lamp.**

Parking Braking System

Inspection and Adjustment

Check

● Check and adjust parking brake only when brake is normal.

● Vehicle should be parked on flat road and use cleat to fasten the wheel when checking the parking brake system.

Parts Inspection

1 Check whether fixed condition of each part is normal.

2 Check whether parking brake handle assembly is bended, damaged or crack. Please replace it if it has the above situations.

3 Whether parking brake withdraw is abrased or damaged. Please replace it, if it has.

4 Whether parking brake warning light switch is normal. Please check or replace if it can't work normally.

5 Remove parking brake switch connector, and check conduction between positiove terminal and vehicle body.

When parking brake handle is up, it should be conductive.

When parking brake handle is down, it should not be conductive.

Check parking brake handle stroke

Pull parking brake handle by the force of 196N, pulled gear number is within standard gear number when pulling parking brake handle.

Standard gear number: 7~9

Note:

● There is one ticking sound when parking brake handle passing by one gear, listen and calculate sound times to judge whether stroke is within specified range when pulling parking brake handle.

Adjust the parking brake handle

1 open the front cabin cover.

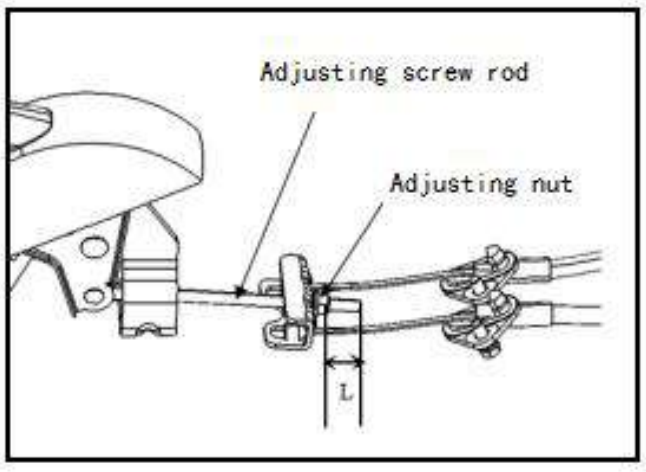
2 Dismantle the sub instrument panel house, details refer to sub instrument panel

3 Adjust parking control handle stroke

Adjust the adjusting nut of parking brake control system , and make sure that the distance L between adjusting nut and drawbench end is within the standard value.

Standard value: L=20~25mm

Standard gear number: 7~9



Note:

● If pulled gear number is less than 7, should reduce L; if pulled gear number is more than 9, should increase L.

4 Put down the parking brake handle.

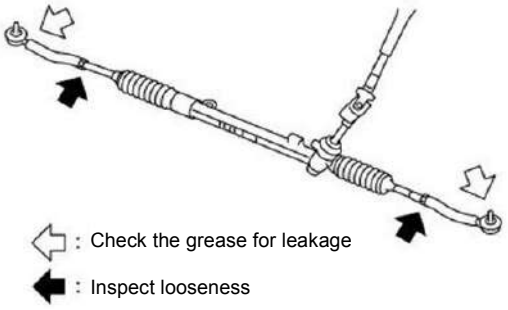
5 Check whether there is dragging in rear wheels

Steering Gear and Pull Rod

Steering Rod

Check the outer housing and shield for looseness、damage or grease leakage

Check the connection with steering rod for looseness



Steering Track Rod

Check the ball, dust cover and other components for looseness、wear、and grease leakage

Steering Wheel

Check

Inspection of Installation Situation

1 Check the installation situation of steering gear assembly、front suspension、axle and steering column.

2 Check the upside and downside、left and right side of steering wheel and axial movement for shift.

3 Check the fixing bolt and nut of steering gear assembly for looseness.

Inspect the free stroke of steering wheel

1 Rotate the steering wheel and place the front wheel forward straightly.

2 Turn on the ignition switch, rotate the steering wheel to the left or right slightly until the front wheel starts to move.

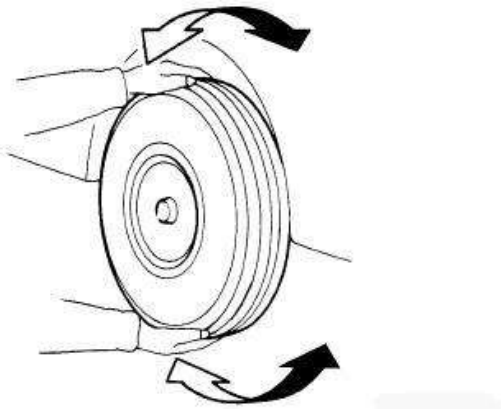
3 Measure the excircle movement of steering wheel.

Free stroke of steering wheel: 0mm ～30mm

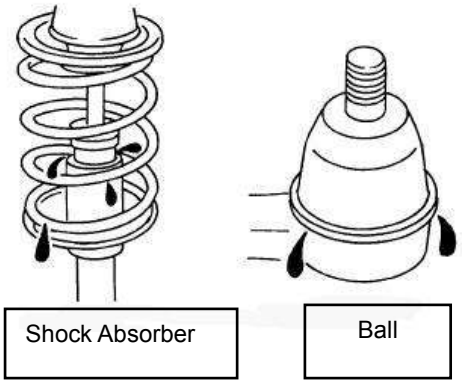
4 As the measured value surpasses the standard value, check the clearance of each joint in reference to steering column and installation situation of steering engine. Adjust or replace relevant components according to actual condition.

Axle and Suspension

Check the front、 rear axle and suspension for big clearance、abnormal sound、wear or other damage.



- Waggle each wheel to check the wheel for big clearance.
- Check the wheel bearing for normal operation.
- Check the axle and suspension bolt and nut for looseness.
- Check the shock absorber for hydraulic oil leakage or other damage.
- Check the suspension ball for grease leakage、dust cover leakage or other damage.



Rear Wheel Hub

Basic Inspection

Ensure that fixation (looseness、clearance) and component(wear、damage) of rear wheel hub are under normal conditions.

Inspection of Rear Wheel Hub

Inspect according to the following items, if necessary, please replace the response components.

- Use your hand to push the wheel hub and bearing assembly along the axle direction, confirm whether the wheel bearing is loosened or not. If does, it is advisable to replace the rear wheel hub or reassemble it

Axle End Clearance：0.05mm or less 0.05mm

- Rotate the wheel hub and confirm whether it has abnormal sound or other abnormal condition or not. If does, it is advisable to replace the rear wheel hub.

Front Suspension Assembly

Basic Inspection

Ensure that the fixation(looseness、clearance) of each component and component(wear、damage) are under normal conditions.

Inspect the axle end of ball stud for clearance

1 Place the front wheel forward straightly.

2 Place the gavelock or similar tools between tie rod and steering knuckle.

3 Pry the front wheel up and down to measure the axle end clearance.

Axle End Clearance：0mm

Caution:

- **Please do not depress the brake pedal.**
- **Please do not damage the dust cover of ball stud.**
- **Please do not apply a lot of pressure to avoid the damage on the installation position.**

Shock Absorber Inspection

Check the shock absorber for oil leakage、damage， if the malfunction has been found out, please replace it in time.

Rear Suspension Assembly

Basic Inspection

Ensure that the fixation(looseness、clearance) of each component and component(wear、damage) are under normal conditions.

Shock Absorber Inspection

Check the shock absorber for oil leakage、damage， if the malfunction has been found out, please replace it in time.

Inspection of Axial Clearance of Wheel Bearing

1 Jack up the vehicle, check the axial clearance as the vehicle stays in static state.

Prompt:

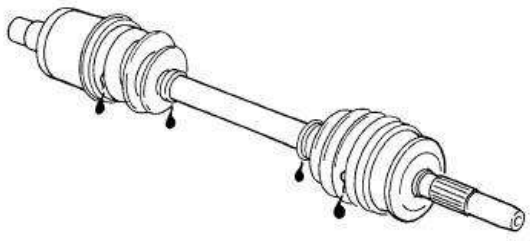
If the vehicle does have axial clearance, loosen the parking brake handle grip and continue the following step.

2 Check the axial clearance of wheel bearing end.

- Place the micrometer on the surface of wheel hub, rotate the wheel hub, check the axial clearance. Standard Clearance: 0～0.22mm.
- If the axial clearance is not able to be adjusted to regulated range, please replace the rear wheel hub.

Drive Shaft

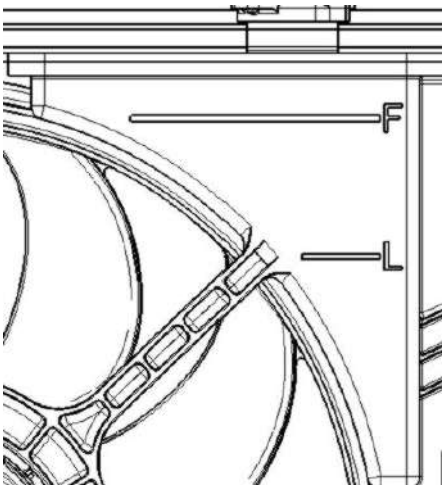
Check the dust cover and drive shaft for crack、wear、damage and grease leakage.



Cooling System

Check

Inspection of Cooling Liquid Volume



1 As the vehicle stays cold state, ensure that the coolant level of expansion tank stays between L line and F line.

2.If the coolant level of expansion tank does not stay between L line and F line, please adjust the coolant level of expansion tank.

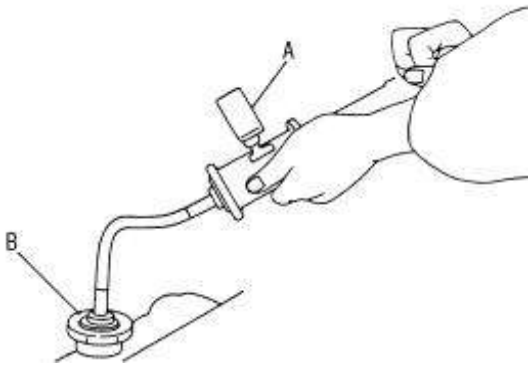
Caution:

- **Please refuel with cooling liquid.**
- **Please do not dilute the cooling liquid with water.**
- **Tighten up the filter cover of radiator.**

3 Tighten up the filter cap of expansion tank.

Leakage Test

Make use of the leak detector of radiator cap to check the cooling system for leakage by imposing pressure on it.



Warning:

- **It is prohibited to open the radiator cap immediately after parking the vehicle, the coolant temperature at this time is fairly higher, which may spill over from radiator filter and cause serious scald.**

Caution:

- **Before inspection, fill up the radiator assembly with water.**
- **During test, install the pipeline adaptor between leak detector of radiator cap and radiator filter cap to avoid filter cap deformation.**
- **Inspection must be in accordance with regulated test pressure.**
- **If the coolant volume decreases, fill up the coolant; if the damaged component has been found out, please repair or replace it.**

Cooling Liquid Drainage and Reinjection

Caution:

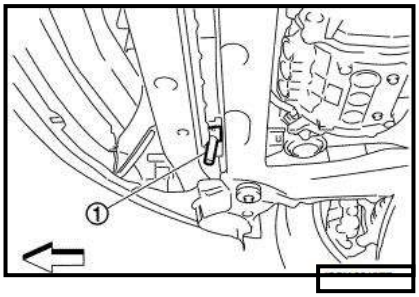
- **Please do not add other additive, for example detection solution of leakage, these additives may lead to blocked cooling circuit.**

Cooling Liquid Drainage

Warning:

- **It is prohibited to open the radiator cap immediately after parking the vehicle, the coolant temperature at this time is fairly higher, which may spill over from radiator filter and cause serious scald.**
- **Wrap up the radiator cap with cloth and unscrew it carefully. Rotate the cap for a quarter, then unscrew it completely.**

1 Unscrew the drain plug ① on the bottom of radiator, then remove the radiator cap.



⇦ ：In the front part of the vehicle

Caution:

- **Execute this step after electric drive system cooled.**

2 If necessary, remove the expansion tank, discharge the cooling liquid and clean expansion tank before installation.

3 Check the discharged cooling liquid for corrosion、rustiness or discoloration. If cooling liquid is contaminated, please wash the electric-drive cooling system.

Cooling Liquid Reinjection

1Install the removed expansion tank and radiator drain plug.

Caution:

- **Clean the drain plug and install a new O-ring.**

2 Confirm that each pipe clamp has been tightened.

3 Fill the cooling liquid into radiator assembly and expansion tank slowly until it reaches regulated liquid level(between F line and L line).

4 Install radiator cap.

5 Place the key in the ON position and the cooling water pump works.

6 Turn off the engine, fill up the cooling liquid in the radiator, fill the cooling liquid in the expansion tank to F line position.

7 Install the radiator cap and repeat it for 3~6 times until the liquid level of coolant stays stable.

8 Operate the cooling water pump, check the cooling system for leakage.

Caution:

- **If the cooling water pump has not been filled up with coolant, the phenomenon of limited power and inoperation may happen to the vehicle due to poor heat dissipation of electric drive system.**
- **Please do not operate EWP before filling the cooling liquid.**

Support Beam of Suspension Assembly and Power Assembly

Basic Inspection

Make sure that each component(wear、 damage) and its fastening(looseness、 clearance) is under normal condition .

Suspension Assembly Inspection

Inspect according to the following items, if necessary, please replace the components:

1 Check the suspension cushion rubber for crack, whether the suspension cushion suffers from compressional deformation generated by lateral force or not under static state. If does, it is suggested that the suspension cushion should be replaced or reassembled.

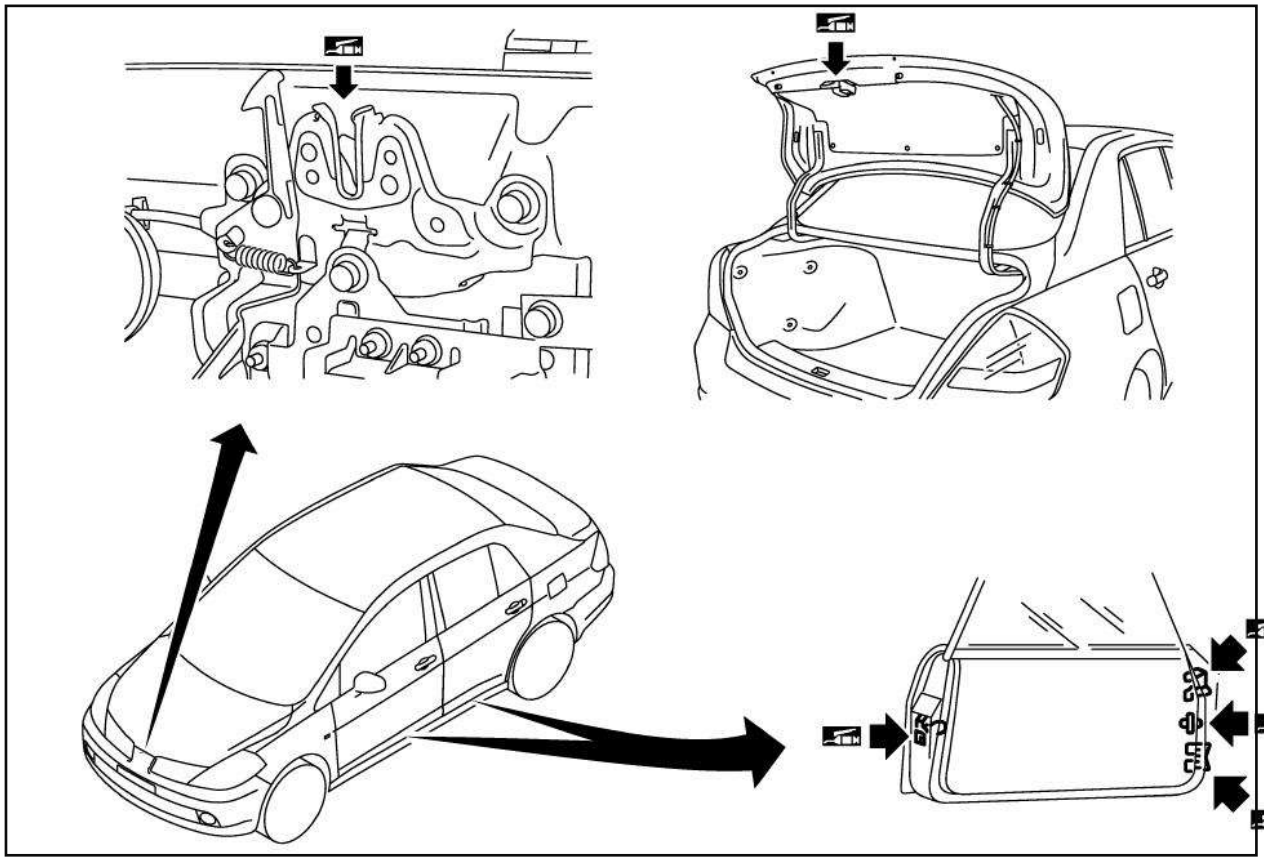
2 Check the connection between suspension bracket and support beam of power assembly、 suspension bracket and body girder for reliability, the bolt for looseness, the torque for design requirement. If does, it is suggested that the suspension cushion should be replaced or reassembled.

Inspection of Support Beam of Power Assembly

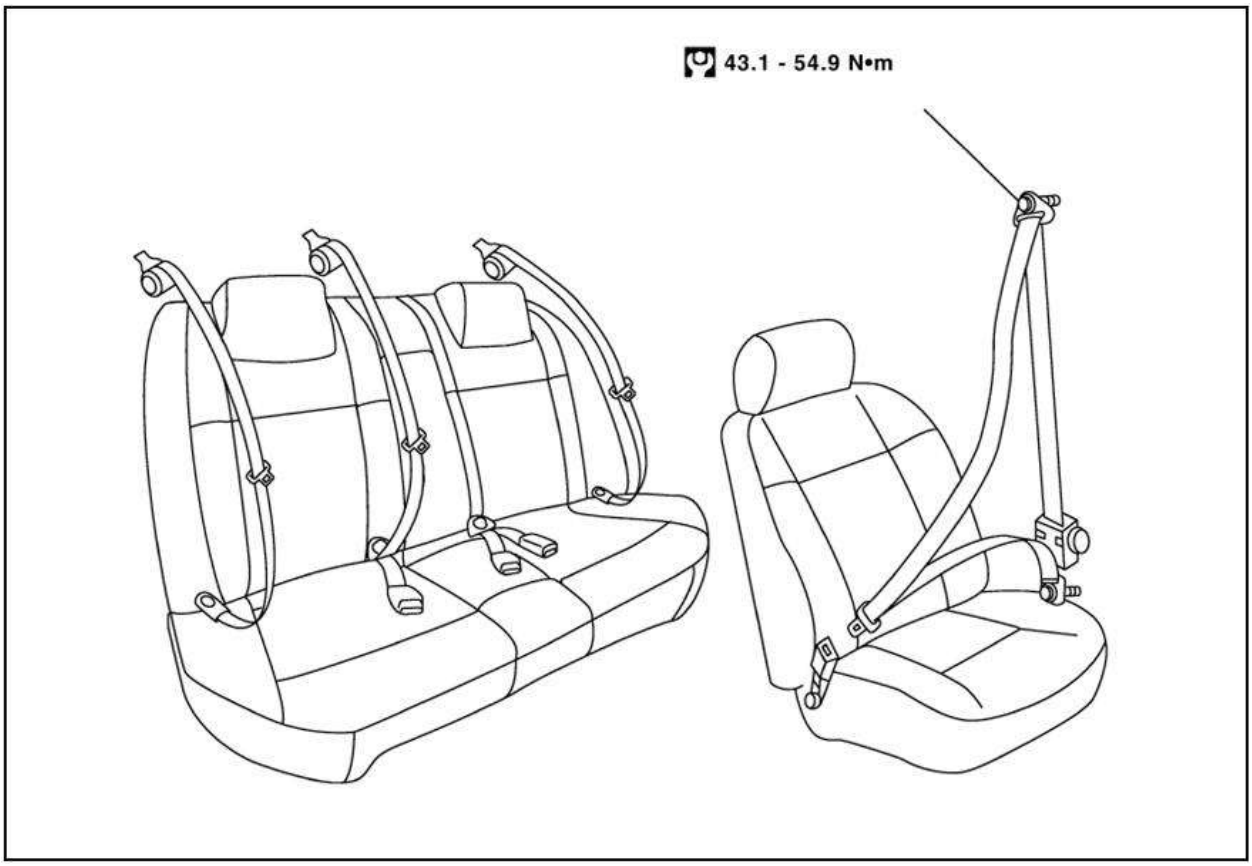
Check the connection between support beam of power assembly and each component of power assembly for reliability, the bolt for looseness, the torque for design requirement. If does, it is suggested that replace the support beam of power assembly or reassemble each component of power assembly.

Body Maintenance

Lubrication of Door Lock、Hinge and Plunger Latch of Engine Hood



Inspection of Seat Belt、Hasp、Curling Device、Fixator and Regulator



Caution:

- **After any collision happened, all the seat belt assembly should be inspected, including retractor and other additional hardware(for example, fixed bolt, track type facility).**
- **Our company advise you to replace all the seat belt assembly after collision, unless all the seat belt assembly is without any damage after slight collision and conducted proper operation..**
- **The unused seat belt assembly during collision is also needed to be inspected, and replace the damaged seat belt or the seat belt without proper operation.**
- **If the front collision leads to the airbag explosion on the driver and passenger side, replace the seat belt pretensioner even though the seat belt is unused before.**
- **If any component and part of seat belt assembly has problem, please replace the seat belt assembly instead of repairing it.**
- **If the seat belt cracked, worn or damaged, please replace the seat belt assembly.**
- **Please do not lubricate the retaining ring and buckle.**
- **Please use DR genuine seat belt assembly.**
- **Check the fixator for looseness.**
- **Check the seat belt for damage.**
- **Check the retractor for smooth operation.**
- **After the retaining ring is open, check the retaining ring and buckle for normal function.**

Service Data and Detail

Wheel

Item		Limit
Wear Limit of Tire Thread	Side Eccentric Wear	Less than0.3mm
	Top Surface Wear	
Permitted Imbalance	Dynamic State	Less than10g
	Static State	Less than20g