DR 1.0 EV Manuale
di Assistenza

service & parts srl

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ELECTRONIC PARKING BRAKE SYSTEM

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System Overview

System Description

Electrical Parking Brake (EPB) determines the current operation function by getting the information of the ignition signal, switch command, and other nodes on the vehicle. At the same time, EPB also has the fail-safe function. When the failure occurs (such as other node information is invalid), EPB can also determine the real-time vehicle state through a particular algorithm, and ensure security and reliability of EPB system to the maximum limit.

Basic Function	Manual Releasing	Release EPB by detecting signals of EPB switch and brake pedal.
	Automatic Releasing	Release EPB by detecting signals of accelerator pedal, engine speed / torque, gear position and gradient, etc.
	Manual Parking	EPB applies parking brake by detecting EPB switch signal.
	Power Off Parking	With vehicle stationary, EPB applies parking brake automatically after POWER switch is turned off.
	Reclamping at High Temperature	Monitor the brake disc temperature, power system and vehicle status. Reclamp when temperature exceeds limit to prevent vehicle from slipping downward.
	Reclamping at Coasting	EPB reclamps with the maximum clamping force if slipping downward is determined by monitoring wheel speed signal after vehicle is parked.
	Reclamping by Switch	If parking request from EPB switch exceeds 3 seconds after parking, EPB reclamps with the maximum clamping force.
	RWU Braking	EPB is controlled by the EPB switch during driving, to perform the rear wheel anti-lock brake.
	Degraded Braking	When wheel speed fails, it applies rear wheel brake with a constant small clamping force.

Manual Parking

- When the vehicle starts or is turned on, the vehicle is stationary.
- Manually pull the parking button and the vehicle is parked.
- The electronic parking button indicator comes on.

Manual Releasing

- When the vehicle starts or is turned on, depress the brake pedal or accelerator pedal.
- Manually press the parking button and release the parking brake.
- The electronic parking button indicator goes off.

Automatic Releasing

- The whole vehicle is ready, driver seat belt is fastened, driver door is closed, vehicle speed = 0, gear position is in D or R, EPB is clamping, actual power torque is larger than the required power torque released by EPB, and accelerator pedal opening matches the actual power torque (different driving mode), release EPB.

Power Off Automatic Parking

- The vehicle is stationary;
- Turn POWER switch to OFF;
- EPB switch is not pressed;
- EPB is clamping to park.

Power Off Automatic Parking Function OFF

- The vehicle is stationary;
- EPB is released;
- Long press EPB switch more than 3 seconds. Turn off the power, then release EPB switch after powering off, EPB cannot perform power off automatic parking function.

Reclamping at High Temperature

- According to the brake disc temperature after parking, determine the reclamping cooling waiting time.
- Performing: Reclamp with the maximum force and try to prevent vehicle coasting.

Reclamping at Coasting

- When the vehicle is coasting after parking, the system will perform reclamping.

Reclamping by Switch

- The vehicle is stationary;
- EPB is in parking status;
- Long pull and hold EPB switch, system performs reclamping operation again according to the set maximum clamping force.

EPB Rear Wheel Anti-lock Brake

- The wheel speed signal is valid;
- CDP function is invalid or ESC is not configured;
- Pull and hold EPB switch, parking brake is applied to front wheel. Control motors at both sides to rotate clockwise or counterclockwise individually, adjust brake force and the wheels do not lock. When the vehicle decelerates to stop, EPB performs the static parking, and dynamic brake control is end.

Degraded Braking

- The vehicle is in dynamic mode;
- The wheel speed signal is invalid;
- Pull and hold EPB switch, the system use a small clamping force to apply parking brake.

Emergency Releasing

Jump releasing

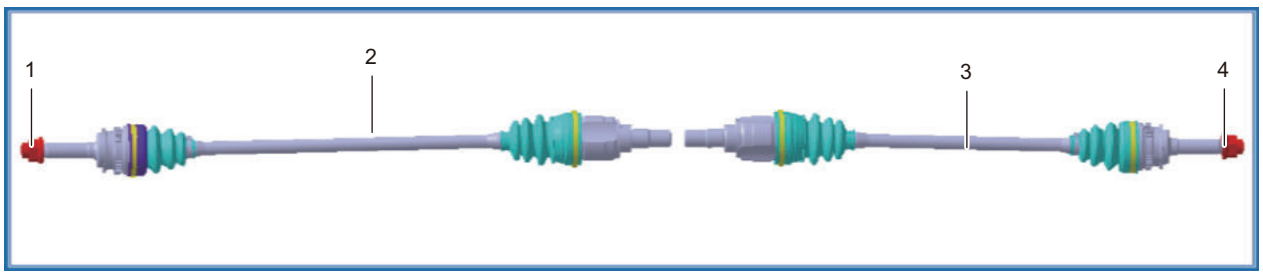
- When the vehicle is jumped, release it by parking switch.

Mechanical releasing

- Remove parking motor, rotate screw clockwise with 40# spline.

System Components Diagram

Electronic Parking Brake System Structure Diagram



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No.	Name	No.	Name
1	Electronic Control Unit	2	Instrument Cluster Indicator
3	Parking Switch	4	Parking Actuator

Component Function Description

Instrument Cluster Indicator

 Electrical parking malfunction light (yellow) comes on to indicate that the electrical parking brake fails.  Parking indicator (red) comes on to indicate electrical parking brake is applied and vehicle is parked.If the  light comes on and then goes off during normally driving. Do not worry. Because of the road surface or incorrect operation, the instantaneous signal cannot meet the system requirements, which may not affect EPB system function and normal operation.

Parking Switch

P button can be pulled and pressed with fingers, which is used to control the clamping and releasing of electrical parking brake. If the square indicator (red) on the switch comes on, which indicates it responds the parking command; If the indicator goes off, which indicates that it responds the releasing command.The parking switch is installed on the center of front seats. The received signals are processed by EPB controller, which controls to rotate EPB motor clockwise or counterclockwise. Therefore, clamp or cancel brake disc clamping to complete the clamping and releasing of park brake.When it is necessary to park, press EPB switch button on the center of seat. The signal is processed with EPB controller, the motor rotates to push piston to clamp the brake disc, which completes the parking brake.

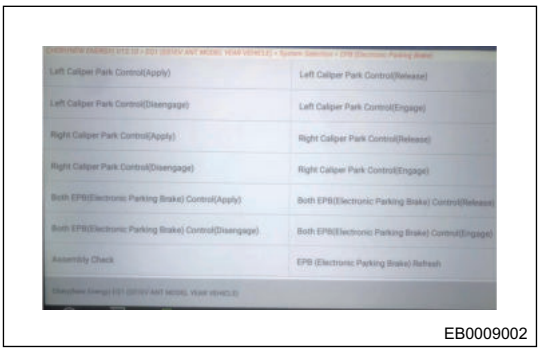

EB0011002

EPB Module

EPB module drives the parking brake directly with the actuator motors on brake wheel cylinder at both sides.


EB0008002

EPB module calibration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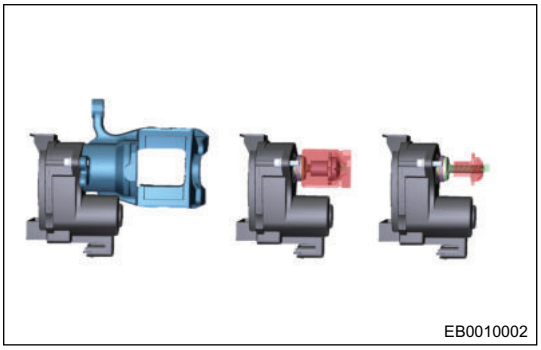
Parking Actuator

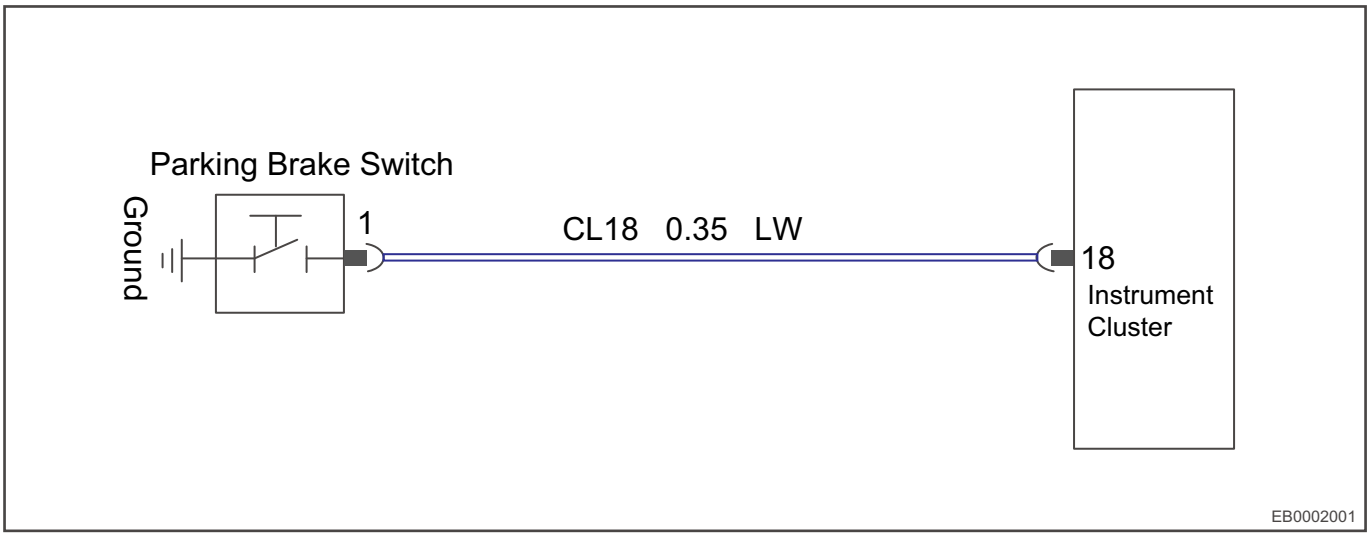
Motor operation: EPB pushes out screw by controlling parking brake motor, then push piston and brake plate in final to brake.



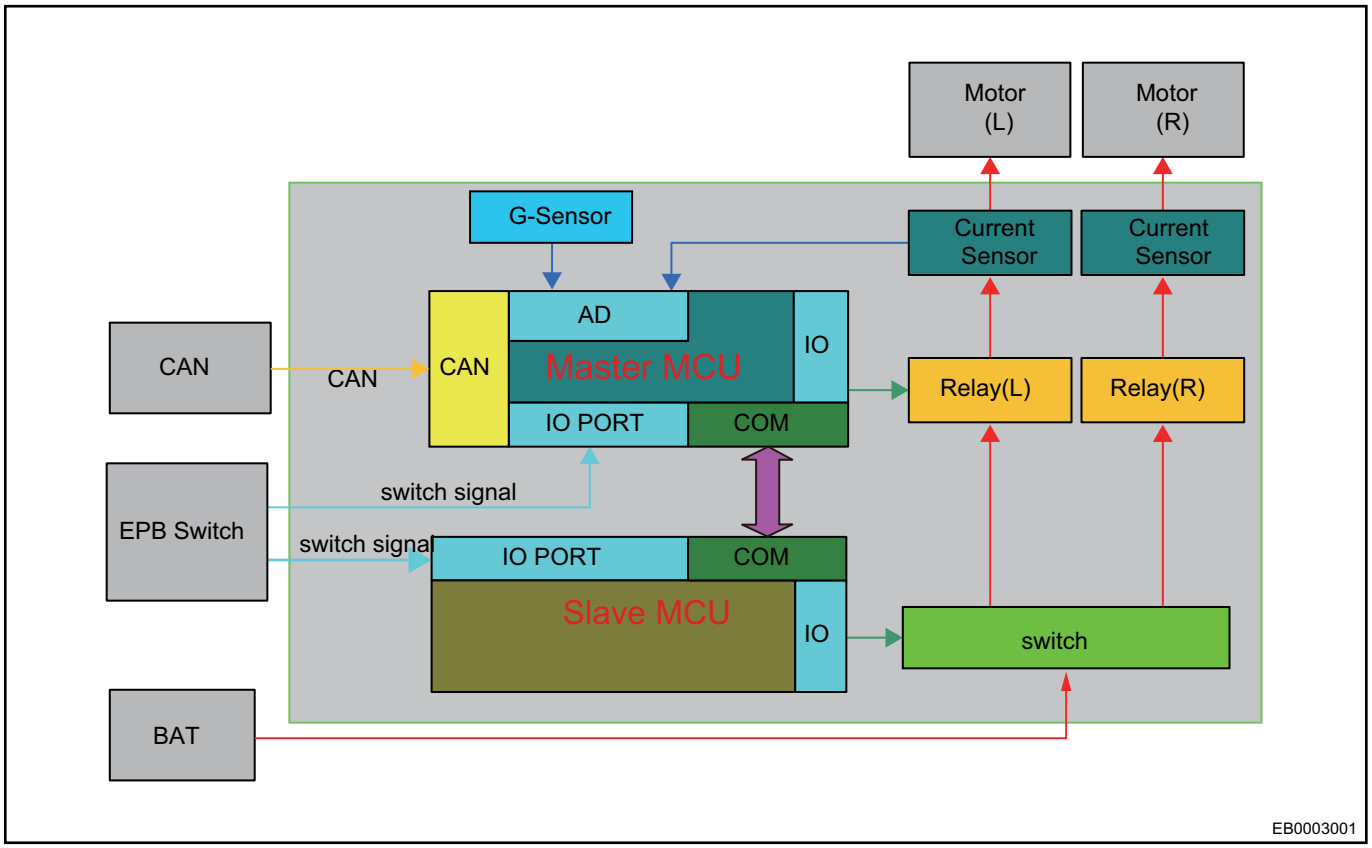
System Circuit Diagram

Circuit Diagram

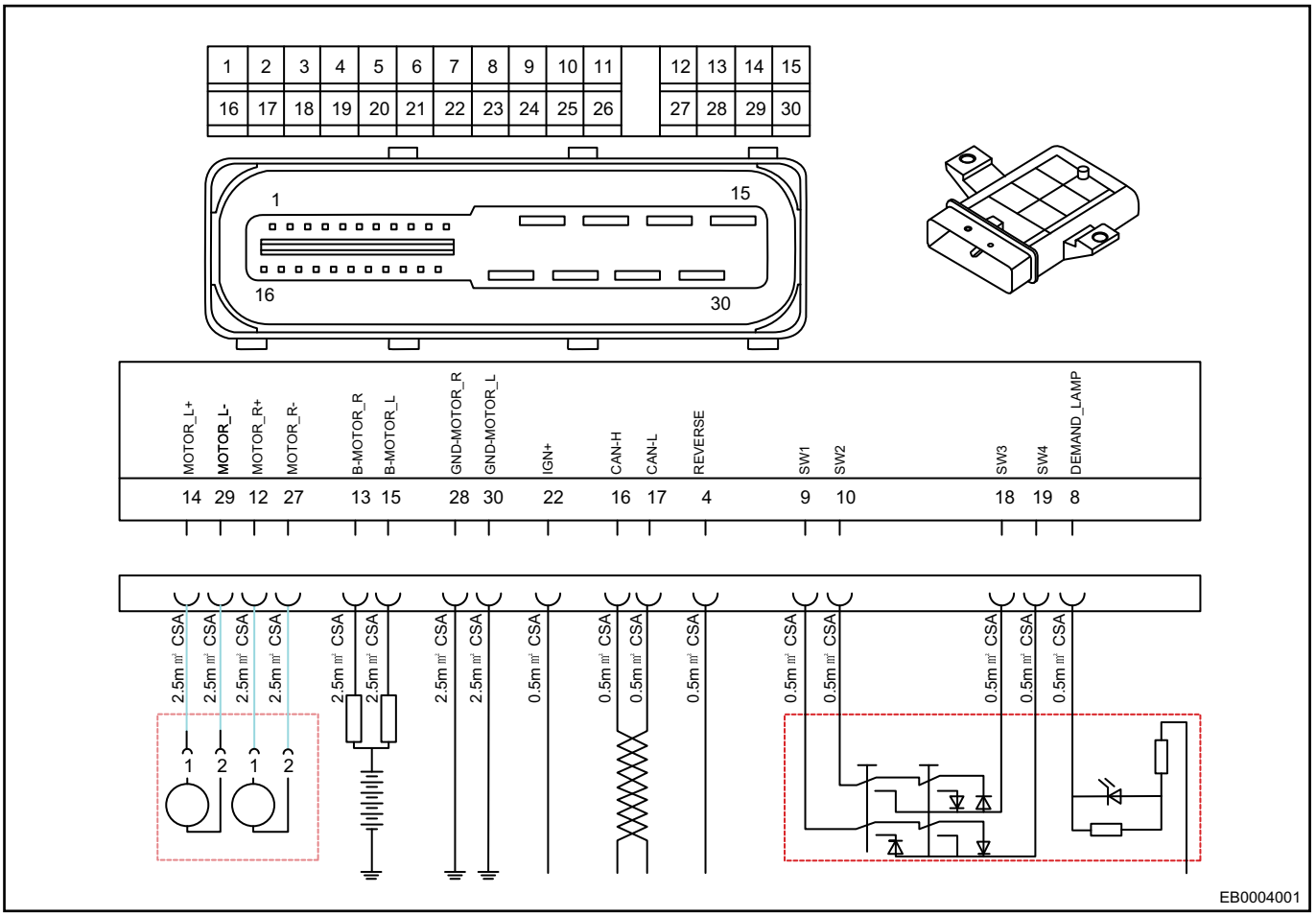
Parking Brake System (Models without EPB)



Parking Brake System (Models with EPB)



EPB Hardware Wiring Diagram



Diagnosis & Test

Problem Symptoms Table

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

Symptom	Suspected Area	Recommended Repair Method
In status with parking brake, brake shoe and brake disc contact and wear each other	Parking brake system adjustment (it is adjusted incorrectly, the stoke is too small)	Adjust the tension of parking brake system
	Parking brake shoe (too large diameter)	Adjust parking brake shoe clearance
	Brake shoe return tension spring (damaged)	Replace brake shoe return tension spring
In status without parking, brake lining and brake disc contact and wear each other	EPB motor failure	Replace EPB electronic control drive unit
	EPB caliper set malfunction	Replace rear caliper body set

Parking brake cannot provide enough parking force while parking	Parking brake system adjustment (it is adjusted incorrectly, the stoke is too large)	Adjust the tension of parking brake system
	Brake shoes (diameter is too small after wear, and parking system stoke is too large)	Adjust the tension of parking brake system
	Brake shoes (wear exceeds the limit)	Replace brake shoes
	Parking cable and balancer (- poor connection)	Connect them firmly
	Parking cable and parking brake arm (poor contact)	Connect them firmly
	Parking brake control mechanism (poor fixing)	Fix parking brake control mechanism
	Parking brake control mechanism (internal fault: it cannot be locked)	Replace parking brake control mechanism
EPB failure	EPB switch button failure (the corresponding signal cannot be provided)	Replace EPB switch button
	EPB electronic control drive assembly (clamping force cannot be transmitted)	Replace electronic control drive assembly
Brake warning light comes on when parking brake is not applied	Warning light circuit (failure)	Replace warning light, wire harness or switch on the parking brake control mechanism
Brake warning light does not come on when parking brake is applied	Warning light circuit (failure)	Replace warning light, wire harness or switch on the parking brake control mechanism
Model with EPB , instrument cluster failure	Controller assembly, wire harness, wheel speed signal, electronic control actuator assembly or network failure	For details, refer to Diagnostic Trouble Code (DTC) Chart

Diagnosis Procedure

1	**Vehicle brought to workshop**

Next

2	**Customer problem analysis and symptom check**

Confirm problem symptoms

Next

3	**Check CAN communication system**

Check if CAN communication system operates normally with diagnostic tester

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output	B

A → **Check CAN communication circuit**

B

4	**Check for DTCs, inquire DTC chart**

Next

5	**Detect malfunction**

Next

6	**Confirm malfunction**

Next

7	**Repair or replace**

Next

8	**Confirm test**

Clear DTCsFunction test

Result	Proceed to
Functions are abnormal	Step 5
Functions are normal	Next

DTC check

Result	Proceed to
DTCs are output	Step 4
DTCs are not output	Next

Next

End

Diagnostic Trouble Code (DTC) Chart

DTC Vehicle Designation	DTCs	DTC Description
U240088	E40088	CAN BusOff Error
C110116	510116	IGN Line (Short to Ground or Open)
C110017	510017	Battery Voltage is Abnormal (-Over Voltage)
C110016	510016	Battery Voltage is Abnormal (-Under Voltage)
C110060	510060	Actuator Voltage out of Range
C11A418	51A418	Actuator Mechanical Fault
C11A477	51A477	Actuator Error or Incoherent
C11A07C	51A07C	Left Actuator Fault (Operates for Too Long)
C11A37C	51A37C	Right Actuator Fault (Operates for Too Long)
C11A013	51A013	Left Actuator Fault (Open)
C11A313	51A313	Right Actuator Fault (Open)
C11A011	51A011	Left Actuator Fault (Control Circuit Fault)
C11A311	51A311	Right Actuator Fault (Control Circuit Fault)
C11A07E	51A07E	Left Actuator Fault (Failure of Mosfet)
C11A37E	51A37E	Right Actuator Fault (Failure of Mosfet)
C11A070	51A070	Left Actuator Fault (Actuator Broken)
C11A370	51A370	Right Actuator Fault (Actuator Broken)
C11A015	51A015	Left Actuator Fault (Motor Short)
C11A315	51A315	Right Actuator Fault (Motor Short)
C11A07D	51A07D	Left Actuator Fault (Failure of Relay)
C11A37D	51A37D	Right Actuator Fault (Failure of Relay)

C11A063	51A063	Left Actuator Fault (Failure of Transistor)
C11A363	51A363	Right Actuator Fault (Failure of Transistor)
C11A054	51A054	Left Actuator Fault (Failure of Calibration)
C11A354	51A354	Right Actuator Fault (Failure of Calibration)
C113800	513800	Switch Broken (Failure of circuit)
C113861	513861	Switch Broken (Switch Not Stable)
C11352A	51352A	Switch Broken (Switch Apply Stuck)
C11362A	51362A	Switch Broken (Switch Release Stuck)
C110860	510860	Switch Broken (Failure of Line)
C110862	510862	Switch Broken (Switch State not Agree)
C116045	516045	ECU Fault (Failure of Stack)
C116040	516040	ECU Hardware Fault (AD Module)
C116042	516042	ECU Hardware Fault (EEPROM)
C110862	510862	Switch Broken (Switch State not Agree)
C116045	516045	ECU Fault (Failure of Stack)
C116040	516040	ECU Hardware Fault (AD Module)
C116042	516042	ECU Hardware Fault (EEPROM)
C110862	510862	Switch Broken (Switch State not Agree)
C116045	516045	ECU Fault (Failure of Stack)
C116040	516040	ECU Hardware Fault (AD Module)
C116042	516042	ECU Hardware Fault (EEPROM)
C110862	510862	Switch Broken (Switch State not Agree)
C116045	516045	ECU Fault (Failure of Stack)
C116040	516040	ECU Hardware Fault (AD Module)

C116042	516042	ECU Hardware Fault (EEPROM)
C110862	510862	Switch Broken (Switch State not Agree)
C116045	516045	ECU Fault (Failure of Stack)
C116040	516040	ECU Hardware Fault (AD Module)
U241086	E41086	Invalid Data Received From EMS
U241186	E41186	Invalid Data Received From TCU
U241286	E41286	Invalid Data Received From BCM
U241386	E41386	Invalid Data Received From BCS
U24148	E41486	Invalid Data Received From ICM
C11D112	51D112	EPB Status Lamp Line (Short to Battery)
C11D114	51D114	EPB Status Lamp Line (Short to Ground or Open)

DTC Diagnosis Procedure

CAN Bus Error (E40088)

Malfunction Name	CAN BusOff Error
DTC	E40088
Malfunction Condition	1. EPB malfunction light comes on; 2. EPB can release or clamp manually in static; 3. Automatic releasing and dynamic brake function do not function properly.
Possible Cause	1. EPB malfunction light comes on; 2. CAN _ H and CAN _ L are connected in reverse, or CAN _ H / L is short to power supply or ground; 3. Whole CAN network failure; 4. ECU internal circuit failure.
Judgment Condition	ECU internal CAN network monitoring module detects fault of the CAN bus.
Disabled Function	1. In static status, EPB can responds manual releasing or clamping commands (function is limited at that time). 2.Automatic releasing and dynamic brake function do not function properly.

Troubleshooting:

1. Connect OBD interface with diagnostic tester to perform diagnosis. If the diagnostic tester can not be connected with EPB, check if CAN bus is connected normally. If it is normal, it indicates that EPB controller CAN signal receiving / sending module fails. Test again after replacing EPB ECU.
2. If the diagnostic tester is connected with EPB normally, turn POWER switch on to check it after clearing DTCs. If DTC still exists, check and repair other electronic control units of the vehicle. After confirming CAN communication of other electronic control units is normal, check it again.
3. Clear EPB DTCs with diagnostic tester, turn POWER switch on again. Read DTCs after 5 seconds. Check if this DTC occurs again inside EPB. If it still exists, test again after replacing EPB ECU.

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When CAN connection wire of EPB or whole vehicle CAN bus fails, EPB prompts “CAN Bus Off” and also prompts other nodes time out (such as “VCU Node Timeout”, “ABS Node Timeout”). In this case, the technicians should not judge that node timeout failure is VCU, ABS and other nodes damaged. EPB cannot receive information of these nodes due to CAN line failure at this time. Therefore, when “CAN Bus Off” and “Node Timeout” occur at the same time, the technicians should inspect and repair CAN bus firstly.

System Power Supply Voltage High (Over Voltage) (C110017)

Malfunction Name	Battery Voltage is Abnormal (Over Voltage)
DTC	C110017
Malfunction Condition	1. EPB malfunction light comes on; 2. Display “Battery Voltage is Too High” by reading DTC with diagnostic tester.
Possible Cause	1. External power supply voltage is too high or battery is damaged; 2. EPB controller internal failure occurs.
Judgment Condition	Battery voltage exceeds the set threshold voltage and duration is too long.
Disabled Function	EPB actuator cannot operate clamping or releasing normally.

Troubleshooting:

1. Measure the on-board battery voltage, check if the battery voltage is too high (more than 16 V). If it is too high, check and repair is necessary. If battery voltage value is not within the rated voltage range due to battery internal structure malfunction, it is necessary to replace battery for preventing damage to EPB or other on-board electronic control units.
2. If the battery voltage is normal, EPB still detect “Battery Voltage is Too High” malfunction, it indicates that EPB internal voltage detects the circuit malfunction. It is necessary to replace EPB controller.
3. Clear EPB DTCs with diagnostic tester, turn POWER switch on again. Read DTCs after waiting for a period of time. Check if this DTC occurs again inside EPB.

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When “Battery Voltage is Too High” malfunction occurs in EPB, EPB function still can be used normally, perform troubleshooting immediately. It is mainly to prevent damage to EPB actuator and controller due to overvoltage.

System Power Supply Voltage Low (C110016)

Malfunction Name	Battery Voltage is Abnormal (Under Voltage)
DTCs	C110016
Malfunction Condition	1. EPB malfunction light comes on; 2. EPB does not response to clamping and releasing of actuator.
Possible Cause	1. Battery voltage is too low or battery is damaged; 2. Connection wire and positive/negative of battery are in poor contact; 3. EPB internal circuit failure.
Judgment Condition	Battery voltage is lower than the set threshold voltage and duration is too long.
Disabled Function	EPB may not operate clamping or releasing of actuator normally.

Troubleshooting:

1. Check if the battery voltage is too low. If the battery voltage is low, first it is necessary to charge the battery. After the voltage reaches the rated voltage of battery, test again. If the battery is charged for a long time, the battery voltage still cannot reach the rated voltage, which indicates that there is internal malfunction, it is necessary to replace battery at this time.
2. If the battery voltage is normal, EPB still check “Battery Voltage is Too Low” malfunction. Check if EPB power supply connection wire and positive/negative of battery are in poor contact, or resistance of connection is too large due to large area oxidation on contact surface. It is necessary to reconnect if it is in poor contact.
3. Clear EPB DTCs with diagnostic tester, turn POWER switch on again. Read DTCs after waiting for a period of time. Check if this DTC occurs again inside EPB. If it still exists, it indicates that EPB internal voltage detection circuit is damaged, test again after replacing ECU.

IGN Line Malfunction (C110116)

Troubleshooting:

1. Check if IGN line of EPB is connected to IGN line of the whole vehicle properly. If it is not connected properly, correct it; Check if IGN line is open. If it is open, it is necessary to replace connection wire.
2. Read the current information inside EPB with diagnostic tester. Check if the ignition status obtained from diagnostic tester is same as the ignition status of actual vehicle. If it is inconsistent, it indicates EPB internal ignition status detection circuit fault. Test again after replacing EPB.
3. Using diagnostic tester to clear fault. Repeat the ignition test. If the fault still exists, it indicates that EPB internal circuit is damaged. Test again after replacing EPB ECU.

Actuator Voltage out of Range (C110060)

Malfunction Name	Actuator Voltage out of Range
DTCs	C110060
Malfunction Condition	1. EPB malfunction light comes on; 2. Actuator cannot operate properly.
Possible Cause	1. Actuator connection wire is open; 2. Actuator internal motor connection wire is open; 3. Actuator connection wire is shorted; 4. Actuator internal motor connection wire is open; 5. EPB internal control motor circuit is damaged.
Judgment Condition	When EPB operates, the voltage at both ends of actuator connection wire is abnormal.
Disabled Function	EPB actuator cannot operate normally.

Troubleshooting:

1. Check if the actuator and caliper are installed properly. If not, perform test after reinstalling.
2. Check if connector and wire harness on the actuator are connected properly. Reconnect the connector if it is not proper; in addition, note if the buckle on the connector is damaged. If it is damaged, it is necessary to replace this connector to prevent failure from recurring.
3. Check if the pins on connection wire of actuator falls off from plastic housing of connector. If it falls off, the plastic housing internal may be damaged or the pins are pulled out from plastic housing by external force. It is necessary to replace connector and pins on the connection wire at this time.
4. Check if the pins on connection wire of actuator falls off from plastic housing of connector. If it falls off, the plastic housing internal may be damaged or the pins are pulled out from plastic housing by external force. It is necessary to replace connector and pins on the connection wire at this time.
5. Check if two metal pins in the connectors on the actuator are open (metal pins are connected to the both ends of the actuator motor through internal wire). If it is open, replace the actuator. At this time, it

is also necessary to note if the metal pins and metal pins in connector female are in poor contact due to other factors such as water seepage or corrosion. Replace it if necessary.

6. Check if the actuator connection wire is shorted. If so, replace the connection wire; If the motor is shorted because the two connection wires are cut by the external sharp items. While replacing the connection wire, troubleshoot the cause of connection wire short circuit in time. Prevent same failure from recurring.
7. In order to troubleshoot if actuator connector is disconnected due to actuator internal motor connection wire short or mechanical stuck of motor, etc. Connect the fault-free actuator (for checking if the actuator fails), turn POWER switch on again. Operate EPB switch to control the releasing/clamping of actuator. Check if the actuator operate normally. If it does, it indicates that the actuator fails, replace it if necessary.
8. If there are no problems in the above inspections, it indicates that EPB controller internal circuit is damaged, replace it if necessary.
9. Clear EPB DTC with a diagnostic tester. Turn POWER switch on again and check if this DTC occurs inside EPB. Operate EPB switch to clamp and release repeatedly. Confirm that the faults are troubleshooting.

Left Actuator Fault (C11A07C, C11A013, C11A011, C11A07E, C11A070, C11A015, C11A07D, C11A063, C11A054)

Malfunction Name	Left Actuator Fault
DTCs	C11A07C, C11A013, C11A011, C11A07E, C11A070, C11A015, C11A07D, C11A063, C11A054
Malfunction Condition	1. EPB malfunction light comes on (C11A063, C11A054 malfunction light does not come on); 2. Actuator cannot operate properly.
Possible Cause	1. Left actuator connection wire is open; 2. Left actuator internal motor connection wire is open; 3. Left actuator connection wire is shorted; 4. Left actuator internal motor connection wire is shorted; 5. Left actuator internal motor is stuck; 6. Brake lining is not installed in the left actuator or lining is too thin, so that EPB braking time is too long and brake cannot applied normally; 7. Left actuator has internal mechanical malfunction; 8. EPB internal control motor circuit is damaged.
Judgment Condition	1. When EPB is power on for self-check, voltage and current signals at the both ends of left actuator connection wire is abnormal; 2. When EPB operates, voltage and current signals at the both ends of left actuator connection wire are abnormal.
Disabled Function	During manual parking, manual releasing, automatic releasing, dynamic brake and automatic parking with power off, left actuator cannot operate properly.

Troubleshooting:

1. Check if left actuator and caliper are installed properly. If not, perform test after reinstalling.
2. Check if connector and wire harness on the left actuator are connected properly. Reconnect the connector if it is not proper; in addition, note if the buckle on the connector is damaged. If it is damaged, it is necessary to replace this connector to prevent failure from recurring.
3. Check if the pins on connection wire of left actuator falls off from plastic housing of connector. If it falls off, the plastic housing internal may be damaged or the pins are pulled out from plastic housing by external force. It is necessary to replace connector and pins on the connection wire at this time.

4. Check if left actuator connection wire is open or damaged. If the wire is damaged, replace it. If left motor is open due to open circuit of connection wire. It is also necessary to check if there are sharp materials near the open circuit position of connection wire to cut the connection wire. If there are, it needs to rectify it and prevent failure from recurring.
5. Check if two metal pins in the connectors on the left actuator are open (metal pins are connected to the both ends of the actuator motor through internal wire). If it is open, replace the actuator. At this time, it is also necessary to note if the metal pins and metal pins in connector female are in poor contact due to other factors such as water seepage or corrosion. Replace it if necessary.
6. Check if the left actuator connection wire is shorted. If so, replace the connection wire; If the left motor is shorted because the two connection wires are cut by the external sharp items. While replacing the connection wire, troubleshoot the cause of connection wire short circuit in time. Prevent same failure from recurring.
7. In order to troubleshoot if left actuator connector is disconnected due to left actuator internal motor connection wire short or mechanical stuck of motor, etc. Connect the fault-free actuator (for checking if the actuator fails), turn POWER switch on again. Operate EPB switch to control the releasing/clamping of actuator. Check if the Left actuator operate normally. If it does, it indicates that the actuator fails, replace it if necessary.
8. If there are no problems in the above inspections, it indicates that EPB controller internal circuit is damaged, replace it if necessary.
9. Clear EPB DTC with a diagnostic tester. Turn POWER switch on again and check if this DTC occurs inside EPB. Operate EPB switch to clamp and release repeatedly. Confirm that the faults are troubleshooting.

Right Actuator Fault (C11A37C, C11A313, C11A311, C11A37E, C11A370, C11A315, C11A37D, C11A363, C11A354)

Malfunction Name	Right Actuator Fault
DTCs	C11A37C, C11A313, C11A311, C11A37E, C11A370, C11A315, C11A37D, C11A363, C11A354
Malfunction Condition	1. EPB malfunction light comes on (C11A363, C11A354 malfunction light does not come on); 2. Right actuator cannot operate properly.
Possible Cause	1. Right actuator connection wire is open; 2. Right actuator internal motor connection wire is open; 3. Right actuator connection wire is shorted; 4. Right actuator internal motor connection wire is shorted; 5. Right actuator internal motor is stuck; 6. Brake lining is not installed in the left actuator or lining is too thin, so that EPB braking time is too long and brake cannot applied normally; 7. Right actuator has internal mechanical malfunction; 8. EPB internal control motor circuit is damaged.
Judgment Condition	1. When EPB is power on for self-check, voltage and current signals at the both ends of right actuator connection wire is abnormal; 2. When EPB operates, voltage and current signals at the both ends of right actuator connection wire are abnormal.
Disabled Function	During manual parking, manual releasing, automatic releasing, dynamic brake and automatic parking with power off, right actuator cannot operate properly.

Troubleshooting:

1. Check if the right actuator and caliper are installed properly. If not, perform test after reinstalling.

2. Check if connector and wire harness on the right actuator are connected properly. Reconnect the connector if it is not proper; in addition, note if the buckle on the connector is damaged. If it is damaged, it is necessary to replace this connector to prevent failure from recurring.
3. Check if the pins on connection wire of right actuator falls off from plastic housing of connector. If it falls off, the plastic housing internal may be damaged or the pins are pulled out from plastic housing by external force. It is necessary to replace connector and pins on the connection wire at this time.
4. Check if right actuator connection wire is open or damaged. If the wire is damaged, replace it. If right motor is open due to open circuit of connection wire. It is also necessary to check if there are sharp materials near the open circuit position of connection wire to cut the connection wire. If there are, it needs to rectify it and prevent failure from recurring.
5. Check if two metal pins in the connectors on the right actuator are open (metal pins are connected to the both ends of the actuator motor through internal wire). If it is open, replace the actuator. At this time, it is also necessary to note if the metal pins and metal pins in connector female are in poor contact due to other factors such as water seepage or corrosion. Replace it if necessary.
6. Check if the right actuator connection wire is shorted. If so, replace the connection wire; If the right motor is shorted because the two connection wires are cut by the external sharp items. While replacing the connection wire, troubleshoot the cause of connection wire short circuit in time. Prevent same failure from recurring.
7. In order to troubleshoot if right actuator connector is disconnected due to right actuator internal motor connection wire short or mechanical stuck of motor, etc. Connect the fault-free actuator (for checking if the actuator fails), turn POWER switch on again. Operate EPB switch to control the releasing/clamping of actuator. Check if the right actuator operate normally. If it does, it indicates that the actuator fails, replace it if necessary.
8. If there are no problems in the above inspections, it indicates that EPB controller internal circuit is damaged, replace it if necessary.
9. Clear EPB DTC with a diagnostic tester. Turn POWER switch on again and check if this DTC occurs inside EPB. Operate EPB switch to clamp and release repeatedly. Confirm that the faults are troubleshooting.

Switch Broken (C113800, C113861, C11352A, C11362A, C110860, C110862)

Malfunction Name	Switch Broken
DTCs	C113800, C113861, C11352A, C11362A, C110860, C110862
Malfunction Condition	1. EPB malfunction light comes on; 2. EPB does not response to switch command, EPB actuator cannot be clamped or released normally in static status.
Possible Cause	1. Circuit between EPB and switch is shorted and open; 2. Switch internal circuit failure; 3. EPB internal switch detection circuit failure; 4. EPB switch is stuck.
Judgment Condition	Main and auxiliary microcontroller continuously detects the abnormal status of the switch several times.
Disabled Function	It is unable to release/apply parking brake with operating switch.

Troubleshooting:

1. Check if the circuit connected to switch is shorted and open. Replace connection wire if the circuit fails.
2. Check if the connectors on the connection wire are not connected to switch properly. If it is not connected properly, reconnect them.
3. Pull and press the switch several times. Wait for 3 seconds or more after releasing the switch. Check if the switch light flashes. If it flashes, replace switch.
4. Pull up EPB switch, read the current information of EPB internal with a diagnostic tester. Check if the obtained switch position by the diagnostic tester is in “parking position”; Press EPB switch, read the

current information of EPB internal with a diagnostic tester. Check if the obtained switch position by the diagnostic tester is in “releasing position”; In addition, when EPB switch is not operated, obtain the switch position information with a diagnostic tester. Check if it is in “natural position”; If three positions of EPB switch is not consistent with the actual operation, it indicates that EPB switch internal fails, it is necessary to replace EPB switch.

5. Clear EPB DTCs with diagnostic tester, turn POWER switch on again. Read DTCs after operating EPB switch repeatedly. Check if this DTC occurs again inside EPB. If it still exists, EPB internal switch detection circuit is damaged. Test again after replacing ECU.

Controller Fault (C116045, C116040, C116042, C116054, C116055, C116086, C11604C, C116004, C116046, C116044, C11607C)

Malfunction Name	ECU Hardware Fault
DTCs	C116045, C116040, C116042, C116054, C116055, C116086, C11604C, C116004, C116046, C116044, C11607C
Malfunction Condition	1. EPB malfunction light comes on (C116086, C11604C, C116004 malfunction light does not come on); 2. Display “Controller Fault” by reading DTC.
Possible Cause	1. Storage data of main microcontroller in EPB controller errors; 2. Auxiliary microcontroller failure.
Judgment Condition	1. EEPROM operation failure; 2. Communication error between main and auxiliary microcontroller.
Disabled Function	EPB fails

Troubleshooting:

1. Clear DTCs with diagnostic tester, turn POWER switch on again. Operate EPB switch to clamp and release. Check if the function is normal. If DTC still exists, it is necessary to replace EPB controller and check it again.
2. Clear DTCs with diagnostic tester, turn POWER switch on again, read DTCs. Check if the malfunction occurs again.

Network Node Timeout (U241087, U241187, U241287, U241387, U241487)

Malfunction Name	Lost Communication With EMS/TCU/BCM/ABS
DTCs	U241087, U241187, U241287, U241387, U241487
Malfunction Condition	1. EPB malfunction light comes on; 2. Read DTCs with diagnostic tester; 3. Some functions of EPB system is lost.
Possible Cause	1. Node is off from CAN network; 2. Message cycle of CAN network sent by node is incorrect; 3. CAN network fails or EPB internal circuit fails.
Judgment Condition	Message signal of any node is over time for 10 cycles
Disabled Function	Some functions of EPB fail

Troubleshooting:

1. Check if CAN connection wire of network node is off from CAN network of whole vehicle (such as VCU node off-line). For the specific node, first it is necessary to confirm CAN connection wire connected with corresponding node correctly.
2. Check if ECU of faulty node is damaged and installed correctly. If ECU is damaged or not installed correctly, troubleshoot the malfunction.

3. Check if the node message cycle meets the requirements. If not, it is necessary to send the message according to the specific cycle.
4. Clear DTCs with a diagnostic tester, read DTCs after turning POWER switch on again. Check if node timeout still exists. If exists, it indicates that EPB still does not receive network node message and EPB internal circuit fails, test again after replacing EPB ECU. If the malfunction occurs repeatedly and DTC cannot be cleared during the first installation, it is suspected that EPB ECU cannot correspond to this model. Read EPB identifier with diagnostic tester at this time to verify if the faulty EPB corresponds to the model. Avoid more improper EPB installation.

Network Node Signal Invalid (U241086, U241186, U241286, U241386, U241486)

Malfunction Name	Invalid Data Received From EMS/TCU/BCM/ABS
DTCs	U241086, U241186, U241286, U241386, U241486
Malfunction Condition	1. EPB malfunction light comes on; 2. Read DTCs with diagnostic tester; 3. Some functions of EPB system is lost.
Possible Cause	Signal status sent by node to CAN network is invalid
Judgment Condition	Message signal of any node is invalid for 10 cycles
Disabled Function	Some functions of EPB fail

Troubleshooting:

1. Check if CAN message sent by network node is invalid, it is necessary to correct by related controllers.
2. Clear DTCs with a diagnostic tester, read DTCs after turning POWER switch on again. Check if the invalid node exists. If exists, it indicates the related controllers cannot be corrected, it is necessary to continue correcting. If the malfunction occurs repeatedly and DTC cannot be cleared during the first installation, it is suspected that EPB ECU cannot correspond to this model. Read EPB identifier with diagnostic tester at this time to verify if the faulty EPB corresponds to the model. Avoid more improper EPB installation.

Indicator Malfunction (C11D112, C11D114)

Malfunction Name	EPB Status Lamp Line
DTCs	C11D112, C11D114
Malfunction Condition	1. EPB malfunction light comes on; 2. EPB button and instrument cluster indicator are not consistent with the actual control.
Possible Cause	1. Switch light is shorted to power supply; 2. There is open or shorted to ground.
Judgment Condition	EPB button and instrument cluster indicator are not consistent with the actual control
Disabled Function	Without indicator prompt

Troubleshooting:

1. Check if the switch indicator port is shorted to ground or open. If it is shorted to ground, replace the connection wire. Check if the connection wire is cut by the sharp items on the vehicle body for a long time and the connection wire coat peels off, which cause the direct contact between connection wire and the whole vehicle housing (short to ground). If short circuit is caused by this reason, it is necessary to rectify the sharp items or add a layer of insulation housing near the connection wire contacted with it.
2. Check if EPB switch indicator port is shorted to power supply. If the wire fails, replace connection wire.

3. If the above troubleshooting has no problem, clear EPB DTCs with a diagnostic tester. Operate EPB switch to clamp and release. Check if the DTC still exists. If exists, test again after replacing ECU.
4. Clear EPB DTCs with diagnostic tester, turn POWER switch on again. Operate EPB switch to clamp and release repeatedly. Read DTCs, check if this DTC occurs inside EPB.

Actuator Failure (C11A418, C11A477)

Malfunction Name	Mechanical Malfunction
DTCs	P15B216, P15B301
Malfunction Condition	1. EPB malfunction light comes on (C11A477 malfunction light does not come on); 2. Actuator cannot operate.
Possible Cause	1. Actuator internal malfunction; 2. Caliper mechanical structure malfunction.
Judgment Condition	1. Clamping time of caliper is over 3 seconds but the corresponding current of set clamping force cannot reach; 2. Minimum current of motor is larger than the specific threshold current during clamping.
Disabled Function	EPB actuator cannot operate normally

Troubleshooting:

1. Replace the actuator that cannot function properly.
2. Clear DTCs with diagnostic tester. Operate EPB switch to clamp and release repeatedly. Read EPB DTCs, check if this DTC still exists. If the malfunction still exists, it indicates that the internal resistance of connection wire between actuator and EPB controller is too large due to poor connection or contact surface oxidation of connection. Therefore, the actuator current is not enough to clamp. It is necessary to replace connection wire and connector at this time, and then test again.

On-vehicle Service

Tools

Tools: 10# socket, 17# socket, 13# socket, T30 screwdriver head, ratchet wrench, vernier caliper, digital multimeter, diagnostic tester (including connector)

Specifications

Torque Specifications

Part Name	Torque (N·m)
EPB Controller Fixing Bolt	10 ± 1.5
Coupling Bolt Between EPB Controller Bracket and Body	25 ± 4
Coupling Nut Between EPB Controller Bracket and Body	10 ± 1.5
Brake Caliper Body Fixing Bolt	22 - 32
Electronic Control Gear Train Fixing Bolt	9 - 11
Wheel Mounting Bolt	110 ± 10

Part Name	Torque (N·m)
Coupling Nut Between Parking Brake Control Mechanism Assembly and Body	25 ± 4
Coupling Nut Between Parking Brake Rear Cable Assembly Fixing Bracket and Rear Shaft Assembly	10 ± 1.5
Coupling Bolt Between Parking Brake Rear Cable Assembly Fixing Bracket and Parking Brake Assembly	27 ± 3
Coupling Bolt Between Wheel Speed Sensor and Parking Brake Assembly	9 ± 1.5

Parking Brake Parameter

- Models without EPB

Name	Standard Thickness (mm)	Minimum Thickness (mm)
Rear Brake Shoe	2.8	1

Name	Standard Inner Diameter (mm)	Maximum Inner Diameter (mm)
Rear Brake Disc	186	188

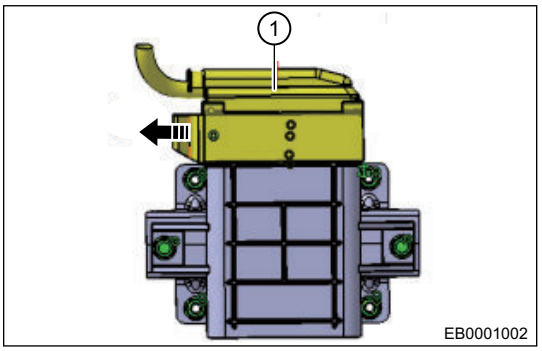
- EPB Model

Name	Standard Thickness (mm)	Minimum Thickness (mm)
Rear Brake Disc	10	8

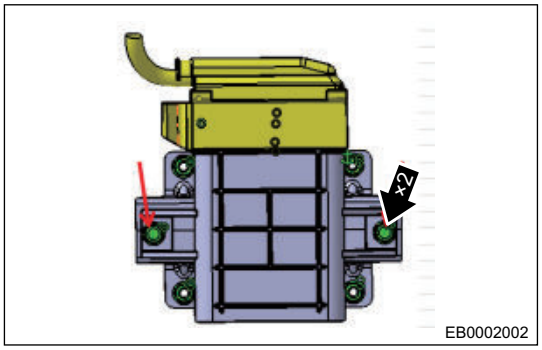
EPB Controller Assembly

Removal

1. Remove the auxiliary fascia console assembly (refer to “Interior” section).
2. Remove the wire harness on EPB controller, first pull it out to the left according to the arrow as shown in illustration, and then remove the wire harness connector (1).



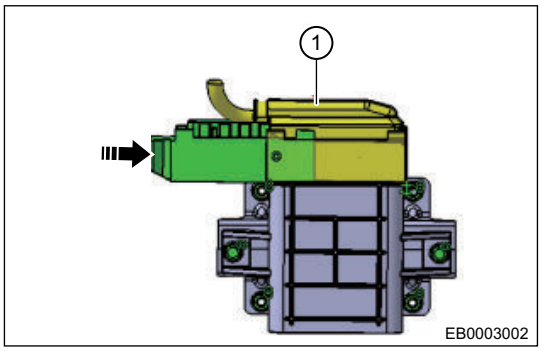
3. Remove 2 fixing bolts (arrow) from EPB controller with 10# socket.



4. Remove EPB controller from auxiliary fascia console quarter.

Installation

1. Install EPB controller on EPB controller bracket.
   Tightening torque: 10 ± 1.5 N m
2. Install EPB controller wire harness: first install wire harness connector (1) to EPB controller, then install lock into place in direction of arrow.



3. Install the auxiliary fascia console assembly (refer to “Interior” section).

Parking Brake Assembly of Model with EPB

Removal

- During usage and maintenance, the instrument cluster does not indicate parking system malfunction. The driver does not find that the parking system is abnormal. When the brake lining of EPB parking system is worn to the limit in general, replace it.
- Use same procedures for right and left sides. Procedures listed below are for left side.

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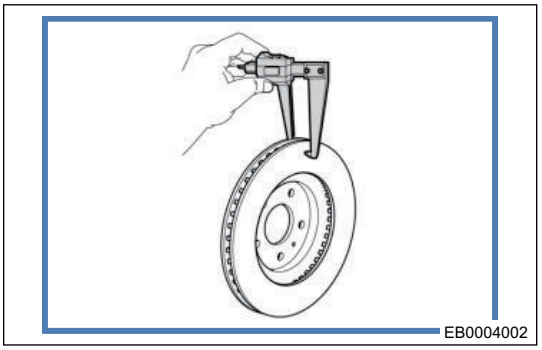
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Remove the rear left wheel with 17# socket (refer to “Tires and Wheels” section).
2. Remove the rear left brake caliper assembly (refer to “Brake” section).
3. Remove the rear left brake disc (refer to “Brake” section).

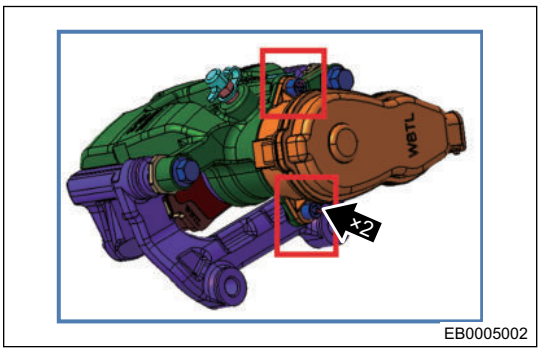
4. Use a caliper to measure thickness of brake disc:

   Standard thickness: 10 mm

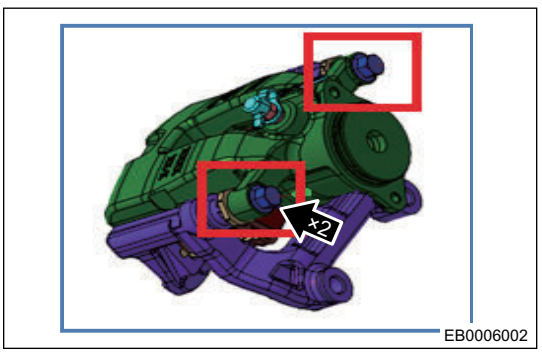
   Minimum thickness: 8 mm



5. Remove 2 fixing bolts (arrow) from electronic control gear train with T30 screwdriver.



6. Remove fixing bolt (arrow) from brake caliper body with 13# socket.

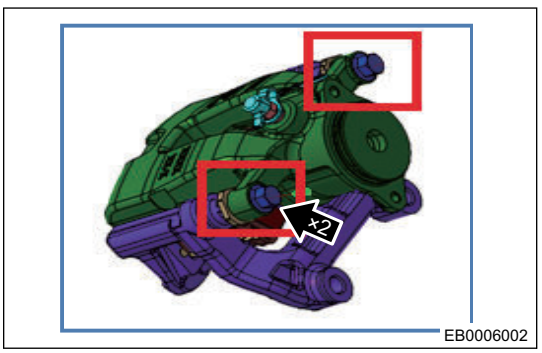


7. Remove the brake caliper body set.

Installation

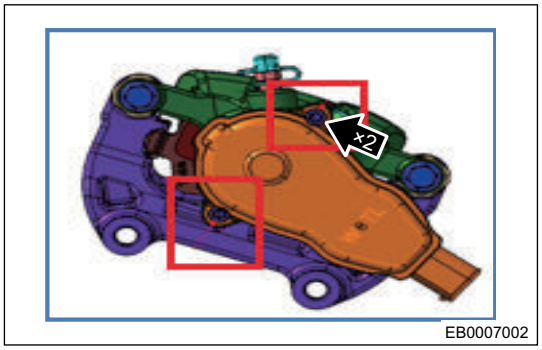
1. Install 2 fixing bolts (arrow) to brake caliper body with 13# socket.

   Tightening torque: 22 - 32 N•m



2. Install 2 fixing bolts (arrow) on electronic control gear train with T30 screwdriver.

   Tightening torque: 22 - 32 N•m



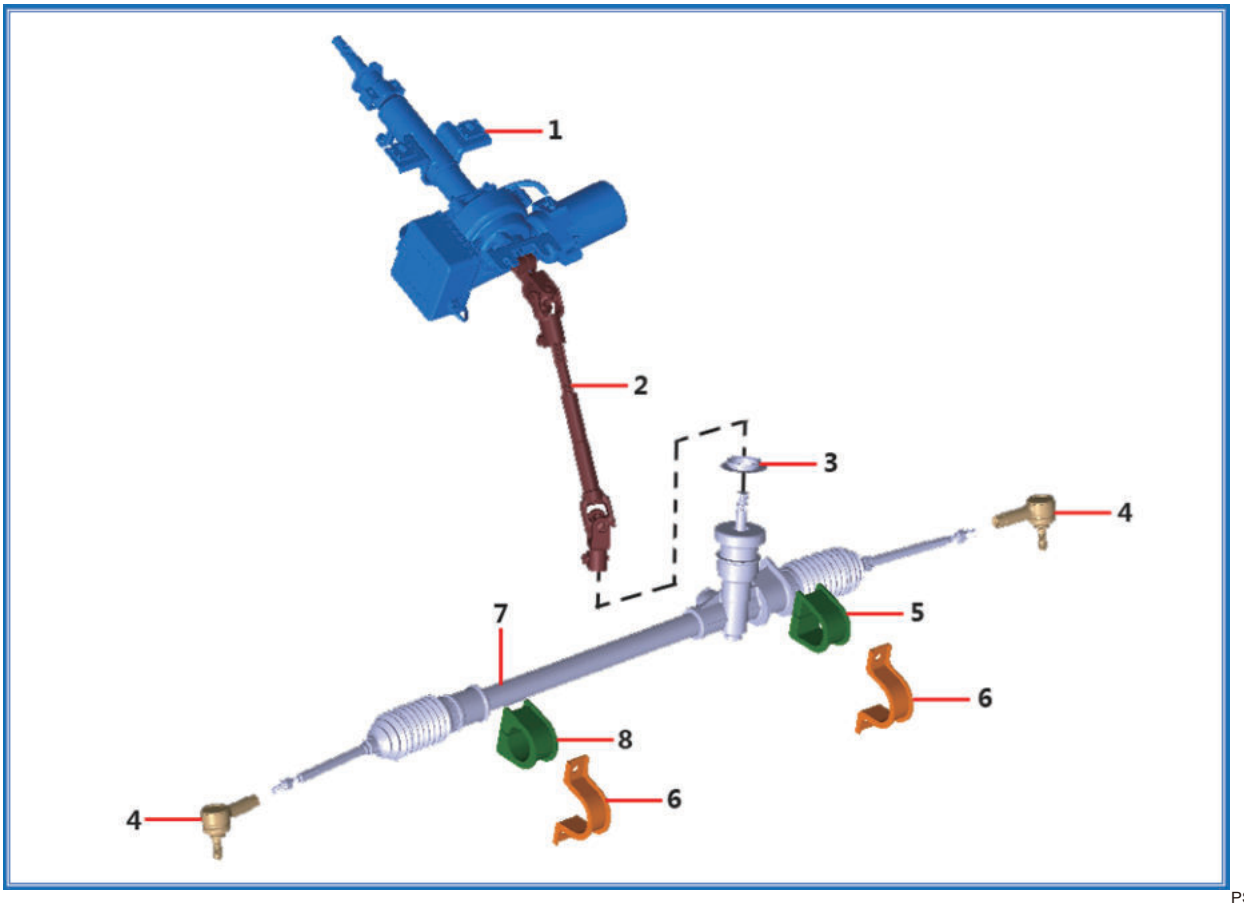
3. Install the rear left brake disc (refer to “Brake” section).
4. Install the rear left brake caliper assembly (refer to “Brake” section).
5. Install the rear left wheel (refer to refer to “Brake” section).

STEERING

ELECTRONIC POWER STEERING

System Overview

System Composition Diagram

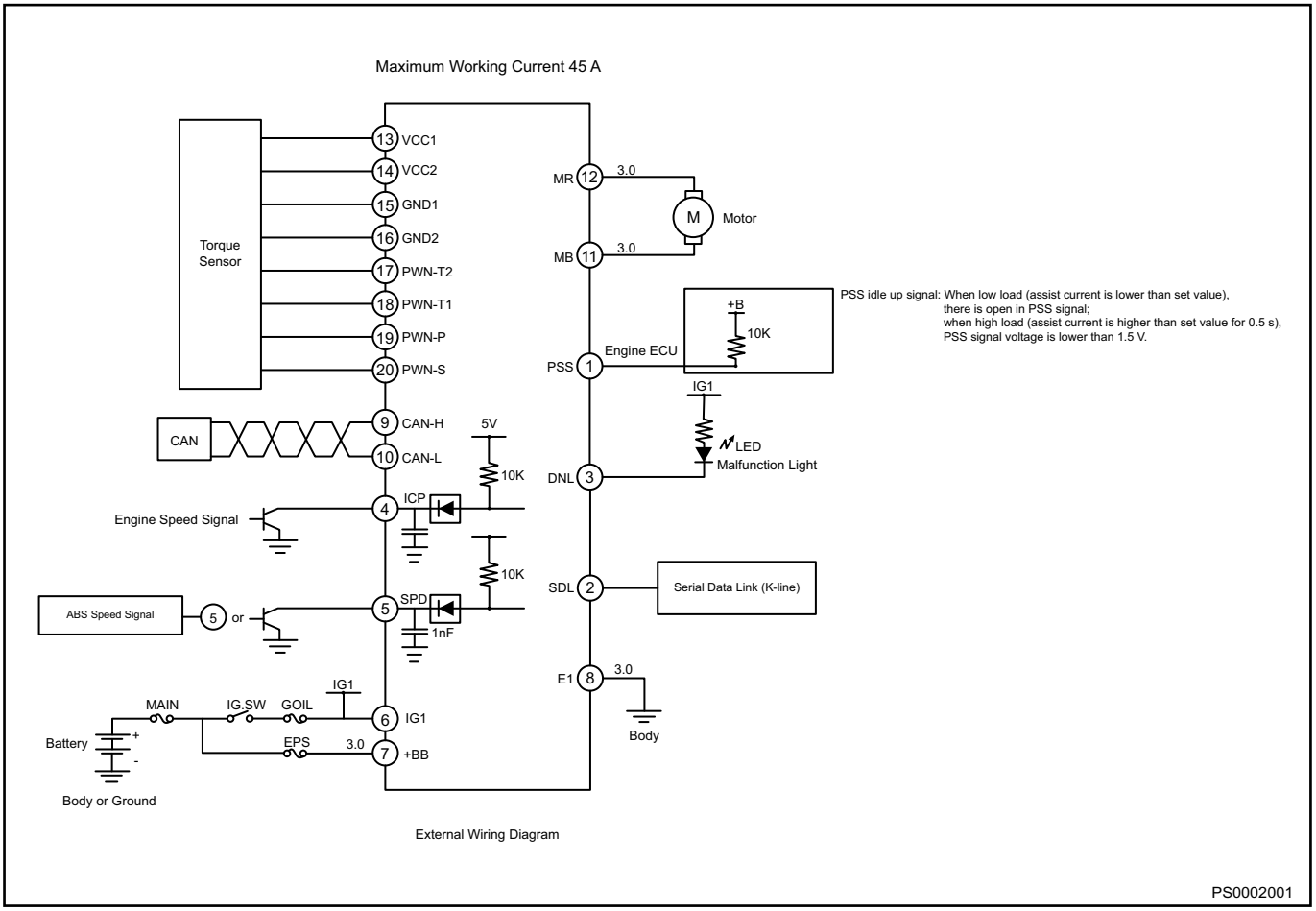


No.	Name	No.	Name
1	Steering Shaft with Motor	5	Left Rubber Bushing
2	Propeller Intermediate Shaft	6	Mounting Bracket
3	Steering Gear Sound Insulator Block Cover	7	Steering Gear Body
4	Ball Pin and Ball Pin Base	8	Right Rubber Bushing

System Circuit Diagram

Control Principle and Pin Definition

Control Schematic Diagram



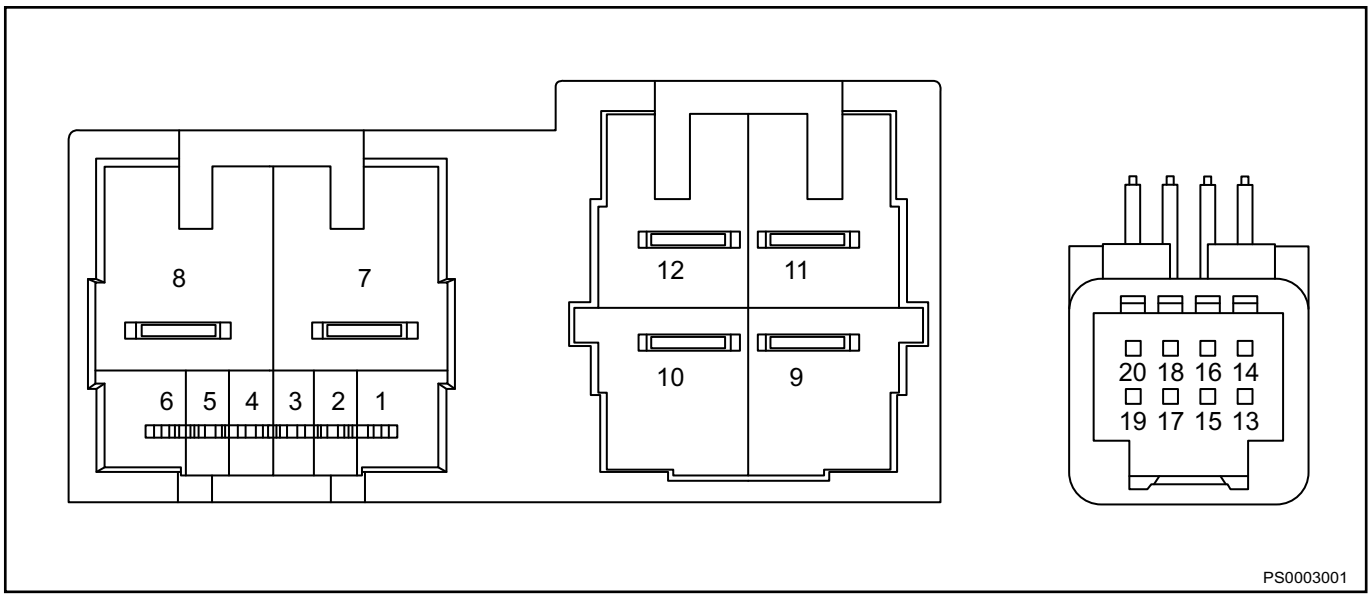
PSS idle up signal

1. PSS signal open circuit at low load (assist current is lower than the set value).
2. PSS signal voltage is lower than 1.5 V at high load (assist current is higher than the set value for 0.5 s).

Operation

EPS controller is the core component of EPS system, which is generally divided into two parts: control circuit and drive circuit. The control circuit determines the drive state of motor according to signals such as vehicle signal, sensor input signal, motor voltage and motor current signal detected by itself, and sends corresponding control signal to drive circuit; the drive circuit drives the motor according to the control signal.

Connector Pin Definition



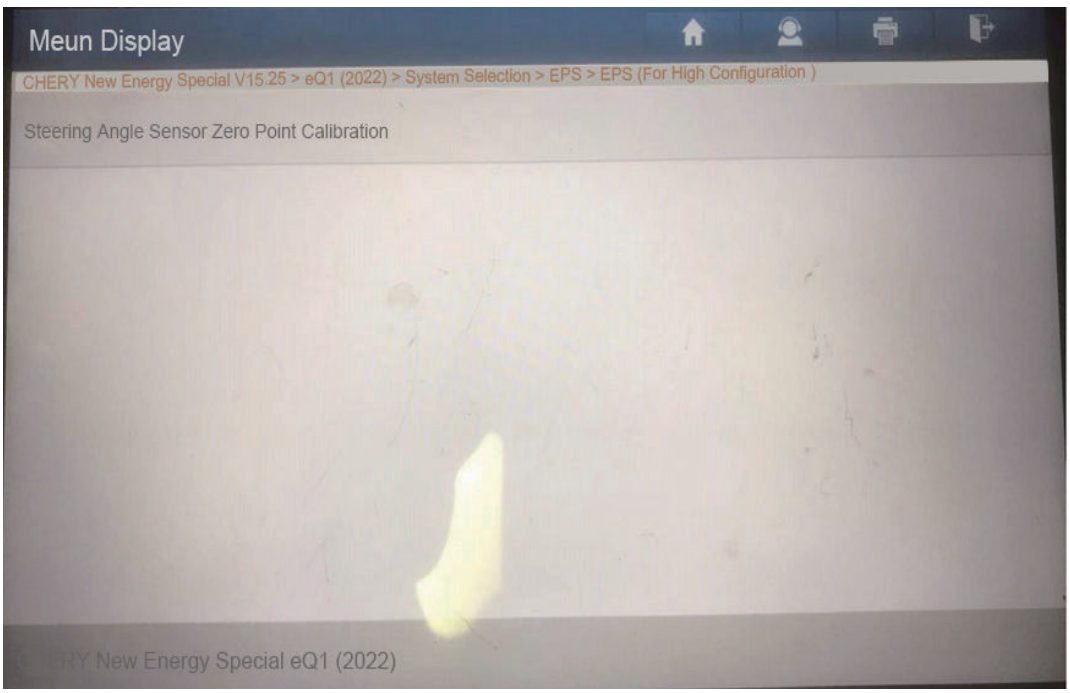
PIN No.	Name	PIN Definition	Signal Description
1	PSS	Unused end/ Reserved	Reserved
2	SDL	K line	K line diagnosis tester interface
3	DNL	Malfunction light	The instrument panel malfunction light can be illuminated by connecting the instrument panel
4	IGP	Engine speed signal	PWM signal
5	SPD	Vehicle speed signal	PWM signal
6	IG1	Ignition signal	Voltage is 12VDC
7	+BB	Power supply (+BB)	Continuous power supply with voltage of 12VDC (battery positive)
8	E1	Ground	Continuous power supply with voltage of 12VDC (battery negative)
9	CAN-H	Unused end/ Reserved	Reserved
10	CAN-L	Unused end/ Reserved	Reserved
11	MB	Motor output	Pulse signal with a peak of 12 V, pulse width is variable
12	MR	Motor output	Pulse signal with a peak of 12 V, pulse width is variable
13	VCC1	Power supply 1	Torque main signal power supply positive (5VDC)

14	VCC2	Power supply 2	Torque sub signal power supply positive (5VDC)
15	GND1	Ground 1	Torque main signal power supply negative
16	GND2	Ground 2	Torque sub signal power supply negative
17	PWM-T2	Sensor torque pulse width signal 2	PWM signal with a peak of 5 V
18	PWM-T1	Sensor torque pulse width signal 1	PWM signal with a peak of 5 V
19	PWM-P	Sensor angle P signal	PWM signal with a peak of 5 V
20	PWM-S	Sensor angle S signal	PWM signal with a peak of 5 V

Diagnosis & Test

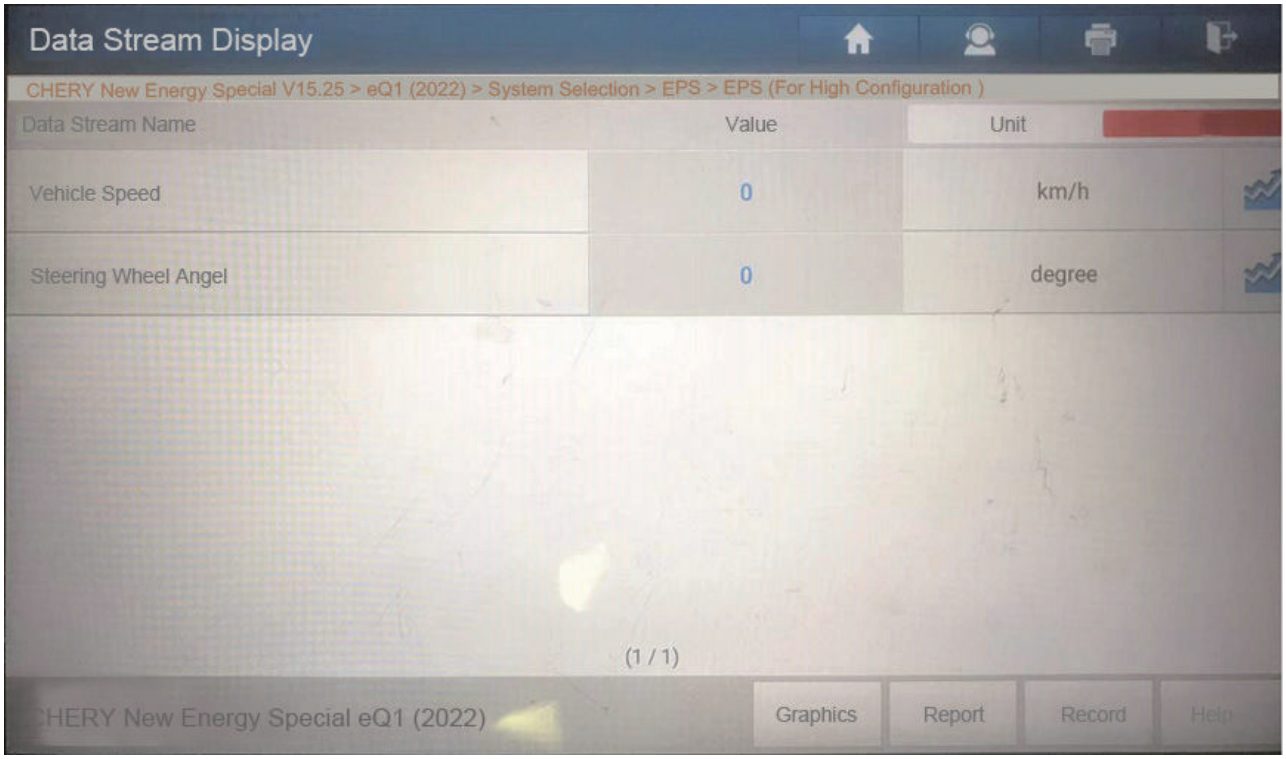
Make sure that the power supply of EPS is normal and that the diagnosis tester can communicate with EPS normally when performing diagnosis.

Calibration



PS0004001

Data Analysis



PS0005001

Problem Symptoms Table

Symptom	Possible Cause	Recommended Repair Method
Steering wheel loose	Steering wheel fixing bolt loose	Check steering wheel fixing bolt and tighten it to specified torque
Steering wheel free play is too large	Steering gear fixing point loose	Check and tighten steering gear mounting bolt to specified torque value
	Steering column fixing point loose	Check and re-tighten it to specified torque value
	Connecting bolt between universal joint under the steering column and the steering gear loose	Check and re-tighten it to specified torque value
	Control arm ball joint is loose or worn	Check and replace ball joint
	Front hub bearing is worn or loose	Check and replace front hub bearing

	Steering intermediate shaft is worn or loose		Check and replace steering intermediate shaft
	Pull rod inner ball joint is loose or worn		Replace pull rod assembly
	Large engagement gap of rack and pinion		Replace steering gear assembly
Steering is not smooth	Steering column and steering gear interfere with surrounding parts, tire interferes with surrounding parts		Check and eliminate interference
	Inner and outer pull rod ball joint is stuck, control arm ball joint is stuck, steering gear is stuck, steering column is stuck, universal joint is stuck, and strut bearing is stuck		Check, confirm and replace
	Steering column intermediate shaft phase angle deviation		Adjust phase angle with reference to the same model
When turning to a certain position, there will be stuck, bump and viscous	Lubrication of steering gear tie rod ball pin is insufficient		Check or replace tie rod ball pin
	Tire is inflated improperly		Check tire and adjust to specified tire pressure
	Steering gear internal failure		Check or replace steering gear
Steering wheel reacts too much to road conditions	Steering gear tie rod ball pin is worn		Check or replace tie rod ball pin
There is abnormal sound when turning	When turning, there are obvious clear metallic sounds such as "cluck ", "tick ", "clack"	Connection point of each mechanism loose	Check if the steering column fixing point, steering gear fixing point, coupling bolt between steering column and steering gear, sub frame fixing point, control arm fixing point, and steering pipeline fixing point are loose and adjust them; check if the steering link ball joint and control arm ball joint are loose; and check the rotational flexibility of left and right strut and strut bearing; replace as necessary
		Components interference, loose	Check if there is interference between intermediate shaft and boot, steering gear and surrounding parts and

			adjust them; check if there is interference between steering pipeline and surrounding parts and adjust them; check if the steering column adjustment handle, steering gear interior and steering column with intermediate shaft assembly are loose; replace as necessary
	When turning, there are obvious non-metallic abnormal dry friction sounds such as "chirp " and "purr"	Lower end surface of steering wheel rubs against combination switch cover	Check and troubleshoot
		Steering wheel and spiral cable	Check and apply grease
		There is friction sound inside spiral cable	Check and adjust, replace as necessary
		There is friction sound between steering input shaft, intermediate shaft and boot, foot pad	Check and troubleshoot, replenish grease or replace as necessary
		There is dry friction in steering gear, steering gear inner and outer ball joint	Use auxiliary auscultation equipment to confirm if the abnormal sound is caused by steering gear interior and pull rod ball joint; replace steering gear or pull rod ball joint as necessary
		There is dry friction abnormal sound in steering column, intermediate shaft and cross axle	Use auxiliary auscultation equipment to confirm if the abnormal sound is caused by steering column, intermediate shaft or cross axle; replace as necessary
Running deviation	Tire pressure is too high or too low		Adjust tire pressure to specified value
	Different tire wear (diameter difference occurs)		Check and replace tire
	Wheel alignment is wrong		Perform wheel alignment
Sideslip	Tire pressure		Adjust tire pressure to specified value

	Brake lag	Check brake system
	Wheel alignment is wrong	Perform wheel alignment
	Steering column is worn or damaged	Check and replace steering column
	Steering or suspension parts are loose or worn	Check and replace steering or suspension parts

DTCs Display for Controller Part

Read DTCs using vehicle diagnostic tester, and the DTCs description of diagnostic tester for electronic power steering system is as follows:

Fault Expression	Fault Classification	
DTC	Component Specification	Fault Type
C1611		Torque sensor
C1612		
C1613		
C1614		
C1664		
C1661		Relay
C1621		Power supply
C1622		
C1666		Motor
C1663		
C1631		EEPROM chip
C1667		Temperature sensor chip
C1668		
C1317		Angel sensor failure
C1615		
C1665		Internal fault

Troubleshooting Procedures for Controller Part

Torque Sensor Failure

1. Fault classification
   a. C1611 Torque sensor main signal fault.
   b. C1612 Torque sensor sub signal fault.
   c. C1613 Torque sensor main and sub signal fault.
   d. C1614 Torque sampling timeout.
   e. C1664 Sensor + 5VA power supply fault.

2. Judgment standard:
   a. Torque sensor main and sub signal fault: Low level duty ratio of sensor main and sub torque output signal exceeds the normal range by 5% ~ 95%.
   b. Torque sensor main and sub signal sum error: The sum of sensor main torque output signal and sensor sub torque output signal is abnormal, which is less than 94% or greater than 106%.
   c. Torque sensor sampling timeout: EPS does not collect torque signal.
   d. Sensor + 5VA power supply fault: Torque sensor power supply voltage is not between 4.65 and 5.35 V.
3. Fail safe, backup function
   a. EPS cuts off assist and illuminates electric steering warning light, DTC stored.
4. Possible cause:
   a. Torque sensor main and sub signal fault.
      - Torque sensor main (sub) signal out of limit range.
      - Torque sensor of EPS assembly failure.
      - Sensor wire harness is short or open.
      - Sensor connector is in poor contact.
      - Controller circuit fault.
   b. Torque sensor main and sub signal sum error.
      - Torque sensor of EPS assembly failure.
      - Sensor wire harness is short or open.
      - Sensor connector is in poor contact.
      - Controller circuit fault.
   c. Torque sampling timeout.
      - Torque sensor of EPS assembly failure.
      - Sensor wire harness is short or open.
      - Sensor connector is in poor contact.
      - Controller circuit fault.
   d. Sensor +5VA power supply fault.
      - Controller circuit fault.
      - Sensor connector power supply pin is short to ground.
      - Sensor power supply line is short to power supply + and power supply -.

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- Before checking and repairing the DTCs of torque sensor, please make the following confirmation:
  1. Restore the steering wheel position, turn POWER switch to ON again to start the engine, and check if the malfunction light remains on.
  2. Check if the torque sensor wire harness is in good condition, and if the wire harness is loose. If it is damaged and loose, turn POWER switch to ON again to start the engine, and check if the indicator is on after repairing wire harness. If the indicator is still on after making the above confirmation, perform the following inspection steps.

Judgment Steps
C1611 & C1612 & C1613 & C1614

Step	Operation	Yes	No
1. Check torque sensor power supply voltage	Turn the POWER switch to ON, measure the voltage between controller signal	Go to step 2.	Go to C1664 sensor +5VA power supply fault diagnosis.

	connector terminal 13/ 14 and column (ground) from behind the connector without disconnecting connector. Determine if this voltage is in a range of 4.65 - 5.35 V.		
2. Check main and sub signal duty ratio	Turn the steering wheel to left and right fully and middle position respectively, hold for 3 seconds. Check the torque sensor main and sub signal duty ratio in the above three positions respectively: measure the output duty ratio between terminal 17/18 and case ground without disconnecting connector. Determine if the main and sub signal duty ratio is in a range of 5% ~ 95%.	Go to step 3.	Go to step 4.
3. Check wire harness	Check if the sensor terminal is in poor contact.	Go to step 7 after repairing wire harness.	Go to step 4.
4. Check connector	Check for open or short in terminal 17/18 wire harness end.	Go to step 7 after repairing.	Go to step 5.
5. Replace controller	Start the engine. Check if the DTC is still torque sensor signal fault.	Go to step 6.	Diagnosis is finished, controller damaged.
6. Replace steering column assembly	It is not the fault of controller, replace it with the original controller. Replace the steering column. Start the engine. Turn steering gear to left and right fully respectively, and hold for 3 seconds. Check if there is still torque sensor signal fault in the system.	Read DTCs and repair according to DTCs.	Diagnosis is finished, sensor damaged.
7. Recheck diagnosis fault	Turn the POWER switch to ON to restart the engine. Check if the malfunction light remains on, and if there is fault in the system.	Read DTCs and repair according to DTCs	Diagnosis is finished, and fault is solved.

Relay Fault

1. Fault classification.
   C1661 relay is open.
2. Judgment standard.
   The difference between battery voltage and bus voltage (relay rear end) is greater than 1 V.
3. Fail safe, backup function.
   EPS cuts off assist and illuminates electric steering warning light, DTC stored.
4. Possible cause
   EPS controller relay is damaged or circuit is damaged.

⚠

- Before checking and repairing the relay fault, please make the following confirmation:
  1. Restore the steering wheel position, turn the POWER switch to ON again to start the engine, and check if the indicator remains on. If the indicator is still on after making the above confirmation, perform the following inspection steps.

Judgment Steps
C1661

Step	Operation	Yes	No
Replace controller	Replace controller, start the engine, check if the malfunction indicator is on, and if there is fault in the system.	Read DTCs and repair according to DTCs.	Diagnosis is finished.

Power Supply Fault

1. Fault classification.
- C1621 Power supply voltage too high.
- C1622 Power supply voltage too low.
2. Judgment standard.
- Power supply monitoring voltage is higher than 17.5 V or lower than 9 V.
3. Fail safe, backup function.
- EPS stops assist and illuminates electric steering warning light, DTC stored.
4. Possible cause.
- Power supply voltage too high.
  - Battery output voltage too high.
  - EPS - controller fault.
- Power supply voltage too low.
  - Battery output voltage too Low.
  - EPS - controller fault.

⚠

- Before checking and repairing the power supply fault, please make the following confirmation:
  - Restore the steering wheel position, turn the POWER switch to ON again to start the engine, and check if the malfunction light remains on. If the indicator is still on after making the above confirmation, perform the following inspection steps.

C1621&C1622

Step	Operation	Yes	No
1. Check power supply voltage	Start the engine, measure the voltage between power supply connector terminal 7 and terminal 8 from behind the connector without disconnecting connector. Check if there is a voltage output value.	Go to step 2.	Go to step 2.
2. Check power supply system	1) Check if fuse is normal.2) Check if battery is normal.3) Check if wire harness is normal.	Go to step 3.	Go to step 4 after repairing power supply system.
3. Replace controller	Replace controller, start the engine, check if the malfunction indicator is on, and if this fault exists in the system.	Read DTCs and repair according to DTCs.	Diagnosis is finished, EPS controller damaged.
4. Restart, check diagnosis fault.	Start the engine, check if the malfunction indicator is on, and if there is fault in the system.	Read DTCs and repair according to DTCs.	Diagnosis is finished.

Motor Failure

1. Fault classification.
   a.C1666 Short circuit in predrive.
   b.C1663 Overcurrent.
2. Judgment standard.
   a.Short circuit in predrive: Predrive outputs fault signal.
   b.Overcurrent: Motor current is greater than 80 A.
3. Fail safe, backup function.
   a.EPS cuts off assist and illuminates electric steering warning light, then DTC stored.
4. EPS controller fault.

⚠

- Before checking and repairing EEPROM fault, please make the following confirmation: Restore the steering wheel position, turn the POWER switch to ON again to start the engine.

Judgment Steps
C1631

Step	Operation	Yes	No
1. Check diagnosis fault after restarting	Start the engine, check if this fault exists in the system.	Go to step 2.	Diagnosis is finished, delete history fault with diagnostic tester, and EPS can be used normally.
2. Check diagnosis fault after replacing controller.	Replace controller, start the engine, check if there is fault in the system.	Read DTCs and repair according to DTCs.	Diagnosis is finished, controller damaged.

Temperature Sensor Failure

1. Fault classification.
   a. C1667 MOSFET over heat failure.
   b.C1668 Temperature sensor failure.
2. Judgment standard.
   a.MOSFET over heat failure: Controller detects that MOSFET temperature is 90℃.
   b.Temperature sensor failure: Temperature sensor is short or open.
3. Fail safe, backup function.
   a.EPS assist descent, electric steering warning light remains on, and DTC is stored.
4. Possible cause.
   a.Steering time is too long in extreme operating condition.
   b.Controller fault.

⚠

- Before checking and repairing temperature sensor fault, please make the following confirmation: Restore the steering wheel position, turn the POWER switch to ON again to start the engine, and check if the malfunction light remains on. If the indicator is still on after making the above confirmation, perform the following inspection steps.

Judgment Steps
C1667 & C1668

Step	Operation	Yes	No
1. Wait for vehicle to cool down after stalling, check diagnosis fault after restarting.	Check if the indicator is on, and if this fault exists in the system.	Go to step 2.	Diagnosis is finished.
2. Check diagnosis fault after replacing controller	Replace controller, start the engine, check if the indicator is on, and if there is fault in the system.	Read DTCs and repair according to DTCs.	Diagnosis is finished.

Angel Sensor Failure

1. Fault classification.
   a.C1317 Angle sensor center point is not calibrated.
   b.C1615 Angel sensor failure.
2. Judgment standard.
   a.Angle sensor center point is not calibrated: EPS controller does not perform angle calibration.
   b.Angel sensor failure: Angle sensor P or S signal is abnormal.

3. Fail safe, backup function.
   a.Angle sensor center point is not calibrated: EPS provides assist normally, electric steering warning light remains on, and DTC is stored Angel sensor failure: EPS provides assist normally, electric steering warning light is not on, and DTC is stored.
4. Possible cause.
   a.Angle sensor center point is not calibrated.
   - ESP controller does not perform center position calibration.
   - Angel sensor of EPS steering column assembly failure.
   - Sensor angle signal wire harness is short or open.
   - Sensor connector is in poor contact.
   - Controller circuit fault.

   b.Angel sensor failure.
   - Angel sensor of EPS steering column assembly failure.
   - Sensor angle signal wire harness is short or open.
   - Sensor connector is in poor contact.
   - Controller circuit fault.

⚠

- Before checking and repairing the angel sensor failure, please make the following confirmation: Restore the steering wheel position, turn the POWER switch to ON again to start the engine.

Judgment Steps
C1317 & C1615

Step	Operation	Yes	No
1. Check for DTCs	Check if there is current fault of C1317 in DTCs.	Go to step 2.	Go to step 3.
2. Perform angle calibration	Check if the angle calibration is successful.	Diagnosis is finished.	Go to step 3.
3. Check sensor power supply	Turn the POWER switch to ON, measure the voltage between controller signal connector terminal 13/ 14 and column (ground) from behind the connector without disconnecting connector. Determine if this voltage is in a range of 4.65 ~ 5.35 V.	Go to step 4.	Go to C1664 sensor +5VA power supplyFault diagnosis.
4. Check P and S signal duty ratio	Turn the steering wheel to left and right fully and middle position respectively, hold for 3 seconds. Check the angel sensor P and S signal duty ratio in the above three positions respectively: measure the output duty ratio	Go to step 5.	Go to step 6.

	between terminal 19/20 and case ground without disconnecting connector. Determine if the signal duty ratio is in a range of 5% ~ 95%.		
5. Check wire harness	Check if the wire harness and sensor terminal is in poor contact.	Go to step 9 after repairing wire harness.	Go to step 6.
6. Check connector	Check for open or short in terminal 19/20 wire harness terminal.	Go to step 9 after repairing.	Go to step 7.
7. Replace controller	Replace controller, start the engine, check if the DTC is still torque sensor signal fault.	Go to step 8.	Diagnosis is finished, controller damaged.
8. Replace column assembly	It is not the fault of controller, replace it with the original controller. Replace steering column, start the engine, and turn steering gear to left and right fully respectively, and hold for 3 seconds. Check if there is still angel sensor signal fault in the system.	Read DTCs and repair according to DTCs.	Diagnosis is finished, sensor damaged.
9. Recheck diagnosis fault	Turn the POWER switch to ON to restart the engine. Check if there is fault in the system.	Read DTCs and repair according to DTCs.	Diagnosis is finished, and fault is solved.

Controller Internal Fault

1. Fault classification.
   a.C1665 Controller internal fault.
2. Judgment standard.
   a.Controller operating conditions exceed preset value.
3. Fail safe, backup function.
   a.Store Diagnostic Trouble Code (DTC).
4. Possible cause.
   a.MCU fault; motor fault; calibration data problem.

⚠

- Before checking and repairing controller internal fault, please make the following confirmation: Make sure that all EPS signals are normal, turn the POWER switch to ON again to start the engine, and check if the fault exists. If the fault still exists after making the above confirmation, perform the following inspection steps.

Judgment Steps
C1665

Step	Operation	Yes	No
1. Check diagnosis fault after replacing controller.	Replace controller, start the engine, and check if this fault exists in the system.	Go to step 2	Diagnosis is finished, controller damaged.
2. Check diagnosis fault after replacing column.	Replace column, start the engine, and check if fault exists in the system.	Read DTCs and repair according to DTCs.	Diagnosis is finished.

On-vehicle Service

Tools

Tools
Ball pin separator, 1 set of TORX wrench, 1 set of common large and small sockets, 1 torque wrench, flat tip screwdriver and cross screwdriver, 1 vise, 1 snap spring caliper and needle nose plier, 1 plastic hammer, 1 iron hammer and 1 puller.

Auxiliary Material
Grease

Protective Equipment
Gloves, uniform, working shoes, helmet

Specifications

Torque Specifications

Part Name	Torque (N·m)
Mounting bolt between steering gear and body	65 ± 5
Coupling bolt between lower of intermediate shaft and steering gear	25 ± 4
Steering wheel nut	35 ± 3
Coupling bolt between lower of intermediate shaft and steering gear	25 ± 4
Mounting nut between steering column with universal joint assembly and instrument cluster crossmember	25 ± 4

Removal and Installation of Steering Gear with Tie Rod Assembly

Removal

⚠

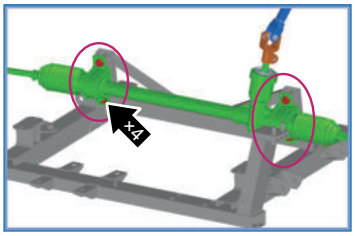
- Be sure to wear necessary safety equipment to prevent accidents.
- When removing the tie rod ball pin, it is forbidden to directly hit the end of ball pin with a hammer to avoid damaging the ball pin thread.
- Avoid touching the skin or eyes with steering fluid when removing steering system.
- Before removing the steering wheel, the battery negative terminal must be disconnected to prevent the airbag from deploying.

1. Remove the coupling nut between tie rod ball joint and steering knuckle assembly with 19# TORX wrench, and pull out tie rod ball joint with special tool (ball pin separator).


PS0001002

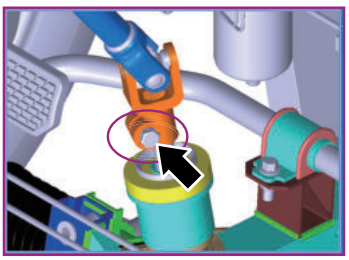
2. Remove 4 mounting bolts (arrow) between steering gear and body with 15# socket.

   Tightening torque: 65 ± 5 N·m


PS0002002

3. Remove coupling bolt (arrow) between lower of intermediate shaft and steering gear with 13# wrench.

   Tightening torque: 25 ± 4 N·m


PS0003002

4. Remove the tire and turn the front suspension with brake assembly, and pull out the mechanical steering gear with tie rod assembly from the side.

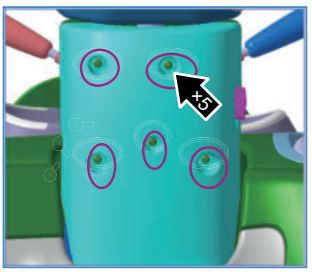
Installation

1. Installation is in the reverse order of removal.

Removal and Installation of Steering Column with Intermediate Shaft Assembly

Removal

1. Turn the POWER switch to LOCK position to lock steering wheel.
2. Using a cross screwdriver, remove 5 screws (arrow) from steering column trim cover, and remove upper and lower trim cover.

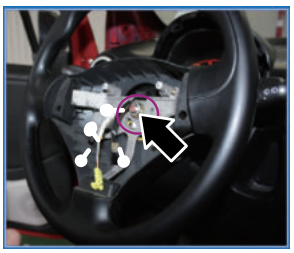

PS0004002

3. Using a flat tip screwdriver, jack up preload spring (arrow) of upper cover, and remove driver airbag.

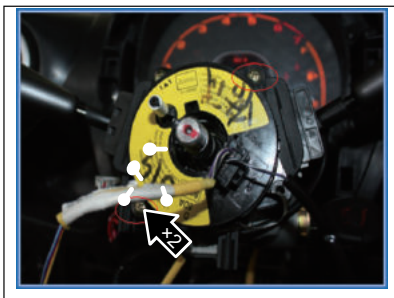

PS0005002

4. Remove steering wheel nut (arrow) with 22# socket and ratchet wrench, and remove the steering wheel.

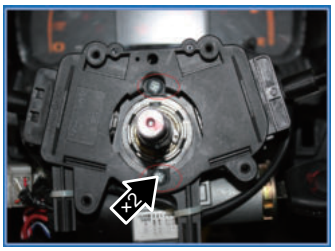
   Tightening torque: 35 ± 3 N·m


PS0006002

5. Using a cross screwdriver, remove 2 screws (arrow) from spiral cable, unplug wire harness connector, and remove the spiral cable.

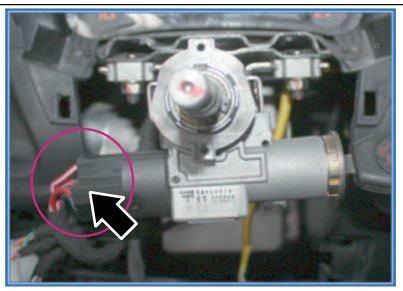

PS0007002

6. Using a cross screwdriver, remove 2 screws (arrow) from combination switch, unplug wire harness connector, and remove the combination switch.



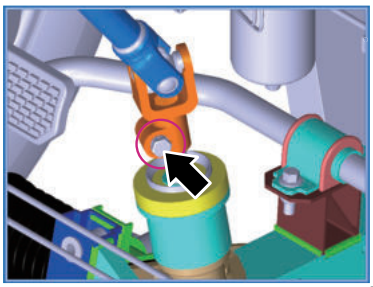
PS0008002

7. Unplug the POWER switch wire harness connector (arrow).


PS0009002

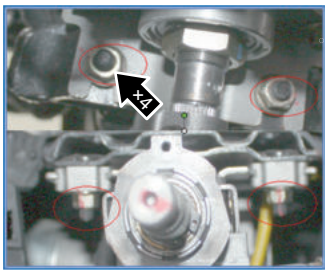
8. Remove coupling bolt (arrow) between lower of intermediate shaft and steering gear with 13# wrench.

   Tightening torque: 25 ± 4 N·m


PS0010002

9. Remove 4 mounting nuts between steering column with universal joint assembly and instrument cluster crossmember with 13# socket, and remove steering column.

   Tightening torque: 25 ± 4 N·m



PS0011002

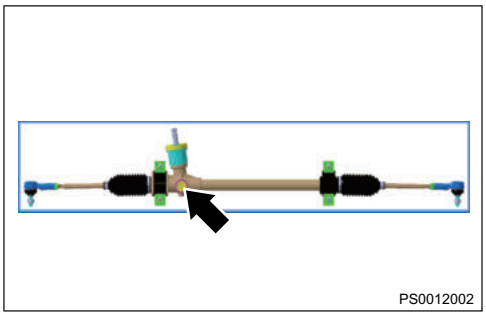
Installation

1. Installation is in the reverse order of removal.

Steering Gear Gap Adjustment

1. With the wheels in the straight-ahead position, turn the steering wheel to both sides.
2. If you hear a noise from steering gear, adjust the screw according to the position shown in illustration (the adjustment position is indicated by the arrow), until you cannot hear the impact noise from steering wheel.
3. Tighten the screw another 1/8 turn (about 45°), and perform road test.
4. If the steering mechanism cannot return to the center position by itself, loosen the screw 15°, and perform road test.

   Hint: The steering gear has been adjusted before leaving the factory, and generally does not need to be adjusted.



AIR CONDITIONING SYSTEM

AIR CONDITIONING SYSTEM

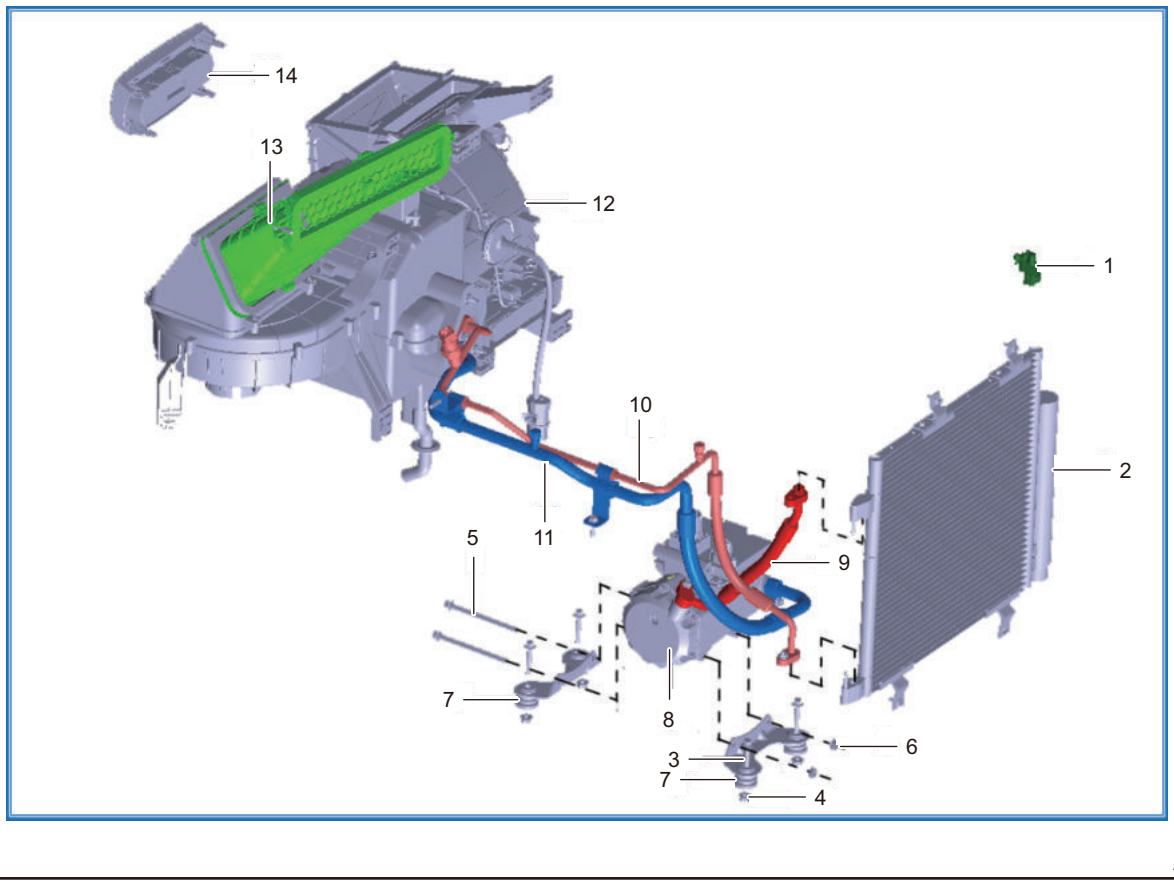
System Overview

System Description

The air conditioning system of DR 1.0 EV series electric vehicle consists of HVAC assembly, condenser assembly, compressor assembly, evaporator - compressor line, compressor - condenser line, condenser - evaporator line, air inlet, outside temperature sensor, compressor bracket, air conditioning control panel, air conditioning element and mounting bracket.
eQ1 air conditioning system is integrated heating and cooling electric air conditioning. This air conditioning system can provide cooling, dehumidification, heating, defrosting, ventilation and other functions for cabin, and provides a comfortable driving environment for cabin. It is an essential and important system for the vehicle.
Ⅰ, Cooling and dehumidification: Outside (inside) air is introduced into air conditioning by blower first, then cooled and dehumidified by evaporator, and sent to cabin.
Ⅱ, Heating and defroster: When VCU drives PTC relay to promote operating of PTC, the heat will be transferred to outside by blower.
Ⅲ, Ventilation: Adjust each damper on HVAC distributor so that they can move to various positions as required, inside or outside air can be introduced through different air ducts to realize various modes.

System Components Diagram

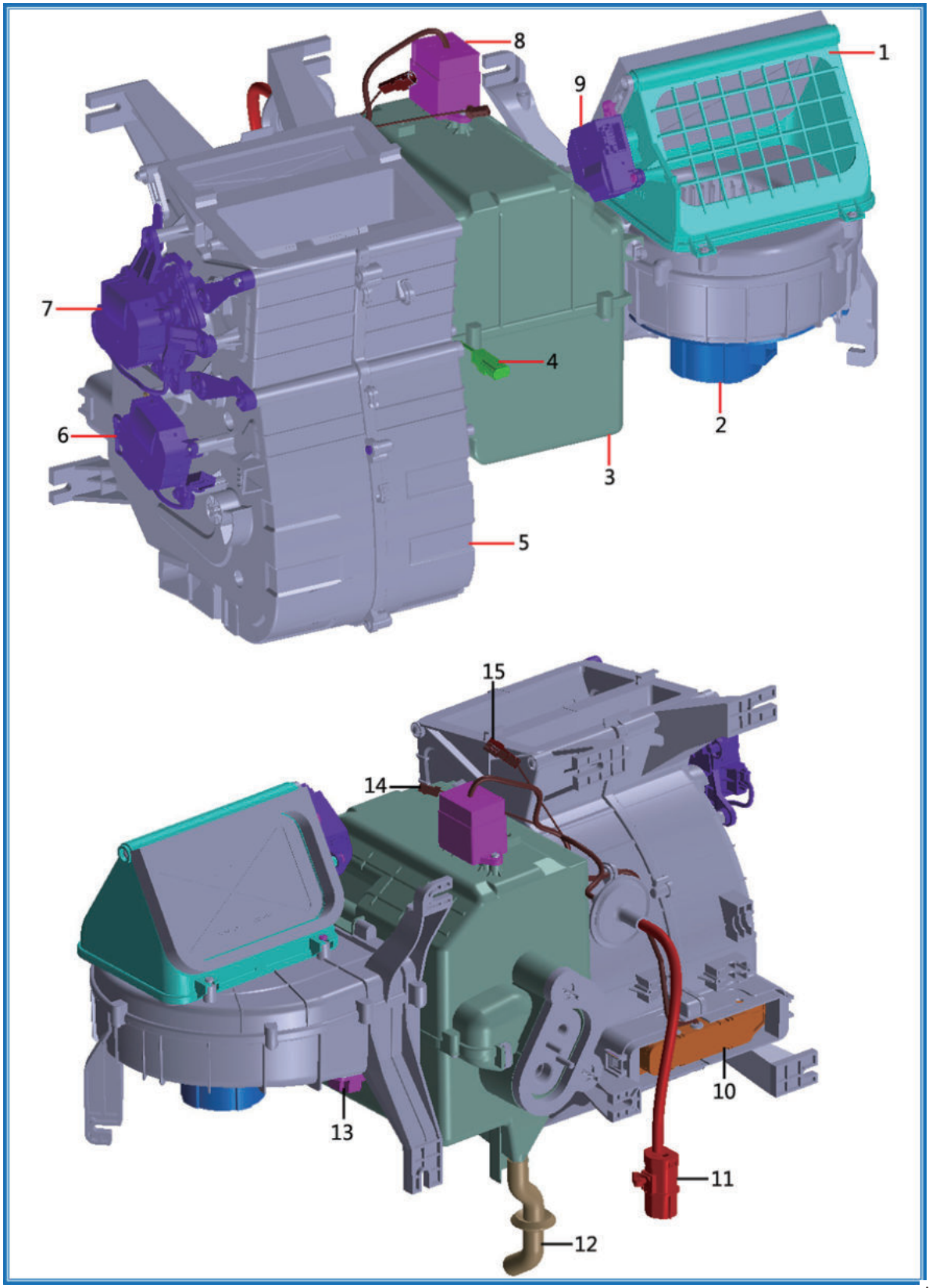
Air Conditioning System Structure Diagram



AC0001001

No.	Name	No.	Name
1	Outside Temperature Sensor Assembly	2	Cooling Condenser Assembly
3	Hexagon Flange Bolt M8 × 42	4	Hexagon Flange Nut M8
5	Hexagon Flange Bolt M8 × 110	6	Hexagon Flange Nut M8
7	Compressor Mounting Bracket Assembly	8	Electric A/C Compressor Assembly
9	Compressor - Condenser Line Assembly	10	Condenser - Evaporator Line Assembly
11	Evaporator - Compressor Line Assembly	12	HVAC Assembly
13	Air Inlet Assembly	14	A/C Control Panel Assembly

HVAC Assembly Structure Diagram

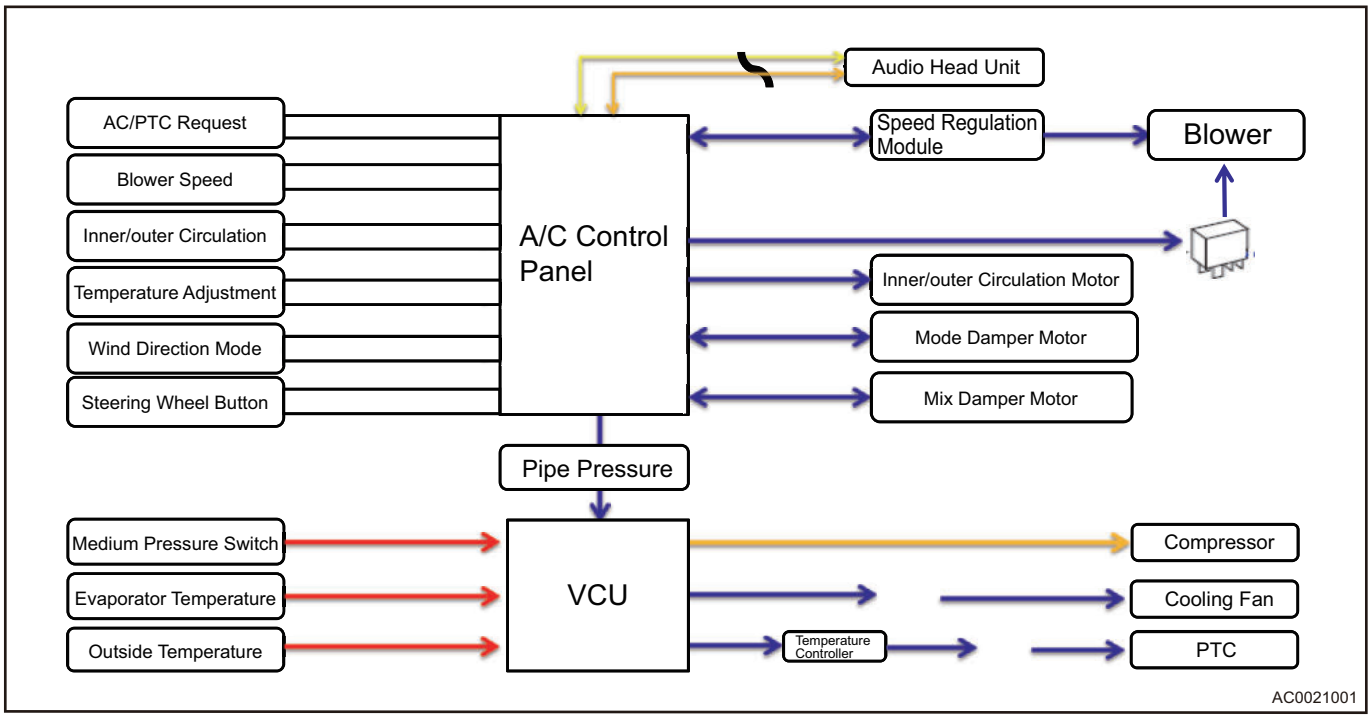


AC0002001

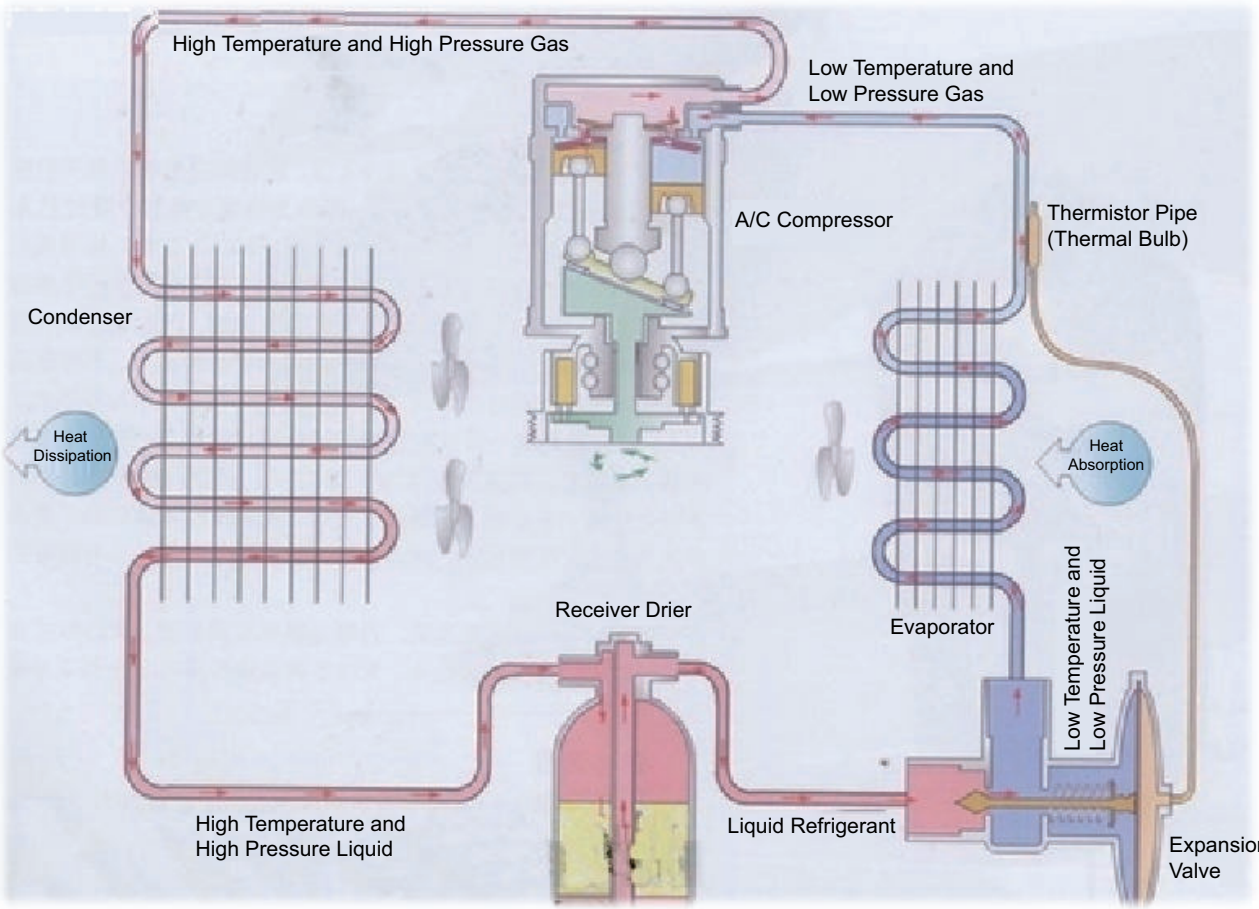
No.	Name	No.	Name
1	Inlet Box Set	2	Blower
3	Evaporator Set	4	Evaporator Temperature Sensor
5	Heating Set	6	Heating/cooling Servo Motor
7	Mode Servo Motor	8	PTC High Voltage Relay
9	Inner/outer Circulation Servo Motor	10	PTC Assembly
11	PTC High Voltage Connector	12	Drain Hose
13	Speed Regulation Resistor	14	PTC Relay Signal Connector
15	PTC Loop Interlock Connector		

Air Conditioning System Schematic Diagram

Air Conditioning Control System Schematic Diagram

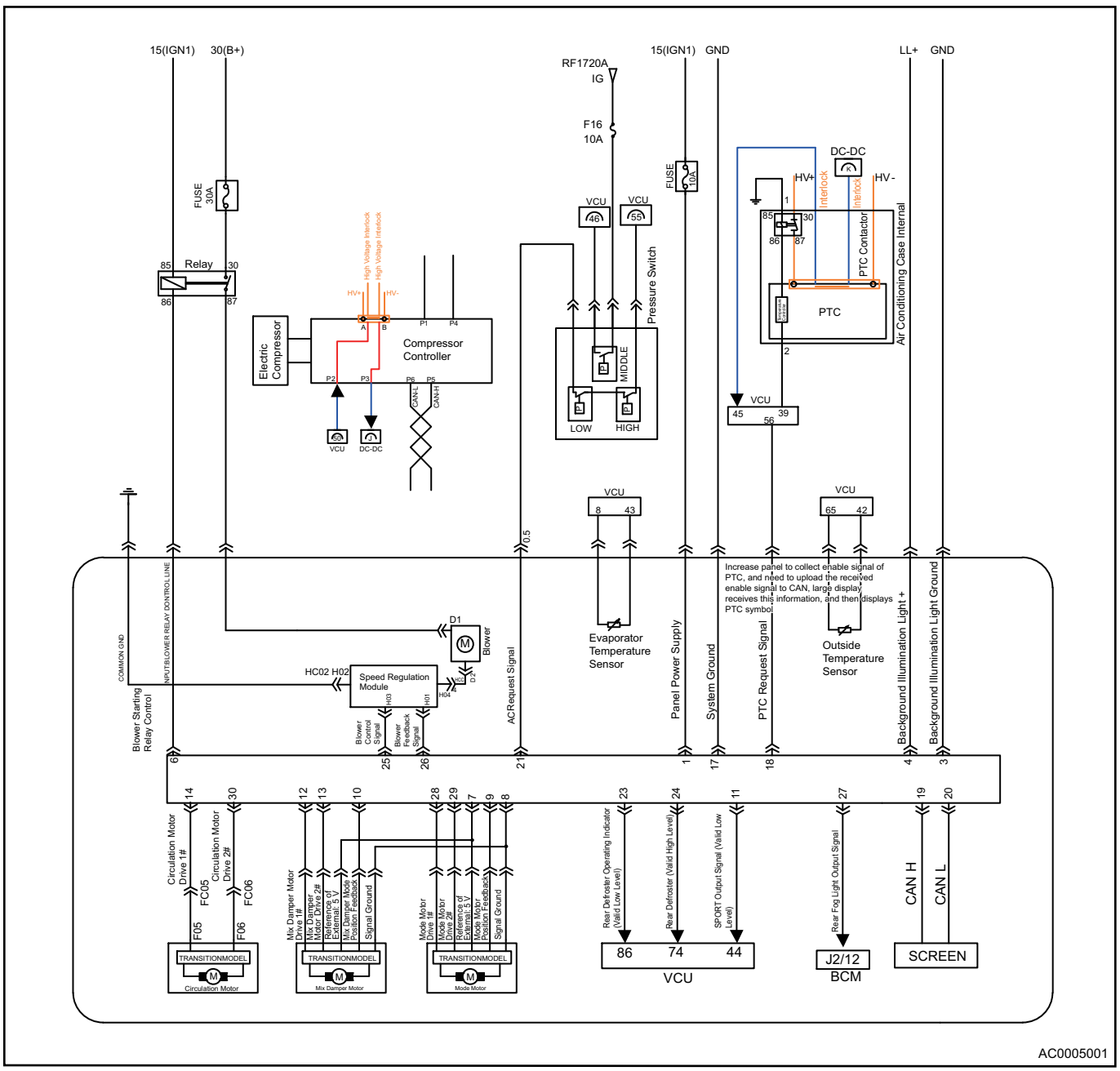


Refrigerant System Schematic Diagram

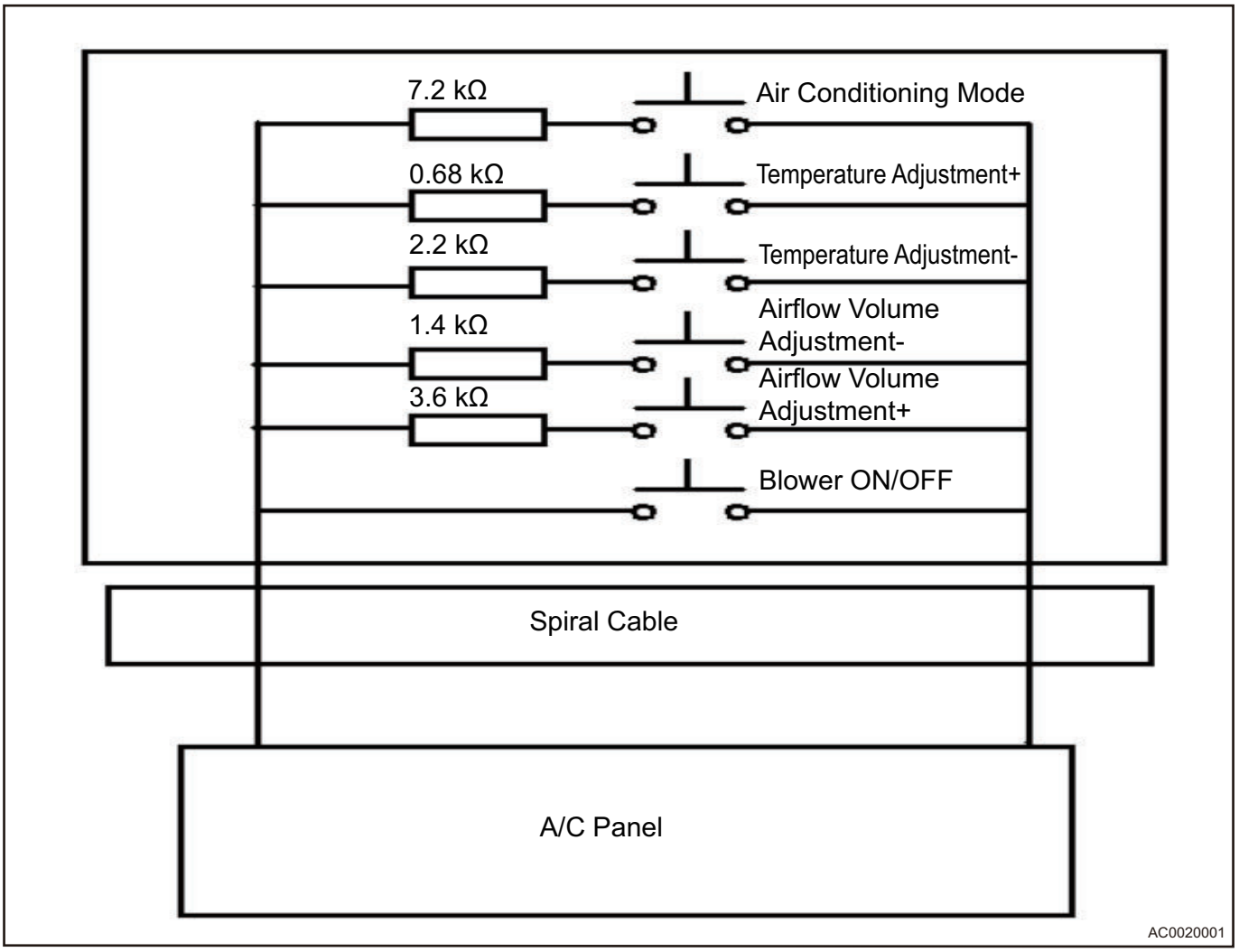


Air Conditioning Control System Circuit Schematic Diagram

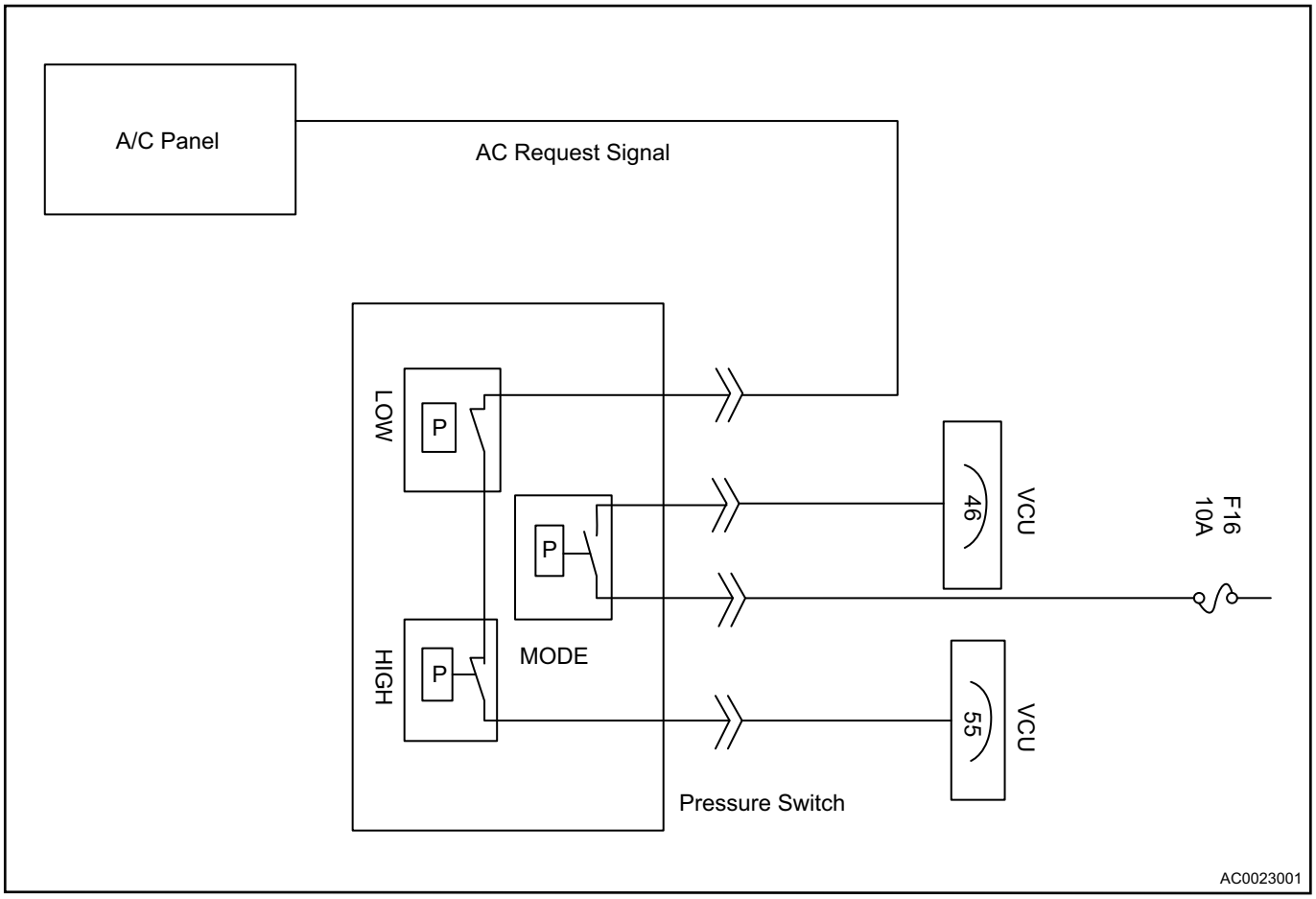
Air Conditioning Control System Circuit Schematic Diagram



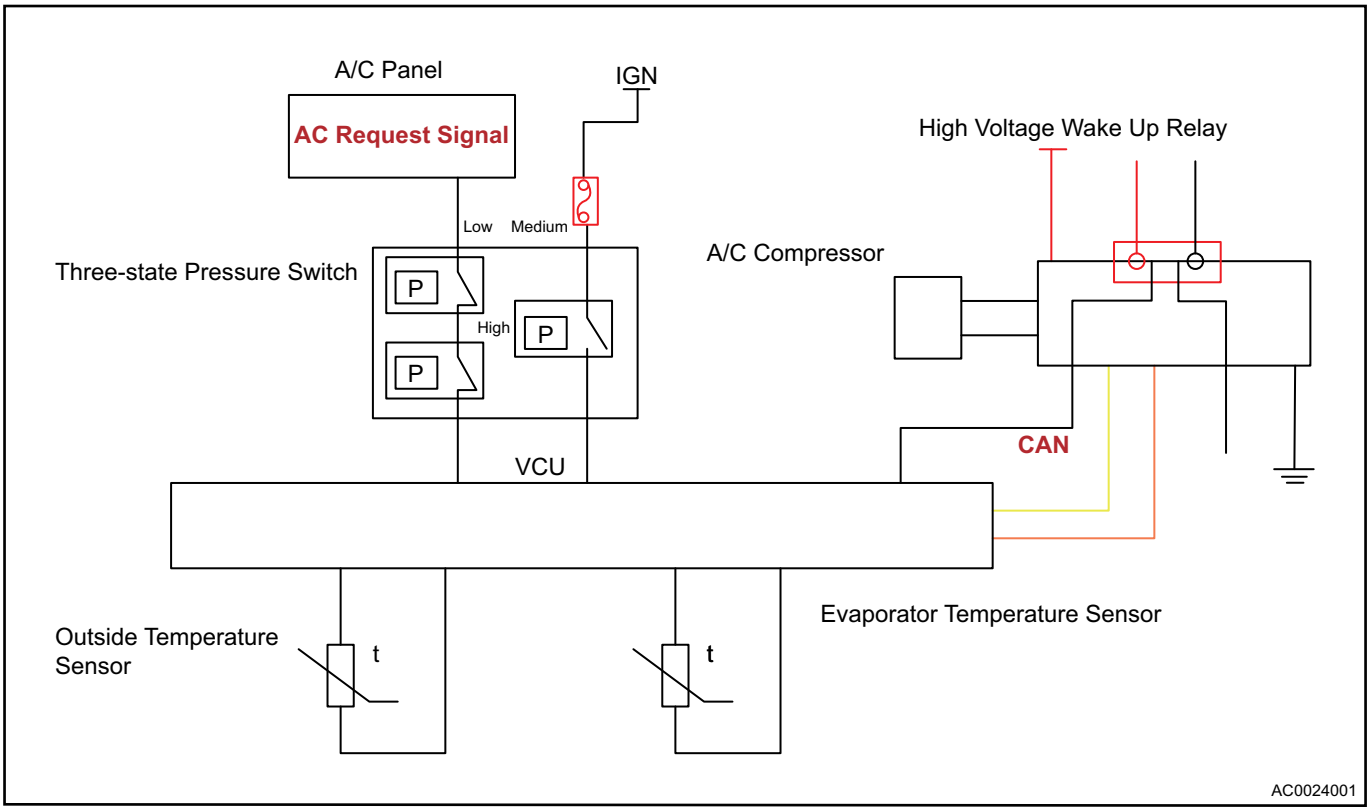
Steering Wheel Quick Button Circuit Schematic Diagram



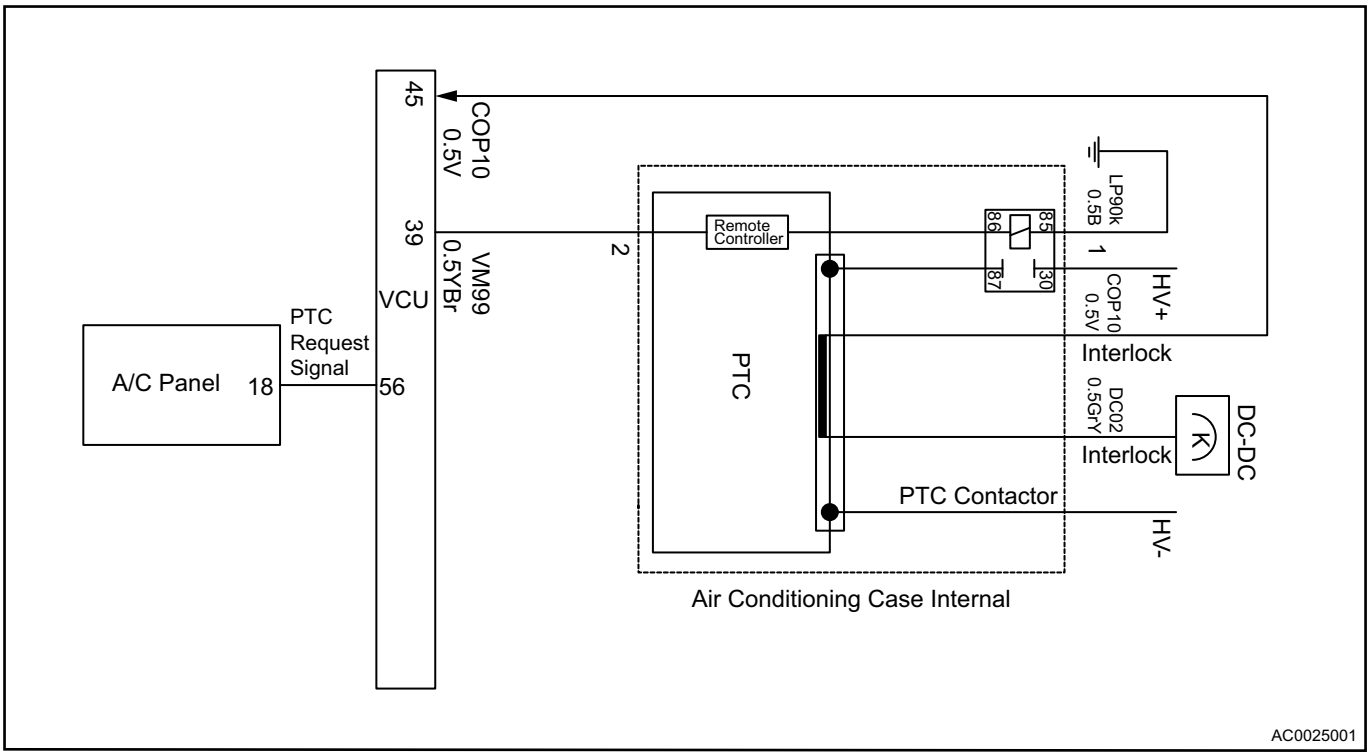
A/C Pressure Switch Circuit Schematic Diagram



Refrigerant System Circuit Schematic Diagram



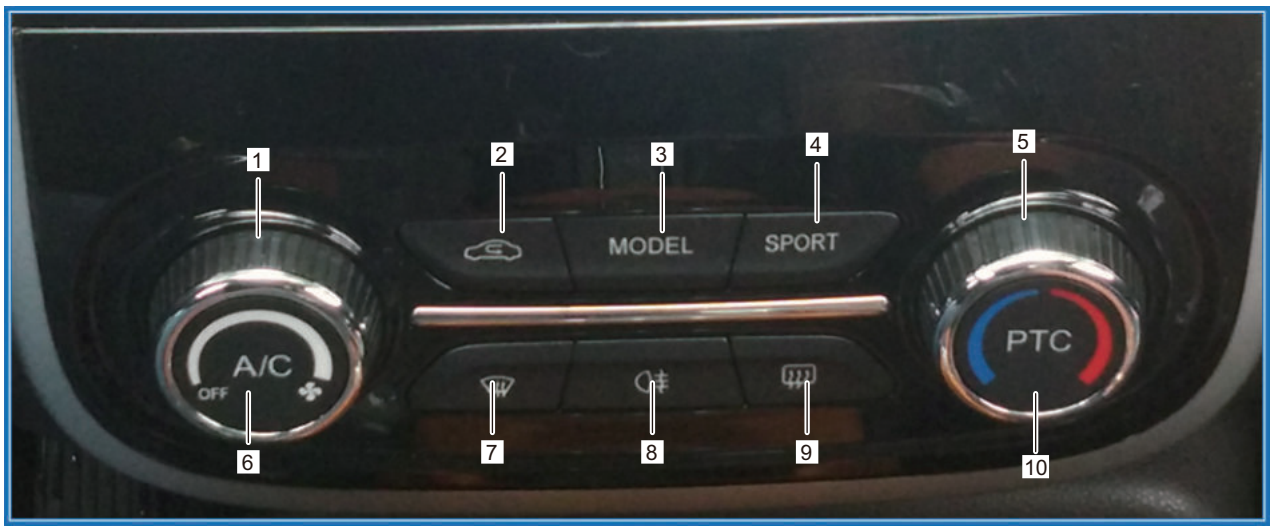
Heating Circuit Schematic Diagram



Component Function Description

A/C Control Panel

1. Function description



AC0004001

No.	Name	No.	Name
1	Air Volume Knob	2	Inner/outer Circulation Switch
3	Blow Mode Switch	4	ECO/SPORT Mode Switch
5	Heating/cooling Knob	6	Compressor ON Request Switch
7	Front Defrosting/defogging Switch	8	Rear Fog Light ON Request Switch
9	Rear Defrosting ON Request Switch	10	PTC ON Request Switch

Driver operates operate air conditioning system by operating air conditioning control panel. There are 2 knobs and 8 switches on eQ1 air conditioning control panel:

a. Air volume knob: Adjust air volume of each air outlet.
b. Inner/outer circulation switch: Press the button to switch outside fresh air mode or inside air circulation mode. Short press this button once to switch the state between inner/outer circulation once.
c. Blow mode switch: Short press this button once to change blow mode of air conditioning once, the mode changes in the order of face - face and foot, foot, foot and defrosting - face in cycle (in foot and defrosting mode, AC request is allowed, and air volume is level 4 by default. Short press this button again to restore previous AC and air volume state, and mode state is changed once).
d. ECO/SPORT mode switch: Press SPORT switch on A/C panel, and E light on meter comes on, ECO mode is activated, and the vehicle power performance will decrease; Press once again, S light on meter comes on, and the vehicle is switched to SPORT mode.
e. Heating/cooling knob: Adjust air temperature of each air outlet.
f. Compressor ON request switch: When blower is operating, operate this button to start/stop compressor once. The compressor operation depends on normal system pressure, also is related to evaporator temperature and POWER switch shift position. In normal conditions, when DVD large display indicator comes on, indicating that A/C switch is turned on, when it goes off, indicating that A/C switch is turned off.
g. Front defrosting/defogging switch: Short press this button once to enter front defrosting state, outer circulation is performed forcibly. Air volume is level 4 by default, AC request is allowed; Short press again to restore previous state.
h. Rear fog light ON request switch: Short press this button once to turn on rear fog light. Short press this button once again to turn off rear fog light. Preconditions for rear fog light ON operation is that position light is turned on.
i. Rear defrosting ON request switch: Short press this button once, rear windshield starts defrosting. Short press this button once again, rear windshield stops defrosting. After pressing rear defrosting button and there is no any operation for 15 minutes, rear defroster stops operating automatically.
j. PTC ON request switch: Short press this button once to turn on PTC heating request, and heating is displayed in large display. PTC heating request ON command can be output with blower ON, that is, PTC heating can be turned on when turning on blower. Short press this button once again to turn off PTC heating request.

2. Control strategy

Button Name	Operation Type	Synchronous Display Status on Large Display	Detailed Description for Button Function
Blow mode switch	Adjust blow mode of air conditioning	Yes	Short press this button once to change blow mode of air conditioning once, the mode changes in the order of face - face and foot, foot, foot and defrosting - face in cycle (in foot and defrosting mode, AC request is allowed, and air volume is level 4 by default. Short press this button again to restore previous AC and air volume state,

			and mode state is changed once).
Front defrosting/ defogging switch	Front windshield performs defrosting operation	Yes	Short press this button once, front defrosting state is entered, outer circulation is performed forcibly. Air volume is level 4 by default, AC request is allowed and indicator comes on. Short press this button again, it will restore previous state.
Inner/outer circulation switch	Switch inner/outer circulation state manually	Yes	Short press this button once, it is switched between inner/outer circulation once.
Rear fog light ON request switch	Turn on rear fog light	Display indication in instrument cluster	Short press this button once, rear fog light is turned on. Short press this button once again, rear fog light is turned off.
ECO/SPORT mode switch	Switch ES mode manually	Display indication in instrument cluster	Short press this button once, the mode is switched between E and S mode.
Rear defrosting ON request switch	Rear windshield performs defrosting operation	Yes	Short press this button once, rear windshield starts defrosting. Short press this button once again, rear windshield stops defrosting. After pressing rear defrosting button and there is no any operation for 15 minutes, rear defroster stops operating automatically.
Compressor ON request switch	Turn on compressor request	Yes	Short press this button once, compressor request is turned on and snowflake is displayed in large display. Compressor request ON command

			can be output with blower ON, that is, compressor can be turned on when turning on blower. Short press this button once again, AC request is turned off.
PTC ON request switch	Turn on PTC heating	Yes	Short press this button once, PTC heating request is turned on and heating is displayed in large display. PTC heating request ON command can be output with blower ON, that is, PTC heating can be turned on when fan is turned on. Short press this button once again, PTC heating request is turned off.
Air volume knob	Increase or decrease air conditioning speed when system is turned on	Yes	Air volume adjustment knob is used to control blower speed, and air conditioning speed is adjusted by blower.
Heating/cooling knob	Adjust the temperature set value	Yes	Heating/cooling knob is used to control air temperature at air outlet. Appropriate temperature can be selected by turning knob.

Description:

1. A/C control panel does not participate in control of cooling fan, VCU collects A/C pressure switch signal directly.
2. After pressing rear defrosting ON request switch and there is no any operation for 15 minutes, rear defroster stops operating automatically.
3. VCU control strategy for A/C compressor:

   VCU collects evaporator temperature sensor signal and outside temperature sensor signal, and detects compressor ON request signal sent by A/C control panel, then outputs the signal to control compressor relay, and finally realizes compressor high pressure output ON/OFF.

   Air conditioning system operates when the following conditions are met:

   - High voltage/insulation resistance is normal;
   - A/C switch is turned on;
   - System pressure meets the requirements;
   - VCU functions are normal;
   - Evaporator temperature sensor is higher than 2 ℃;
   - Battery voltage is normal.

   In some cases, VCU must cut off A/C compressor or prohibit air conditioning system from starting, which can ensure high pressure safety or the vehicle power performance, or protect engine or air conditioning system. Meanwhile, in order to prevent compressor from frequent ON/OFF, once air conditioning enters cut-off mode, compressor can be engaged again after VCU ensures that a certain time has passed by the way of delay, etc. Main modes are as follows:

   a.In case of power battery malfunction/insulation malfunction, compressor/PTC high voltage is powered off.

   When power battery malfunction/insulation malfunction light is displayed in instrument cluster: High voltage is safe.

   b.When A/C is operating, if evaporator temperature is less than 2 ℃, cut off A/C compressor.

   A/C is in cut-off mode when A/C evaporator temperature is too low: Protect A/C system.

   When any of following conditions is met, vehicle enters A/C cut-off mode when A/C evaporator temperature is too low:

   a.A/C evaporator temperature sensor is malfunctioning;
   b.A/C evaporator temperature is lower than 2 ℃.

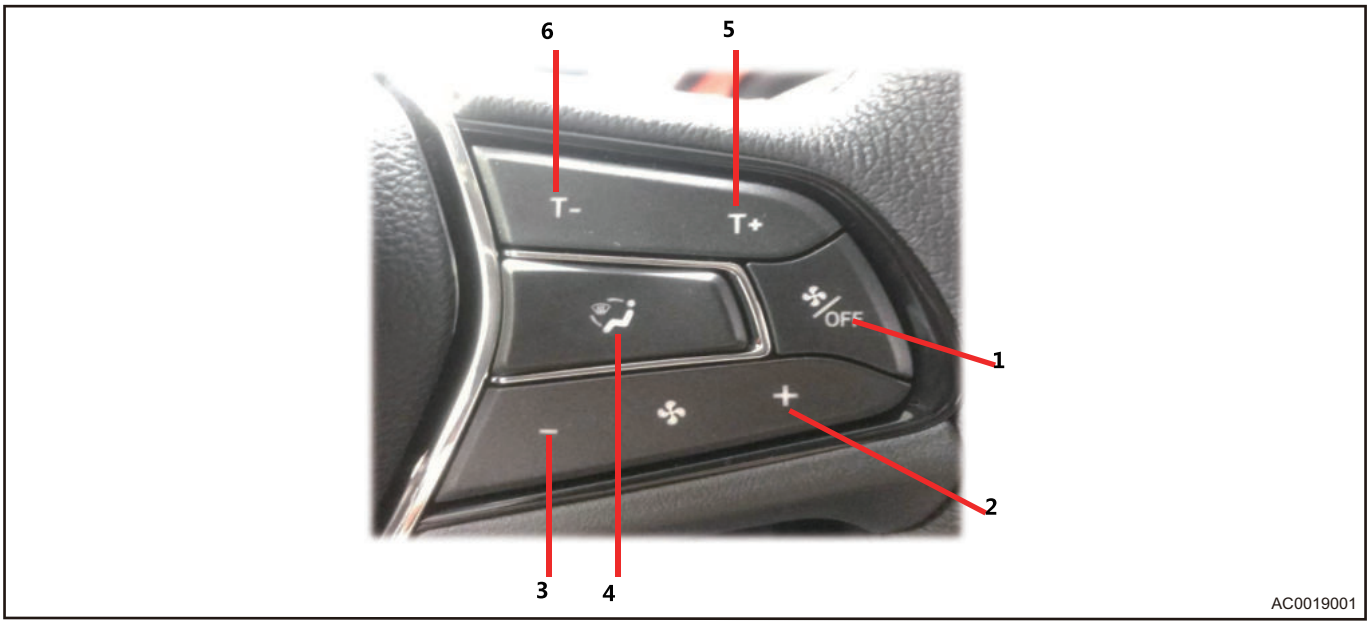
   When the following 2 conditions is met, vehicle exits A/C cut-off mode when A/C evaporator temperature is low:

   a.A/C evaporator temperature sensor is normal;
   b.A/C evaporator temperature is higher than 6 ℃.

Auxiliary description:

If the starting operation conditions of VCU air conditioning are met after turning on (it is not in air conditioning cut-off mode), evaporator temperature is 6 ℃ or more, such as 7 ℃, compressor will be engaged after VCU receives A/C request.

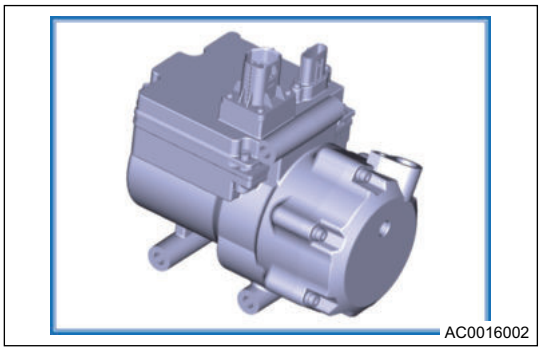
Steering Wheel Quick Button



No.	Name	No.	Name
1	Blower ON/OFF Button	2	Air Volume Increase Button
3	Air Volume Decrease Button	4	Mode Damper Button
5	Temperature Increase Button	6	Temperature Decrease Button

A/C Compressor Assembly

Constant displacement electric scroll compressor is adopted. The motor is brushless DC motor.Equipped controller is used to control brushless motor speed.In a wide speed range, this compressor has high performance coefficient.



Technical parameters:

- Air volume: 27 cc/r
- Speed regulation range: 1000 - 6500 rpm
- Rated speed: 6500 rpm
- Type: Scroll type
- Refrigerant: R134a
- Refrigeration oil: RL68H 90 ml

A/C compressor operating conditions:

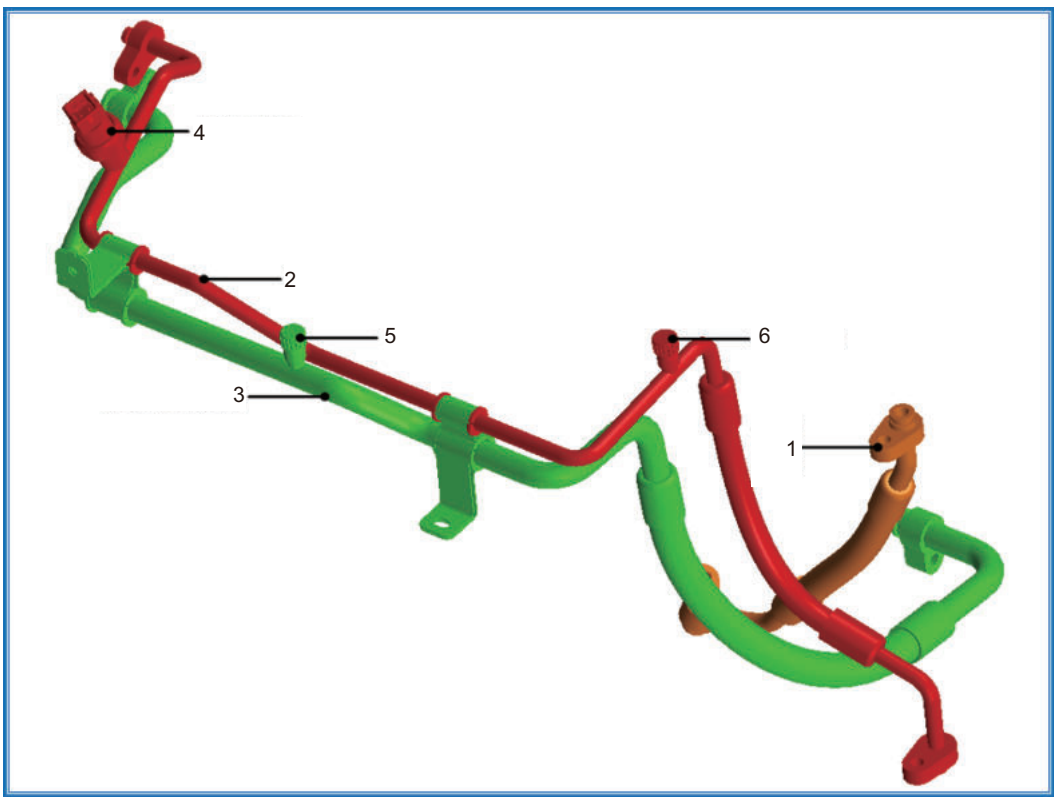
1. Blower is in operation status;
2. A/C operating switch is turned on (A/C switch);
3. System pressure is normal/pressure switch is normal;
4. Outside temperature is higher than - 1 ℃;
5. When evaporator tank temperature is lower than 2 ℃, AC starting is prohibited or AC is turned off immediately, when evaporator temperature returns to 6 ℃ or more, AC enable is restored.
6. The vehicle SOC power meets the compressor operation condition;
7. VCU functions are normal;
8. Insulation resistance is normal.

A/C compressor operation mode:Press A/C switch on air conditioning switch panel, and A/C request signal is transmitted to VCU through three-state switch. VCU collects evaporation temperature sensor signal to determine if compressor is turned on, and collects outside temperature sensor signal to control compressor speed.

Compressor parameters:

No.	Type	Scroll type
1	Displacement	27 CC/R
2	Refrigeration oil type/amount	RL68H/90 ml
3	Refrigerant	R134a

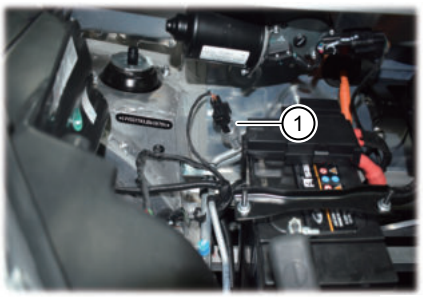
A/C Line and Pressure Switch



AC0003001

No.	Name	No.	Name
1	Compressor - Condenser Line Assembly	2	Condenser - Evaporator Line Assembly
3	Evaporator - Compressor Line Assembly	4	A/C Pressure Switch
5	Low Voltage Charging Valve	6	High Voltage Charging Valve

A/C pressure switch (1) is a three-state pressure switch, including high, medium and low pressure.



AC0020002

A/C pressure switch parameters: (unit: MPa)

Low Voltage		Medium Voltage		High Voltage	
OFF	ON	OFF	ON	OFF	ON
0.12 ± 0.02	⩽ 0.24	1.25 ± 0.1	1.60 ± 0.1	3.20 ± 0.15	2.40 ± 0.15

Evaporator Temperature Sensor (with Wire Harness)

Negative thermistor is adopted.The installation position is on evaporator in evaporator tank.Relationship between AC and evaporator temperature sensor: After turning on AC, VCU collects evaporator temperature sensor temperature to determines if compressor is allowed to be turned on and off according to the set temperature values of compressor that are allowed to be turned on and off.

Control logic:When AC is operating, if evaporator temperature sensor occurs fault or evaporator temperature is lower than 2 ℃, system will cut off A/C compressor operation.When evaporator temperature is higher than 6 ℃, compressor will operate again.


AC0017002

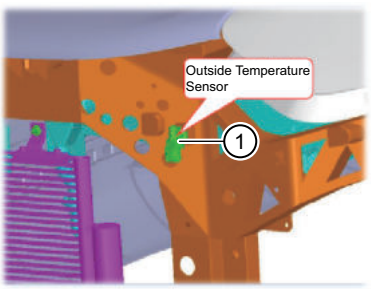
Evaporator temperature sensor R - T value

Temperature(℃)	Lower Limit Value	Nominal Value	Upper Limit Value
-20	19.176	20.086	20.996
-15	14.307	14.986	15.665
-10	10.817	11.330	11.843
-5	8.247	8.638	9.029
0	6.320	6.650	6.982
1	6.052	6.304	6.556
2	5.760	6.000	6.240
3	5.447	5.674	5.901

4	5.206	5.423	5.640
5	4.925	5.130	5.335
6	4.698	4.894	5.090
7	4.472	4.658	4.844
8	4.260	4.438	4.616
9	4.059	4.228	4.397
10	3.853	4.014	4.175
15	3.032	3.158	3.284
20	2.404	2.504	2.604
25	1.940	2.000	2.060
30	1.546	1.610	1.674
35	1.253	1.305	1.357
40	1.021	1.064	1.107
45	0.837	0.872	0.907
50	0.690	0.719	0.748
55	0.573	0.597	0.621
60	0.478	0.498	0.518
65	0.401	0.418	0.435
70	0.339	0.353	0.367

Outside Temperature Sensor

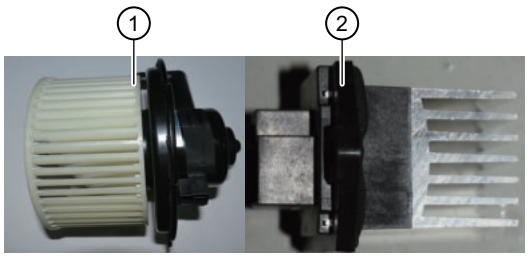
Relationship between AC and outside temperature sensor (1): After turning on AC, VCU collects outside temperature sensor temperature to control compressor speed according to the set compressor speed.
Control logic:When outside temperature is lower than - 1 ℃, A/C compressor is not allowed to operate.



AC0021002

Blower

Centrifugal blower is adopted.Blower (1) is installed under evaporator tank in front passenger compartment.Blower speed adjustment is controlled by speed regulation module (2).



AC0022002

A/C Self-ventilation Function Introduction

- When releasing vehicle fortifying, blower will operate in advance (30 seconds).
- Blower turns on the maximum air volume, outer circulation and face mode automatically, and does not turn on AC/ PTC.
- When blower operates for more than 30 seconds, any door is opened or the vehicle enters fortifying mode, blower will stop operating.
- After exiting the self-ventilation mode, blower, circulation and mode will restore the state before self-ventilation.
- This function can be turned off in audio system.


AC0019002

A/C Self-cleaning Function Introduction

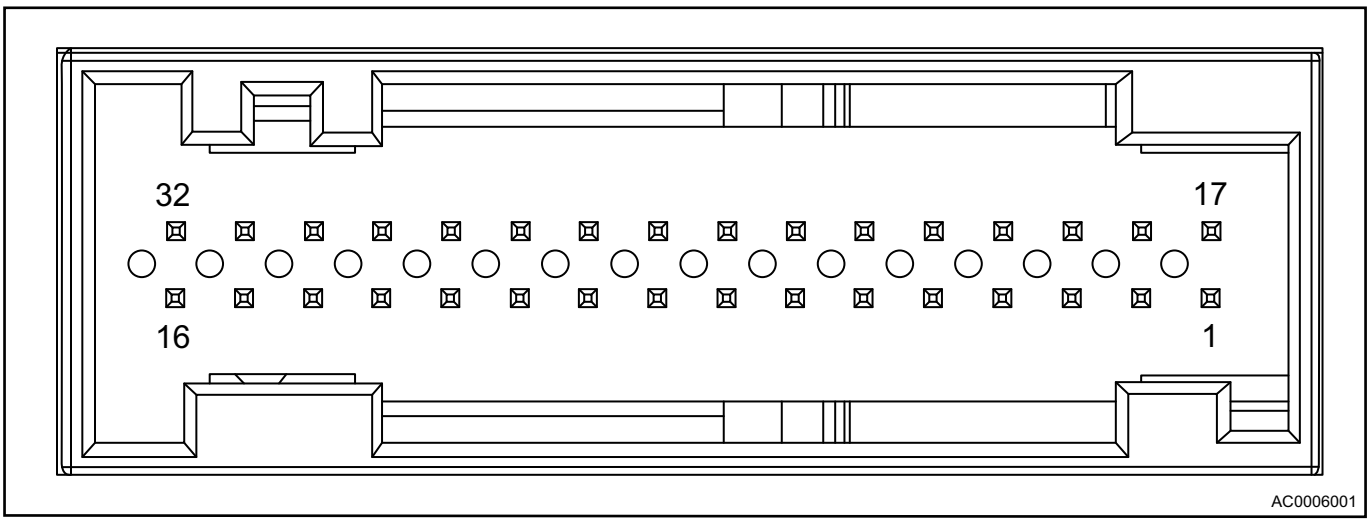
- When A/C operates properly, first turn off A/C or PTC, then turn off blower within 10 seconds.
- After the vehicle is powered off, blower starts operating at the air volume of level 2 and stops operating after 15 seconds.
- When mode damper is switched to foot mode, outer circulation and mode indicator do not change.
- After exiting the self-cleaning mode, blower, circulation and mode will restore the state before self-cleaning.
- This function can be turned off in audio system.


AC0019002

System Circuit Diagram

Module Terminal Definition

A/C Control Panel Terminal Definition

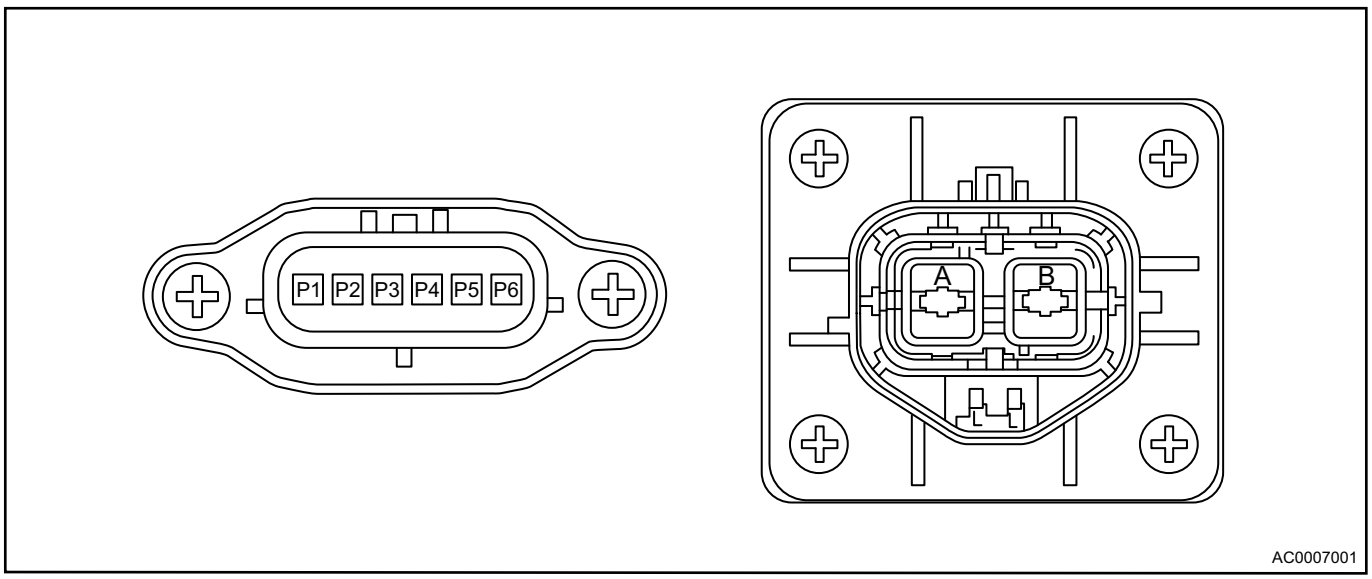


AC0006001

Terminal	Terminal Definition	Terminal	Terminal Definition
1	Panel power supply	2	Button AD detection signal
3	Backlight (illumination light) -	4	Backlight (illumination light) +

5	Null	6	Blower ON relay control (valid low level)
7	External reference 5 V	8	Signal ground
9	Mode motor position feedback	10	Mix damper motor position feedback
11	E/S output signal (valid pulse high level)	12	13 +/12 - turn to cooling direction
13	13 -/12 + turn to heating direction	14	14 +/30 - inner circulation
15	Null	16	Null
17	System ground	18	PTC request signal (- valid high level)
19	CAN - H communication	20	CAN - L communication
21	AC request signal (valid high level)	22	Button ground
23	Rear defroster operating signal (valid low level)	24	Rear defroster output signal (valid pulse high level)
25	Blower control signal	26	Blower feedback signal
27	Rear fog light output signal (valid low level)	28	29 +/28 - turn to face direction
29	29 -/28 + turn to defrosting direction	30	14 -/30 + outer circulation
31	Null	32	Null

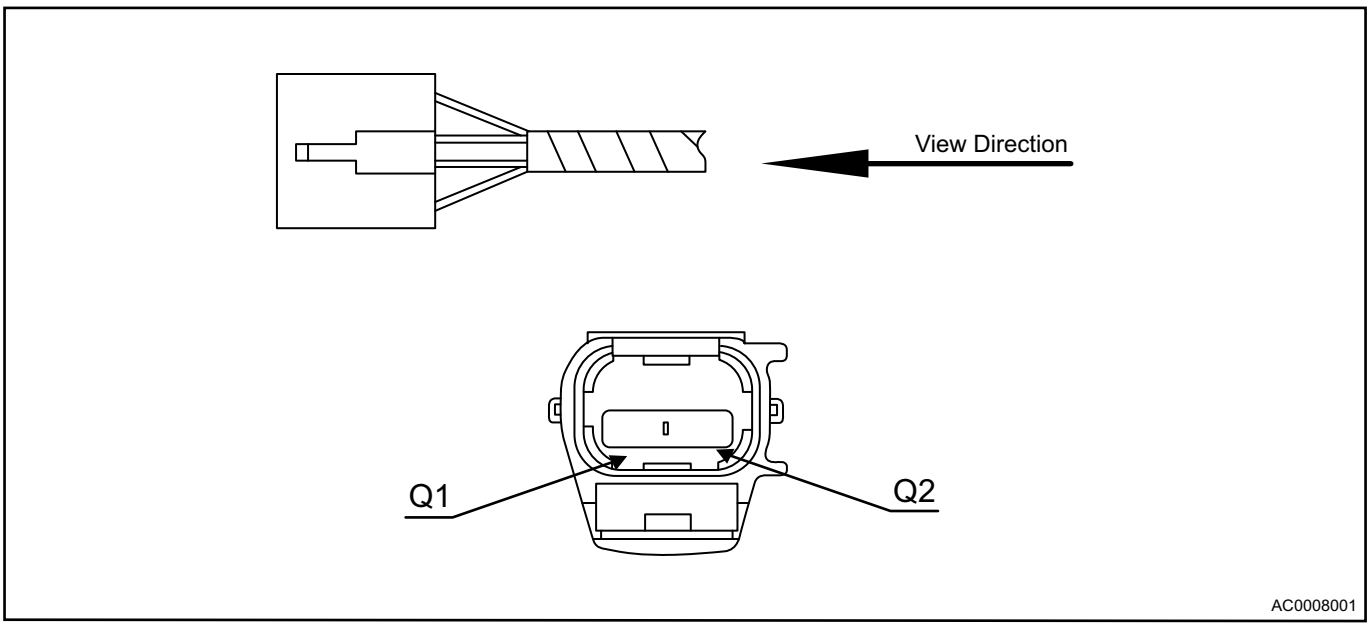
A/C Compressor Connector Terminal Definition



Terminal	Terminal Definition	Terminal	Terminal Definition
A	Main power supply positive	B	Main power supply negative
L	Interlock	L	Interlock
P1	12 V +	P2	Interlock signal terminal
P3	Interlock signal terminal	P4	12 V -
P5	CAN-H	P6	CAN-L

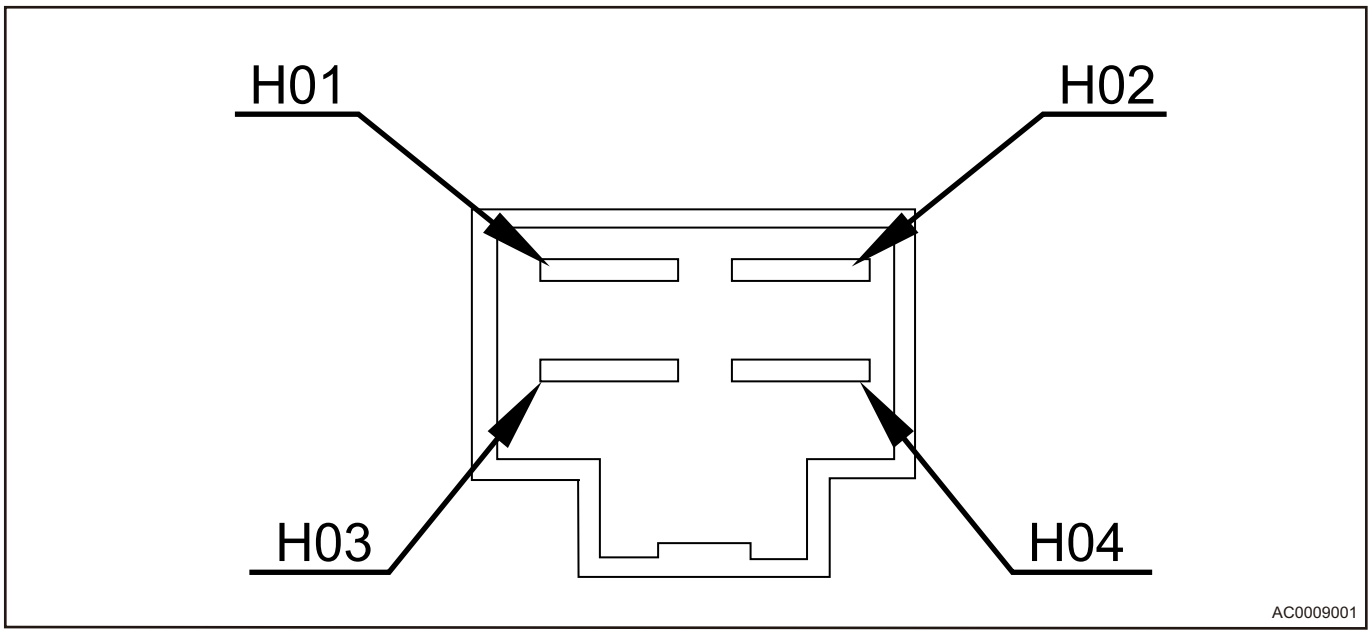
HVAC Wire Harness Connector Terminal Definition (Wire Harness Terminal)

- Outside temperature sensor



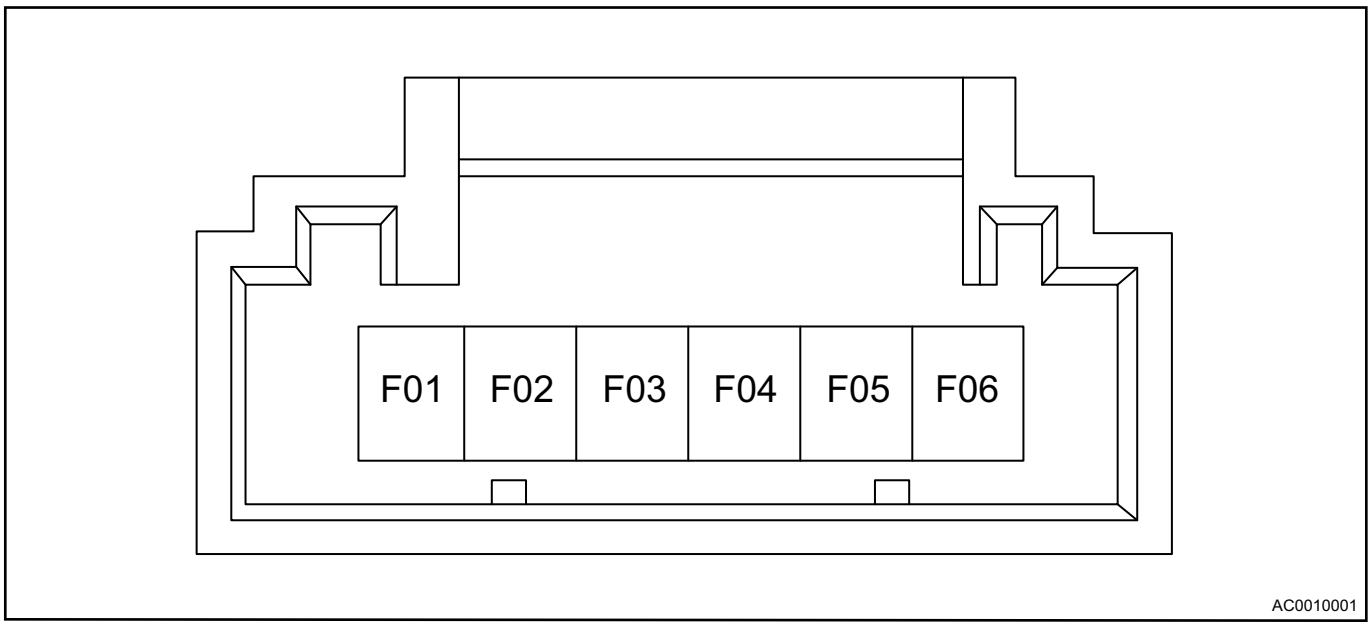
Terminal	Terminal Definition	Terminal	Terminal Definition
Q1	AMB SENSOR+	Q2	AMB SENSOR-

- Speed regulation module



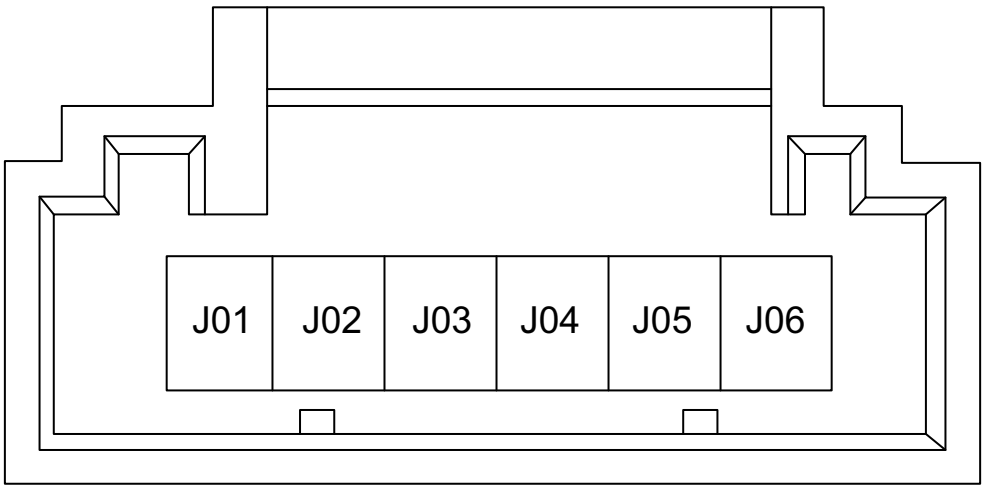
Terminal	Terminal Definition	Terminal	Terminal Definition
H01	FEEDB AC K	H02	GND
H03	THE CONTROL END	H04	BLOWER

- Inner/outer circulation servo motor



Terminal	Terminal Definition	Terminal	Terminal Definition
F01	Null	F02	Null
F03	Null	F04	Null
F05	F5+, F6 – , TO RECYCL	F06	F5+, F6 – , TO FRESH

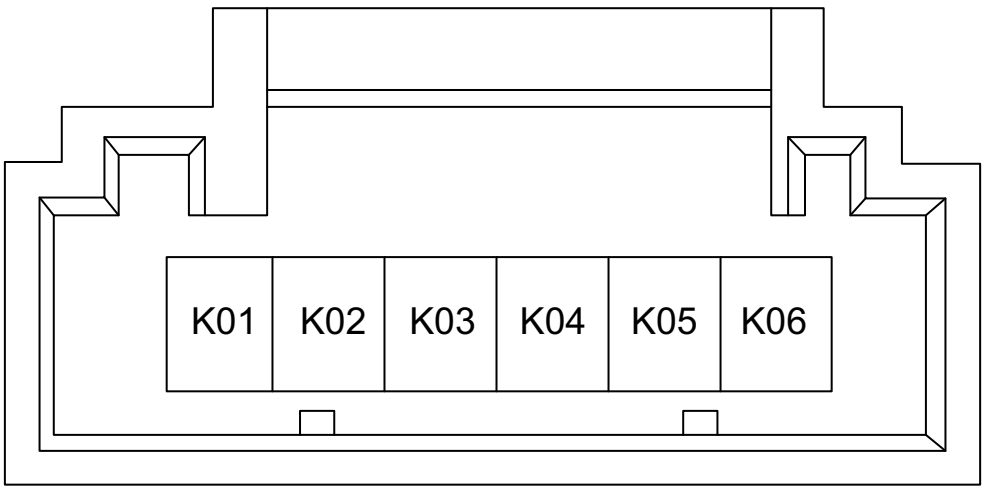
- Mix damper motor



AC0011001

Terminal	Terminal Definition	Terminal	Terminal Definition
J01	MOTOR GND	J02	MIX DOOR FEEDB AC K
J03	MOTOR POWER +5 V	J04	Null
J05	K5+, K6 – , TO COOL	J06	K5+, K6 – , TO HOT

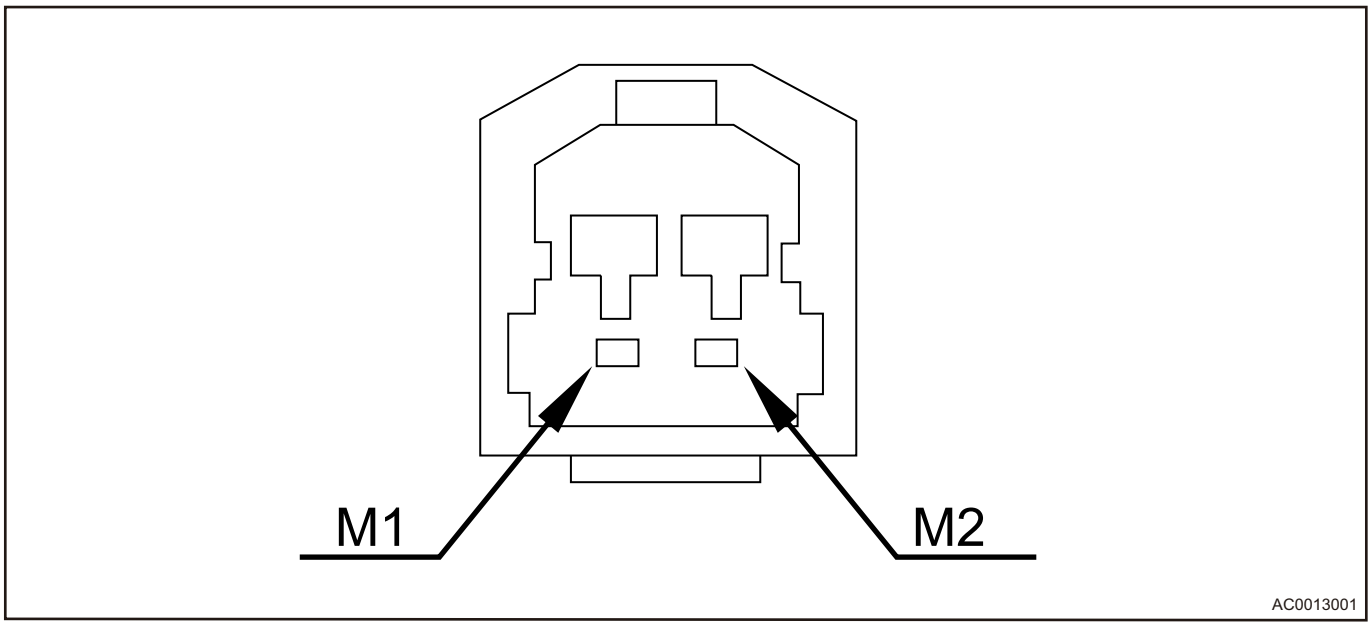
- Mode servo motor



AC0012001

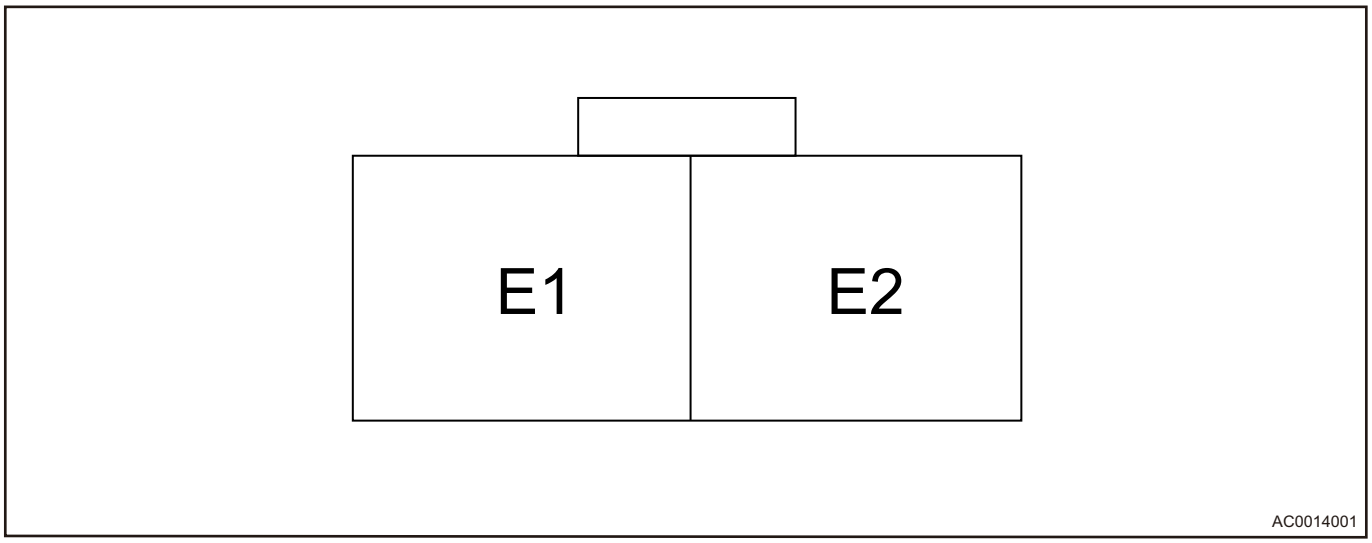
Terminal	Terminal Definition	Terminal	Terminal Definition
K01	MOTOR GND	K02	MOTOR DOOR FEEDB AC K
K03	MOTOR POWER +5 V	K04	Null
K05	K5+, K6 – , TO FACE	K06	K5 – , K6+, TO DEFROST

- Relay coil



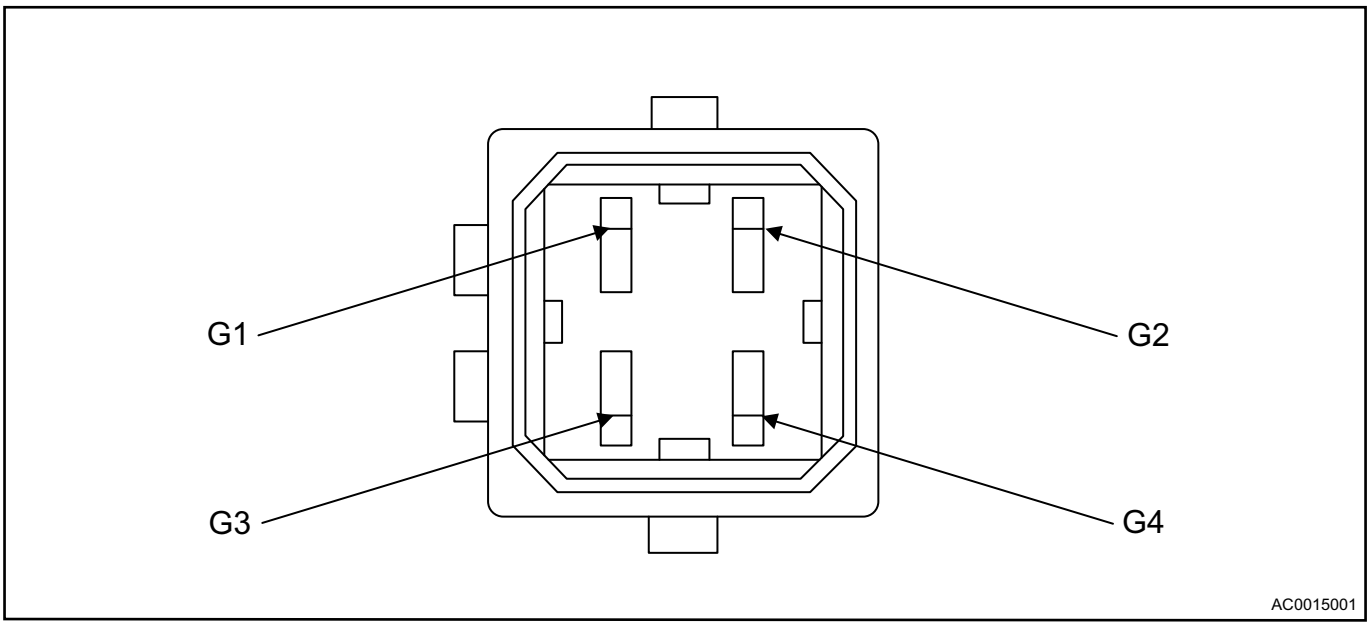
Terminal	Terminal Definition	Terminal	Terminal Definition
M1	RELAY COIL GND	M2	RELAY COIL IN

- Evaporator temperature sensor



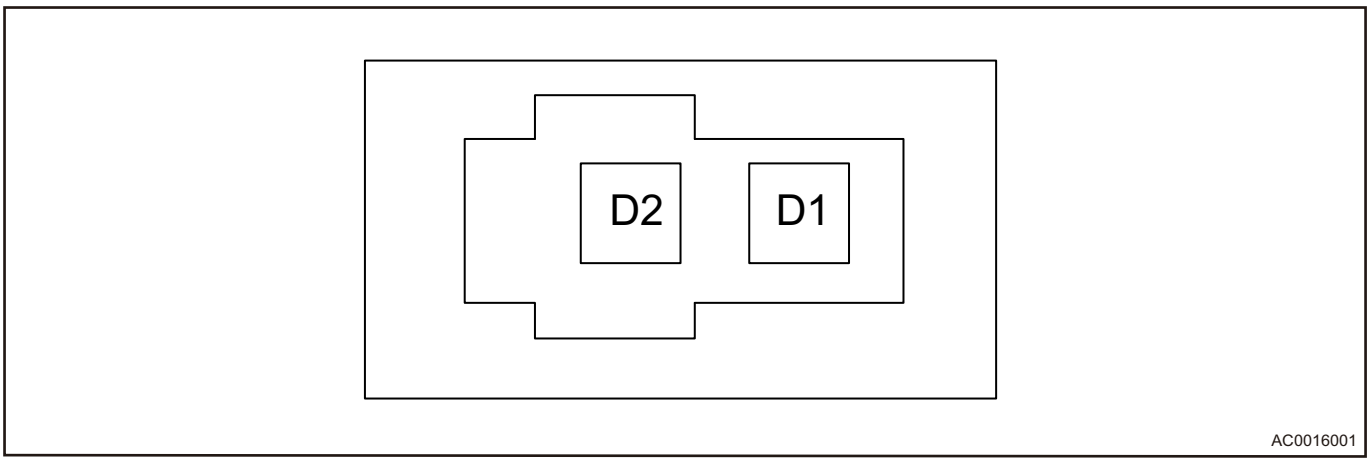
Terminal	Terminal Definition	Terminal	Terminal Definition
E1	EVAP SENSOR	E2	SENSOR GND

- Pressure switch



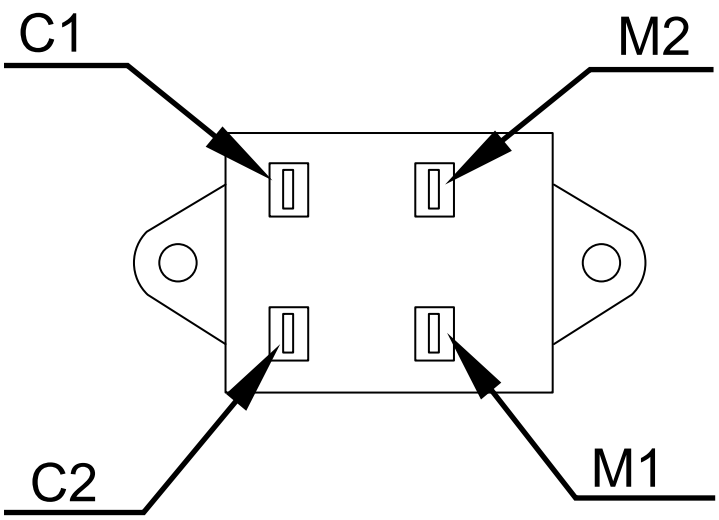
Terminal	Terminal Definition	Terminal	Terminal Definition
G1	HIGH PRESSURE	G2	MIDDLE PRESSURE
G3	LOW PRESSURE	G4	MIDDLE PRESSURE

- Blower motor



Terminal	Terminal Definition	Terminal	Terminal Definition
D1	BLOWER POWER +	D2	BLOWER POWER -

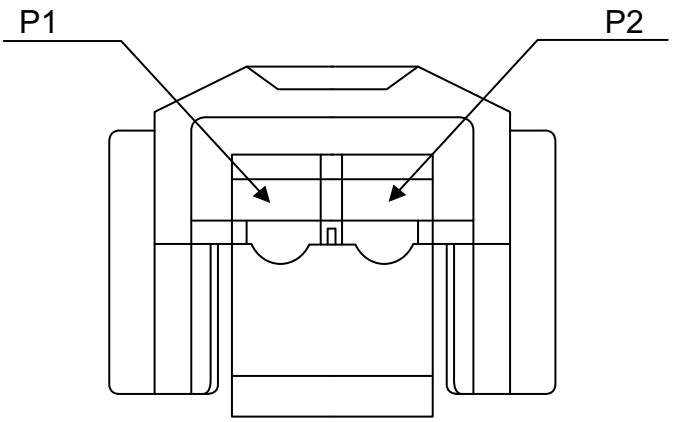
- Relay connector



AC0017001

Terminal	Terminal Definition	Terminal	Terminal Definition
C1	Load input terminal (+)	C2	Load input terminal (-)
M1	Coil terminal (no polarity)	M2	Coil terminal (no polarity)

- High voltage interlock connector



AC0018001

Terminal	Terminal Definition	Terminal	Terminal Definition
P1	Interlock connector 1	P2	Interlock connector 2

Diagnosis & Test

Common Troubleshooting

No Cooling/Heating for A/C
Check if high voltage is normal (check if meter battery malfunction light and insulation resistance malfunction light come on). If the lights come on, it indicates high voltage malfunction, and compressor/ PTC does not operate.

Poor Refrigeration Effect
Read CAN message to confirm if compressor actual speed and VCU required speed conform to specified value.

No Compressor Operation
Read CAN message to confirm if enable signal sent from VCU to compressor is 1. If it is 1, check if compressor connection is loose or if there is water ingress. If it is 0, check if the pressure switch is disconnected.

A/C Cooling Operation Detection

The following conditions must be met for detection:

- Park the vehicle in a place where the temperature is more than 15 ˚C, the ambient temperature is lower than 28 ˚C and is away from the sun;
- Blower control switch is turned to the maximum speed;
- Cooling temperature switch is turned to the maximum;
- Center air outlet is in the blow mode;
- Turned to inner circulation;
- Close door and window glass;
- Increase external temperature and humidity;
- Place thermometer as close to air outlet as possible.

On-vehicle Service

Tools

Tools: Cross screwdriver, flat tip screwdriver, socket, wrench

Specifications

Torque Specifications

Part Name	Torque (N•m)
A/C compressor bracket fixing bolt	25 ± 2
Fixing bolt between condenser and radiator assembly	6 ± 1
A/C air inlet assembly fixing bolt	6 ± 1
HVAC assembly fixing bolt	6 ± 1

Refrigerant Charging Capacity

Name	Filling Capacity
Refrigerant: R134a	425 ± 10 g

Filling and Recovering of Refrigerant

Filling Refrigerant

Air conditioning system uses a vacuum pump to pump the vacuum and maintain the pressure to test sealing. Refrigerant type: R134a. After pipe connection is completed, use refrigerant charging valve to fill with 425 g ± 10 g.

Recovering Refrigerant

Remove filler nut, and drain refrigerant with manifold pressure gauge.

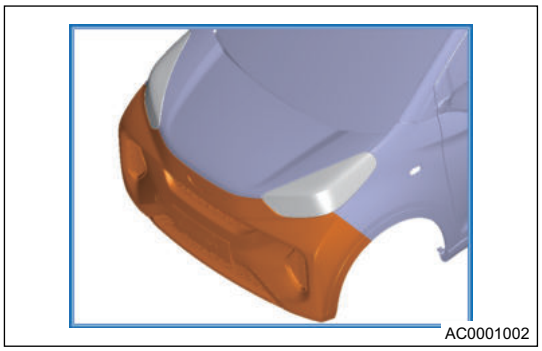
⚠

- Slowly open high pressure hand valve to adjust refrigerant flow. Do not open valve too much; Check towel placed at the end of discharge port to make sure that no oil is drained; When the count of high pressure gauge drops below 350 KPa, slowly open low pressure hand valve; When system pressure drops, gradually open high pressure and low pressure hand valves until readings on both pressure gauges reach 0 KPa.

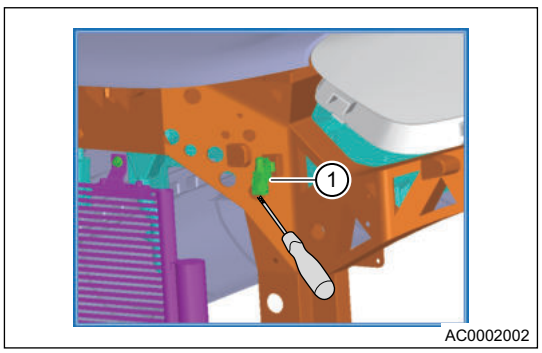
Outside Temperature Sensor

Removal

1. Remove the front bumper (refer to “Interior” and Exterior” sections in “Body”).


AC0001002

2. Using a flat tip screwdriver, pry up outside temperature sensor assembly (1), and then unplug wire harness connector to remove temperature sensor assembly.



AC0002002

Installation

1. Refer to the reverse steps of removal for installation steps.

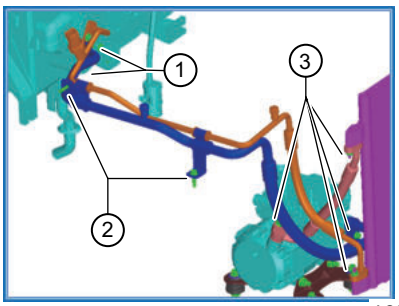
A/C Line

Removal

⚠

- Disconnect the negative battery cable before removing electrical components.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of ornament.
- For safety, be sure to wear necessary safety equipment to prevent accidents.
- When removing line, pay attention to removal order, do not remove roughly to ensure that line is not deformed or broken.
- After line is removed, install plug to pipe port immediately to make sure that line is clean.
- When cleaning line, do not use compressed air, but nitrogen or refrigerant gas can be used.
- Assemble properly and check tightening torque of each connection as required.
- Check all components to ensure that they are not damaged and adjacent components do not interfere with each other.
- Perform leakage test to make sure that there is no leakage in the air conditioning system.
- Before filling refrigerant, it is necessary to pump the vacuum and hold the pressure for air conditioning system to test sealing.

1. Remove the front bumper assembly (refer to “Interior” and Exterior” sections in “Body”).
2. Turn power supply to OFF, unplug wire harness connector of pressure switch, drain refrigerant. Using socket and wrench, remove 8 fixing bolts (1, 2 and 3 in illustration) from line, and seal pipe connector and HVAC connector after removing line.



AC0003002

Installation

1. Refer to the reverse steps of removal for installation steps.

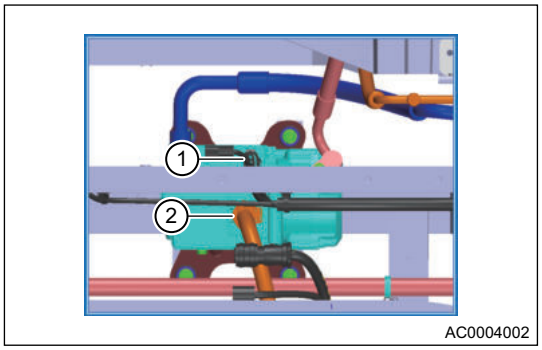
A/C Compressor Assembly

Removal

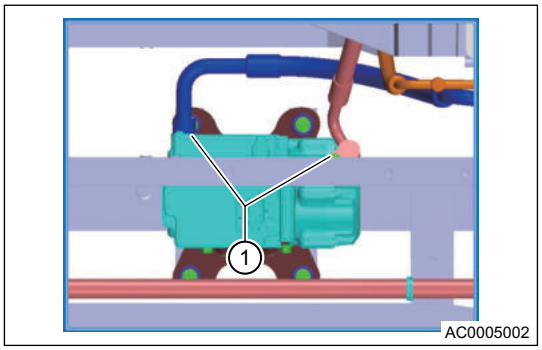
⚠

- Disconnect the negative battery cable before removing electrical components.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of ornament.
- For safety, be sure to wear necessary safety equipment to prevent accidents.
- When removing line, pay attention to removal order, do not remove roughly to ensure that line is not deformed or broken.
- After line is removed, install plug to pipe port immediately to make sure that line is clean.
- When cleaning line, do not use compressed air, but nitrogen or refrigerant gas can be used.
- Assemble properly and check tightening torque of each connection as required.
- Check all components to ensure that they are not damaged and adjacent components do not interfere with each other.
- Perform leakage test to make sure that there is no leakage in the air conditioning system.
- Before filling refrigerant, it is necessary to pump the vacuum and hold the pressure for air conditioning system to test sealing.

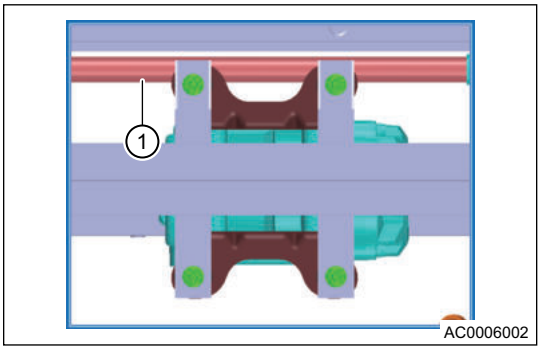
1. Turn power supply to OFF and disconnect high pressure repair switch (refer to “Electric Power” section).
2. Unplug A/C compressor high pressure connector (1) and low pressure signal connector (2).



3. Drain the refrigerant in A/C.
4. Raise the vehicle with a lift and remove 2 A/C lines (1) from A/C compressor.

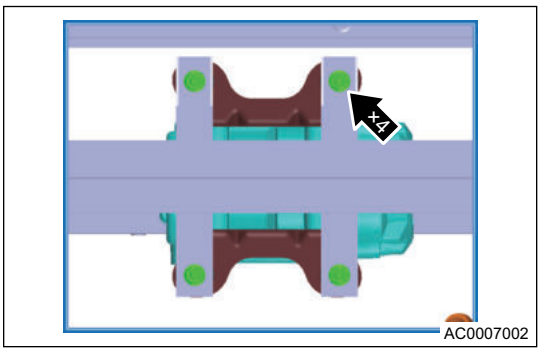


5. Remove the front suspension lateral stabilizer bar (1).



6. Remove 4 fixing bolts (arrow) from compressor bracket and A/C compressor assembly with bracket.

   Tightening torque: 23 ± 2 N•m



Installation

1. Refer to the reverse steps of removal for installation steps.

Condenser

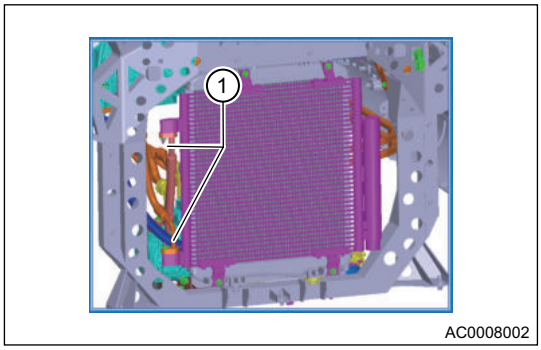
Removal

⚠

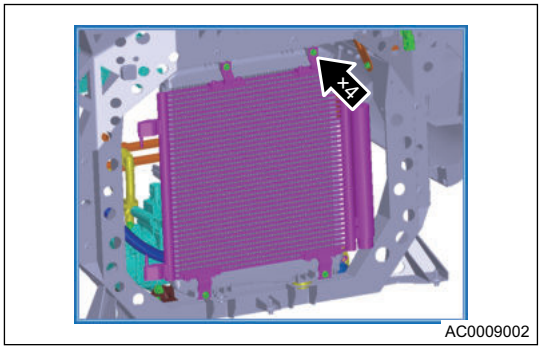
- Disconnect the negative battery cable before removing electrical components.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of ornament.
- For safety, be sure to wear necessary safety equipment to prevent accidents.
- When removing line, pay attention to removal order, do not remove roughly to ensure that line is not deformed or broken.
- After line is removed, install plug to pipe port immediately to make sure that line is clean.
- When cleaning line, do not use compressed air, but nitrogen or refrigerant gas can be used.
- Assemble properly and check tightening torque of each connection as required.
- Check all components to ensure that they are not damaged and adjacent components do not interfere with each other.
- Perform leakage test to make sure that there is no leakage in the air conditioning system.
- Before filling refrigerant, it is necessary to pump the vacuum and hold the pressure for air conditioning system to test sealing.

1. Disconnect the high pressure repair switch.
2. Remove front bumper assembly and impact beam assembly (refer to “Interior” and Exterior” sections in “Body”).
3. Drain the refrigerant in A/C.

4. Remove A/C line (1) from condenser.



5. Remove 4 fixing bolts (arrow) from condenser and radiator assembly and condenser assembly.



Installation

1. Refer to the reverse steps of removal for installation steps.

HVAC Assembly

Removal

⚠

- Disconnect the negative battery cable before removing electrical components.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of ornament.
- For safety, be sure to wear necessary safety equipment to prevent accidents.
- When removing line, pay attention to removal order, do not remove roughly to ensure that line is not deformed or broken.
- After line is removed, install plug to pipe port immediately to make sure that line is clean.
- When cleaning line, do not use compressed air, but nitrogen or refrigerant gas can be used.
- Assemble properly and check tightening torque of each connection as required.
- Check all components to ensure that they are not damaged and adjacent components do not interfere with each other.
- Perform leakage test to make sure that there is no leakage in the air conditioning system.
- Before filling refrigerant, it is necessary to pump the vacuum and hold the pressure for air conditioning system to test sealing.

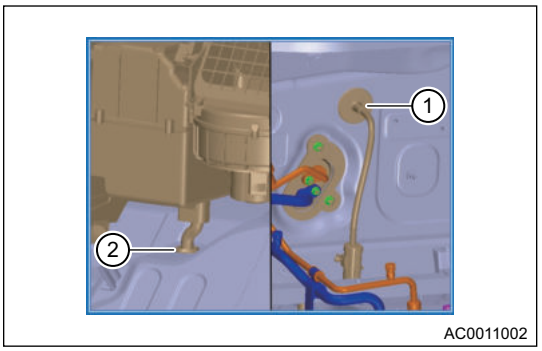
1. Disconnect high voltage switch and unplug PTC connector.
2. Drain the refrigerant in A/C system.
3. Remove A/C line from HVAC (refer to “Removal and Installation” section in “A/C Line”).
4. Remove the instrument cluster (refer to “Interior” and Exterior” sections in “Body”).

5. Remove the instrument panel crossmember (refer to “Interior” and Exterior” sections in “Body”).
6. Remove the instrument panel wire harness assembly.
7. Remove the air inlet assembly. Using socket and wrench, remove 2 fixing bolts from air inlet to remove air inlet.

   Tightening torque: 6 ± 1 N m

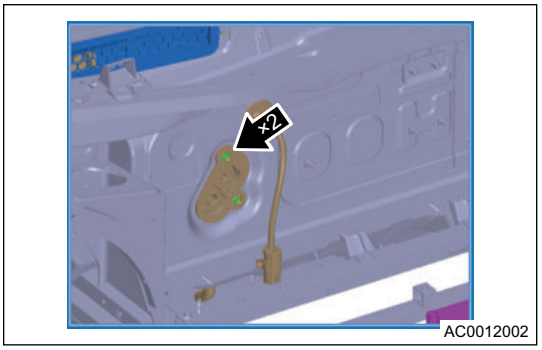
8. Remove PTC wire harness seal rubber sleeve (1) and seal rubber sleeve from drain pipe (2), and push PTC wire harness on HVAC to passenger compartment.

   Tightening torque: 6 ± 1 N m



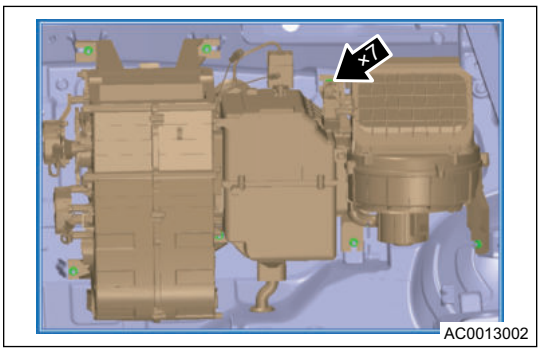
9. Remove 2 fixing nuts (arrow) from HVAC assembly at front compartment.

   Tightening torque: 6 ± 1 N m



10. Remove 7 fixing bolts from HVAC assembly in passenger compartment to remove HVAC assembly.

    Tightening torque: 6 ± 1 N m



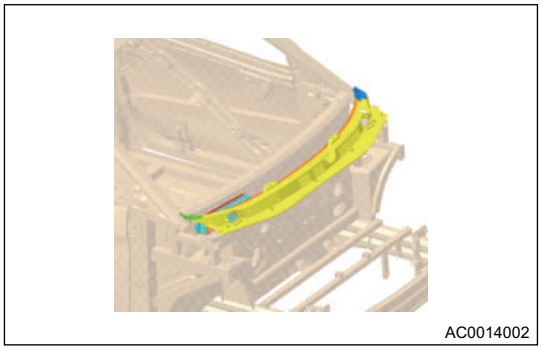
Installation

1. Refer to the reverse steps of removal for installation steps.

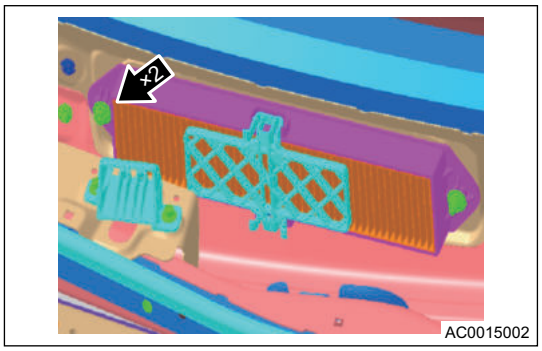
A/C Element

Removal

1. Remove the front windshield lower trim panel (please refer to “Removal” section in “Front Windshield Lower Trim Panel”).


AC0014002

2. Using a socket, remove 2 nuts, and remove element and its mounting bracket.



AC0015002

Installation

1. Refer to the reverse steps of removal for installation steps.

Replacement

1. Remove A/C element according to removal steps.
2. Replace the element with a new one.
3. Then close the cover plate.
4. Install front windshield lower trim panel and replace element.

⚠

- It is recommended that element be replaced once every six months, otherwise it will affect A/C effect under A/C outer circulation due to dust accumulation after a long time.

SUPPLEMENTAL RESTRAINT SYSTEM

SUPPLEMENTAL RESTRAINT SYSTEM

System Overview

Airbag is used in conjunction with seat belt, which can help reduce the risk of serious injury in a major crash accident.

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Do not destroy gas generator

Do not drag wire harness

Do not energize airbag

Do not measure connector or energize connector in this way

Do not cut wire or damage connector terminal

Do not place end surface of airbag assembly downward

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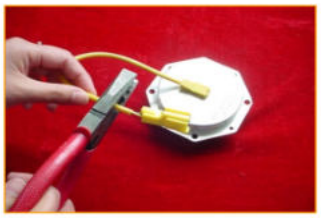
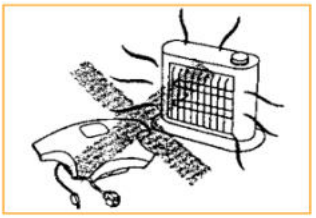
⚠

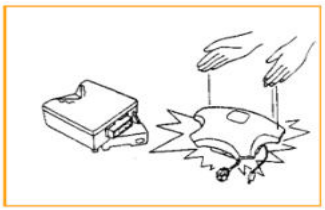
Do not contact with water or other liquids



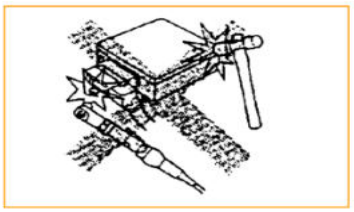
Do not cut wire or damage connector terminal



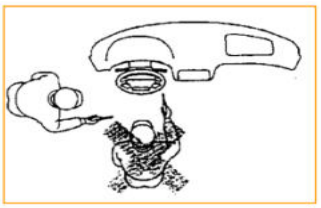
Do not get close to high temperature heat source



Do not drop airbag from a height



Do not hit controller with wrench or hammer

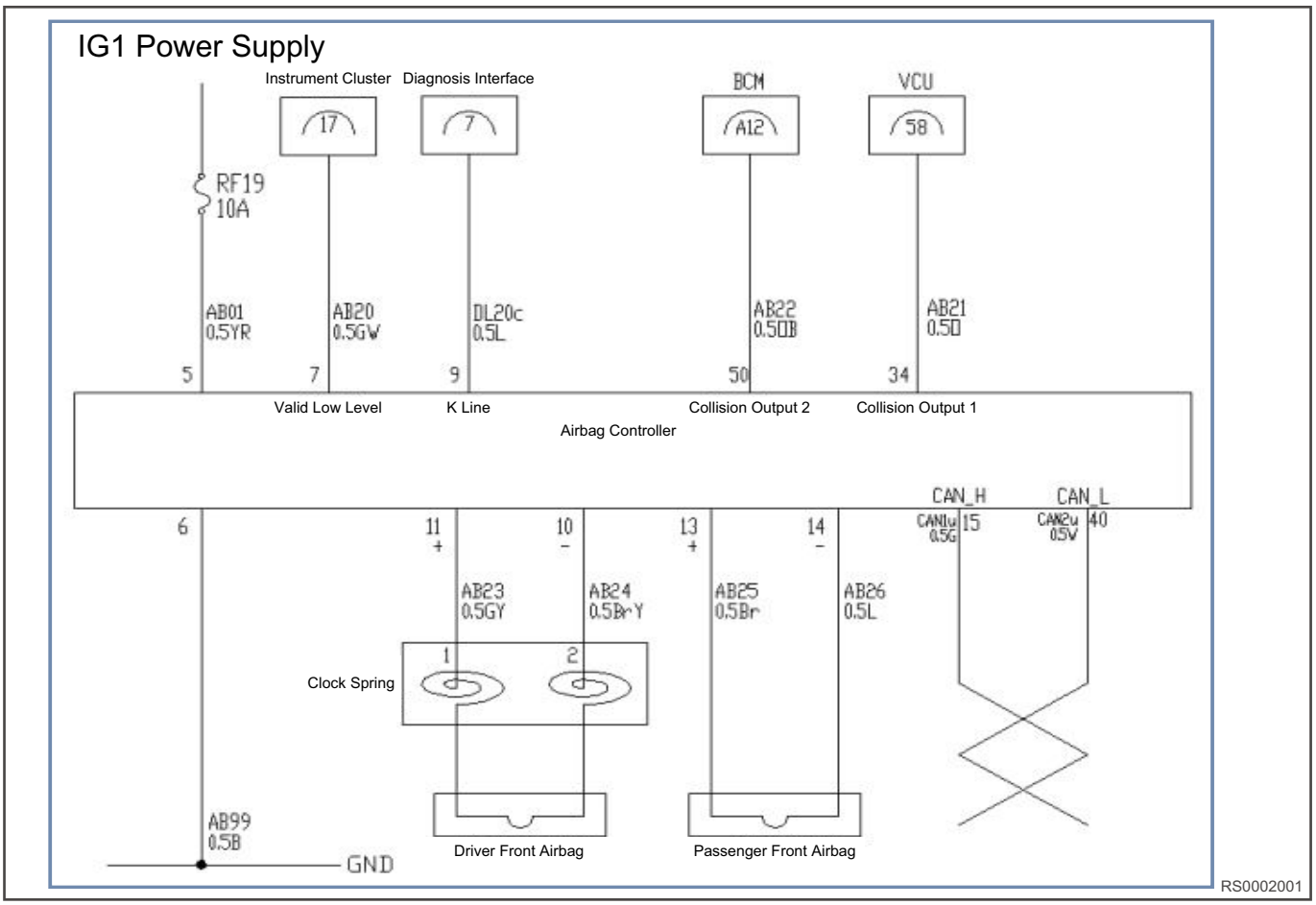


Do not face airbag during removal or replacement

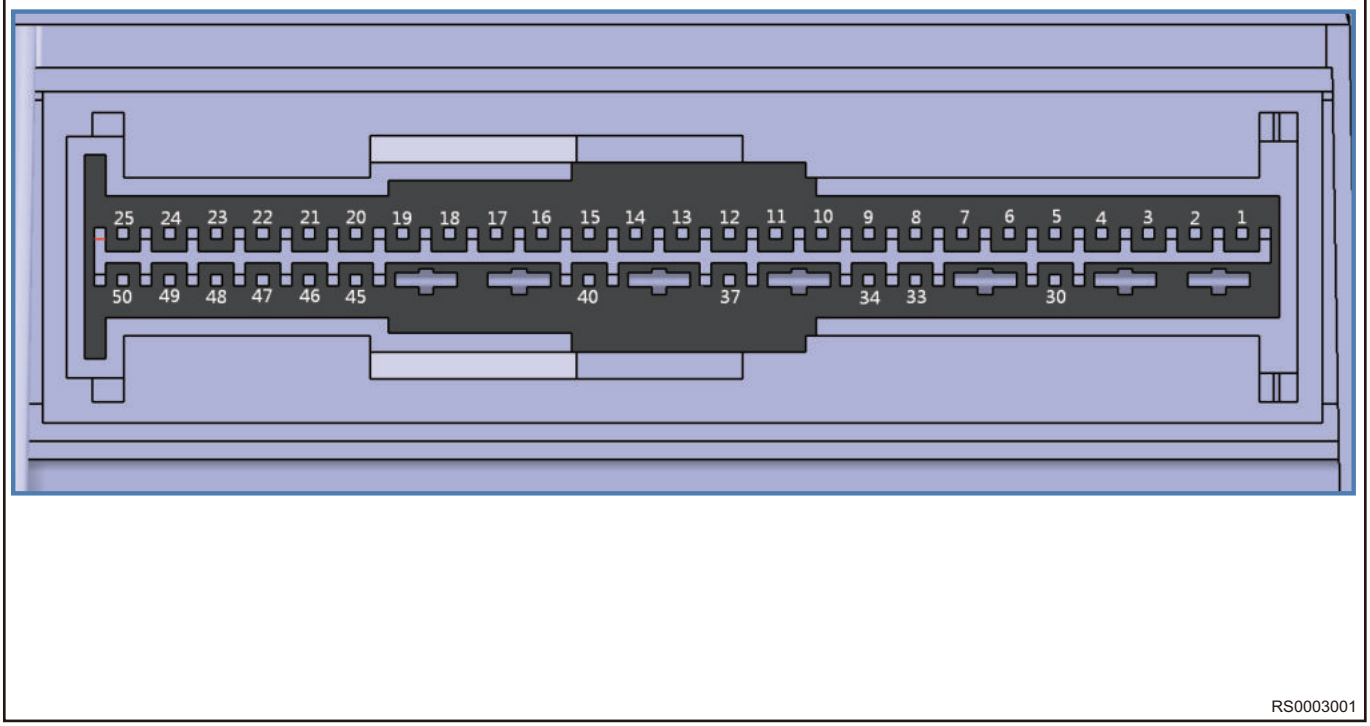
RS0005001

System Circuit Diagram

Airbag Control Schematic Diagram



Airbag Controller Connector Pin Definition



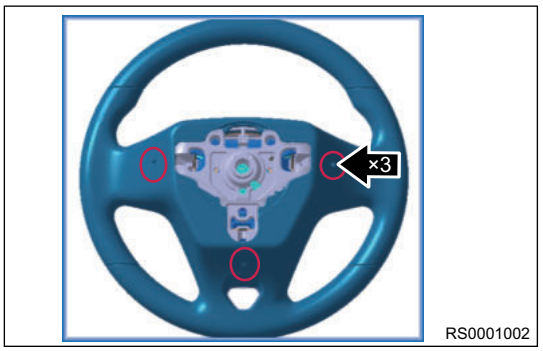
Pin	Definition	Pin	Definition	Pin	Definition
5	Power supply (input)	10	Driver airbag drive low terminal	15	CAN-H
6	Ground terminal (input)	11	Driver airbag drive high terminal	34	Collision output
7	Airbag warning light (output)	13	Front passenger airbag drive high terminal	40	CAN-L
9	Communicatio-n line K-LINE	14	Front passenger airbag drive low terminal	50	Collision output

On-vehicle Service

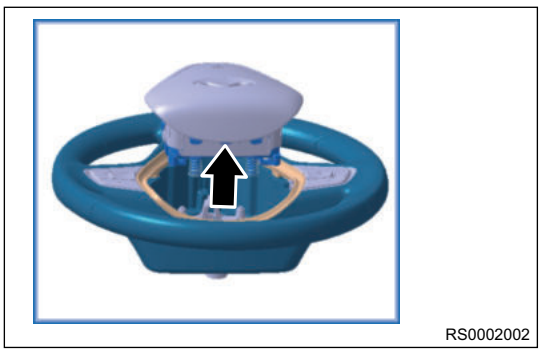
Driver Airbag

Removal

1. Using a flat tip screwdriver, pry off 3 screw hole clamping structure (arrow) respectively.



   a. Remove airbag (arrow is the direction of removal).



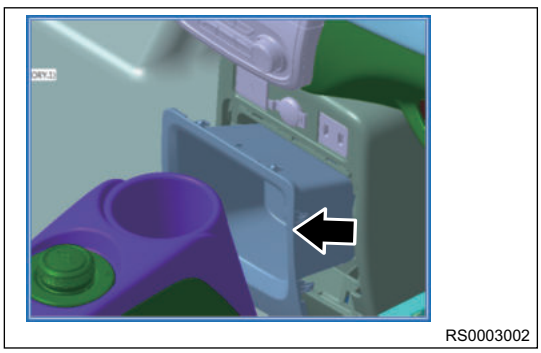
Installation

Installation is in the reverse order of removal.

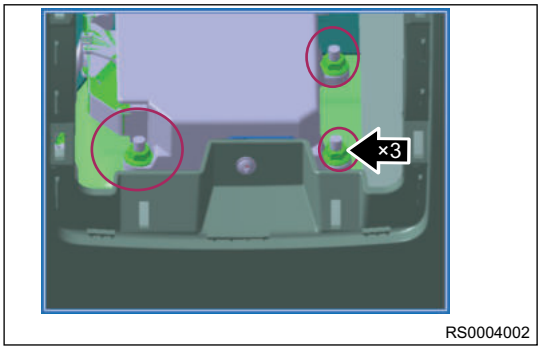
Airbag Controller

Removal

1. Remove auxiliary fascia console storage box panel (arrow is the direction of removal).



2. Unscrew 3 nuts (arrow).



3. Unplug wire harness terminal connector, and remove airbag controller.

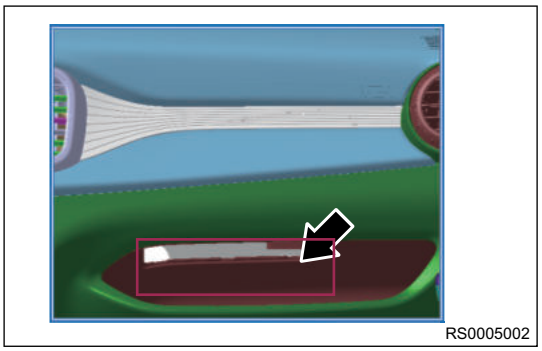
Installation

1. Installation is in the reverse order of removal.

Front Passenger Airbag

Removal

1. Remove the glove box PAB inspection and repair cover plate first (arrow is the PAB inspection and repair cover plate).



2. Unscrew front passenger airbag fixing bolt from glove box PAB inspection and repair cover plate.
3. Remove front passenger airbag from instrument panel body.

Installation

1. Installation is in the reverse order of removal.

VEHICLE SAFETY AND ANTI-THEFT

VEHICLE SAFETY AND ANTI-THEFT

System Overview

Remote Lock/Unlock

RKE Lock Performed When Following Conditions are Met with IGN OFF:

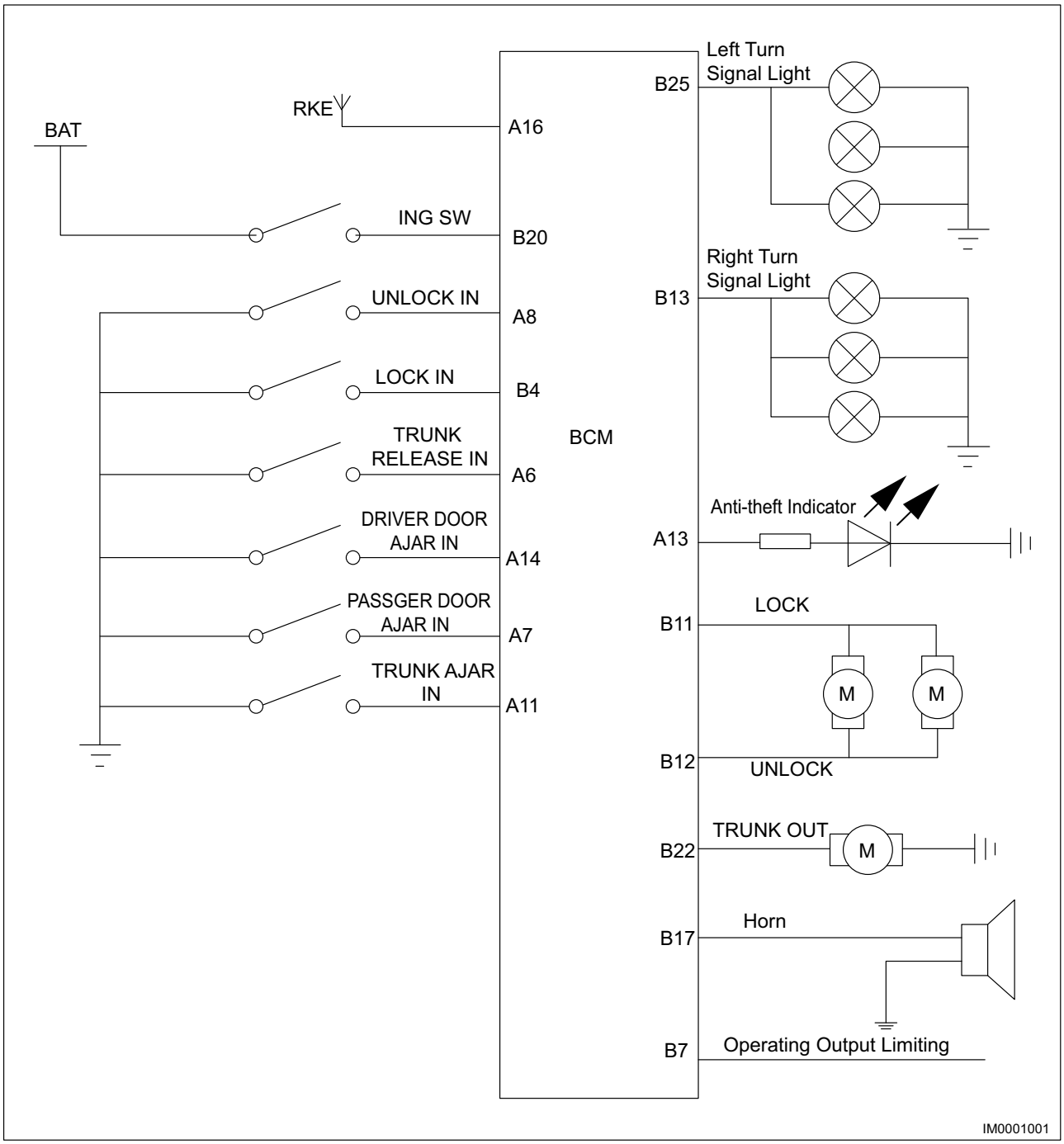
1. When all doors are closed and door locks are unlocked, the turn signal light flashes once (500 ms), lock once (200 ms), high and low pitched horn alarm once (50 ms) after receiving the RKE lock command or remote lock command.
2. When all doors are closed and door locks are locked, the turn signal light flashes once (500 ms), high and low pitched horn alarm once (50 ms) after receiving the RKE lock command or remote lock command;
3. When any door is open, the door lock locks and then unlock, the turn signal light flashes twice (ON (500 ms) → OFF (1,500 ms) → ON (500 ms)) after receiving the RKE lock command or remote lock command.

RKE Unlock Performed When Following Conditions are Met with IGN OFF:

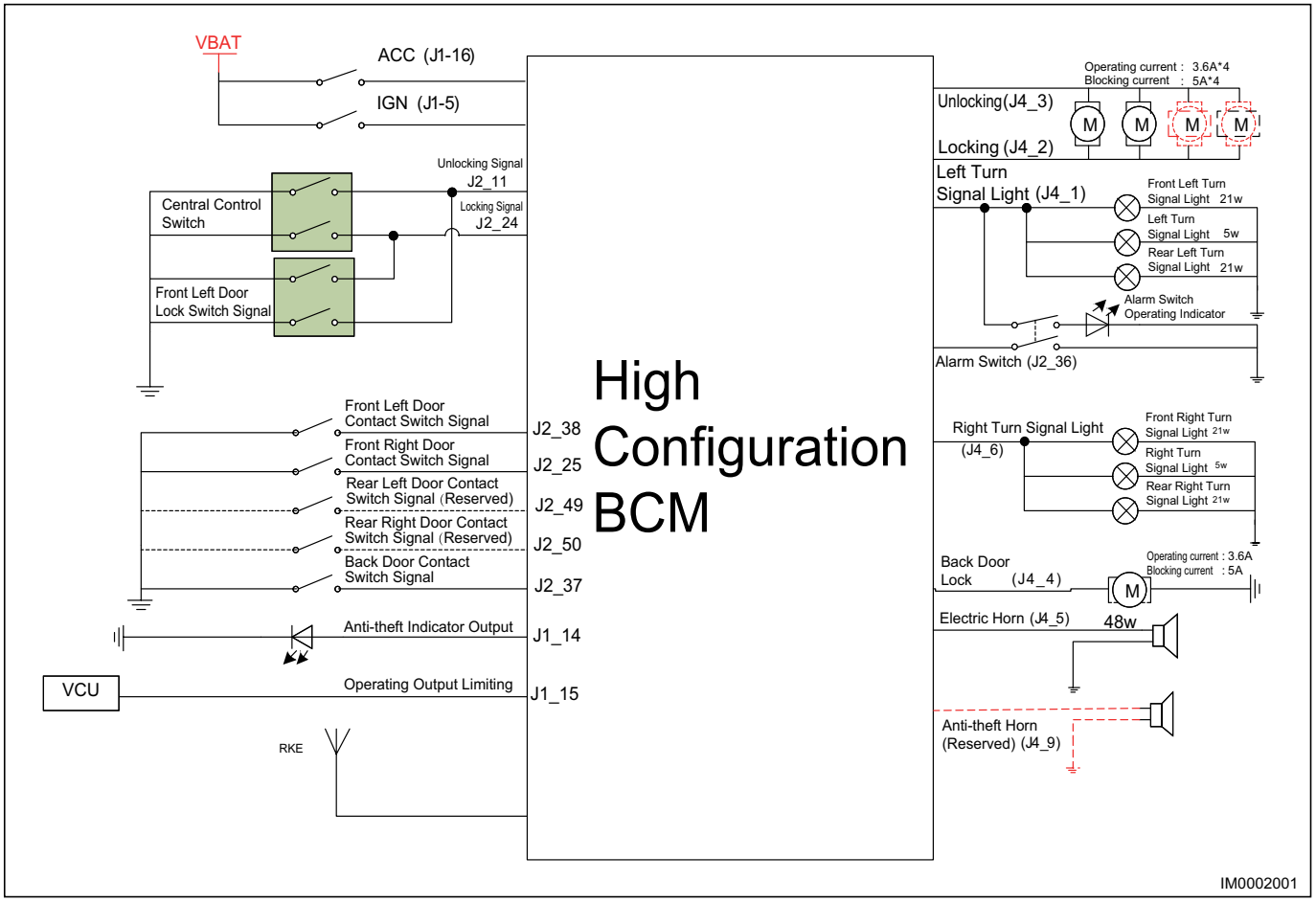
1. When door is locked, the turn signal light flashes twice (ON (500 ms) → OFF (500 ms) → ON (500 ms)) after receiving the RKE unlock command or remote unlock command;
2. When door is unlocked, the turn signal light flashes twice (ON (500 ms) → OFF (500 ms) → ON (500 ms)) after receiving the RKE unlock command or remote unlock command.

Control Schematic Diagram

Comfort Model



Lease Model, Luxury Model



Vehicle Safety

Mode Description

- Arming Mode: Vehicle enters arming state when driver press the arming button.
- Disarming Mode: Driver releases the vehicle anti-theft.
- Intrusion Mode: Vehicle intrusion alarm is detected.
- Disable Intrusion Mode: Turn off the alarm of vehicle.
- Arming Fault Mode: Vehicle cannot be armed.
  Back door open mode.

Arming Mode

1. Enter arming mode when all the following conditions are met.
   - IGN = OFF.
   - All doors are closed, back door is closed.
   - Successfully locked by key.
2. Sound and light alarm feedback is as follows when arming mode is entered:
   - Anti-theft indicator flashes at a frequency of 0.5 Hz (100 ms ON, 900 ms OFF).
   - Turn signal light flashes once (500 ms ON).
   - Electric horn alarms once (50 ms).

Disarming Mode

1. Enter disarming mode when receiving remote unlock command. After disarming, if all doors and luggage compartment are not opened, the vehicle will re-enter arming state after 28 seconds, but the window auto up function does not operate.

Intrusion Mode

1. In arming state, when any door, luggage compartment is opened or POWER switch is turned to ON, an alarm will be triggered, and the alarm form is as follows.
   - The alarm and flasher will work continuously for 28 seconds, then the alarm and flasher must be turned off at the same time.
   - BCM outputs vehicle operation limit signal (high level is effective).
2. In alarm state, it is detected that all doors, luggage compartment are closed and POWER switch is turned to OFF, and it will enter arming state and stop outputting the vehicle operation limit signal immediately after the alarm cycle ends (after 28 seconds); if any door, luggage compartment is open or POWER switch is turned to ON, the alarm will trigger again.
3. If the intrusion condition remains unchanged, the alarm will continue for 10 cycles, with a 2 seconds pause after each cycle. During the cycle, BCM continuously outputs vehicle operation limit signal.
4. After 10 alarm cycles, the vehicle detects the status of all doors, luggage compartment and POWER switch. If all doors, luggage compartment are closed and POWER switch is turned to OFF, the vehicle enters arming state and stops outputting vehicle operation limit signal; while waiting for T1, BCM continuously outputs vehicle operation limit signal.

Disable Intrusion Mode

In intrusion mode, perform the following operations will disable the intrusion mode:

1. Disable intrusion mode caused by door opening, control logic is as follows:
   - Press remote unlock/Lock button
   - In intrusion alarm mode, if the door is open, press remote unlock button, release alarm and meanwhile all doors are unlocked, enter disarming mode and stop outputting vehicle operation limit signal; press remote lock button, release alarm and meanwhile enter arming fault mode and stop outputting vehicle operation limit signal.
   - In intrusion alarm mode, if the door is closed, press remote unlock button, release alarm, stop outputting vehicle operation limit signal, and meanwhile enter disarming and re-arming mode; press remote lock button, release alarm, stop outputting vehicle operation limit signal, and meanwhile enter arming mode.
2. The method for disable intrusion mode caused by turning POWER switch to ON is as follows:
   - Turn POWER switch to OFF, press remote lock button, release alarm, stop outputting vehicle operation limit signal, and enter arming mode.
   - Turn POWER switch to OFF, press remote unlock button, release intrusion alarm, stop outputting vehicle operation limit signal, enter disarming mode, and vehicle will enter re-arming status.

Arming Fault Mode

If the door and luggage compartment are not fully closed, arming fault flasher will be activated, and vehicle cannot be armed at this time.

Back Door Open Mode

1. In IGN OFF and arming mode, the back door open mode is activated within 30 seconds after pressing the remote control key back door unlock button, and the left and right turn signal lights illuminate for 1 second when the remote control key back door unlock button is pressed. Open the back door in back door open mode and no alarm is triggered.
   a. If the following conditions are met, it will exit back door open mode and enter arming state.
      - Back door is not opened within 30 seconds, and 30-second timer ends.
      - Open the back door within 30 seconds, and then close the back door.
      - Press remote lock button.

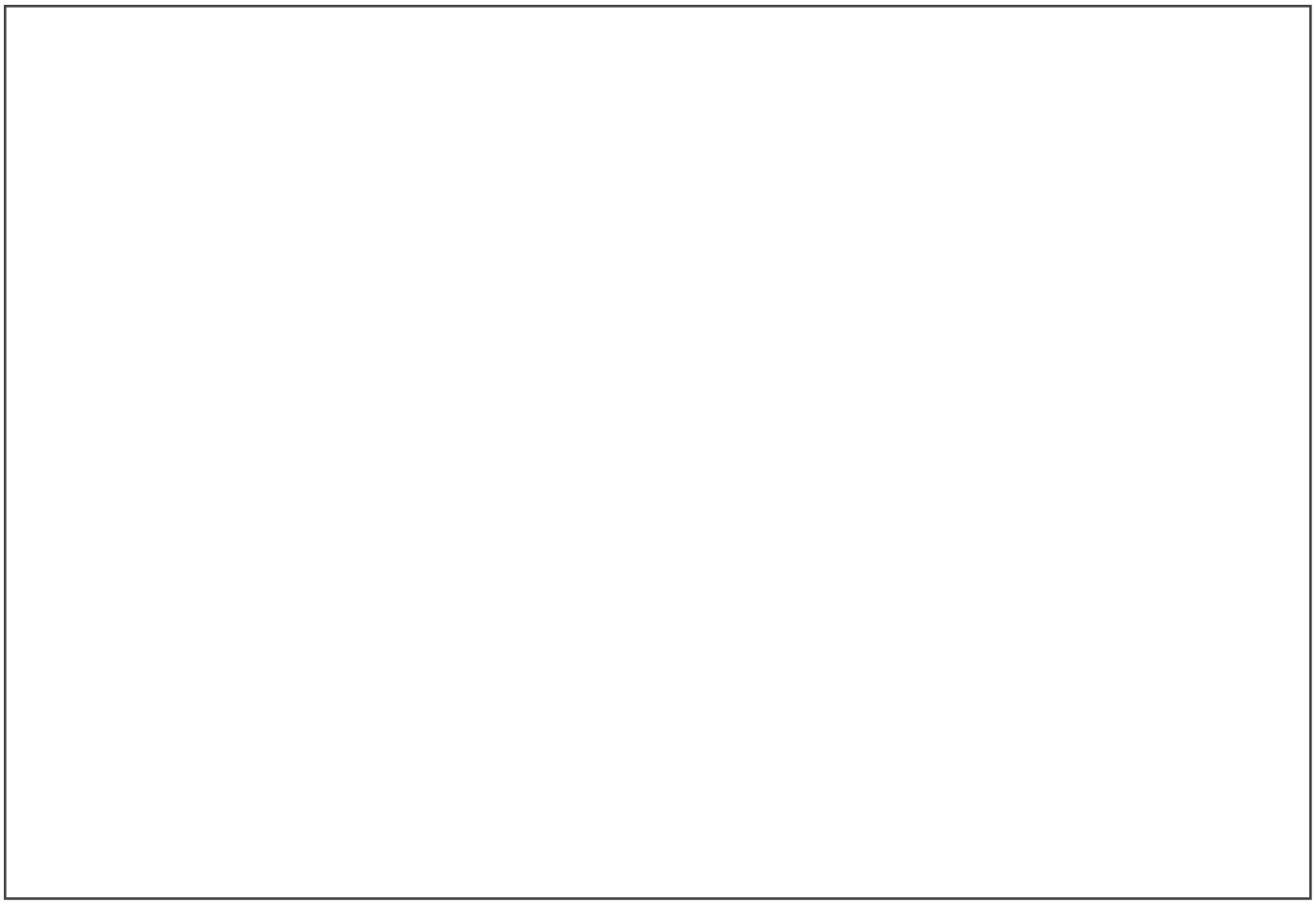
Re-arming Definition

1. The re-arming requires that the following operations cannot be performed after remote disarming.
   - Open any door.
   - Open luggage compartment.
   - IGN is ON.
   - Press remote lock.
2. The re-arming can only occur after remote arming or when remote disarming is used during the alarm. Re-arming period: 28 ± 2 s.

Supplementary Anti-theft Function

BCM should not be re-armed after power off, and should remain in the state before power off when power is restored.

Anti-theft Remote Controller Matching



1. When matching, connect diagnostic tester, select corresponding model and enter “PEPS (Passive Entry/Start System)”, select “Special Operation” → select “Key Learning”.

   Prompt on diagnostic tester:
   - “Please input 17 - digit VIN code”.
   - “Place the first vehicle key on the cup holder with the "Key" mark, and place the other key or wristbands 50 cm away from here”.
2. After the learning is completed, it will prompt to put in the second key or wristband, and place the first key 50 cm away from here.

   After the matching is completed, the diagnostic tool prompts:
   - Matching is finished: Number of matched remote keys: XX.

- At this time, press the lock/unlock button of the matching remote controller or key to observe whether the vehicle door lock operates. If it does, the matching is successful.

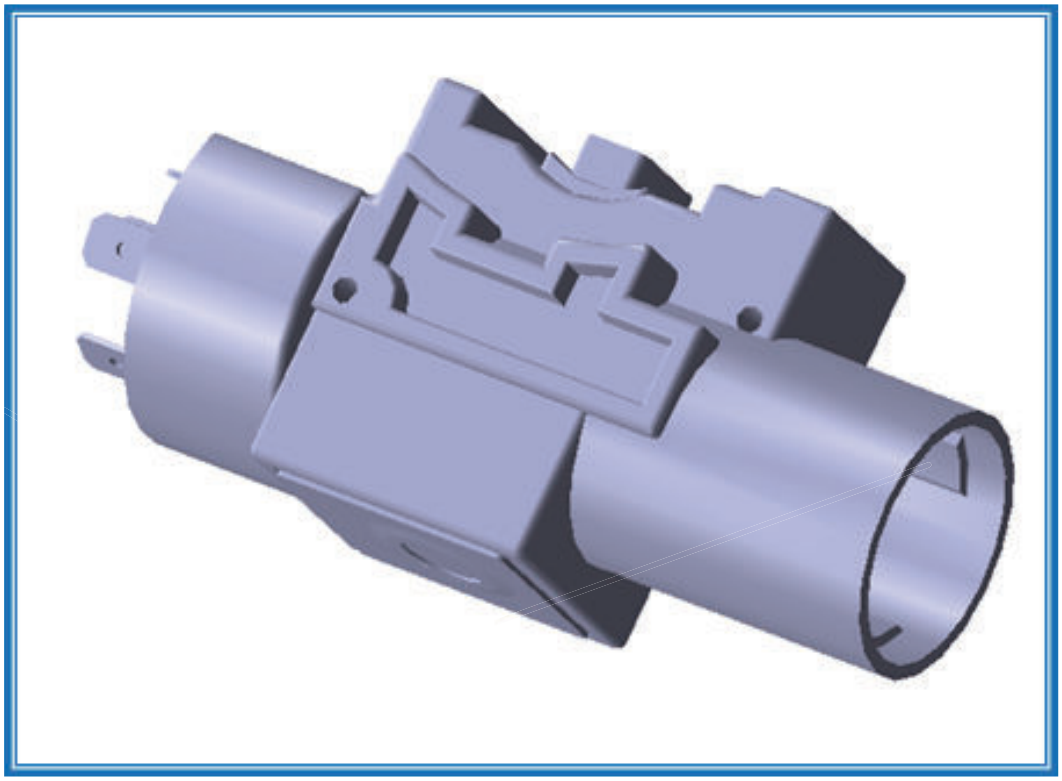
POWER SWITCH

POWER SWITCH

System Overview

POWER Switch

The POWER switch is installed on the steering column to lock and unlock the steering column, anti-theft the steering column and to control the state of vehicle power supply.



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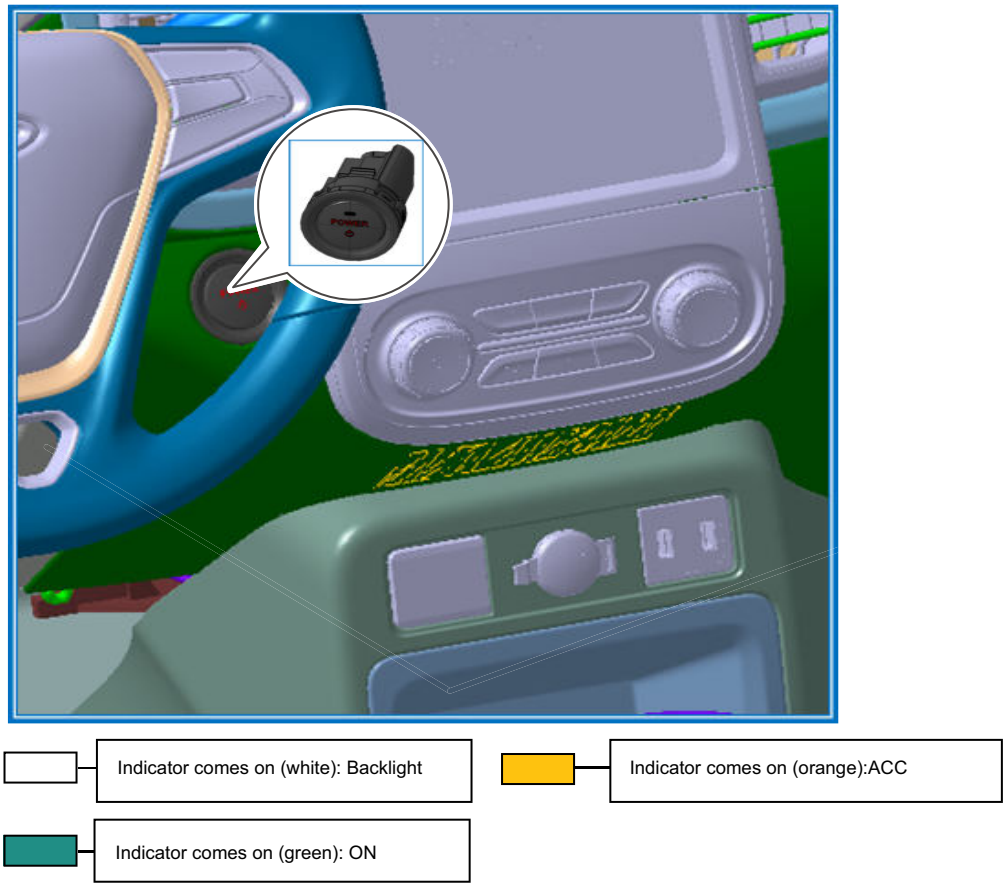
POWER Switch



POWER switch is installed in a prominent position on instrument cluster, providing the BCM controller with the transition of vehicle power supply state and the input signal controlled by VCU.

POWER Switch Function Description

- In remote fortifying deactivation, ACC = ON, IGN = OFF state for more than 30 minutes. The state will change to ACC = OFF, IGN = OFF.
- In remote fortifying deactivation, ACC = ON, IGN = OFF state, depress brake and press POWER switch; in ACC = ON, IGN = ON state, detect that the gear position is in N, send START signal, and enters into start motor state. If it is detected that the gear position is not in N, the state is ACC = ON, IGN = ON, the motor does not start.
- In remote fortifying deactivation, ACC = OFF, IGN = OFF state, press POWER switch without depressing brake pedal, and the state is change to ACC = ON, IGN = OFF. Press POWER switch when depressing brake pedal, the state is ACC = ON, IGN = ON; it is detected that the gear position is in N, the state is start motor; if it is not in N, the state keeps in ACC = ON, IGN = ON.
- In remote fortifying deactivation, ACC = ON, IGN = ON, motor running state, press POWER switch if vehicle speed is less than 5 km/h and gear position is not in N, and the state is changed to ACC = ON, IGN = OFF.
- In remote fortifying deactivation, ACC = ON, IGN = ON, motor running state, perform emergency shutdown if vehicle speed is more than 5 km/h, and the state is changed to ACC = ON, IGN = OFF.
- In remote fortifying deactivation, ACC = ON, IGN = ON, motor running state, press POWER switch if vehicle speed is less than 5 km/h and gear position is in N, and the state is changed to ACC = OFF, IGN = OFF.

Note

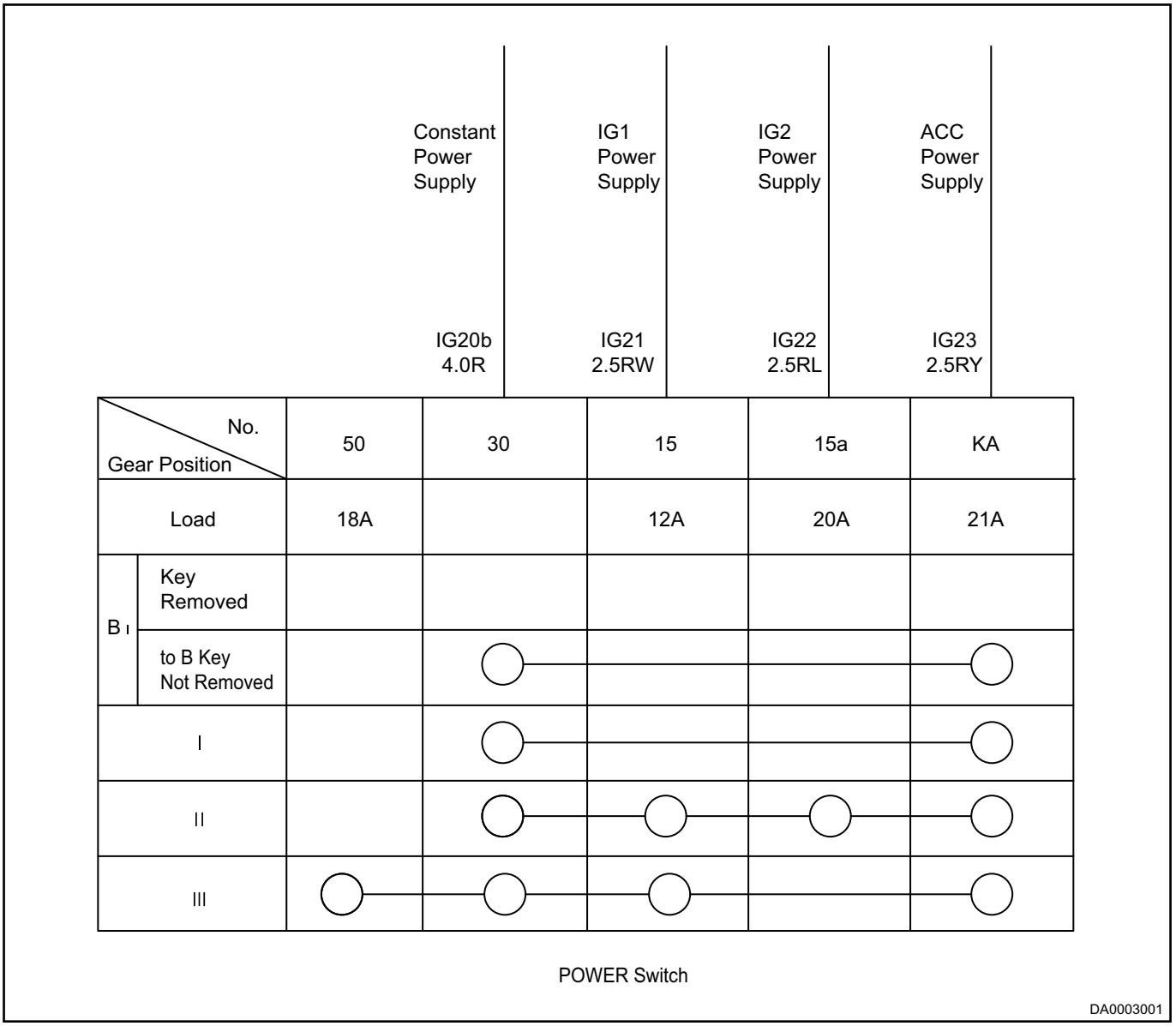
1. Gear position signal can only be detected by hard wire in IGN position.

2. When returning from ON/Start position to OFF, the vehicle speed must be less than 5 Km/h; if the vehicle speed is more than 5 Km/h in ON/Start position, continue to stay in ON (except for emergency shutdown).
3. Important: Conditions for stopping the motor while driving: Press the button three times within 3 seconds (emergency stop function).

System Circuit Diagram

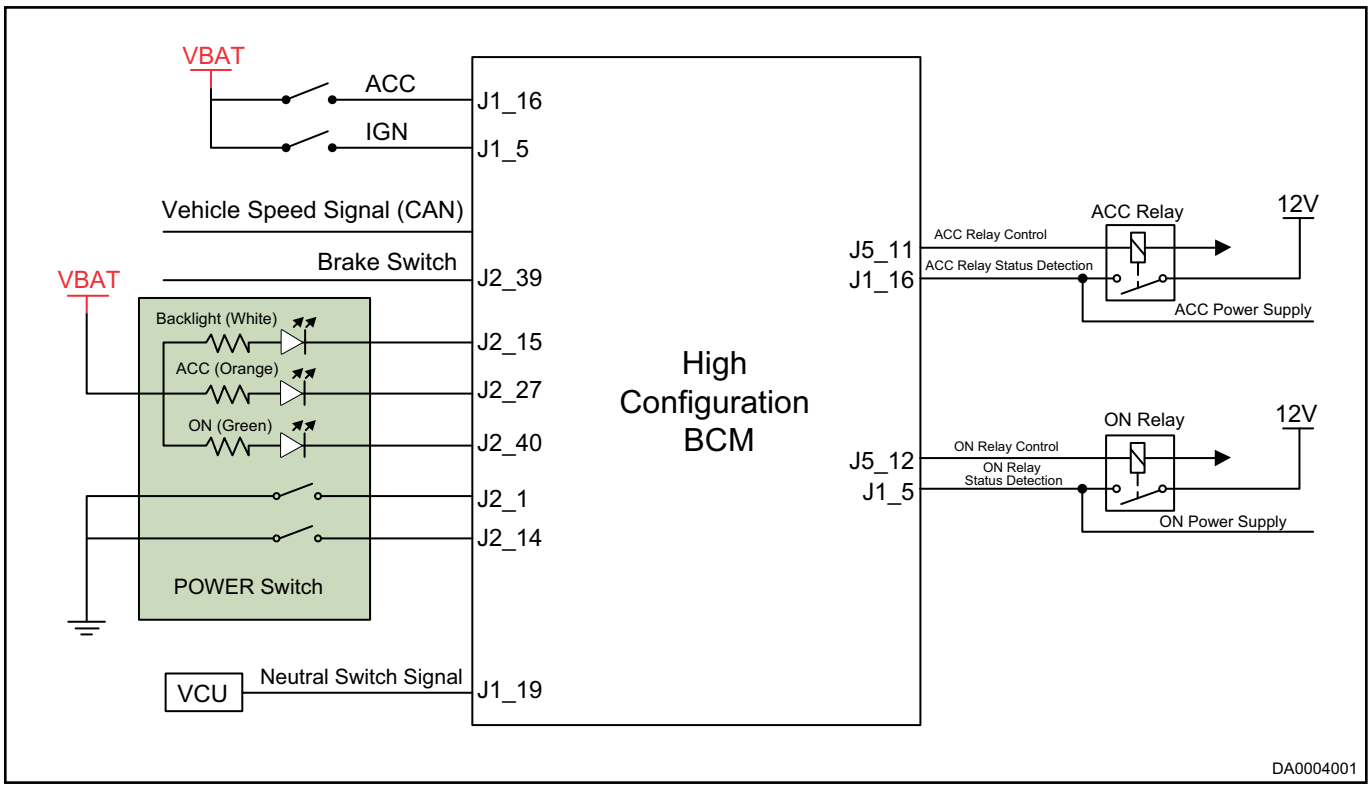
Control Principle and Connector Pin Definition

POWER Switch

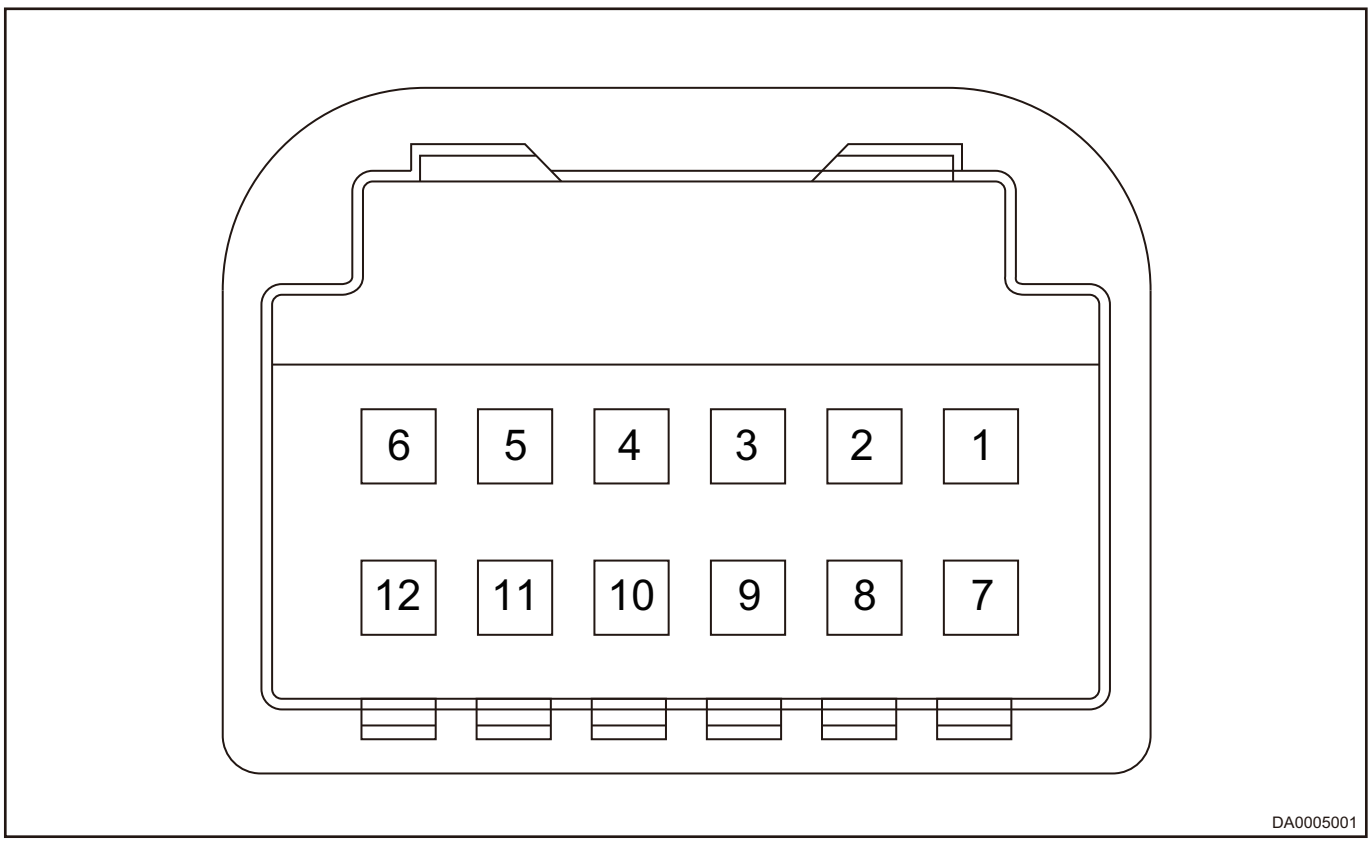


POWER Switch has four gear positions: LOCK ← ACC ← ON ← START. In LOCK position, the locking tab pops out to lock the steering column and prevent from rotation, and in other positions, the locking tab is retracted, and the steering column can be rotated. After releasing from START position, the key will automatically return to ON position. If you want to change from ACC to LOCK, you need to press the switch and then turn to LOCK position.

POWER Switch



POWER Switch Pin Definition



No.	Definition
1	POWER Switch Power Supply ACC Indicator

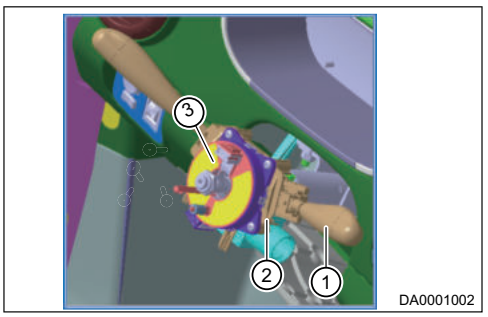
2	POWER Switch Power Supply ON Indicator
3	POWER Switch Background Indicator
4	POWER Switch Signal (to BCM)
5	GND
6	-
7	-
8	GND
9	POWER Switch Signal (to BCM)
10	-
11	-
12	Power Supply

On-vehicle Service

POWER Switch

Removal

1. Turn off all electrical equipment and POWER switch, and remove battery negative terminal.
2. Remove the driver airbag.
3. Remove the steering wheel.
4. Remove the combination switch upper and lower cover.
5. Remove the spiral cable and combination switch.
6. Unplug the POWER switch connector, cut off the fixing bolt of the lock with a hacksaw, and remove the POWER switch lock body (1 is the combination switch, 2 is the POWER switch, 3 is the spiral cable).



Installation

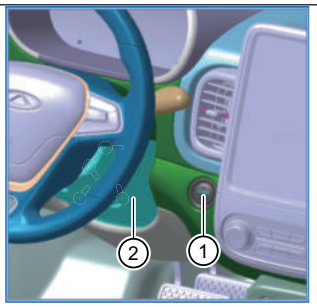
1. Installation is in the reverse order of removal.

POWER Switch

Removal

1. Remove the lower left protector.
2. Disconnect the connector.

3. Press the switch clip, remove POWER switch (1 is the ignition switch, 2 is the lower left protector).



Installation

1. Installation is in the reverse order of removal.

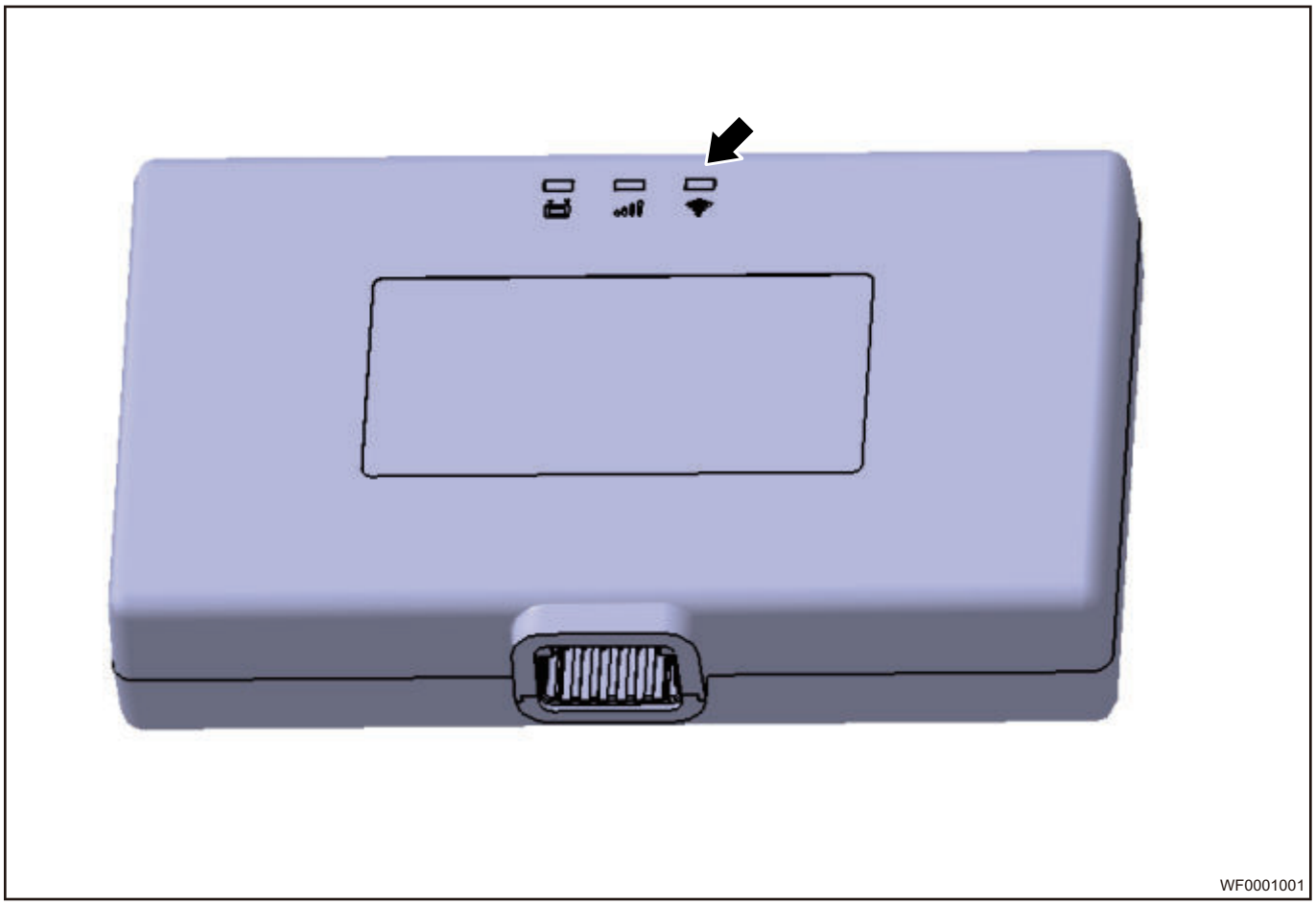
WIFI MODULE

WIFI MODULE

System Overview

System Description

Its main function is to provide Internet access services for the no disc DVD in the vehicle and the user's mobile devices (mobile phones, tablet computers, notebook computers, etc.), to ensure that the above devices can enjoy network services normally (the arrow is the Wifi module three-color indicator of fixture status).

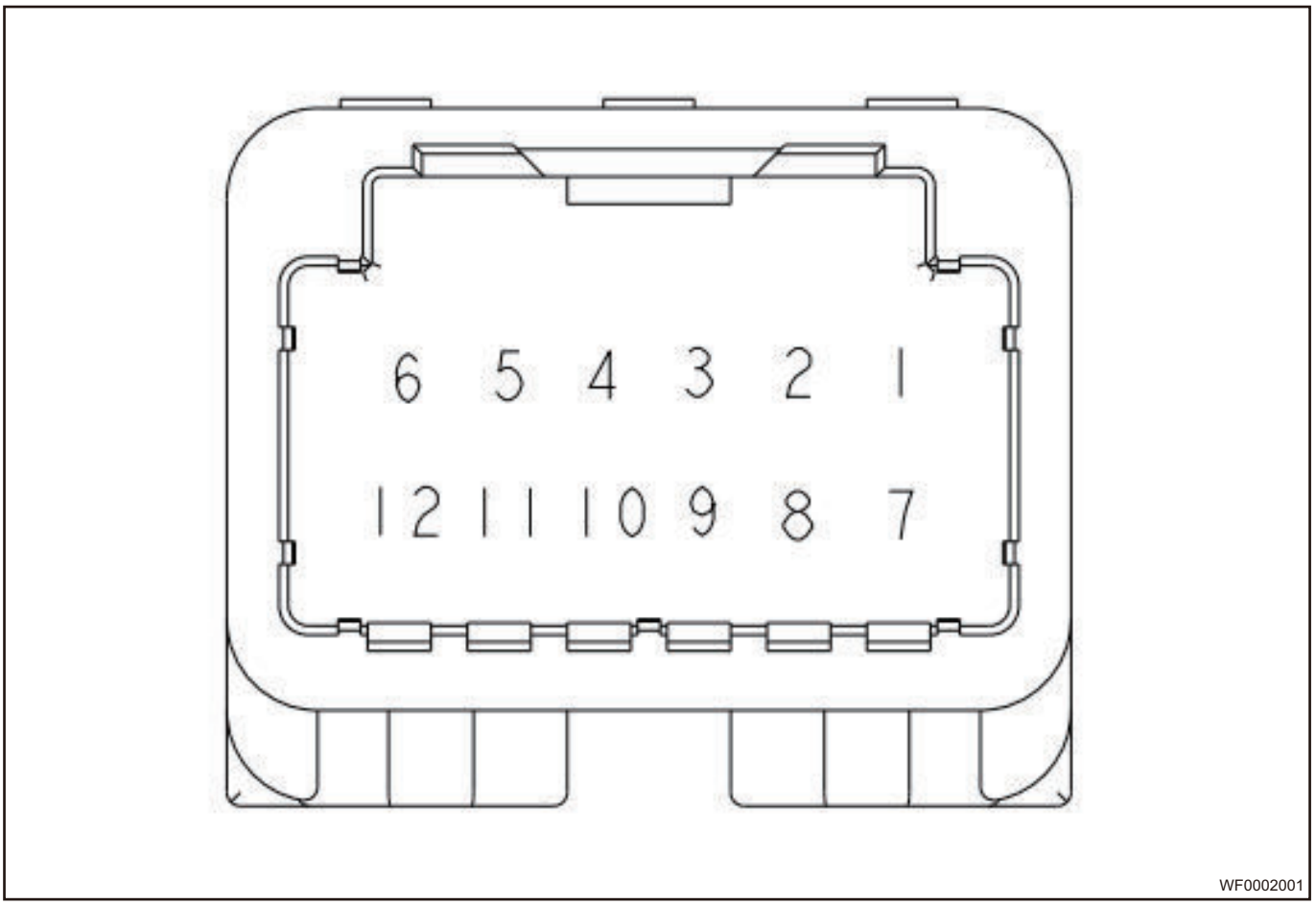


WF0001001

System Circuit Diagram

Module Terminal Definition

Signal Connector Pin Definition



2x6P Connector Tyco TE 1318772

Pin	Functional Definition	Current Requirements	Note
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	VBAT -	1A	-
7	-	-	-
8	-	-	-
9	-	-	-
10	-	-	-

11	ACC	17 mA	-
12	VBAT +	1A	-

Diagnosis & Test

Wifi Malfunction Detection and Common Troubleshooting

Wifi Module Failures Can be Divided into Two Categories

- Wifi head unit failure.
- Network service failure.

Diagnosis Procedure

1. Check if positive and negative output wire harnesses are connected properly to connector, if there is loose short circuit.
2. Turn the digital multimeter to the DC voltage band, the red probe is connected to the positive terminal of wire harness terminal connector, and the black probe is connected to the negative terminal of wire harness terminal connector. When the digital multimeter shows that the voltage is 12 V ± 0.5, the power supply is normal. If there is no voltage display or voltage display is 16 V or higher or 9 V or lower, the vehicle power supply is abnormal.
3. If the power supply is normal, check the operating status indicator of Wifi module. The red light represents the power supply, the blue light represents the 1G signal, and the green light represents the Wifi signal.
4. The red light remains on indicates that the Wifi module circuit operates normally, and the red light flashes indicates that the Wifi module circuit operates abnormally. Please replace it.
5. The blue light remains on indicates that the 1G network service of Wifi module is normal, the blue light flashes indicates that there is no network service. Please check if the Wifi module is activated, if the no disc DVD in vehicle is connected to Wifi module, and if the network service has expired. If there is no problem with the above, please replace it.
6. The green light remains on indicates that the hot spot service of Wifi module is normal. Check if the blue light operates normally when green light is off. If the blue light flashes indicates that there is no network service for hot spot, the green light flashes indicates that the hot spot service of Wifi module malfunction at this time, please replace it.

On-vehicle Service

Tools

Tools
One set of ratchet socket, a torque wrench, multimeter.

Protective Equipment
Cotton gloves, insulating gloves, working clothes, working shoes.

Wifi Module Removal Methods

Removal Methods

⚠

- Be sure to wear necessary safety equipment to prevent accidents.
- Please make sure that the vehicle is powered off before removal or installation to avoid accidents.

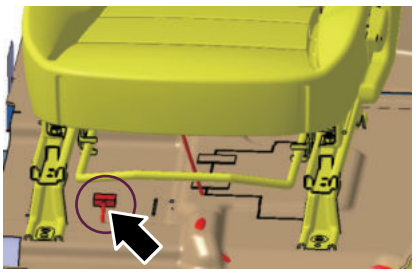
1. Unplug the wire harness terminal connector of Wifi module. There is a magical stick on Wifi module, its fixing method is to stick it on the carpet, and separate Wifi module from the carpet with appropriate force.

Installation and Removal of Wifi Module

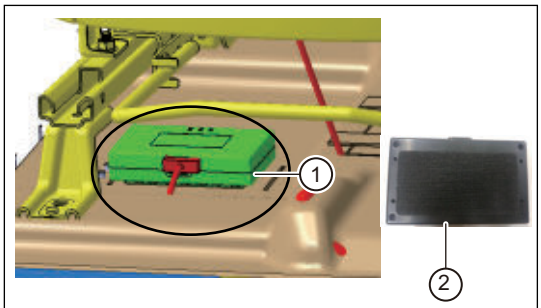
Item	Name	Part No.	Quantity	Tightening Torque	Note
1	Wifi Module	J72－7911073FA	1	/	/

Installation of Wifi Module

1. Move the driver seat to the rearmost position, then adjust the seat to the highest position.
2. Pull out the wire harness (as indicated by the arrow) from under the driver seat.


WF0001002

3. Firmly connect the Wifi module wire harness connector with the product end connector.
4. Paste the Wifi module surface with magical stick (as shown in 2) on the carpet under the driver seat (direction as shown in 1).



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Removal

1. Move the driver seat to the rearmost position, then adjust the seat to the highest position.
2. Disconnect the connector connected to the Wifi module.
3. Separate the magical stick part of Wifi module from the carpet and remove Wifi module.

Binding Operation between Wifi Module and No Disc DVD

1. After the Wifi module is installed, turn the POWER switch to ON and wait for about 20 seconds.
2. During the waiting period, find the manual of Wifi module in the glove box and find the default name of Wifi module on the manual homepage for backup.
3. After waiting for 20 seconds, Wifi module has been started, open the wireless network of no disc DVD and search to connect this Wifi module. After the connection is completed, open online services such as online music or online map, online music or online map can be played or refreshed in real time, Internet function is normal.
4. Disconnect the connection between no disc DVD and Wifi module. After the disconnection is successful, connect the mobile phone to the hot spot. If the mobile phone cannot access the Internet, turn on the no disc DVD wireless network again to connect it to the vehicle Wifi module and wait for about 5 seconds. After that, the mobile phone restores the unlimited Internet access function (the

mobile phone cannot be disconnected from vehicle Wifi module), and the binding is completed and operates normally.

提示：
Before the binding of Wifi module is completed, Wifi module cannot be connected by the no disc DVD in other Chery new energy models, otherwise it will cause equipment failure. In addition, if the Wifi device name, ICCID and SIM card number in the manual are inconsistent with the Wifi device name, ICCID and SIM card number on Wifi module label, the name, ICCID and SIM card number on Wifi module label shall prevail.

Wifi Module Activation Operation

Please open the webpage on the notebook computer, enter "active.cherynev.simbalink.cn" (the activation website and activation method should be kept strictly confidential by the after-sales personnel), enter the "-ICCID code" of Wifi module on the activation page, and click activate to complete the activation operation of Wifi module.

Wifi Module Replacement During Warranty Period

Please open the webpage on the notebook computer, enter "active.cherynev.simbalink.cn", enter the "-ICCID code" of the spare part of Wifi module on the activation page, and click activate. At this time, an interface will pop up, asking you to enter the "ICCID code" of the faulty part of vehicle Wifi module, and click activate to complete the activation operation of Wifi module.

Wifi Module Malfunction Prompt:

1. Red light - power supply indicator: The red light remains on when power on; if the power supply light is abnormal, please replace it.
2. Green light - Wifi indicator When Wifi hot spot is on, it operates normally, and the green light remains on; when Wifi hot spot is off, the green light is off; when Wifi is abnormal, the green light flashes (on for 100 ms, off for 100 ms); if the green light is abnormal, please replace it.
3. Blue light - network indicator: When network is normal, the blue light remains on; when there is no network service, the blue light is off; when the network is limited, the blue light flashes (on for 1 s and off for 1 s); the module is abnormal/no card, etc. (quick flashing, on for 100 ms, off for 100 ms). If this module is faulty, please replace it.

LIGHTING SYSTEM

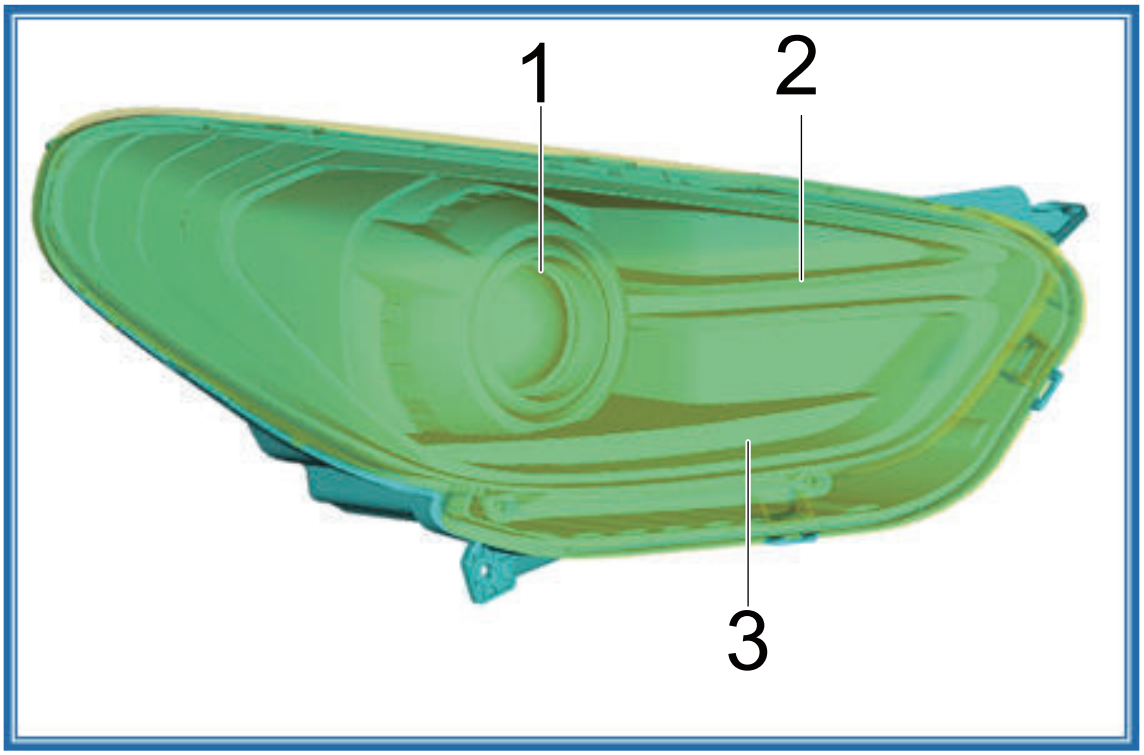
LIGHTING SYSTEM

System Overview

System Composition

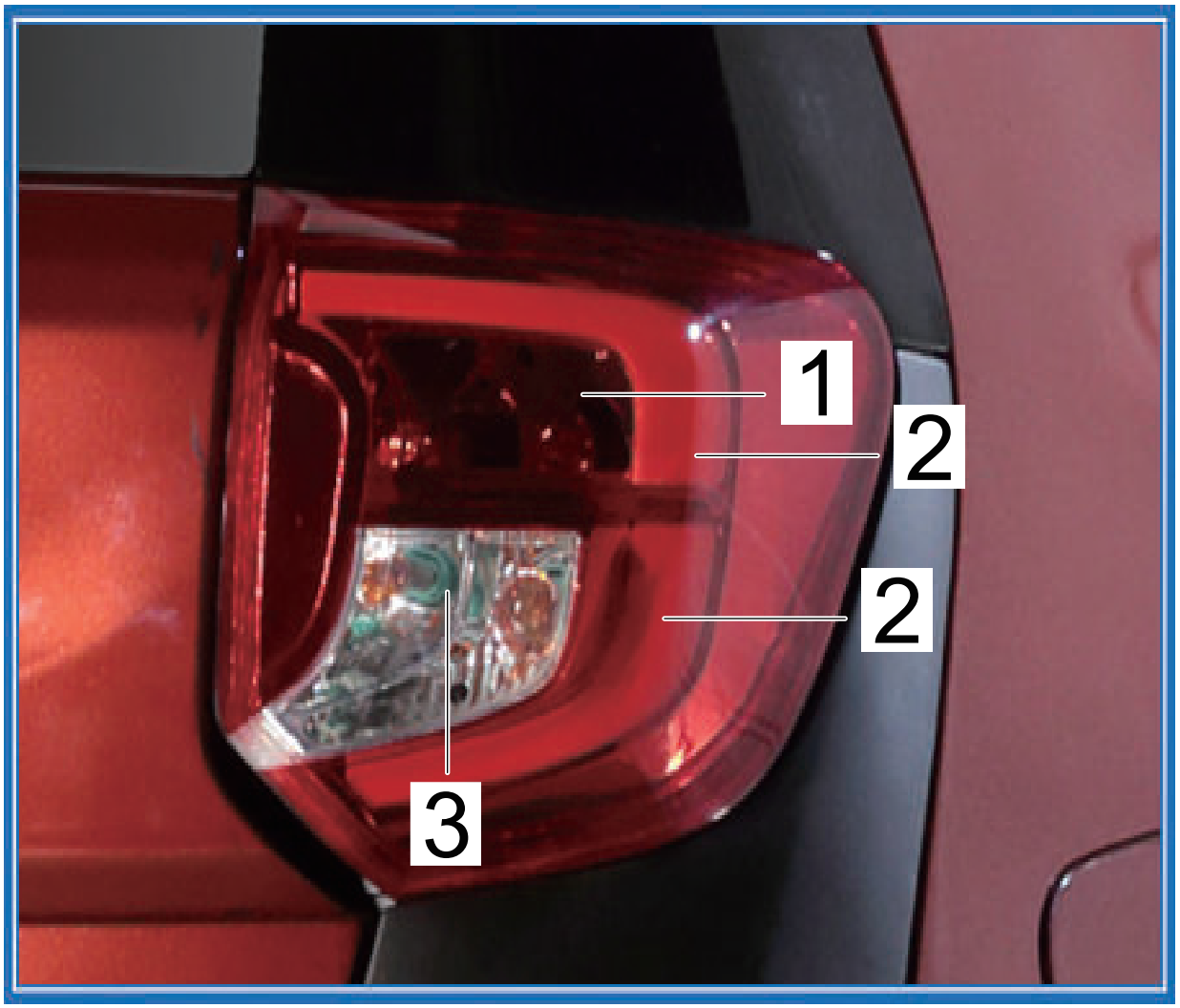
LI0002001

1	Interior Dome Light	2	Side Turn Signal Light (Luxury)
3	Side Turn Signal Light (Comfort, Rental)	4	Headlight
5	Front Fog Light (Luxury)	6	High Mounted Stop Light
7	Rear Combination Light	8	License Plate Light
9	Back-up Light and Retro-reflector	10	Rear Fog Light and Retro-reflector



LI0003001

1	High/Low Beam Light	2	Turn Signal Light
3	Position Light		

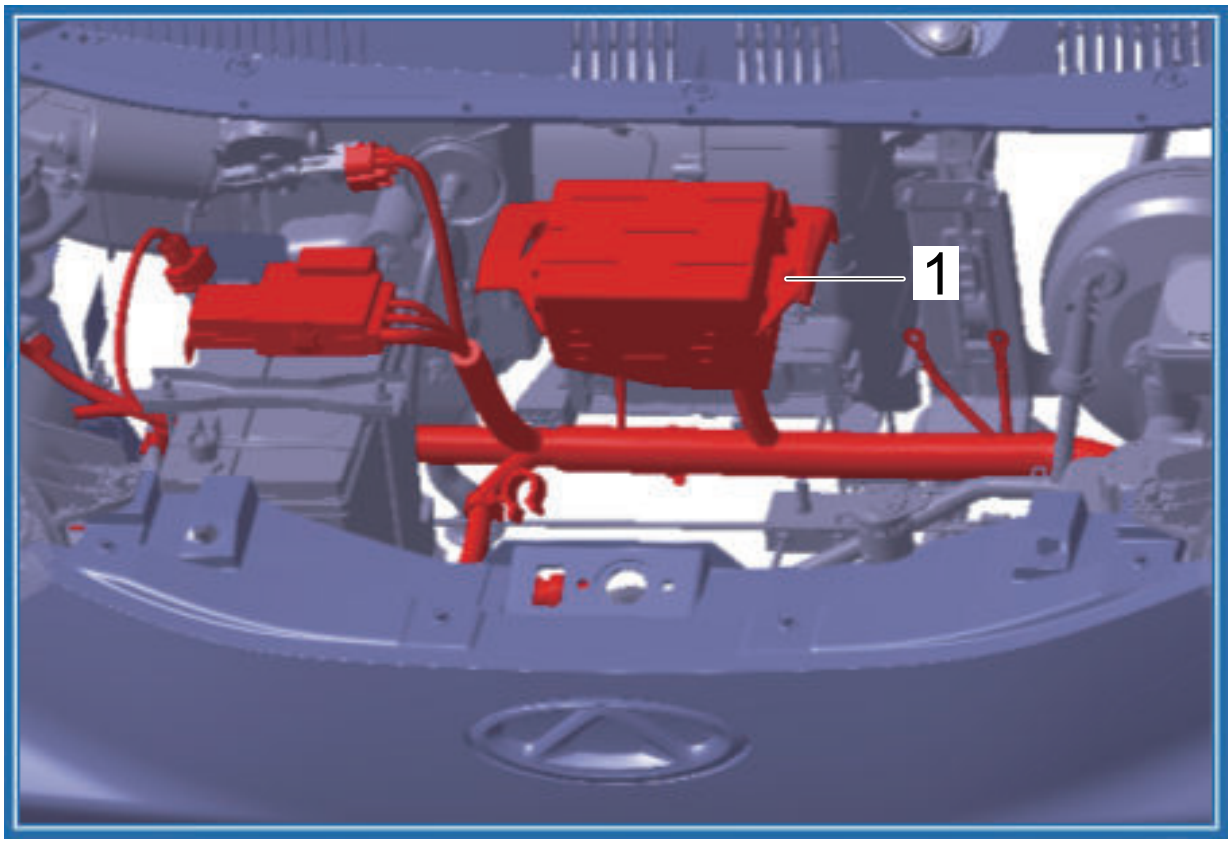


LI0004001

1	Brake Light	2	Position Light
3	Turn Signal Light		

Main Components Related to Lighting System

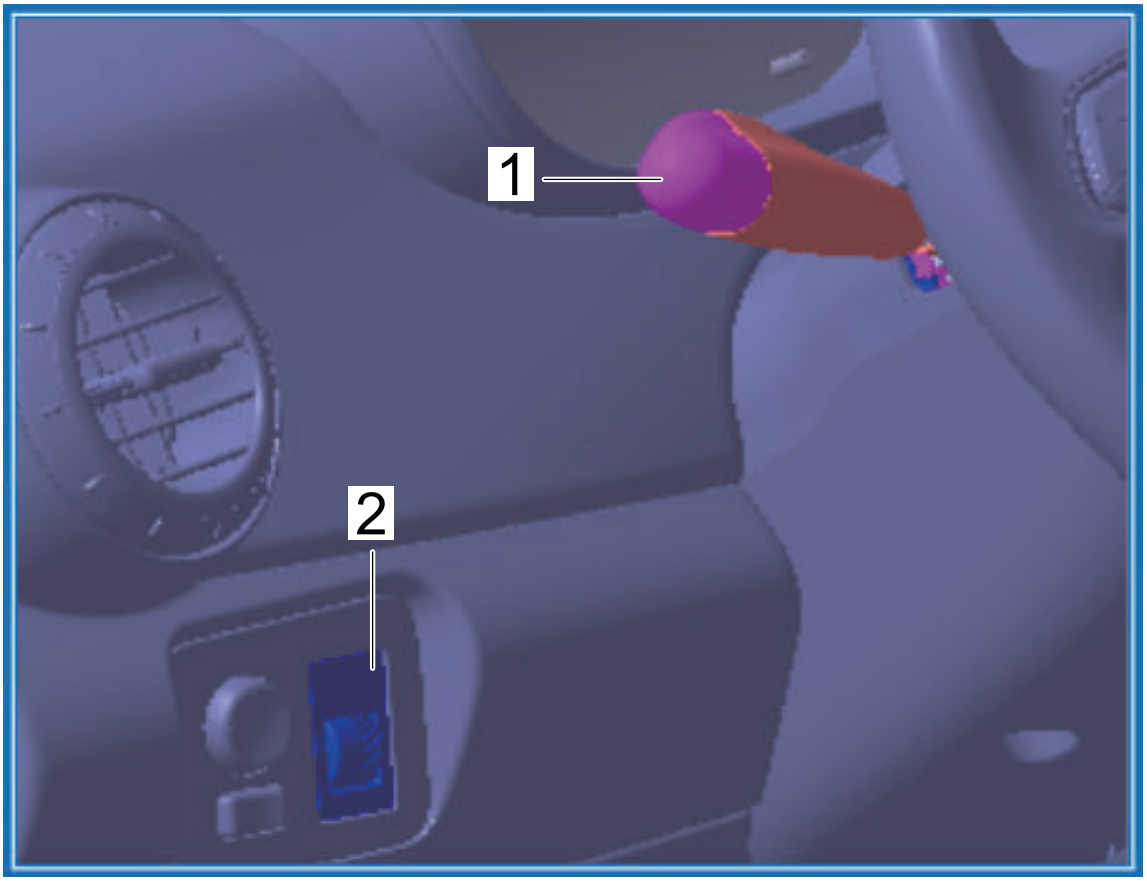
Engine Compartment Fuse and Relay Box



LI0005001

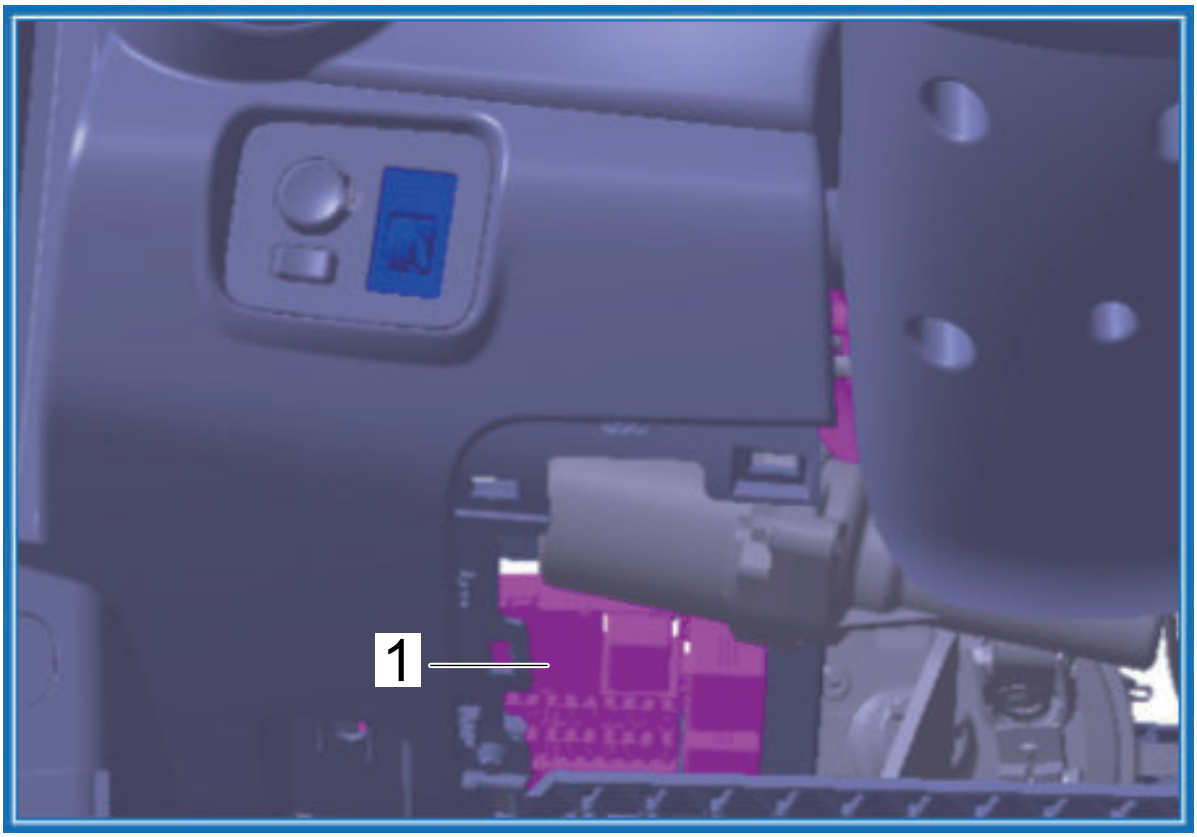
1	Engine Compartment Fuse and Relay Box		

Light Switch



1	Light Switch	2	Headlight Leveling Switch

Interior Fuse Box



LI0007001

1	Interior Fuse Box		

Interior Dome Light Assembly and Hazard Warning Light Switch

1	Interior Dome Light Assembly	2	Hazard Warning Light Switch

Door Contact Switch

LI0009001

Summary of Functional and Technical Requirements

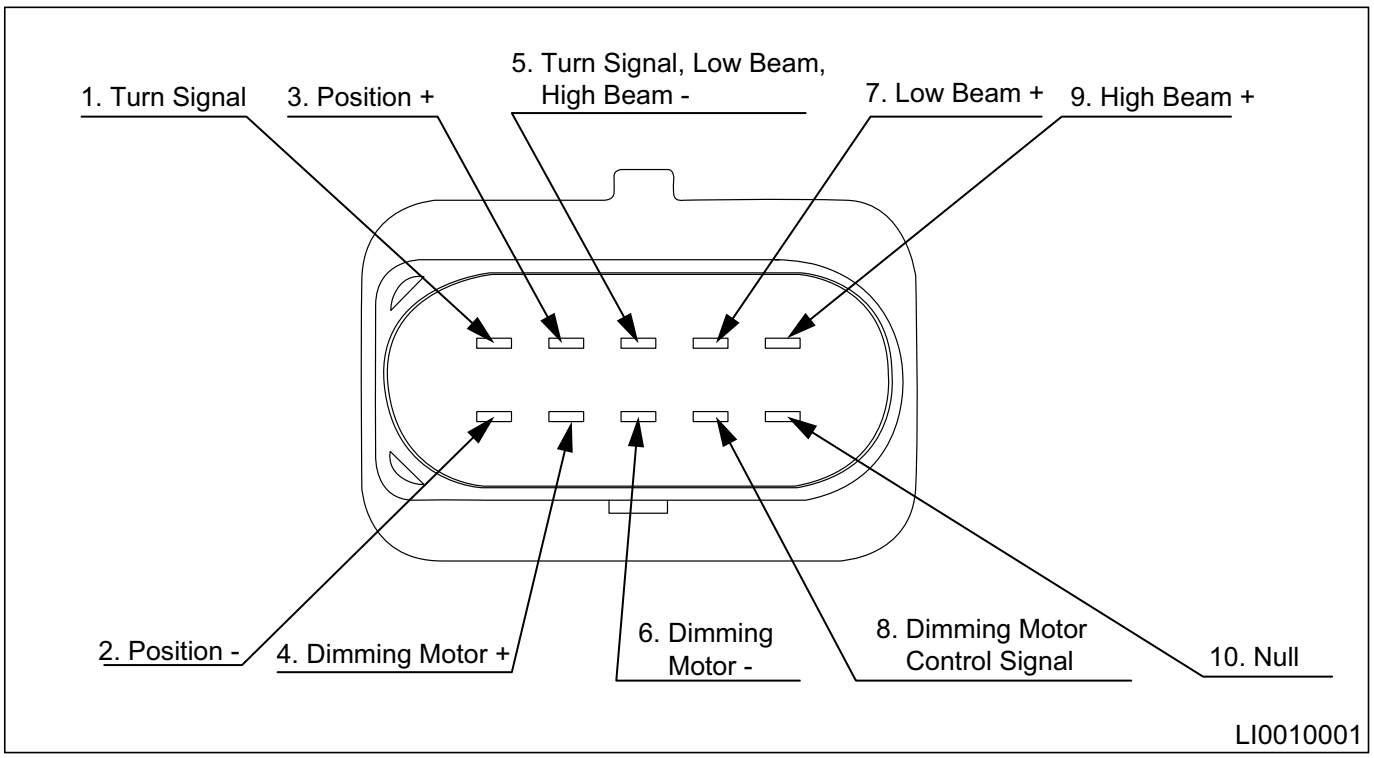
Name	Rated Voltage (V)	Type/Model	Combination Condition
Low/high beam light	12	H7: 55W	Combined with front position light, front turn signal light and high/low beam light
Front position light	12	LED: 0.8W × 10	As above
Front turn signal light	12	P21W	As above
Daytime running light	12	LED: 0.8W × 10	As above
Rear position light	12	LED: 0.2W × 24	Combined with rear turn signal light and brake light
Rear turn signal light	12	PY21W	Combined with rear turn signal light and brake light
Brake light	12	P21W	Combined with rear turn signal light and brake light

High mounted stop light	12	LED: 5.5W	Independent
Back-up light	12	P21W	Combined with right retro-reflector
Rear fog light	12	P21W	Combined with left retro-reflector
Front fog light (high configuration)	12	LED: 0.1W × 8	Independent
License plate light	12	C5W	Independent
Side turn signal light (low configuration)	12	W5W	Low configuration and independent
Side turn signal light (- high configuration)	12	LED: 5W	Integrated with rear view mirror
Front map light	12	10W	Independent
Retro-reflector			Left side combined with rear fog light, and right side combined with back-up light

System Circuit Diagram

Terminal Definition (Comfort)

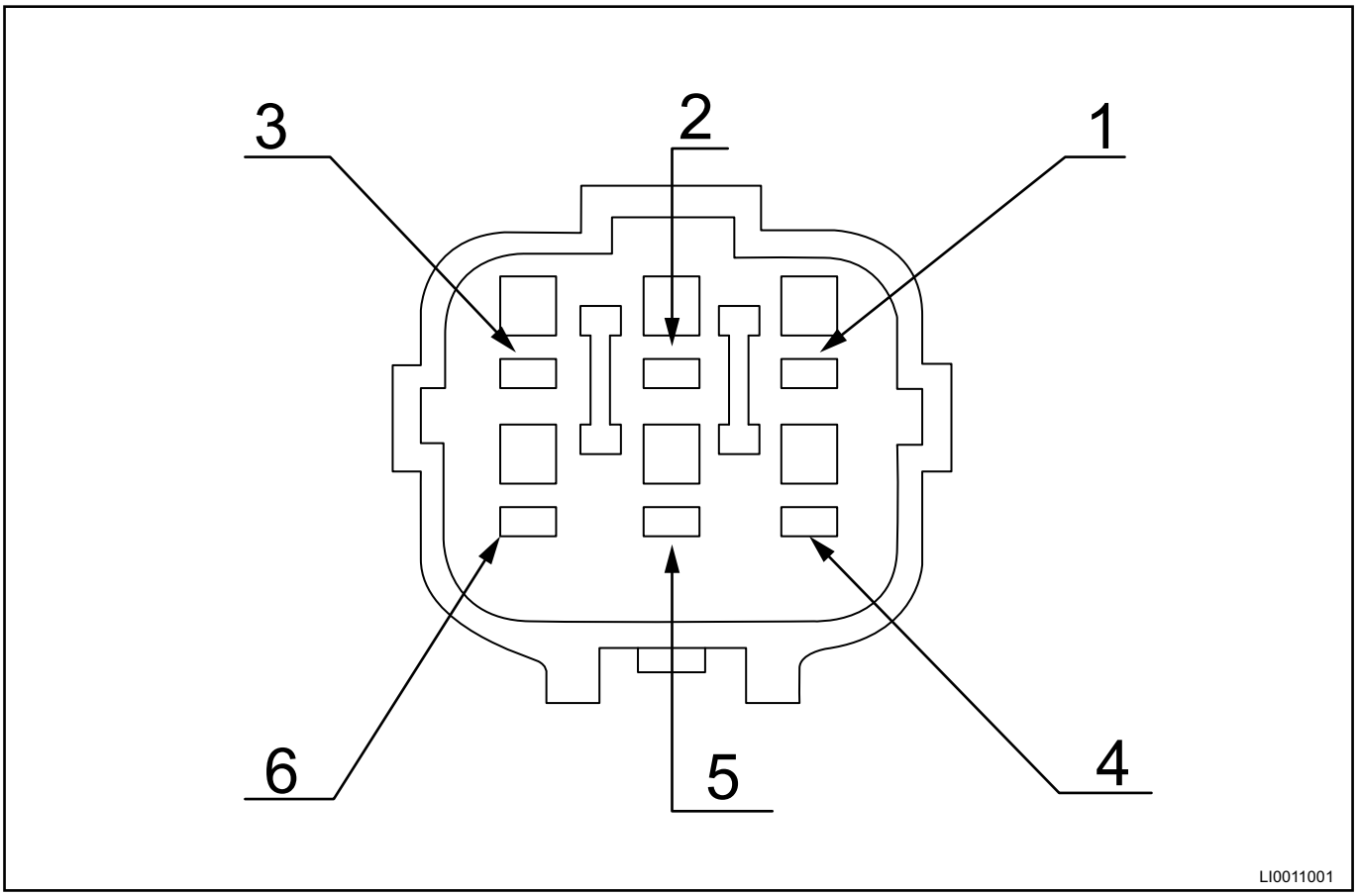
Front Combination Light Terminal Definition



Terminal	Definition	Terminal	Definition
1	Turn Signal	2	Position -

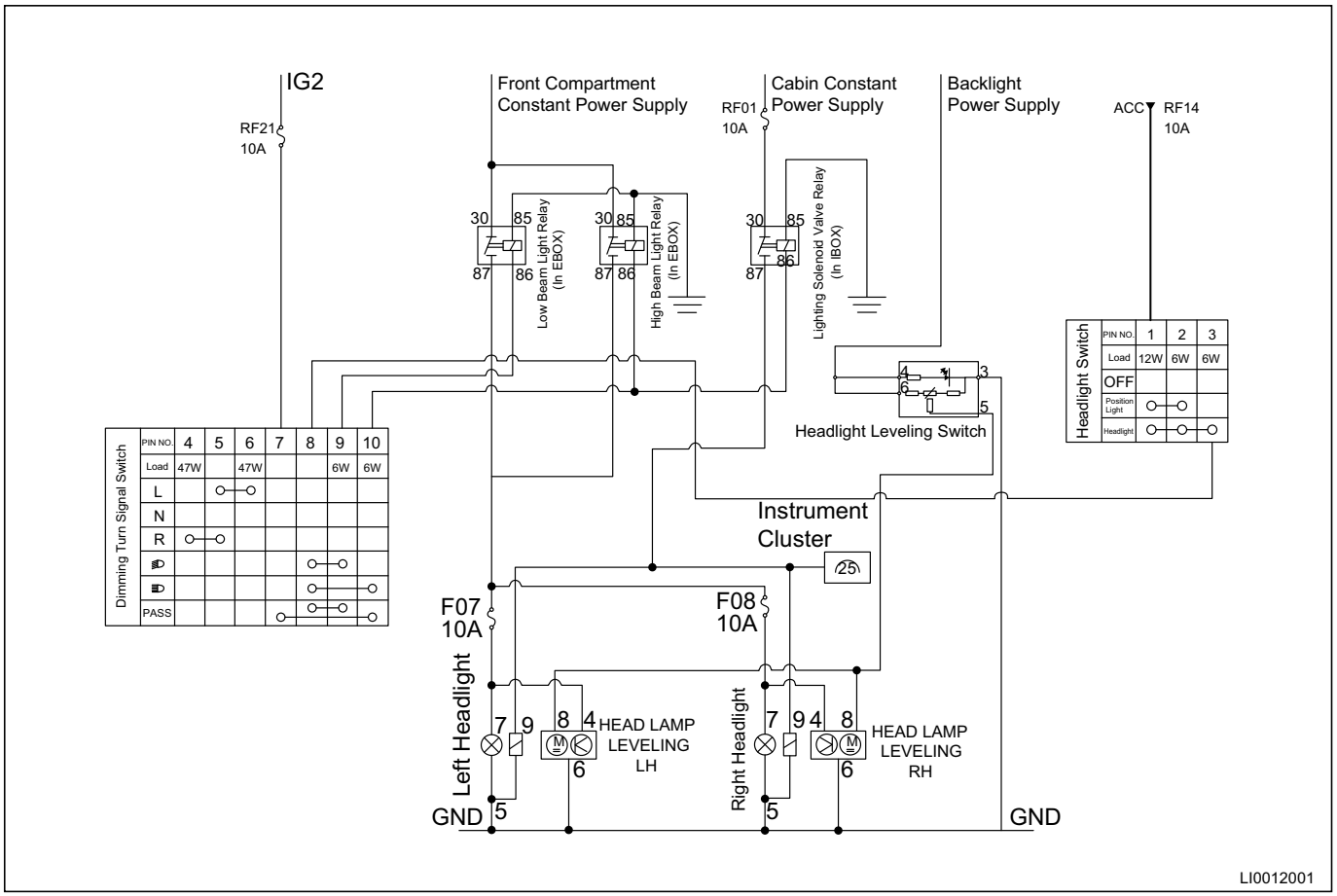
3	Position +	4	Dimming Motor +
5	Turn Signal, Low Beam, High Beam -	6	Dimming Motor -
7	Low Beam +	8	Dimming Motor Control Signal
9	High Beam +	10	Null

Rear Combination Light Terminal Definition



Terminal	Definition	Terminal	Definition
1	Position Light +	2	Position Light -
3	Turn Signal Light -	4	Brake Light -
5	Turn Signal Light +	6	Brake Light +

Adjustment and Control Schematic Diagram for High/Low Beam Light, Passing Light and Headlight Leveling



High/Low Beam Light Operating Conditions

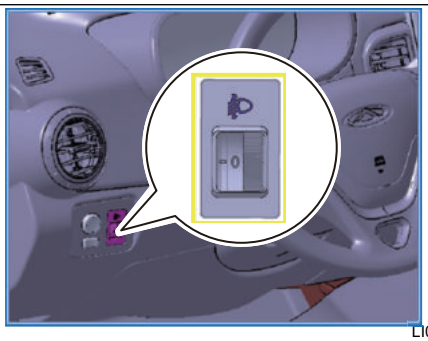
- Turn key to ON position.
- Turn high/low beam light switch on.

High/low Beam Light Operation

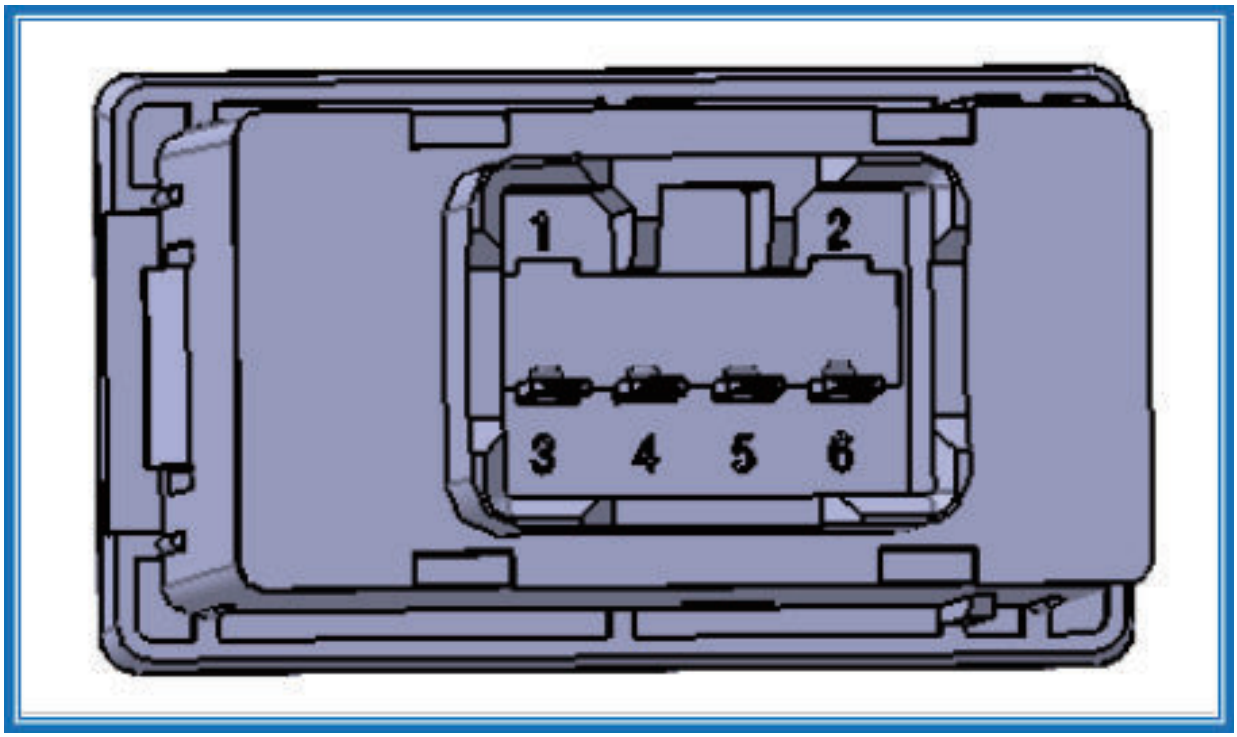
The high/low beam uses a same bulb and filament. Combination switch can switch the headlight between high and low beam by using ISU to control the opening and closing of the high/low beam switching solenoid valve. The principle is to set a sliding shading reflecting plate in the high beam area of light-emitting source of the bulb. The sliding shading reflecting plate is inserted into the slot of the light holder housing and is driven by a solenoid valve to form a switching control device. In this way, the lighting function of high/low beam switching can be realized.

Headlight Leveling Adjustment

1. The headlight leveling switch is located on lower left of the instrument panel and there are four levels to select: 0, 1, 2, 3. Headlight leveling can be adjusted as needed through this switch.
   - Level 0: The highest beam.
   - Level 3: The lowest beam.



Headlight Leveling Switch Terminal Definition



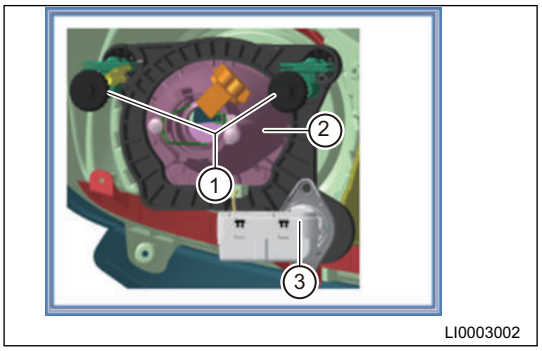
Terminal	Definition	Terminal	Definition
1	-	2	-
3	Ground	4	Backlight Input
5	Headlight Adjustment Output	6	Headlight Adjustment Input

Electrical Adjustment Control Principle

1. Through the beam level adjuster installed in the headlight, the headlight adjuster screw is extended and retracted along with the adjustment switch, and the headlight bracket (with lens) is driven to adjust the height of the reflective focal length to adjust the beam level.
2. In addition, the bracket angle can also be adjusted through the manual adjustment point to adjust the beam level and left/right direction. Electrical adjustment is to perform adjustment again on the basic of manual adjustment.

Manual Adjustment Method

1. As shown in illustration, insert the flat tip screwdriver into the dimming point (make sure that the screwdriver is inserted to the bottom) and perform the operations according to the following instruction:
   - Adjust the high/low beam up and down: Clockwise, the beam moves downward; counterclockwise: the beam moves upward.
   - Adjust the high/low beam left and right: Clockwise, the beam moves to right; counterclockwise: the beam moves to left.
     - Tire inflation pressure comes up to standard.
     - Vehicle is unladen.
     - Park the vehicle on a level ground.
     - Keep lens surface of front combination light free from dirt.
     - Check if the power supply operates normally and if the bulbs are installed correctly.
     - The high beam is turned off while adjusting the low beam.



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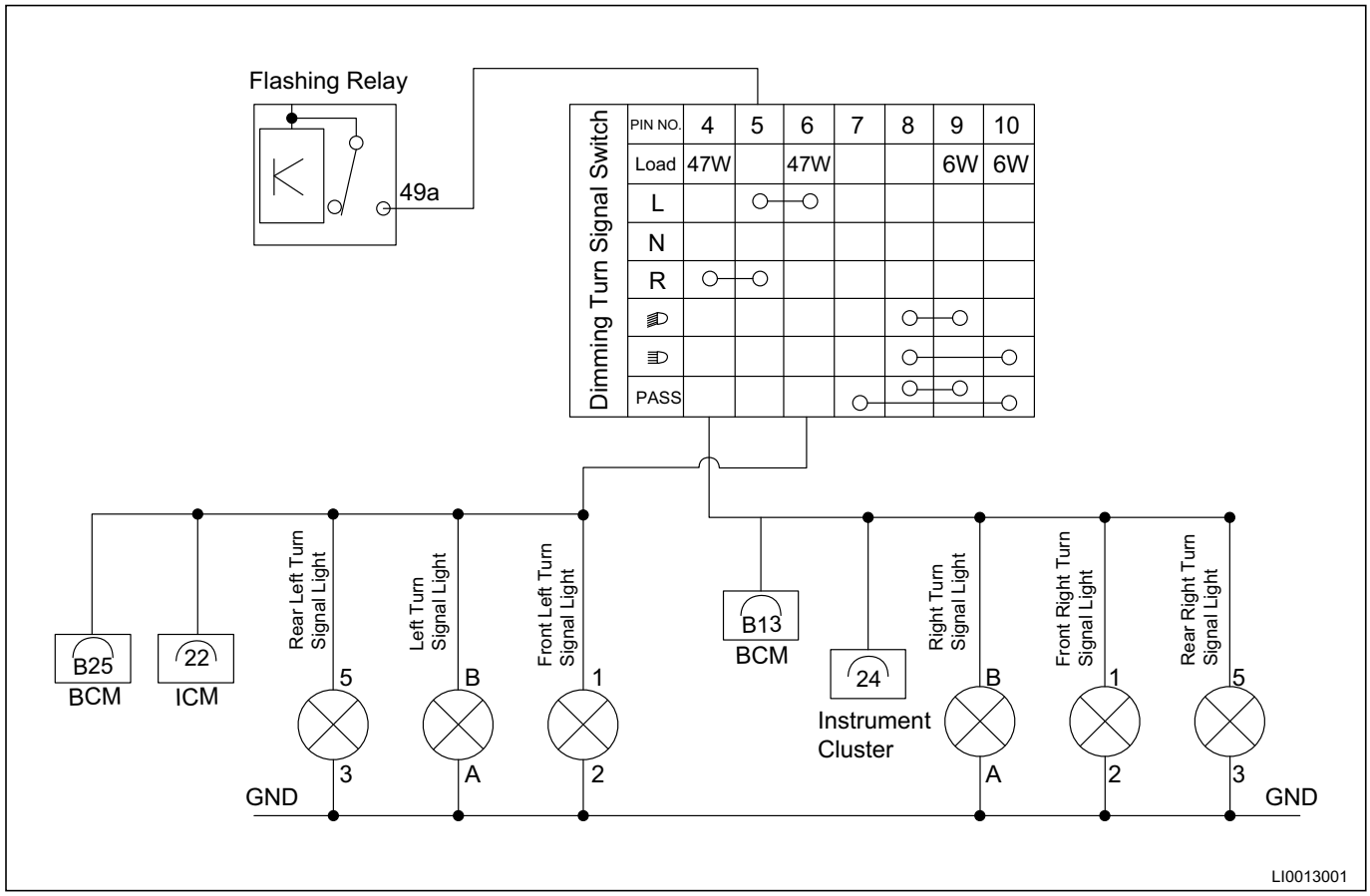
- Whether headlight leveling is correct or not will directly affects driving safety, so be sure to adjust the beam according to related specification.

Turn Signal Light Control Schematic Diagram



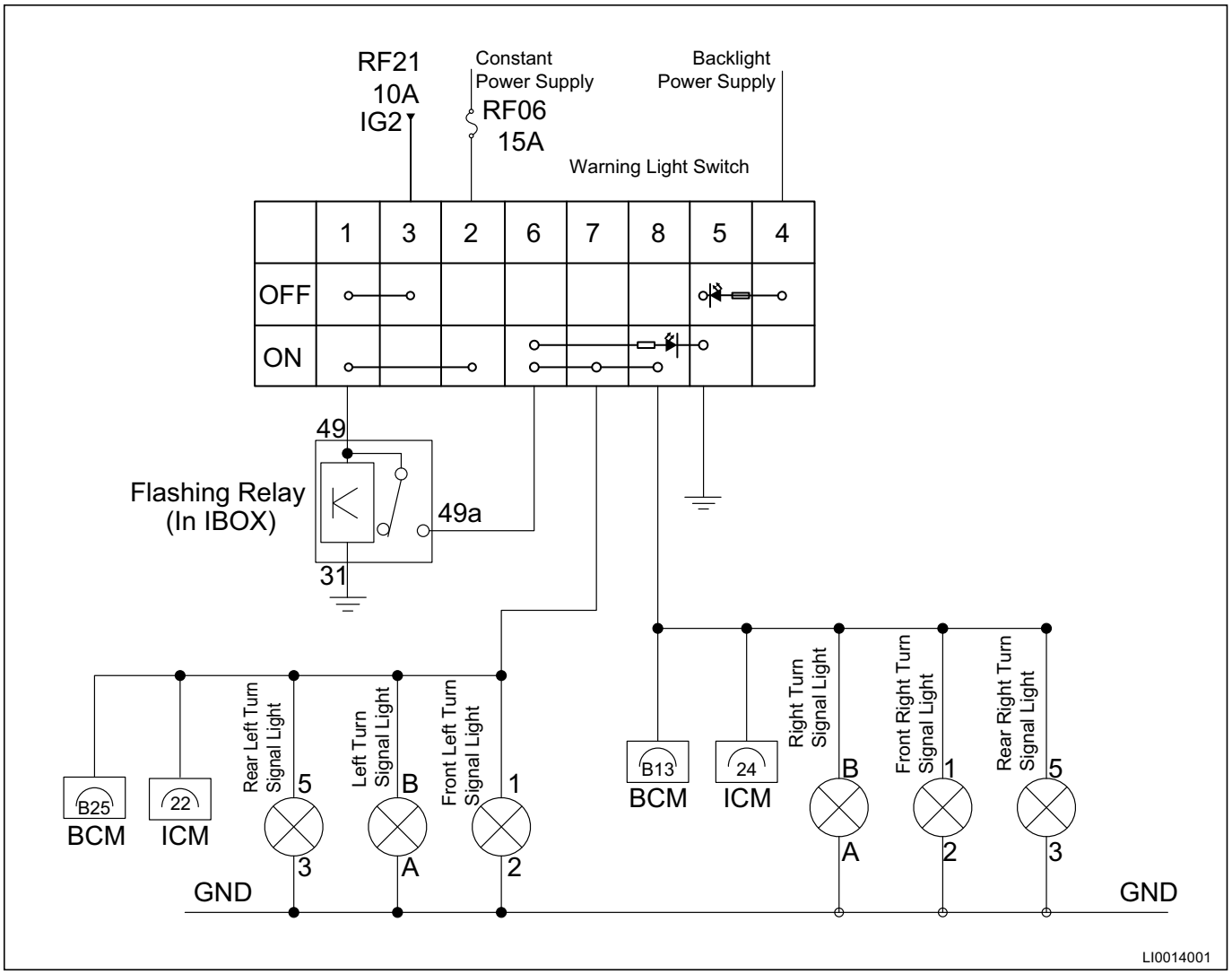
Turn Signal Light Operating Conditions

- The key is turned to ON.
- Turn signal light switch is ON.

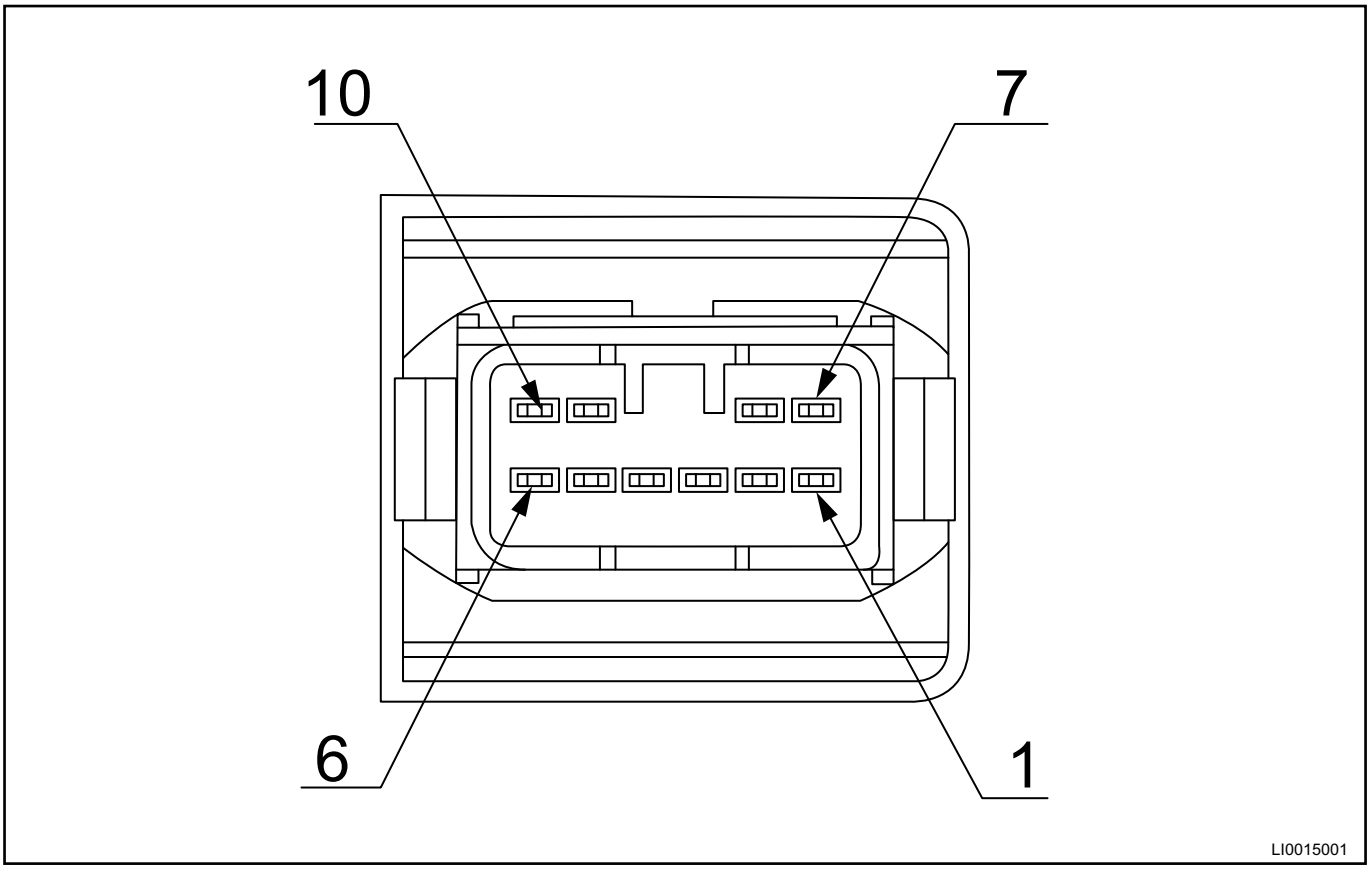
Turn Signal Light Diagnosis

When a front/rear damaged turn signal light is turned on, the corresponding indicator on the meter will flash at a greater frequency. In addition, the frequency of the other side which is not damaged remains unchanged.

Hazard Warning Light Control Schematic Diagram



Hazard Warning Light Switch Terminal Definition



Terminal	Definition	Terminal	Definition
1	Turn Signal Flasher Power Supply Input	2	30 Battery Positive
3	15 POWER Switch Output	4	Illumination Indication Power Supply Input
5	31 Battery Negative	6	-
7	Turn Signal Flasher Power Supply Output	8	Left Turn Signal Light
9	Right Turn Signal Light		

Other Description

1. Left and right turn signal lights are turned on at the same time when the hazard warning light switch is valid.
2. Hazard warning light is turned on if you press the hazard warning light switch for one time, and it is turned off if you press the switch once again.
3. The function of hazard warning light is not related to the key.
4. Hazard warning light switch operation indicator comes on when hazard warning light function is valid.

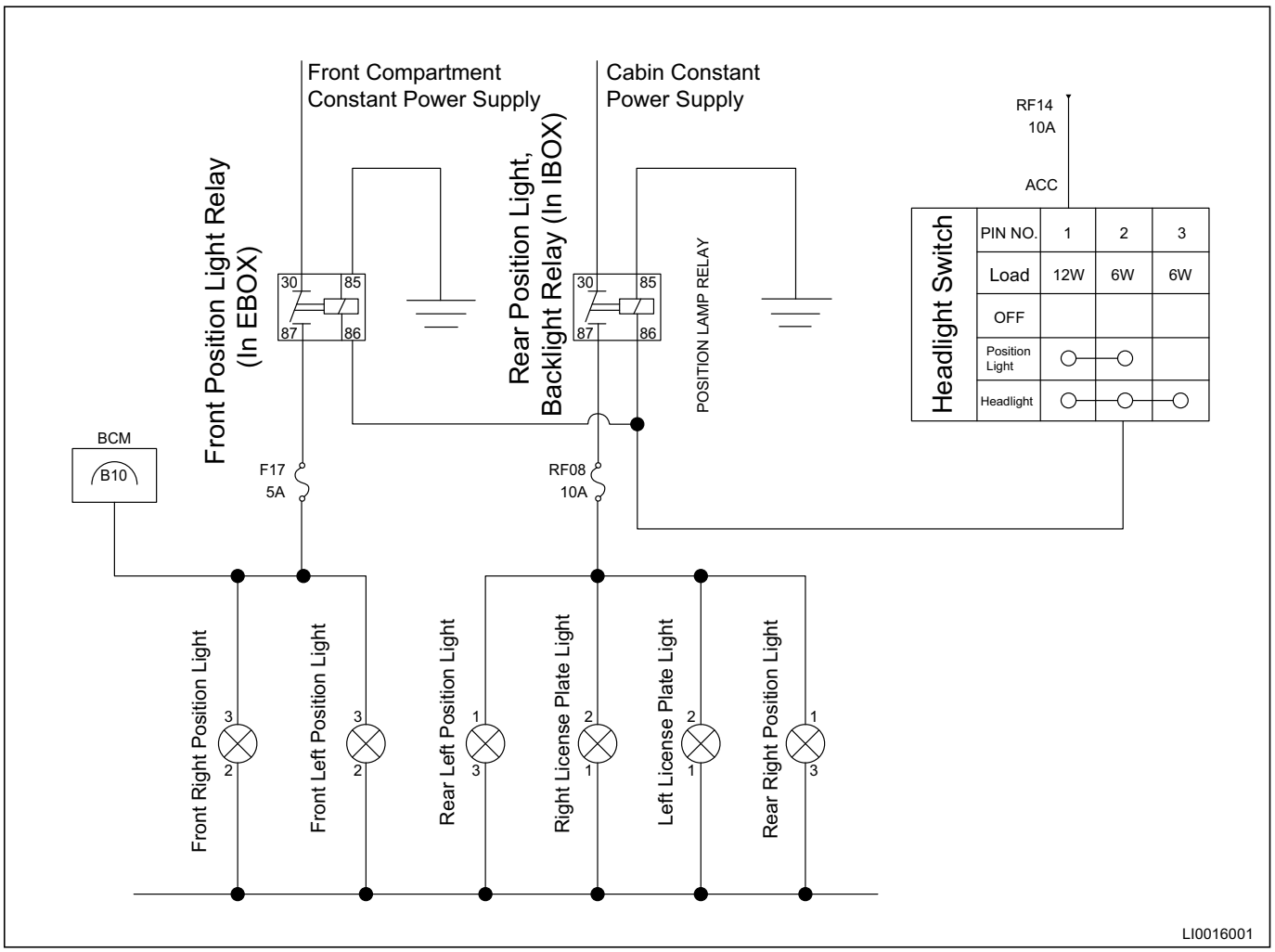
Note:

1. Turn signal light does not operate if you turn on turn signal light while the hazard warning light function is activated.

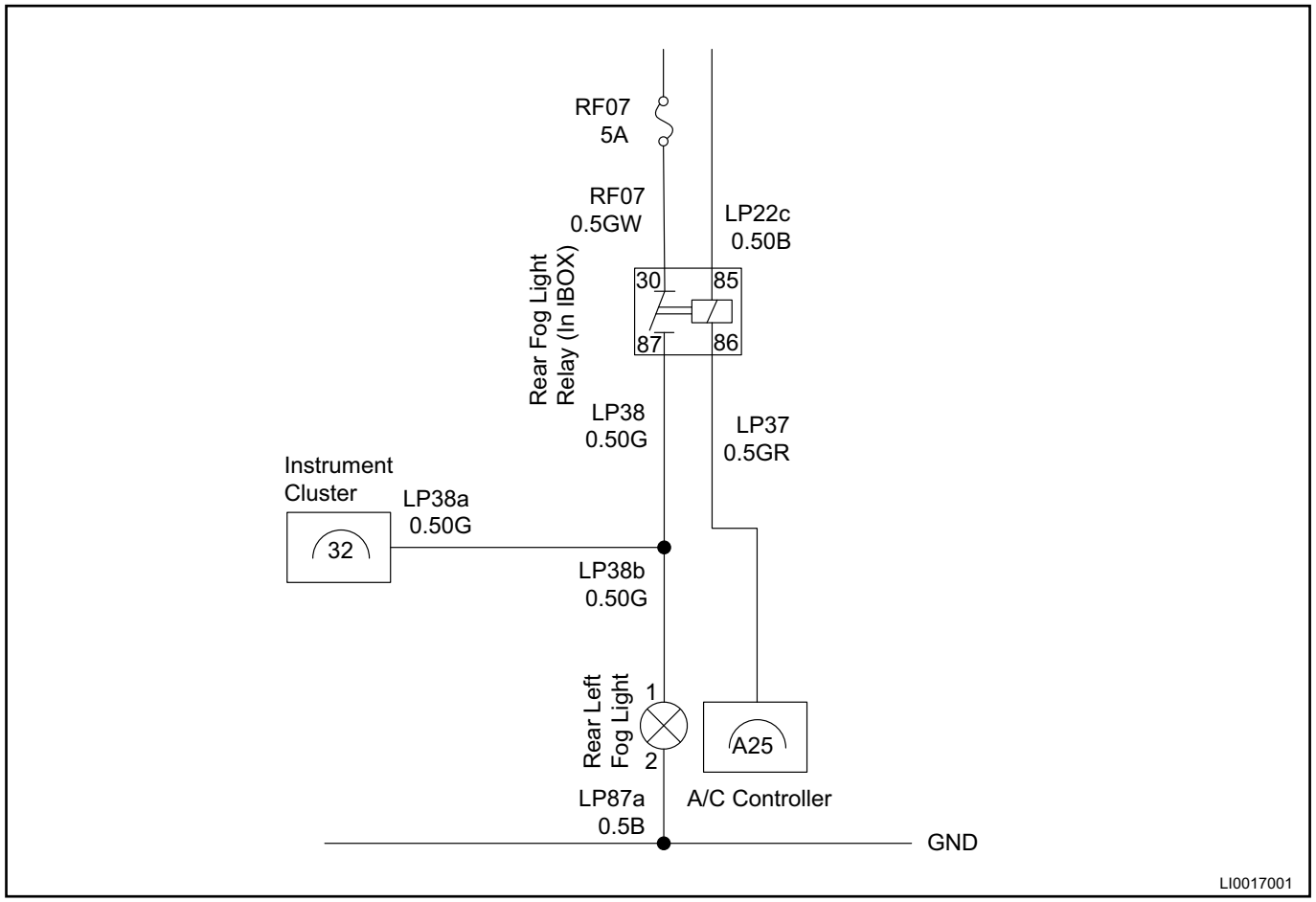
Hazard Warning Light Diagnosis

When a front/rear turn signal light is damaged, the indicator on meter flashes faster if hazard warning light function is activated.

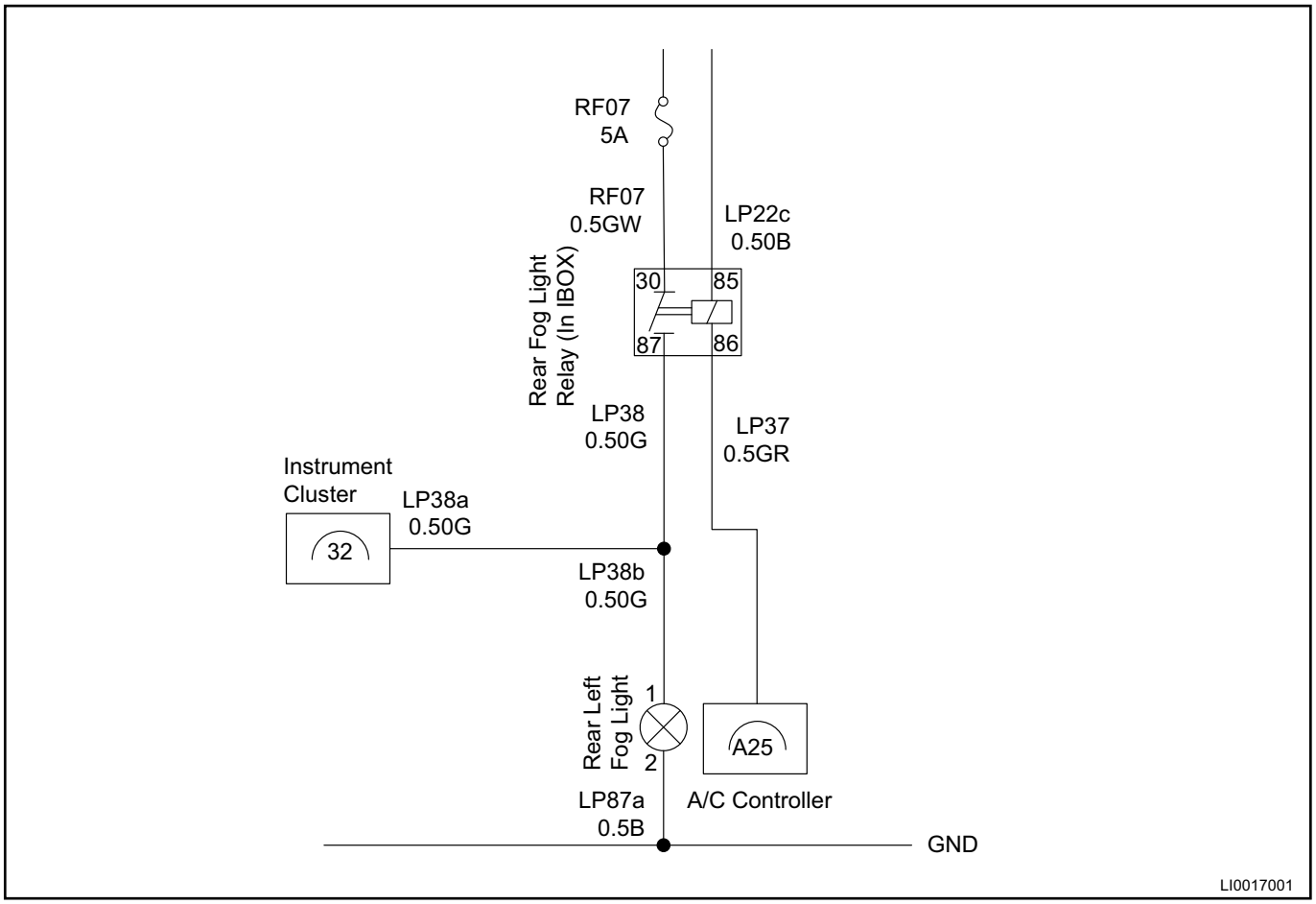
Small Light (Position Light, License Plate Light) and Background Light



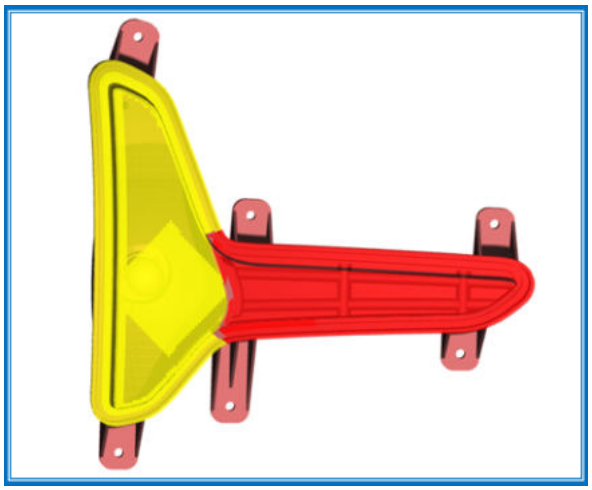
Rear Fog Light Control Schematic Diagram

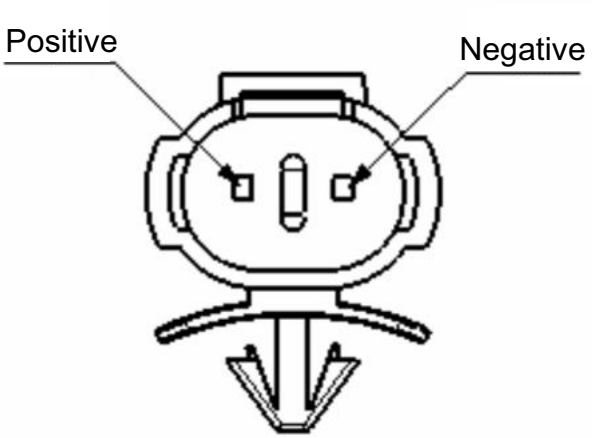


Rear Fog Light Control Schematic Diagram



Rear Fog Light Terminal Definition





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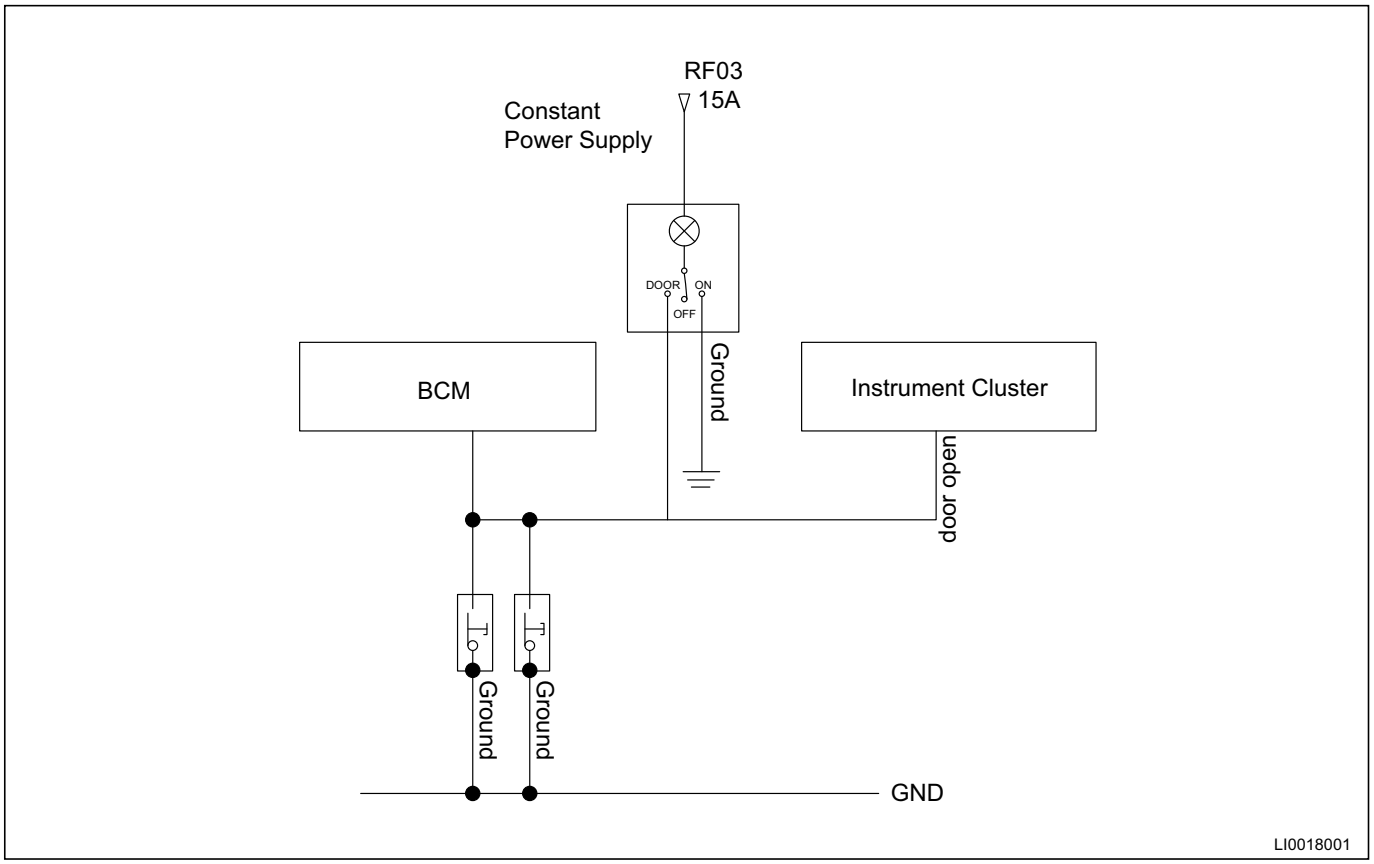
Dome Light and Door Contact Switch Control Schematic Diagram



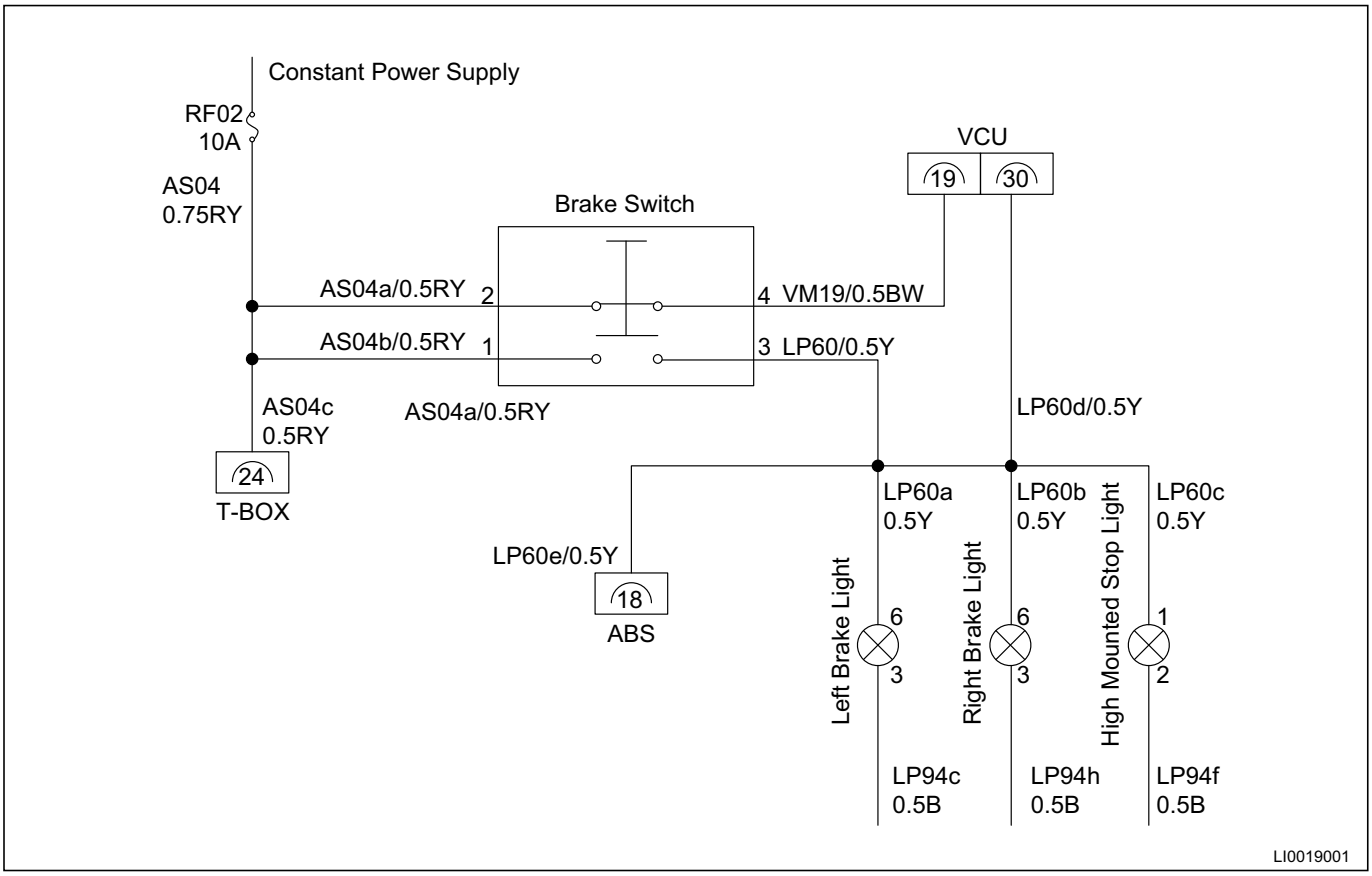
Dome Light ON Logic

1. If any of doors is opened and remains open, the dome light comes on for 10 minutes (fades in and fades out).
2. In IGN OFF, the dome light comes on if RKE unlocking or central control unlocking command is received. After 30 seconds timing process, the dome light fades out for 3 seconds and then goes off.

Dome Light OFF Logic

1. In IGN OFF or ACC and all doors are closed, the dome light fades out for 3 seconds after a delay of 30 seconds and then goes off.
2. In IGN ON and all doors are closed, the dome light goes off immediately.
3. Within 30 seconds delay and all doors are closed, the dome light goes off immediately if you turn the POWER switch to IGN ON.
4. In IGN OFF and all doors are closed, the dome light goes off immediately if RKE locking, central control locking or auto re-locking action command is received.
5. When dome light switch is in ON position and all doors are closed, the dome light goes off after receiving RKE/PKE locking commend (because dome light is related to battery save function).
6. Continuously lighting time ends and there is no new trigger condition.

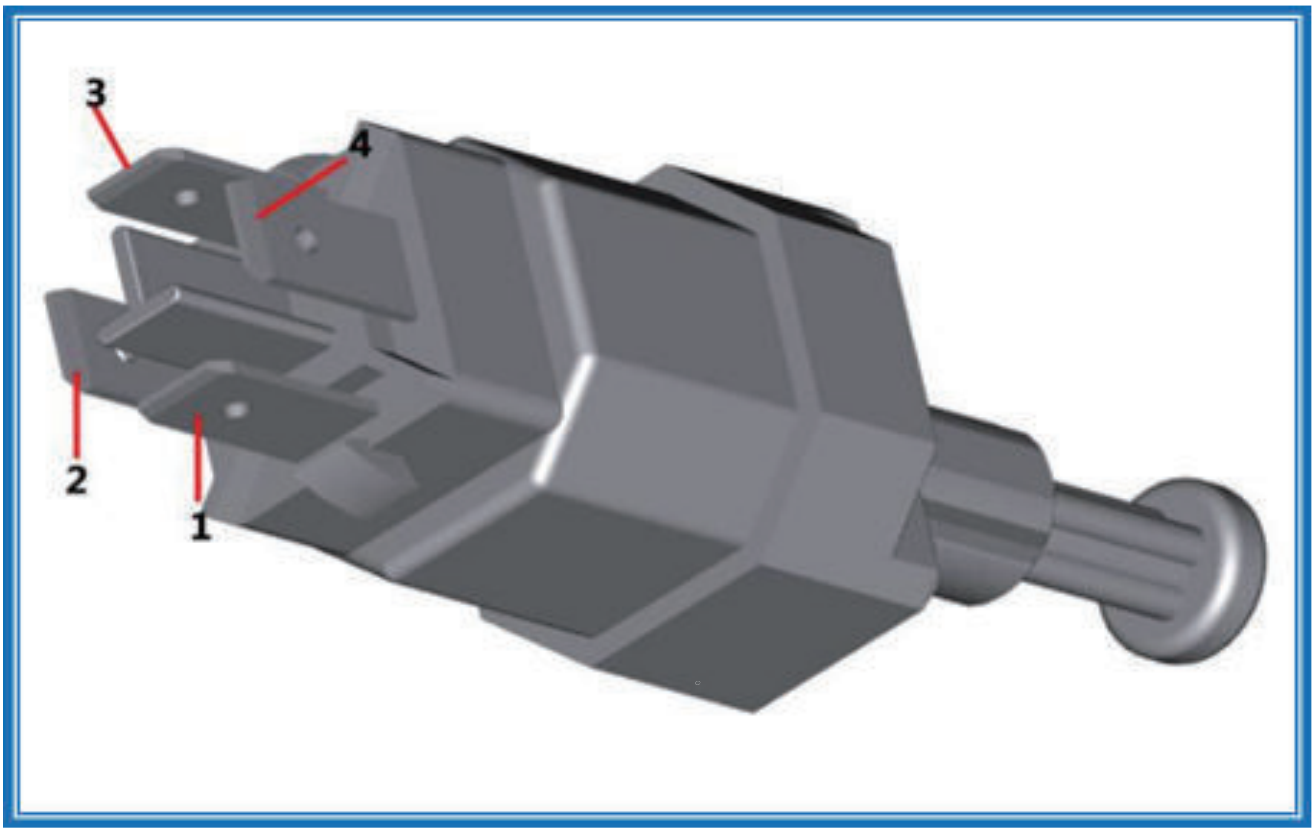
Brake Light Control Schematic Diagram



Brake Light Operation

Brake switch terminal 1 and 3 are continued when the brake pedal is depressed, and the brake light comes on.

Brake Switch Terminal Definition



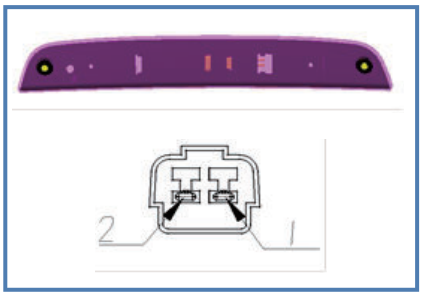
LI0032001

Terminal	Functional Definition	Wire Specifications
1	30 Power	0.5RY
2	30 Power	0.5RY
3	Brake Light, ABS, VCU	0.5Y
4	VCU	0.5BW

1. High mounted stop light is generally installed on the upper part of the rear of the vehicle, so that the following vehicle can brake as soon as possible to avoid rear collision.

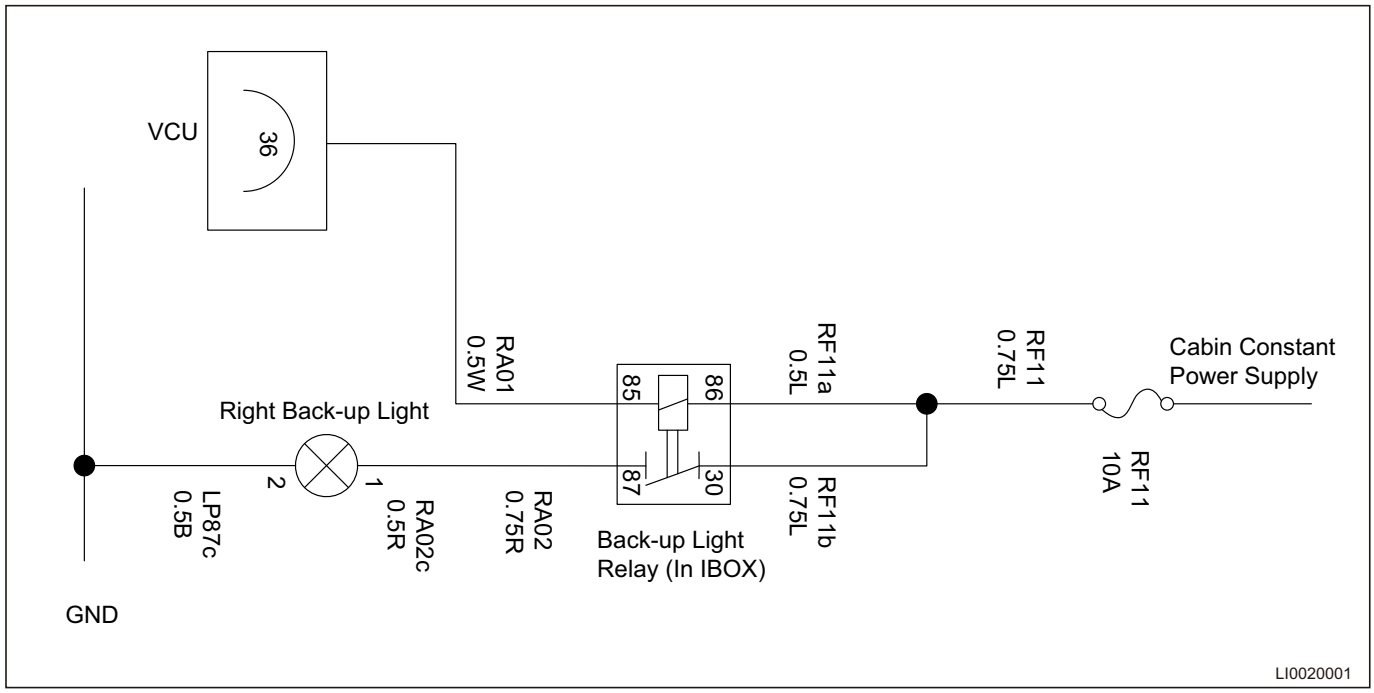
   1: Positive +.

   2: Negative -.



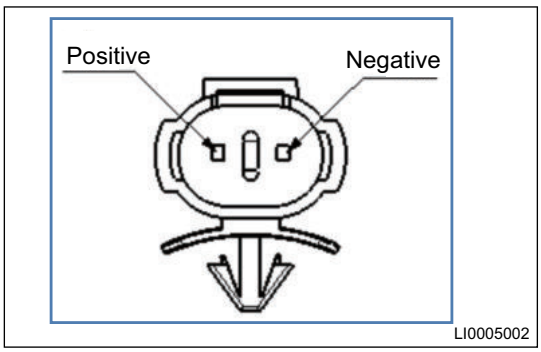
LI0004002

Back-up Light Control Schematic Diagram

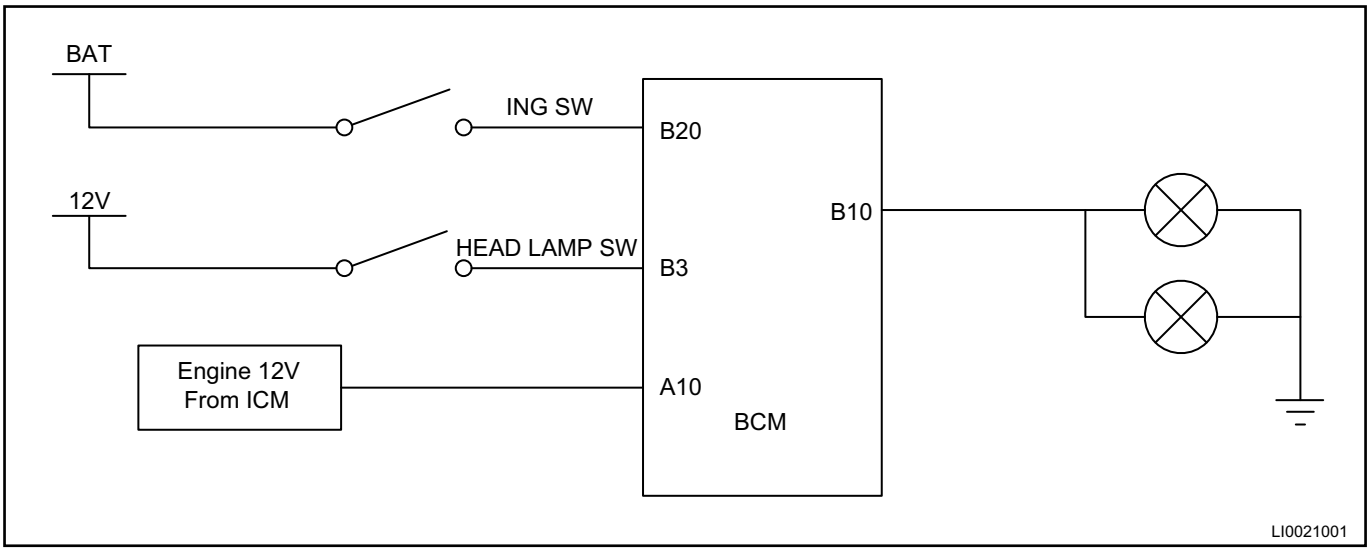


Back-up Light Terminal Definition

1. Back-up light terminal definition.



Daytime Running Light Control Schematic Diagram

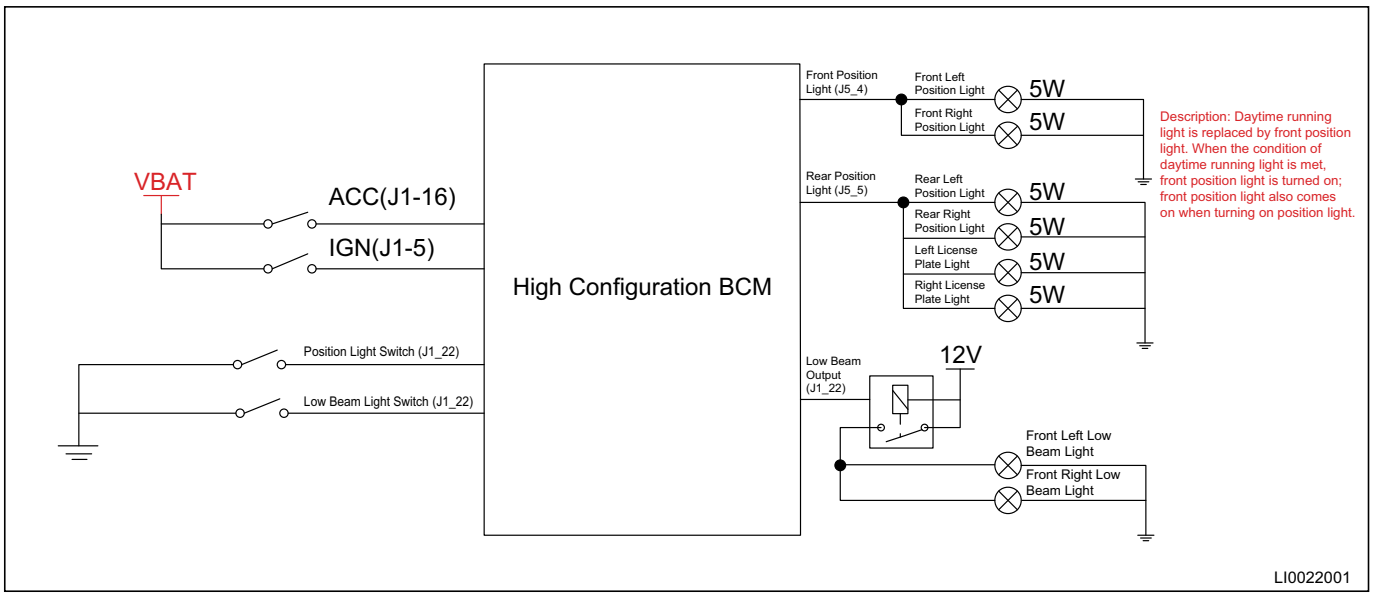


Daytime Running Light Operating Conditions

- POWER switch is in ON.
- Headlight switch input is invalid.
- Driver motor operates.

Terminal Definition (Rental, Luxury)

Small Light (Position Light, License Plate Light) and Daytime Running Light Control Schematic Diagram



Small Light Function Description

Small light will operate if the following conditions are met:

- When small light switch is ON, the small light comes on.
- When small light switch is OFF, the small lights goes off.

  The small light is not controlled by POWER switch.

  When small light switch is activated, BCM will turn small light on while outputting the backlight, BCM sends small light status to CAN bus, and the corresponding operation indicator on meter comes on. Reserved function: BCM receives backlight brightness signal which is sent from DVD and adjust the output backlight.

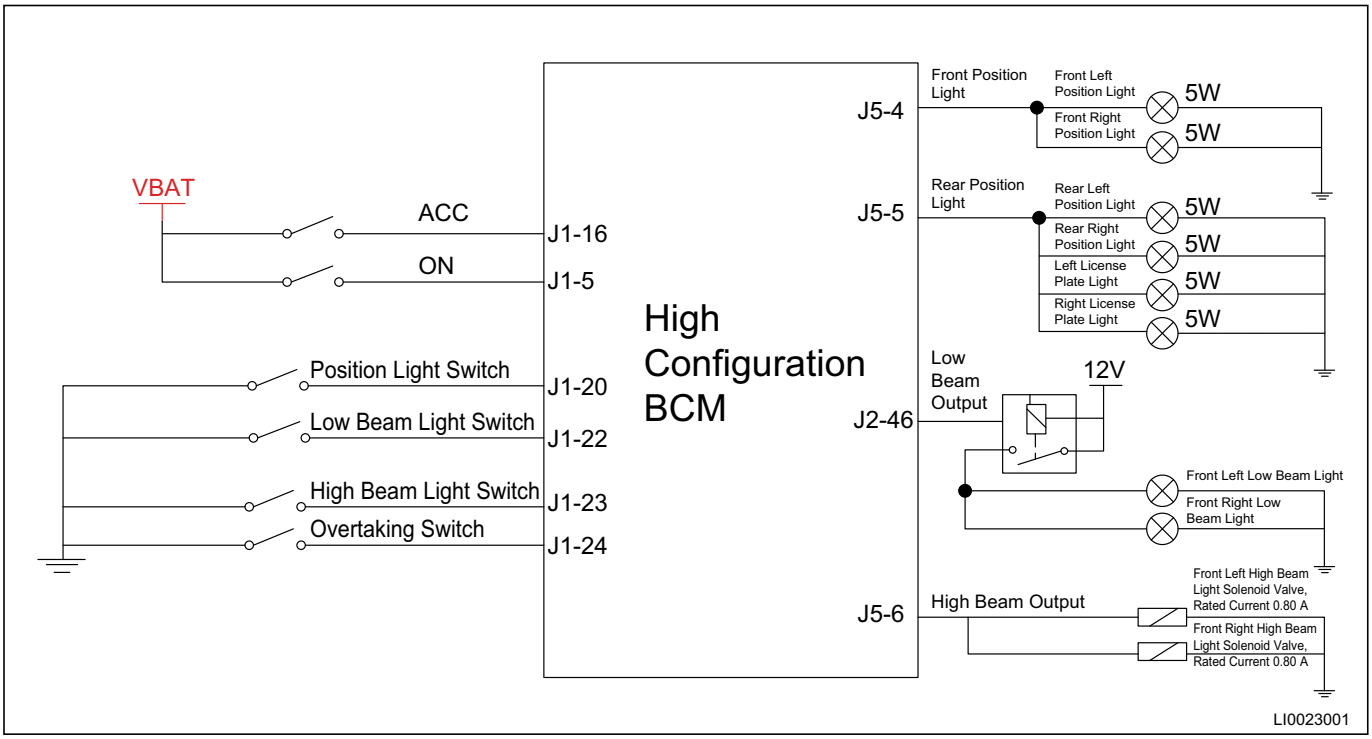
Daytime Running Light Function Description (there is no separate daytime running light, and it can be replaced by front small light)

If the following conditions are met, the front small light operates; and if one of the following conditions is not met, the daytime running light goes off.

- IGN = ON;
- Small light switch = OFF;
- Low beam light switch = OFF;
- Motor runs normally.

  Descriptions: The activated passing light has no effect on the function of daytime running light.

Low/High Beam Light, Passing Light Control Schematic Diagram



Low Beam Light Function Description:

1. When the following conditions are met simultaneously, the low beam light comes on.
   - IGN = ON.
   - Small light switch = ON.
   - Low beam light switch = ON.
2. The low beam light goes off when any of following conditions is met.
   - IGN = OFF.
   - Small light switch = OFF.
   - Low beam light switch = OFF.
3. BCM sends the low beam light status to CAN bus when the low beam light switch is activated.

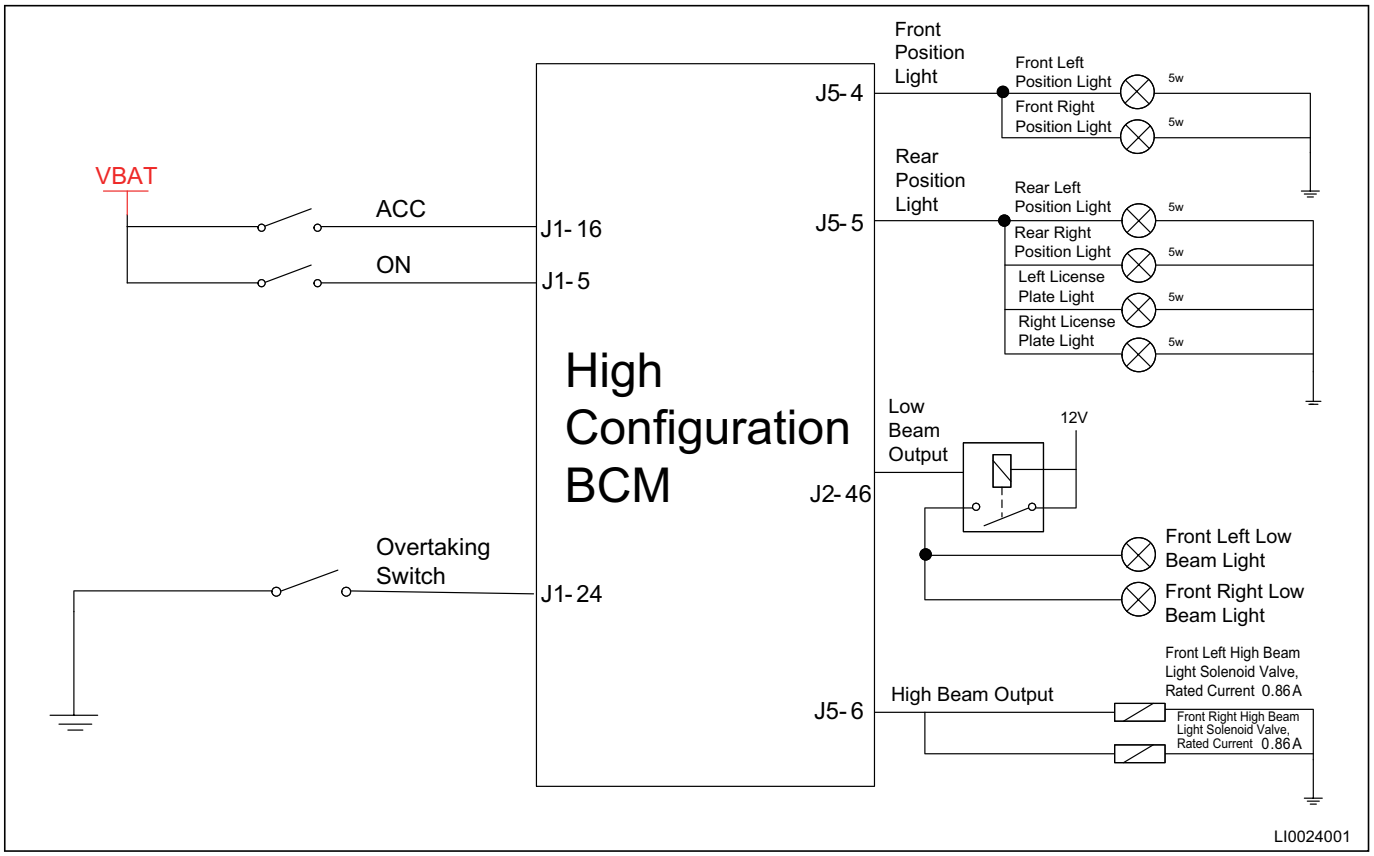
High Beam Light Function Description

1. When the following conditions are met simultaneously, the high beam light solenoid valve is driven to operate while the low beam light is on.
   - IGN = ON.
   - Small light switch = ON.
   - Low beam light switch = ON.
   - High beam light switch = ON.
2. When any of following conditions is met, the high beam light solenoid valve is closed while the low beam light is off.
   - IGN = OFF.
   - Small light switch = OFF.
   - Low beam light switch = OFF.
3. When the following conditions are met simultaneously, the high beam light solenoid valve is closed but the low beam light remains on.
   - IGN = ON.

- Small light switch = ON.
- Low beam light switch = ON.
- High beam light switch = OFF.

Passing Light (High Beam Light Flashing) Function Description
When IGN = ON and Flash SW = ON, the high beam light flashing function is activated.The high beam light flashing function cannot be affected by the state of POWER switch, small light switch and low beam light.

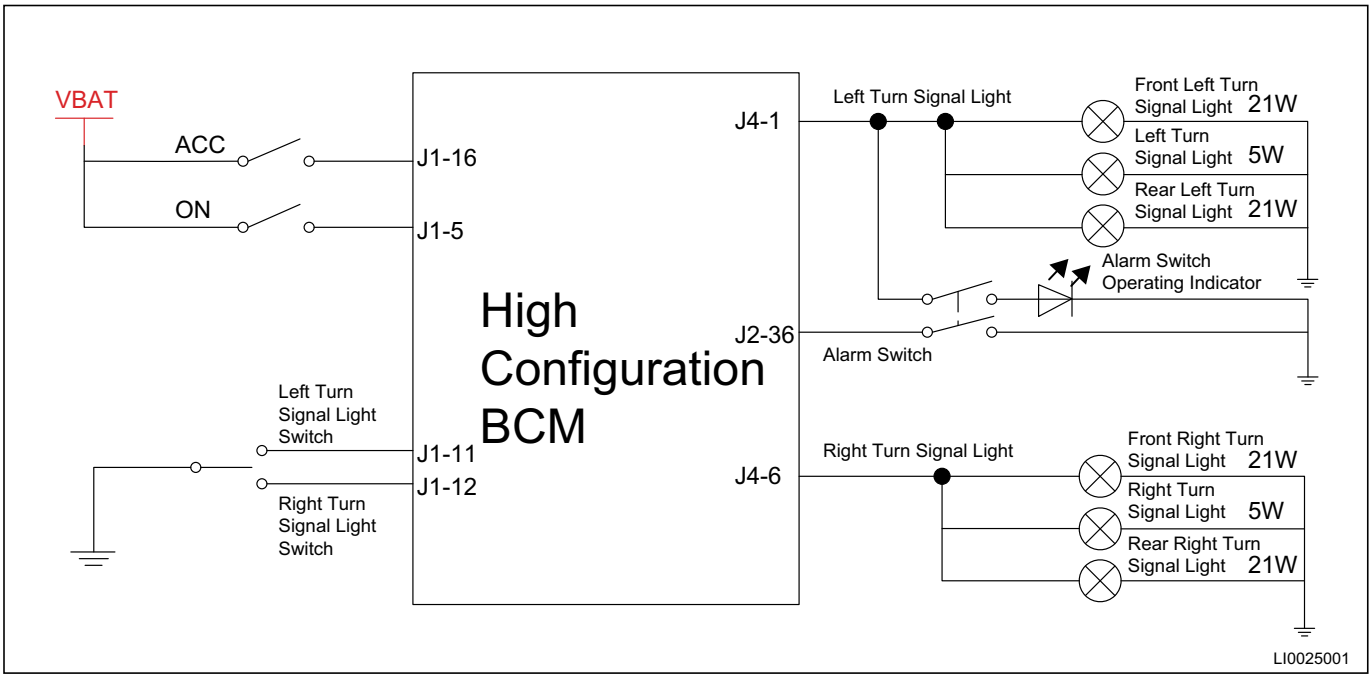
Follow Me Home function Control Schematic Diagram
Follow me home function can turn small light and high beam light on while in IGN OFF.



Function Introduction

1. If the following conditions are met, follow me home function is activated.
   - Within 2 minutes after the POWER switch is turned to OFF from ACC or IGN ON, if the time from passing light switch being turned ON to OFF is less than 2 seconds, follow me home function is activated, the small light and high beam light continuously come on for 30 seconds.
   - If the condition that the time from passing light switch being turned ON to OFF is less than 2 seconds is triggered for many times within 2 minutes after the POWER switch is turned to OFF from ACC or IGN ON, the time of small light and high beam light turning on increases by 30 seconds each time this condition is triggered. The maximum continuous operating time of small light and high beam light is 30s*8=240s.
2. If any of following conditions is met, the follow me home function can be turned off.
   - Turn the POWER switch to ACC or IGN ON.
   - The passing light switch input exceeds 2 seconds within 2 minutes.

Turn Signal Light and Hazard Warning Light Control Schematic Diagram



Turn Signal Light Function Description

1. Turn signal light activation conditions.
   - POWER switch is in ON.
   - Left/right turn signal light switch is activated.
2. Turn signal light OFF conditions.
   - Turn the POWER switch to OFF or ACC.
   - Turn off the left and right turn signal light switch.
3. Function description.
   - The flashing frequency of turn signal light is 75 times per minute and the duty ratio is 50%.
   - When any of the turn signal lights fails, the turn signal light on the same side will flash at a frequency of 150 times per minute.
   - When left and right turn signal light switch is activated, BCM will turn on the corresponding turn signal light while sending the turn signal light status to bus through CAN message. When left and right turn signal light switch is OFF, the turn signal light goes off immediately and the CAN signal returns to default value.

Lane Change Function Activation Condition

- Turn the POWER switch to ON.
- The left and right turn signal light switch is activated and the activation time is 50ms $<$ T $<$ 1s.

Function Description:

- If the lane change switch is activated (50 ms < T < 1 s) again during lane change flashing, the turn signal light will flash again according to the new input and the last flashing is ignored.
- If the contact time of lane change switch is more than 1 second, the turn signal lights flash at a normal frequency until the switch is turned off.
- If turn signal light function is activated during lane change flashing, the turn signal light will flash at a normal frequency until the switch is turned off.
- When the lane change function is activated and any of the turn signal lights fails, the turn signal light on the same side will flash at a frequency of 150 times per minute.

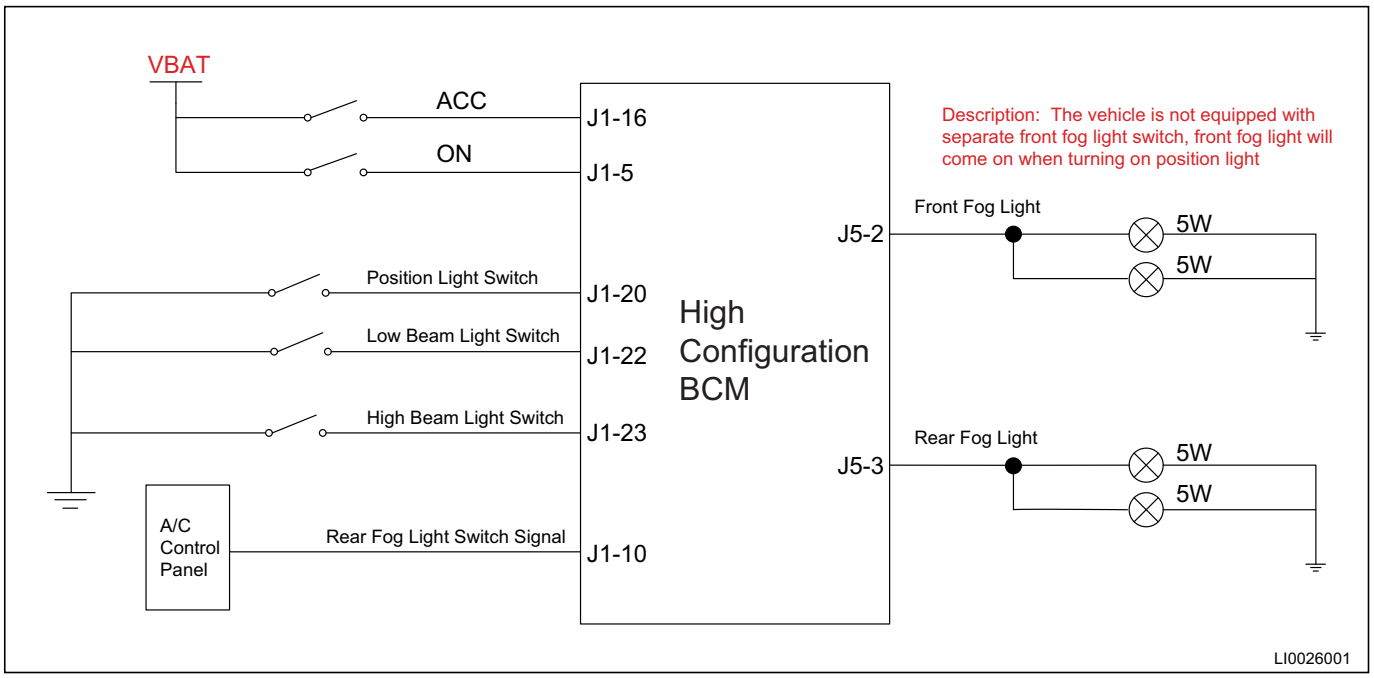
Hazard Warning Light Function

- When the hazard warning light function is activated, BCM lights up the turn signal lights on both sides while sending the turn signal light status to bus via CAN.
- The flashing frequency of turn signal light is 75 times per minute and the duty ratio is 50%.
- The hazard warning light function is not controlled by POWER switch.
- Hazard warning switch indicator also flashes at a frequency of 75 times per minute (the duty ratio is 50%) when hazard warning light function is activated; and switch operating indication, indicator on the instrument cluster and external turn signal lights should keep synchronous (the flashing frequency is consistent).
- When the hazard warning light function is activated and any of the turn signal lights fails, the turn signal light and the hazard warning light switch indicator flash at a frequency of 150 times per minute.
- After collision occurs and the BCM receives a collision signal, both the turn signal lights and the hazard warning light switch indicator flash at a frequency of 75 times per minute (the duty ratio is 50%) while sending turn signal light status to CAN bus. During a collision and the hazard warning light turning on, turn the key to OFF and turn off the hazard warning light function.

Turn Signal Light Priority Function

When BCM receiving turn signal light (lane change) and hazard warning light switch input at the same time, the priority is as below: turn signal light (lane change) > hazard warning light.

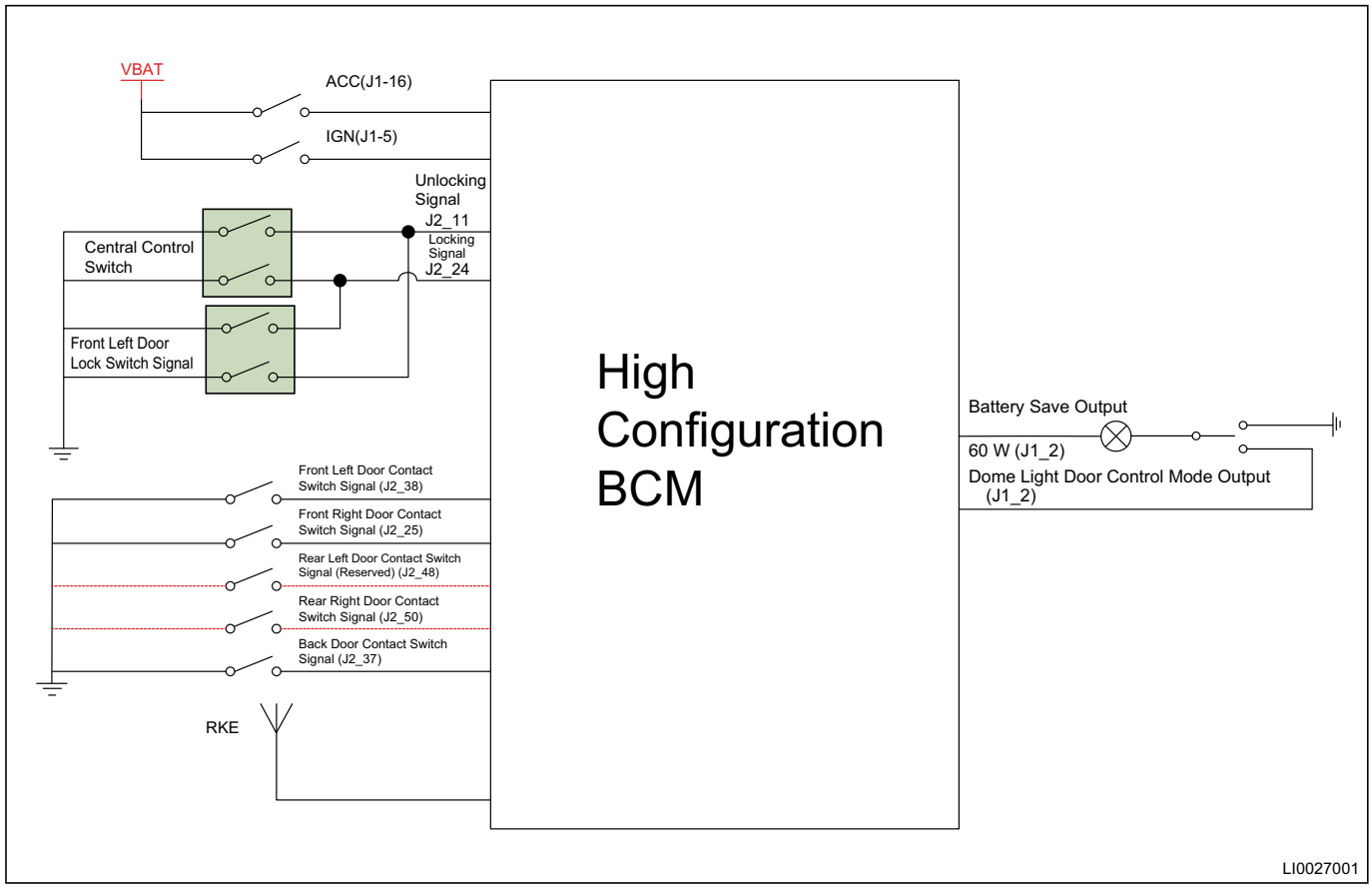
Front and Rear Fog Lights Control Schematic Diagram



Front and Rear Fog Lights Function Description

1. Front fog light operating conditions.
   - IGN = ON.
   - Small light switch = ON.
2. Rear fog light operating conditions.
   - IGN = ON.
   - Small light switch = ON.
   - Low beam light switch = ON or high beam light switch = ON or front fog light switch = ON.
   - Rear fog light switch = ON.

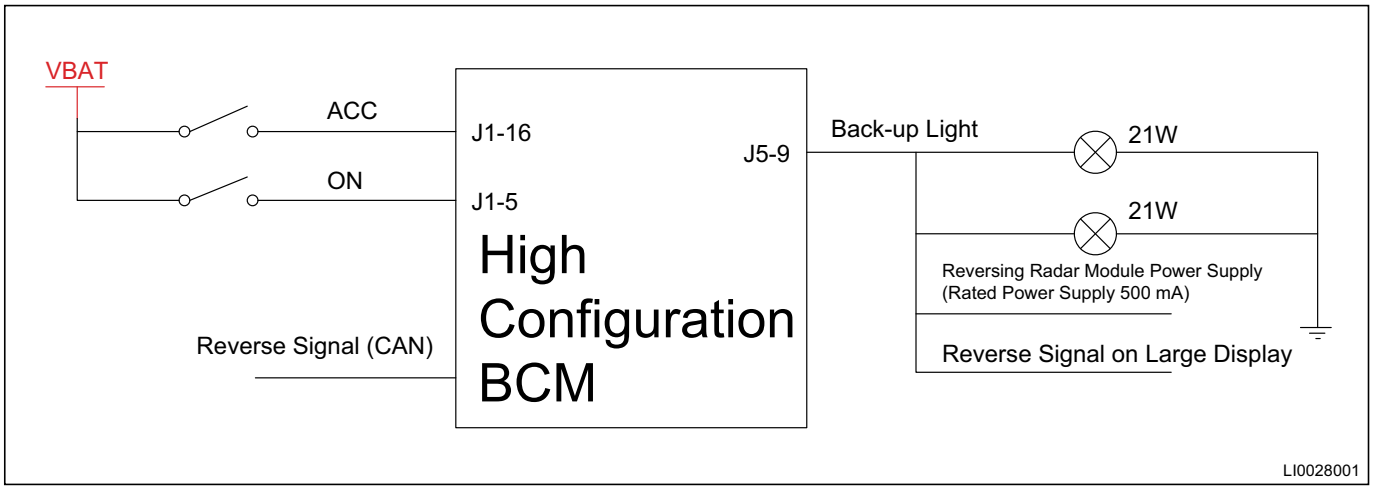
Dome Light Control (with dome light switch in DOOR position) Schematic Diagram



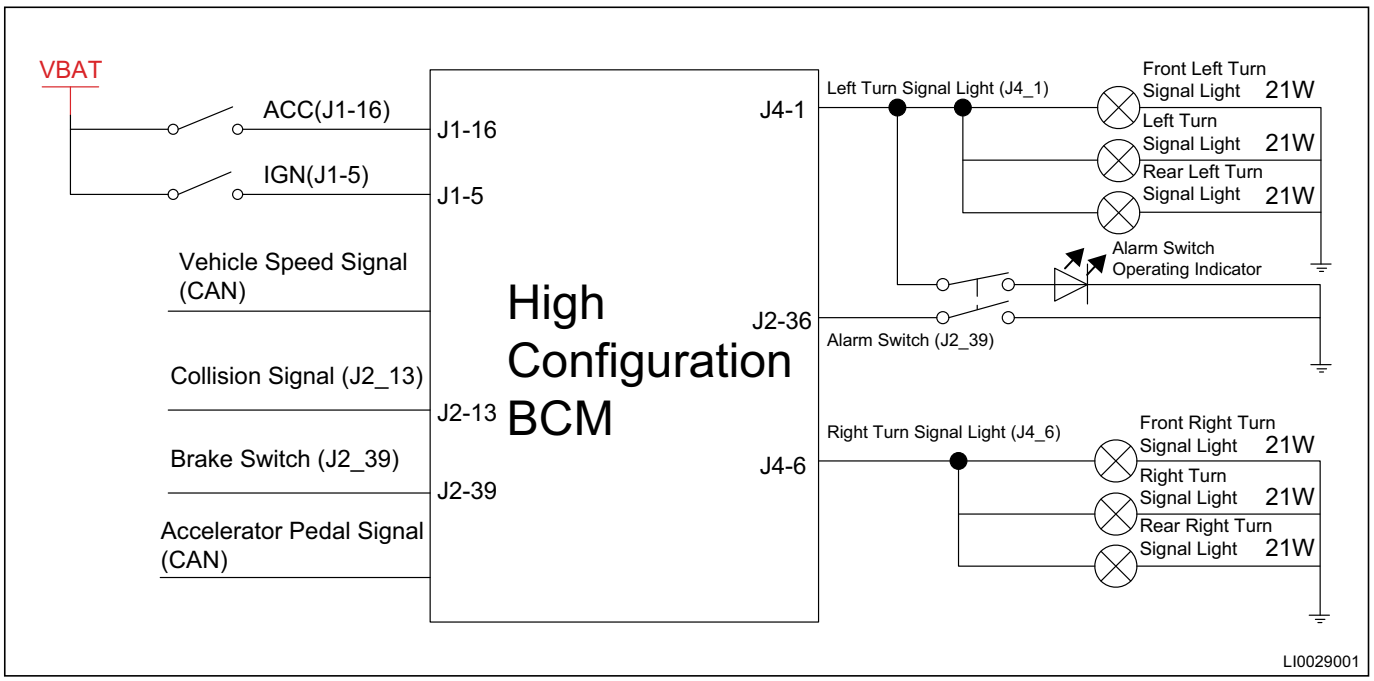
Dome Light Function Description

1. Dome light ON logic (Interior light will fade in within approximately 0.7 seconds)
   - Dome light comes on if the door is opened and it goes off automatically after continuous operating for 10 minutes.
   - In IGN OFF, the dome light comes on if RKE unlocking or central control unlocking command is received. After 30 seconds timing process, the dome light fades out for 3 seconds and then goes off.
2. Dome light OFF logic (Interior light will fade out within 0.7 seconds).
   - In IGN OFF or ACC and all doors are closed, the dome light fades out for 3 seconds after a delay of 30 seconds and then goes off.
   - In IGN ON and all doors are closed, the dome light goes off immediately.
   - Within 30 seconds delay and all doors are closed, the dome light goes off immediately if you turn the POWER switch to IGN ON.
   - In IGN OFF and all doors are closed, the dome light goes off immediately if RKE locking, central control locking or auto re-locking action command is received.
   - When dome light switch is in ON position and all doors are closed, the dome light goes off after receiving RKE/PKE locking commend (because dome light is related to battery save function).
   - Continuously lighting time ends and there is no new trigger condition.

Back-up Light Control Schematic Diagram



Sudden braking hazard warning light control schematic diagram



Sudden Braking Flashing Function Description

If the sudden braking flashing function is activated and the hazard warning light is activated at least 3 seconds, the left and right turn signal lights, indicator and turn signal light CAN signal flash at frequency of 200 ms ON and 200 ms OFF.

1. When all conditions are met, the sudden braking flashing function is activated and begins to flash.
   - With the key in ON position.
   - Brake switch input is activated.
   - The vehicle speed exceeds 50 km/h before decelerating.
   - The vehicle deceleration is 6 m/s.
2. The hazard warning light stops if any of following conditions is met.
   - IGN = OFF.
   - If hazard warning light switch is operated while the function is activated, this function stops immediately.
   - If a collision signal is received while the function is activated, this function stops immediately.

- BCM receives accelerator pedal signal.

On-vehicle Service

Tools

8# socket, 10# socket, flat tip screwdriver, cross screwdriver, ratchet, connecting rod

Specifications

Torque specifications

Part Name	Torque (N·m)
Headlight Fixing Bolt	5 ± 1
Rear Combination Light Fixing Bolt	5 ± 1
Front Fog Light (Luxury) Self-tapping Screw	2 ± 0.5
Installation Point on High Mounted Stop Light	2 ± 0.5
License Plate Light Clip	2 ± 0.5
Front Dome Light Fixing Screw	3.5±0.5

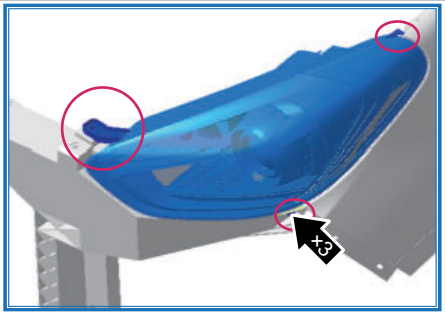
Headlight

Removal

⚠

- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Remove the front bumper assembly (refer to “Interior” and “Exterior” sections in “Body”).
2. Loosen 3 fixing bolts (arrow) of headlight with 10# socket.
   Tightening torque: 5 ± 1 N·m



3. Disconnect wire harness connector from headlight and remove headlight assembly.

Installation

1. Installation is in the reverse order of removal, please refer to the removal steps when installing headlight.

Rear Combination Light

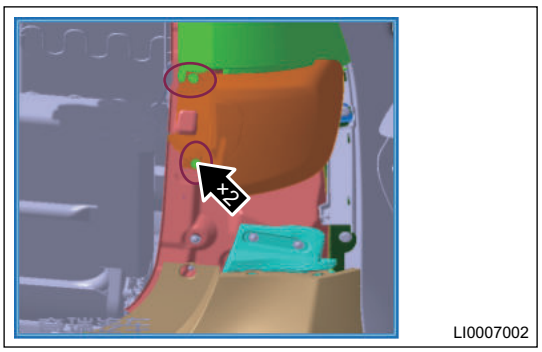
Removal

⚠

- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Open the back door.
2. Remove 2 fixing bolts (arrow) shown in the illustration with 8# socket.

   Tightening torque: 5 ± 1 N·m



3. Forcibly pull the rear combination light backward.
4. Disconnect wire harness connector from rear combination light and remove the rear combination light assembly.

Installation

1. Installation is in the reverse order of removal, please refer to the removal steps when installing rear combination light.

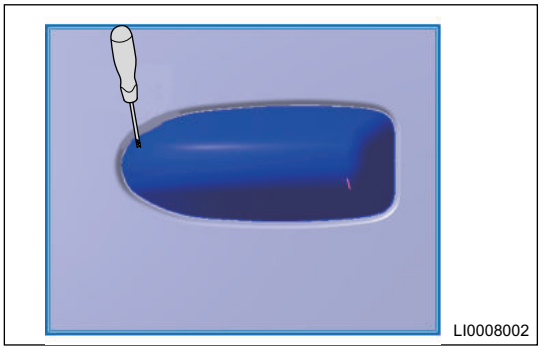
Removal and Installation of Side Turn Signal Light

Removal

⚠

- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Using a flat tip screwdriver, pry off the side turn signal light from the round side (arrow).



2. Disconnect the connector and remove the side turn signal light.

⚠

- During removing, pay more attention to safety and be careful not to scratch the headlight cover and the wing surface.

Installation

1. Installation is in the reverse order of removal, please refer to the removal steps when installing side turn signal light.

⚠

- Pay attention to protect the paint surface and side turn signal light surface during operation.

Front Fog Light (Luxury)

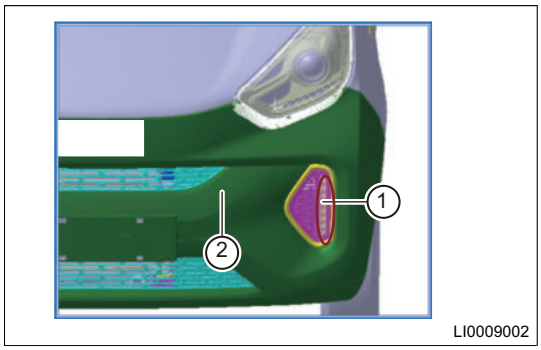
Removal

⚠

- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Remove the front bumper assembly (refer to “Removal and Installation of Front Bumper Assembly” section).
2. Remove 3 self-tapping screws with a cross screwdriver (-there is no order, 1 is front fog light assembly and 2 is front bumper).

   Torque: 2 ± 0.5 N·m



Installation

1. Installation is in the reverse order of removal.

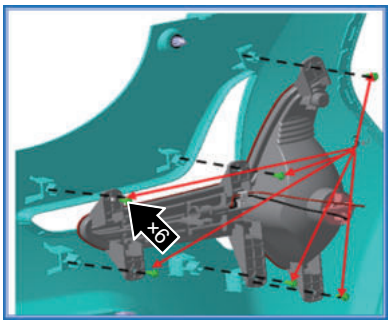
Removal and Installation of Rear Fog Light/Back-up Light

Removal

⚠

- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Remove the rear bumper (refer to “Interior” and “Exterior” sections in “Body”).
2. Disconnect the connectors of rear fog light/back-up light.
3. Remove 6 bolts from rear bumper with a cross screwdriver and remove the rear fog light/back-up light.



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Installation

1. Installation is in the reverse order of removal.

High Mounted Stop Light

Removal

⚠

- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Unscrew 2 installation points (arrow) of high mounted stop light with a cross screwdriver.

LI0011002

2. Pull out the high mounted stop light, disconnect the connector and remove the high mounted stop light.

Installation

1. Installation is in the reverse order of removal.

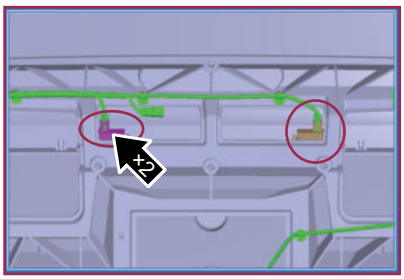
License Plate Light

Removal

⚠

- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

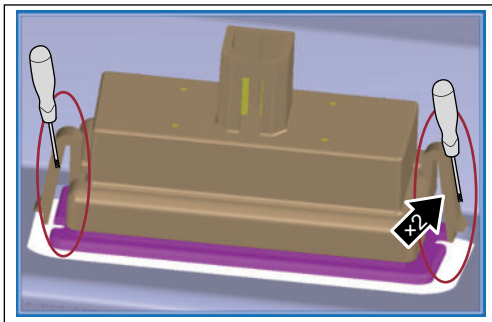
1. Remove the back door protector (refer to “Interior” and “Exterior” sections in “Body”).
2. Disconnect the connectors (arrow) from license plate light.



LI0012002

3. Press the clips (arrow) with a flat tip screwdriver and remove the license plate light.

   Tightening torque: 2 ± 0.5 N·m



LI0013002

Installation

1. Installation is in the reverse order of removal.

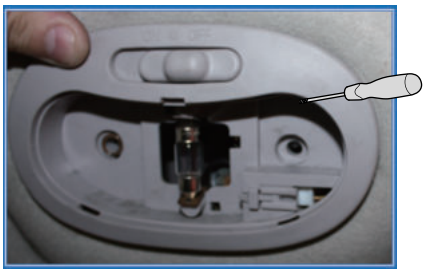
Front Dome Light

Removal

⚠

- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Using a flat tip screwdriver, pry off the front dome light cover.



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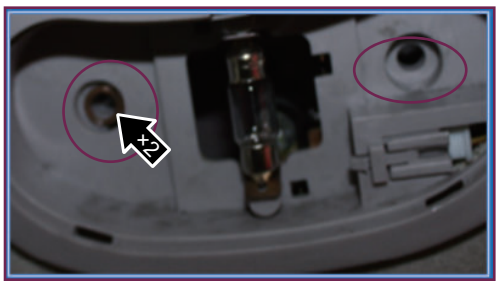
⚠

- Do not scratch the ornament surface when removing the module.

2. Remove the fixing screws (arrow) from front dome light.

   Tightening torque: 3.5 ± 0.5 N·m



LI0015002

3. Remove the front map light and disconnect the connectors.

Installation

1. Installation is in the reverse order of removal.

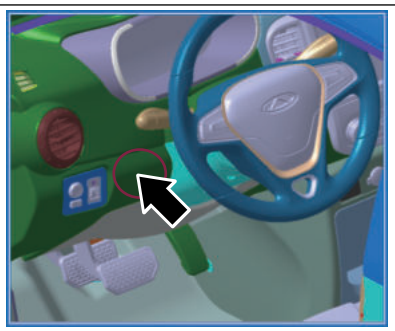
Brake Switch

Removal

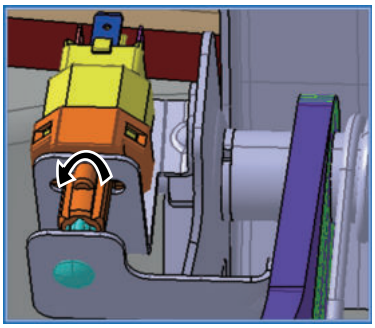
⚠

- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Remove the left lower protector (arrow).


LI0016002

2. Disconnect the brake switch connector.
3. Press and hold foot rest and rotate the brake switch 90° to remove it.


LI0017002

Installation

1. Depress the brake pedal and then align the switch adjusting rod with the installation hole on brake pedal. Rotate it clockwise by approximately 90° after inserting into the installation hole and then release the brake pedal.

⚠

- Make sure that the brake switch lever is in the longest extension state before installing to vehicle.

2. Connect the wire harness connector to brake switch.
3. Install the left lower protector.

Headlight Leveling Switch

Removal

⚠

- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Remove the switch set panel (arrow) and disconnect the connector.


LI0018002

2. Press and hold the clip to remove the headlight leveling switch.

Installation

1. Installation is in the reverse order of removal.

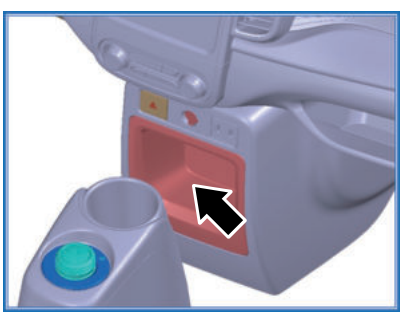
Hazard Warning Light Switch

Removal

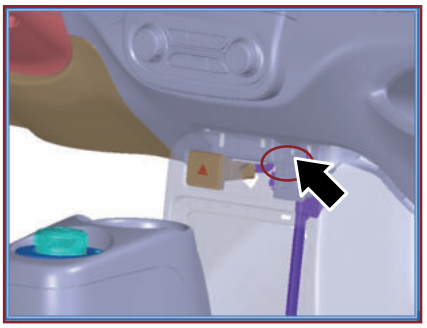
⚠

- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Remove the storage box trim panel body (arrow).


LI0019002

2. Disconnect the wire harness connector (arrow).


LI0020002

3. Remove the hazard warning light switch.

Installation

1. Installation is in the reverse order of removal.

Door Contact Switch

Removal

⚠

- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Unscrew the self-tapping screw (arrow).


LI0021002

2. Disconnect the connector and remove the rear door contact switch.

Installation

1. Perform installation in the reverse order of removal.

Combination Switch

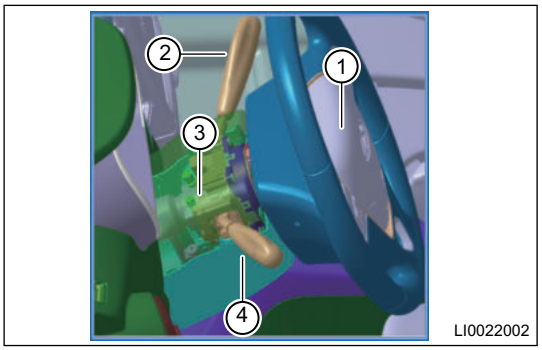
Removal

⚠

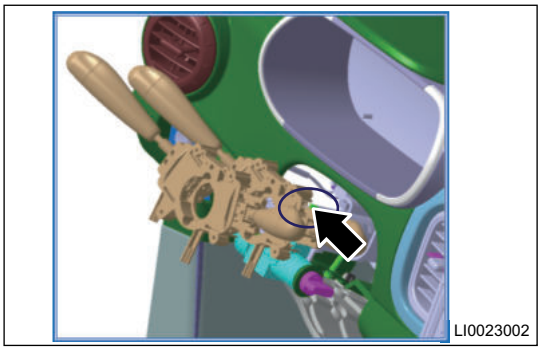
- Disconnect the battery before removal.
- Be sure to wear necessary safety equipment to prevent accidents.
- Try to prevent the front combination light from being scratched while removing and installing;
- Do not apply excessive force when removing and installing in a low temperature environment to prevent the front combination light from being cracked.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Remove the steering wheel (1), combination switch cover (4) and spiral cable (3).

   (combination switch is 2)



2. Disconnect the wire harness connector.
3. Remove the mounting screw (arrow) from combination switch.



4. Remove the combination switch.

Installation

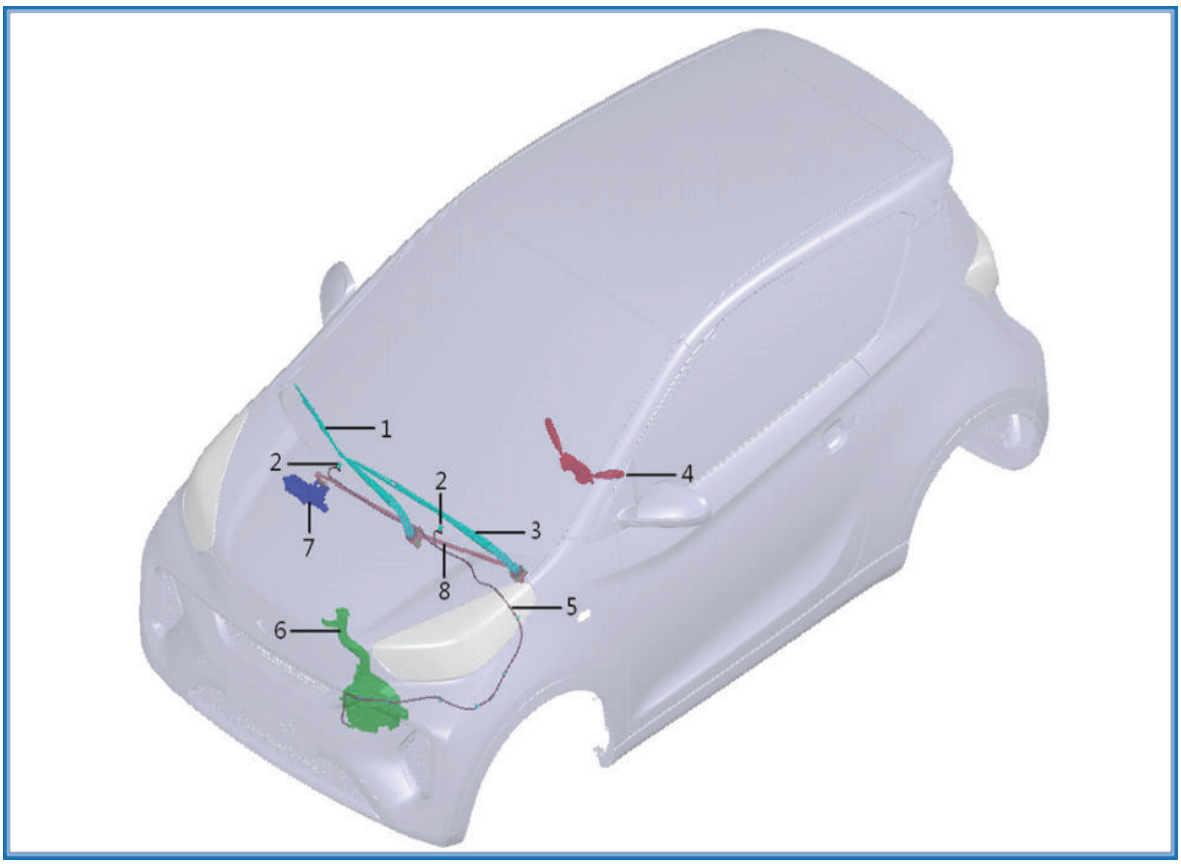
1. Installation is in the reverse order of removal.

WIPER AND WASHER

WIPER AND WASHER SYSTEM

System Overview

System Components Diagram



WW0001001

1	Sub Wiper Arm Assembly	2	Front Nozzle
3	Main Wiper Arm Assembly	4	Wiper and Washer Switch
5	Front Washer Pipeline Assembly	6	Washer Reservoir Assembly
7	Front Wiper Motor	8	Link Rod Assembly

Function Description

Wiper Low Speed

- When the following conditions are met simultaneously:
  - POWER switch ON.
  - Front wiper high speed switch is ON.
- The output of the front wiper low speed and high speed power pin is low, the output of the front wiper low speed and high speed select pin is low, and the front wiper operates at high speed.
- POWER switch OFF, front wiper runs at low speed for current cycle, and stops output when the stop position signal is detected.

- POWER switch IG, front wiper high speed switch is OFF, low speed switch is OFF, front wiper runs at low speed for current cycle, and stops output when the stop position signal is detected.
- POWER switch ON, front wiper high speed switch changes from ON to OFF, and low speed switch changes from OFF to ON, front wiper enters the low speed operation state in current cycle.

Wiper Intermittent

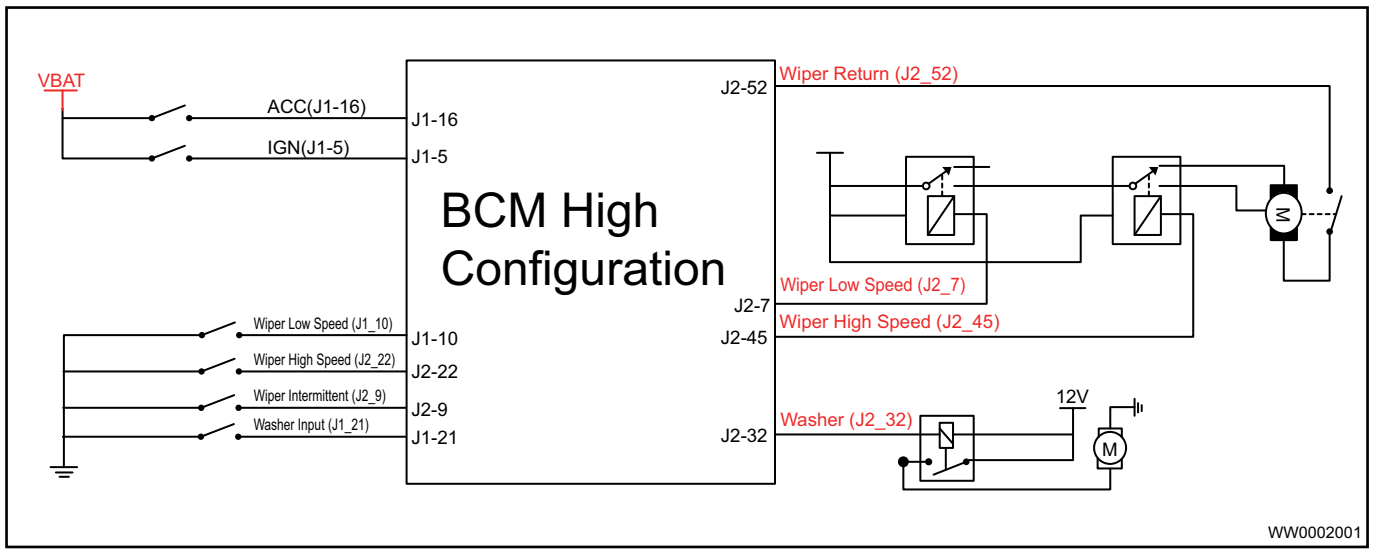
- When the following conditions are met simultaneously
  POWER switch IG ON.
  Front wiper intermittent switch is ON.
- During operation of wiper, change the POWER switch from ON to OFF, wiper will return to the stop position.

Washer

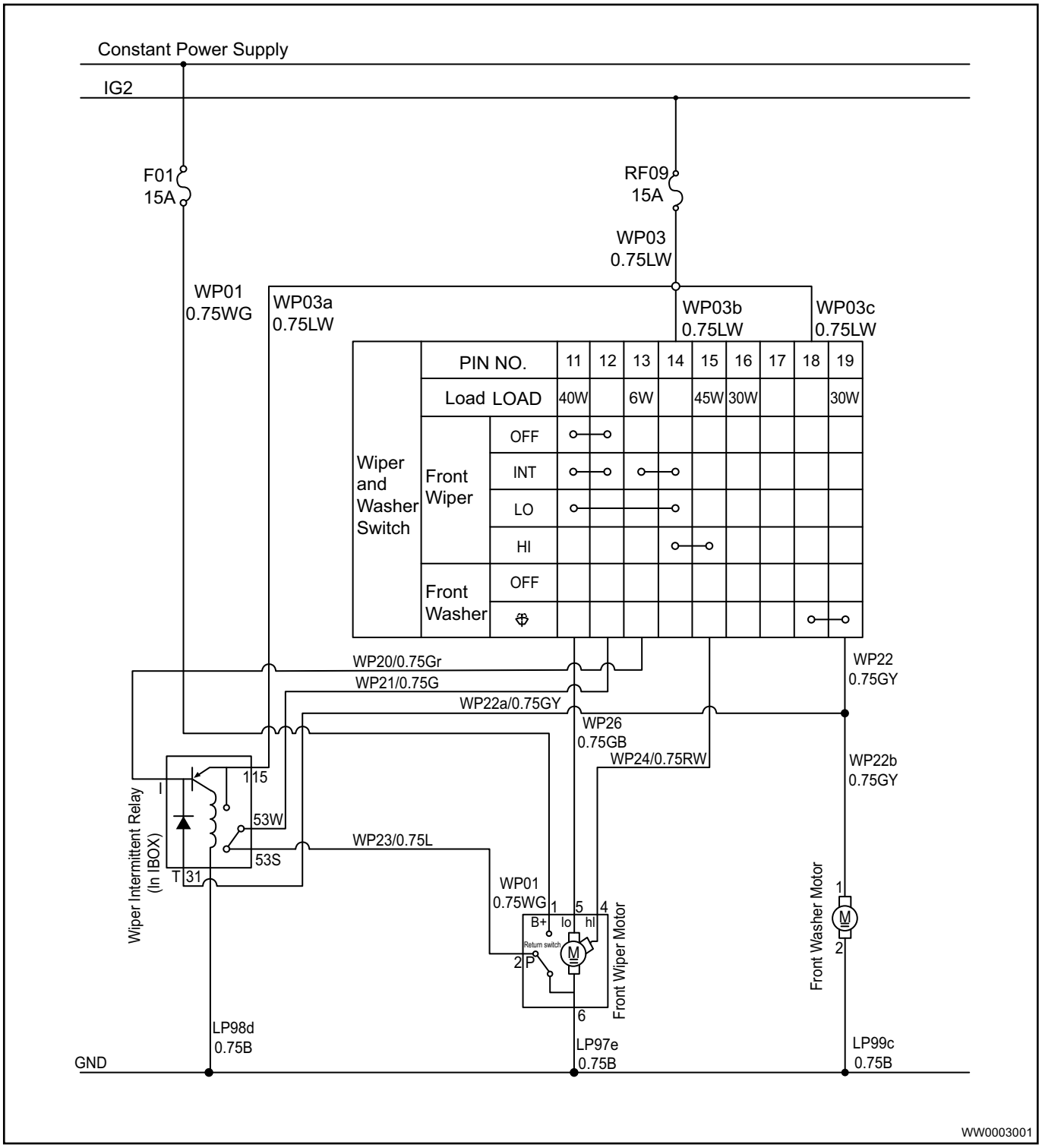
- When front wiper switch is OFF, if pressing and holding the front washer switch for 300 ms, front wiper operates at low speed. After releasing the switch, front wiper operates for 3 cycles (including current operating cycle), and works for another cycle after an interval of 6 seconds.
- When front wiper switch is in intermittent gear, if pressing and holding the front washer switch for 300 ms, front wiper operates at low speed. After releasing the switch, front wiper operates for 3 cycles (-including current operating cycle) and returns to intermittent operation.
- When front wiper switch is in high speed gear or low speed gear, if pressing and holding the washer switch for 300 ms, front wiper still runs at high or low speed.
- When front washer switch ON time is less than 300 ms, wiper motor does not operate.

Control Principle and Pin Definition

Luxury Model

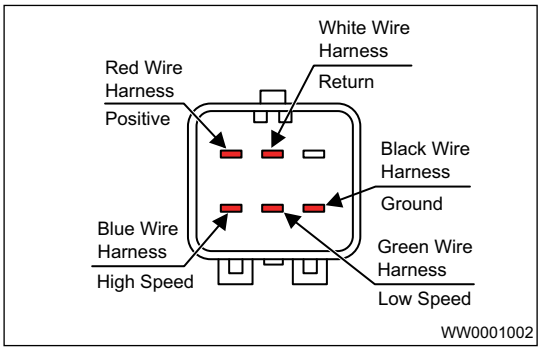


Comfort Model

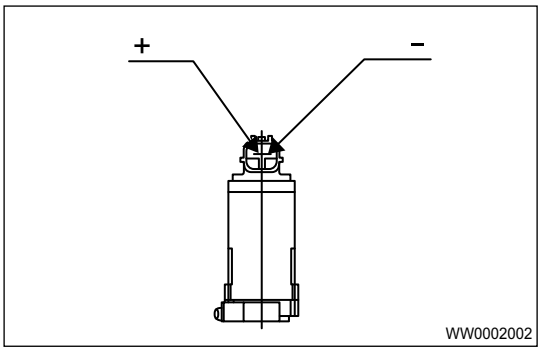


Connector Pin Definition

Wiper Motor



Washer Reservoir



Removal and Installation

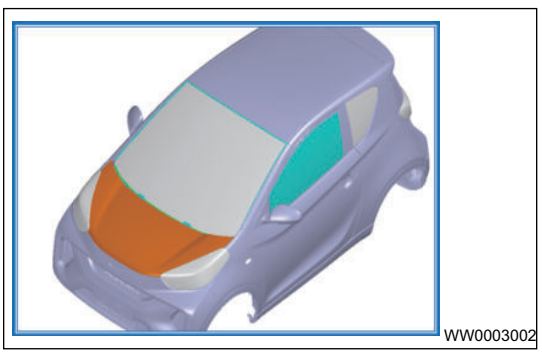
Specifications

Torque Specifications

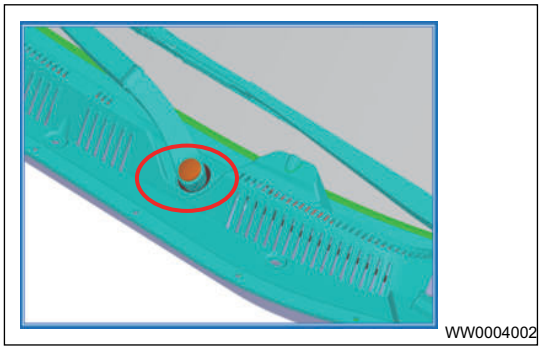
Part Name	Torque (N·m)
Mounting Nut between Sub Wiper Arm and Output Shaft	18 ± 2
Mounting Nut between Wiper Output Shaft and Bracket	5 ± 1

Removal and Installation of Main and Sub Wiper Arm

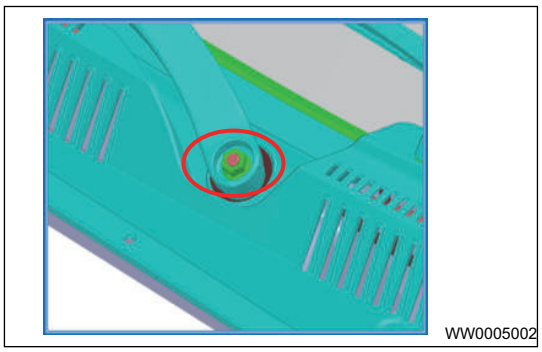
1. Turn off all electrical equipment and power switch, and disconnect the negative battery cable.
2. Remove the front compartment cover assembly (refer to “Body and Interior & Exterior” section).



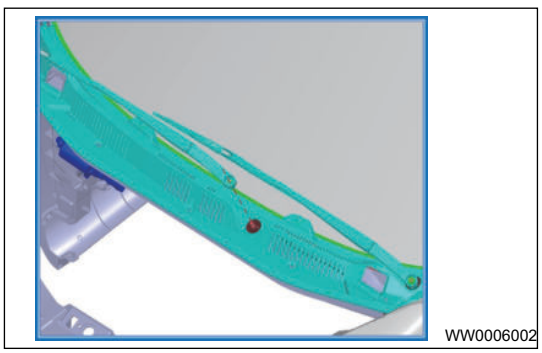
3. Remove sub wiper arm trim cap with a flat tip screwdriver.


WW0004002

4. Remove mounting nut between sub wiper arm and output shaft with torque wrench and socket 13#.
   Tightening torque: 18 ± 2 N·m


WW0005002

5. Remove sub wiper arm from installation position of output shaft (Removal steps of main wiper arm are the same).


WW0006002

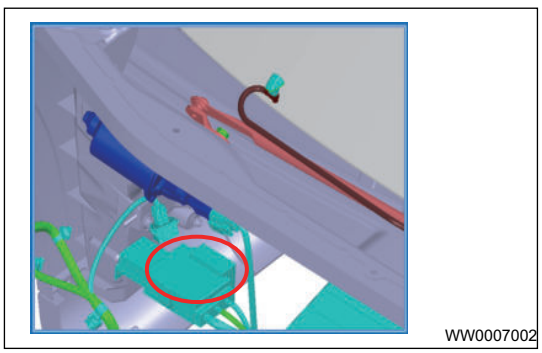
Installation

1. Installation is in the reverse order of removal.

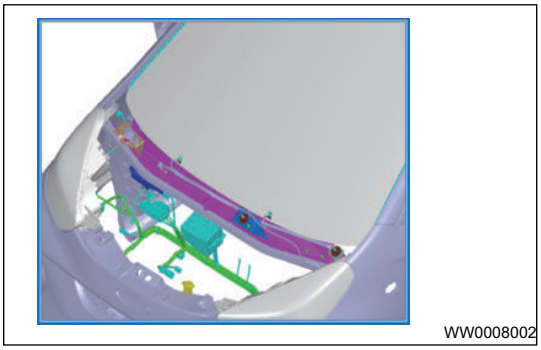
Removal and Installation of Link Rod Assembly and Wiper Motor

Removal

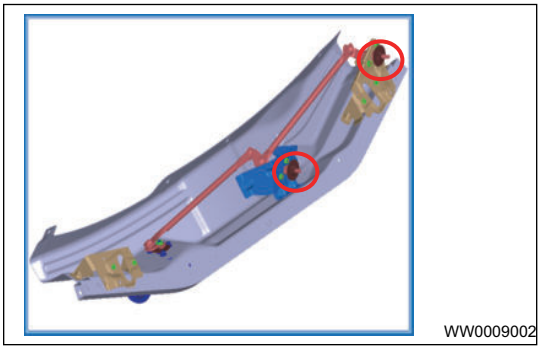
1. Turn off all electrical equipment and POWER switch, and disconnect the negative battery cable.
2. Remove front compartment cover assembly, main and sub wiper arms (refer to this section).
3. Remove the front windshield lower trim panel assembly.
4. Disconnect connectors from wiper motor and link rod assembly.


WW0007002

5. Remove the gutter channel assembly.

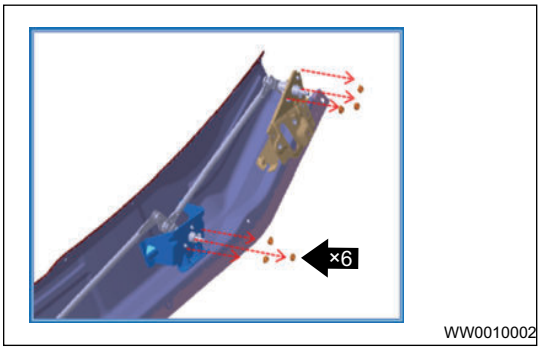


6. Remove the wiper output shaft trim.

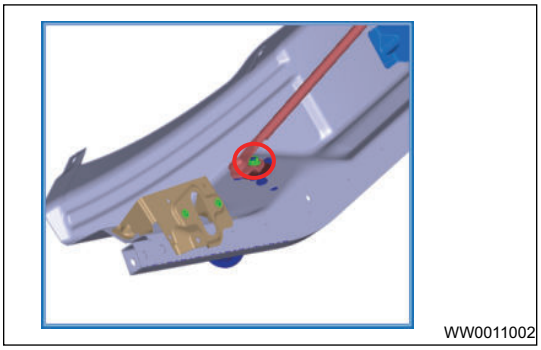


7. Remove 6 mounting nuts between wiper output shaft and bracket.

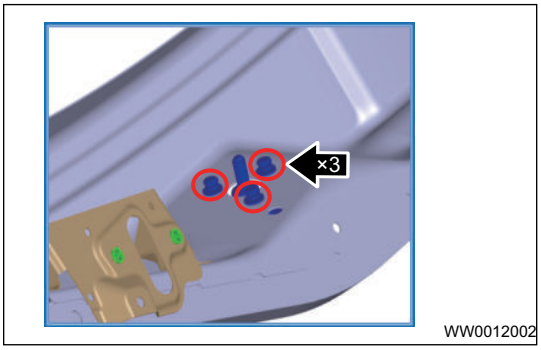
   Torque: 5 ± 1 N·m



8. Remove coupling nut between wiper connecting rod crank and wiper motor output shaft with torque wrench, and remove wiper link rod assembly.



9. Remove 3 coupling bolts (arrow) between wiper motor and gutter channel, and remove wiper motor.



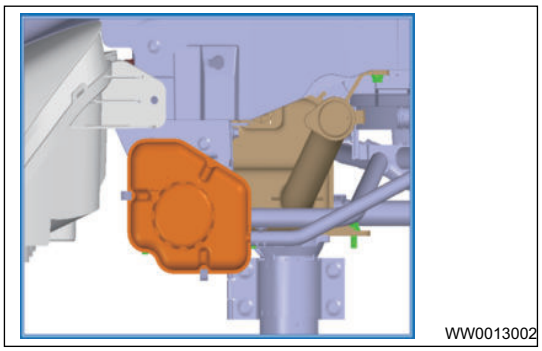
Installation

1. For installation steps of main and sub wiper arm assembly, link rod assembly, wiper motor assembly, installation is in the reverse order of removal.

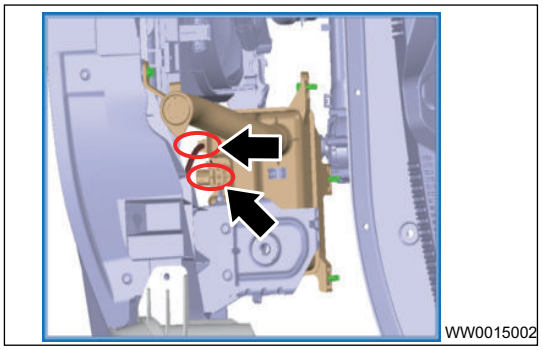
Removal and Installation of Washer Reservoir

Removal

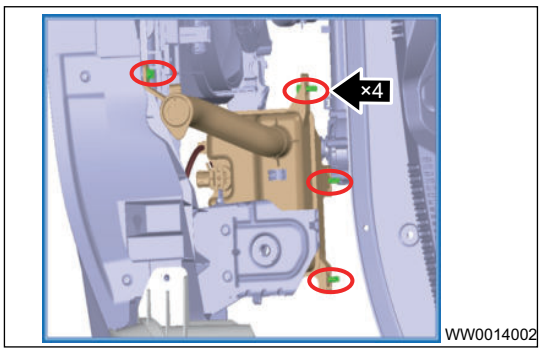
1. Remove the expansion tank.



2. Disconnect connector and washer pipeline (arrow).



3. Loosen 4 mounting bolts (arrow) around reservoir, and remove the reservoir.



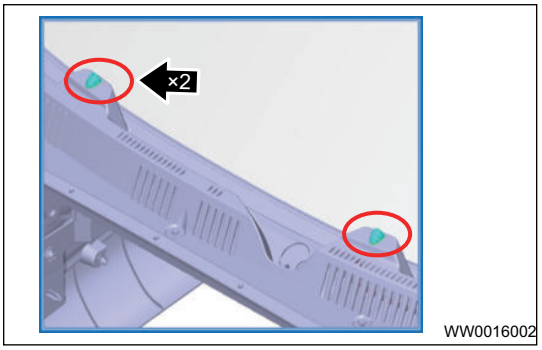
Installation

1. Installation is in the reverse order of removal.

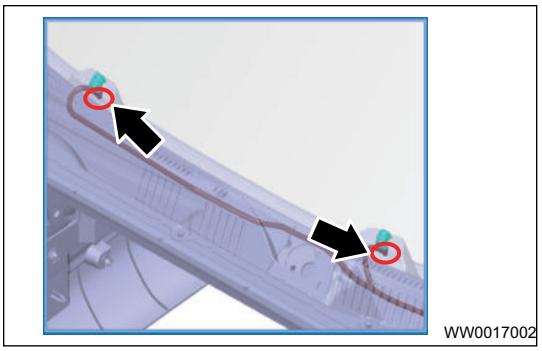
Removal and Installation of Front Nozzle

Removal

1. Pry off 2 washer nozzles (arrow) with a tool.



2. Disconnect the washer pipeline (arrow), and remove washer nozzle.



Installation

1. Installation is in the reverse order of removal for front nozzle.

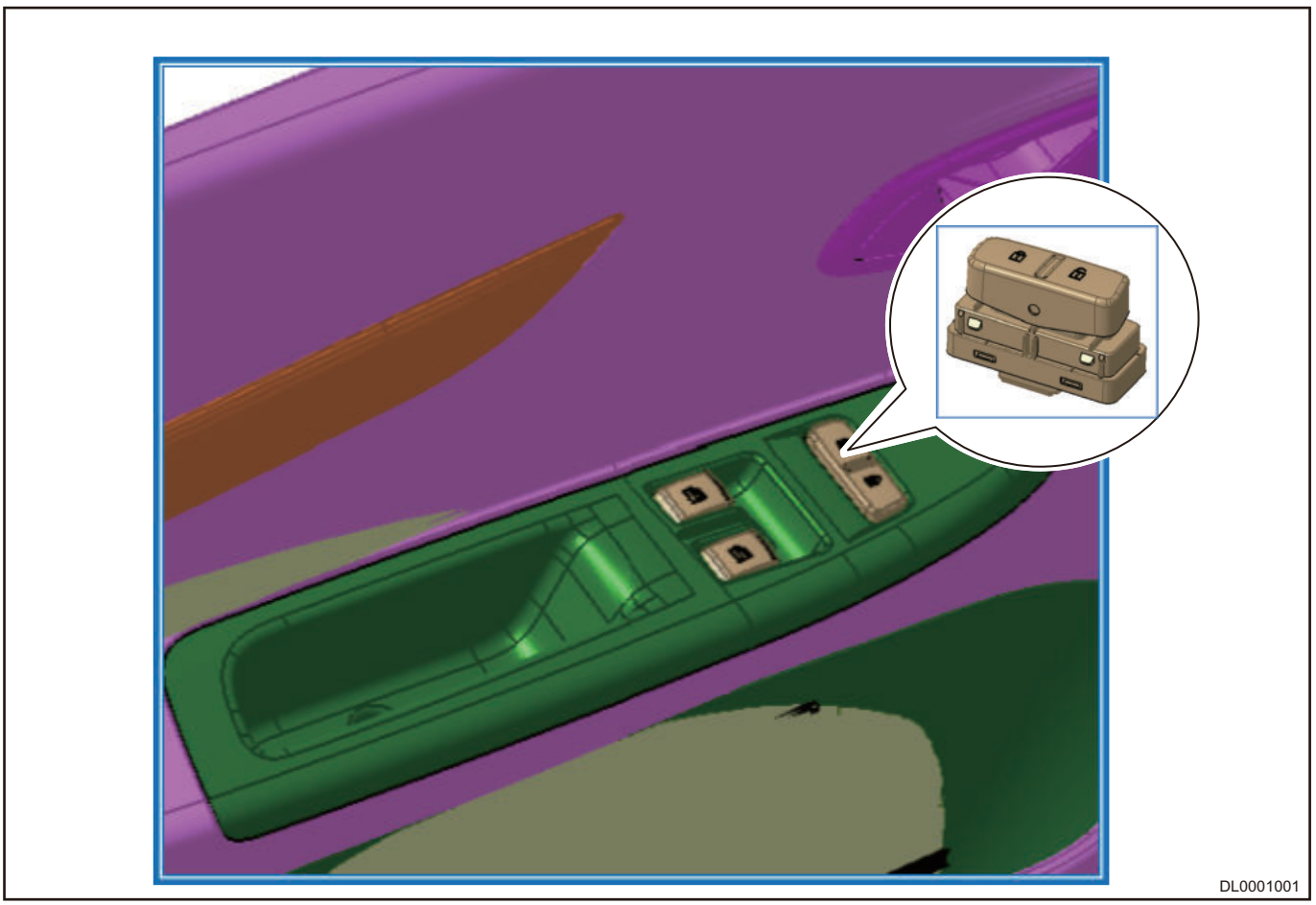
DOOR LOCK

CENTRAL CONTROL LOCK UNLOCKING AND BACK DOOR OPENING

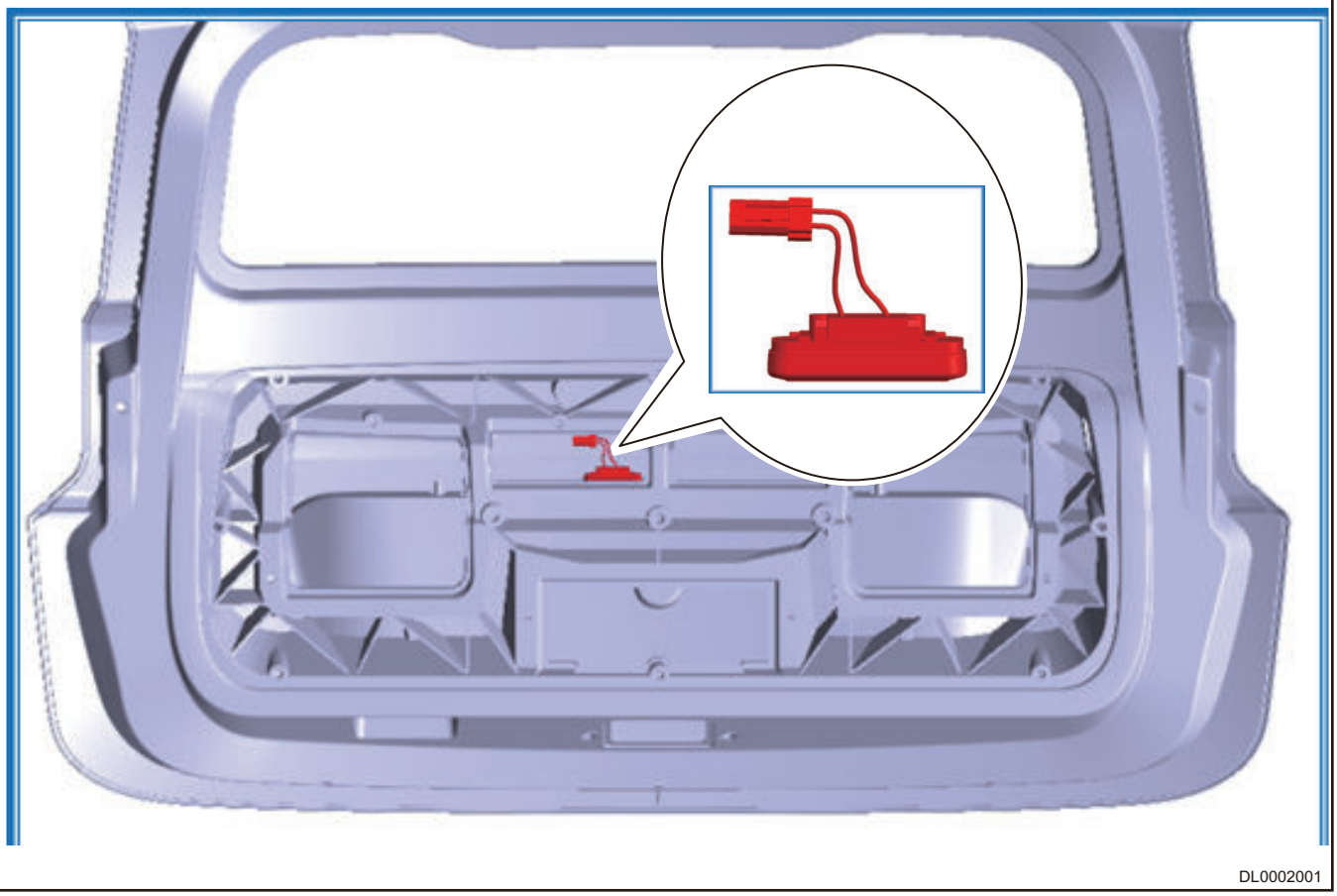
System Overview

System Composition

Central Control Lock Switch
The central control lock switch is installed on the front left door switch panel and is used to control the locking of doors on both sides to prevent potential safety hazards caused by accidentally touching the door handle.



Back Door Opener Switch
Back door opener switch is installed on back door assembly. It provides input signal for BCM system to open the back door.



Component Function Description

Central control lock

- Locking/unlocking
  - In the unlocked and all doors closed state, locking signal is input and lock operation is performed.
  - In the locked state, unlocking signal is input and unlock operation is performed.

    Note
    - ♦ Locking function is invalid when any door is opened.
    - ♦ Operation time of door lock motor is 600 ± 50 ms.
- Protection function
  - In order to protect central control door lock, the central control lock will work continuously for 8 times within 10 seconds, and the central control lock will fail within the following 15 seconds (the remote locking is fail within 15 seconds, and remote unlocking works normally).
- Priority
  - The central control door lock function and power window function cannot be performed at the same time. If the central control door lock function and power window function are performed at the same time, central control door lock function shall be performed first, and power door and window function shall be performed after central control door lock function is completed.
  - In sleep status, when the status of lock/unlock pin signal changes, BCM can perform the corresponding action.

Back door can be opened when any of following conditions is met

- In fortifying deactivation mode, press back door opener switch to unlock the back door.

- When IGN OFF and in fortifying mode, press back door unlock button on remote control key within 30 seconds (back door opening mode), press the back door opener switch to unlock the back door.

Back door opening mode

- Opening the back door in back door opening mode will not trigger the alarm.
- If any of following conditions is met, back door opening mode will be exited and fortifying state is entered.
  - Back door will not be opened within 30 seconds, and timer ends for 30 seconds.
  - Back door will be opened within 30 seconds, then the back door is closed.
  - Press the remote locking button.

    Note

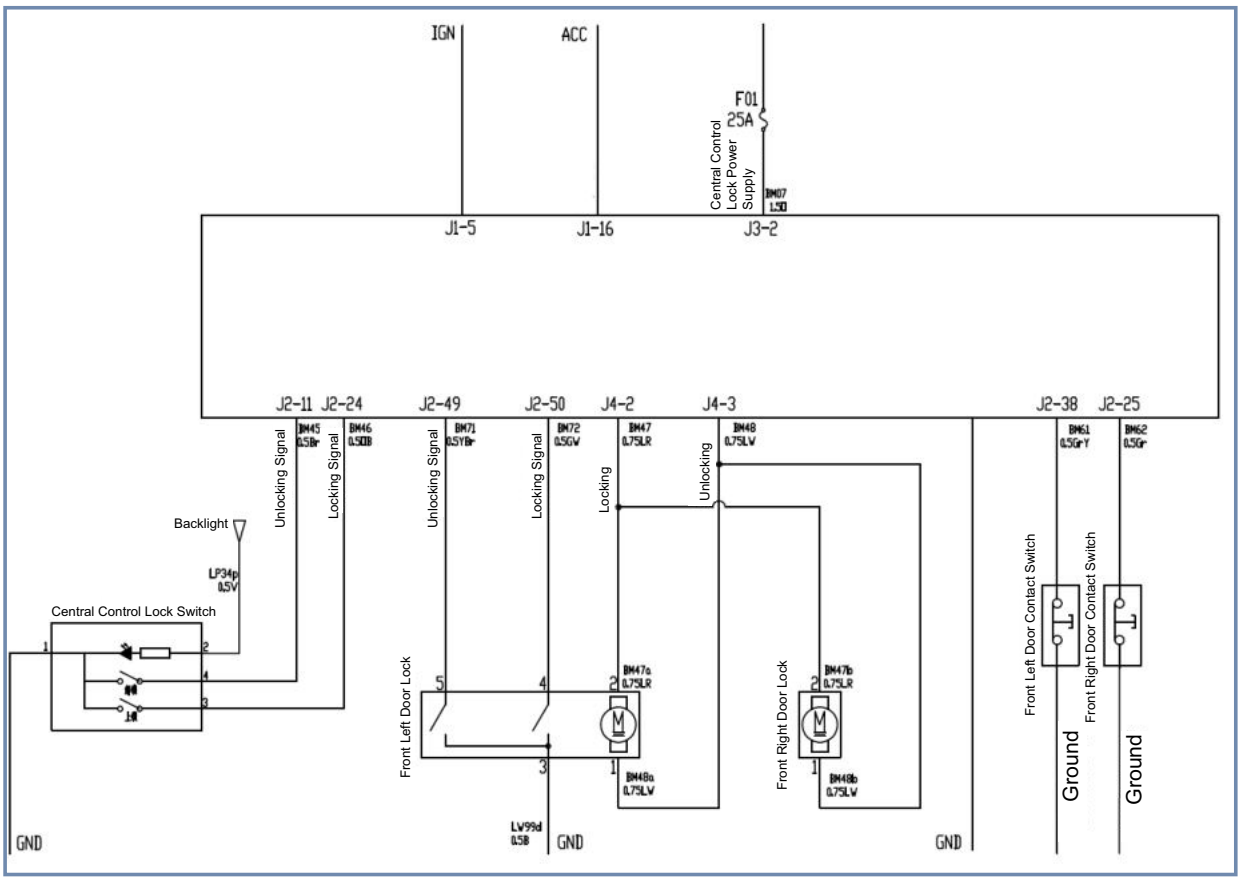
    ♦ Pressing the back door unlock button of remote control key will not unlock the back door.

    ♦ When luggage compartment is operated for 8 or more times within 10 seconds, luggage compartment will turn on the thermal protection function, and luggage compartment will be forbidden to operate for 15 seconds, and the function will be restored after 15 seconds.

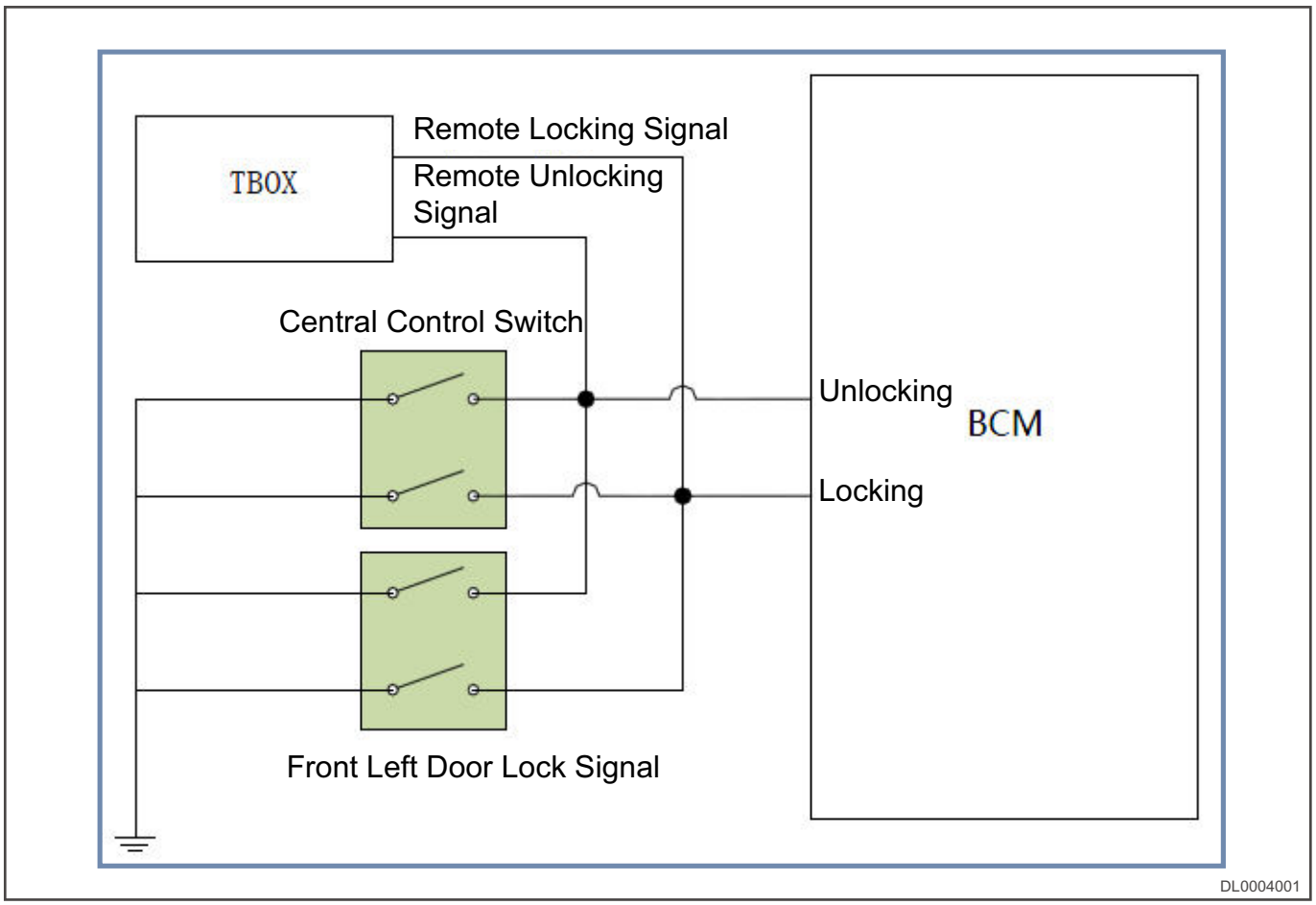
System Circuit Diagram

Control Schematic Diagram

Lease model, luxury model

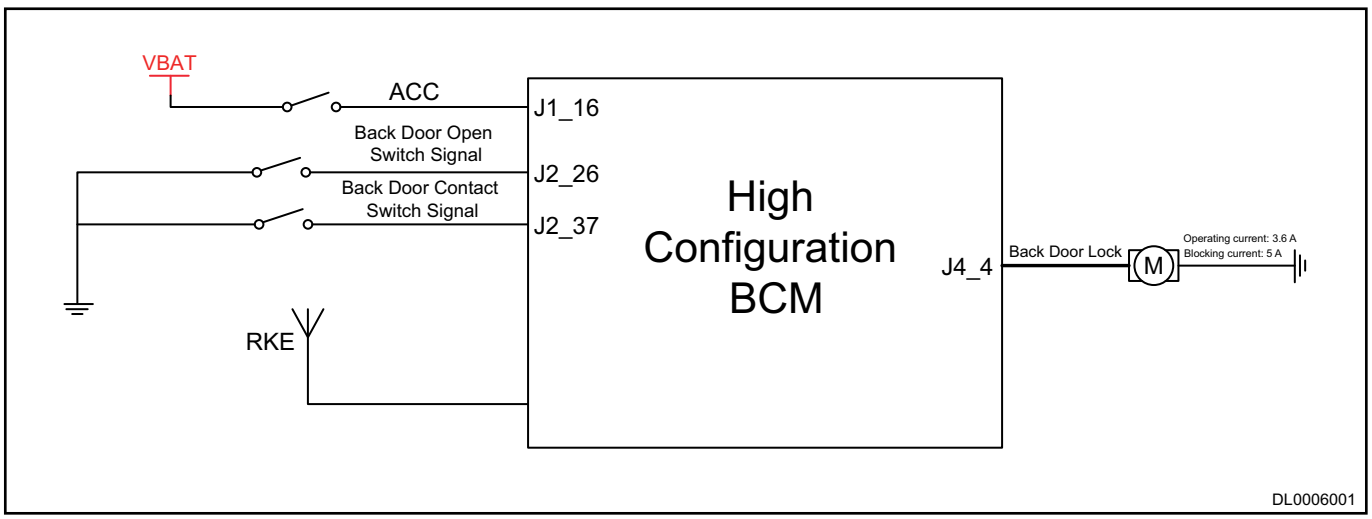


Comfort model

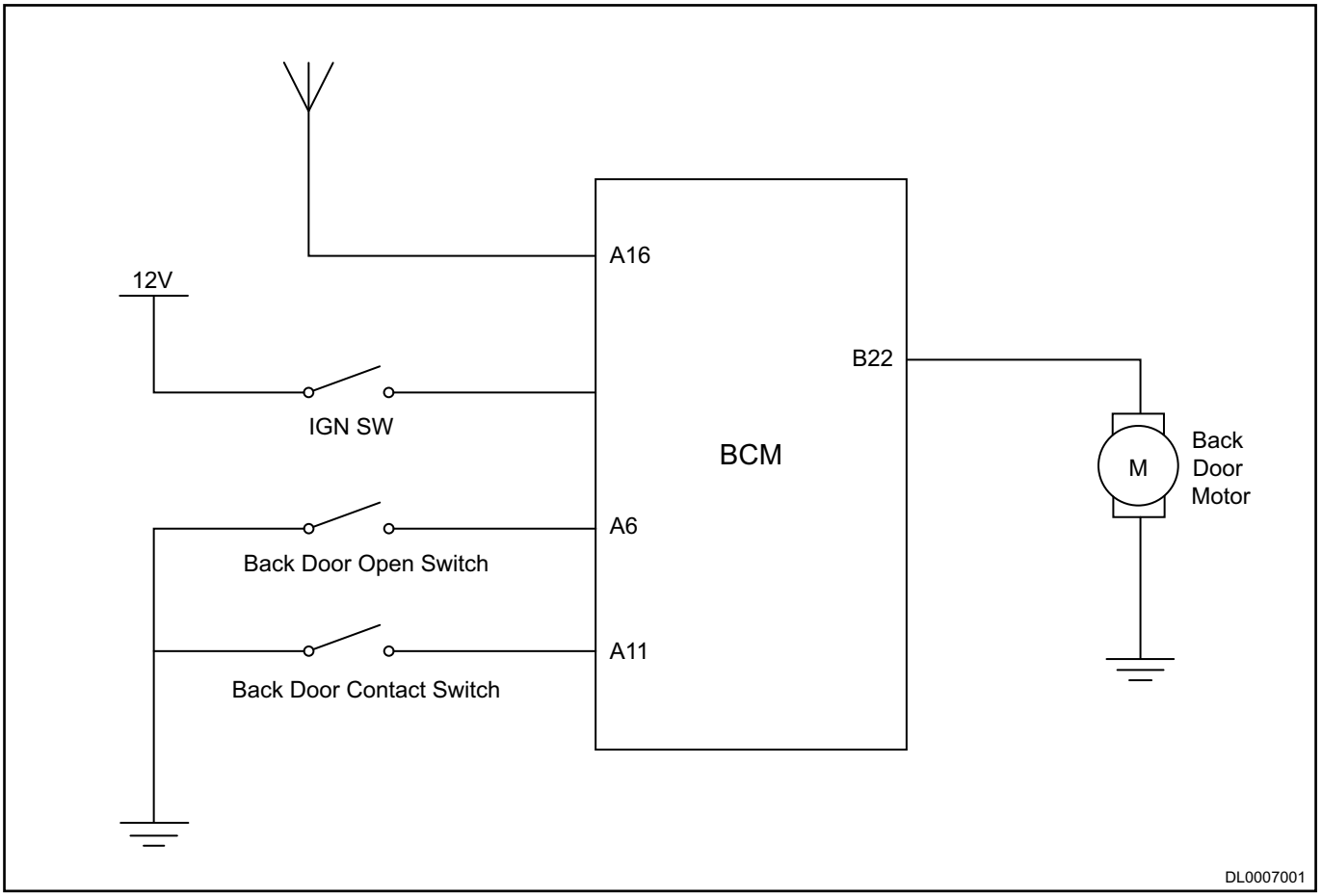


Back Door Lock Control Principle

Lease model, luxury model

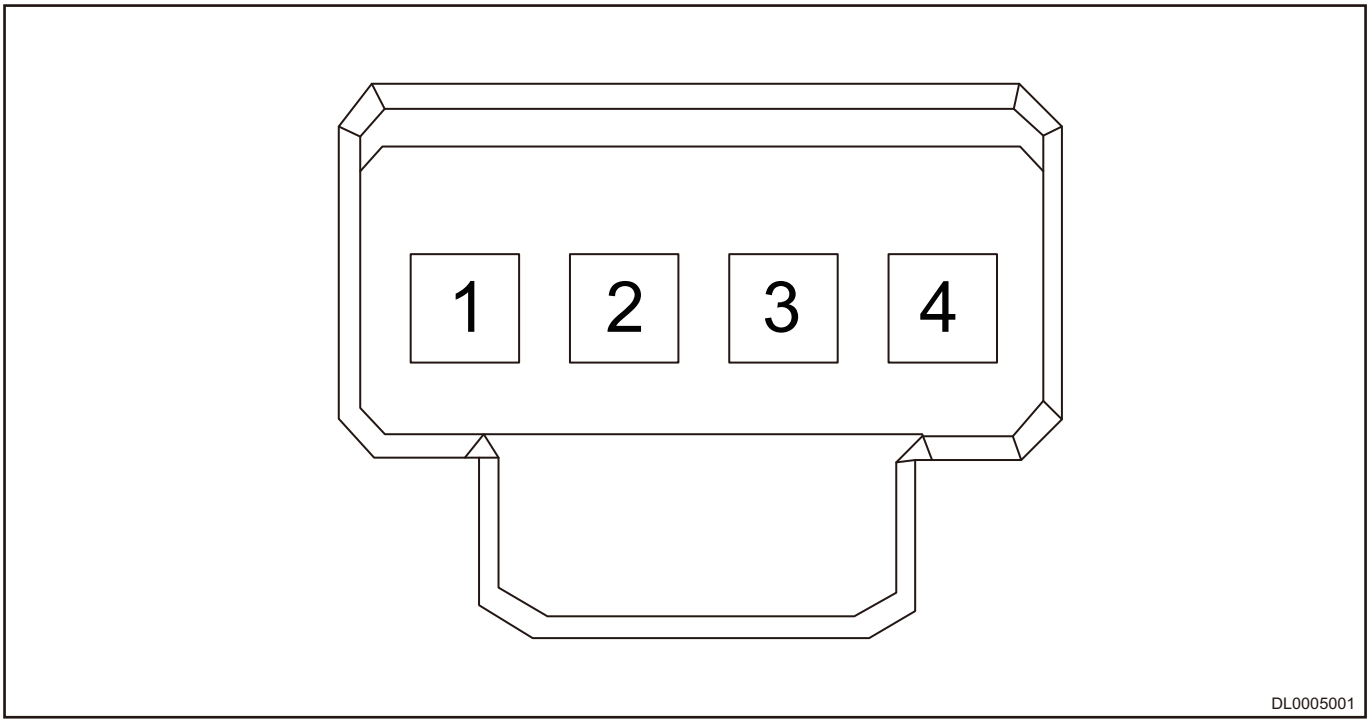


Comfort model



Module Terminal Definition

Central control switch pin definition



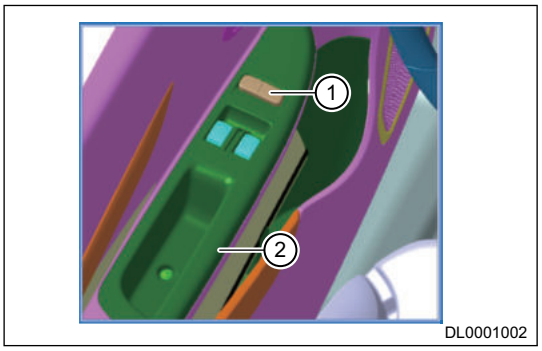
Terminal	Definition
1	Ground
2	Backlight Power Supply
3	Lock Input
4	Unlock Input

On-vehicle Service

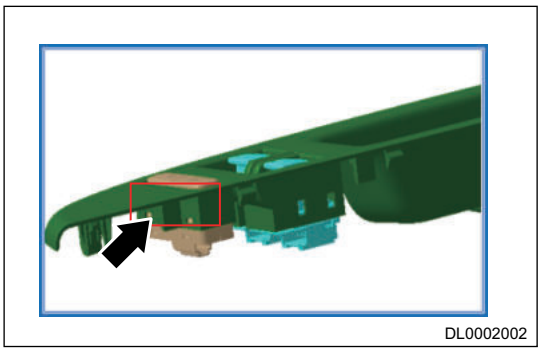
Central Control Switch

Removal

1. Remove the switch panel (1 is central control switch, 2 is switch panel).



2. Disconnect the connector.
3. Pry up the central control lock switch with a special tool (- arrow indicates the prying point).



Installation

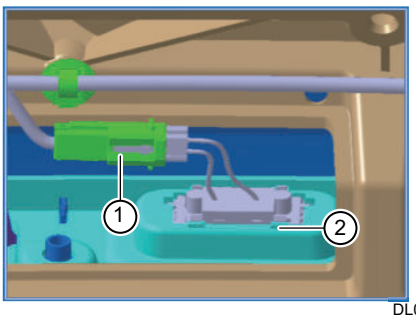
1. Installation is in the reverse order of removal.

Back Door Switch

Removal

1. Remove the back door inner protector.

2. Disconnect the connector (1).
3. Press and hold the clip, remove back door opener switch (2).



DL0003002

Installation

1. Installation is in the reverse order of removal.

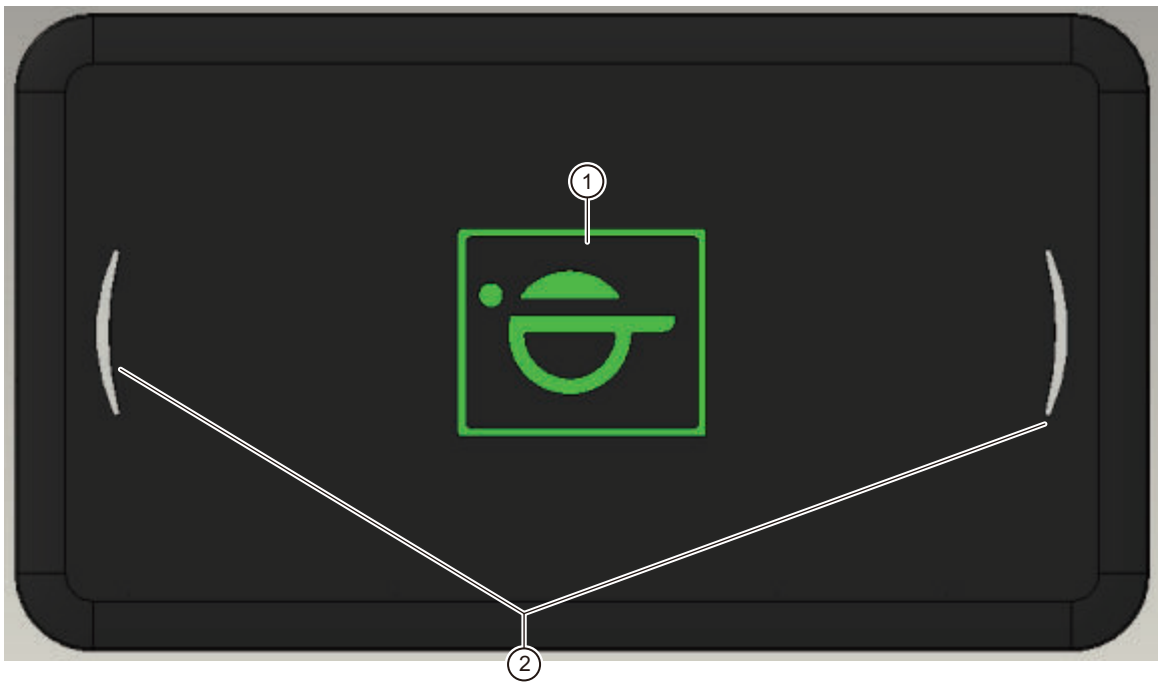
WIRELESS CHARGING SYSTEM

WIRELESS CHARGING SYSTEM

System Overview

System Description

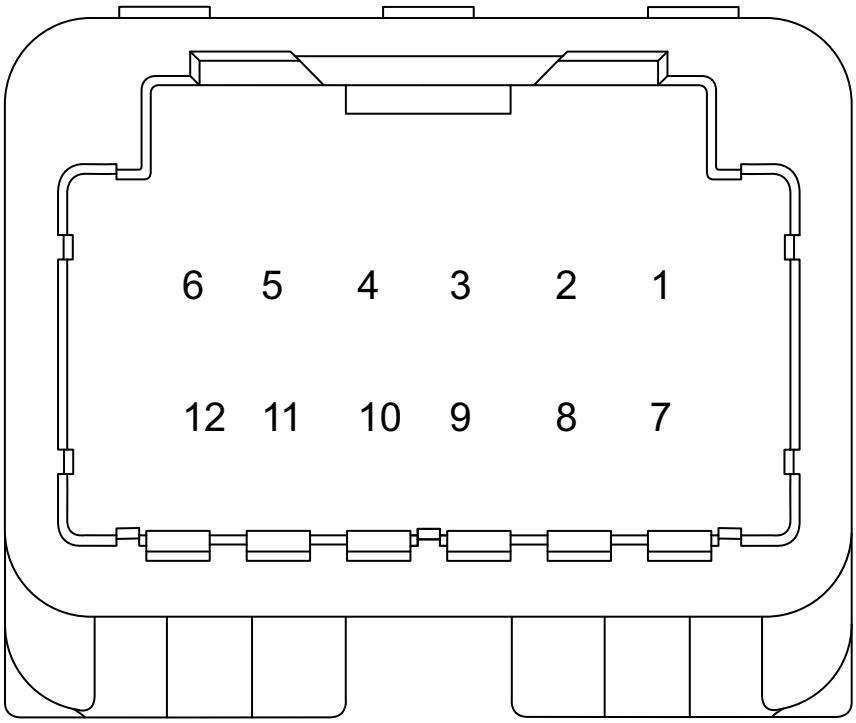
Its main function is to provide wireless charging function for mobile devices of users that support wireless charging, it is convenient for users to charge the mobile devices that support wireless charging (1 is uncharged sign , 2 is operation status).



OT0001001

System Circuit Diagram

Module Terminal Definition



OT0002001

Interface Type			
Pin	Functional Definition	Current Requirements	Note
1	-	-	-
2	-	-	-
3	MUTE	50	-
4	-	-	-
5	-	-	-
6	GND	5A	-
7	-	-	-
8	-	-	-
9	-	-	-
10	-	-	-
11	-	-	-
12	ACC	5A	-

Diagnosis & Test

Diagnosis Procedure

Wireless Charging Module Head Unit Failure Detection

1. Check if positive and negative output wire harnesses are connected properly to connector, if there is loose short circuit.
2. Use DC voltage band of digital multimeter, the red probe is connected to positive of wire harness end connector, and black probe is connected to negative of wire harness end connector. When voltage on multimeter is 12 V ± 0.5, the power supply is normal. If there is no voltage display or voltage display is 16 V or more or 9 V or less, the power supply of vehicle is abnormal.
3. If the power supply is normal, check the operation status indicator of wireless charging module. The red indicator indicates fault mode, and the blinking green indicator indicates normal working mode.
4. If there is a receiving device, the blinking green indicator indicates that wireless charging module circuit works normally, and the blinking red indicator indicates that wireless charging module circuit works abnormally, please replace with a new one.

On-vehicle Service

Tools

- Tools

  Interior crow plate, multimeter.

- Protection Equipment

  Cotton gloves, insulating gloves, working clothes, working shoes.

Removal & Installation of Wireless Charging Module

Removal

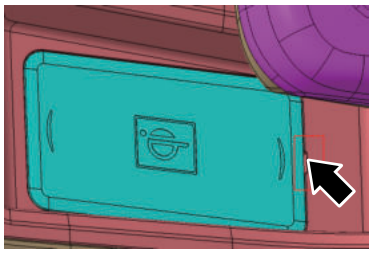
⚠

- Be sure to wear necessary safety equipment to prevent accidents.
- Please make sure that the vehicle is powered off before removal or installation to avoid accidents.
- Avoid scratching interior during removal and installation.

Pry up the wireless charging module from one side of notch from auxiliary fascia console (the notch is on the auxiliary fascia console), and unplug wire harness end connector of wireless charging module.

Item	Name	Part No.	Quantity	Tightening Torque	Note
1	Wireless Charging Module	J72-7911072FA	1	-	-

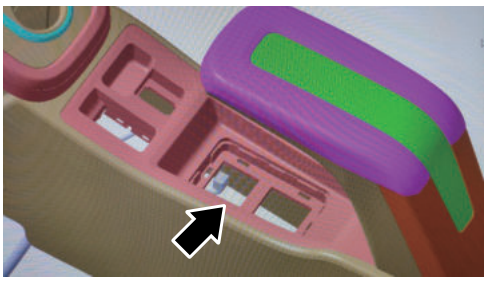
1. Pry up the wireless charging module first (arrow).


OT0001002

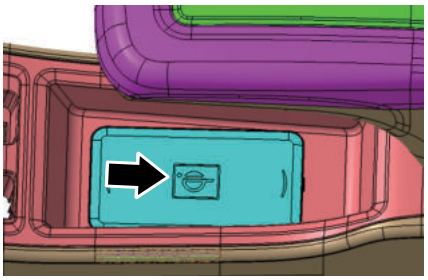
2. Disconnect the instrument cluster connector.

Installation

1. Pull out wire harness from hole position (arrow) now.


OT0002002

2. Connect the wireless charging module connector properly.
3. Assemble wireless charging module to auxiliary fascia console (in direction of arrow).


OT0003002

4. Press down and assemble wireless charging module in place.

INSTRUMENT CLUSTER

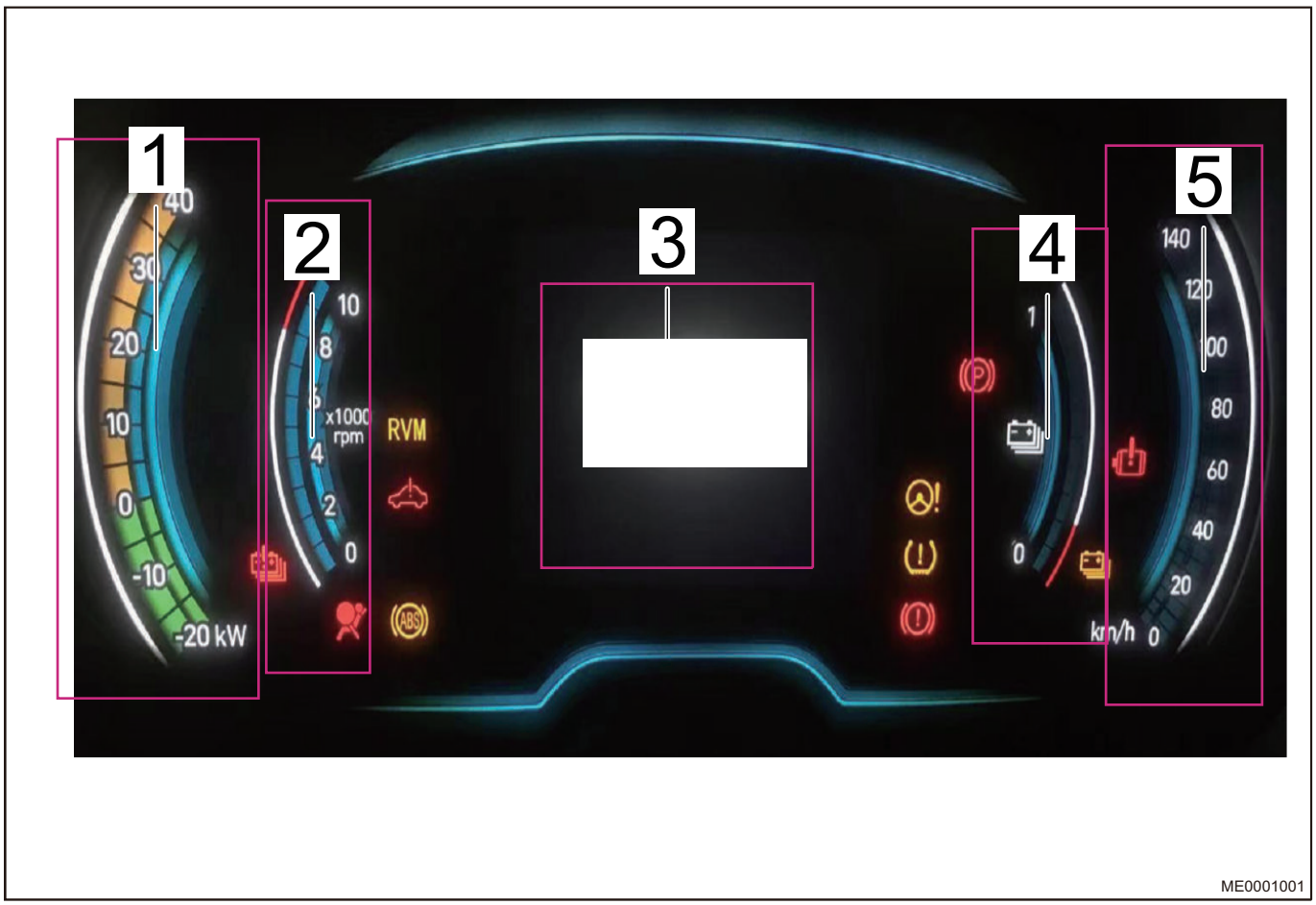
INSTRUMENT CLUSTER

System Overview

System Description

1. Tachometer and electricity meter are simulated and displayed on a segment code screen.
2. Instrument cluster adopts blue LED backlight lighting.
3. Instrument cluster adopts TN technology and two negative LCD displays are arranged.
4. A total of 28 alarm indicator symbols are arranged.

Effect Diagram of Instrument Cluster with All Indicators are Lit is Shown Below



1	Power Meter	2	Tachometer
3	Function Display Area	4	Electricity Meter
5	Speedometer		

Instrument Cluster (Mode Button)

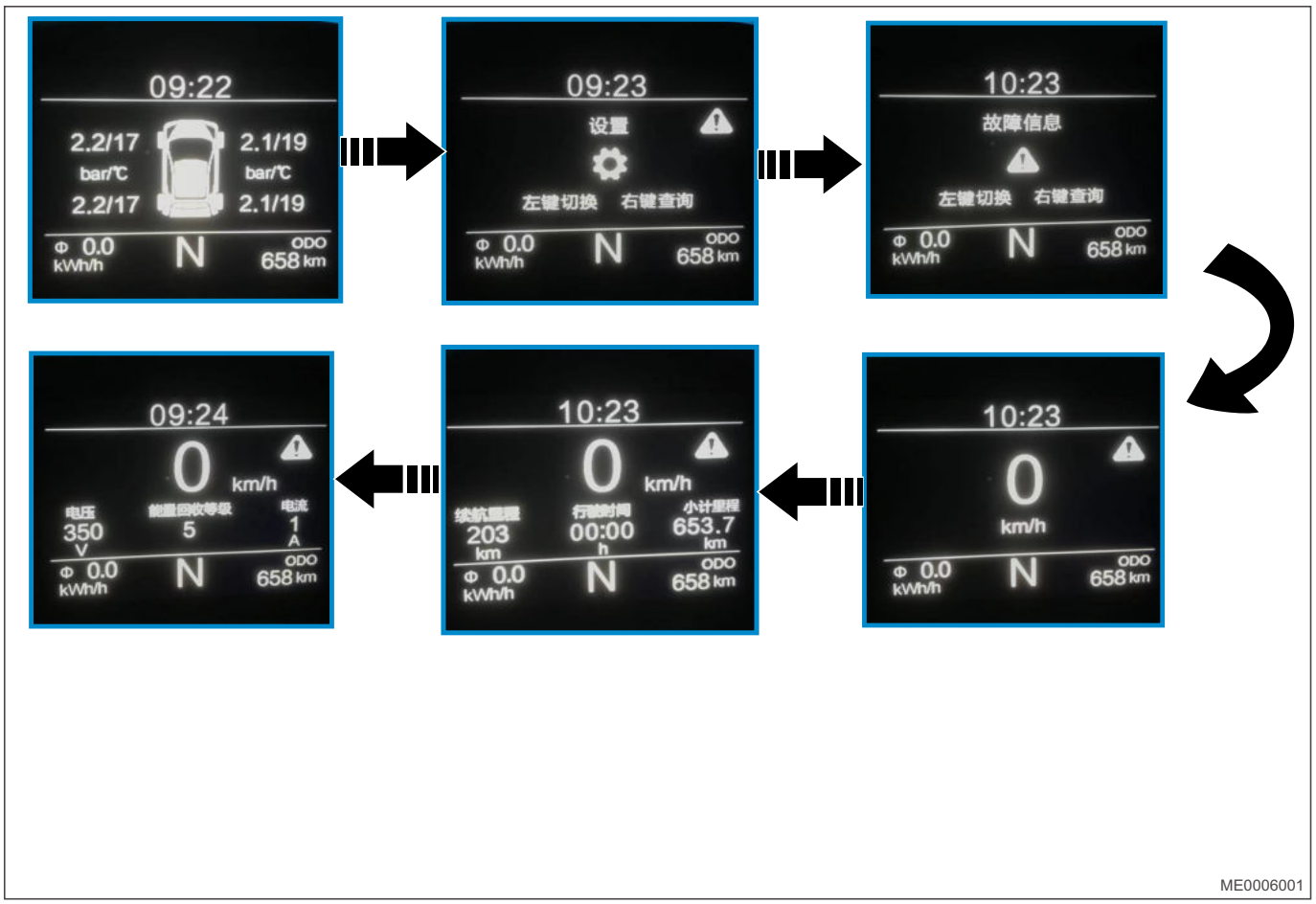
ME0005001

Position/definition of lower part of instrument cluster.

1.  : Mode/back button.
2. 

: Set/reset button.

Instrument Cluster (Function Area Switching)
Short press mode button to switch among function areas.

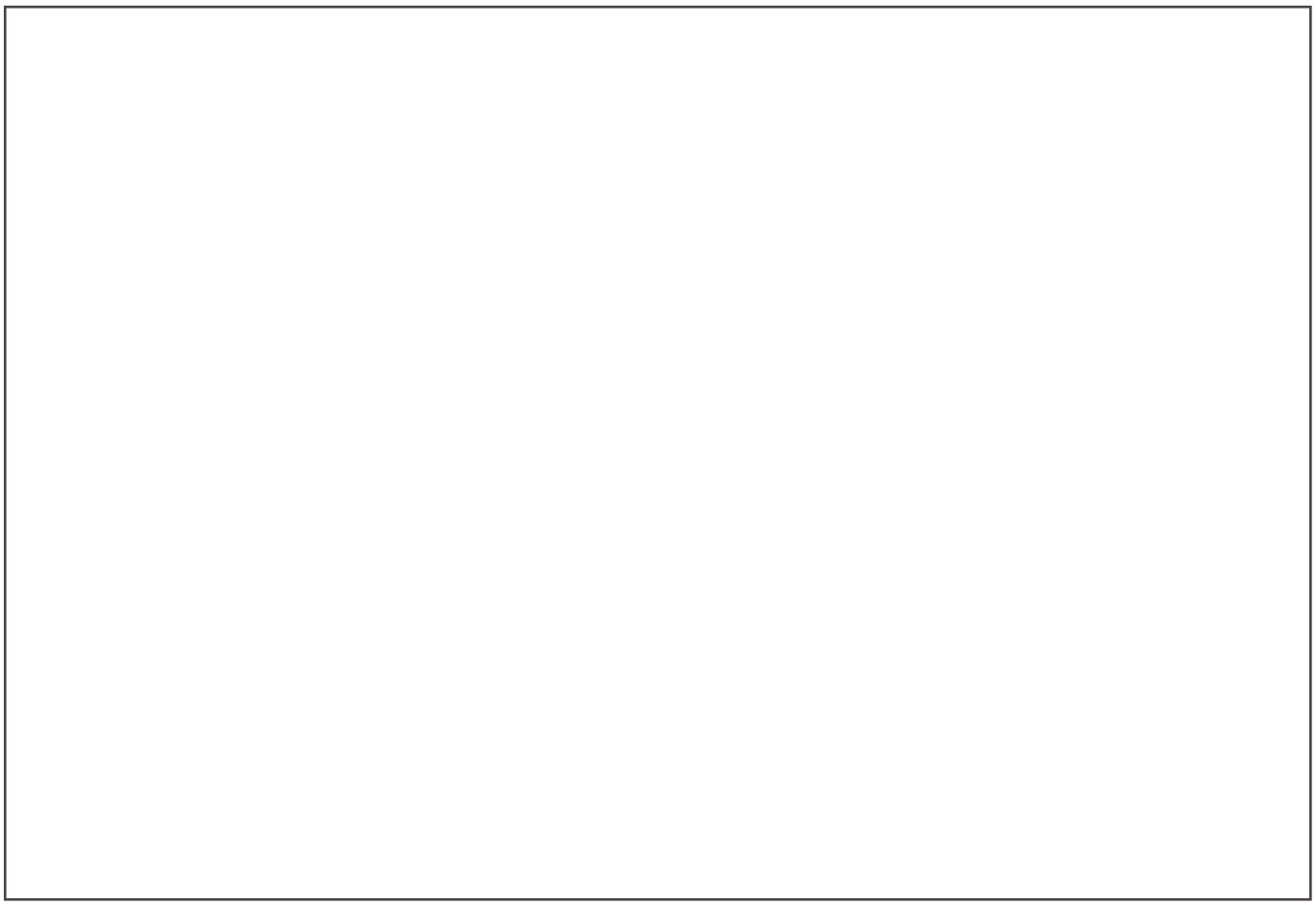


Instrument Cluster (Function Setting)

1. Timer setting

- Mode button: Switch between hours/minutes.
- Setting button: Hours/minutes adjustment.

2. Fatigue driving setting



- Setting range: 1h-4h/off.
- The setting time changes in unit of 0.5h.

Use Environment and Requirements

Environment Operating Conditions

1. Operating temperature:
   - Operating temperature: -40ºC～+75ºC.
   - All LEDs come on: -35ºC～+75ºC.
2. Storage temperature:
   - Low temperature storage: Store at -40ºC for 24 hours.
   - High temperature storage: Store at +85ºC for 48 hours; Store at +90ºC for 24 hours.

Electrical Operating Voltage

1. Operating voltage range: 9 V - 16 V.
2. Test voltage: 13.5 V ± 0.2 V.
3. Nominal voltage: 12 V.
4. CAN network operating voltage: 6 V - 16 V

Static Current

1. In 15 OFF (30 ON) mode, the current flowing through Pin11 is lower than 1.5 mA.

LCD

1. LCD is located in center of the instrument cluster, mainly displays the following contents: Driving mileage, current, voltage, vehicle speed, gear position, power consumption of 100 kilometers, trip mileage, time, reverse radar distance, total vehicle driving mileage, the overall effect is as follows:

ME0002001

Total Mileage

1. Signal processing control strategy:
   - Total mileage range is 0 ~ 999,999km, and this value will be maintained when it reaches the maximum reading (999,999 km). It is calibrated by PPK value stored in EEPROM.
   - If the battery voltage is cut off, EEPROM is updated every two kilometers to retain the current total mileage value in order to prevent loss of total mileage. If the battery voltage is cut off, the maximum total loss value is ±1 Km. Three mileage backups should be kept in the EEPROM for error checking: If value stored in the EEPROM is found to be incorrect, "Error" will be displayed instead of the total mileage.

Trip Mileage

1. The display range of trip mileage is 0~999.9 km, with an accuracy of 0.1 km, and the content is stored in RAM. If instrument cluster power is cut off and battery is disconnected, trip mileage will be cleared.

Clock

1. The time is displayed in 24-hour mode and can be adjusted in display clock mode. When ignition switch is ON, LCD will display the mode displayed before the ignition switch is turned off.

Power Consumption of 100 kilometers:

- The signal is sent to instrument cluster through CAN signal. When VMS does not send this data or CAN signal is lost, the instrument cluster displays as follows:
- Power consumption of 100 kilometers is shown in integer digits without decimals.

Current

- Current signal is sent to instrument cluster through CAN - BUS. When VMS does not send this data or CAN signal is lost, the instrument cluster displays as follows:
- Current is shown in integer digits without decimals. When the current is between 0 A to 1 A, it displays 1 A. 0 is displayed only when 0 A signal is received.The current display is updated every 1 second, and the valid data of last frame within 1 second is taken as the display value.

Voltage

- Voltage signal is sent to instrument cluster through CAN - BUS. When VMS does not send this data or CAN signal is lost, the instrument cluster displays as follows:
- After 10 frames (within 1 second) are received, take the average value as display voltage and displayed once every 1 second.

Driving Mileage

- Driving mileage is sent to instrument cluster through CAN - BUS. When VMS does not send this data or CAN signal is lost, the instrument cluster displays as follows:
- Driving mileage is shown in integer digits without decimals.

Clock Setting and Trip Mileage Reset

Digital Clock Setting

- The right adjustment lever (with clock symbol) can be used as a time adjustment lever. In the display clock mode, long press (more than 2 seconds) adjustment lever to enter the hour setting mode . Then the hour number flashes at a frequency of 1 Hz, defined as follows.
- In hour setting mode, the number of hours increases with short presses of the adjustment lever ($t < 0.3$ s). When the adjustment lever is pressed for a long time ($t > 2$ s), the hours will increase continuously at a frequency of 3 Hz. Loosen the adjustment lever for 5 seconds, it will enter the minute setting mode. At this time, the number of minutes blinks at the frequency of 1Hz, as defined above. The adjustment mode is the same as hour setting mode. (More than 300 ms and less than 2 s)

Trip Mileage Clearing

- The left adjustment lever (with reset mark) can be used for trip mileage reset. In trip mileage display mode, if left adjustment lever is pressed and held for a long time, the trip mileage will be reset ($t > 2$ s).

Indicator and Alarm Light Definition and Control Strategy

Item	Image	Color	Control Strategy
Left Turn Signal Indicator		Green	When left/right turn signal light is turned on, instrument cluster Pin

Right Turn Signal Indicator		Green	22/24 inputs high level signals. Left/right turn signal light (green) of instrument cluster will turn on and go off with ON/OFF of relay.
High Beam Indicator		Blue	When the high beam light is turned on, the corresponding pin25 high level signal is input to instrument cluster, and instrument cluster high beam indicator (-blue) will turn on.
EPS Indicator		Yellow	When there is a fault in the EPS, pin4 fault signal is input to instrument cluster, instrument cluster malfunction light turns on
Brake Fault Indicator		Red	When the brake fluid level is low or EBD function is faulty, instrument cluster brake fault alarm light (red) will turn on. When EBD fails,this alarm light and ABS alarm light turn on together. (When the EBD fails, the alarm light is controlled by software).
Parking Brake Indicator		Red	When the parking brake is pulled up, the input of pin18 is low level, and the brake fault indicator (red) remains on.
Small Light Indicator		Green	
Driver Seat Belt Indicator		Red	When driver seat belt is not fastened during ignition or after ignition, the input signal of pin19 is low level, and seat belt alarm light (red) turns on.

Door Opening Indicator		Red	When any door is opened, pin1 input is a low level signal, and the door opening alarm light remains on (when the READY light is on, if driver side door is opened, the buzzer will sound three times).
Charging/Discharging Indicator		Red	When 12 V battery is low or cannot be charged, the battery charging/discharging fault alarm light remains on.
Airbag Malfunction Indicator		Red	When there is a fault in airbag, pin17 input is a low level signal, airbag alarm light remains on.
Low Power Battery Indicator		Yellow	
Electric Drive System Malfunction Indicator		Red	When there is a fault in electric drive system, alarm light remains on (CAN signal transmission)
ABS Malfunction Indicator		Yellow	Comes on when there is a fault in ABS system (CAN signal transmission)
Power Reduction Indicator		Yellow	When system power decreases, alarm light remains on (CAN signal transmission)
Power Battery Malfunction Indicator		Yellow	When there is a fault in power battery system, alarm light remains on (CAN signal transmission)
Vehicle System Malfunction Indicator		Red	When there is a fault in vehicle system, alarm light remains on (CAN signal transmission)
Rear Fog Light Indicator		Yellow	When rear fog light turns on, high level is output to instrument cluster P32, rear fog

			indicator on instrument cluster comes on.
Power Battery Cut Off Indicator		Yellow	When connection between power battery and motor is cut off, alarm light remains on (CAN signal transmission).
Insulation Failure Indicator		Red	When the bus voltage is leaking to vehicle body, the indicator remains on for general leakage, and flashes for serious leakage (CAN signal transmission).
Charging Cable Connection Indicator		Red	When there is a fault in charging, charging cable connection alarm light remains on (CAN signal transmission).
Driving READY Indicator		Green	About 6 seconds after the key is switched to START, VMS transmits signals through CAN line, READY indicator on instrument cluster comes on, and CAR OK are displayed on LCD screen at the same time (CAN signal transmission).
Motor and Controller Overheat Indicator		Red	When motor or controller is overheating, alarm light remains on (CAN signal transmission).
Vehicle Maintenance Indicator		-	This Indicator (yellow) comes on when the mileage starts to accumulate to the next 5000 Km after the last maintenance indication has been cleared. Clearing method: 1. Through diagnostic tester; 2. Clear manually, press and hold the adjustment lever before turning power switch on, and then switch to IGN ON position. After waiting

			for 5 seconds, the indicator will change from on to off.
Power Battery Maintenance Indicator		-	Battery maintenance is CAN information and displayed in real time, that is, this symbol flashes (1HZ) when instrument cluster receives battery maintenance signal from CAN. No display when no information is received from CAN.
T-BOX Malfunction Indicator		-	When any one of the three alarms RVM_3-GSts, RVM_GPSSts and RVM_PowerSts fails, the alarm symbol shall be remains on, and if there is no fault indication symbol, it will turn off immediately. For this signal, instrument cluster perform self-check for 3 seconds, and 3 signals are shielded during self-check (CAN signal transmission).
E Indicator		Green	Signal comes from VCU-3, when instrument cluster receives CAN signal, “E” or “S” comes on and is displayed on instrument cluster.
S Indicator		Orange	

Control Strategy for Other Alarm Devices

Parking Light (Pin28)

1. When parking light comes on, pin input is high level signal, parking light indicator symbol remains on.

Small Light ON Hint (Pin1/Pin13/Pin28)

1. When any door is opened, pin1 input is low level signal, buzzer alarms when the door is opened, key is in off and small light LED is on, method: Frequency 744 Hz (400 ms ON and 300 ms OFF, sound for 4 times).
   - If the trigger condition always exists, the cycle is repeated with an interval of 3 seconds.
   - If the trigger condition appears again, the alarm repeatedly occurs.

If the Trigger Condition Appears Again, the Alarm Repeatedly Occurs

1. This instrument meter only has voice prompt, does not show the distance.

Distance	Less than 40 CM	40 - 60 CM	60 - 90 CM	90 - 150 CM	More than 150 CM
Buzzer Frequency	Continuous sound	4 Hz	2 Hz	1 Hz	Does not sound

Battery Power Alarm Setting

1. The battery power is sent to instrument cluster through CAN signal, and battery power accuracy is 10%. When power is lower than 30%, the low power alarm light on instrument cluster will come on, and when the power is greater than 32%, the alarm light will turn off. The signal list is as follows:

Number of LEDs lit by Battery Power	1	2	3	4	5	6	7	8	9	10
LED ON Power Value	0.02	0.12	0.22	0.32	0.42	0.52	0.62	0.72	0.82	0.92
LED OFF Power Value	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9

Instrument Cluster Self-check

1. When the POWER switch is turned to ON (vehicle does not start), the following alarm indicator symbols in the instrument cluster require self-check.
   - Brake failure, low power alarm, READY, ABS, RVM; If the instrument cluster is in self-test, each system sends signals to instrument cluster (power battery failure, vehicle system failure, electric drive system failure, airbag failure, insulation failure), instrument cluster continues to perform self-test at this time.
   - If each system sends fault signals to instrument cluster after self-check, instrument cluster LED comes on at this time.
   - The self-check of signals transmitted by CAN bus should meet the requirements of CAN bus.

Self-check Control Logic of Instrument Cluster is as Follows

1. When the POWER switch is turned to ON (engine does not start), the above defined LED light will perform self-check and remain on for 3 seconds. When the engine speed is higher than 300 rpm, the self-test will be interrupted before running.

Network Communication

1. If instrument cluster cannot receive CAN signal from VMS module within 2.5 seconds, motor temperature high alarm light, charging/discharging indicator, power reduction indicator, READY indicator, electric drive system malfunction indicator, power battery malfunction indicator, ABS malfunction indicator and insulation failure indicator come on. Driving mileage display: Driving mileage: - - -, Vehicle speed display: - - , Power consumption of 100 kilometer display: - -.
2. If instrument cluster cannot receive CAN signal from MCU module within 2.5 seconds, tachometer LED will not display.

3. If instrument cluster cannot receive CAN signal from BMS_1 module within 2.5 seconds, electricity meter LED will not display.
4. If instrument cluster cannot receive CAN signal from BMS_3 module within 2.5 seconds, voltage display: Voltage: —, current display: —.
5. If instrument cluster cannot receive CAN signal from BMS_6 module within 2.5 seconds, insulation alarm light will come on.
6. If instrument cluster cannot receive CAN signal from ABS_1 module within 2.5 seconds, ABS light will come on.
7. If instrument cluster cannot receive CAN signal from RVM module within 2.5 seconds, RVM light remains on.
8. If instrument cluster cannot receive CAN signal from VCU module within 2.5 seconds, ECO mode light  and sport mode light  remain on.

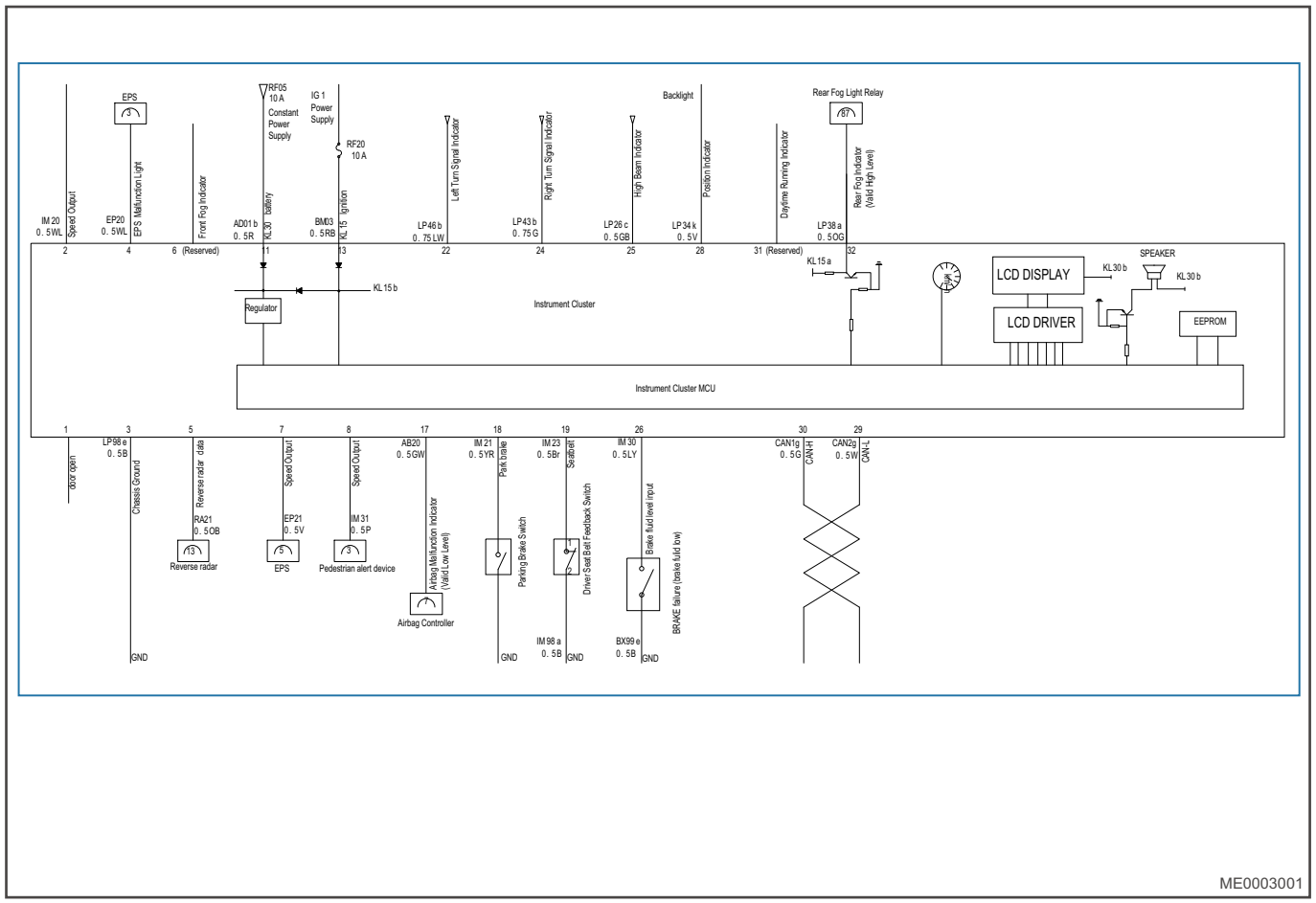
Buzzer Warning Priority

1. Reverse radar warning.
2. Tachometer warning.
3. Door warning.
4. The seat belt warning is referenced to the Chery platforming requirements.
5. Small light ON warning.

System Circuit Diagram

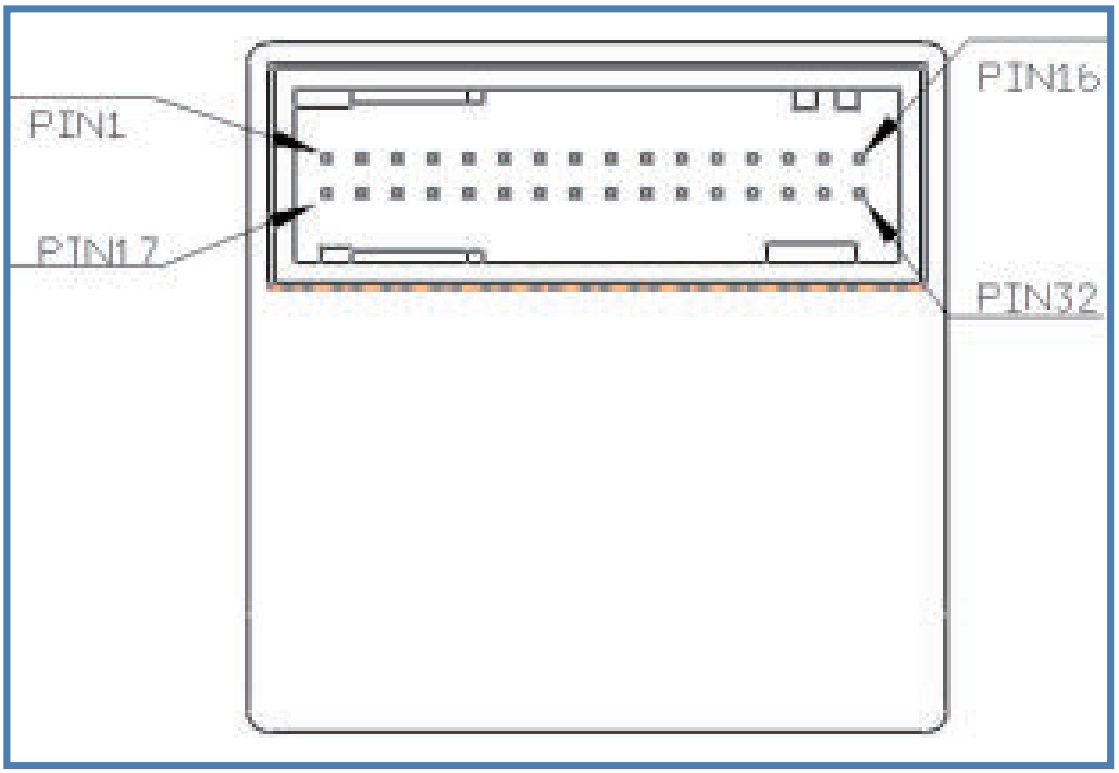
Module Terminal Definition

Instrument Cluster Unit Electrical Schematic Diagram



Instrument Cluster Interface Pin Definition (Blue Connector)

- Terminal view



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Pin	Functional Definition	Pin	Functional Definition
1	Any Door Open	17	Airbag
2	Speed Output (High and Low Level)	18	Parking Brake
3	Ground	19	Seat Belt
4	EPS	20	-
5	Reverse Radar Data Signal LIN	21	-
6	Front Fog Light (Reserved)	22	Left Turn Signal Indicator
7	Vehicle Speed Frequency Signal Output	23	Steering Button Input (left/right switching, setting a total of 3 buttons) - High Configuration Meter
8	Speed Output (- Pedestrian Alert Reception)	24	Right Turn Signal Indicator
9	-	25	High Beam Indicator
10	-	26	Low Brake Fluid Level

11	Battery (KL30)	27	-
12	CLOCK (Reverse Radar Clock Signal Wire)	28	Small Light Indicator
13	Ignition Power Supply	29	CAN-L
14	-	30	CAN-H
15	-	31	Daytime Running Indicator (Reserved)
16	-	32	Rear Fog Light

On-vehicle Service

Specifications

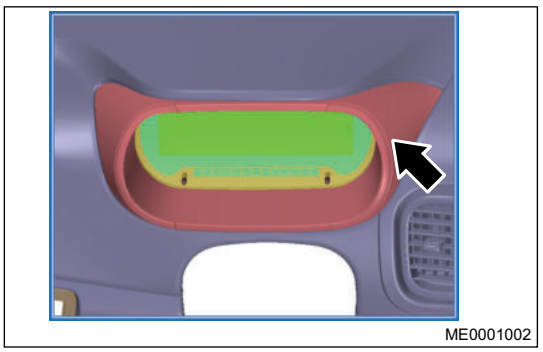
Torque Specifications

Part Name	Torque (N·m)
Fixing Screw between Instrument Cluster and Instrument Panel	2 ± 0.5

Instrument Cluster

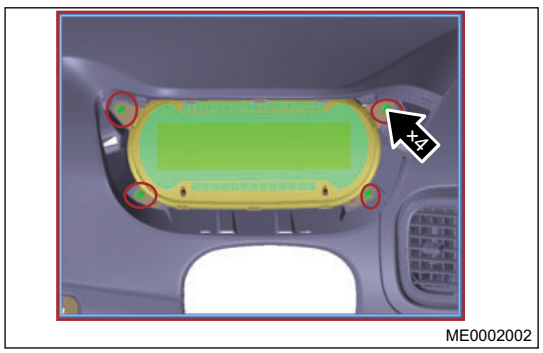
Removal

1. Turn off the POWER switch, disconnect the negative 12 V battery.
2. Remove instrument cluster trim cover (arrow) with a flat tip screwdriver.


ME0001002

3. Remove fixing screws (arrow) between instrument cluster and instrument panel with a cross screwdriver.

   Tightening torque: 2 ± 0.5 N·m



ME0002002

4. Disconnect the wire harness connector, and remove instrument cluster.

Installation

1. Installation is in the reverse order of removal.

AUDIO/VISUAL SYSTEM

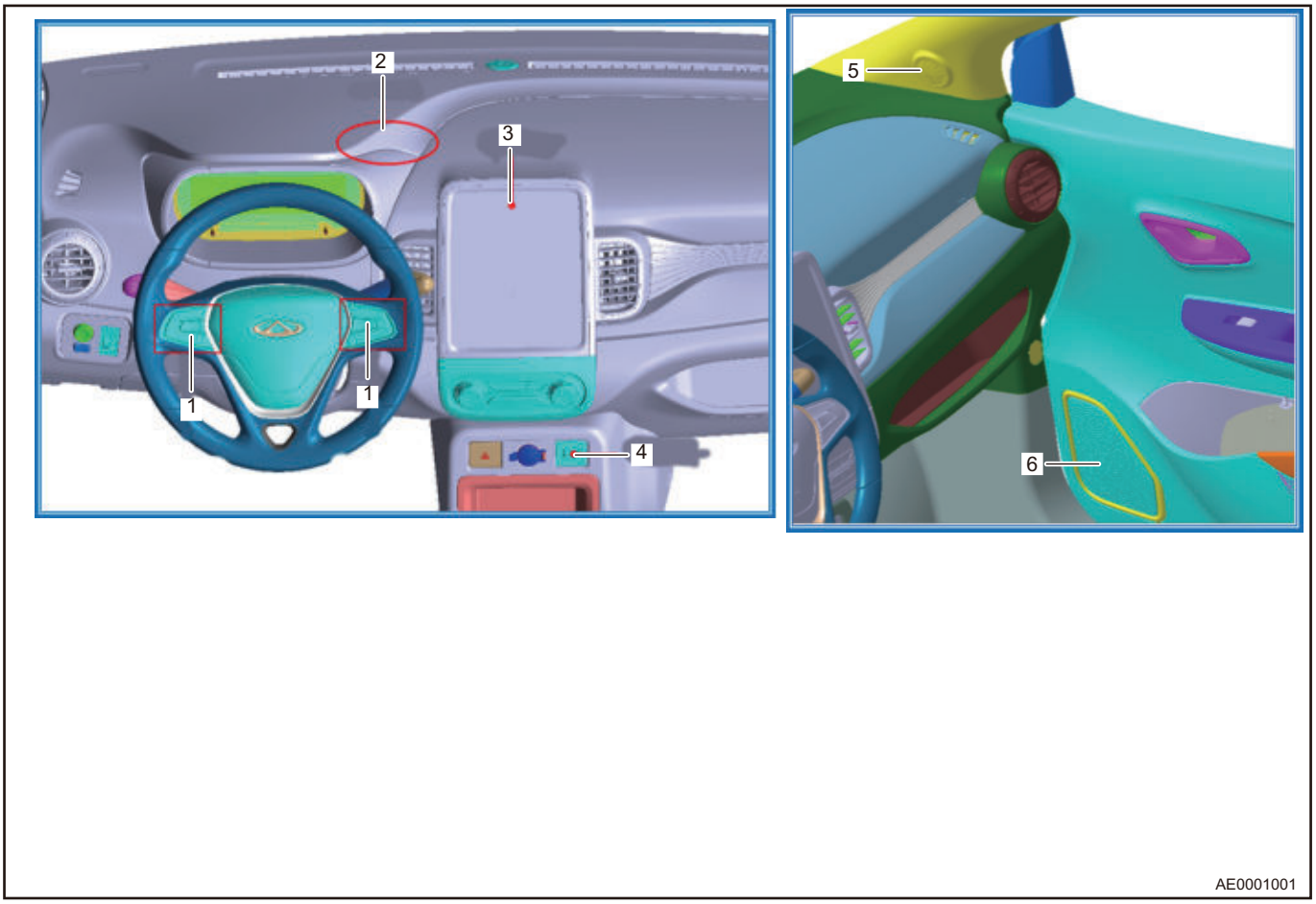
AUDIO/VISUAL SYSTEM

System Overview

System Description

Audio/visual system is composed of antenna, GPS antenna (luxury model), speaker, tweeter (luxury model), large screen DVD, USB cable, multi-function interface, steering wheel multi-function switch (-luxury model).

System Components Diagram



1	Multi-function Switch	2	GPS Antenna
3	Large Screen DVD	4	USB Interface
5	Tweeter	6	Speaker

Function Description

Audio/visual system mainly has the functions of radio, navigation (luxury model), audio information operation, Bluetooth, dual screen interaction, multimedia, part of vehicle status display and charging for occupant electronic products etc.

Central Control Screen Function

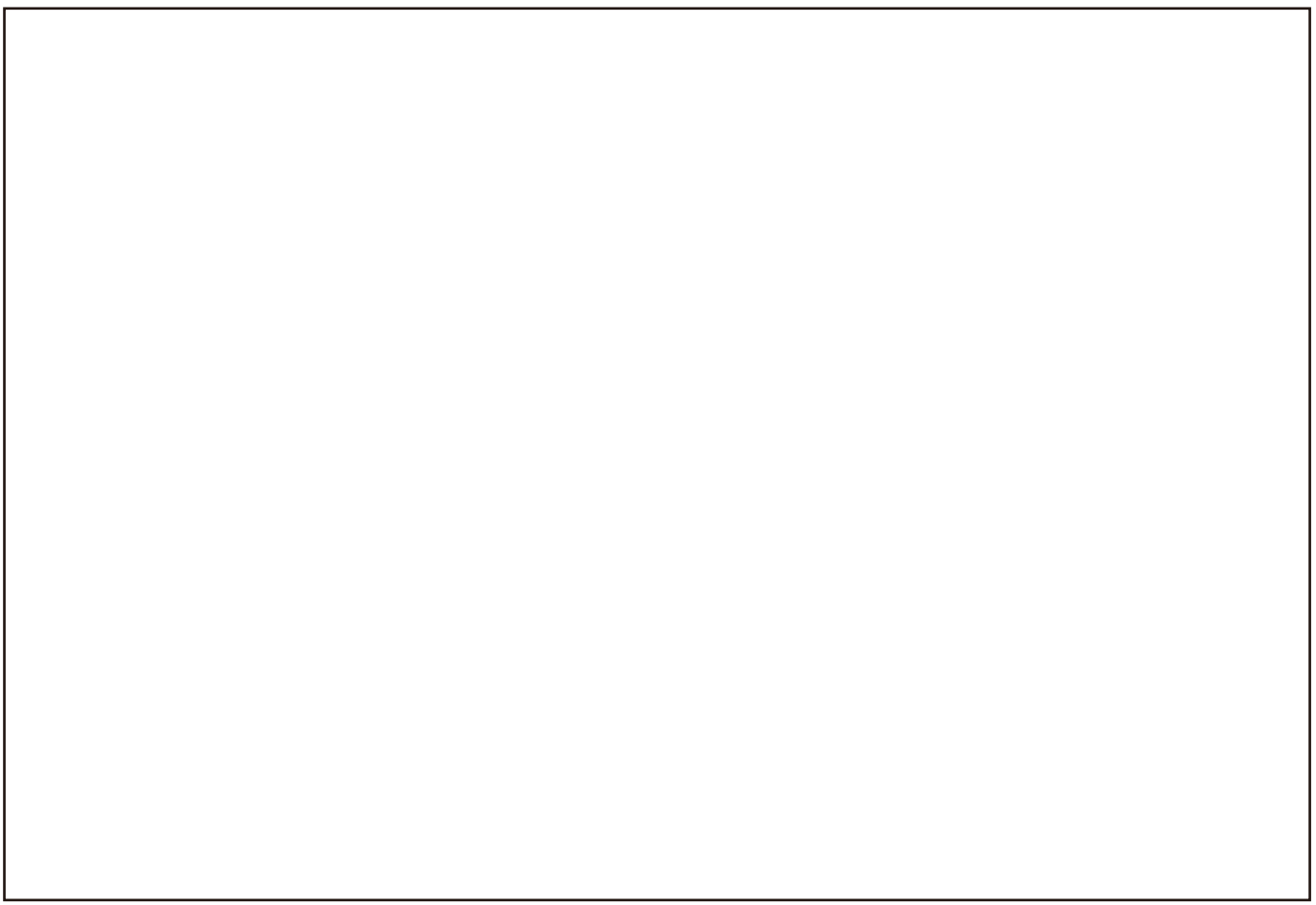
Function Introduction

1	Automatic Parking Switch	2	Voice Wake-up Assistant
3	Navigation	4	Setting
5	Dual Screen Interaction	6	A/C Setting Screen Switch
7	Return to Last Operation	8	Home Page
9	Volume Adjustment	10	Vehicle Condition Information / Setting
11	Bluetooth Phone	12	Multimedia
13	Radio	14	Status Display Bar
15	Passenger Airbag Status	16	A/C Status Display Bar

Mobile Phone Interconnection
Download and install "Baidu CarLife" APP on your mobile phone (Android/Apple) first.

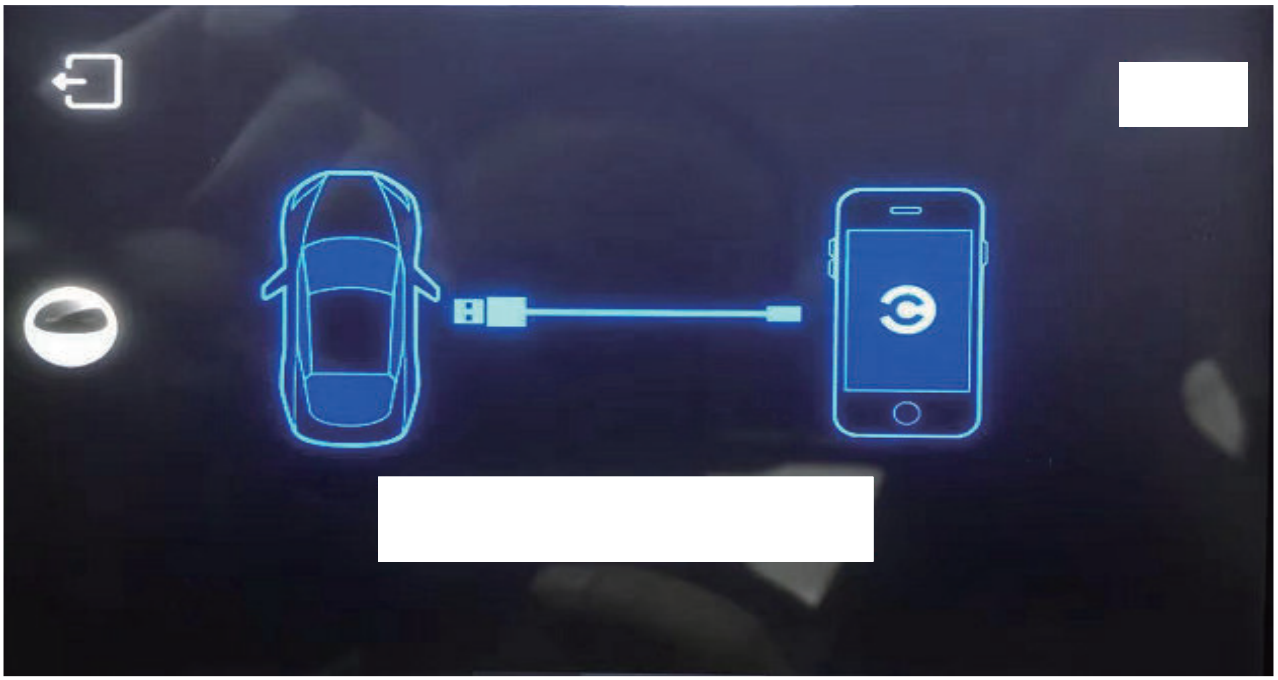
- Android phone interconnect operation

  1. Phone setting — 2. Select Developer option — 3. Select USB Debugging — 4. Allow USB debugging — 5. Connect original USB cable to mobile phone and head unit — 6. Turn on APP CarLife to realize the head unit interconnection.

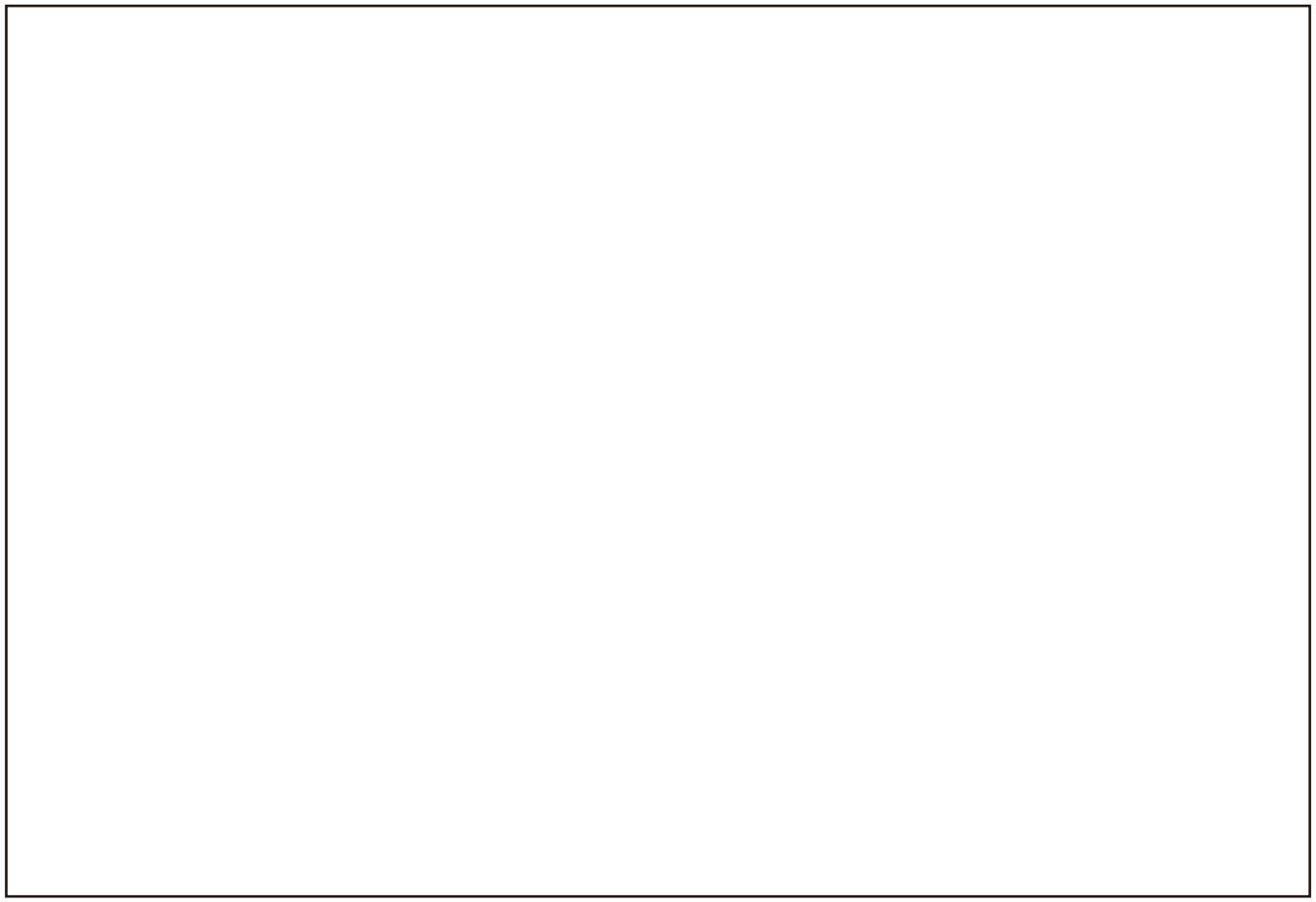


- Apple phone interconnect operation

  1. Phone setting — 2. Start cellular mobile data network — 3. Turn on personal hotspot — 4. Turn on head unit WIFI — 5. Connect hotspots established by mobile phone — 6. Turn on APP CarLife to realize the head unit interconnection.

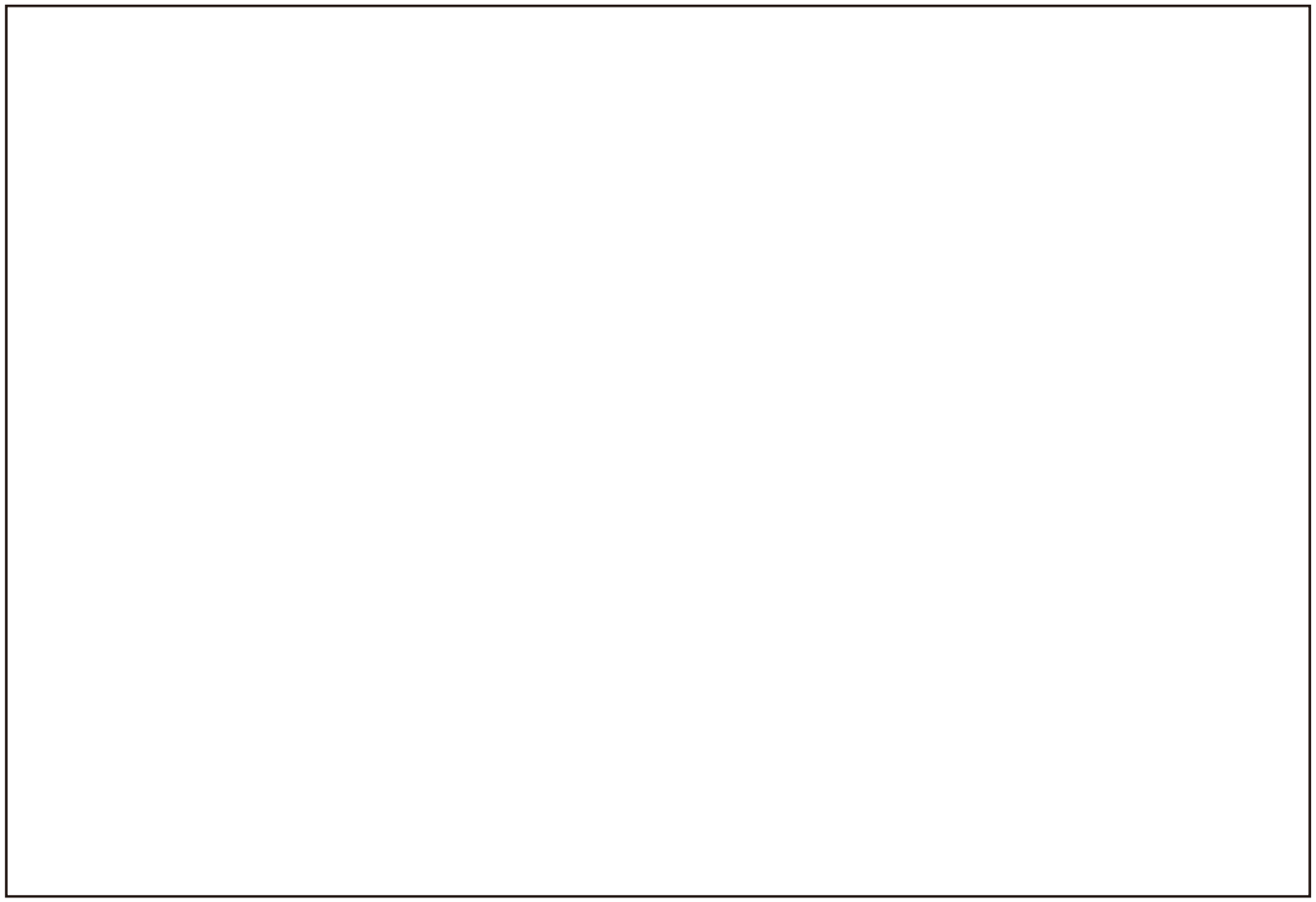


Mobile Phone Interconnection (Enter Screen)

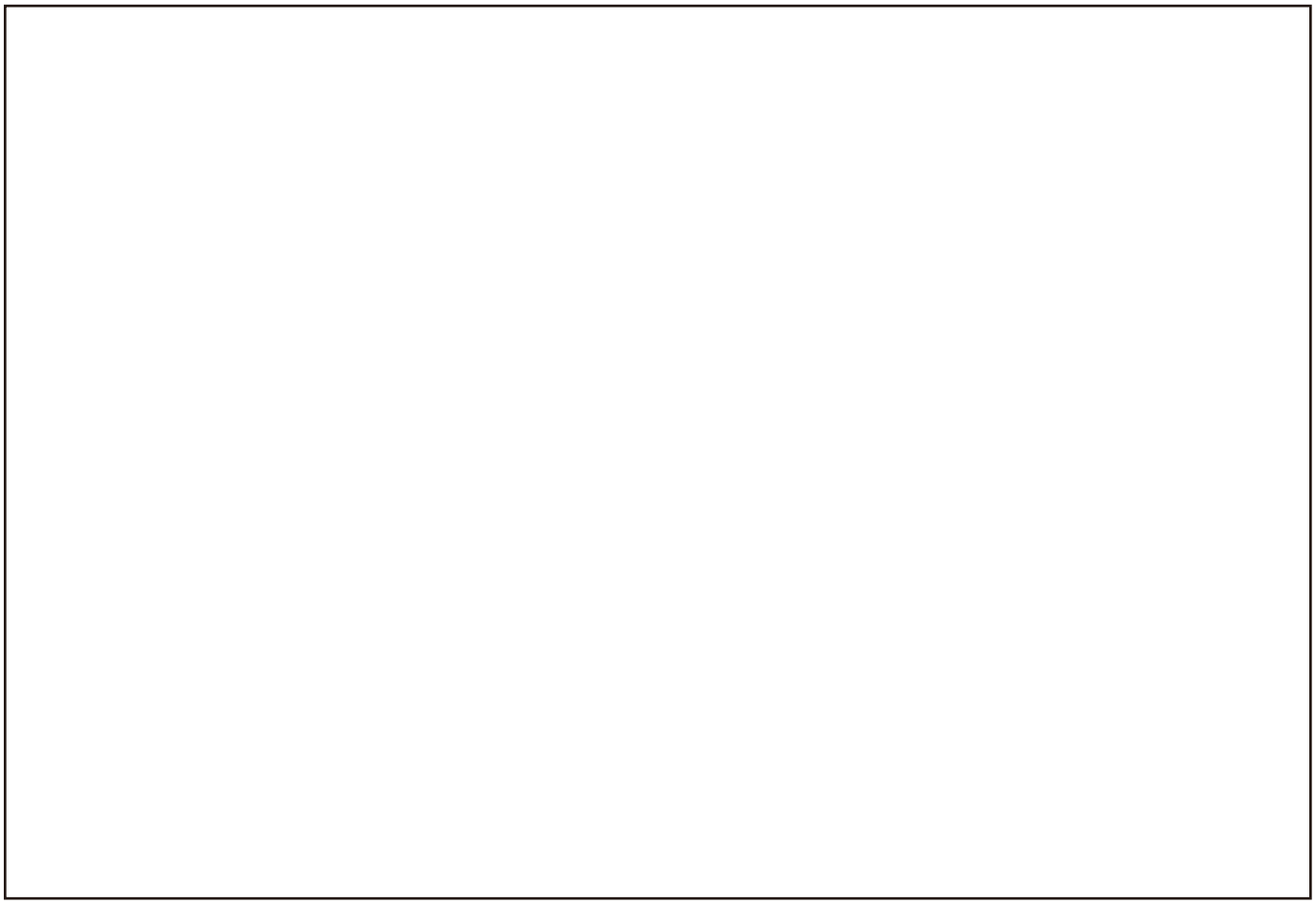


Mobile Phone Interconnection (Main Screen)

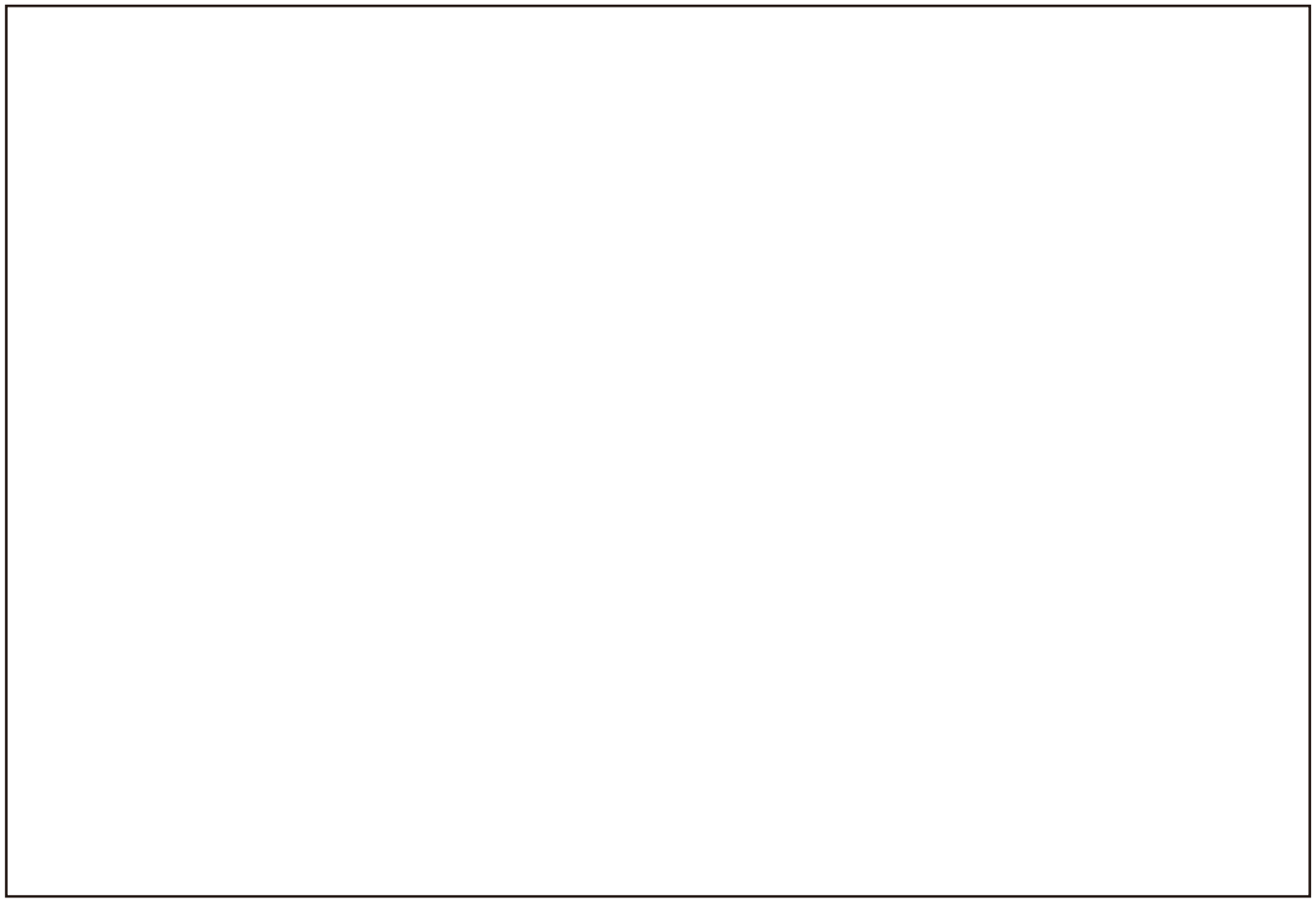
Mobile Phone Interconnection (Phone)

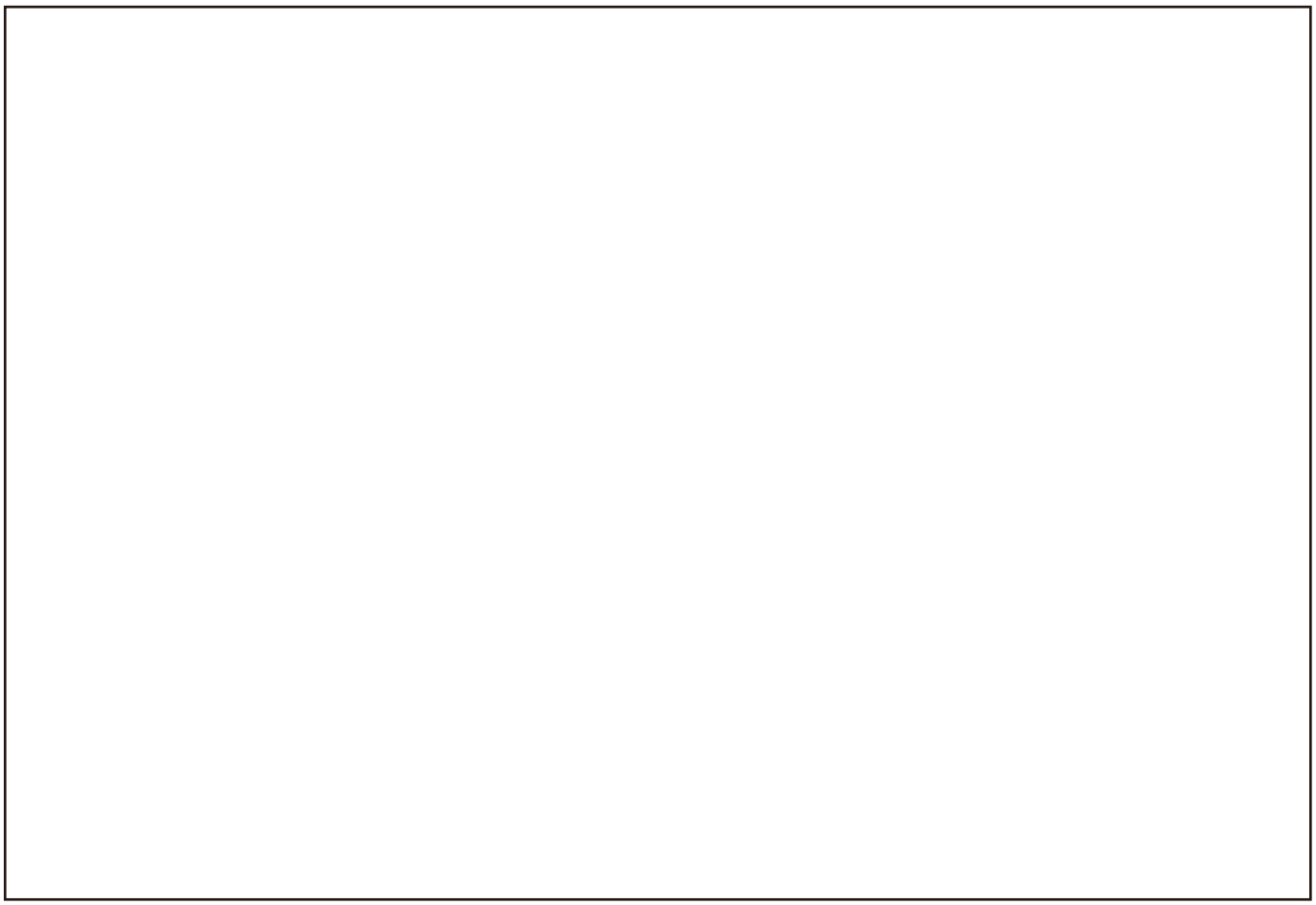


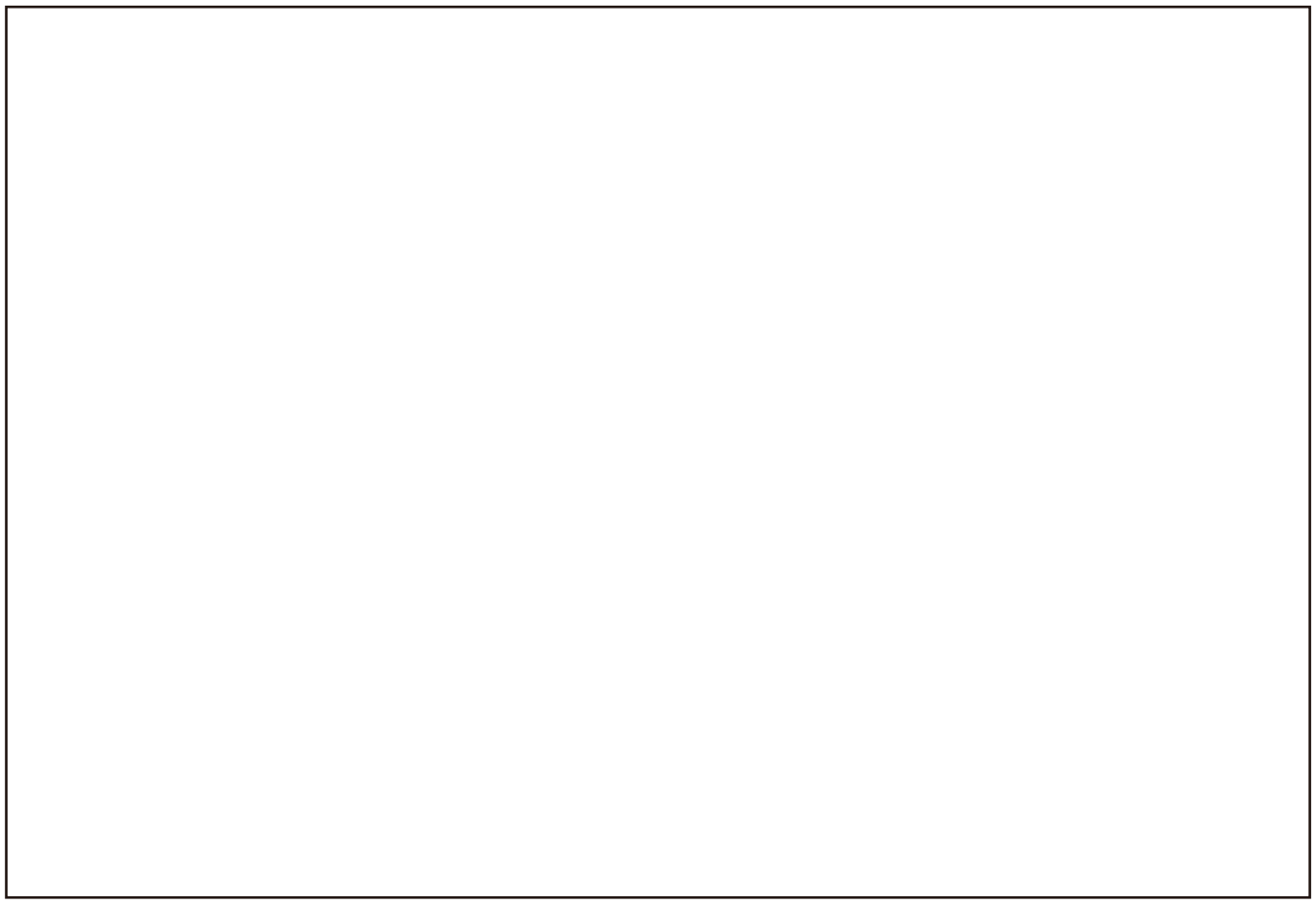
Mobile Phone Interconnection (Navigation)

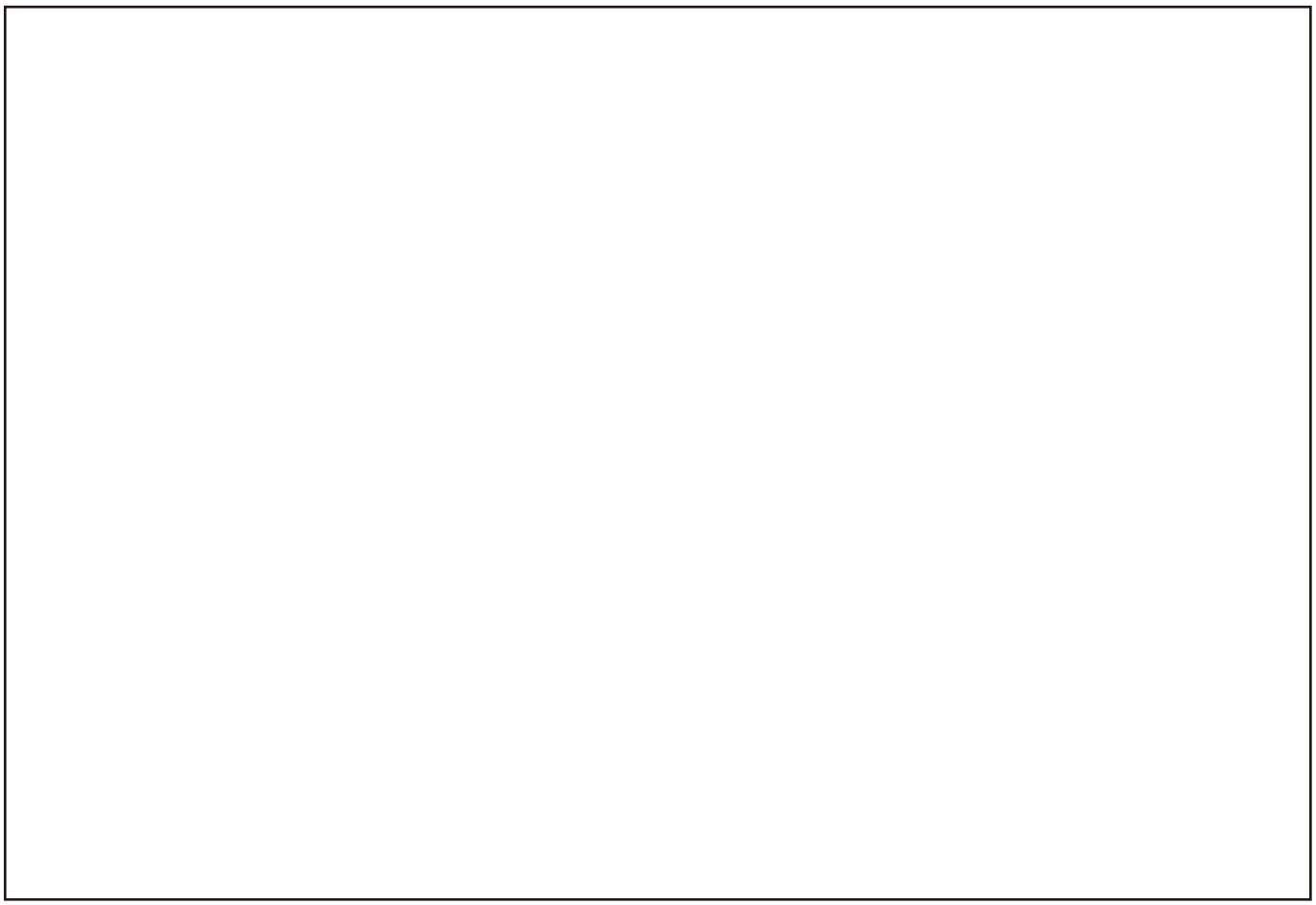


Head Unit Setting









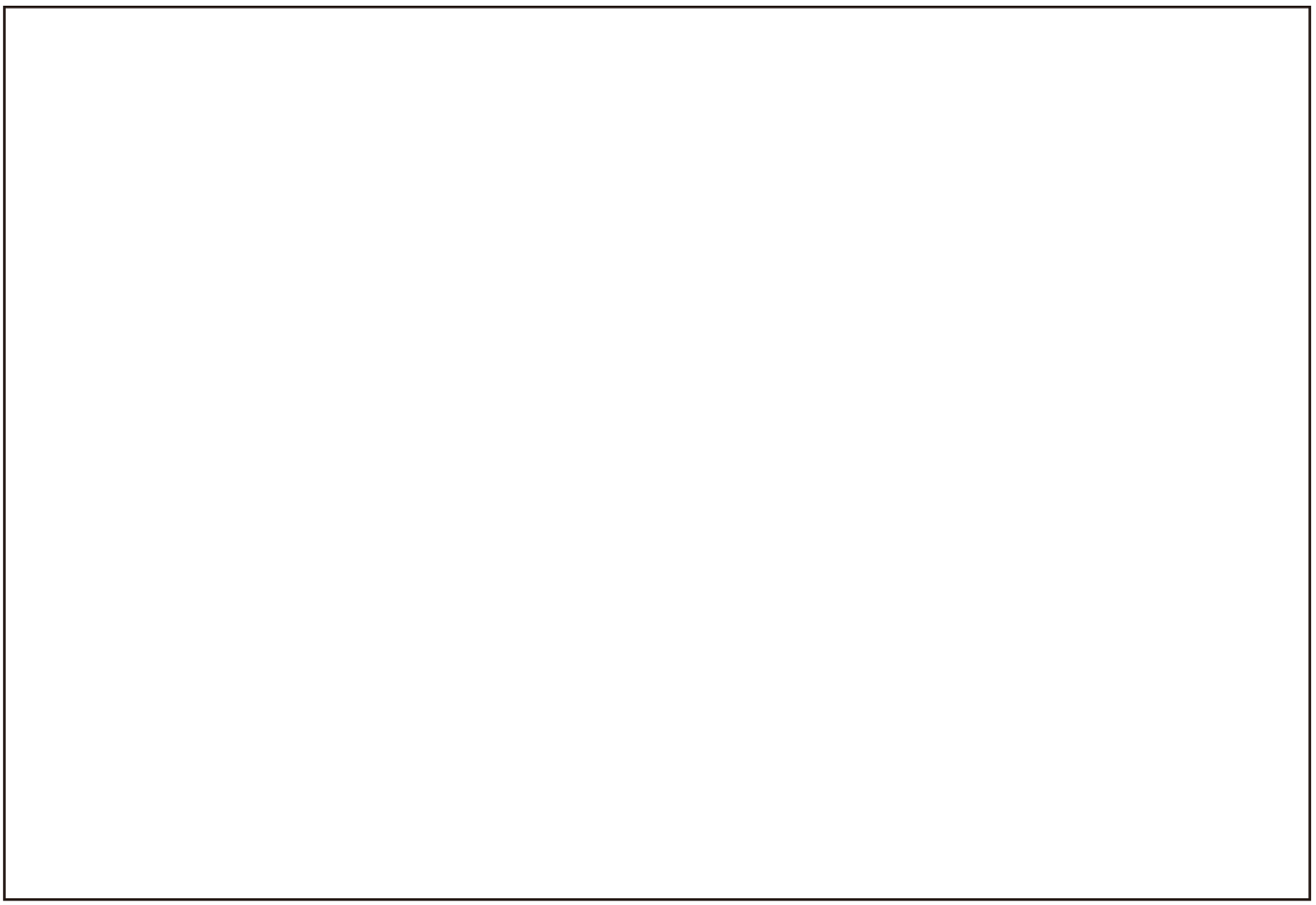
Vehicle Condition Display

- Door condition

  In this screen, you can see the status of door and know whether the door is open or closed.

- Driving range

  In this screen, you can check how far the vehicle can travel with the current remaining charge and how much power is consumed per 100 kilometers.



- Front passenger airbag

  Click the button according to the situation to turn on or off the airbag, to prevent accidental injury to others and yourself.

⚠

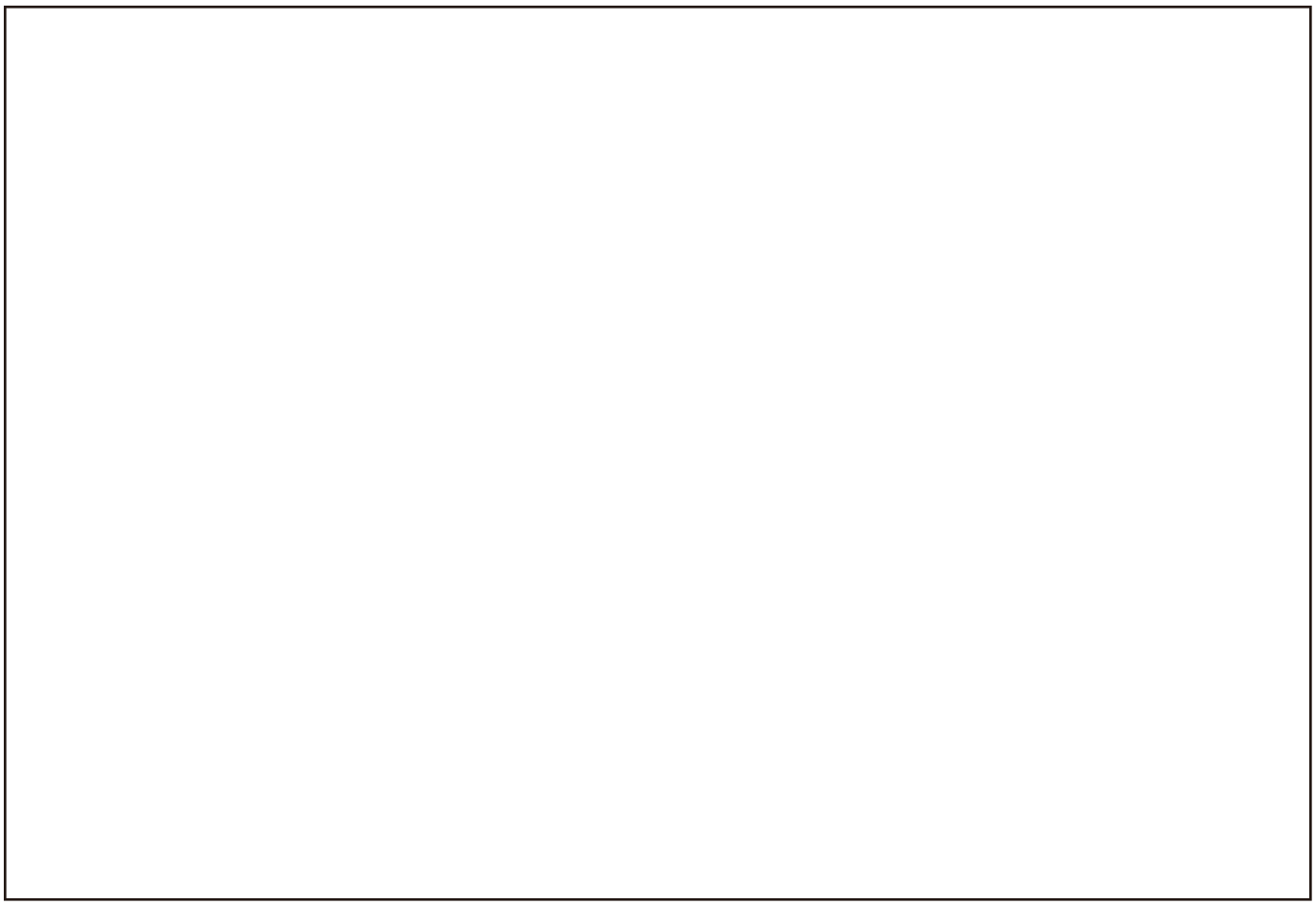
- When a child is placed in the front seat, the front passenger airbag must be disabled to prevent the child from being injured by the airbag in a collision.

- Driving for long distance

  Click this button to turn on or off driving for long distance.

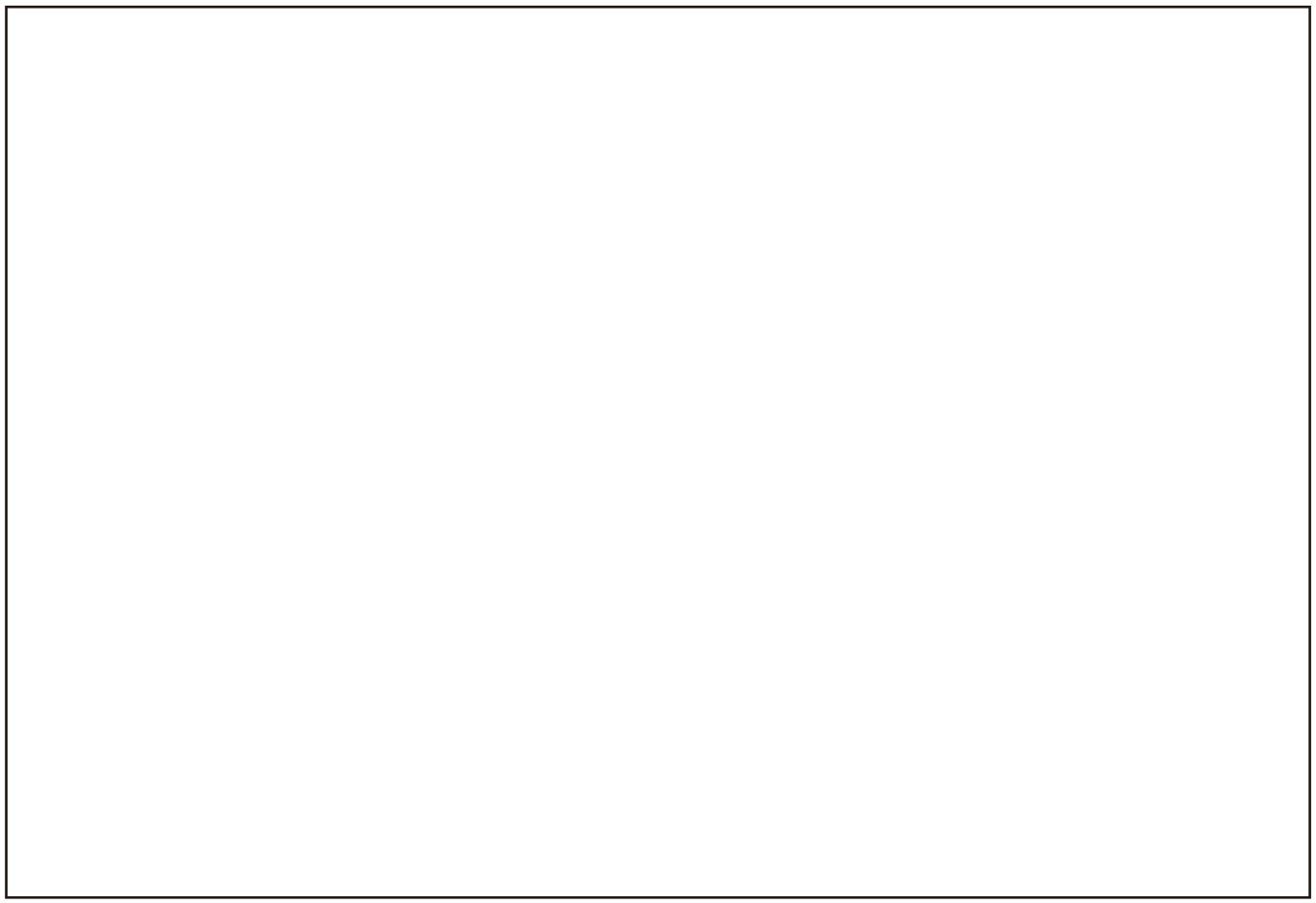
⚠

- Turning on the driving for long distance will increase the discharge depth of battery, increasing the driving range. This mode can only be used in an emergency.



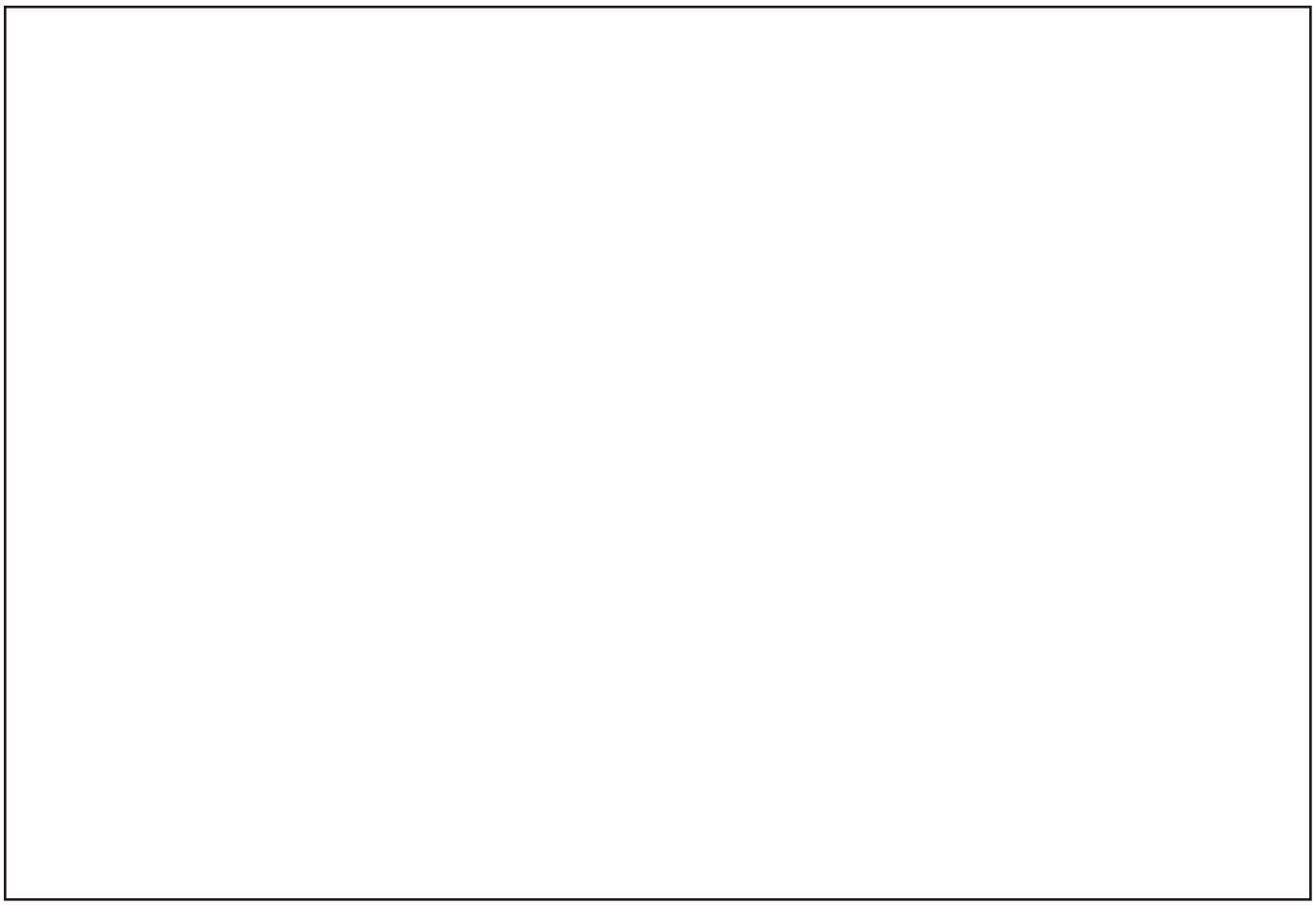
Energy Recovery

- In the energy recovery interface, you can adjust the gears of energy recovery amount, a total of 7 gears, from top to bottom is 1st to 7th in turn.
- The 1st gear is equivalent to the coasting gear of a gasoline vehicle, which does not provide pushing power. Energy recovery begins after the 2nd gear. The recovery energy of 2nd, 3rd, 4th, 5th, 6h and 7th gear increases in sequence.
- For initial power-on, the default startup in E mode is 5th gear. Default startup in S (sport) mode is 4th gear, and the user setting gear value can be memorized separately in 2 modes.

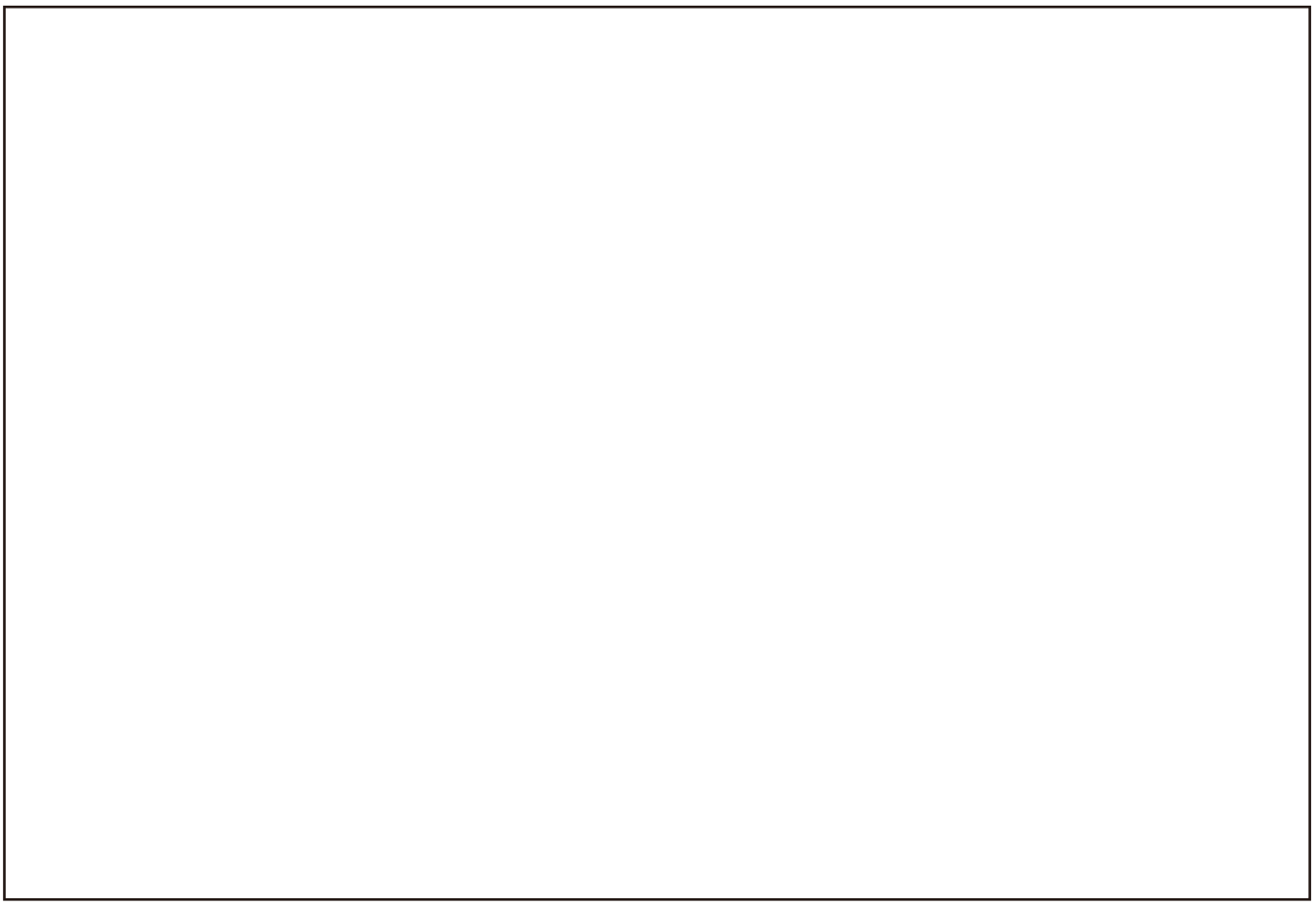


Intelligent Assist

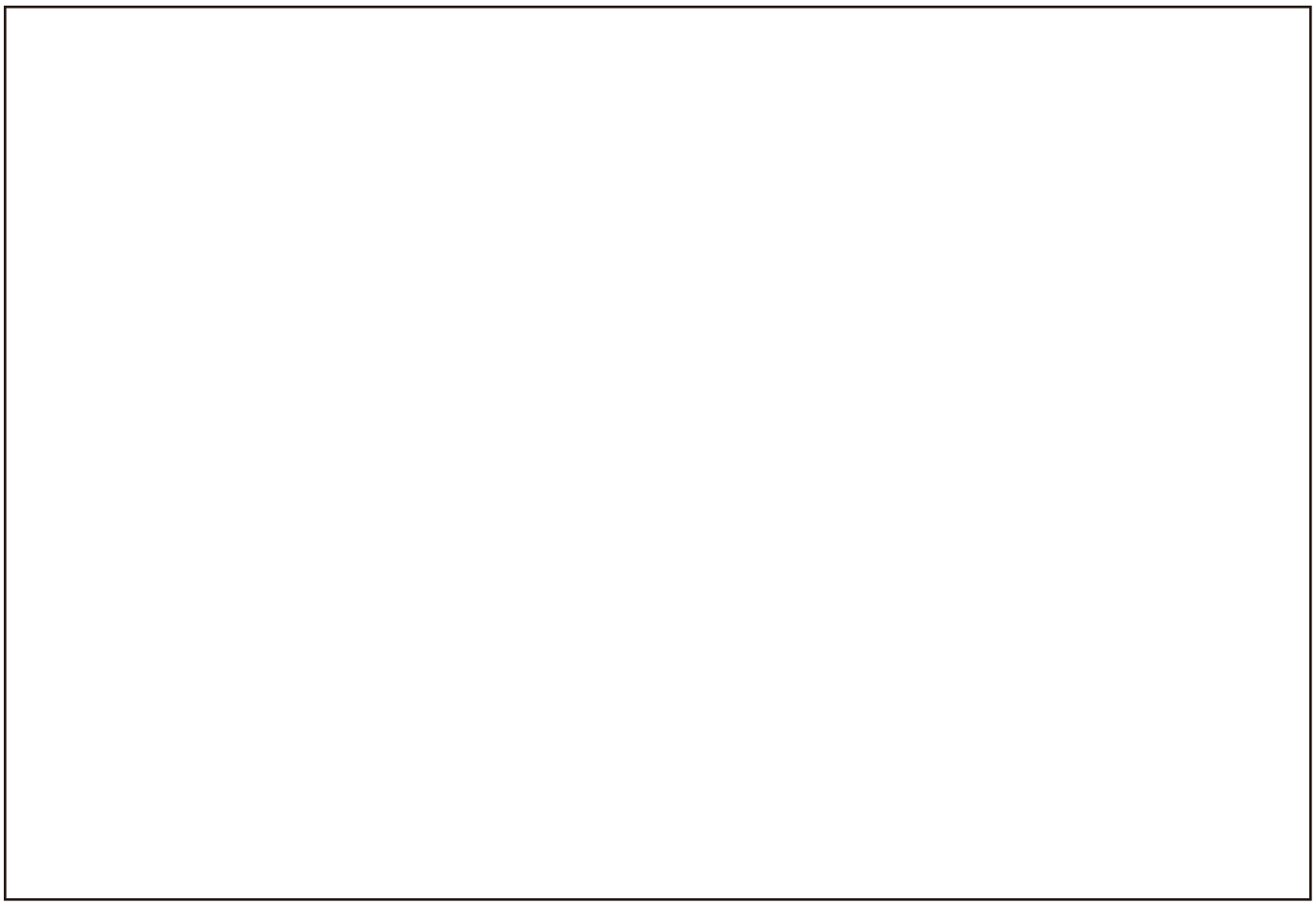
- Instrument cluster setting
  - Instrument cluster display time /fatigue driving time can be set via this menu interface.



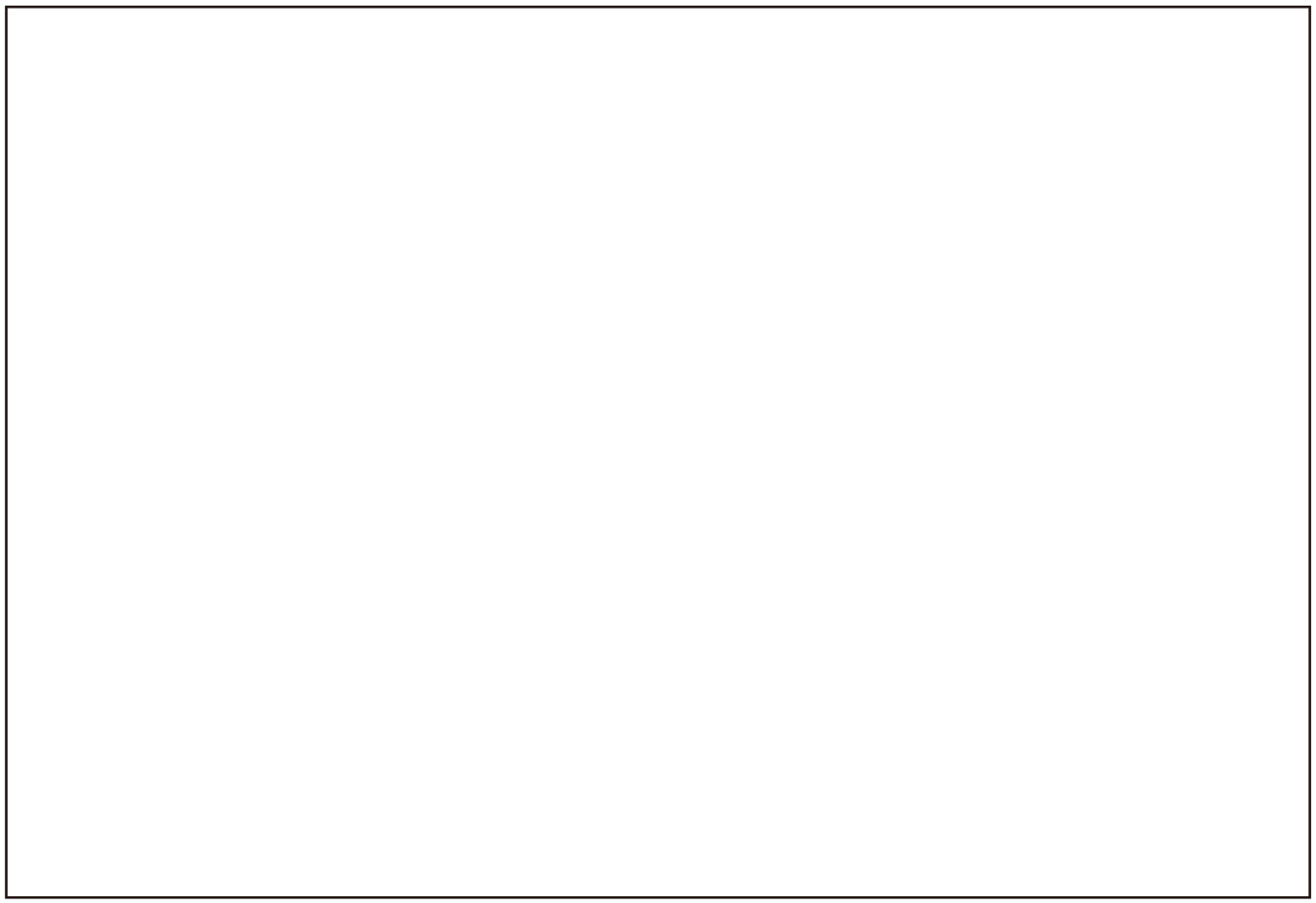
- A/C setting
  - A/C self-cleaning / self-ventilation function can be turned on and off via this menu interface.
  - Air conditioning screen display time can also be set at the same time.
  -



- Power setting
  - Functions such as anti-slip regulation, hill hold control, automatic parking can be turned on and off via this menu interface.
  - Driving modes (ECO mode, sport mode, I-PEDAL mode) can be set at the same time.



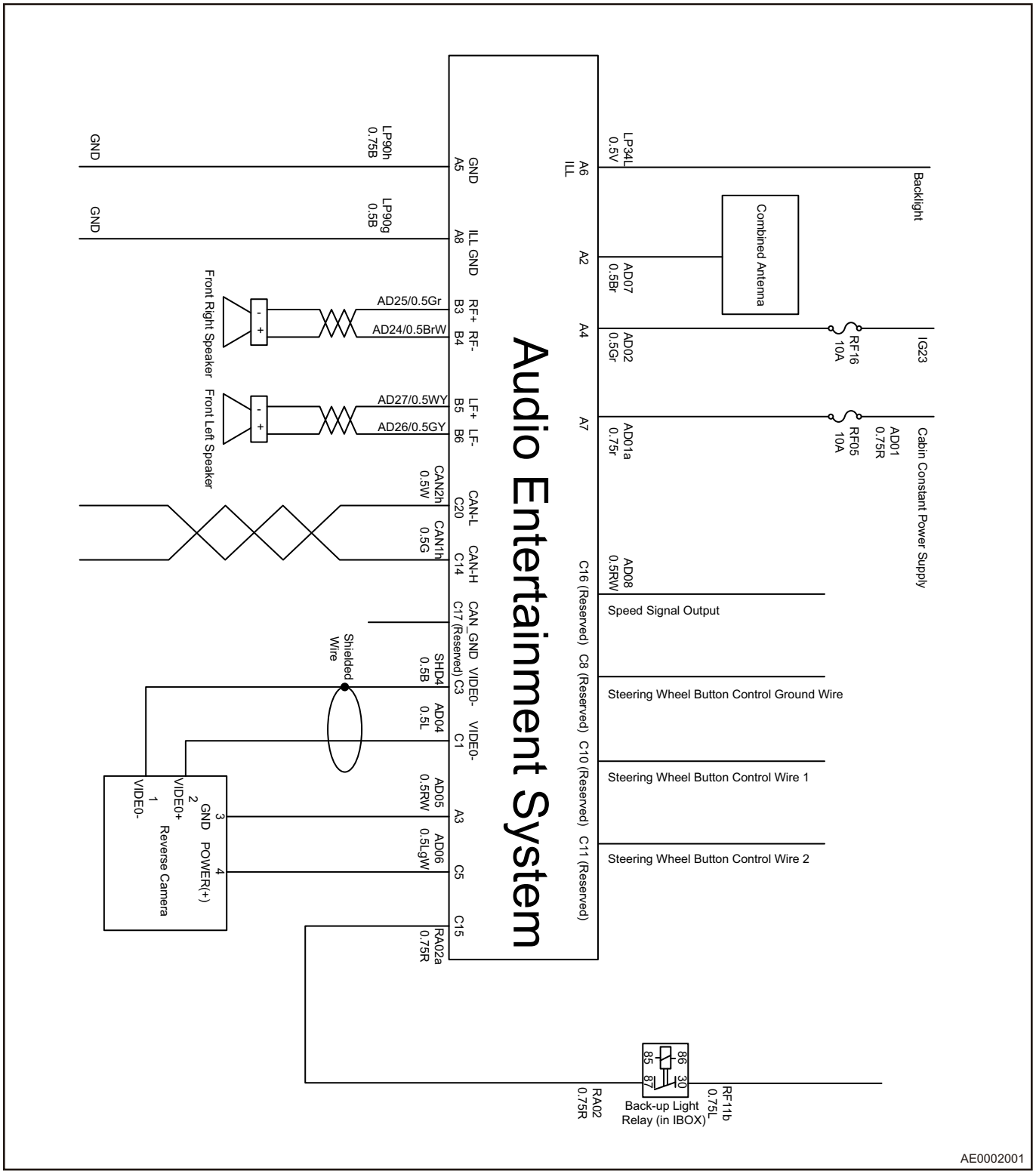
- Parking setting
  - The remote parking function can be turned on or off via this menu interface.



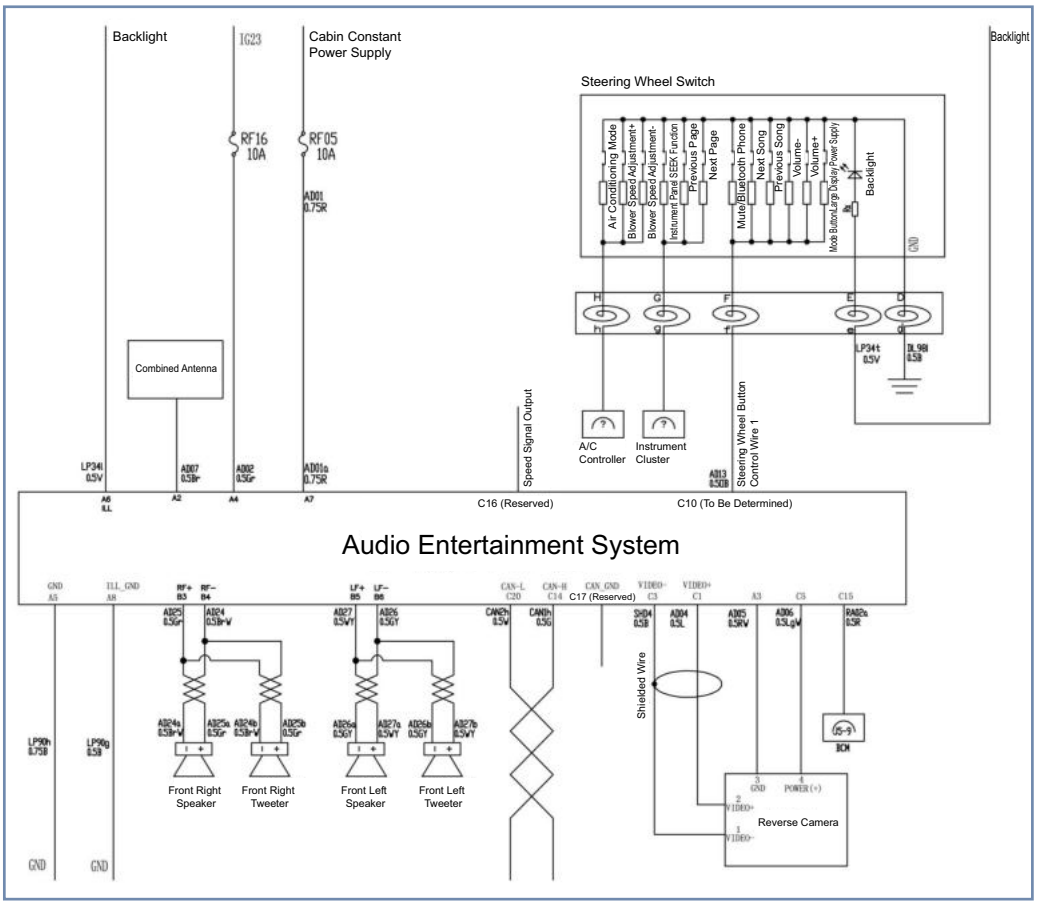
System Circuit Diagram

Control Schematic Diagram

Comfort Model, Lease Model



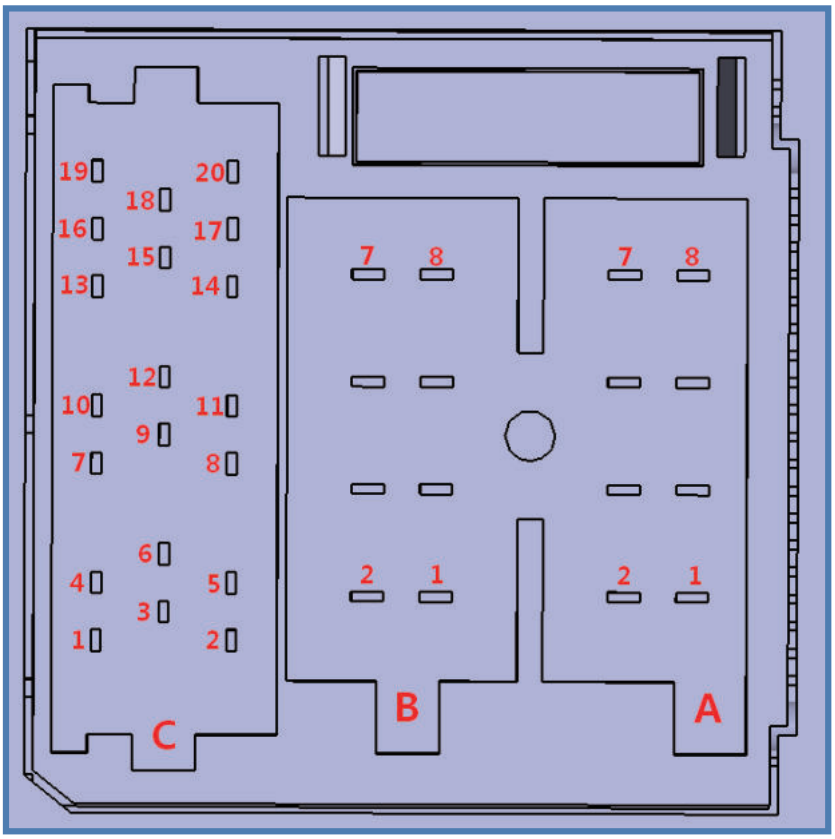
Luxury Model



AE0003001

Module Terminal Definition

Large Screen DVD Connector Pin Definition

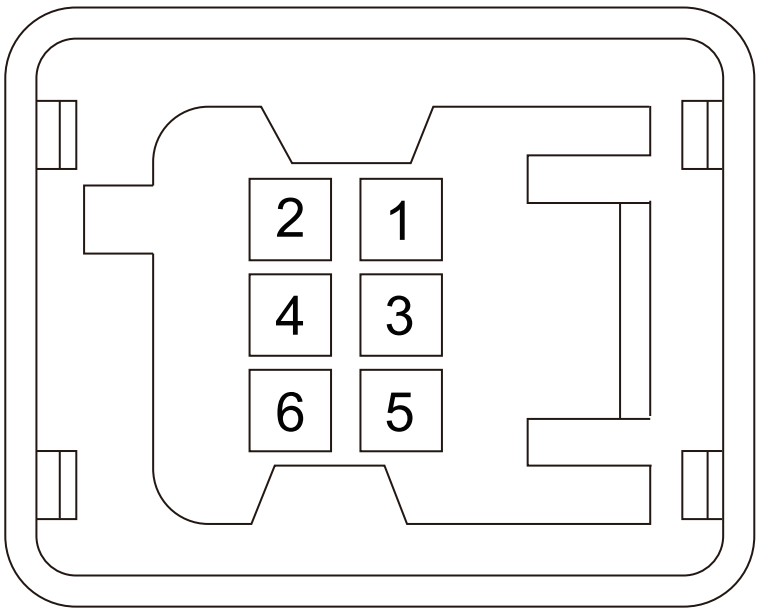


AE0004001

Pin No.	Functional Definition	Pin No.	Functional Definition
A-1	Camera Power Supply (Power Supply Output 12 V)	C-3	Camera Video Ground
A-2	ANT Radio Antenna Power Supply 12 V	C-4	-
A-3	VGND (Camera Video Ground)	C-5	-
A-4	ACC Switch	C-6	-
A-5	GND	C-7	-
A-6	ILL	C-8	Steering Wheel Button Control Ground Wire
A-7	Battery Power Supply Input	C-9	-
A-8	Power Supply Ground	C-10	Steering Wheel Button Control Wire 1

B-1	Rear Right Horn Output +	C-11	Steering Wheel Button Control Wire 2
B-2	Rear Right Horn Output -	C-12	-
B-3	Front Right Horn Output +	C-13	-
B-4	Front Right Horn Output -	C-14	CAN-H
B-5	Front Left Horn Output +	C-15	Reverse Control Signal
B-6	Front Left Horn Output -	C-16	Vehicle Speed Signal Output
B-7	Rear Left Horn Output +	C-17	CAN (GND)
B-8	Rear Left Horn Output -	C-18	-
C-1	Rear Camera Video Output	C-19	-
C-2	-	C-20	CAN-L

USB Cable Connector Pin Definition



AE0005001

Pin No.	Functional Definition
1	USB D+
2	GND

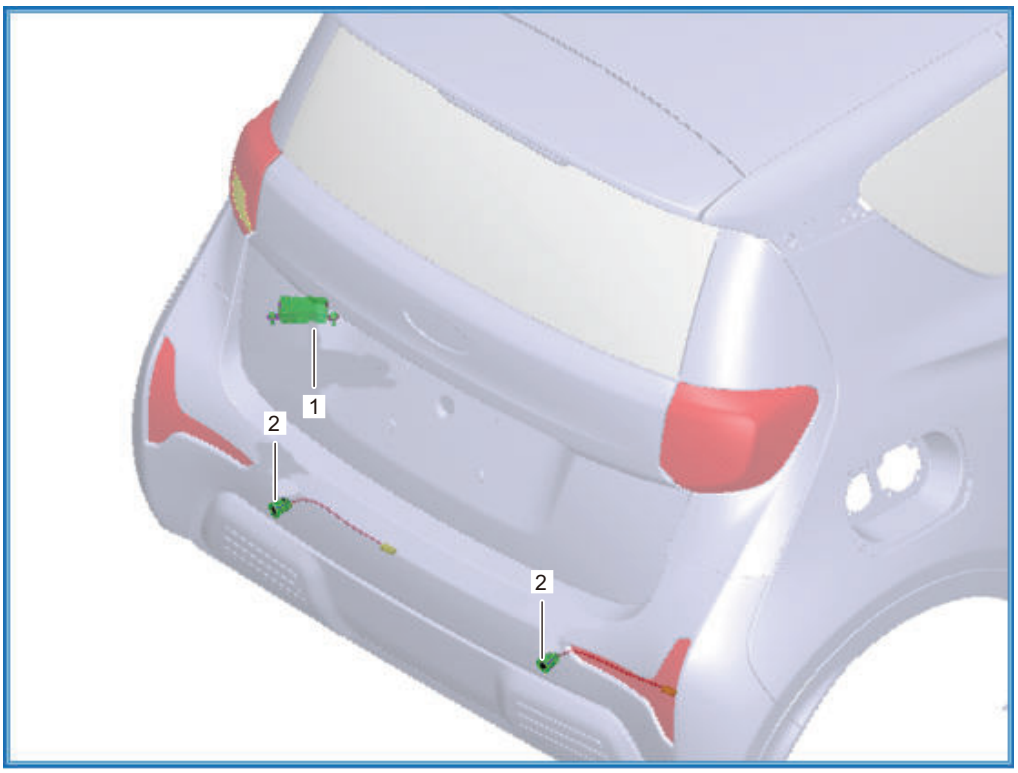
3	USB D-
4	USB 5 V
5	GND
6	USB 5 V

PARKING ASSIST SYSTEM

PARKING ASSIST SYSTEM

System Overview

System Composition



PM0001001

1	Radar Control Module	2	Radar Control Module

Parts Technology Requirements

Reverse Radar Module

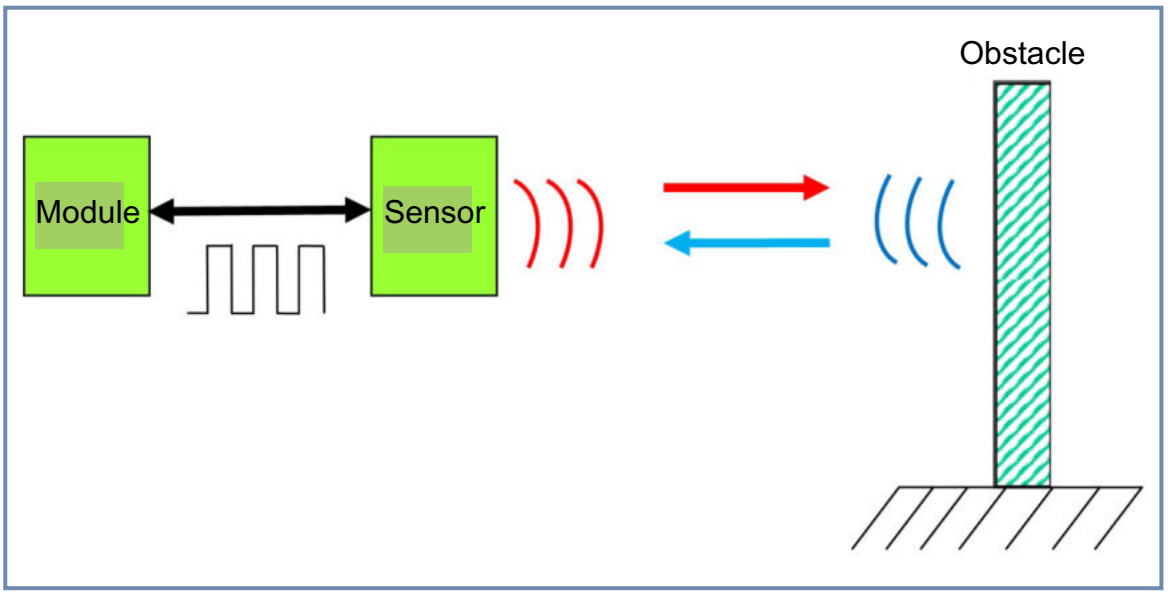
Rated Voltage	Operating Voltage Range	Operating Temperature Range	Storage Temperature Range
13.5 V	9 V - 16 V	-30℃ - 80℃	-40℃ - 85℃

Sensor

Rated Voltage	Operating Voltage Range	Operating Temperature Range	Storage Temperature Range
13.5 V	9 V - 16 V	-40℃ - 80℃	-40℃ - 85℃

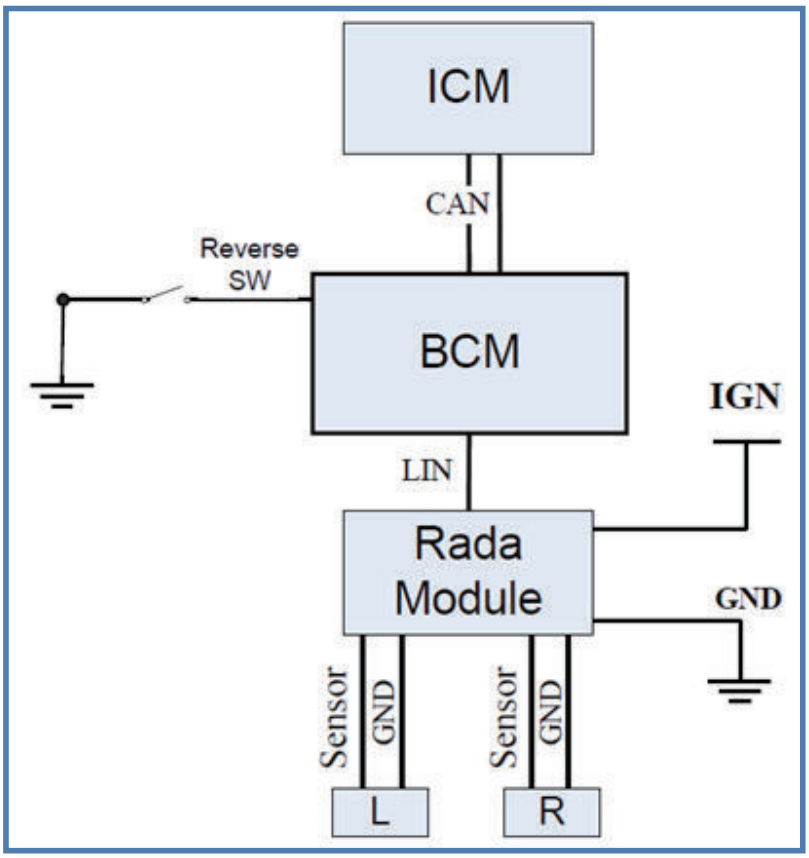
Reverse Radar Schematic Diagram

Reverse radar system uses the principle of ultrasonic distance detection, the principle is as follows



PM0002001

- The sensor sends and receives ultrasonic waves, and the distance from sensor to obstacle is calculated according to this time difference.
- The propagation speed of ultrasonic waves in air is about 340 m/s
- Distance is: S = V × T / 2
- Reverse radar system consists of 1 control module, dual line digital sensor, alarm display, vehicle speed signal (optional). Reverse radar module sends alarm information to combination display alarm device via LIN line, and uses the display alarm device to issue buzzer alarm.



PM0003001

- Currently, front sensor is not provided for all models, but 2 rear sensors provided. For reverse radar system with only rear sensor, this instrument cluster only provides sound prompts, and does not display distance.

Distance	Less than 40 CM	40 - 60 CM	60 - 90 CM	90 - 150 CM	More than 150 CM
Buzzer frequency	Continuous sound	4 Hz	2 Hz	1 Hz	Does not sound

Radar System Self-check

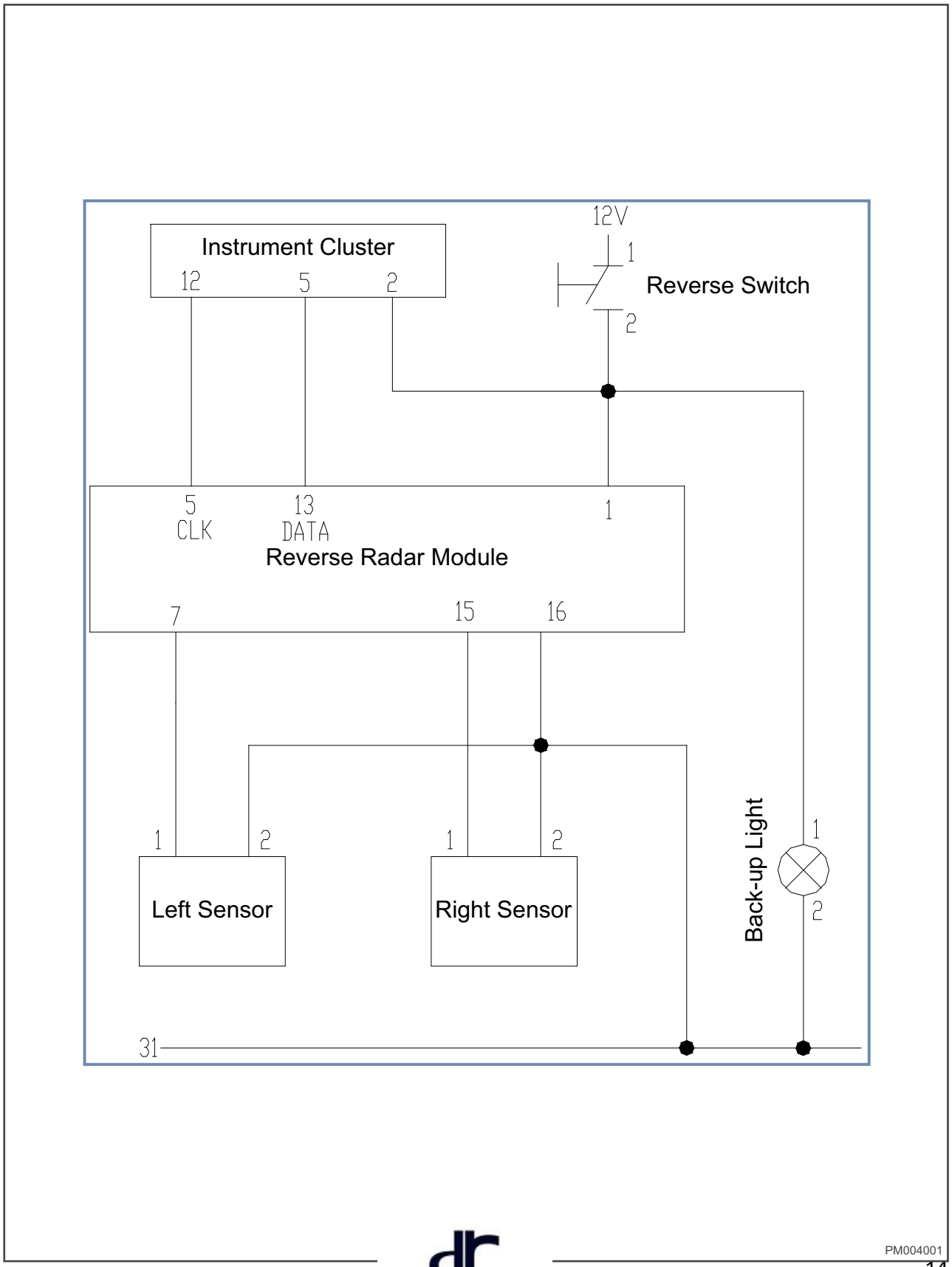
After the system is powered on, the module first performs a self-check on the sensor. The self-check process is as follows:

1. If sensor fault, reverse radar control module sends fault information (i.e. channel information of faulty sensor) to alarm device to sound the buzzer when performing power on self-check; sounds for 0.5 s → stops for 0.5 s → sounds for 0.5 s → stops, after 2 seconds, reverse radar control module switches to normal distance detection.
2. If all sensors are normal, reverse radar control module sends this information to display alarm device when performing power on self-check; after buzzer sounds once for 0.5 seconds, reverse radar control module switches to normal distance detectio.

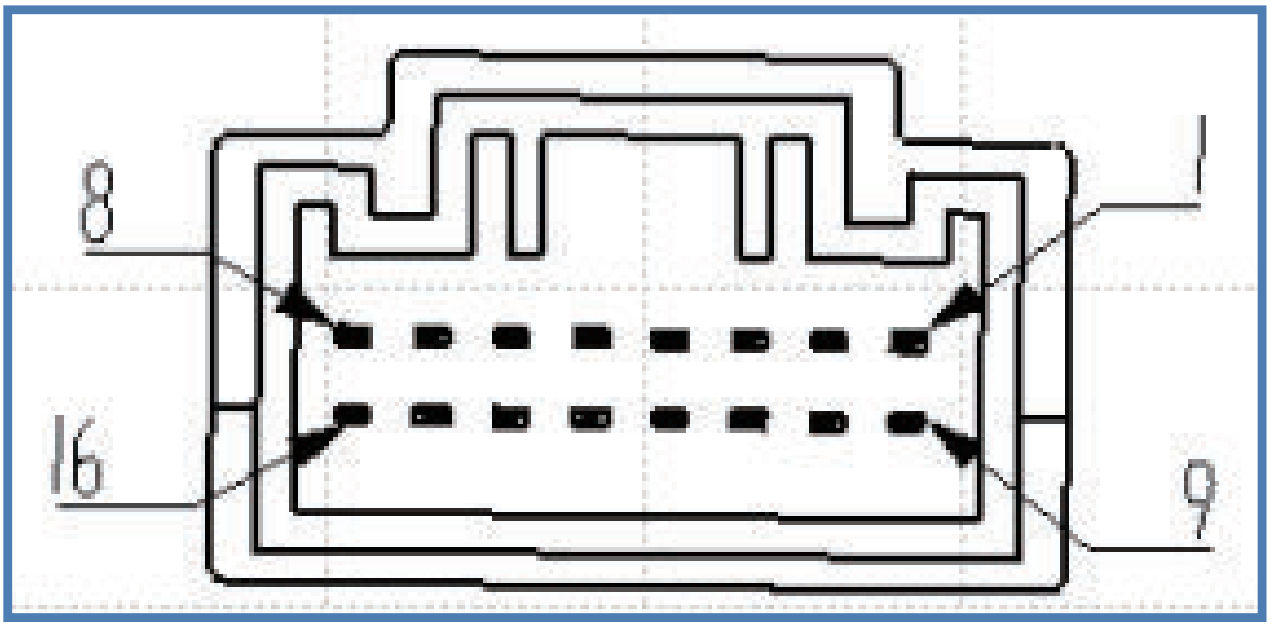
System Circuit Diagram

Control Schematic Diagram

Reverse Radar Control Schematic Diagram



Reverse Radar Module Pin Definition



PM0005001

Terminal	Function	Terminal	Function
1	R-SHIFT (reverse signal, module power supply)	2	-
3	-	4	-
5	-	6	
7	Left sensor signal	8	-
9	-	10	-
11	-	12	-
13	Data line	14	-
15	Right sensor signal	16	Ground

On-vehicle Service

Specifications

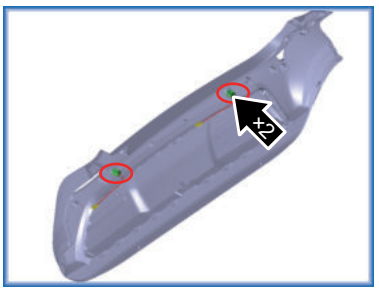
Torque Specifications

Part Name	Torque (N·m)
Radar module fixing bolt	7 ± 1

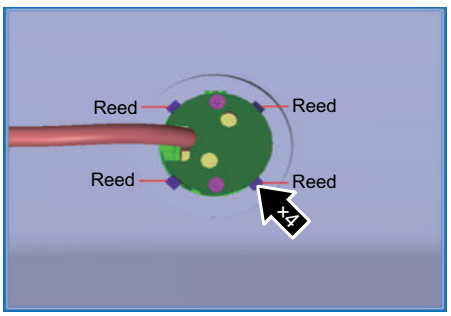
Sensor

Removal

1. Remove the rear bumper (refer to “Interior” and “Exterior” sections in “Body”).
2. Disconnect reverse radar sensor connector (arrow).


PM0001002

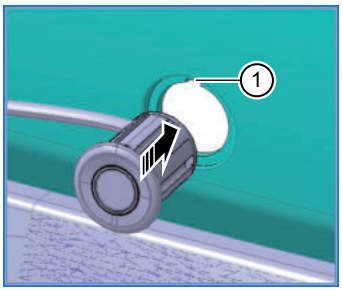
3. Using a flat tip screwdriver, unscrew clamping reed, and remove reverse radar sensor.



PM0002002

Installation

1. Insert sensor connector terminal into sensor installation hole from outside of rear bumper body, and align sensor failure-proof groove with rear bumper sensor installation hole groove (1 is the failure-proof groove), install the sensor in place (arrow is the installation direction) , and fit with outer surface of rear bumper body.



PM0003002

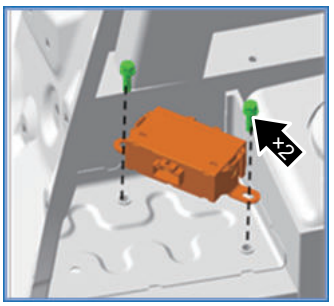
2. Connect sensor connector with indoor wire harness connector in place.

Radar Module

Removal

1. Remove luggage compartment inner trim panel and left quarter protector.
2. Disconnect radar module connector wire harness.
3. After removing radar module fixing bolt (arrow), remove radar module.

   Tightening torque: 7 ± 1 N·m



Installation

1. Installation is in the reverse order of removal.

TIRE PRESSURE MONITORING SYSTEM

TIRE PRESSURE MONITORING SYSTEM

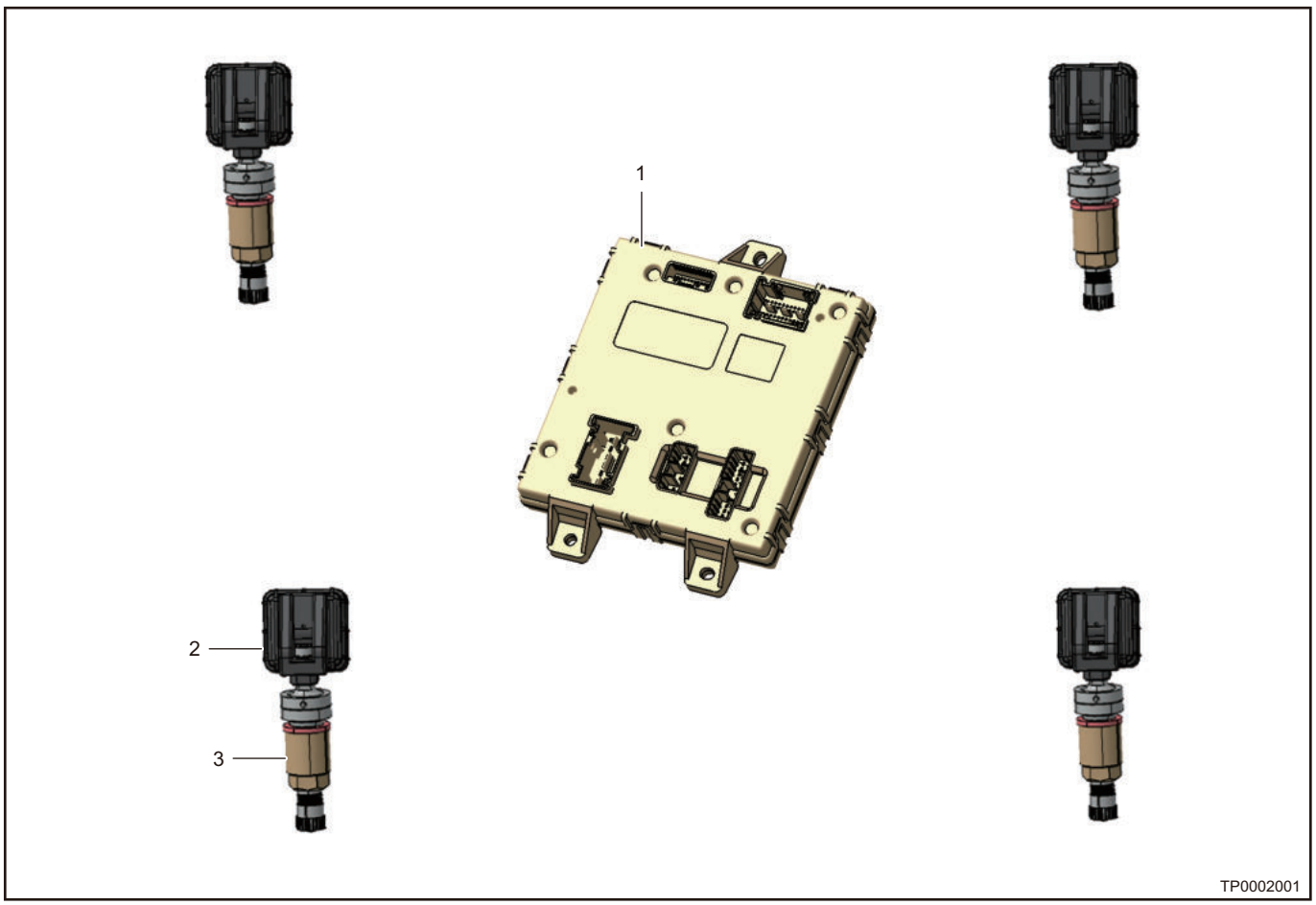
System Overview

System Description

Tire Pressure Monitoring System is an active safety device, which can monitor tire pressure and temperature in real time, tire pressure can be displayed on instrument cluster. When tire pressure is too low or two high or temperature is too high, tire pressure monitoring system will give an alarm.
After the system is powered off, it can still receive the data sent by sensor. When the tire pressure change value is 10 kPa or higher or the temperature change value is 5 ℃ or higher, the sensor sends a set of data. If the vehicle is in OFF or ACC gear at this time, the receiver will store the data, and sends the data immediately after the next power-on.

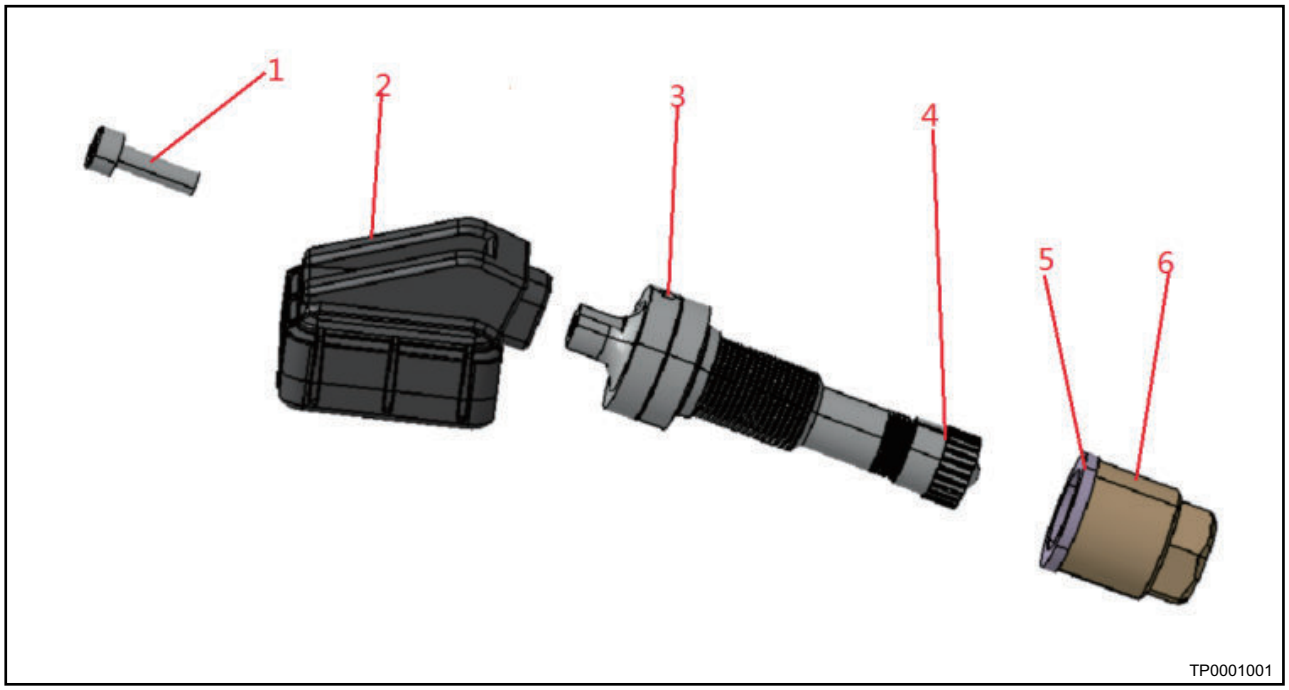
System Components Diagram

Tire Pressure Monitoring System Structure Diagram



No.	Name	No.	Name
1	Body Control Module	2	Tire Pressure Sensor Body
3	Tire Pressure Sensor Nut		

Tire Pressure Sensor Composition Diagram



No.	Name	No.	Name
1	Screw	2	Sensor
3	Valve Stem	4	Valve Cap
5	Seal Washer	6	Nut

Component Function Description

Body Control Module

Body control module is the receiving terminal of tire information.The body control module receives radio-frequency signal sent from tire pressure sensor and processes these data. Body control module processes data of tire pressure sensor, then sends them to instrument cluster via CAN bus. Tire pressure value is displayed on meter via CAN bus signal.

Technical Parameters

- Operating voltage: 9 V ~ 16 V
- Modulation mode: FSK
- Receiving frequency: 433.92 MHz
- Operating temperature: - 40 ˚C ~ + 85 ˚C
- Storage temperature: - 40 ˚C ~ + 95 ˚C
- Operating current: ⩽ 100 mA
- RF receiving sensitivity: ⩽ - 105 dBm (closed loop test)
- Sensor signal receiving success rate: ⩾ 90%
- Static current: ⩽ 2.5 mA
- Set standard tire pressure value: 220 ± 10 kPa
- Body control module power supply terminal connects constant power supply.

Tire Pressure Sensor
Tire pressure sensor is the transmitting terminal of tire information.Tire pressure sensor is the core component of tire pressure monitoring system. Tire pressure sensor is installed on rim, which collects data such as pressure, temperature inside tire, and sends these data to tire pressure receiver via radio-frequency signal. The wireless communication frequency between tire pressure sensor and tire pressure receiver is 433.92 MHz.

Technical Parameters

- Operating voltage: 2.1 V ~ 3.6 V
- Modulation mode: FSK
- Transmitting frequency: 433.92 MHz ± 75 KHz
- Operating temperature: - 40 ˚C ~ + 105 ˚C, - 105 ˚C ~ + 125 ˚C (it can operate for 1 hour)
- Storage temperature: - 40 ˚C ~ + 125 ˚C
- Temperature measurement range: - 40 ˚C ~ + 125 ˚C, Measurement accuracy: ± 3 ˚C
- Pressure measurement range: 0 ~ 800 kPa, Measurement accuracy: ± 10 KPa
- Transmitting power: - 10 ~ + 5 dBm
- Sensor service life: ⩾ 10 years

Alarm Description

Low Pressure Alarm
When the pressure of a certain wheel is lower than 165 kPa, the tire pressure monitoring system will issue a low pressure alarm when the vehicle is in ON gear, and the warning light  and the indicator and value of corresponding tire position on instrument cluster will flash.
If the tire pressure is too low, please resume it to normal pressure as soon as possible. Too low tire pressure will increase fuel consumption and tire wear. And seriously worn tire will cause an accident such as flat tire.
For DR 1.0 EV please resume the tire pressure to 2.2 bar.

High Pressure Alarm
When the pressure of a certain wheel is higher than 275 kPa, the tire pressure monitoring system will issue a high pressure alarm when the vehicle is in ON gear, and the warning light  and the indicator and value of corresponding tire position on instrument cluster will flash.
If the tire pressure is too high, please resume it to normal pressure as soon as possible. Too high tire pressure will cause the risk of flat tire.
For DR 1.0 EV please resume the tire pressure to 2.2 bar.

High Pressure Alarm
When the temperature of a certain wheel is higher than 80 ℃, the tire pressure monitoring system will issue a high temperature alarm when the vehicle is in ON gear, and the warning light  and the indicator and value of corresponding tire position on instrument cluster will flash.
The instrument cluster does not display temperature value. The system will issue a high temperature alarm when tire temperature is higher than 80 ℃.
When a high temperature alarm occurs, stop vehicle to cool the tire naturally, otherwise there is a danger of accident. When tire temperature is too high, never cool the tire by pouring cold water, otherwise, tire may be damaged, resulting in an accident.

Rapid Leakage Alarm
When a tire leaks at a rate greater than 30 kpa/min, the receiver will issue a rapid leakage alarm signal within 1 minute, and the warning light  and the indicator and value of corresponding tire position on instrument cluster will flash.
When the leakage alarm occurs, stop driving, and check the tire condition to ensure safety.

Sensor Lost Communication with Body Control Module Alarm (One of System Alarms)
When the vehicle speed is higher than 25 km/h, if the receiver does not receive one or more sensor signals for 10 consecutive minutes, and the relevant alarm signal is issued. The warning light  remains on, and the indicator and value of corresponding tire position will flash on instrument cluster.
The sensor lost communication with body control module, which may be caused by external interference. The communication can be restored by leaving the interference source. If the communication cannot be restored, further inspection is required.

Sensor Low Battery Alarm (One of System Alarms)

When the sensor battery is low, the receiver issues alarm signal. The warning light  remains on, and the indicator and value of corresponding tire position will flash on instrument cluster.
The sensor needs to be replaced when the sensor battery is low.

Low Pressure Alarm
When the body control module voltage is high (higher than 16 V), receiver voltage is low (lower than 9 V), body control module self-check and initialization fails, body control module memory access fails, bus is off or sensor ID does not match (or is forcibly deleted), the body control module will send system malfunction alarm signal, and warning light  on instrument cluster remains on.

System Circuit Diagram

Module Terminal Definition

Terminal Definition

Type of Connector			
No.	Type	BCM Connector	Wire Harness Terminal
1	52 PIN 0.63 x 0.63	Terminal No.: 2 - 963964 - 7	TYCO 284972 - 1
2	24 PIN 0.63 x 0.63	Terminal No.: 2 - 963964 - 7	TYCO 1318917 - 1
3	14 PIN 2.8 x 0.8	Terminal No.: 338429 - 2	TYCO 2209895 - 1
4	12 PIN 1.7 x 0.63	Terminal No.: 2288592 - 2	TYCO 368542 - 1
5	20 PIN 1.7 x 0.63	Terminal No.: 2288592 - 2	TYCO 368511 - 1

Terminal Definition

24 PIN Connector		
Terminal	Signal Type	Function
1	Ground / GND	GND
2	Output - Low Level / O - L	Dome Light Output (LSD)
3	Output - Digital - High Level / O - D - H	-
4	Output - Digital - Low Level / O - D - L	-

5	Input - Digital - High Level / I - D - H	IGNI Input (High Level Trigger)
6	-	KEY Input (Reserved)
7	Output - High Level / O - H	Wireless Charging Module Control Pin (HSD)
8	Input - Digital - High Level / I - D - H	Vehicle Speed Signal (Reserved)
9	Input - Digital - Low Level / I - D - L	Front Fog Light Switch (Reserved)
10	Input - Digital - Low Level / I - D - L	Wiper Low Speed Input
11	Input - Digital - Low Level / I - D - L	Left Turn Signal Light Input (Low Level Trigger)
12	Input - Digital - Low Level / I - D - L	Right Turn Signal Light Input (Low Level Trigger)
13	Input - Analog / I- A	-
14	Output - High Level / O - H	Security Indicator Light Output (HSD)
15	Output - High Level / O - H	Operation Limit Output
16	Input - Digital - High Level / I - D - H	ACC Input (High Level Trigger)
17	/	/
18	Input - Analog / I- A	Remote Lock and Unlock Trigger Signal (Reserved)
19	Input - Digital - Low Level / I - D - L	Overtaking Switch Input
20	Input - Digital - Low Level / I - D - L	Position Light Switch Input (Low Level Trigger)
21	Input - Digital - Low Level / I - D - L	Washer Switch Input (Low Level Trigger)
22	Input - Digital - Low Level / I - D - L	Low Beam Switch Input (Low Level Trigger)
23	Input - Digital - Low Level / I - D - L	High Beam Switch Input (Low Level Trigger)
24	Input - Digital - Low Level / I - D - L	-

Terminal Definition

52 PIN Connector		
Terminal	Signal Type	Function

Terminal Definition

14 PIN Connector		
Terminal	Signal Type	Function
1	Power Supply / Power	Wiper Power Supply
2	Power Supply / Power	Central Control Lock Power Supply
3	Ground / GND	Front Window Power Supply Ground
4	Ground / GND	Rear Window Power Supply Ground (Reserved)
5	Output - High Level / O - H	Rear Right Window Power Supply Up (Reserved)
6	Output - High Level / O - H	Rear Right Window Power Supply Down (Reserved)
7	Power Supply / Power	Rear Window Power Supply (Reserved)
8	Output - High Level / O - H	Front Left Window Power Supply Up
9	Output - High Level / O - H	Front Left Window Power Supply Down
10	Power Supply / Power	Front Window Power Supply
11	Output - High Level / O - H	Front Right Window Power Supply Up
12	Output - High Level / O - H	Front Right Window Power Supply Down
13	Output - High Level / O - H	Rear Left Window Power Supply Up (Reserved)
14	Output - High Level / O - H	Rear Left Window Power Supply Down (Reserved)

Terminal Definition

12 PIN Connector		
Terminal	Signal Type	Function
1	Output - High Level / O - H	Left Turn Signal Light
2	Output - High Level / O - H	Door Lock
3	Output - High Level / O - H	Door Unlock
4	Output - High Level / O - H	Back Door Lock Release
5	Output - High Level / O - H	Electric Horn
6	Output - High Level / O - H	Right Turn Signal Light

7	Power Supply / Power	POWER - HSD
8	/	/
9	Output - High Level / O - H	Washer
10	Output - High Level / O - H	Battery Save
11	Ground / GND	Vehicle Lock Ground
12	Ground / GND	Power Supply Ground

Terminal Definition

20 PIN Connector		
Terminal	Signal Type	Function
1	Power Supply / Power	POWER - HSD
2	Output - High Level / O - H	Brake Light
3	Output - High Level / O - H	Rear Fog Light
4	Output - High Level / O - H	Front Position Light
5	Output - High Level / O - H	Rear Lower Light
6	Output - High Level / O - H	High Beam Light Output
7	Output - High Level / O - H	Backlight Output
8	Output - High Level / O - H	Daytime Running Light (Reserved)
9	Output - High Level / O - H	Back-up Light
10	Power Supply / Power	PDU Power Supply
11	Output - High Level / O - H	ACC Relay Output
12	Output - High Level / O - H	IGNI Relay Output
13	-	/
14	-	/
15	Ground / GND	PDU Power Supply Ground
16	-	/
17	-	/
18	-	/
19	-	/
20	-	/

On-vehicle Service

Specifications

Torque Specifications

Part Name	Torque (N·m)
Tire Pressure Sensor Fixing Nut	4 - 5

Tire Pressure Sensor

Installation

1. First pass the sensor through the mounting hole on the rim as shown in illustration, and the gum application surface is facing the rim.


TP0001002

2. Place the seal washer as shown in illustration.


TP0002002

3. Install the nut (11mm).


TP0003002

⚠

- Be sure to pre-tighten the nut until the sensor does not shake.

4. Use the auxiliary tool to fix it, insert the pin on auxiliary tool into the air vent on air valve, and then press the auxiliary device with left hand to prevent the sensor from rotating.


TP0004002

5. Using a electric gun (or torque wrench), tighten the nut, and keep the sensor gum application surface facing the rim surface after tightening (it can be deflected slightly).

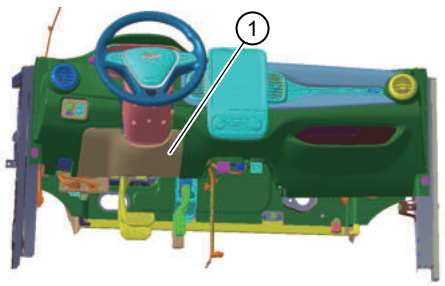
   Tightening torque: 4 - 5 N•m


TP0005002

Body Control Module

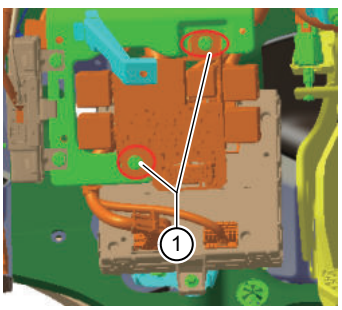
Removal

1. Move the front seat back first, then remove the steering wheel lower protector (1).



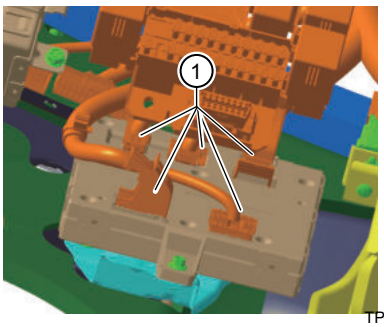
TP0006002

2. Remove 2 M8 bolts (1) from front compartment fuse and relay box.



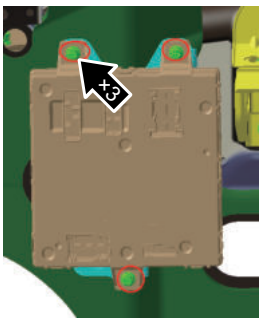
TP0007002

3. Remove 5 connectors (1) from body control module.



TP0008002

4. Remove 3 M6 fixing bolts (arrow) from body control module, and body control module can be removed.



TP0009002

Installation

1. Perform installation in the reverse order of removal.

Diagnostic Tester Information

Deflating Learning for Tire Pressure Monitoring System

1. Turn the POWER switch to ON, inflate the tires that need to be learned and enter diagnosis.

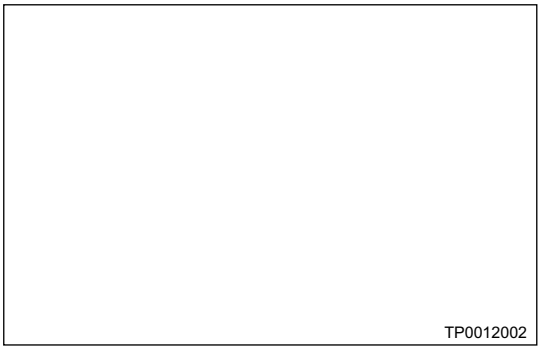
   Click TPMS (Tire Pressure Monitoring System).

TP0010002

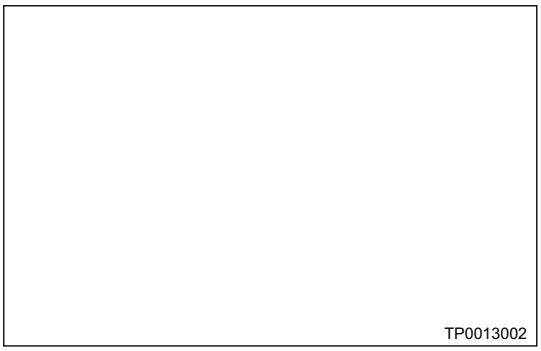
2. Click Special Operation.

TP0011002

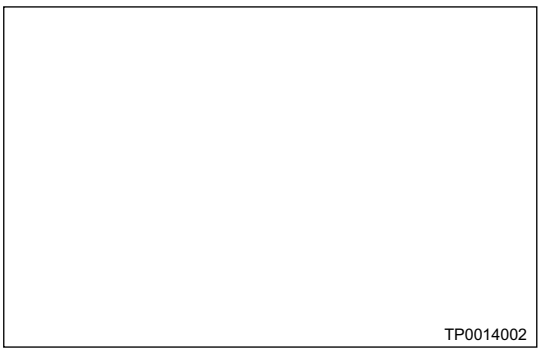
3. Click Tire Pressure Sensor Learning, and then click OK.


TP0012002

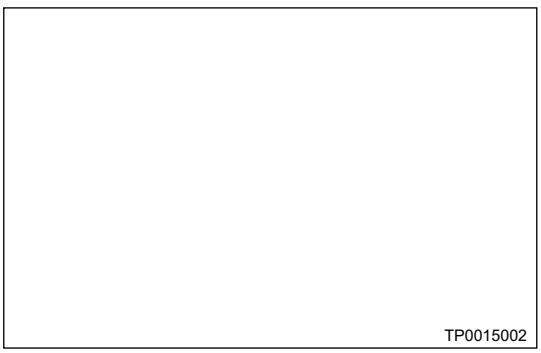
4. Select tire pressure sensor to be learned, such as front left tire pressure sensor learning.

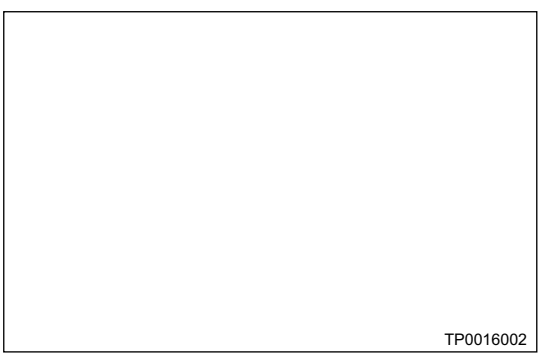

TP0013002

5. Deflate front left tire after entering learning.


TP0014002

6. If the learning is successful, the prompt as shown in illustration above will be displayed, and if it fails, the prompt as shown in illustration below will be displayed.


TP0015002


TP0016002

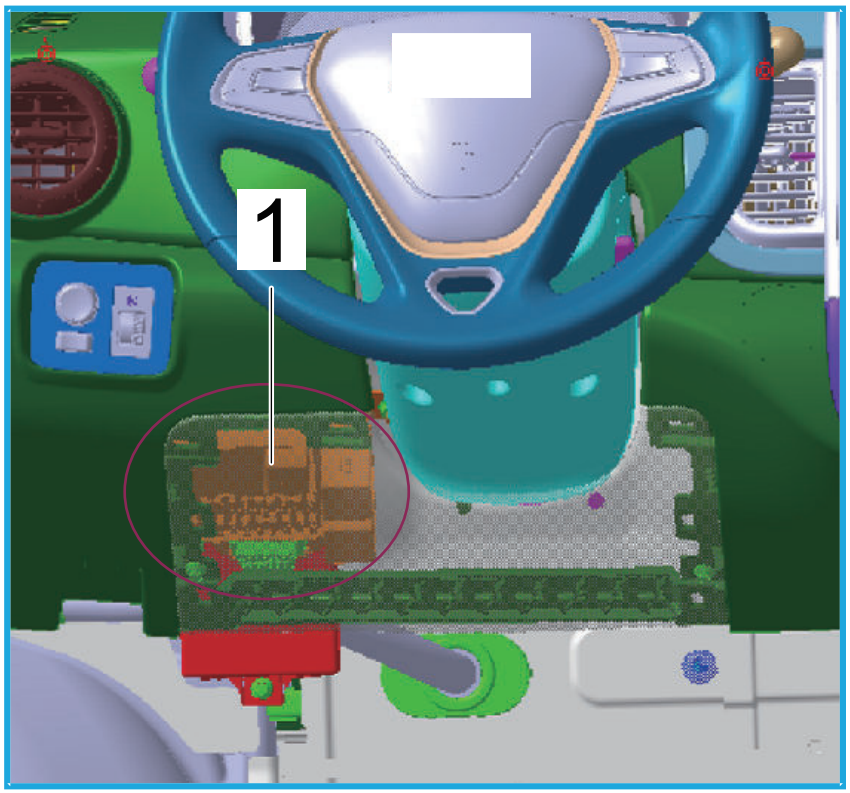
AIR CONDITIONING SYSTEM

A/C COOLING SYSTEM

System Overview

Body Control Module (BCM)

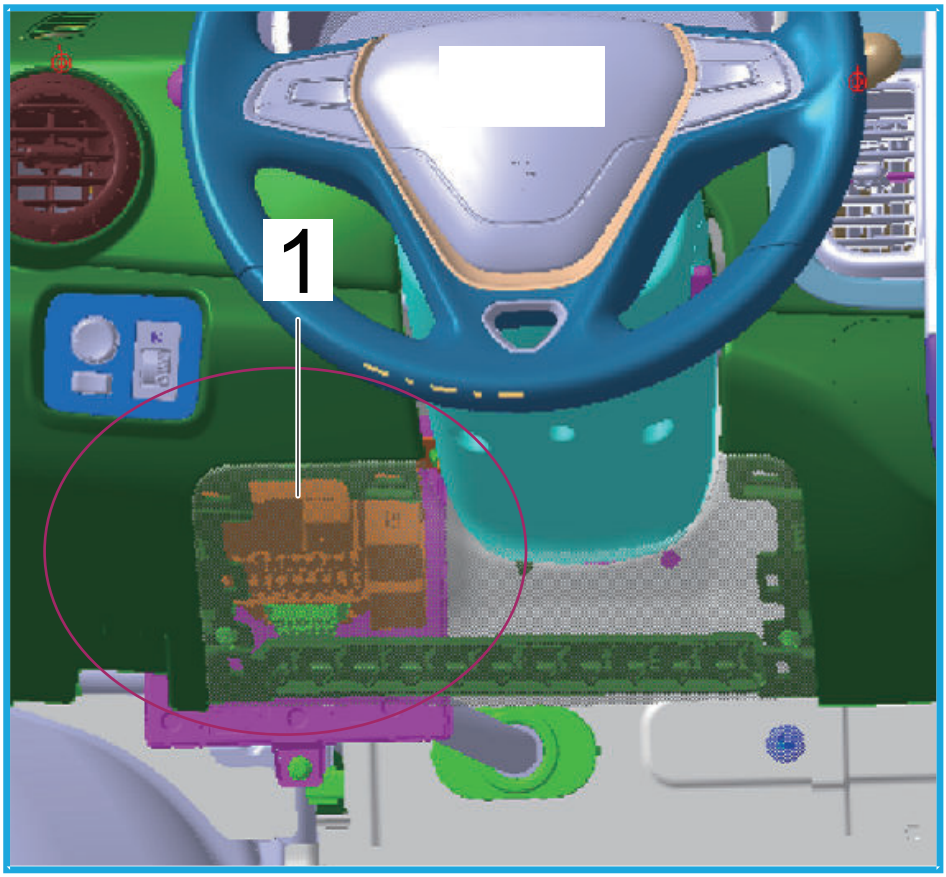
Comfort Model J72-3600030



BM0001001

1	Body Control Module (BCM)		

Lease Model, Luxury Model J72-3600030AB



BM0002001

1	Body Control Module (BCM)		

Summary of Functional and Technical Requirements

BCM Function List

- Power window control (Luxury model, with glass jam protection function).
- Daytime running light.
- ENGINE START STOP Switch (Luxury model).
- Central control lock.
- Back door opening function.
- Collision unlocking.
- Vehicle safety and anti-theft.
- Electric horn.
- Diagnosis function.

BCM Technical Parameters Description

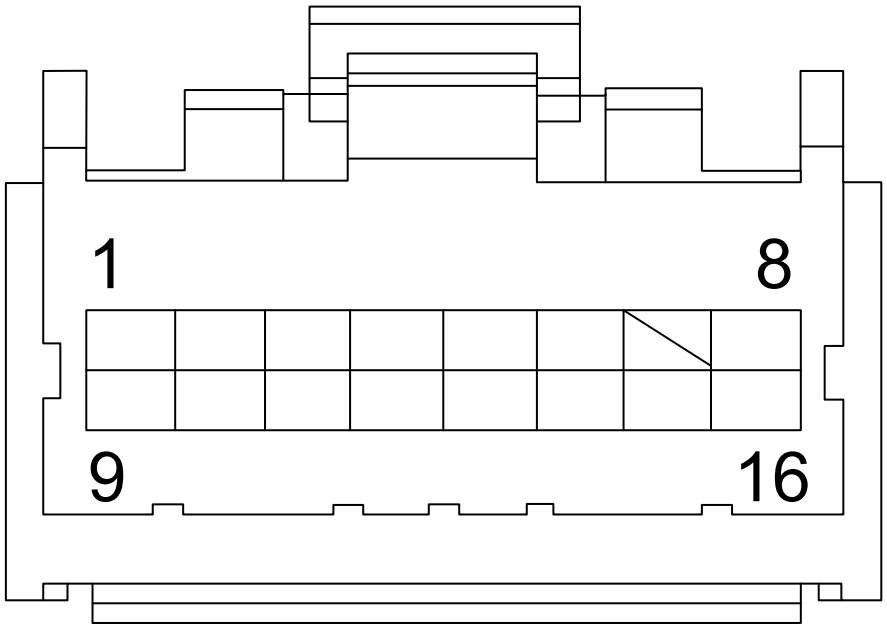
- Operating temperature: -40 ~ 85℃.
- Storage temperature: -40 ~ 70℃.
- Operating voltage range: 9 ~ 16 V.
- Test voltage: 13.5 ± 0.2 V.
- Nominal voltage: 12 V.
- Static current: ⩽ 5 mA.

System Circuit Diagram

Body Control Module Connector Terminal Definition Description

J72-3600030 Body Control Module

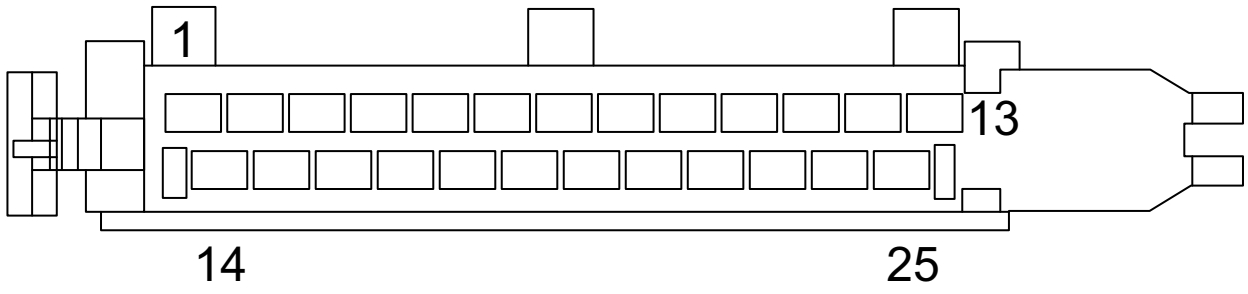
- Wire harness terminal A connector terminal view and definition



BM0003001

Pin No.	Functional Definition	Pin No.	Functional Definition
A1	Front Left Window Up Switch	A2	Front Right Window Down Switch
A3	Front Right Window Up Switch	A4	Horn Switch
A5	-	A6	Back Door Opener Switch
A7	Front Passenger Side Door Contact Switch	A8	Unlock Switch
A9	Front Left Window Down Switch	A10	Speed Signal
A11	Back Door Contact Switch	A12	Airbag Collision Signal
A13	Anti-theft Indicator	A14	Driver Side Door Contact Switch
A15	K-LINE	A16	Remote Receiving Antenna

- Wire harness terminal B connector terminal view and definition

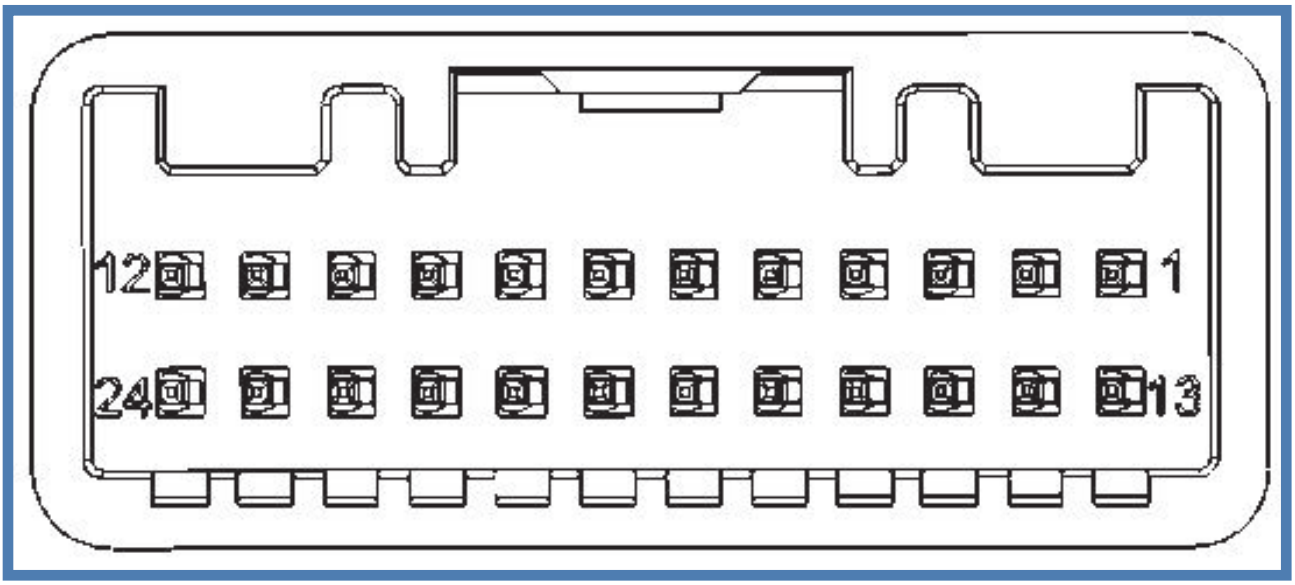


BM0004001

Pin No.	Functional Definition	Pin No.	Functional Definition
B1	Front Left Glass Up Output	B14	Front Left Glass Down Output
B2	Start Signal	B15	Front Right Glass Up Output
B3	Headlight Switch Signal	B16	Front Right Glass Up Output
B4	Lock Switch	B17	High and Low Pitched Horn
B5	Power Supply (BAT)	B18	-
B6	Power Supply (BAT)	B19	Power Supply (BAT)
B7	Operation Limit Output	B20	POWER Switch Signal
B8	GND (Ground)	B21	GND (Ground)
B9	GND (Ground)	B22	Back Door Opener Output
B10	Daytime Running Light	B23	-
B11	Lock Output	B24	Turn Signal Light Power Supply
B12	Unlock Output	B25	Left Turn Signal Output
B13	Right Turn Signal Output		

J72-3600030AB Body Control Module

- Wire harness terminal A connector terminal view and definition

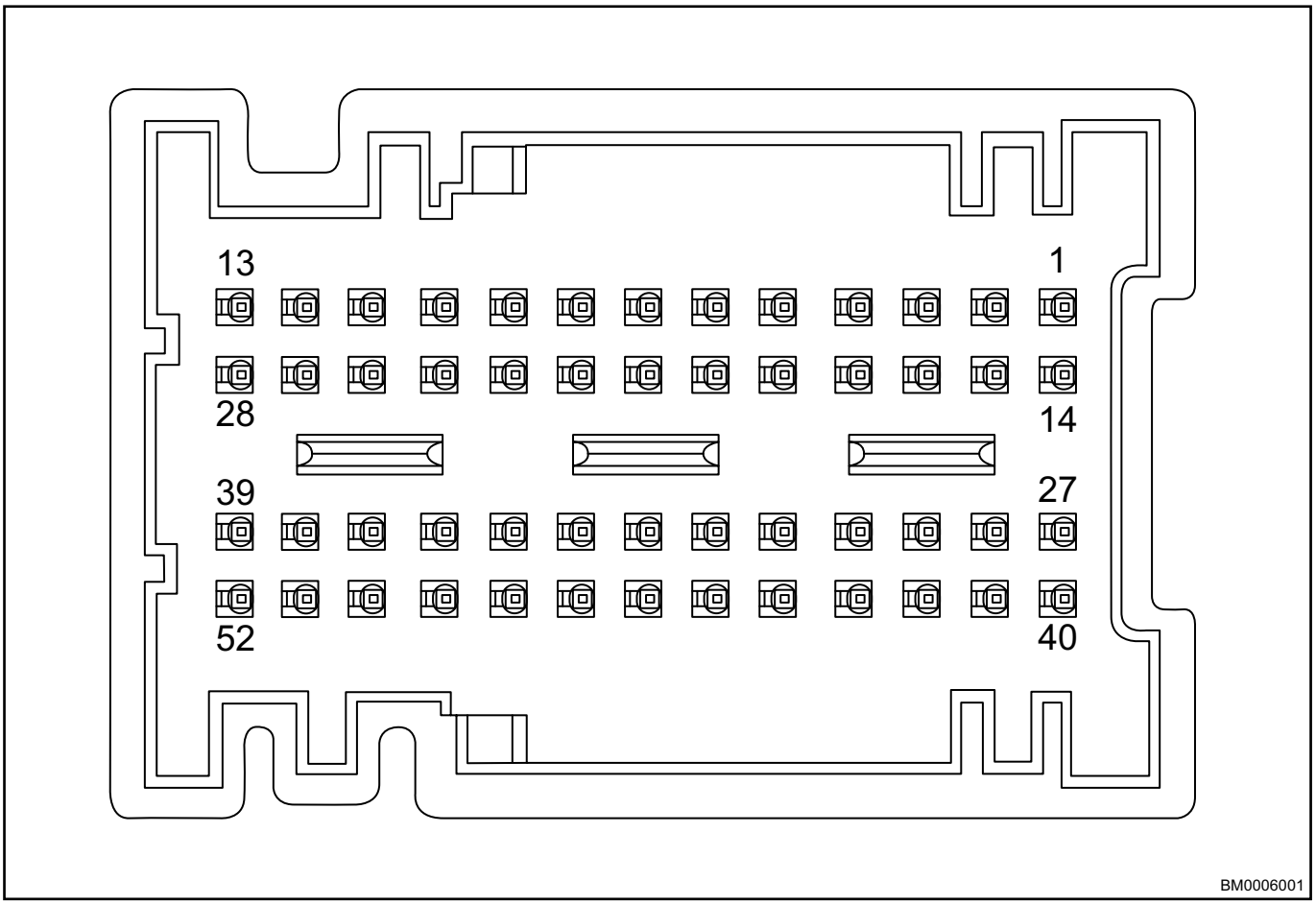


BM0005001

Pin No.	Functional Definition	Pin No.	Functional Definition
PIN-1	GND	PIN-2	Dome Light Output (LSD)
PIN-3	IMMO Antenna +	PIN-4	IMMO Antenna -
PIN-5	IGN1 Input (High Level Trigger)	PIN-6	KEY Input (Reserved)
PIN-7	START Signal	PIN-8	Vehicle Speed Signal (Reserved)
PIN-9	Front Fog Light Switch (Reserved)	PIN-10	Wiper Low Speed
PIN-11	Left Turn Signal Light Input (Low Level Trigger)	PIN-12	Right Turn Signal Light Input (Low Level Trigger)
PIN-13	RF Antenna	PIN-14	Security Indicator Light Output (HSD)
PIN-15	Operation Limit Output (Reserved)	PIN-16	ACC Input (High Level Trigger)

PIN-17		PIN-18	Remote Lock and Unlock Trigger Signal (Reserved)
PIN-19	Overtaking Switch Input (Reserved)	PIN-20	Position Light Switch Input (Low Level Trigger)
PIN-21	Washer Switch Input (Low Level Trigger)	PIN-22	Low Beam Switch Input (Low Level Trigger)
PIN-23	High Beam Switch Input (Low Level Trigger)	PIN-24	Neutral Gear Signal (Low Level Trigger)

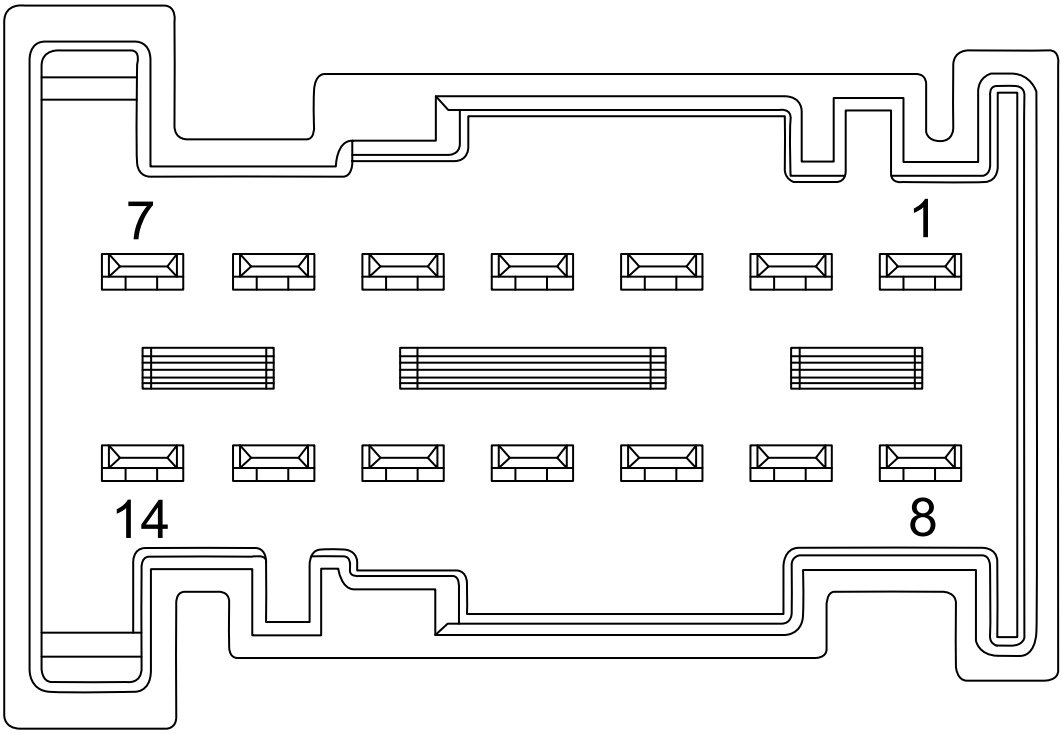
- Wire harness terminal B connector terminal view and definition



Pin No.	Functional Definition	Pin No.	Functional Definition
PIN-1	SSB Button Switch 1 Input	PIN-2	SSB Ground
PIN-3	-	PIN-4	-
PIN-5	-	PIN-6	-
PIN-7	Wiper Low Speed Output	PIN-8	Front Left Door Window Up
PIN-9	Wiper Intermittent	PIN-10	Rear Right Door Window Up (Reserved)

PIN-11	Unlock Signal	PIN-12	Rear Fog Light Switch
PIN-13	Collision Signal	PIN-14	SSB Button Switch 2 Input
PIN-15	SSB Backlight LED Output	PIN-16	-
PIN-17	-	PIN-18	-
PIN-19	-	PIN-20	-
PIN-21	Front Left Door Window Down	PIN-22	Wiper High Speed
PIN-23	Rear Right Door Window Down (Reserved)	PIN-24	Lock Signal
PIN-25	Front Right Door Contact Switch Input	PIN-26	Luggage Compartment Open Signal input
PIN-27	SSB Amber LED Output	PIN-28	CAN-H
PIN-29	-	PIN-30	-
PIN-31	-	PIN-32	Washer Output
PIN-33	-	PIN-34	Front Right Door Window Up
PIN-35	Rear Left Door Window Up (Reserved)	PIN-36	Alarm Switch
PIN-37	Luggage Compartment Door Contact Switch Input	PIN-38	Front Left Door Contact Switch Input
PIN-39	Brake Signal Input	PIN-40	SSB Green LED Output
PIN-41	CAN-L	PIN-42	-
PIN-43	-	PIN-44	Wiper High Speed
PIN-45	Wiper High Speed Output	PIN-46	Low Beam Light Output
PIN-47	Front Right Door Window Down	PIN-48	Rear Left Door Window Down (Reserved)
PIN-49	Rear Left Door Contact Switch Signal (Reserved)	PIN-50	Rear Right Door Contact Switch Signal (Reserved)
PIN-51	Horn Input	PIN-52	Wiper Return

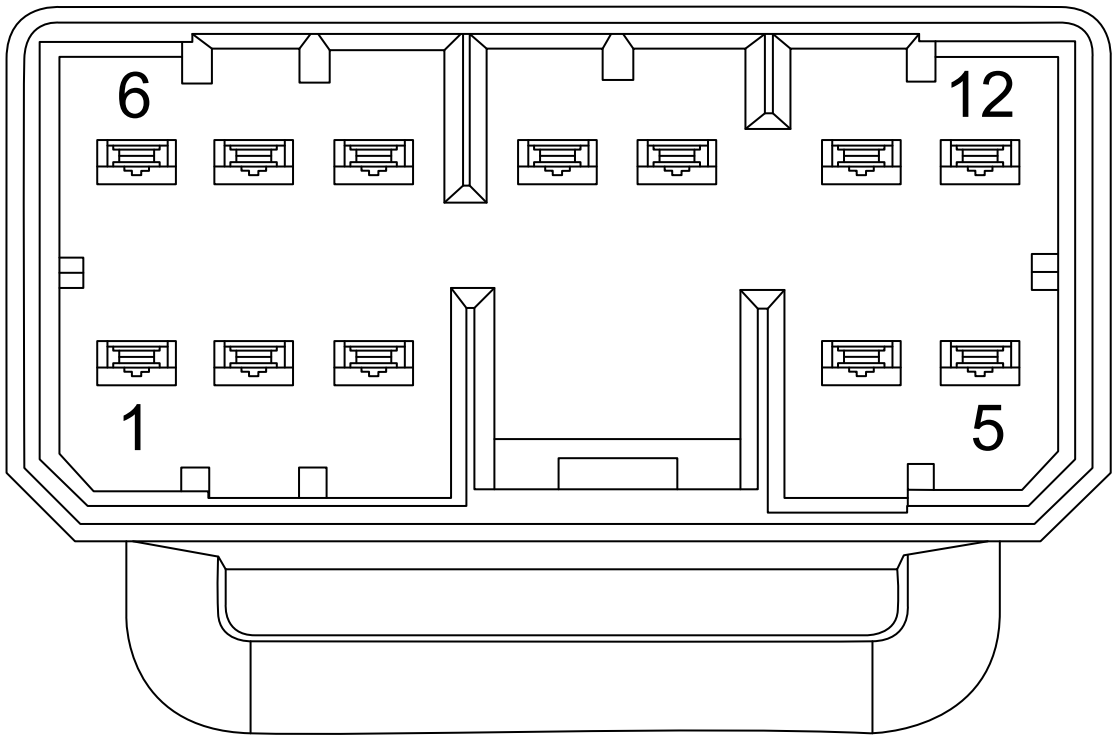
- Wire harness terminal C connector terminal view and definition



BM0007001

Pin No.	Functional Definition	Pin No.	Functional Definition
PIN-1	Power Supply	PIN-2	Central Control Lock Power Supply
PIN-3	Front Window Power Supply Ground	PIN-4	Rear Window Power Supply Ground (Reserved)
PIN-5	Rear Right Window Power Supply Up (Reserved)	PIN-6	Rear Right Window Power Supply Down (Reserved)
PIN-7	Rear Window Power Supply (Reserved)	PIN-8	Front Left Window Power Supply Up
PIN-9	Front Left Window Power Supply Down	PIN-10	Front Window Power Supply
PIN-11	Front Right Window Power Supply Up	PIN-12	Front Right Window Power Supply Down
PIN-13	Rear Left Window Power Supply Up (Reserved)	PIN-14	Rear Left Window Power Supply Down (Reserved)

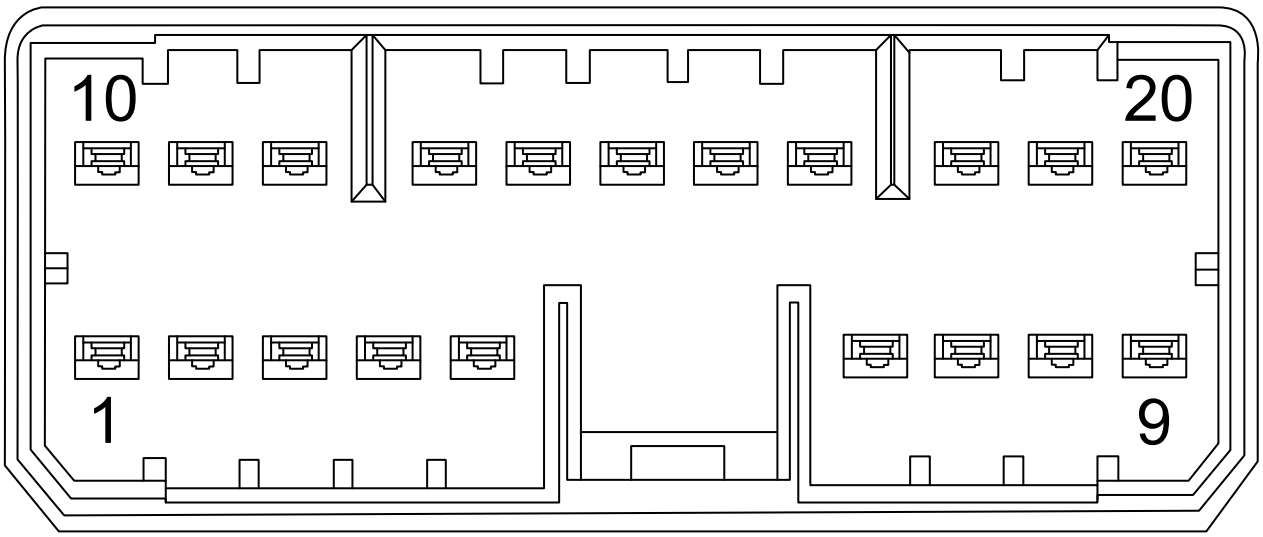
- Wire harness terminal D connector terminal view and definition



BM0008001

Pin No.	Functional Definition
PIN-1	Left Turn Signal Light
PIN-2	Door Lock
PIN-3	Door Unlock
PIN-4	Back Door Lock Release
PIN-5	Electric Horn
PIN-6	Right Turn Signal Light
PIN-7	POWER-HSD
PIN-8	Battery Save
PIN-9	Anti-theft Horn (Reserved)
PIN-10	-
PIN-11	Vehicle Lock Ground
PIN-12	Power Supply Ground

- Wire harness terminal E connector terminal view and definition



BM0009001

Pin No.	Functional Definition
PIN-1	POWER-HSD
PIN-2	Front Fog Light
PIN-3	Rear Fog Light
PIN-4	Front Position Light
PIN-5	Rear Position Light
PIN-6	High Beam Light Output
PIN-7	Backlight Output
PIN-8	Daytime Running Light (Reserved)
PIN-9	Back-up Light (New)
PIN-10	PDU Power Supply
PIN-11	ACC Relay Output
PIN-12	IGN1 Relay Output
PIN-13	-
PIN-14	-
PIN-15	-
PIN-16	-
PIN-17	-
PIN-18	-
PIN-19	-
PIN-20	-

On-vehicle Service

A/C Coaxial Line Assembly

Removal

1. Remove the lower left protector.
2. Unscrew the mounting bolt (in no particular order).
3. Unplug wire harness terminal connector, and remove the module.

Installation

1. Perform BCM installation in the reverse order of removal.

REMOTE CONTROL SYSTEM

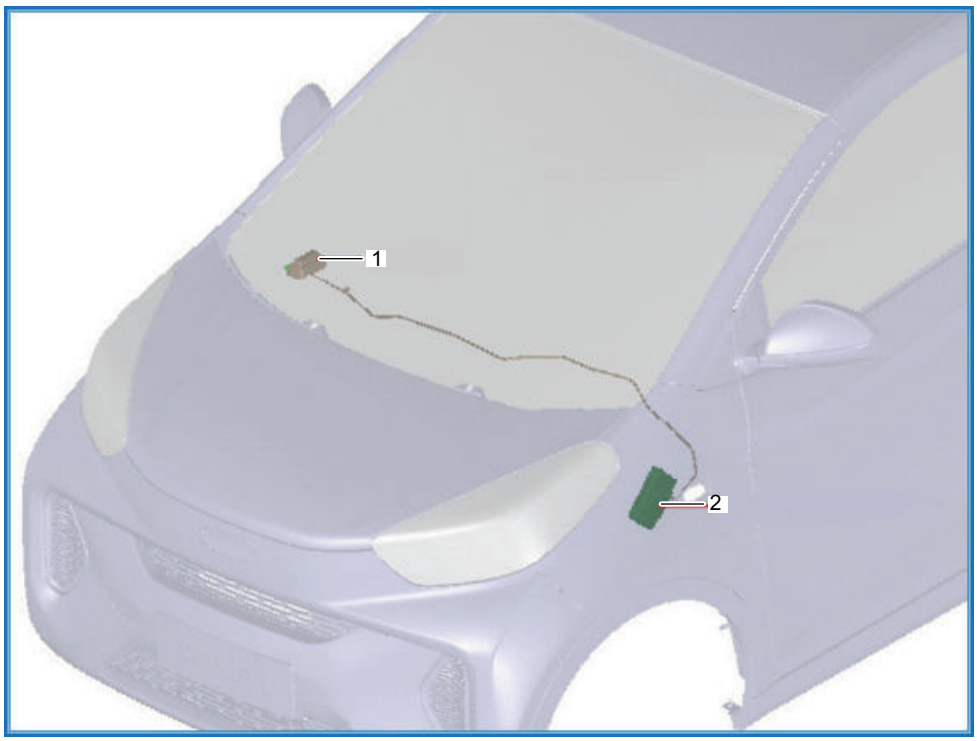
FAULT DIAGNOSIS DEVICE SYSTEM

System Overview

Function Description

For eQ1 fault diagnosis device system, users can download APP on their mobile phones to remotely control door lock and unlock, and remotely control automatic air conditioning, which more effectively realizes the combination of vehicle and mobile Internet, and also convenient for users.

System Composition



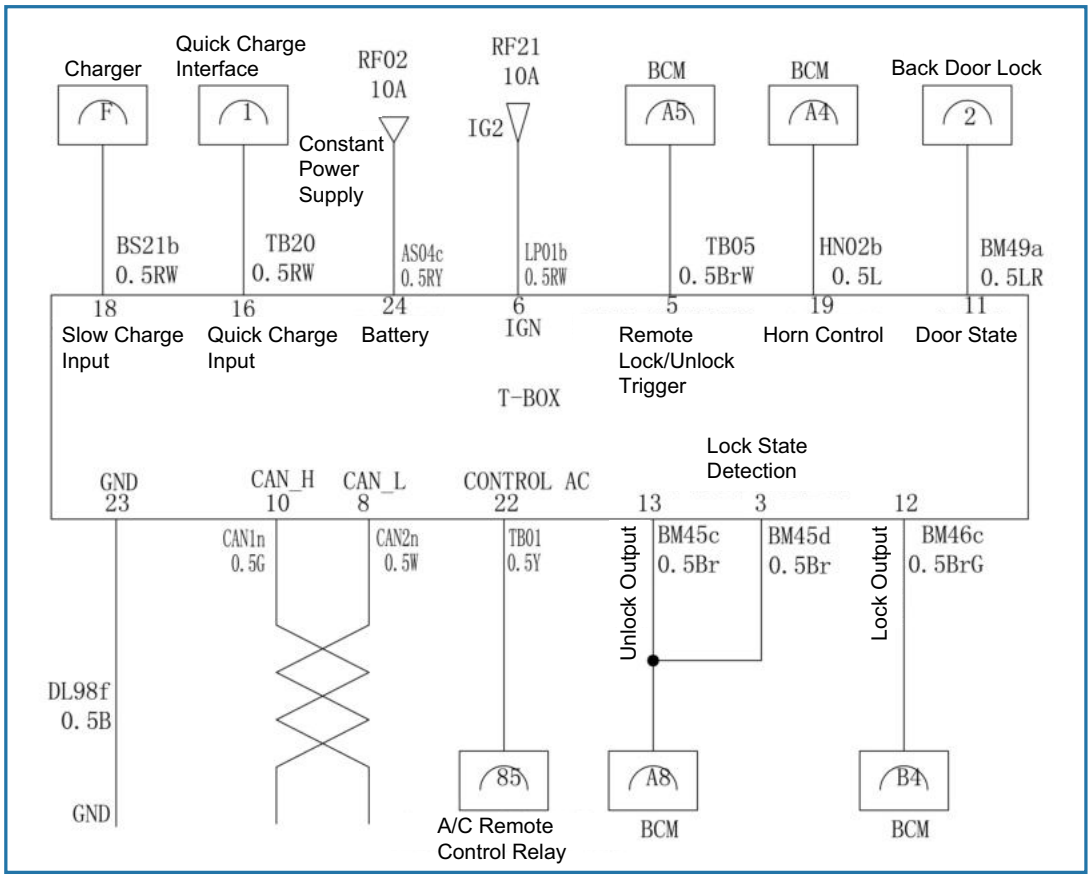
TB0001001

1	Combined Antenna	2	Fault Diagnosis Device Assembly

System Circuit Diagram

Control Principle

Control Schematic Diagram



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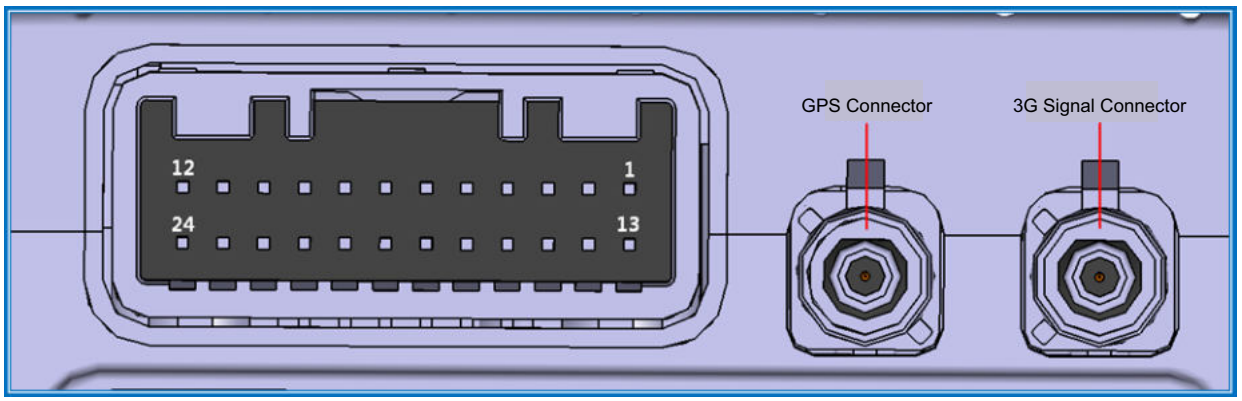
Connector Pin Definition



TB0003001

Pin	Definition	Pin	Definition	Pin	Definition
1	Reserved	9	-	17	CAN-H
2	Reserved	10	Horn Relay Control	18	Lock Output
3	Reserved	11	Reserved	19	-
4	Reserved	12	GND	20	Quick Charge 12 V
5	Authorization to Start	13	Reserved	21	Slow Charge 12 V
6	Door Status Detection	14	Reserved	22	Reserved
7	Unlock Output	15	ACC	23	Control Air Conditioning
8	-	16	CAN-L	24	VBAT +

On-vehicle Service

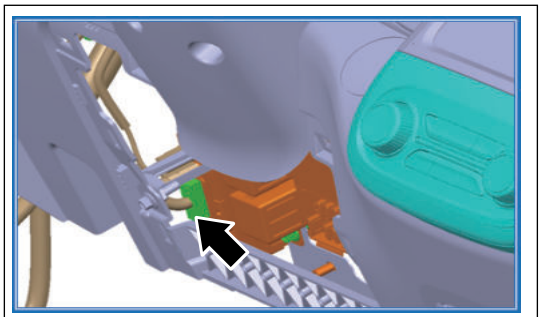
Fault Diagnosis Device Assembly

Removal

1. Remove the lower left protector (arrow).


TB0001002

2. Disconnect the wire harness connector and combined antenna connector (arrow).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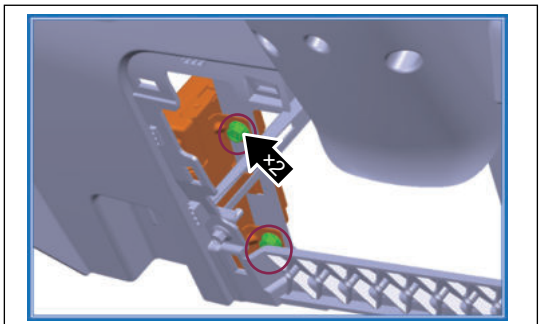
3. Remove 2 fixing bolts (arrow) from diagnosis device, and remove diagnosis device assembly.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Installation

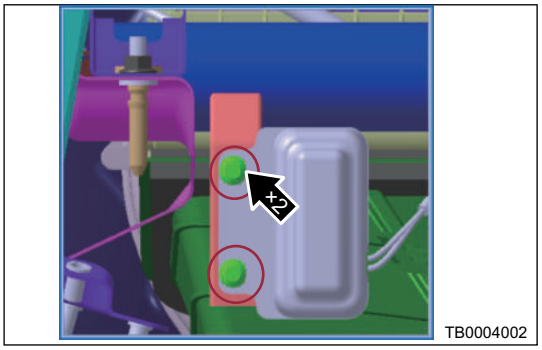
1. Installation is in the reverse order of removal.

Combined Antenna

Removal

1. Remove instrument panel body (refer to “Interior” and “Exterior” sections in “Body”).
2. Disconnect the connector between combined antenna and diagnosis device assembly.

3. Remove the bolt (arrow), and remove combined antenna.



Installation

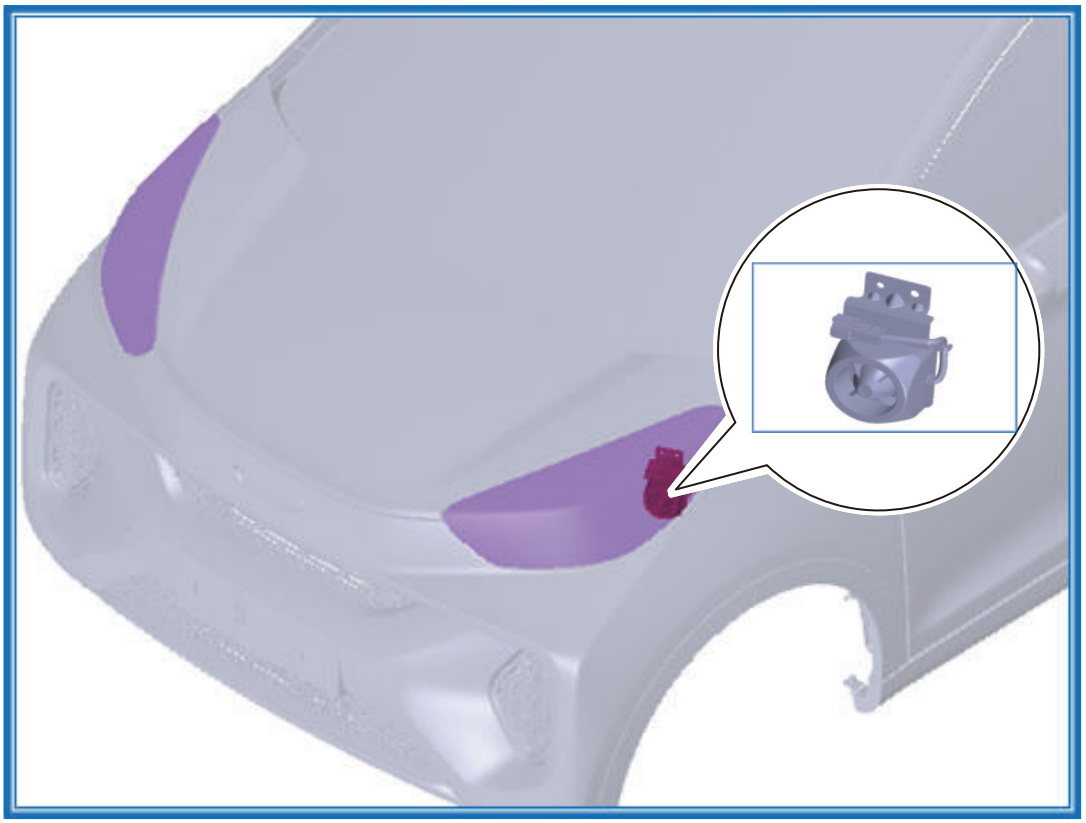
1. Installation is in the reverse order of removal.

PEDESTRIAN ALERT SYSTEM

PEDESTRIAN REMINDER

System Overview

System Composition



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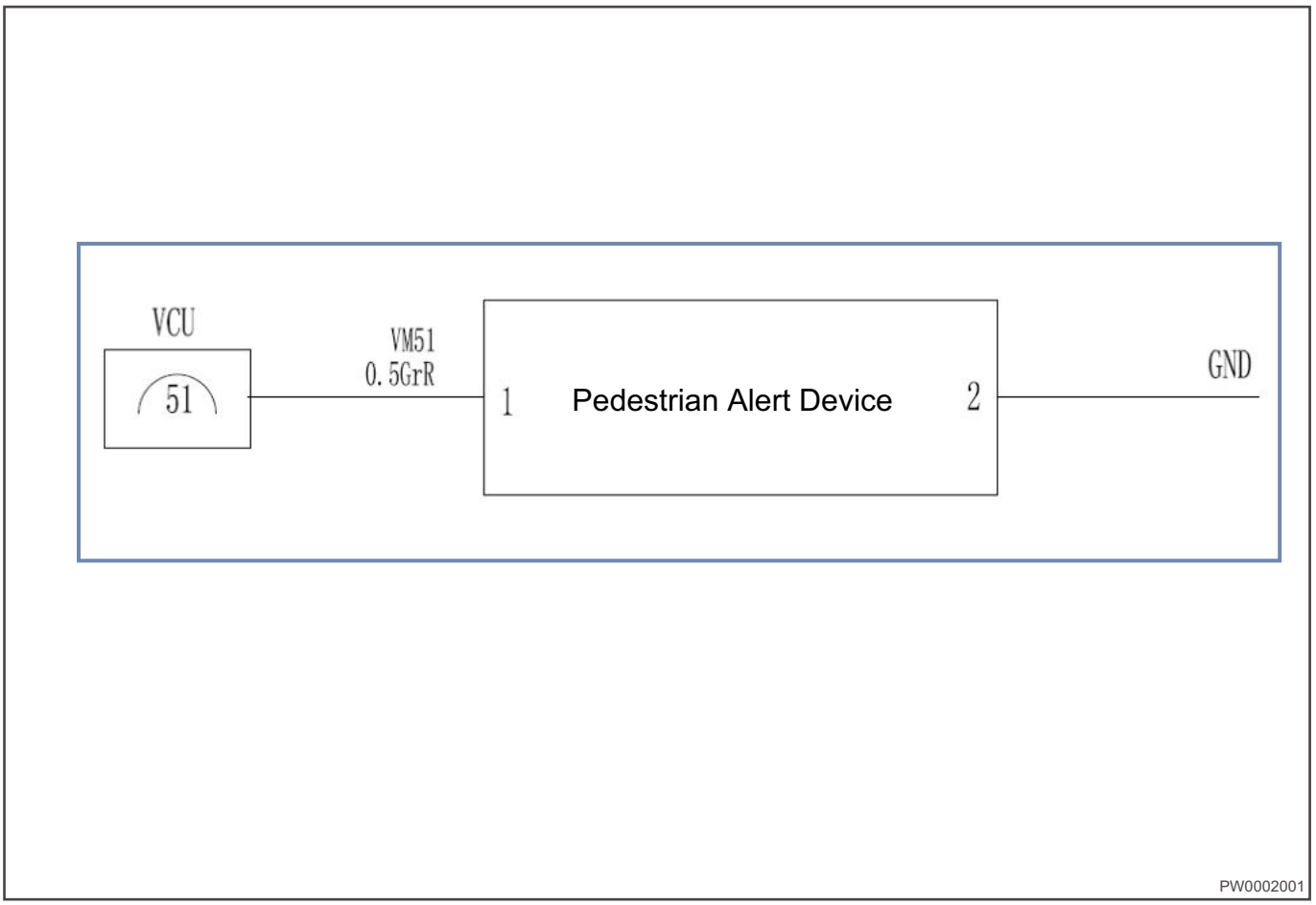
Control Schematic Diagram



Control Strategy

Condition for Prompt Sound Mode During Driving Forward

1. Turn ignition key to ON.
2. Gear position is in forward gear.
3. Vehicle speed is between 1 ~ 20 km/h.
   Note: The above conditions must be met at the same time.

Condition for Prompt Sound Mode During Reversing

1. Turn ignition key to ON.
2. Gear position is in reverse gear.
3. Vehicle speed is between 0 and 20 km/h.
   Note: The above conditions must be met at the same time.

Condition for Mute Mode

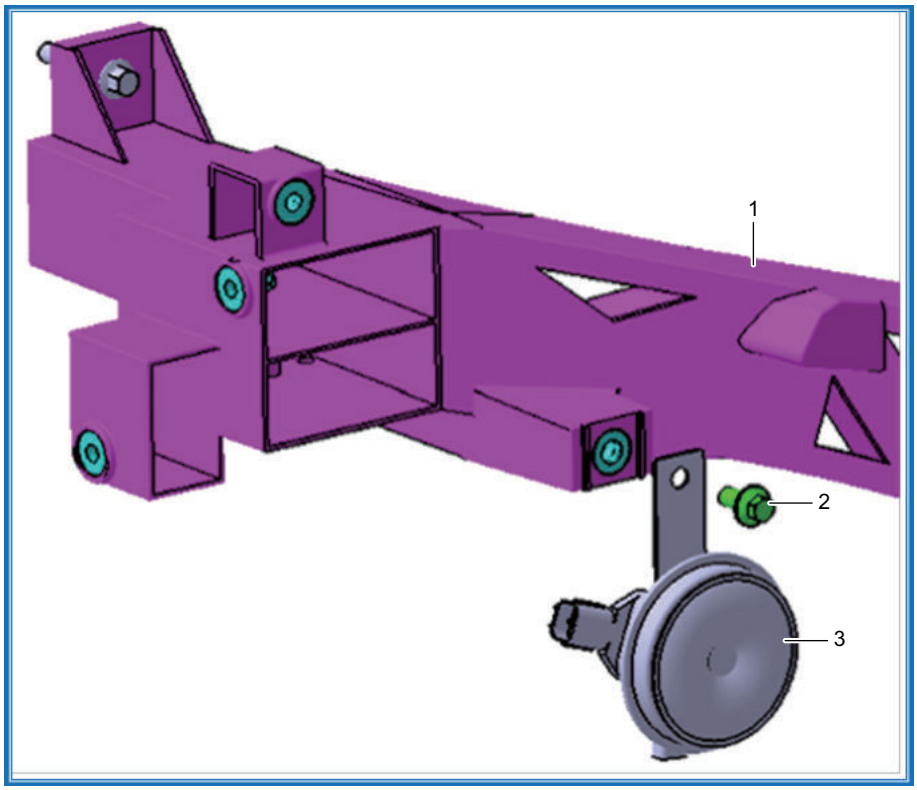
1. Turn ignition key to OFF.
2. Gear is in a position other than forward or reverse gear.
3. Vehicle speed is lower than 1 km/h or higher than 20 km/h.
   Note: When any of the above condition occurs.

HORN

ALARM DEVICE (HORN)

System Overview

System Composition



HR0001001

No.	Name	No.	Name
1	Front End Module Assembly	2	M8 Mounting Bolt
No.	Name		
3	High Pitched Horn		

Function Description and Control Principle

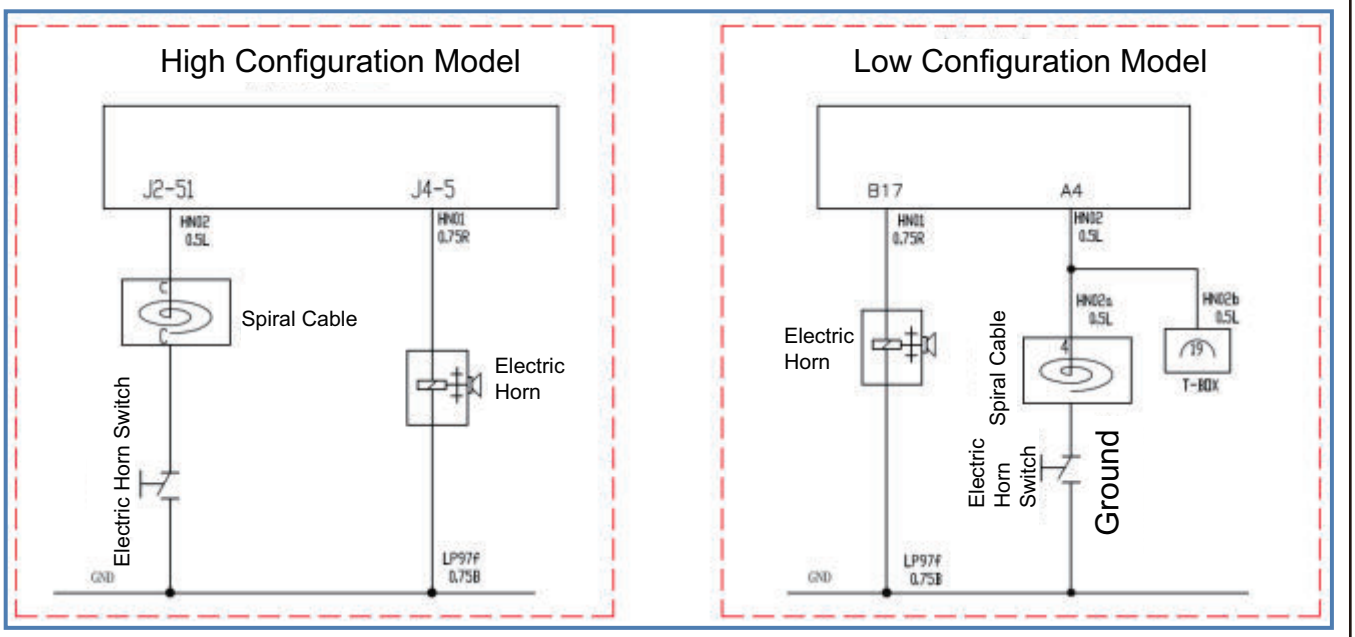
The horn operation is not controlled by POWER switch, press the horn switch, the horn sounds.

Function Description

The horn system is mainly composed of high pitched horn and horn button etc, which is mainly provided for users.

1. Function for sound the buzzer, alerting passers-by in the process of driving.
2. Intrusion alarm function.

Control Schematic Diagram



HR0002001

Diagnosis & Test

Horn System Inspection

Step	Measure	Normal Result	Abnormal Result
1	Press and release	Horn sounds when horn button is pressedHorn stops sounding when horn button is released	Horn cannot soundHorn sound is abnormal

Horn Cannot Sound

Step	Measure	Yes	No
1	Check if EF27 fuse of horn is blown.	Go to step 3	Go to step 2
2	1. Unplug horn assembly connector2. Connect the test light to horn assembly connector between terminals 1 and 23. Observe if the test light	Go to step 4	Go to step 5

	is on while pressing the horn.		
3	Replace horn fuse	Go to “Horn System Inspection”	-
4	Replace horn assembly	Go to “Horn System Inspection”	-
5	1. Reconnect the horn2. Disconnect the horn relay3. Connect test light to the position between relay pin 3 and pin 54. Check if the horn sounds	Go to step 6	Go to step 8
6	1. Reinstall the horn relay2. Disconnect the airbag circuit system3. Remove the horn switch cable from steering wheel4. Connect test light to the position between horn button connector 1 and 2, check if the horn sounds.	Go to step 7	Go to step 10
7	Replace horn button	Go to “Horn System Inspection”	—
8	1. Still place the test light in the same position (between horn button connector 1 and 2)2. Temporarily connect a 15 A fuse at the position between horn relay terminal pin 3 and pin 5, check if the test light comes on.	Go to step 9	Go to step 10
9	Replace horn relay	Go to “Horn System Inspection”	—
10	To check if it is in poor contact with ground, connect the test light to the position between:1. Horn relay terminal 5 and ground2. Horn button terminal 1 and ground, check if the test light comes on	Go to step 11	Go to step 12

11	Repair cables in poor contact with the ground	Go to “Horn System Inspection”	-
12	Repair the poor contact between circuits	Go to “Horn System Inspection”	-

In Case of Illegal Intrusion, Horn does not Sound, Others Works Normally

Step	Measure	Yes	No
1	Enter body control system with diagnostic tester, perform action test for the horn, check if the horn sounds.	Go to step 5	Go to step 2
2	Disconnect BCM PE2 connector, measure for continuity between 2-13# and horn relay 3#	Go to step 4	Go to step 3
3	Repair the wire harness connected between BCM and horn relay, test if the horn sounds again with diagnostic tester	Go to step 5	Go to step 4
4	Replace the body control module, test if the horn sounds again with diagnostic tester	Go to step 5	—
5	If the fortifying conditions are not met, refortifying, close four doors, hood and luggage compartment, and re-test if the horn sounds	End	—

Horn Sounds Abnormally

If Horn Sounds Abnormally Obviously, Perform Following Routine Inspection

1. Check terminals for poor contact; repair any poor contact problem.
2. Check ground circuit; if there is poor contact, repair it.
3. Make sure horn assembly fixing bolt is properly fastened.
4. Ensure that the horn assembly does not contact with any other object; if it contacts with other objects, relocate the position of other object; bend the horn assembly bracket if necessary, operate the horn to determine whether that situation still exists.

If Situation Still Obvious, Perform Following Specific Inspection

1. Determine the type of sound produced by horn.
   - Grave.
   - Sharp.
2. If it is obviously grave, it indicates that the current is too high and the horn assembly must be replaced.

3. If it is obviously sharp, foreign matters may attach to horn, remove horn assembly and check for foreign matters.
4. Remove any attached foreign matters and reinstall the horn assembly.
   If no foreign matter is found, or if the foreign matter cannot be removed, replace horn assembly.

On-vehicle Service

Specifications

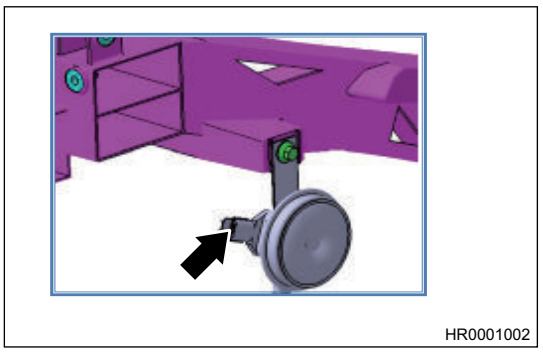
Torque Specifications

Part Name	Torque (N·m)
High Pitched Horn Fixing Nut	9 ± 1

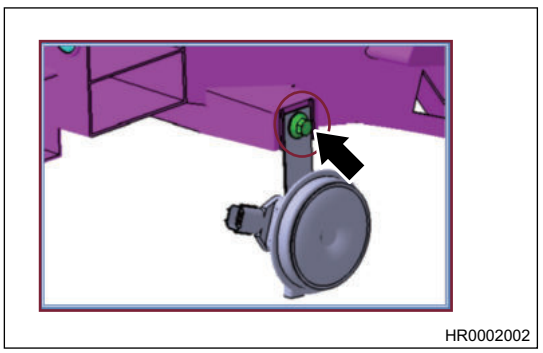
High Pitched Horn Assembly

Removal

1. Turn off all electrical equipment and the POWER switch, and disconnect the negative battery cable.
2. Remove the front bumper assembly (Refer to "Removal and Installation of Front Bumper Assembly" section).
3. Disconnect the high pitched horn wire harness connector (arrow).


HR0001002

4. Remove the high pitched horn fixing nut (arrow) with 13# socket.
   Tightening torque: 9 ± 1 N•m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Installation

1. Installation is in the reverse order of removal.

⚠

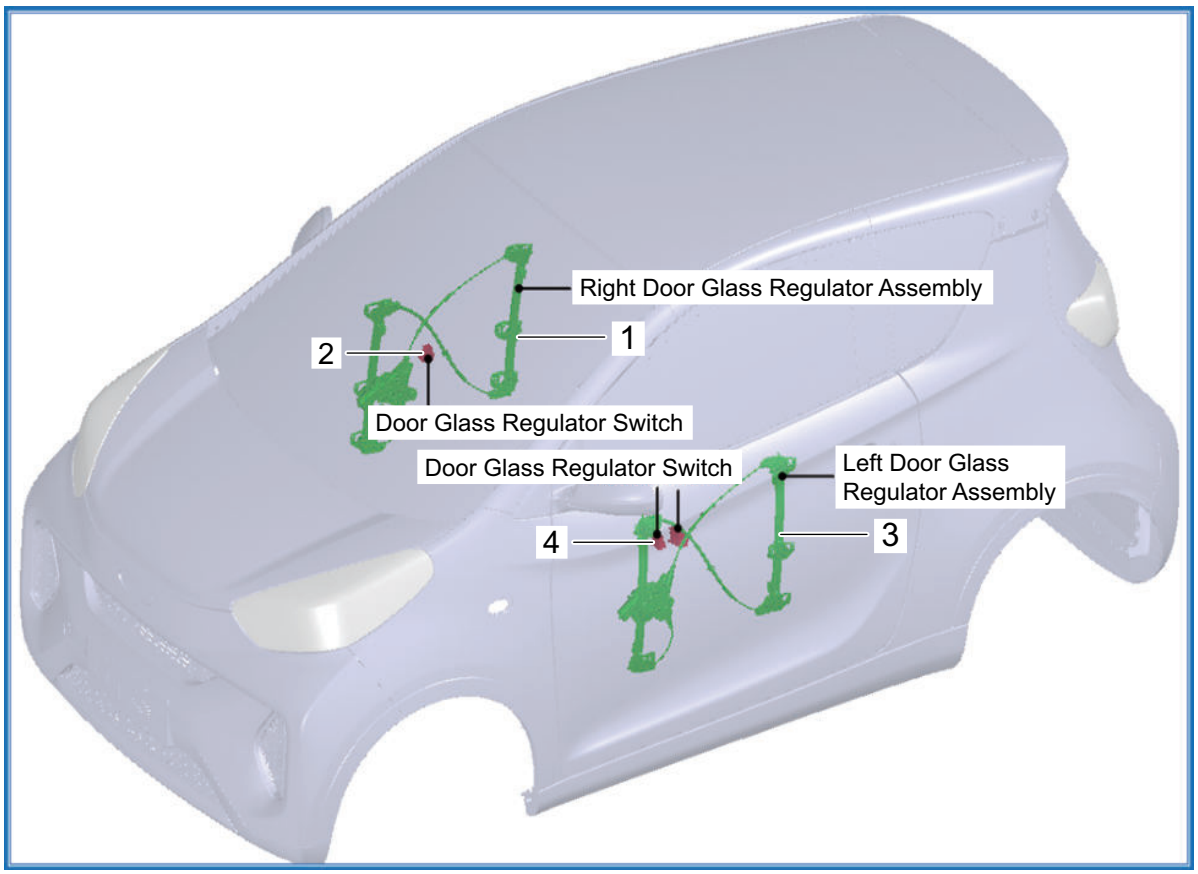
- Tighten the fixing nuts to the specified torque.
- Install connectors securely.

WINDSHIELD / WINDOW GLASS

WINDSHIELD / WINDOW GLASS SYSTEM

System Overview

System Components Diagram



WS0001001

1	Right Door Glass Regulator Assembly	2	Right Door Glass Regulator Switch
3	Left Door Glass Regulator Assembly	4	Left Door Glass Regulator Switch

Function Overview

Ordinary Window (Comfort)

Control Strategy

- Glass regulating function is available with POWER switch ON.
- Automatic down and manual up and down functions are disabled 60 s after turning key to OFF from ON or if any door is opened within 60 s of turning key to OFF from ON.
- When power window goes up to the top or goes down to the bottom, the window motor stops operating.
- When the same operation for right window is requested by driver side switch and right window switch, operation will be performed according to the time priority.
- When different operations for right window are requested by driver side switch and right window switch, the lowering function will be given priority.

Ignition Pause Function

- Turn POWER switch to START while glass is going up or down, window up and down function is suspended and resumes after starting is finished.

Protection Function

- Overcurrent protection: When window motor current exceeds the blocking current of window motor, window motor stops operating.
- Timeout protection: The maximum operating time of window motor is limited within 8 s; when window glass is operated to top or bottom by motor, the motor is turned off.

Window Up and Down Control

- Manual window up control: Power window goes up when UP switch is turned on, and stops if it is not turned on. (Note: Only manual window up function is equipped, and there is no automatic window up function)
- Automatic / manual window down control:
  When DOWN switch is pressed for less than 300 ms (T1), automatic down function is enabled.
  When DOWN switch is pressed for 300 ms or more (T2), manual down function is enabled.
- When DOWN switch is pressed for 300 ms or more, the opening method of power window will be switched from automatic to manual opening.
- When UP switch is pressed for 300 ms or more, the opening method of power window will be switched from automatic to manual opening.
- When UP or DOWN switch is pressed for less than 300 ms, power window stops operating.

Remote Window

- Enabling conditions for remote window up

1. Left and right doors and back door are closed.
2. Key is in OFF position.
3. Vehicle enters fortifying mode successfully and remote lock button is pressed for 1.5 s.

- Condition description
- After 1.5 s, two door glasses start to go up automatically at an interval of 100 ms in sequence of driver door window first and then the front passenger door window.
- Function stops or is disabled.
- During remote up of glass, if remote button is released, glass stops operating immediately.
- When four door glasses reach the top blocking position, glass stops moving.

- Note
- Remote long-press window up function is restricted by regulations GB11552 and 74/60/EC, and can be enabled by diagnostic tester. (This function is not provided in BCM by default. It is reserved to enable this function by diagnostic command. Only the diagnostic tester with this function can be used to open the window).
- Remote window function is invalid when the key is turned to ON.

Power Window Jam Protection (Lease model, Luxury model)

- On Lease and Luxury models, the electric control window is equipped with manual / automatic window up, manual / automatic window down, remote long-press window down, remote one-button window up, motor heat protection and window jam protection functions.

Window Glass Up and Down (Manual Glass Up and Down, Automatic Glass Up and Down)

1. This function is enabled when key is turned to ON. The window glass up and down operations can be controlled by window glass UP / DOWN switch within 60 s since the key is turned to a position other than ON. If any front door is opened within the 60 s, window glass will stop operating immediately and window glass UP / DOWN switch will not control the up and down operations of window glass any more (The window glass also stops immediately even when it is going up / down automatically, except when it operates in reverse direction in case of jam protection function caused by an object).
2. If door is not opened within 60 s since the key is turned to OFF from ON, as the delay time is reached, the window glass UP / DOWN switch will not control the up and down operations; if window is going up or down automatically at this time, the automatic up or down operation is allowed to be finished.
3. There are four operating modes for window glass up and down

- Manual up: When the window glass UP switch signal is output for 300 ms or more, the corresponding window glass performs up operation, and stops when the switch is released.
- Manual down: When the window glass DOWN switch signal is input for 300 ms or more, the corresponding window glass performs down operation, and stops when the switch is released.
- Automatic up: When the window glass DOWN switch signal is input for more than 50 ms and less than 300 ms, the corresponding window glass performs automatic up operation and goes up to the top position automatically.
- Automatic down: When the window glass DOWN switch signal is input for more than 50 ms and less than 300 ms, the corresponding window glass performs automatic down operation and goes down to the bottom position automatically.

Remote One-button Window Up

Function activation conditions:

- Key is in OFF position.
- All doors are closed.
- Remote lock button is pressed.

Remote one-button window up will not be activated by BCM re-fortifying. During remote window up process, the jam protection function is available with jam protection force of less than 100 N.

If initialization of all windows are completed after the remote one-button window up function is enabled, the window glasses will directly go up to the top in the reserved order of front left → front right with an interval of 100 ms; if any window is not initialized, the initialized windows will perform automatic window up operation normally while the windows failing to initialize will automatically go down to the bottom and then go up to the top (with jam protection function).

For windows with remote one-button window up function triggered, the window glasses will stop after moving to the top. If any object occurs in the jam protection area while window glass is going up, jam protection function will be enabled (For detailed definition, refer to “Jam Protection Function”).

During window glass up process, if remote control unlock / lock signal or window glass UP / DOWN switch signal is input, the window glass will stop going up / down. If fortifying conditions are met, the one-button window up function will be triggered if remote control lock signal is input again.

After POWER switch is turned to OFF for 60 s and window glass stops going up, the window glass up and down operations can also be controlled for 6 ± 2 s by remote unlocking or locking or window glass UP / DOWN switch.

If any door is opened during remote window up process, window up operation will stop immediately (jam protection rollback function will not be affected).

If remote window down signal is received during remote window up process, the window up operation stops. If window down signal keeps for more than 1.5 s, perform remote long-press window down function (jam protection rollback function will not be affected). (For details, refer to “Remote Long-Press Window Down Function”)

If key is turned to ACC or ON position during remote window up process, the remote window up operation will not be affected; if key is turned to START position, the remote window up operation stops immediately in the process of starting, and previous remote window up operation resumes after starting.

Remote Long-press Window Down

1. Function activation conditions:
   - Key is in OFF position.
   - Four doors are closed.
   - BCM receives remote control unlock button signal for judging time of more than 1.5 s, and remote window down command is performed.
2. When remote long-press window down conditions are met, long press the remote unlock button for 1.5 s to enable the function, then window glass performs down operation. The window glass stops moving if remote button is released or window glass goes down to the bottom position (soft stop position).
3. Down order for all window glasses: Front left → front righ. Window down interval is 100 ms. If window glass has reached the bottom, no operation will be performed while interval time of 100 ms still exists.
4. Remote window down function will be disabled when one of the following conditions is met.
   - If any door is opened during remote long-press window down process, window down operation will stop immediately (jam protection rollback function will not be affected).
   - If key is turned to a position other than OFF during remote long-press window down process, window down operation will stop.
   - Press remote lock button during remote long-press window down process.

Within 60 s after POWER switch is turned to OFF, if any window button is operated during remote window down process, the remote long-press window down operation of the corresponding window will stop and the window operation will be controlled by the button, while other windows will not be affected.

Startup Protection

1. If POWER switch is turned to START position during automatic window glass up and down process, the window glass up and down operations stop and input signal of window glass UP / DOWN switch is shielded. After startup operation is finished, the automatic up and down operations before starting continue and window glass up and down functions resume.
2. Turn POWER switch to START position while jam protection is functioning, window glass stops after jam protection operation is finished. After starting, window glass up and down functions resume.

Delay Protection and Overload Stop

- If power window operates in one direction (continuous up or down) for more than 8 s, the corresponding window output will be paused. After the corresponding switch is released (for example, users press the corresponding UP / DOWN switch again), power window continues to operate. Current protection is provided for each window motor driver. Once blocking current is found, stop the motor operation within 200 ms.

Heat Protection

- When a certain window is operated too frequently, BCM will enter the software heat protection function, at this time, the window glass can only perform window up operation (with jam protection function). After the window reaches the top position, BCM will stop the window up and down operations within a certain period of time to protect the motor. Heat protection conditions are as follows: The increased temperature is calibrated by monitoring the operating current and operating time of motor, and the decreased temperature is calibrated by the natural heat dissipation time of motor. When motor operating temperature exceeds the temperature upper limit, the motor stops (it does not enter heat protection during window up process and jam protection rollback process) and does not operate until heat dissipation time of motor is exceeded. Temperature will continue to increase in case of further operation. The increased temperature and heat dissipation time are determined by the calibration result of motor.

Disabling and Enabling of Passenger Side Window Up and Down

- Disabling window glass UP / DOWN switch signal has no effect on the driver side glass UP / DOWN switch signal. Only disable the input signal of glass UP / DOWN switch that is not on the driver side. There is no effect on the glass that is going up or down automatically after disabling the window glass

UP / DOWN switch signal input, and automatic glass up and down operations are allowed to be completed.

Priority

- When operation requests from driver side switch and other window switch are sent to the same window, the window will operate according to the following priority:

1. With other window glass switch in manual up / down status, if window is operated by driver side switch, it will operate according to the operation of driver side switch.
2. With other window glass switch in manual up / down status, if an opposite manual / automatic operation signal is sent by the local switch, the window will stop; If the same manual / automatic operation signal is sent by local switch at the same time, the window will operate according to the operation of driver side switch.
3. With other window glass switch in automatic up / down status, if window is operated by driver side / local switch, it will stop going up / down.
4. With driver side window glass switch in automatic up / down status, if window is operated by driver side / local switch, it will stop going up / down.
5. With driver side window glass switch in manual up / down status, the operation of other window glass switches will not affect the up and down operations of driver side window glass; if an opposite manual / automatic operation signal is sent by driver side switch, the widow will stop; if the same manual / automatic operation signal is sent by driver side switch at the same time, the window will operate according to the operation of driver side switch.

Jam Protection Function

Self-learning Function

- Workshop off-line learning
  Turn key to ON in the workshop, BCM performs learning through diagnostic tester. After self-learning command is sent by diagnostic tester, BCM controls the windows to the top at the same time, then BCM controls the windows to learn in order of front left, front right. The interval between two window glasses learning is 100 ms. The self-learning process for each window glass is to allow it to go up to the top, go down to the bottom, and then go up to the top again; after successful learning of four windows, all the window glasses will stay at the top position of window. The window learning is failed if the glass goes up to the top and then goes down by 150 mm and stops (the learning status can be read by diagnostic tester). The self-learning command shall be sent again to perform leaning again.

  Jam protection learning can be ended by itself, however, to prevent persons from being jammed and guarantee the personnel safety during learning process, if anyone is found to be jammed by the window, use EOL device to send jam protection learning suspension command to BCM. After BCM receives the corresponding signal, the four door windows immediately go down to the bottom blocking position of window.

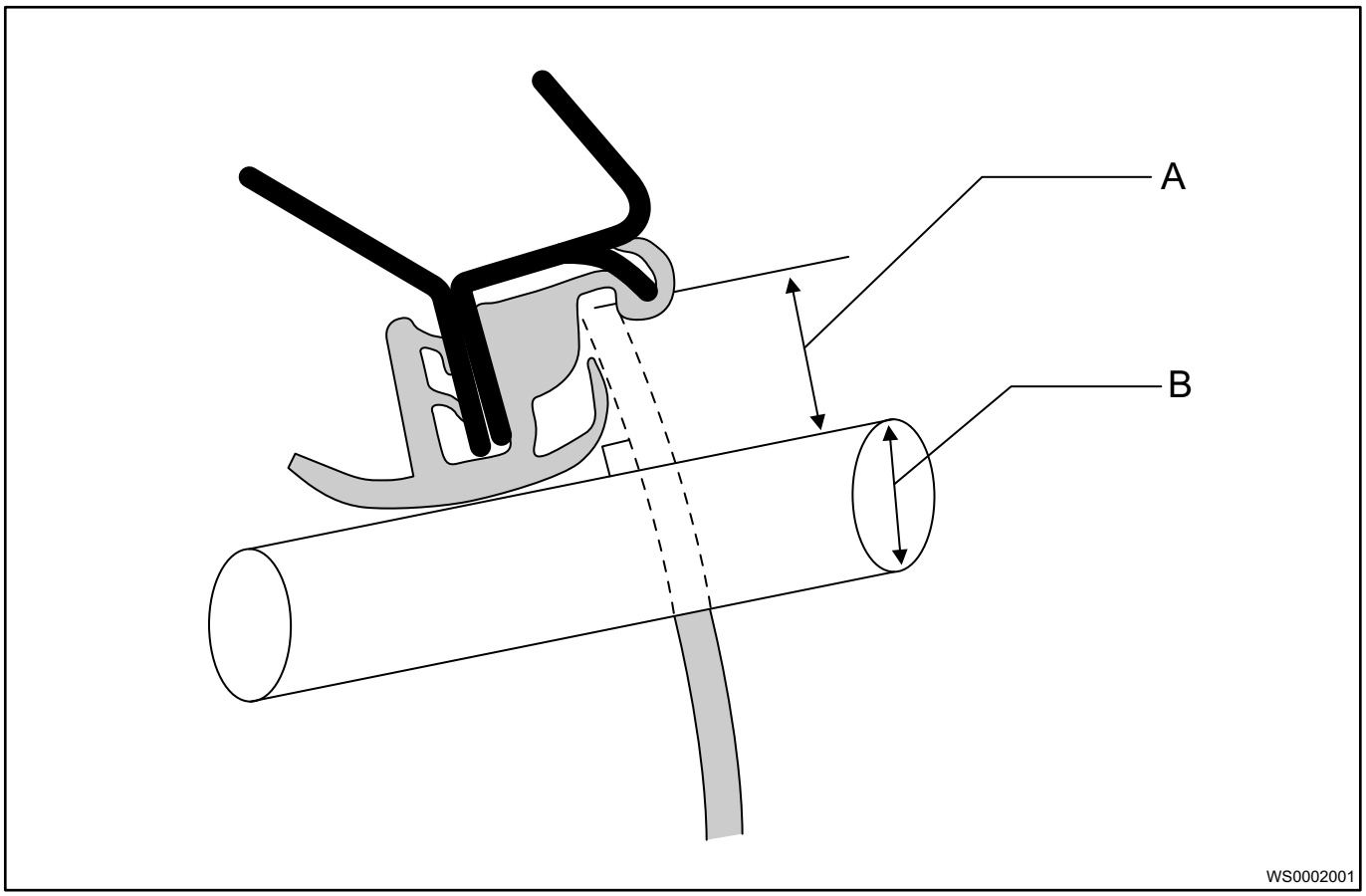
- Manual learning
  Turn key to ON, operate FL (FR/RL/RR) window UP button to raise the window to the top and release the button, operate UP button again to raise window to the top blocking position for 2 s, then manually lower it to the bottom, after that, manually raise it to the top again. FL (FR/RL/RR) learning is successful if above operations are finished.

⚠

- In this learning mode, window up and down operations shall be finished continuously, if there is any interruption, perform learning again.

Jam Protection Area

Jam protection area is located between A+4mm and A+200mm as shown in figure below.



- A: Distance between top stop position of glass and weatherstrip lower end.
- B: Cylinder with diameter of 4 mm.

Jam Protection Function
After successful self-learning of BCM, if a passenger is caught by glass or the upper door frame in the jam protection area during manual up, automatic up or remote up process of window glass, the jam protection function will be activated. The maximum allowable jam protection force of system is no more than 100 N. Jam protection rollback: When an obstacle is encountered in the jam protection area, the window motor will operate in reverse direction and window glass will be lowered by 150 mm. If the moving distance of window glass is less than 150 mm, window will go down to the blocking position with jam protection force of less than 100 N. Jam protection suppression function: If an obstacle is encountered during window glass up process, jam protection function is activated and window glass operates in reverse direction. If window glass does not reach the top position after jam protection functions several times, BCM enters non-initialization mode. Jam protection suppression function will be enabled under the following conditions:

- During the first window glass up (manual, automatic, remote one-button window up) process, if an obstacle is encountered, the jam protection function is activated and window glass operates in reverse direction.
- During the second automatic window glass up (automatic, remote one-button window up) process, if an obstacle is encountered again, the jam protection function is activated and window glass goes down to the bottom and BCM cancels the automatic up function; if window glass goes up to the top, the automatic window up function resumes and jam protection times are reset.

Jam Protection Self-adjusting

1. If automatic window down operation is performed after window glass jam protection is enabled due to an obstacle, window glass will go down to the bottom blocking position and soft stop position will be learned again.

2. If window glass does not reach the top or bottom after going up or down 15 times or more, BCM will enter non-initialization mode.
3. After performing soft stop 20 times, the original soft stop position will be invalid and soft stop position will be learned again. Recount will start after soft stop position is learned again.

Soft Stop Function

When window glass goes down to the bottom position and stops by the resistance, motor will be subjected to mechanical shock and heat will be generated. To avoid this symptom and protect the motor, glass movement will be stopped automatically before window glass goes down to the blocking position. This function is called a soft stop. Soft stop function can be enabled when following conditions are met:

- BCM has been initialized.
- While window glass is going down.
- Window glass is in a position above soft stop position.

In normal mode, if BCM detects hard blocking while window glass is going down, BCM will learn the soft stop position, which is more than 1 mm above the blocking position. After window glass operates to the soft stop position, it will stop at the position. Window glass will go down to the blocking position if window glass down signal is input again. To ensure the accuracy of position, system will reset the soft stop position automatically after 20 times of soft stop.

System Non-initialization Mode

After BCM is powered off, BCM will enter non-initialization mode. In non-initialization mode, BCM only supports manual up, automatic down, manual down functions of the window glass. BCM has no following functions at this time:

- Automatic window up function
- Soft stop function
- Jam protection function

BCM enters non-initialization mode again under the following conditions:

- Power supply is cut off for over 24 ± 2 ms while glass is operating
- BCM is powered off for over 15 s in non-sleep mode, and over 30 s in sleep mode
- Window position is out of the initialization leaning position range
- Window glass does not reach the top or bottom after going up or down 15 times or more
- BCM identifies window position signal error of motor

Window Position Error

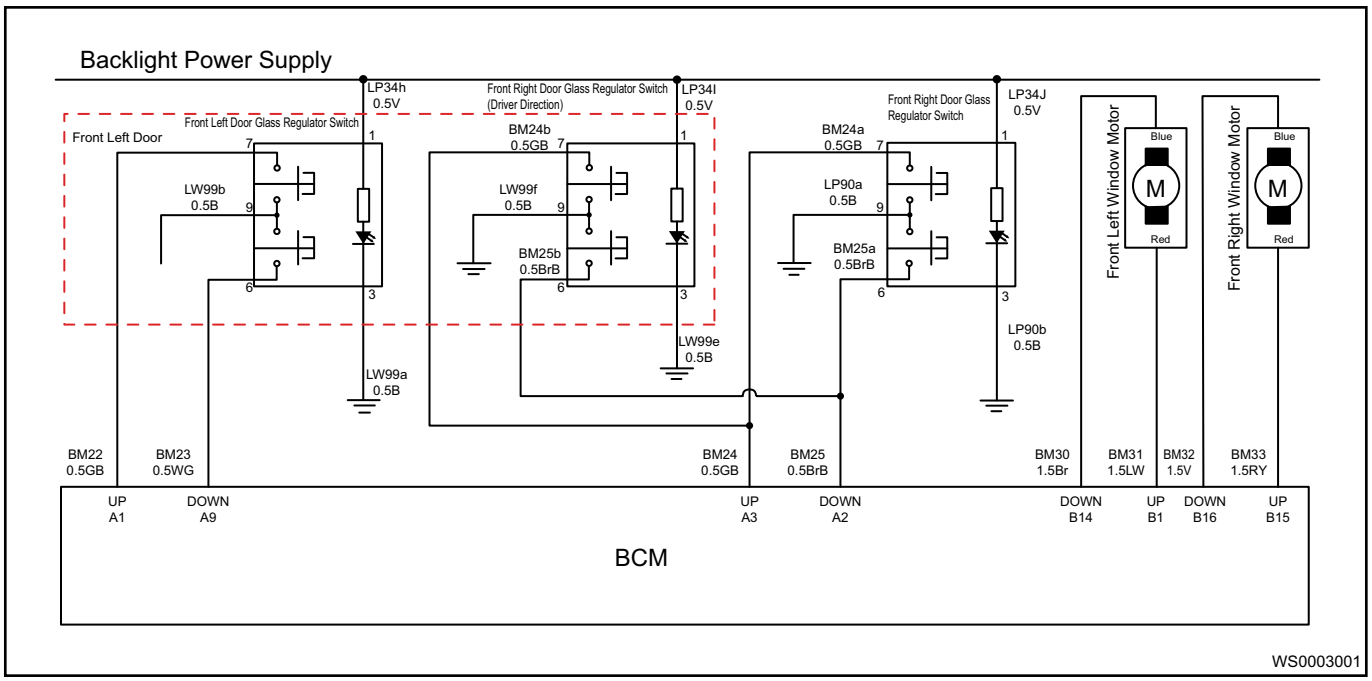
BCM determines the top and bottom positions after initialization is completed successfully. When BCM calculates that the window position exceeds the top or bottom position by 25 mm, it is determined that there is error in window position. In such case:

- If window down operation is performed, window will go down to the bottom blocking position and then stop, and BCM enters non-initialization mode.
- If window up operation is performed, window will stop immediately, and BCM enters non-initialization mode.

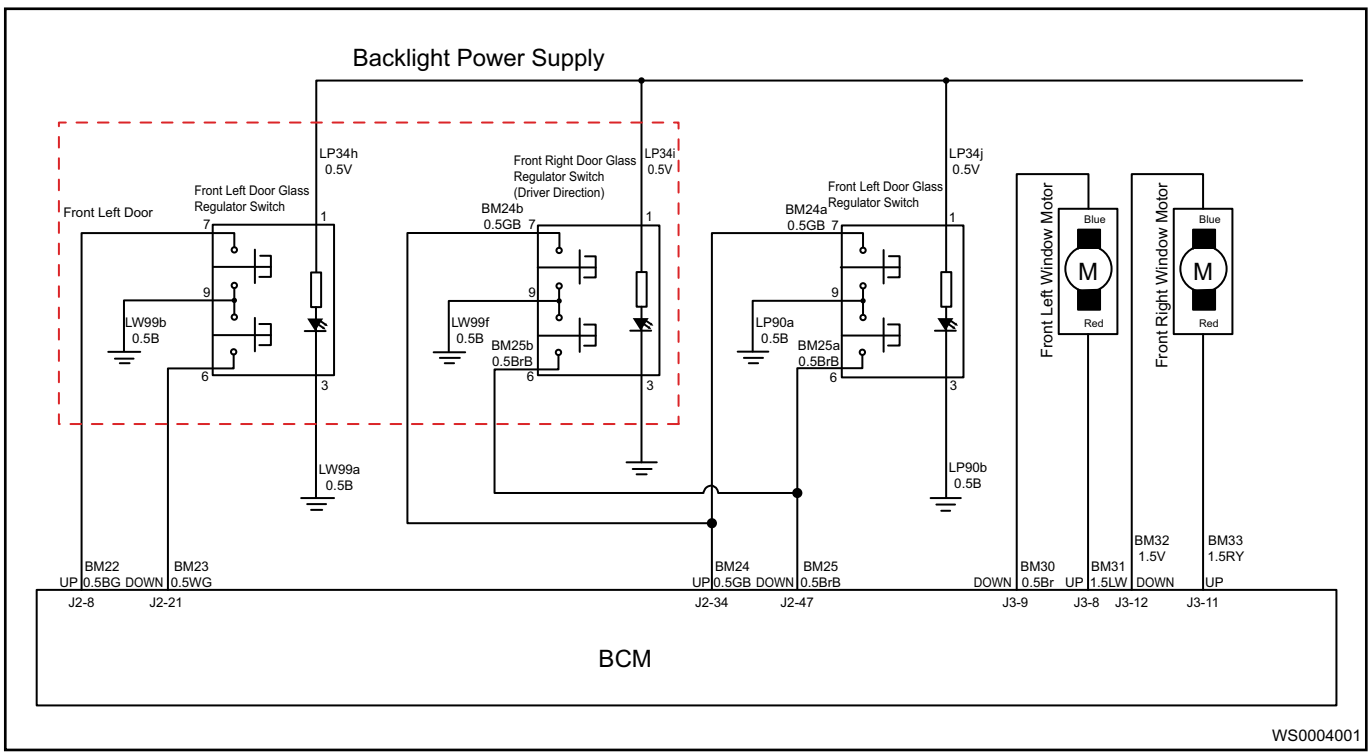
In BCM learning process, after blocking is completed at a position other than zero point (zero point position: Window top blocking position) or a position other than window bottom, window stops immediately and BCM enters non-initialization mode if window goes up to this position again. After window position error is corrected and BCM determines that window blocks at the top position and performs initialization again, current window position error will be cleared and converted to history error.

Control Principle and Pin Definition

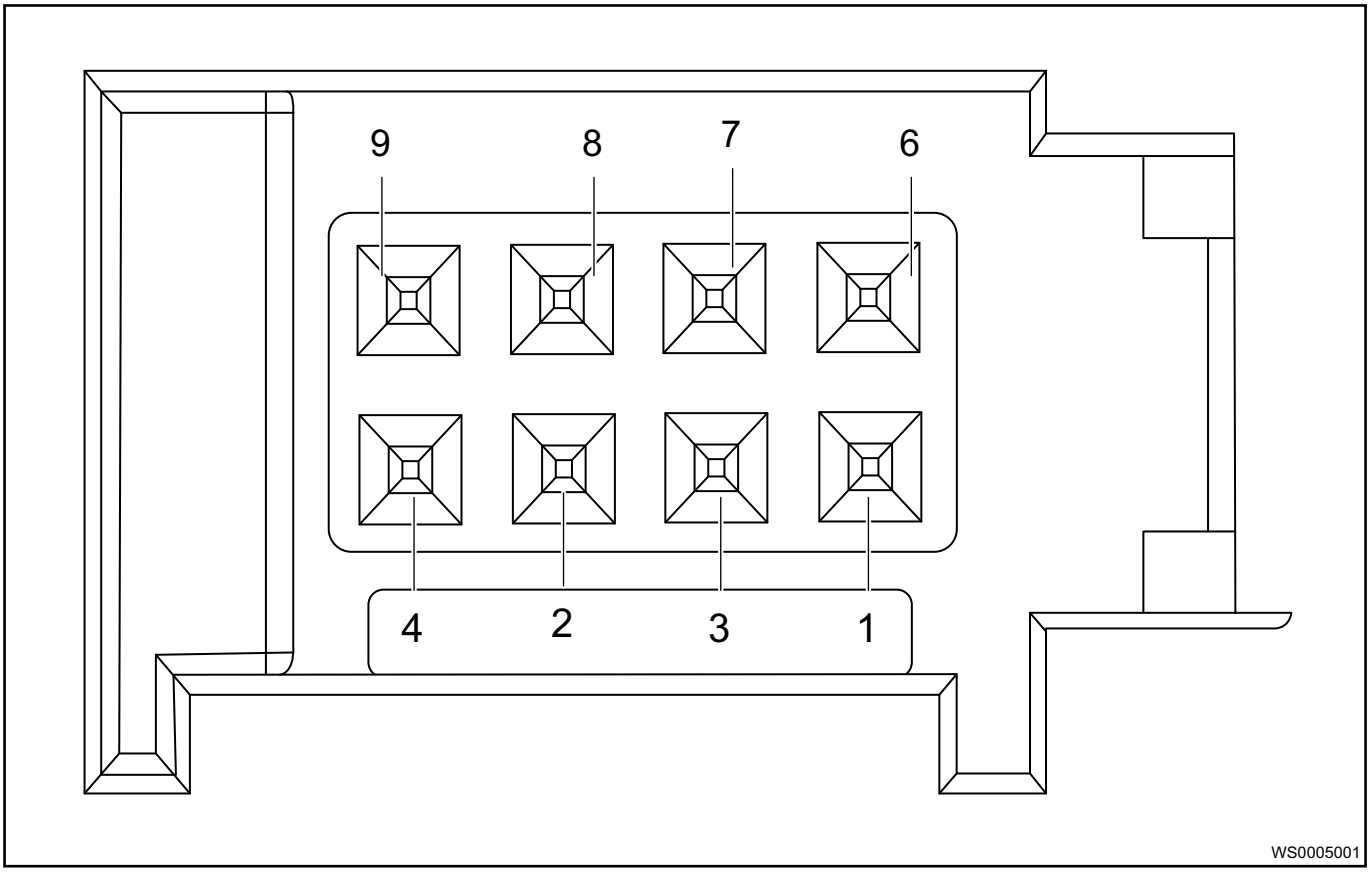
Control Schematic Diagram (Comfort)



Control Schematic Diagram (Lease model and Luxury model)



Glass Up / Down Control Switch Pin Definition

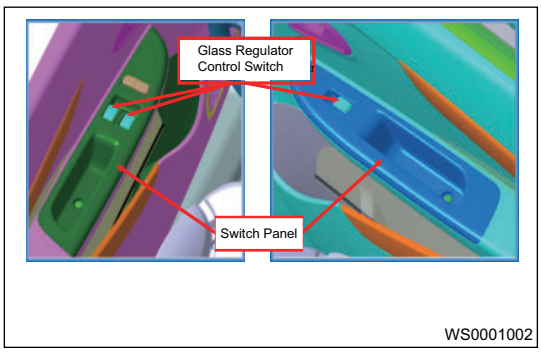


Terminal	Definition
1	Backlight Power Supply
4	Backlight Ground
6	UP Input
9	Ground

Removal

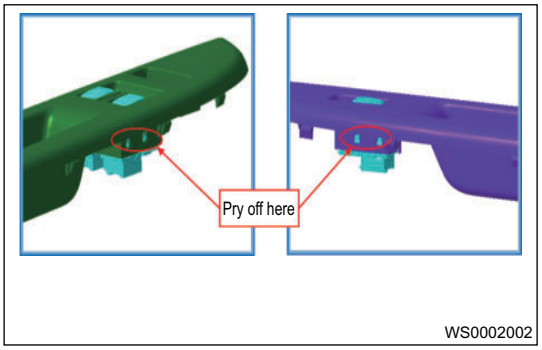
Step

1. Remove the switch panel.



2. Disconnect the connector.

3. Pry out door glass regulator switch with special tool.



Installation

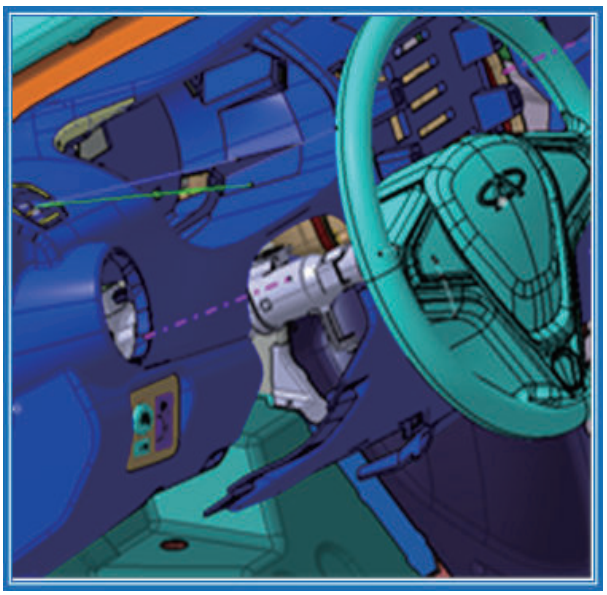
1. Installation is in the reverse order of removal.

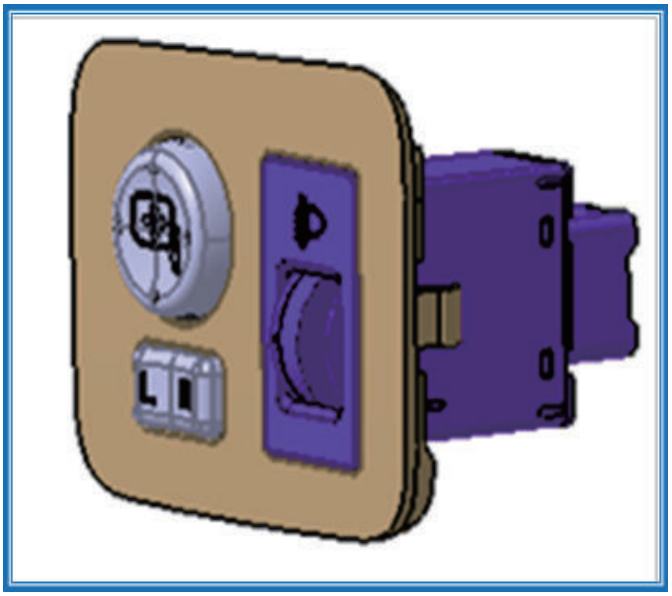
POWER REAR VIEW MIRROR

POWER REAR VIEW MIRROR SYSTEM

System Overview

System Composition Diagram



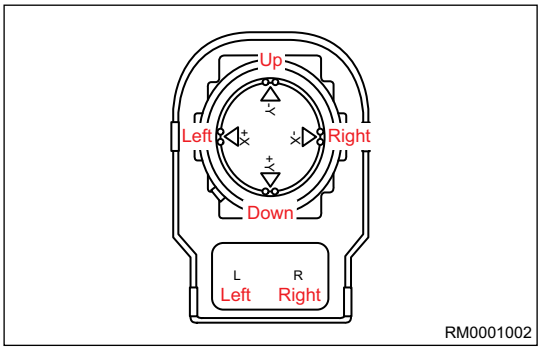


RM0001001

Function Description

Electrical Adjustment Function

Operate the switch to select left or right rear view mirror. The corresponding rear view mirror can be adjusted up and down, left and right by turning on the different internal circuit of switch.



RM0001002

Rear View Mirror Heating Function


RM0001102

Rear Defroster Heating

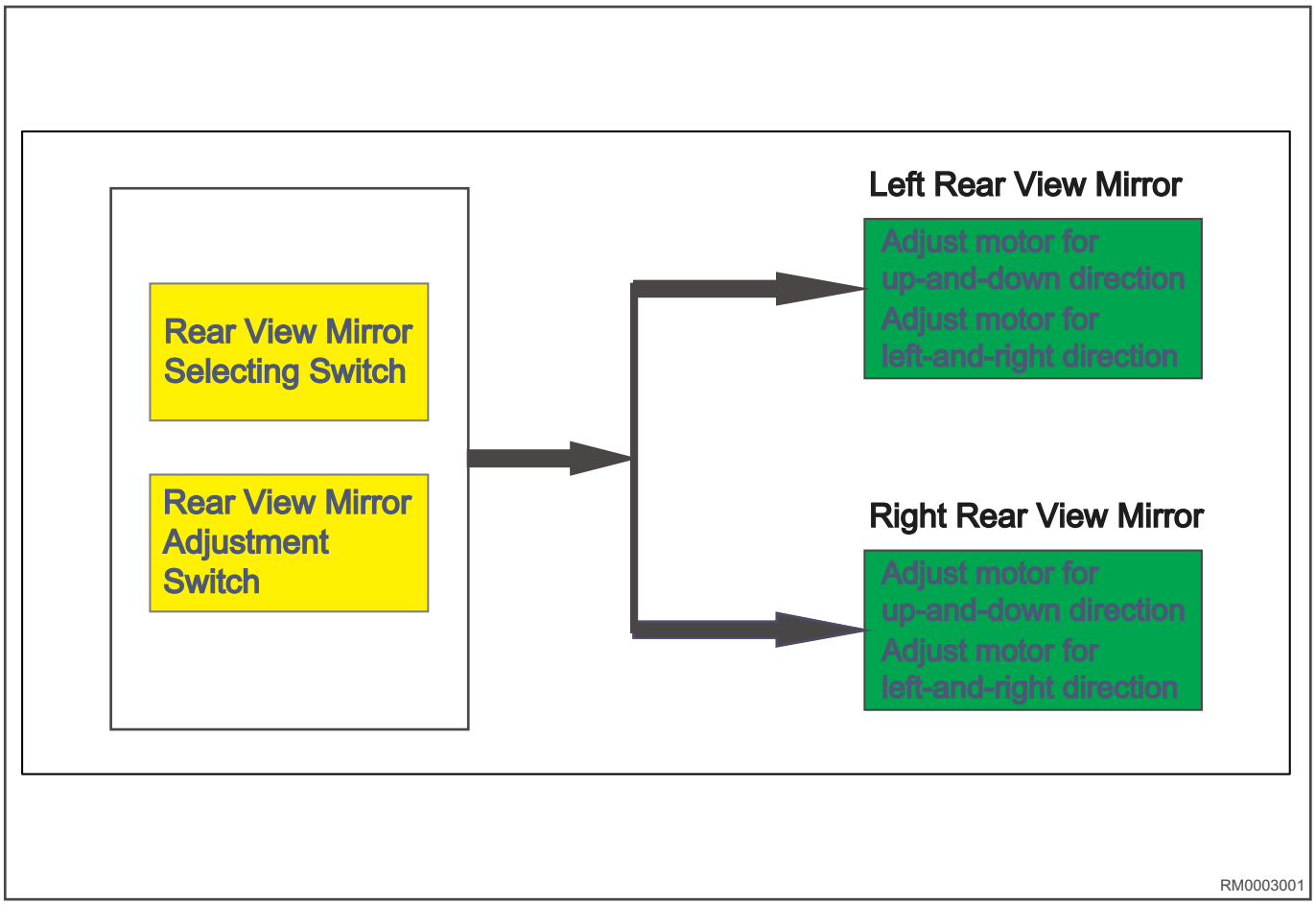
1. Turn POWER switch to ON.
2. Press the rear defrosting button.
3. Rear defroster heating continuously operates for more than 15 minutes and then shuts off automatically.


RM0001202

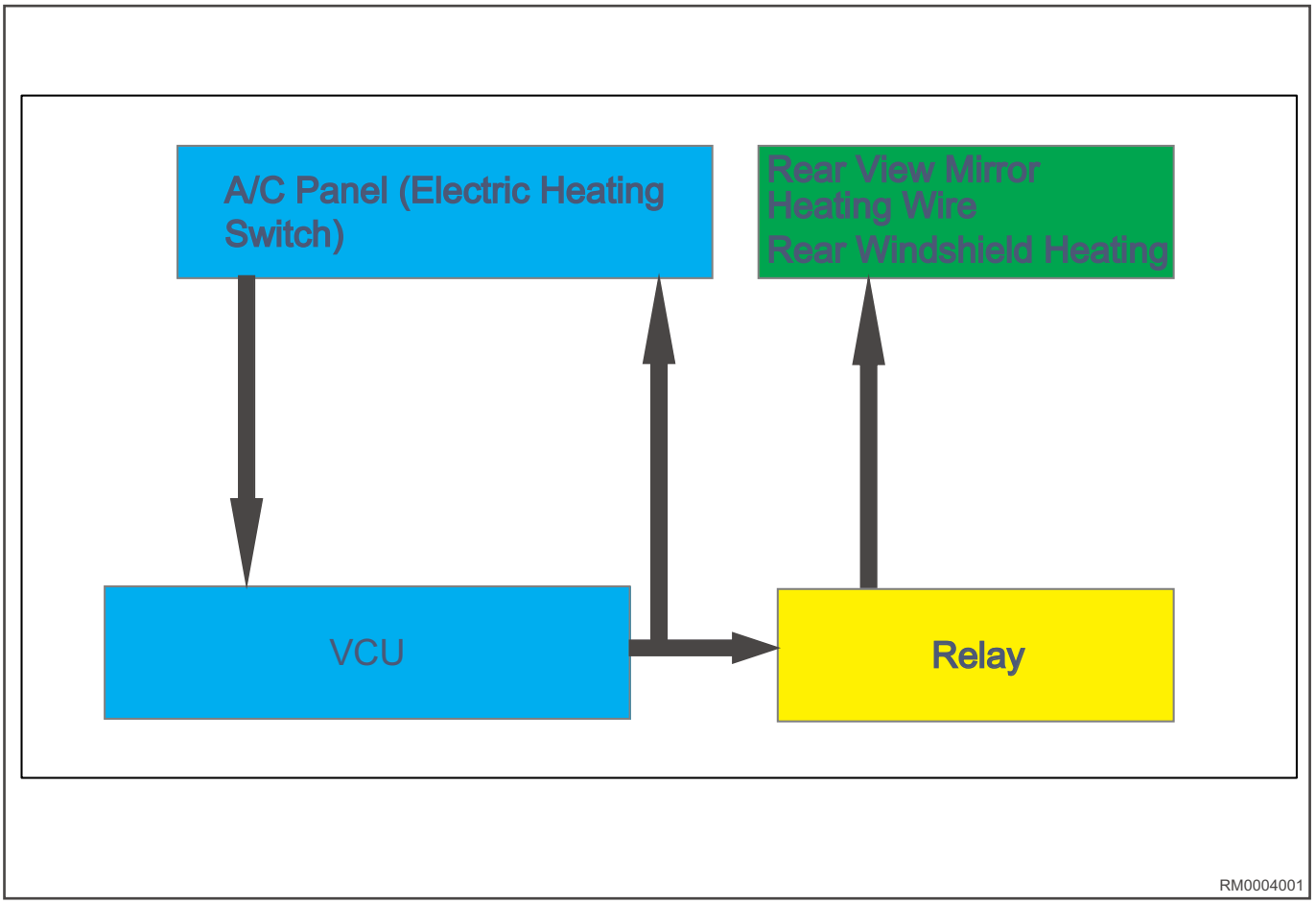
Circuit Diagram

Control Schematic Diagram

Rear View Mirror Electrical Adjustment

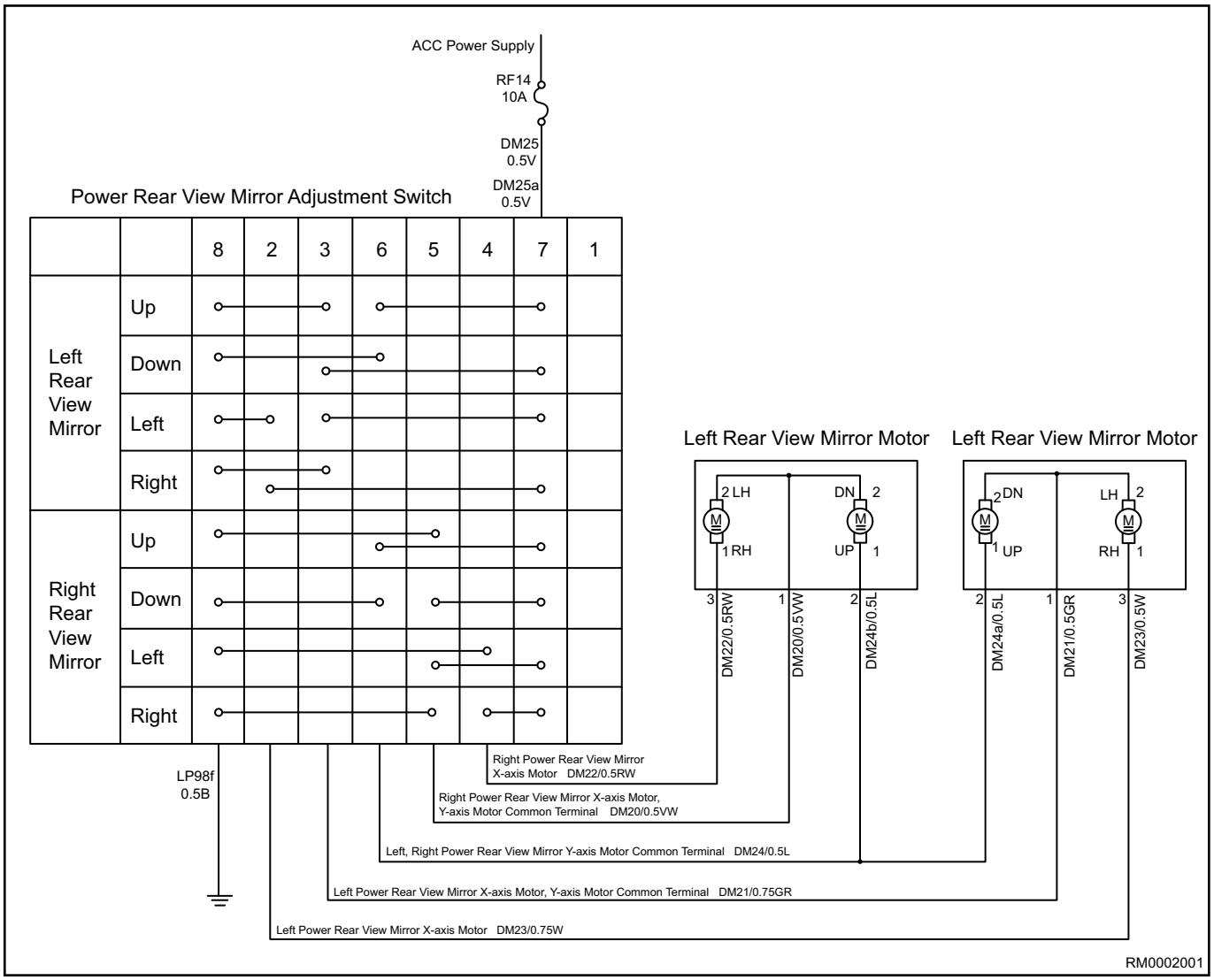


Rear Defroster Heating

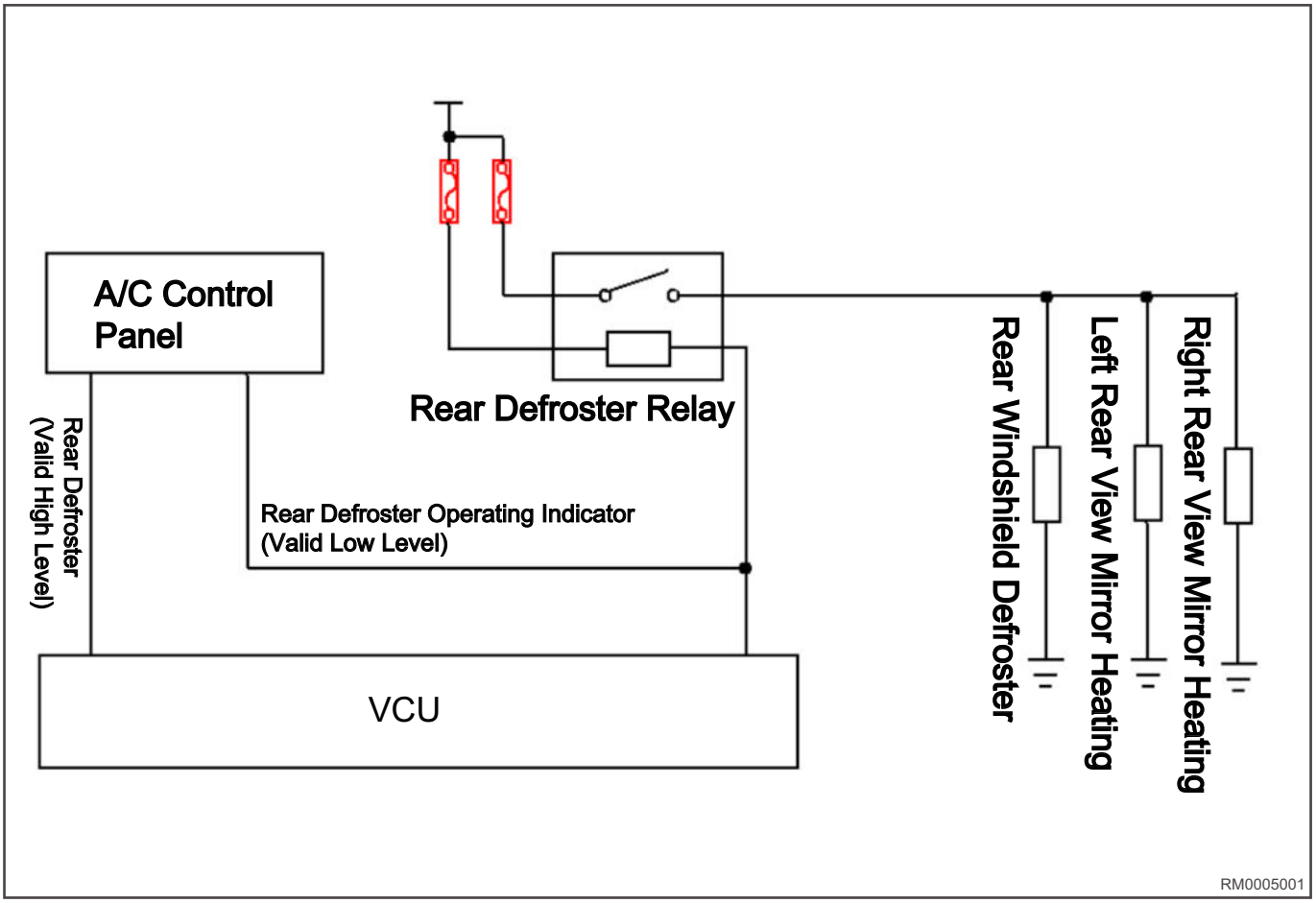


Circuit Schematic Diagram

Electrical Adjustment



Rear Defroster Heating



INSTRUMENT PANEL

INSTRUMENT PANEL

On-vehicle Service

Tools

Tools: Cross screwdriver, flat tip screwdriver, ratchet, socket, wrench

Specifications

Torque Specifications

Part Name	Torque (N•m)
Fixing Screw Between Instrument Cluster and Instrument Panel	2 ± 0.5
Fixing Hexagon Flange Nut Between Armrest Assembly and Auxiliary Fascia Console Assembly	25 ± 5
Airbag Connector Fixing Bolt	5 ± 1
Fixing Bolt Between Both Sides of Instrument Panel and Body	10 ± 1
Fixing Screw Between Instrument Panel and Instrument Panel Crossmember	10 ± 1

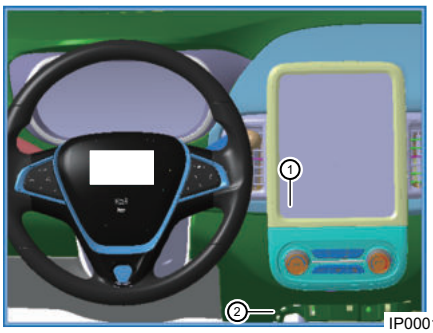
DVD and A/C Control Panel

Removal

⚠

- Disconnect the negative battery cable before removing electrical components.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of interior ornament.
- For safety, be sure to wear necessary safety equipment to prevent accidents.

1. Using a flat tip screwdriver, pry off DVD (1) and A/C control panel (2).
2. Unplug wire harness connectors in turn, and remove DVD (1) and A/C control panel (2).



Installation

1. Make sure each wire harness connector is connected in place without looseness.
2. Ensure uniform, safe and reliable fit clearance with the periphery.
3. Installation is in the reverse order of removal.

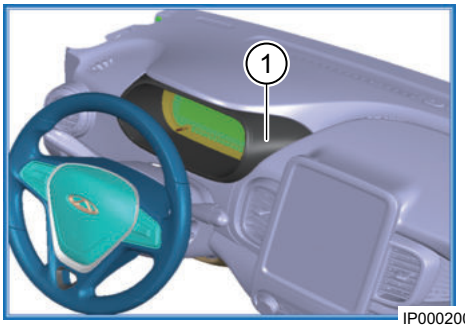
Instrument Cluster

Removal

⚠

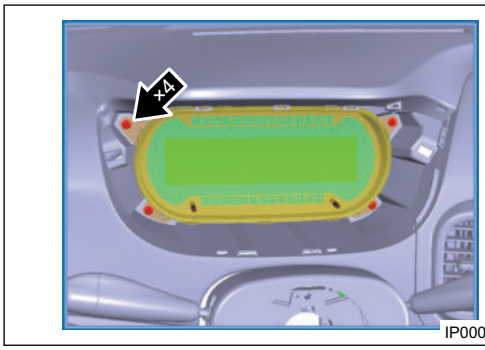
- Disconnect the negative battery cable before removing electrical components.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of interior ornament.
- For safety, be sure to wear necessary safety equipment to prevent accidents.

1. Cut off the power supply of 12 V battery, and remove instrument cluster trim cover (1) with a flat tip screwdriver.



2. Using a cross screwdriver, remove 4 fixing screws (arrow) between instrument cluster and instrument panel.

   Tightening torque: 2 ± 0.5 N•m



3. Disconnect instrument cluster wire harness connector, and remove instrument cluster.

Installation

1. Make sure instrument cluster wire harness is connected in place.
2. Ensure uniform, safe and reliable fit clearance with the periphery.
3. Installation is in the reverse order of removal.

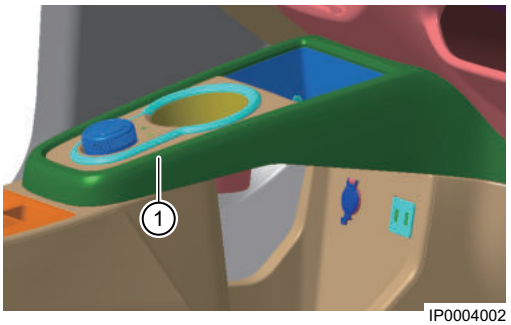
Auxiliary Fascia Console

Removal

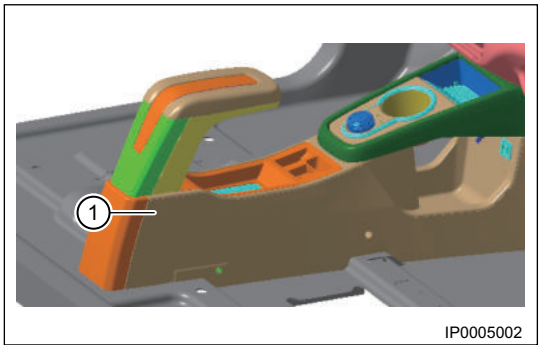
⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of interior ornament.

1. Using a flat tip screwdriver, pry off shift panel assembly (1), and then unplug shift knob wire harness connector.

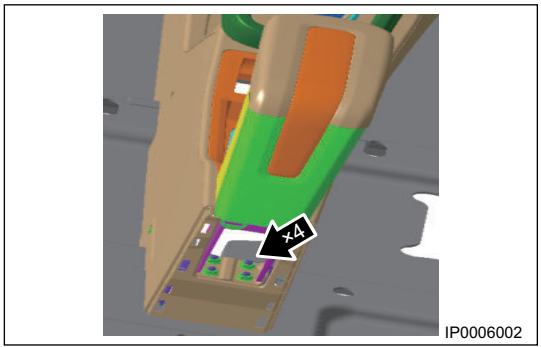


2. Using a flat tip screwdriver, pry off auxiliary fascia console rear end cover (1) assembly.

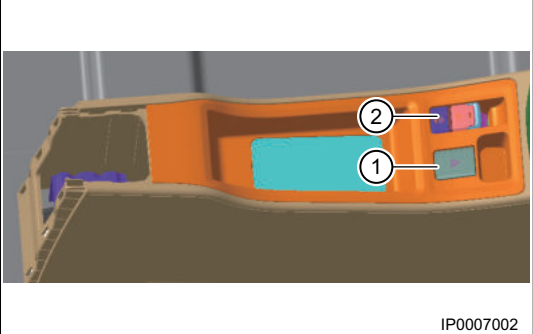


3. Remove the armrest lower cover plate (for models with armrest).
   a. Using ratchet and socket, remove 4 hexagon flange nuts Q32008F36 (arrow), and remove armrest assembly.

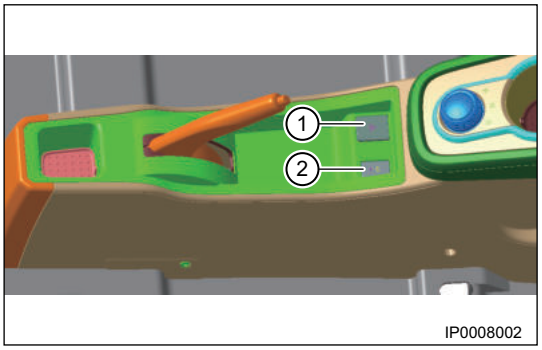
      Tightening torque: 25 ± 5 N•m



   b. Using a flat tip screwdriver, pry off accessories such as armrest lower cover plate, warning light switch (1) and EPB switch (2), and then unplug wire harness connector on back.



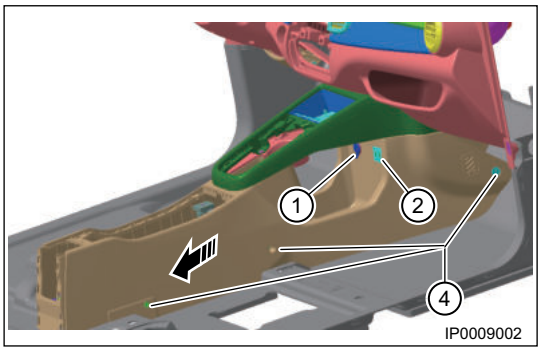
4. Pull parking brake lever to the upper limit position. Using a flat tip screwdriver, pry off accessories such as parking brake cover plate assembly, warning light switch (1), automatic parking switch (2), and then unplug wire harness connector on back (for models without armrest).

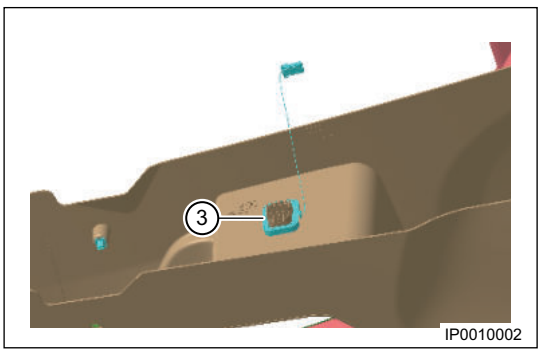


5. Remove the auxiliary fascia console assembly.

   Using a cross screwdriver, remove 6 self-tapping screws (4), which are portioned symmetrically left to right. Pull out auxiliary fascia console assembly in direction of arrow, and disconnect back-up power supply, USB interface and wire harness connector on back of anti-theft coil (1, 2, 3 shown in figure).

   (Anti-theft coil is engaged on back of bottom of auxiliary fascia console)





Installation

1. Ensure uniform, safe and reliable fit clearance with the periphery.
2. Installation is in the reverse order of removal.

Instrument Panel Assembly

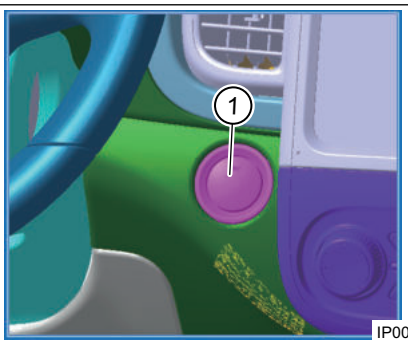
Removal

⚠

- Disconnect the negative battery cable before removing electrical components.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of interior ornament.
- For safety, be sure to wear necessary safety equipment to prevent accidents.

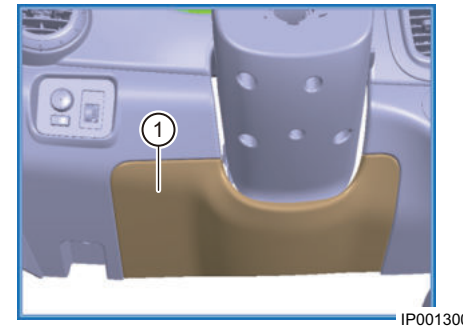
1. Remove the steering column assembly (Refer to “Steering” section in “Chassis”).
2. Remove the front compartment cover handle assembly (Refer to “Front Compartment Cover and Back Door” section in this part).
3. Remove auxiliary fascia console, DVD, A/C control panel and instrument cluster.

4. Remove the POWER switch (only for high configuration) (1). Using a flat tip screwdriver, pry off POWER switch, then disconnect wire harness connector to remove POWER switch.

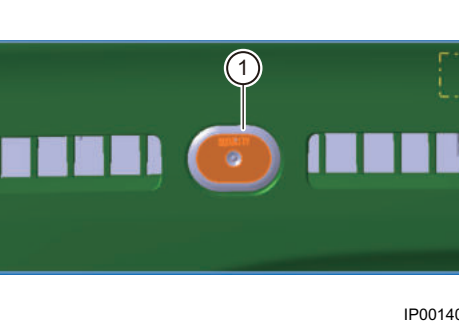


5. Remove the left lower switch control panel. Using a flat tip screwdriver, pry off left lower switch cover plate, then disconnect wire harness connector to remove left lower switch cover plate.

6. Remove the left lower protector assembly (1). Using a flat tip screwdriver, pry off left lower protector assembly to remove it.

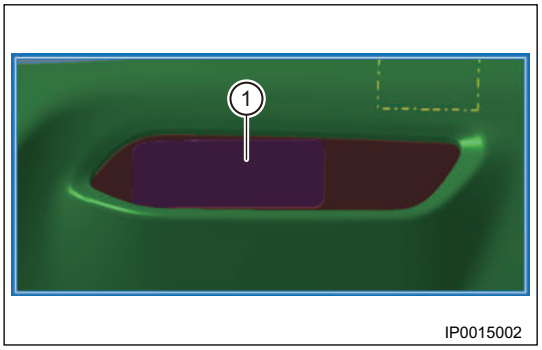


7. Remove the anti-theft indicator (1). Using a flat tip screwdriver, pry off anti-theft indicator, then disconnect wire harness connector to remove anti-theft indicator.

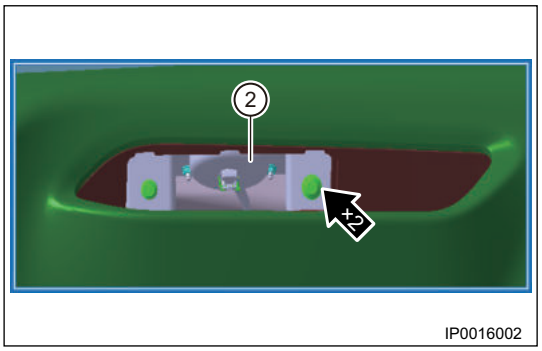


8. Remove PAB mounting cover plate (1), and remove airbag fixing bolt (only for high configuration). Using a flat tip screwdriver, pry off PAB mounting cover plate to remove it. Remove airbag connector (2), and remove two fixing bolts (arrow) of airbag.

   Tightening torque: 5 ± 1 N•m

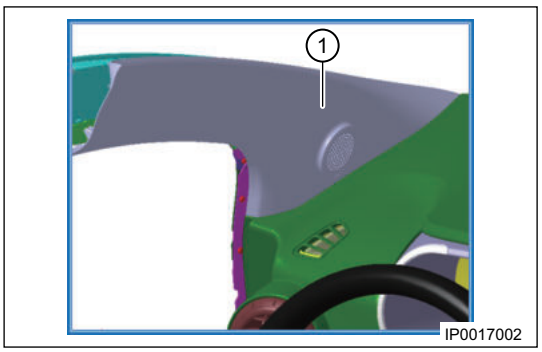


IP0015002



IP0016002

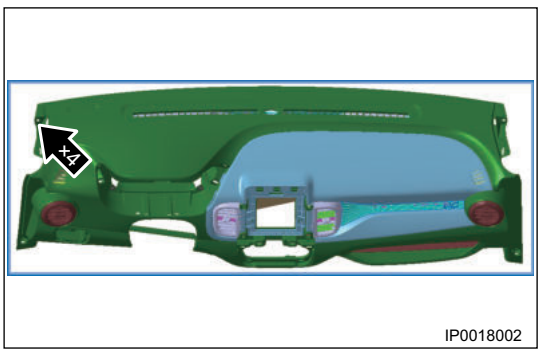
9. Remove A-pillar protector (1), and pry off instrument panel left and right lower block covers with a flat tip screwdriver.



IP0017002

10. Remove connecting bolts (arrow) between both sides of instrument panel and body.

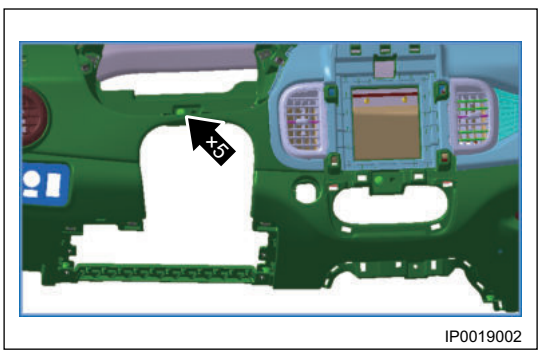
    Tightening torque: 10 ± 1 N•m



IP0018002

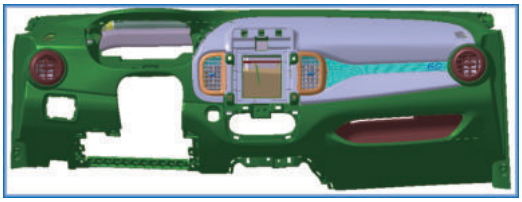
11. Remove 5 fixing screws (arrow) between instrument panel and instrument panel crossmember.

    Tightening torque: 10 ± 1 N•m



IP0019002

12. Remove the instrument panel assembly.


IP0020002

Installation

⚠

- Instrument panel outlet should match with A/C outlet interface. Avoid improper installation, air leakage and interference between instrument panel air duct and instrument panel crossmember and evaporator, which may affect installation of instrument panel, resulting in failing to install instrument panel and other accessories in place.
- Instrument panel should not interfere with front windshield and affect its installation, and clearance between instrument panel and front windshield should be uniform.
- Clearance between instrument panel and both sides of vehicle body should be uniform and satisfies the assembly of door opening weatherstrip.

1. Installation is in the reverse order of removal.

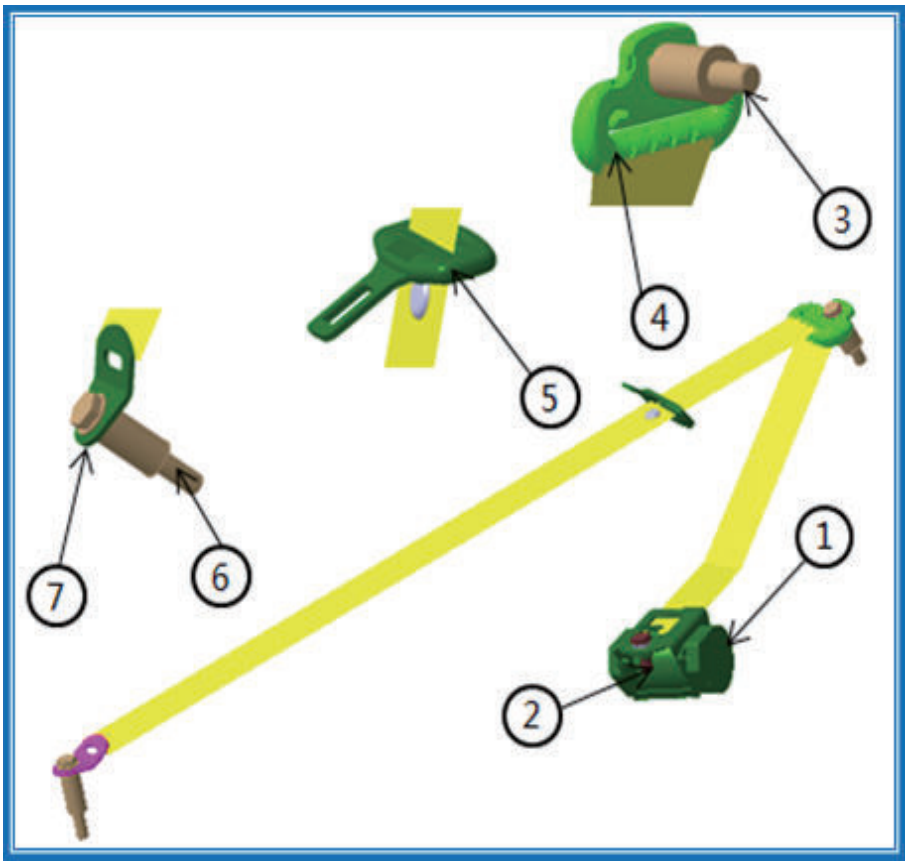
SEAT BELT

SEAT BELT

System Overview

System Components Diagram

Seat Belt



SE0010001

1	Retractor Assembly	2	Bolt
3	Bolt	4	Guide Ring
5	Tab	6	Bolt
7	End Plate		

Function Introduction

Function Introduction (Front Passenger Power Seat)

- Front passenger seat electrical adjustment (4-way).
- Seat position learning and memory function.
- Easy-Entry function.
- Front passenger seat belt unfastened warning function.
- Seat position self-learning function.

Power Mode Management

- In low / high voltage mode, it is prohibited to send manual seat adjustment, seat position memory, Easy-Entry and network message.
- When power supply voltage is less than 7 V, controller enters low voltage mode; In low voltage mode, power supply returns to 8 V or more, and power supply voltage enters normal voltage mode.
- When power supply voltage is more than 18 V, controller enters high voltage mode; In high voltage mode, power supply returns to 17 V or less, and power supply voltage enters normal voltage mode.

Wake-up and Sleep

Seat controller uses indirect network management method. Message is sent with key in ON, and not sent with key in a position other than ON. After sleep conditions are met, it enters sleep mode 5 s later.

Sleep Conditions

- Seat does not operate.
- Seat adjustment switch is not pressed.
- Quick entry / exit switch is not pressed.
- Network message is not received.
- POWER switch is in OFF position.

Wake-up Conditions

- IGN signal is detected, seat controller is woken up and network message is sent.
- 4-way adjustment button or quick exit button of seat is pressed, seat controller is woken up and no network message is sent.
- Vehicle network message is received, seat controller is woken up and no network message is sent.

Front Passenger Seat Electrical Adjustment

Function Description

- Press any direction adjustment button of seat while power supply is in any position and voltage mode is normal, seat operates in the corresponding direction.
- If all four directions of seat are not learned, when seat operates to the hard stop position in any direction (blocking point), and blocking current is more than 10 A for 1 s, operation in this direction will stop.
- If four directions of seat are learned, when seat operates to soft stop position (approximately 2 mm from hard stop position) in any direction, operation in this direction will stop. After seat reaches the soft stop position in any direction and stops operating, if adjusting button corresponding to this direction is pressed again, the seat will operate to the hard stop position.
- The soft stop position is set to prevent motor from easily blocking and extend motor’ s life. The soft stop position can be calibrated.

Exit Conditions

- Motor operates to the hard stop position (not learned).
- Motor operates to the soft stop position (learned).
- Seat adjustment switch is not pressed.
- Power supply voltage mode is not a normal mode.
- Motor operating current is more than 10 A for 1 s.

Easy-Entry Function

Quick Entry Function

- When invalid SBR signal (front passenger seat is not occupied) and invalid seat belt buckle signal (- front passenger seat belt is not fastened) are detected, press quick entry function button to adjust seat to the front soft stop position in horizontal direction, and adjust seatback to the preset position (- approximately 35°); both directions of operation are performed at the same time, however, as the different travel distance, the operation will not stop at the same time.

Quick Exit Function

- When invalid SBR signal (front passenger seat is not occupied) and invalid seat belt buckle signal (- front passenger seat belt is not fastened) are detected, press quick exit function button to adjust seat to a position about 10 cm from the rear end soft stop position in horizontal direction, and adjust seatback to the preset position (approximately 20°); both directions of operation are performed at the same time, however, as the different travel distance, the operation will not stop at the same time.

Exit Conditions

- Any button is pressed (manual adjustment button or quick entry / exit button).
- SBR signal is valid (front passenger seat is occupied).
- Seat belt buckle signal is valid (front passenger seat belt is fastened).
- Seat is automatically adjusted to the set position of this function.
- Collection fault occurs in motor hall signal.
- Power supply voltage mode is not a normal mode.

Seat Position Learning and Memory

Manual Learning

- If four directions of seat are not learned, it is necessary to adjust seat to the hard stop position in four directions respectively. Motor stops operating if blocking current is more than 10 A for 1 s. The soft stop position is approximately 2 mm from the front (in relative to the rearmost of travel) or rear (in relative to the foremost of travel) and is stored in EEPROM. Even if ECU is powered off, the learned soft stop position will not be lost.

Exit Conditions

- If collection fault occurs in motor hall signal, the position will not be memorized.
- If difference of hall counts between front and rear blocking positions for seat or seatback is less than the calibration value, position will not be memorized; (calibration value of horizontal travel is that of actual travel ± 80 hall counts, calibration value of seatback travel is that of actual travel ± 160 hall counts).
- If power supply voltage mode is not a normal mode, position will not memorized.

Front Passenger Seat Belt Unfastened Warning Function

Warning Function

- If valid SBR signal (front passenger seat is occupied) and invalid seat belt buckle signal (front passenger seat belt is not fastened) is detected when power supply is in ON position and vehicle speed is more than 25 km/h, alarm status will be sent to vehicle network.
- In this case, if vehicle speed is less than 25 km/h, alarm will not released.
- In this case, if invalid SBR signal (front passenger seat is not occupied) or valid seat belt buckle signal (front passenger seat belt is fastened) is detected, no alarm status will be sent to vehicle network.

Exit Conditions

- Power supply is in OFF position.
- Invalid SBR signal is detected (front passenger seat is not occupied).
- Seat belt buckle is available (front passenger seat belt is fastened).

Diagnosis & Test

Problem Symptoms Table

Common Problem	Troubleshooting Result	Solutions
Easy-entry does not operate (-seat does not operate when Easy-entry button is pressed)	Seat belt buckle is inserted (Easy-entry function is turned off when inserted in this position)	Remove the plug
	A weight of more than 15 kg is placed on the seat and it is detected by the weight sensor, Easy-entry function is turned off	Remove the weight
	Motor is faulty and Easy-entry function fails. Meanwhile, seat cushion side button fails	Replace the seat
	Easy-entry function wire harness is faulty or any connector is not connected	Replace wire harness or connect connector
	Vehicle wire harness is faulty (-virtual connection, open circuit) or current is abnormal due to motor blocking, which affects seat functions (It can be confirmed by replacing seat)	Repair the vehicle wire harness
	Front passenger seat belt buckle wire harness connector is not connected	Complete the connection of seat belt wire harness
	When door is opened and seat is not operated within 5 minutes, press seat rearward switch and seat does not operate (seat stops operating for 5 minutes, and seat Easy-entry function enters sleep mode)	Press Easy-entry forward button to perform wake up operation.

On-vehicle Service

Tools

General Tools
Flat tip screwdriver, cross screwdriver, 17# socket, torque wrench, 13# socket wrench, torque wrench

Parts
Non-reusable clips

Specifications

Torque Specifications

Part Name	Torque (N•m)
Seat Belt Bolt	45 ± 5
Seat Belt Upper Hanger Bolt	45 ± 5
Seat Belt Retractor Fixing Bolt	45 ± 5
Seat Fixing Bolt	25 ± 4

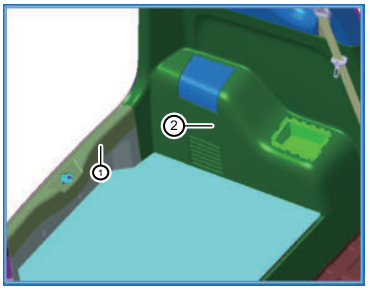
Removal Step

Removal

⚠

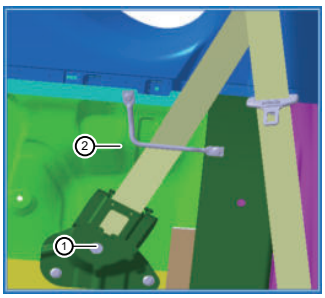
- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Keep seat belt clean without oil, and check seat belt for damage.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of interior ornament.

1. Using a flat tip screwdriver, carefully pry off luggage compartment doorsill upper protector (1) and quarter lower protector (2).



SE0010002

2. Using torque wrench and 17# socket, loose seat belt bolt (1).
   Torque: 45 ± 5 N·m
3. Using 17# socket, remove seat belt upper hanger bolt.
   Torque: 45 ± 5 N·m
4. Pass seat belt through guide bracket (2).
5. Using 17# socket, remove seat belt retractor fixing bolt, and then remove seat belt.
   Torque: 45 ± 5 N·m



SE0010003

⚠

- As seat belt with pretensioner is installed on this vehicle, operate carefully when removing retractor, to avoid damage to the retractor.

Installation

1. Ensure uniform, safe and reliable fit clearance with the periphery.
2. Installation is in the reverse order of removal.

Seat System

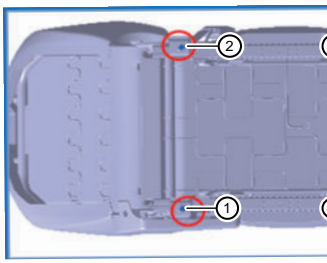
Removal

Tool

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Keep seat surface clean without oil, and check seat for scratches.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of interior ornament.

1. Move seat backward by pulling handle under the front left seat, and use torque wrench and 13# socket to remove 2 fixing bolts (1) and (2) from front of seat. Then move seat forward by pulling handle under the front left seat, and use torque wrench and 13# socket to remove 2 fixing bolts (3) and (4) from rear of seat.
2. Unplug connector under the seat, and remove seat.



Installation

1. Ensure uniform, safe and reliable fit clearance with the periphery.
2. Installation is in the reverse order of removal.

FRONT COMPARTMENT COVER AND DOORS

REMOVAL AND INSTALLATION OF FRONT COMPARTMENT COVER AND BACK DOOR

On-vehicle Service

Tools

19 mm adjustable wrench, torque wrench, flat tip screwdriver, 10# socket wrench, cross screwdriver, 7#, 8#, 10#, 13# socket, inner spline wrench, rubber hammer, ratchet, connecting rod.

Specifications

Torque Specifications

Part Name	Torque (N•m)
Front Compartment Cover Lock Handle Clamping Nut	10 ± 1
Coupling Nut Between Left / Right Back Door Hinge and Body	25 ± 4
Screw Between Window Frame Weatherstrip and Front / Rear Joint	2.0 ± 0.5
Coupling Bolt Between Door Upper Hinge and Body	55 ± 5
Coupling Clip Between Door Outer Panel Assembly and Door Frame	10 ± 1
Glass Regulator Fixing Bolt	10 ± 1
Door Rear Lower Guide Rail Fixing Bolt	10 ± 1
Fixing Bolt Between Hinge and Body	9 ± 1

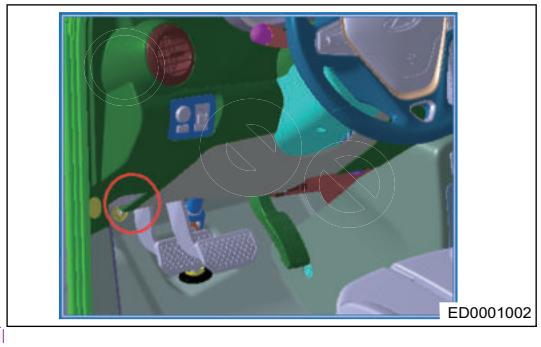
Removal of Front Compartment Cover Assembly

Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch front compartment cover outer panel surface during removal and installation of front compartment cover.

1. Operate front compartment cover lock handle on left lower side of instrument panel to unlock the front compartment cover lock.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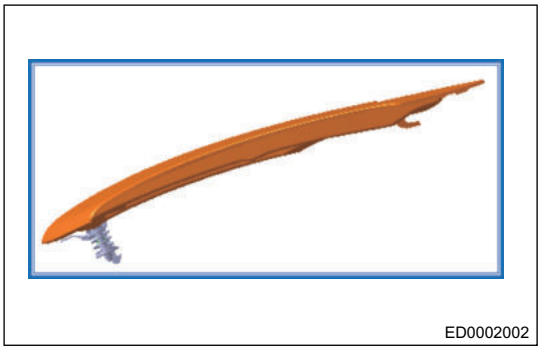
2. Operate front compartment cover lock safety hook handle to fully separate upper and lower parts of front compartment cover lock, then pull out rear pin of front compartment cover assembly from mounting bracket.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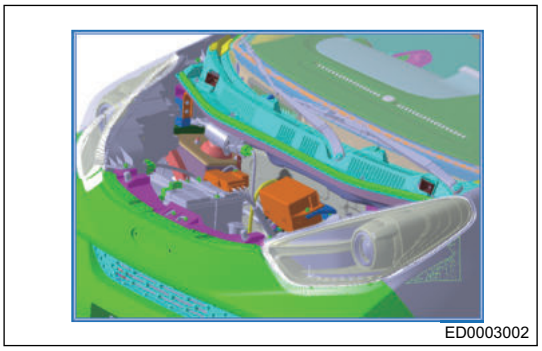
Installation of Front Compartment Cover Assembly

1. Installation is in the reverse order of removal.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Removal and Installation of Front Compartment Cover Lock Handle and Cable

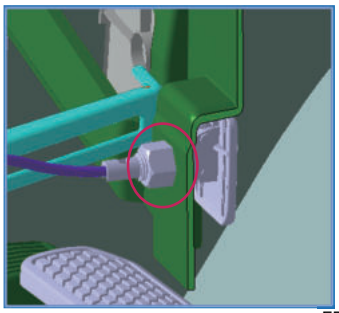
Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Using adjustable wrench, loosen clamping nut of front compartment cover lock handle, and remove lock cable fixing end from handle to separate cable and pull wire.

   Tightening torque: 10 ± 1 N•m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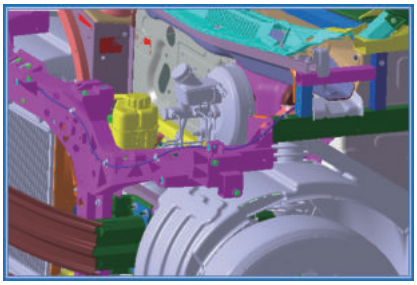
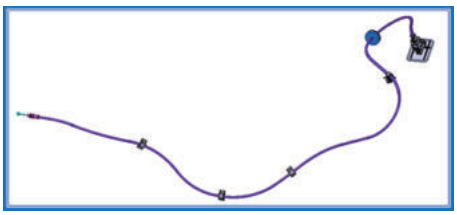
2. Remove the front combination light (For detailed steps, refer to “Electrical”).
3. Using a flat tip screwdriver, remove front compartment cover cable fixing clip from body, and disconnect connector between cable and lower part of front compartment cover lock from lock.


ED0005002

4. Remove front compartment cover cable completely.


ED0006002

Installation

1. Installation is in the reverse order of removal.

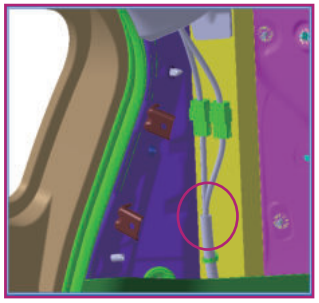
Removal and Installation of Back Door

Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Disconnect the battery to avoid damage to electrical device.
- Be careful not to scratch visible surface during removal and installation.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Using a flat tip screwdriver, remove left quarter upper and lower protectors, disconnect back door wire harness connector and pull out wire harness boot from body.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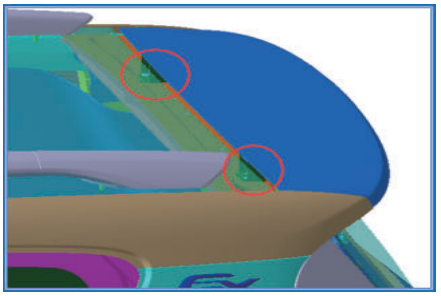
2. Using a flat tip screwdriver, remove rear side of roof. Using 10# socket wrench, remove coupling nut between left / right back door hinge and body through the hole under rear roof beam.

   Tightening torque: 25 ± 4 N•m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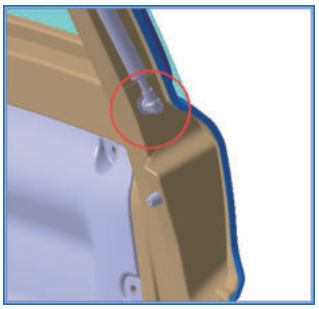
3. Using a flat tip screwdriver, remove hinged joint between gas spring on both sides of back door and back door.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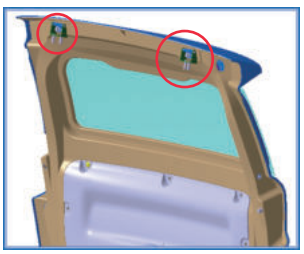
4. Move back door upward to separate hinge bolt from body, then remove back door assembly.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Installation

1. Installation is in the reverse order of removal.

⚠

- Uniformly adjust the peripheral clearance during installation, to ensure the uniform upper and lower heights and smooth transition; Pay special attention to protecting the finish paint of part and glass.

Removal of Door Protector

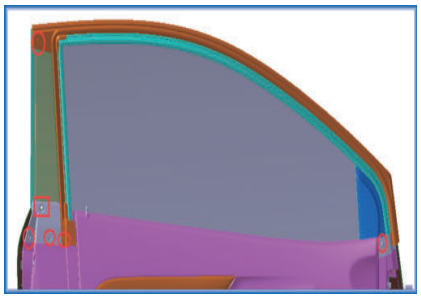
Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Disconnect the battery to avoid damage to electrical device.
- Pay attention to protecting the finish paint while removing some ornaments with a flat tip screwdriver.
- Be careful not to scratch ornament surface during removal and installation of interior ornament.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. Using a flat tip screwdriver, remove mounting clips and screw between window frame weatherstrip and front / rear joint (Clip positions are indicated by circle as shown in illustration, and screw installation position is indicated by rectangle).

   Tightening torque: 2.0 ± 0.5 N•m



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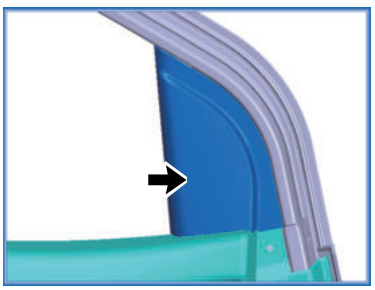
2. Using a cross screwdriver, remove clip and triangle protector (arrow) from door.



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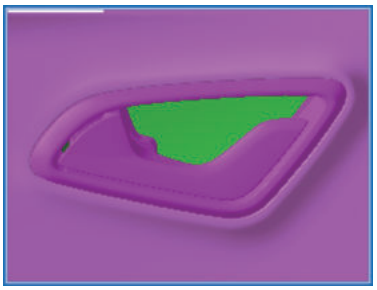
3. Using a cross screwdriver, remove door inside handle block cover.



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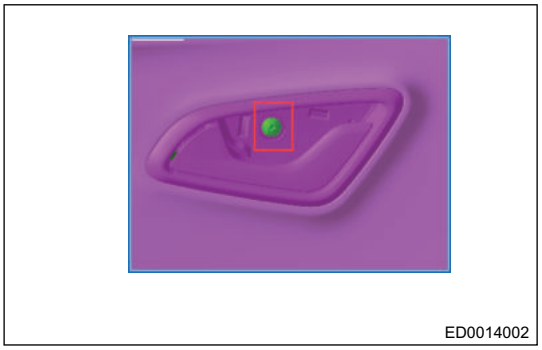
4. Using a screwdriver, remove fixing screw and disconnect connection between inside cable and inside handle, and remove inside handle.

   Tightening torque: 2.0 ± 0.5 N•m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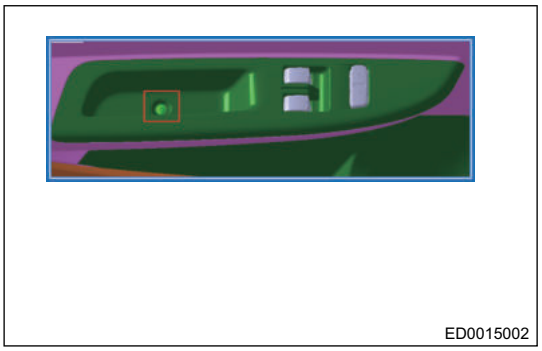
5. Using a cross screwdriver, remove screw and handle box, and disconnect quick closer wire harness.

   Tightening torque: 2.0 ± 0.5 N•m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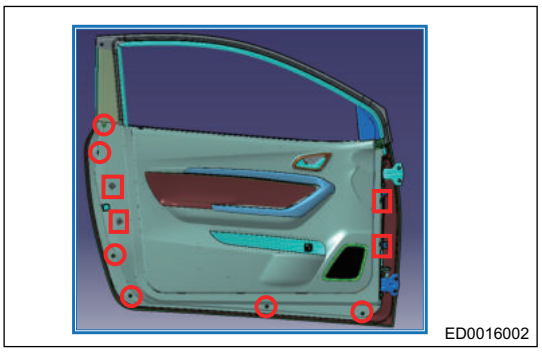
6. Using a cross screwdriver, remove protector tightening screw. Rotate and remove latch lever lift button, and use a flat tip screwdriver to pry off door protector clip to remove door protector.

   Tightening torque: 2.0 ± 0.5 N•m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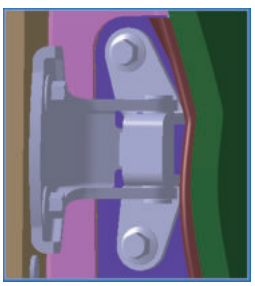
Removal and Installation of Door

Removal

1. Using 13# socket, remove coupling bolts between door upper hinge and body, and remove door assembly.

   Tightening torque: 55 ± 5 N•m


ED0017002

Installation

1. Installation is in the reverse order of removal.

Adjustment of Front Door

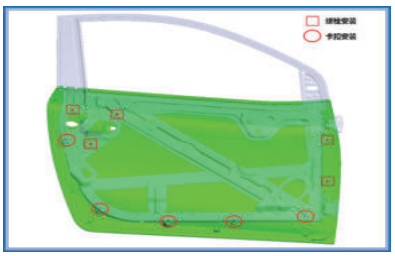
1. Adjust front door in front and rear and vertical directions.
2. Using special tools, loosen body hinge bolt and adjust door.
3. Adjust front door in left and right and vertical directions.
4. Loosen door side hinge bolt and adjust door.

Removal of Door Outer Panel Assembly

Removal

1. Using 10# socket, remove coupling bolt between door outer panel assembly and door frame. Using a flat tip screwdriver, remove coupling clips between door outer panel assembly and door frame.

   Tightening torque: 10 ± 1 N•m



ED0018002

2. Disconnect connection between outside handle and outside handle lever and key cylinder lever, and remove door outer panel assembly.

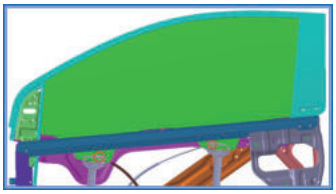
Installation

1. Installation is in the reverse order of removal.

Removal of Door Glass

Removal

1. Lower glass to a proper position and use a flat tip screwdriver to pry off glass fixing pin on the glass regulator, to separate glass and regulator. Glass pin fixing points are indicated by circles as shown in illustration.
2. Pull out the glass from outside of door by lifting glass upward and adjusting glass angle slowly left and right.



ED0019002

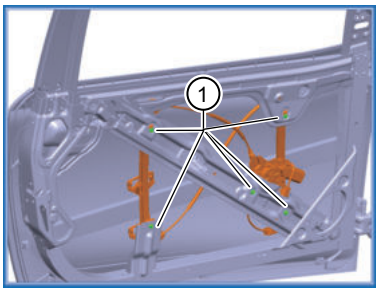
Installation

1. Installation is in the reverse order of removal.

Removal of Door Glass Regulator

Removal

1. Using 10# socket, remove glass regulator fixing bolts.
   Tightening torque: 10 ± 1 N•m
2. Remove the glass regulator assembly.



ED0020002

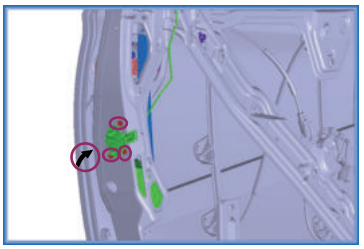
Installation

1. Installation is in the reverse order of removal.

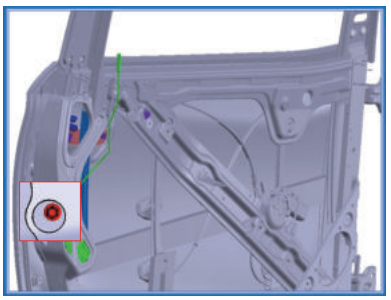
Removal of Door Lock

Removal

1. Remove the door protector assembly.
2. Using 10# socket, remove door rear lower guide rail fixing bolt through hole on the lock mounting board, and remove door rear lower guide rail.
   Tightening torque: 10 ± 1 N•m


ED0021002

3. Using a cross wrench, remove 3 fixing screws from door lock, and remove door lock assembly.


ED0022002

Installation and Adjustment Procedure

Installation and Adjustment of Door Components

Installation

1. Installation is in the reverse order of removal.

Adjustment

Adjustment of Door Glass Regulator System

1. Perform inspection after installing glass regulator system. It will take about 7 s for the window going up to the highest position from the lowest position. If the time is too long, perform inspection in time.
2. Check if glass regulator motor operates normally.
3. Check glass run for any dust, which may cause excessive resistance during going up of glass.
4. Check for deviation in installation position of glass guide rail, which may lead to glass sticking by different radian while glass is going up. Glass guide rail can be adjusted by its fixing bolt.

⚠
• Never apply any grease on the glass run or glass to prevent dust adhesion.

Installation and Adjustment of Door Assembly

Installation

1. Installation is in the reverse order of removal.

Adjustment

1. Check horizontal and vertical clearances and closing force of the door after installation. If clearance is not correct or closing force is too large, adjust it in time. For clearance value of door, refer to “Body Dimension”.
2. Door clearance can be adjusted by adjusting the fixing bolt between hinge and body, or by adjusting sheet metal of door.
3. Closing force of door can be adjusted slightly by adjusting the position of front door lock pillar.
   Tightening torque: 9 ± 1 N•m

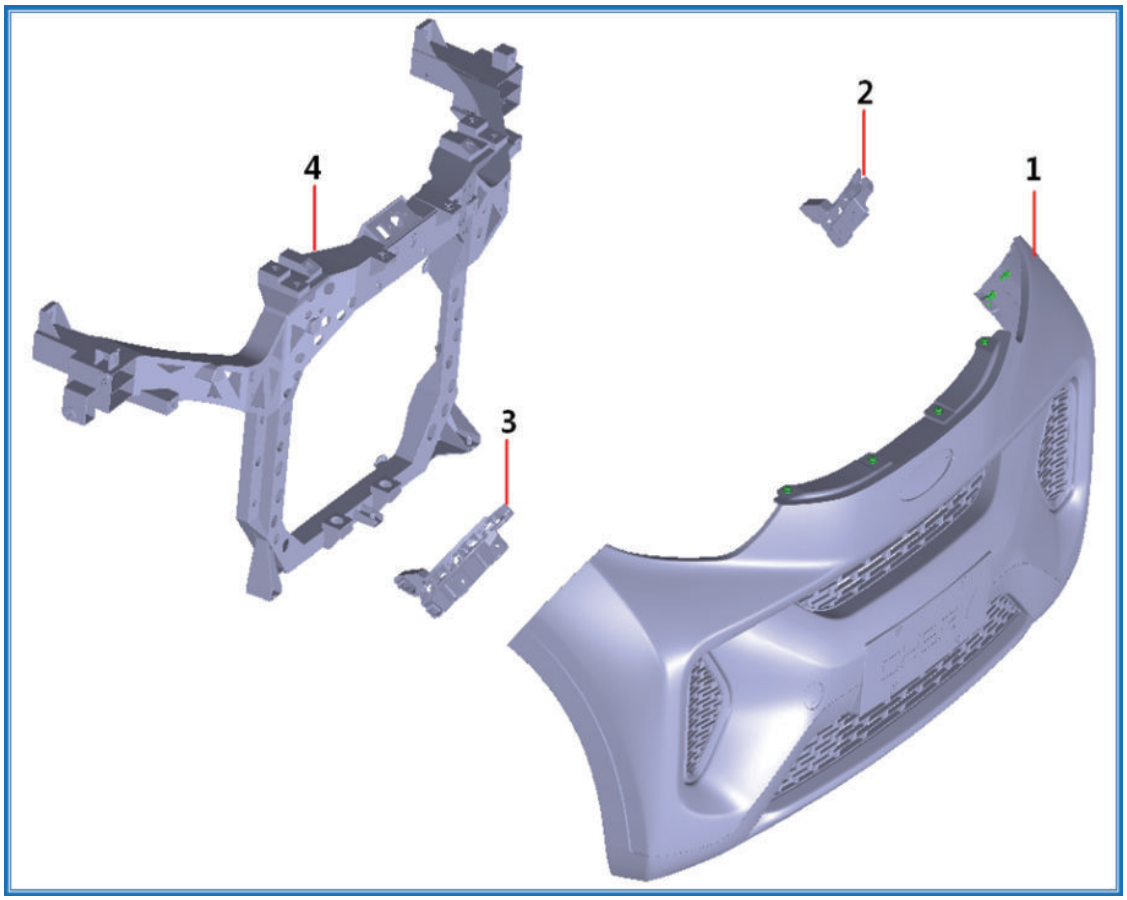
EXTERIOR

EXTERIOR

System Overview

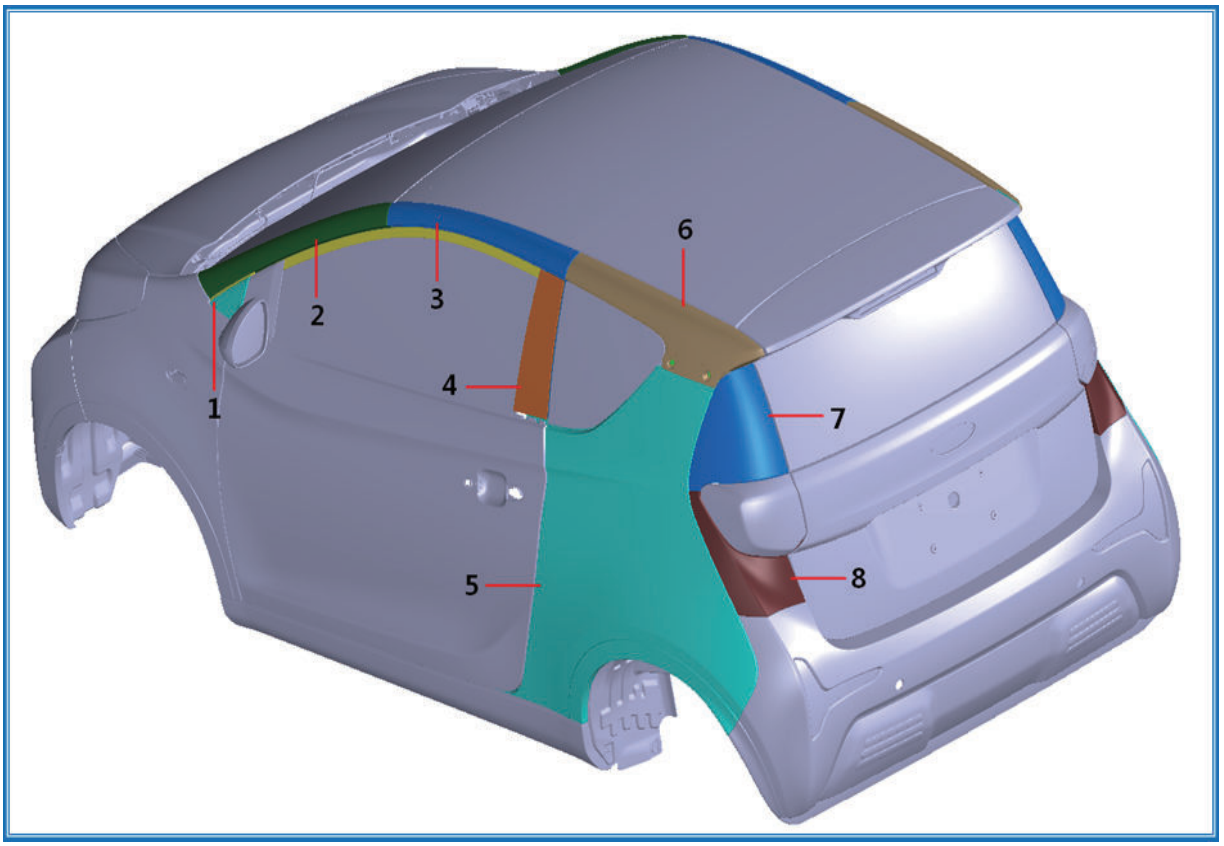
System Components Diagram

Front Bumper System



1	Front Bumper Body Assembly	2	Front Bumper Left Mounting Bracket Assembly
3	Front Bumper Right Mounting Bracket Assembly	4	Front Bumper Front End Bracket Assembly

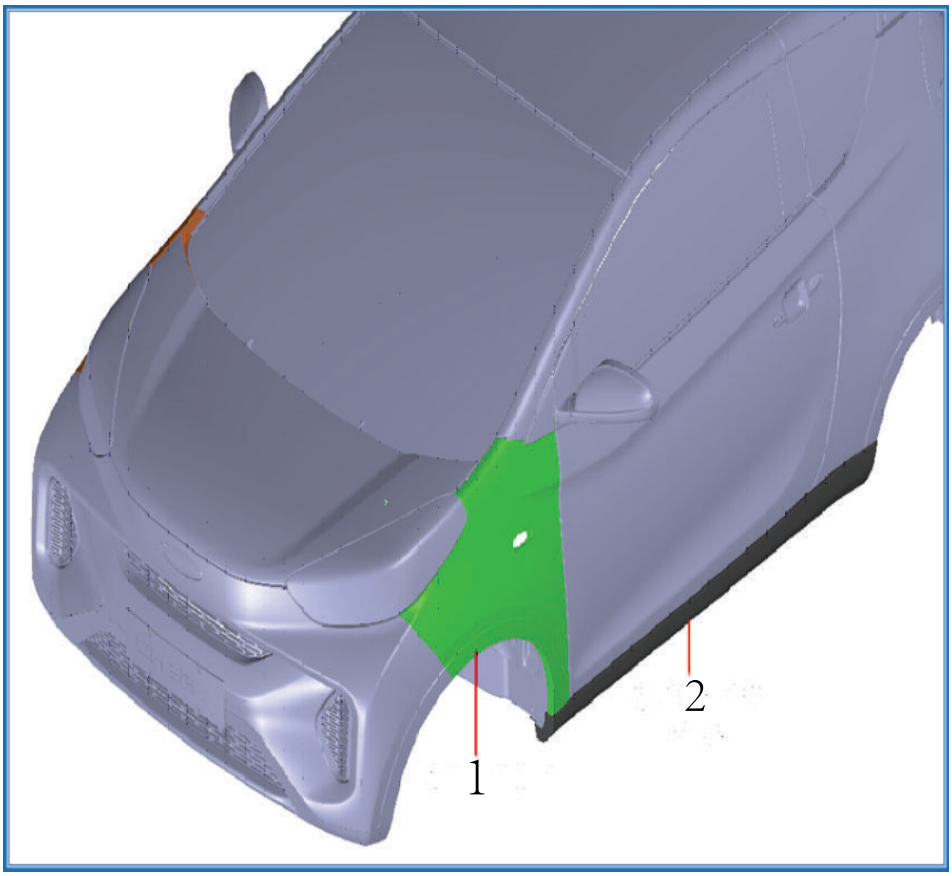
Quarter Upper Ornament System



ET0009001

1	Front Left Quarter Outer Triangular Block Assembly	2	Left A-pillar Outer Trim Panel Assembly
3	Left Top Side Beam Outer Panel Front Trim Panel Assembly	4	Rear Left Pillar Outer Trim Panel Assembly
5	Left Quarter Outer Panel Assembly	6	Left Top Side Beam Outer Panel Rear Trim Panel Assembly
7	Rear Left Quarter Ornament Assembly	8	Rear Left Quarter Combination Light Ornament Assembly

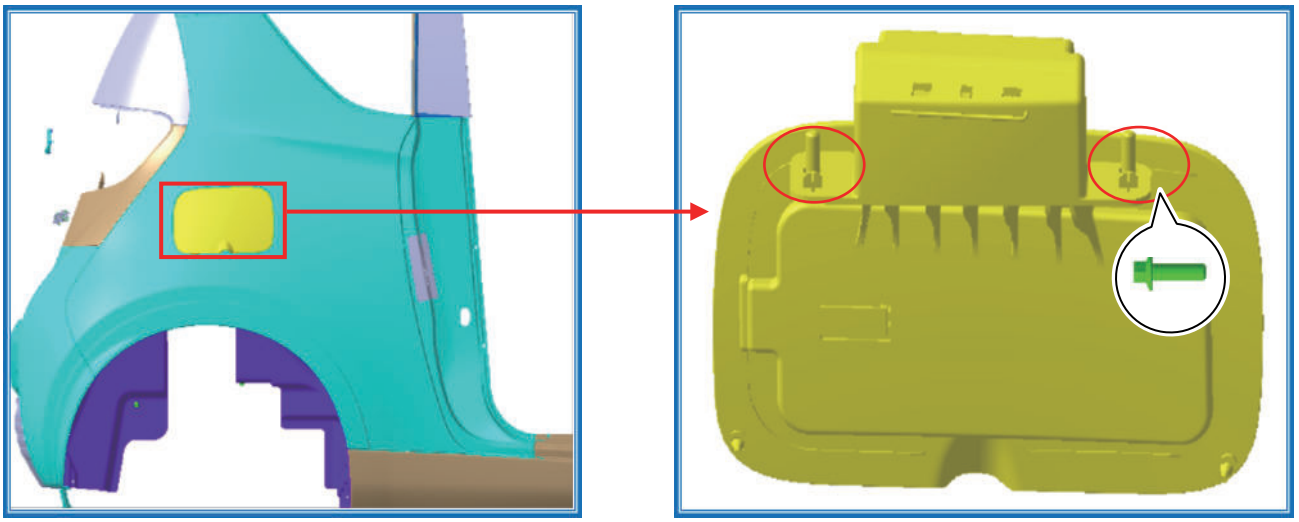
Quarter Lower Ornament System



ET0019001

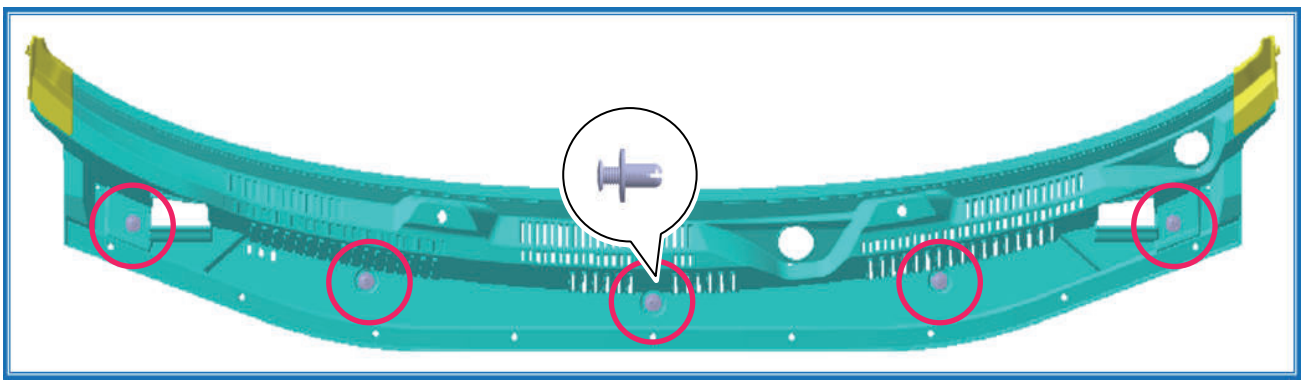
1	Left Wing Assembly	2	Left Doorsill Trim Panel Assembly

Charging Port Cover System



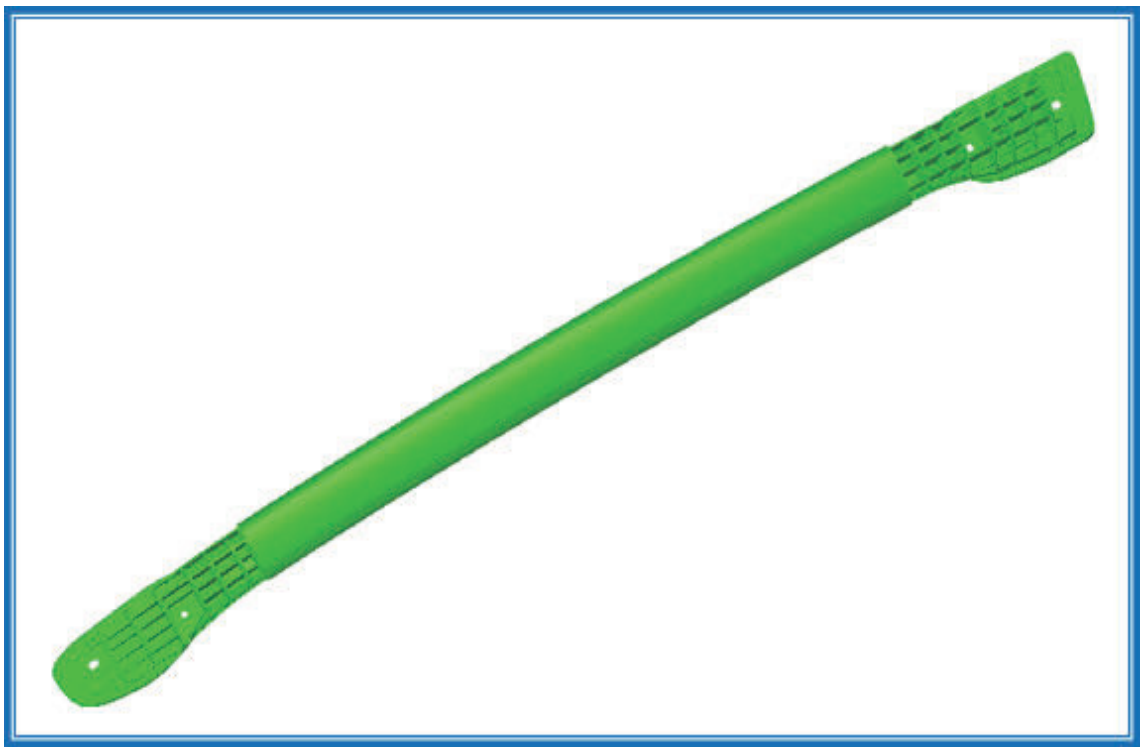
ET0024002

Front Windshield Lower Trim Panel System



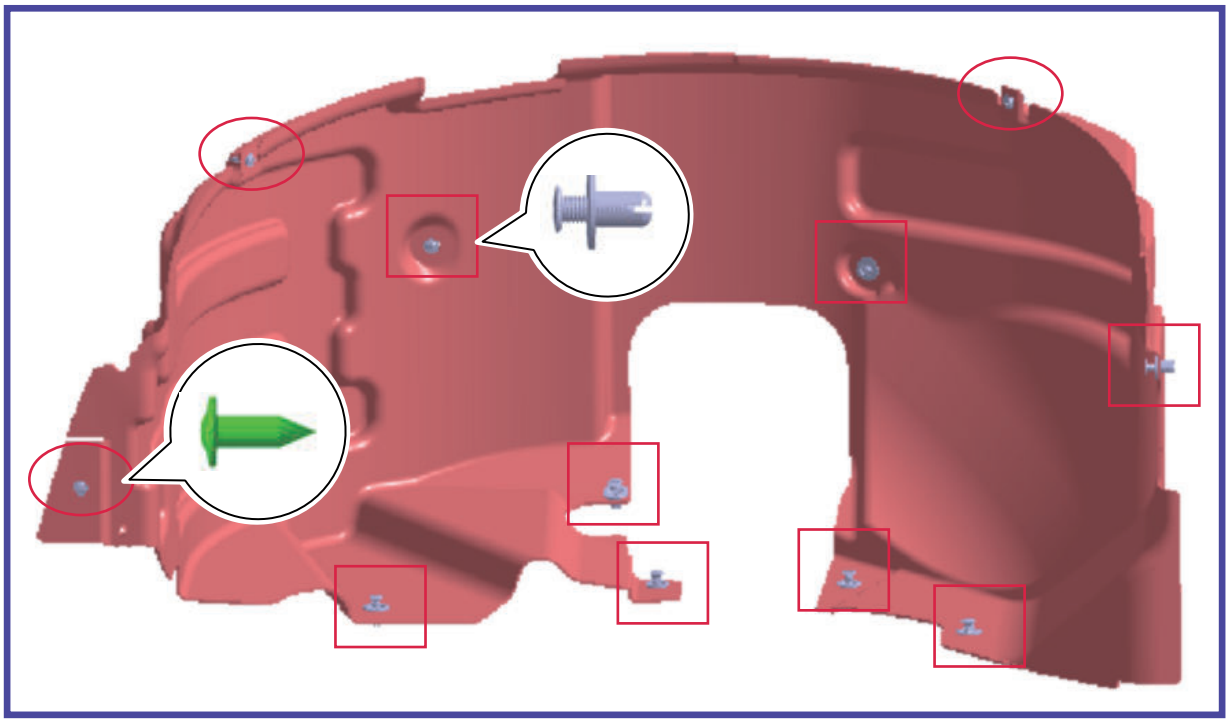
ET0011001

Rack System



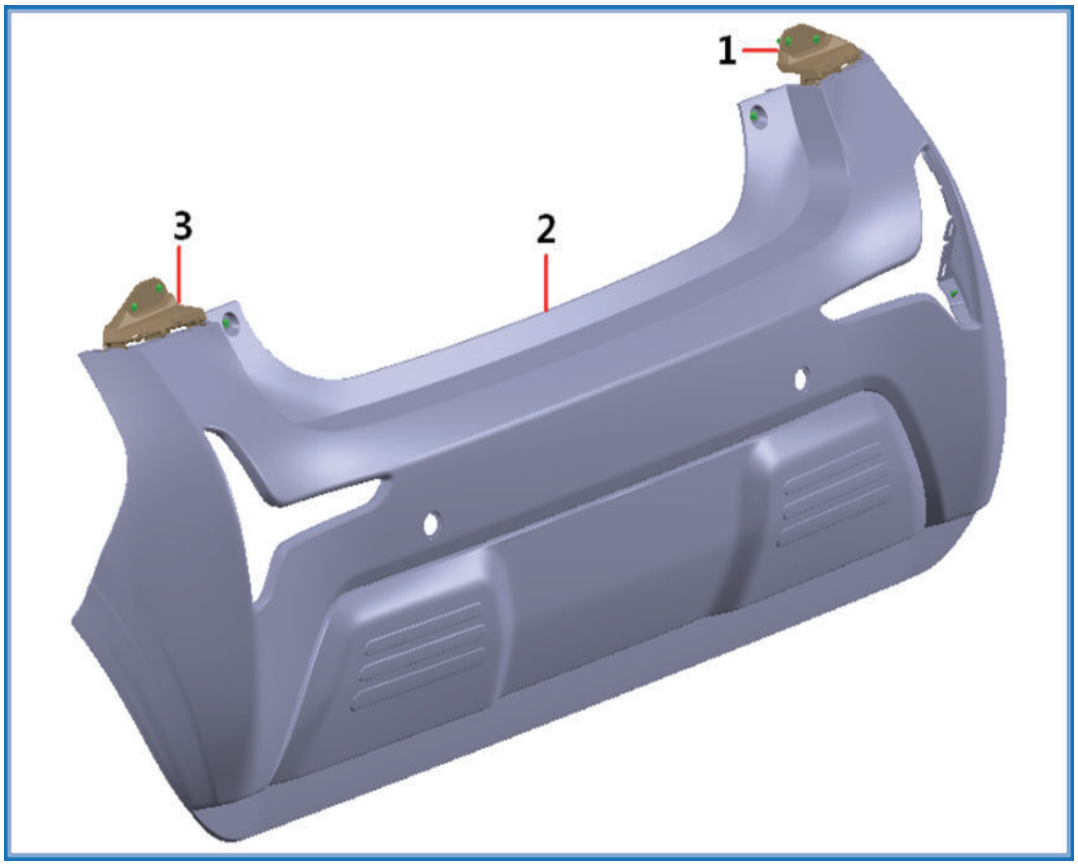
ET0026001

Wheel House Protector System



ET0023001

Rear Bumper System



ET0005001

1	Rear Bumper Right Mounting Bracket	2	Rear Bumper Body Assembly
3	Rear Bumper Left Mounting Bracket		

On-vehicle Service

Tools

Tools: Flat tip screwdriver, cross screwdriver, M6 socket wrench, 8# socket wrench, ratchet, connecting rod, torque wrench, 10# socket wrench.
Part: Non-reusable clip

Specifications

Part Name	Torque (N·m)
Cross-Recessed Button Head Self-Tapping Screw	2 ± 0.5
Cross-Recessed Pan Head Screw	2 ± 0.5
Hexagon Flange Bolt	5 ± 1
Cross-Recessed Button Head Self-Tapping Screw	2 ± 0.5
Fixing Bolt between Left Wing and Body	5 ± 1
Charging Port Cover Fixing Bolt	5 ± 1

Mounting Screw of Left Wing and Front Bumper	2 ± 0.5
Cross-Recessed Button Head Self-Tapping Screw	2 ± 0.5
Rear Bumper Bracket Screw	5 ± 1
Mounting Screw of Front Bumper Lower Part and Front Wheel House (Both Sides)	2 ± 0.5
Mounting Screw of Front Bumper (Both Sides) and Front Bumper Mounting Bracket	2 ± 0.5
Front Bumper Lower Mounting Bolt	5 ± 1
Front Bumper Upper Mounting Bolt	5 ± 1
Mounting Screw of Left Wing and Front Bumper Left Mounting Bracket	2 ± 0.5
Front Bumper Left Mounting Bracket Fixing Bolt	5 ± 1
Front Bumper Mounting Bracket (Both Sides) Fixing Bolt	5 ± 1
Front End Bracket Fixing Bolt	23 ± 2

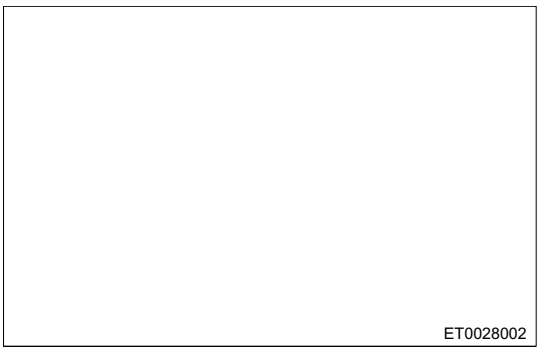
CAC Name Plate (Front Name Plate)

Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of exterior ornament.

1. Using a flat tip screwdriver, pry from the gap between CAC name plate (front name plate) and upper edge of front bumper. A soft material such as foam should be placed under screwdriver to prevent front bumper from being scratched.

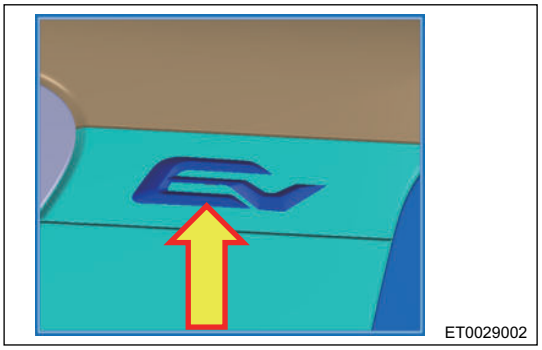


2. Pull outward after prying up a little.

Removal/Installation and Repair of "EV", "NEQ" Mark

1. Remove rear combination light and quarter ornament (refer to “Quarter Upper Ornament System” in this section).

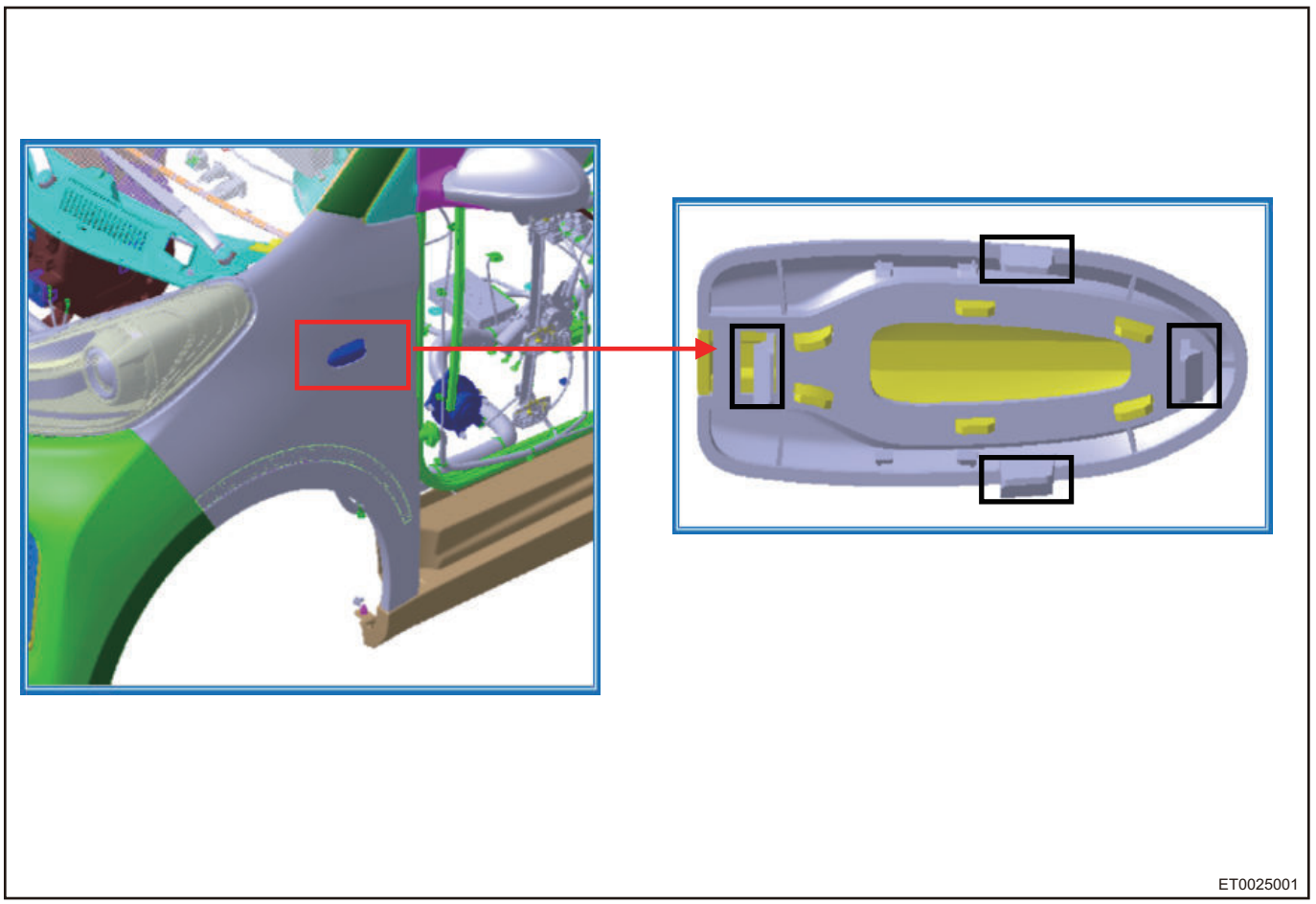
2. Using a flat tip screwdriver, pry from the back of gap between "EV" mark and rear quarter outer panel. A soft material such as foam should be placed under screwdriver to prevent rear quarter outer panel from being scratched.


ET0029002

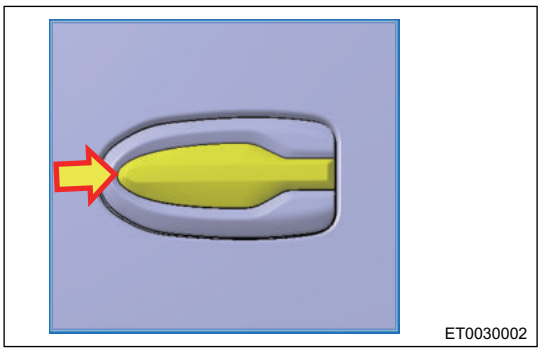
3. After carefully prying up, pull backwards and out from under the quarter window glass.

Removal/Installation and Repair of Wing Ornament

Wing Ornament Mounting Points


ET0025001

1. Using a flat tip screwdriver, pry from the gap between wing ornament and wing shown on the right. A soft material such as foam should be placed under screwdriver to prevent wing from being scratched.
2. Carefully pry up the clip and pull outward.


ET0030002

Installation

1. Installation is in the reverse order of removal.

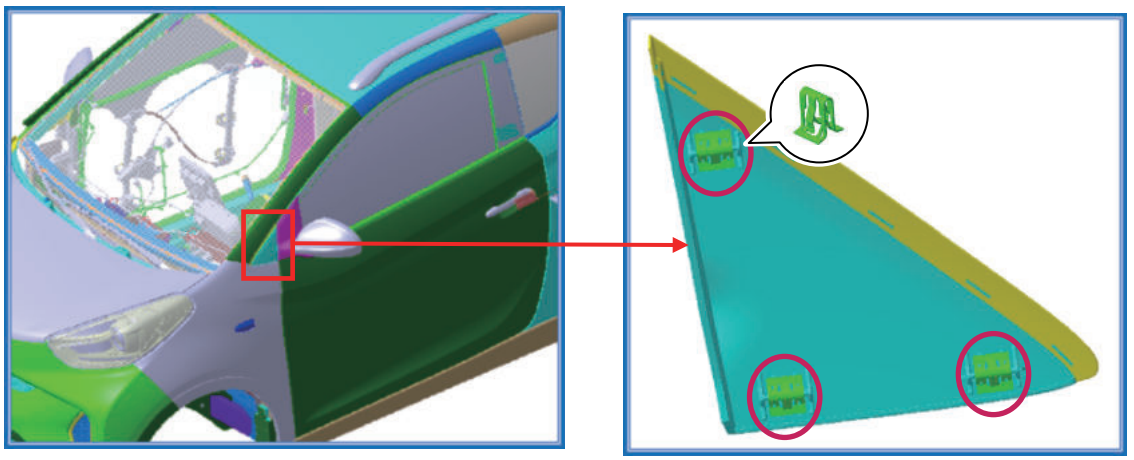
Removal of Front Left Quarter Outer Triangular Block Assembly

Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of exterior ornament.

Composition Diagram of Mounting Points

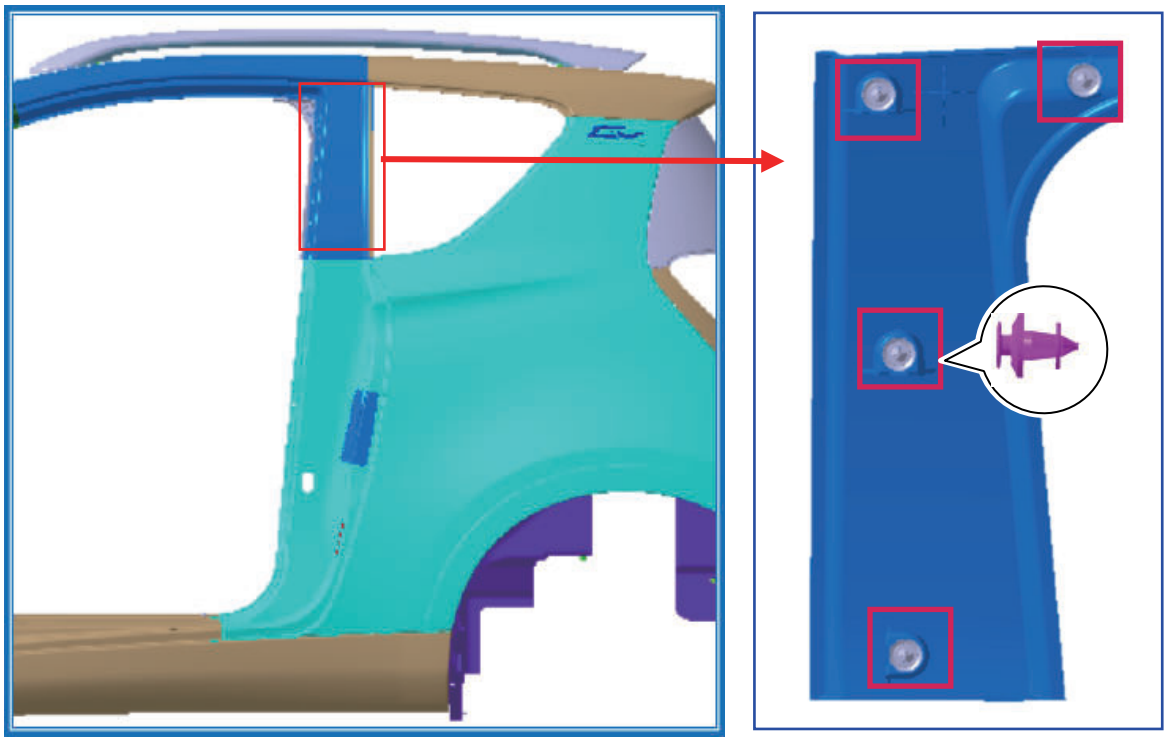


ET0010001

1. Using a flat tip screwdriver, pry from near the three mounting points of front left quarter triangular block in the order of 1-2-3, pry off mounting points from three corners. A soft material such as foam should be placed under screwdriver to prevent wing from being scratched.
2. Pull outward with force after mounting point is pried up.

Removal of Left A-pillar Outer Trim Panel Assembly

Composition Diagram of Mounting Points

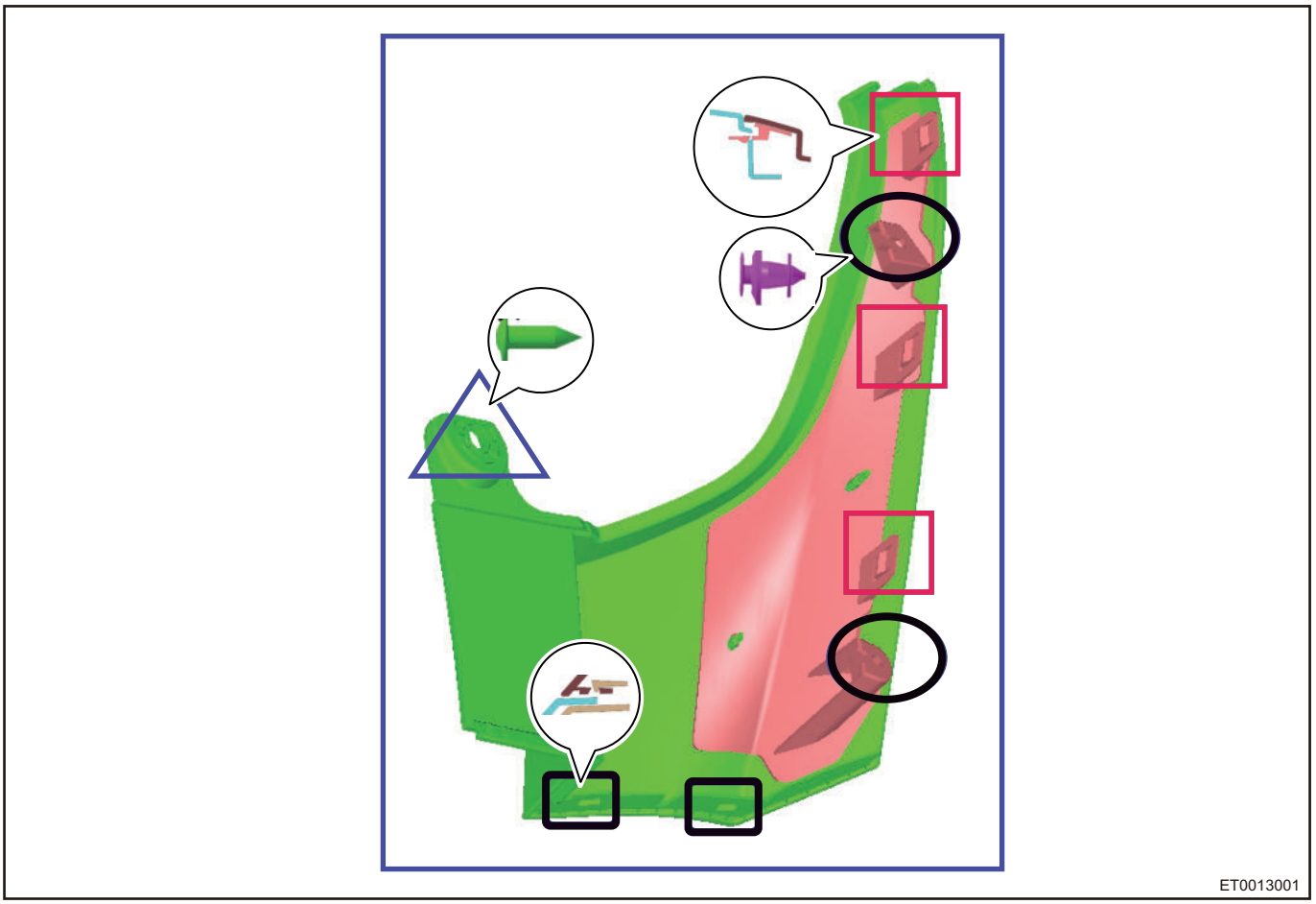


Removal

1. Using a flat tip screwdriver, carefully pry rear left pillar outer panel to remove rear left pillar outer panel.

Removal of Rear Left Quarter Combination Light Ornament

Composition Diagram of Mounting Points

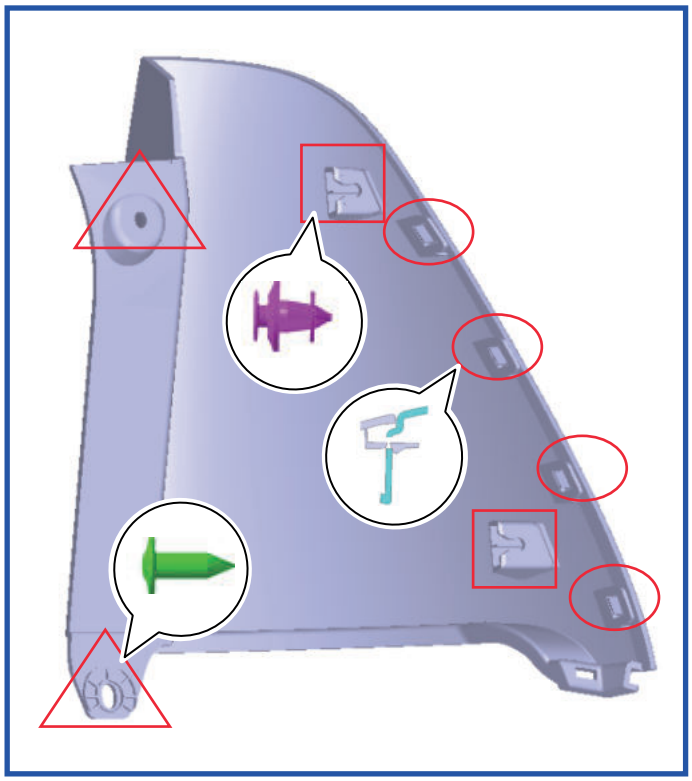


Removal

1. Remove rear bumper body assembly and rear left combination light.
2. Using a flat tip screwdriver, carefully pry off rear left quarter combination light ornament assembly.

Removal of Rear Quarter Ornament

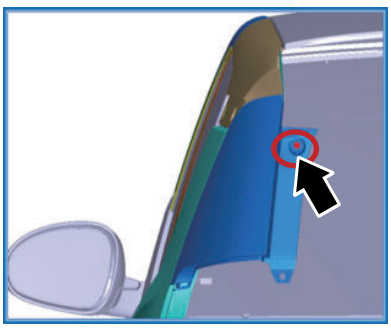
Composition Diagram of Mounting Points



ET0014001

Removal

1. Open back door and remove rear left quarter ornament assembly and rear left combination light.
2. Using a cross screwdriver, remove 1 cross-recessed button head self-tapping screw (arrow).
   Tightening torque: 2 ± 0.5N·m

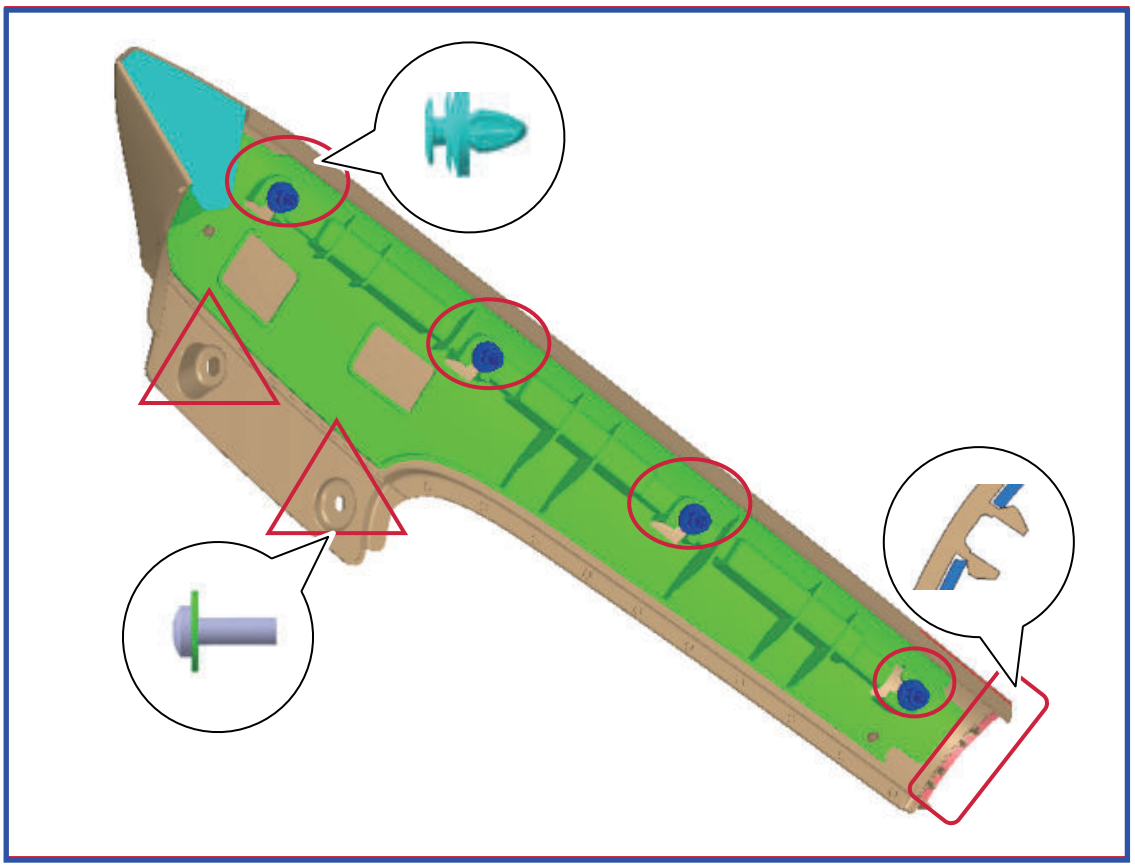


ET0016002

3. Using a flat tip screwdriver, carefully pry off rear left quarter ornament assembly (for clip position, refer to composition diagram of mounting points).

Removal of Left Top Side Beam Outer Panel Rear Trim Panel

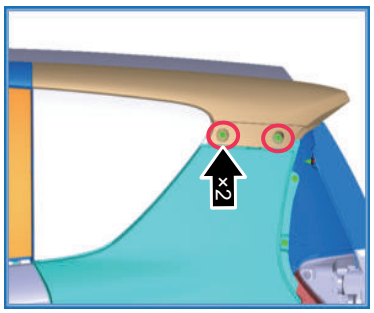
Composition Diagram of Mounting Points



ET0015001

Removal

1. Remove rear left quarter ornament assembly, left/right "EV" mark, rear left pillar outer trim panel assembly.
2. Using a cross screwdriver, remove 2 cross-recessed pan head screws (arrow).
   Tightening torque: 2 ± 0.5N·m

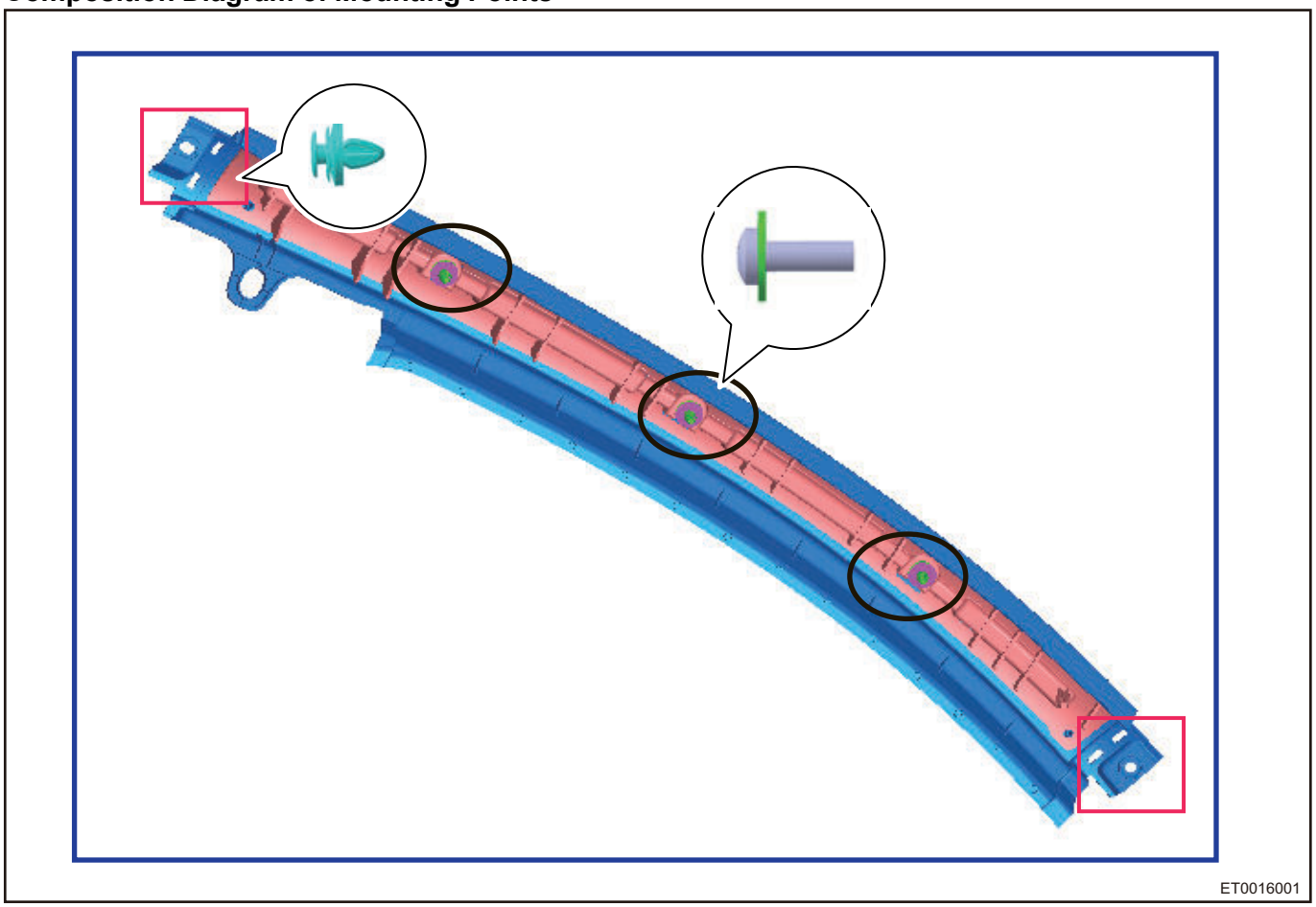


ET0017002

3. Using a flat tip screwdriver, carefully pry off and remove the left top side beam outer panel rear trim panel assembly.

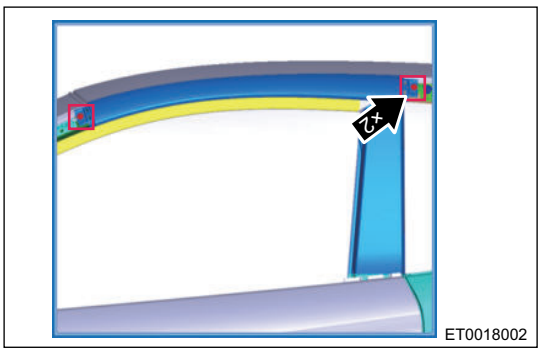
Removal of Top Side Beam Outer Panel Front Trim Panel

Composition Diagram of Mounting Points



Removal

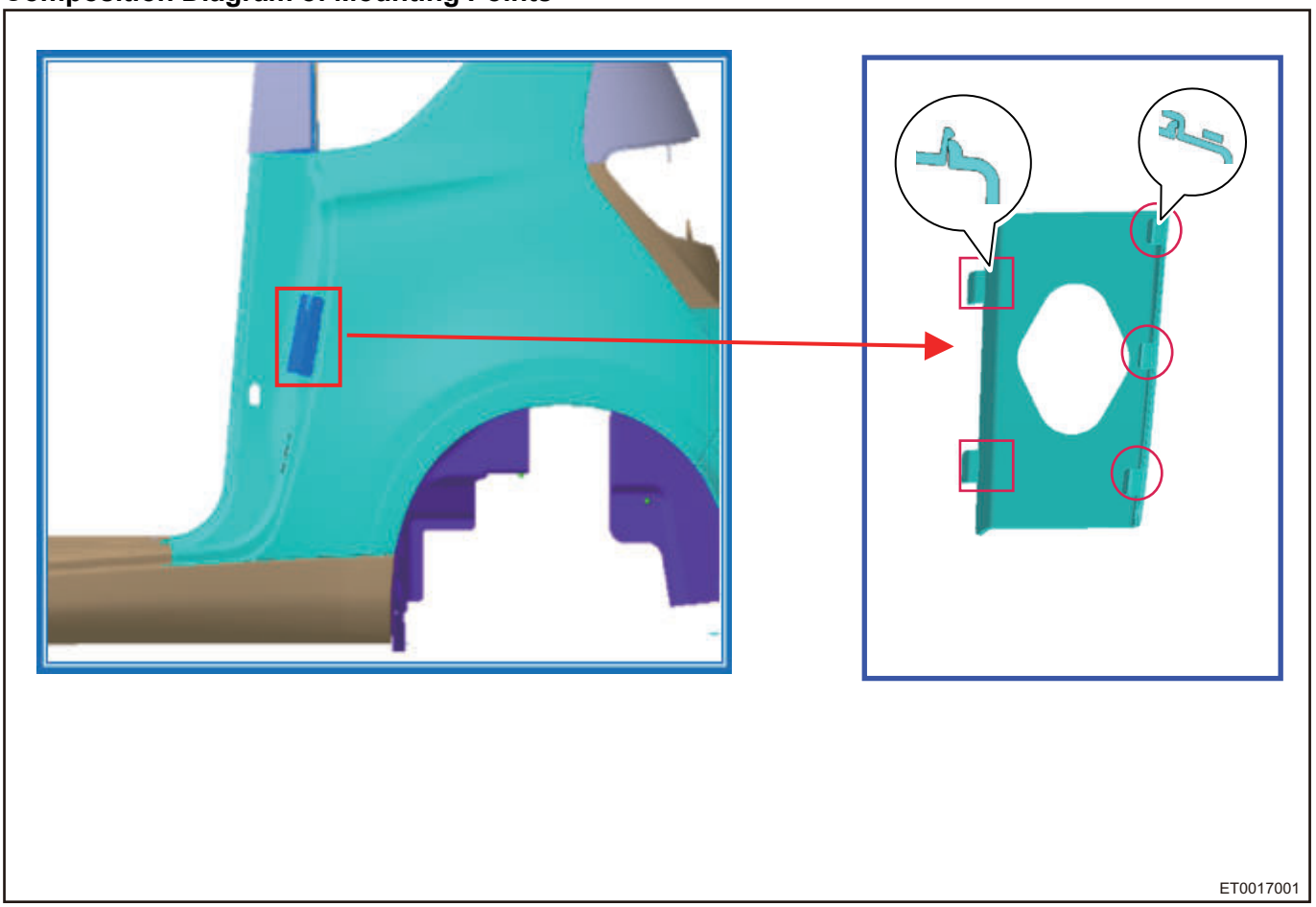
1. Remove left A-pillar outer trim panel assembly, rear left pillar outer panel assembly, left top side beam outer panel rear trim panel assembly
2. Using a cross screwdriver, remove 2 cross-recessed pan head screws (arrow).
   Tightening torque: 2 ± 0.5N·m



3. Using a flat tip screwdriver, carefully pry off and remove the left top side beam outer panel front trim panel assembly.

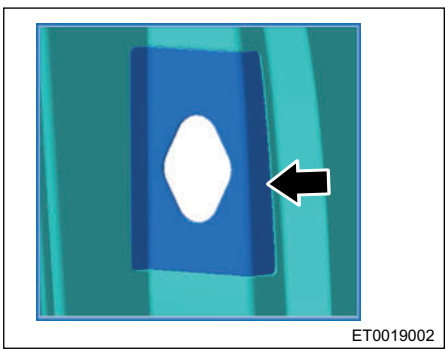
Removal of Door Lock Striker Trim Cover

Composition Diagram of Mounting Points



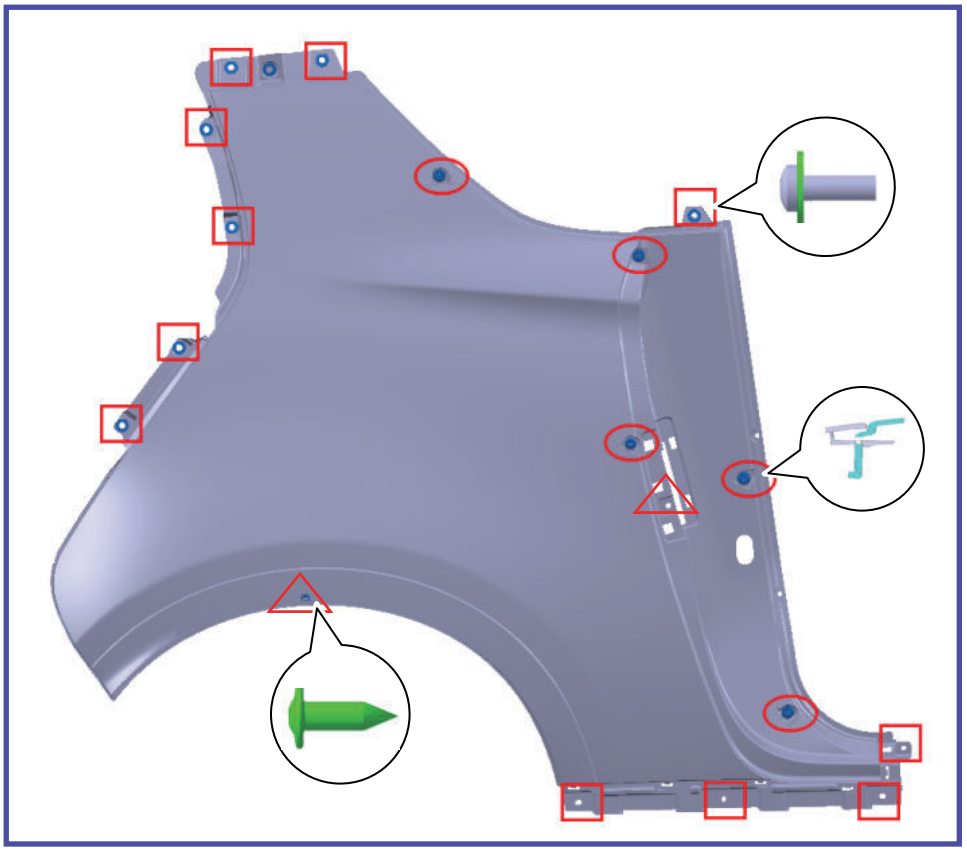
Removal

1. Using a flat tip screwdriver, carefully pry off and remove the left door lock striker trim cover plate.



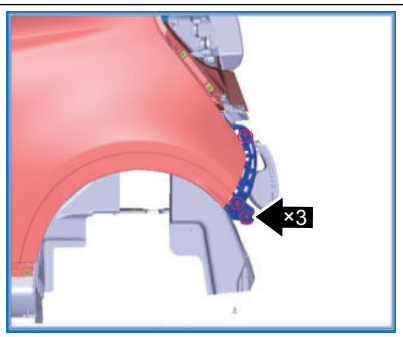
Removal of Left Quarter Outer Trim Panel

Composition Diagram of Mounting Points



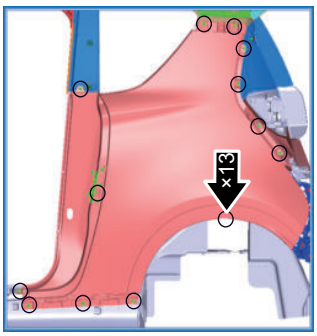
ET0018001

1. Remove left door lock striker trim cover plate, left doorsill trim panel assembly, rear bumper body assembly, rear left quarter combination light ornament assembly, rear left quarter ornament assembly, left "EV" mark, left top side beam outer panel rear trim panel assembly, rear left pillar outer trim panel assembly.
2. Remove 3 hexagon flange bolts (arrow) from left quarter bracket.
   Tightening torque: 5 ± 1 N·m



ET0020002

3. Remove 13 outer panel cross-recessed pan head screw big gasket and cross-recessed button head self-tapping screw (arrow) from left quarter.
   Tightening torque: 2 ± 0.5 N·m



ET0021002

Installation

1. For each part of quarter upper ornament, installation is in the reverse order of removal.

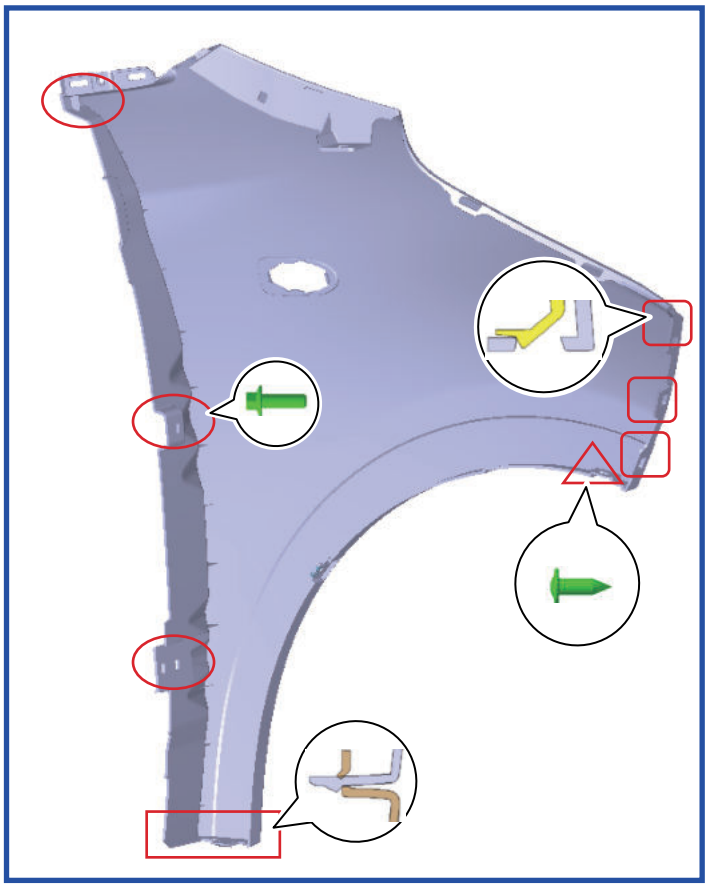
Left Wing Assembly

Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of exterior ornament.

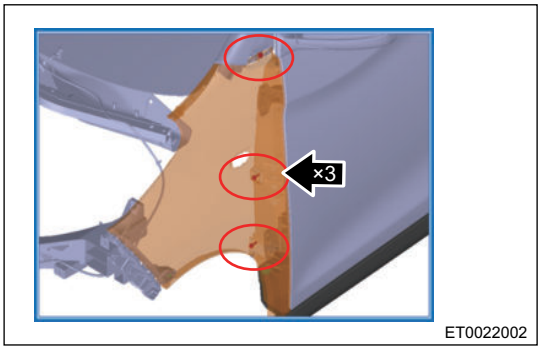
Composition Diagram of Mounting Points



ET0020001

1. Remove the front compartment cover (refer to “Front Compartment Cover and Back Door” in this section).
2. Remove front bumper body assembly and front bumper left mounting bracket bolt (refer to “Front Bumper System” in this section).
3. Remove headlight and turn signal light (refer to “Lighting System” in “Vehicle Electrical”).
4. Remove the front left wheel house (refer to “Wheel House Protector System” in this section).
5. Remove the front left quarter triangular block (refer to “Quarter Upper Ornament System” in this section).
6. Remove the windshield lower trim panel left end cover (refer to “Front Windshield Lower Trim Panel System” in this section).

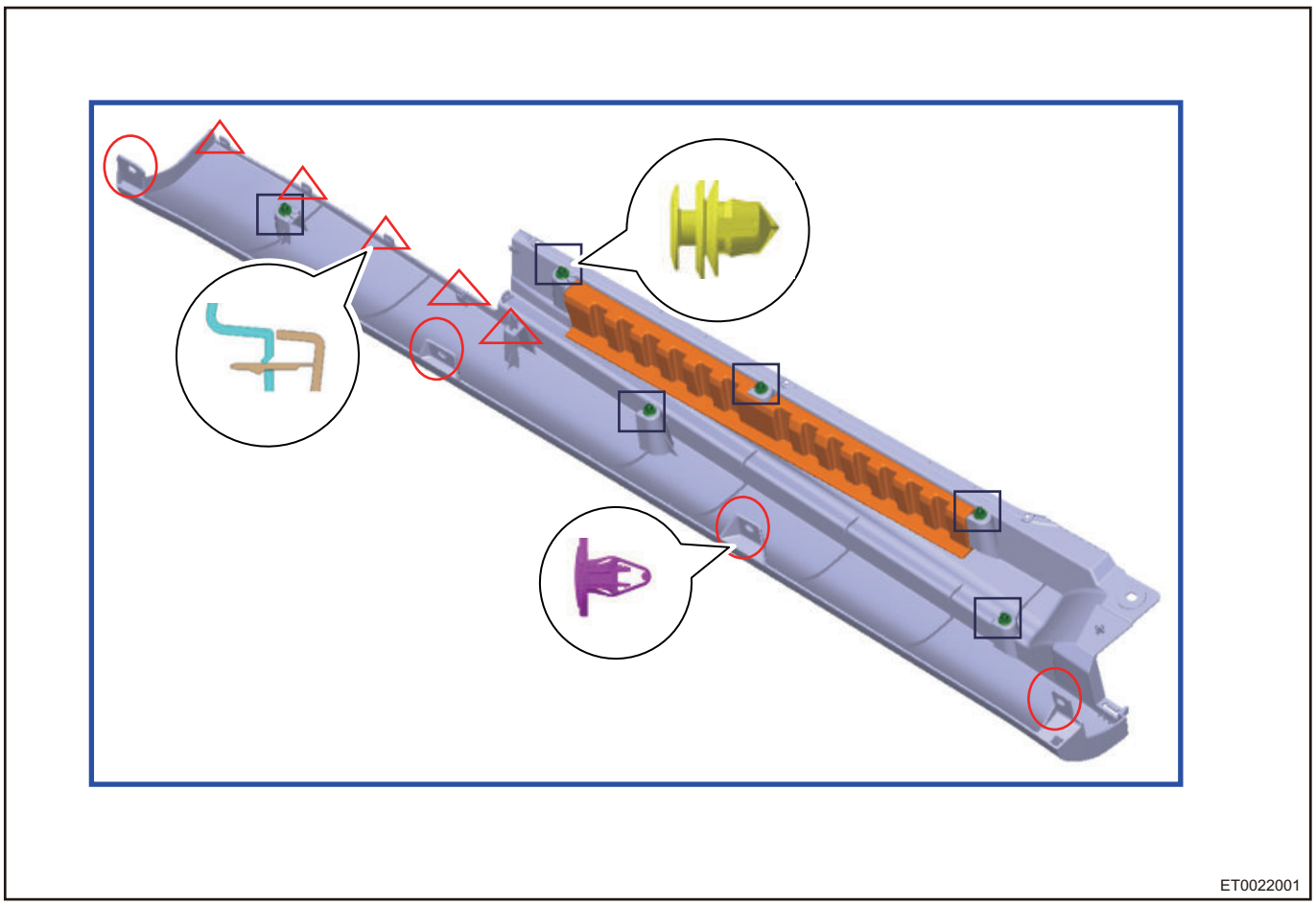
7. Using 8# socket wrench, remove 3 fixing bolts (arrow) between left wing and body.
   Tightening torque: 5 ± 1 N·m



8. Pull out left wing lower end clip with force from left doorsill trim panel, remove it along the front direction of vehicle.

Removal of Left Doorsill Trim Panel Assembly

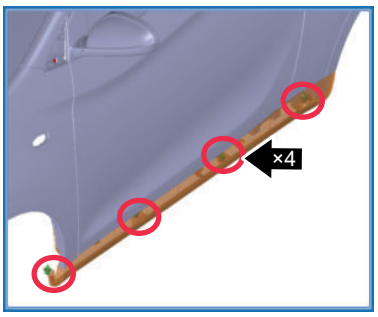
Composition Diagram of Mounting Points



Removal

1. Open left door to a suitable angle or remove door, and remove door opening weatherstrip (refer to “Door Assembly” in this section).

2. Remove 4 mounting snap fasteners (arrow) from left doorsill trim panel.



ET0023002

3. Using a flat tip screwdriver, pry along the mounting points of plastic clip (points marked with black squares in composition diagram of mounting points).
4. Using a screwdriver, pry off left doorsill trim panel rear end clip (points marked with red triangle boxes in composition diagram of mounting points) and then pull it out with force from left quarter outer panel. A soft material such as foam should be placed under screwdriver to prevent left quarter outer panel from being scratched.

Installation

1. Installation is in the reverse order of removal.
2. Pay attention to trim panel and body periphery, the clearance between them should be uniform, safe and reliable.

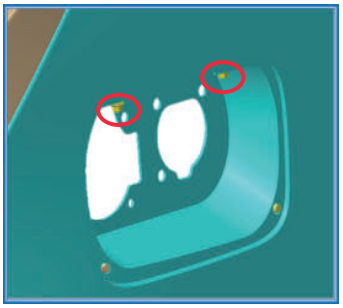
Charging Port Cover

Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of exterior ornament.

1. Using a socket wrench, remove 2 bolts shown on the right. Torque: 5 ± 1 N·m


ET0025002

2. Gently remove the charging port cover assembly.

Installation

1. Installation is in the reverse order of removal.

⚠

- When installing, first locate charging port cover and quarter with 2 positioning pins, and then tighten bolts.

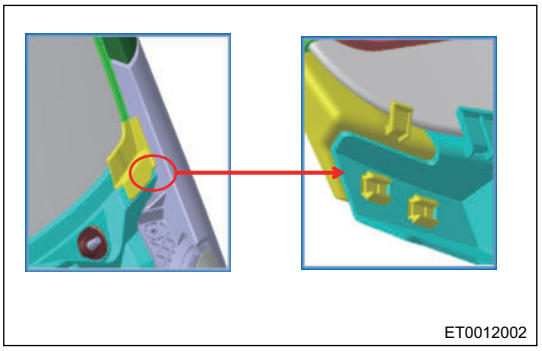
Front Windshield Lower Trim Panel

Removal

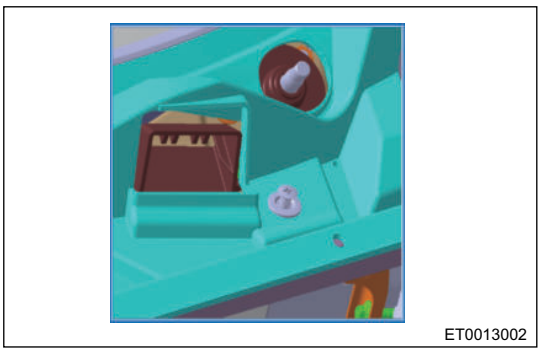
⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of exterior ornament.

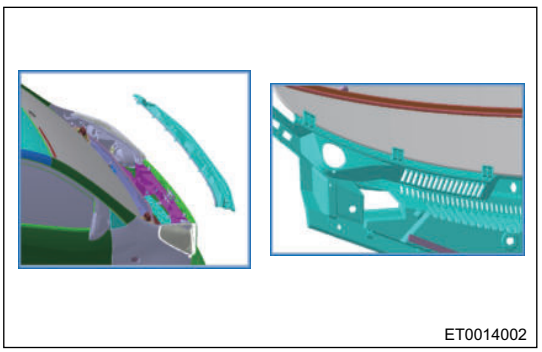
1. Remove front compartment cover assembly and main & sub wiper arm assemblies.
2. Using a flat tip screwdriver, carefully pry off the clip between left/right end cover and windshield lower trim panel.
3. Push end cover forward by hand, remove the clip between end cover and wing.


ET0012002

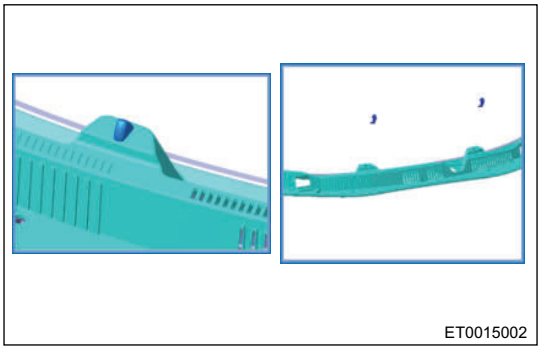
4. Using a cross screwdriver, remove 5 expansion clips between windshield lower trim panel and body.


ET0013002

5. Move windshield lower trim panel toward the front of vehicle, so that fitting clip between windshield lower trim panel and glass can be disengaged.


ET0014002

6. Unplug the clip between washer nozzle and windshield lower trim panel, and Unplug the clip between washer pipe and windshield lower trim panel, then remove the windshield lower trim panel.



Installation

1. Installation is in the reverse order of removal.

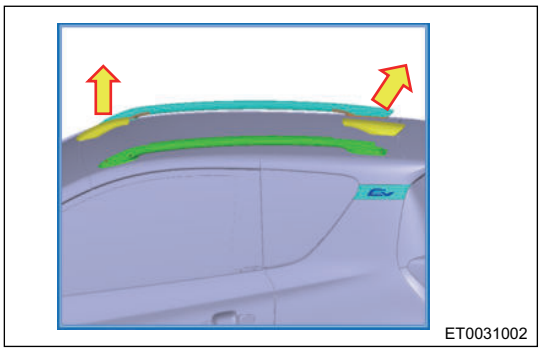
Rack

Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of exterior ornament.

1. Pull out left rack front end cover assembly upward with force, and pull out rear end cover assembly diagonally with force.



2. Using a heater, heat glass glue until the adhesive part of rack comes off the roof glass, then remove left rack.

Installation

1. Installation is in the reverse order of removal.

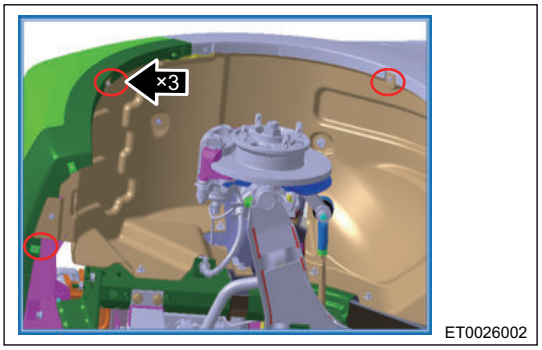
Front Wheel House Protector

Removal

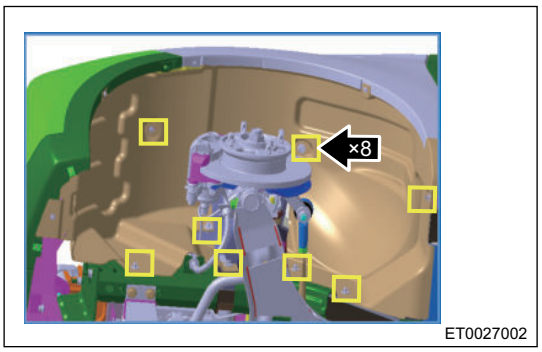
⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of exterior ornament.
- Appropriate force should be applied, and never operate roughly.

1. Remove the front left wheel.
2. Using a cross screwdriver, remove mounting screws from left wing and front bumper.
   Tightening torque: 2 ± 0.5N·m

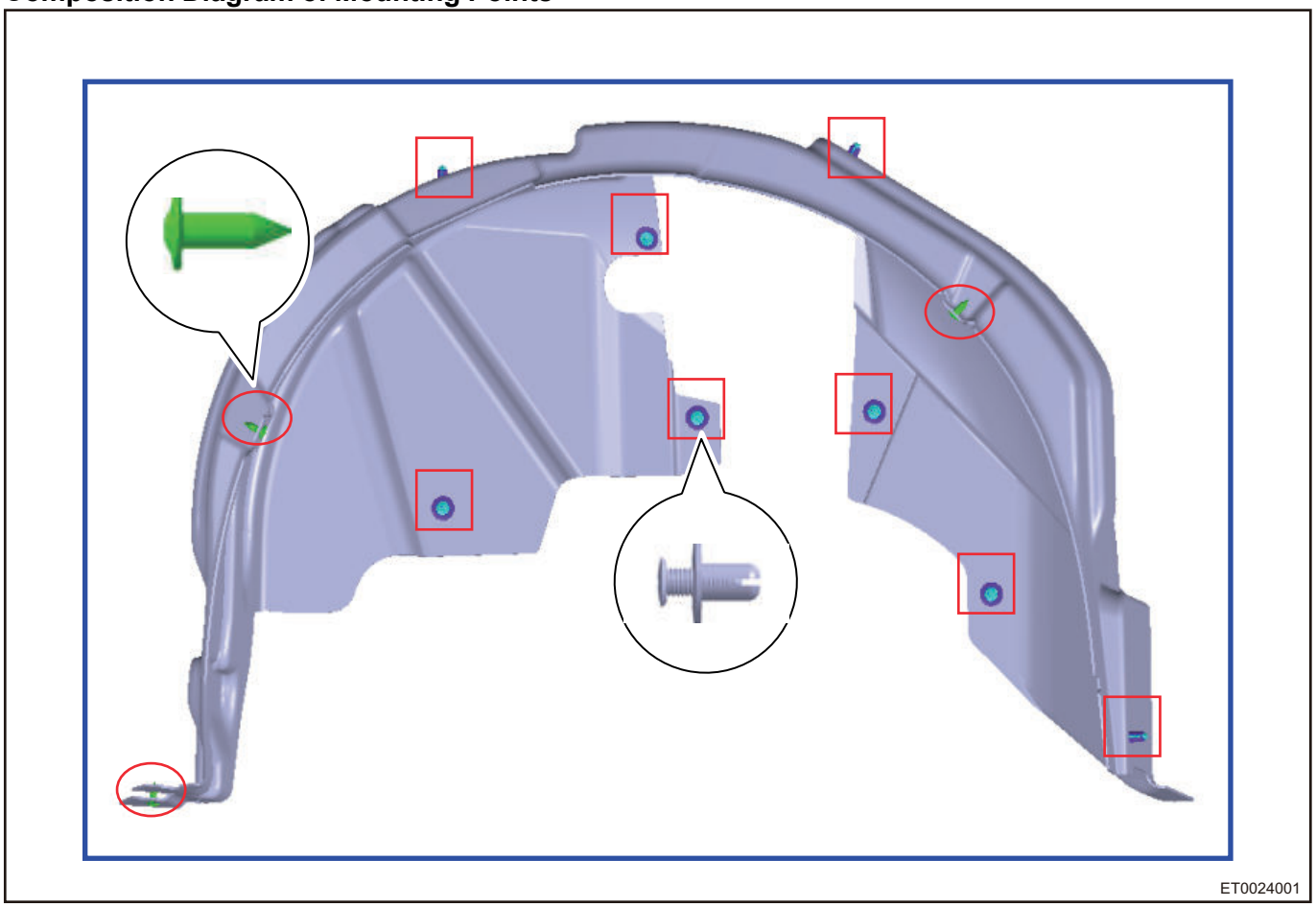


3. Using a cross screwdriver, remove 8 expansion clips (- arrow) from body, and remove front left wheel house protector.



Rear Wheel House Protector

Composition Diagram of Mounting Points



1. Remove the rear left wheel.

2. Using a cross screwdriver, remove mounting screws from rear left quarter outer panel and rear bumper (points marked with red circles in composition diagram of mounting points). Tightening torque: 2 ± 0.5 N·m
3. Using a cross screwdriver, remove expansion clips from body and rear bumper (points marked with red squares in composition diagram of mounting points), and remove rear left wheel house protector.

Dual-zone Solar Sensor

Dual-zone solar sensor is installed on instrument panel and used to detect light intensity in the area where the vehicle is located and control the automatic mode of air conditioning.

Installation

1. Installation is in the reverse order of removal.

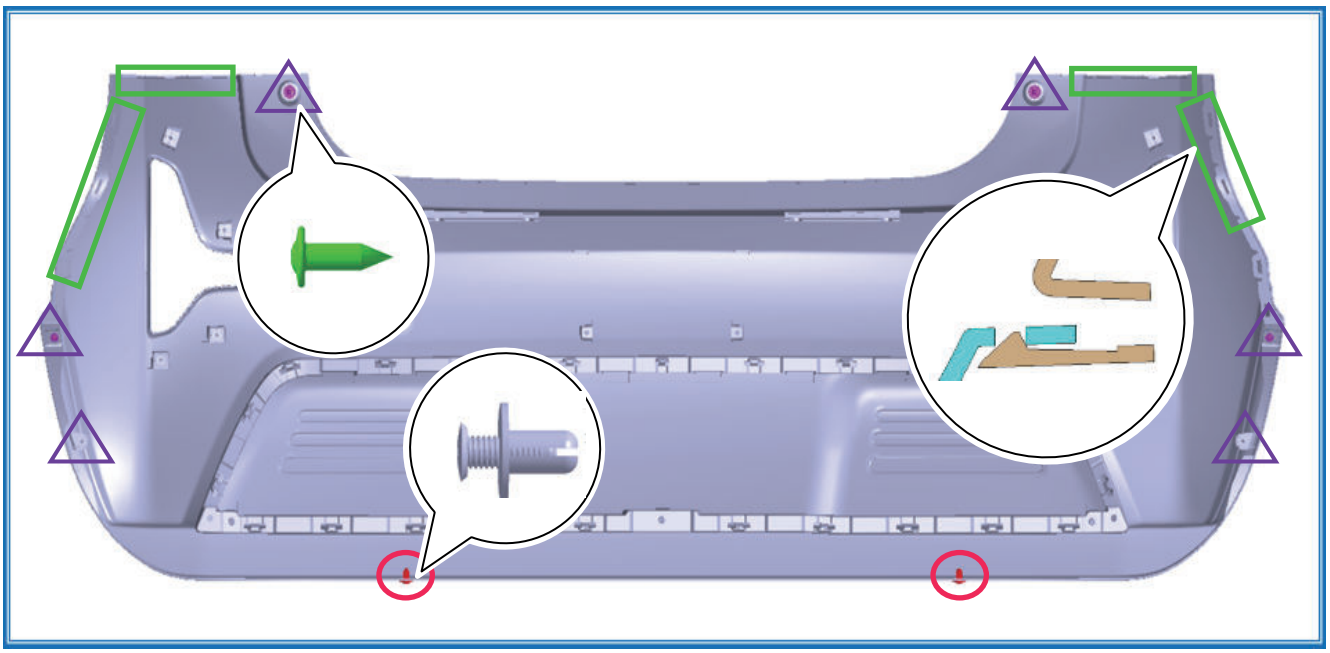
Rear Bumper Body Assembly

Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of exterior ornament.

Composition Diagram of Mounting Points



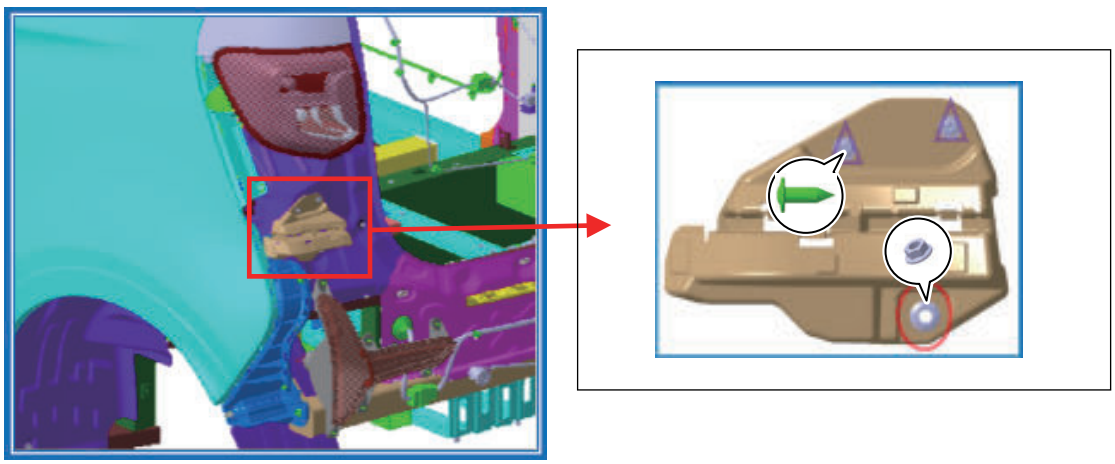
ET0007001

1. Remove rear left/rear right quarter combination light ornament assembly.

2. Remove 6 cross-recessed button head self-tapping screws (tightening torque: 2 ± 0.5 N m) and 2 plastic clips.
3. Remove rear bumper from rear bumper mounting bracket and quarter mounting bracket.
4. Unplug reverse radar wire harness connector and fog light connector respectively.
5. Remove the rear bumper assembly.

Rear Bumper Left/Right Mounting Bracket

Composition Diagram of Mounting Points

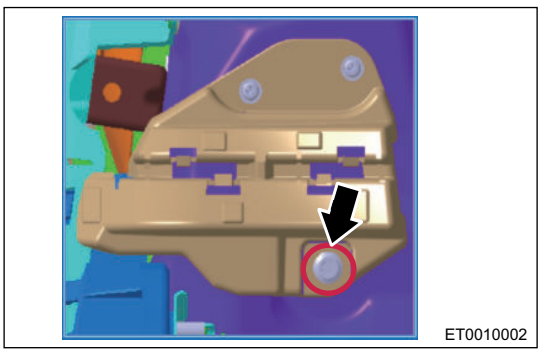


ET0008001

Removal

1. Remove rear left quarter combination light ornament assembly, rear left quarter ornament assembly, rear bumper body assembly.
2. Using M6 socket wrench, remove the lower nut (arrow).

   Tightening torque: 5 ± 1 N•m



ET0010002

3. Using a cross screwdriver, remove 2 upper cross-recessed button head self-tapping screws and rear bumper left/right mounting bracket.

Installation

1. Installation is in the reverse order of removal.

⚠

- When installing, insert positioning pin into body sheet metal hole, adjust position, and then assemble.

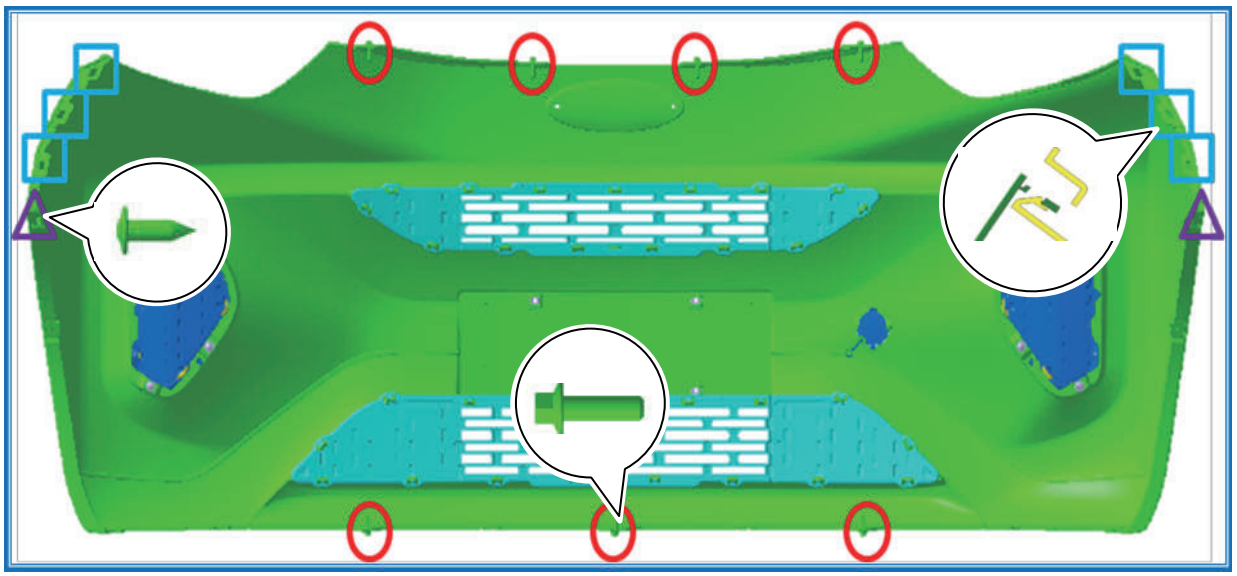
Front Bumper Body Assembly

Removal

⚠

- Try to avoid scratching the bumper finish during removal and installation.
- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of exterior ornament.
- Appropriate force should be applied, and never operate roughly.

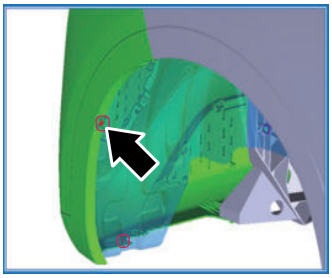
Composition Diagram of Mounting Points



ET0001001

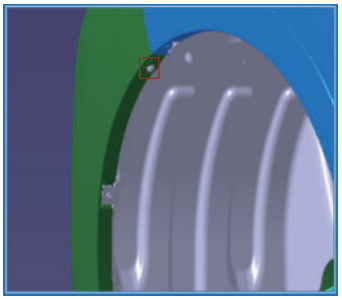
1. Remove the front compartment cover (refer to “Front Compartment Cover and Back Door” in this section).
2. Using a cross screwdriver, remove mounting screws (-arrow) from front bumper lower part and front wheel house (both sides).

   Tightening torque: 2 ± 0.5 N·m



ET0002002

3. Using a cross screwdriver, remove mounting screw from front bumper (both sides) and front bumper mounting bracket.



ET0003002

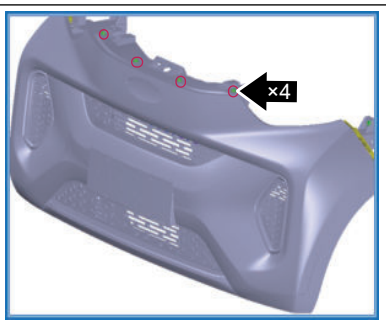
4. Using 8# socket wrench, remove 3 mounting bolts (arrow) from lower part of front bumper.

   Tightening torque: 5 ± 1 N·m

ET0004002

5. Using 8# socket wrench, remove 4 mounting bolts (arrow) from upper part of front bumper.

   Tightening torque: 5 ± 1 N·m



ET0005002

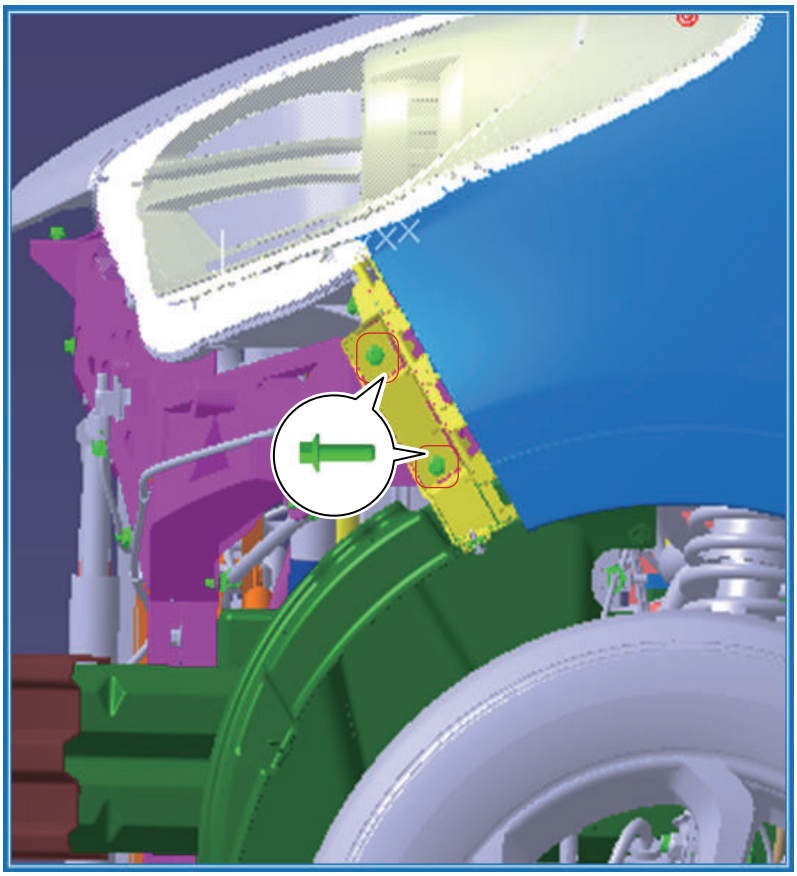
6. Pull out left/right side of front bumper from front bumper mounting bracket clips.
7. Carefully pulling front bumper until front fog light wire harness is visible, remove front fog light wire harness (this step is only available for high configuration models).
8. Remove the bumper.

Installation

1. Installation is in the reverse order of removal.

Front Bumper Left/Right Mounting Bracket

Composition Diagram of Mounting Points

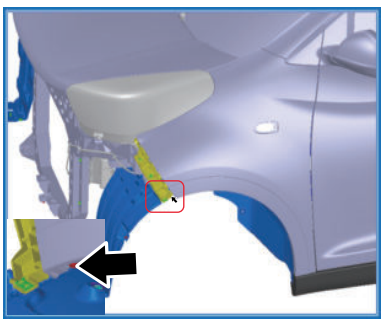


ET0006001

Removal

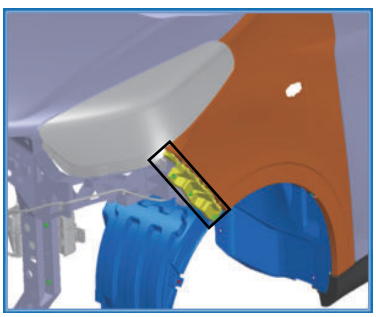
1. Remove the front bumper assembly.
2. Remove the headlight (refer to “Lighting System” in “Vehicle Electrical”).
3. Using a cross screwdriver, remove mounting screw (-arrow) from left wing and front bumper left mounting bracket.

   Tightening torque: 2 ± 0.5N·m



ET0007002

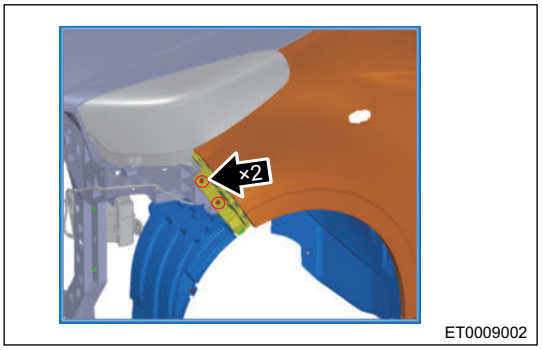
4. Pull out left wing flange from front bumper left mounting bracket clips.



ET0008002

5. Using 8# socket wrench, remove 2 fixing bolts (arrow) from front bumper left mounting bracket, and remove mounting bracket.

   Tightening torque: 5 ± 1 N·m



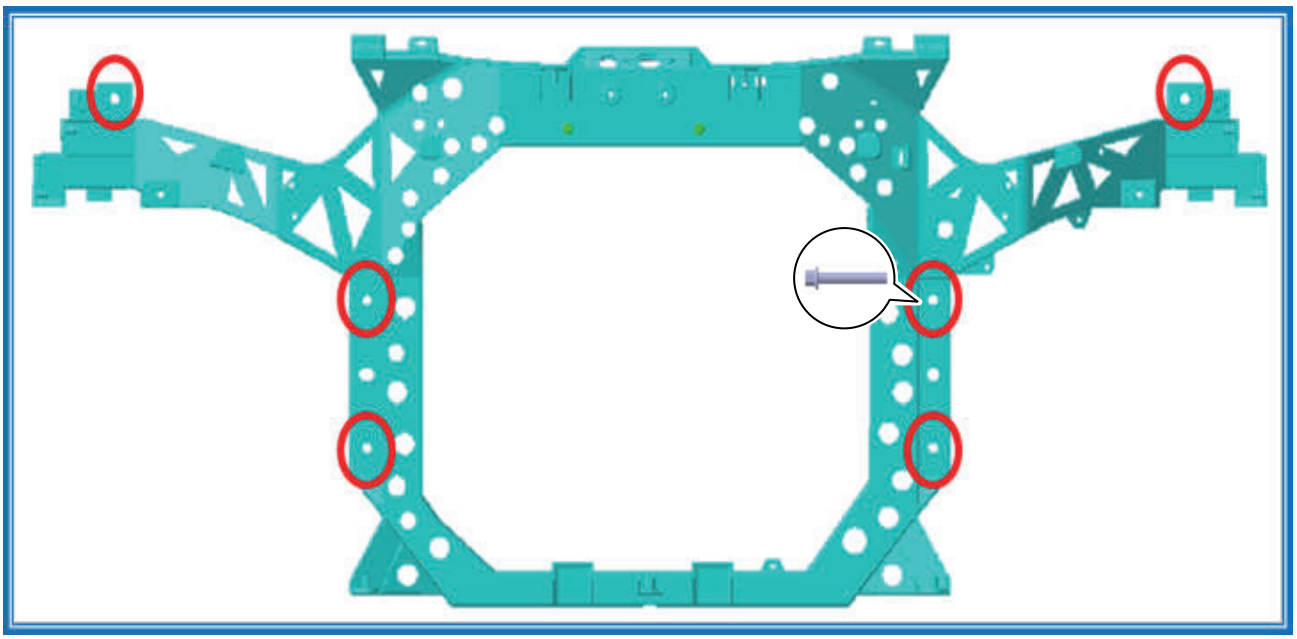
6. The front right bumper mounting bracket is completely symmetrical with the left side, removal produces for left and right are same.

Installation

1. Installation is in the reverse order of removal.

Removal of Front Bumper Front End Bracket

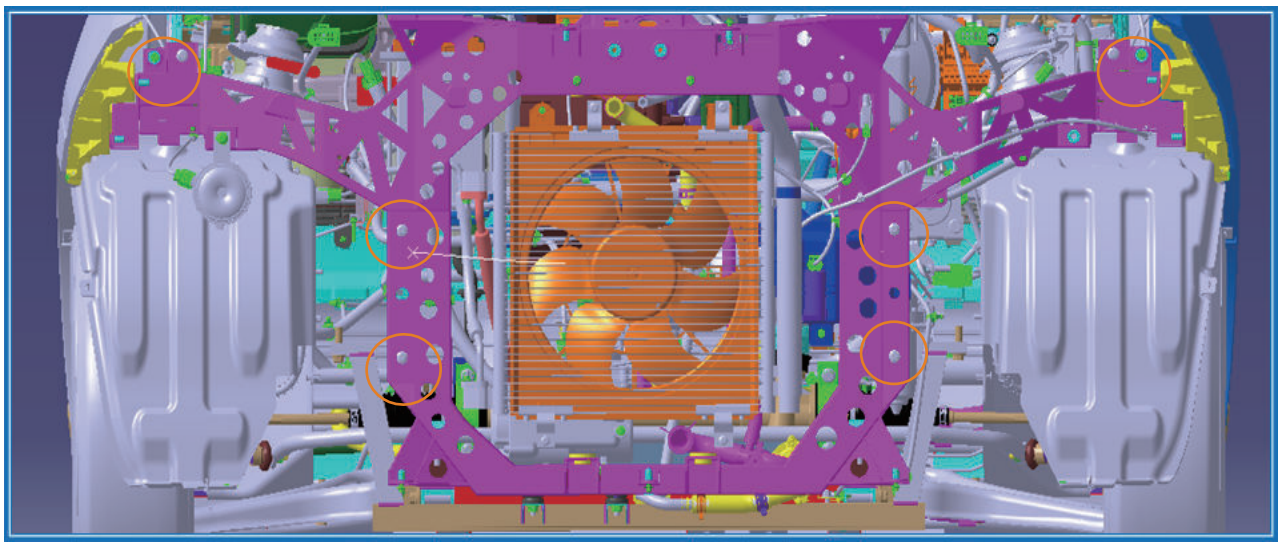
Composition Diagram of Mounting Points



Removal

1. Remove front compartment cover, lock cable (refer to “Front Compartment Cover and Back Door” section) and front bumper.
2. Remove the headlight (refer to “Lighting System” in “Vehicle Electrical”).
3. Remove the front bumper crossmember assembly.

4. Remove the front compartment wire harness (refer to “Vehicle Electrical” section).
5. Remove the washer pipe (refer to “Wiper” section in “Vehicle Electrical”).
6. Remove expansion tank pipeline and radiator connecting pipeline (refer to “Cooling System Device” section in “Chassis”).
7. Remove the condenser connecting pipeline (refer to “Electric A/C” section in “Vehicle Electrical”).
8. Using a cross screwdriver, remove expansion clip from front wheel house.
9. Using 8# socket wrench, remove fixing bolt from front bumper mounting bracket (both sides).
   Tightening torque: 5 ± 1 N·m
10. Make sure that front end bracket has no other connecting parts except its own installation point, hold front end bracket, use 10# socket wrench to loosen 6 fixing bolts from front end bracket in turn (- positions are as shown in the illustration), remove front end bracket.
    Tightening torque: 23 ± 2 N·m



ET0002001

Installation

1. Installation is in the reverse order of removal.

INTERIOR

On-vehicle Service

Tools

Cross screwdriver, flat tip screwdriver, 8# socket wrench, torque wrench, socket , wrench

Specifications

Torque Specifications

Part Name	Torque (N·m)
Luggage Compartment Doorsill Lower Protector Self-tapping Screw	1.5 ± 0.5
Left Quarter Lower Protector Self-tapping Screw	1.5 ± 0.5
Front Left Sun Visor Holder Screw	1.5 ± 0.5
Sun Visor Holder	1.5 ± 0.5
Sun Sunshade Bolt	10 ± 1

Removal and Installation of A-pillar Protector

Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of interior ornament.

1. Using a flat tip screwdriver, remove A-pillar protector, and unplug speaker connector (arrow) because speakers of the vehicle are installed on A-pillar.

IR0001002

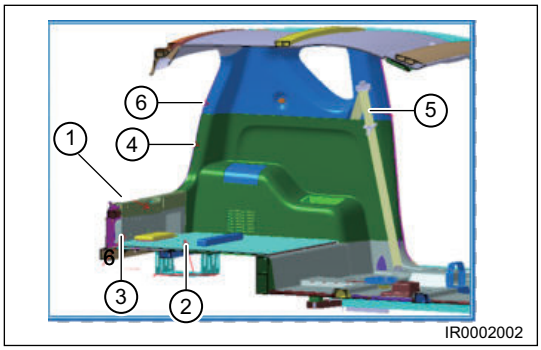
2. Remove the A-pillar protector.

Installation

1. Ensure uniform, safe and reliable fit clearance with the periphery.
2. Installation is in the reverse order of removal.

Removal/Installation of Quarter Protector (Take Left Side as An Example)

Removal



1. Using a flat tip screwdriver, remove the luggage compartment doorsill upper protector assembly.
2. Remove the luggage compartment carpet.
3. Using a flat tip screwdriver, remove self-tapping screw from luggage compartment doorsill lower protector, then using a flat tip screwdriver, remove luggage compartment doorsill lower protector.

   Tightening torque: 1.5 ± 0.5 N·m
4. Using a cross screwdriver, remove cross-recessed button head self-tapping screw between left quarter lower protector and body.

   Tightening torque: 1.5 ± 0.5 N·m
5. Using a flat tip screwdriver, remove the left quarter lower protector assembly.
6. Remove the seat belt device (refer to “Seat Belt System” in this section).
7. Using a cross screwdriver, remove cross-recessed button head self-tapping screw between left quarter upper protector and body.

   Tightening torque: 1.5 ± 0.5 N·m
8. Using a flat tip screwdriver, remove quarter upper protector plug, plastic clip and left quarter upper protector assembly.

Installation

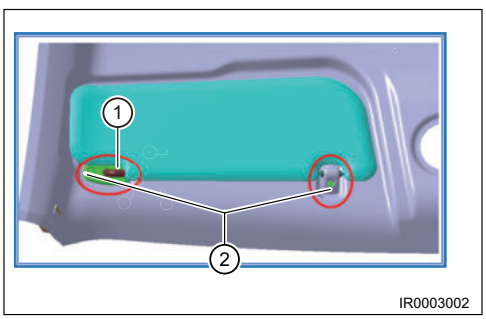
1. Ensure uniform, safe and reliable fit clearance with the periphery.
2. Installation is in the reverse order of removal.

Removal/Installation of Roof and Accessory System

Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of interior ornament.



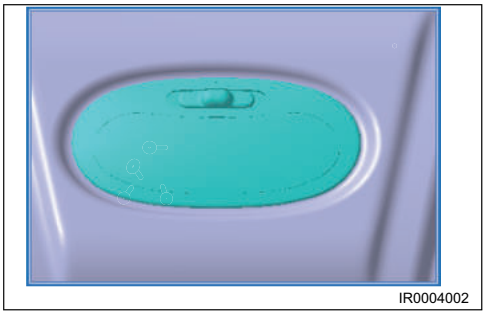
1. Using a cross screwdriver, loose 2 screws from front left sun visor holder.

   Tightening torque: 1.5 ± 0.5 N·m
2. Using a cross screwdriver, remove the other sun visor holder.

   Tightening torque: 1.5 ± 0.5 N·m
3. Remove front left sun visor. Use same removal procedures for front right sun visor.

Removal of Front Dome Light

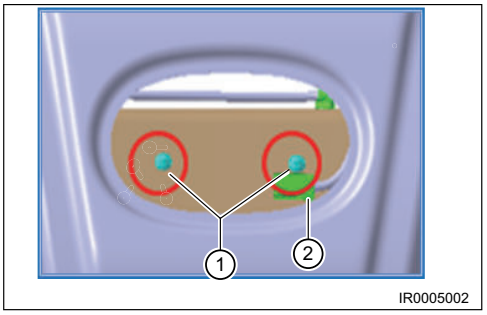
1. Using a flat tip screwdriver, pry off the front dome light cover.


IR0004002

⚠

- Do not scratch the surface of ornaments.

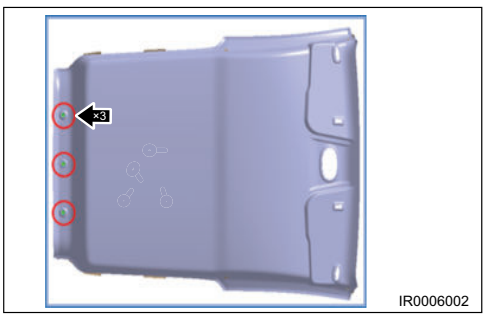
2. Remove fixing bolts (arrow) from front dome light, unplug dome light connector and remove dome light assembly.



IR0005002

Removal of Roof Assembly

1. Remove front left/right sun visor.
2. Remove the front dome light.
3. Remove weatherstrip and pillar protector (refer to “Pillar Protector System” in this section).
4. Using a flat tip screwdriver, remove 3 plastic clips (arrow) and roof.



IR0006002

Installation

1. Installation is in the reverse order of removal.
2. Ensure uniform, safe and reliable fit clearance with the periphery.

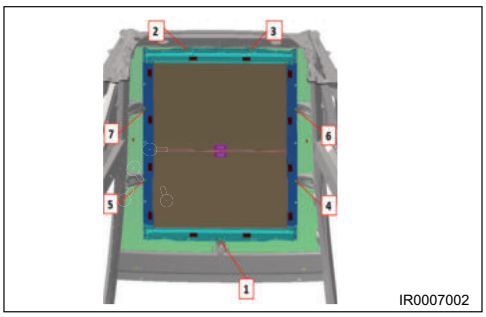
Removal/Installation of Sliding Roof Sunshade System

Removal

⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch sunshade surface during removal and installation of sunshade.
- Sliding roof sunshade is large in size and requires two people to cooperate to avoid deformation.

1. Firstly, loose mounting bolts 4, 5, 6 and 7 shown on the right with 8# socket wrench.
2. And then loose bolts 3, 2 in turn.
3. One person holds the rear side, and the other looses front 1 bolt and remove it from back door.



Installation

1. Two people work together to lift front and rear of the sunshade, align sliding roof sunshade with the hole, and pre-tighten bolts 1 and 2.
2. Then pre-tighten bolt 3.
3. Pre-tighten bolts 4, 5, 6, and 7, then tighten them to the specified torque in the above order.
   Tightening torque: 10 ± 1 N·m
4. Make sure a safe and reliable installation.

⚠

- Do not scratch the surface of sunshade.

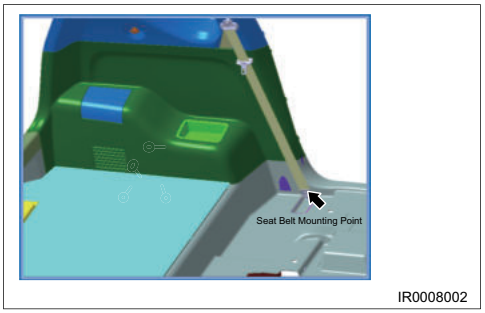
Removal/Installation and Repair of Carpet System

Removal

⚠

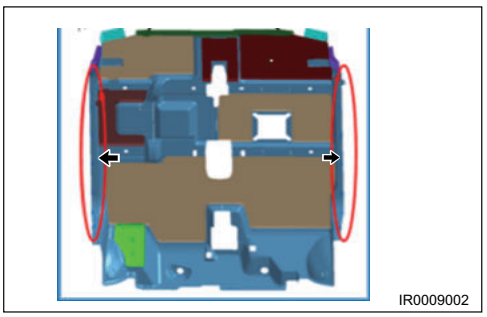
- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal and installation, and never operate roughly.
- Be careful not to scratch ornament surface during removal and installation of interior ornament.

1. Remove the seat (refer to “Seat System” in this section).
2. Remove armrest box and auxiliary fascia console (refer to “Instrument Cluster System” in this section).
3. Remove quarter lower protector (refer to “Quarter Protector” in this section).
4. Remove the buckle and from luggage compartment carpet.
5. Remove the seat belt lower mounting point (arrow).



IR0008002

6. Remove left and right lower mounting points between instrument panel and carpet.
7. Remove fixing point of carpet, doorsill clips (arrow) between side edge and doorsill and carpet.


IR0009002

Installation

1. Ensure uniform, safe and reliable fit clearance with the periphery.
2. Installation is in the reverse order of removal.

VEHICLE TECHNICAL PARAMETERS

VEHICLE TECHNICAL PARAMETERS

Chassis Passing Performance and Braking Performance Parameters

Item	Parameter		
Vehicle Model			SQR7000BEVJ72
Passing Performance	Minimum Ground Clearance (mm)		135
	Ground Clearance between Front and Rear Axial (mm)		137
	Front Axial Lower Ground Clearance (mm)		148
	Rear Axial Lower Ground Clearance (mm)		154
	Minimum Turning Diameter	Right Turning (m)	9.2
		Left Turning (m)	9.2
	Angle of Approach (°)		27
	Angle of Departure (°)		47
	Ramp Angle	Unloaded (°)	20
		Full Loaded (°)	18
Braking Performance	Braking Distance at Initial Speed of 50 km/h (m)	Unloaded (m)	⩽ 18
		Full Loaded (m)	⩽ 20
	Braking distance at initial speed of 100 km/h (m)		⩽ 44

Wheel Alignment Parameters (Unloaded)

Item		Parameter
Vehicle Model		SQR7000BEVJ72
Front Wheel	Front Wheel Camber	0.5 ° ± 30′
	Kingpin Caster	7.8 ° ± 30′
	Kingpin Inclination	15.2 ° ± 30′
	Front Wheel Toe-in	0.17 ° ± 10′
Rear Wheel	Rear Wheel Camber	0 ° ± 30′
	Rear Wheel Toe-in	- 0.3 ° ± 10 ′
Sideways Sliding		⩽ 3 m/km

Rim Type and Tire Type

Item		Parameter
Rim	Type	15 × 5 J
	Offset (mm)	+ 45
Tire Type		165 / 65 R 15

Tire Pressure

Unit: kpa

Item	Front Wheel	Rear Wheel
Unloaded	220	220

Steering System

Vehicle Model			SQR7000BEVJ72
Steering Wheel		Diameter (mm)	375
		Skeleton Material	Magnesium aluminum alloy AM50A
Steering Gear		Type	Rack and pinion mechanical steering gear
		Steering Assist Type	Electric power assist
Steering Column	Type		Collapsible electric power steering column (EPS)
	Installation Angle	Side Angle (α) (°)	26
		Plane Angle (β) (°)	2.5
	Steering Wheel Adjustment Range	Upward and Downward (mm)	/
		Frontward and Rearward (mm)	/
Maximum Wheel Angle		Left	35.6
		Steering Wheel Left Rotation Turns	1.5
		Right	31
		Steering Wheel Right Rotation Turns	1.5

Brake System Type

Brake System Type	Vacuum assist, diagonal arrangement, double circuit brake system
ABS System Control Mode	X type 4-channel 4 wheel independent control

Tightening Torque List

No.	Part Name	Part No.	Quantity for One Vehicle	Torque (N·m)
1	All-metal Hexagon Flange Locking Nut	Q33008F36	8	25 ± 4
2	Hexagon Flange Bolt	FQ1851255TF61KN	8	110 ± 10
3	All-metal Hexagon Flange Locking Nut	Q33112T13F36K	8	-
4	Hexagon Flange Bolt	FQ1851255TF61KN	8	110
5	All-metal Hexagon Flange Locking Nut	Q33112T13F36K	8	-
6	Hexagon Flange Bolt	FQ1851255TF61KN	4	110
7	All-metal Hexagon Flange Locking Nut	Q33112T13F36K	4	-
8	Hexagon Flange Bolt	FQ1831275TF61KN	8	110
9	All-metal Hexagon Flange Locking Nut	Q33112T13F36K	8	-
10	Non-metallic Insert Hexagon Locking Nut	FQ32912F36K	4	35
11	Wheel Nut	S11-3100115	16	110
12	All-metal Hexagon Flange Locking Nut	Q33008F36	4	25
13	Non-metallic Insert Hexagon Locking Nut	FQ32914T15F36K	1	35
14	Hexagon Flange Bolt	Q1831030TF61Q	4	65

15	Non-metallic Insert Hexagon Locking Nut	FQ32912F36K	2	35
16	Hexagon Flange Nut	Q32008F36	4	25
17	Hexagon Head Bolt Spring Cushion Flat Cushion Set	FQ146B0822F36	1	25
18	Hexagon Flange Bolt	Q1820825F36	3	25
19	Hexagon Flange Bolt	Q1820825F36	3	25
20	Hexagon Flange Bolt	Q1880616F36	6	10
21	Hexagon Flange Bolt	Q1880616F36	4	10
22	Hexagon Flange Eye Bolt	S11-3506013	2	25
23	Hexagon Flange Nut	Q32006F36	7	10
24	Hexagon Flange Bolt	Q1840842F36	1	25
25	Hexagon Flange Bolt	Q1820816F36	2	25
26	Cross-Recessed Large Cup Head Self-Tapping Screw	Q2736316F36	1	6
27	Hexagon Flange Bolt	Q1840645F36	2	10
28	Hexagon Flange Bolt	Q1820816F36	2	25
29	Hexagon Flange Bolt	Q1851050F36	11	65
30	Hexagon Flange Bolt M10 X 25	Q1821025TF61	24	65
31	Hexagon Flange Bolt	Q1831035TF61QK	8	65
32	Hexagon Flange Bolt	Q1820825F36	2	25
33	Hexagon Flange Locking Nut	S21-2203205	2	260
34	Cross-Recessed Pan Head Self-	Q2714213F36	4	3.5

	Tapping Screw - Type C			
35	Hexagon Flange Nut	Q32006F36	3	10
36	Hexagon Flange Bolt	Q1820816F36	4	25
37	Hexagon Flange Bolt	Q1831040TF61	3	65
38	Hexagon Flange Bolt	Q1831030TF61Q	8	65
39	Hexagon Flange Bolt	Q1831035TF61QK	4	65
40	Hexagon Flange Bolt	Q1851280TF61K	1	110
41	All-metal Hexagon Flange Locking Nut	Q33112T13F36K	3	110
42	Hexagon Flange Bolt	Q1820616F38	4	10
43	Hexagon Flange Bolt	Q1820825F36	4	25

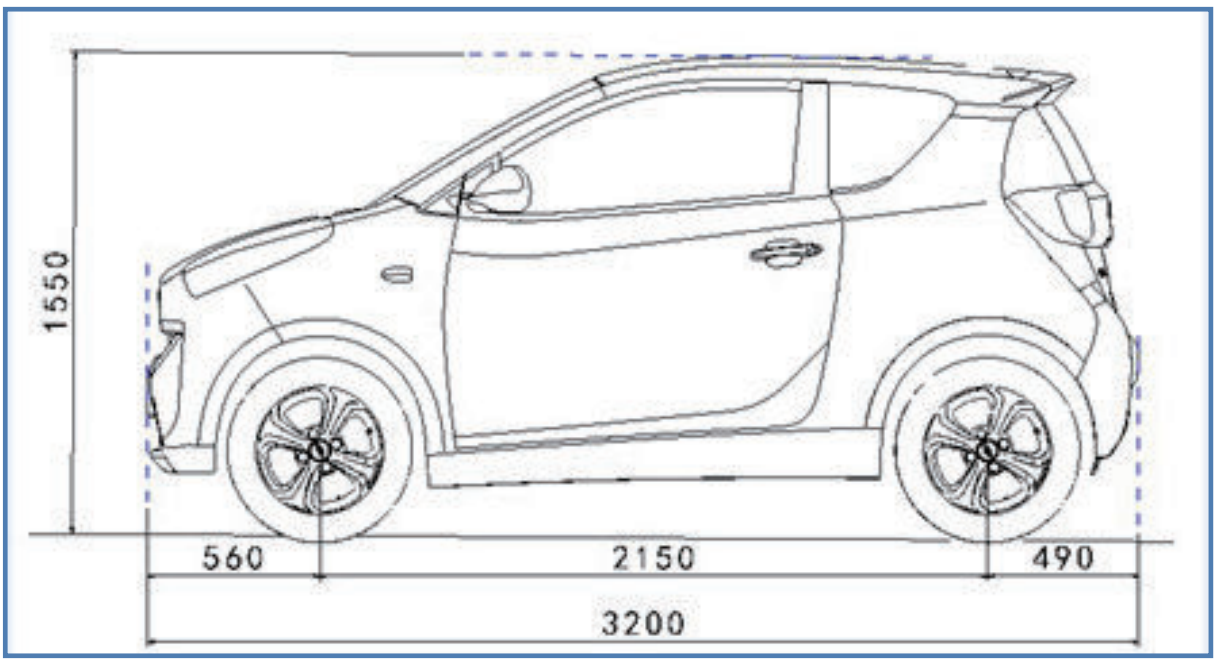
⚠

- Self-locking nut is a non-reusable component, and replace it after removal and installation.

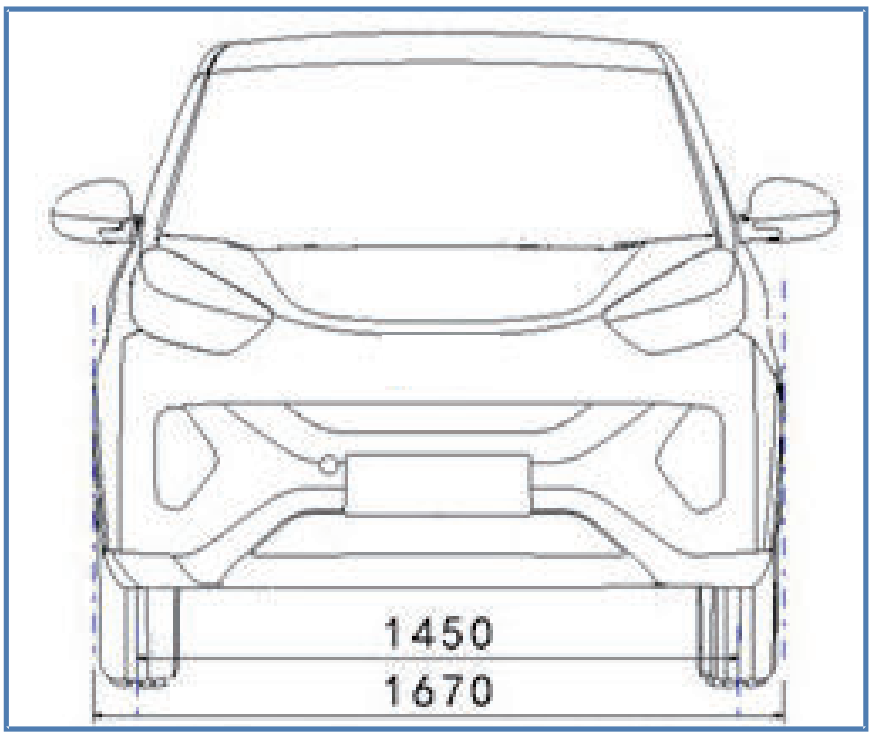
BODY DIMENSIONS

BODY DIMENSIONS

Body Dimensions



BD0001001



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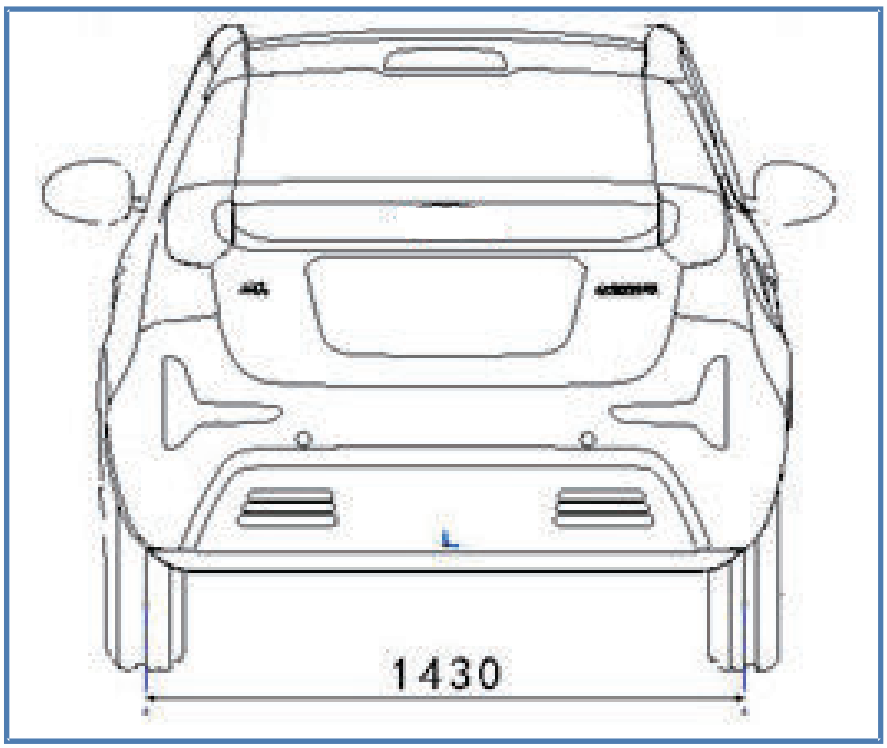


BD0003001

Item	Parameter	
Overall Size (mm)	Length	3200
	Width	1670
	High	1550
Wheel Base (mm)		2150
Tread (mm)	Front	1450
	Rear	1430
	Front Suspension	560
	Rear Suspension	490

OVERVIEW

OVERVIEW

Vehicle Parameter

Items		Unit	NEQ7000BEV-J72		NEQ7000BEV-J72A		NEQ7000BEV-J72B		NEQ7000BEV-J72C	
Drive type	-	-	Rear wheel drive 4×2		Rear wheel drive 4×2		Rear wheel drive 4×2		Rear wheel drive 4×2	
Vehicle curb mass	-	kg	965	985	995	1015	975	1005	965	975
Vehicle curb axle laden mass	Front axle	kg	478	490	493	499	483	500	478	485
	Rear axle	kg	487	495	502	516	492	505	487	490
Maximum manufacturer's laden mass (-including occupants)	-	kg	150	300	150	300	150	300	150	300
Maximum manufacturer's mass	-	kg	1115	1285	1145	1315	1125	1305	1115	1275
Axle laden mass under maximum manufacturer's total mass	Front axle	kg	542	568	557	578	547	578	542	563
	Rear axle	kg	573	717	588	737	578	727	573	712
Maximum manufacturer's allowable axle	Front axle	kg	568	568	578	578	578	578	563	563
	Rear axle	kg	717	717	737	737	727	727	712	712

laden mass										
Number of occupants (-including driver)	-	Person	2	4	2	4	2	4	2	4

Items		Unit	NEQ7000BEV-J72D		NEQ7000BEV-J72E		NEQ7000BEV-J72F		NEQ7000BEV-J72G	
Drive type	-	-	Rear wheel drive 4×2		Rear wheel drive 4×2		Rear wheel drive 4×2		Rear wheel drive 4×2	
Vehicle curb mass	-	kg	965	975	965	975	965	975	950	975
Vehicle curb axle laden mass	Front axle	kg	478	485	478	485	478	485	471	479
	Rear axle	kg	487	490	487	490	487	490	485	490
Maximum manufacturer's laden mass (-including occupants)	-	kg	150	300	150	300	150	300	150	300
Maximum manufacturer's mass	-	kg	1115	1275	1115	1275	1115	1275	1100	1275
Axle laden mass under maximum manufacturer's total mass	Front axle	kg	542	563	542	563	542	563	535	565
	Rear axle	kg	573	712	573	712	573	712	563	712
Maximum	Front axle	kg	563	563	563	563	563	563	563	563

manufacturer's allowable axle laden mass	Rear axle	kg	712	712	712	712	712	712	712	712
Number of occupants (-including driver)	-	Person	2	4	2	4	2	4	2	4

Items		Unit	NEQ7000BEVJ72J		NEQ7000BEVJ72K		NEQ7000BEVJ72H	
Drive type	-	-	Rear wheel drive 4×2		Rear wheel drive 4×2		Rear wheel drive 4×2	
Vehicle curb mass	-	kg	905	925	835	855	935	955
Vehicle curb axle laden mass	Front axle	kg	449	456	414	421	464	471
	Rear axle	kg	460	465	425	430	475	480
Maximum manufacturer's laden mass (-including occupants)	-	kg	150	300	150	300	150	300
Maximum manufacturer's mass	-	kg	1055	1225	985	1155	1085	1255
Axle laden mass under maximum manufacturer's total mass	Front axle	kg	513	542	478	507	528	557
	Rear axle	kg	538	687	503	652	553	702

Maximum manufacturer's allowable axle laden mass	Front axle	kg	538	538	503	503	553	553
	Rear axle	kg	687	687	652	652	702	702
Number of occupants (-including driver)	-	Person	2	4	2	4	2	4

Items		Unit	NEQ7000BEVJ72L		NEQ7000BEVJ72M		NEQ7000BEVJ72N	
Drive type	-	-	Rear wheel drive 4×2		Rear wheel drive 4×2		Rear wheel drive 4×2	
Vehicle curb mass	-	kg	935	955	820	840	965	985
Vehicle curb axle laden mass	Front axle	kg	464	471	407	413	470	495
	Rear axle	kg	475	480	418	422	480	505
Maximum manufacturer's laden mass (-including occupants)	-	kg	150	300	150	300	150	300
Maximum manufacturer's mass	-	kg	1085	1255	970	1140	1115	1285
Axle laden mass under maximum manufacturer's total mass	Front axle	kg	528	557	471	499	534	581
	Rear axle	kg	553	702	496	644	558	727
Maximum	Front axle	kg	553	553	496	496	558	558

manufacturer's allowable axle laden mass	Rear axle	kg	702	702	644	644	727	727
Number of occupants (-including driver)	-	Person	2	4	2	4	2	4

Items		Unit	NEQ7000BEVJ72P		NEQ7000BEVJ72Q		NEQ7000BEVJ72R	
Drive type	-	-	Rear wheel drive 4×2		Rear wheel drive 4×2		Rear wheel drive 4×2	
Vehicle curb mass	-	kg	955	975	935	955	925	945
Vehicle curb axle laden mass	Front axle	kg	473	482	464	471	458	467
	Rear axle	kg	485	490	475	480	470	475
Maximum manufacturer's laden mass (-including occupants)	-	kg	150	300	150	300	150	300
Maximum manufacturer's mass	-	kg	1105	1275	1085	1255	1075	1245
Axle laden mass under maximum manufacturer's total mass	Front axle	kg	537	568	528	557	522	553
	Rear axle	kg	563	712	553	702	548	697
Maximum manufacturer's	Front axle	kg	578	578	553	553	578	578

allowable axle laden mass	Rear axle	kg	727	727	702	702	727	727
Number of occupan-ts (- including driver)	-	Person	2	4	2	4	2	4

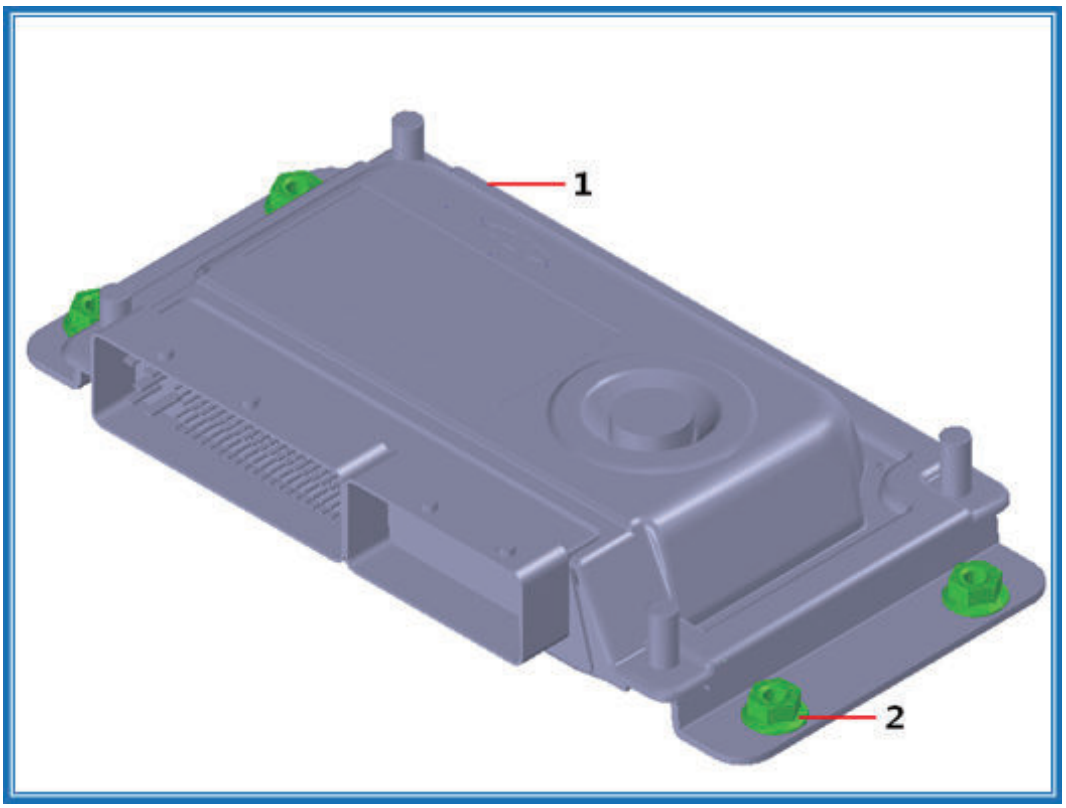
VEHICLE CONTROL SYSTEM

VEHICLE CONTROL SYSTEM

System Overview

System Component Diagram

Vehicle Control Unit System Composition Diagram

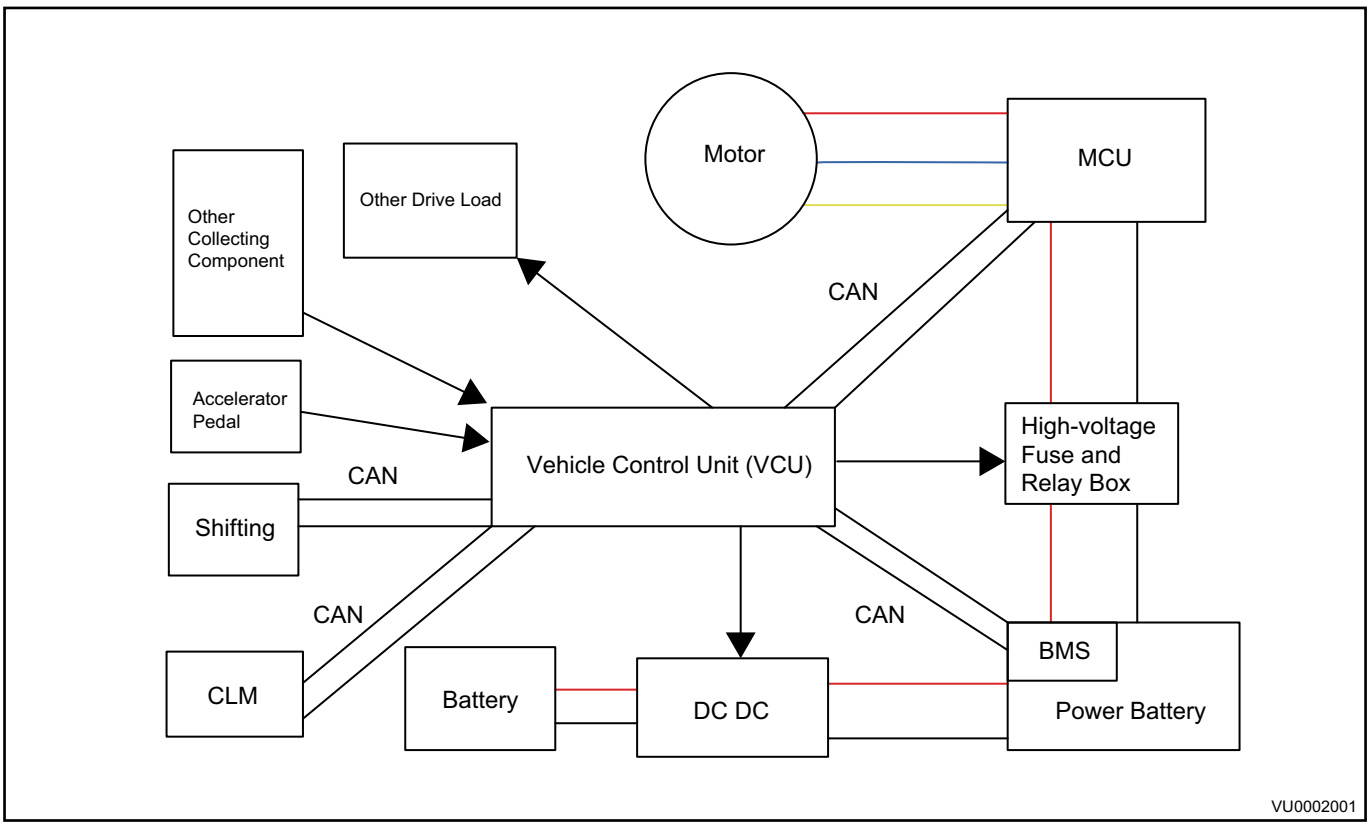


VU0001001

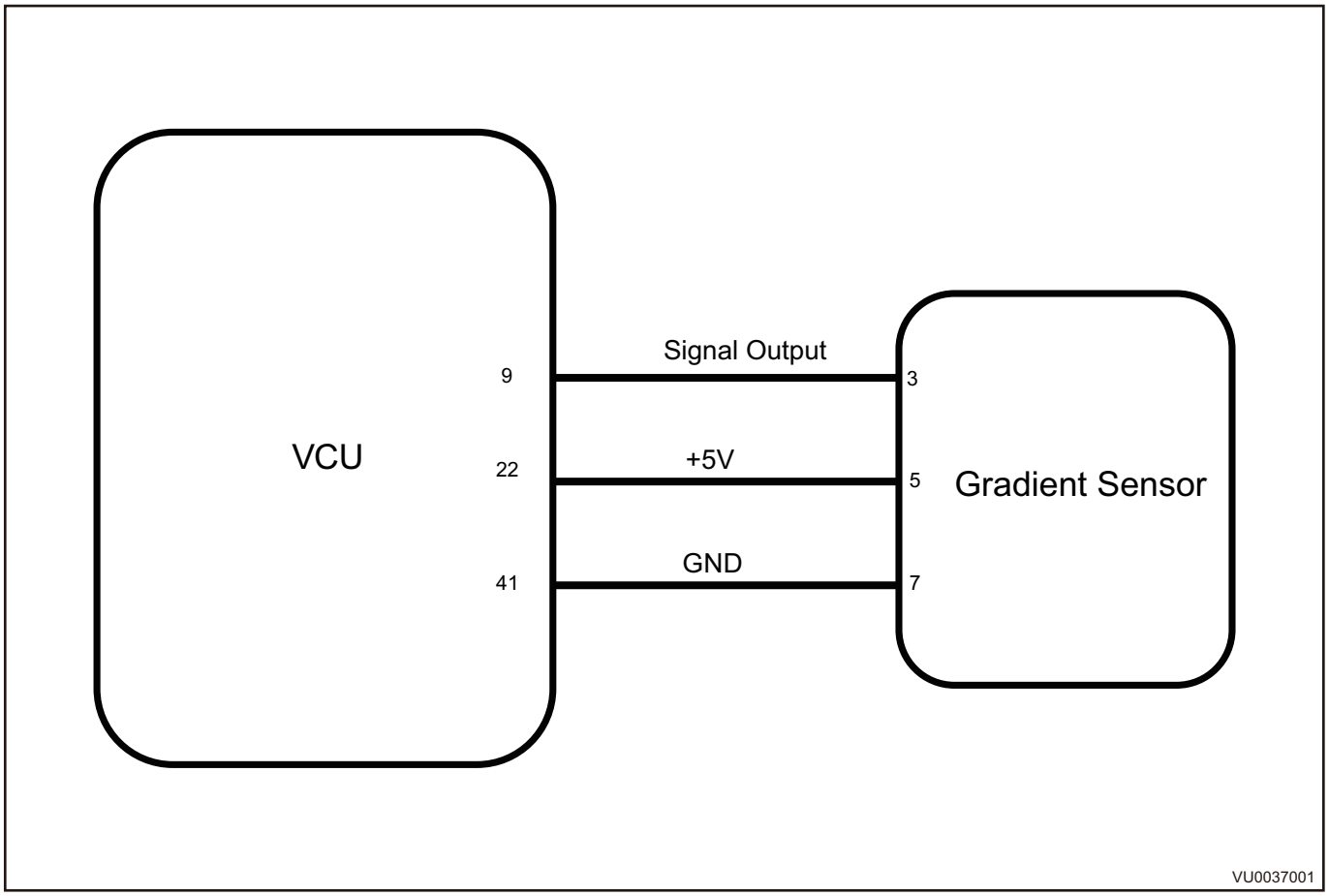
No.	Name	No.	Name
1	Vehicle Control Unit Assembly	2	Hexagon Flange Locking Nut

Vehicle Control Unit System Schematic Diagram

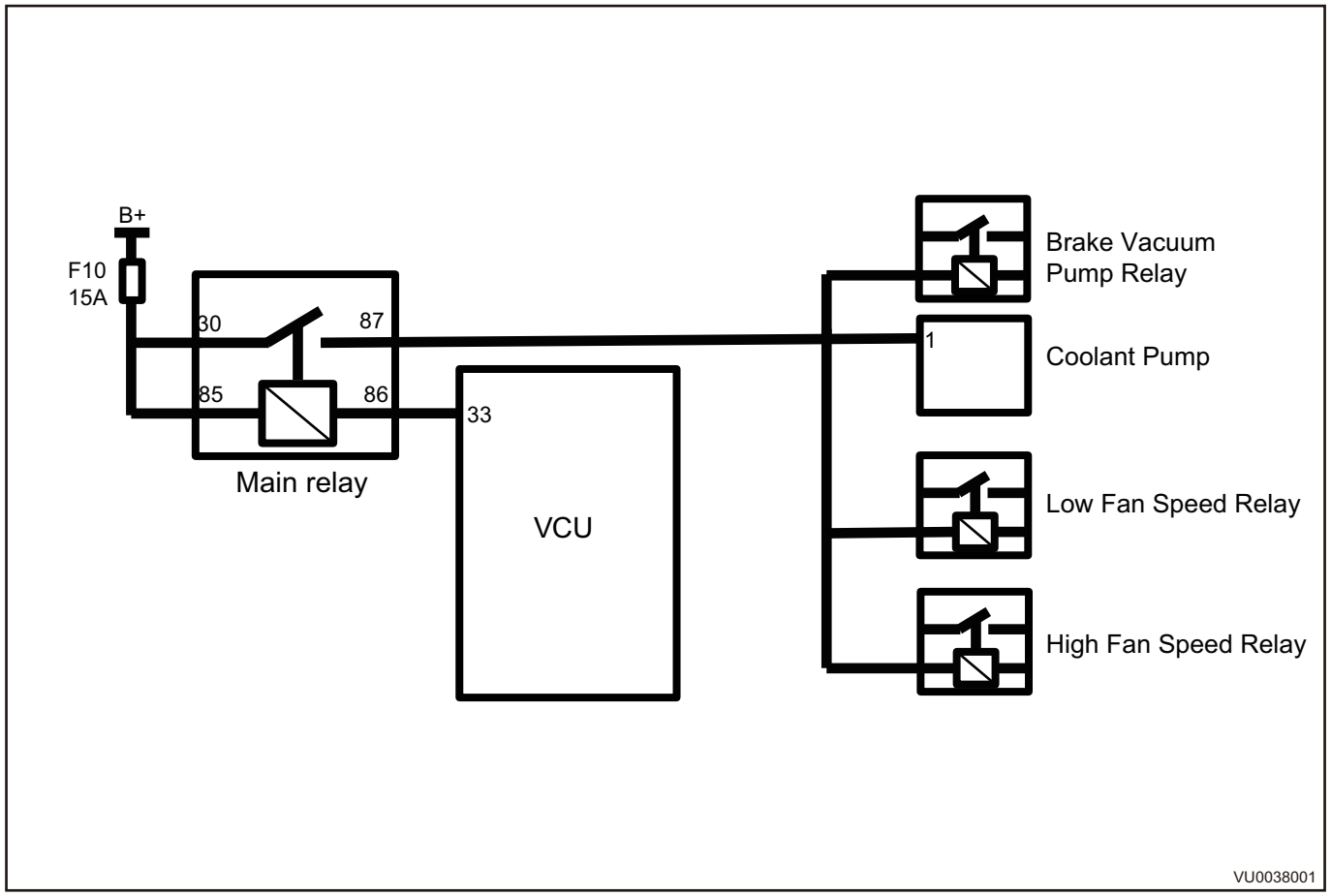
Connection Schematic Diagram between Vehicle Control Unit and Vehicle System
The following is the connection between CAN communication and high voltage wire harness among critical parts (such as Vehicle Control Unit (VCU), Motor Control Unit (MCU) and Power Battery Management System (BMS)).



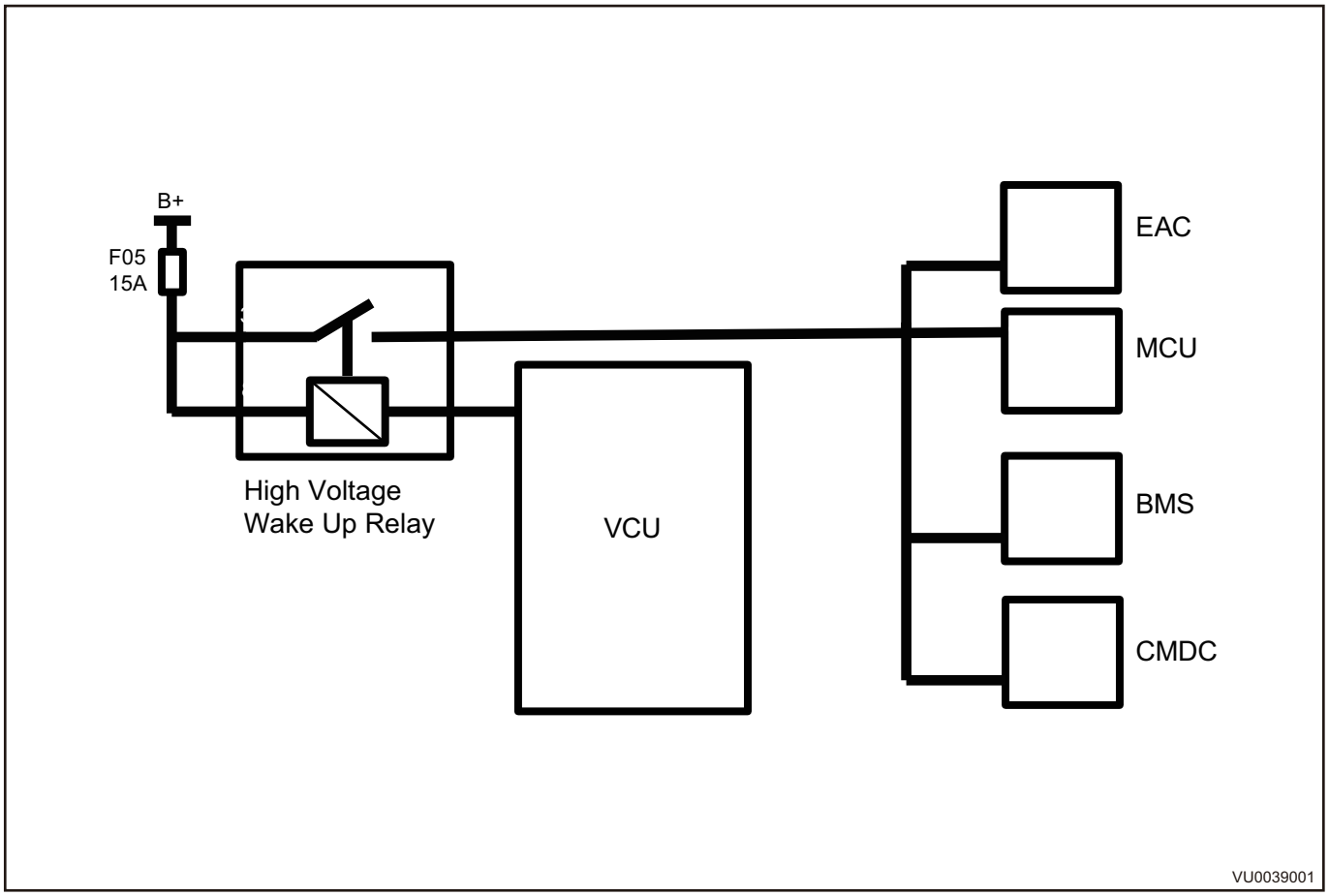
Gradient Sensor Circuit Schematic Diagram



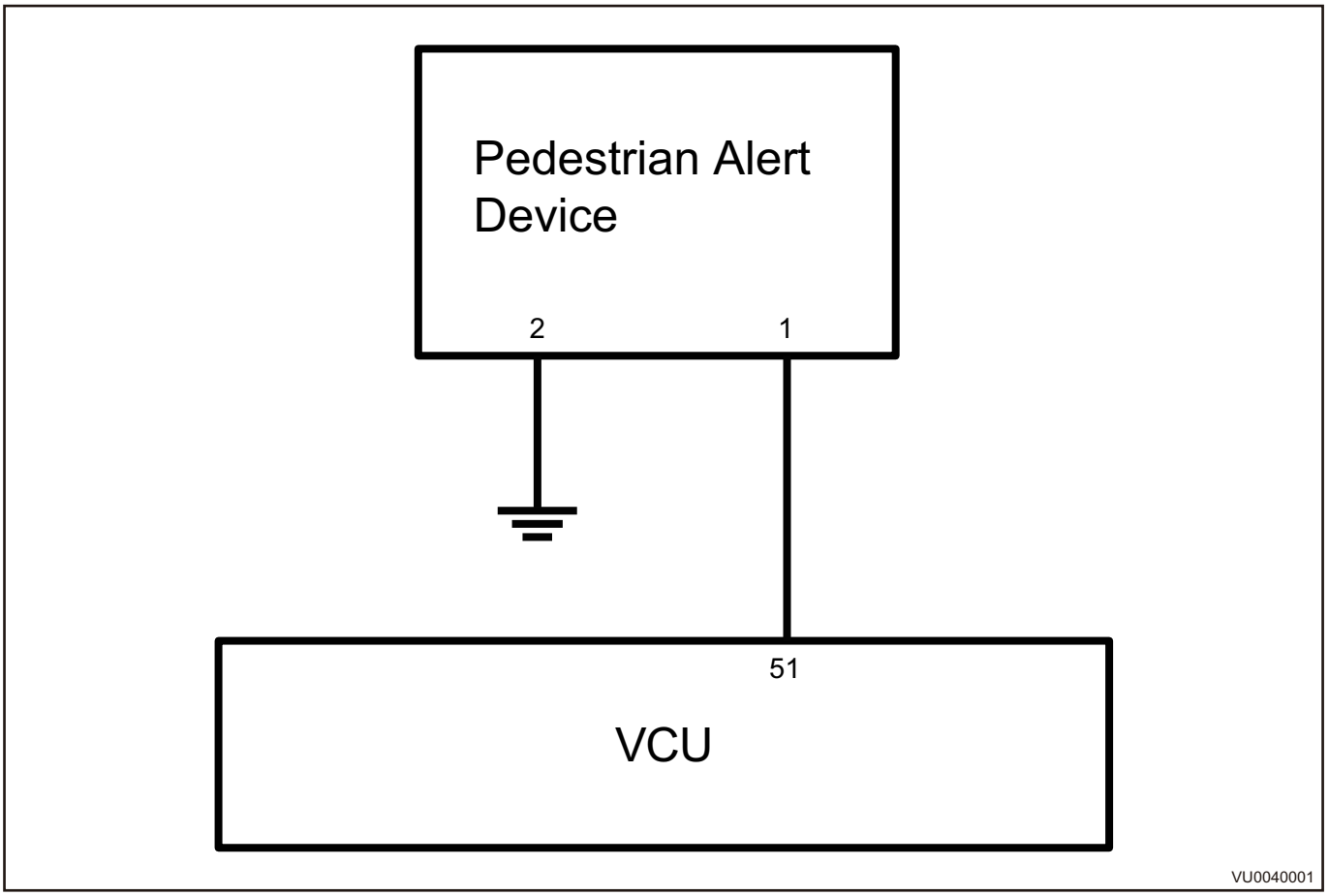
Main Relay Circuit Schematic Diagram



High Voltage Wake Up Relay Circuit Schematic Diagram



Pedestrian Alert Device Circuit Schematic Diagram



Component Function Description

Vehicle Control Unit
Vehicle control unit is under the front passenger side seat.

Type	Specification
Operating Voltage	9 V - 16 V
Rated Power	3 W
Peak Power	20 W
Rated Current	0.2 A
Peak Current	1.5 A

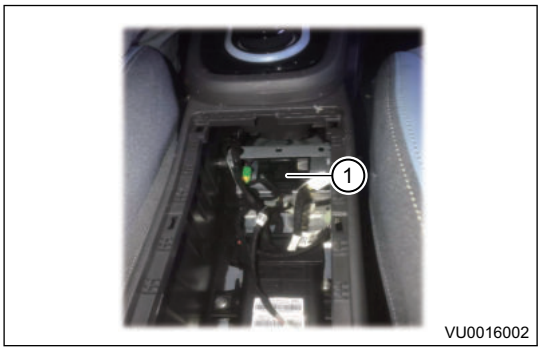
Operating Temperature Range	- 40 ℃ to + 85 ℃
Cooling Type	Cool down naturally

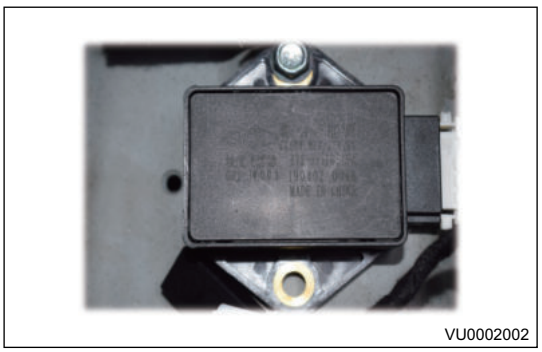
Main function of vehicle control unit:

- Recognize driver driving intention, realize vehicle functions such as driving forward, driving backward and parking.
- Distribution and limitation management control of the energy flow (power) of the vehicle under different working conditions.
- Control the vehicle to realize braking energy recovery function.
- Perform safety protection for power battery, drive motor and other subsystems.
- It is equipped with OBD fault diagnosis function, which can monitor and diagnose the status of the vehicle and component.
- It is equipped with CAN input/output interface, which can communicate with other on-board controllers, receive and send data.
- Control DC/DC converter and maintain power balance of 12 V low voltage network.
- Control cooling fan, electric water pump, brake vacuum pump, PTC, compressor, rear defroster, etc.
- It is equipped with power-off data storage function.

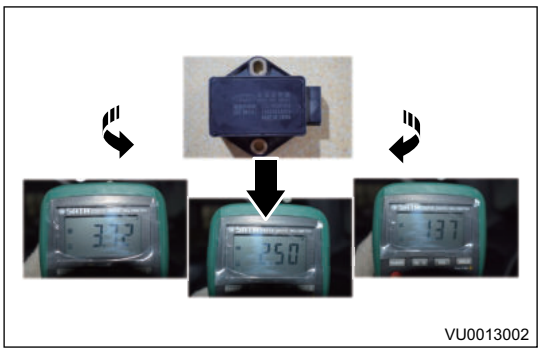
Gradient Sensor

Function of gradient sensor (1): Monitor driving road conditions of the vehicle, input signal to VCU, realize functions such as hill hold control, etc.

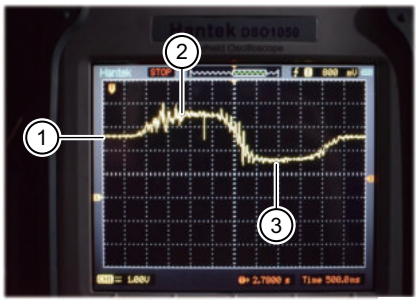




Measurement analysis of gradient sensor

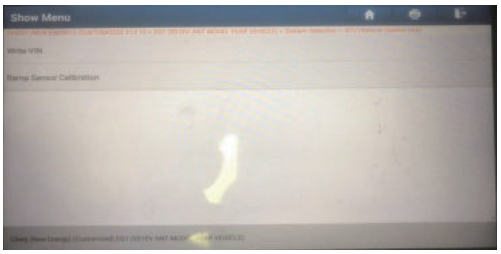


Waveform analysis of gradient sensorIt is (1) when the front is horizontal; it is (2) when the front is upward; it is (3) when the front is downward.



VU0003002

It is necessary to perform “Position Calibration” with a diagnostic tester after repairing, removing/installing or replacing gradient sensor.



VU0014002

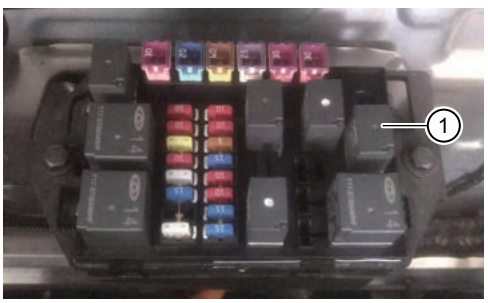
Main Relay

Function of main relay (1): It is controlled by VCU to provide power supply for low voltage components (cooling fan, cooling water pump, vacuum pump).

VU0015002

High Voltage Wake Up Relay

Function of high voltage wake up relay (1): It is controlled by VCU to provide power supply for high voltage components (EAC, MCU, BMS, CMDC).



VU0017002

Energy Recovery

Function: It is controlled by VCU to provide power supply for high voltage components (EAC, MCU, BMS, CMDC).

VU0004002

Brief introduction of the function

1. The energy recovery interface allows you to adjust the level of energy recovery. There are 7 levels in total, which are 1 to 7 levels from bottom to top.
2. The 1st is equivalent to the coasting gear of the gasoline vehicle, which does not provide energy recovery, and from the 2rd level, energy recovery starts, with increasing energy recovery in 2nd, 3rd, 4th, 5th, 6th, and 7th levels.
3. When powering on for the first time, economy mode (E) is defaulted to 5th level at startup; sport mode (S) is defaulted to 4th level at startup, the level value set by user can be memorized in the 2 modes respectively.

Conditions to be met

1. Release accelerator pedal or depress brake pedal.
2. The gear position is in D and the vehicle speed is more than 10 km/h.
3. The vehicle will not perform energy recovery when power battery SOC is too high and power battery temperature is too high/low.

Driving Mode

Driving mode is divided into economy mode, sport mode, single pedal mode.The system is economic mode by default.

Economy mode

VU0007002

Sport mode

VU0008002

Single pedal mode

VU0009002

There are 2 switching methods:

1. Sport mode can be switched by pressing switch (1) on air conditioning panel.

VU0005002

2. Click the virtual button on audio head unit to switch to economy mode, sport mode, single pedal mode separately.

VU0006002

Long Range Driving Mode

- Turn on "Long Range Driving" through "Vehicle Setting" on audio head unit.
- Enable condition: When the battery level showed on meter is greater than 0.
- Enable times: 15 times. When the actual battery level showed on meter is equal to 0, count 1 time.
- It can discharge 5% more, driving range is about 15 - 20 km more.

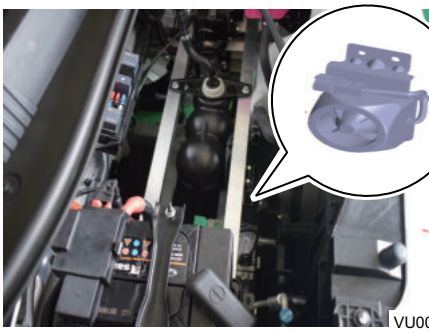
VU0010002

VU0011002

Pedestrian Alert Device

Function: According to standard requirements of regulation, appropriate prompt sound is issued to pedestrians outside the vehicle when the electric vehicle drives with speed lower than 20 km/h.Operating conditions:

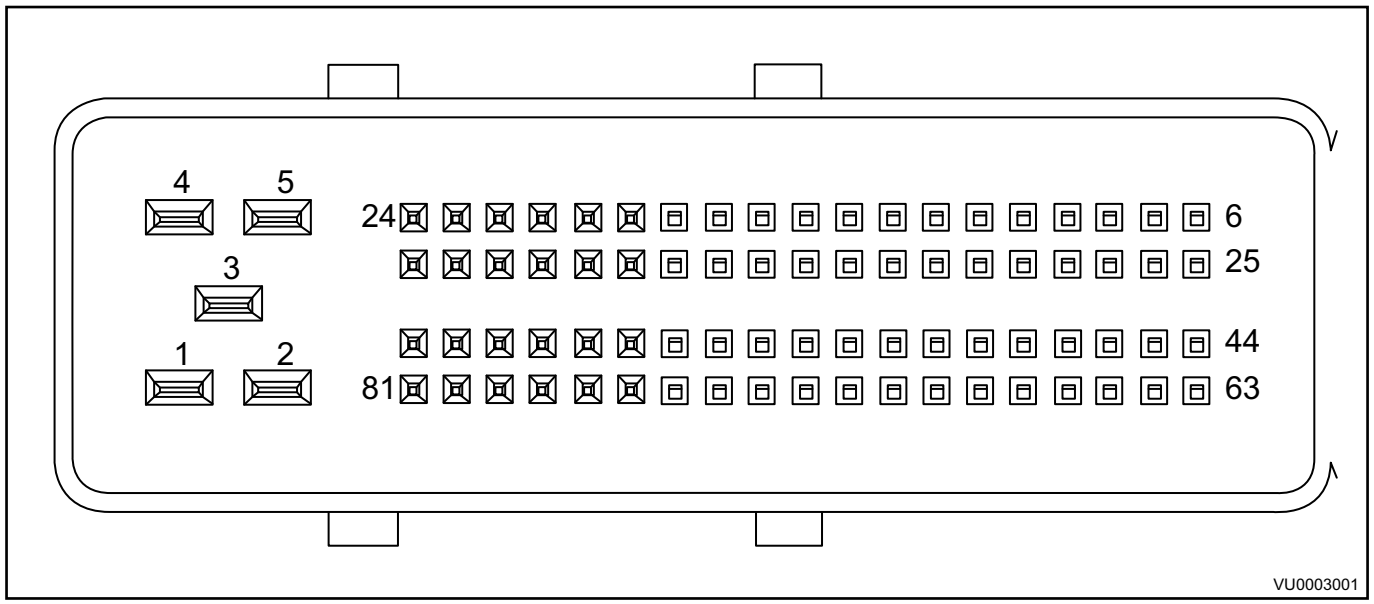
1. Vehicle is in READY.
2. Gear position is in driving or reverse position.
3. The speed is within 0 to 20 km/h.


VU0012002

System Circuit Diagram

Module Terminal Definition

Vehicle Control Unit (VCU)



Terminal	Function	Signal Type	Terminal	Function	Signal Type
1	KL 30 _ supply	KL 30 Power Supply Signal	39	Highside _ Spare _ 1	High Side Drive Spare Port 1
2	KL 30 _ supply	KL 30 Power Supply Signal	40	ED _ Spare _ 5	Digital Input Spare Port 5
3	Power _ GND	Power Supply Ground Signal	41	Analog GND	Analog Ground
4	KL 30 _ supply _ GND	Power Supply Ground Signal	42	Analog GND	Analog Ground
5	KL 30 _ supply _ GND	Power Supply Ground Signal	43	Analog GND	Analog Ground
6	CAN BUS HIGH SIGNAL	CAN High	44	DI _ ECO _ Switch	Economy Mode Switch
7	CAN BUS LOW SIGNAL	CAN Low	45	ED _ Spare _ 6	Digital Input Spare Port 6
8	EXTAN _ Temp _ 1	Thermistor Collection 1	46	AN _ Spare _ 2	Analog Spare Port 2
9	EXTAN _ Spare _ 1	Analog Spare Port 1	47	AN _ Spare _ 3	Analog Spare Port 3
10	EXTAN _ Spare _ 2	Analog Spare Port 2	48	Lowside _ Spare _ 6	Low Side Output Spare 6

11	DCDC _ load _ Current	DCDC Load Current	49	Lowside _ Spare _ 7	Low Side Output Spare 7
12	/	/	50	High Side Output Spare 2	Digital
13	/	/	51	High Side Output Spare 3	Digital
14	AN _ Accelarator _ 1	Accelerator Pedal Signal 1	52	PWM 1	Square Wave Pulse Output 1
15	AN _ Accelarator _ 2	Accelerator Pedal Signal 2	53	PWM 2	Square Wave Pulse Output 2
16	DCDC _ enable	DCDC Enable	54	PWM 3	Square Wave Pulse Output 3
17	DCDC _ setpoint	DCDC Output Voltage Adjustment	55	Spare 5	Digital Input Spare Port 5
18	CRANK	Ready Signal	56	Spare 6	Digital Input Spare Port 6
19	Air _ condition	A/C ON Signal	57	Charger _ wake	Digital Input Port
20	Accessory Switch	ACC	58	Spare 3	Digital Input Spare Port 3
21	Ignition	POWER Switch	59	Spare 4	Digital Input Spare Port 4
22	AN 5V	Analog 5 V Output	60	Charge _ Connector _ ok	Charging Connection
23	AN 5V	Analog 5 V Output	61	ED _ PWM1	Square Wave Pulse Input 1
24	AN 5V	Analog 5 V Output	62	ED _ PWM2	Square Wave Pulse Input 2
25	ED _ Spare _ 1	Digital Input Spare Port 1	63	CAN _ B _ L	—
26	ED _ Spare _ 2	Digital Input Spare Port 2	64	CAN _ B _ H	—
27	ED _ Spare _ 3	Digital Input Spare Port 3	65	EXTAN _ Temp 2	Thermistor Collection 2
28	ED _ Spare _ 4	Digital Input Spare Port 4	66	AN _ Spare 3	Analog Spare Port 3
29	DCDC _ OK	DCDC Self-check Signal	67	AN _ Spare 4	Analog Spare Port 4
30	Brake	Brake Signal	68	AN _ Spare 5	Analog Spare Port 5

31	Lowside _ Spare _ 1	Low Side Drive Spare Port 1	69	AN _ Spare 6	Analog Spare Port 6
32	Lowside _ Spare _ 2	Low Side Drive Spare Port 2	70	AN _ Spare 7	Analog Spare Port 7
33	Lowside _ Spare _ 3	Low Side Drive Spare Port 3	71	AN _ Spare 8	Analog Spare Port 8
34	Lowside _ Spare _ 4	Low Side Drive Spare Port 4	72	CAN _ C _ H	—
35	Lowside _ Spare _ 5	Low Side Drive Spare Port 5	73	CAN _ C _ L	—
36	Reverse lamp driver	Back-Up Light Drive Signal	74	Spare 7	Digital Input Spare Port 7
37	Inverter enable	Motor Enable Signal	75	Spare 8	Digital Input Spare Port 8
38	Battery _ contactor _ enable	Battery Connection Signal			

Diagnosis & Test

Common Problem and Symptom

During using any vehicle, its mechanisms and components will have different degrees of natural wear, loosening and mechanical damage, and the vehicle performance will continue to decline. In addition, the vehicle will inevitably have some kinds of hidden troubles due to various subjective and objective reasons. If the necessary technical maintenance is not carried out in time, or the hidden troubles cannot be found in time, it will inevitably lead to failures, destroy normal use of the vehicle, resulting in serious injuries and death. Therefore, if fault cause and fault location are found according to the symptoms in time and repair the fault, it will not only keep the vehicle in good technical condition, but also contribute to service life and driving safety. This chapter introduces the common fault cause, type and symptom briefly. Faults listed in this chapter are stored and recorded by VCU, including the faults related to VCU, MCU, BMS, ABS, and CLM. If VCU system detects these faults, it will light up corresponding malfunction light on instrument cluster according to the different malfunction levels to remind the driver to repair in time.

Common Problem Diagnosis and Inspection Method

- After driving the vehicle for a long time, the technical condition of the vehicle will gradually decline as the driving mileage continues to increase. Insufficient power, poor economy and reduced reliability etc. will occur. This is an inevitable changing. However, if the technical condition of the vehicle can be checked according to a certain period and driving mileage, and the corresponding maintenance measures can be taken, the service life of the vehicle can be extended.
- Common problem diagnosis and inspection methods of the vehicle are divided into two types: One is to diagnose by manual experience, and the other is to detect by instrument and equipment.
- Manual experience diagnosis, also known as intuitive diagnosis, does not require any equipment or conditions. Vehicle inspection personnel rely on practical experience and certain theoretical knowledge to use simple tools to see, hear, and touch by hand and smell by nose, and then perform qualitative analysis and judgment of vehicle technical condition without disassemble or partial disassemble the vehicle. This method can be performed in any occasion because it does not require special instruments or equipment, and the investment is low. Its disadvantage is that diagnosis for complex

faults is slow, and diagnosis accuracy depends largely on technical level and experience of diagnosing personnel.

- Instrument detection method, which is a modern detection method developed on the basis of manual diagnosis by experience. Use instrument or equipment to test vehicle performance, parameter, curve or waveform of fault, and even automatically analyze and judge technical condition of the vehicle. For this method, detection speed is fast, accuracy is high, can perform qualitative analysis and easy to master, but requires more instruments and equipment and larger investment.
- In general, the above two methods are often used in combination.

Diagnostic Trouble Code (DTC) Chart

No.	DTC	Malfunction Name	Description
1	U0073	CAN _ BUS _ FAULT	CAN Communication Busoff Fault
2	P1A51	UNEXPECTED _ INTERRUPT	VCU Software Unexpected Interrupt Fault
3	P1A53	GEARPOSITION _ FAULT	Gear Position Fault
4	P1A58	PEDAL _ POSITION _ FAULT	Accelerator Pedal Position Signal Synchronization Fault
5	P1A59	A _ SENS _ SUPPLY _ FAULT	External Sensor Power Supply Voltage Fault
6	P1A5A	VAC _ SENS _ OC _ SC	Brake Vacuum Pressure Sensor Fault
7	P1A5B	DCDC _ CHARGE _ FAULT	DCDC Charging Fault
8	P1A5C	LV _ BATT _ VOLTAGE _ FAULT	Low Voltage Battery Voltage Fault
9	P1A5D	BRAKE _ SWITCH _ FAULT	Brake Switch Fault
10	P1A5E	VAC _ SENS _ IMPLAUSIBLE	Vacuum Degree Sensor Signal Implausible
11	P1A5F	VEHICLE _ SPEED _ IMPLAUSIBLE	Vehicle Speed Signal Implausible
12	P1A60	FMEM _ FAILED	EEPROM Data is Lost
13	P1A61	APP _ OVERRUN	VCU Controller Application Overrun
14	P1A62	SW _ WATCHDOG _ OCCURED	Software Watchdog Fault
15	U0293	MCU _ CAN _ RX _ FAILED	Motor System CAN Communication Receiving Failed
16	P1A63	MOTOR _ POSTION _ FAULT	Motor Position Sensor Fault
17	P1A64	PAHSE _ OVERCURRENT	Phase Current Overcurrent Fault
18	P1A65	INVERTER _ FAULT	MCU Inverter Fault

19	P1A66	DCLINK _ OVERCUR	DC Bus Overcurrent Fault
20	P1A67	DCLINK _ OVERVOLTAGE	DC Bus Overvoltage Fault
21	P1A68	MOTOR _ OVER _ TEMP	Motor Over-temperature Fault
22	P1A69	INVERTER _ OVER _ TEMP	MCU Controller Over-temperature Fault
23	P1A6A	MOTOR _ OVERSPEED	Motor Overspeed Fault
24	P1A6B	MCU _ SENSOR _ SUPPLY _ FAULT	MCU Internal Sensor Supply Voltage Fault
25	P1A6C	GATE _ SUPPLY _ FAULT	Gate Driver Supply Voltage Fault
26	P1A6D	MCU _ LV _ SUPPLY _ FAULT	MCU Controller Supply Voltage Fault
27	P1A6E	MCU _ TORQUE _ FAULT	MCU Torque Monitoring Fault
28	P1A6F	MCU _ MODE _ ERROR	MCU Mode Error
29	P1A70	DCLINK _ UNDERVOLTAGE	DC Bus Undervoltage Fault
30	P1A7E	GATE _ DRIVER _ DESAT _ FAULT	Gate Driver Desaturated Fault
31	P1A81	BMS _ HVINTERLOCK _ FAULT	Power Battery Loop Interlock Fault
32	P1A82	BMS _ ISOSUPER _ FAULT	Power Battery Leakage Fault
33	P1A83	BMS _ CONTACT _ FAULT	Power Battery Management System Relay Fault
34	P1A84	VCU _ POWER _ MOSFET _ SC	MOSFET Short Fault
35	P1A85	Cooling Pump Drive Fault	Cooling Pump Drive Fault
36	P1A86	Brake EVAC Drive Fault	Brake Drive Fault
37	P0A7D	BMS _ BATTUNDERSOC _ WARNING	Power Battery Pack Low Power Warning
38	P0A7E	BMS _ BATTOVERTEMP _ WARNING	Power Battery Pack Excessive Over-temperature Warning
39	P0A9D	BMS _ CELLUNDERTEMP _ WARNING	One Cell in Power Battery Pack Excessive Under-temperature Warning
40	P0A9E	BMS _ CELLOVERTEMP _ WARNING	One Cell in Power Battery Pack Excessive Over-temperature Warning
41	P0AA9	BMS _ CELLUNDERVOLT _ WARNING	One Cell in Power Battery Pack Excessive Under-voltage Warning

42	P0AAA	BMS _ CELLOVERVOLT _ WARNING	One Cell in Power Battery Pack Excessive Over-voltage Warning
43	P0ABD	BMS _ BATTOVERVOLT _ WARNING	Power Battery Pack Excessive Over-voltage Warning
44	P0ABC	BMS _ BATTUNDERVOLT _ WARNING	Power Battery Pack Excessive Under-voltage Warning
45	P0AC2	BMS _ BATTOVERCURRENT _ WARNING	Power Battery Pack Excessive Over-current Warning
46	P1A79	BMS _ BATTCOMPFLT _ WARNING	Battery System Integration Fault
47	B2173	COMPRESSOR _ FAULT	Compressor Fault
48	B2127	EVAPORATOR _ TEMPERATURE _ SENSOR _ FAULT	Evaporator Temperature Sensor Fault
49	B2126	EXTERNAL _ TEMPERATURE _ SENSOR _ FAULT	Outside Temperature Sensor Fault
50	U0294	BMS _ CAN _ RX _ FAILED	Battery System CAN Communication Receiving Failed
51	U0121	ABS _ CAN _ RX _ FAILED	ABS System CAN Communication Receiving Failed
52	C1002	ABS _ STATUS _ CHECK _ FAILED	ABS Status Monitoring Failed
53	U0164	CLM _ CAN _ RX _ FAILED	CLM System CAN Communication Receiving Failed
54	P0A27	REVERSELAMP _ DRIVE _ FAULT	Back-up Light Drive Fault
55	P0A28	LOWCOOLINGFAN _ DRIVE _ FAULT	Low Speed Fan Drive Fault
56	P0A30	INVERTER _ DRIVE _ OC _ SC	INVERTER Drive Fault
57	P0A32	CONTACTOR _ DRIVE _ OC _ SC	CONTACTER Drive Fault
58	P0A37	PEDAL1 _ LOW _ FAULT	Accelerator Pedal Position Signal 1 Low Voltage Fault
59	P0A38	PEDAL1 _ HIGH _ FAULT	Accelerator Pedal Position Signal 1 High Voltage Fault
60	P0A39	PEDAL2 _ LOW _ FAULT	Accelerator Pedal Position Signal 2 Low Voltage Fault

61	P0A40	PEDAL2 _ HIGH _ FAULT	Accelerator Pedal Position Signal 2 High Voltage Fault
62	P0A41	BMS _ SERIOUS _ FAULT	BMS Serious Fault
63	P0A42	BMS _ POWERLIMIT _ WARNING	BMS Power Limit Warning
64	P0A43	MCU _ POWERLIMIT _ WARNING	MCU Power Limit Warning
65	P0A44	MCU _ HVIL _ FAULT	MCU Interlock Fault
66	P0A45	ATT _ HVIL _ FAULT	High Voltage Accessory Loop Interlock
67	P0A46	CRASH _ IMPLAUSIBLE	Crash Switch Implausible
68	P0A47	HIGHCOOLINGFAN _ DRIVE _ FAULT	High Speed Fan Drive Fault
69	P0A48	COMPRESSOR _ DRIVE _ FAULT	Compressor Drive Fault
70	P0A49	PTCRELAY _ DRIVE _ FAULT	PTC Relay Drive Fault
71	P0A50	DCDC _ DRIVE _ FAULT	DCDC Drive Fault
72	P0A51	T _ MODUL _ FAULT	T-BOX Function Fault
73	P0A52	L1 _ MOTOR _ TQ _ CHECK _ ERROR	Motor Torque Checksum Error
74	P0A53	L1 _ MOTOR _ MODE _ CHECK _ ERROR	Motor Mode Checksum Error
75	P2A44	MOTOR _ BLOCK _ WARNING	Motor Block Fault
76	P2A45	MCU _ HARDWARELOCK _ FAULT	MCU Hardware Circuit Interlock Fault
77	P2A46	MCU _ COOLSYSTEM _ FAULT	MCU Cooling System Fault
78	P2A47	MCU _ SELFCHECK _ FAULT	MCU Self-check Fault
79	P2A48	MCU _ RDCALIGNMENT _ FAULT	Motor Position Angle Fault
80	P2A49	MOTORLACKPHASE _ FAULT	Motor Phase Lack Fault
81	P2A50	MCU _ LVBATTCHECK _ FAULT	MCU Low Voltage Power Supply Input Fault
82	P2A51	MCU _ SENSORCHECK _ FAULT	MCU Sensor Self-check Fault
83	P2A52	MCU _ SERIOUS _ FAULT	MCU Serious Fault
84	P2A53	CLM _ LOWCOMPRESSURE _ FAULT	Compressor Low Exhaust Pressure

85	P2A54	MAINCONTRELAY _ DRIVE _ FAULT	Main Relay Drive Fault
86	P1A71	DCDC _ IP _ OVER _ CURRENT	DCDC Input Over-current
87	P1A72	DCDC _ IP _ UNDER _ VOLTAGE	DCDC Input Under-voltage
88	P1A73	DCDC _ IP _ OVER _ VOLTAGE	DCDC Input Over-voltage
89	P1A74	DCDC _ OP _ OVER _ CURRENT	DCDC Input Over-current
90	P1A75	DCDC _ MD _ OVER _ TEMP	DCDC Module Over-temperature
91	P1A76	DCDC _ OP _ UNDER _ VOLTAGE	DCDC Output Under-voltage
92	P1A77	DCDC _ OP _ OVER _ VOLTAGE	DCDC Output Over-voltage
93	U0295	DCDC _ CAN _ RX _ FAILED	DCDC CAN Signal Receiving Failed

DTC Diagnosis Procedure

1. CAN Communication Busoff Fault U0073

   Occurrence factors: Road condition, speed, acceleration, deceleration, straight, curve, time, climate, etc.

   Regarding vibration: Slightly shake connector and wire harness horizontally or vertically. Gently shake the wire harness that is considered to be the cause of the fault with your finger.

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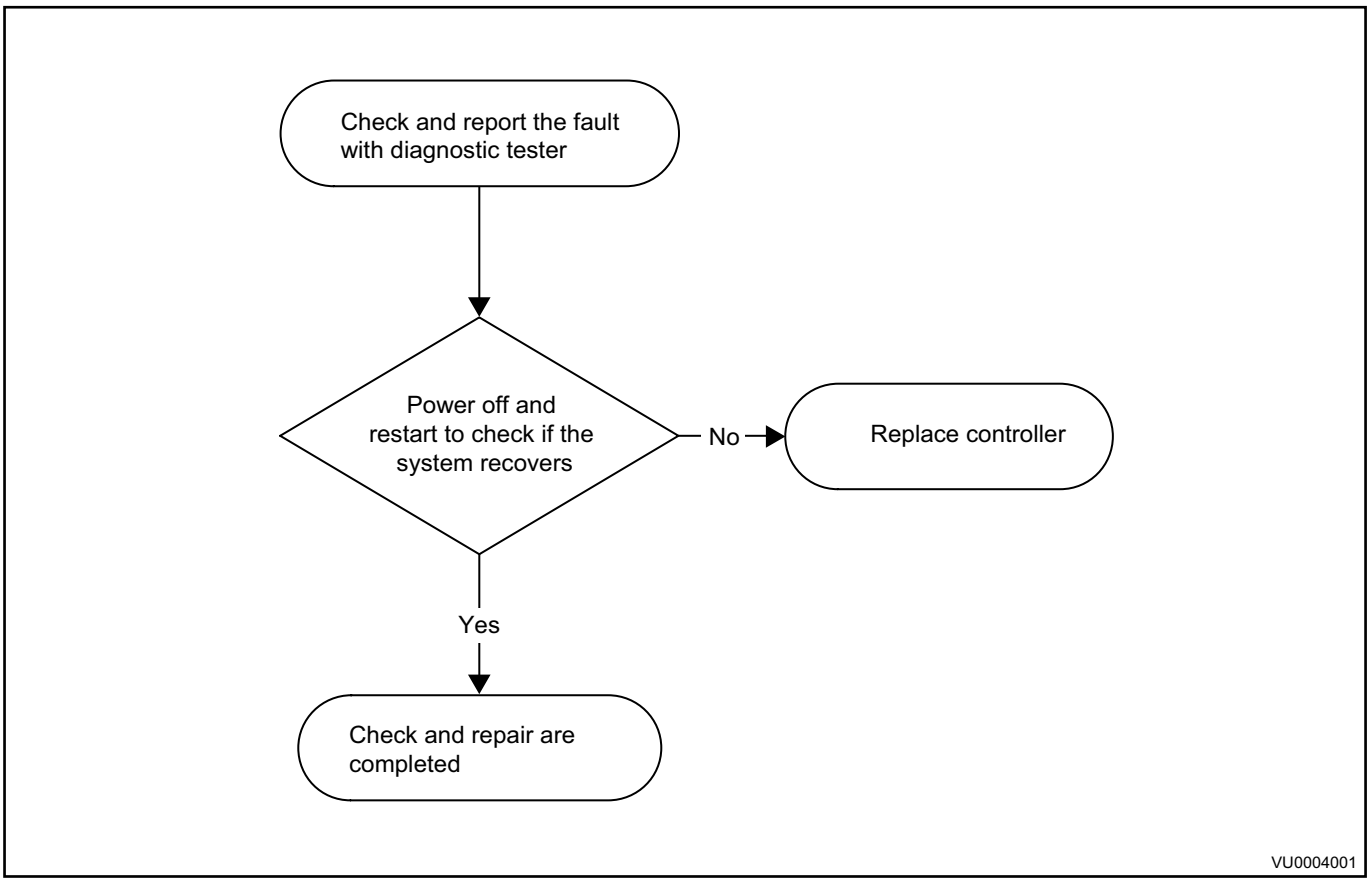
- Severe vibration or wet weather may cause wire harness to be disconnected or contact surface of pin to not fit, resulting in CAN bus communication failure.If the communication failure is not caused by the harness, it is recommended to rewrite software code. If the fault still occurs, controller hardware may be damaged, it is recommended to replace VCU controller.

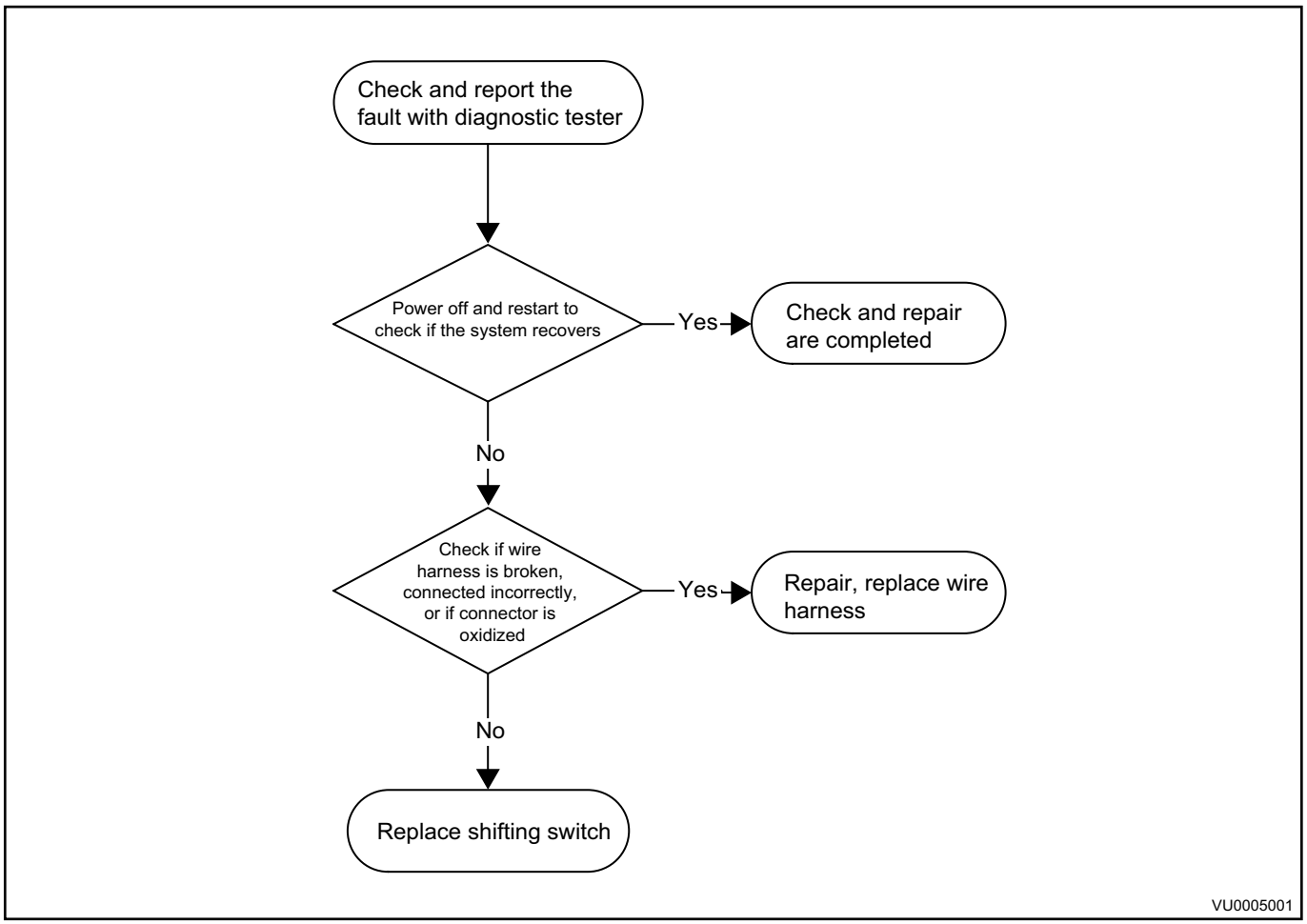
2. VCU Software Unexpected Interrupt Fault P1A51

   The fault is caused by unexpected interruption of controller software program, which causes malfunction light to come on. It is recommended to rewrite software code. If the fault still occurs, controller hardware may be damaged, it is recommended to replace VCU controller.



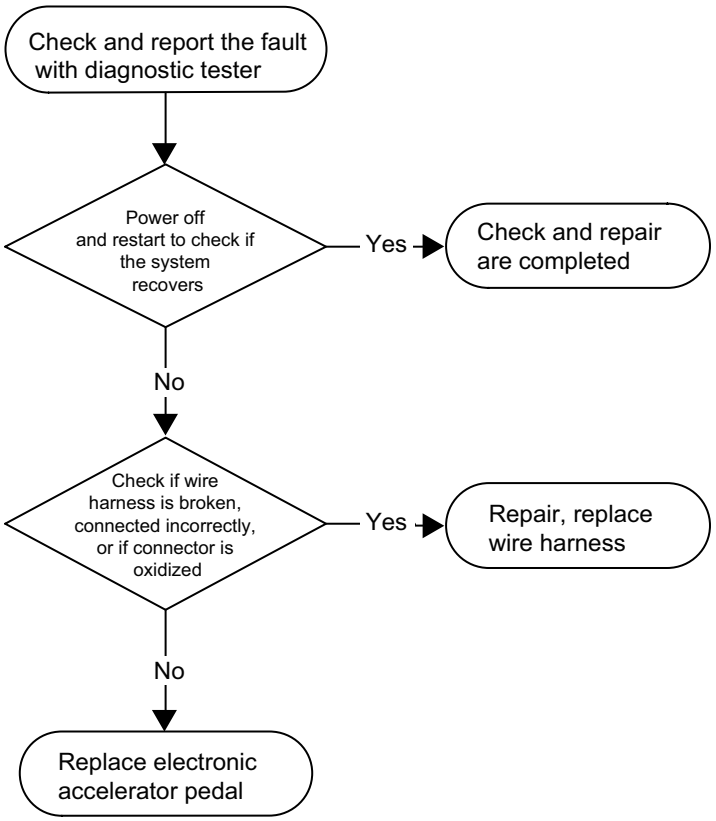
3. Gear Position Fault P1A53

   First perform power-on reset. If malfunction light cannot be cleared, check if there is short or open in wire harness. If wire harness is connected normally, there may be a problem with gear switch. Please replace gear switch.



4. Accelerator Pedal Position Signal Synchronization Fault P1A58

   First perform power-on reset. If malfunction light cannot be cleared, check if wire harness is short to ground. If not, replace electronic accelerator pedal.



5. External Sensor Power Supply Voltage Fault P1A59

   First perform power-on reset. If malfunction light cannot be cleared, check if wire harness is normal. If it is normal, replace VCU controller.

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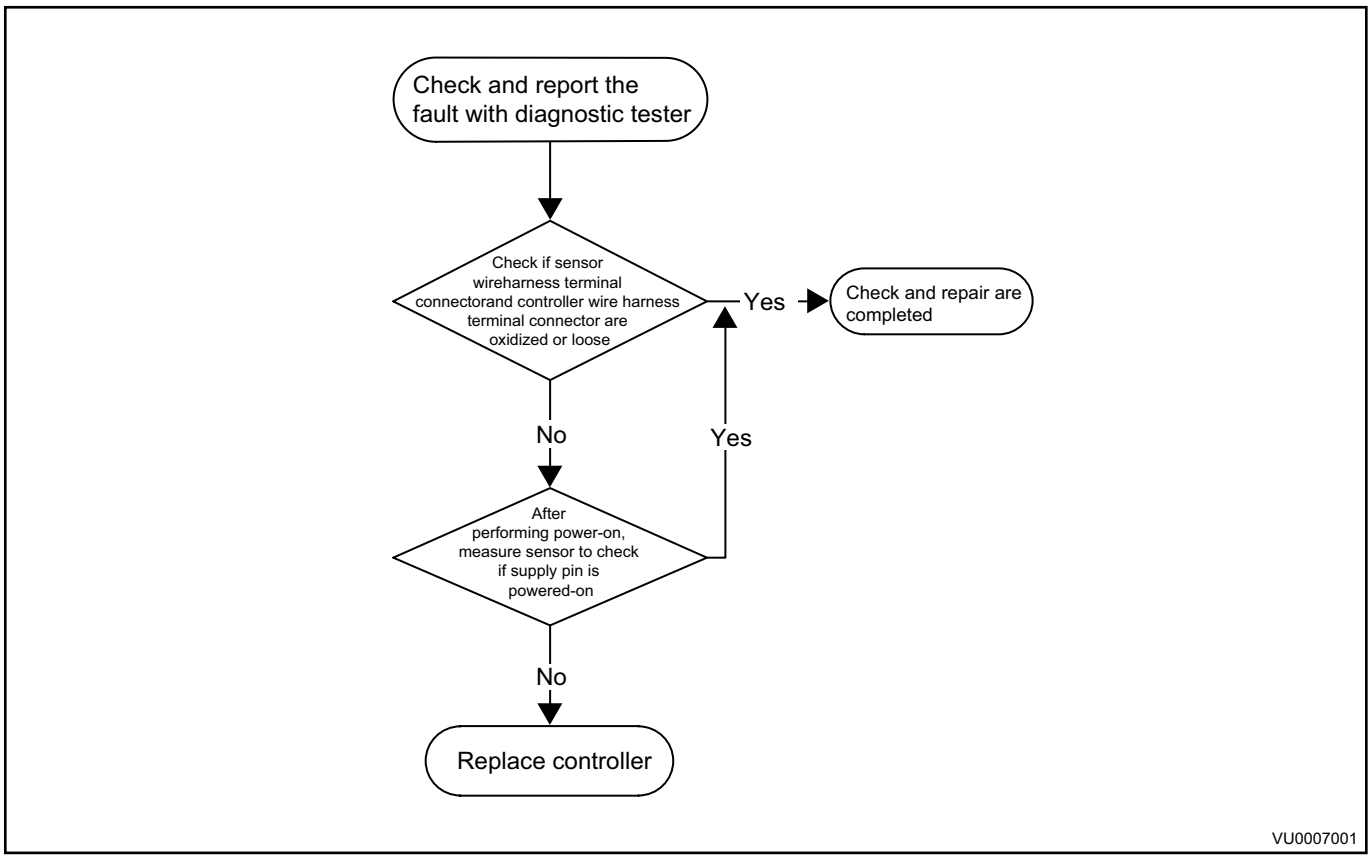
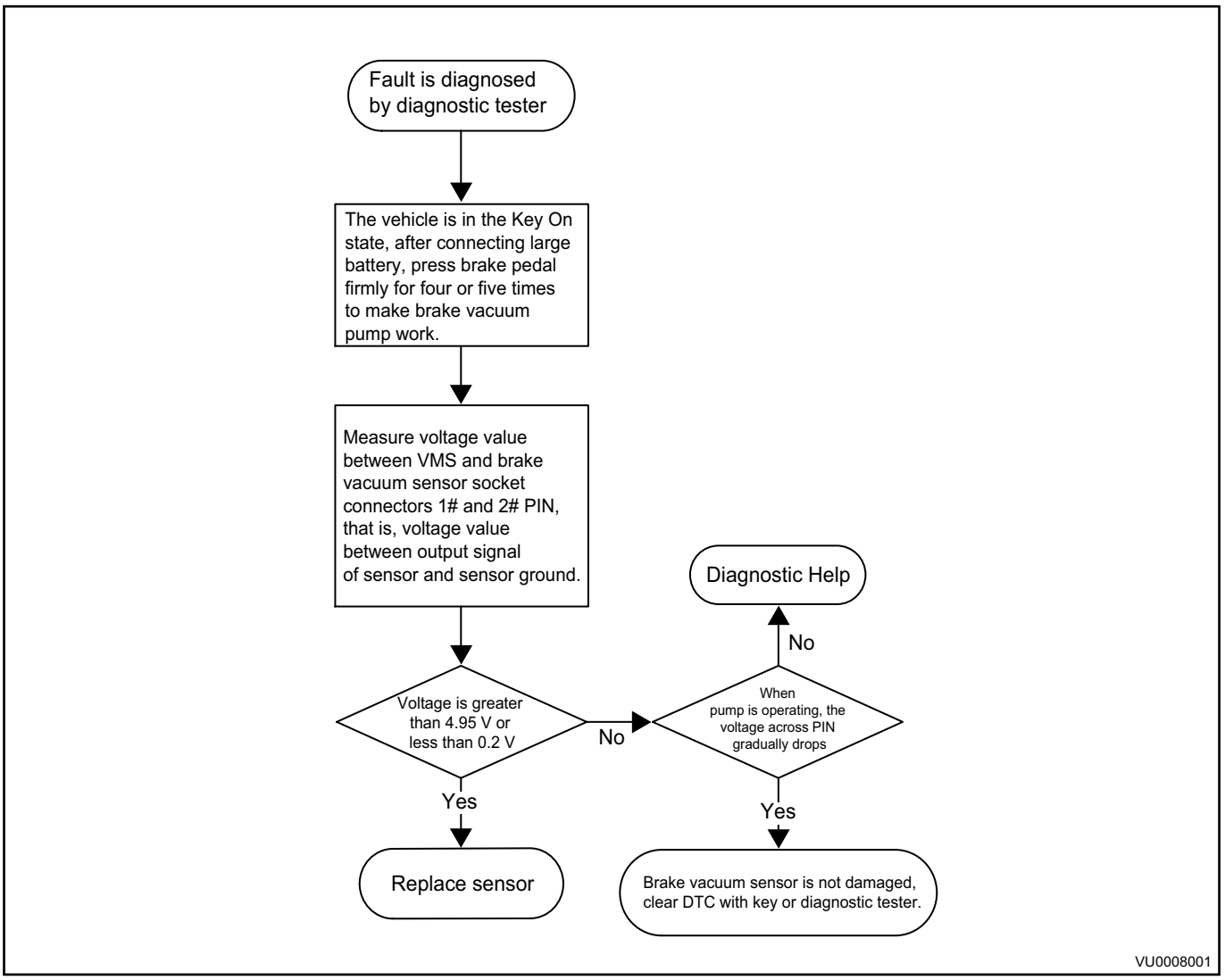
- A short circuit between brake vacuum pump sensor or accelerator pedal connector and ground can cause this fault.



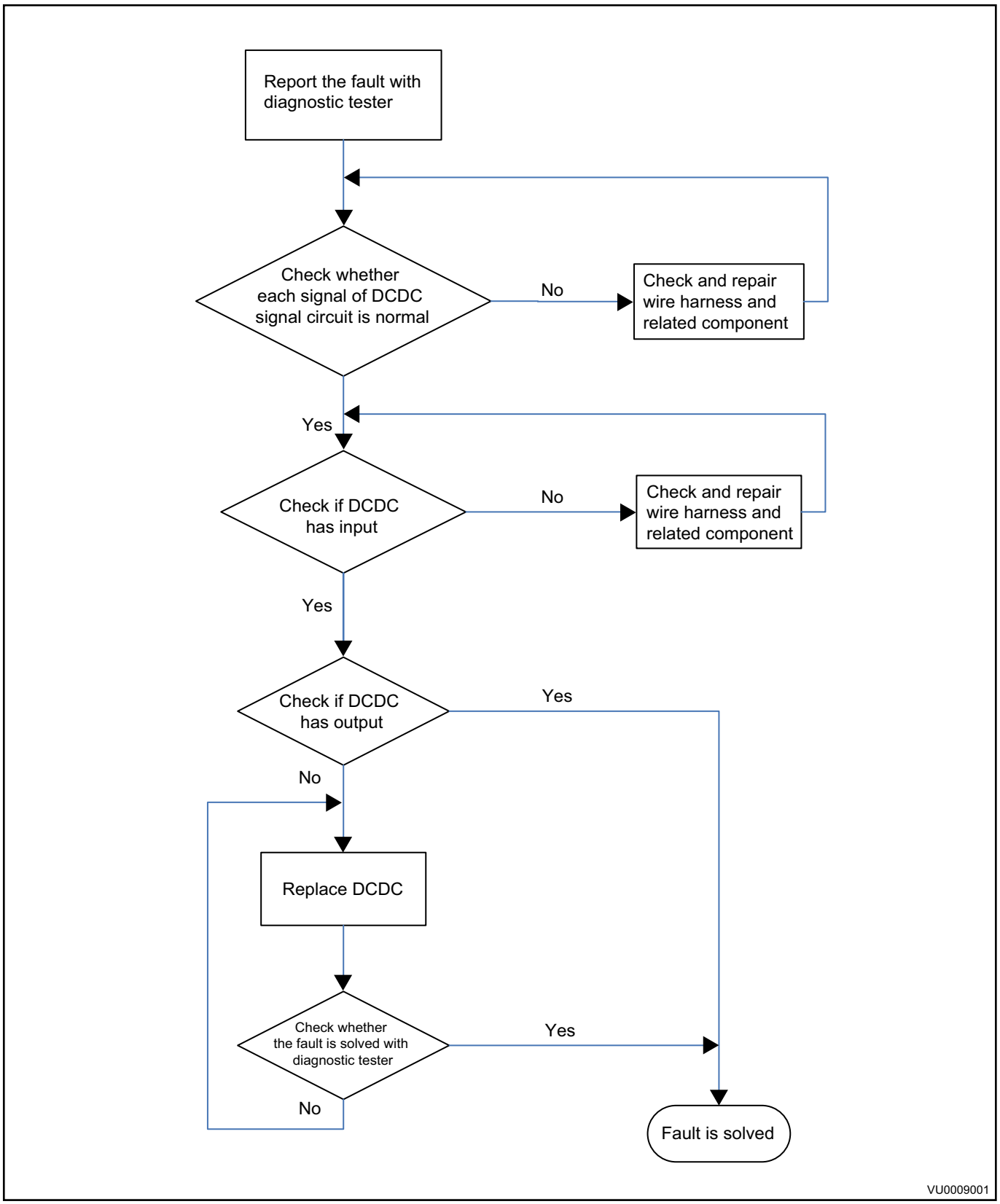
6. Brake Vacuum Pressure Sensor Fault P1A5A

   First perform power-on reset. If malfunction light cannot be cleared, check if wire harness is normal. If it is normal, replace brake vacuum pressure sensor.



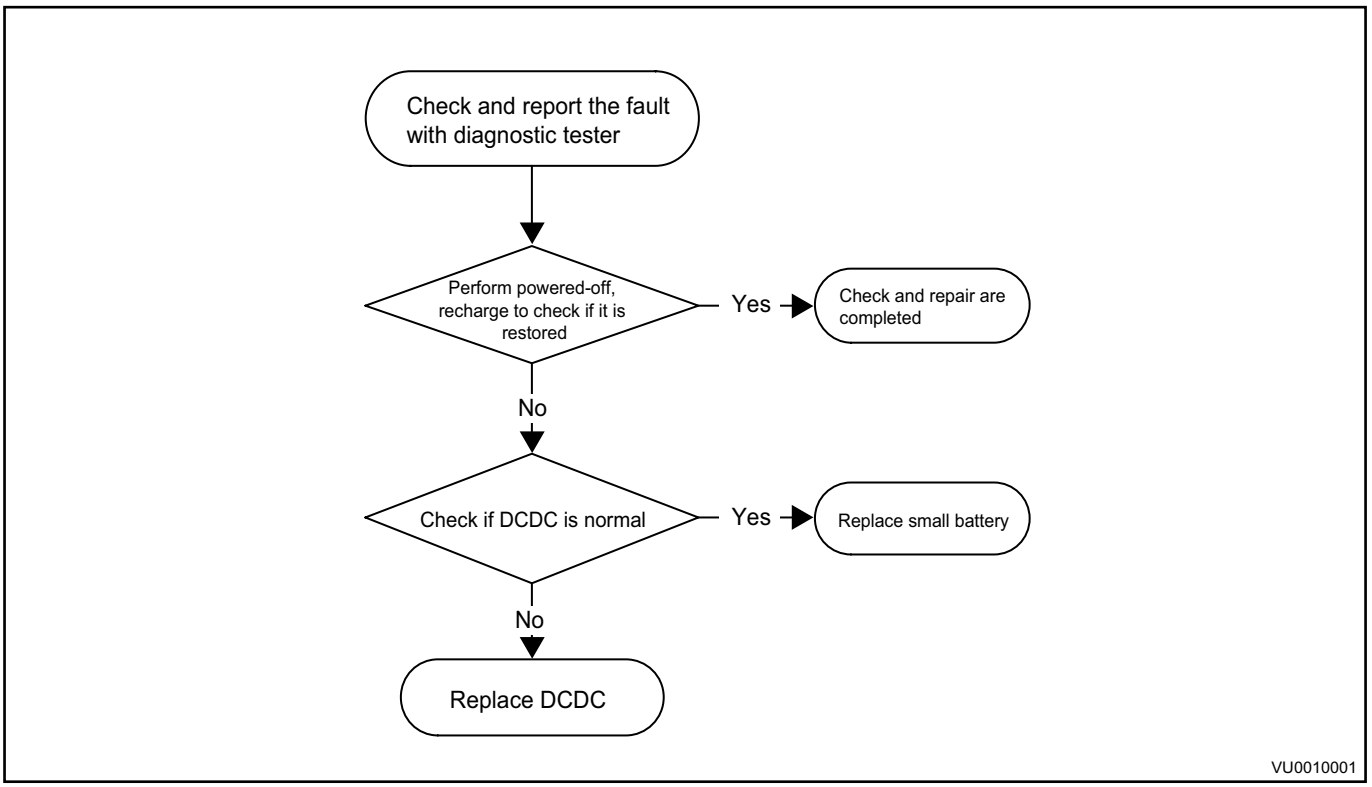
7. DCDC Charging Fault P1A5B

First perform power-on reset. If malfunction light cannot be cleared, check if wire harness is normal. If it is normal, replace DCDC.



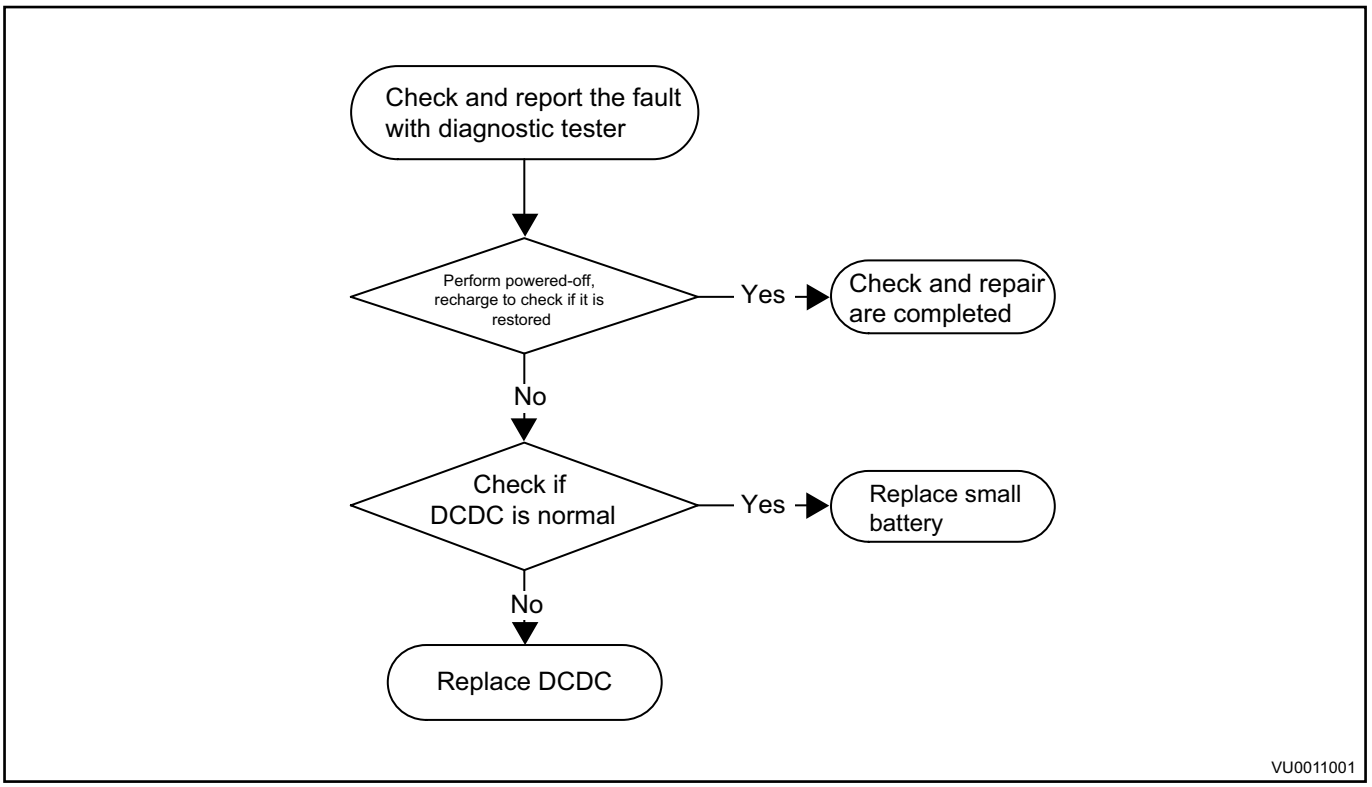
8. Low Voltage Battery Voltage Fault P1A5C

This fault may be caused by small battery feeding, perform charging, if the fault still cannot be repaired, check DCDC (refer to DCDC charging fault solution), if it is still normal, please replace small battery body.



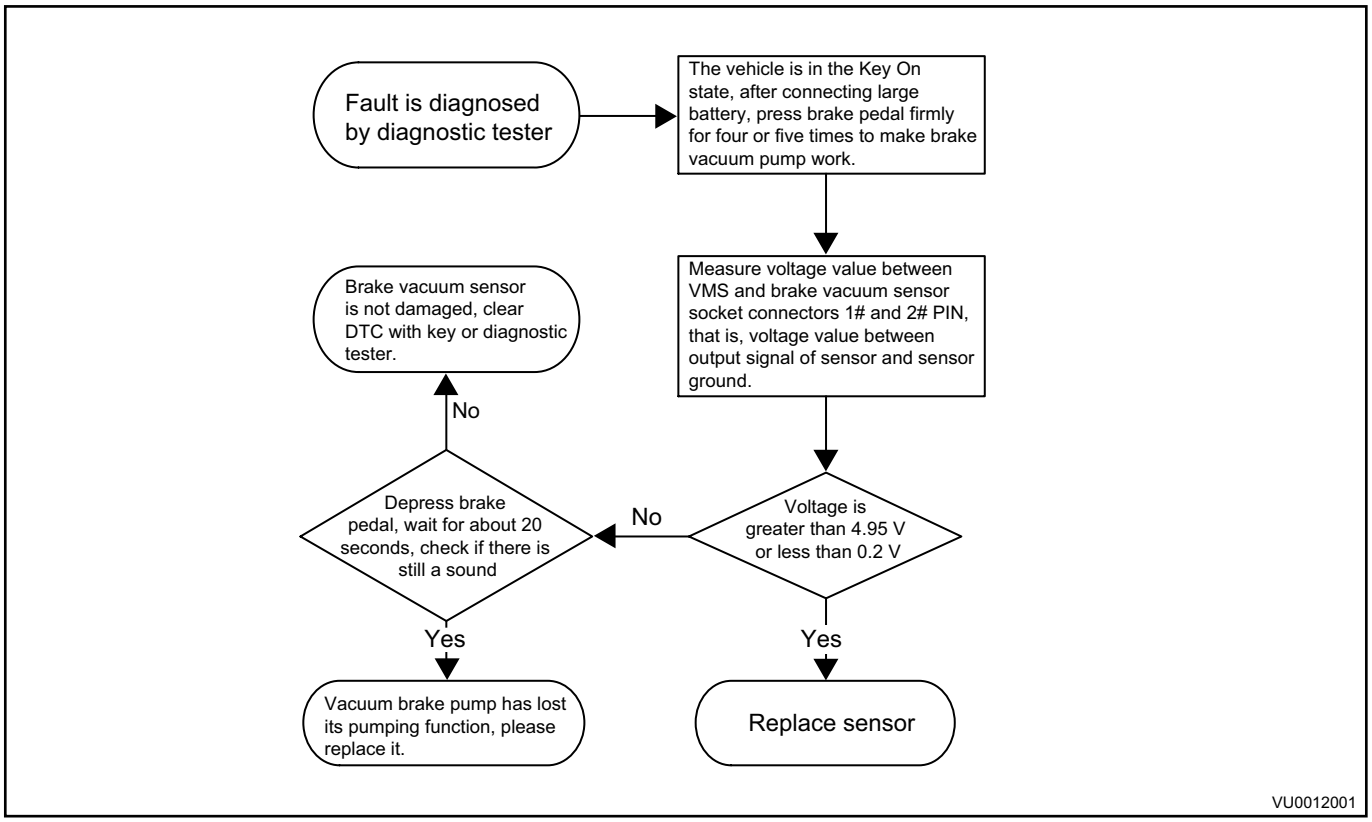
9. Brake switch fault P1A5D

First perform power-on reset. If malfunction light cannot be cleared, check if wire harness is normal. If it is normal, replace brake switch.



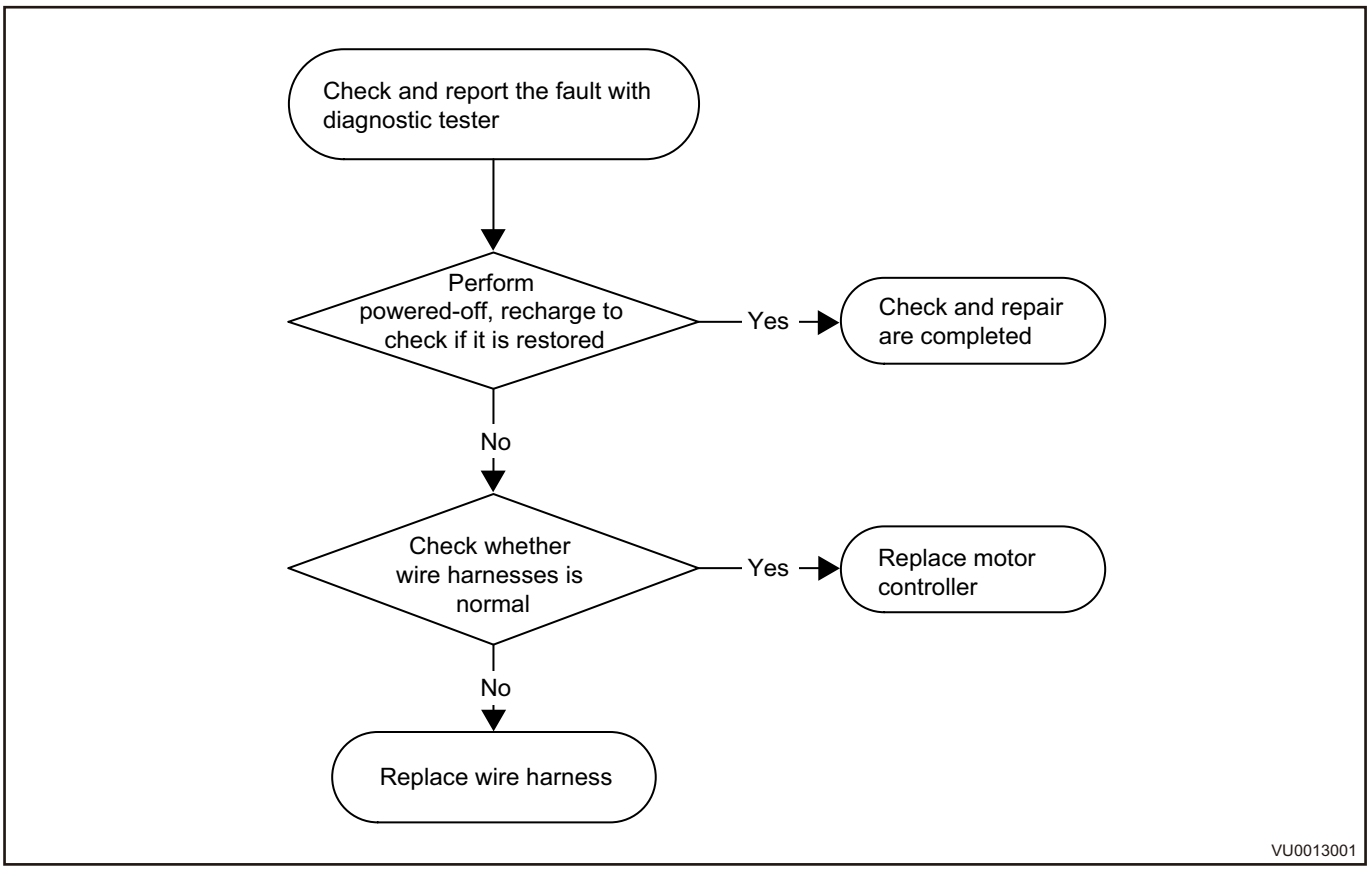
10. Vacuum Degree Sensor Signal Implausible P1A5E

First perform power-on reset. If malfunction light cannot be cleared, depress brake pedal a few times and measure voltage between PIN1 and PIN2. If the voltage is outside 4.95 V - 0.2 V, please replace sensor.



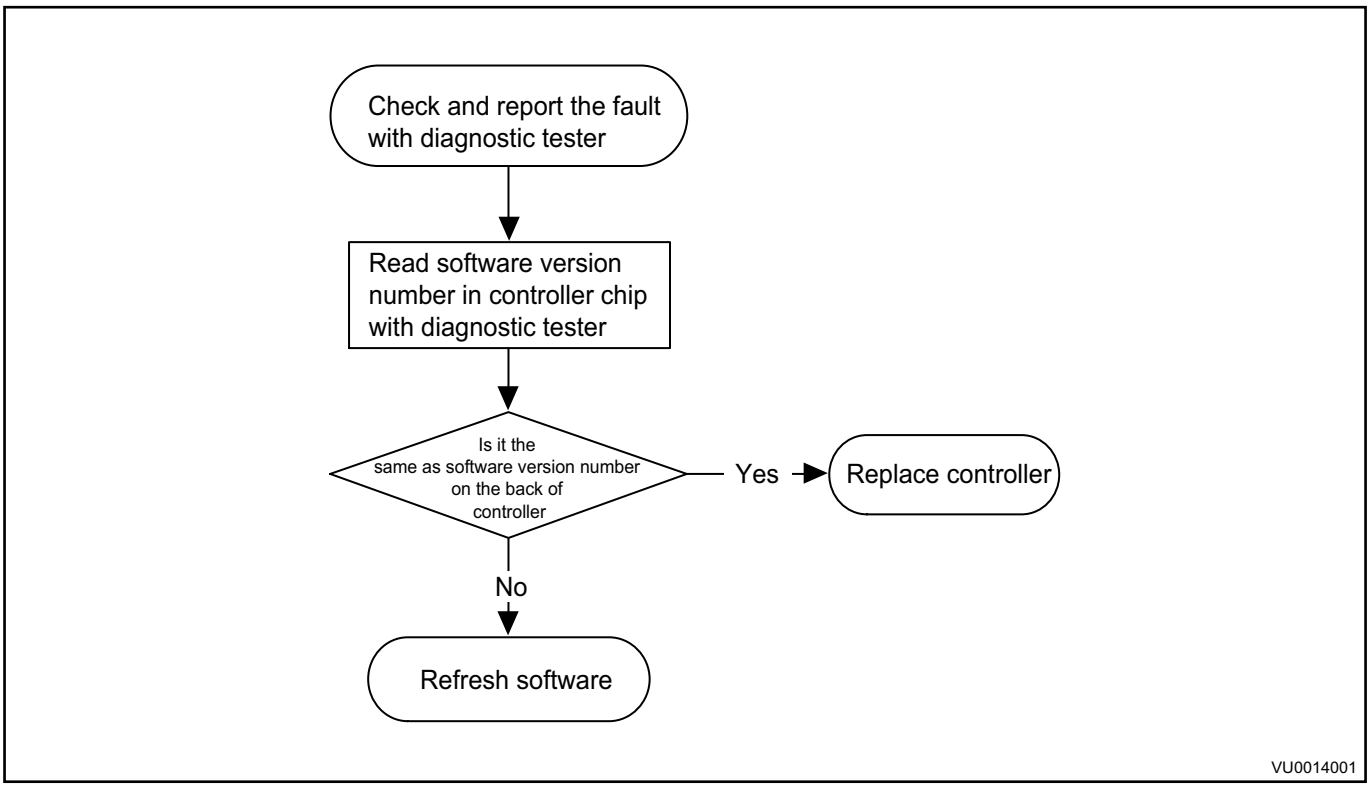
11. Vehicle Speed Signal Implausible P1A5F

First perform power-on reset. If malfunction light cannot be cleared, check if wire harness is normal. If it is normal, replace MCU controller.



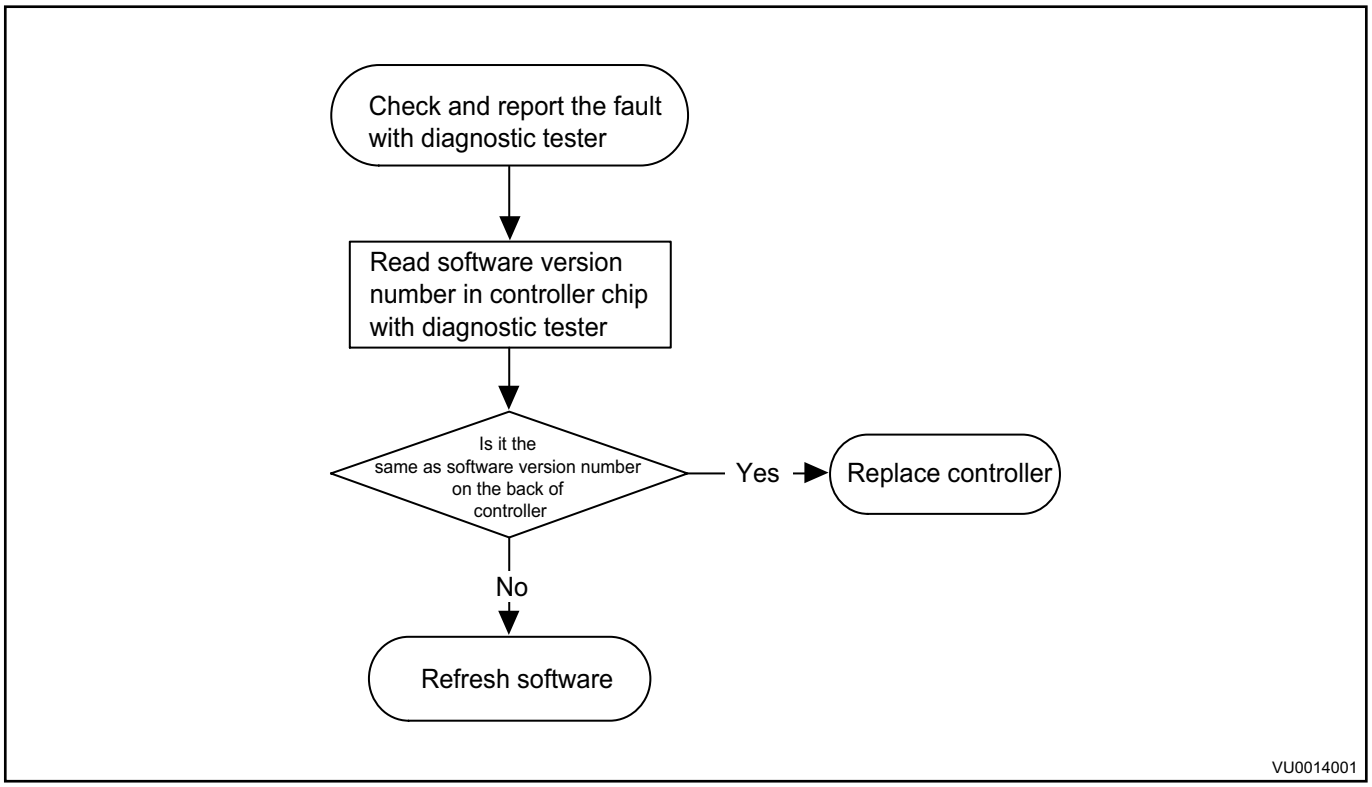
12. EEPROM Data Lost P1A60

This fault is the result of OBD module diagnosis after CHECKSUM detection of EEPROM fails when underlying software copies the data in EEPROM to RAM.



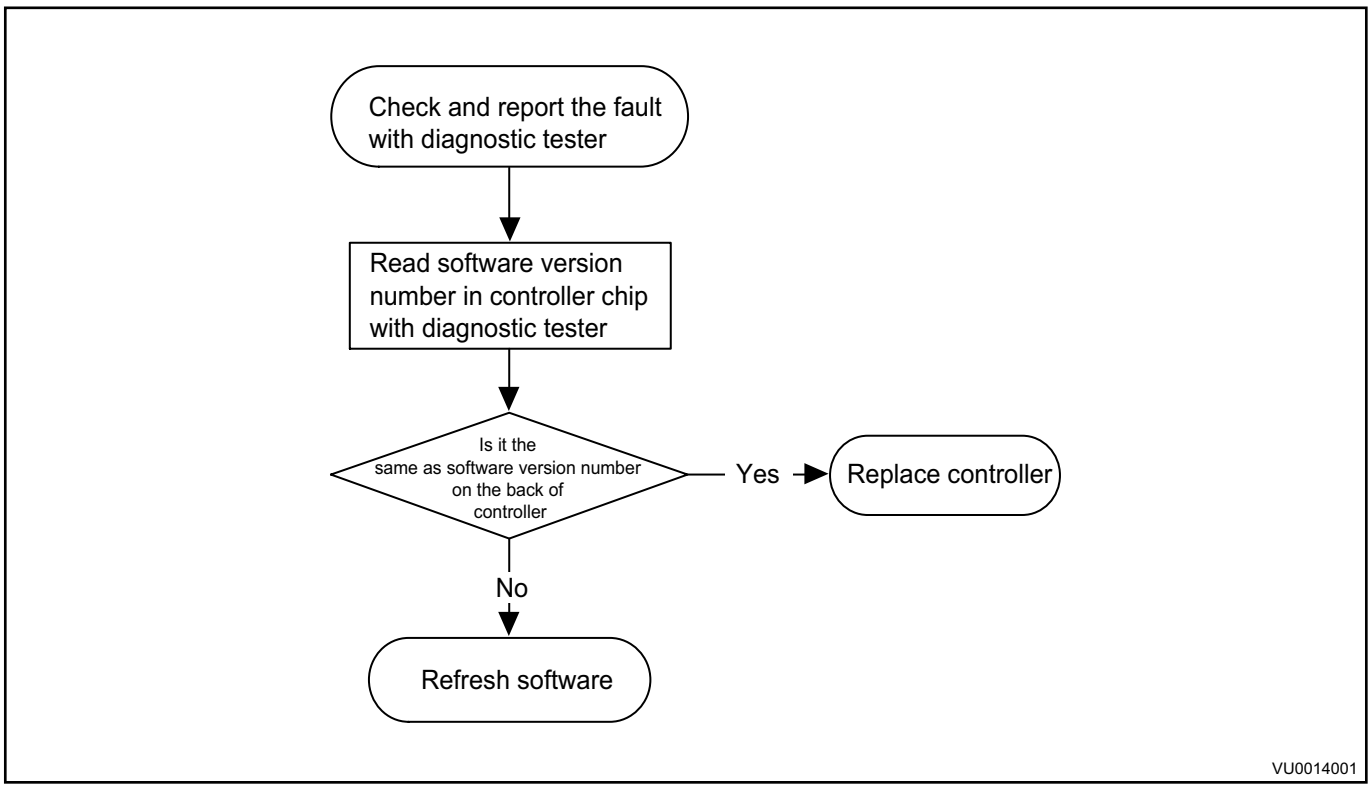
13. VCU Controller Application Overrun Fault P1A61

The DTC is caused by abnormal execution of software program or damage to inside crystal oscillator of controller, the program running time in one cycle exceeds the execution cycle time of program.



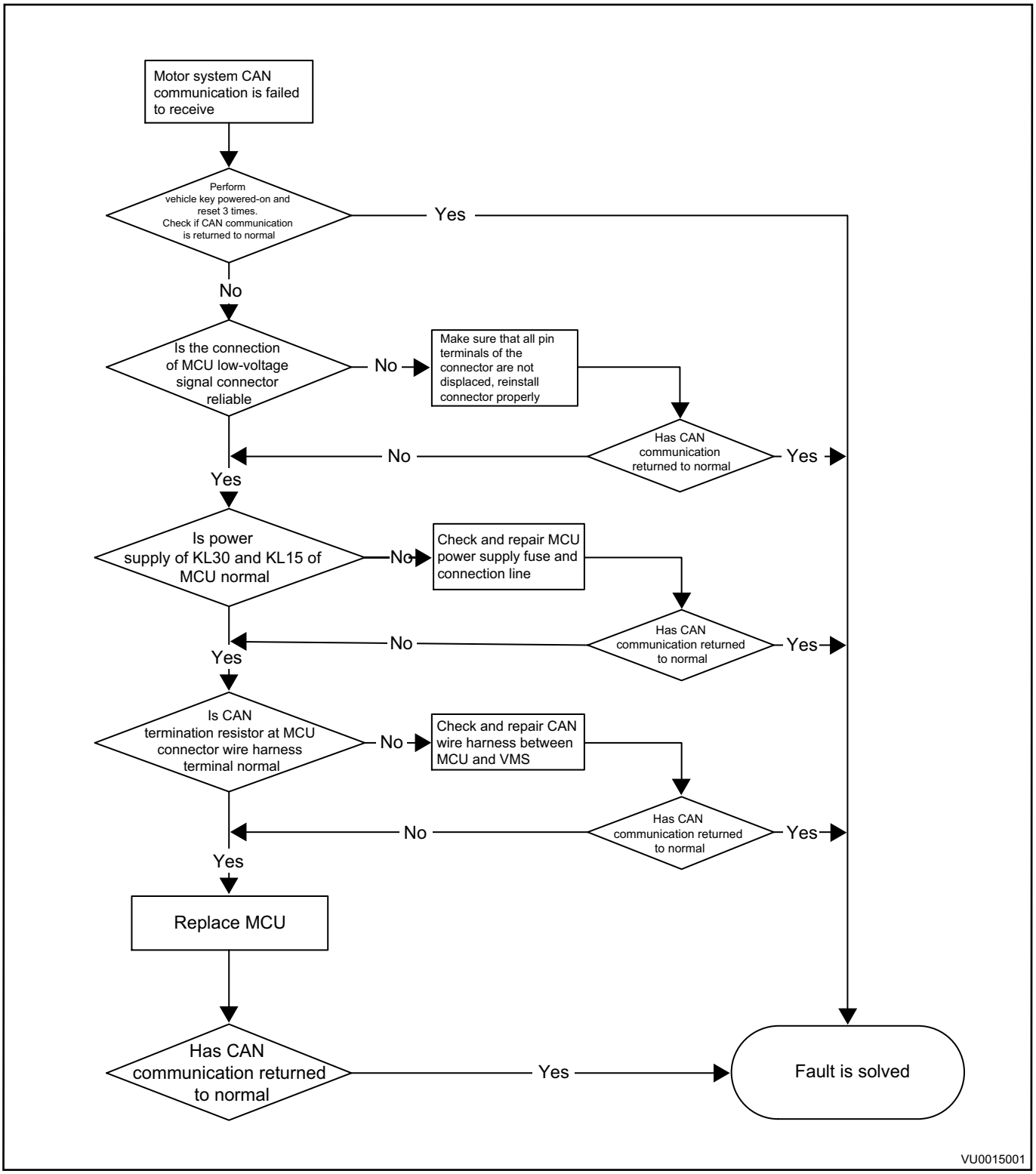
14. Software Watchdog Fault P1A62

An error occurred in software program, sends a restart signal to chip.



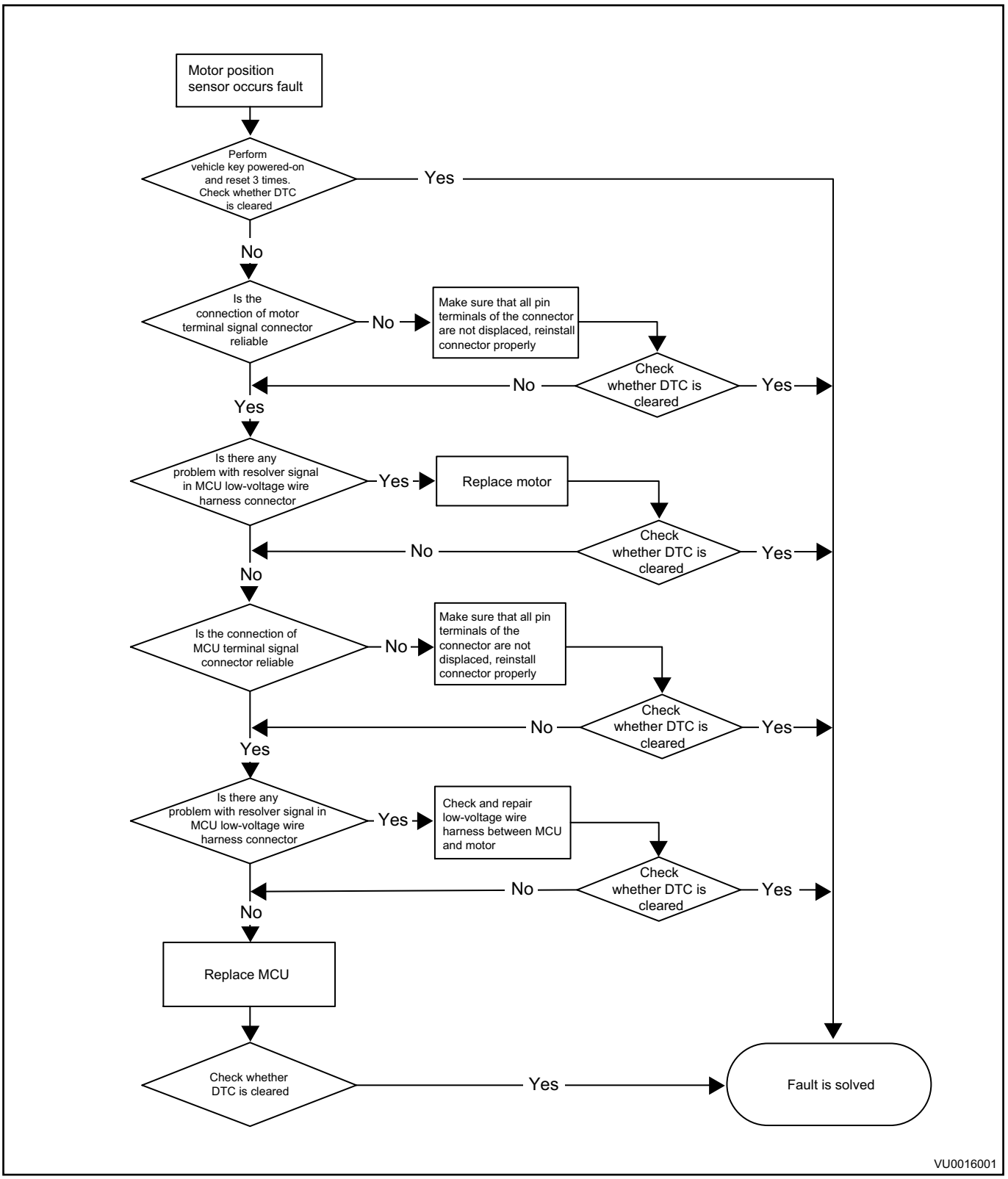
15. Motor System CAN Communication Receiving Failed U0293

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, check whether the low voltage signal connector of the motor controller contacts reliably, and then check whether the power signal in the wire harness and the CAN terminal resistance are faulty. If the fault still cannot be cleared after troubleshooting, please replace the motor controller assembly. The specific process is as follows:



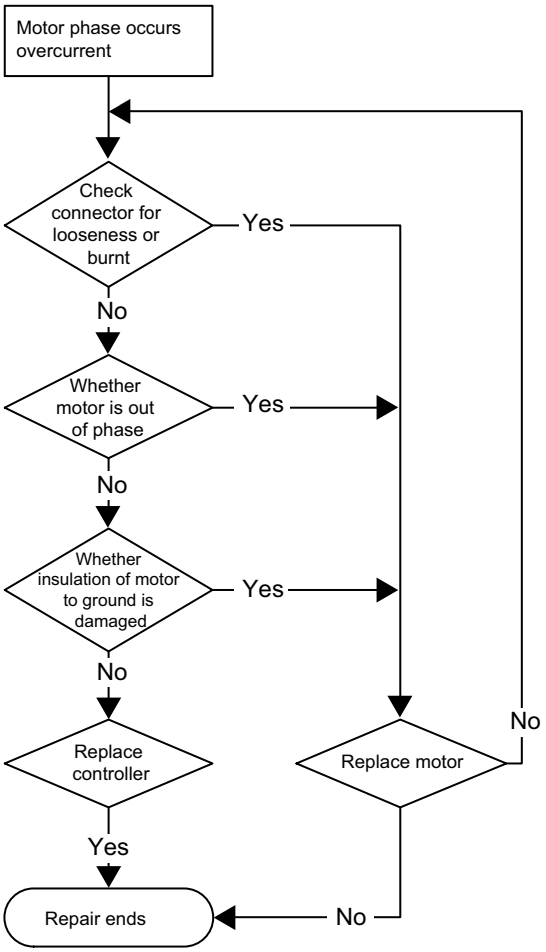
16. Motor Position Sensor Fault P1A63

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, check whether the motor terminal signal connector contacts reliably, and check whether there is any problem with the rotary wire harness signal of the wire harness (refer to signal detection method of wire harness connector terminals and reference value above). If there is any problem, replace the motor. Then check whether the low voltage signal connector of the motor controller contacts reliably, and check whether there is any problem with the rotary wire harness signal of the wire harness. If the fault still cannot be cleared after troubleshooting, please replace the motor controller assembly. The specific process is as follows:



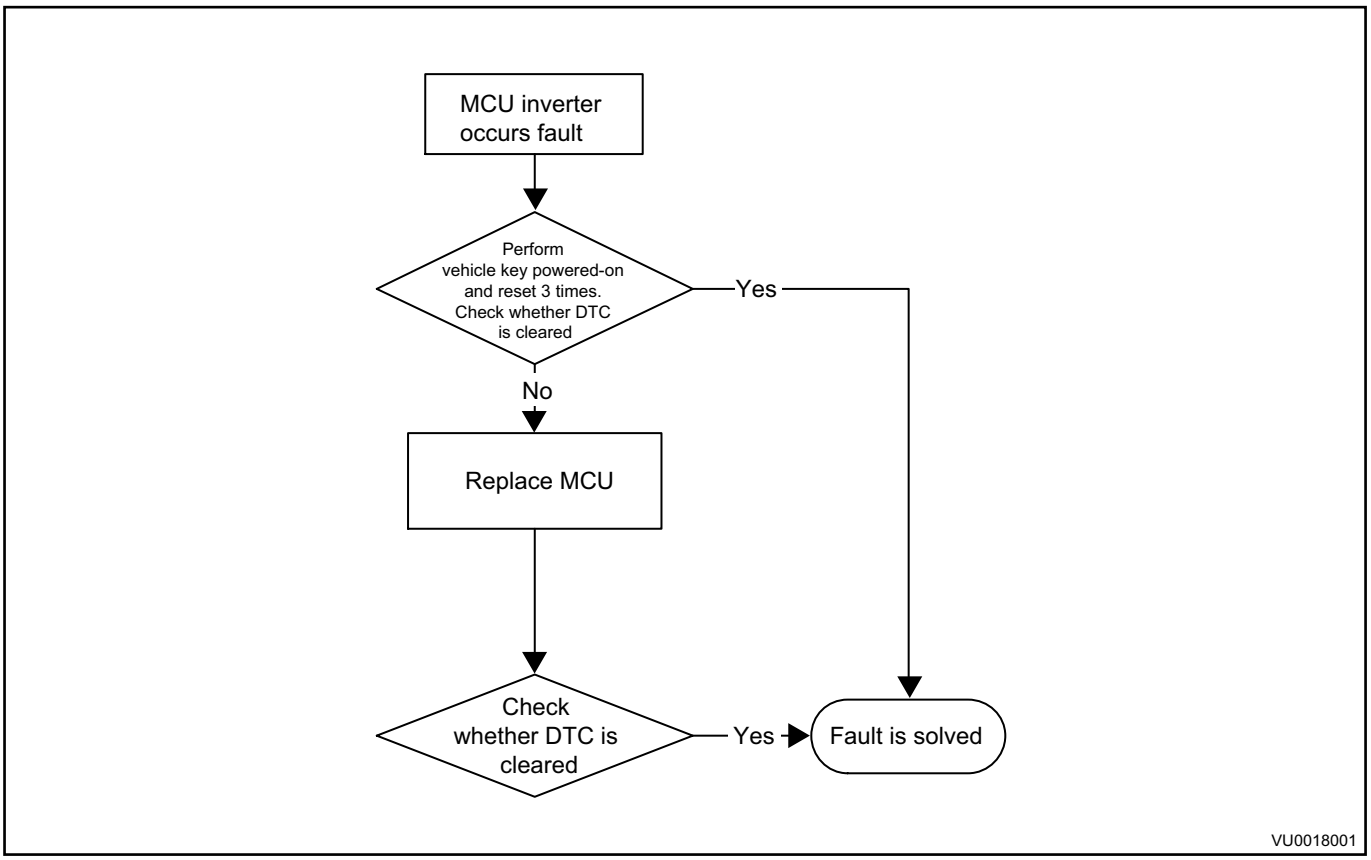
17. Phase Electronic Overcurrent Fault P1A64

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, the specific process is as follows:



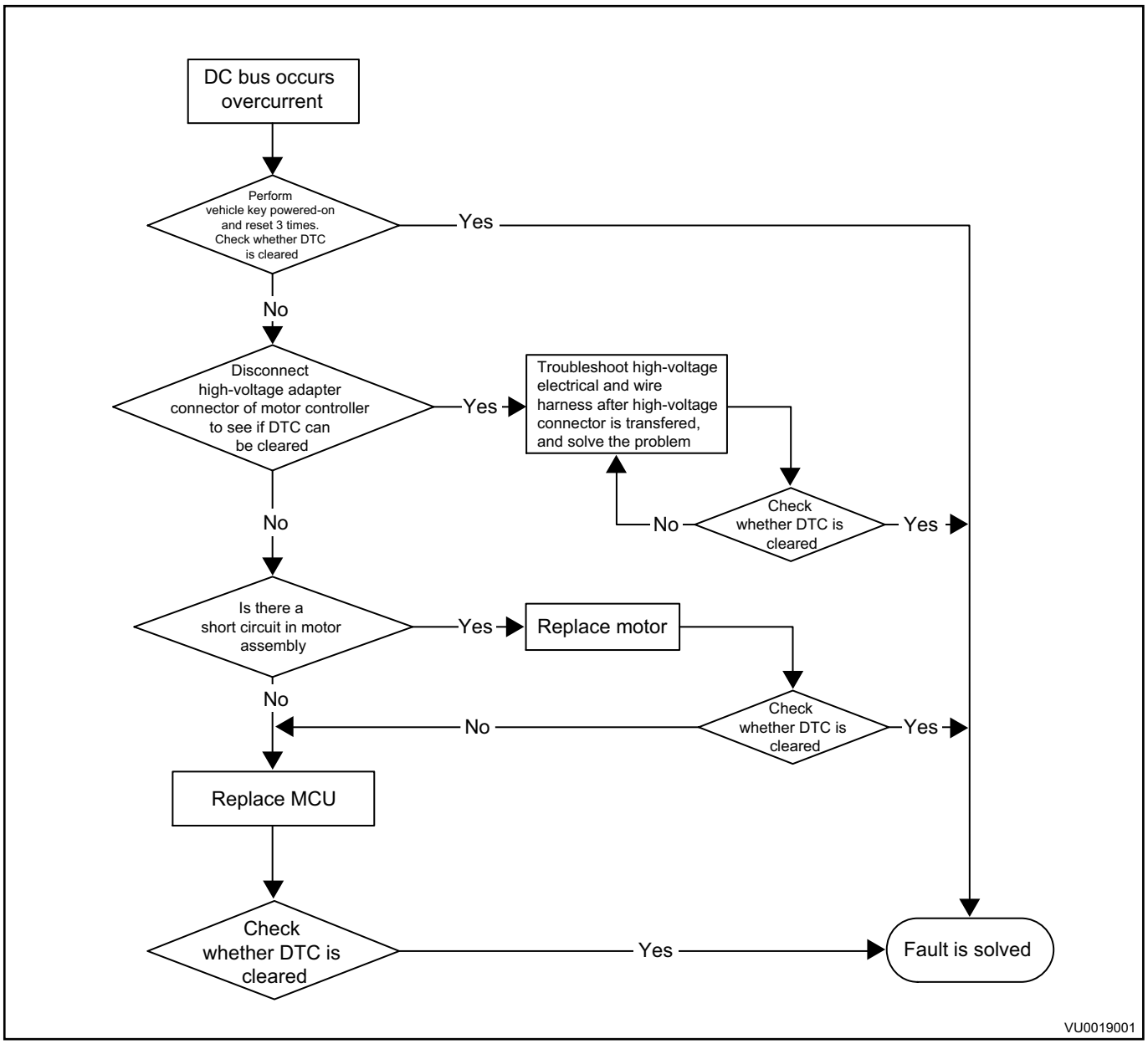
18. MCU Inverter Fault P1A65

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:



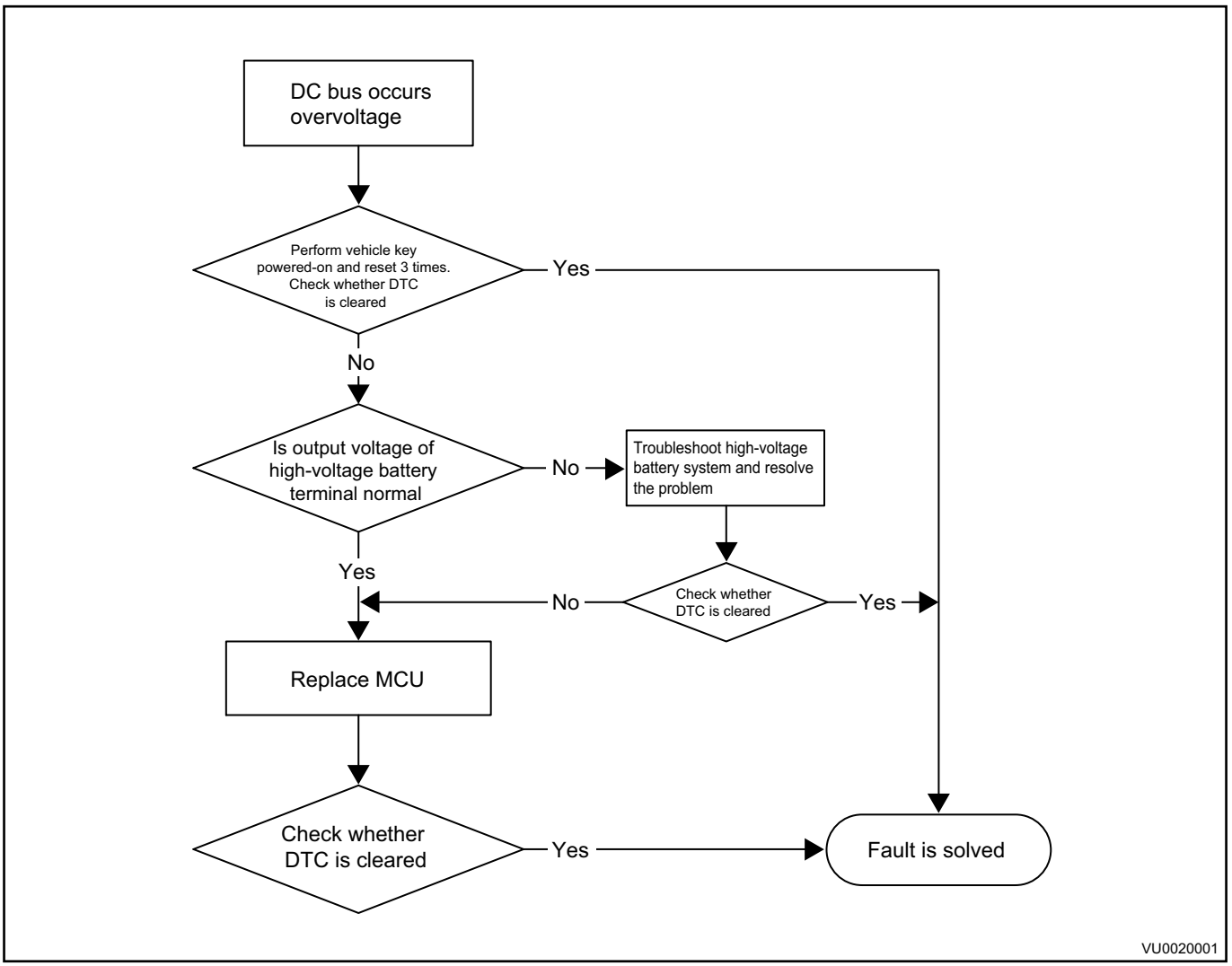
19. DC Bus Overcurrent Fault P1A66

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, disconnect the high voltage connector of the motor controller. If the fault still cannot be cleared, check whether there is a short circuit in motor assembly. If so, replace the motor. If not, replace the motor controller assembly. The specific process is as follows:



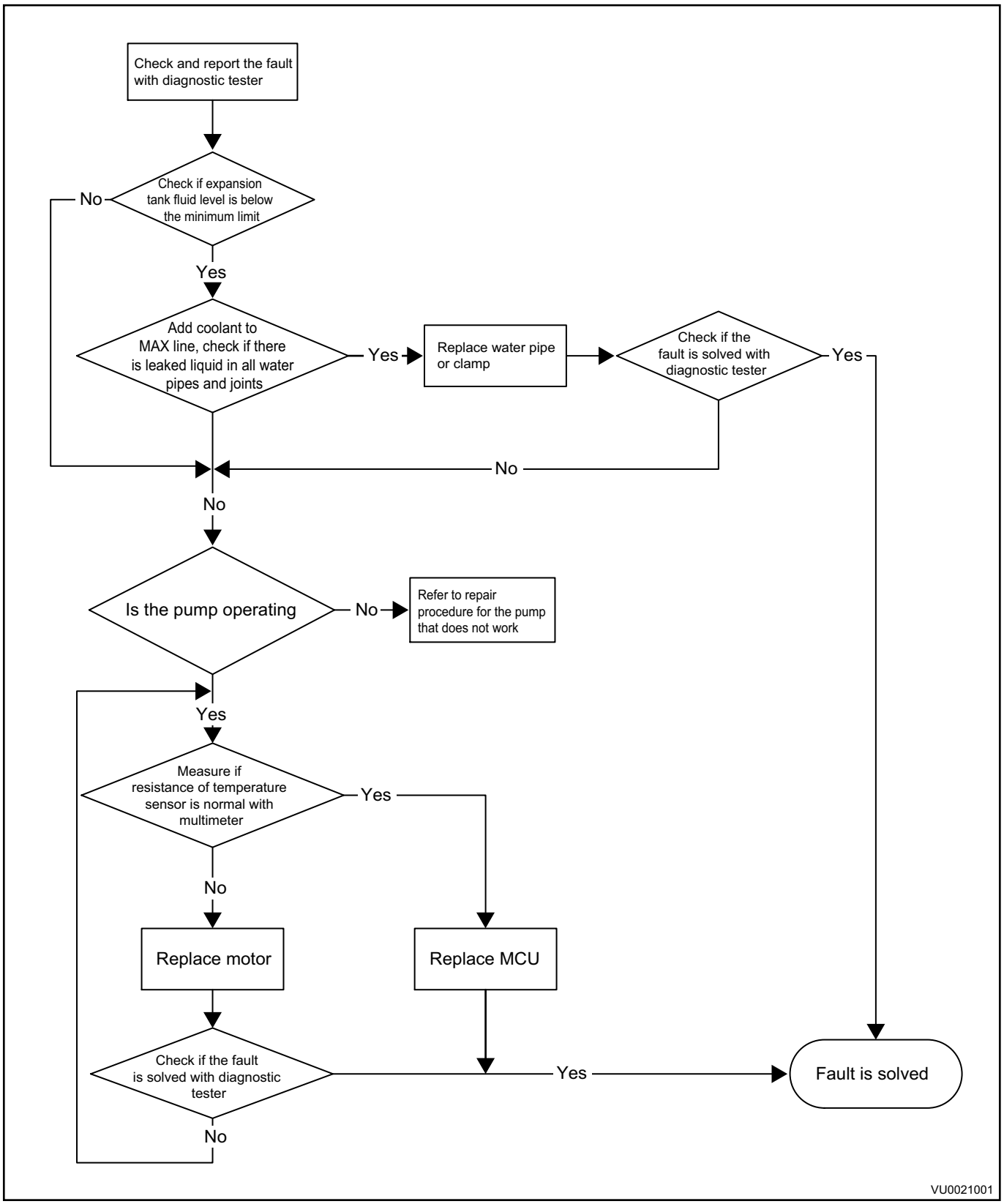
20. DC Bus Overvoltage Fault P1A67

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, check whether the output voltage of high voltage battery is normal. If it is normal, replace the motor controller assembly. The specific process is as follows:



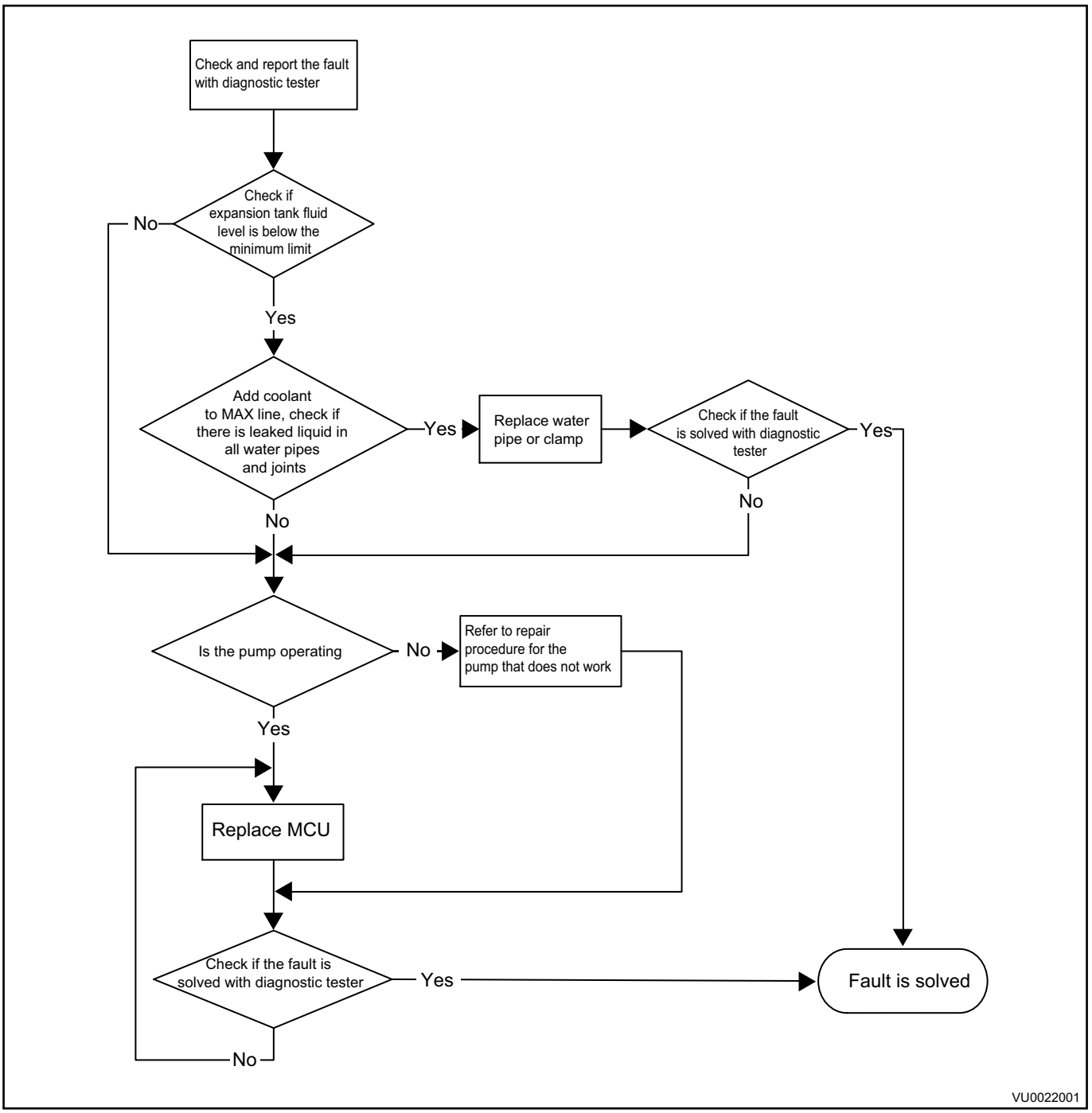
21. Motor Over-temperature Fault P1A68

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please judge according to the following logic.



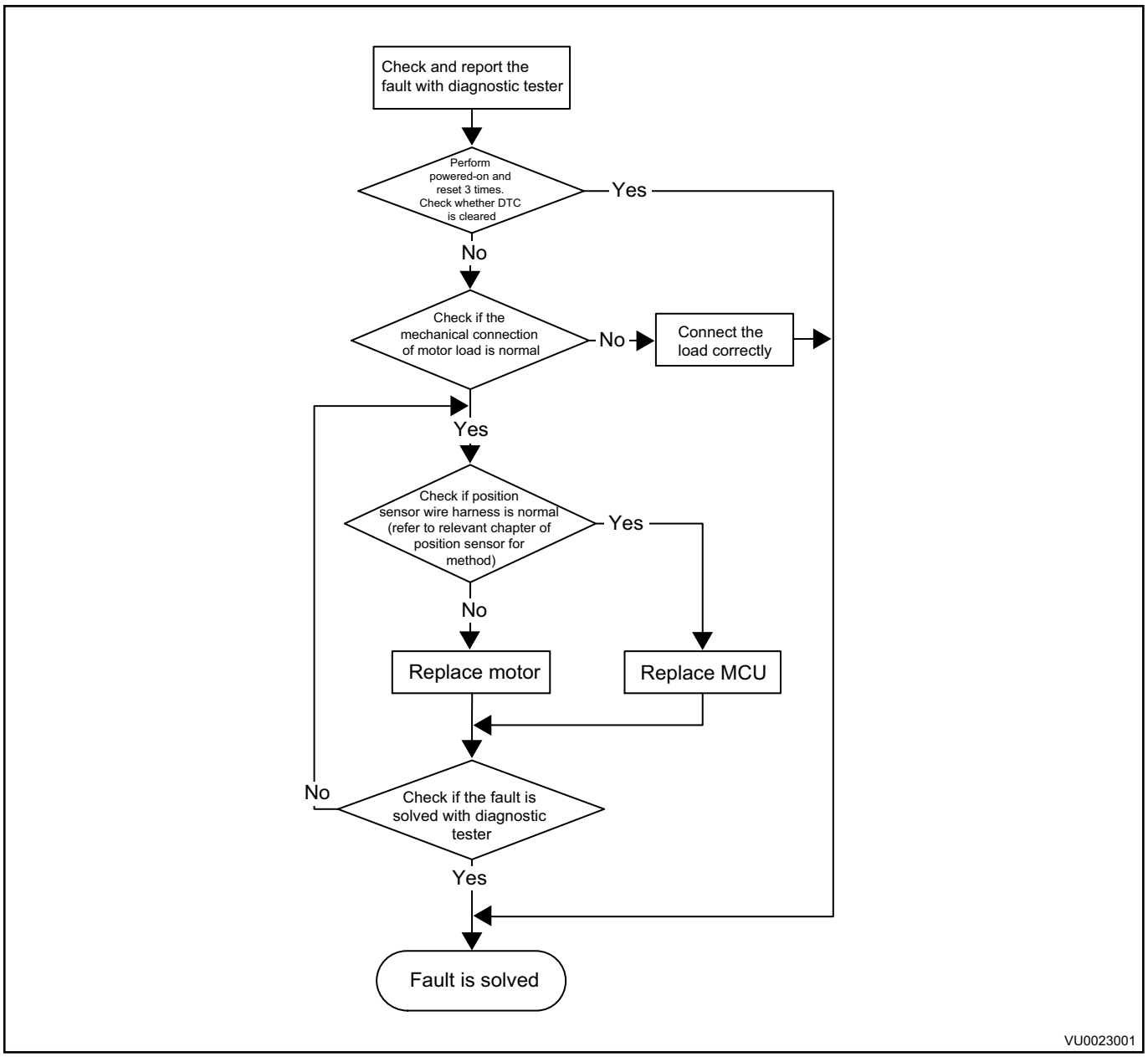
22. MCU Controller Over-temperature Fault P1A69

The MCU controller over-temperature fault is frequently reported while driving. Please check whether the cooling system operates normally. If it is normal, replace the motor controller assembly. The specific process is as follows:



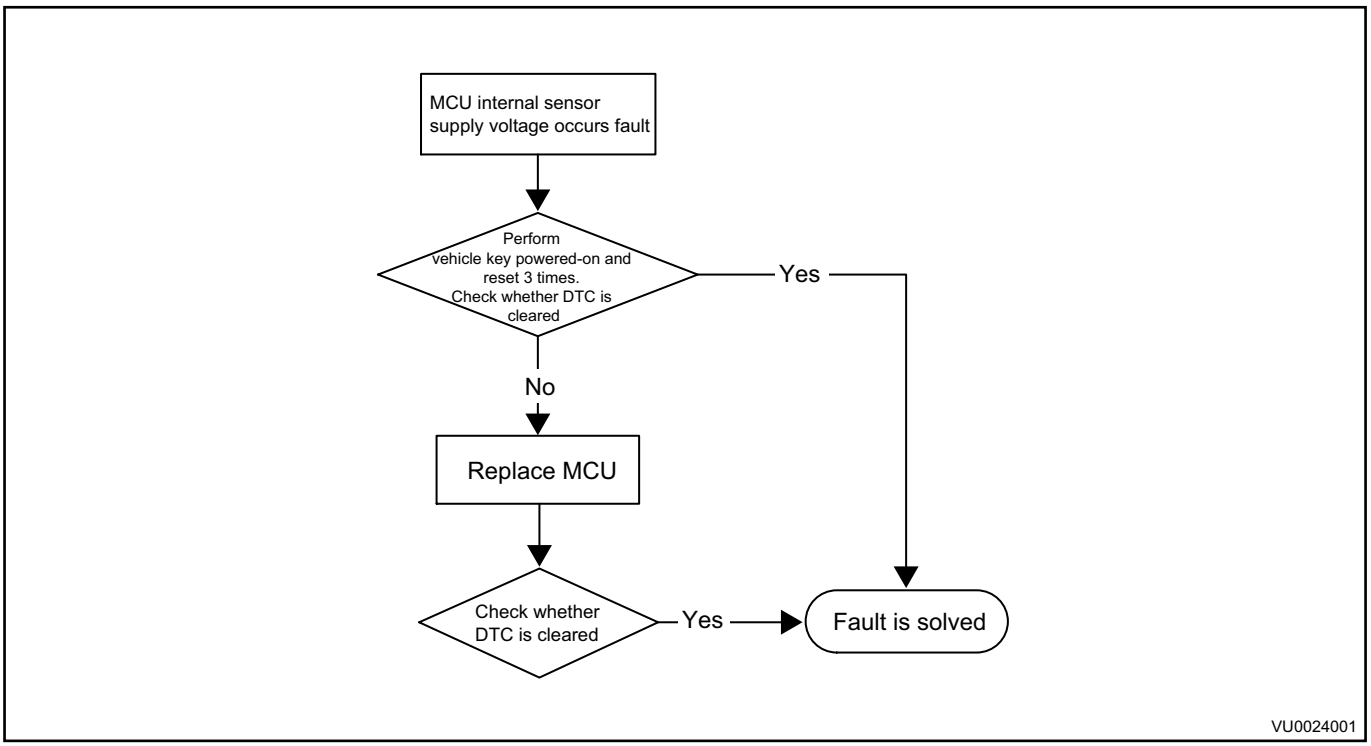
23. Motor Overspeed Fault P1A6A

Power-on and reset, the motor load may be disconnected, check the mechanical connection of the motor load, if it is normal, check whether the position sensor wire harness is normal, if it is normal, replace the motor controller, if not, replace the motor.



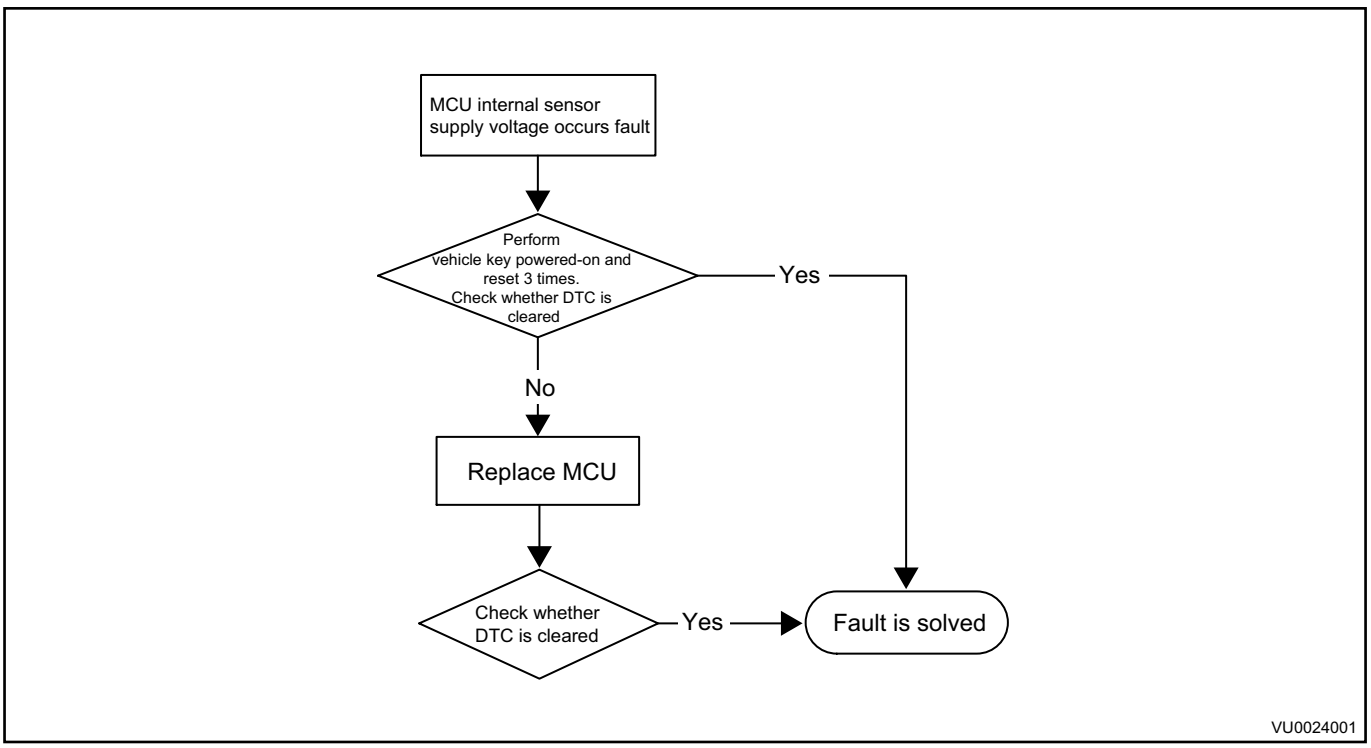
24. MCU Internal Sensor Supply Voltage Fault P1A6B

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly.



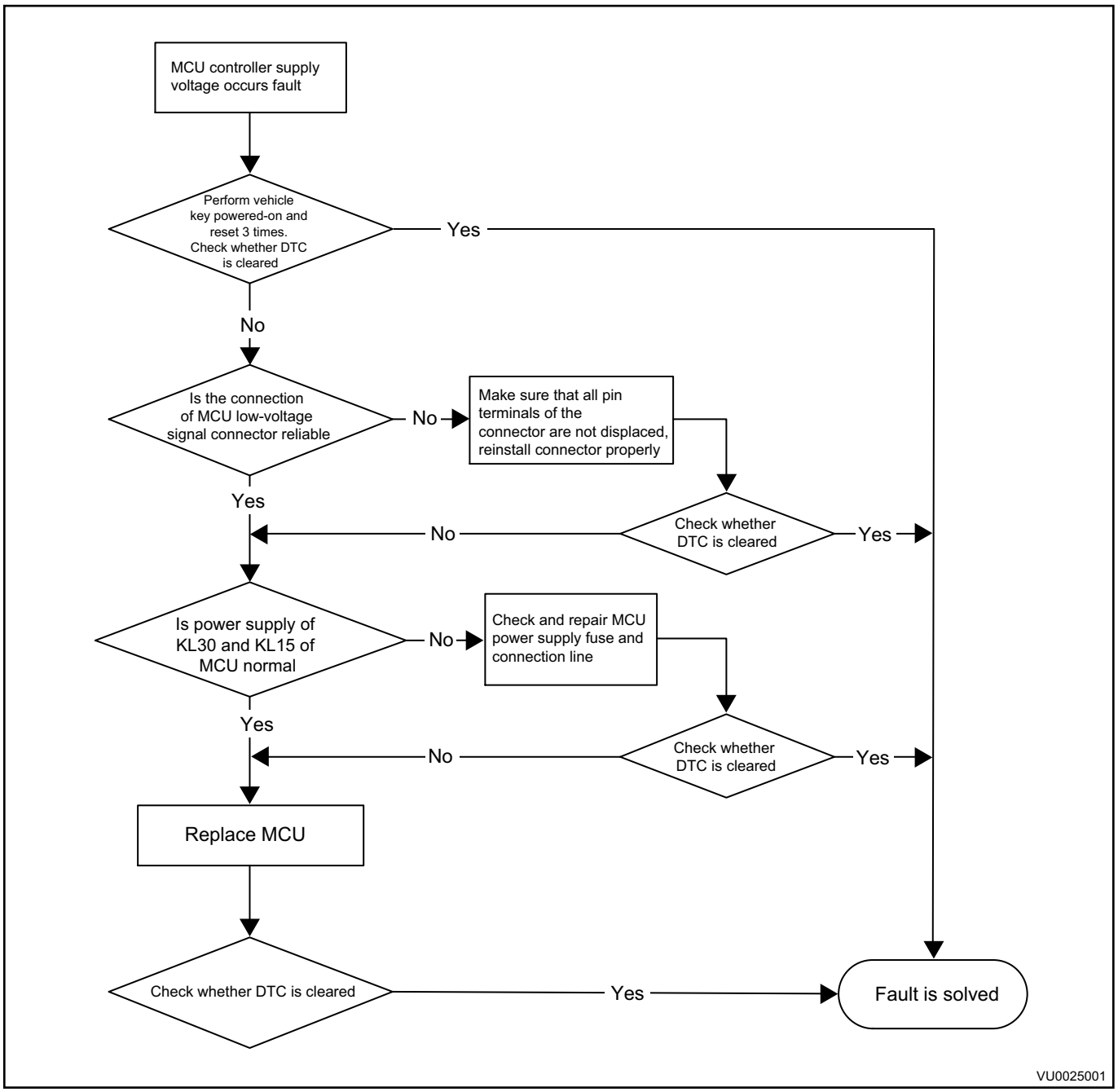
25. Gate Driver Supply Voltage Fault P1A6C

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly.



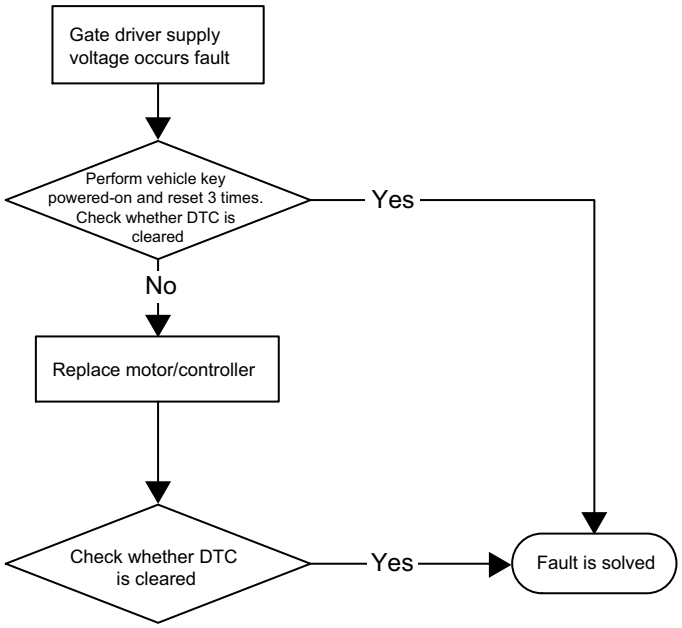
26. MCU Controller Supply Voltage Fault P1A6D

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, check whether the low voltage signal connector of the motor controller contacts reliably, and then check the power signal of the wire harness. If the fault still cannot be cleared after troubleshooting, please replace the motor controller assembly. The specific process is as follows:



27. MCU System Safe Fault P1A6E

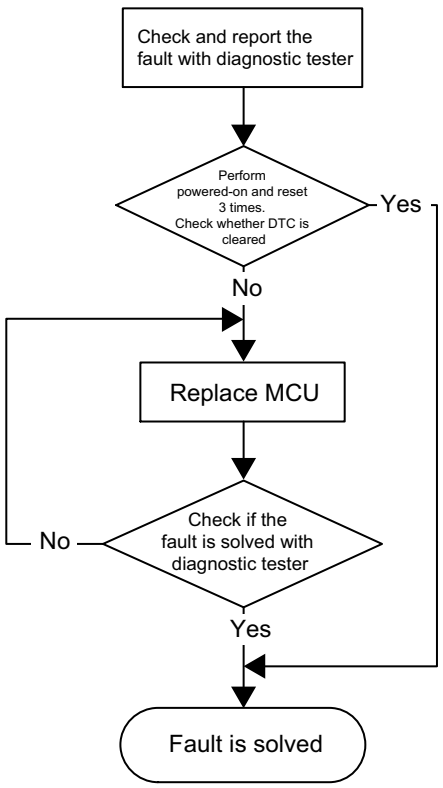
First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:



VU0026001

28. MCU Mode Error P1A6F

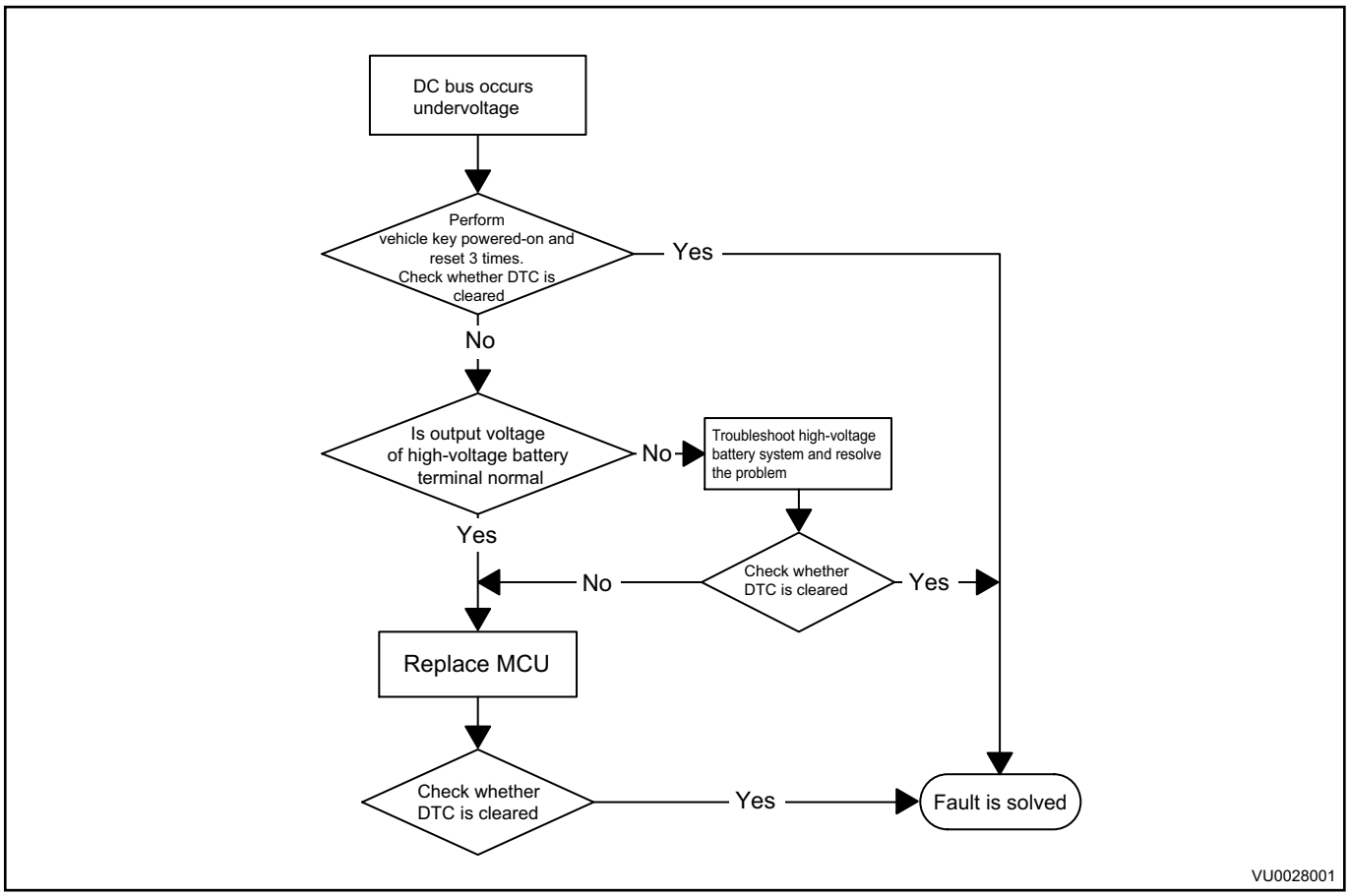
First, use the vehicle key to power on and reset. If the fault cannot be cleared, please replace the controller.



VU0027001

29. DC Bus Undervoltage Fault P1A70

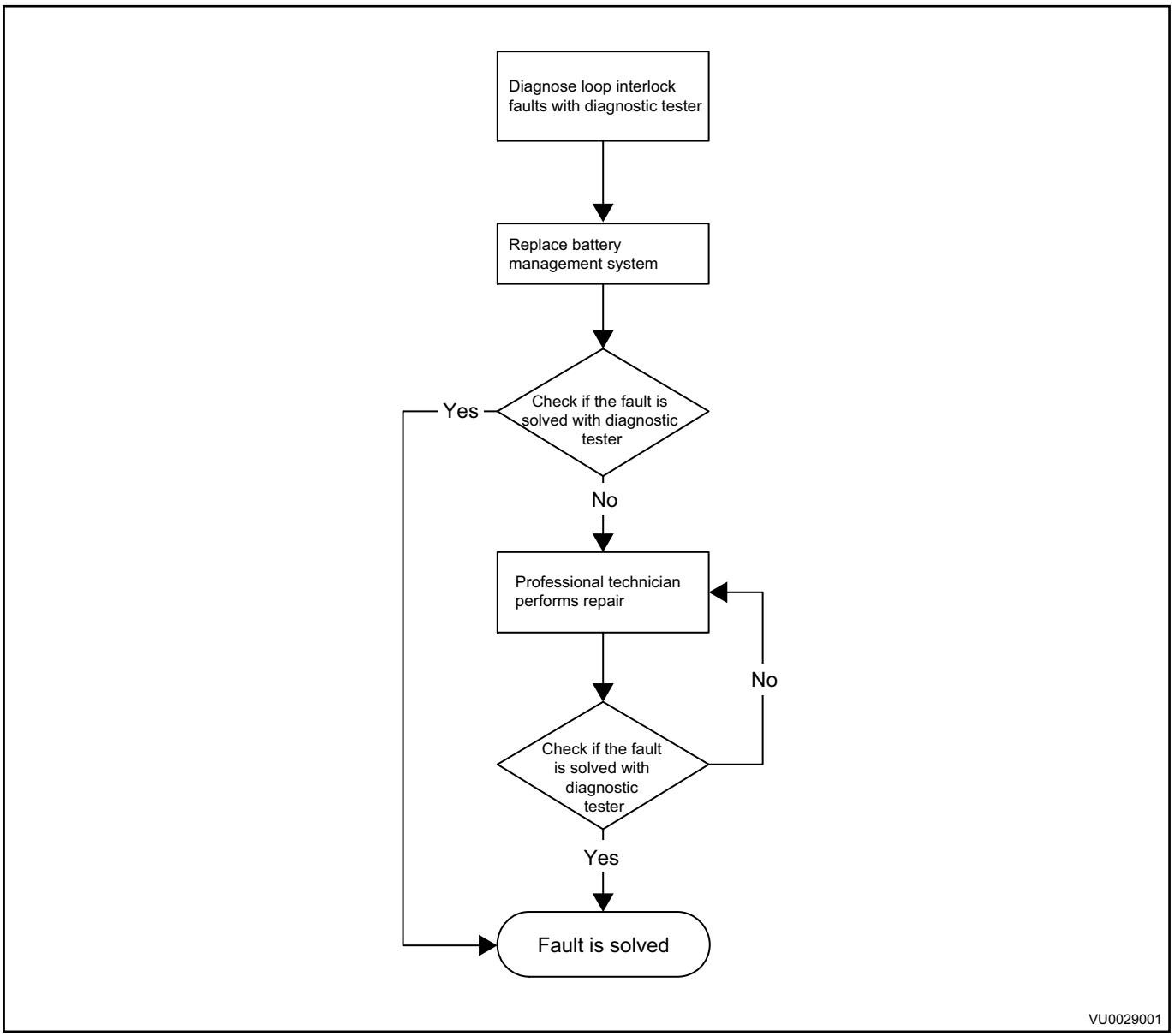
First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:



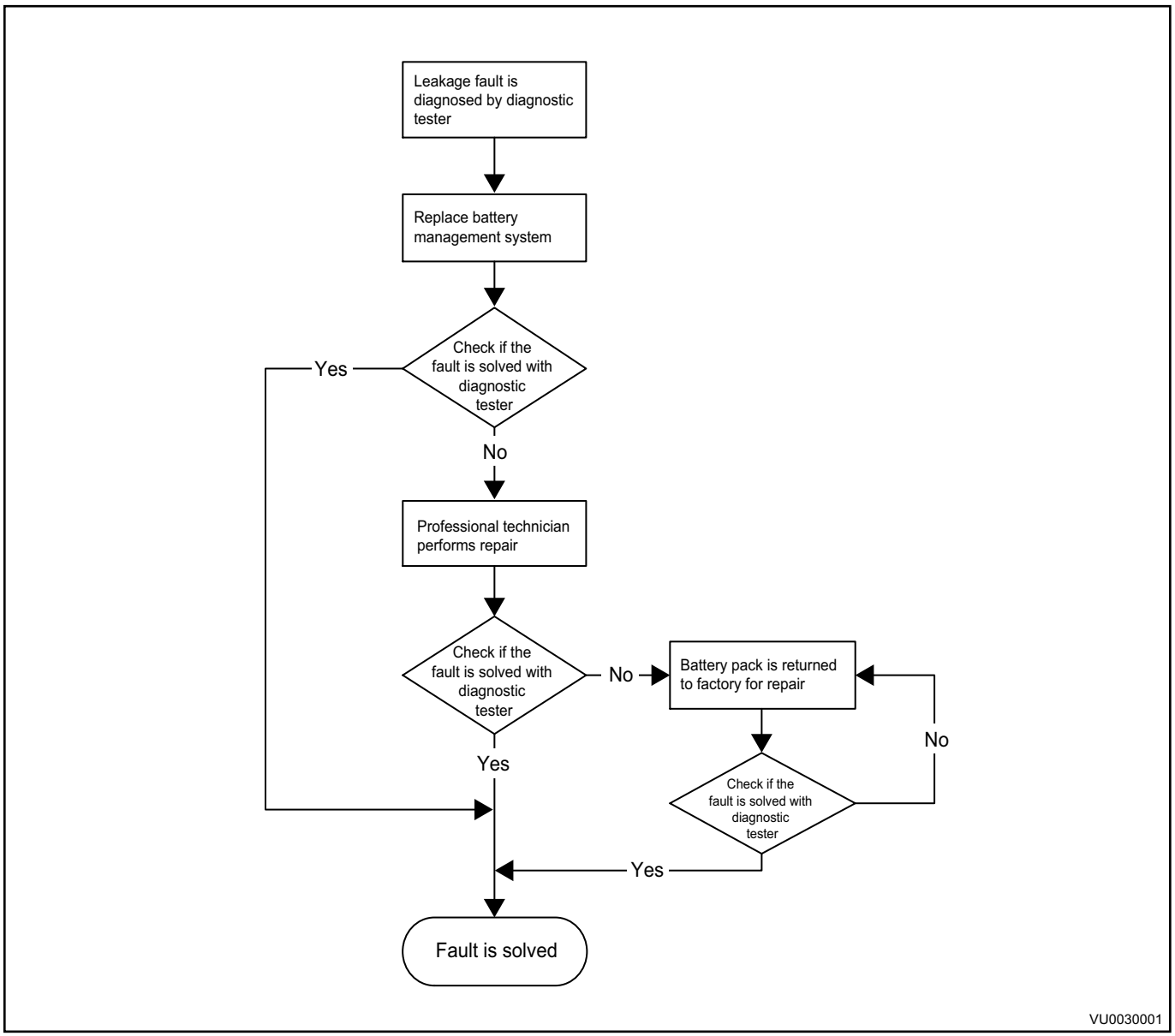
30. Gate Driver Desaturated Fault P1A7E

It is a hardware fault. Do as follows. First perform power-on reset. If malfunction light cannot be cleared, replace motor controller.

31. Power Battery Loop Interlock Fault P1A81



32. Power Battery Leakage Fault P1A82



33. Power Battery Management System Relay Fault P1A83

For detailed solutions, please refer to BMS repair section.

34. MOSTFET Fault P1A84

After this fault occurs, there is no need to power-on and reset to clear the fault. First, check if there is short in related connector connected with VCU and wire harness or if wire harness is exposed. If so, please replace this part of connector and wire harness. If replacement does not clear the fault, consider that VCU internal components are damaged by external short circuit or exposed wire harness, please replace VCU controller assembly.

35. Cooling Pump Drive Fault P1A85

First perform power-on and reset to clear the fault. If the fault still exists, please refer to repair method of cooling water pump to perform a more detailed troubleshooting for cooling water pump and peripheral physical connection. If the fault still exists, replace with a normal VCU.

36. Brake Drive Fault P1A86

First perform power-on and reset to clear the fault. If the fault still exists, check brake switch. If it is damaged, replace brake switch. If switch is not damaged, check if the wire harness between brake switch and VCU is normal.

37. Power Battery Pack Low Power Warning

    For detailed solutions, please refer to BMS repair section.

38. Power Battery Pack Excessive Wet Warning

    For detailed solutions, please refer to BMS repair section.

39. One Cell in Power Battery Pack Excessive Under-temperature Warning

    For detailed solutions, please refer to BMS repair section.

40. One Cell in Power Battery Pack Excessive Over-temperature Warning

    For detailed solutions, please refer to BMS repair section.

41. One Cell in Power Battery Pack Excessive Under-voltage Warning

    For detailed solutions, please refer to BMS repair section.

42. One Cell in Power Battery Pack Excessive Over-voltage Warning

    For detailed solutions, please refer to BMS repair section.

43. Power Battery Pack Excessive Over-voltage Warning

    For detailed solutions, please refer to BMS repair section.

44. Power Battery Pack Excessive Under-voltage Warning

    For detailed solutions, please refer to BMS repair section.

45. Power Battery Pack Excessive Over-current Warning

    For detailed solutions, please refer to BMS repair section.

46. Battery System Integration Fault

    For detailed solutions, please refer to BMS repair section.

47. Compressor Fault B2173

    First, using high voltage DC band of multimeter, check if voltage at the high voltage power supply terminal of compressor is normal, confirm if compressor controller is protected due to overvoltage or undervoltage; if so, when power supply returns to normal, the air conditioner can be operated again to start.

    Secondly, check if low voltage power supply of compressor controller and air conditioning request signal (low level is valid) after turning on air conditioning are normal; if it is not normal, please check if wire harness connector or output signal of air conditioning control panel or evaporator temperature sensor is faulty, and then perform the corresponding repair.

    Thirdly, check if the pressure of air conditioning system is normal to determine if compressor controller overcurrent protection or compressor blocking due to system overload; if it is not normal, the air conditioning system may have blockage or poor heat dissipation in the front compartment, it needs further inspection to confirm and repair the corresponding components.

    For reasons other than the above, it may be a mechanical or electrical failure of electric compressor itself, compressor needs to be replaced.

48. Evaporator Temperature Sensor Fault B2127

First, check if there is open, short in sensor, or abnormal R-T value; if so, replace it.

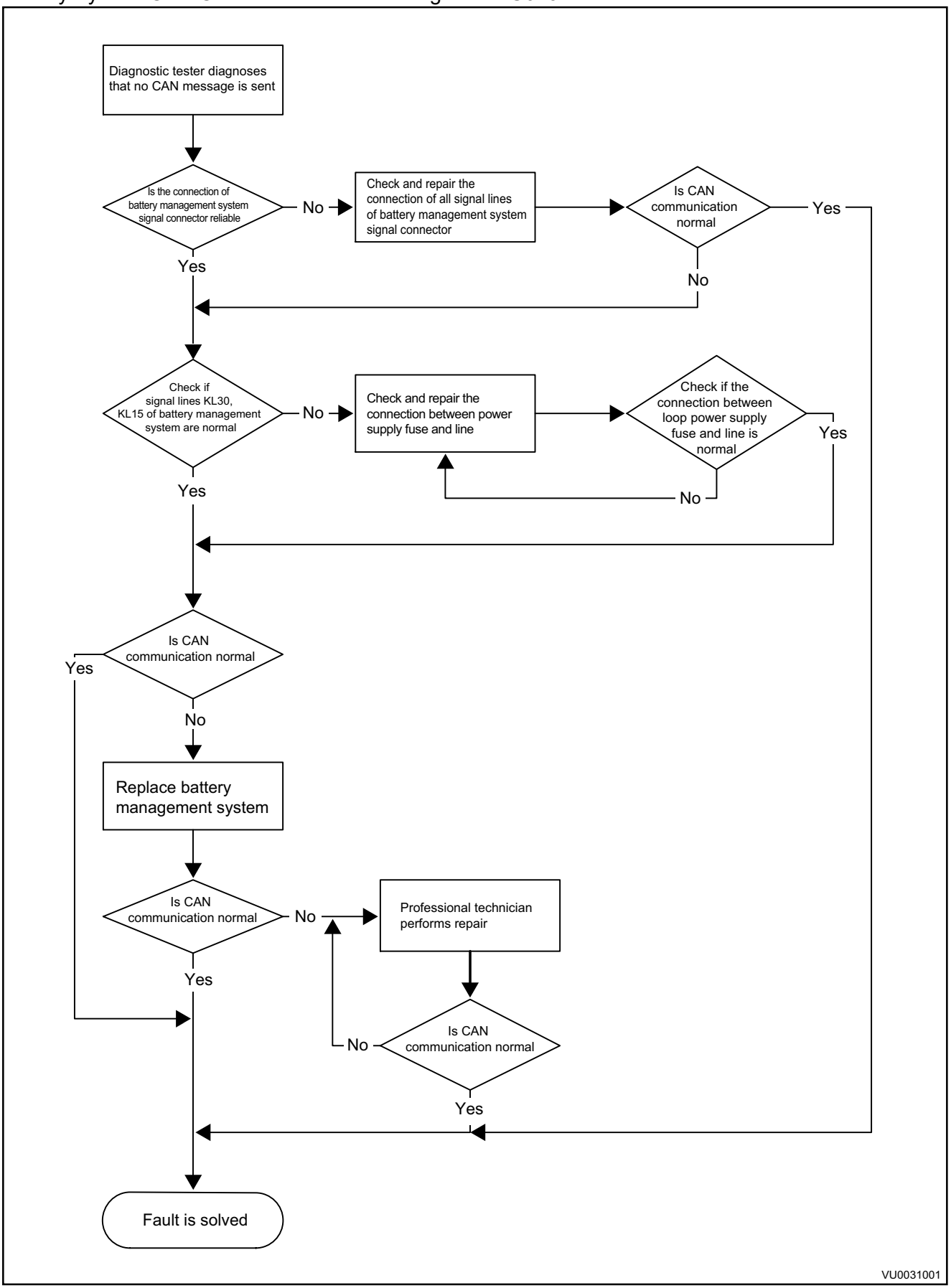
Next, check if each connection wire harness or connector is normal, if not, carry out the corresponding repair.

49. Outside Temperature Sensor Fault B2126

First, check if there is open, short in sensor, or abnormal R-T value; if so, replace it.

Next, check if each connection wire harness or connector is normal, if not, carry out the corresponding repair.

50. Battery System CAN Communication Receiving Failed U0294



51. ABS System CAN Communication Receiving Failed U0121

    First perform power-on and reset to clear the fault. If the fault still exists:
    a. Confirm if ABS is installed, if not, please install ABS controller;
    b. If the fault still exists after confirming that ABS is installed, confirm if physical connection of CAN cable between VCU and ABS is normal. If not, please check wire harness and connector.

52. ABS Status Monitoring Failed C1002

    First perform power-on and reset to clear the fault. If the fault still exists:
    a. Confirm if ABS is installed, if not, please install ABS controller;
    b. If the fault still exists after confirming that ABS is installed, please use ABS special diagnostic tester to detect fault of ABS system. If there is any fault, please refer to ABS repair manual for repair.

53. CLM System CAN Communication Receiving Failed U0164

    This fault may cause wire harness to be disconnected due to severe vibration, resulting in failure of CAN bus communication. First, perform power-on and reset to clear fault. If the fault still exists, check if communication failure is caused by wire harness. After confirming that there is no loose connection, it is recommended to check air conditioning control. If the fault still occurs, A/C controller hardware may be damaged, it is recommended to replace A/C controller.

54. Back-up Light Drive Fault

55. Low Speed Fan Drive Fault

56. INVERTER Drive Fault

57. CONTACTER Drive Fault

58. Accelerator Pedal Position Signal 1 Low Voltage Fault

59. Accelerator Pedal Position Signal 1 High Voltage Fault

60. Accelerator Pedal Position Signal 2 Low Voltage Fault

61. Accelerator Pedal Position Signal 2 High Voltage Fault

62. BMS Serious Fault

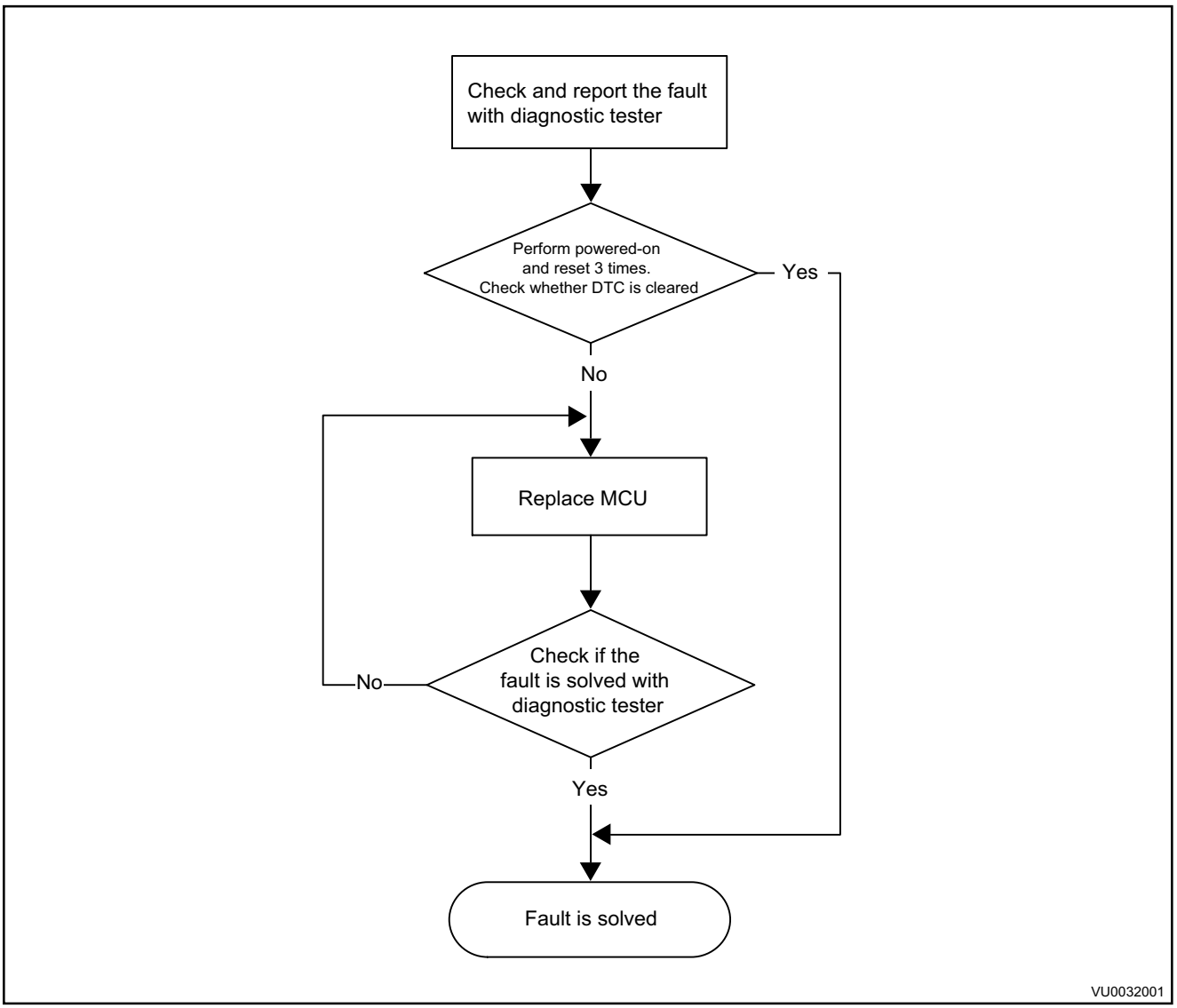
    For detailed solutions, please refer to BMS repair section.

63. BMS Power Limit Warning

    For detailed solutions, please refer to BMS repair section.

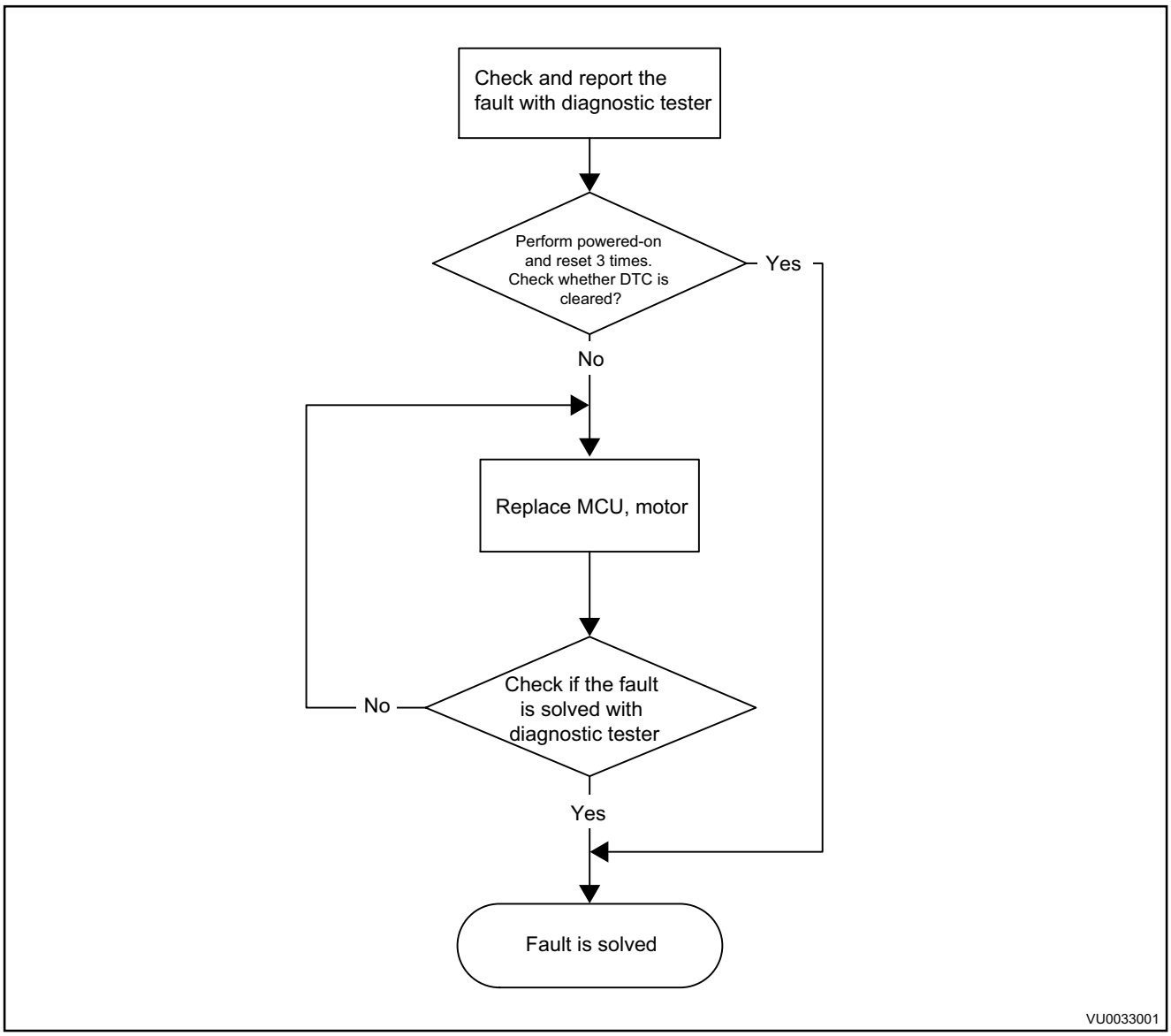
64. MCU Power Limit Warning P0A43

    Electric drive system power limit warning is frequently reported while driving. Please check whether the cooling system operates normally. If it is normal, replace the motor controller assembly. For the specific process, please refer to the troubleshooting methods for motor over-temperature fault and controller over-temperature fault.



65. MCU Interlock Fault P0A44

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:



66. High Voltage Accessory Loop Interlock Fault P0A45
67. Crash Switch Implausible P0A46
68. High Speed Fan Drive Fault P0A47
69. Compressor Drive Fault P0A48
70. PTC Drive Fault P0A49

    First, check if high voltage PTC relay is working normally. If relay is blocked or fails, replace the relay.

    Next, check whether air conditioning panel control signal and high voltage power supply are normal, and whether wire harness connector is normal; if it is not normal, it needs to be repaired or replaced.

71. DCDC Drive Fault P0A50
72. T-BOX Function Fault P0A51

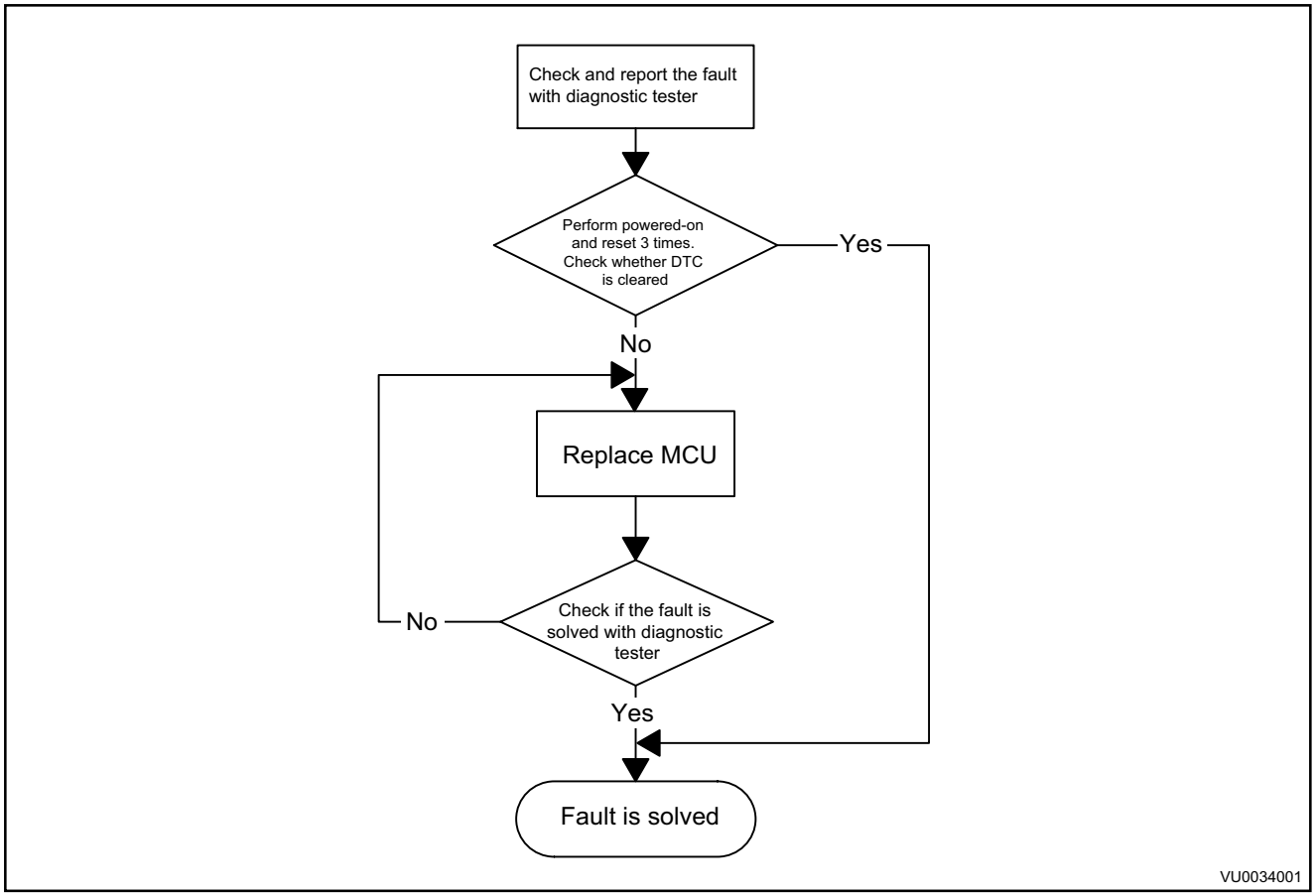
    There is a fault in T-BOX, which is sent to VCU via CAN. Replace T-BOX after the fault occurs.

73. Motor Torque Checksum Error P0A52
74. Motor Mode Checksum Error P0A53
75. Motor Block Fault P2A44

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, replace the motor.

76. MCU Hardware Circuit Interlock Fault P2A45

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, the specific process is as follows:

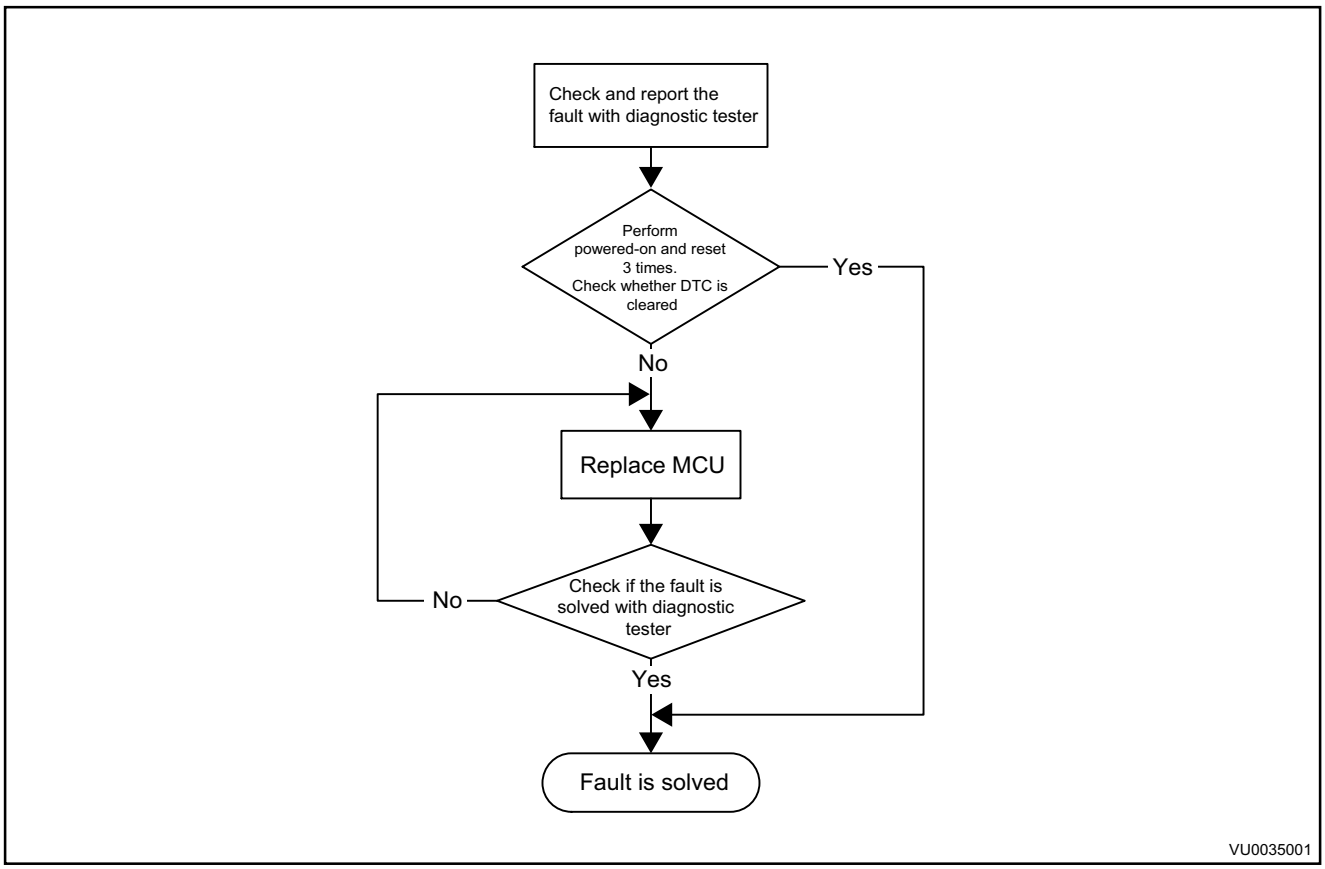


77. MCU Cooling System Fault

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, for the specific procedures, refer to troubleshooting method for motor over-temperature fault and controller over-temperature fault.

78. MCU Self-check Fault P2A47

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace controller. The specific process is as follows:



79. Motor Position Angle Fault

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please follow the steps below to troubleshoot fault cause:

a. When the vehicle is powered off, check if motor position sensor connector is in poor contact, reconnect it, check if the fault occurs after the vehicle is powered on and the wheel is turned. If the fault does not recur, troubleshoot it. If not, refer to step 2.

b. When the vehicle is powered off, check if motor wire harness is in poor contact. Power-on after troubleshooting, and check if the fault has occurred after the vehicle is in READY. If the fault does not recur, troubleshoot it. If not, refer to step 3.

c. After the above steps 1 and 2, if fault is still not eliminated, refer to EXTP_R1 and EXTP_R2, EXTP_S1 and EXTP_S3, EXTP_S2 and EXTP_S4 in wire harness terminal connector pin signal definition table, check if resistance of each group of loop is consistent with the resistance of name defined in the corresponding parameter table of temperature sensor, if not, the fault cause is determined, replace motor. If the resistance is consistent, check wire harness between motor and MCU for break or MCU connector pin for loose contact. please refer to the vehicle wire harness for details.

d. After the above steps 1, 2 and 3, if fault is still not eliminated, please replace MCU controller.

80. Motor Phase Lack Fault P2A49

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, replace the motor.

81. MCU Low Voltage Power Supply Input Fault

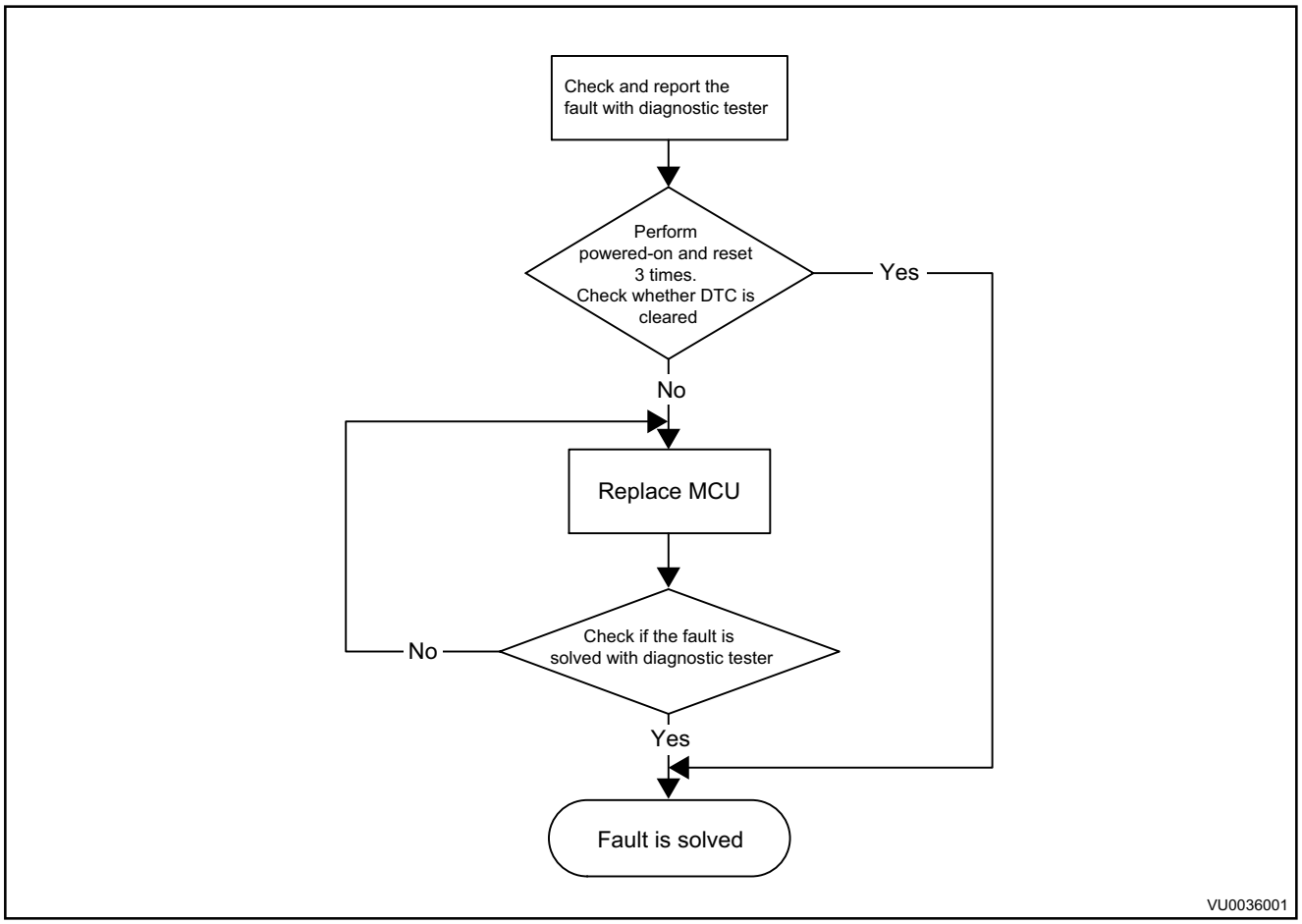
First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please follow the steps below to troubleshoot fault cause:

a. When the vehicle is powered off, use a multimeter to measure if battery voltage is lower than 10 V. If so, the fault cause is determined; if battery voltage is higher than 12 V, refer to step 2.

b. When the vehicle is powered on, use a multimeter to test if battery voltage is lower than 10 V. If so, the fault cause is determined; if not, replace MCU controller.

82. MCU Sensor Self-check Fault P2A51

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace controller. The specific process is as follows:



83. MCU Serious Fault P2A52

This fault is caused by other faults of motor. After troubleshooting other faults of motor, replace MCU.

84. Compressor Low Exhaust Pressure P2A53

85. Main Relay Drive Fault P2A54

⚠
• For DCDC fault, refer to the detailed explanation of electric drive module.

HIGH VOLTAGE WIRE HARNESS

HIGH VOLTAGE WIRE HARNESS SYSTEM

Precautions While Repairing High Voltage Wire Harness

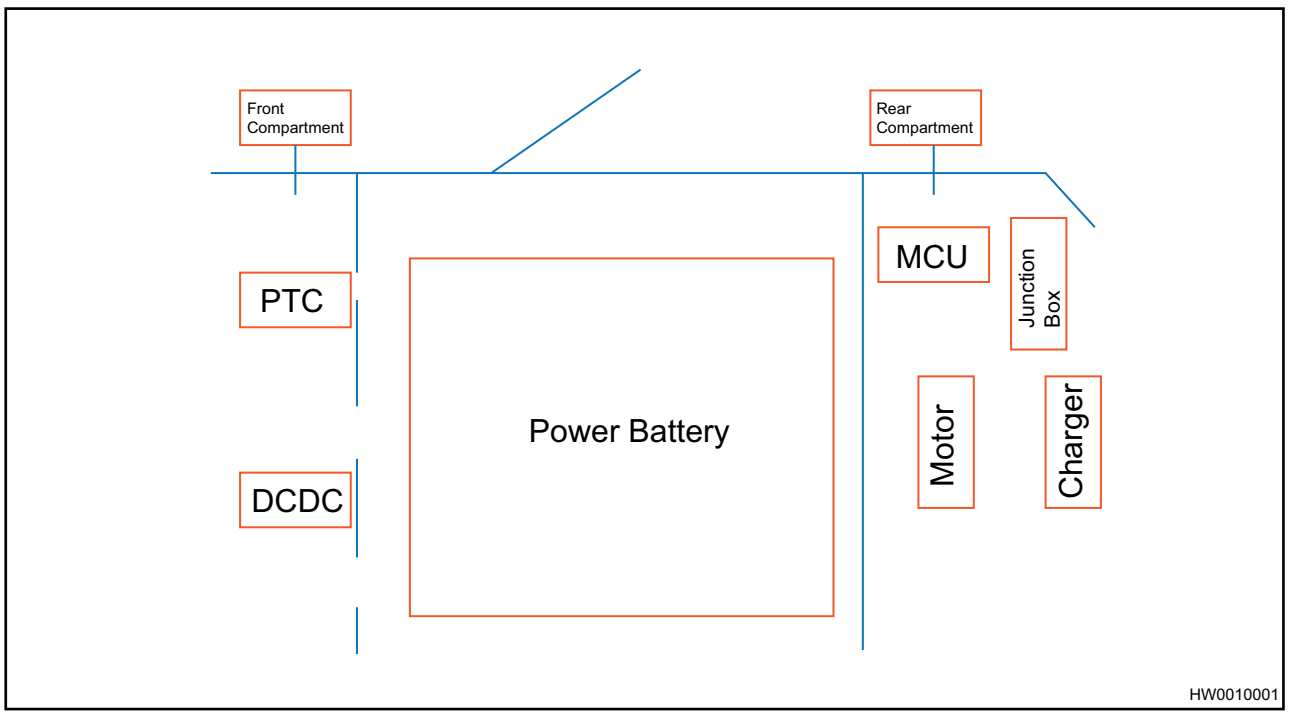
1. When repairing the high voltage wire harness, ensure that the vehicle is powered off and the power battery service switch is disconnected to avoid the risk of electric shock.
2. When the vehicle is running, the current in high voltage bus may exceed 80 A. Therefore, in order to ensure safety, it is necessary to confirm that all connectors on the high voltage wire harness are connected in place and all metal terminals are tightened according to the torque specified in the assembly instruction.

High Voltage Wire Harness System Electrical Schematic Diagram

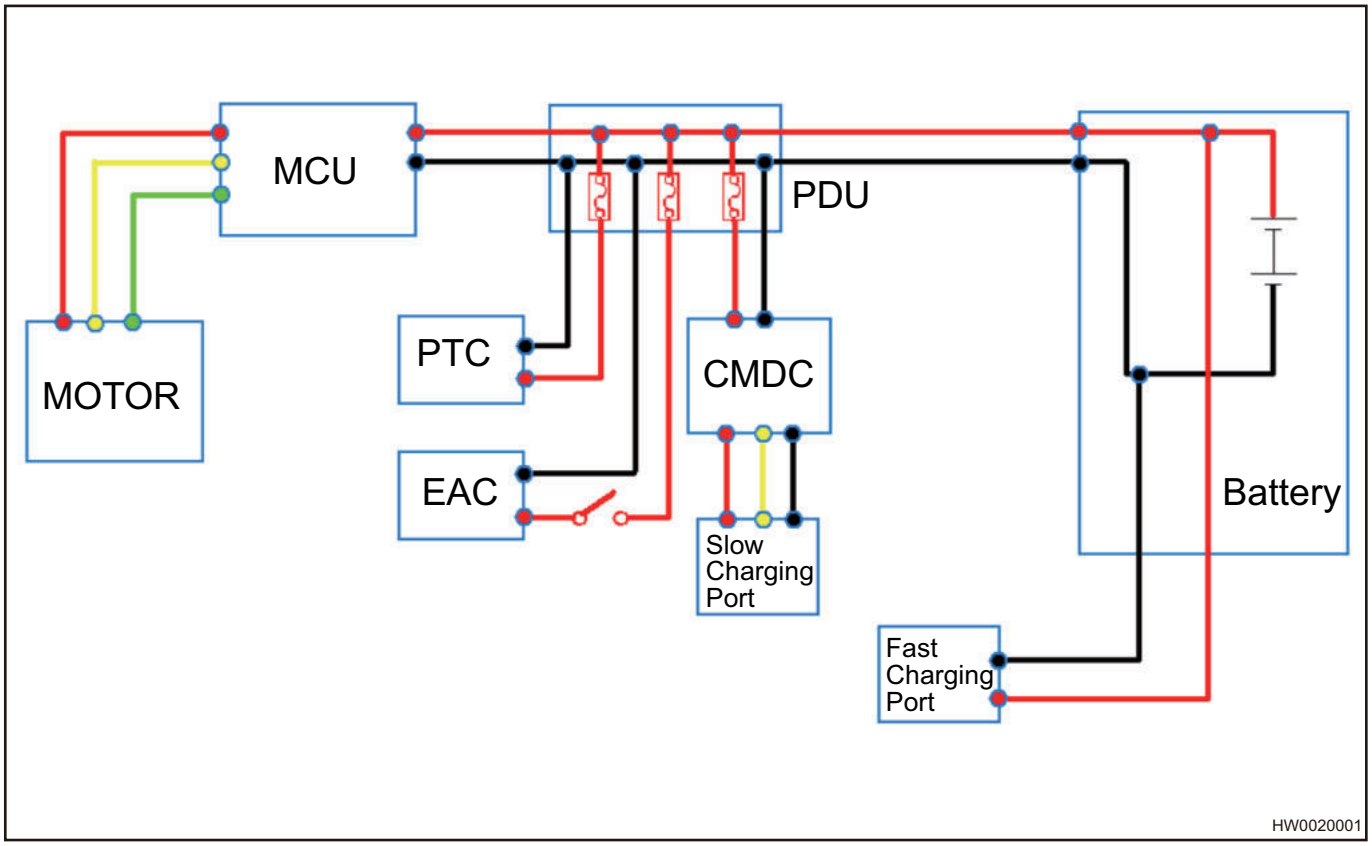
System Description

The function of high voltage wire harness is to connect all high voltage components of vehicle. The main components include power battery, charger, MCU, PTC, DCDC, motor, A/C compressor, etc. the high voltage component location diagram and the high voltage wire harness system electrical schematic diagram is as follows:

High Voltage Component Location Diagram

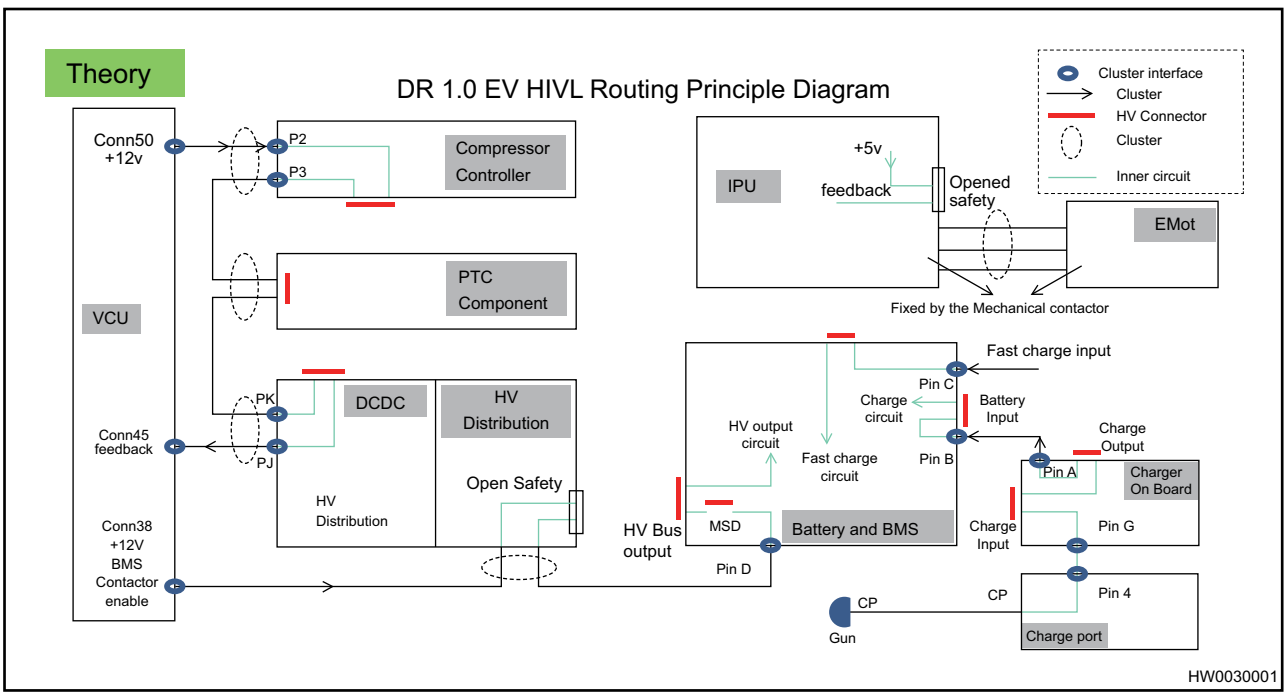


Power Cable System Electrical Schematic Diagram



High Voltage Loop Interlock Control Principle

Scheme Principle



eQ1 Loop interlock statistics:

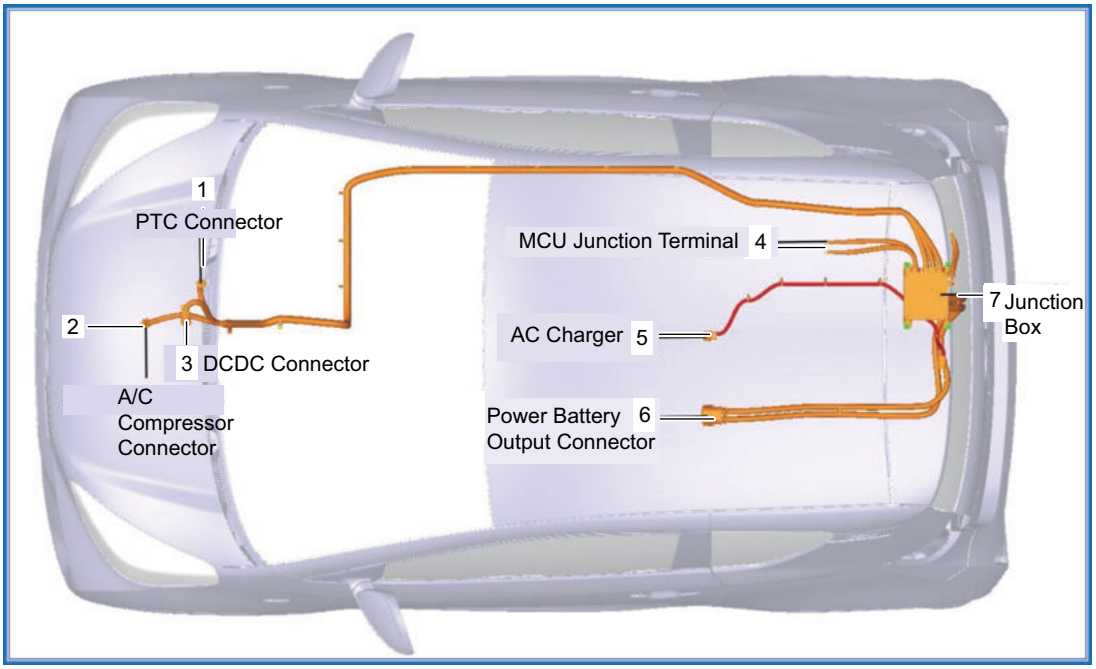
1. Accessory loop: VCU transmitter - A/C compressor - DCDC - PTC - VCU receiver.

2. Discharge loop: VCU transmitter - high voltage junction box (uncovered protection) - manual service switch (MSD) - battery pack main output connector - BMS receiver.
3. Electric drive loop: MCU (uncovered protection) transmitter - MCU detects this signal itself.
4. Slow charging loop: AC slow charging port - charger input connector - charger output connector - battery pack slow charging input port - BMS receiver.
5. Fast charging loop: DC fast charging port - battery pack fast charge input port - BMS receiver.

High Voltage Wire Harness Vehicle Layout Location Description And Wire Harness Connector Definition

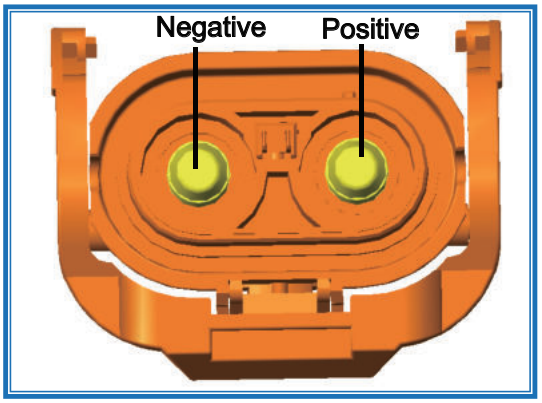
Power Cable Assembly Layout And Connector Definition

Location Diagram of Power Cable Assembly (J72-2105030) Connector in Junction Box

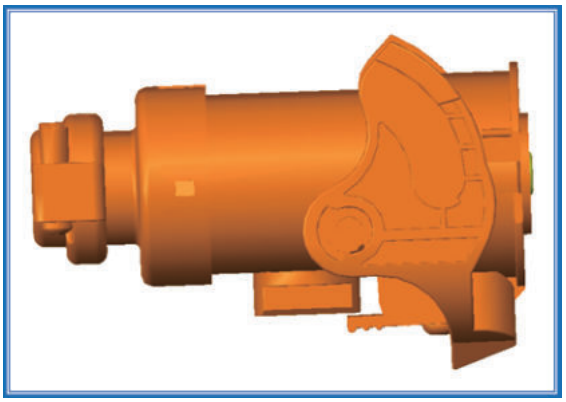


1	PTC Connector	2	DCDC Connector
3	A/C Compressor Connector	4	MCU Junction Terminal
5	AC Charging Cable	6	Power Battery Output Connector
7	Junction Box		

Definition Diagram of Power Cable Assembly Connector in Junction Box



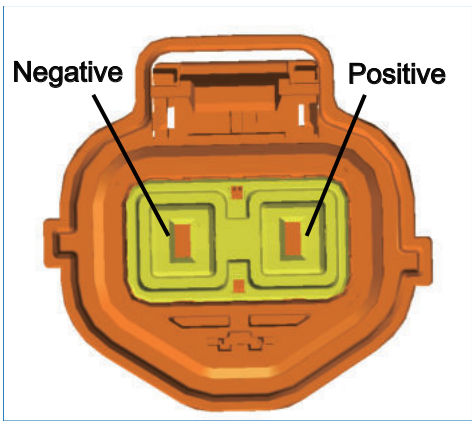
Front View



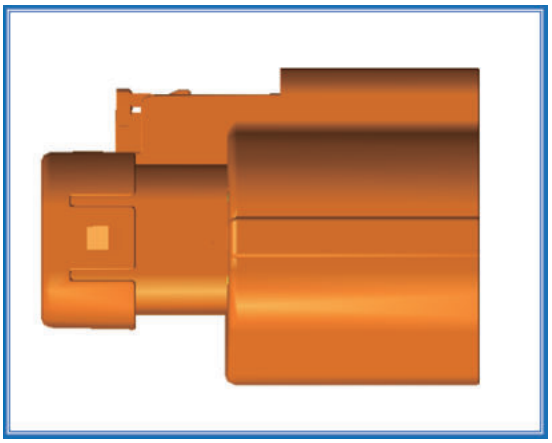
Left View

HW0032001

DCDC, PTC, Compressor Power Input Connector



Front View

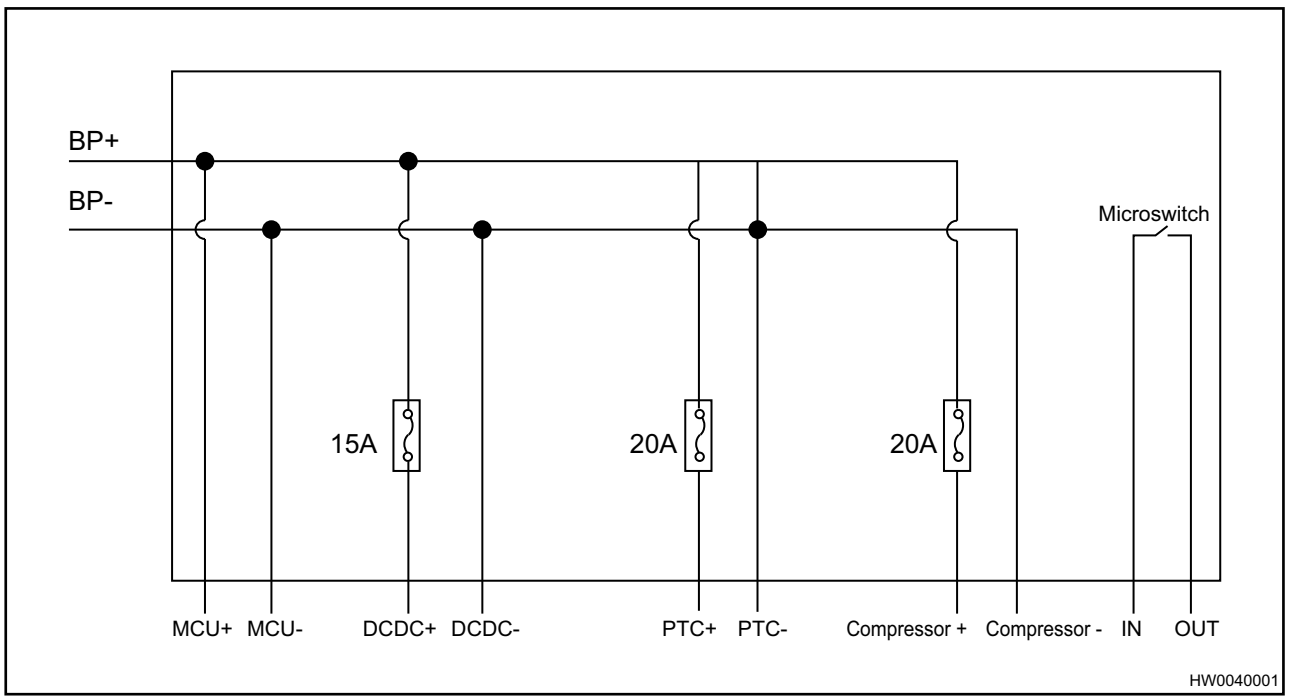


Left View

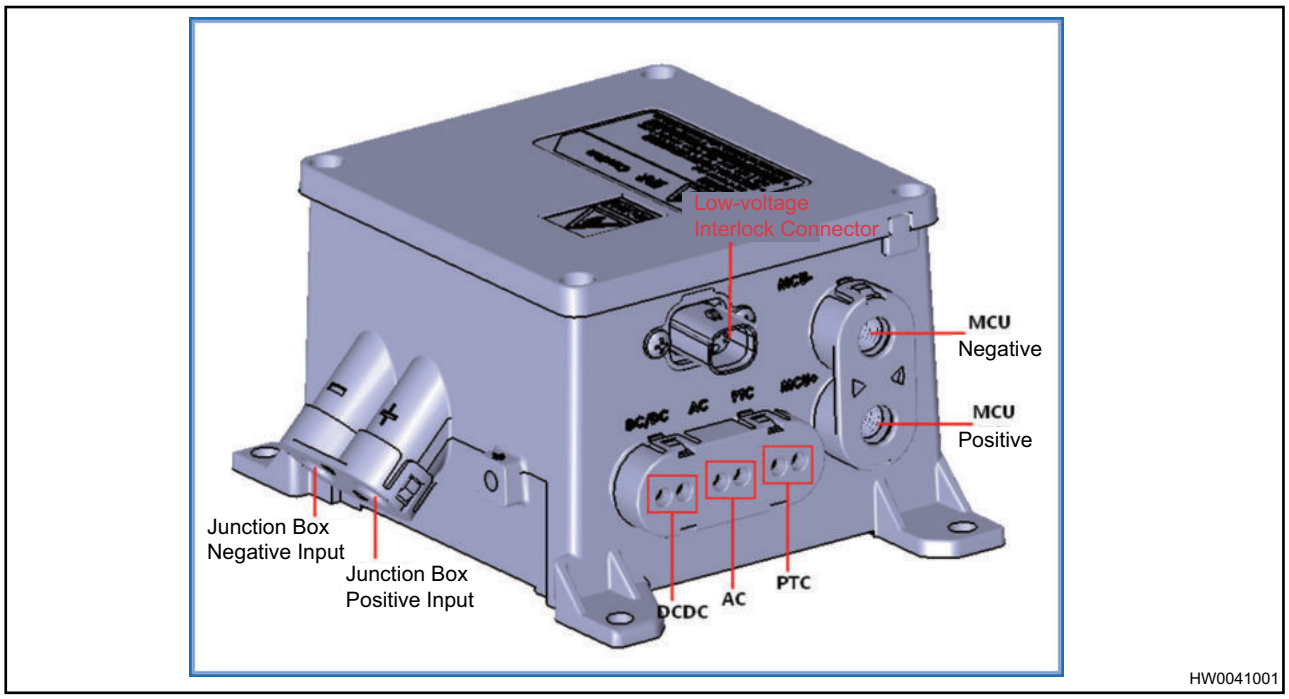
HW0033001

Junction Box Principle And Interface Definition

Junction Box Schematic Diagram

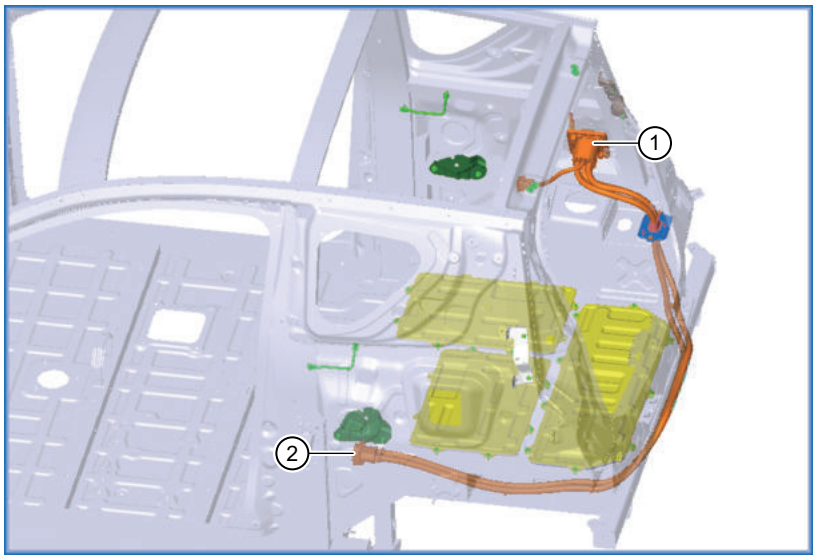


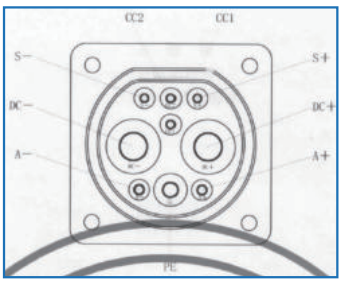
Junction Box Interface Definition



DC Charging Cable

DC Charging Cable Connector Location Diagram

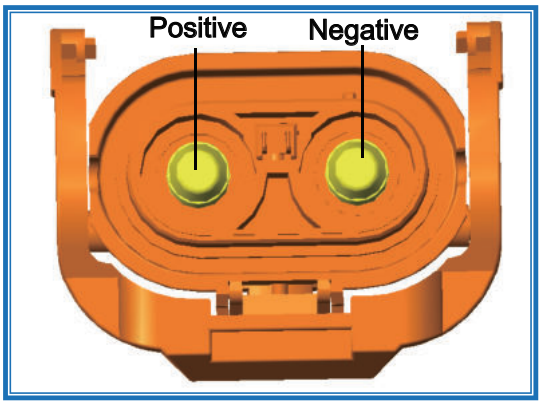


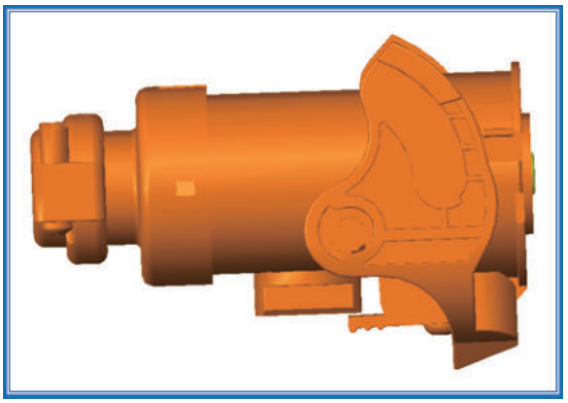


Front View

HW0042001

Fast Charging Input Connector Definition Diagram

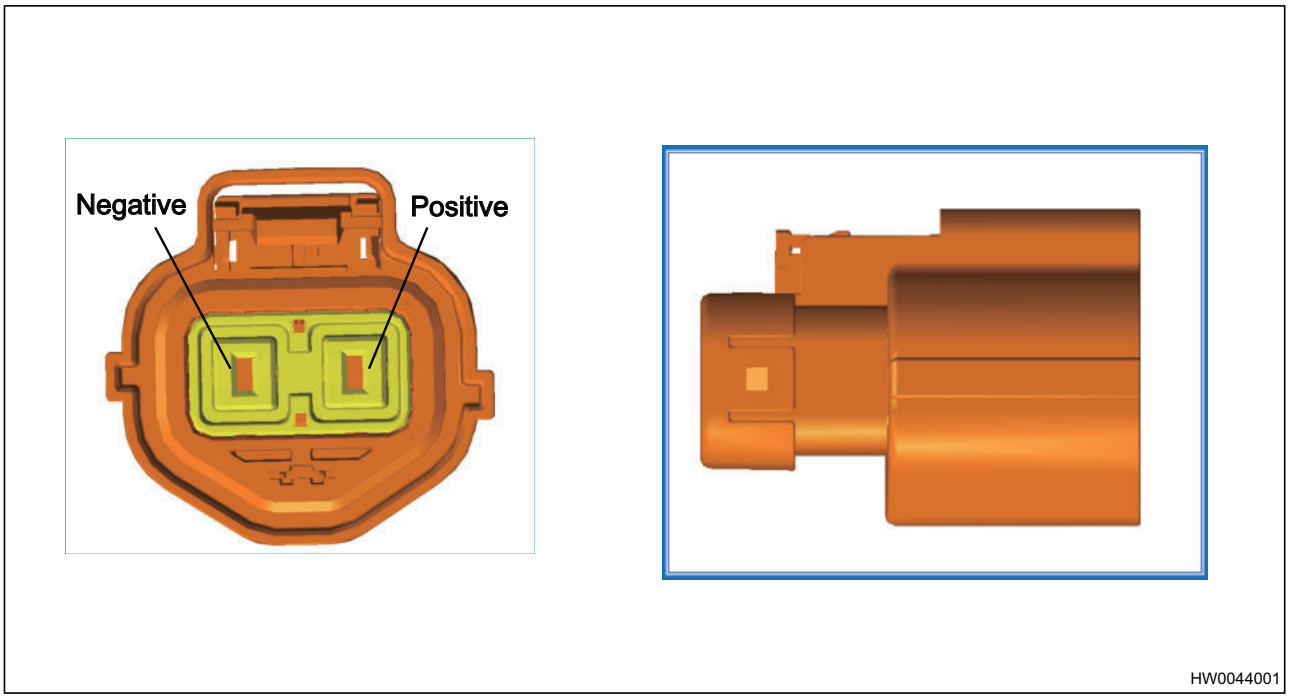




HW0043001

AC Charging Cable

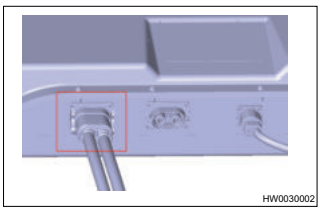
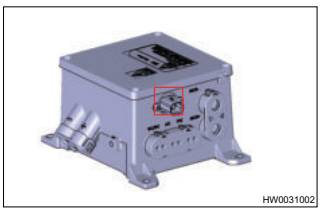
Pin Definition of AC Charging Cable Motor Output End And Battery Input End

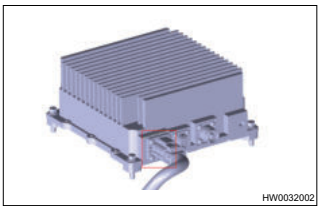
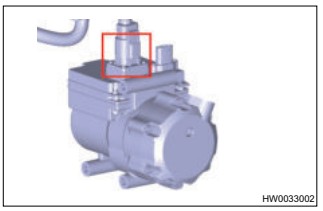
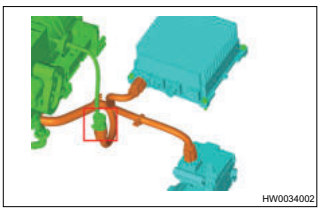
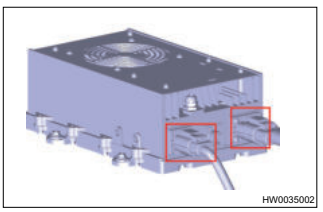
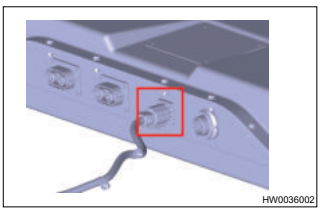


Diagnosis & Test

Vehicle Cannot Be Started

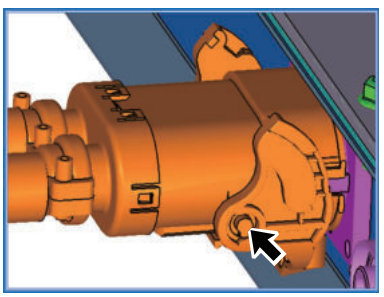
Common Faulty Area

No.	Diagnostic Tester DTC	Faulty Area	Faulty Connector Location
①	Discharging Circuit Loop Interlock Fault	Battery pack main positive and main negative connector	
②		Junction box	

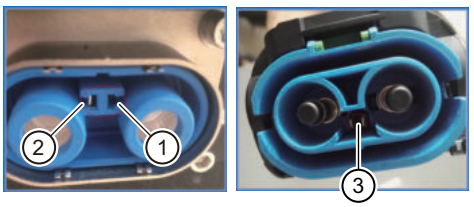
③	High Voltage Accessory Loop Interlock Fault	DCDC high voltage connector	 HW0032002
④		A/C compressor high voltage connector	 HW0033002
⑤		PTC high voltage connector	 HW0034002
⑥	Charging Port Charging Indicator Not Come On	Charger high voltage connector	 HW0035002
⑦		Battery pack slow charging connector	 HW0036002

Fault Detection And Repair Method

1. Detection method of faulty area ①.
   a. Confirm that the appearance of connector is intact without any damage, and the connector auxiliary handle lug pin (arrow) is intact without damage.


HW0037002

b. Unplug the connector, observe with eyes whether the interlocking terminal in battery pack connector is disengaged (1) or not disengaged (2), and observe whether the interlocking short-circuit plate (3) in connector is bent and skewed.



HW0038002

2. Repair method of faulty area ①.

Damage Location	Repair Method
Connector auxiliary handle damaged	Replace power cable assembly
Connector lug pin damaged	Replace power cable assembly
Connector interlocking short-circuit plate bent and skewed	Calibrate manually or replace power cable assembly
Socket lug pin damaged	Contact supplier for repair
Socket interlocking terminal disengaged	

3. Detection method of faulty area ②.
   a. Confirm hat the appearance of low voltage connector is intact without any damage; the connector is well connected.
   b. Unplug the low voltage connector, and using multimeter check for continuity and resistance between two pins of the low voltage socket of junction box.
4. Repair method of faulty area ②.

Damage Location	Repair Method
Low voltage connector	Replace low voltage wire harness
Junction box low voltage socket or micro switch	Replace junction box power cable assembly

5. Detection method of faulty area ③.
   a. Confirm hat the appearance of connector is intact without any damage, and the connector is connected in place.
   b. Keep the high voltage connector connected and using multimeter check for continuity between pin J and pin K of the DCDC low voltage signal connector. If so, it means that the faulty area ③ has no fault. If not, perform the third step.
   c. Unplug the connector from faulty area ③, check whether the connector interlocking short-circuit plate is bent and skewed. If it is normal, disengage the interlocking terminal of socket.
6. Repair method of faulty area ③.

Damage Location	Repair Method
Connector damaged	Replace junction box power cable assembly
Connector interlocking short-circuit plate bent and skewed	Calibrate manually
Socket interlocking terminal disengaged	Replace DCDC

7. Detection method of faulty area ④.

a. Confirm hat the appearance of connector is intact without any damage, and the connector is connected in place.
b. Keep the high voltage connector connected and using multimeter check for continuity between pin P2 and pin P3 of the compressor low voltage signal connector. If so, it means that the faulty area ④ has no fault. If not, perform the third step.
c. Unplug the connector from faulty area ④, check whether the connector interlocking short-circuit plate is bent and skewed, whether the interlocking terminal of socket is disengaged.

8. Repair method of faulty area ④.

Damage Location	Repair Method
Connector damaged	Replace junction box power cable assembly
Connector interlocking short-circuit plate bent and skewed	Calibrate manually
Socket interlocking terminal disengaged	Replace compressor

9. Detection method of faulty area ⑤.
   a. Confirm hat the appearance of connector is intact without any damage, and the connector is connected in place.
   b. Keep the high voltage connector connected and using multimeter check for continuity of interlocking low voltage signal connector. If so, it means that the faulty area ⑤ has no fault. If not, perform the third step.
   c. Unplug the connector from faulty area ⑤, check whether the connector interlocking short-circuit plate is bent and skewed, whether the interlocking terminal of socket is disengaged.
10. Repair method of faulty area ⑤.

Damage Location	Repair Method
Connector damaged	Replace junction box power cable assembly
Connector interlocking short-circuit plate bent and skewed	Calibrate manually
Socket interlocking terminal disengaged	Replace A/C evaporator

11. Detection method of faulty area ⑥.
   a. Confirm hat the appearance of connector is intact without any damage, and the connector is connected in place.
   b. Keep the high voltage connector connected and using multimeter check for continuity between pin A and pin G of charger low voltage signal connector. If so, it means that the faulty area ⑥ has no fault. If not, perform the third step.
   c. Unplug the connector from faulty area ⑥, check whether the connector interlocking short-circuit plate is bent and skewed, whether the interlocking terminal of socket is disengaged.
12. Repair method of faulty area ⑥.

Damage Location	Repair Method
Connector damaged	Replace AC charging cable
Connector interlocking short-circuit plate bent and skewed	Calibrate manually
Socket interlocking terminal disengaged	Replace charger

13. Detection method of faulty area ⑦.
   a. Confirm hat the appearance of connector is intact without any damage, and the connector is connected in place.

b. Unplug the connector from faulty area ⑦, check whether the connector power terminal is disengaged.

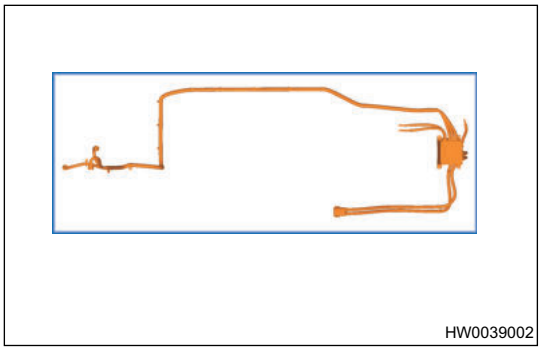
14. Repair method of faulty area ⑦.

Damage Location	Repair Method
Connector damaged	Replace AC charging cable
Connector interlocking short-circuit plate bent and skewed	Calibrate manually
Socket interlocking terminal disengaged	Contact supplier for repair

Insulation Resistance Detection

Insulation Resistance Detection of Junction Box Power Cable Assembly

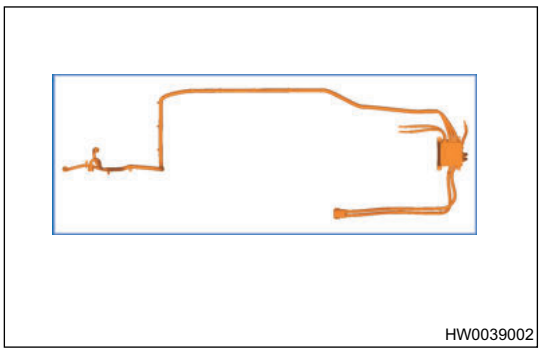
1. Confirm that all connectors of wire harness is disconnected from other components, and the connectors are not in contact with any other components.



2. Use insulation resistance meter to measure the resistance between terminals of each connector, between terminals and vehicle body, between terminals and shield in turn. The measuring voltage is 500V, and the insulation resistance is required to be greater than or equal to 100 MΩ.
3. If the measured result is less than 100 MΩ, open the junction box cover, remove the bolts of MCU circuit, PTC circuit, DCDC circuit and compressor circuit in turn, and insulate the terminals of individual MCU circuit, PTC circuit, DCDC circuit and compressor circuit from vehicle body, and confirm which circuit insulation is faulty.

Insulation Resistance Detection of AC Charging Cable

1. Confirm that all connectors of wire harness is disconnected from other components, and the connectors are not in contact with any other components.



2. Use insulation resistance meter to measure the resistance between terminals of each connector, between terminals and vehicle body, between terminals and shield in turn. The measuring voltage is 500 V, and the insulation resistance is required to be greater than or equal to 100 MΩ.

Fuse Detection

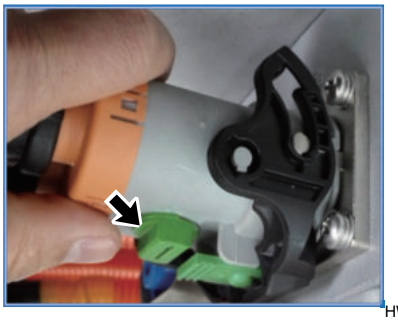
When the compressor, DCDC, PTC and other high voltage accessories do not work, after detecting that there is no problem with the compressor, DCDC and PTC, open the rear service port cover and the junction box cover, using multimeter check for continuity of compressor fuse, DCDC fuse and PTC fuse; if not, replace the corresponding fuse.

On-Vehicle Service

Removal and Installation of High Voltage Connector

Removal of 150 A High Current Connector

1. Turn green knob (arrow) to position shown in illustration.


HW0001002

2. Toggle black handle to position shown in illustration.


HW0002002

3. Separate connector from socket.


HW0003002

4. Restore black handle to position shown in illustration below.


HW0004002

Installation of 150 A High Current Connector

1. Turn connector knob (arrow) to position shown in illustration below.


HW0005002

2. Press green button and toggle black handle downward.


HW0006002

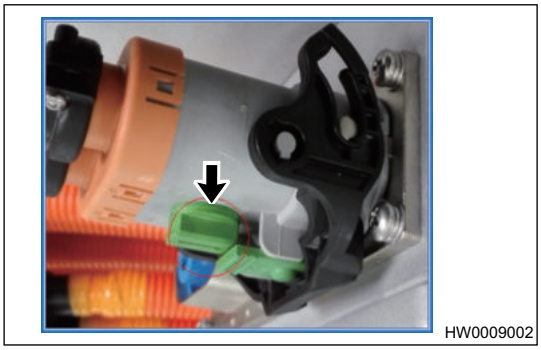
3. Insert connector into socket of battery pack.


HW0007002

4. Insert connector with force and toggle handle until a click is heard to indicate that it is assembled in place.

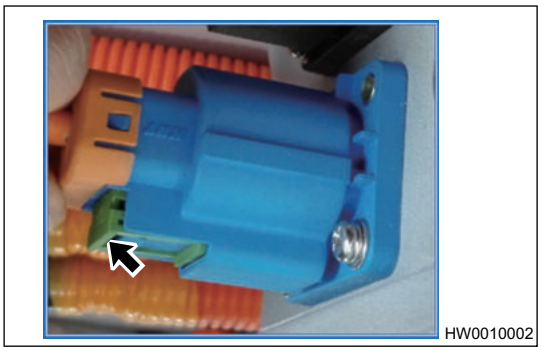

HW0008002

5. Unscrew green knob (arrow).

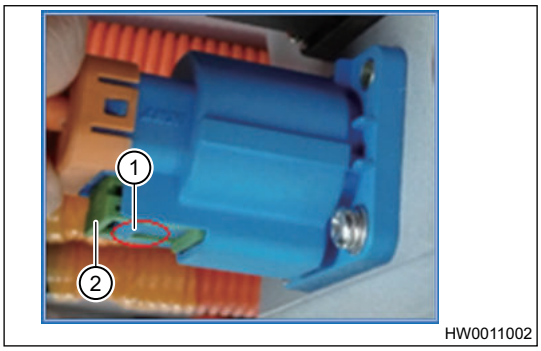

HW0009002

Removal of 20 A Low Current Connector

1. Pull out green pull ring to lowest position.


HW0010002

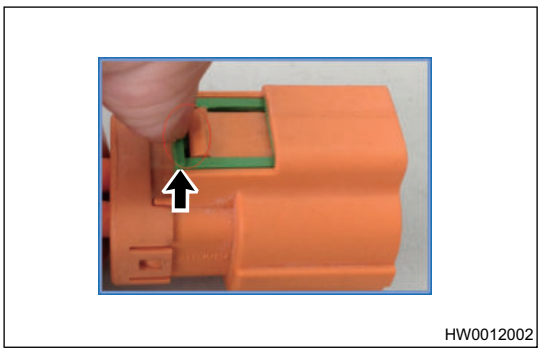
2. Press blue buckle (1) once and pull out connector. After pulling out connector, pay attention to lock green pull ring (2).



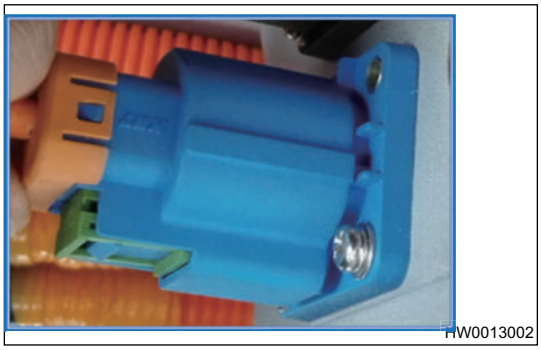
HW0011002

Installation of 20 A Low Current Connector

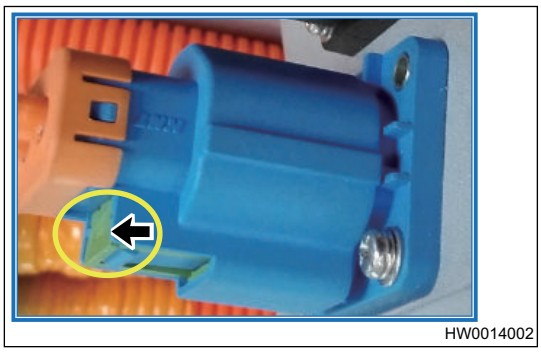
1. Pull out green latch (arrow) from connector.


HW0012002

2. Insert wire harness connector into socket, press connector firmly until a click is heard to indicate that it is assembled in place.


HW0013002

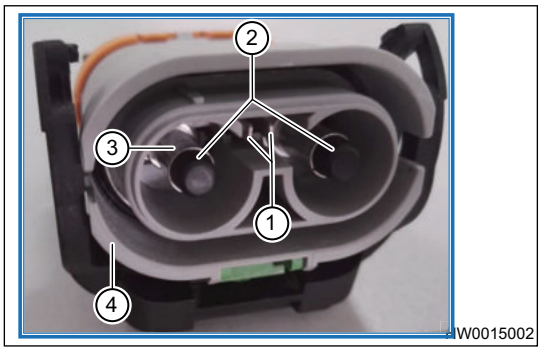
3. Lock green pull ring (arrow).


HW0014002

Description of High Voltage Wire Harness Components

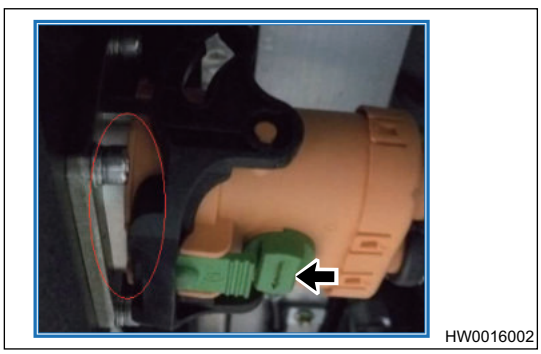
Power Battery Output Connector

1. The appearance of connector should be intact as shown in illustration.
   a. The loop interlock conducting piece (1) is free from disengagement and warpage.
   b. The anti-contact terminal (2) is free from skew and looseness.
   c. The hole of terminal (3) is free from sundries and water stains.
   d. The connector body (4) is not damaged.

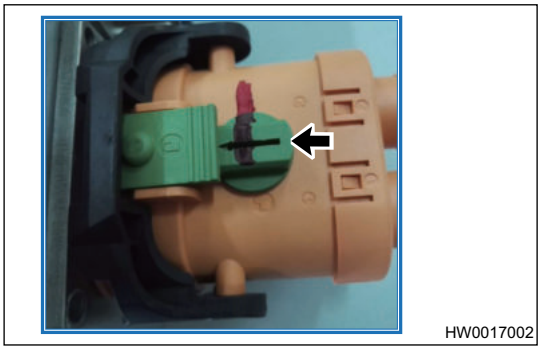


HW0015002

2. The power battery output connector is locked in place after inserting, as shown in illustration below
   a. It is not locked in place after inserting (arrow).

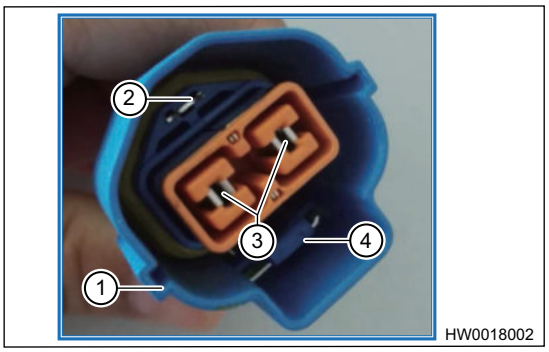

HW0016002

b. It is locked in place after inserting (arrow).

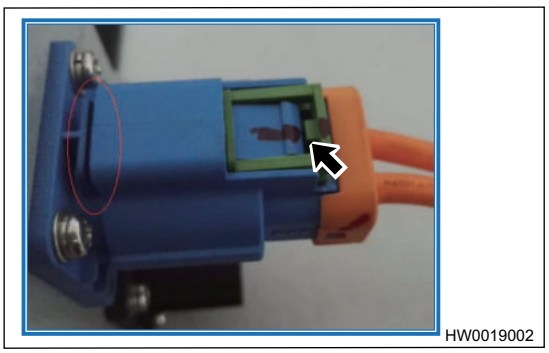


AC, DCDC, PTC Connector

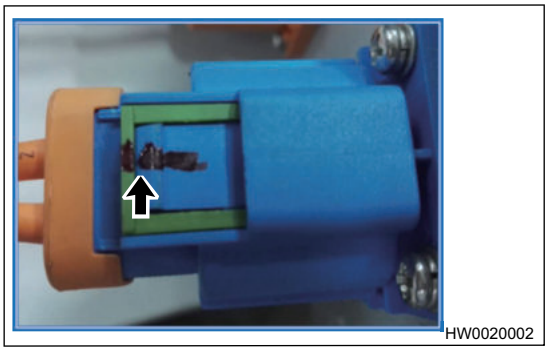
1. The appearance of connector should be intact as shown in illustration.
   a. The connector body is not damaged (1).
   b. The loop interlock conducting piece (2) is free from disengagement and warpage.
   c. The lock button (3) is not damaged.
   d. The hole of terminal is free from sundries and water stains.



2. The connector is inserted in place, as shown in illustration below
   a. It is not locked in place after inserting (arrow).



   b. It is locked in place after inserting (arrow).



Junction Box (PDU)

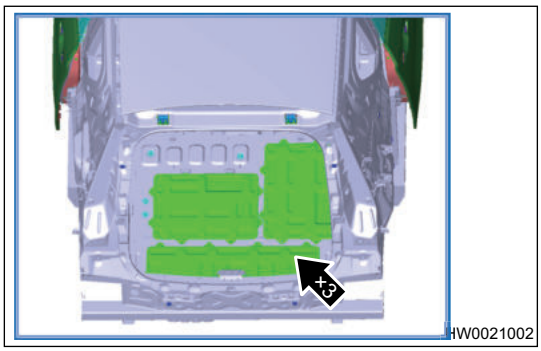
1. The appearance of junction box should be intact as following:

a. The warning label should be free of warpage.
b. MCU cable end cover is not damaged, and the cable shrinkable tube is not damaged.
c. AC, DCDC, PTC cable end cover is not damaged, and the cable shrinkable tube is not damaged.
d. The ground bolt is tightened in place.
e. Junction box main positive and negative cable end cover is not damaged, the cable shrinkable tube is not damaged.
f. 4 screws are tightened in place.

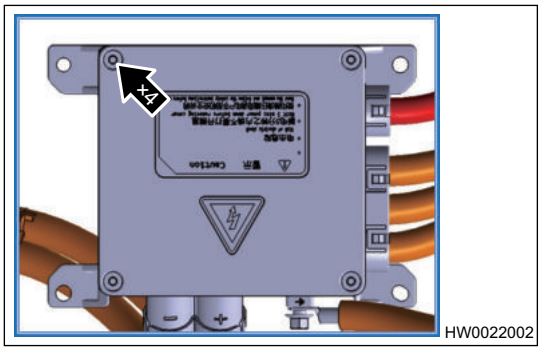
Replacement of High Voltage Fuse

Replacement

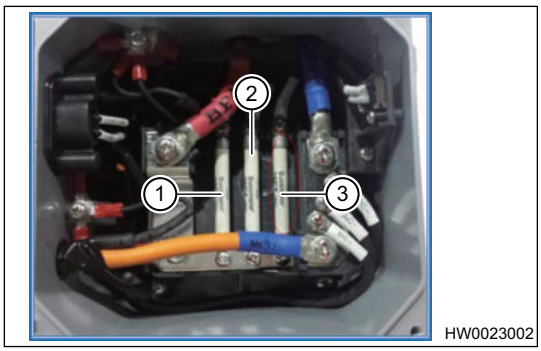
1. Open luggage compartment , lift carpet and remove rear service port cover (arrow) with a tool.



2. Use inner hexagon wrench to remove upper cover bolts (- arrow) from junction box.



3. Replace damaged fuses: PTC fuse (1), AC fuse (2), DCDC fuse (3).

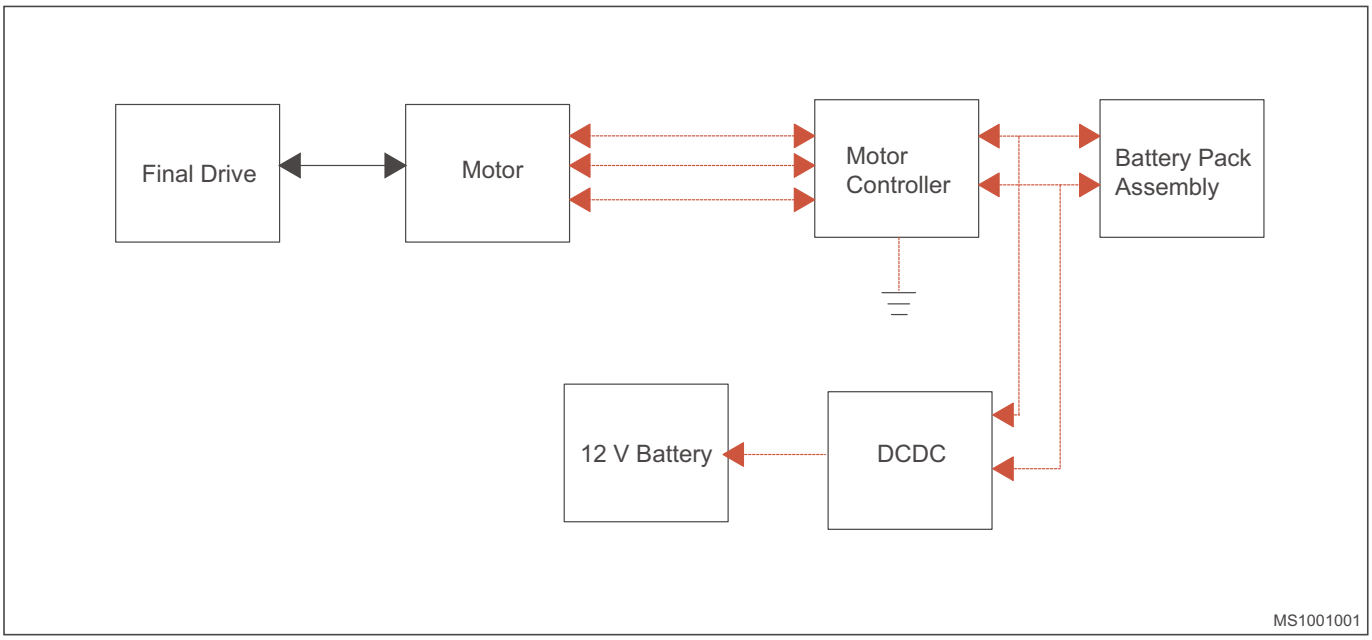


DRIVE MOTOR AND MOTOR CONTROLLER

DRIVE MOTOR AND MOTOR CONTROLLER SYSTEM

System Overview

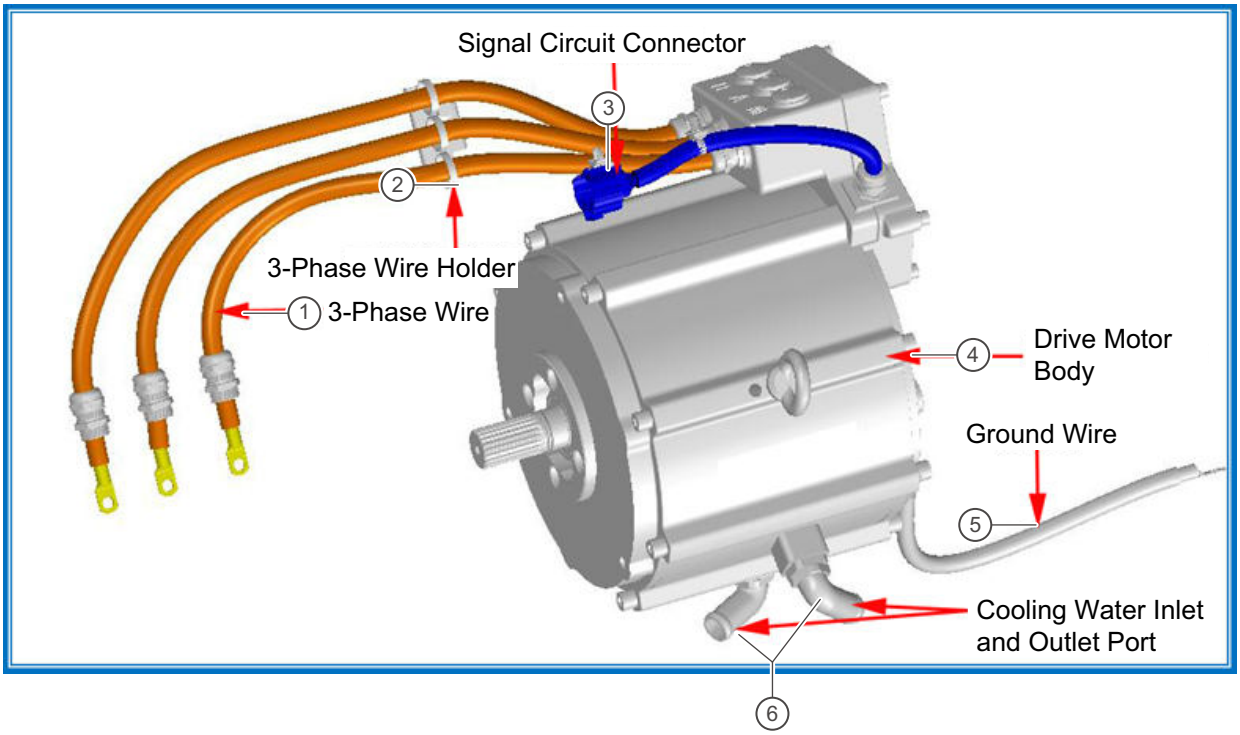
Electric Drive System Structure Diagram



Drive Motor Function Introduction

Drive motor is a three-phase permanent magnetic synchronous motor, which is used as drive of electric vehicle and installed in luggage compartment. This kind of motor has the characteristics such as simple structure, small volume, light weight and high efficiency.
Under the control of controller, the motor can work in a wide speed range to meet the operating conditions of electric vehicle.

- The motor has a built-in resolver, which is used to detect the speed and position of rotor, so as to realize the vector control of motor.
- Cooling type of motor is water-cooled.



1	3-Phase Wire	2	3-Phase Wire Holder
3	Signal Wire Connector	4	Drive Motor Body
5	Ground Wire	6	Cooling Water Inlet and Outlet

⚠

- The J72-2103010 drive motor assembly must be equipped with J72-2142010 motor controller.

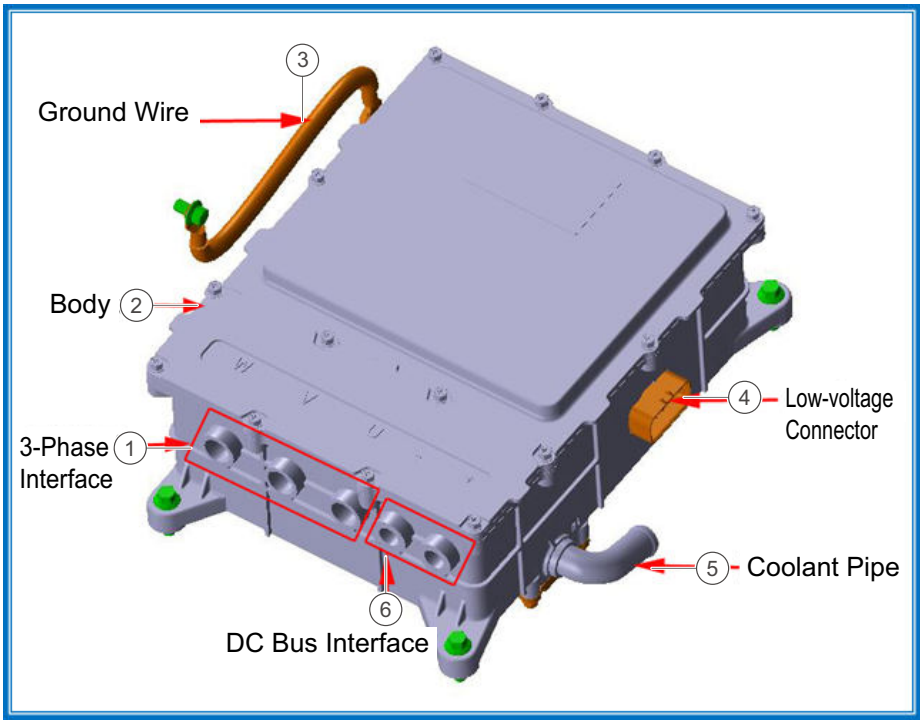
Drive Motor Technical Parameters

Specification	Voltage (V)	Rated / Peak Power (KW)	Rated / Peak Torque (N. M)	Operating Temperature (˚C)	Cooling Type	Sealing Level
Permanent magnetic synchronous	345	15.5/30	59/120	-40 ~ 105	Water cooled	IP67

Motor Controller Function Introduction (DC Input, Three-phase AC Output)

The main functions of motor controller are:

- Control the motor to operate in power mode or generator mode.
- Control the torque of motor drive system.
- With over-temperature, over-current, over-voltage and other protection functions.
- With CAN communication and diagnostic function.



MS1003001

1	3-Phase Interface	2	Box Body
3	Ground Wire	4	Low Voltage Connector
5	Cooling System	6	DC Bus Interface

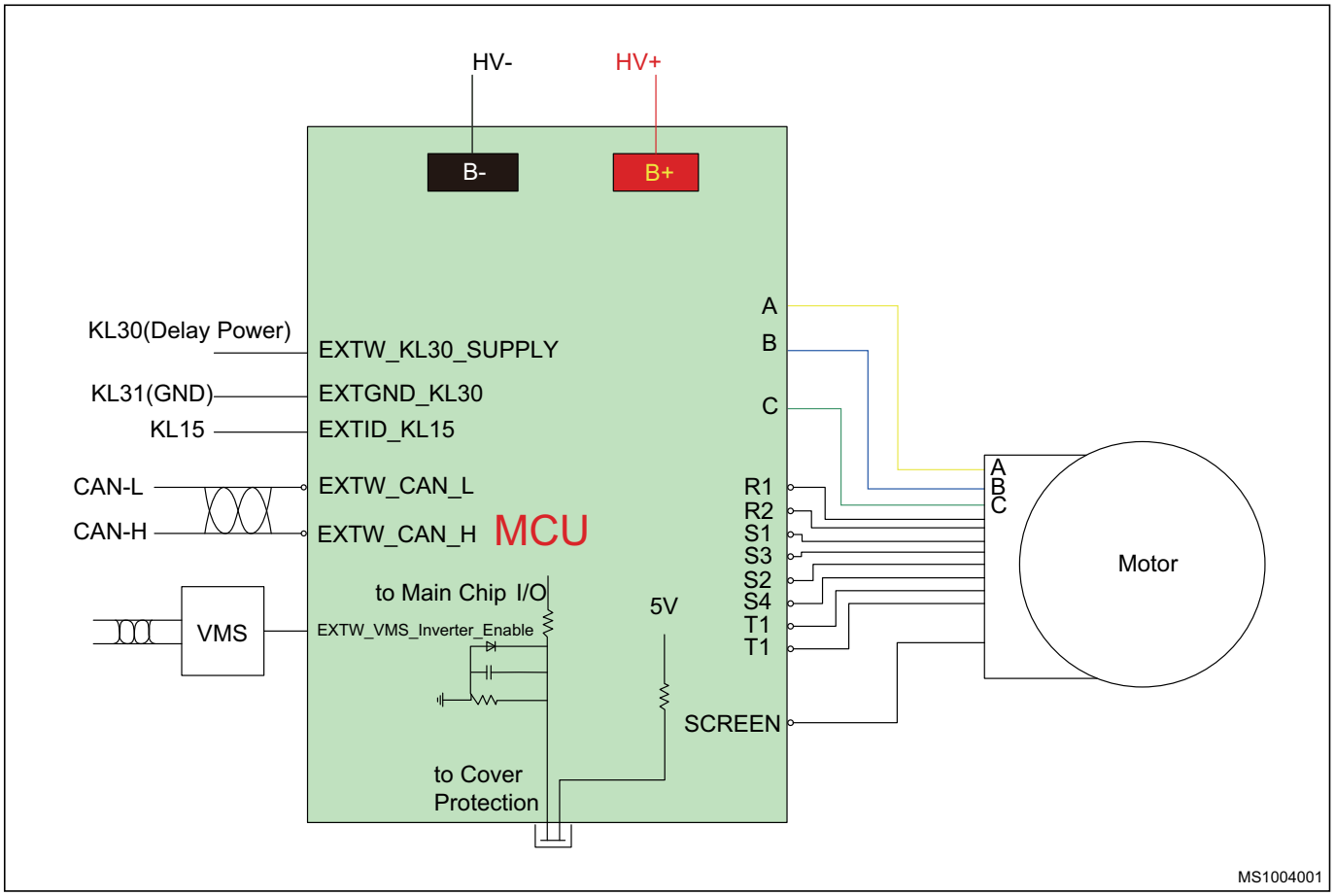
⚠

- The J72-2103010 drive motor assembly must be equipped with J72-2142010 motor controller.

Technical Parameters of Motor Controller Functional Part

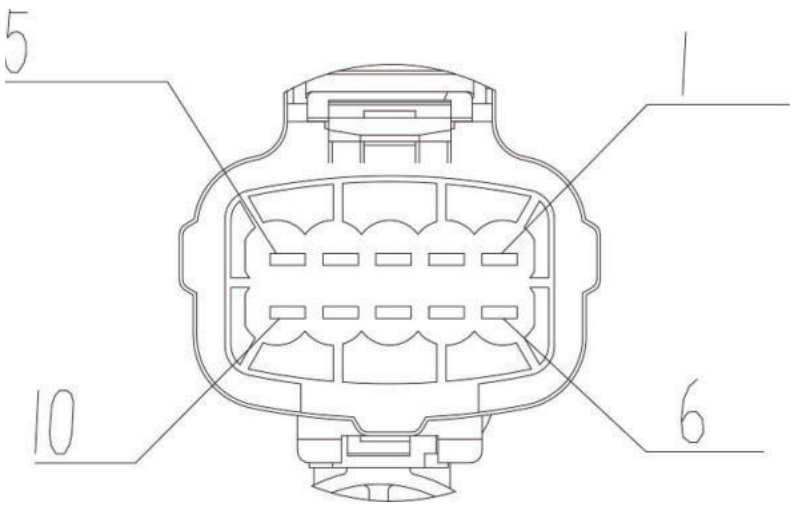
Rated Input Voltage (V) / Current (A)	Rated Capacity / Maximum Capacity (KVA)	Control Power Supply Voltage (V)	Cooling Type	Operating Temperature (˚C)	Sealing Level
345/45	28/50	9 - 16	Water cooled	-40 ~ 85	IP67

Electrical Schematic Diagram



Connector Terminal Definition

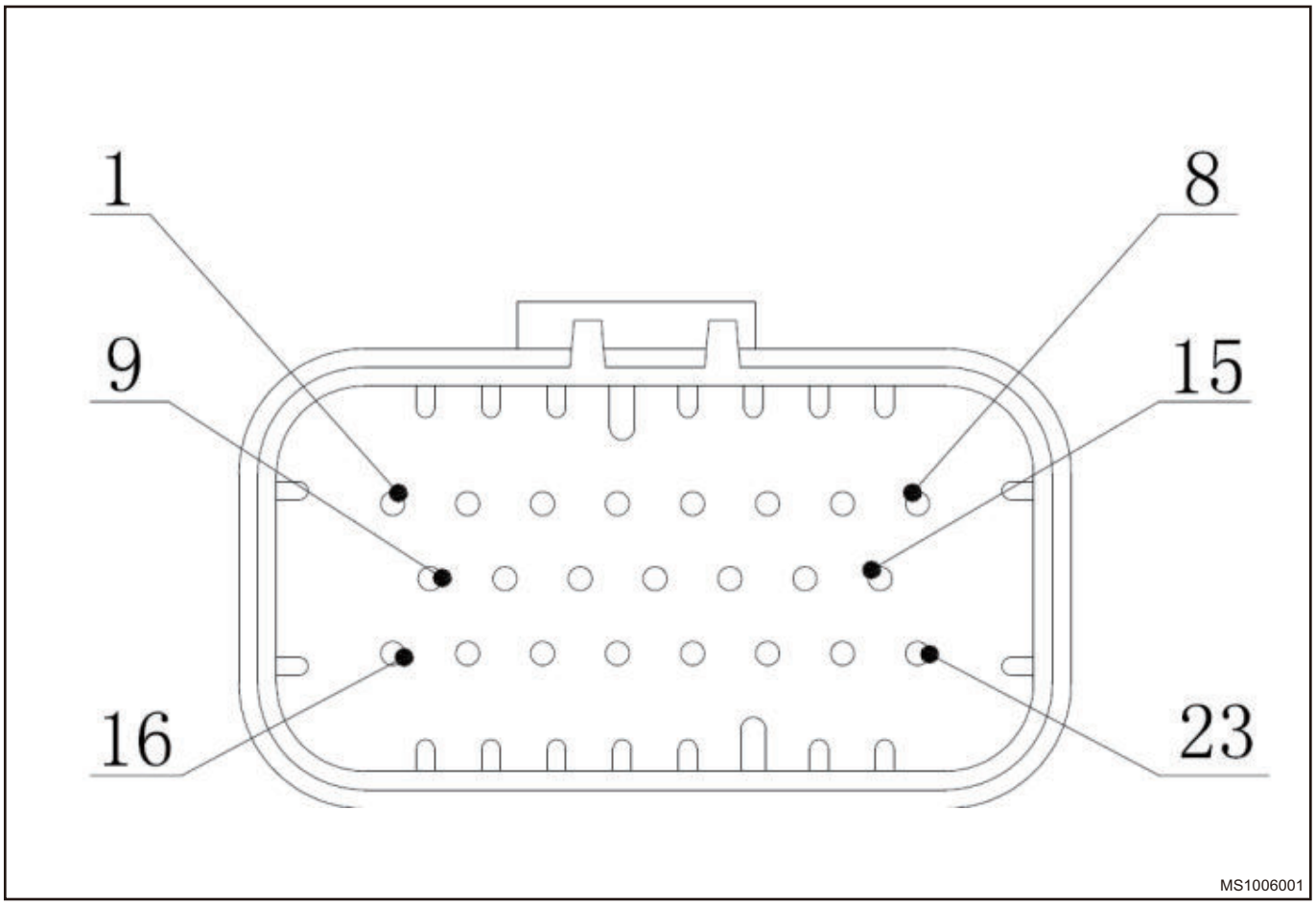
Motor Signal Connector Terminal Definition



MS1005001

Termin-al	Definition	Termin-al	Definition
1	Rotary EXTP_R1	2	Rotary EXTP_R2
3	Rotary EXTP_S1	4	Rotary EXTP_S3
5	Rotary EXTP_S2	6	Rotary EXTP_S4
7	Motor Temperature Sensor TEMP_1	8	Motor Temperature Sensor TEMP_1
9	-	10	-

MCU Low Voltage Connector



Terminal	Function	Signal Type	Terminal	Function	Signal Type
1	12V (KL30)	KL30 Power Supply Signal	2	12V (KL30)	KL30 Power Supply Signal
3	R1	Rotary Sensor Signal	4	R2	Rotary Sensor Signal
5	S1	Rotary Sensor Signal	6	S3	Rotary Sensor Signal
7	CAN-H	CAN (High) Signal	8	CANL	CAN (Low) Signal
9	KL15	KL15 Power Supply Signal	10	VMS - EN	VMS Enable Control Signal
11	TEMP-1	Temperature Sensor Signal	12	TEMP - 2	Temperature Sensor Signal
13	S2	Rotary Sensor Signal	14	S4	Rotary Sensor Signal
15	Screen - GND	Shield (Ground) Signal	16	12VGND - KL31	Power Supply Ground Signal
17	12VGND - KL31	Power Supply Ground Signal	18	Reserved	-
19	Reserved	-	20	-	-

21	-	-	22	-	-
-23	-	-			

Diagnosis & Test

Detection of Motor Phase Loss

Motor phase loss is due to the phenomenon that one or two phases of motor are not energized or the resistance value is large for some reason. The main reason may be that a certain phase in motor is burned, the cable is disconnected from the internal winding of the motor, and the cable connector is burnt because it is not tightened.

1. Open the small cover of controller and check whether the cable connector (arrow) is burnt (this fault is mostly caused by untightening of the connector during installation). After maintenance, the cable connector in illustration must be tightened in place.


MS1010002

2. Use a multimeter to detect the resistance between phase A and phase B, phase B and phase C, phase A and phase C of the motor to check whether there is phase loss. It is determined that motor is missing phase if the difference between them is more than 0.5 Ω. Please replace the motor.


MS1011002

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- Unplug the service switch, open the small cover of motor controller, and loosen the U, V, W three-phase wires. Turn the multimeter to the minimum unit scale, and measure the resistance value between phases.

Motor System Insulation Failure Detection

1. Motor insulation failure is often caused by water ingress inside the motor, or the insulation layer of motor is heated to failure, or the winding is ablated somewhere and short circuited to the ground.
2. Motor controller insulation failure is often caused by water ingress inside the controller, or reduced creepage distances. When insulation failure occurs in motor system, it often causes the controller to report module failure or vehicle insulation failure. When checking the insulation failure of motor system, the motor system should be disconnected from the vehicle (Open the small cover of the controller, remove the bus bolts connected to MCU, and disconnect the wires from the mounting base). Use an insulation meter to test the positive and negative of the motor system to ground respectively. The test voltage of the insulation meter is 500 V, the motor temperature should be close to normal temperature during test, and the resistance value of the test result should be higher than 20 MΩ. If it is lower than this value, it is necessary to further determine whether it is the problem of the motor or the controller. Remove the 3-phase wire bolt, disconnect the wire from the mounting base, and conduct an insulation test for the motor separately. If the resistance value is lower than 20 MΩ, it is judged that the motor is damaged, please replace the motor. Otherwise, replace the controller. The test tool adopts a high-voltage insulation meter.

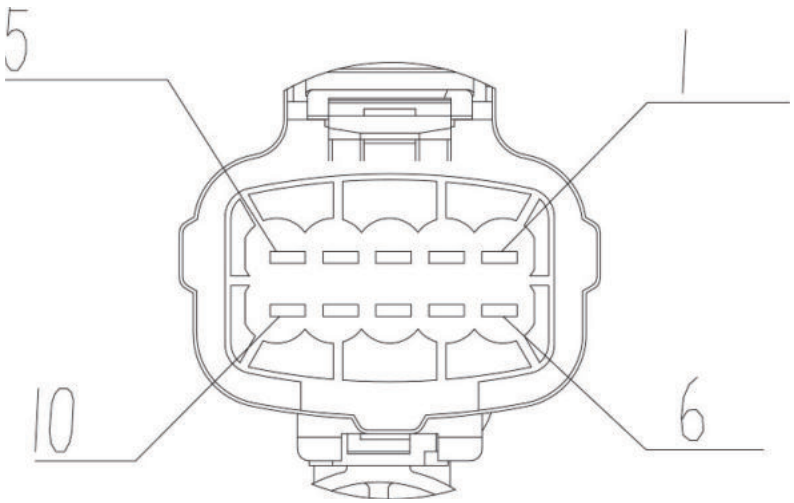
MS1012002

⚠

- When measuring, it should be noted that one end is connected to the terminal, and the other end is connected to the housing. The test voltage should be 500 V.

Static Test Method for Motor Position Sensor Signal and Temperature Sensor Signal

The motor position sensor is responsible for monitoring the motor rotor position and providing position signals for motor control. The motor position sensor adopts a structure of resolver. A possible failure is internal short circuit or open circuit.



MS1005001

Termin-al	Definition	Termin-al	Definition
1	Rotary EXTP_R1	2	Rotary EXTP_R2
3	Rotary EXTP_S1	4	Rotary EXTP_S3
5	Rotary EXTP_S2	6	Rotary EXTP_S4
7	Motor Temperature Sensor TEMP_1	8	Motor Temperature Sensor TEMP_1
9	-	10	-

1. Motor end signal wire connector PIN definition is shown in illustration. P1 ~ P6 pins are rotary signals, P7 ~ P8 pins are temperature signals, resistance values should be measured in groups: P1 ~ P2, P3 ~ P4, P5 ~ P6, P7 ~ P8.

MS1013002

Test Parameter Table:

	Terminal	Standard
R1R2 Excitation circuit	P1P2	20 Ω ± 10 %

S1S3 Sine circuit	P3P4	46 Ω ± 10 %
S2S4 Cosine circuit	P5P6	50 Ω ± 10 %
One path temperature sensor	P7P8	See parameter table for details

J72-2103010 Temperature Sensor Corresponding Parameter Table

Temp-eratu-re/˚C	Maxi-mum Value/ KΩ	Stand-ard Value/ KΩ	Mini-mum Valu-e/KΩ	Temp-eratur-e/˚C	Maxi-mum Value/ KΩ	Stan-dard Valu-e/KΩ	Minim-um Value/ KΩ	Temp-eratu-re/˚C	Maxi-mum Value/ KΩ	Stand-ard Value/ KΩ	Minim-um Value/ KΩ
-50	11810	9574	7758	27	102.1	90.86	80.82	104	4.754	4.494	4.245
-49	10920	6665	7195	28	97.24	86.65	77.15	105	4.602	4.354	4.115
-48	10100	8214	6676	29	92.68	82.66	73.66	106	4.456	4.218	3.989
-47	9347	7616	6200	30	88.35	78.88	70.36	107	4.315	4.087	3.868
-46	8659	7066	5761	31	84.23	75.27	67.2	108	4.179	3.961	3.75
-45	8027	6560	5356	32	80.33	71.85	64.21	109	4.048	3.839	3.638
-44	7446	6094	4983	33	76.62	68.6	61.36	110	3.922	3.722	3.529
-43	6912	5665	4639	34	73.12	65.52	58.66	111	3.8	3.608	3.423
-42	6420	5270	4321	35	69.79	62.6	56.09	112	3.682	3.498	3.321
-41	5967	4905	4028	36	66.64	59.82	53.65	113	3.568	3.392	3.222
-40	5550	4568	3757	37	63.64	57.19	51.34	114	3.459	3.29	3.127
-39	5158	4250	3500	38	60.8	54.68	49.13	115	3.353	3.192	3.035
-38	4793	3957	3263	39	58.11	52.3	47.04	116	3.251	3.096	2.946
-37	4458	3686	3044	40	55.54	50.04	45.04	117	3.153	3.005	2.861
-36	4150	3435	2841	41	53.09	47.87	43.13	118	3.058	2.916	2.778
-35	3865	3204	2653	42	50.76	45.81	41.31	119	2.966	2.83	2.698
-34	3601	2990	2479	43	48.54	43.85	39.57	120	2.878	2.748	2.621
-33	3358	2791	2318	44	46.43	41.98	37.92	121	2.792	2.667	2.546
-32	3133	2608	2169	45	44.43	40.2	36.35	122	2.709	2.59	2.473
-31	2925	2438	2030	46	42.53	38.51	34.85	123	2.63	2.515	2.403
-30	2732	2280	1901	47	40.72	36.91	33.42	124	2.552	2.442	2.335
-29	2550	2131	1779	48	38.99	35.37	32.06	125	2.478	2.372	2.269
-28	2382	1993	1667	49	37.35	33.91	30.76	126	2.406	2.305	2.206
-27	2226	1866	1562	50	35.79	32.52	29.52	127	2.338	2.24	2.145
-26	2082	1747	1464	51	34.29	31.18	28.33	128	2.269	2.176	2.085
-25	1948	1636	1373	52	32.86	29.91	27.2	129	2.204	2.115	2.028
-24	1824	1534	1289	53	31.5	28.7	26.12	130	2.141	2.056	1.972
-23	1708	1439	1210	54	30.2	27.54	25.08	131	2.08	1.999	1.918

-22	1601	1350	1137	55	28.97	26.43	24.1	132	2.022	1,943	1.866
-21	1501	1267	1069	56	27.79	25.38	23.15	133	1.965	1.889	1.816
-20	1408	1190	1005	57	26.67	24.37	22.25	134	1.909	1.837	1.767
-19	1320	1117	945.2	58	25.6	23.41	21.39	135	1.856	1.787	1.719
-18	1238	1049	888.9	59	24.57	22.49	20.57	136	1.805	1.738	1.673
-17	1162	986.3	836.4	60	23.6	21.62	19.78	137	1.755	1.691	1.629
-16	1092	927.3	787.4	61	22.68	20.77	19.03	138	1.706	1.646	1.586
-15	1026	872.3	741.5	62	21.76	19.97	18.3	139	1.66	1.602	1.544
-14	963.6	820.9	698.7	63	20.9	19.2	17.81	140	1.614	1.559	1.503
-13	906.1	772.9	658.7	64	20	18.46	16.95	141	1.571	1.517	1.464
-12	852.6	728.1	621.2	65	19.31	17.75	16.31	142	1.528	1.477	1.426
-11	802.5	686.1	586.1	66	18.56	17.08	15.7	143	1.487	1.438	1.389
-10	755.7	646.9	553.2	67	17.84	16.44	15.12	144	1.447	1.4	1.353
-9	711.5	609.7	522	68	17.16	15.82	14.57	145	1.408	1.363	1.318
-8	670.1	574.9	492.8	69	18.51	15.23	14.03	146	1.371	1.328	1.285
-7	631.4	542.4	465.5	70	15.89	14.66	13.52	147	1.334	1.293	1.252
-6	595.2	511.8	439.8	71	15.28	14.12	13.03	148	1.299	1.26	1.22
-5	561.3	483.3	415.7	72	14.71	13.6	12.56	149	1.265	1.227	1.189
-4	529.6	456.5	393.1	73	14.16	13.1	12.11	150	1.232	1.196	1.159
-3	499.9	431.4	371.9	74	13.83	12.62	11.67	151	1.201	1.165	1.129
-2	472	407.8	352	75	13.12	12.16	11.26	152	1.171	1.135	1.1
-1	445.9	385.7	333.2	76	12.64	11.72	10.86	153	1.142	1.107	1.071
0	421.5	364.9	315.6	77	12.18	11.3	10.47	154	1.114	1.079	1.044
1	398.1	345.1	298.8	78	11.73	10.9	10.11	155	1.086	1.052	1.017
2	376.2	326.5	283	79	11.31	10.51	9.759	156	1.06	1.025	0.991-3
3	355.7	309	268.2	80	10.9	10.14	9.421	157	1.034	0.9996	0.966-1
4	336.4	292.6	254.2	81	10.51	9.779	9.095	158	1.009	0.9748	0.941-7
5	318.3	277.1	241	82	10.13	9.436	8.782	159	0.983-8	0.9508	0.918
6	301.3	262.6	228.6	83	9.769	9.107	8.482	160	0.960-1	0.9274	0.895
7	285.3	248.9	216.9	84	9.424	8.791	8.193	161	0.937-1	0.9047	0.872-6
8	270.3	236	205.9	85	9.092	8.488	7.916	162	0.914-6	0.8826	0.850-9

9	256.1	223.9	195.6	86	8.773	8.195	7.649	163	0.892-8	0.8611	0.829-8
10	242.8	212.5	185.8	87	8.467	7.915	7.392	164	0.871-7	0.8403	0.809-3
11	230.1	201.6	176.5	88	8.173	7.646	7.146	165	0.8511	0.82	0.789-4
12	218.2	191.4	167.7	89	7.891	7.387	6.909	166	0.8311	0.8004	0.770-1
13	207	181.7	159.3	90	7.62	7.138	6.681	167	0.8116	0.7813	0.751-3
14	196.4	172.6	151.5	91	7.359	6.898	6.461	168	0.792-7	0.7627	0.733-1
15	186.4	164	144.1	92	7.109	6.668	6.249	169	0.774-3	0.7446	0.715-4
16	177	155.9	137.1	93	6.868	6.446	6.045	170	0.756-5	0.7271	0.698-3
17	168.1	148.2	130.5	94	6.636	6.233	5.849	171	0.739	0.71	0.681-5
18	159.8	141	124.2	95	6.414	6.028	5.661	172	0.722-1	0.6934	0.665-3
19	151.9	134.1	118.3	96	6.2	5.831	5.479	173	0.705-6	0.6773	0.649-5
20	144.4	127.7	112.7	97	5.994	5.641	5.305	174	0.689-6	0.6618	0.634-1
21	137.3	121.5	107.4	98	5.797	5.459	5.138	175	0.674	0.6463	0.619-2
22	130.6	115.7	102.3	99	5.606	5.283	4.974	176	0.658-8	0.6314	0.604-7
23	124.2	110.1	97.6	100	5.423	5.114	4.818	177	0.644	0.617	0.590-6
24	118.3	104.9	93.07	101	5.246	4.95	4.667	178	0.629-6	0.6029	0.576-8
25	112.6	100	88.78	102	5.076	4.793	4.521	179	0.615-6	0.5893	0.563-5
26	107.2	95.31	84.69	103	4.912	4.641	4.381	180	0.602	0.576	0.550-5

MCU Low Voltage Connector Signal Test Method

First, unplug the low voltage connector from the controller, and check the wire harness connector terminals for bad contact. If so, please repair or replace the connector.
Use a multimeter to test the signal of connector terminals. The test reference value is shown in table below:
Signal detection method of wire harness connector terminals and reference value

Test Item	Test Terminal (- Multimeter Positive Probe)	Opposite Terminal (- Multimeter Negative Probe)	Multimeter Band	Test Condition	Test Reference Value
KL30 power supply detection	1	16 or 17	DC voltage band	Vehicle key ON	(9 ～ 16) V
KL30 power supply detection	2	16 or 17	DC voltage band	Vehicle key ON	(9 ～ 16) V
Rotary sensor signal	3	4	Resistance band	Vehicle key OFF	20 Ω
Rotary sensor signal	4	3	Resistance band	Vehicle key OFF	20 Ω
Rotary sensor signal	5	6	Resistance band	Vehicle key OFF	46 Ω
Rotary sensor signal	6	5	Resistance band	Vehicle key OFF	46 Ω
CAN termination resistance detection	7	8	Resistance band	Vehicle key OFF	(120 ± 5) Ω
CAN termination resistance detection	8	7	Resistance band	Vehicle key OFF	(120 ± 5) Ω
Key ignition signal	9	16 or 17	DC voltage band	Vehicle key ignition	(9 ～ 16) V
VMS enable signal detection	10	16 or 17	DC voltage band	Vehicle key ignition	(9 ～ 16) V
Motor temperature sensor detection	11	12	Resistance band	Vehicle key OFF	See motor temperature sensor resistance table
Motor temperature sensor detection	12	11	Resistance band	Vehicle key OFF	See motor temperature sensor resistance table
Rotary sensor signal	13	14	Resistance band	Vehicle key OFF	50 Ω
Rotary sensor signal	14	13	Resistance band	Vehicle key OFF	50 Ω

Shield (ground) signal	15	16 or 17	Resistance band	Vehicle key OFF	0 Ω
KL30 power supply detection	16	1 or 2	DC voltage band	Vehicle key ON	(-9 ～ -16) V
KL30 power supply detection	17	1 or 2	DC voltage band	Vehicle key ON	(-9 ～ -16) V

1. When using multimeter to test, do not directly insert the probe into the low voltage connector terminal, so as to prevent bad contact of terminal. It is necessary to extend and thin the probe (see the example in illustration), and then test.

MS1014002

MCU Insulation Failure Detection

Test Description

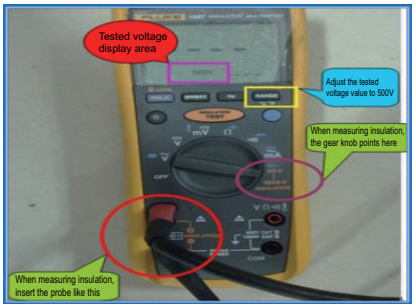
Before test, first remove the vehicle key or turn to OFF position, and unplug the service switch connector (- under the front passenger seat), use the sleeve to remove the small cover of the controller. After confirming that the bus voltage is lower than 5 V, remove 5 M6 bolts from the wire harness terminal to separate the terminal from the contact surface, and remove the signal wire connector of motor controller.

⚠

- Make sure that no liquid flows or splashes into the high voltage connector or low voltage connector.
- Note that the low voltage connector must be pulled out.

Test Method

1. As shown in illustration, adjust the insulation meter and select 500 V of test voltage.



MS1015002

2. Connect the ground wire of insulation meter to the housing of the motor controller, as shown in illustration.


MS1016002

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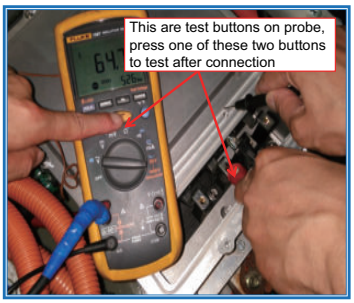
- The ground wire of the insulation meter must be in reliable contact with the motor controller housing, and the human body should not touch the motor controller housing.

3. Connect the high voltage probe of insulation meter to the high voltage terminal of motor controller, and press the button on the probe to start the insulation test as shown in illustration. Use the same operation to test the high voltage DC bus input terminal and 3-phase high voltage output terminal of the motor controller in turn, and record the test results.



MS1017002

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- When testing with a high voltage insulation meter, it is forbidden to directly touch the high voltage probe to the human body to prevent electric shock.

Measurement Standard
Insulation resistance is 20 MΩ.

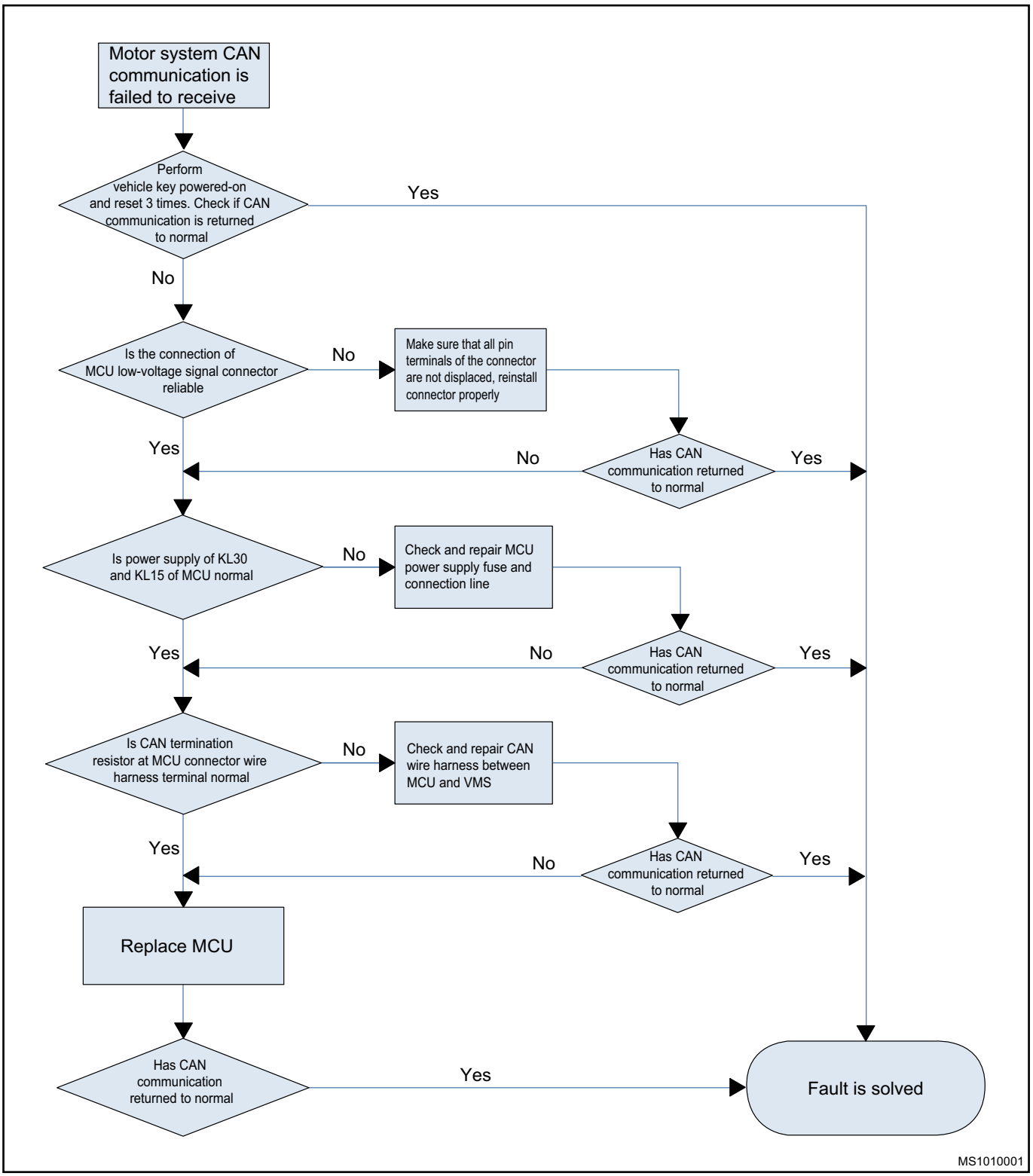
Diagnostic Trouble Code (DTC) Chart

No.	DTC	Description
1	U0293	MCU _ CAN _ RX _ FAILED
2	P1A63	MOTOR _ POSTION _ FAULT
3	P1A64	PAHSE _ OVERCURRENT
4	P1A65	INVERTER _ FAULT
5	P1A66	DCLINK _ OVERCUR
6	P1A67	DCLINK _ OVERVOLTAGE
7	P1A68	MOTOR _ OVER _ TEMP
8	P1A69	INVERTER _ OVER _ TEMP
9	P1A6A	MOTOR _ OVERSPEED
10	P1A6B	MCU _ SENSOR _ SUPPLY _FAULT
11	P1A6C	GATE _ SUPPLY _ FAULT
12	P1A6D	MCU _ LV _ SUPPLY _FAULT
13	P1A6E	MCU _ TORQUE _ FAULT
14	P1A6F	MCU _ MODE _ ERROR
15	P1A70	DCLINK _ UNDERVOLTAGE

No.	DTC	Description
16	P0A43	MCU _ POWERLIMIT _WARNING
17	P0A62	MCU
18	P0A44	MCU _ HVIL _ FAULT
19	P0A57	MCU
20	P0A61	MCU
21	P0A55	MCU
22	P0A59	
23	P0A54	

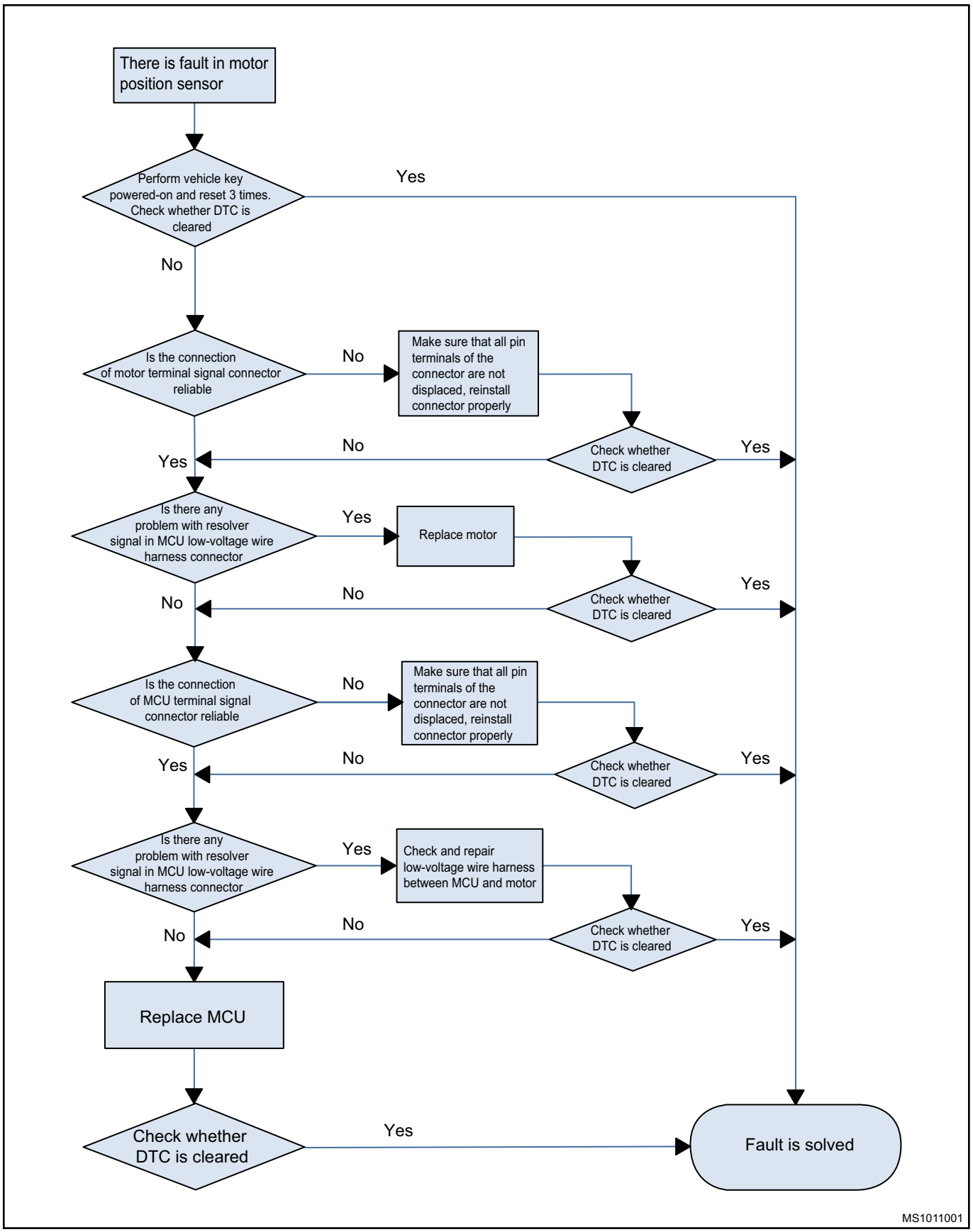
DTC Diagnosis Procedure

Motor System CAN Communication Receiving Failed U0293
First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, check whether the low voltage signal connector of the motor controller contacts reliably, and then check whether the power signal in the wire harness and the CAN terminal resistance are faulty. If the fault still cannot be cleared after troubleshooting, please replace the motor controller assembly. The specific process is as follows:



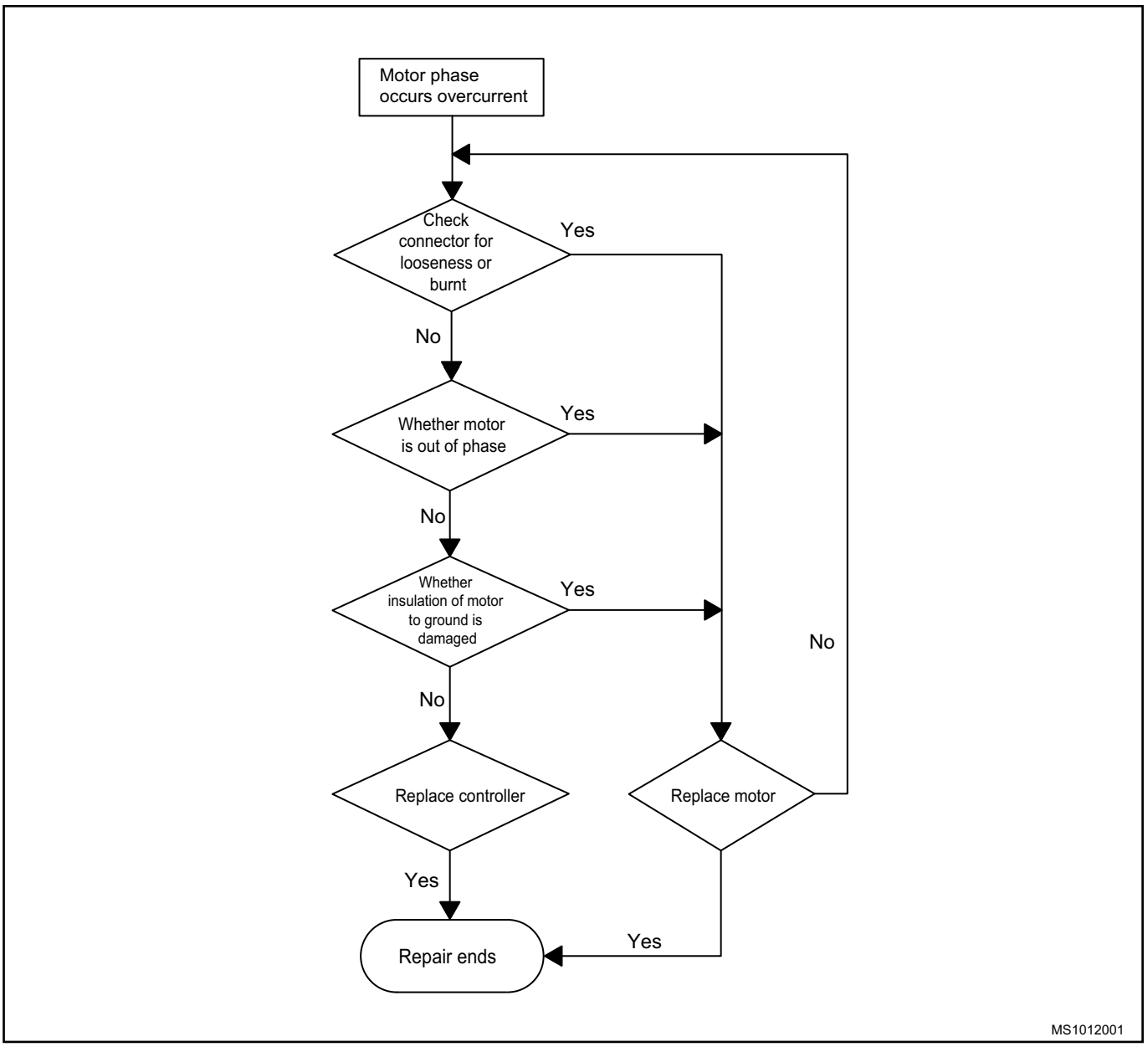
Motor Position Sensor Fault P1A63

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, check whether the motor terminal signal connector contacts reliably, and check whether there is any problem with the rotary wire harness signal of the wire harness (refer to signal detection method of wire harness connector terminals and reference value above). If there is any problem, replace the motor. Then check whether the low voltage signal connector of the motor controller contacts reliably, and check whether there is any problem with the rotary wire harness signal of the wire harness. If the fault still cannot be cleared after troubleshooting, please replace the motor controller assembly. The specific process is as follows:



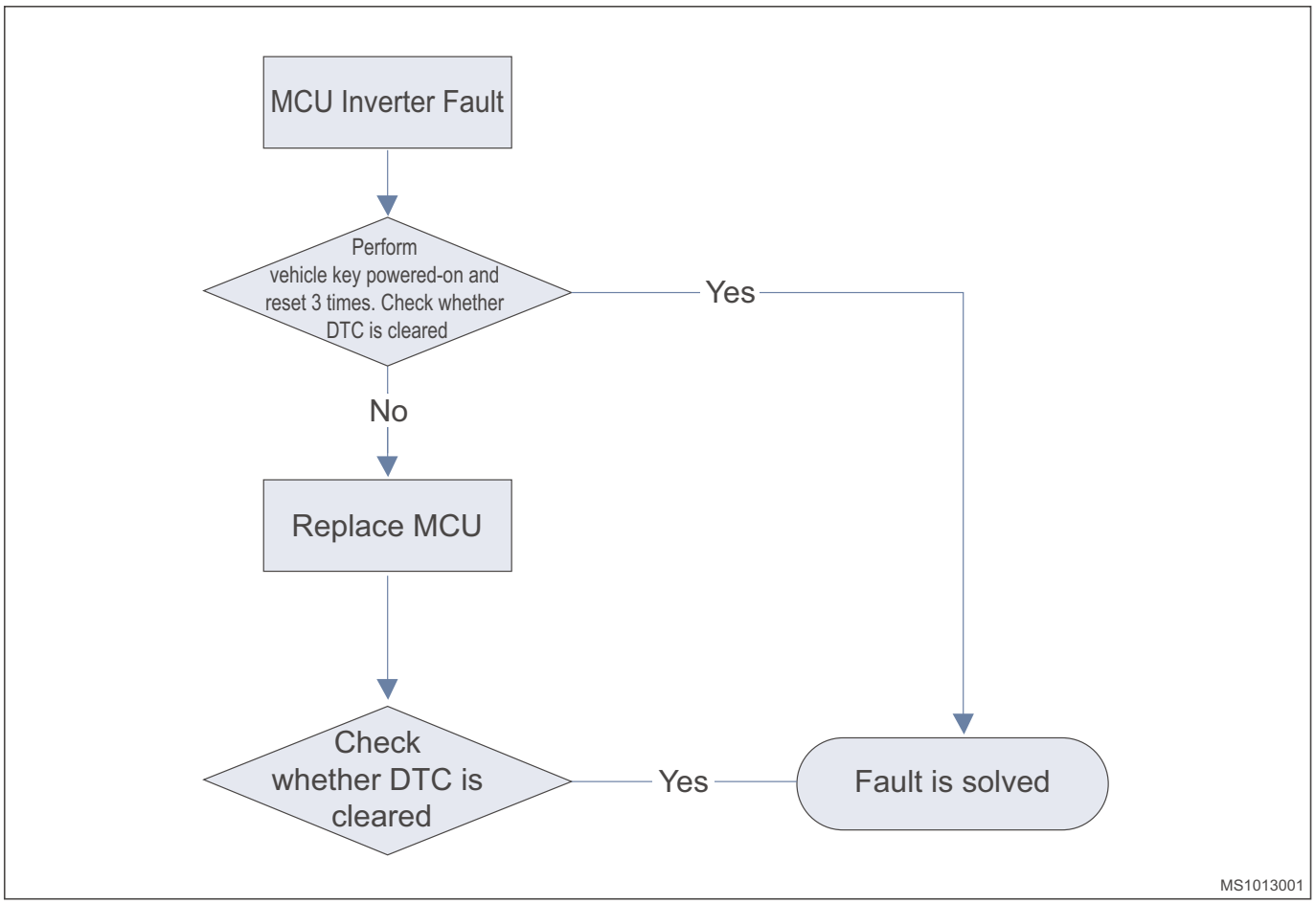
Phase Current Overcurrent Fault P1A64

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, the specific process is as follows:



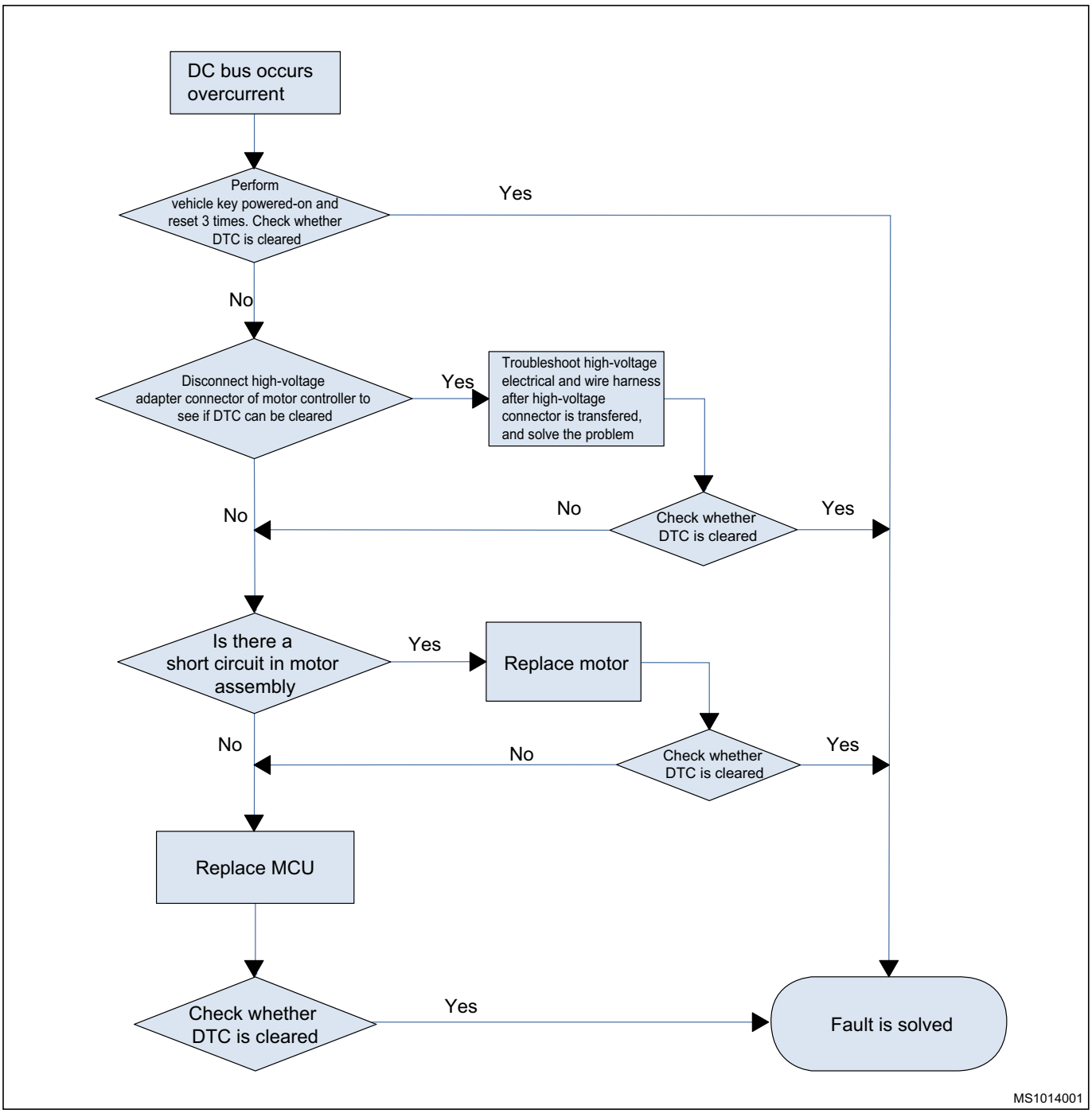
MCU Inverter Fault P1A65

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:



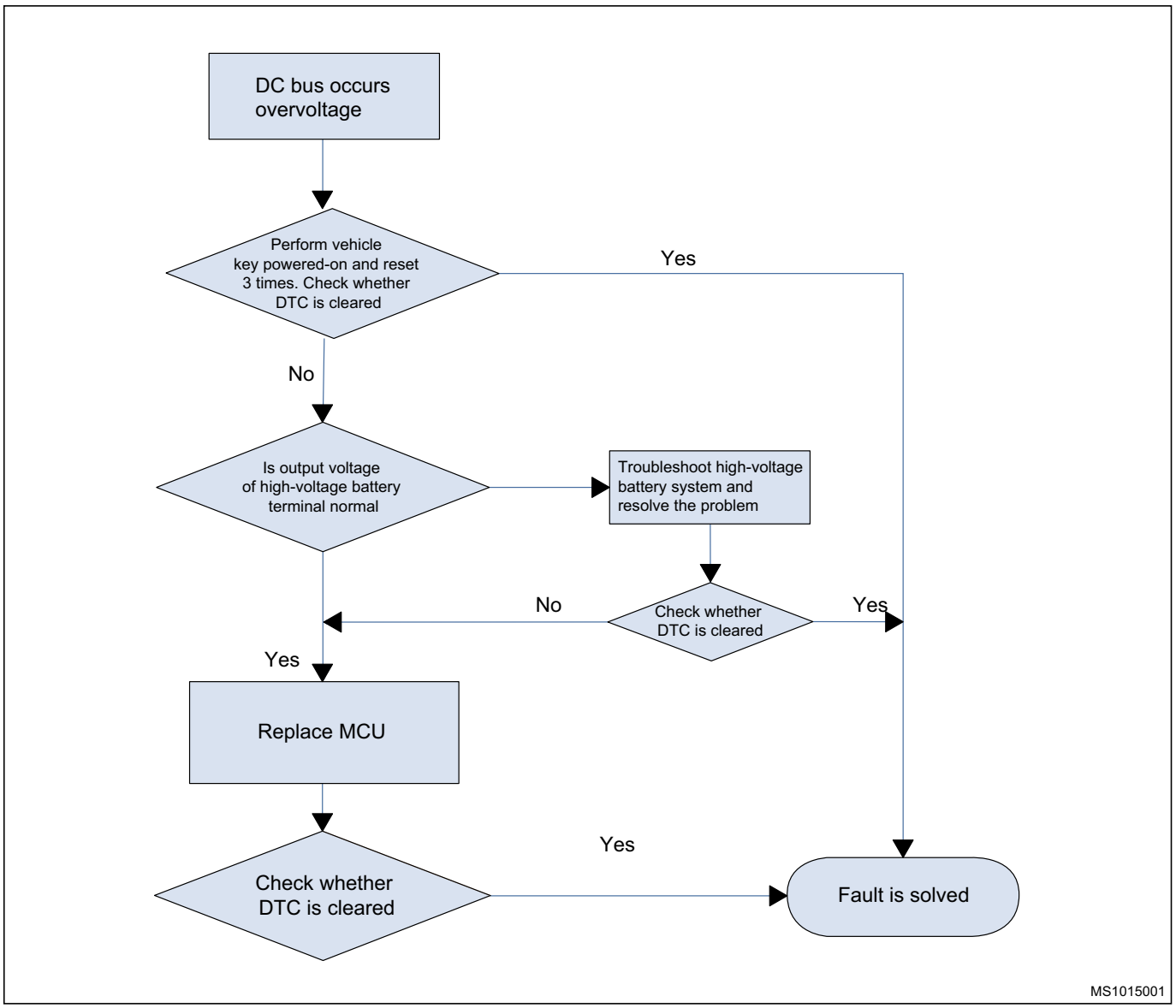
DC Bus Overcurrent Fault P1A66

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, disconnect the high voltage connector of the motor controller. If the fault still cannot be cleared, check whether there is a short circuit in motor assembly. If so, replace the motor. If not, replace the motor controller assembly. The specific process is as follows:



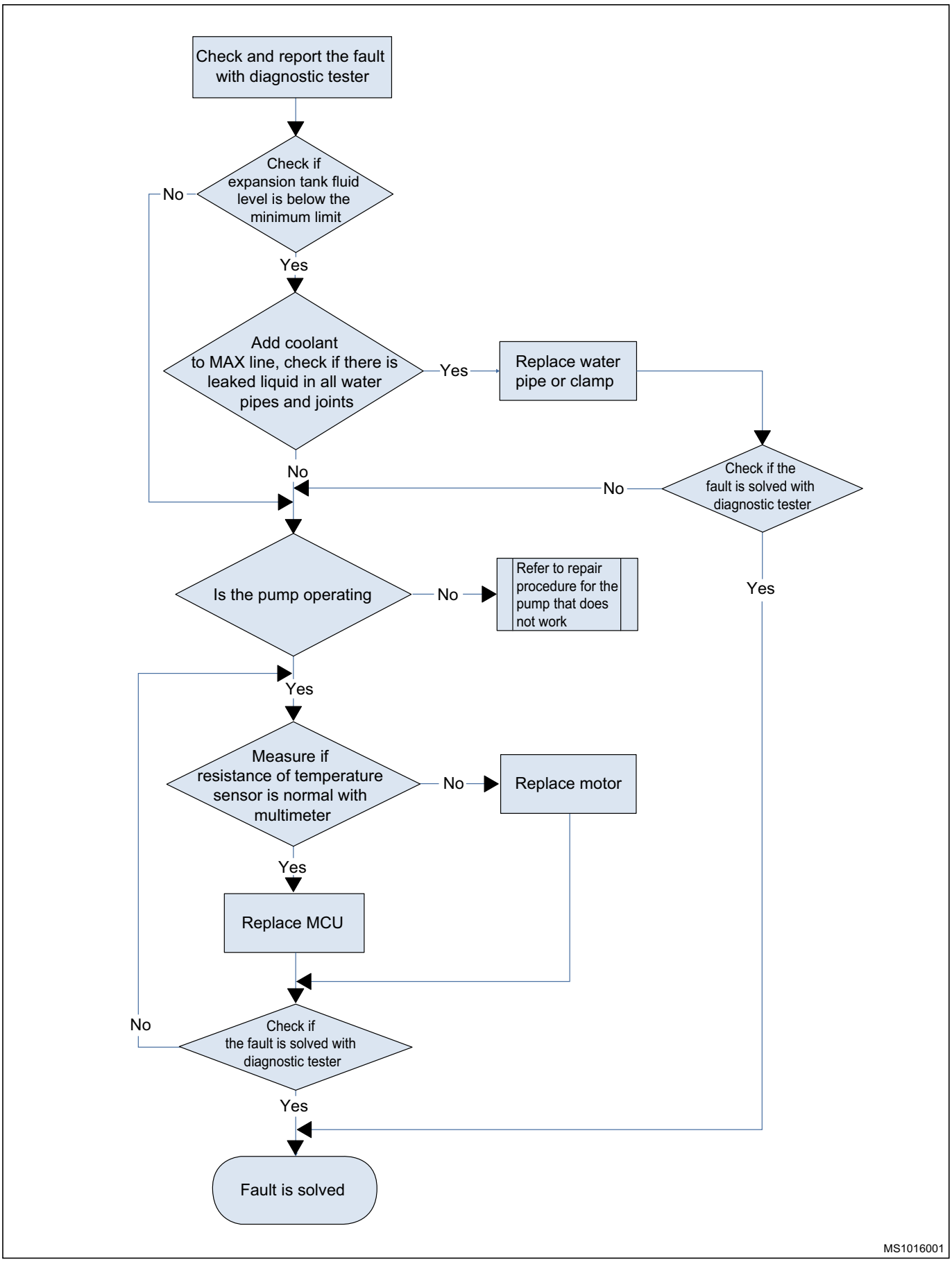
DC Bus Overvoltage Fault P1A67

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, check whether the output voltage of high voltage battery is normal. If it is normal, replace the motor controller assembly. The specific process is as follows:



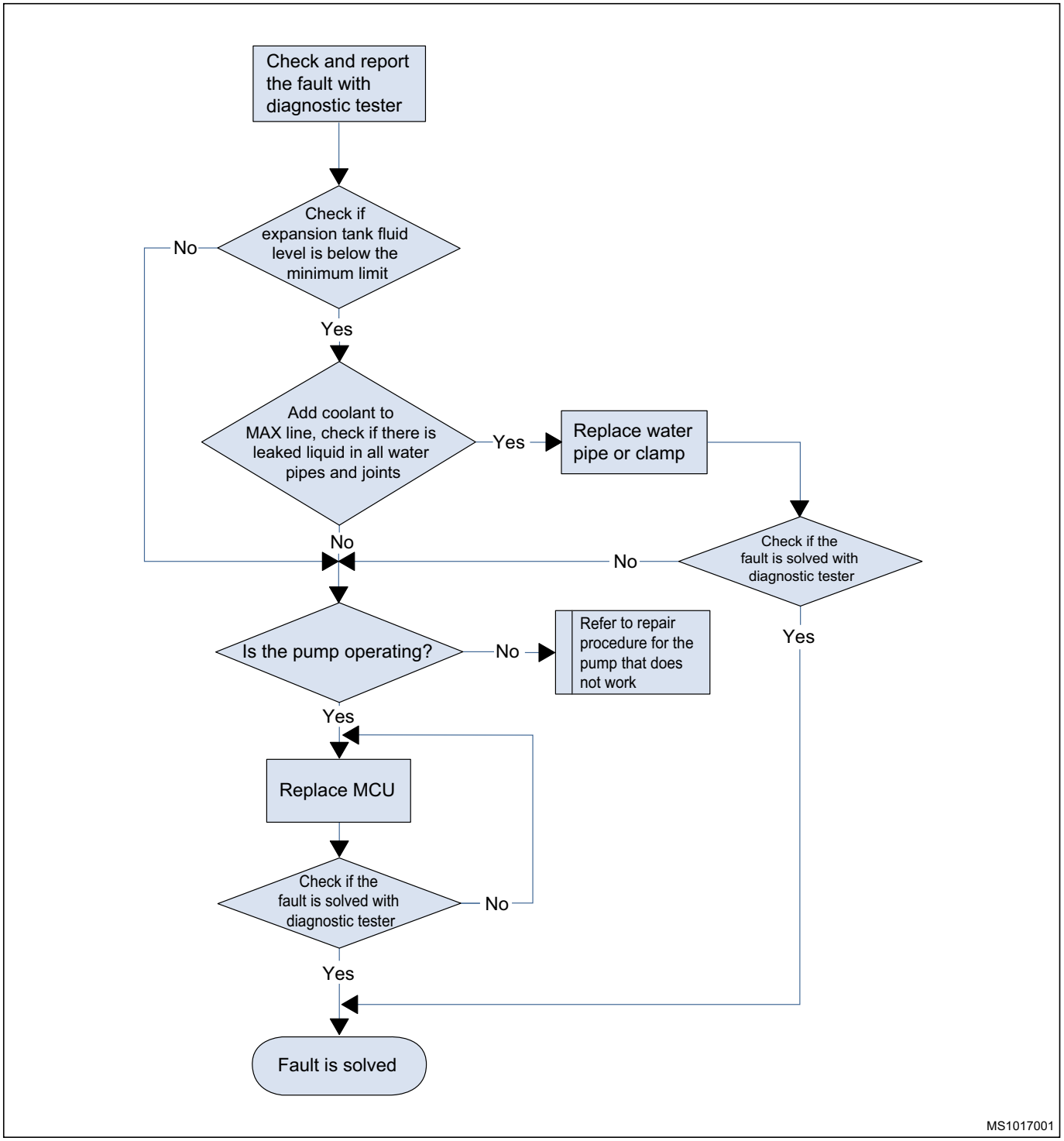
Motor Over-temperature Fault P1A68

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please judge according to the following logic.


Check and report the fault with diagnostic tester
Check if expansion tank fluid level is below the minimum limit
No
Yes
Add coolant to MAX line, check if there is leaked liquid in all water pipes and joints
Yes
Replace water pipe or clamp
Check if the fault is solved with diagnostic tester
No
No
Yes
Is the pump operating
No
Refer to repair procedure for the pump that does not work
Yes
Measure if resistance of temperature sensor is normal with multimeter
No
Replace motor
Yes
Replace MCU
No
Check if the fault is solved with diagnostic tester
Yes
Fault is solved
MS1016001

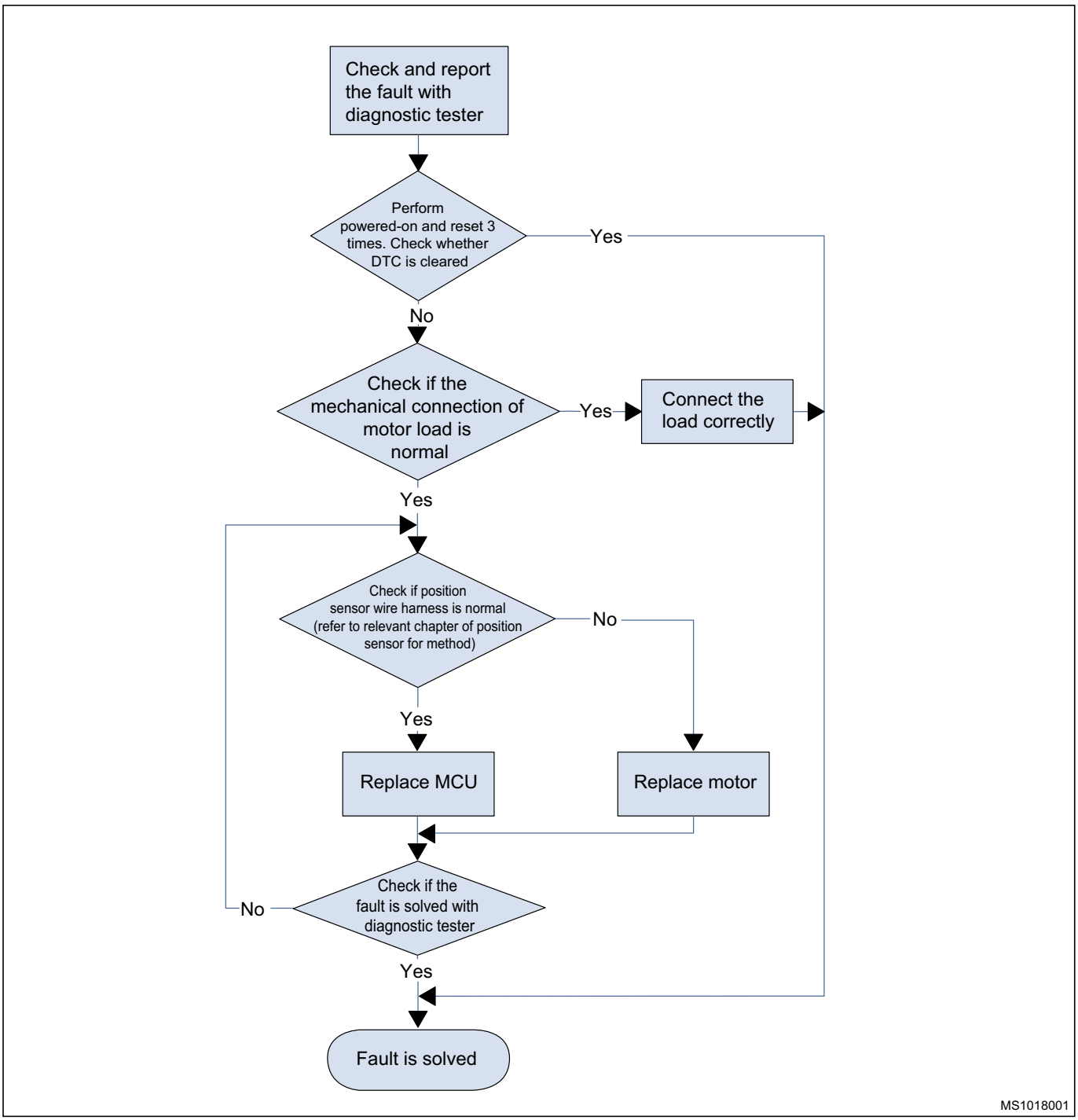
MCU Controller Over-temperature Fault P1A69

The MCU controller over-temperature fault is frequently reported while driving. Please check whether the cooling system operates normally. If it is normal, replace the motor controller assembly. The specific process is as follows:



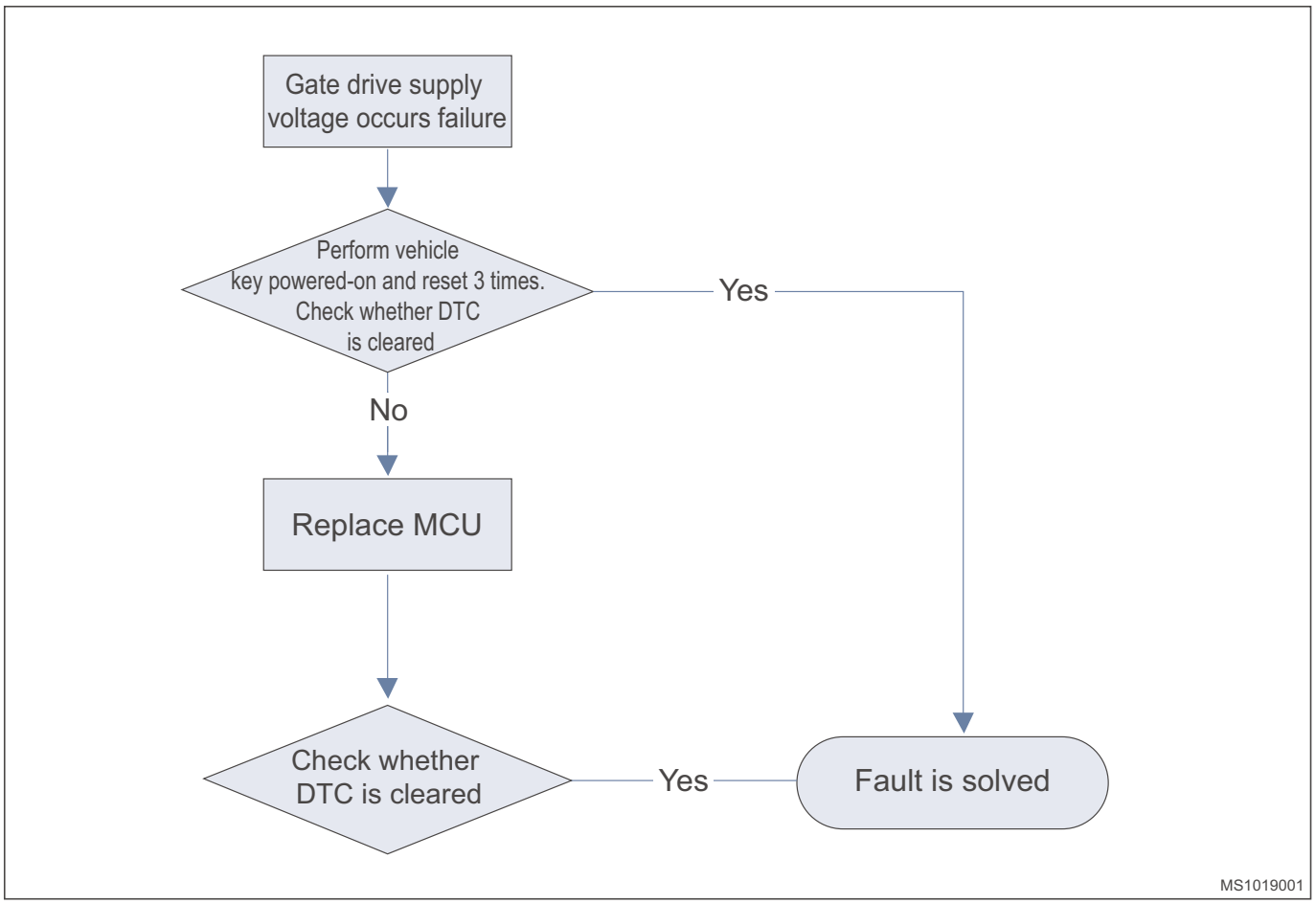
Motor Overspeed Fault P1A6A

Power-on and reset, the motor load may be disconnected, check the mechanical connection of the motor load, if it is normal, check whether the position sensor wire harness is normal, if it is normal, replace the motor controller, if not, replace the motor.

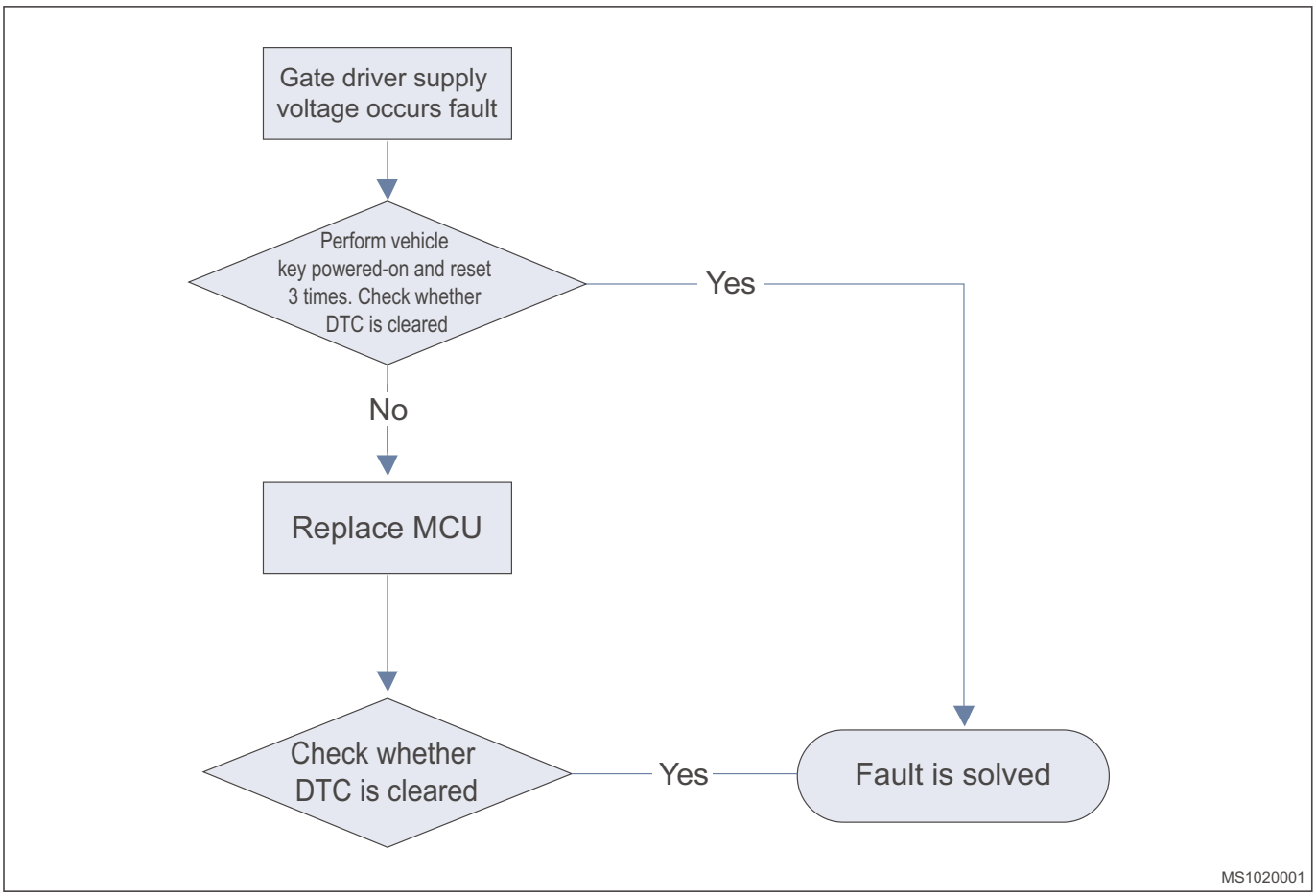


MCU Internal Sensor Supply Voltage Fault P1A6B

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:

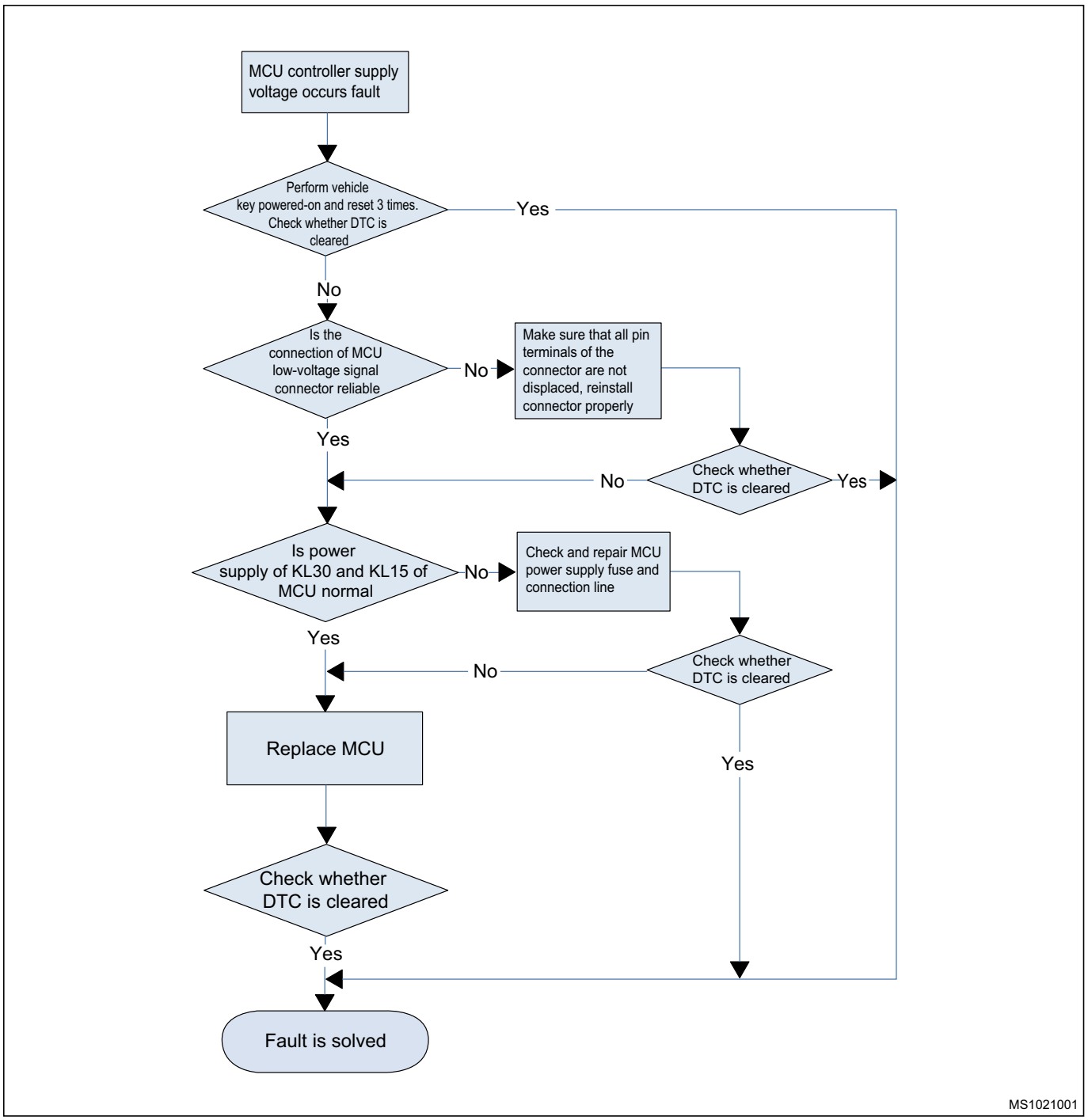


Gate Driver Supply Voltage Fault P1A6C
First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:



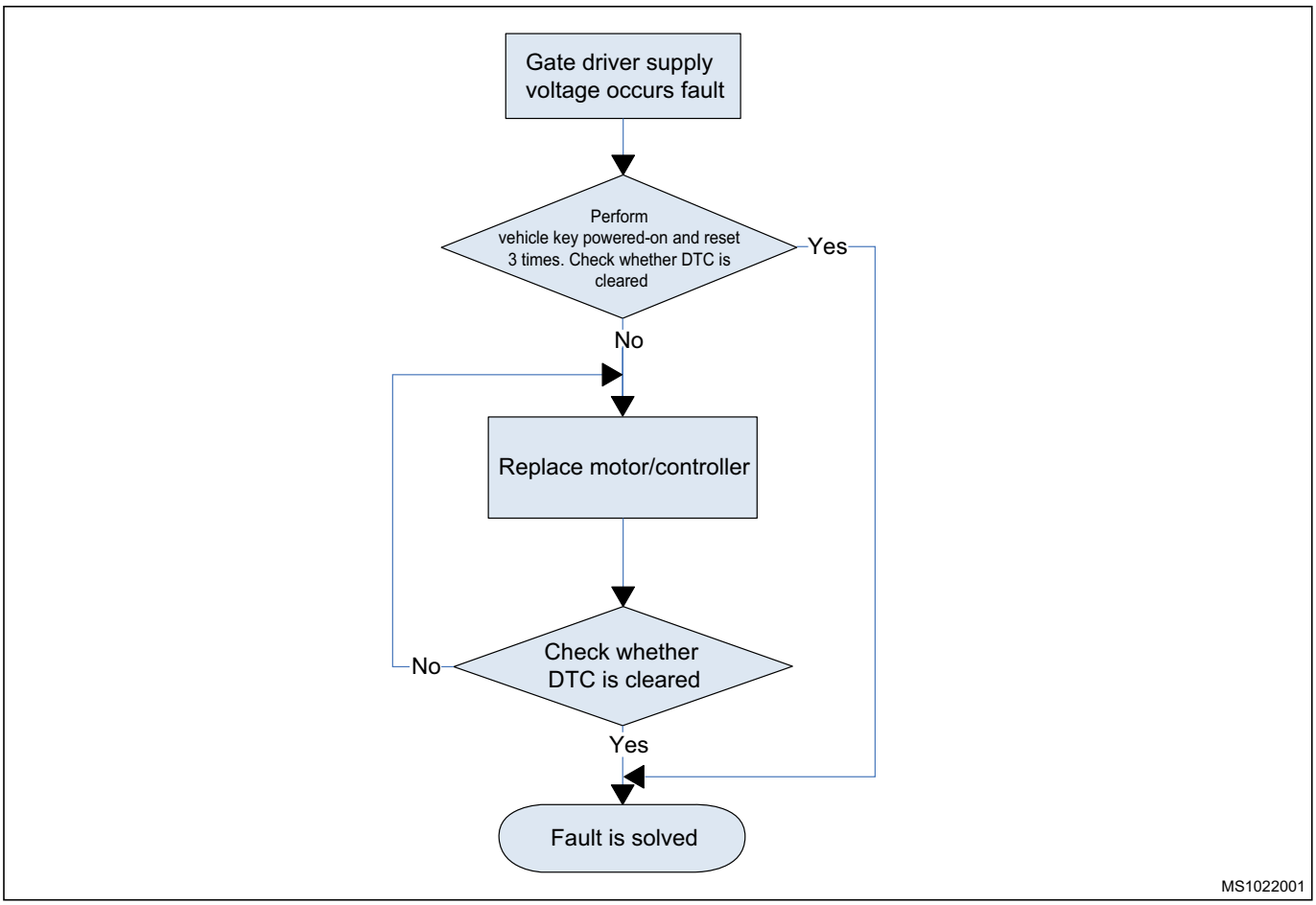
MCU Controller Supply Voltage Fault P1A6D

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, check whether the low voltage signal connector of the motor controller contacts reliably, and then check the power signal of the wire harness. If the fault still cannot be cleared after troubleshooting, please replace the motor controller assembly. The specific process is as follows:



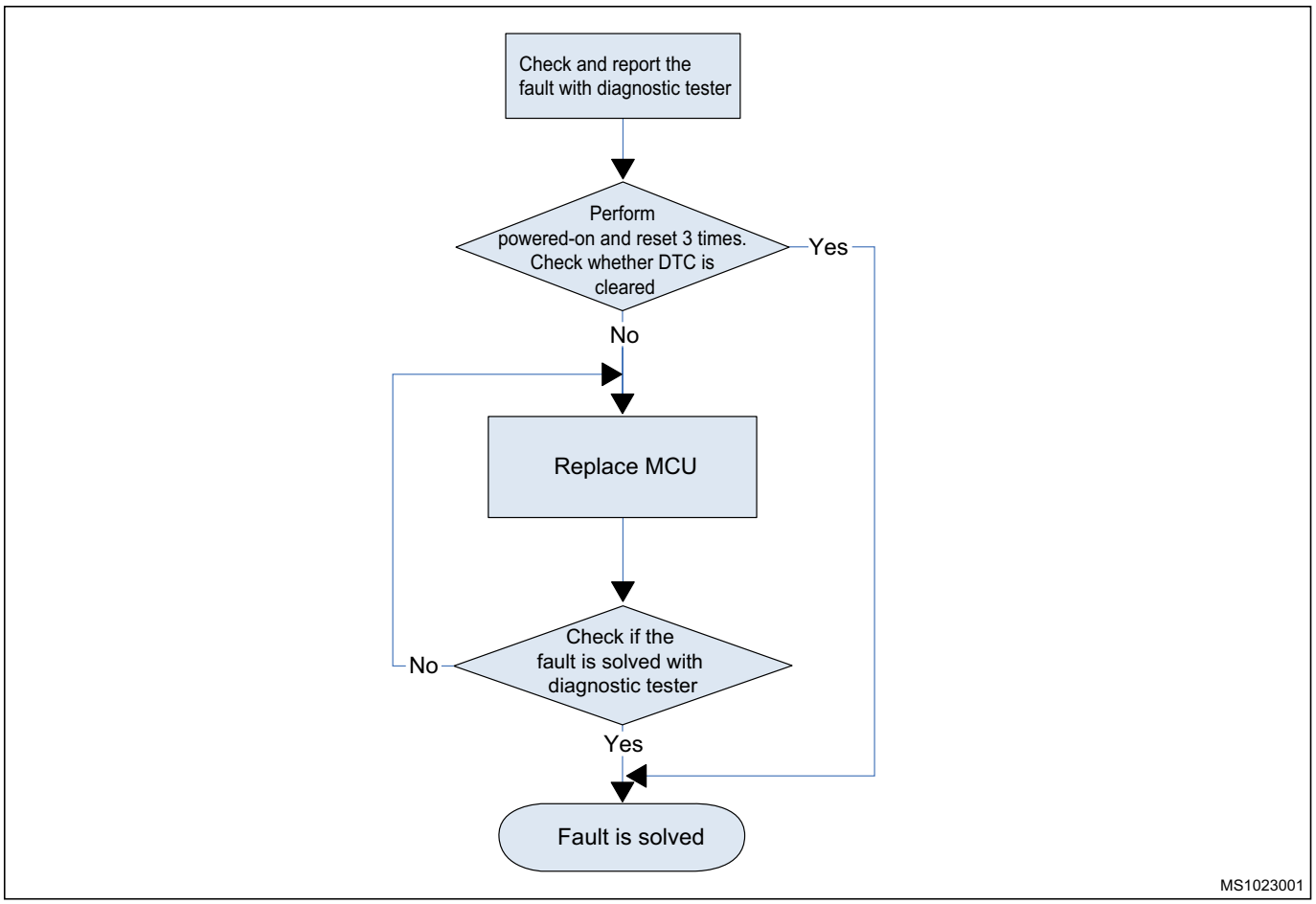
MCU System Safe Fault P1A6E

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:



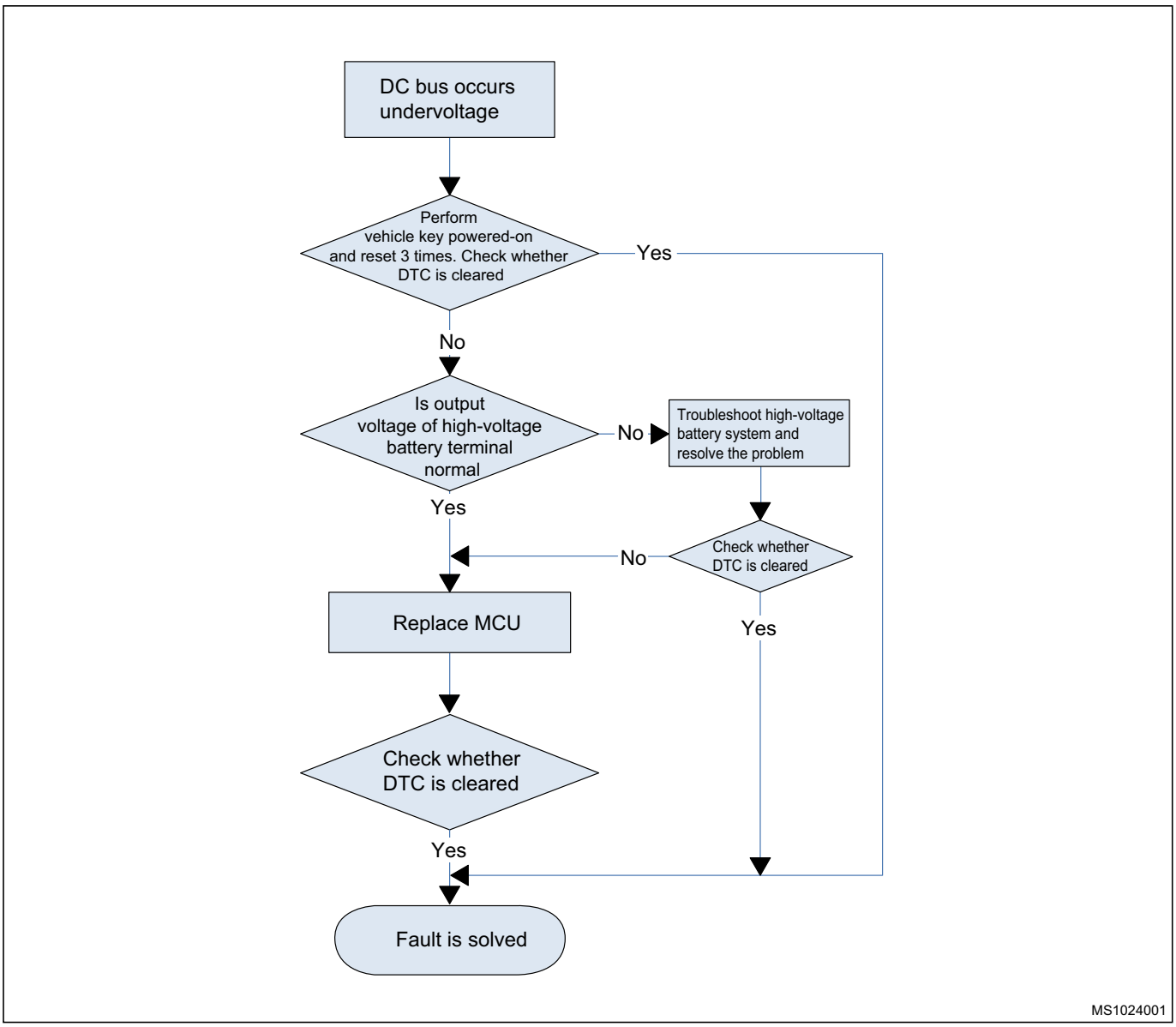
MCU Mode Error P1A6F

First, use the vehicle key to power on and reset. If the fault cannot be cleared, please replace the controller.



DC Bus Undervoltage Fault P1A70

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:

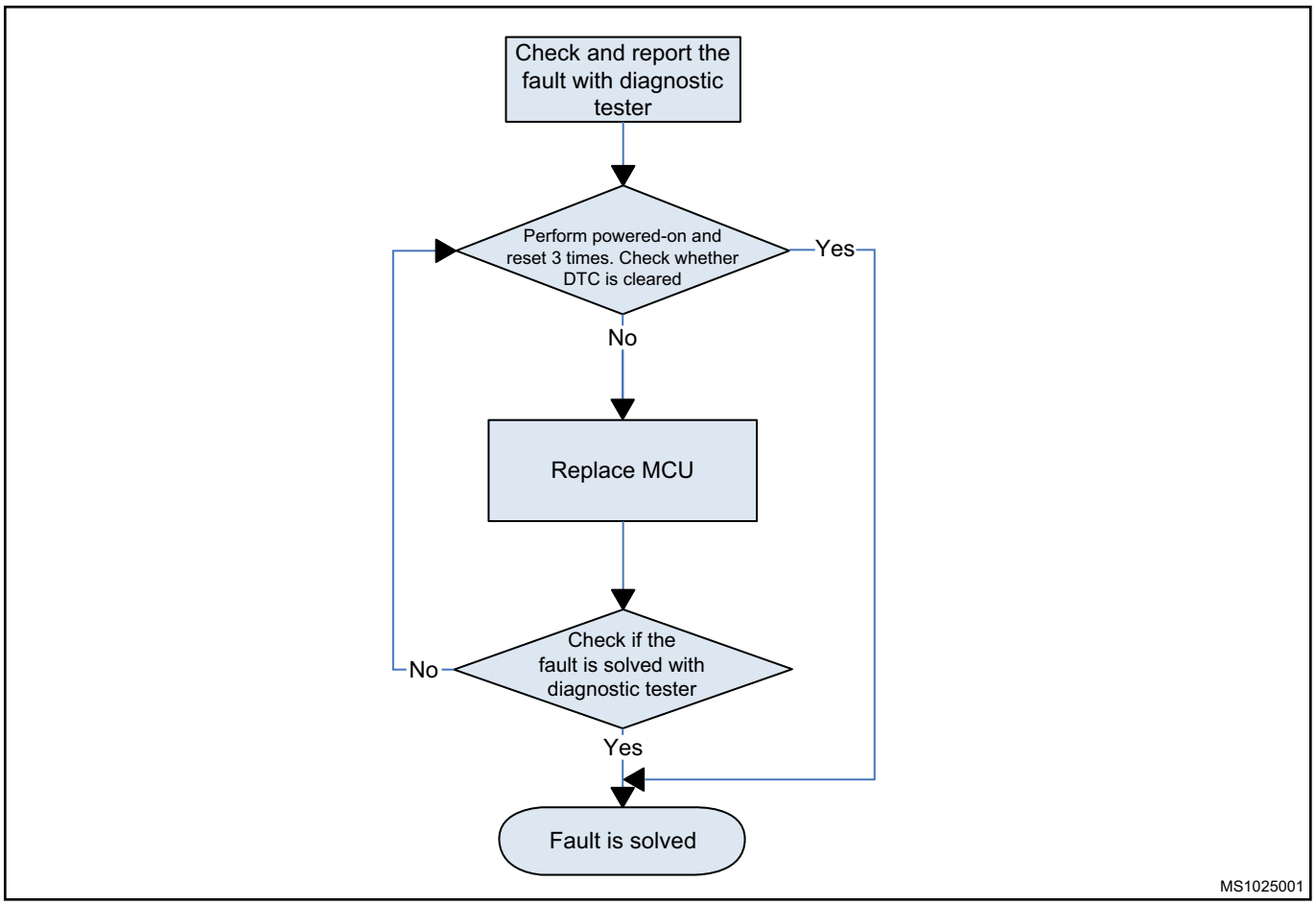


Electric Drive System Power Limit Warning P0A43

Electric drive system power limit warning is frequently reported while driving. Please check whether the cooling system operates normally. If it is normal, replace the motor controller assembly. For the specific process, please refer to the troubleshooting methods for motor over-temperature fault and controller over-temperature fault.

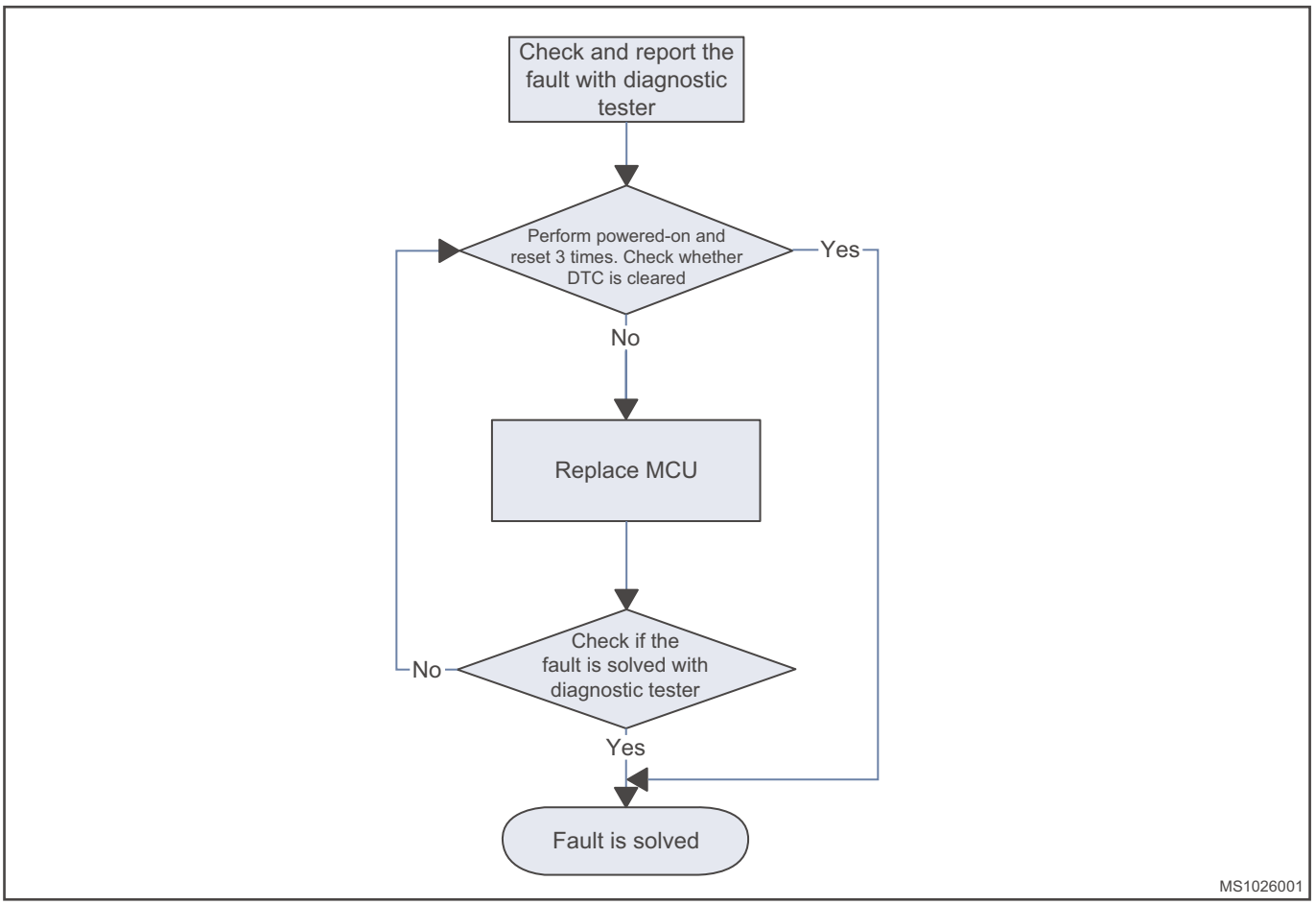
MCU System Level 1 Fault P0A62

This fault is caused by other faults of the motor. After troubleshooting the other faults of the motor, replace the MCU.



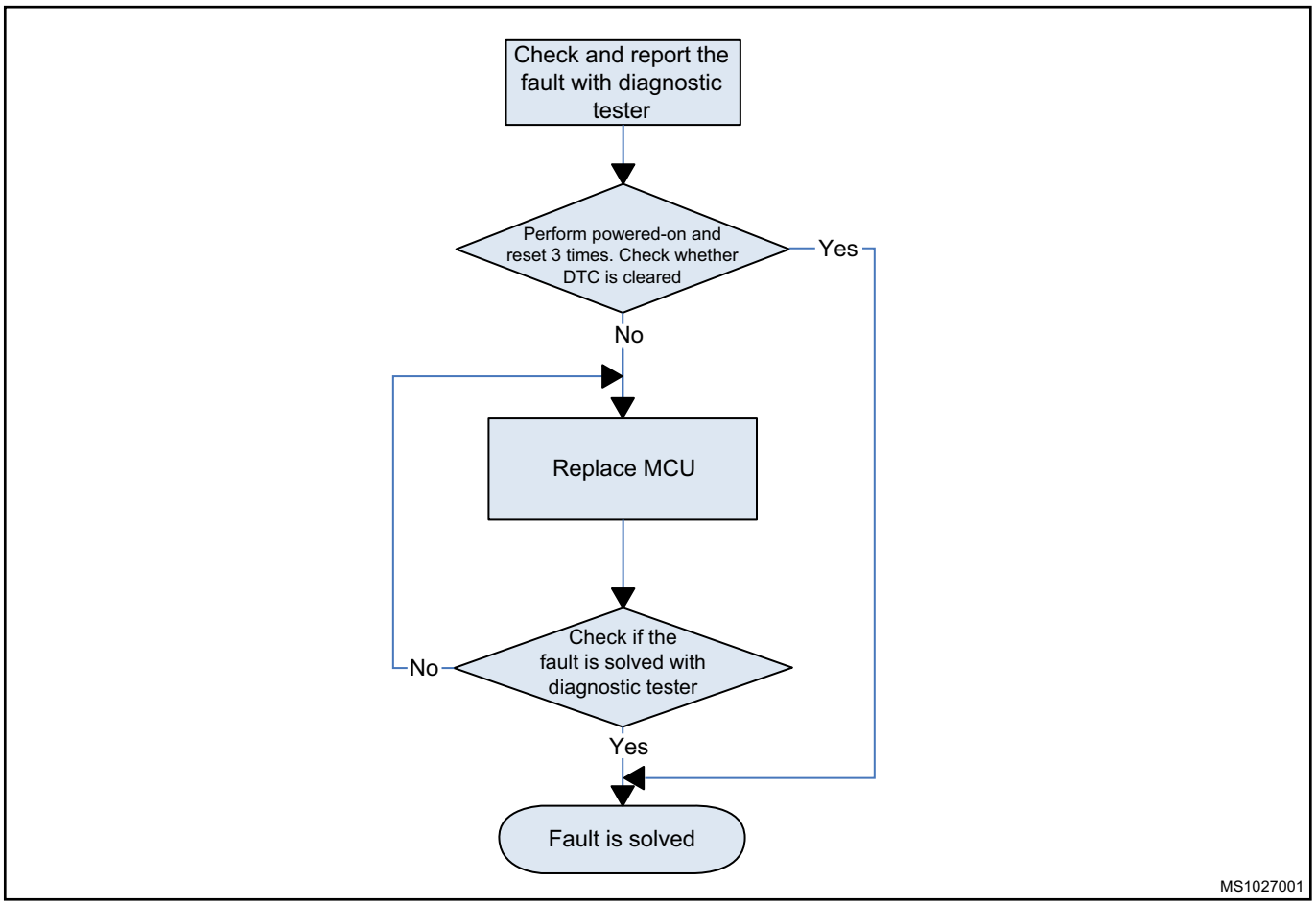
MCU Uncovered Protection Fault P0A44

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:



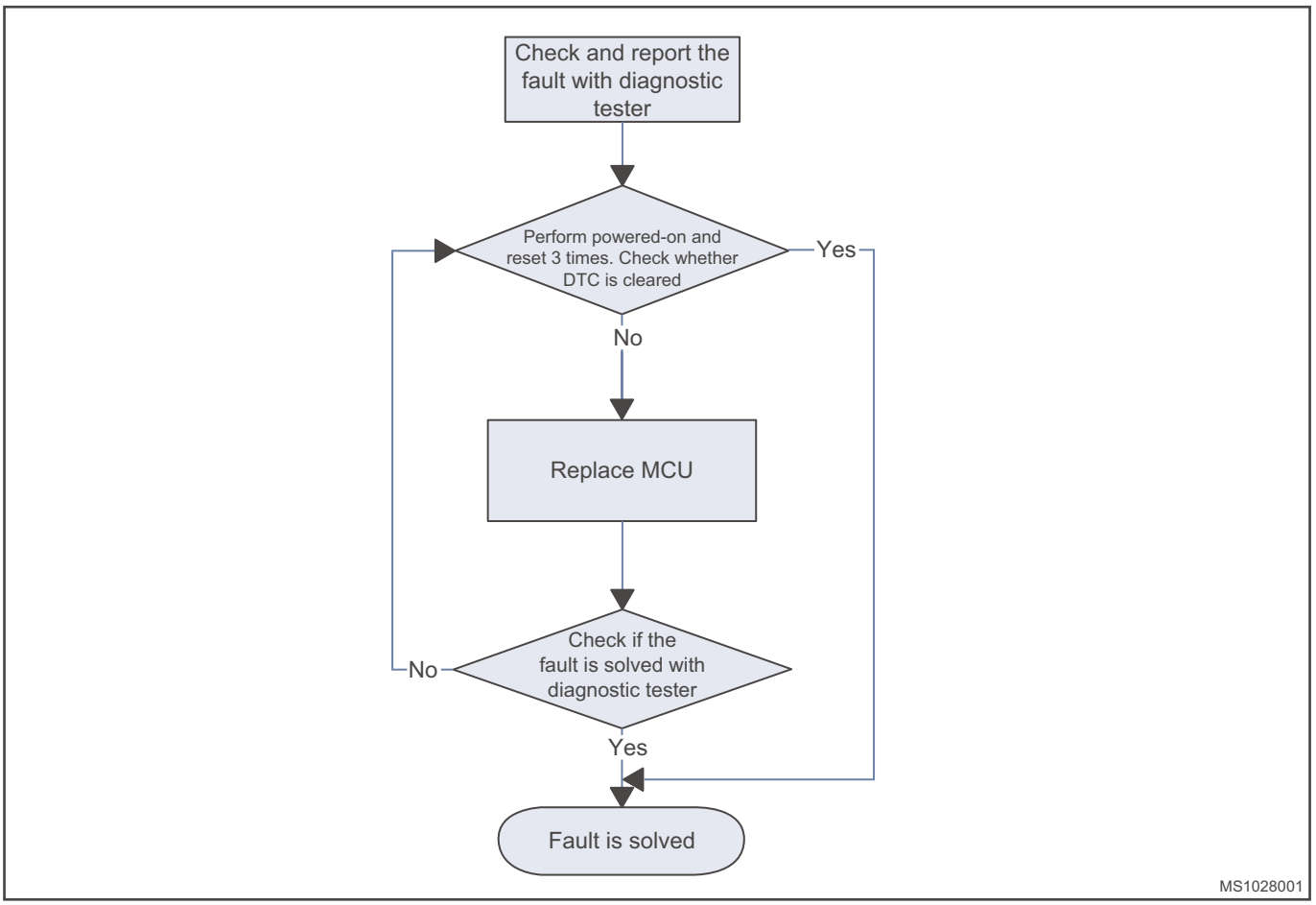
P0A57 MCU Self-check Fault

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the controller. The specific process is as follows:



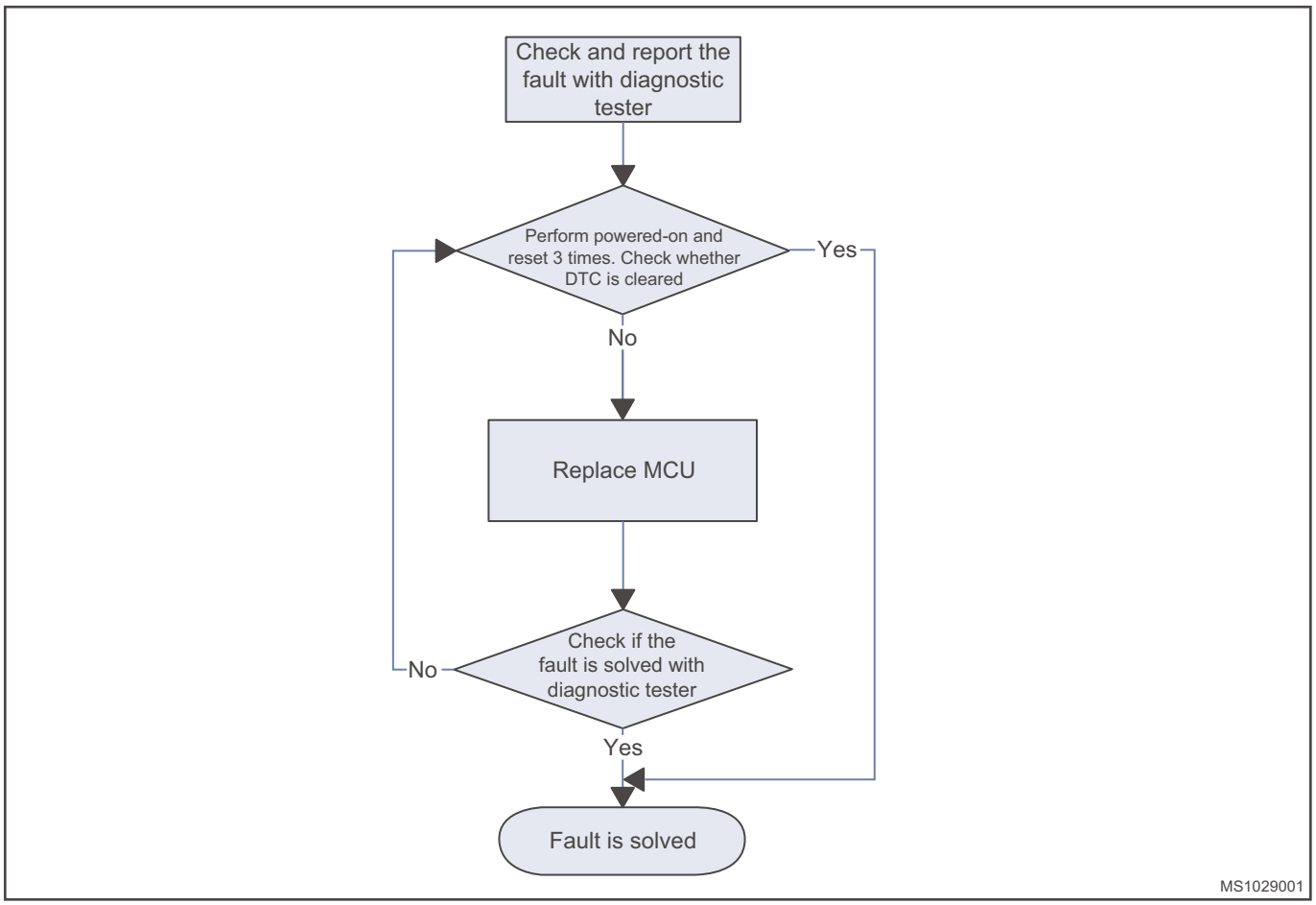
MCU Sensor Self-check Fault P0A61

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the controller. The specific process is as follows:



MCU Hardware Latch Fault P0A55

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, the specific process is as follows:



Motor Phase Lack Fault P0A59
First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, replace the motor.

Motor Block Fault P0A54
First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, replace the motor.

On-vehicle Service

Tools

A set of ratchet socket tool, a torque wrench, an adjustable wrench, a clamp pliers, a multimeter, a high voltage insulation meter, a lift, and a flat trailer.

Auxiliary Material

Gear oil, gasket, coolant.

Protective Equipment

Cotton gloves, insulation gloves, working clothing, safety helmet, working shoes.

Specifications

Torque Specifications

Part Name	Torque (N·m)
Motor Fixing Nut	20 ± 3
Waterproof Terminal	4 ± 1
Wire Harness Terminal Fixing Bolt	4 ± 1
Coupling Bolt between Motor and Final Drive	60 ± 6
Four Fixed Screw Connections of Controller	25 ± 4

Motor Assembly

Removal

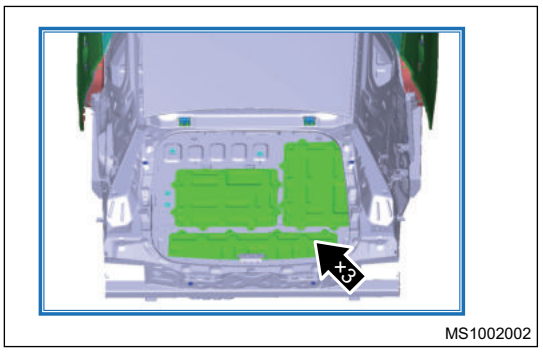
⚠

- Be sure to wear necessary safety equipment to prevent accidents.
- Confirm that the power battery pack relay is disconnected before removal or installation, and remove the service switch connector (under front passenger seat).
- When installing and removing the final drive, avoid damaging the mating surface between final drive and motor.
- Avoid damaging the oil seal when installing the drive shaft.
- Make sure that the final drive is at the proper angle of inclination when filling the transmission oil.
- Avoid contamination of transmission oil, or contact with eyes.
- Lift or hold the power assembly before removing.

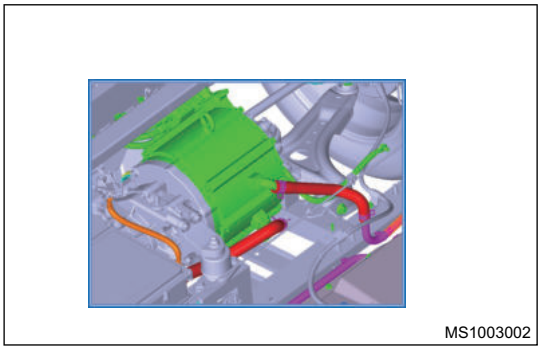
1. Cut off the high voltage, and remove the service switch (MSD fuse terminal) connector (arrow) (under front passenger seat, push the seat backward to remove).


MS1001002

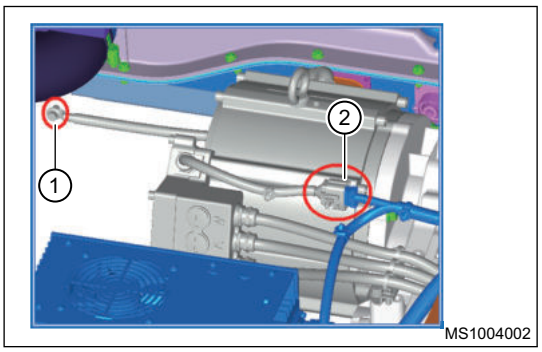
2. Remove rear service port cover plate assembly (arrow).


MS1002002

3. Remove motor water inlet pipe (1) and outlet pipe (2).

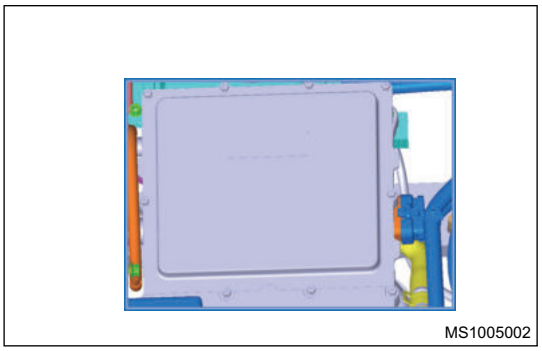

MS1003002

4. Remove motor ground wire (1) and unplug motor signal connector (2).

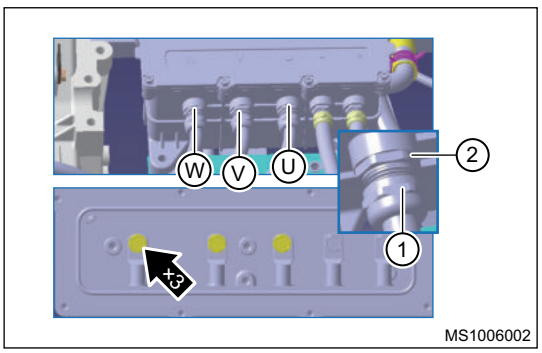


MS1004002

5. Raise vehicle with a lift and place a flat trailer under the sub frame to support it.
6. Unplug controller signal connector and remove other high voltage and low voltage wire harnesses on sub frame.

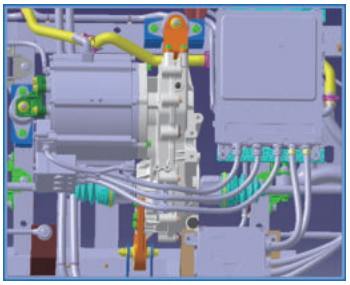

MS1005002

7. Remove sub frame and place it on flat trailer.
8. Remove 3-phase wire connecting motor and motor controller from the controller side.
   a. Remove nut (1) with a adjustable wrench.
      Tightening torque: 20 ± 3 N·m
   b. Remove fixing nut (2) from controller.
      Tightening torque: 20 ± 3 N·m
   c. Remove waterproof terminals (U), (V), (W).
      Tightening torque: 4 ± 1 N·m
   d. Open small cover of controller and remove 3 M6 bolts (arrows) from wire harness terminal.
      Tightening torque: 4 ± 1 N·m



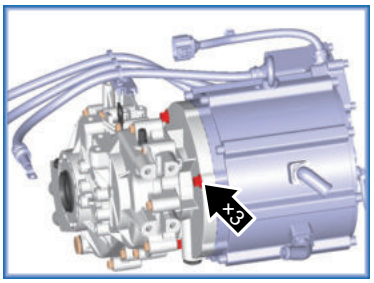
MS1006002

9. Remove motor and left mounting (1), front mounting (2), and rear mounting (3) of final drive, and place motor and final drive assembly on workbench.


MS1007002

10. Remove coupling bolt (3 Q1831035TF61QK) (arrow) between motor and final drive,

    Tightening torque: 60 ± 6 N·m



MS1008002

11. Shake motor and pull it in opposite direction to remove. If it is fit tightly, use a flat tip screwdriver to pry the mating surface, or tap final drive housing with a plastic hammer to separate motor and final drive. (Pay attention to the final drive oil seal when removing and installing).

Installation

1. The installation of motor is in the reverse order of removal. For the connection of cables and signal lines and the installation of water pipes, please refer to the controller installation, wire harness and water pipe installation sections. After assembly, add coolant according to the coolant adding method.

⚠

- Before installing the drive motor, use the 500 V band of high-voltage insulation meter to detect the insulation resistance between 3-phase wire and housing. it is qualified when the value is greater than 20 MΩ.The installation is in the reverse order of removal.
- After the motor is installed, check the phase sequence of the 3-phase cables.

Motor Controller Assembly

Removal

⚠

- Be sure to wear necessary safety equipment to prevent accidents.
- Confirm that the power battery pack relay is disconnected before removal or installation.
- Removal of the controller must be carried out after confirming that the high voltage is disconnected, first remove the vehicle key or turn to OFF position, unplug the service switch connector (under front passenger seat), use an adjustable wrench to remove the small cover of the controller and wait for 3 minutes, test with the multimeter DC voltage band, only when the test value is lower than 5 V, the follow-up maintenance work is allowed.

1. Use a clamp pliers to loosen the water pipe clamp, remove the water pipe, and drain the coolant; remove all high voltage cables of MCU and pull them out, then remove the signal wire connector, and use a socket tool to disconnect 4 fixed threaded connections of the controller.

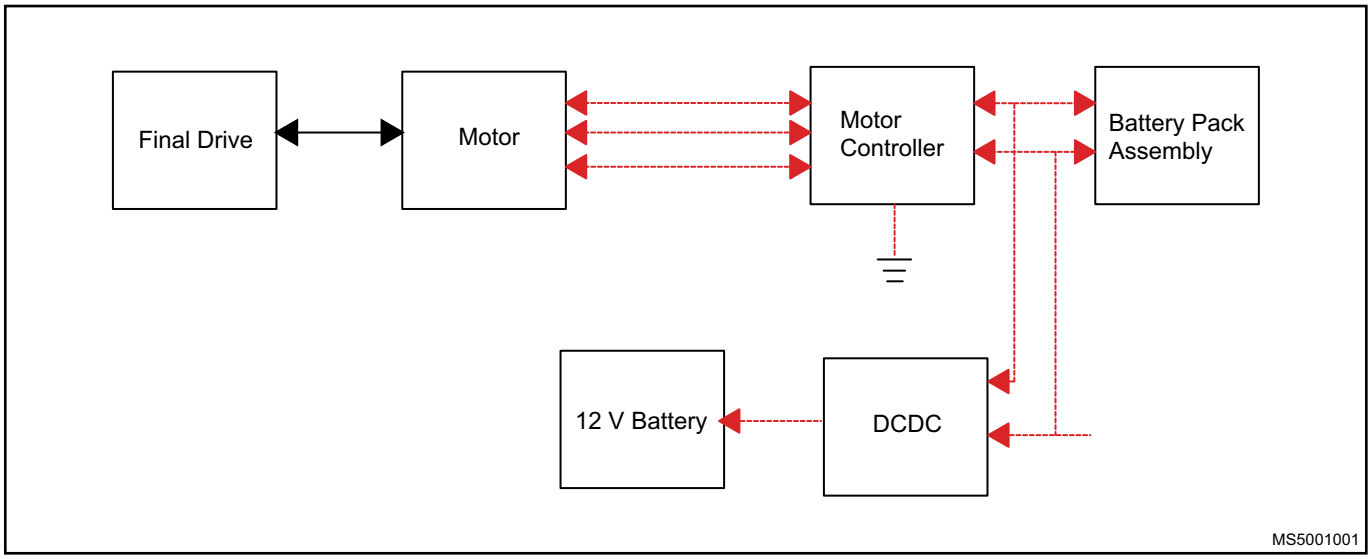
   Tightening torque: 25 ± 4 N·m

THREE-IN-ONE DRIVE MOTOR AND MOTOR CONTROLLER SYSTEM

System Overview

Three-in-one motor assembly: integrated drive motor controller, drive motor and final drive.

Electric Drive System Structure Diagram

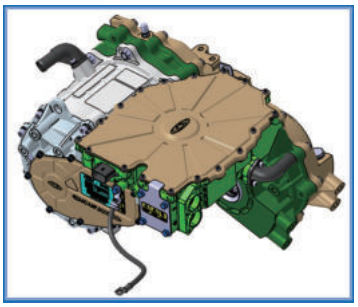


Drive Motor Function Introduction

Drive motor is a three-phase permanent magnetic synchronous motor, which is used as drive of electric vehicle and installed in luggage compartment. This kind of motor has the characteristics such as simple structure, small volume, light weight and high efficiency.
Under the control of controller, the motor can work in a wide speed range to meet the operating conditions of electric vehicle.

- The motor has a built-in resolver, which is used to detect the speed and position of rotor, so as to realize the vector control of motor.
- Cooling type of motor is water-cooled.
- Converting electrical energy into kinetic energy: Convert high voltage battery electric energy into mechanical power to drive the vehicle.
- Regenerative braking kinetic energy: Regenerative braking converts kinetic energy into electrical energy to recharge the battery.
- Forward and reverse function: By changing the direction of forward and reverse, the vehicle can move forward and backward.
- Signal output and status monitoring: Feedback temperature signals to the vehicle for monitoring and diagnosis.
- It has a built-in resolver, which is used to detect the speed and position of rotor, so as to realize the vector control of motor.

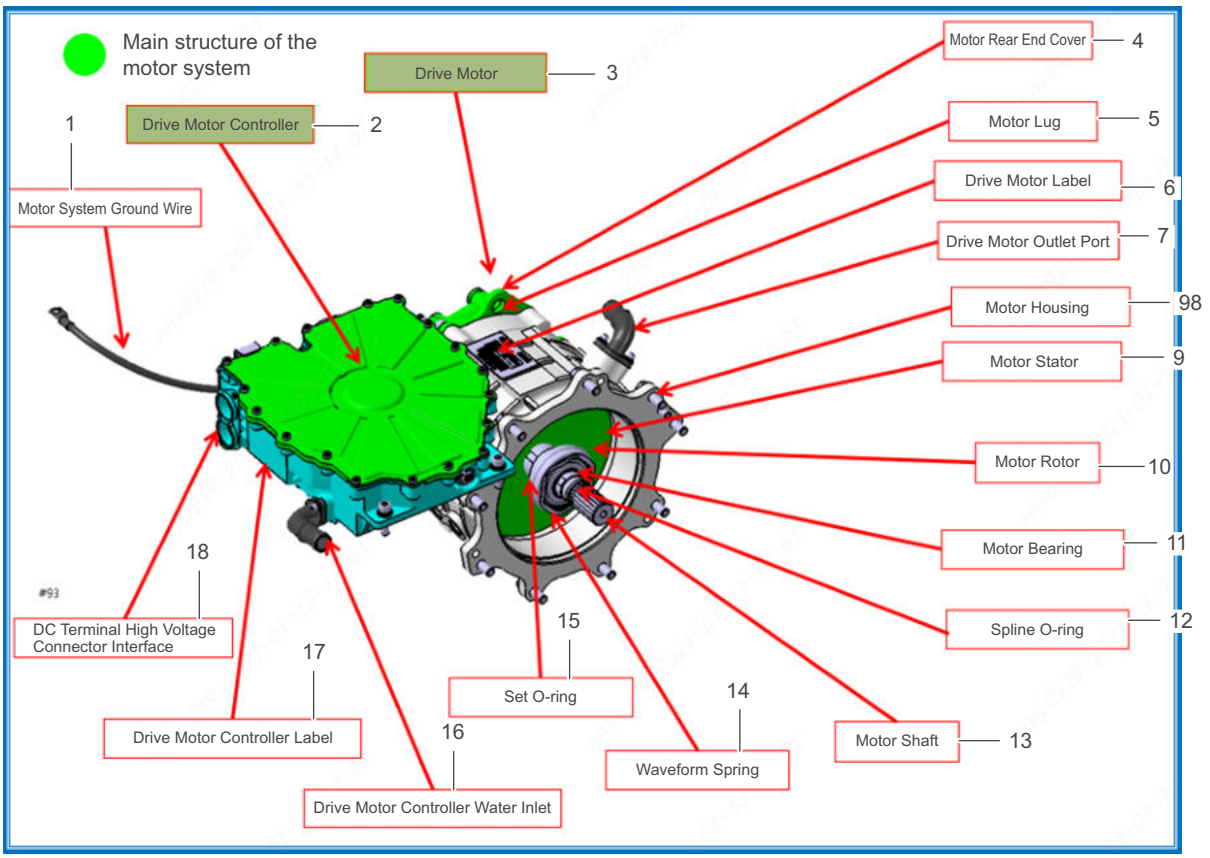
- J72-2100010 three-in-one drive system assembly


MS5001002

⚠

- The J72-2103010KA drive motor must be equipped with J72-2142010KA drive motor controller.

J72-2103010KA drive motor & J72-2142010KA drive motor controller



MS5002001

1	Motor System Ground Wire	2	Drive Motor Controller
3	Drive Motor	4	Motor Rear End Cover
5	Motor Lug	6	Drive Motor Label
7	Drive Motor Water Outlet	8	Motor Housing
9	Motor Stator	10	Motor Rotor
11	Motor Bearing	12	Spline O-ring

13	Motor Shaft	14	Wave Spring
15	Stop O-ring	16	Drive Motor Controller Water Inlet
17	Drive Motor Controller Label	18	DC Terminal High Voltage Connector Interface

Drive Motor Technical Parameters

Specification	Voltage (V)	Rated / Peak Power (KW)	Rated / Peak Torque (N. M)	Operating Temperature (˚C)	Cooling Type	Sealing Level
Permanent magnetic synchronous	345	15.5/30	59/120	-40 ~ 105	Water cooled	IP67

Motor Controller Function Introduction (DC Input, Three-phase AC Output)

The main functions of motor controller are: (Hereinafter referred to as: MCU)

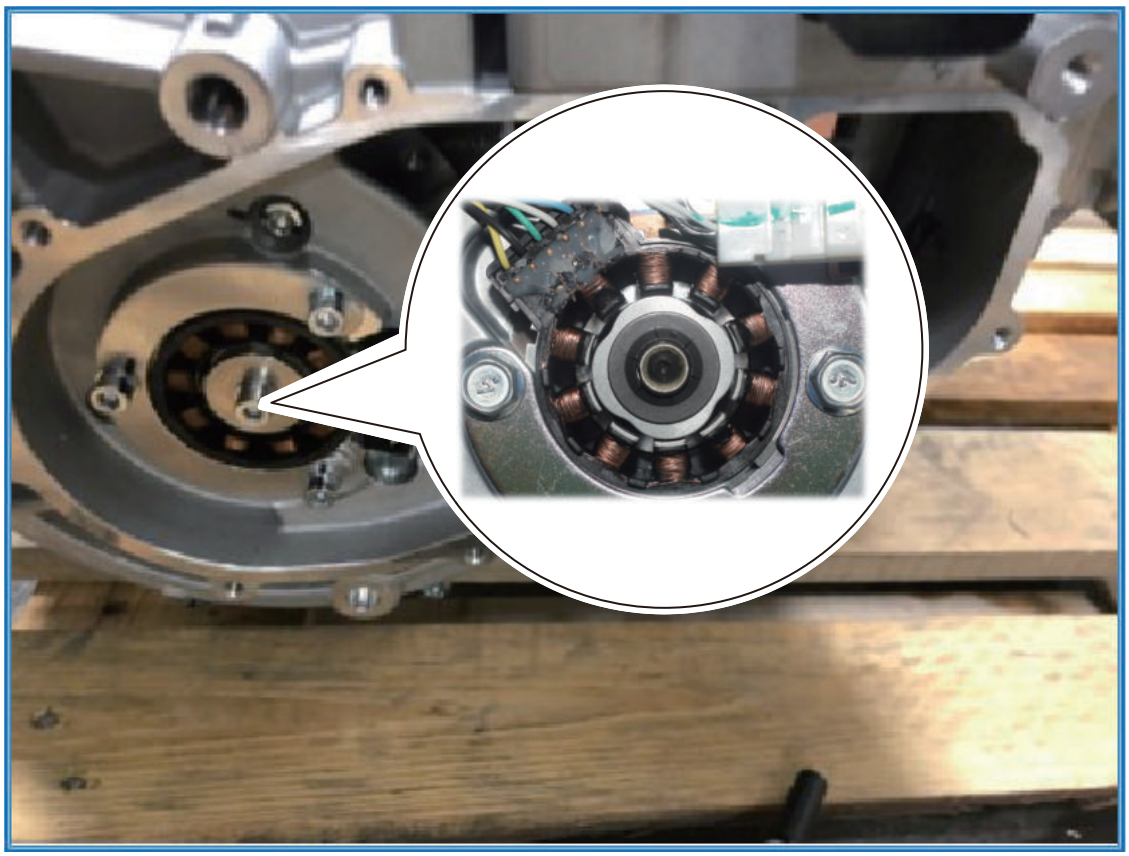
- Control the motor to operate in power mode or generator mode.
- Control the torque of motor drive system.
- With over-temperature, over-current, over-voltage and other protection functions.
- With CAN communication and diagnostic function.

Technical Parameters of Motor Controller Functional Part

Rated Input Voltage (V) / Current (A)	Rated Capacity / Maximum Capacity (KVA)	Control Power Supply Voltage (V)	Cooling Type	Operating Temperature (˚C)	Sealing Level
345/45	28/50	9-16	Water cooled	-40 ~ 85	IP67

Rotary Position Sensor

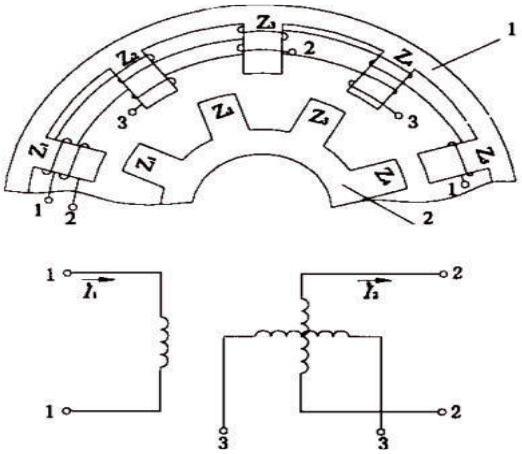
Reluctance type resolver is an electromagnetic sensor. When the rotor rotates, the sine and cosine voltage signals are respectively induced on the two-phase windings of the secondary side and sent to the motor controller through the principle of reluctance. After decoding and processing by the motor control, the position of the motor rotor is known. The motor torque and speed are effectively controlled. Closed loop control is realized.

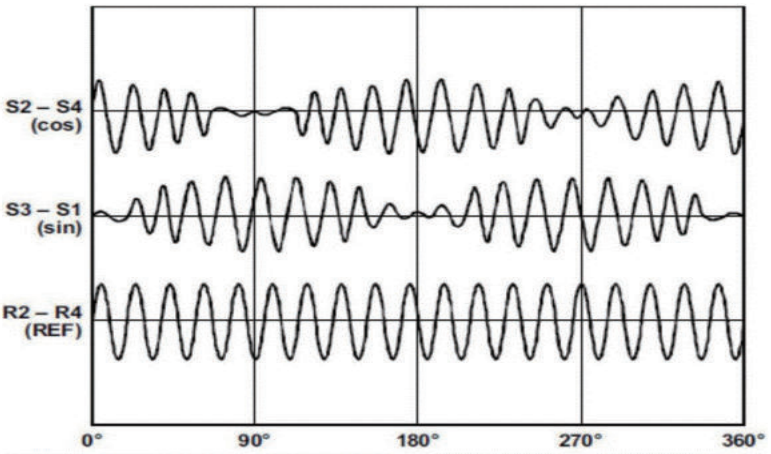


MS5002101

Rotary Position Sensor Schematic Diagram

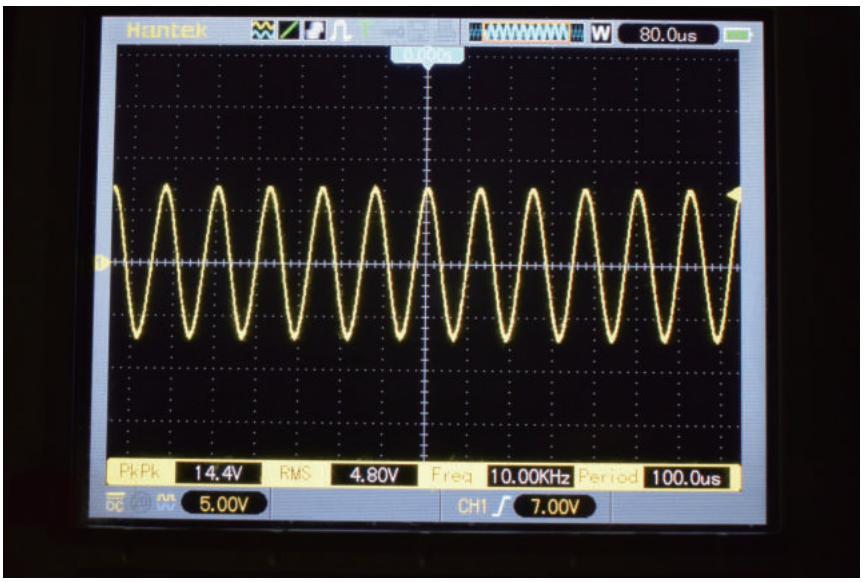
The resolver is composed of stator and rotor. The stator winding (EXC) is used as the primary side of the transformer to receive the excitation voltage (about 7 V). The excitation frequency usually is 400 Hz, 3 KHz, 5 KHz, 10 KHz, etc., the rotor windings (SIN, COS) are used as the secondary side of transformer to obtain induced voltage through electromagnetic coupling. The voltage can be decoded to obtain the angle.

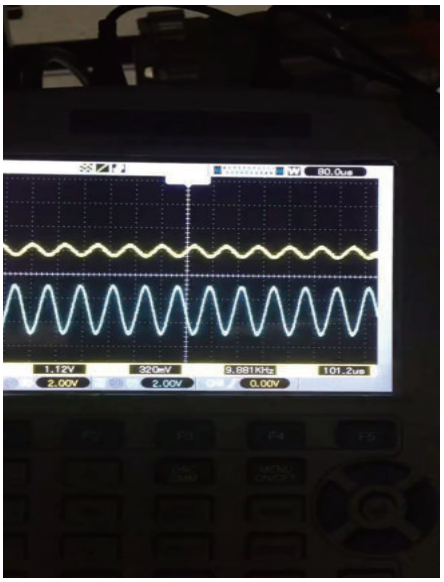




MS5002201

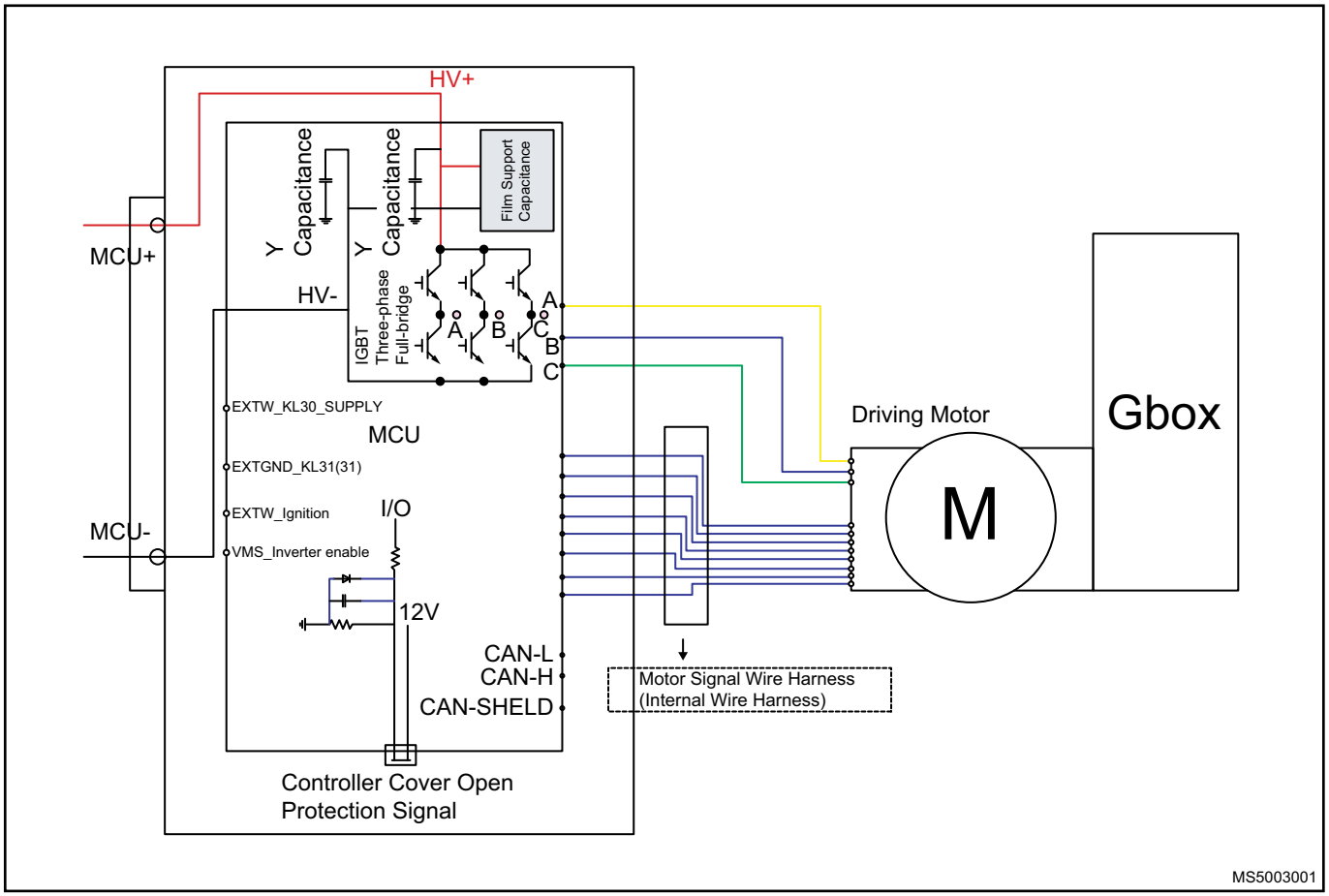
Rotary Position Sensor Dynamic Waveform Analysis



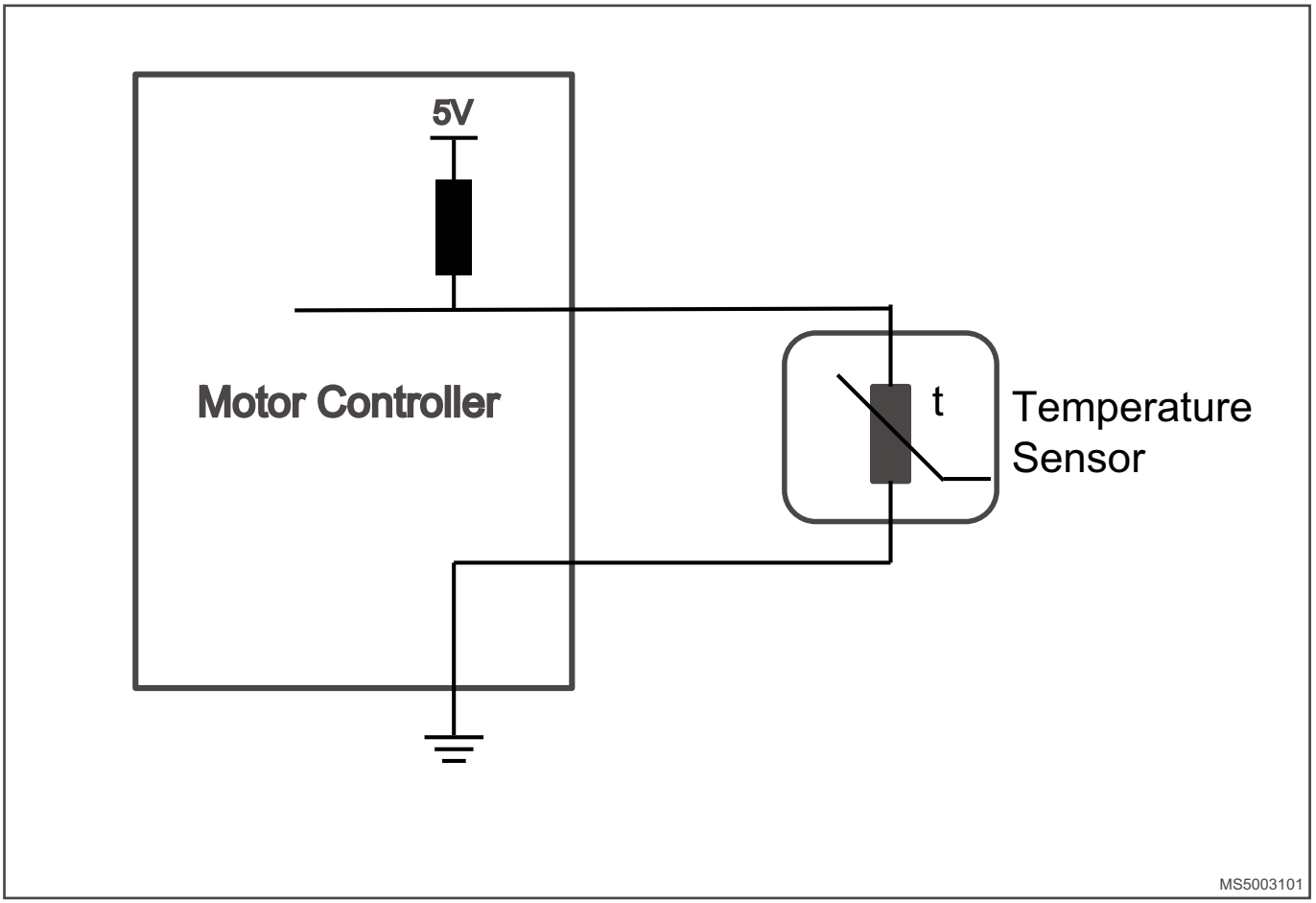


MS5002301

Electrical Schematic Diagram



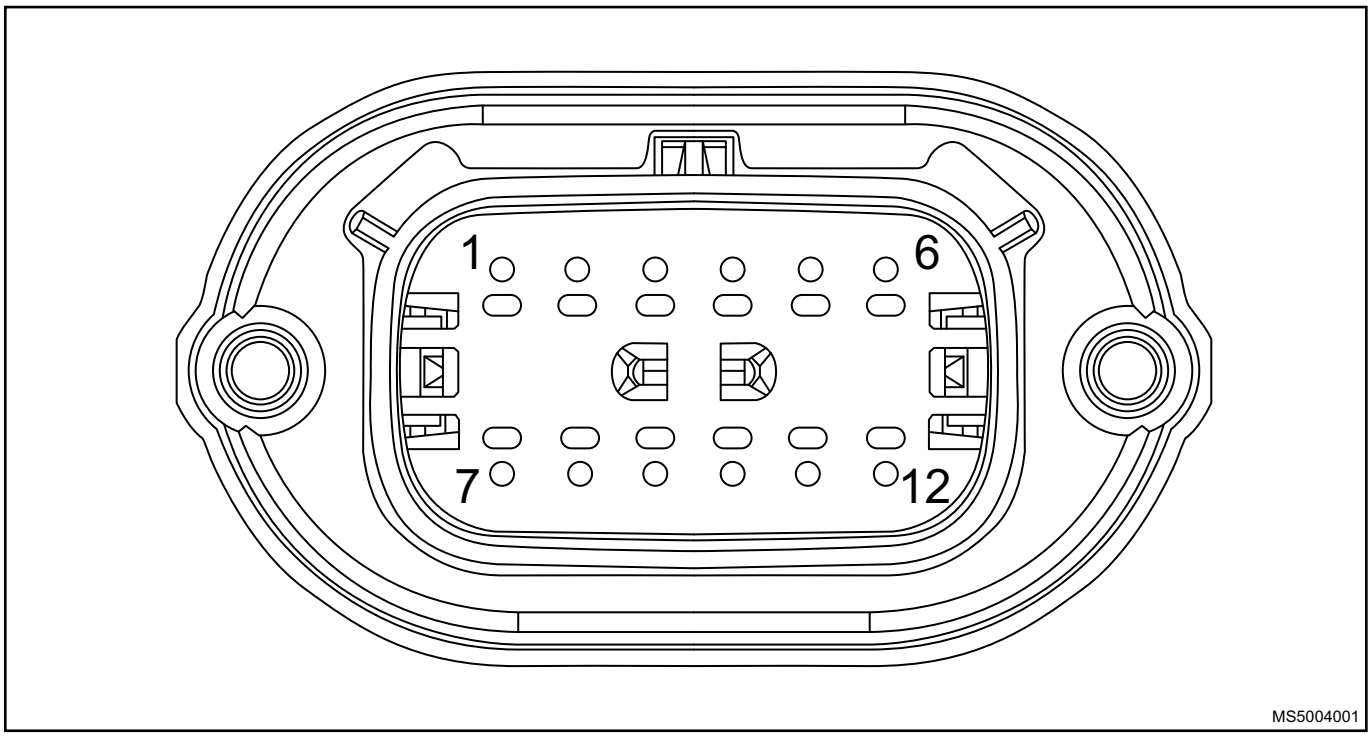
Motor Temperature Sensor Circuit Schematic Diagram



System Circuit Diagram

Module Terminal Definition

MCU Signal Connector Terminal Definition



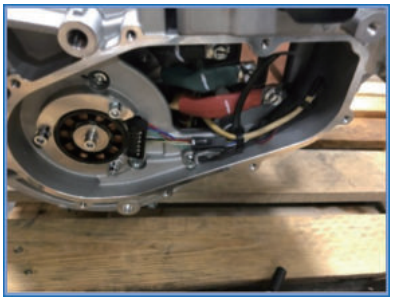
Terminal	Function	Signal Type	Terminal	Function	Signal Type
1	CAN_SHIELD	CAN Shield	2	-	-
3	-	-	4	CAN1_L	CAN Signal
5	CAN1_H	CAN Signal	6	-	-
7	KL15	Key Signal	8	VMS	Hard Wire Enable Signal
9	-	-	10	-	-
11	KL31	Power Supply Negative	12	KL30	Power Supply Positive

Diagnosis & Test

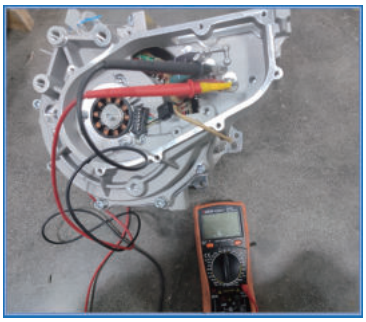
Detection of Motor Phase Loss

Motor phase loss is due to the phenomenon that one or two phases of motor are not energized or the resistance value is large for some reason. The main reason may be that a certain phase in motor is burned, the cable is disconnected from the internal winding of the motor, and the cable connector is burnt because it is not tightened.

1. Open the junction box cover on the side of drive motor, and check whether the 3-phase copper bar connector (1) is burnt (this fault is mostly caused by untightening of the connector during installation, if serious burnt occurs, replace the motor). After maintenance, the cable connector (2) in illustration must be tightened in place.


MS5020002

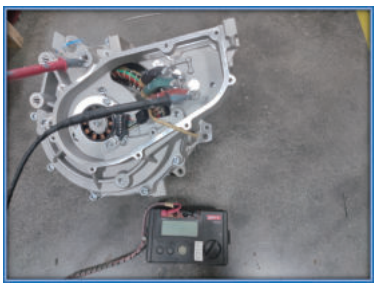
2. Use a multimeter to detect the resistance between phase A and phase B, phase B and phase C, phase A and phase C of the motor to check whether there is phase loss. It is determined that motor is missing phase if the difference between them is more than 0.5 Ω. Please replace the motor.


MS5021002

⚠

- Remove the service switch and open the junction box cover on the side of drive motor. Turn the multimeter to the minimum unit scale, and measure the resistance value between phases.

Motor System Insulation Failure Detection


MS5022002

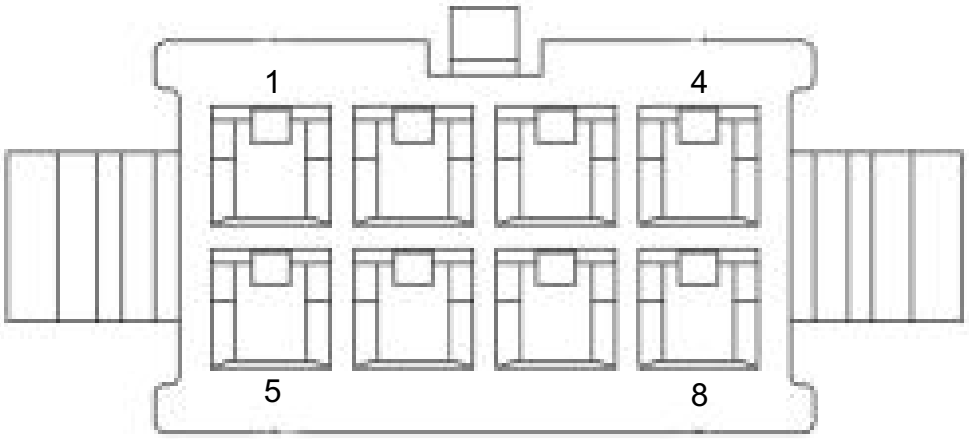
- Motor insulation failure is often caused by water ingress inside the motor, or motor insulation layer of motor is heated to failure, or the winding is ablated somewhere and short circuited to the ground.
- Motor controller insulation failure is often caused by water ingress inside the controller, or reduced creepage distances. When insulation failure occurs in motor system, it often causes the controller to report module failure or vehicle insulation failure. When checking the insulation failure of motor system, the motor system should be disconnected from the vehicle (Open the side small cover of the controller, remove the bus bolts connected to MCU, and disconnect the wires from the mounting base). Use an insulation meter to test the positive and negative of the motor system to ground respectively. The test voltage of the insulation meter is 1KV, the motor temperature should be close to normal temperature during test, and the resistance value of the test result should be higher than 20 MΩ. If it is lower than this value, it is necessary to further determine whether it is the problem of the motor or the controller. Remove the junction box cover on the side of motor and motor 3-phase wire bolt, disconnect the wire from the copper bar of mounting base and conduct an insulation test for the motor separately. If the resistance value is lower than 20 MΩ, it is judged that the motor is damaged, please replace the motor. Otherwise, replace the controller. The test tool adopts a high-voltage insulation meter.

⚠

- When measuring, it should be noted that one end is connected to the terminal, and the other end is connected to the housing. The test voltage should be 1 KV.

Static Test Method for Motor Position Sensor Signal and Temperature Sensor Signal

The motor position sensor is responsible for monitoring the motor rotor position and providing position signals for motor control. The motor position sensor adopts a structure of resolver. A possible failure is internal short circuit or open circuit.

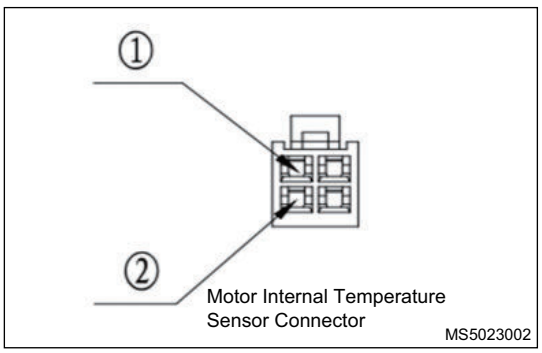


Motor Internal Resolver Signal Connector

MS5005001

Termin-al	Function	Termin-al	Function
1	-	2	Rotary EXTP_R2
3	Rotary EXTP_R1	4	Rotary EXTP_S3
5	-	6	Rotary EXTP_S1
7	Rotary EXTP_S2	8	Rotary EXTP_S4

Motor internal rotary signal connector PIN definition is shown in illustration The resistance values should be measured in groups: P2 ~ P3, P6 ~ P4, P7 ~ P8.



Test Parameter Table J72-2103010KA:

	Terminal	Standard
R1R2 Excitation circuit	P2P3	120 Ω ± 20%
S1S3 Sine circuit	P6P4	408 Ω ± 20%

S2S4 Cosine circuit	P7P8	408 Ω ± 20%
One path temperature sensor	1, 2	See parameter table for details

J72-2103010KA Temperature Sensor Corresponding Parameter Table

Temperature/˚C	Maximum Value/KΩ	Standard Value/KΩ	Minimum Value/KΩ	Temperature/˚C	Maximum Value/KΩ	Standard Value/KΩ	Minimum Value/KΩ	Temperature/˚C	Maximum Value/KΩ	Standard Value/KΩ	Minimum Value/KΩ
-40	4161.4	4632.1	5151.-5	41	45.648	47.760	49.9-26	122	2.349	2.605	2.886
-39	3880.6	4313.4	4790.-2	42	43.644	45.704	47.8-18	123	2.280	2.530	2.805
-38	3620.3	4018.4	4456	43	41.739	43.747	45.8-11	124	2.214	2.458	2.726
-37	3378.9	3745.2	4147.-4	44	39.926	41.884	43.8-98	125	2.150	2.388	2.650
-36	3155	3492.1	3861.-7	45	38.202	40.110	42.0-75	126	2.088	2.320	2.577
-35	2947.1	3257.5	3597.-3	46	36.561	38.420	40.3-37	127	2.028	2.255	2.506
-34	2754.1	2040.0	3352.-5	47	34.999	36.810	38.6-80	128	1.970	2.192	2.437
-33	2574.9	2838.2	3125.-7	48	33.512	35.276	37.1-00	129	1.913	2.130	2.370
-32	2408.3	2651.0	2915.-5	49	32.096	33.814	35.5-92	130	1.859	2.071	2.305
-31	2253.4	2477.1	2720.-6	50	30.747	32.420	34.1-53	131	1.807	2.014	2.243
-30	2109.3	2315.6	2539.-8	51	29.461	31.090	32.7-80	132	1.756	1.958	2.182
-29	1975.3	2165.6	2372.-0	52	28.236	29.822	31.4-69	133	1.707	1.905	2.124
-28	1850.5	2026.1	2216.-3	53	27.068	28.612	30.2-17	134	1.659	1.853	2.067
-27	1734.3	1896.3	2071.-6	54	25.954	27.458	29.0-22	135	1.613	1.802	2.012
-26	1626.1	1775.6	1937.-2	55	24.892	26.355	27.8-80	136	1.569	1.754	1.958
-25	1525.2	1663.3	1812.-3	56	23.878	25.303	26.7-88	137	1.526	1.706	1.907
-24	1431.1	1558.7	1696.-1	57	22.912	24.298	25.7-45	138	1.484	1.660	1.856
-23	1343.4	1461.2	1588.-0	58	21.989	23.338	24.7-48	139	1.444	1.616	1.808

-22	1261.5	1370.4	1487.-4	59	21.107	22.421	23.7-94	140	1.404	1.573	1.761
-21	1185.1	1285.7	1393.-7	60	20.266	21.544	22.8-83	141	1.336	1.532	1.715
-20	1113.7	1206.8	1306.-5	61	19.463	20.706	22.0-10	142	1.330	1.491	1.671
-19	1047.-03	1133.1	1225.-2	62	18.695	19.905	21.1-75	143	1.294	1.452	1.628
-18	984.72	1064.3	1149.-4	63	17.961	19.139	20.3-76	144	1.260	1.414	1.586
-17	926.46	1000.-13	1078.-7	64	17.260	18.407	19.6-12	145	1.226	1.377	1.546
-16	871.98	940.15	1012.-7	65	16.590	17.706	18.8-79	146	1.194	1.342	1.506
-15	821.00	884.10	951.2	66	15.949	17.035	18.1-78	147	1.162	1.307	1.468
-14	773.28	831.70	893.7-2	67	15.336	16.393	17.5-07	148	1.132	1.273	1.431
-13	728.61	782.70	840.0-5	68	14.750	15.778	16.8-63	149	1.103	1.241	1.395
-12	686.76	736.85	789.8-9	69	14.189	15.190	16.2-46	150	1.074	1.209	1.361
-11	647.55	693.95	743.0-0	70	13.652	14.626	15.6-55	151	1.046	1.179	1.327
-10	610.79	653.78	699.1-6	71	13.138	14.086	15.0-89	152	1.019	1.149	1.294
-9	576.33	616.16	658.1-5	72	12.646	13.569	14.5-45	153	0.993	1.120	1.262
-8	544.00	580.91	619.7-6	73	12.175	13.073	14.0-24	154	0.968	1.092	1.231
-7	513.66	547.87	583.8-3	74	11.724	12.597	13.5-24	155	0.943	1.065	1.201
-6	485.18	516.89	550.1-8	75	11.291	12.142	13.0-45	156	0.91-93	1.038	1.172
-5	458.44	487.84	518.6-6	76	10.877	11.705	12.5-84	157	0.89-62	1.013	1.144
-4	433.32	460.58	489.1-1	77	10.480	11.286	12.1-43	158	0.87-37	0.98-79	1.116
-3	409.71	434.99	461.4-1	78	10.099	10.884	11.71-9	159	0.85-19	0.96-37	1.089-2
-2	387.52	410.96	435.4-3	79	9.734	10.498	11.31-1	160	0.83-07	0.94-02	1.063-1
-1	366.66	388.40	411.0-5	80	9.384	10.128	10.9-20	161	0.81-01	0.91-73	1.037-8

0	347.03	367.19	388.1-8	81	9.048	9.772	10.5-45	162	0.79-02	0.89-52	1.013-2
1	328.56	347.26	366.7-0	82	8.926	9.431	10.1-84	163	0.77-08	0.87-36	0.989-3
2	311.18	328.53	346.5-3	83	8.417	9.103	9.837	164	0.75-19	0.85-27	0.966-1
3	294.81	310.90	327.5-8	84	8.120	8.789	9.504	165	0.73-36	0.83-23	0.943-5
4	279.39	294.32	309.7-6	85	7.836	8.486	9.183	166	0.71-58	0.81-25	0.921-5
5	264.86	278.71	293.0-2	86	7.562	8.196	8.875	167	0.69-86	0.79-33	0.900-1
6	251.17	264.02	277.2-7	87	7.300	7.917	8.579	168	0.68-18	0.77-46	0.879-3
7	238.26	250.18	262.4-5	88	7.047	7.649	8.294	169	0.66-55	0.75-64	0.859-1
8	226.09	237.14	248.5-1	89	6.805	7.391	8.020	170	0.64-96	0.73-88	0.839-4
9	241.60	224.85	235.3-8	90	6.572	7.143	7.756	171	0.63-42	0.72-16	0.820-3
10	203.76	213.26	223.0-2	91	6.348	6.904	7.502	172	0.61-92	0.70-49	0.801-6
11	193.52	202.34	211.3-7	92	6.133	6.675	7.257	173	0.60-46	0.68-86	0.783-5
12	183.86	192.03	200.3-9	93	5.927	6.454	7.022	174	0.59-05	0.67-28	0.765-8
13	174.73	182.31	190.0-5	94	5.728	6.242	6.796	175	0.57-67	0.65-74	0.748-7
14	166.10	173.13	180.2-9	95	5.536	6.037	6.578	176	0.56-33	0.64-24	0.731-9
15	157.95	164.46	171.0-9	96	5.353	5.841	6.367	177	0.55-02	0.62-78	0.715-7
16	150.24	156.27	162.4-1	97	5.176	5.651	6.165	178	0.53-76	0.61-63	0.699-8
17	142.95	148.54	154.2-1	98	5.005	5.469	5.970	179	0.52-52	0.59-98	0.684-4
18	136.05	141.23	146.4-7	99	4.841	5.293	5.782	180	0.51-32	0.58-64	0.669-4
19	129.52	134.32	139.1-6	100	4.684	5.124	5.601	181	0.50-16	0.57-33	0.654-7
20	123.34	127.78	132.2-6	101	4.532	4.961	5.426	182	0.49-02	0.56-06	0.640-5
21	117.49	121.60	125.7-4	102	4.385	4.804	5.258	183	0.47-91	0.54-82	0.626-6

22	111.95	115.75	119.5-7	103	4.244	4.653	5.095	184	0.46-84	0.53-61	0.613-0
23	106.6-95	110.21	113.7-4	104	4.109	4.507	4.939	185	0.45-79	0.52-43	0.599-8
24	101.7-18	104.97	108.2-2	105	3.978	4.366	4.788	186	0.44-77	0.51-29	0.587-0
25	97.000	100.0-00	103.0-0	106	3.852	4.230	4.642	187	0.43-77	0.50-17	0.574-5
26	92.348	95.296	98.25	107	3.731	4.100	4.501	188	0.42-81	0.49-08	0.562-3
27	87.943	90.838	93.74	108	3.614	3.974	4.366	189	0.41-87	0.48-02	0.550-4
28	83.773	86.612	89.46-7	109	3.501	3.852	4.234	190	0.40-95	0.46-99	0.538-8
29	79.822	82.606	85.40-9	110	3.392	3.734	4.108	191	0.40-05	0.45-99	0.527-5
30	76.078	78.806	81.55-7	111	3.287	3.621	3.986	192	0.39-18	0.45-01	0.516-5
31	72.530	75.200	77.89-9	112	3.186	3.512	3.868	193	0.38-34	0.44-05	0.505-7
32	69.166	71.779	74.42-5	113	3.088	3.406	3.754	194	0.37-51	0.43-12	0.495-2
33	65.976	68.532	71.12-4	114	2.994	3.304	3.644	195	0.36-70	0.42-21	0.485-0
34	62.949	65.449	67.98-6	115	2.903	3.206	3.537	196	0.35-92	0.41-33	0.475-1
35	60.078	62.520	65.00-4	116	2.815	3.111	3.435	197	0.35-16	0.40-46	0.465-3
36	57.352	59.739	62.16-8	117	2.731	3.019	3.335	198	0.34-41	0.39-62	0.455-9
37	54.765	57.095	59.47-1	118	2.649	2.931	3.239	199	0.33-68	0.38-80	0.446-6
38	52.308	54.582	56.90-5	119	2.570	2.845	3.146	200	0.32-98	0.38-00	0.437-6
39	49.974	52.193	54.46-3	120	2.494	2.762	3.057				
40	47.756	49.922	52.13-9	121	2.420	2.682	2.970				

MCU Low Voltage Connector Signal Test Method

First, unplug the low voltage connector from the controller, and check the wire harness connector terminals for bad contact. If so, please repair or replace the connector.
Use a multimeter to test the signal of connector terminals. The test reference value is shown in table below:
Signal detection method of wire harness connector terminals and reference value

Test Item	Test pin (- Multimeter Positive Probe)	Opposite pin (- Multimeter Negative Probe)	Multimeter Band	Test Condition	Test Reference Value
Shield (ground) signal	1	11	Resistance band	Vehicle key OFF	0 Ω
-	2	-	-	-	-
-	3	-	-	-	-
CAN termination resistance detection	4	5	Resistance band	Vehicle key OFF	(128 ± 5) Ω
CAN termination resistance detection	5	4	Resistance band	Vehicle key OFF	(128 ± 5) Ω
-	6	-	-	-	-
Key ignition signal	7	11	DC voltage band	Vehicle key ignition	(9 ～ 16) V
Hard wire enable signal	8	11	DC voltage band	Vehicle key ON	(9 ～ 16) V
-	9	-	-	-	-
-	10	-	-	-	-
Power supply negative	11	12	DC voltage band	Vehicle key ON	(-9 ～ -16) V
Power supply positive	12	11	DC voltage band	Vehicle key ON	(9 ～ 16) V

1. When using multimeter to test, do not directly insert the probe into the low voltage connector terminal, so as to prevent bad contact of terminal. It is necessary to extend and thin the probe (see the example in illustration), and then test.


MS1014002

⚠

- Make sure that no liquid flows or splashes into the low voltage connector.

MCU Insulation Failure Detection

Test Description

Before test, first remove the vehicle key or turn to OFF position, and unplug the service switch connector (-under the front passenger seat), use the sleeve to remove the small cover of the controller. After confirming that the bus voltage is lower than 5 V, remove 2 M6 bolts from the wire harness terminal to separate the terminal from the contact surface, and remove the signal wire connector of motor controller.

⚠

- Make sure that no liquid flows or splashes into the high voltage connector or low voltage connector.
- Note that the low voltage connector must be pulled out.

Test Method

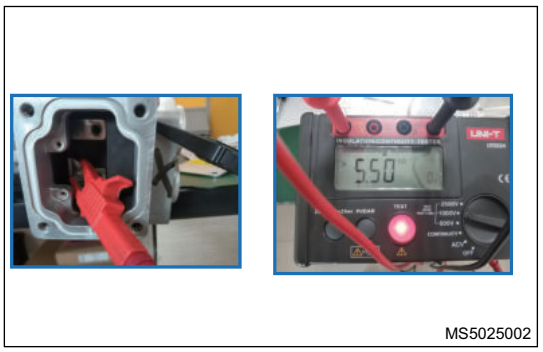
1. As shown in illustration, adjust the insulation meter and select 1KV of test voltage.

MS5024002

2. Connect the ground wire of insulation meter to the housing of the motor controller at the position indicated by the black clip as shown in illustration.

⚠

- The ground wire of the insulation meter must be in reliable contact with the motor controller housing, and the human body should not touch the motor controller housing.



MS5025002

3. Connect the high voltage probe of insulation meter to the high voltage terminal of motor controller, and turn on the button to start the insulation test as shown in illustration. Use the same operation to test the high voltage DC bus input terminal of the motor controller, and record the test results.

⚠

- When testing with a high voltage insulation meter, it is forbidden to directly touch the high voltage probe to the human body to prevent electric shock.

MS5026002

Measurement Standard

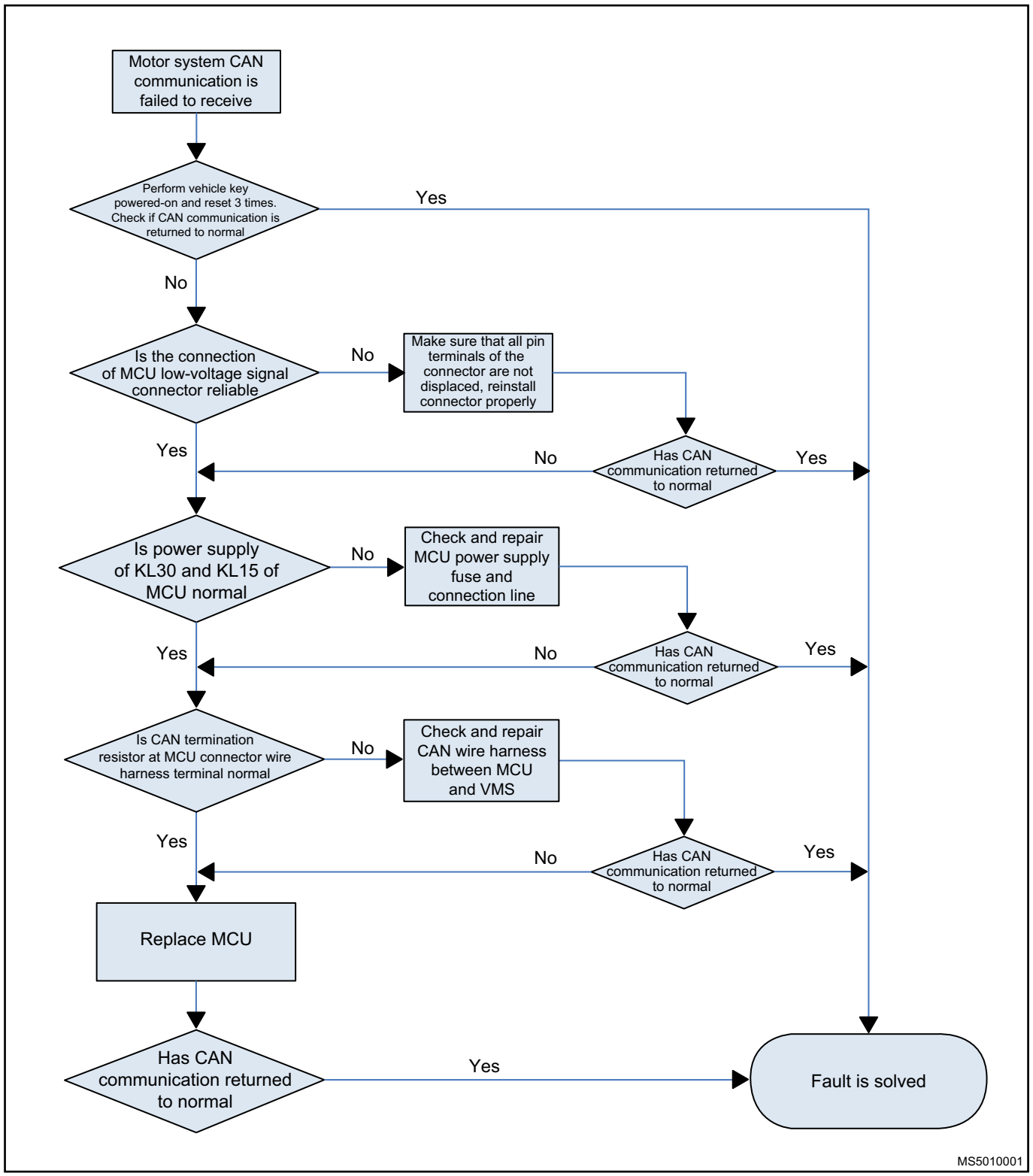
Insulation resistance is 20 MΩ or higher.

Diagnostic Trouble Code (DTC) Chart

No.	DTC	Description
1	U0293	MCU _ CAN _ RX _ FAILED
2	P1A63	MOTOR _ POSTION _ FAULT
3	P1A64	PAHSE _ OVERCURRENT
4	P1A65	INVERTER _ FAULT
5	P1A66	DCLINK _ OVERCUR
6	P1A67	DCLINK _ OVERVOLTAGE
7	P1A68	MOTOR _ OVER _ TEMP
8	P1A69	INVERTER _ OVER _ TEMP
9	P1A6A	MOTOR _ OVERSPEED
10	P1A6B	MCU _ SENSOR _ SUPPLY _FAULT
11	P1A6C	GATE _ SUPPLY _ FAULT
12	P1A6D	GATE _ SUPPLY _ FAULT
13	P1A6E	MCU _ TORQUE _ FAULT
14	P1A6F	MCU _ MODE _ ERROR
15	P1A70	DCLINK _ UNDERVOLTAGE
16	P0A43	MCU _ POWERLIMIT _WARNING
17	P0A62	MCU
18	P0A44	MCU
19	P0A57	MCU
20	P0A61	MCU
21	P0A55	MCU
22	P0A59	
23	P0A54	

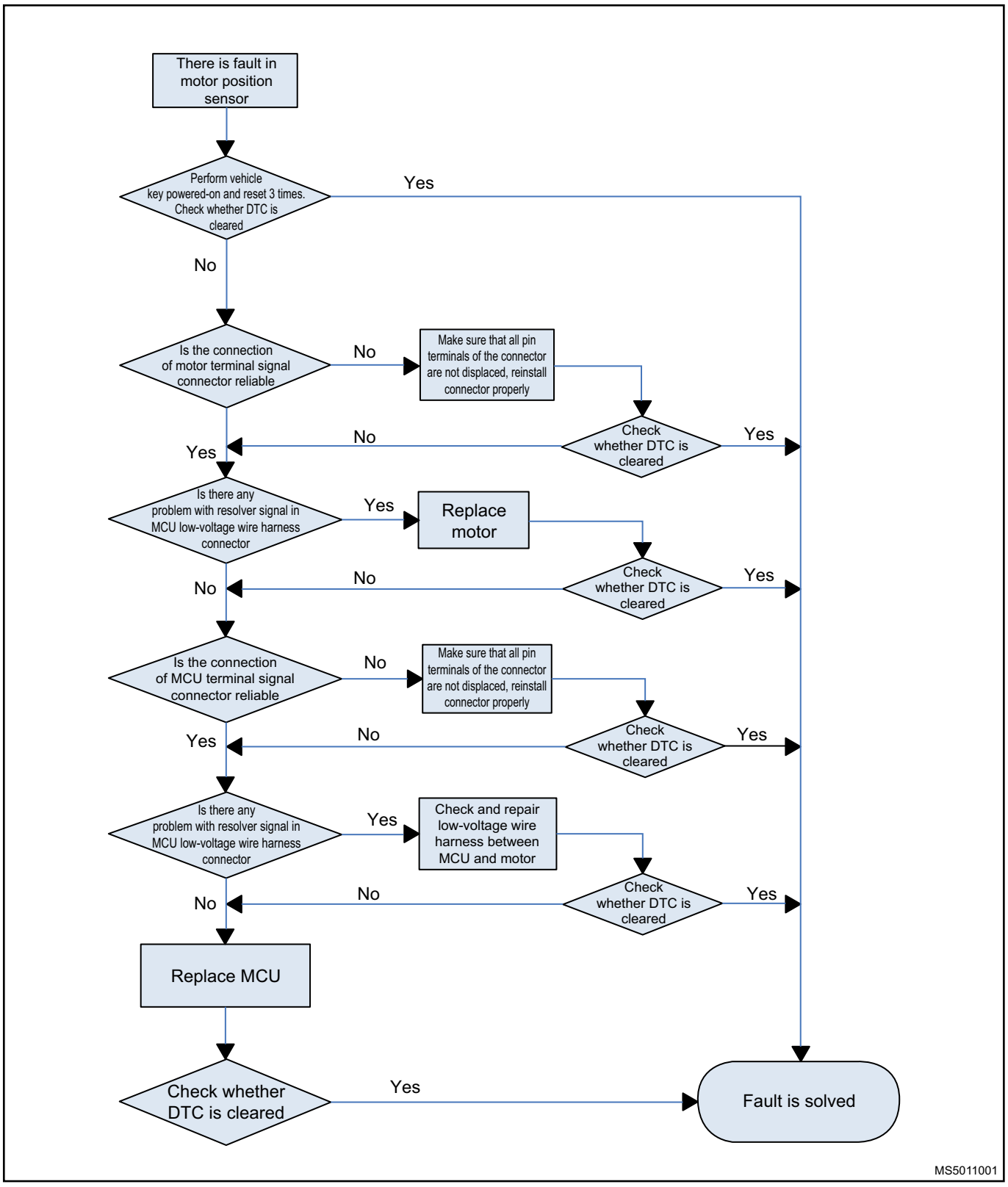
DTC Diagnosis Procedure

Motor System CAN Communication Receiving Failed U0293
First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, check whether the low voltage signal connector of the motor controller contacts reliably, and then check whether the power signal in the wire harness and the CAN terminal resistance are faulty. If the fault still cannot be cleared after troubleshooting, please replace the motor controller assembly. The specific process is as follows:



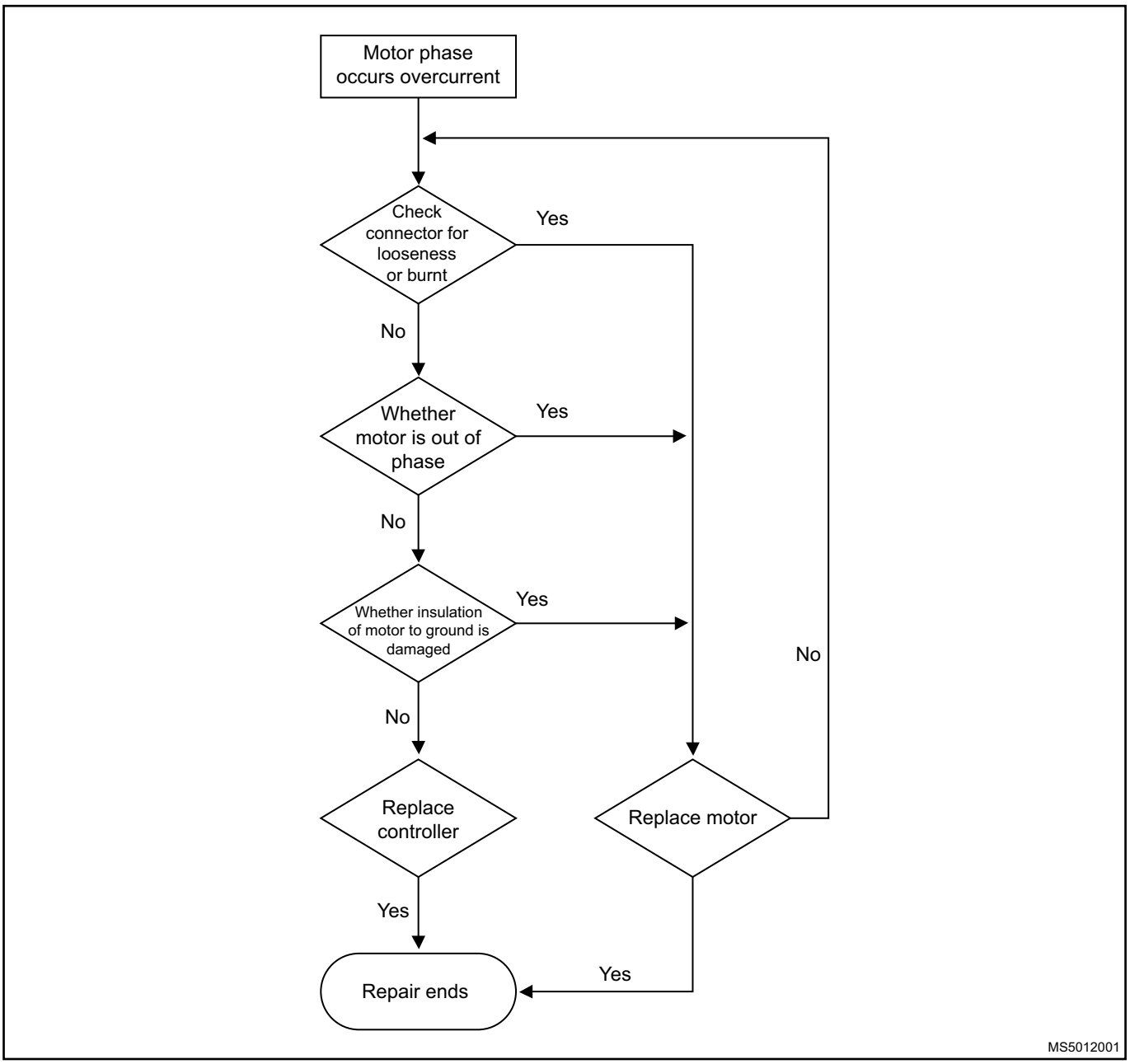
Motor Position Sensor Fault P1A63

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, check whether the motor terminal signal connector contacts reliably, and check whether there is any problem with the rotary wire harness signal of the wire harness (refer to signal detection method of wire harness connector pins and reference value above). If there is any problem, replace the motor. Then check whether the low voltage signal connector of the motor controller contacts reliably, and check whether there is any problem with the rotary wire harness signal of the wire harness. If the fault still cannot be cleared after troubleshooting, please replace the motor controller assembly. The specific process is as follows:



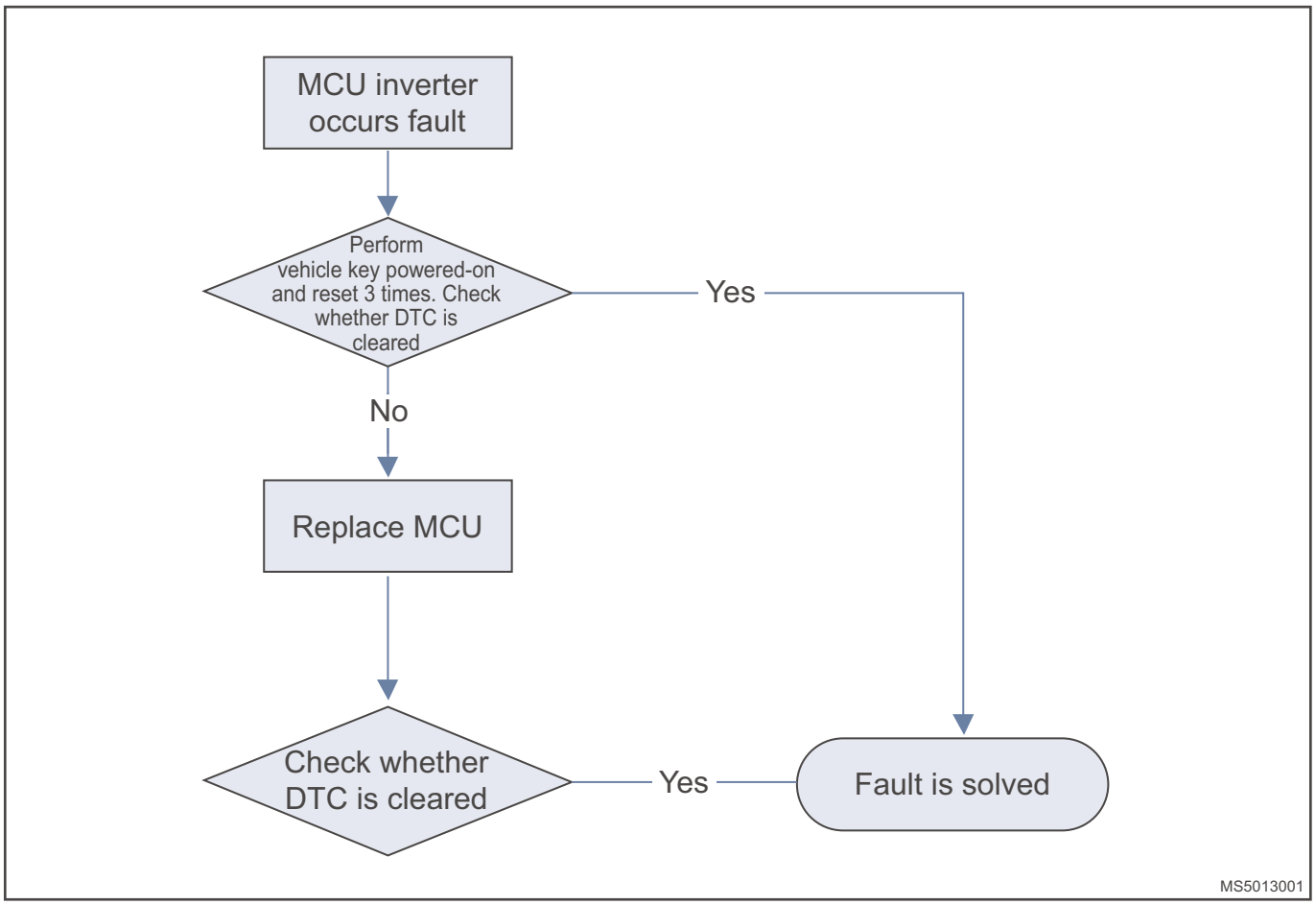
Phase Current Overcurrent Fault P1A64

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, the specific process is as follows:



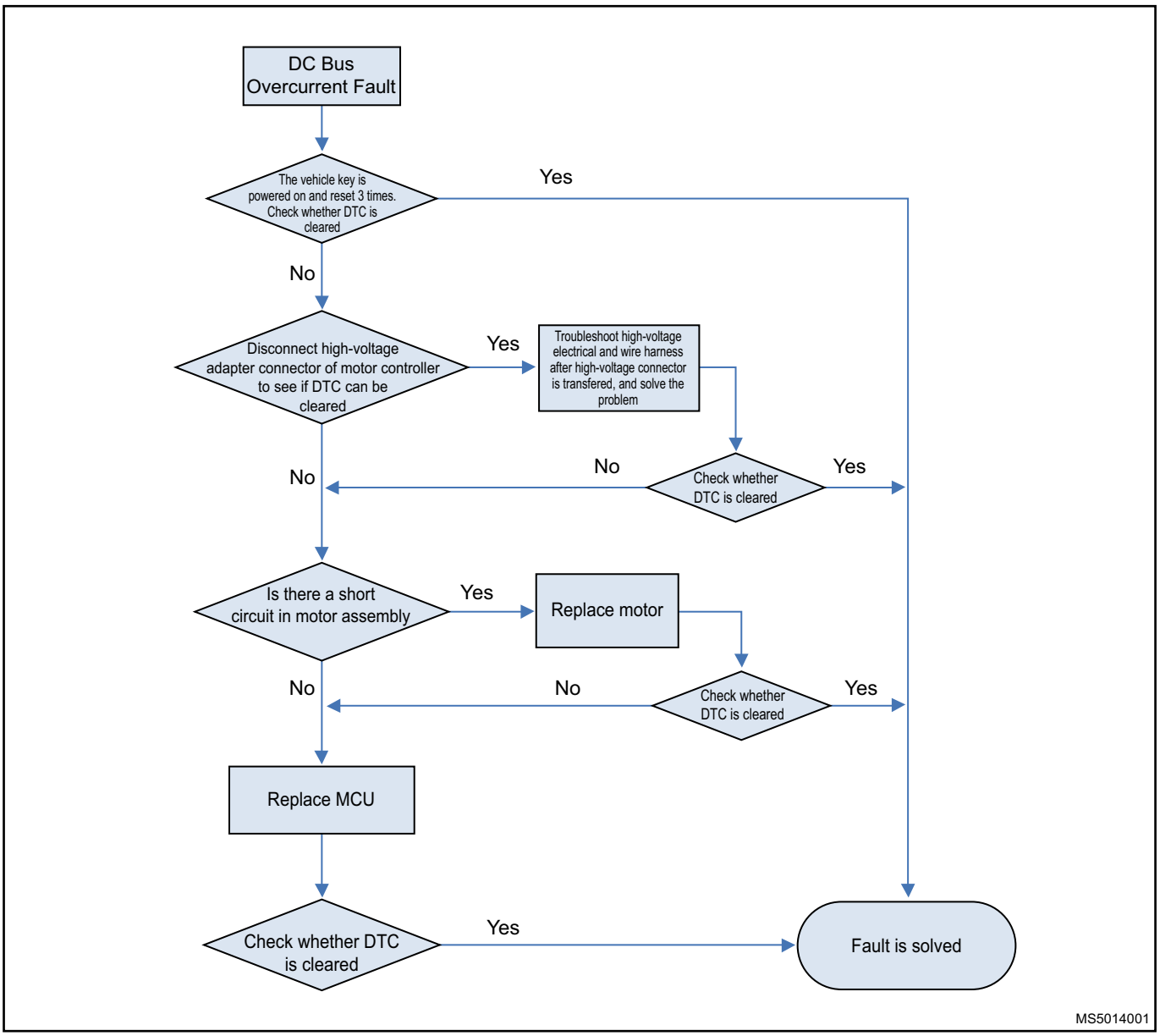
MCU Inverter Fault P1A65

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:



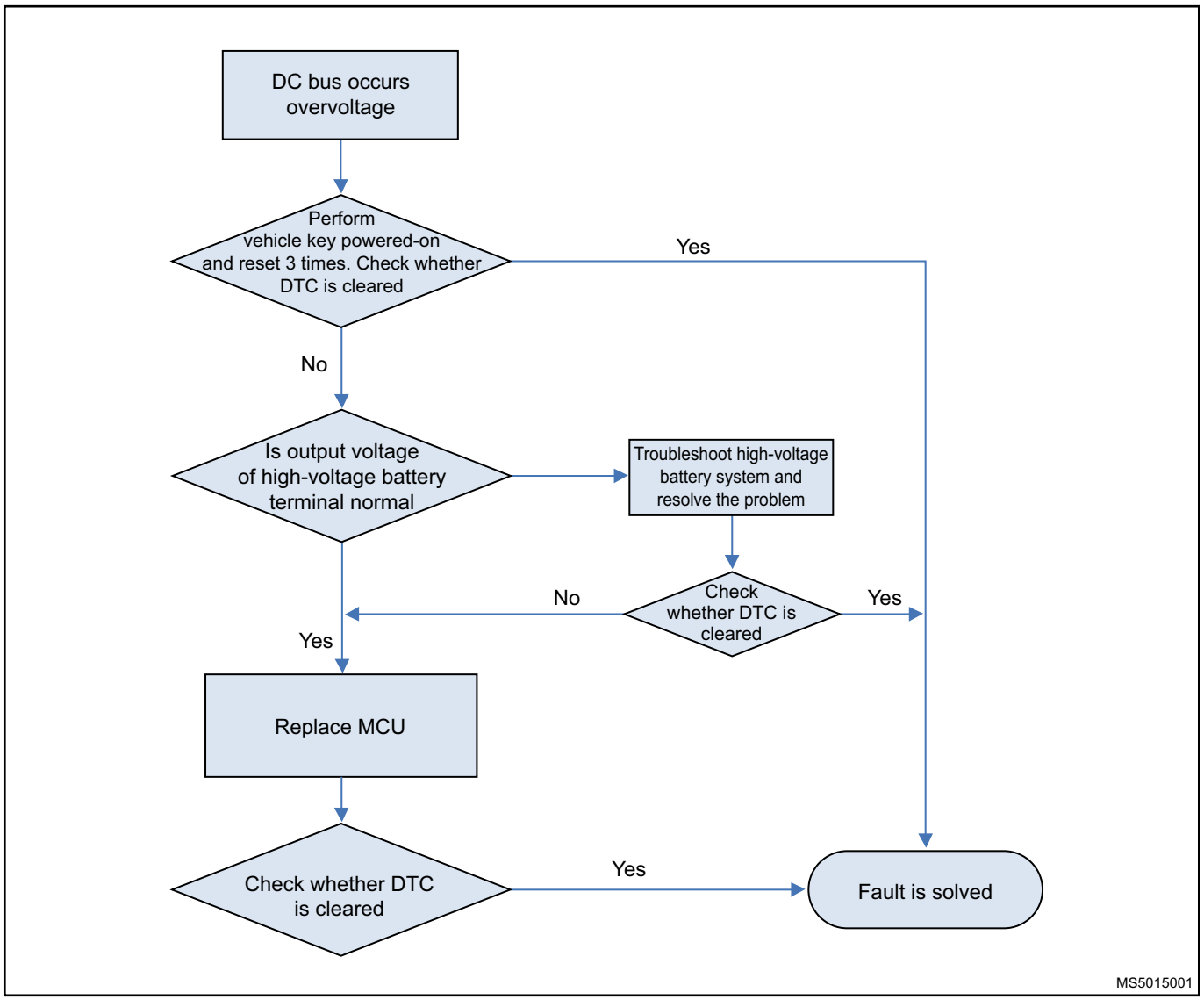
DC Bus Overcurrent Fault P1A66

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, disconnect the high voltage connector of the motor controller. If the fault still cannot be cleared, check whether there is a short circuit in motor assembly. If so, replace the motor. If not, replace the motor controller assembly. The specific process is as follows:



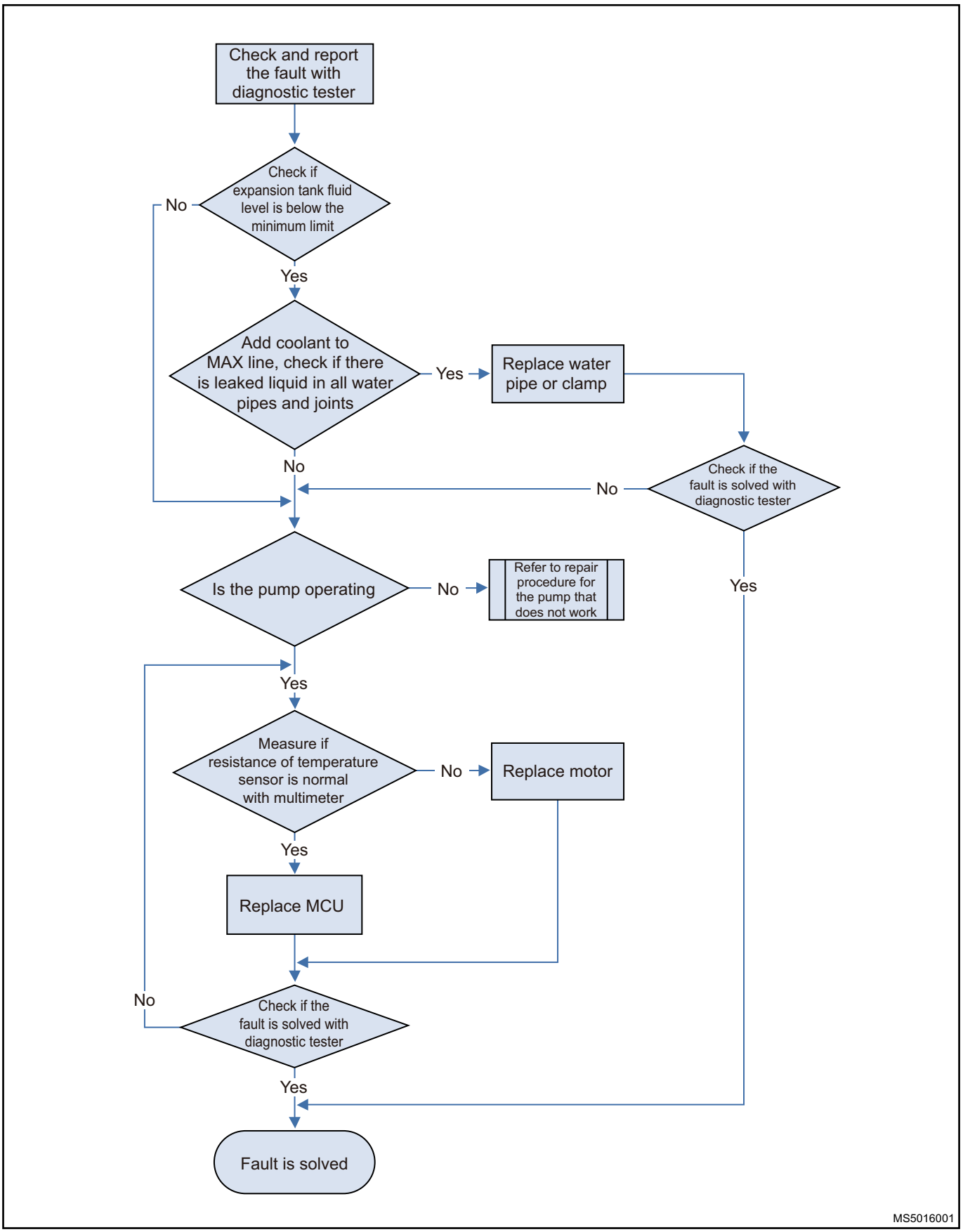
DC Bus Overvoltage Fault P1A67

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, check whether the output voltage of high voltage battery is normal. If it is normal, replace the motor controller assembly. The specific process is as follows:



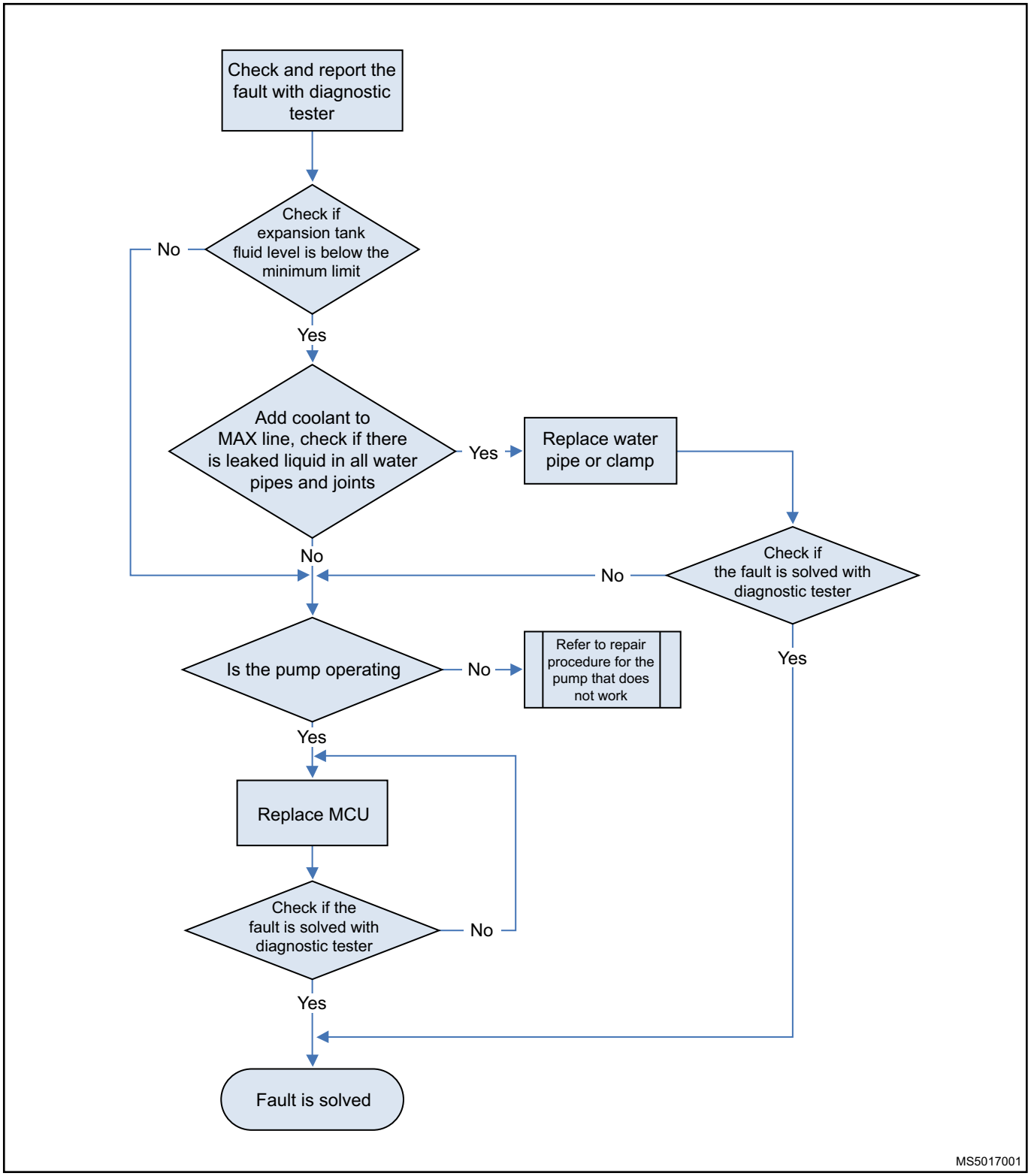
Motor Over-temperature Fault P1A68

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please judge according to the following logic.


Check and report the fault with diagnostic tester
Check if expansion tank fluid level is below the minimum limit
No
Yes
Add coolant to MAX line, check if there is leaked liquid in all water pipes and joints
Yes
Replace water pipe or clamp
No
Check if the fault is solved with diagnostic tester
No
Yes
Is the pump operating
No
Refer to repair procedure for the pump that does not work
Yes
Measure if resistance of temperature sensor is normal with multimeter
No
Replace motor
Yes
Replace MCU
No
Check if the fault is solved with diagnostic tester
Yes
Fault is solved
MS5016001

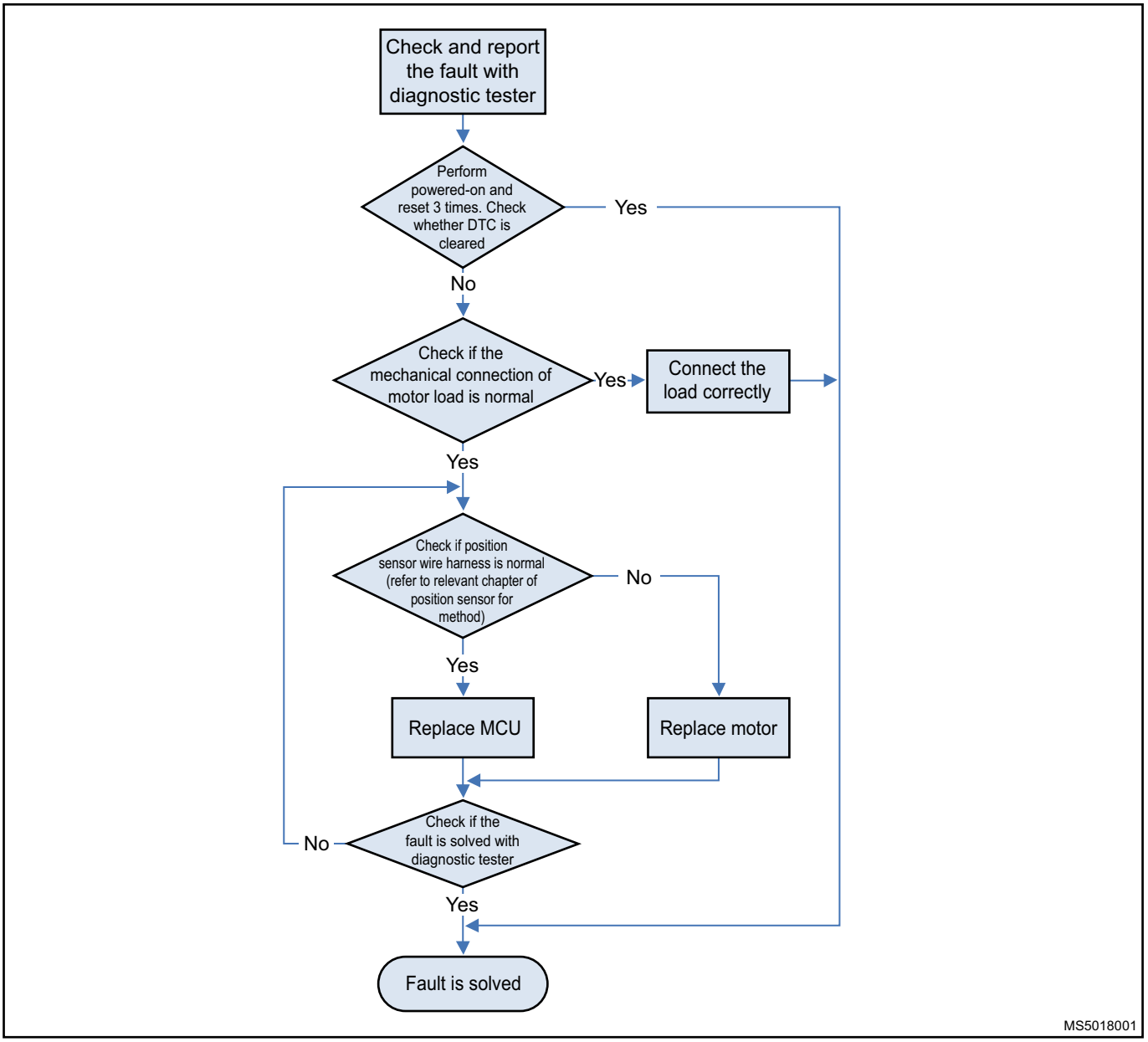
MCU Controller Over-temperature Fault P1A69

The MCU controller over-temperature fault is frequently reported while driving. Please check whether the cooling system operates normally. If it is normal, replace the motor controller assembly. The specific process is as follows:



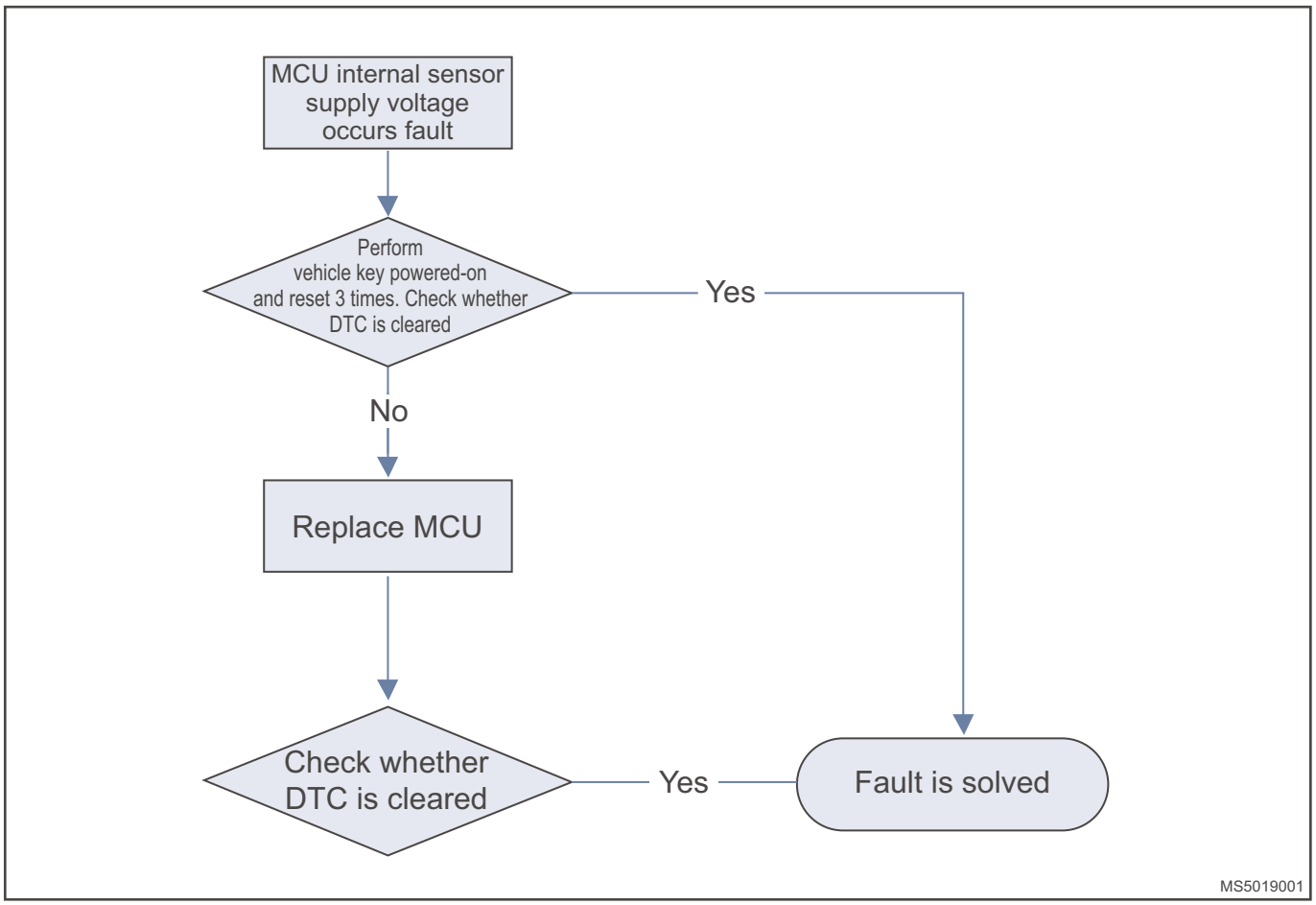
Motor Overspeed Fault P1A6A

Power-on and reset, the motor load may be disconnected, check the mechanical connection of the motor load, if it is normal, check whether the position sensor wire harness is normal, if it is normal, replace the motor controller, if not, replace the motor.

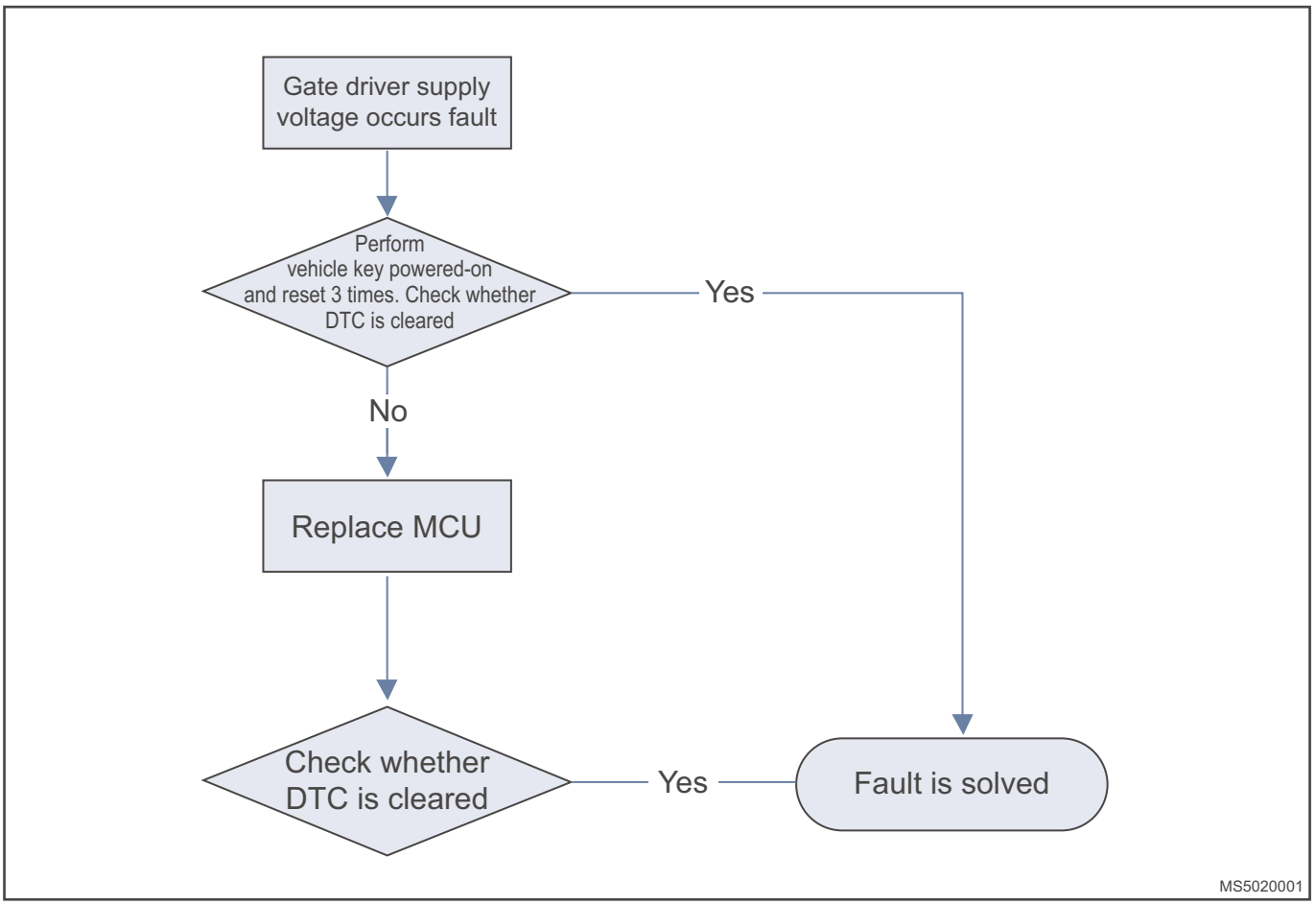


MCU Internal Sensor Supply Voltage Fault P1A6B

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:

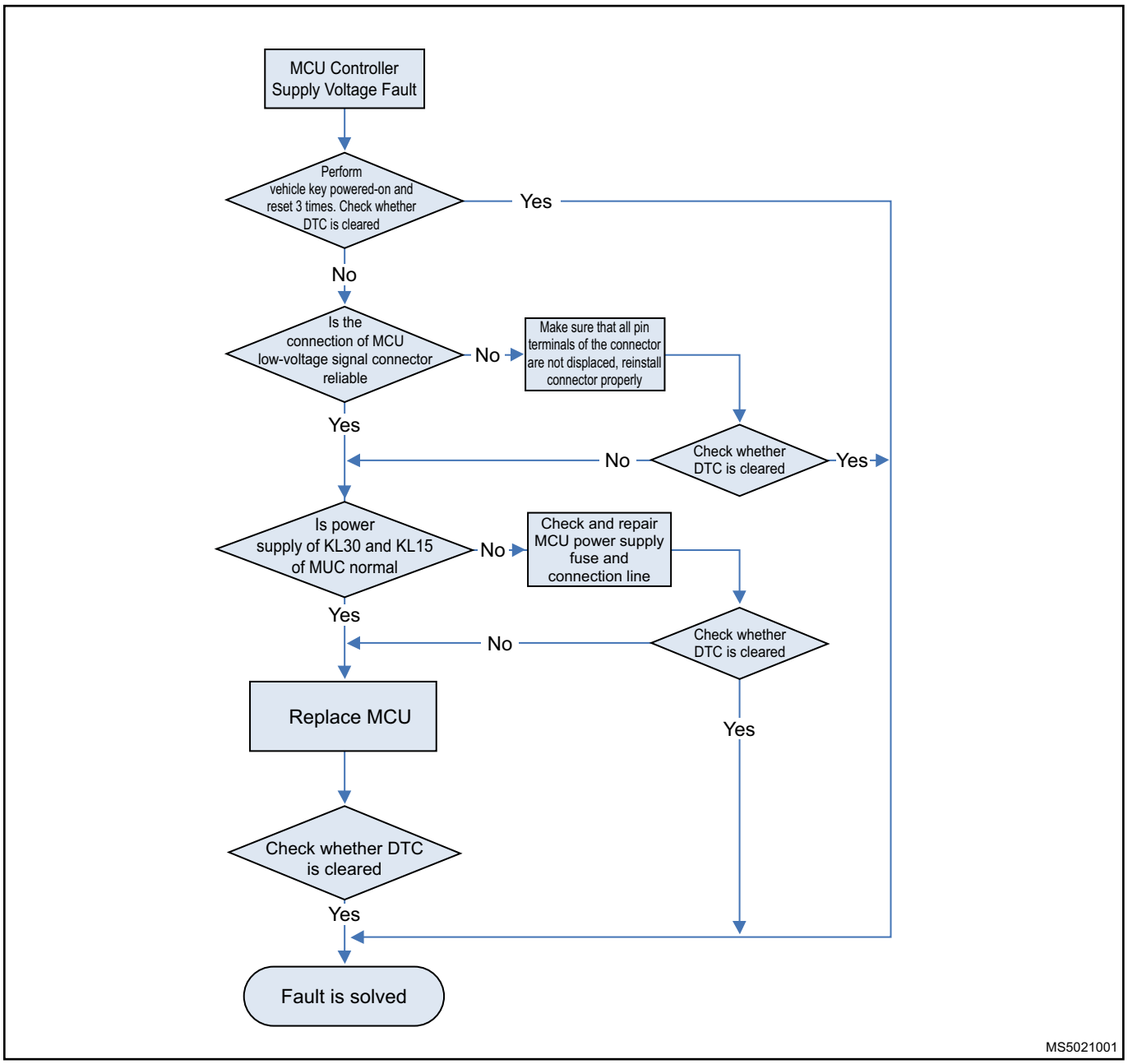


Gate Driver Supply Voltage Fault P1A6C
First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:



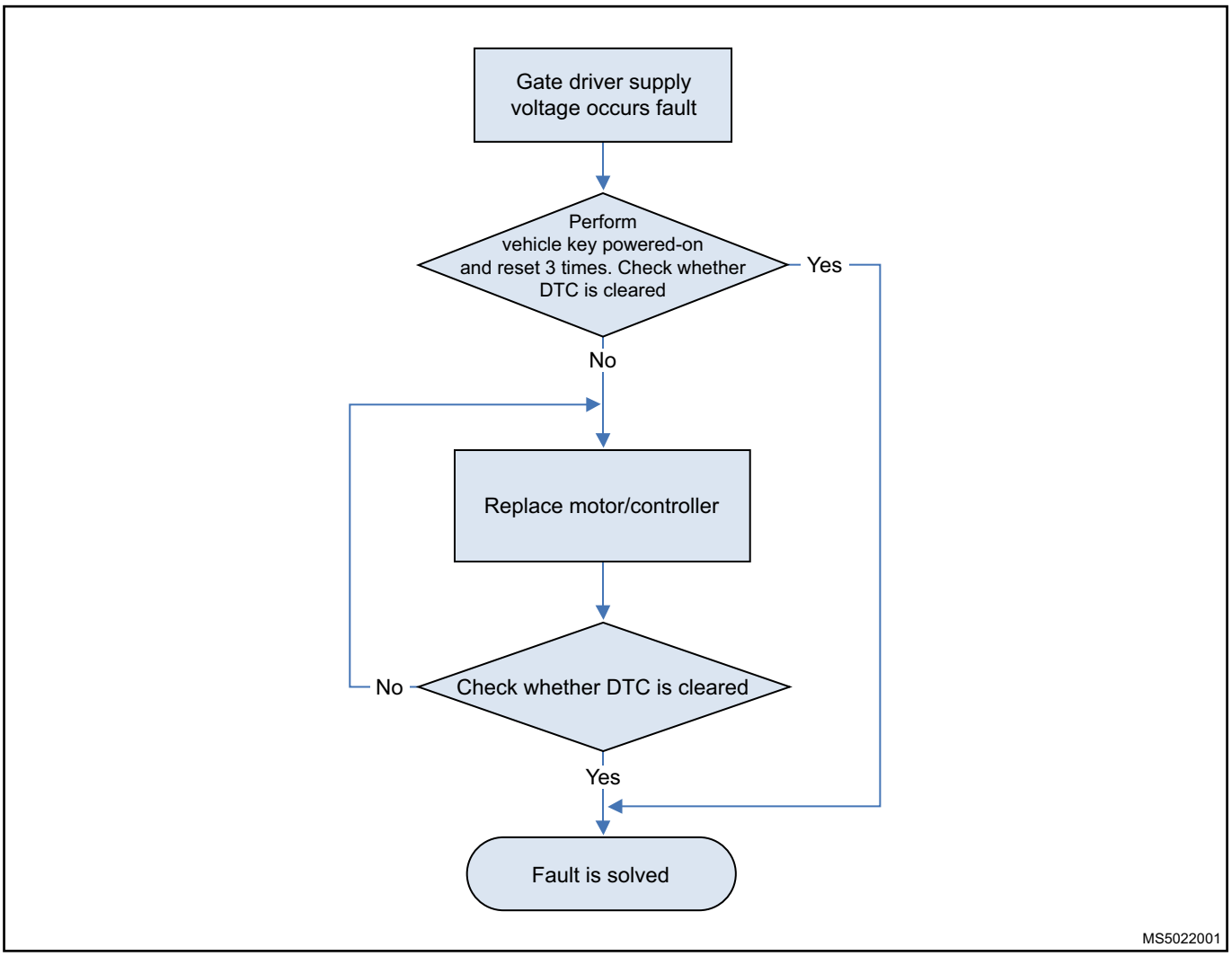
MCU Controller Supply Voltage Fault P1A6D

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, check whether the low voltage signal connector of the motor controller contacts reliably, and then check the power signal of the wire harness. If the fault still cannot be cleared after troubleshooting, please replace the motor controller assembly. The specific process is as follows:



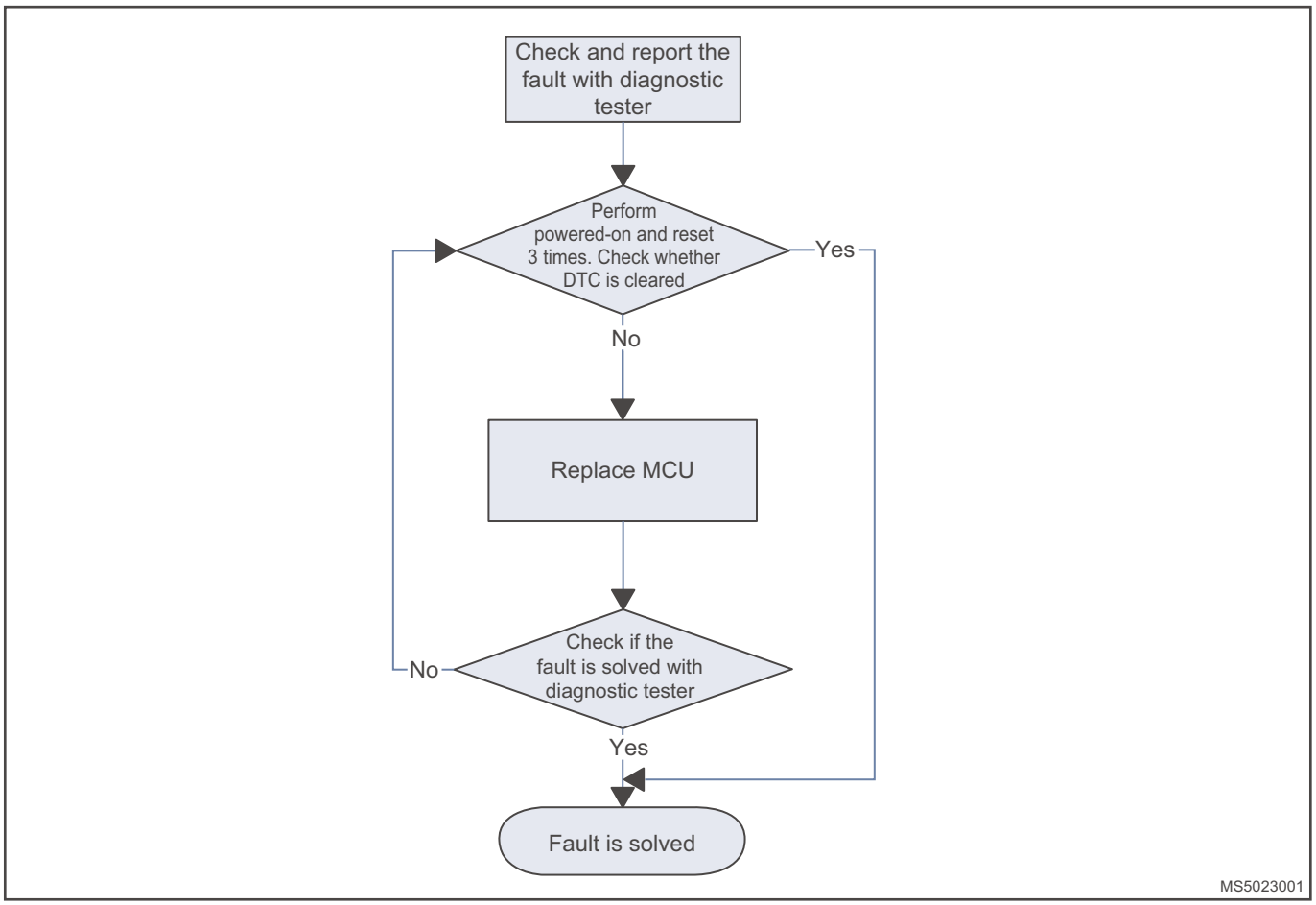
MCU System Safe Fault P1A6E

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:



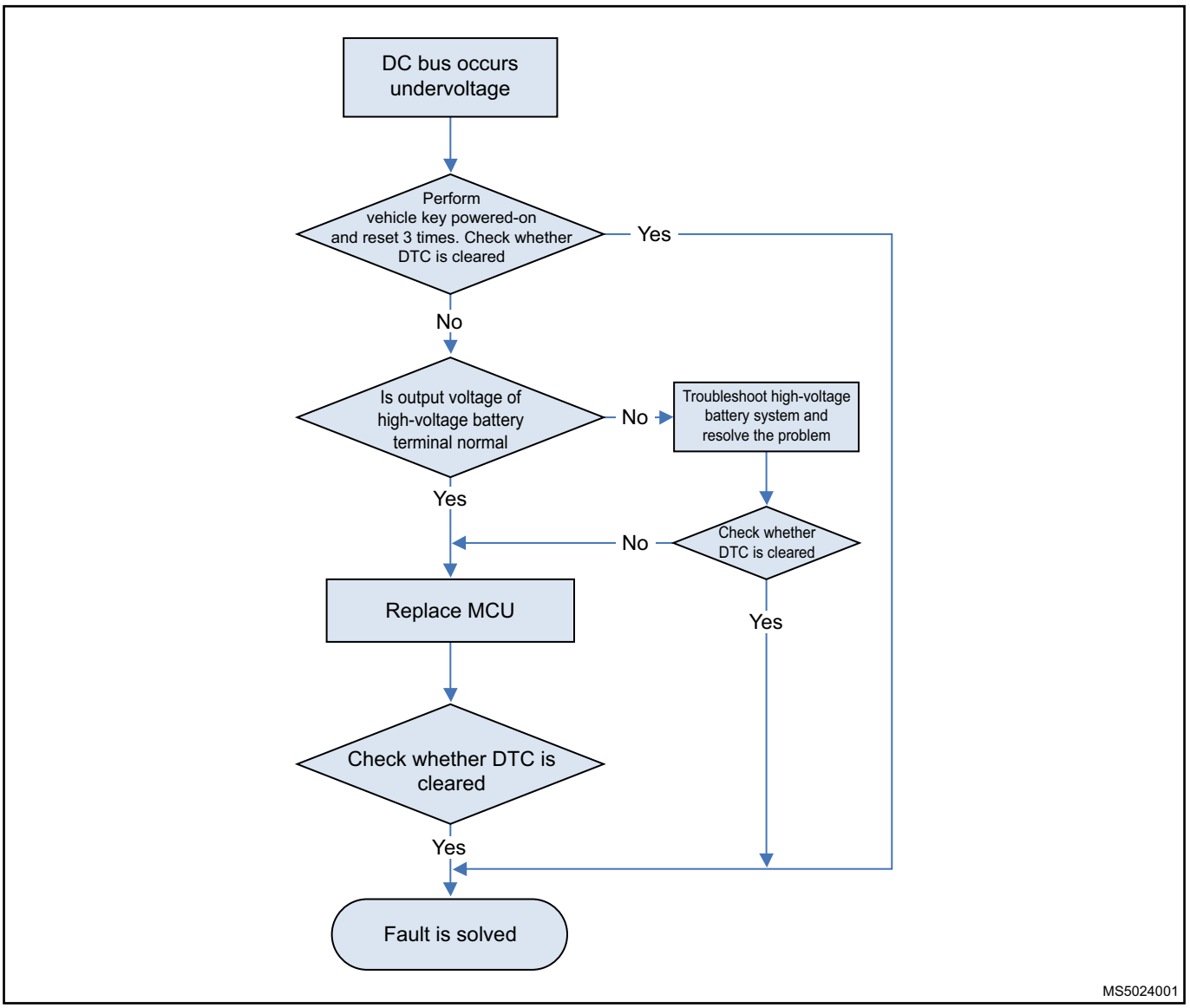
MCU Mode Error P1A6F

First, use the vehicle key to power on and reset. If the fault cannot be cleared, please replace the controller.



DC Bus Undervoltage Fault P1A70

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:

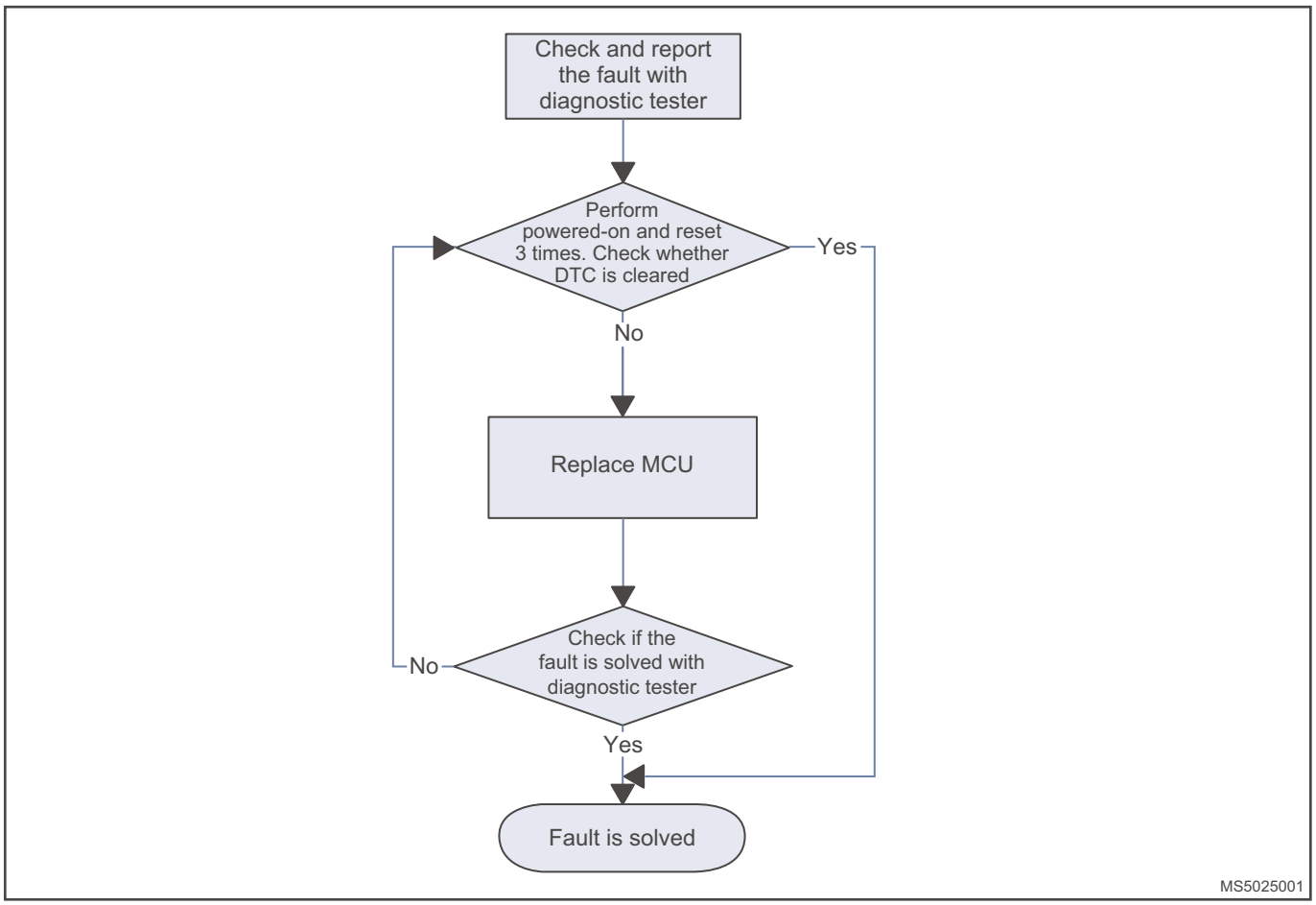


Electric Drive System Power Limit Warning P0A43

Electric drive system power limit warning is frequently reported while driving. Please check whether the cooling system operates normally. If it is normal, replace the motor controller assembly. For the specific process, please refer to the troubleshooting methods for motor over-temperature fault and controller over-temperature fault.

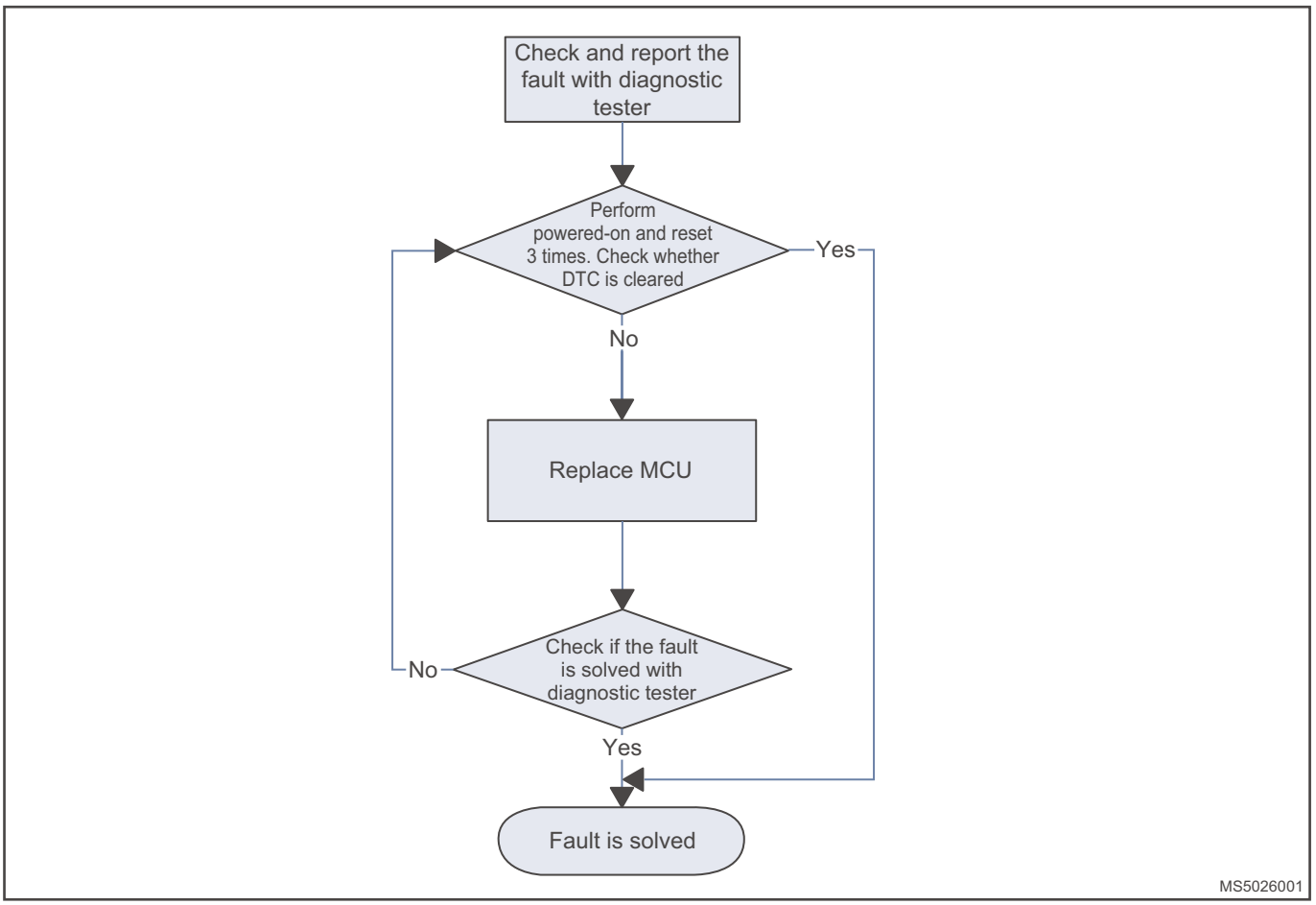
MCU System Level 1 Fault P0A62

This fault is caused by other faults of the motor. After troubleshooting the other faults of the motor, replace the MCU.



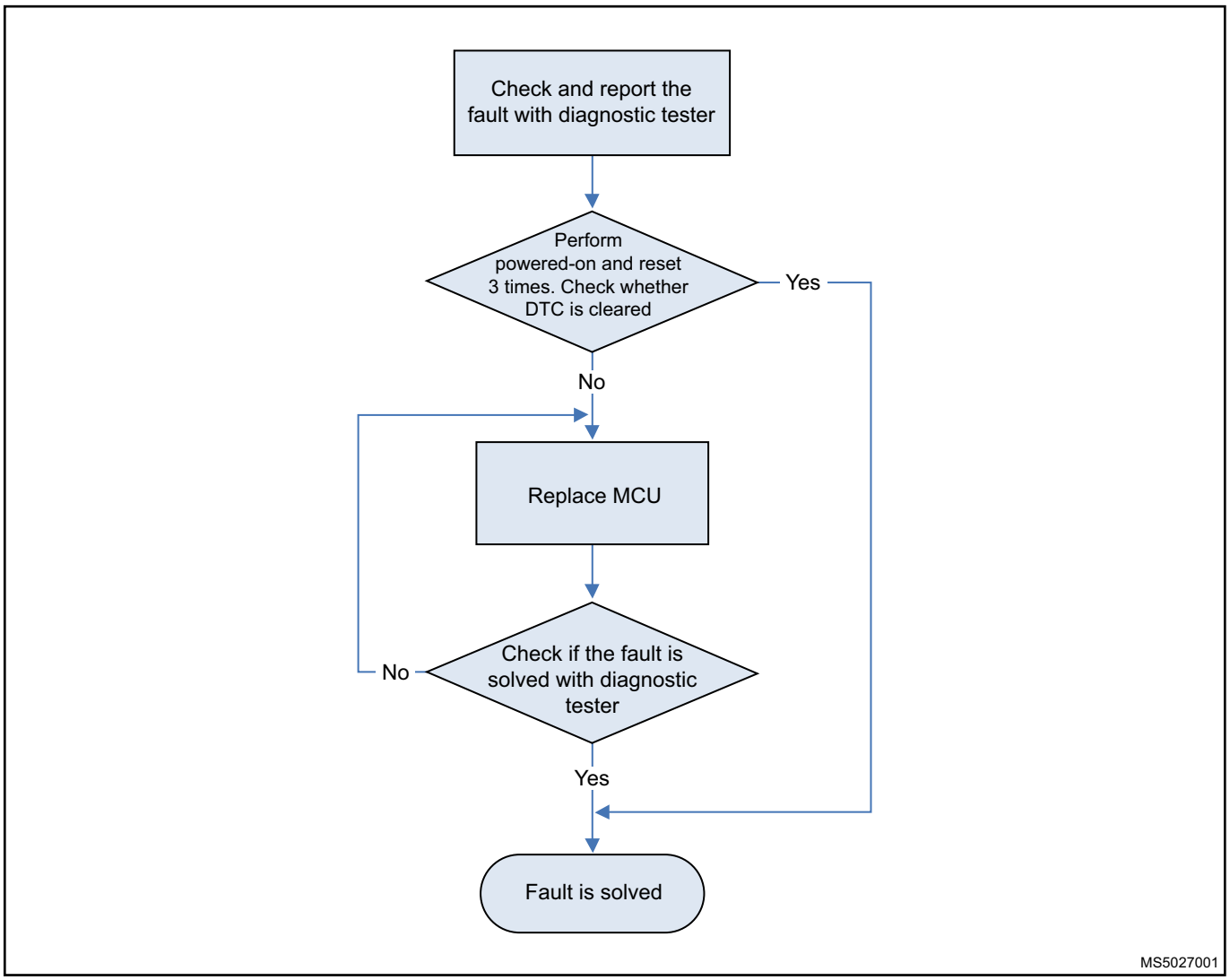
MCU Uncovered Protection Fault P0A44

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the motor controller assembly. The specific process is as follows:



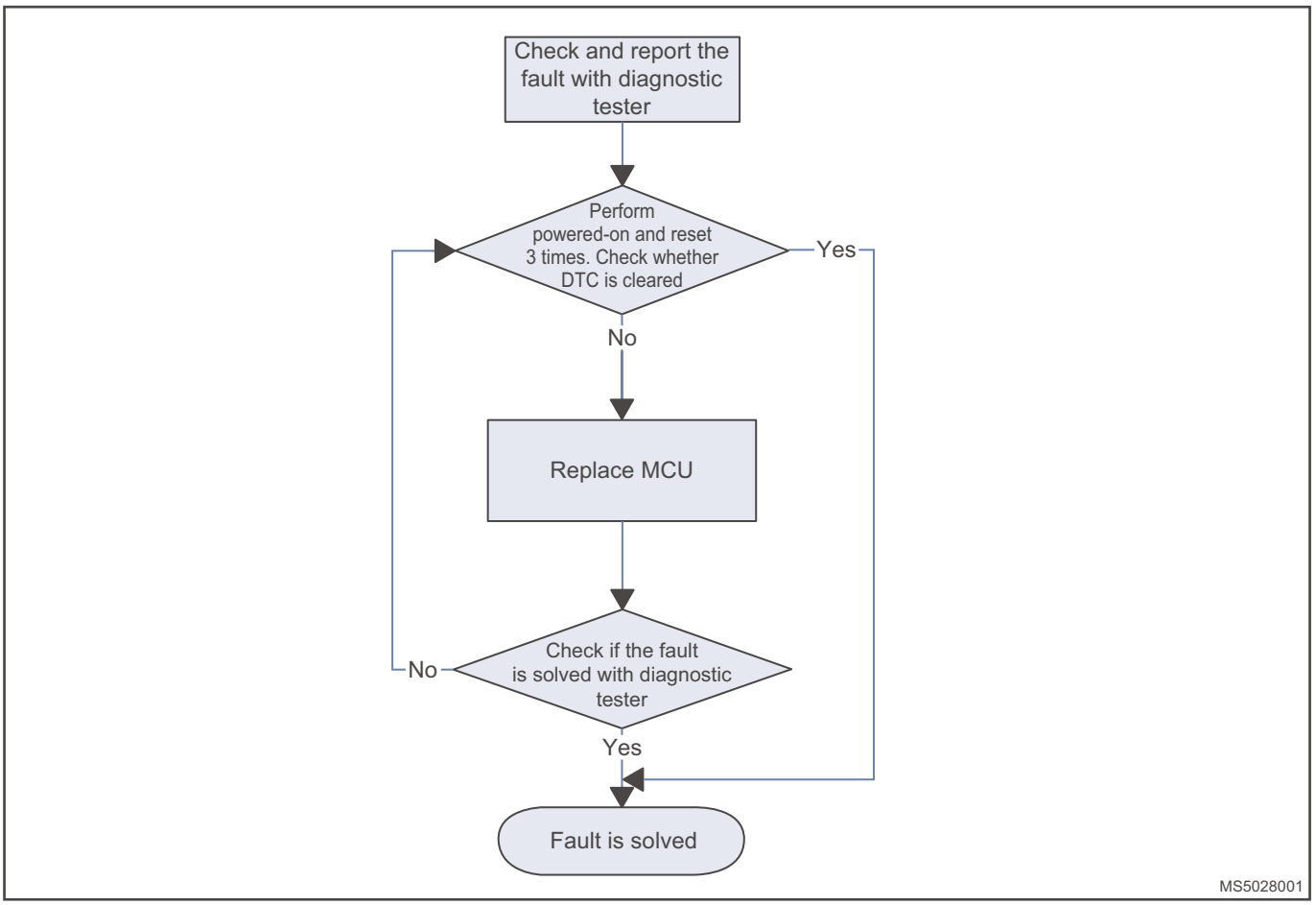
P0A57 MCU Self-check Fault

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the controller. The specific process is as follows:



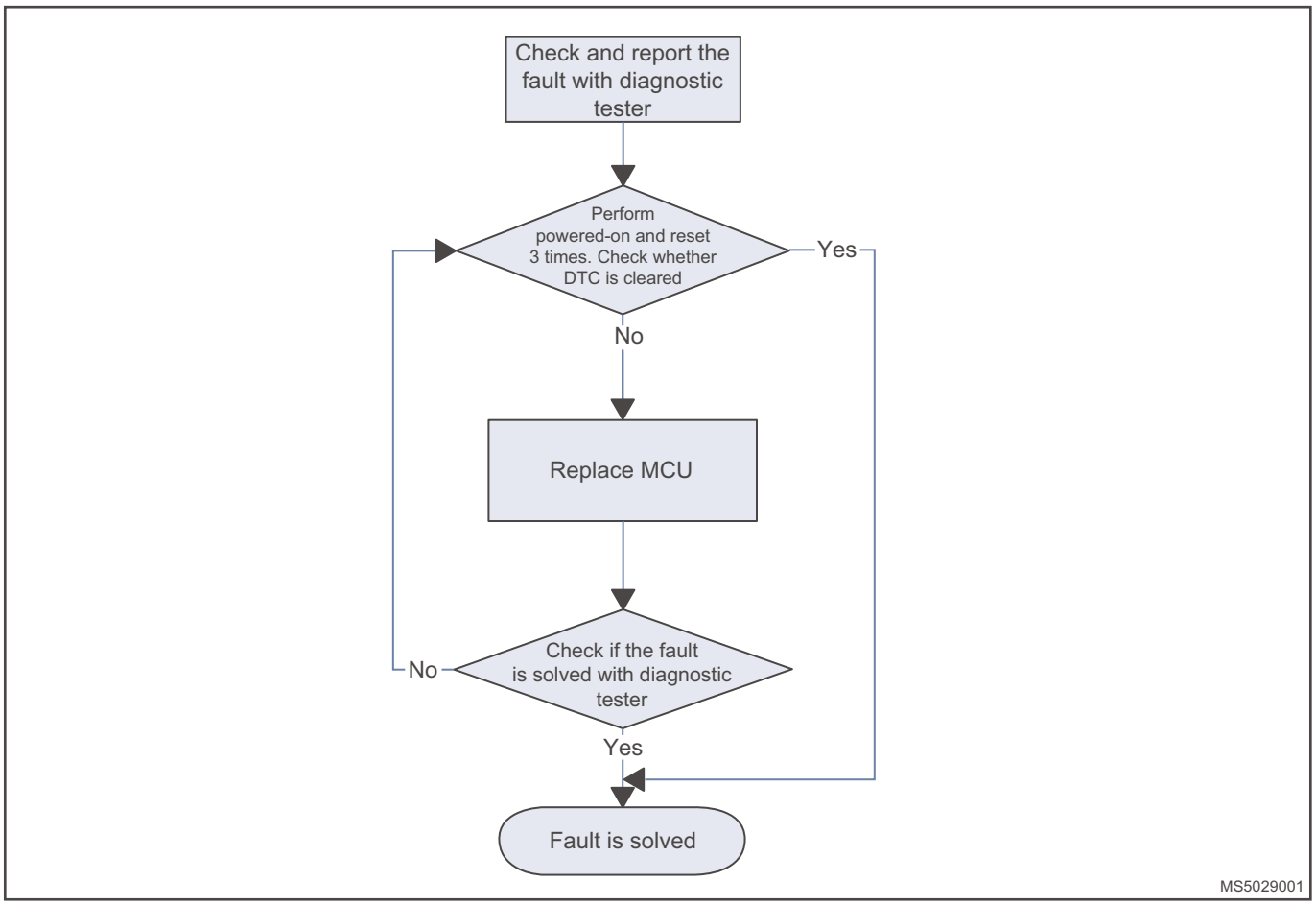
MCU Sensor Self-check Fault P0A61

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, please replace the controller. The specific process is as follows:



MCU Hardware Latch Fault P0A55

First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, the specific process is as follows:



Motor Phase Lack Fault P0A59
First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, replace the motor.

Motor Block Fault P0A54
First, use the vehicle key to power on and reset for 3 times. If the fault cannot be cleared, replace the motor.

On-vehicle Service

Tools

A set of ratchet socket tool, a torque wrench, an adjustable wrench, a clamp pliers, a multimeter, a high voltage insulation meter, a lift, and a flat trailer.

Auxiliary Material

Gear oil, gasket, coolant.

Protective Equipment

Cotton gloves, insulation gloves, working clothing, safety helmet, working shoes.

Specifications

Torque Specifications

Part Name	Torque (N·m)
4 Inner Hexagon Set Screws of Controller	25 ± 3
Drive Motor Junction Box Cover Set Bolt	6 ± 1
3-Phase Copper Bar Fixing Bolt in Drive Motor Junction Box	9 ± 1

Three-in-one Motor Assembly (Including Final Drive)

Removal

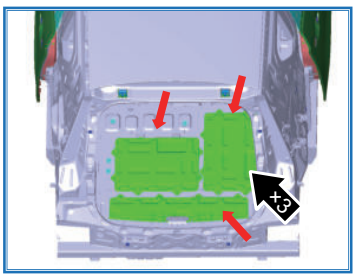
⚠

- Be sure to wear necessary safety equipment to prevent accidents.
- It must be carried out after confirming that the high voltage is disconnected before removal and installation, remove the vehicle key or turn to OFF position, confirm that the power battery pack relay is disconnected, and remove the service switch connector (under front passenger seat).
- When removing the high voltage power cable between the high voltage junction box to MCU, wait for 3 minutes, test with the multimeter DC voltage band, only when the test value is lower than 5 V, the follow-up maintenance work is allowed.
- When installing and removing the final drive, avoid damaging the mating surface between final drive and motor.
- Avoid damaging the oil seal when installing the drive shaft.
- Make sure that the final drive is at the proper angle of inclination when filling the transmission oil.
- Avoid contamination of transmission oil, or contact with eyes.
- Lift or hold the power assembly before removing.

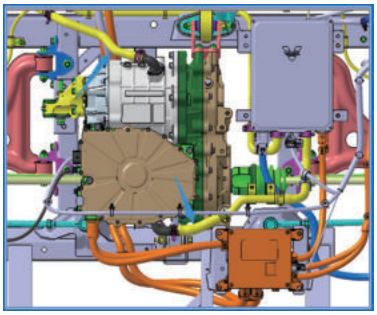
1. Cut off the high voltage, and remove the service switch (MSD) connector (arrow) (under front passenger seat, push the seat backward to remove the cover to remove).


MS5002002

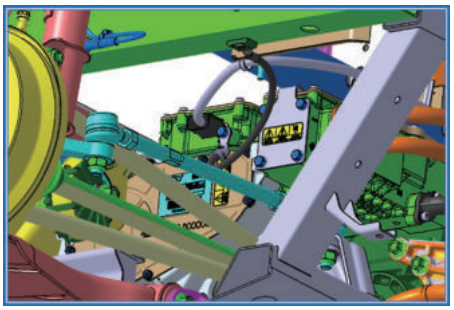
2. Remove rear service port cover plate assembly (arrow).


MS5003002

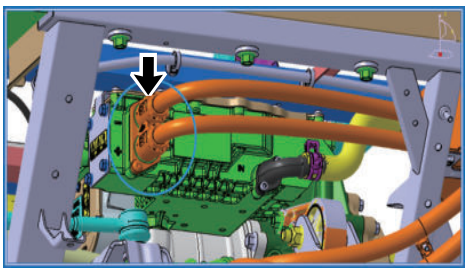
3. Remove the MCU water inlet pipe (1) and motor outlet pipe (2).
4. Remove the motor ground wire (3) and unplug the MCU signal connector (4).

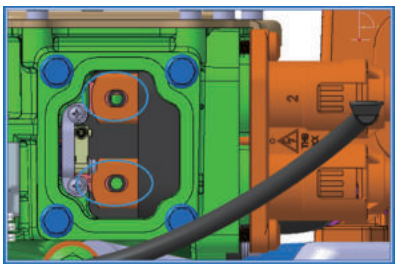

MS5004002

5. Raise vehicle with a lift and place a flat trailer under the sub frame to support it.

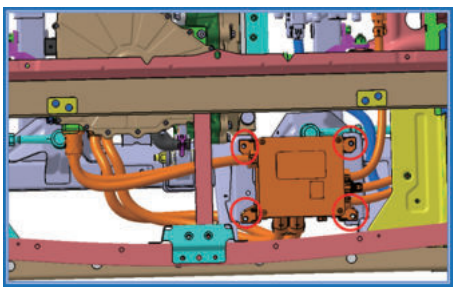

MS5005002

6. Remove high voltage power cable (arrow) between high voltage junction box and MCU.

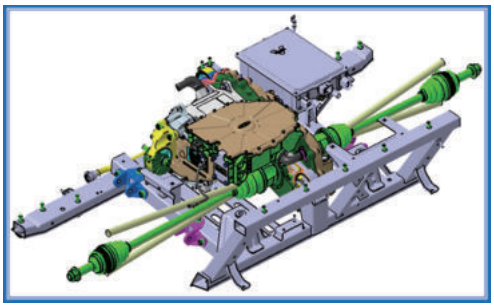

MS5006002


MS5007002

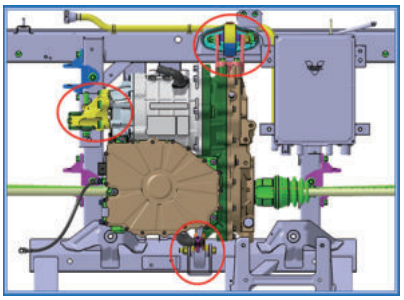
7. Remove the high voltage junction box.


MS5008002

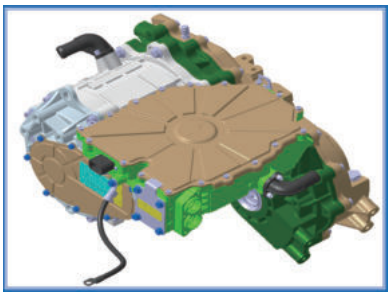
8. Remove sub frame and place it on flat trailer.


MS5009002

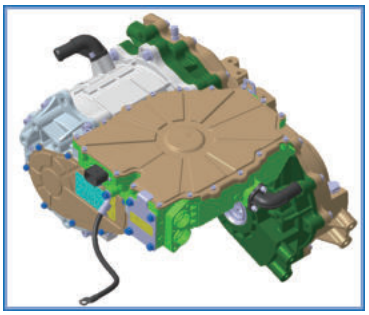
9. Remove left mounting, front mounting and rear mounting of three-in-one motor assembly, and place three-in-one motor assembly on workbench.

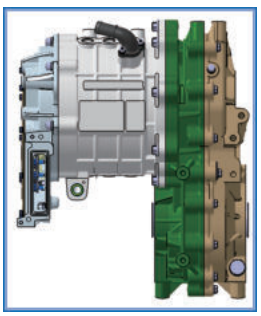

MS5010002

10. Remove the three-in-one motor assembly.


MS5011002

11. Remove the drive motor controller (J72-2142010KA), see the drive motor (J72-2103010KA) for the removal method and steps.


MS5012002


MS5013002

Installation

1. The installation of the three-in-one motor assembly is in the reverse order of removal. For the connection of cables and signal lines and the installation of water pipes, please refer to the wire harness and water pipe installation section. After assembly, add coolant according to the coolant adding method.

⚠

- Before installing the three-in-one motor assembly, use the 1 KV band of high-voltage insulation meter to detect the insulation resistance between MCU DC bus terminal junction base and housing. It is qualified when the value is greater than 20 MΩ. The installation is in the reverse order of removal.

Removal and Installation of Drive Motor Controller

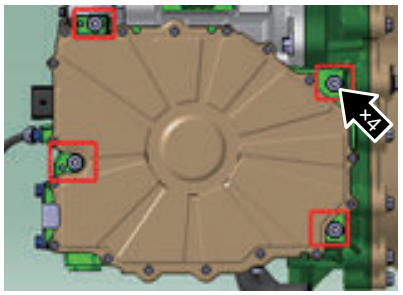
Removal

⚠

- Be sure to wear necessary safety equipment to prevent accidents.
- It must be carried out after confirming that the high voltage is disconnected before removal and installation, remove the vehicle key or turn to OFF position, confirm that the power battery pack relay is disconnected, and remove the service switch connector (under front passenger seat).
- When removing the high voltage power cable between the high voltage junction box to MCU, wait for 3 minutes, test with the multimeter DC voltage band, only when the test value is lower than 5 V, the follow-up maintenance work is allowed.
- When installing and removing the final drive, avoid damaging the mating surface between final drive and motor.
- Avoid damaging the oil seal when installing the drive shaft.
- Make sure that the final drive is at the proper angle of inclination when filling the transmission oil.
- Avoid contamination of transmission oil, or contact with eyes.
- Lift or hold the power assembly before removing.

1. After removing the three-in-one motor assembly, use socket tools to remove 4 inner hexagon set screws of controller: 4-M8*25.

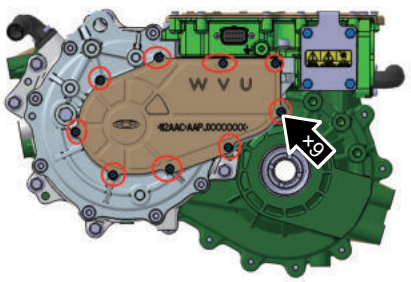
   Tightening torque: 25 ± 3 N·m



MS5014002

2. Remove the cover of the drive motor junction box, as shown in illustration below: Set bolt: 9-M5*12 (arrow)

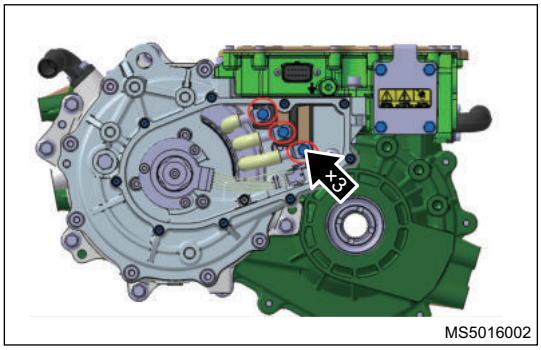
   Tightening torque: 6 ± 1 N·m



MS5015002

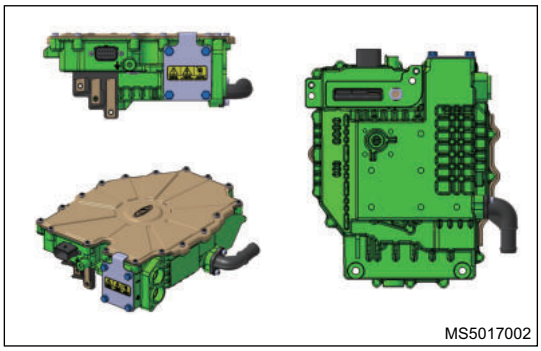
3. Remove the 3-phase copper bar fixing bolt in drive motor junction box, as shown in illustration below: Flange bolt: 3-M6*12

   Tightening torque: 9 ± 1 N·m



MS5016002

4. The removed drive motor controller is shown in illustration below.


MS5017002

ENERGY STORAGE DEVICE

ENERGY STORAGE DEVICE SYSTEM

System Overview

Brief Introduction of Lithium Battery

Four key materials of lithium ion battery:

- Positive material
- Negative material
- Diaphragm
- Electrolyte

During Charging:

- Electrolyte is used as the carrier, lithium ion flows from positive electrode to negative electrode through the diaphragm (many reticular micro holes).

During discharging:

- Electrolyte is used as the carrier, lithium ion flows from negative electrode to positive electrode through the diaphragm.

Safety requirements of battery:

- Overcharging (> 3.7 V)
- Result: It may cause damage to inside of battery, affecting circulation service life, leakage or shell bulge, and it may even cause a fire.
- Over discharging (< 2.7 V)
- Result: Over discharging battery may cause the dissolution inside negative electrode, damage to battery, short circuit inside battery.
- External short circuit (without load in battery circuit)
- Result: It may cause damage to the battery appearance, affecting circulation service life, leakage or shell bulge for slight failure, and it may cause a fire for serious failure.

Environmental adaption requirements:
IP68 waterproof, dust proof (insulation, self-discharging)

- IP68 refers to prevention safety level.
- 6: Prevent against dust inhalation (overall protection against contact, protection against dust penetration).
- 8: Prevent short immersion (anti immersion).

High/low temperature (-20 ºC to 60 ºC)

- When the temperature is below -20 ºC, the particles inside the cell is inactive and cannot be used. If it is used forcibly, there is safety risk.
- When the temperature is over 60 ºC, the particles inside the cell is not stable. There is also safety risk.

Charging and discharging rate:
The amount of current required by a battery to discharge its rated capacity (designed capacity) within a specified time, usually denoted by “C”.

- 1C means that the designed capacity is discharged within 1 hour.
- 2C means that the designed capacity is discharged within 0.5 hours.
  - For example: 10 Ah battery: 1C=10A, 0.5C=5A, 2C=20A.
  - 50 Ah battery: 1C=50A, 0.5C=25A, 2C=100A.

- 60 Ah battery: 1C=60A, 0.5C=30A, 2C=120A.
- 65 Ah battery: 1C=65A, 0.5C=32.5A, 2C=130A.

In battery industry, the unassembled battery is called as monomer cell, the finished product (that combines the cells in series (S)/parallel (P) and connects to Battery Management System (BMS)) with charging and discharging functions is called battery system.

System Overview

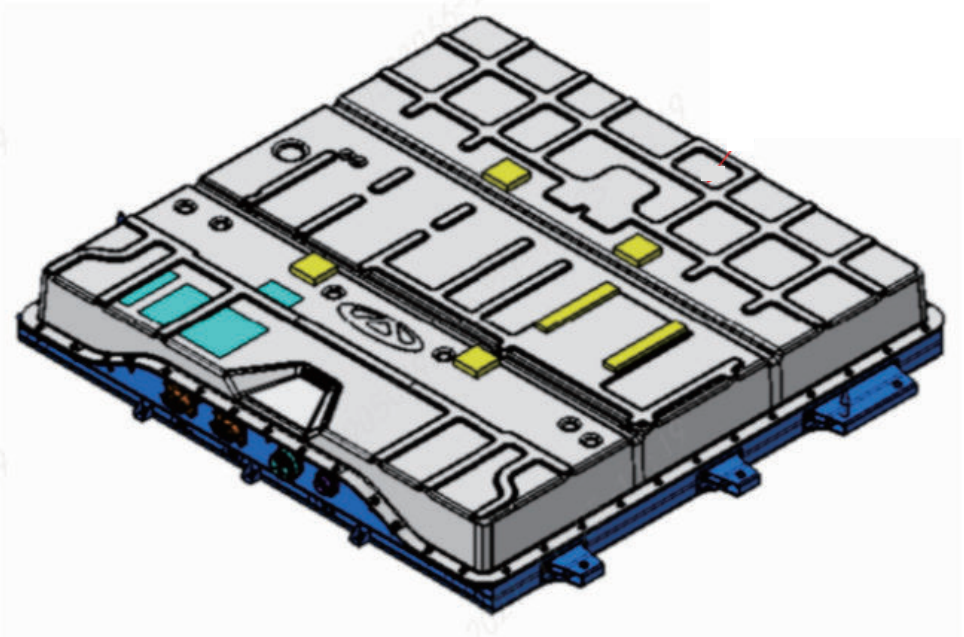
eQ1 adopts lithium oil phosphate battery pack, and the following components are integrated into battery pack:

1. Battery cell
2. ADS (Auto Disconnect System) or BDU (Battery Distribute Unit)
3. BMS (Battery Management System)

Energy storage device assembly technical parameters

Rated Voltage	Energy	Operating Voltage Range	Dust Proof Level	Waterproof Level	Operating Environment
337 V	⩾ 30.8 KWh	270~394.2 V, -5˚C ⩽ T < 60 ˚C 248.4~394.2 V, -20˚C ⩽ T < -5˚C 240~394.2 V, -30˚C ⩽ T < -20˚C	IP6X	IPX8	Charging: -20~60˚C Discharging: -30~60˚C

System Composition

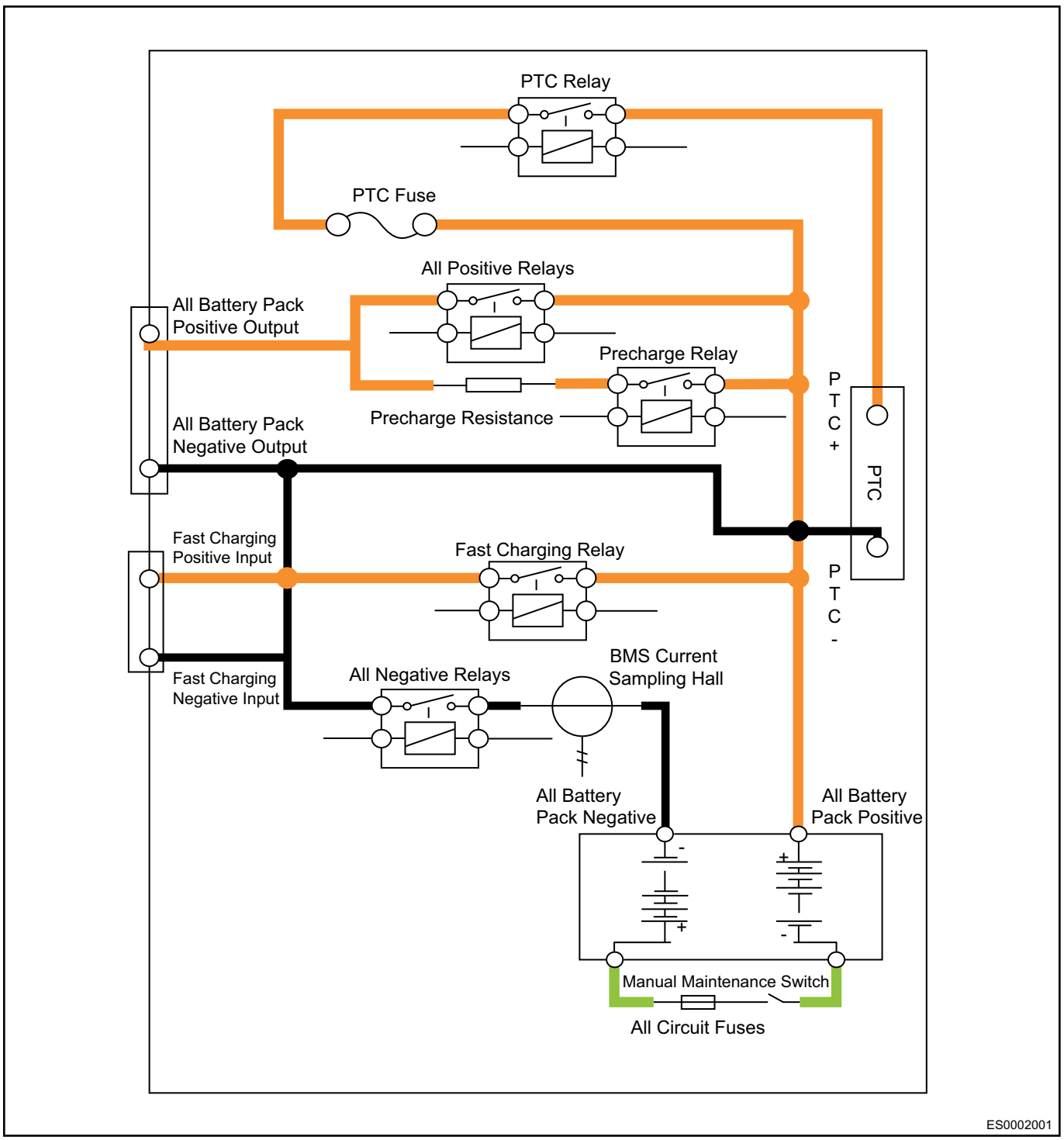


ES0001001

1	Energy Storage Device Assembly		

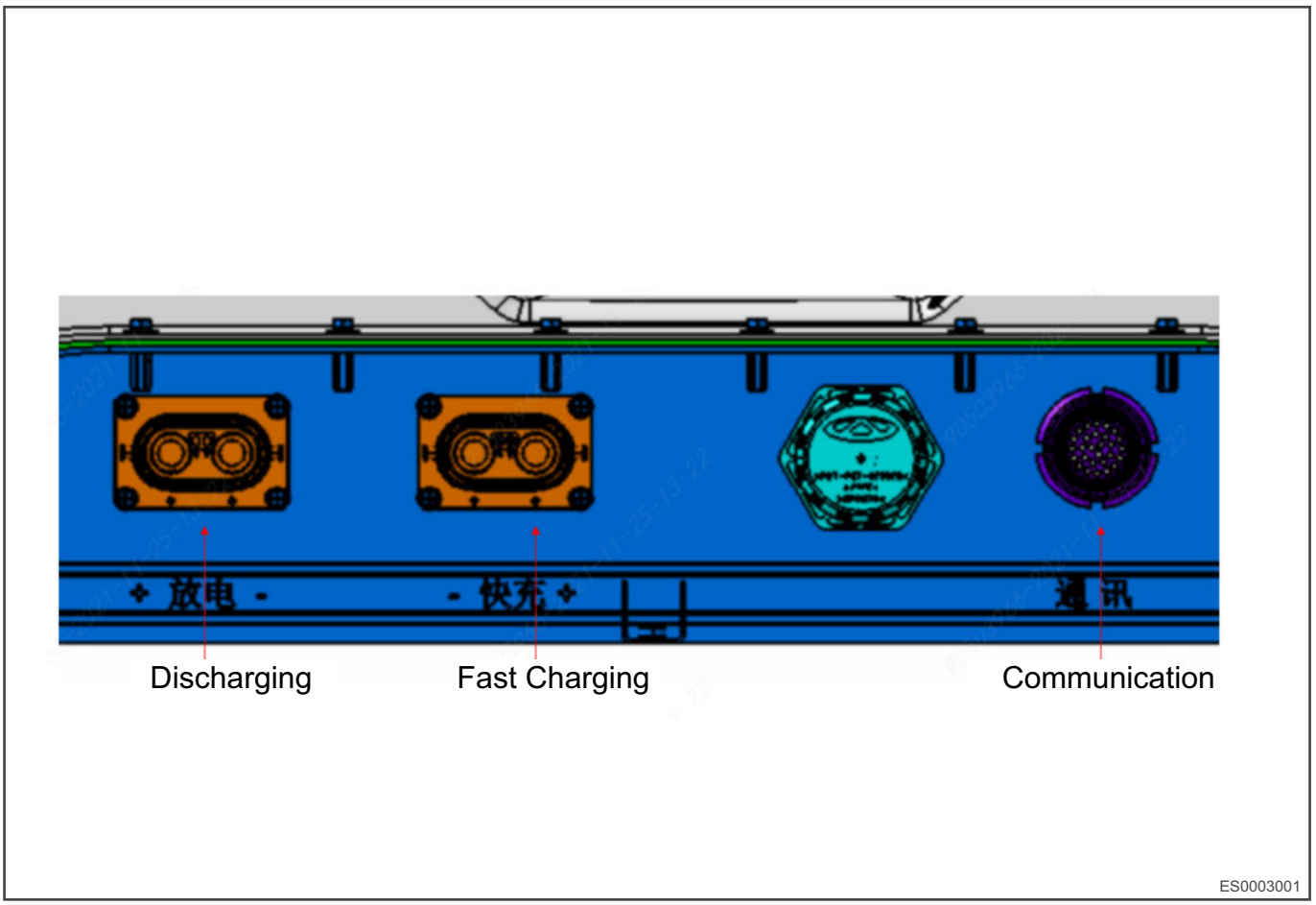
Control Schematic Diagram

Energy Storage Device Assembly High-voltage Control Schematic Diagram

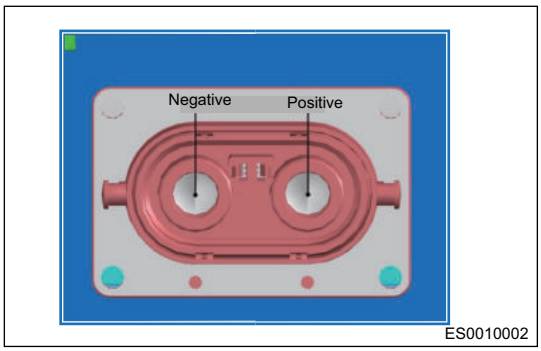


System Circuit Diagram

Connect Connector to One End of Pin Definition Circuit Wire Harness (VHVH-B)

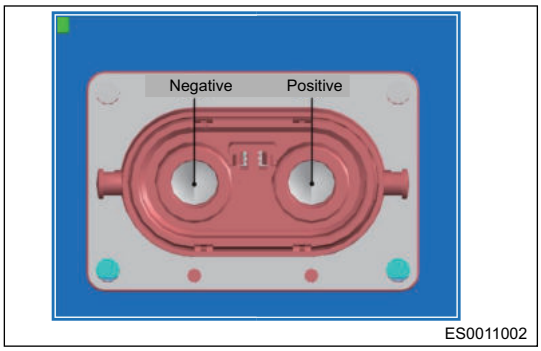


1. Connect batter pack discharging circuit connector (-BHVC1) to one end of vehicle discharging circuit wire harness (VHVH-B).



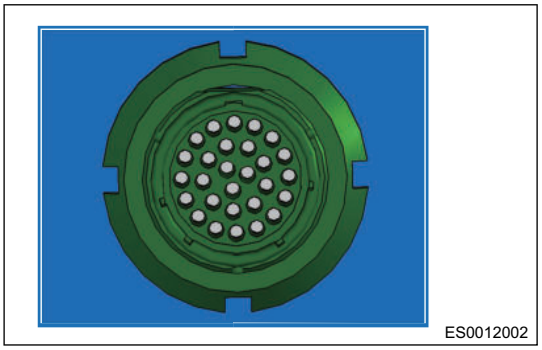
2. Battery pack quick charging circuit connector BHVC2

   Connect battery pack quick charging circuit connector (-BHVC2) to vehicle quick charging high-voltage output wire harness (VFCHVH).



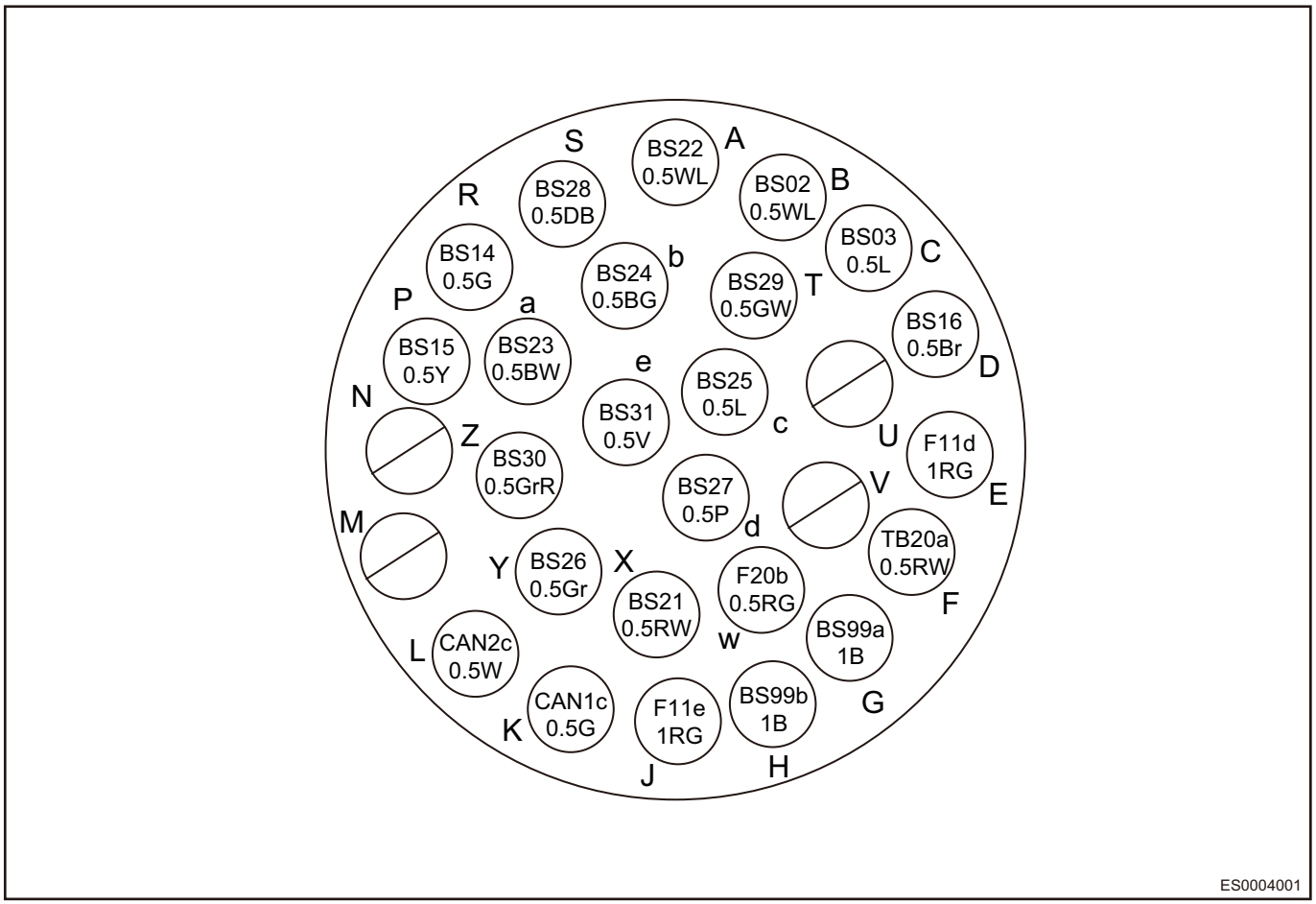
3. Battery pack low-voltage (signal wire) connector BLVC1

   Connect battery pack low-voltage connector (BLVC1) to vehicle battery pack low-voltage wire harness (V2BLVH).



Module Terminal Definition

Battery Pack Low-voltage (Signal Wire) Connector BLVC1 Terminal Definition



A	-	B	-
C	DC Charging Pile Charging Guide Circuit CC Signal	D	High-voltage Circuit Relay Closing Enable Signal
E	12 V Power Supply for BMS	F	Quick Charging Device Ignition Signal
G	BMS Power Supply Ground	H	BMS Power Supply Ground
J	12 V Power Supply for BMS	K	Vehicle CAN High
L	Vehicle CAN Low	M	Shield Ground

N	-	P	Quick Charging CAN Network High
R	Quick Charging CAN Network Low	S	Thermistor 1 (Reserved in New National Standard for Connecting to Quick Charging Temperature Sensor)
T	Thermistor 1 Ground (Reserved in New National Standard for Connecting to Quick Charging Temperature Sensor)	U	-
V	-	W	Vehicle Ignition Signal
X	Charger Ignition Signal	Y	-
Z	Thermistor 2 (Reserved in New National Standard for Connecting to Quick Charging Temperature Sensor)	a	Charging Indicator Drive Signal 1 (Red)
b	Charging Indicator Drive Signal 2 (Green)	c	-
d	DC Charging Wake up Control	e	Thermistor 2 Ground (Reserved in New National Standard for Connecting to Quick Charging Temperature Sensor)

Diagnosis & Test

Troubleshooting

Energy storage device assembly supports diagnosis on-line: When energy storage device assembly fails, battery pack will store the fault; At the same time, it supports diagnosis off-line: Read DTCs through the communication between diagnostic tester and BMS.
Energy storage device assembly includes the following types of faults:

- Vehicle system related faults
- Battery pack faults
  - Faults that battery pack does not need to be disconnected——A
  - Faults that battery pack needs to be disconnected——B
- Charging system failure
- Other faults (No DTC: Diagnostic Trouble Code and History Trouble Code)

Diagnostic Trouble Code (DTC) Chart

DTC list supported by energy storage device assembly is shown in following table:

No.	DTC Name	DTC	Possible Cause	Problem Symptom
1	VEHILCLE_ DISCHGHVINT-ERLOCK_ FAULT	P1B87	• High-voltage connector related with discharging is loose or unplugged • VCU fault • MSD fault • Internal failure of battery pack • Vehicle wire harness failure	• Vehicle cannot be turned to Ready • Power-off during driving
2	VEHILCLE_ CHGHVINTER-LOCK_FAULT	P1B88	• High-voltage connector related with charging is loose or unplugged • In-cable control box failure • Vehicle wire harness failure • Internal failure of battery pack	• Charging cannot be performed or is abnormal
3	POWERSUPP-LY_BMS_ OVERVLT_ FAULT	P0A8E	• Low on-board low-voltage battery voltage • Vehicle wire harness failure • Internal failure of battery pack	• Charging cannot be performed or stops
4	POWERSUPP-LY_BMS_ UNDERVLT_ FAULT	P0A8D	• High on-board low-voltage battery voltage • Vehicle wire harness failure • Internal failure of battery pack • DCDC failure	• Charging cannot be performed or stops
5	BMS_ HIGHVOLFUS-E_FAULT	P0A95	• Excessive charging/ discharging current	• High-voltage discharging fuse: Not available for driving • Instrument cluster voltage < 10 V • Fuse: Charging cannot be performed
6	NONCHG_ CELLUNDERT-EMP_FAULT	P1B8A	• Too low external ambient temperature	• Vehicle cannot be turned to Ready and cannot be charged
7	NONCHG_ CELLOVERTE-MP_FAULT	P1B8B	• Too high external ambient temperature	• Vehicle cannot be turned to Ready

No.	DTC Name	DTC	Possible Cause	Problem Symptom
			• Battery overheating caused by large current	• Disconnected while driving
8	BMS_ POSCONTACT-OR_FAULT	P0AA1	• Contactor stuck caused by large current	• Vehicle cannot be turned to Ready
9	BMS_ NEGCONTACT-OR_FALUT	P0AA4	• Contactor stuck caused by large current	• Vehicle cannot be turned to Ready
10	BAAT_ PACKVOLSAM-PINGLOOP_ FAULT	P1B8E	• Vibration/wire harness is not connected	• Battery maintenance light comes on
11	PILE_ UNDERVOLTA-GE_FAULT	P1B8F	• Internal failure of over discharging battery pack	• Vehicle cannot be turned to Ready • Disconnected while driving
12	PILE_ OVERVOLTAG-E_FAULT	P1B90	• Internal failure of over charging battery pack	• Malfunction alarms • High-voltage circuit contactor closing is prohibited
13	PILECUR_ SAMPLING_ FAULT	P0ABF	• Current sensor internal failure • Current sampling circuit failure	• Vehicle cannot be turned to Ready • Disconnected while driving • Charging cannot be performed
14	CHG_ CELLUNDERT-EMP_FAULT	P1B92	• Too low external ambient temperature	• Stop on-board charging and begin to heat battery
15	CHG_ CELLOVERTE-MP_FAULT	P1B93	• Too high external ambient temperature	• Stop on-board charging
16	BATT_ PRECHGELYC-TRL_ OPENCIRCUIT	P1B95	• Contactor control coil is disconnected	• Vehicle cannot be turned to Ready • Disconnected while driving
17	BATT_ PRECHGRELY-CTRL_ SHORTTOGND	P1B97	• Contactor control coil is short to ground	• Vehicle cannot be turned to Ready • Disconnected while driving
18	BMS_ SOCLOWER_ FAULT	P0A7D	• Battery is low	• Vehicle cannot be turned to Ready

No.	DTC Name	DTC	Possible Cause	Problem Symptom
				• There is only one cell power on instrument cluster
19	BATTTCELL_ OVERVOLTAG-E_FAULT	P1B00	• Over charging • Internal failure of battery pack	• Report malfunction information • Charging/discharging of battery is prohibited
20	BATTTCELL_ UNDERVOLTA-GE_FAULT	P1B01	• Over discharging • Internal failure of battery pack	• Vehicle cannot be turned to Ready • Disconnected while driving • Charging cannot be performed
21	BATTTCELL_ VOLTAGESAM-PLINGLINE_ FAULT	P1B02	• Cell voltage sampling wire harness is disconnected	• Vehicle cannot be turned to Ready • Disconnected while driving • Charging cannot be performed
22	BAAT_ CELLCONSIST-ENCY_ALARM	P1B03	• Poor battery consistency	• None
23	BATT_ TEMPCHANG-E_FAULT	P1B04	• Short circuit inside the battery pack or overcurrent, other failures inside battery pack	• Vehicle cannot be turned to Ready • Disconnected while driving • Charging cannot be performed
24	BMS_ PILECURENT_ FAULT	P1B05	• High voltage short circuit inside the battery pack or overcurrent, other failures inside battery pack	• Vehicle cannot be turned to Ready • Disconnected while driving • Charging cannot be performed
25	MAINRELY_ OPENDEDAM-NIFY_FAULT	P1B06	• P1B06	• Vehicle cannot be turned to Ready • Disconnected while driving
26	DISCHGLOOP_ ISOLATION_	P1B07	• Abnormal insulation in battery pack or abnormal insulation in other high-voltage components	• Vehicle cannot be turned to Ready • Disconnected while driving

No.	DTC Name	DTC	Possible Cause	Problem Symptom
27	CHGLOOP_ ISOLATION_ FAULT	P1B08	• Abnormal insulation or abnormal insulation in other high-voltage components	• Charging cannot be performed or stops
28	CHARGECUR-RENT_FAULT	P1B09	• On-board charger fault or internal failure of battery pack	• Instrument cluster displays that charging current is 10 A
29	CHARGEVOLT-AGE_FAULT	P1B0A	• On-board charger fault or internal failure of battery pack	• NA
30	BATT_ POSRELYCTR-L_ SHORTTOGND	P1B16	• Contactor control coil is short to ground	• Vehicle cannot be turned to Ready • Disconnected while driving
31	BATT_ POSRELYCTR-L_ OPENCIRCUIT	P1B17	• Contactor control coil is disconnected	• Vehicle cannot be turned to Ready • Disconnected while driving
32	BATT_ POSRELYCSW-ITCH_ PROTECTION	P1B18	• Contactor control coil is short to 12 V power supply	• Vehicle cannot be turned to Ready • Disconnected while driving
33	BATT_ NEGRELYCTR-L_ SHORTTOGND	P1B19	• Contactor control coil is short to ground	• Vehicle cannot be turned to Ready • Disconnected while driving • Charging cannot be performed
34	BATT_ NEGRELYCTR-L_ OPENCIRCUIT	P1B1A	• Contactor control coil is disconnected	• Vehicle cannot be turned to Ready • Disconnected while driving • Charging cannot be performed
35	BATT_ NEGRELYCS-WITCH_ PROTECTION	P1B1B	• Contactor control coil is short to ground	• Vehicle cannot be turned to Ready • Disconnected while driving • Charging cannot be performed
36	BATT_	P1B1C	• Contactor control coil is short to ground	• Quick charging cannot be performed

No.	DTC Name	DTC	Possible Cause	Problem Symptom
	FASTCHGREL-YCTRL_ SHORTTOGND			
37	BATT_ FASTCHGELY-CTRL_ OPENCIRCUIT	P1B1D	• Contactor control coil is disconnected	• Quick charging cannot be performed
38	BATT_ FASTCHGREL-YCSWITCH_ PROTECTION	P1B1E	• Contactor control coil is short to ground	• Quick charging cannot be performed
39	BATT_ SLOWCHGRE-LYCTRL_ SHORTTOGND	P1B1F	• Contactor control coil is short to ground	• Quick charging cannot be performed
40	BATT_ SLOWCHGELY-CTRL_ OPENCIRCUIT	P1B20	• Contactor control coil is disconnected	• Quick charging cannot be performed
41	BATT_ SLOWCHGRE-LYCSWITCH_ PROTECTION	P1B21	• Contactor control coil is short to ground	• Quick charging cannot be performed
42	BATT_ PRECHGRELY-CSWITCH_ PROTECTION	P1B22	• Contactor control coil is short to ground	• Vehicle cannot be turned to Ready
43	BATT_ HEATRELYCT-RL_ SHORTTOGND	P1B23	• Contactor control coil is short to ground	• Quick charging cannot be performed
44	BATT_ HEATELYCON-TR_ OPENCIRCUIT	P1B24	• Contactor control coil is disconnected	• Quick charging cannot be performed
45	BATT_ HEATRELYCS-WITCH_ PROTECTION	P1B25	• Contactor control coil is short to ground	• Quick charging cannot be performed
46	BMS_BMU1_ FAULT	P1B3D	• BMU internal fault	• Vehicle cannot be turned to Ready • Slow charging is interrupted • Quick charging is interrupted • Disconnected while driving

No.	DTC Name	DTC	Possible Cause	Problem Symptom
47	BMS_BMU2_ FAULT	P1B3E	• BMU internal fault	• Vehicle cannot be turned to Ready • Slow charging is interrupted • Quick charging is interrupted • Disconnected while driving
48	BMS_BMU3_ FAULT	P1B3F	• BMU internal fault	• Vehicle cannot be turned to Ready • Slow charging is interrupted • Quick charging is interrupted • Disconnected while driving
49	BMS_BMU4_ FAULT	P1B40	• BMU internal fault	• Vehicle cannot be turned to Ready • Slow charging is interrupted • Quick charging is interrupted • Disconnected while driving
50	BMS_BMU5_ FAULT	P1B41	• BMU internal fault	• Vehicle cannot be turned to Ready • Slow charging is interrupted • Quick charging is interrupted • Disconnected while driving
51	BMS_ HIGHVOLHEA-TER_FAULT	P1B4E	• PTC failure	• Charging cannot be performed
52	CHARGER HIGH VOLTAGE OUTPUT UNDERVOLTAGE FAULT	P1F08-16	• On-board charger fault or internal failure of battery pack etc.	• Slow charging is abnormal or stops
53	CHARGER HIGH VOLTAGE OUTPUT UNDERVOLTAGE FAULT	P1F07-17	• On-board charger fault or internal failure of battery pack etc.	• Slow charging is abnormal or stops
54	CHARGER AC INPUT UNDERVOLTAGE FAULT	P1F01-16	• On-board charger fault or abnormal fluctuation	• Slow charging is abnormal or stops

No.	DTC Name	DTC	Possible Cause	Problem Symptom
			of external supply network etc.	
55	CHARGER AC POWER TRANSMISSION INPUT OVERVOLTAGE FAULT	P1F00-17	• On-board charger fault or abnormal fluctuation of external supply network etc.	• Slow charging is abnormal or stops
56	RING TEMPERATURE OVERHEATING	P1D82-4B	• On-board charger fault or vehicle cooling system fault etc.	• Slow charging is abnormal or stops
57	WATER TEMPERATURE TOO HIGH	P1D85-4B	• On-board charger fault or vehicle cooling system fault etc.	• Slow charging is abnormal or stops
58	PFC INDUCTOR OVERTEMPERATURE	P1D86-4B	• On-board charger fault or vehicle cooling system fault etc.	• Slow charging is abnormal or stops
59	THE CHARGING PORT IS OVERHEATED	P1F05-4B	• Charging port fault or other faults etc.	• Slow charging is abnormal or stops
60	AC INPUT POWER DOWN	P1F02-31	• Abnormal fluctuation of external supply network etc.	• Slow charging is abnormal or stops
61	PFC UNDERVOLTAGE	P1F03-16	• On-board charger fault or abnormal fluctuation of external supply network etc.	• Slow charging is abnormal or stops
62	PFC OVERVOLTAGE	P1F04-17	• On-board charger fault or abnormal fluctuation of external supply network etc.	• Slow charging is abnormal or stops
63	SCI1 COMMUNICATION FAILURE	P1F0D-87	• On-board charger fault or communication circuit failure etc.	• Slow charging is abnormal or stops
64	SCI2 COMMUNICATION FAILURE	P1F0E-87	• On-board charger fault or communication circuit failure etc.	• Slow charging is abnormal or stops
65	CP SIGNAL DUTY RADIO	P1F14-3B	• On-board charger fault or abnormal CP signal in charging pile end etc.	• Slow charging is abnormal or stops
66	ELECTRONIC LOCK FAILURE	P1F16-96	• Charging port electronic lock fault or low-voltage wire harness fault etc.	• Slow charging is abnormal or stops

No.	DTC Name	DTC	Possible Cause	Problem Symptom
67	CC FAILURE	P1F15-1E	• Abnormal CC signal low-voltage wire harness or other faults etc.	• Slow charging is abnormal or stops
68	ORIGINAL BORDER AND DEPUTY BORDER	P1F17-86	• On-board charger fault or other faults etc.	• Slow charging is abnormal or stops
69	OBC HARDWARE FAILURE	P1F27-09	• On-board charger fault etc.	• Slow charging is abnormal or stops
70	CP SIGNAL 6V ABNORMAL VOLTAGE	P1F22-1C	• On-board charger fault or abnormal CP signal in charging pile end etc.	• Slow charging is abnormal or stops
71	CP SIGNAL 9V ABNORMAL VOLTAGE	P1F23-1C	• On-board charger fault or abnormal CP signal in charging pile end etc.	• Slow charging is abnormal or stops
72	CP ABNORMAL CP FREQUENCY	P1F24-38	• On-board charger fault or abnormal CP signal in charging pile end etc.	• Slow charging is abnormal or stops
73	ABNORMAL TEMPERATUREB SAMPLING	P1F19-96	• On-board charger fault or other faults etc.	• Slow charging is abnormal or stops
74	CHGER_ POSNEGRELA-Y_FAULT	P1B5B	• Battery pack fault or charger fault	• Slow charging is abnormal or stops
75	BMS_ POSRELYCTR-L_ SHORTTOPO-WER	P1B5C	• Contactor control coil is short to 12 V power supply	• Vehicle cannot be turned to Ready • Disconnected while driving
76	BMS_ NEGRELAYCT-RL_ SHORTTOPO-WER	P1B5D	• Contactor control coil is short to ground	• Vehicle cannot be turned to Ready • Disconnected while driving
77	BATT_ PRECHGRELA-YCTRL_ SHORTTOPO-WER	P1B5E	• Contactor control coil is short to 12 V power supply	• Vehicle cannot be turned to Ready • Disconnected while driving
78	BMS_ CHGRELYCTR-L_ SHORTTOPO-WER	P1B60	• Contactor control coil is short to ground	• Slow charging cannot be performed or charging stops

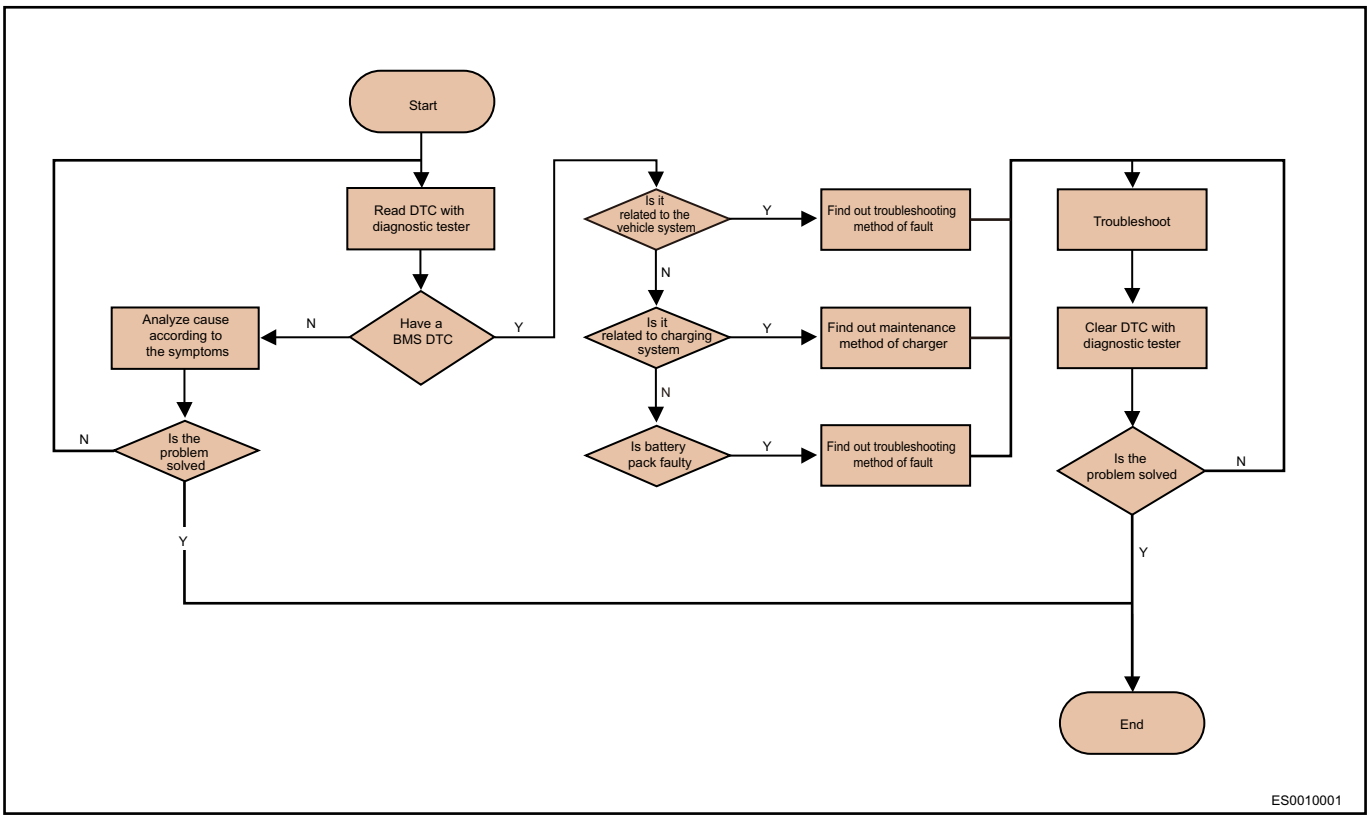
No.	DTC Name	DTC	Possible Cause	Problem Symptom
79	BMS_ FASTCHGREL-YCTRL_ SHORTTOPO-WER	P1B62	• Contactor control coil is short to ground	• Quick charging cannot be performed or charging stops
80	BMS_ HEATRELYCT-RL_ SHORTTOPO-WER	P1B64	• Contactor control coil is short to ground	• Slow charging cannot be performed or charging stops
81	BMS_ HEATERRELY_ FAULT	P1B65	• Contactor stuck caused by large current	• Slow charging cannot be performed or charging stops
82	BMS_ TMPSAMPLIN-G_ SHORTTOGND	P1B66	• Temperature sampling wire harness is short to 12 V ground	• Driving limit discharging power is not suitable for charging
83	BMS_ TMPSAMPLIN-G_ SHORTTOPO-WER	P1B67	• Temperature sampling wire harness is short to 12 V power supply	• – Driving limit discharging power is not suitable for charging
84	BMS_ CURSAMPLIN-G_ SHORTTOPO-WER	P1B68	• Current sensor internal failure • Current sampling circuit failure	• Driving/charging limit discharging power
85	CAN_BUS_ FAULT	U0073	• CANH or CANL is short to power supply, vehicle wire harness failure • Vehicle CAN network failure • Internal failure of battery pack	• Vehicle cannot be turned to Ready/slow charging/ quick charging or driving/ slow charging/quick charging is interrupted
86	MCU_CAN_TX_ FAILED	U0293	• Open in CAN bus wire harness • VCU failure or internal failure of battery pack	• Vehicle cannot be turned to Ready or disconnected while driving
87	BMS_CM_ CAN_FAILED	U0296	• Open in CAN bus wire harness	• Slow charging cannot be performed or stops
88	BMU1_ BMSCAN_ FAILED	U1003	• Open in CAN bus wire harness	• Vehicle cannot be turned to Ready/slow charging/ quick charging or driving/

No.	DTC Name	DTC	Possible Cause	Problem Symptom
				slow charging/quick charging is interrupted
89	BMU2_ BMSCAN_ FAILED	U1004	• Open in CAN bus wire harness	• Vehicle cannot be turned to Ready/slow charging/ quick charging or driving/ slow charging/quick charging is interrupted
90	BMU3_ BMSCAN_ FAILED	U1005	• Open in CAN bus wire harness	• Vehicle cannot be turned to Ready/slow charging/ quick charging or driving/ slow charging/quick charging is interrupted
91	BMU4_ BMSCAN_ FAILED	U1006	• Open in CAN bus wire harness	• Vehicle cannot be turned to Ready/slow charging/ quick charging or driving/ slow charging/quick charging is interrupted
92	BMU5_ BMSCAN_ FAILED	U1007	• Open in CAN bus wire harness	• Vehicle cannot be turned to Ready/slow charging/ quick charging or driving/ slow charging/quick charging is interrupted
93	BMS_ FASTCHARG-E_CAN_FAULT	U1012	• Open in CAN bus wire harness	• Vehicle cannot be turned to Ready/slow charging/ quick charging or driving/ slow charging/quick charging is interrupted
94	BMS_ CURSENSOR-CAN_FAILED	P1B6C	• Open in CAN bus wire harness	• Vehicle cannot be turned to Ready/slow charging/ quick charging or driving/ slow charging/quick charging is interrupted
95	HEATOR_ BATTMPDIFF_ FAULT	P1B6F	• At least one PTC does not operate	• Charging is performed or charging stops
96	HEATOR_ SINGLEHEATI-NGTIMEOUT_ FAULT	P1B70	• PTC failure • PTC failure	• Charging is performed or charging stops
97	HEATOR_ WORKVLT_ FAULT	P1B71	• Charger high-voltage output fault • Internal failure of battery pack	• Charging is performed or charging stops

No.	DTC Name	DTC	Possible Cause	Problem Symptom
98	HEATOR_ BATTMPRUNA-WAY_FAULT	P1B72	• At least one PTC is faulty	• Charging is performed or charging stops
99	IMU_ INPUTVLT_ FAULT	P1B73	• Insulation detection module hardware failure	• Vehicle cannot be turned to Ready/slow charging/ quick charging or driving/ slow charging/quick charging is interrupted
100	IMU_ INPUTPERIO-D_FAULT	P1B74	• Insulation detection module hardware failure	• Vehicle cannot be turned to Ready/slow charging/ quick charging or driving/ slow charging/quick charging is interrupted
101	BMS_ LINKVOLlinkS-AMPINGLOOP_ FAULT	P1B8D	• Abnormal sampling circuit	• Instrument cluster battery maintenance light comes on
102	PRECHARGEL-OOP_FAULT	P1B96	• Pre-charge resistance is damaged • Pre-charge circuit is open	• Pre-charge cannot be performed

Diagnosis Procedure

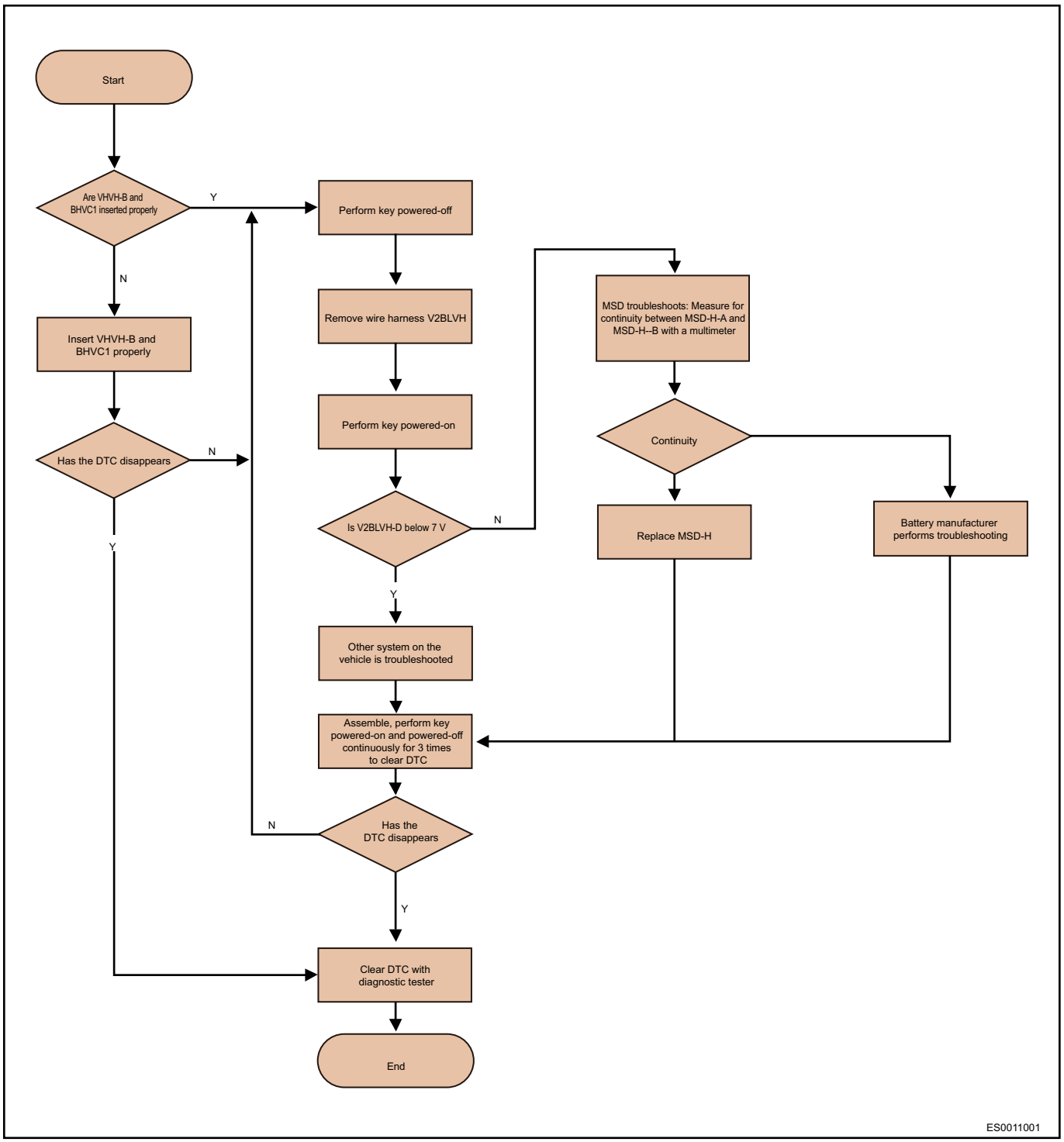
All faults shall be troubleshooted at the vehicle system level first. When the fault points to the battery pack, it is necessary to check whether the battery pack itself is faulty. If the battery pack is faulty, contact the battery supplier. If the fault cannot be located or resolved, please contact professional personnel.
General operation procedure of inspection and repair for eQ1 power energy storage device assembly is shown in illustration below:



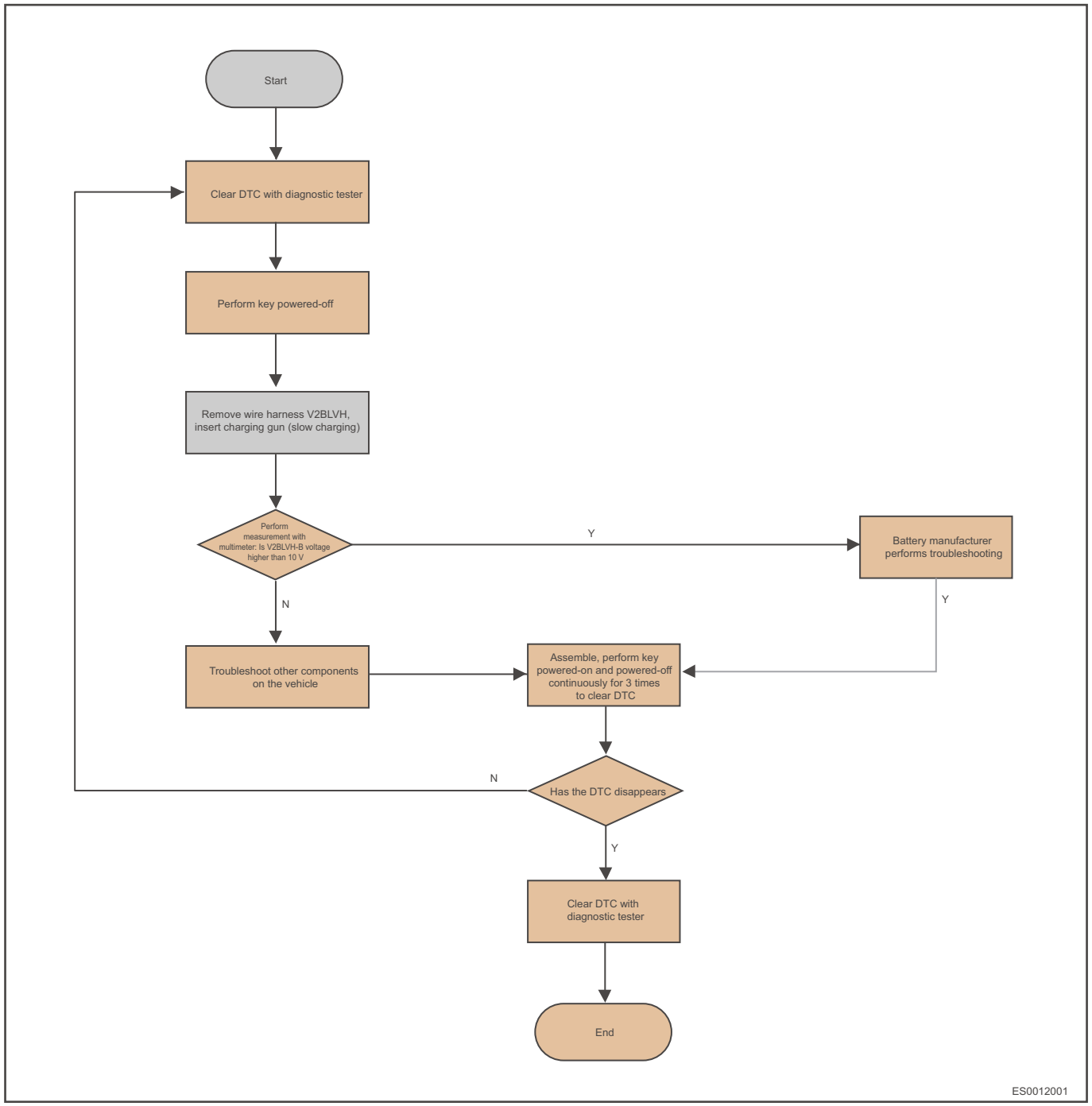
- When troubleshooting the faults, if BMS needs to be replaced, please charge the vehicle fully after replacing battery, so as to guarantee the accuracy of initial SOC.

DTC Diagnosis Procedure

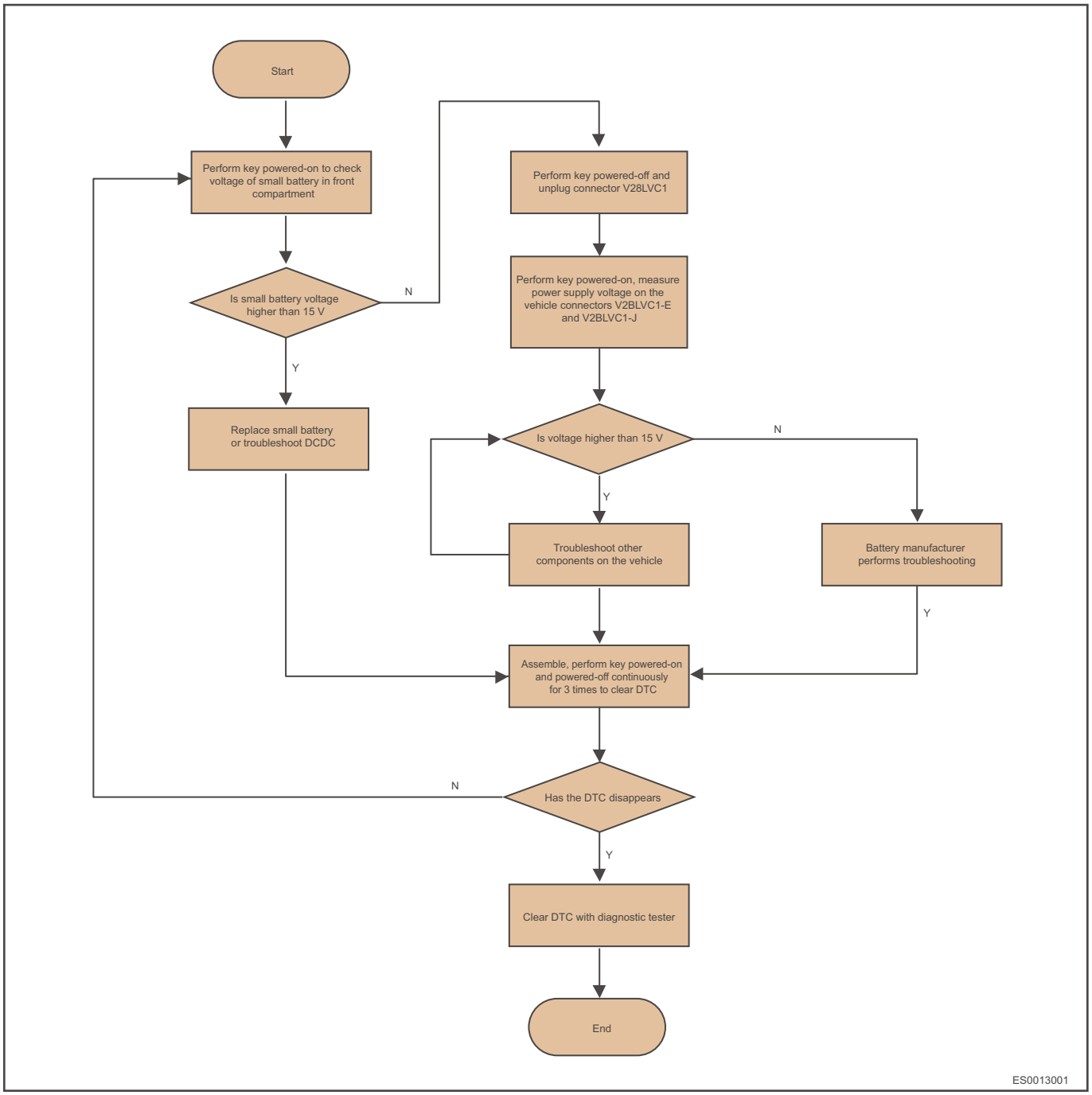
DTC: P1B87 (VEHILCLE_DISCHGHVINTERLOCK_FAULT)
It may cause that vehicle cannot be turned to Ready or high voltage power is disconnected during driving. Because the signal is output by vehicle control, when reading the DTC, first determine whether the VCU has a fault that disables the signal.



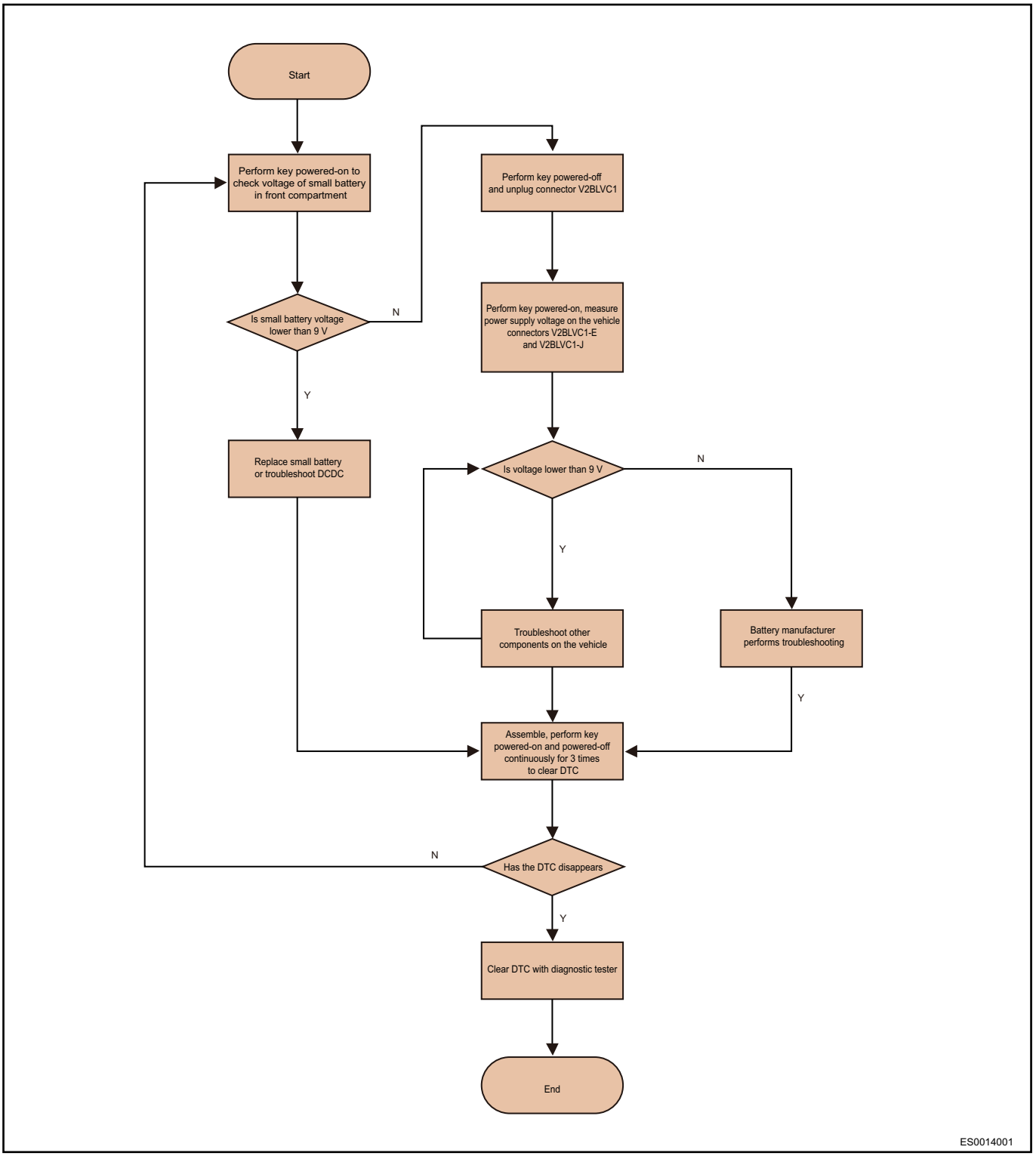
DTC P1B88 (VEHILCLE_CHGHVINTERLOCK_FAULT) Charging Cannot be performed by This Fault



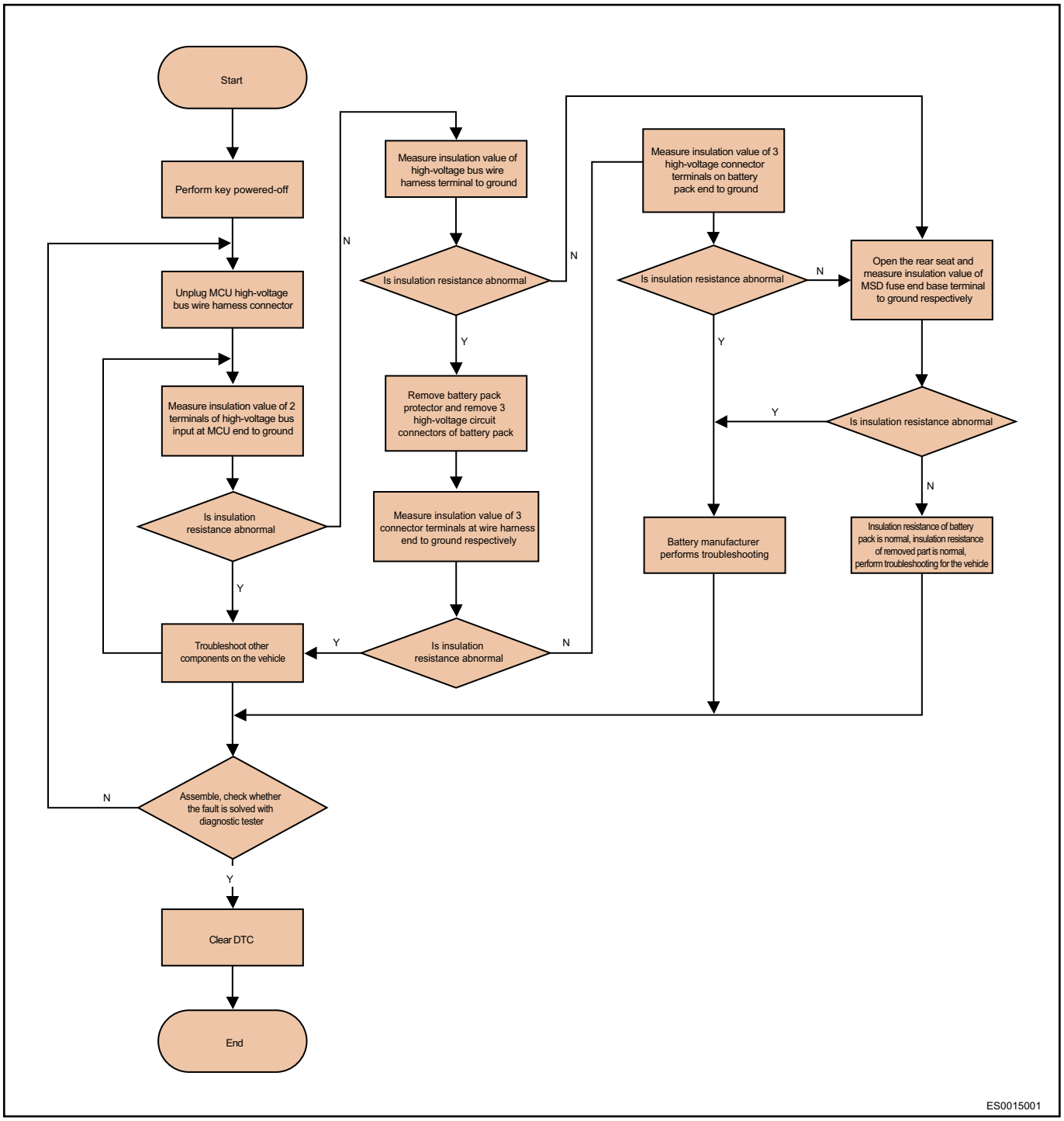
DTC: P0A8E (POWERSUPPLY_BMS_OVERVLT_FAULT)



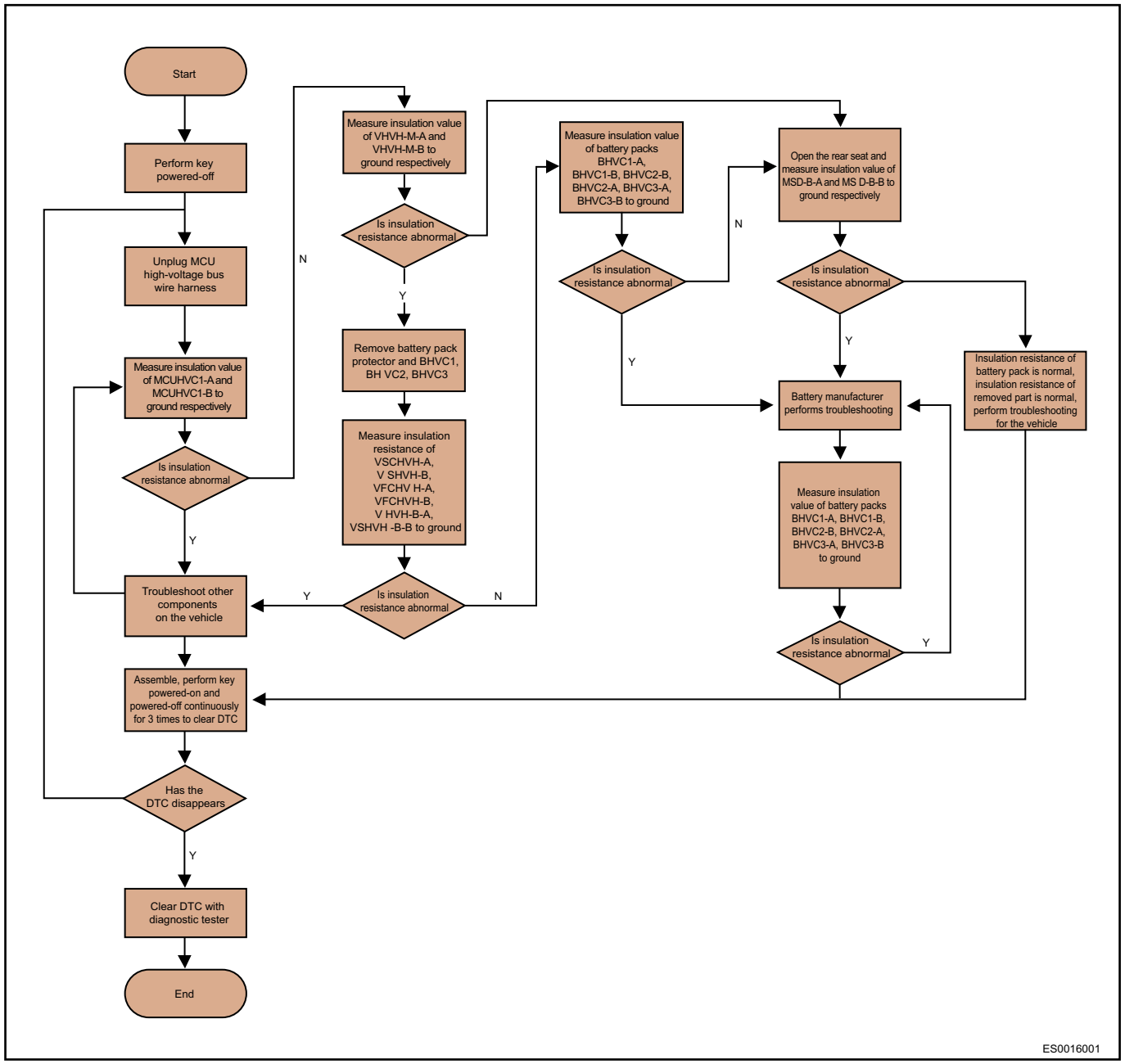
DTC: P0A8D (POWERSUPPLY_BMS_UNDERVLT_FAULT)



DTC: P1B07 (DISCHGLOOP_ISOLATION_)



DTC: P1B08 (CHGLOOP_ISOLATION_FAULT)

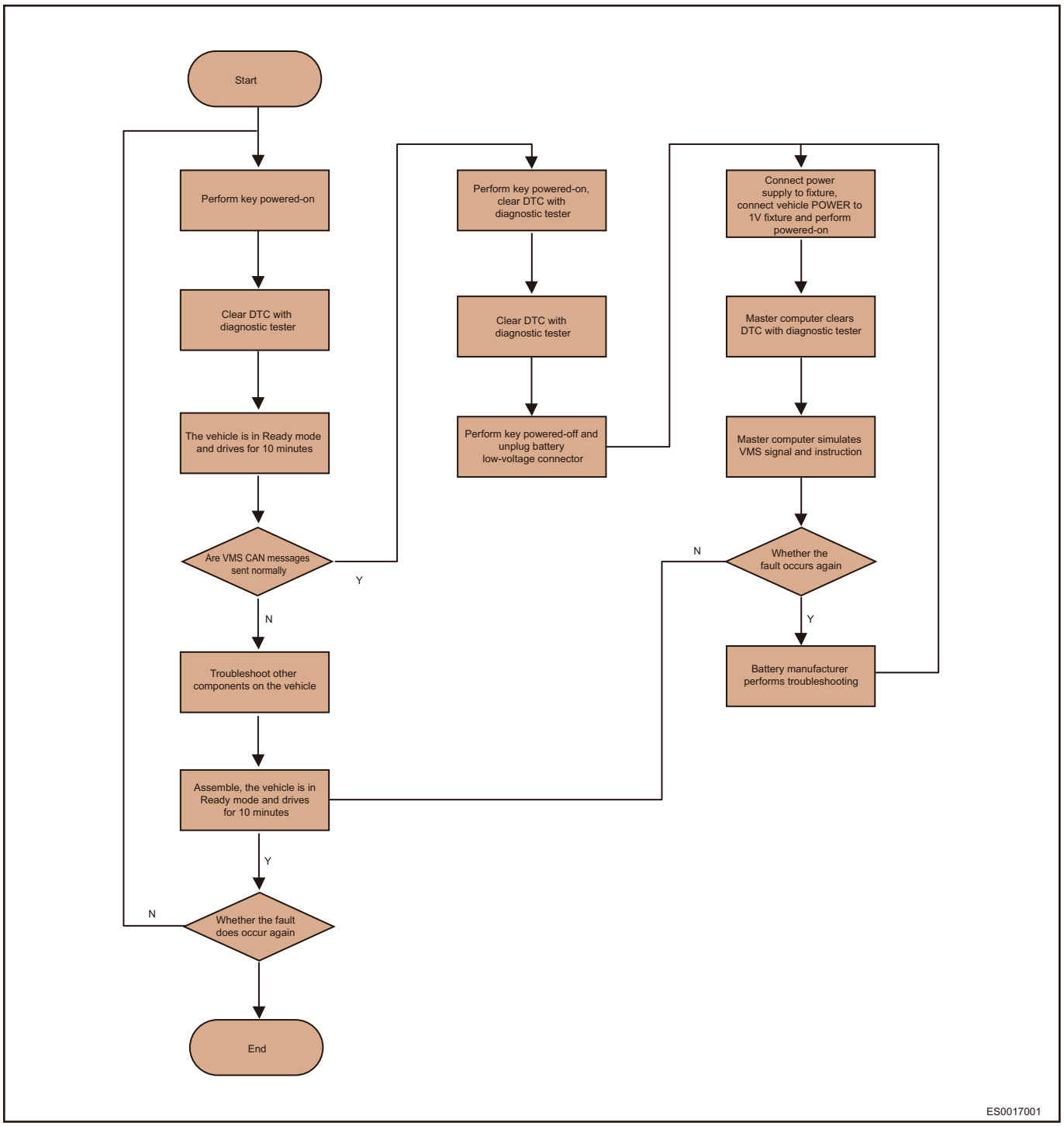


DTC: U0073 (CAN_BUS_FAULT) Feedback to Professional Engineer for Treatment

DTC: U0293 (MCU_CAN_TX_FAILED)

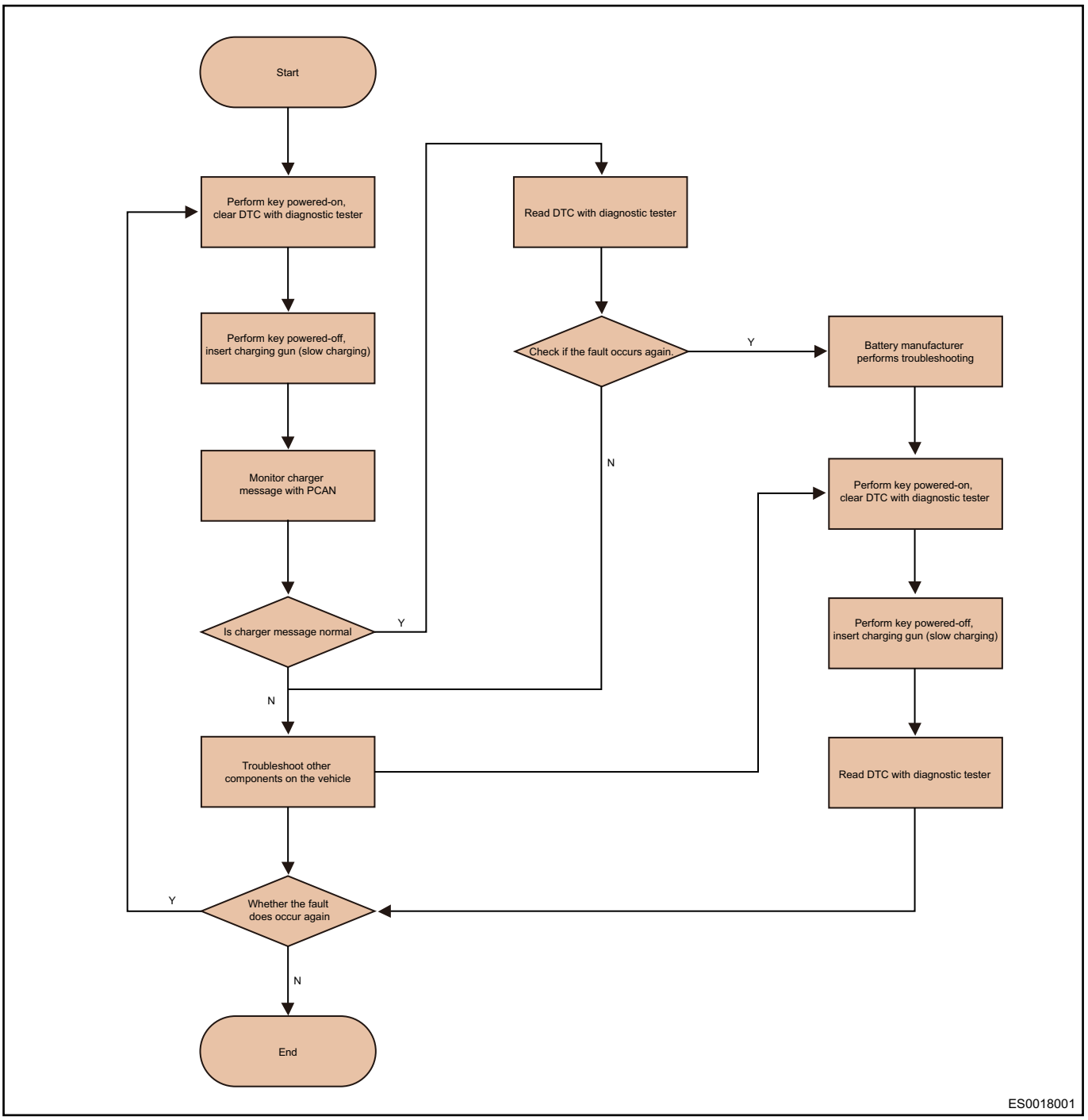
Reasons for abnormal communication between BMS and VCU generally are as follows:

- Wire harness fault between VCU and BMS CAN
- VCU fault
- BMS fault



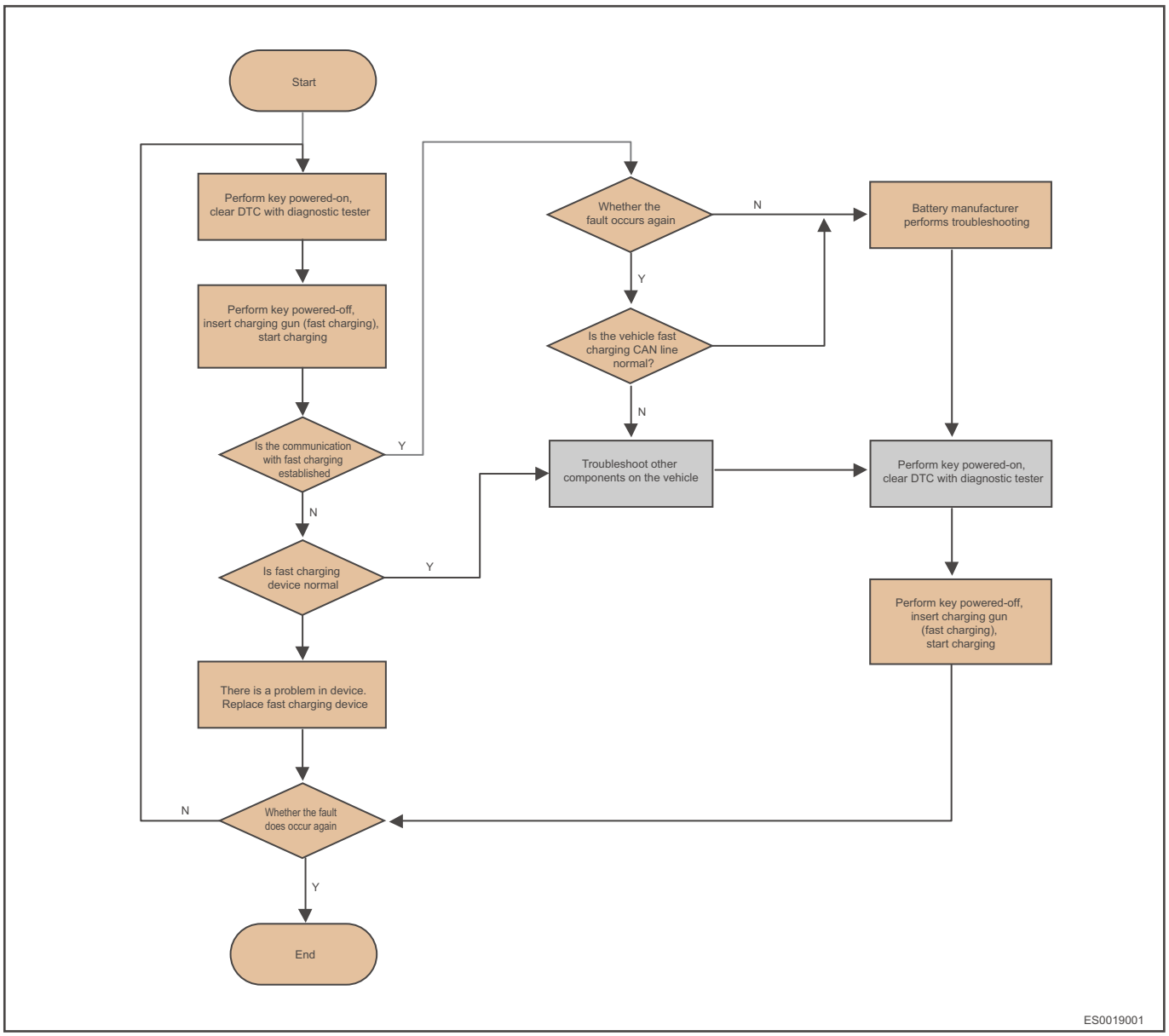
DTC:U0296 (BMS_CM_CAN_FAILED)
Reasons for abnormal communication between BMS and CM generally are as follows:

- Wire harness fault between CM and BMS CAN
- CM fault
- BMS fault



DTC: U1012 (BMS_FASTCHARGE_CAN_FAULT)
Reasons for abnormal communication between BMS and quick charing device generally are as follows:

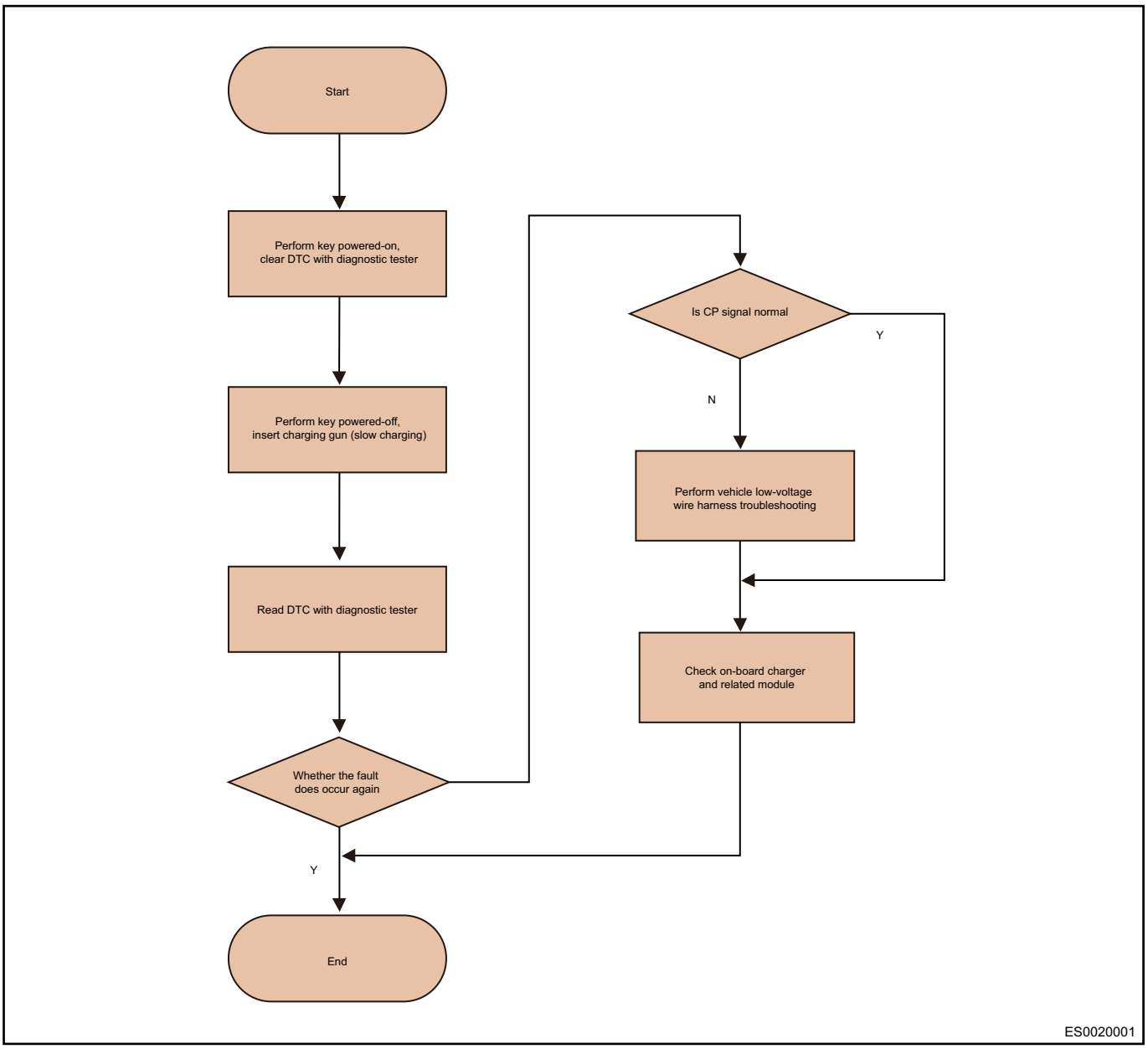
- Wire harness fault between FCM and BMS CAN
- FCM fault
- BMS fault
- Quick charing protocol of FCM and BMS is incompatible



DTC: P1F14-3B ()

The fault is caused generally due to following reasons (same to DTCs P1F22-1C, P1F23-1C, P1F24-38)

- In-cable control box failure
- AC charging pile failure
- Vehicle low-voltage wire harness failure
- After confirming that in-cable control box, AC charging pile and vehicle low-voltage wire harness are OK, the charger supplier should troubleshoot for charger fault or vehicle other module faults.


Start
Perform key powered-on, clear DTC with diagnostic tester
Perform key powered-off, insert charging gun (slow charging)
Read DTC with diagnostic tester
Whether the fault does occur again
Y
End
Is CP signal normal
Y
N
Perform vehicle low-voltage wire harness troubleshooting
Check on-board charger and related module
ES0020001

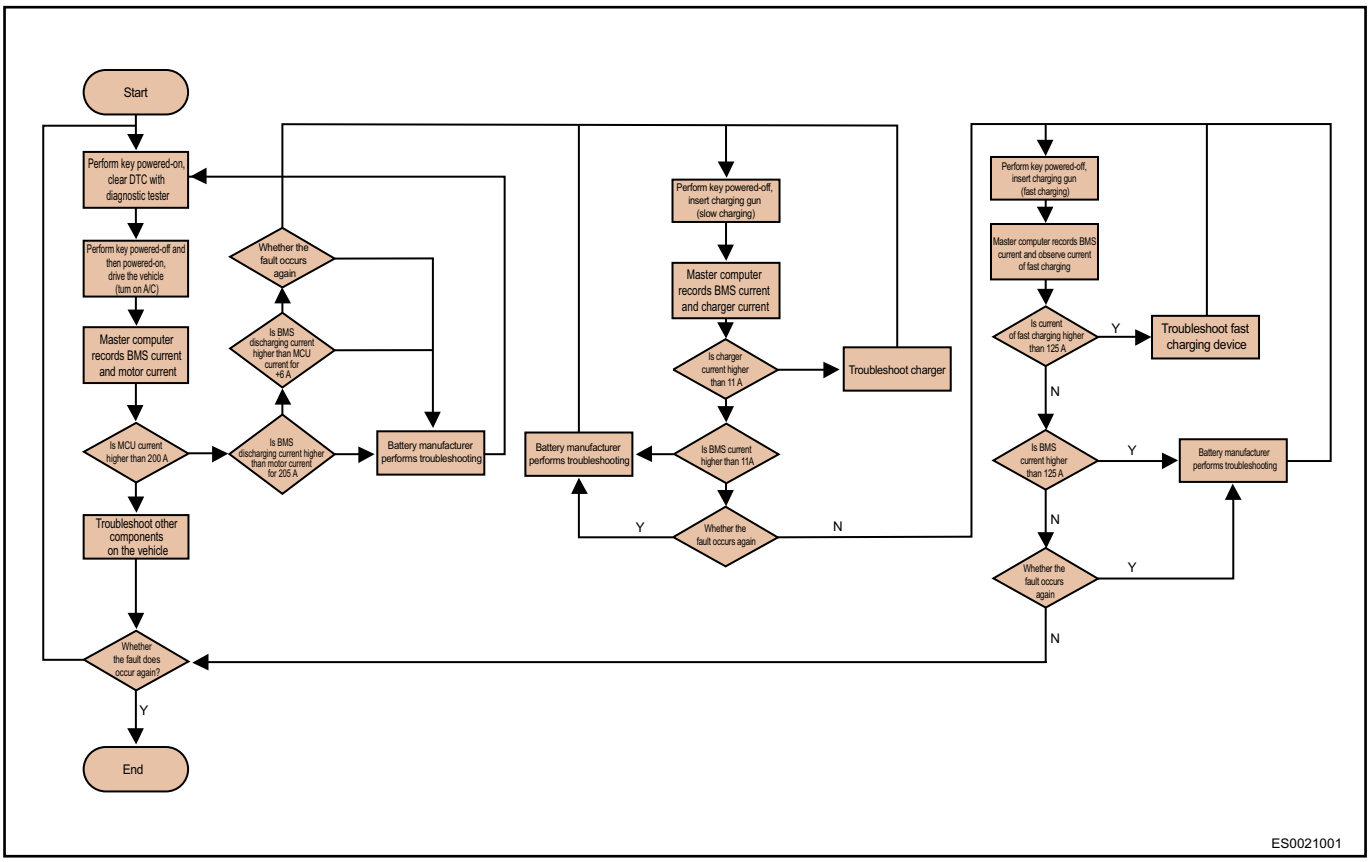
DTC: P1B05 (BMS_PILECURENT_FAULT)

Direct Cause	Recovery Condition	Problem Symptom	Fault Type	Battery Maintenance Light	Battery Malfunction Light	System Malfunction Light
High-voltage bus current exceeds a certain threshold (-discharging current is 205 A, slow charging current is 30 A, fast charging current is 125 A , and lasts for 200 ms)	Bus current is less than a certain threshold (-discharging current is 205 A, slow charging current is 30 A, fast charging current is 125 A)	Battery output power decreases or charging power decreases	Common	Off	On	On

The fault can be divided into three conditions:

- Vehicle overcurrent exists
- BMS sampling fault
- Short circuit inside battery pack

If overcurrent occurs when the customer performs quick charging, eliminate the fault of quick charging device. If the quick charging current is also about 125 A, it may be short inside the battery, contact battery supplier for treatment immediately.
If overcurrent exists during driving, it means vehicle control software is invalid, and the fault cannot be repaired. Feedback to vehicle control. If it is BMS sampling fault or internal short circuit, replace the BMS or current sensor or ask battery supplier for treatment.
Repair procedure is as follows:

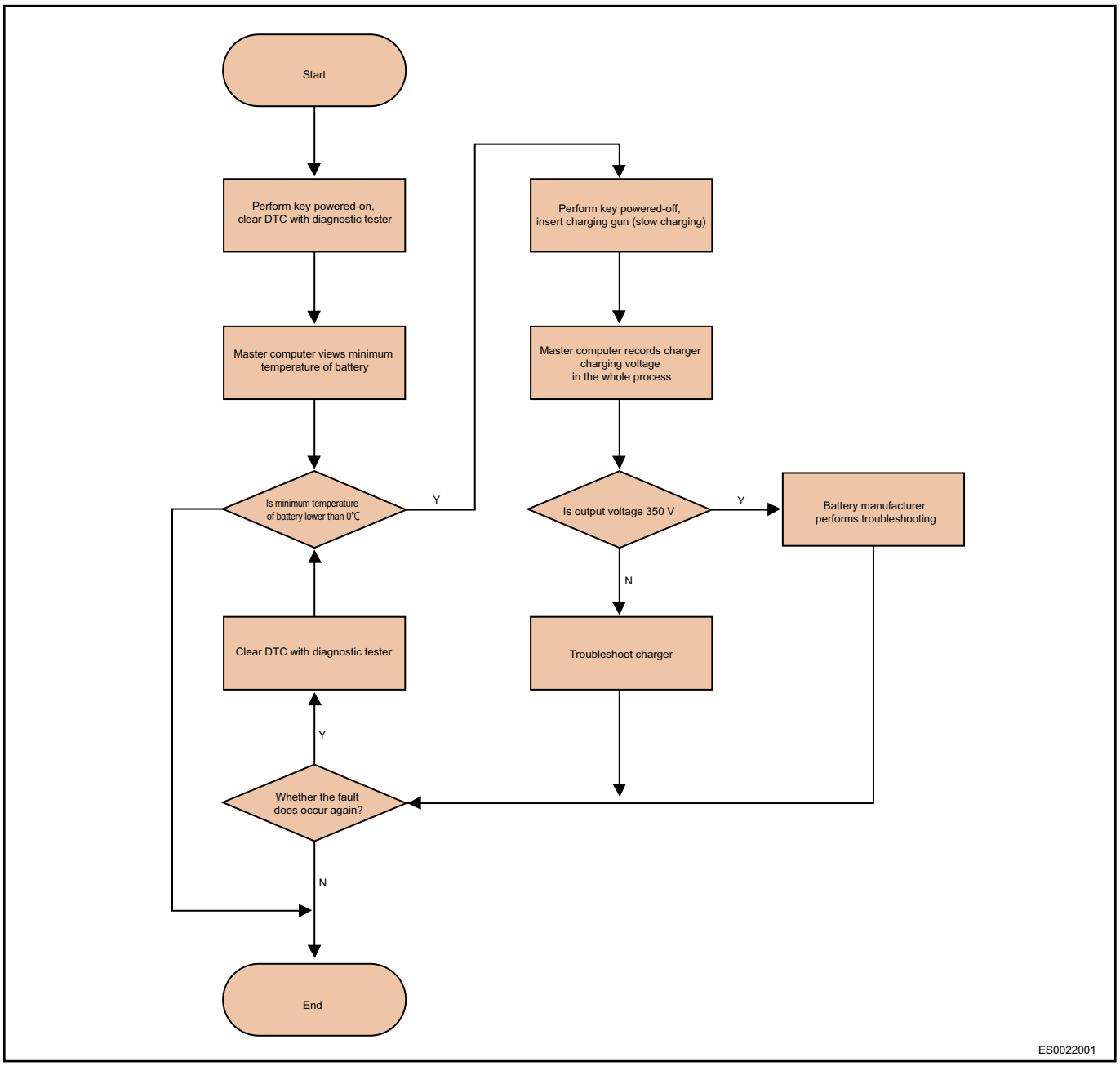


- If it determines that there is short circuit inside the battery pack through any phenomenon, please stay away from vehicle and contact battery supplier for treatment.

DTC: P1B70 (HEATOR_SINGLEHEATINGTIMEOUT_FAULT)
Possible causes of the fault:

- Internal failure of battery pack
- Charger fault

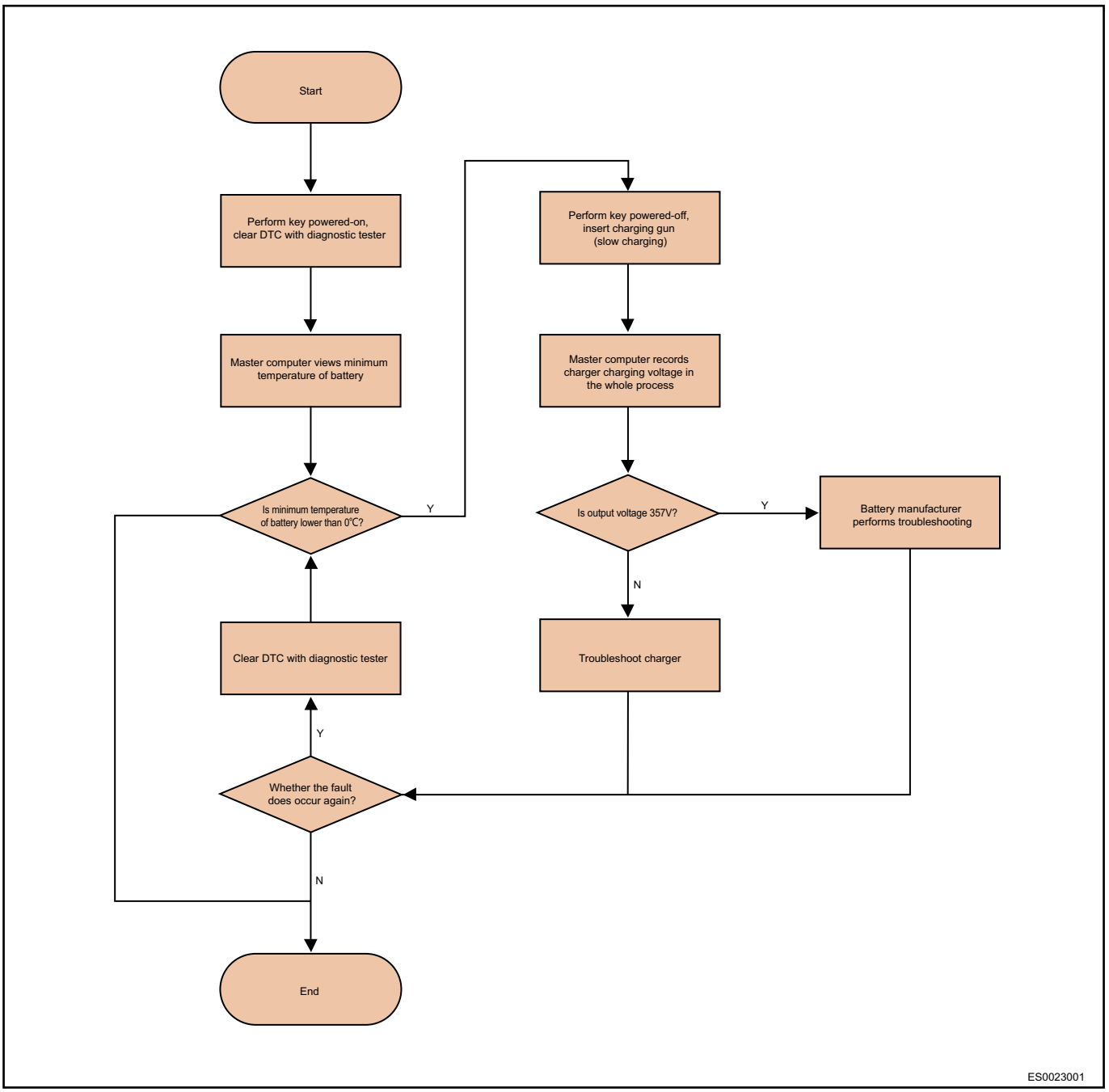
The fault may occur only when charging is carried out at low temperature. If the temperature is higher than 0℃ when troubleshooting, clear DTCs first, then ask battery supplier to give solutions and schemes. (The battery supplier is required to evaluate whether there are other hidden dangers in the battery pack except the loss of low-temperature charging function, especially safety.) If the temperature is low, perform fault location according to following procedures:



DTC: P1B71 (HEATOR_WORKVLT_FAULT)
Possible causes of the fault:

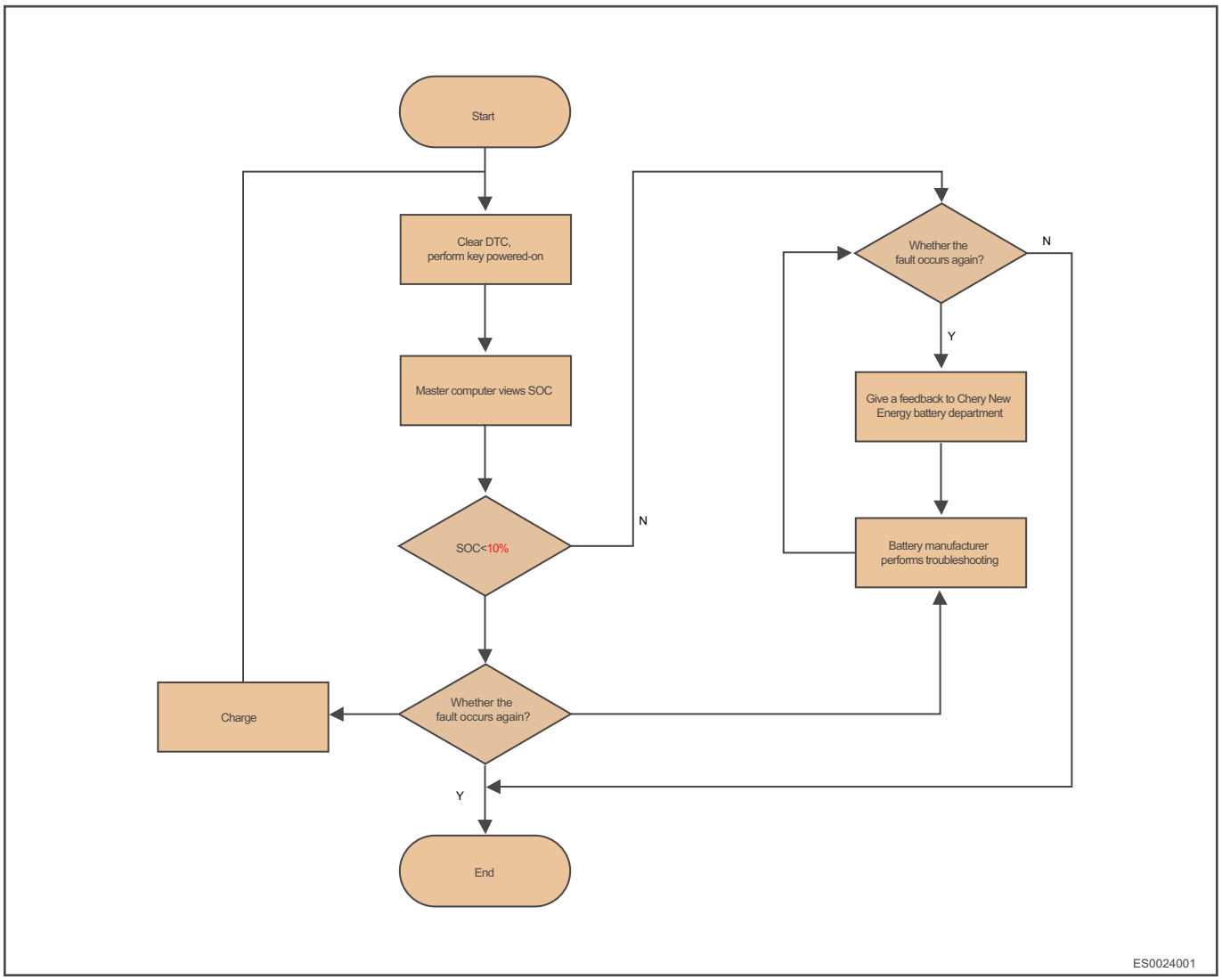
- Internal failure of battery pack
- Charger fault

The fault may occur only when charging is carried out at low temperature. If the temperature is higher than 0℃ when troubleshooting, clear DTCs first, then ask battery supplier to give solutions and schemes. (The battery supplier is required to evaluate whether there are other hidden dangers in the battery pack except the loss of low-temperature charging function, especially safety.) If the temperature is low, perform fault location according to following procedures:



DTC: P1B8D (BMS_LINKVOLlinkSAMPINGLOOP_FAULT)
The possible cause of the fault: Sampling circuit is abnormal.

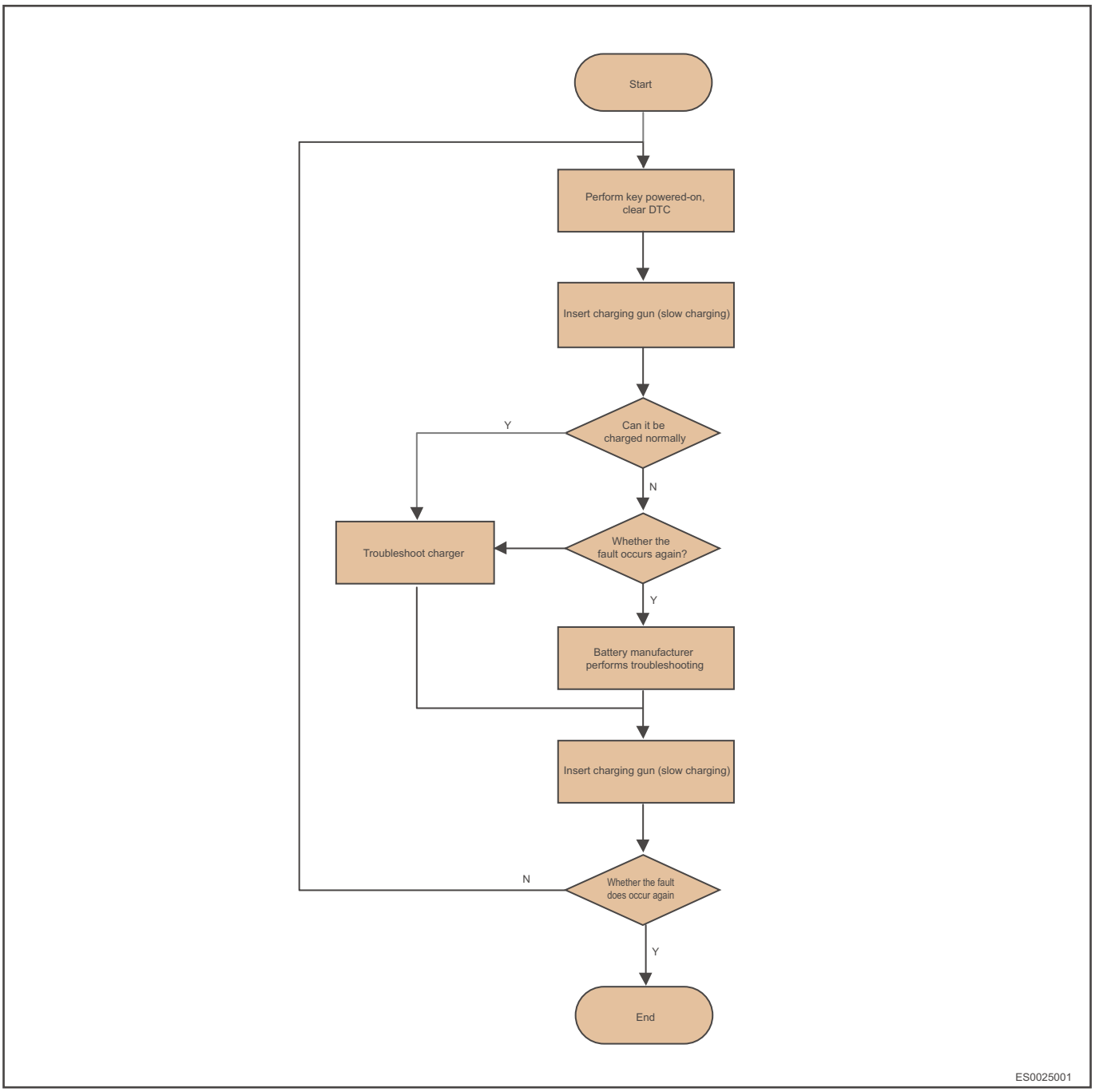
DTC: P0A7D (BMS_SOCLOWER_FAULT) (Troubleshoot Without Disconnecting Battery Pack)
When BMS alarms normally, charge the electric vehicle to solve the problem.



DTC: P1B5A (CHGER_BATTVOL_FAULT) (Troubleshoot Without Disconnecting Battery Pack)
The causes of the fault is as follows:

- Circuit between inside of charger and charger high-voltage output connector is open.
- Internal failure of charger.
- Slow charging fuse is blown.

Troubleshooting procedure of internal failure of battery pack is as follows:



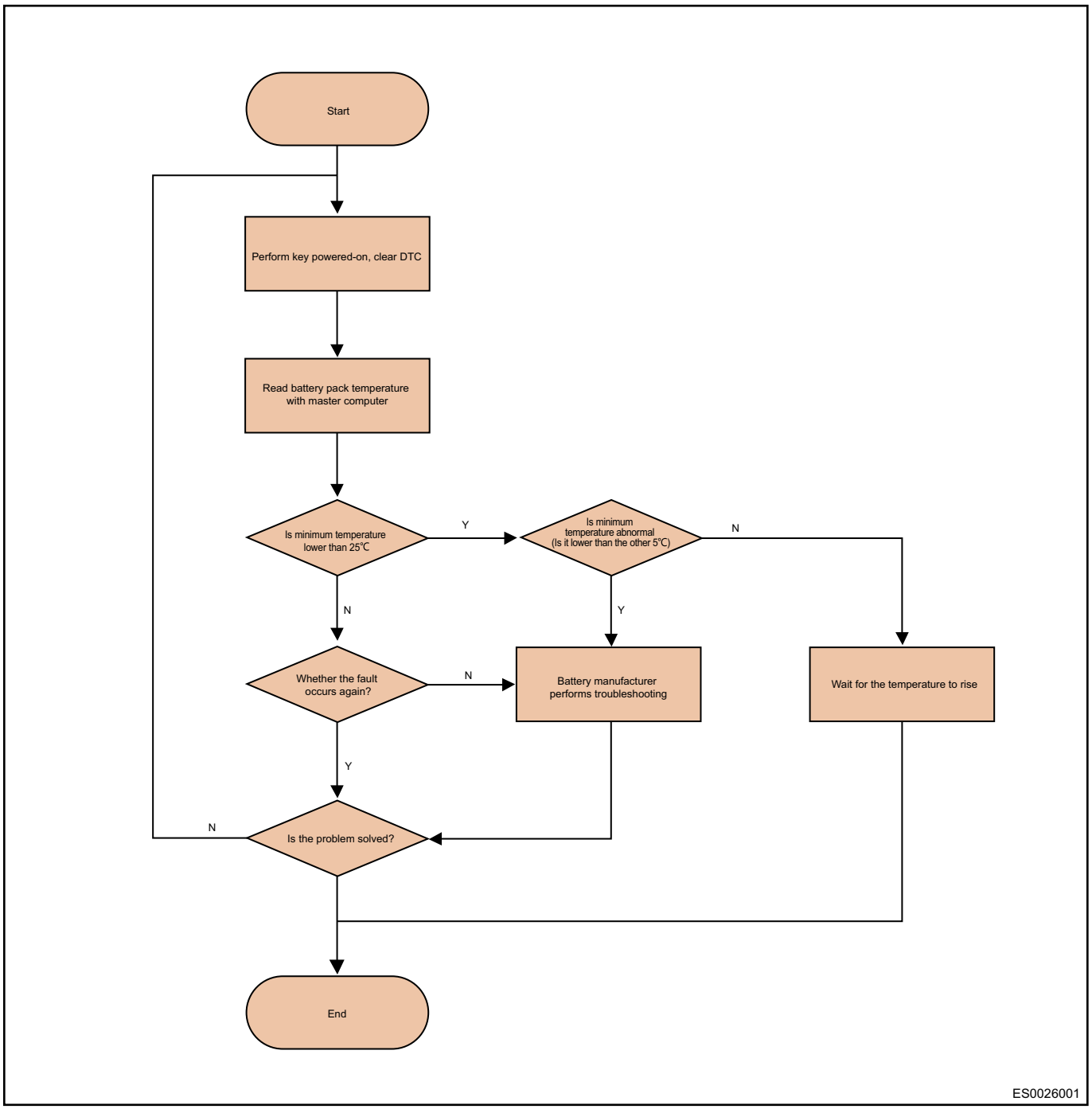
DTC: P1B5B (CHGER_POSNEGRELAY_FAULT) (Troubleshoot Without Disconnecting Battery Pack)

If the vehicle has been normally charged slowly before, it should be reported mistakenly by charger and should be checked by the charger

DTC: P1B8A (NONCHG_CELLUNDERTEMP_FAULT) (Troubleshoot Without Disconnecting Battery Pack)

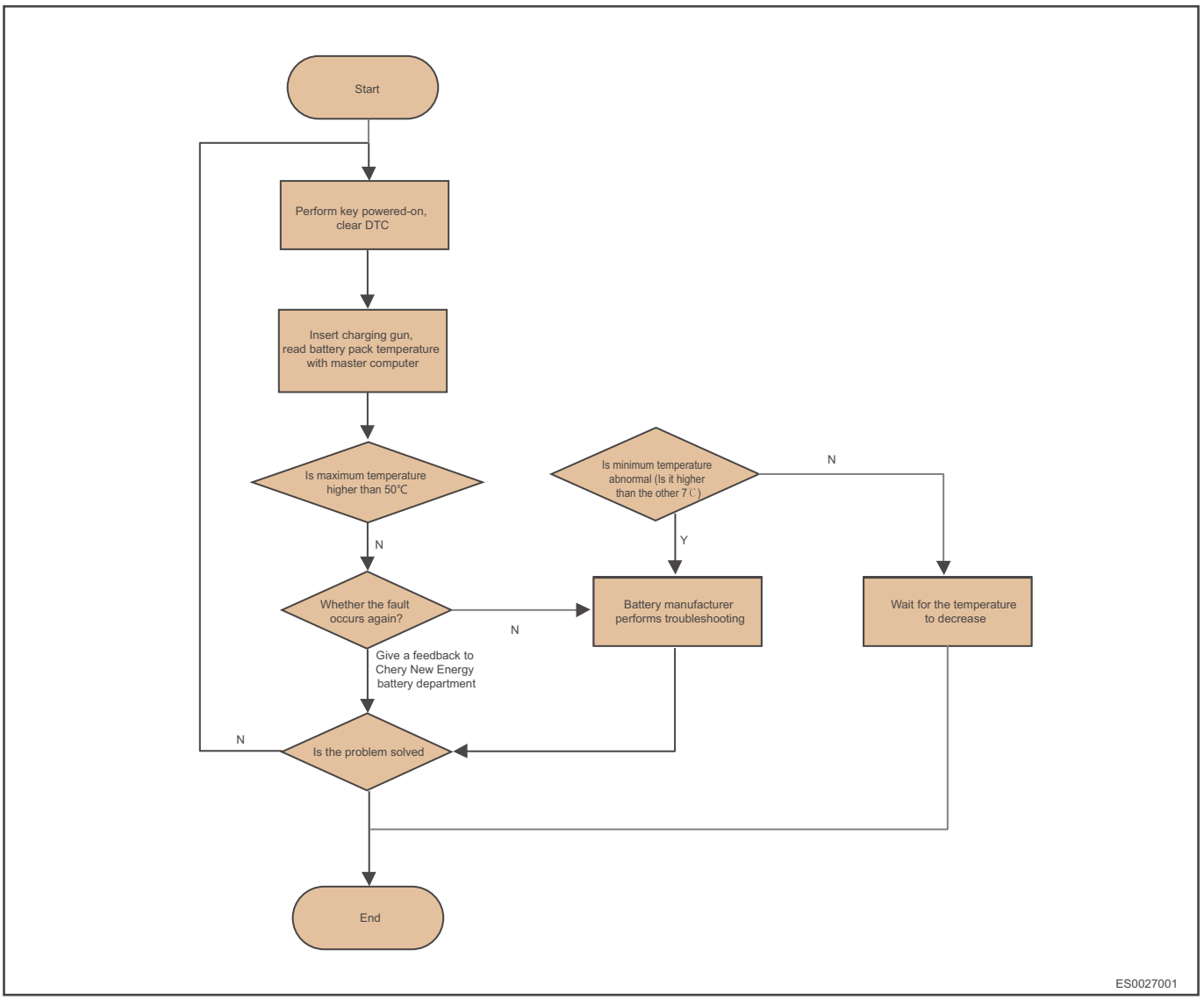
Too low outside temperature causes that the minimum temperature of battery cell is lower than -20℃, which does not need to be repaired.

Troubleshooting procedure is as follows:



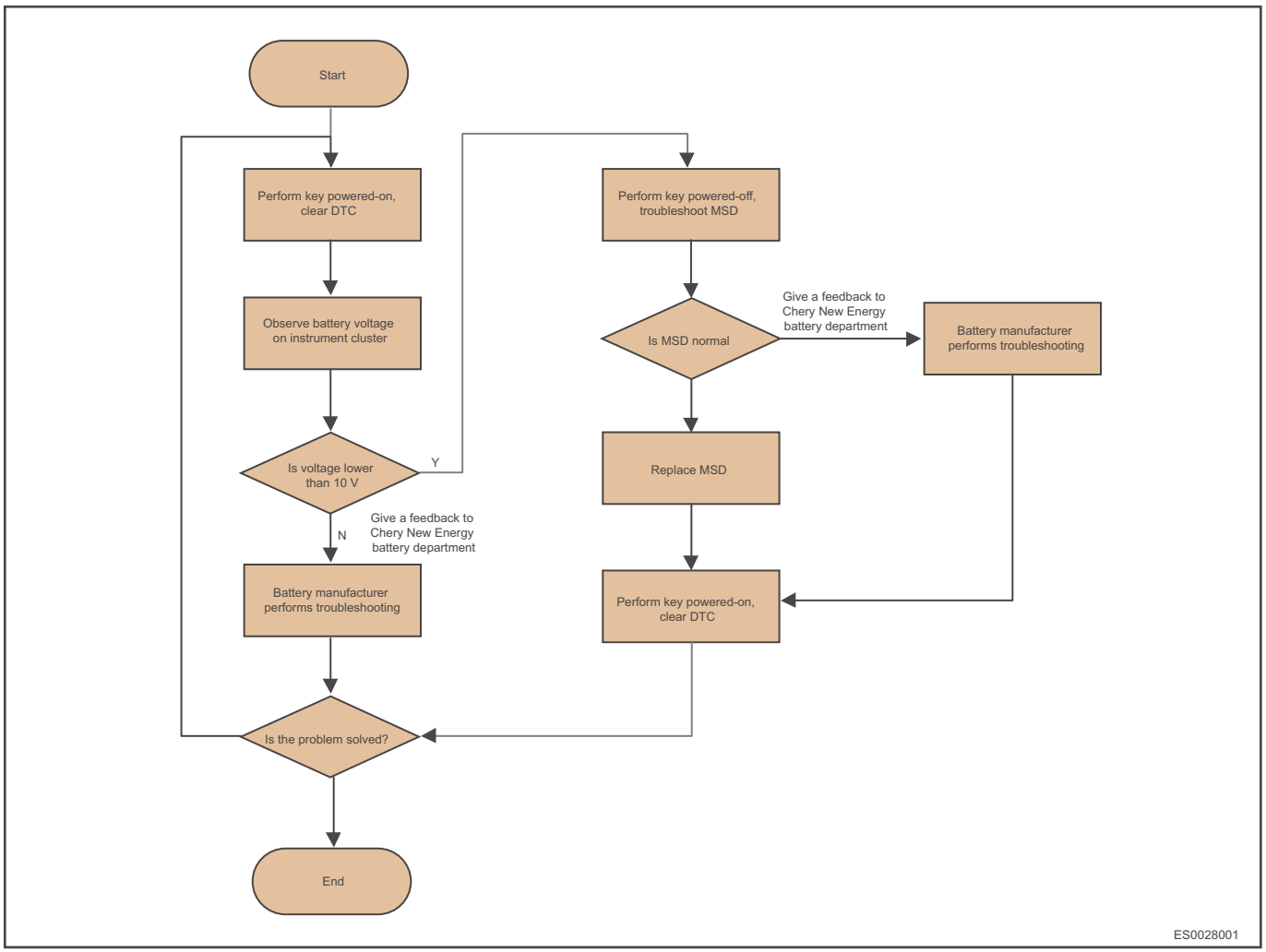
DTC: P1B8B (NONCHG_CELLOVERTEMP_FAULT) (Troubleshoot Without Disconnecting Battery Pack)

Too high outside temperature or continuous charging/discharging operation with high power will cause discharging power of vehicle is limited, which does not need to be repaired.



DTC: P0A95 (BMS_HIGHVOLFUSE_FAULT) (Troubleshoot Without Disconnecting Battery Pack)
First judge whether MSD fuse is blown or slow charging fuse is blown. If BMS battery pack voltage is lower than 10 V (turn on the key, voltage is displayed on instrument cluster), the main fuse is blown.
Main fuse is blown:

1. First troubleshoot MSD, judge the continuity between two terminals. If there is no continuity, it means fuse is blown, then replace the fuse.
2. If MSD is good, then troubleshoot if MSD socket and battery pack MSD socket are OK.
3. If problem still cannot be solved after replacing main fuse, contact battery supplier to repair the blown slowing charging fuse:



Faults That Battery Pack Needs to be Disconnected

When reading the following DTCs with a diagnostic tester, they are faults that battery pack needs to be disconnected, contact the battery supplier for treatment.

- DTC: P0AA1 (BMS_POSCONTACTOR_FAULT)
- DTC: P0AA4 (BMS_NEGCONTACTOR_FALUT)
- DTC: P0ABF (PILECUR_SAMPLING_FAULT)
- DTC: P1B00 (BATTTCELL_OVERVOLTAGE_FAULT)
- DTC: P1B01 (BATTTCELL_UNDERVOLTAGE_FAULT)
- DTC: P1B02 (BATTTCELL_VOLTAGESAMPLINGLINE_FAULT)
- DTC: P1B03 (BAAT_CELLCONSISTENCY_ALARM)
- DTC: P1B04 (BATT_TEMPCHANGE_FAULT)
- DTC: P1B06 (MAINRELY_OPENDEDAMNIFY_FAULT)
- DTC: P1B16 (BATT_POSRELYCTRL_SHORTTOGND)
- DTC: P1B17 (BATT_POSRELYCTRL_OPENCIRCUIT)
- DTC: P1B18 (BATT_POSRELYCSWITCH_PROTECTION)
- DTC: P1B19 (BATT_NEGRELYCTRL_SHORTTOGND)
- DTC: P1B1A (BATT_NEGRELYCTRL_OPENCIRCUIT)
- DTC: P1B1B (BATT_NEGRELYCSWITCH_PROTECTION)
- DTC: P1B1C (BATT_FASTCHGRELYCTRL_SHORTTOGND)
- DTC: P1B1D (BATT_FASTCHGELYCTRL_OPENCIRCUIT)

- DTC: P1B1E (BATT_FASTCHGRELYCSWITCH_PROTECTION)
- DTC: P1B1F (BATT_SLOWCHGRELYCTRL_SHORTTOGND)
- DTC: P1B20 (BATT_SLOWCHGELYCTRL_OPENCIRCUIT)
- DTC: P1B21 (BATT_SLOWCHGRELYCSWITCH_PROTECTION)
- DTC: P1B22 (BATT_PRECHGRELYCSWITCH_PROTECTION)
- DTC: P1B23 (BATT_HEATRELYCTRL_SHORTTOGND)
- DTC: P1B24 (BATT_HEATELYCONTR_OPENCIRCUIT)
- DTC: P1B25 (BATT_HEATRELYCSWITCH_PROTECTION)
- DTC: P1B3D (BMS_BMU1_FAULT)
- DTC: P1B3E (BMS_BMU2_FAULT)
- DTC: P1B3F (BMS_BMU3_FAULT)
- DTC: P1B40 (BMS_BMU4_FAULT)
- DTC: P1B41 (BMS_BMU5_FAULT)
- DTC: P1B4E (BMS_HIGHVOLHEATER_FAULT)
- DTC: P1B5C (BMS_POSRELYCTRL_SHORTTOPOWER)
- DTC: P1B5D (BMS_NEGRELAYCTRL_SHORTTOPOWER)
- DTCX: P1B5E (BATT_PRECHGRELAYCTRL_SHORTTOPOWER)
- DTC: P1B60 (BMS_CHGRELYCTRL_SHORTTOPOWER)
- DTC: P1B62 (BMS_FASTCHGRELYCTRL_SHORTTOPOWER)
- DTC: P1B64 (BMS_HEATRELYCTRL_SHORTTOPOWER)
- DTC: P1B65 (BMS_HEATERRELY_FAULT)
- DTC: P1B66 (BMS_TMPSAMPLING_SHORTTOGND)
- DTC: P1B67 (BMS_TMPSAMPLING_SHORTTOPOWER)
- DTC: P1B68 (BMS_CURSAMPLING_SHORTTOPOWER)
- DTC: P1B6C (BMS_CURSENSORCAN_FAILED)
- DTC: P1B6F (HEATOR_BATTMPDIFF_FAULT)
- DTC: P1B72 (HEATOR_BATTMPRUNAWAY_FAULT)
- DTC: P1B73 (IMU_INPUTVLT_FAULT)
- DTC: P1B73 (IMU_INPUTVLT_FAULT)
- DTC: P1B8E (BAAT_PACKVOLSAMPINGLOOP_FAULT)
- DTC: P1B8F (PILE_UNDERVOLTAGE_FAULT)
- DTC: P1B90 (PILE_OVERVOLTAGE_FAULT)
- DTC: P1B95 (BATT_PRECHGELYCTRL_OPENCIRCUIT)
- DTC: P1B97 (BATT_PRECHGRELYCTRL_SHORTTOGND)
- DTC: U1003 (BMU1_BMSCAN_FAILED)
- DTC: U1004 (BMU2_BMSCAN_FAILED)
- DTC: U1005 (BMU3_BMSCAN_FAILED)
- DTC: U1006 (BMU4_BMSCAN_FAILED)
- DTC: U1007 (BMU5_BMSCAN_FAILED)
- DTC: P1B96 (PRECHARGELOOP_FAULT)

Slow Charging System Related Faults
Because DTCs related to slow charing system are stored by BMS, inquire the charger related repair methods to solve the problems when reading the following DTCs.

- DTC: P1F00-17 ()
- DTC: P1F01-16 ()
- DTC: P1F02-31 ()

- DTC: P1F03-16 ()
- DTC: P1F04-17 ()
- DTC: P1F07-17 ()
- DTC: P1F08-16 ()
- DTC: P1F0D-87 ()
- DTC: P1F0E-87 ()
- DTC: P1F14-3B ()
- DTC: P1F16-96 ()
- DTC: P1F15-1E ()
- DTC: P1F17-86 ()
- DTC: P1F27-09 ()
- DTC: P1F22-1C ()
- DTC: P1F23-1C ()
- DTC: P1F24-38 ()
- DTC: P1F19-96 ()
- DTC: P1D82-4B ()
- DTC: P1D85-4B ()
- DTC: P1D85-4B ()
- DTC: P1F05-4B ()

Quick Charging System Malfunction
Because quick charging device is not on-board device, no related DTC is stored. If quick charging cannot be performed, error information will be displayed on quick charging device.

Other Faults and Common Problem (No DTC)

Slow Charging Cannot be Performed

1. Slow charing ignition is invalid
   - When slow charing ignition is invalid and BMS is not woken up, slow charing cannot be performed. Therefore, if there is no other faults but slow charging cannot be performed, confirm slow charging ignition signal and confirm if the charger outputs 12 V ignition signal.
2. Slow charging CC signal is invalid
   - When slow charing CC signal is invalid and BMS does not enter slow charging mode, slow charing cannot be performed. Therefore, when slow charging ignition signal is valid but slow charging cannot be performed, observe if “Charging gun has been inserted” is displayed on instrument cluster. If not, first confirm if battery pack CC signal input is normal, then check if fault is inside or outside the battery pack. If battery pack output is abnormal, contact battery pack supplier for treatment.
3. Charger cannot enter Ready status
   - When all physical signals are valid but charger does not enter Ready status, BMS cannot enter slow charging mode. Therefore, use master computer to confirm if the charger can enter Ready mode. If it cannot enter Ready mode, please troubleshoot the charger.
4. CAN wire harness is abnormal

Quick Charging Cannot be Performed

1. Quick charge protocol does not match
   - The current eQ1 quick charging protocol only supports international standard. Since the protocols implemented by each quick charging pile are different, if quick charging cannot be performed, the quick charging protocol may not match.
   - Note: If this charging pile and other eQ1 can perform charging, it means the protocol can be matched.

2. Quick charging CC is abnormal
   - When quick charging cannot be performed, turn on the key (keep charging gun connected), and observe if charging gun connection indicator  on instrument cluster comes on.
3. Quick charging ignition is abnormal
   - If quick charging device prompts that it cannot communicate with BMS, first check if quick charging ignition signal is valid.
     - Method 1: Connect quick charging gun, select “Start Charging”, use master computer to monitor if vehicle OBD sends BMS CAN message at the same time. If there is any message, the signal is normal.
     - Method 2: Connect vehicle small battery positive to VFC1-A+ with a cable and small battery negative to VFC1-A-, then use master computer to monitor if vehicle OBD sends BMS CAN message. For example: Use diagnostic tester to attempt to read energy storage device assembly DTCs. If communication succeeds, it means that ignition signal is normal; If the signal is abnormal, troubleshoot vehicle wire harness and battery pack separately.
4. CAN wire harness is abnormal
   - If quick charging device prompts that it cannot communicate with BMS, turn on the key and attempt to perform quick charging.
   - If quick charging still cannot be performed and charging gun connection indicator comes on while quick charging pile still prompts that it cannot communicate with BMS, check if quick charging CAN wire harnesses (VFC1-S+, VFC1-S-) are normal, which includes:
     - Check VFC1-S+ and VFC1-S- between charging port and V2BLVH for continuity
     - Check short circuit among VFC1-S+, VFC1-S- and vehicle ground
     - Check short circuit among VFC1-S+, VFC1-S- and vehicle 12 V

Vehicle Cannot be Turned to Ready

1. Vehicle ignition is invalid
   - Vehicle ignition is invalid and BMS is not woken up. Therefore, if there is no other faults but vehicle cannot be driven, confirm vehicle ignition signal and confirm if the voltage between vehicle ignition and battery pack is 12 V when turning on the key.
2. BMS cannot enter Ready status
   - If BMS does not enter Ready status, vehicle controller will not issue off command and vehicle cannot enter Ready status. Therefore, if there is no other faults but vehicle cannot be driven, confirm if BMS has entered Ready status and vehicle controller has issued off command.
3. Quick charging/slow charging CC is abnormal
   - When quick charging/slow charging CC is invalid signal, BMS does not turn off the relay. At this time,  on instrument cluster comes on. Therefore, when vehicle cannot enter Ready status, confirm if quick charging/slow charging gun is inserted or if this signal is detected by BMS.

Precharge Failure

Phenomenon: After turning on the key, relay sound can be heard, but “High-voltage battery is disconnected” is displayed on instrument cluster, and high-voltage battery malfunction indicator  comes on.

Troubleshooting method:

1. Unplug DC-DC and A/C compressor high-voltage connector fuses on MCU; Power on again and observe if fault disappears. If it disappears, troubleshoot DC-DC and A/C compressor.
2. If the fault cannot be located after step 1, replace MCU; Power on again and observe if fault disappears. If it disappears, troubleshoot MCU.
3. If the fault cannot be located after step 2, replace battery pack or BDU in battery pack; Power on again and observe if fault disappears. If it disappears, troubleshoot battery pack.

4. If the fault cannot be located after step 3, feedback to the engineer.

On-vehicle Service

Tools

One set of ratchet socket tool, torque wrench, cross screwdriver, a flat tip screwdriver, assembly components lift.

Auxiliary Material

Insulation tape.

Protective Equipment

Cotton gloves, insulation gloves, working clothing, safety helmet, working shoes.

Specifications

Torque Specifications

Part Name	Torque (N·m)
Energy Storage Device Assembly Fixing Bolt	70 ± 6

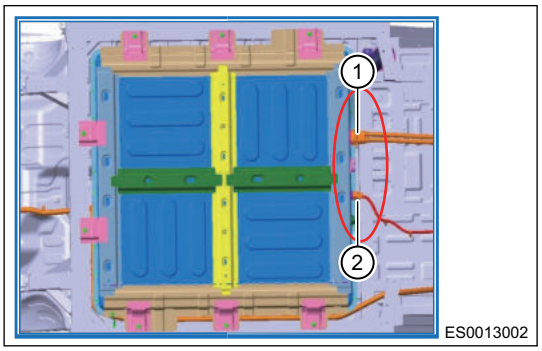
Removal and Installation of Energy Storage Device Assembly

Removal

⚠

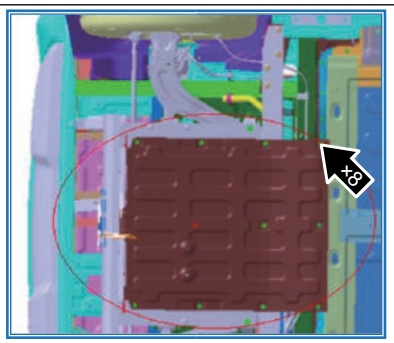
- Be sure to wear necessary safety equipment to prevent accidents.
- Before removal and installation, make sure that vehicle circuit is disconnected to avoid personal injury.
- Disconnect vehicle high-voltage manual service device (MSD), the subsequent maintenance operation can be performed after waiting for 5 minutes.
- Do not shake vehicle during removal and installation, do not operate lift or hoisting machine.
- It is not allowed to remove energy storage device assembly. Removal and installation can be performed by only Chery professionals or under the guidance of professionals from battery pack supplier.

1. Raise the vehicle with a lift.
2. Place the special energy storage device assembly removing support platform under the body.
3. Lower the lift slowly to contact the bottom of energy storage device assembly.
4. Remove the vehicle high-voltage wire harness protector.
5. Unplug high-voltage wire harness connector (1) and signal wire connector (2) in order.



6. Using 19# socket wrench, remove energy storage device assembly and 8 M10x1.25 hexagon head bolts and conical spring washer set that fix the vehicle.

   Tightening torque: 70 ± 6 N·m



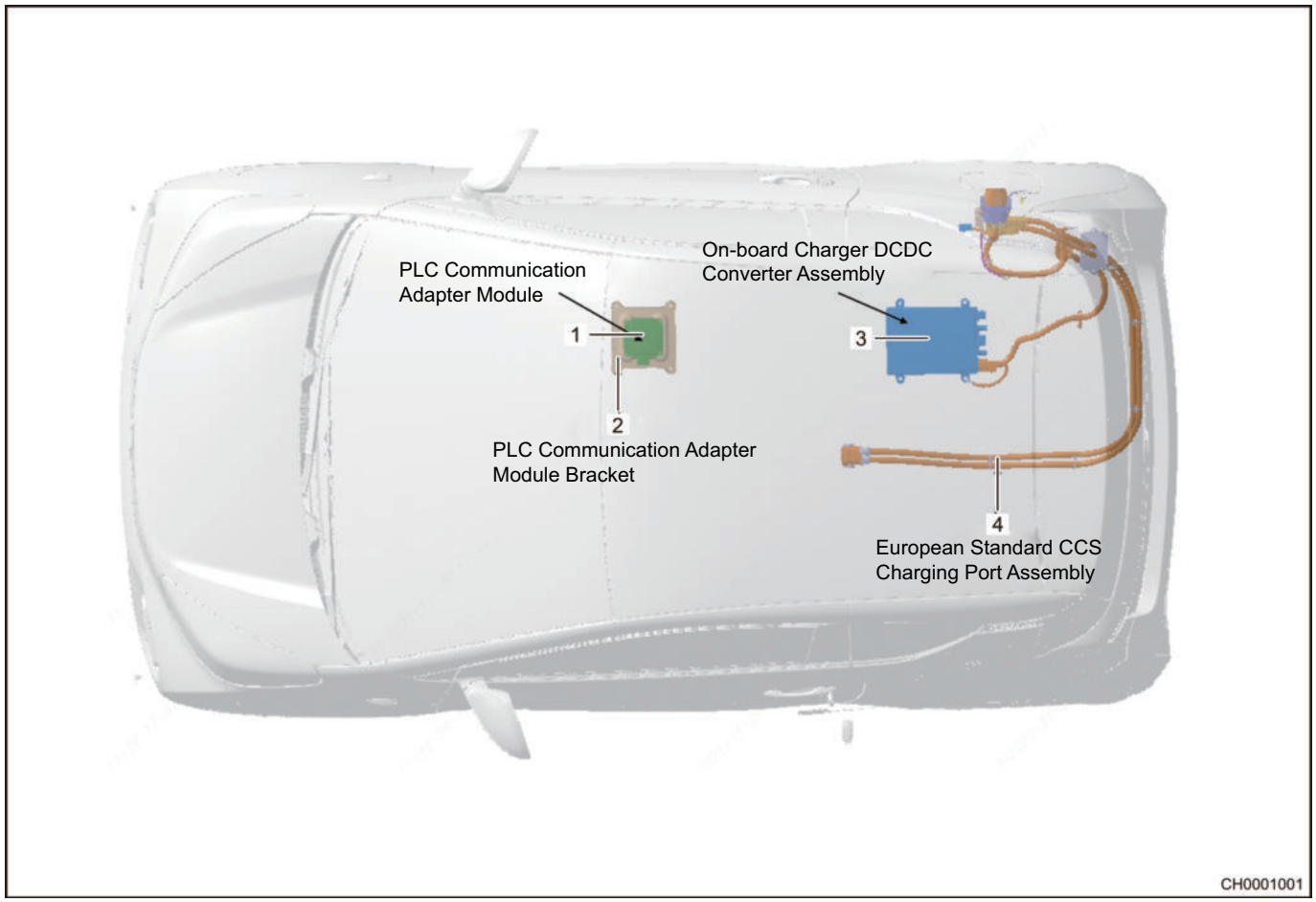
7. After raising the lift, push out energy storage device assembly removing support platform to finish removal of energy storage device assembly.

CHARGING SYSTEM

A/C COOLING SYSTEM

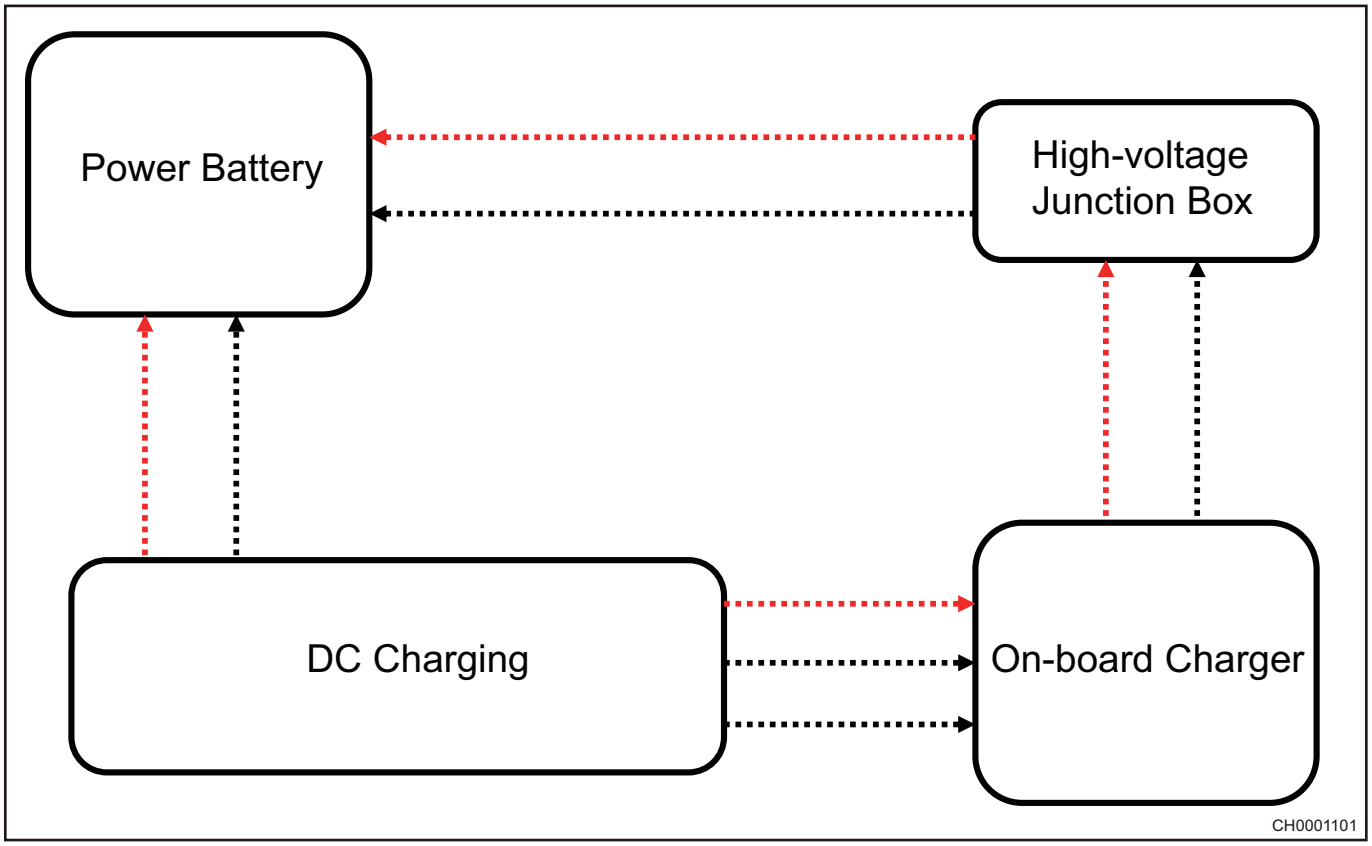
System Overview

System Components Diagram



1	PLC Communication Conversion Module	2	PLC Communication Conversion Module Bracket
3	On-board Charger DCDC Converter Assembly	4	European Standard CCS Charging Port Assembly

Charging System Structure Diagram

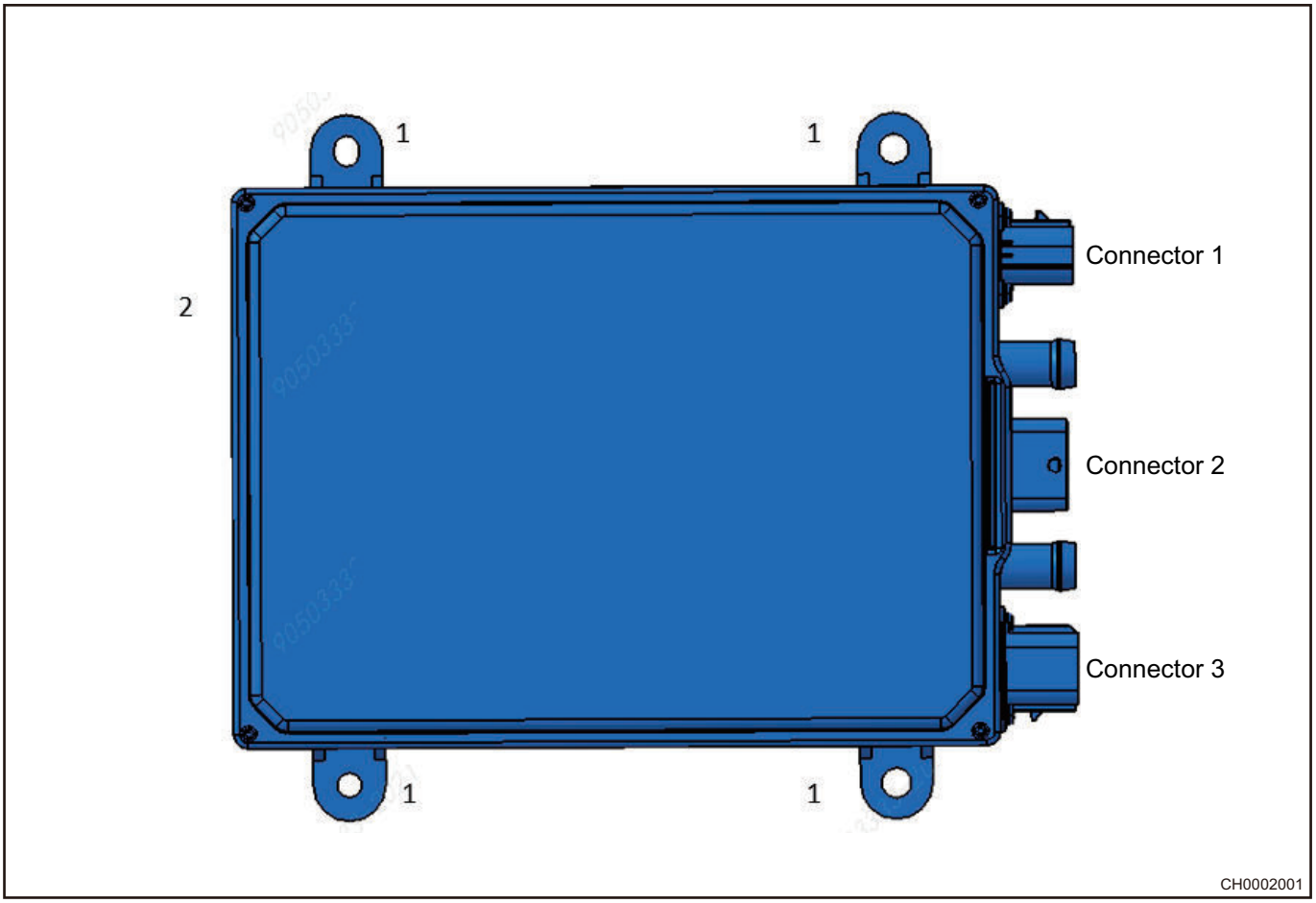


On-board Charger DCDC Converter Assembly

Technical Parameters

Dimension	Height = 68 mm, width = 202 mm, length = 303 mm, error ⩽ ± 2 mm
Weight	⩽ 5.5 Kg
Input Voltage Range (VAC)	176 - 264
Output Voltage Range (VDC)	240 - 425
Rated Output Power (kW)	6.6
Power Factor	0.99
Maximum Efficiency	⩾ 94%
Output Reverse Connection Protection	Reversely connecting with battery without damaging motor
Input Overvoltage/Undervoltage Protection	Shutdown protection for input overvoltage or undervoltage
Overheating Protection	With over-temperature protection function, allowing the operation with decreasing power when ambient temperature is 80˚C, and over-temperature protection for higher than 95˚C
Short-circuit Protection	Shut off when short circuit is input

Structure Introduction



No.	Name	No.	Name
1	Hexagon Flange Bolt M8X20	Connector 1	High-voltage Output Connector, Connects with PDU
2	Grounding Threaded Hole	Connector 2	Charging Control Signal Connector, Connects with Vehicle Low-voltage Cable
		Connector 3	220 V Power Supply Input Connector, Connects with Charging Port

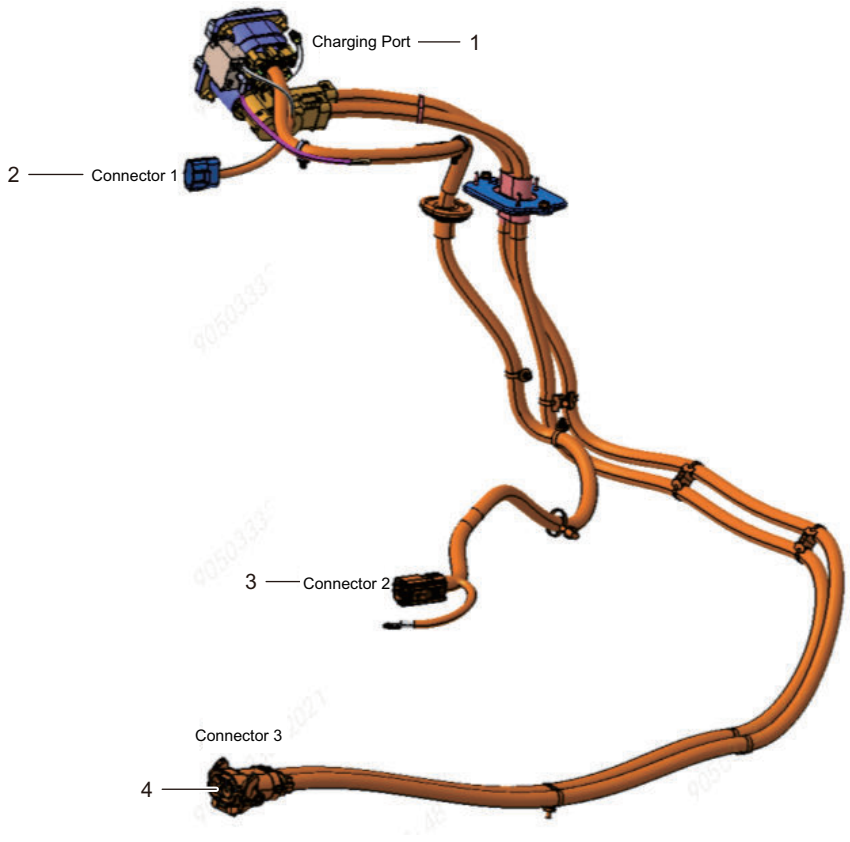
European Standard CCS Charging Port

Technical Parameters

Rated Voltage	AC 250 V
Rated Current	AC 250 V
Operating Temperature	-40˚C ~ 70˚C
Storage Temperature	-40˚C ~ 90˚C
Flame Retardant Plastic Part	UL 94 V-0
Mechanical Service Life	12,000 times

Plug and Unplug Force	＜100N
Protection Level	Connection between charging gun and charging socket IP55 Protective covers equipped on charging gun and charging socket respectively IP54
Insulation Resistance	＞ 20 MΩ (500 VDC)
Dielectric Strength	No flashover, breakdown for AC 2000 V 50 Hz for 1 minute

Structure Introduction



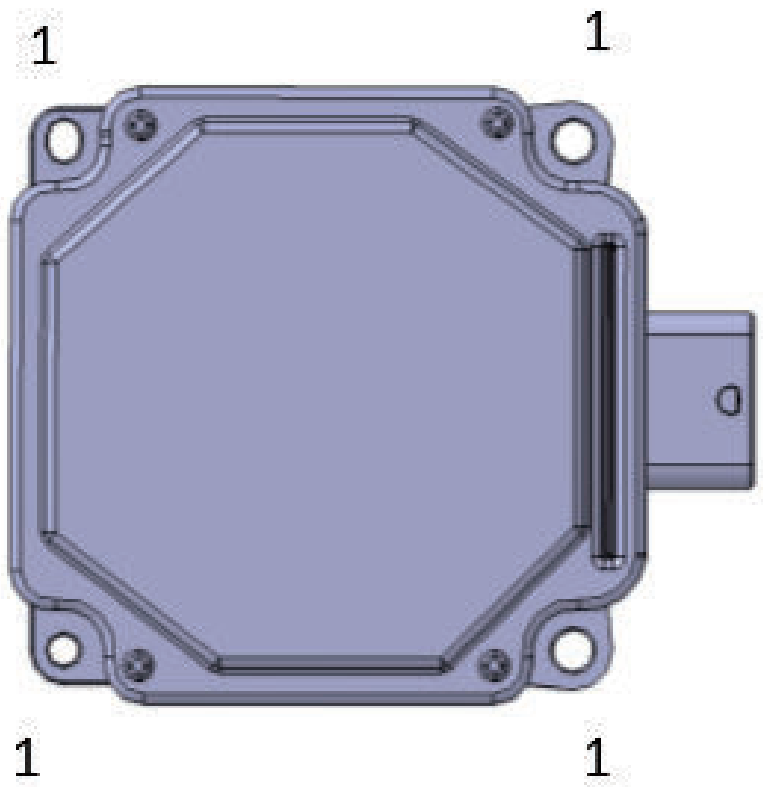
No.	Name	No.	Name
1	Charging Port	2	Signal Connector, Connects with Vehicle Low-voltage Cable
3	AC Side High-voltage Output Connector, Connects with On-board Charger Connector	4	DC Side High-voltage Output Connector, Connects with Battery Pack Connector

PLC Communication Conversion Module

Technical Parameters

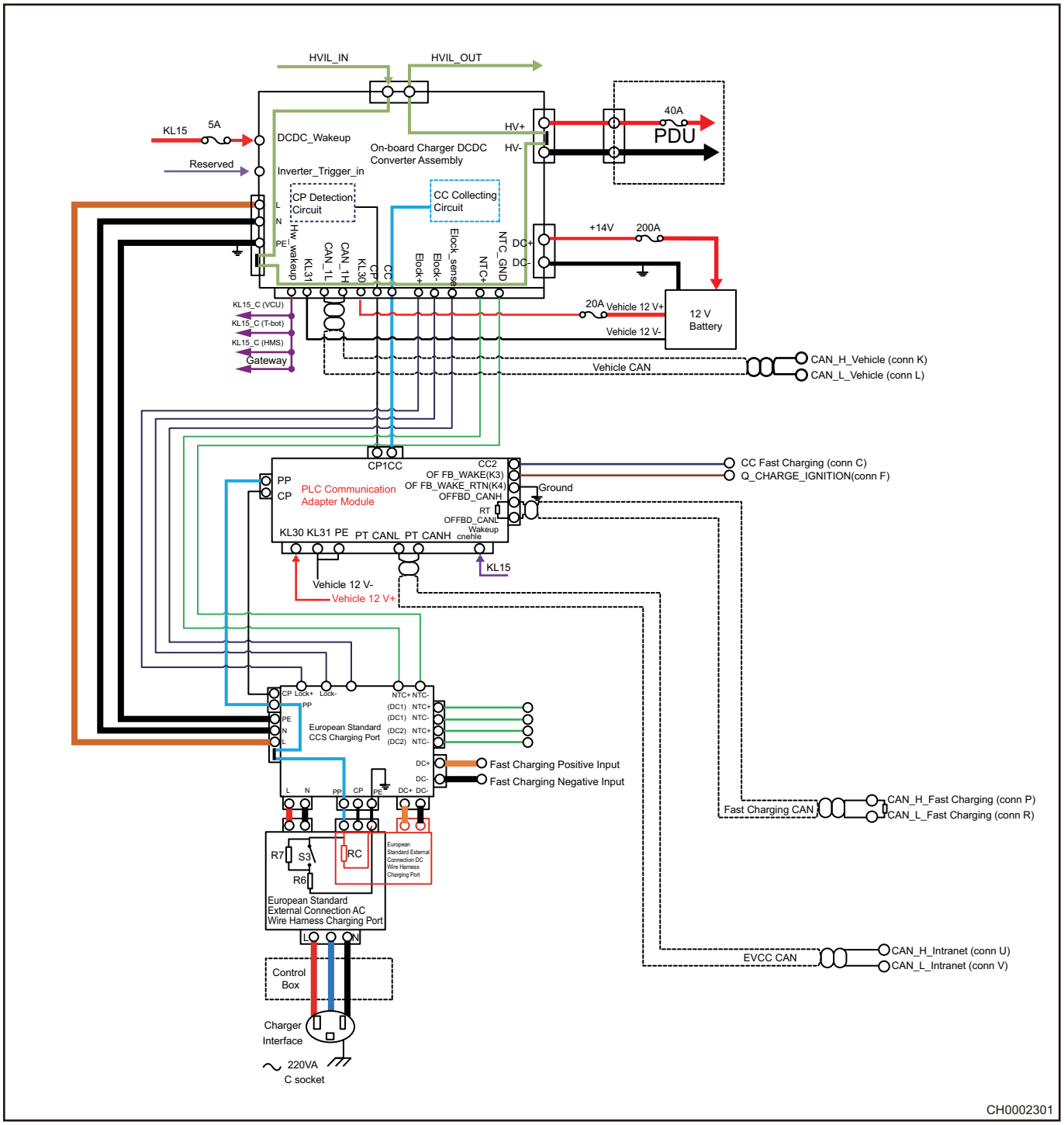
Dimension	Height = 36.5 mm, width = 110 mm, length = 140 mm, error ⩽ ± 2 mm
Weight	⩽ 1 Kg

Structure Introduction



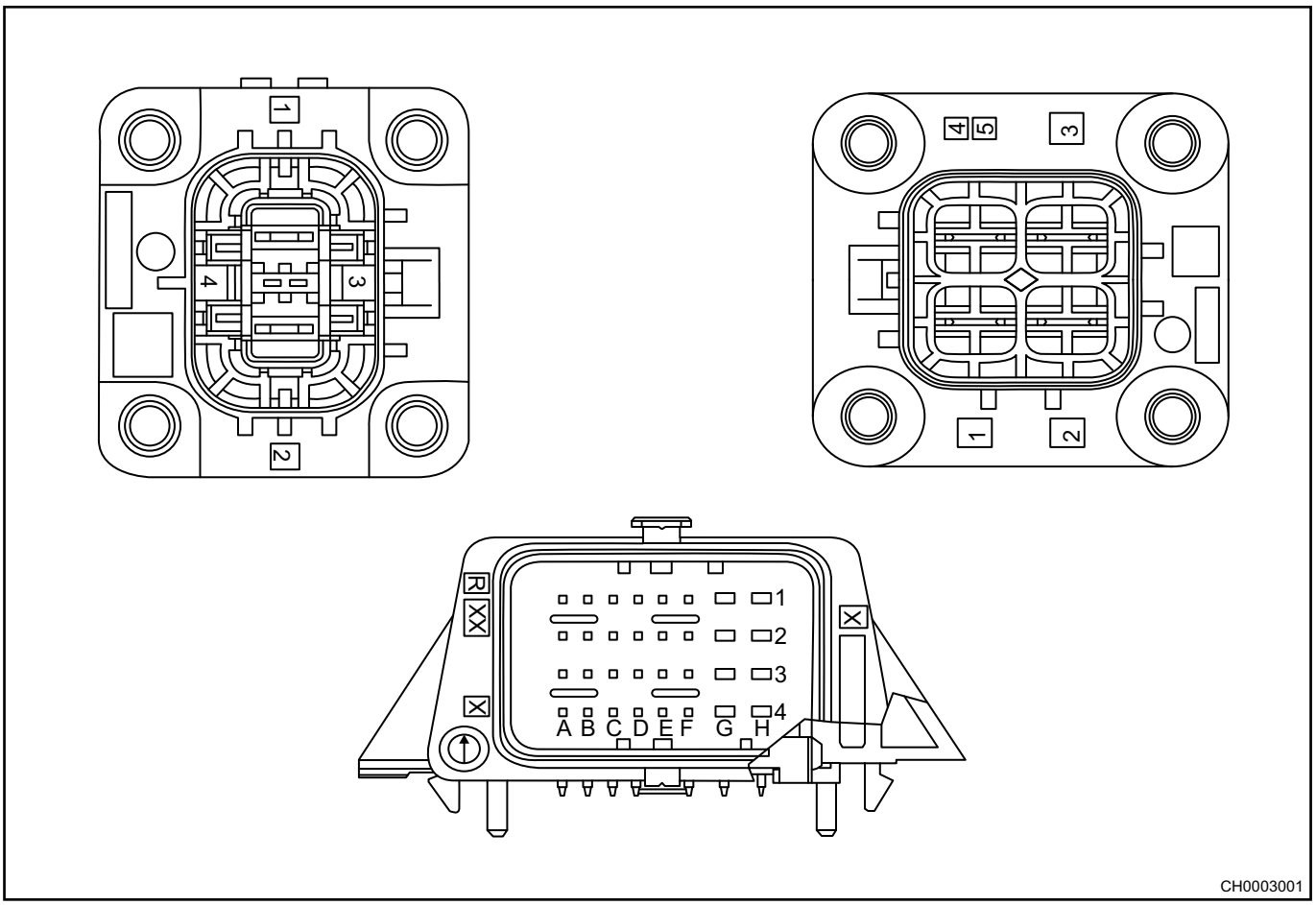
No.	Name	No.	Name
1	Hexagon Flange Nut M6	Conne-ctor 1	Low-voltage Signal Connector, Connects with Vehicle Low-voltage Cable

Schematic Diagram for Charging System and Vehicle Connection



Connector Pin Definition

On-board Charger DCDC Converter Assembly Pin Definition



Connector 1

Pin	Definition	Pin	Definition
1	High-voltage Output Positive (DC+)	2	High-voltage Output Negative (DC-)
3	Interlock	4	Interlock

Connector 2

Pin	Definition	Pin	Definition
1A	-	1B	-
1C	Inverter Trigger Input Signal (Inverter_ trigger_in)	1D	-
1E	-	1F	-
1G	-	1H	Constant Power Supply 12 V + (KL30)
2A	OBC Wake-up Output (Hw_wakeup_ output)	2B	Charging Socket Temperature Detection (NTC+)
2C	-	2D	Charging Socket Temperature Detection (NTC_GND)

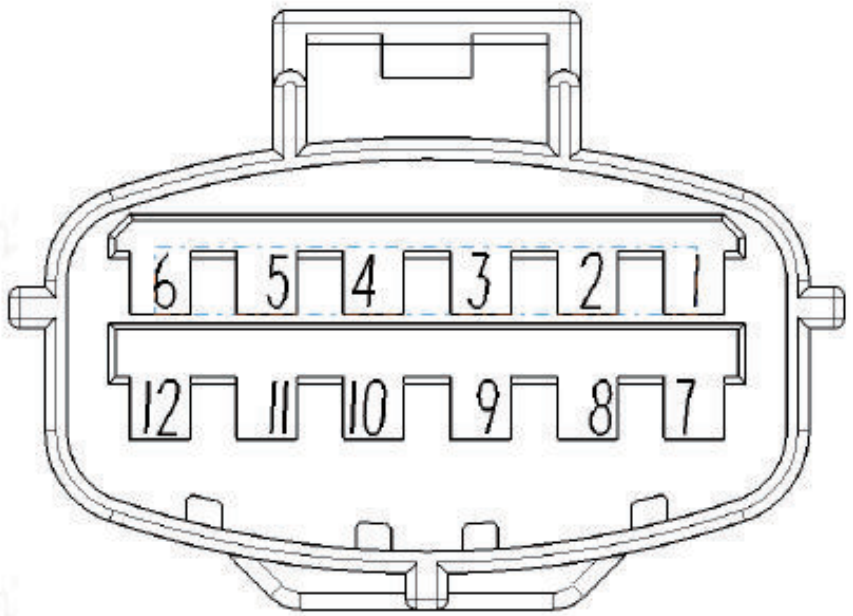
2E	-	2F	-
2G	-	2H	-
3A	Power Confirmation (CP)	3B	Connection Confirmation (CC)
3C	-	3D	DC/DC Hard Wire Wake-up Input (KL15)
3E	-	3F	-
3G	-	3H	Electronic Lock Drive + (Elock+)
4A	CAN High (CAN_1H)	4B	CAN Low (CAN_1L)
4C	Interlock Inlet (HVIL_in)	4D	Interlock Outlet (HVIL_out)
4E	-	4F	Lock Detection (Elock_sense)
4G	Ground 12 V- (KL31)	4H	Electronic Lock Drive Negative (Elock-)

Connector 3

Pin	Definition	Pin	Definition
1	AC Input Live Wire (L)	2	AC Input Neutral Wire (N)
3	AC Input Ground Wire (PE)	4	Interlock
5	Interlock		

European Standard CCS Charging Port Pin Definition

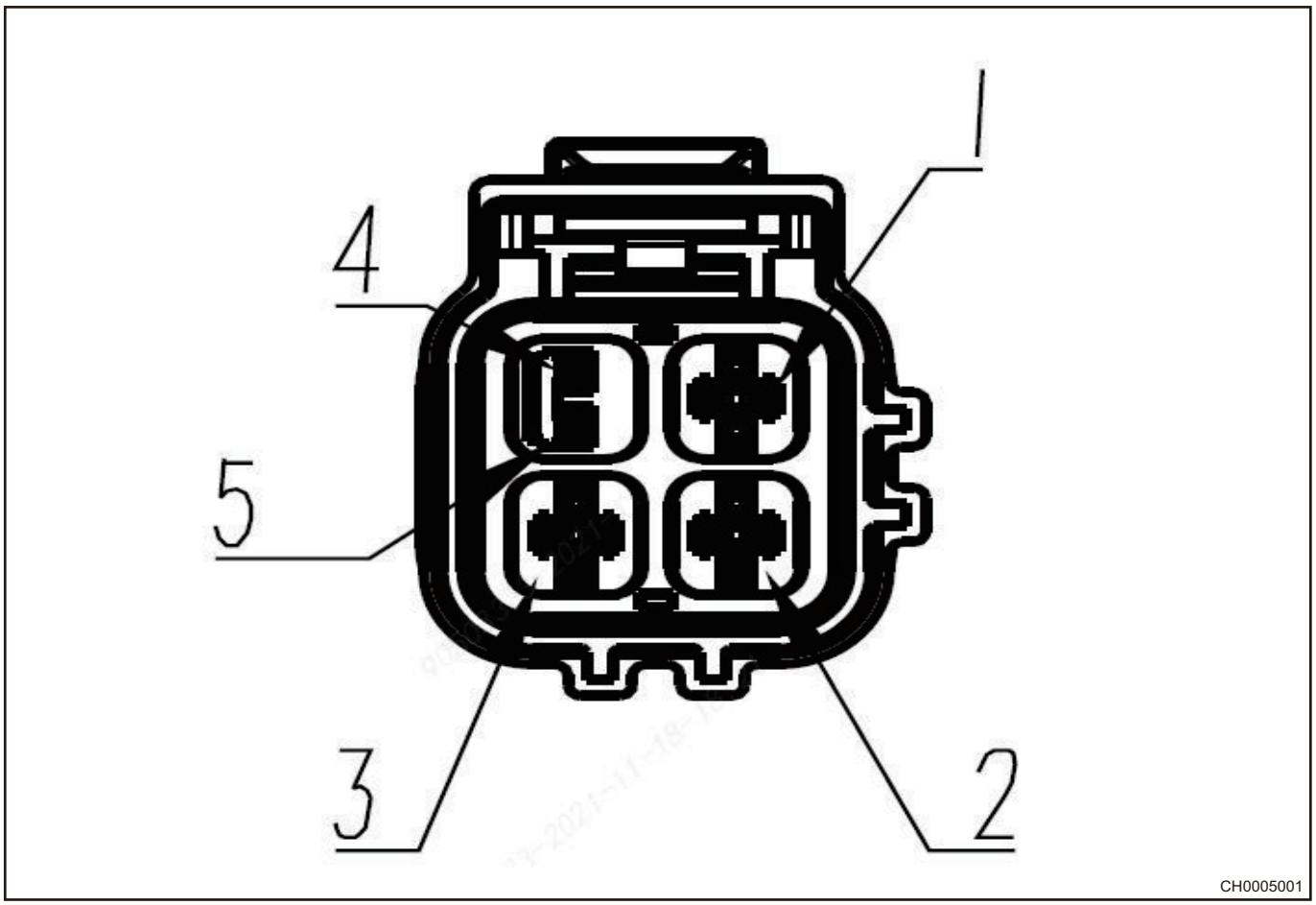
Connector 1



CH0004001

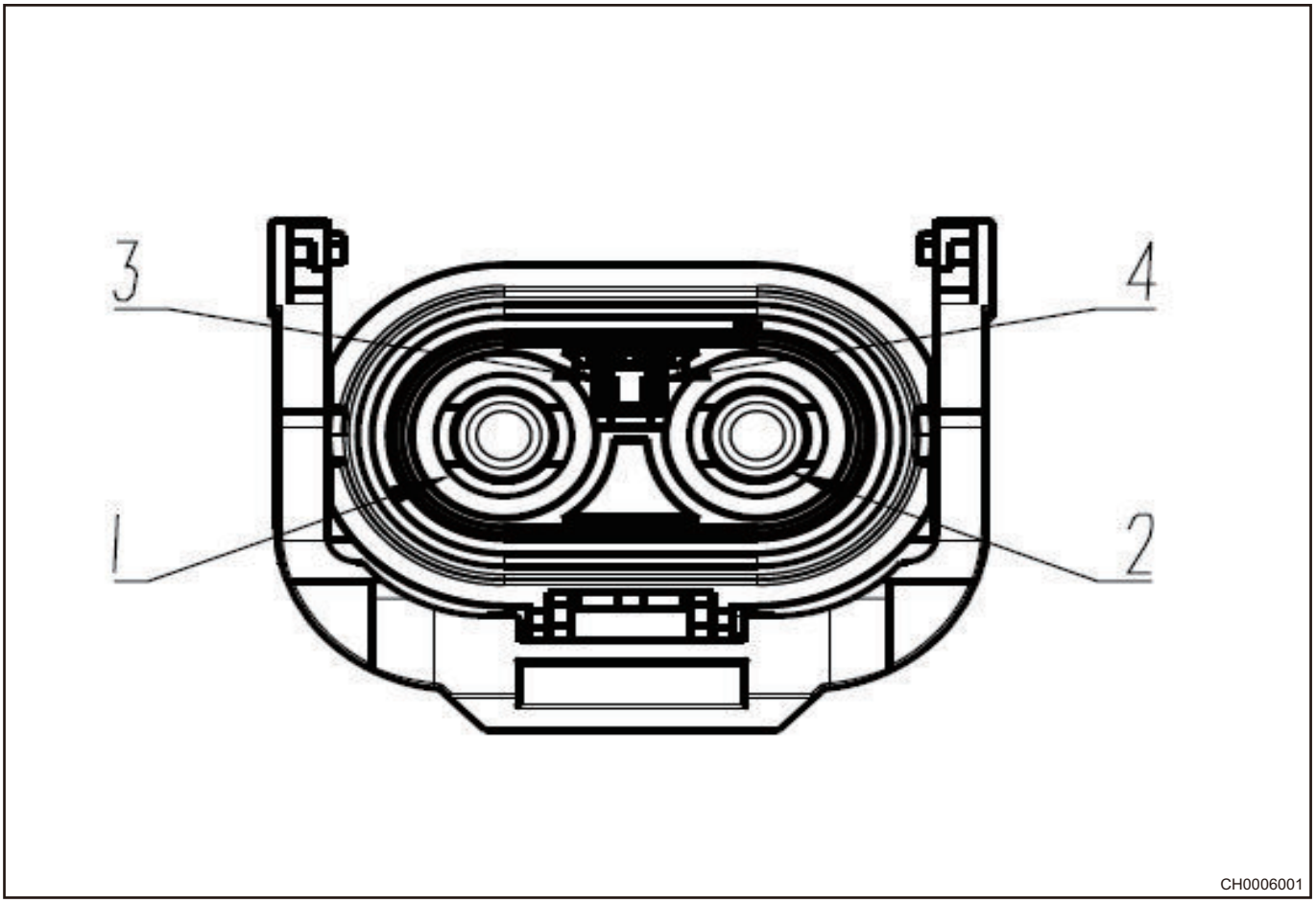
Pin	Definition	Pin	Definition
1	Electronic Lock +	2	Electronic Lock -
3	Lock Detection	4	-
5	CP	6	PP
7	Temperature Sensor (at DC+)	8	Temperature Sensor (at DC+)
9	Temperature Sensor (at DC-)	10	Temperature Sensor (at DC-)
11	Temperature Sensor (at AC)	12	Temperature Sensor (at AC)

Connector 2



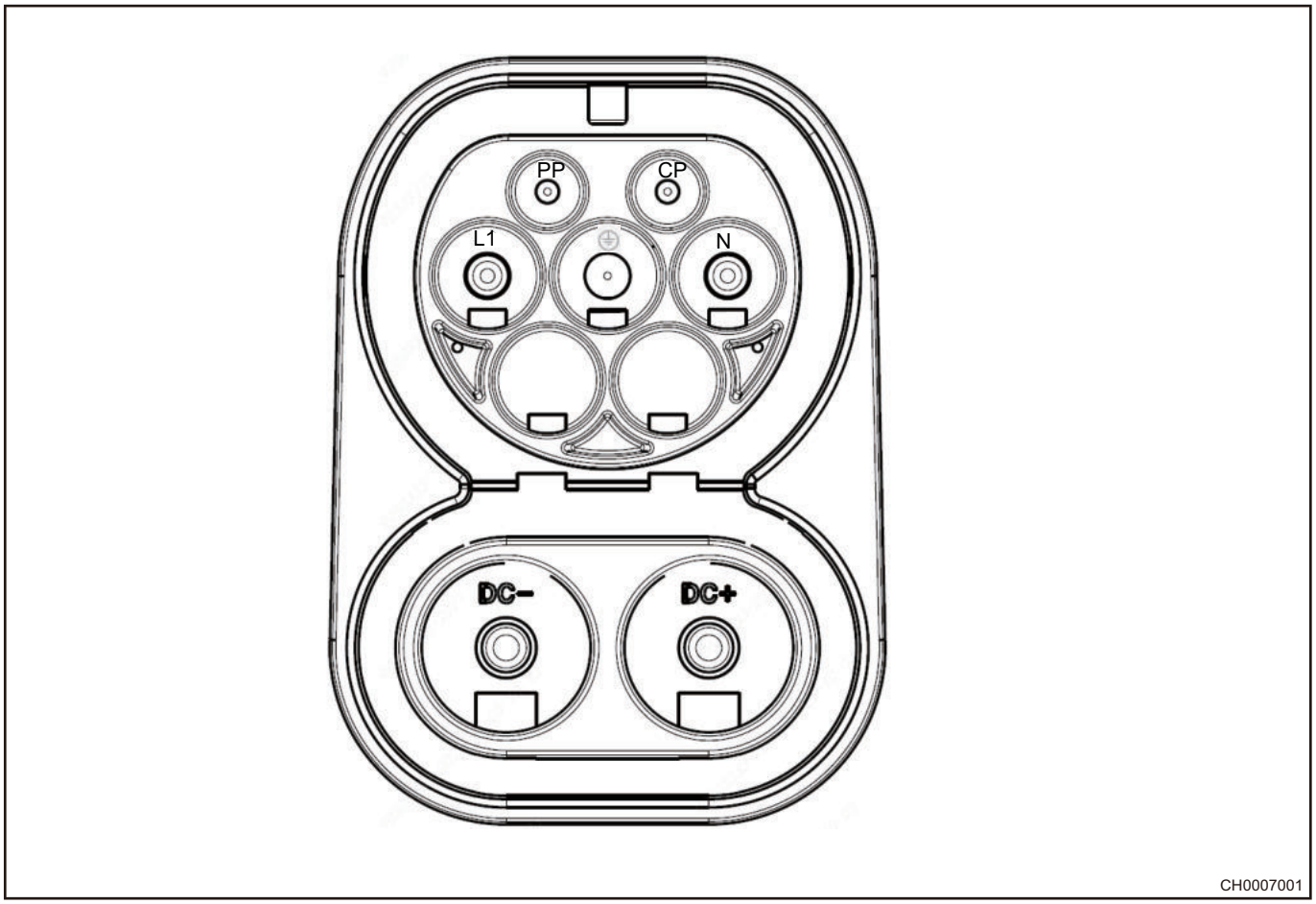
Pin	Definition	Pin	Definition
1	L (Live Wire)	2	N (Neutral Wire)
3	E (Ground Wire)	4	Interlock
5	Interlock		

Connector 3



Pin	Definition	Pin	Definition
1	DC+	2	DC-
3	Interlock	4	Interlock

Charging Port

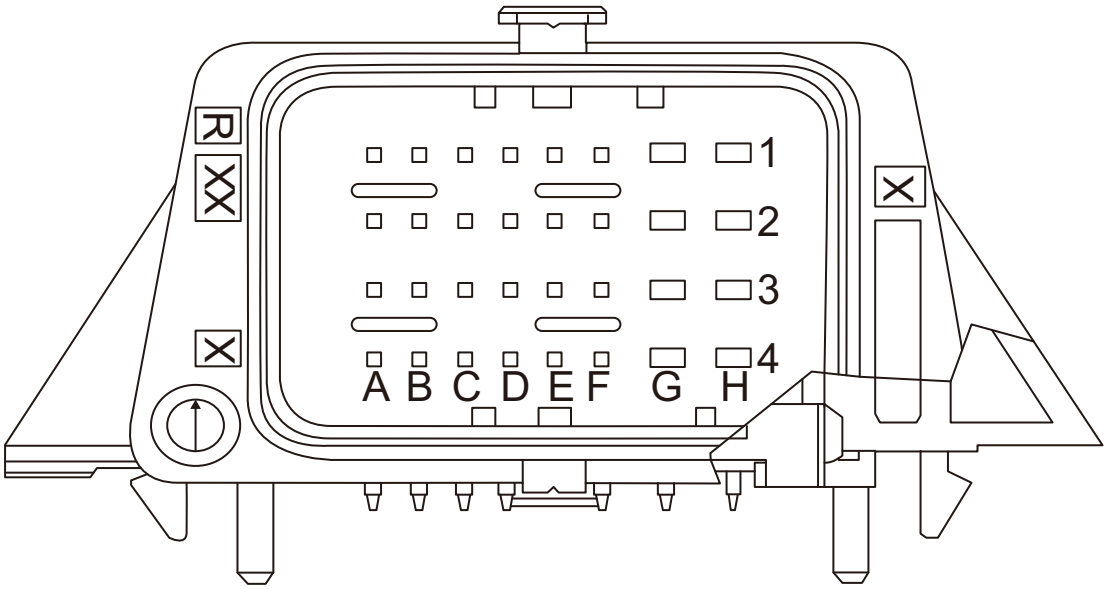


Pin	Definition	Pin	Definition
PP	PP Signal	CP	CP Signal
N	Neutral Wire	L1	Live Wire
DC+	DC+	DC-	DC-
	Ground Wire		

Contact coupling order during the connection of vehicle connector and vehicle socket:

- In case of AC charging: Protective ground (PE), charging connection confirmation (PP), AC power supply live wire and neutral wire (L, N), charging control guide (CP); The order of disconnection is in the reverse order of connection.
- In case of DC charging: Charging connection confirmation (PP), protective ground (PE), DC power supply positive and DC power supply negative (DC+, DC-), charging control guide (CP); The order of disconnection is in the reverse order of connection.

PLC Communication Conversion Module Pin Definition



CH0008001

Pin	Definition	Pin	Definition
1A	-	1B	-
1C	-	1D	-
1E	-	1F	-
1G	-	1H	-
2A	-	2B	-
2C	-	2D	-
2E	Connected with Combo2 Charging Port CP	2F	Connected with Combo2 Charging Port PP
2G	-	2H	-
3A	-	3B	-
3C	Connected with Original Slow Charging Port CP	3D	Connected with Original Slow Charging Port CC
3E	Connected with Original Quick Charging Port CANH	3F	Connected with Original Quick Charging Port CANL
3G	-	3H	-
4A	-	4B	-
4C	Connected with Original Quick Charging Port for Quick Charging Ignition	4D	Connected with Original Quick Charging Port CC
4E	CANH in Diagnosis Interface Battery	4F	CANL in Diagnosis Interface Battery
4G	-	4H	-

Diagnosis & Test

Charging Operation Description

Every Chery eQ1 vehicle is equipped with on-board charger DCDC converter assembly and charging port. First open the AC interface dust boot of charging port, then connect charging gun and charging socket securely before charging the battery.

Problem Judgment

When all indicators do not come on, please check if input 220 V power supply is normal; Troubleshoot other faults according to the above table. If no problem can be found according to the above table, read DTCs through the communication between diagnostic tester and BMS.
DTC list supported by charging system is shown in following table:

No.	DTC Name	DTC	Possible Cause	Problem Symptom
1		P1F00-17	Abnormal supply network voltage or charging pile malfunction	Charging is abnormal or stops
2		P1F01-16	Abnormal supply network voltage or charging pile malfunction	Charging is abnormal or stops
3	CHARGER AC INPUT POWER FAILURE	P1F02-31	Abnormal supply network voltage or charging pile malfunction	Charging is abnormal or stops
4	CHARGER PFC UNDERVOLTAGE FAULT	P1F03-16	Charger fault. Insert charging gun again to confirm its status 10 seconds after unplugging the charging gun	Charging is abnormal or stops
5	CHARGER PFC OVERVOLTAGE FAULT	P1F04-17	Charger fault. Insert charging gun again to confirm its status 10 seconds after unplugging the charging gun	Charging is abnormal or stops
6	CHARGER AMBIENT TEMPERATUREOVER-TEMPERATURE FAULT	P1D82-4B	Too high ambient temperature or charger fault	Charging is abnormal or stops
7	CHARGER WATER TEMPERATURE OVER-TEMPERATURE FAULT	P1D85-4B	Cooling system, VCU, DCDC or charger fault	Charging is abnormal or stops
8	CHARGER PFC OVER TEMPERATURE FAULT	P1D86-4B	Cooling system, VCU, DCDC or charger fault	Charging is abnormal or stops
9	CHARGER TEMP1 OVER-TEMPERATURE	P1D83-4B	Cooling system, VCU, DCDC or charger fault	Charging is abnormal or stops
10	CHARGER TEMP2 OVER TEMPERATURE	P1D84-4B	Cooling system, VCU, DCDC or charger fault	Charging is abnormal or stops
11	CHARGER TEMP3 OVER TEMPERATURE	P1D87-4B	Cooling system, VCU, DCDC or charger fault	Charging is abnormal or stops
12	CHARGER LLC1 OVER-HEATING FAULT	P1D88-4B	Cooling system, VCU, DCDC or charger fault	Charging is abnormal or stops

13	CHARGER LLC2 TEMPERATURE FILTER FAULT	P1D89-4B	Cooling system, VCU, DCDC or charger fault	Charging is abnormal or stops
14	CHARGING PORT TEMPERATURE OVERHEAT FAULT	P1F05-4B	Internal connecting wire harness charging port or charger fault	Charging is abnormal or stops
15	CHARGER HIGH VOLTAGE OUTPUT OVERVOLTAGE FAULT	P1F07-17	High-voltage wire harness, battery or charger fault	Charging is abnormal or stops
16	CHARGER HIGH VOLTAGE OUTPUT UNDERVOLTAGE FAULT	P1F08-16	High-voltage wire harness, battery or charger fault	Charging is abnormal or stops
17	SCI1 COMMUNICATION FAILURE	P1F0D-87	Charger fault. Insert charging gun again to confirm its status 10 seconds after unplugging the charging gun	Charging is abnormal or stops
18	SCI2 COMMUNICATION FAILURE	P1F0E-87	Charger fault. Insert charging gun again to confirm its status 10 seconds after unplugging the charging gun	Charging is abnormal or stops
19	CHARGER TEMP1 TEMPERATURE DETECTION FAILURE FAULT	P1F19-96	Charger fault	Charging is abnormal or stops
20	CHARGER TEMP2 TEMPERATURE DETECTION FAILURE FAULT	P1F20-96	Charger fault	Charging is abnormal or stops
21	CHARGER TEMP3 TEMPERATURE DETECTION FAILURE FAULT	P1F21-96	Charger fault. Insert charging gun again to confirm its status 10 seconds after unplugging the charging gun	Charging is abnormal or stops
22	CHARGER TEMP4 TEMPERATURE DETECTION TEST FAILURE	P1F10-96	Charger fault. Insert charging gun again to confirm its status 10 seconds after unplugging the charging gun	Charging is abnormal or stops
23	CHARGER VCU CAN TIMEOUT FAULT	U293-87	VCU or low-voltage wire harness fault	Charging is abnormal or stops
24	CHARGER BMS CAN TIMEOUT FAULT	U294-87	BMS or low-voltage wire harness fault	Charging is abnormal or stops
25	CHARGER CP DUTY CYCLE FAILURE	P1F14-3B	Charging pile or low-voltage wire harness fault	Charging is abnormal or stops
26	THREE CHARGER ELECTRONIC LOCK FAILURE	P1F16-96	Electronic lock, low-voltage wire harness or charger fault	Charging is abnormal or stops
27	WAKEUP SHORT CIRCUIT FAILURE	P1F13-11	Low-voltage wire harness or charger fault	Charging is abnormal or stops

28	CAN_BUS_FAULT	U0073-88	CAN network failure	Charging is abnormal or stops
29	CHARGER CC FAILURE	P1F15-1E	Charging gun, low-voltage wire harness, high-voltage wire harness, battery or charger fault	Charging is abnormal or stops
30	SANYUAN BORDER AND VICE BORDER	P1F17-86	Charger fault. Insert charging gun again to confirm its status 10 seconds after unplugging the charging gun	Charging is abnormal or stops
31	HARDWARE MALFUNCTION	P1F27-09	Charger fault. Insert charging gun again to confirm its status 10 seconds after unplugging the charging gun	Charging is abnormal or stops
32	SMALL BATTERY OVERVOLTAGE	P1F25-17	Small battery, low-voltage wire harness or charger fault	Charging is abnormal or stops
33	SMALL BATTERY UNDERVOLTAGE	P1F26-16	Small battery, low-voltage wire harness or charger fault	Charging is abnormal or stops
34	CHARGER CP 6V IS ABNORMAL	P1F22-1C	Charging pile or low-voltage wire harness fault	Charging is abnormal or stops
35	CHARGER CP 9V IS ABNORMAL	P1F23-1C	Charging pile or low-voltage wire harness fault	Charging is abnormal or stops
36		P1F24-38	Charging pile or low-voltage wire harness fault	Charging is abnormal or stops

Note: The charger in above table is on-board charger DCDC converter assembly.

On-vehicle Service

Tools

Ratchet wrench, a set of commonly used size socket, multimeter.

Protective Equipment

Cotton gloves, insulation gloves, working clothing, steel toe shoes.

Specifications

Torque Specifications

Part Name	Torque (N·m)
On-board Charger DCDC Converter Assembly Fixing Bolt	25 ± 4
Charging Socket Mounting Bolt	7 ± 1.5
Charging Port Electronic Lock Mounting Bolt	5 ± 1.5

Part Name	Torque (N·m)
PLC Communication Module Mounting Nut	7 ± 1.5
PLC Communication Module Mounting Bolt	10 ± 2

On-board Charger DCDC Converter Assembly

Removal

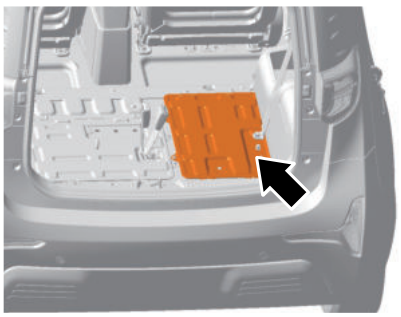
⚠

- Be sure to wear necessary safety equipment, and wear steel toe shoes during removal and installation to prevent charger from falling on feet accidentally; Wear insulation gloves during inspection and repair to prevent electric shock.
- Charger housing surface temperature is high during operation, be careful not to be burnt by residual temperature when turning it off.
- Be sure to cut off AC 220 V power supply input before removal and installation.
- Please turn off vehicle power supply during removal and installation to prevent accidental accidents from starting the vehicle by human misoperation.
- Pay attention to protect wires, cables and connectors during removal and installation.

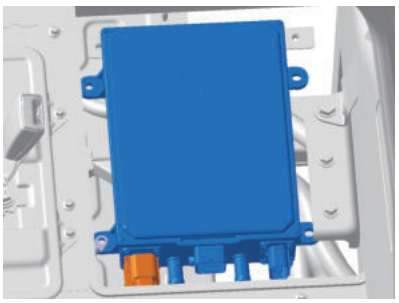
1. Remove the rear seatback assembly, rear seat cushion assembly and luggage compartment carpet assembly (for removal procedure, refer to “Interior” and “Exterior” sections in “Body”).


CH0001002

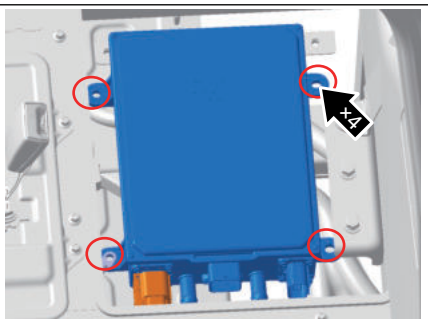
2. Remove the rear service hole cover plate assembly (-arrow) (for removal procedure, refer to “Interior” and “Exterior” sections in “Body”)


CH0002002

3. Unplug all connectors, pipes and ground that are connected to on-board charger DCDC converter assembly.


CH0003002

4. Remove 4 fixing bolts (arrow) with a wrench.
   Tightening torque: 25 ± 4 N·m



CH0004002

Installation

1. Installation of on-board charger DCDC converter assembly is in the reverse order of removal.

European Standard CCS Charging Port Assembly

Removal

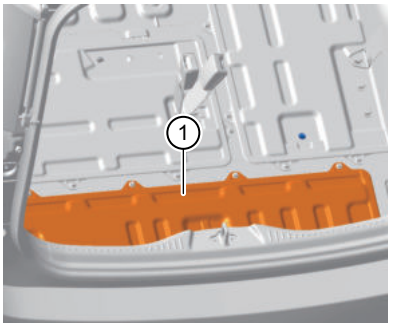
⚠

- Be sure to wear necessary safety equipment, and wear steel toe shoes during removal and installation to prevent charger from falling on feet accidentally; Wear insulation gloves during inspection and repair to prevent electric shock.
- Charger housing surface temperature is high during operation, be careful not to be burnt by residual temperature when turning it off.
- Be sure to cut off AC 220 V power supply input before removal and installation.
- Please turn off vehicle power supply during removal and installation to prevent accidental accidents from starting the vehicle by human misoperation.
- Pay attention to protect wires, cables and connectors during removal and installation.

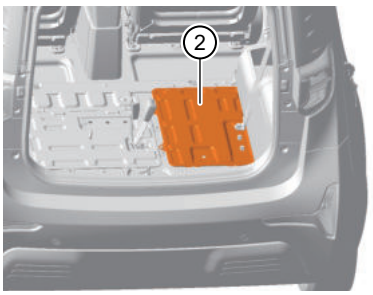
1. Remove the rear seatback assembly, rear seat cushion assembly and luggage compartment carpet assembly (for removal procedure, refer to “Interior” and “Exterior” sections in “Body”).


CH0001002

2. Remove 2 rear service hole cover plate assemblies 1 and 2 as shown in the illustration (for removal procedure, refer to “Interior” and “Exterior” sections in “Body”).

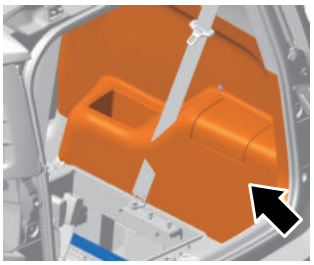


CH0005002

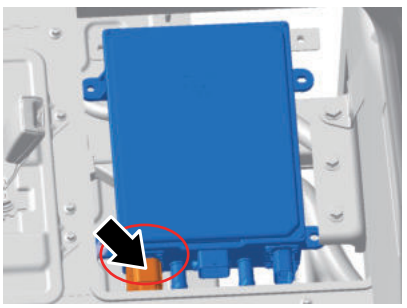


CH0006002

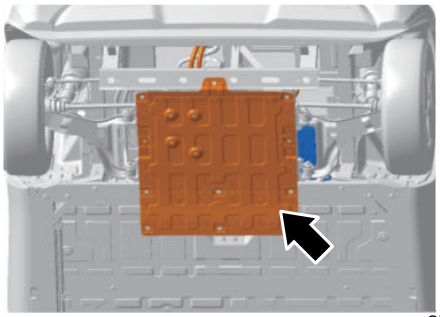
3. Remove the right quarter lower protector assembly (-arrow) (for removal procedure, refer to “Interior” and “Exterior” sections in “Body”).


CH0007002

4. Unplug European standard CCS charging port assembly and on-board charger DCDC converter assembly connector (arrow).

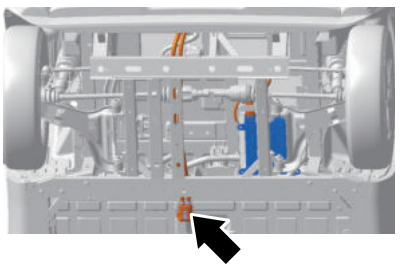

CH0008002

5. Remove the luggage compartment lower protector (arrow) (for removal procedure, refer to “Interior” and “Exterior” sections in “Body”).

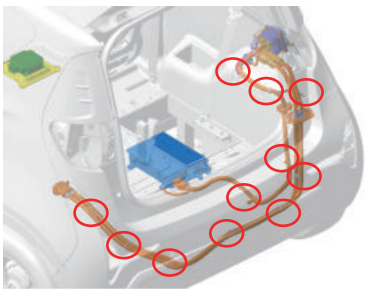

CH0009002

6. Unplug the charging port signal wire connector (arrow).

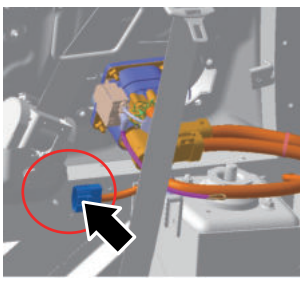
7. Unplug connector between European standard CCS charging port assembly and energy storage device assembly (arrow).


CH0011002

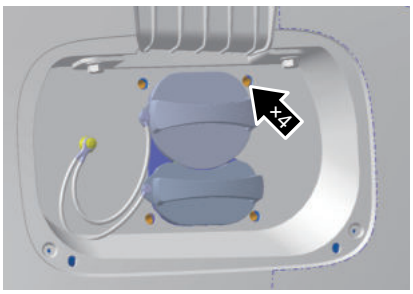
8. Remove charging port wire harness boot, clip on each position and ground bolts.


CH0012002

9. Unplug the charging port signal wire connector (arrow).


CH0013002

10. Remove 4 mounting bolts (arrow) from charging socket.
    Tightening torque: 7 ± 1.5 N·m



CH0014002

11. Remove the European standard CCS charging port.

Installation

1. Installation of European standard CCS charging port assembly is in the reverse order of removal.

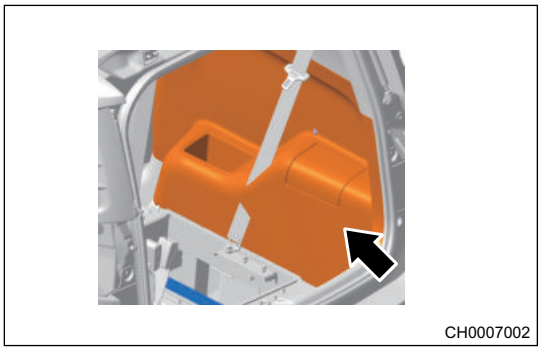
Charing Port Electronic Lock in European Standard CCS Charging Port Assembly

Removal

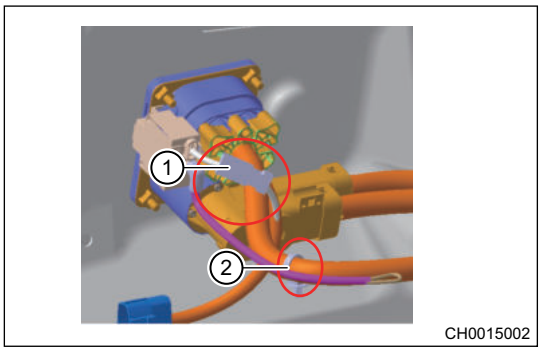
⚠

- Be sure to wear necessary safety equipment, and wear steel toe shoes during removal and installation to prevent charger from falling on feet accidentally; Wear insulation gloves during inspection and repair to prevent electric shock.
- Charger housing surface temperature is high during operation, be careful not to be burnt by residual temperature when turning it off.
- Be sure to cut off AC 220 V power supply input before removal and installation.
- Please turn off vehicle power supply during removal and installation to prevent accidental accidents from starting the vehicle by human misoperation.
- Pay attention to protect wires, cables and connectors during removal and installation.

1. Remove the right quarter lower protector assembly (-arrow) (for removal procedure, refer to “Interior” and “Exterior” sections in “Body”).


CH0007002

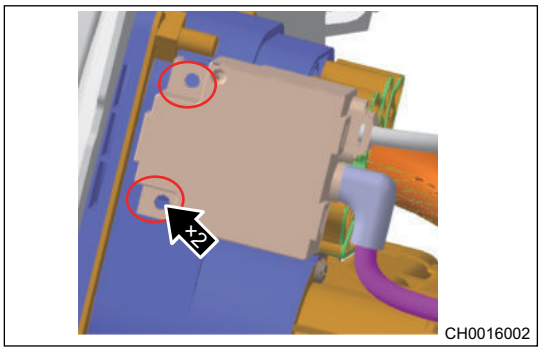
2. Unplug charging port electronic lock connector (1), and remove the fixing ribbon (2) from electronic lock rope.



CH0015002

3. Remove 2 mounting bolts (arrow) from charging port electronic lock.

   Tightening torque: 5 ± 1.5 N·m


CH0016002

4. Remove the charging port electronic lock.

Installation

1. Installation of European standard CCS charging port assembly is in the reverse order of removal.

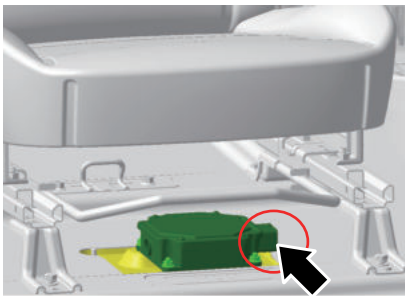
PLC Communication Module and Bracket

Removal

⚠

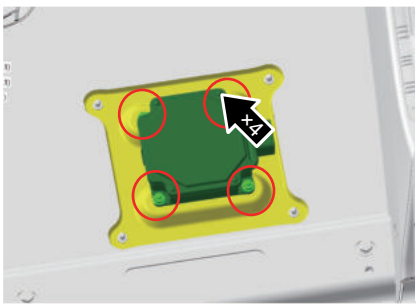
- Be sure to wear necessary safety equipment, and wear steel toe shoes during removal and installation to prevent charger from falling on feet accidentally; Wear insulation gloves during inspection and repair to prevent electric shock.
- Charger housing surface temperature is high during operation, be careful not to be burnt by residual temperature when turning it off.
- Be sure to cut off AC 220 V power supply input before removal and installation.
- Please turn off vehicle power supply during removal and installation to prevent accidental accidents from starting the vehicle by human misoperation.
- Pay attention to protect wires, cables and connectors during removal and installation.

1. PLC communication module is located under front passenger seat. Unplug the signal wire connector (arrow).


CH0017002

2. Remove 4 mounting nuts (arrow) from PLC communication module.

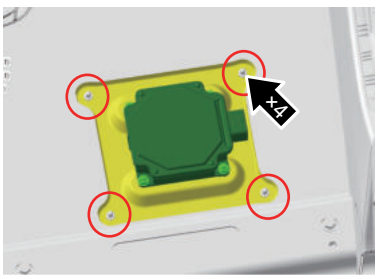
   Tightening torque: 7 ± 1.5 N·m



CH0018002

3. Remove the PLC communication module.
4. Remove 4 mounting bolts (arrow) from PLC communication module.

   Tightening torque: 10 ± 2 N·m



CH0019002

5. Remove the PLC communication module bracket.

Installation

1. Installation of PLC communication conversion module and bracket is in the reverse order of removal.

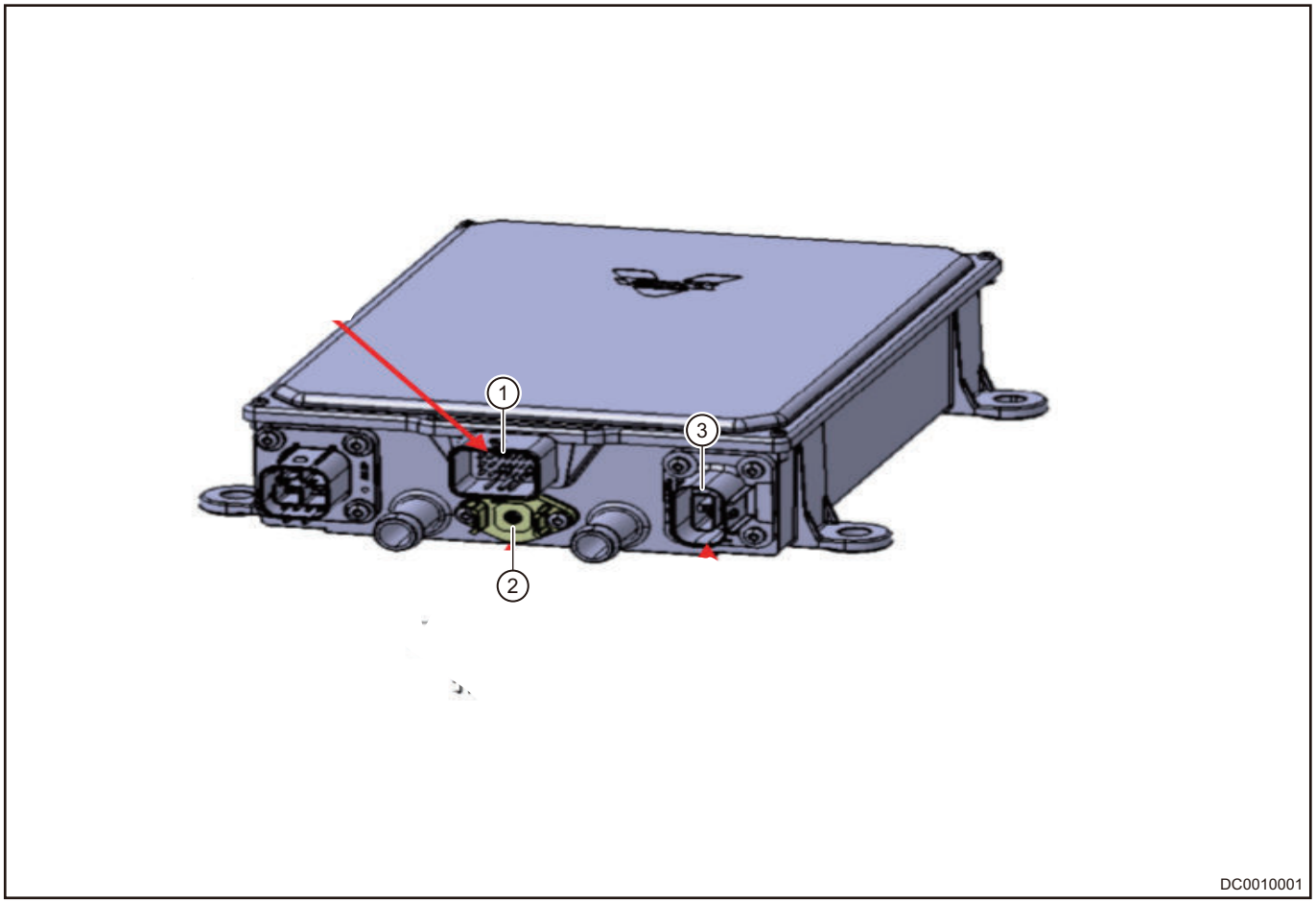
DCDC

DCDC SYSTEM

System Overview

Function Introduction

Its main function is to control the power battery to charge the 12 V low-voltage battery during driving, so as to ensure that the low-voltage electrical equipment can work normally when driving normally.

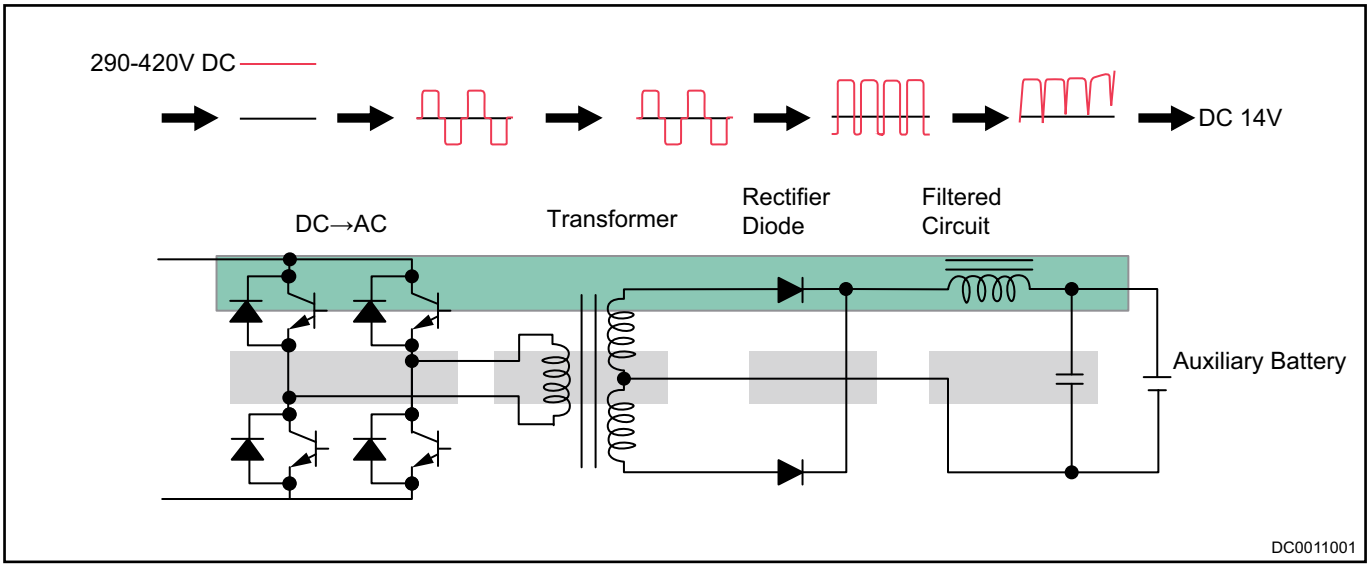


1	Signal Connector	2	Positive Output Connector
3	High-voltage Output Connector		

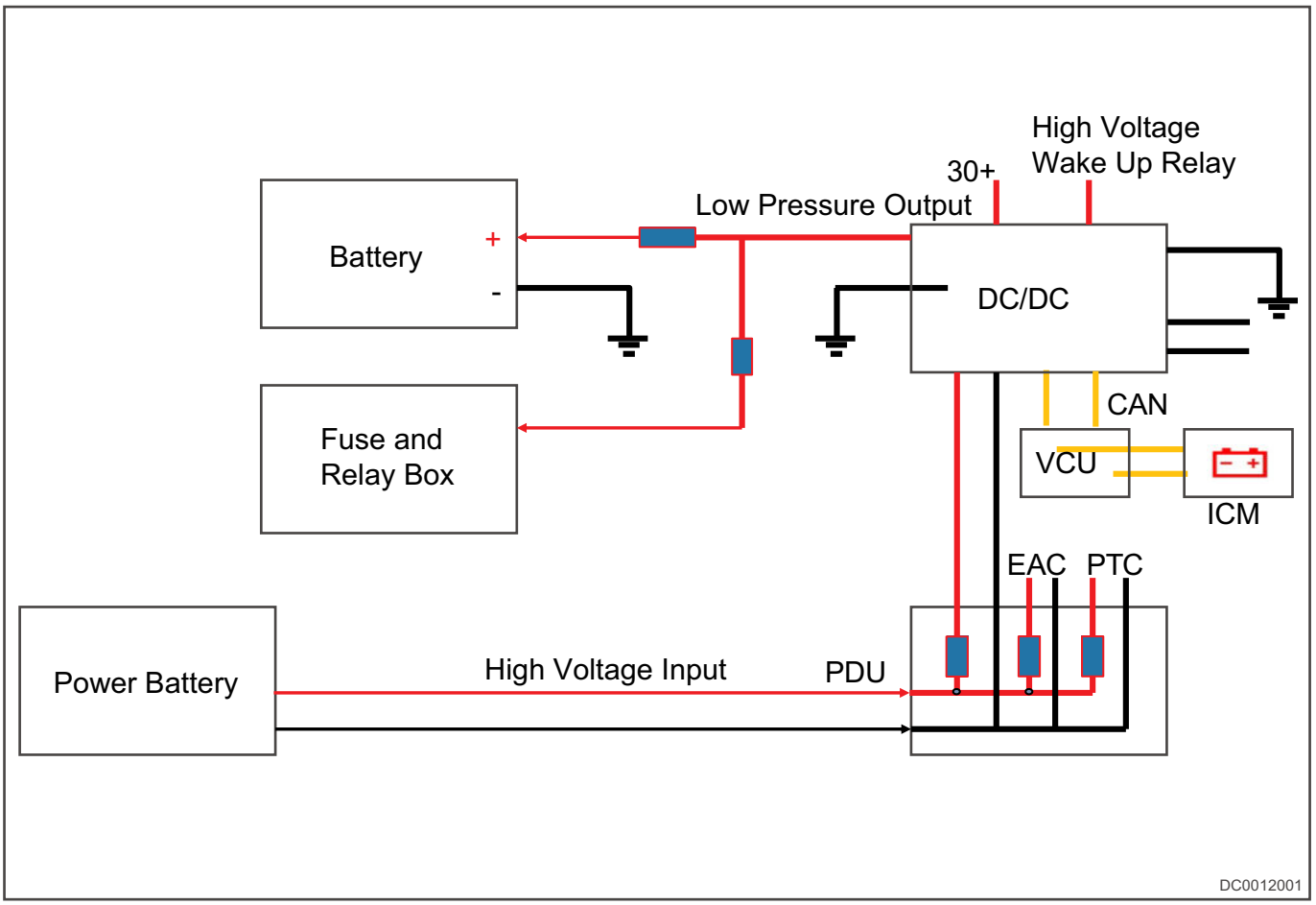
Technical Parameters

Rated Output Voltage (V)	Input Voltage Range (V)	Rated Power (kW)	Efficiency	Protection Level	Cooling Type
14 ± 0.2	240 - 420 V	1.2	> 90%	IP67	Liquid cooled

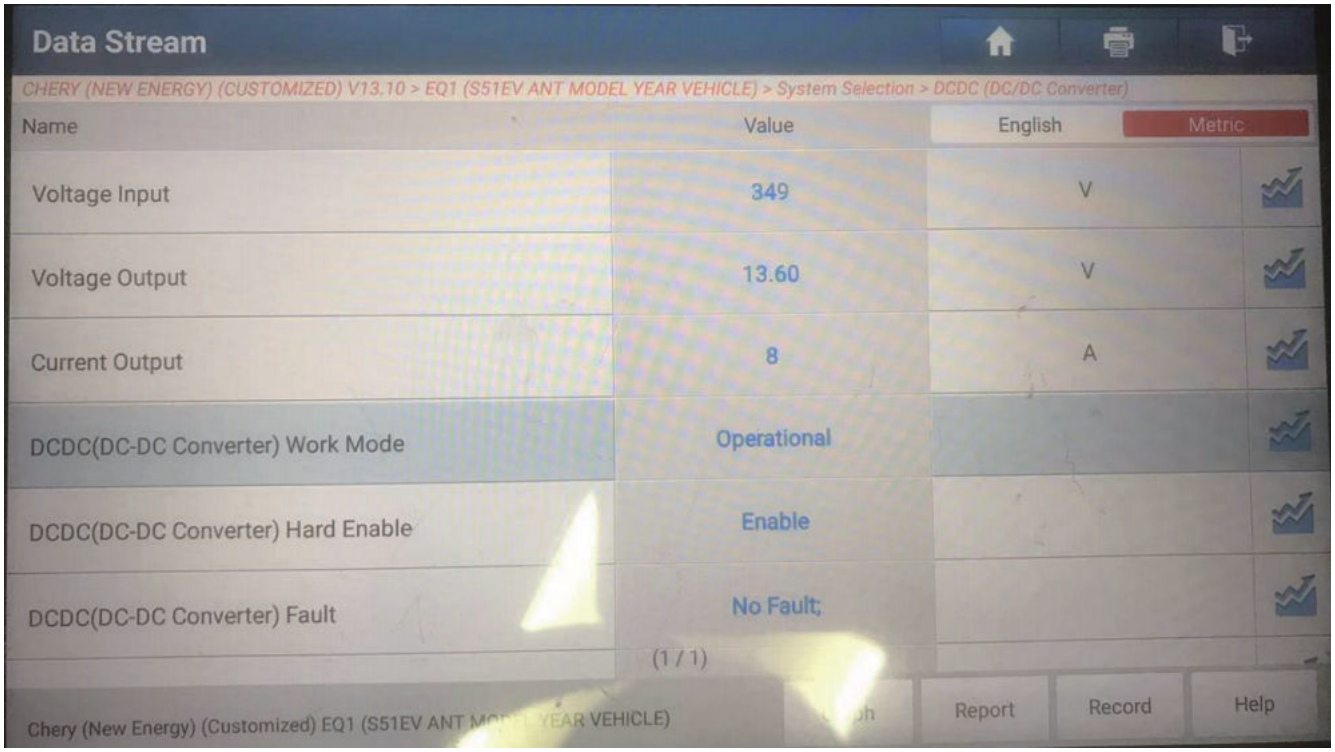
DCDC Converter Operation Principle



DCDC Circuit Principle Schematic Diagram

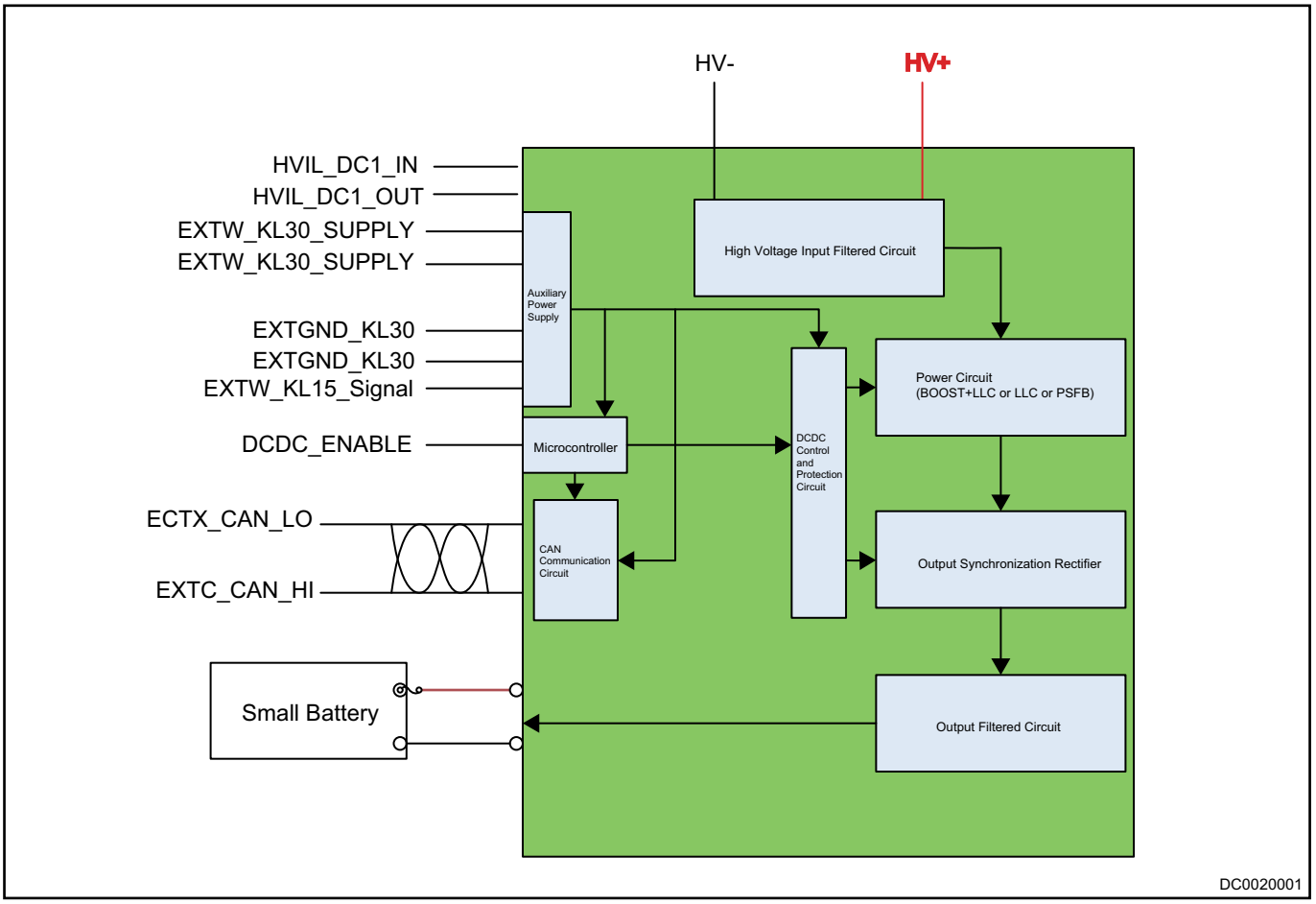


DCDC Data Stream Analysis



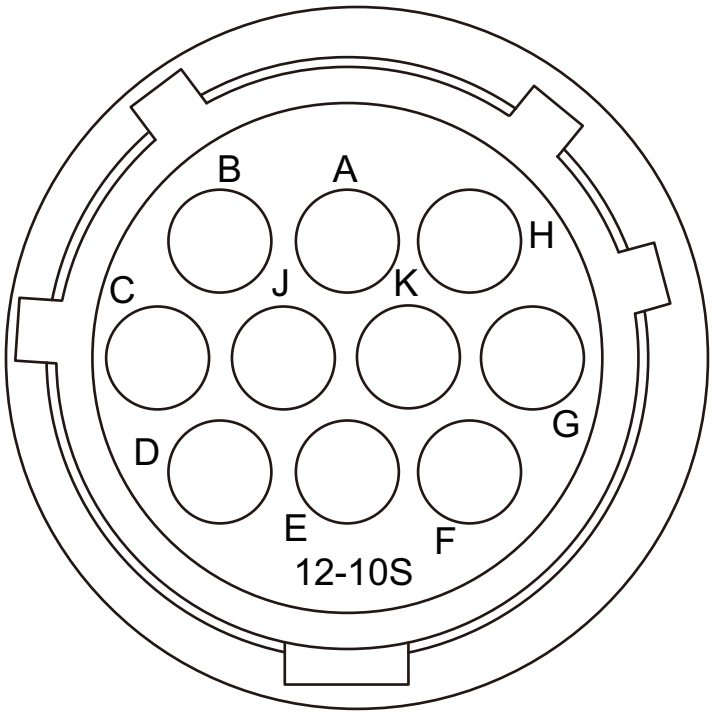
DC0013001

Control Schematic Diagram



System Circuit Diagram

Signal Connector Terminal Definition

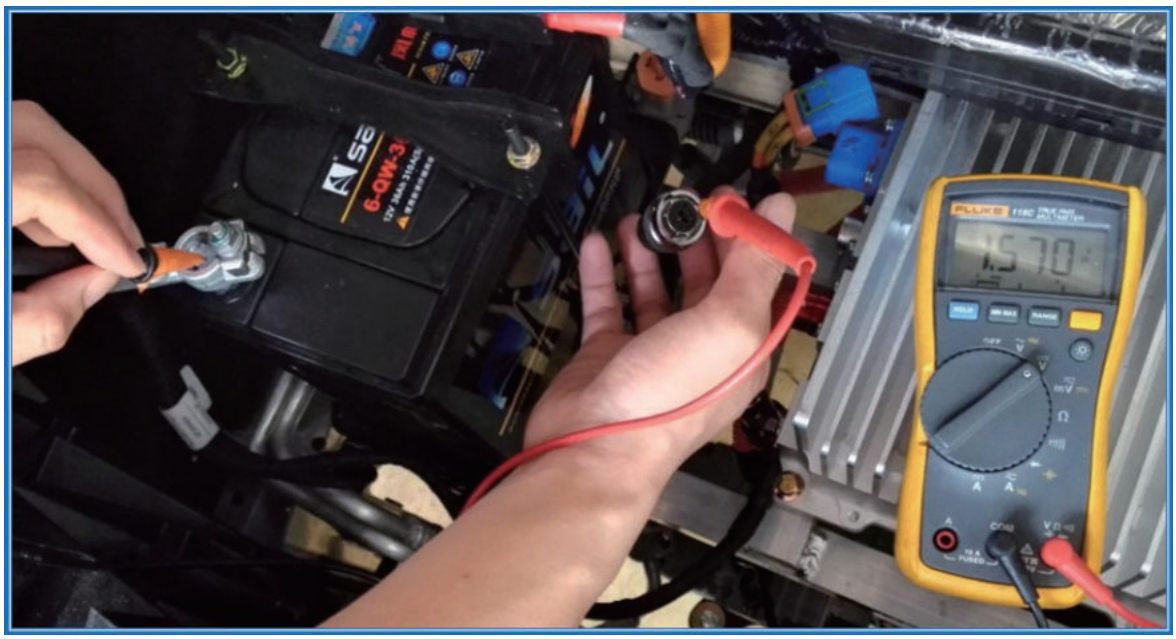


DC0030001

Terminal	Function	Signal Type	Terminal	Function	Signal Type
A	DCDC_ENABLE	DCDC enabled control signal	B	EXTC_CAN_ LO	CAN (low) signal
C	EXTC_CAN_ HI	CAN (high) signal	D	EXTW_KL15_Signal	KL15 power supply signal
E	EXTGND_KL30	Power supply ground signal	F	EXTGND_KL30	Power supply ground signal
G	EXTW_KL30_ SUPPLY	KL30 power supply signal	H	EXTW_KL30_ SUPPLY	KL30 power supply signal
J	HVIL_DC1_IN	High-voltage loop interlock (input) signal	K	High-voltage loop interlock (input) signal	High-voltage loop interlock (output) signal

Diagnosis & Test

Detection of Each Signal for DC/DC Converter Signal Wire



DC0040001

Detection method and reference value of each pin in DCDC signal wire harness connector:

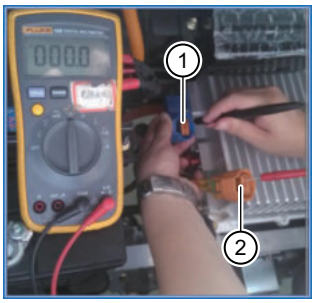
T-er-m-in-al	Function	Multimeter Positive Probe	Multimeter Negative Probe	Multimeter Band	Test Condition	Test Reference Value	Remark
A	DCDC_ ENABLE	A	Battery negative	DC voltage band	Turn vehicle key to ON	0 V	Enable signal
B	EXTC_ CAN_ LO	B	Battery negative	DC voltage band	Turn vehicle key to ON	0.5 V ～ 5 V	-
C	EXTC_ CAN_ HI	C	Battery negative	DC voltage band	Turn vehicle key to ON	0.5 V ～ 5 V	-
D	EXTW_ KL15_ Signal	D	Battery negative	DC voltage band	Turn vehicle key to ON	9 V ～ 16 V	Key signal
E	EXTGND_ KL30	E	Battery negative	DC voltage band	Turn vehicle key to ON	0 V	-

F	EXTGND_ KL30	F	Battery negative	DC voltage band	Turn vehicle key to ON	0 V	-
G	EXTW_ KL30_ SUPPLY	G	Battery negative	DC voltage band	Turn vehicle key to ON	9 V ～ 16 V	-
H	EXTW_ KL30_ SUPPLY	H	Battery negative	DC voltage band	Turn vehicle key to ON	9 V ～ 16 V	
J	HVIL_DC1_ IN	J	Battery negative	DC voltage band	Turn vehicle key to ON	9 V ～ 16 V	Interlock input signal
K	HVIL_DC1_ OUT	K	Battery negative	DC voltage band	Turn vehicle key to ON	0 V	Interlock output signal

DC/DC Converter Input and Output Detection

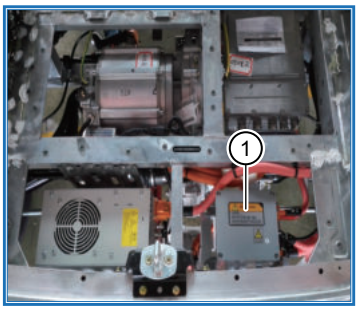
High-voltage Input Detection

1. Unplug DCDC (1) and A/C compressor (2) high-voltage input connectors separately. Adjust multimeter to continuity band and check DCDC and A/C compressor connector positive for continuity. If there is continuity, it means that fuse is in good condition; If there is no continuity, it means that at least one fuse of DCDC and A/C compressor is blown. At this time, it is necessary to remove luggage compartment service cover plate, and open high-voltage junction box to replace the fuse. Specific steps are as follows:



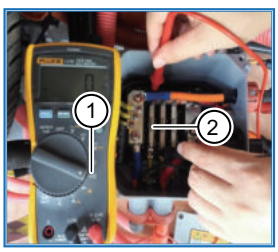
DC0009002

   a. Remove luggage compartment service cover plate to find high-voltage junction box, and open the upper cover (1).



DC0010002

   b. Turn multimeter knob to continuity band (1), check DCDC fuse (2) for continuity. If there is no continuity, it means that DCDC fuse is blown. Replace it with a new one.



DC0011002

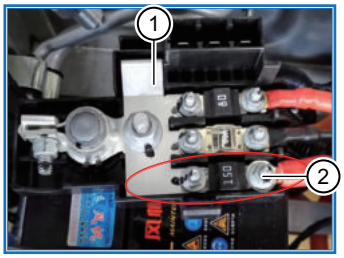
   c. If there is continuity in DCDC fuse, it means A/C compressor fuse is blown. Continue to check 2 fuses nearby for continuity, find the blown A/C compressor fuse and replace it with a new one.

⚠

- Due to high-voltage power supply in junction box, non-professional personnel is prohibited to touch it with hands or contact with other conductive object such as metal.

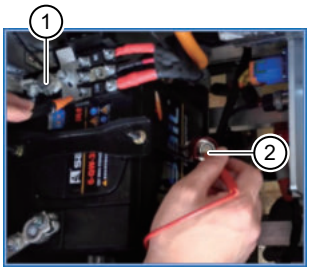
Low-voltage Output Detection

1. Check if positive and negative output wire harnesses and connectors are in good condition, check if the connection is in good condition without looseness, short circuit etc.
2. Turn multimeter to continuity band, then measure two ends of DCDC fuse (DCDC positive output end 2) in battery positive wire harness box (1) with the red probe and black probe of the multimeter separately. When the value displayed by multimeter is 1 and buzzer in multimeter sounds, it means that fuse is normal; Otherwise it means that fuse is damaged and needs to be replaced.



DC0012002

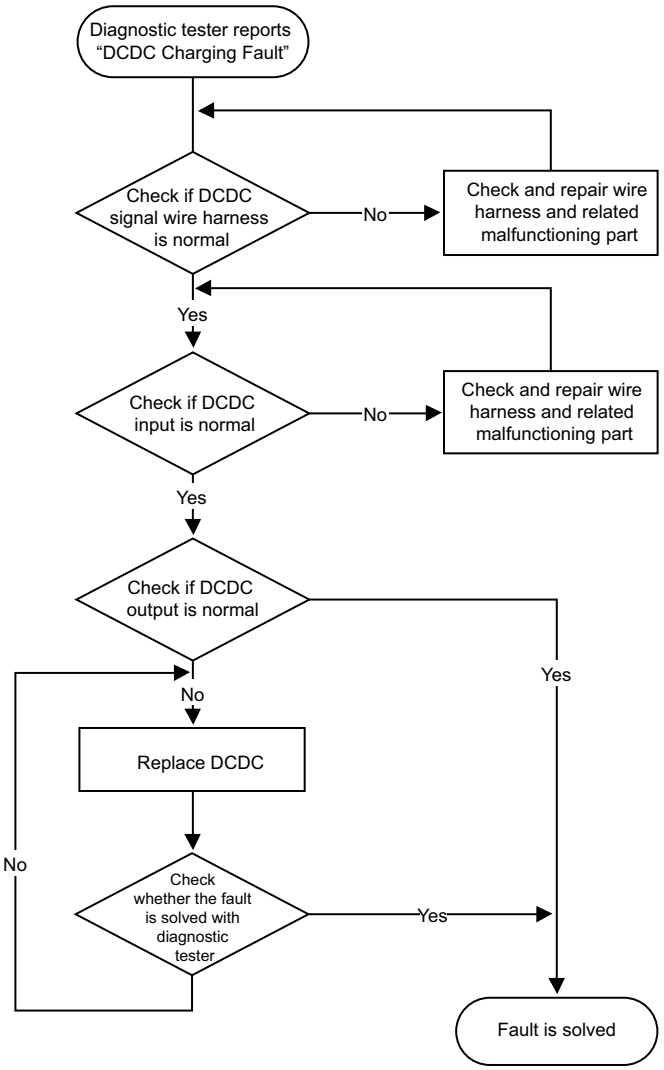
3. Turn multimeter to continuity band, the black probe of multimeter contacts battery positive (1) and the red probe contacts inner conductive core (2) of DCDC positive wire harness connector. If the value displayed by multimeter is 1 and buzzer in multimeter sounds, it means that DCDC positive wire harness is normal; Otherwise it means positive wire harness is damaged and needs to be replaced.



DC0013002

DCDC Charging Fault P1A5B

First powers on and resets, if malfunction light does not go off, please troubleshoot according to following procedures.



DC0050001

On-vehicle Service

Tools

One set of ratchet socket, a torque wrench, multimeter.

Auxiliary Material

Coolant.

Protective Equipment

Cotton gloves, insulation gloves, working clothing, safety helmet, working shoes.

Specifications

Torque Specifications

Part Name	Torque (N·m)
4 Fixing Thread Coupling Bolts of Controller	25 ± 4

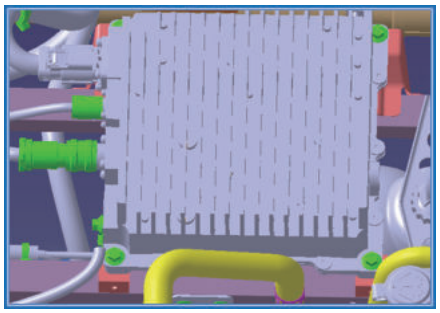
DCDC Assembly

Removal

- Be sure to wear necessary safety equipment to prevent accidents.
- Confirm that the power battery pack relay is disconnected before removal or installation.
- DCDC removal must be carried out under the condition of confirming the disconnection of high-voltage power. Remove the vehicle key first or turn the key to OFF, unplug maintenance switch connector (under front passenger seat), unplug the connector. After waiting for 3 minutes, use DC voltage band of a multimeter to test voltage of high-voltage input connector. Perform subsequent maintenance only when the test value is less than 5 V.

1. Unplug all high-voltage connectors on DCDC, then unplug signal wire connector (1), output connector (2) and ground wire (3). Use socket tool to remove 4 fixing thread coupling bolts (arrow) from controller.

   Tightening torque: 25 ± 4 N·m



DC0001002

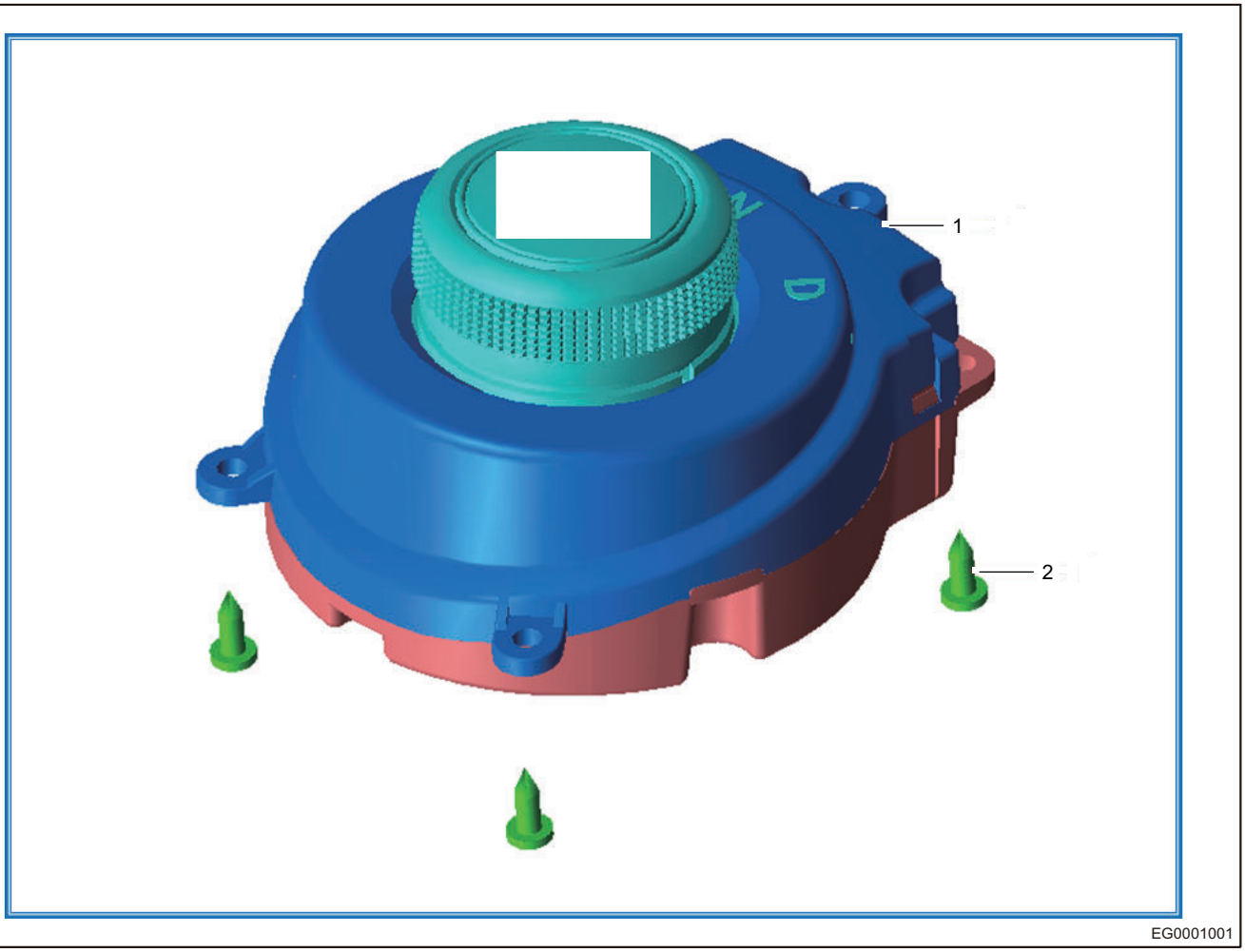
SHIFT CONTROL MECHANISM

SHIFT CONTROL MECHANISM

System Overview

System Components Diagram

Shift Control Mechanism Structure Diagram



No.	Name	No.	Name
1	Shift Control Mechanism Assembly	2	Cross Recess Pan Head Self-tapping Screw - C Type

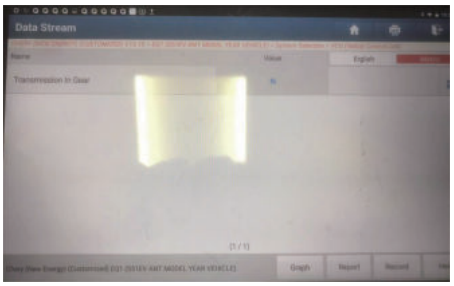
Component Function Description

Shift Control Mechanism

Function: The driver operates gear position and is responsible for inputting gear position information to vehicle controller (VCU), which judges the driver’ s driving intention.

EG0007002

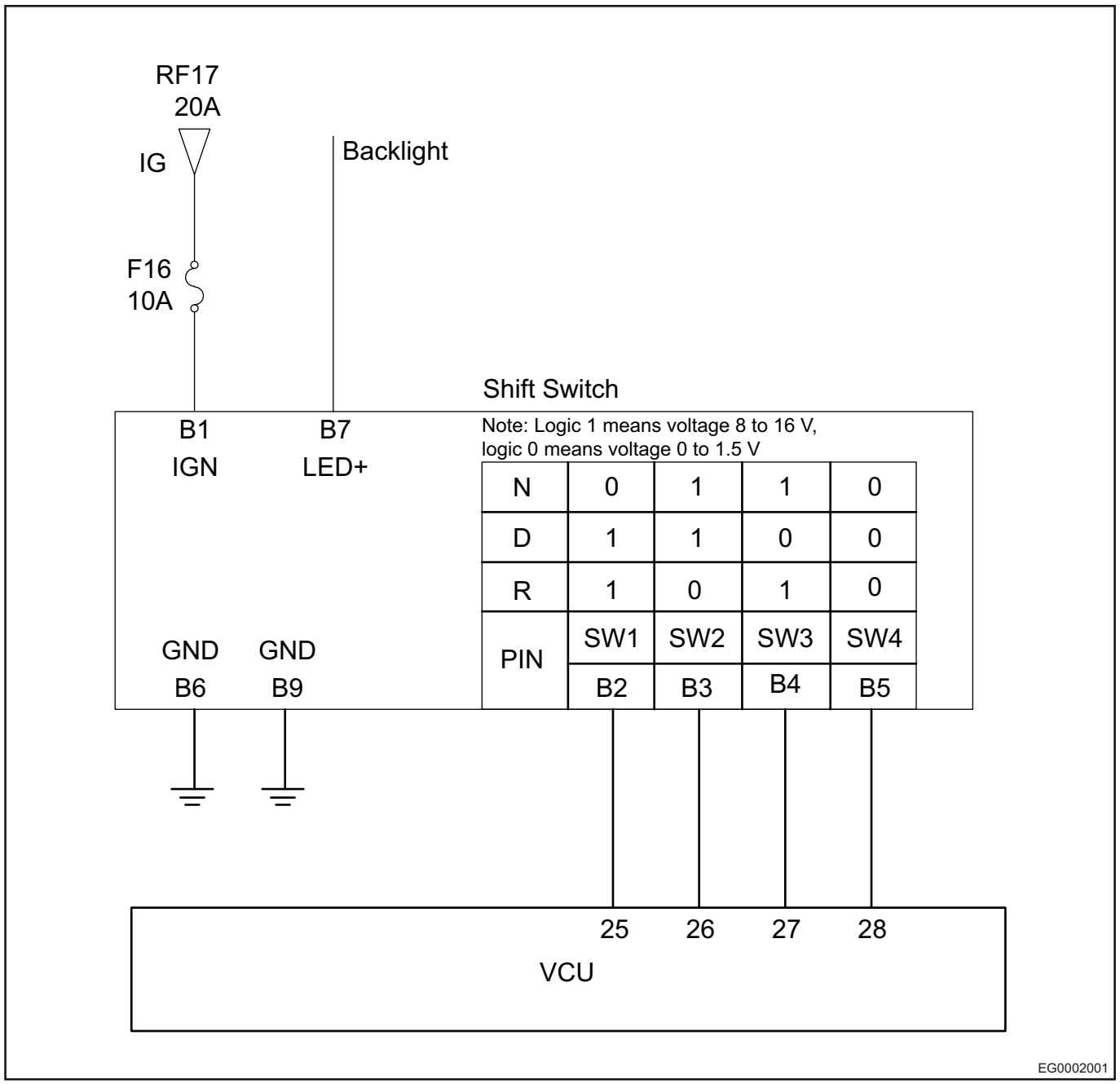
Knob gear shift data stream



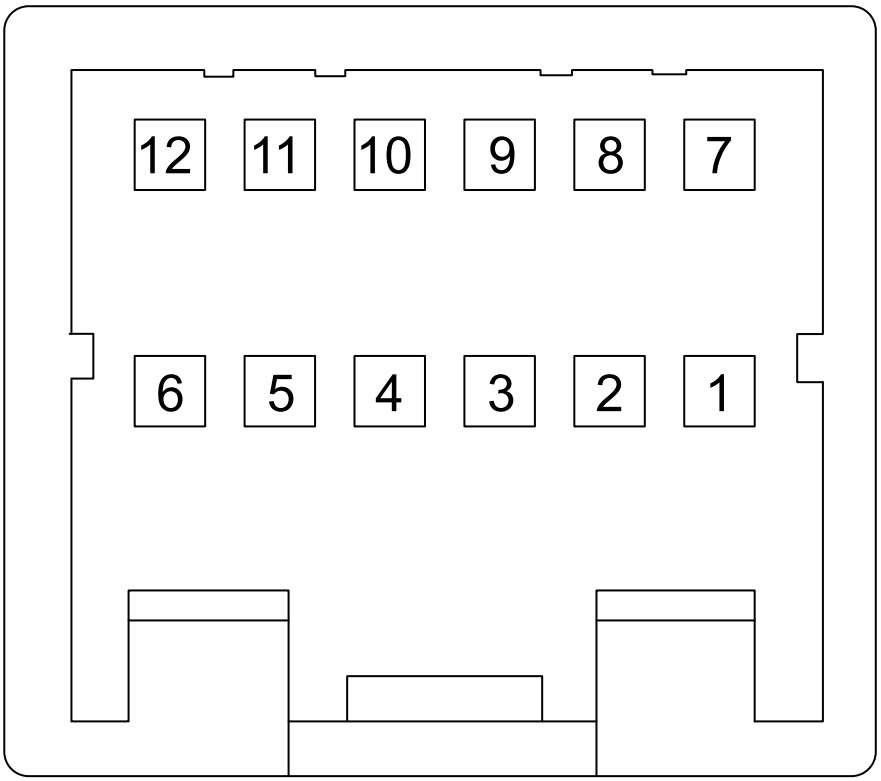
EG0008002

Control Principle and Pin Definition

Control Schematic Diagram



Electronic Accelerator Pedal Pin Definition



EG0003001

Pin	Definition
B1	+ 12 V Power Supply Signal (IG)
B2	SW1
B3	SW2
B4	SW3
B5	SW4
B6	GND Gear Switch Signal Shares with Power Supply Ground
B7	Background Light Power Supply Positive
B8	Backup
B9	Background Light Negative
B10	Backup
B11	Backup
B12	Backup

On-vehicle Service

Tools

Tools: Screwdriver, pry bar

Specifications

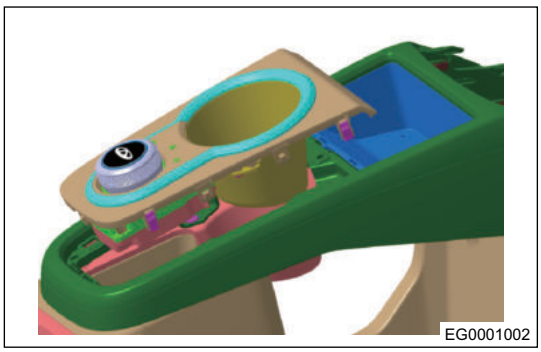
Torque Specifications

Part Name	Torque (N·m)
Connect shift control mechanism assembly to cross recess pan head self-tapping screw on shift panel	0.3 - 0.6

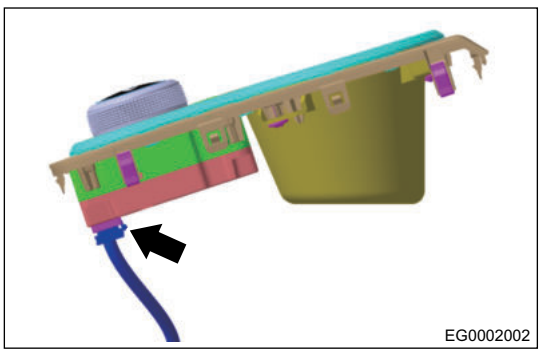
Shift Control Mechanism

Removal

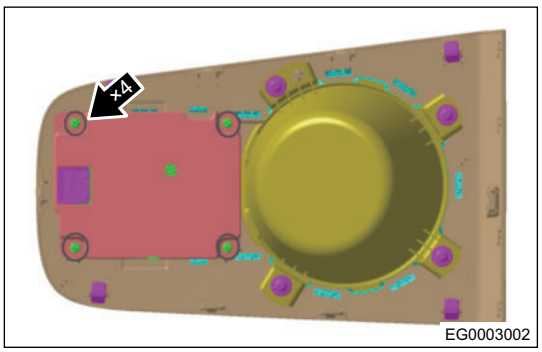
1. Remove shift panel with shift control mechanism assembly from auxiliary fascia console body with a pry bar, until all clips exit from corresponding grooves.


EG0001002

2. Unplug wire harness connector (arrow) from shift control mechanism assembly.


EG0002002

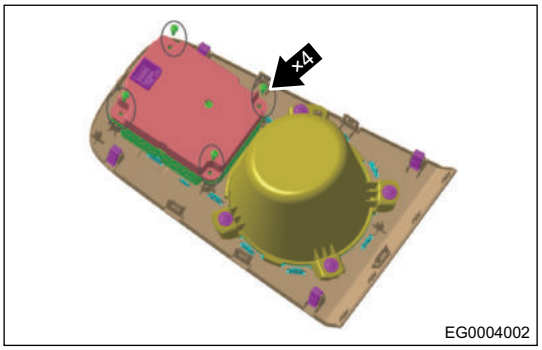
3. Remove 4 cross recess pan head self-tapping screws (-arrow) with a screwdriver, and remove shift control mechanism assembly from shift panel.


EG0003002

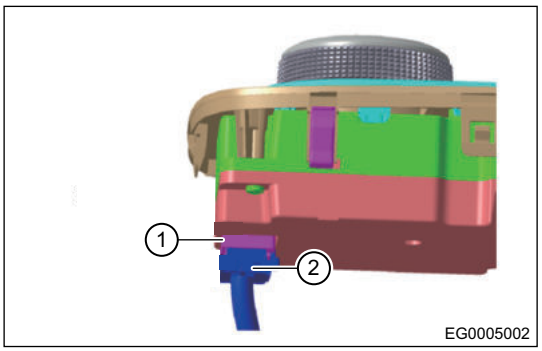
Installation

1. Connect shift control mechanism assembly to shift panel of auxiliary fascia console with 4 Q2712913F36 cross recess pan head self-tapping screws (ST 2.9 × 13).

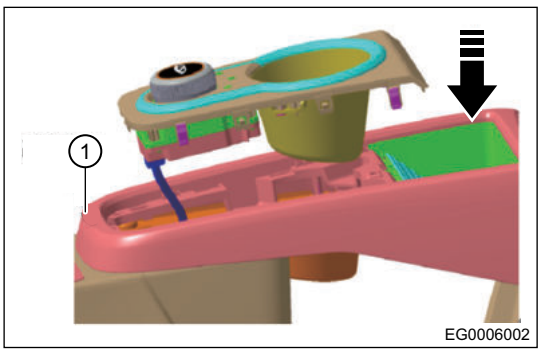
   Tightening torque: 0.3 - 0.6 N•m



2. Connect interior floor wire harness connector male terminal (2) to automatic shift control mechanism assembly connector female terminal (1).



3. After connectors are connected in place, clamp automatic shift control mechanism assembly and shift panel as a whole into auxiliary fascia console (1) (clamp from top to bottom in a direction perpendicular to auxiliary fascia console).



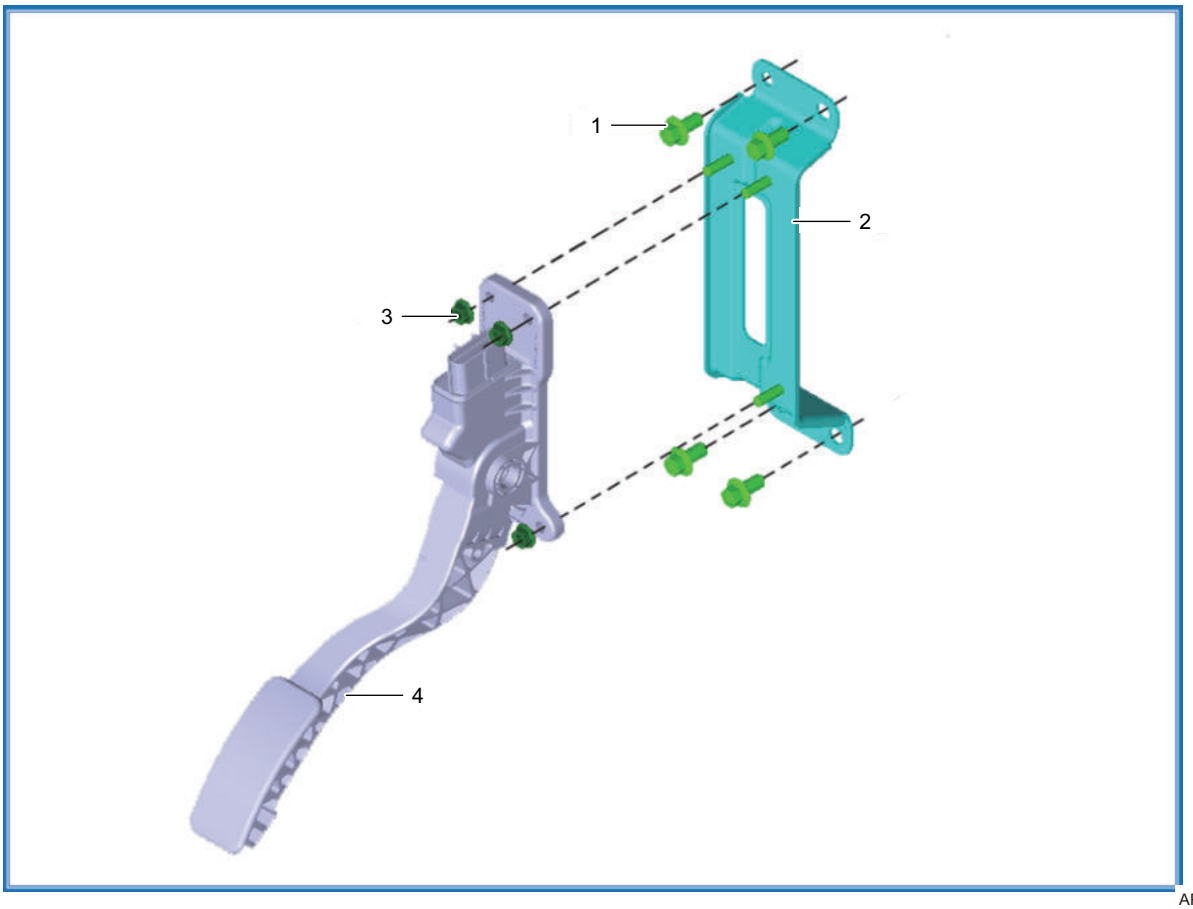
ACCELERATION CONTROL SYSTEM DEVICE

ACCELERATION CONTROL SYSTEM DEVICE

System Overview

System Components Diagram

Acceleration Control System Structure Diagram



No.	Name	No.	Name
1	Hexagon Flange Bolt	2	Electronic Accelerator Pedal Mounting Bracket
3	Hexagon Flange Nut	4	Electronic Accelerator Pedal Assembly

Component Function Description

Accelerator Pedal Position Sensor

Accelerator pedal position sensor (1) is located on the lower right part of driver seat.

AP0005002

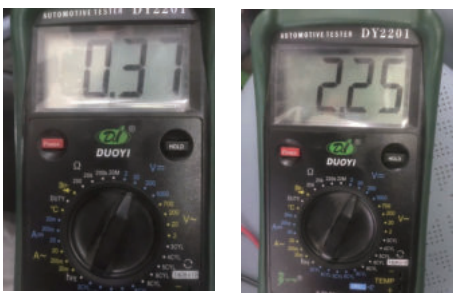
Function: Vehicle controller (VCU) issues generator torque/ speed command to motor controller (MCU) by monitoring accelerator pedal signal.

AP0004002

Accelerator pedal position sensor (data stream).

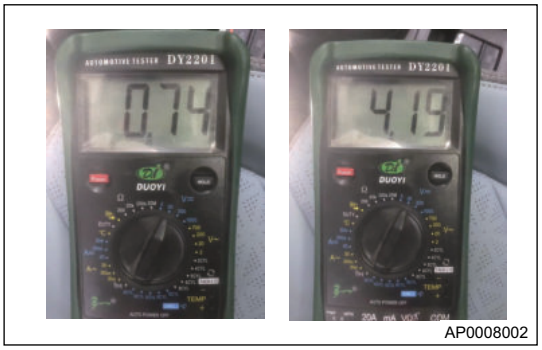
AP0006002

Accelerator pedal position sensor signal 1. The pedal is not depressed in the left picture, and the pedal is depressed in the right picture.



AP0007002

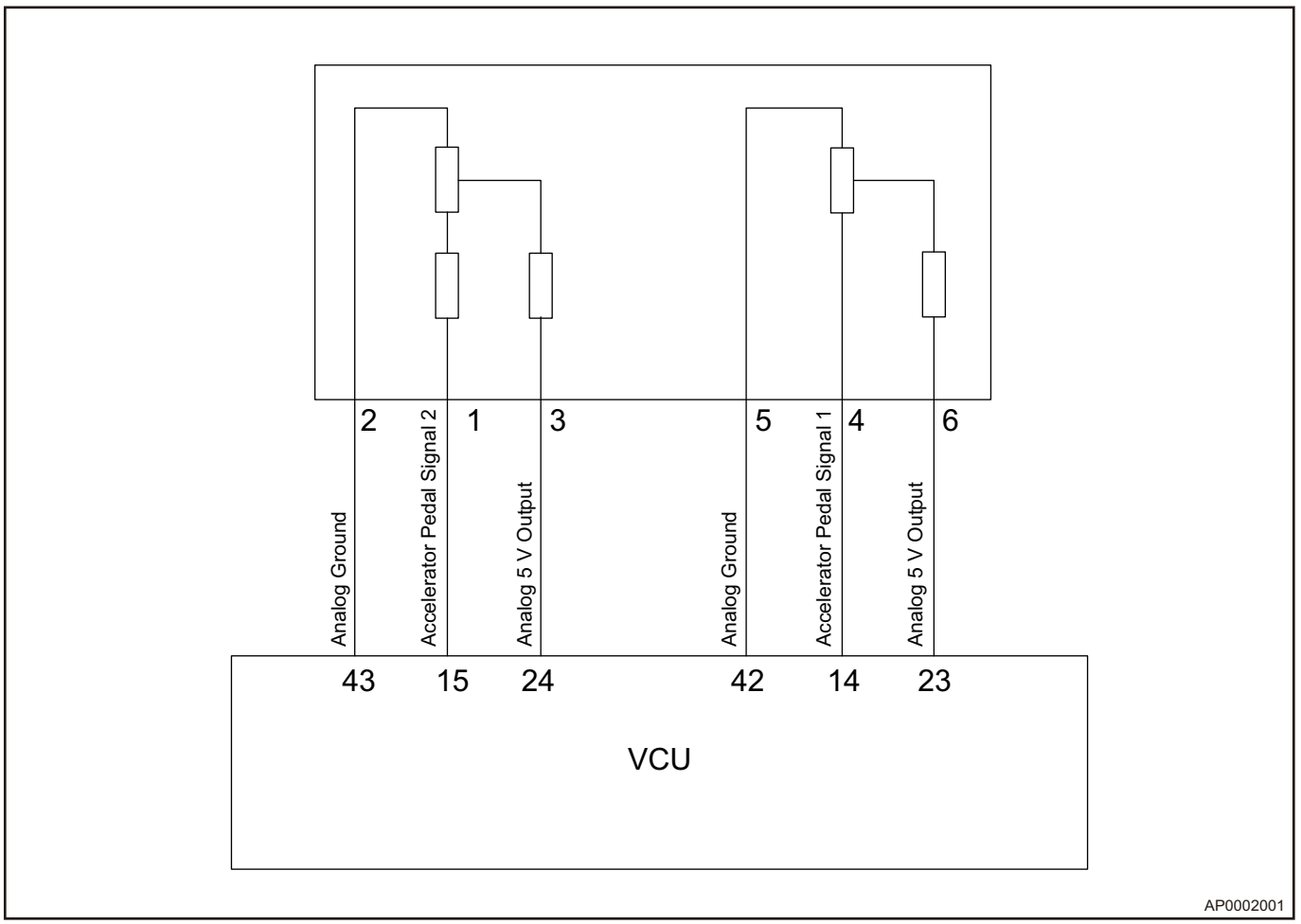
Accelerator pedal position sensor signal 2. The pedal is not depressed in the left picture, and the pedal is depressed in the right picture.



AP0008002

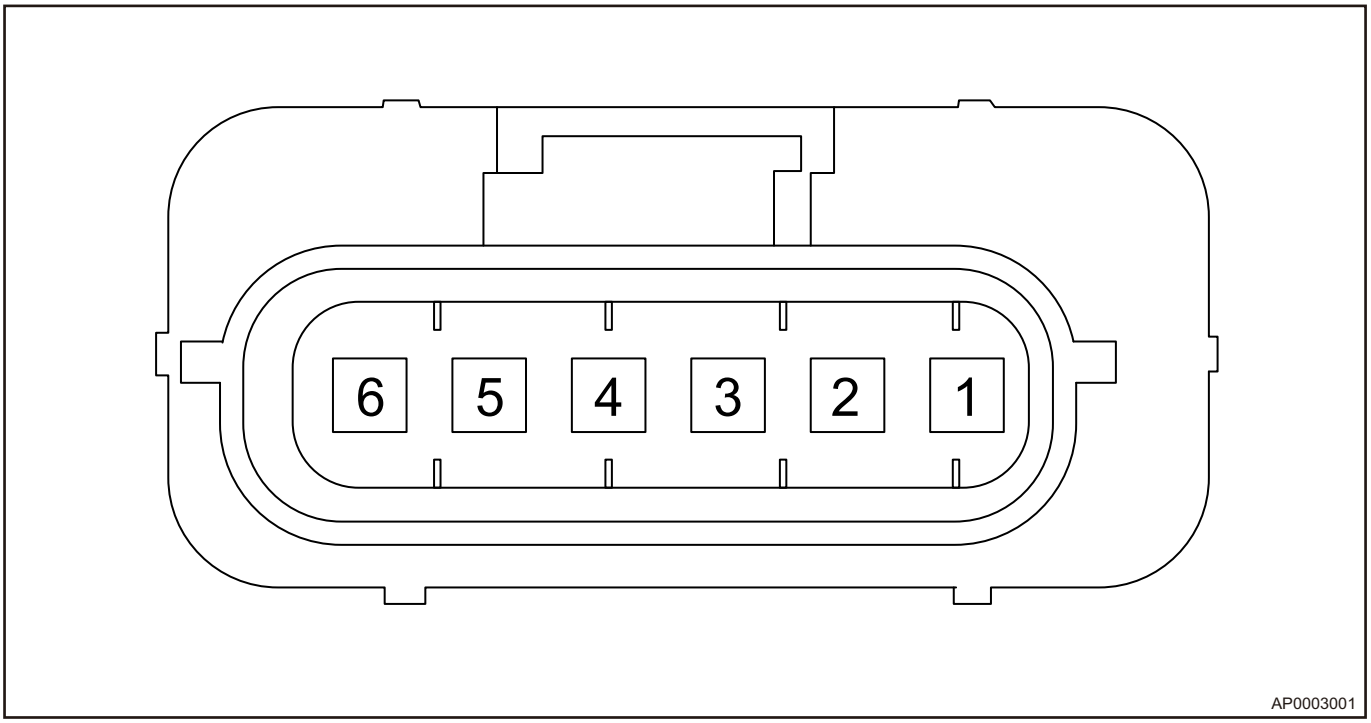
Electronic Accelerator Control Principle

Control Schematic Diagram



AP0002001

Electronic Accelerator Pedal Pin Definition



Pin	Definition
1	Output PPS2
2	Ground PPS2
3	Power Supply +5PPS2
4	Output PPS1
5	Ground PPS1
6	Power Supply +5PPS1

On-vehicle Service

Tools

Tools: 10# socket, ratchet wrench

Specifications

Torque Specifications

Part Name	Torque (N·m)
Electronic Accelerator Pedal Fixing Nut	25 ± 4
Electronic Accelerator Pedal Mounting Bracket Fixing Bolt	10 ± 1

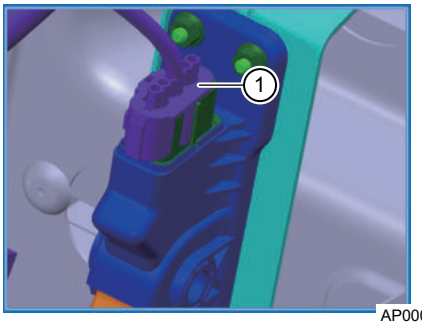
Removal and Installation of Electronic Accelerator Pedal

Removal

⚠

- Accelerator pedal position sensor is integrated with electronic accelerator pedal assembly, which cannot be disassembled separately.

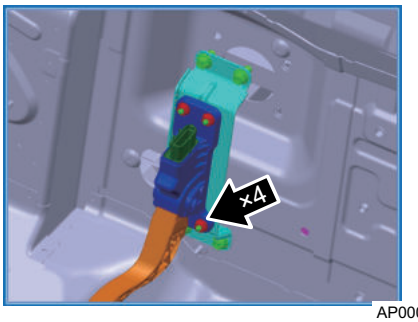
1. Turn the power switch to OFF and turn off all electrical equipment.
2. Disconnect the negative battery cable.
3. Disconnect the accelerator pedal position sensor (1) connecting wire.



AP0001002

4. Unscrew 4 fixing nuts (arrow) with 10# socket, and remove electronic accelerator pedal assembly.

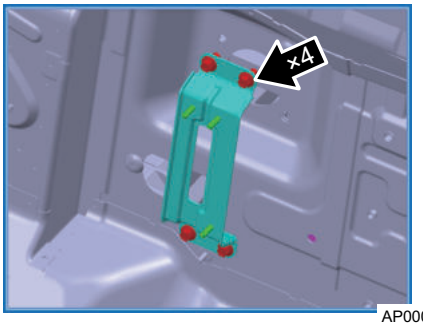
   Tightening torque: 25 ± 4 N•m



AP0002002

5. Unscrew 4 fixing bolts (arrow) from electronic accelerator pedal mounting bracket with 10# socket, and remove bracket.

   Tightening torque: 10 ± 1 N•m



AP0003002

Installation

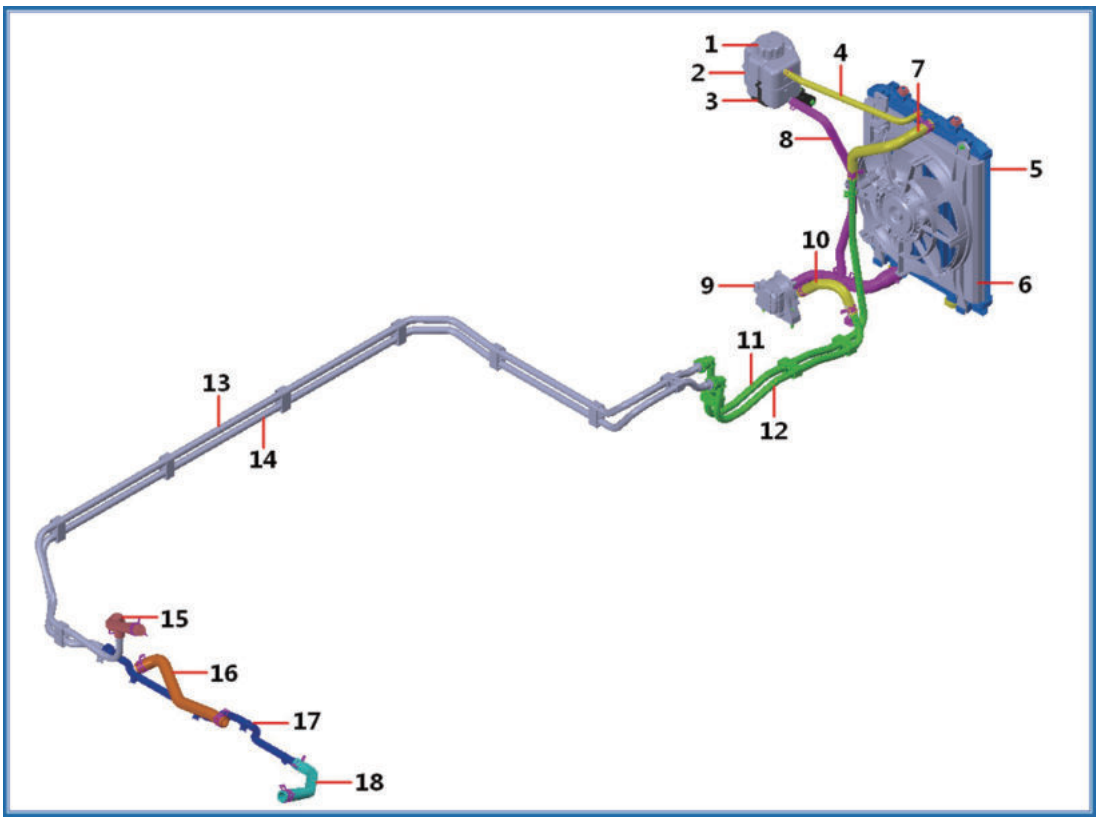
1. Installation is in the reverse order of removal.

COOLING SYSTEM

COOLING SYSTEM DEVICE

System Overview

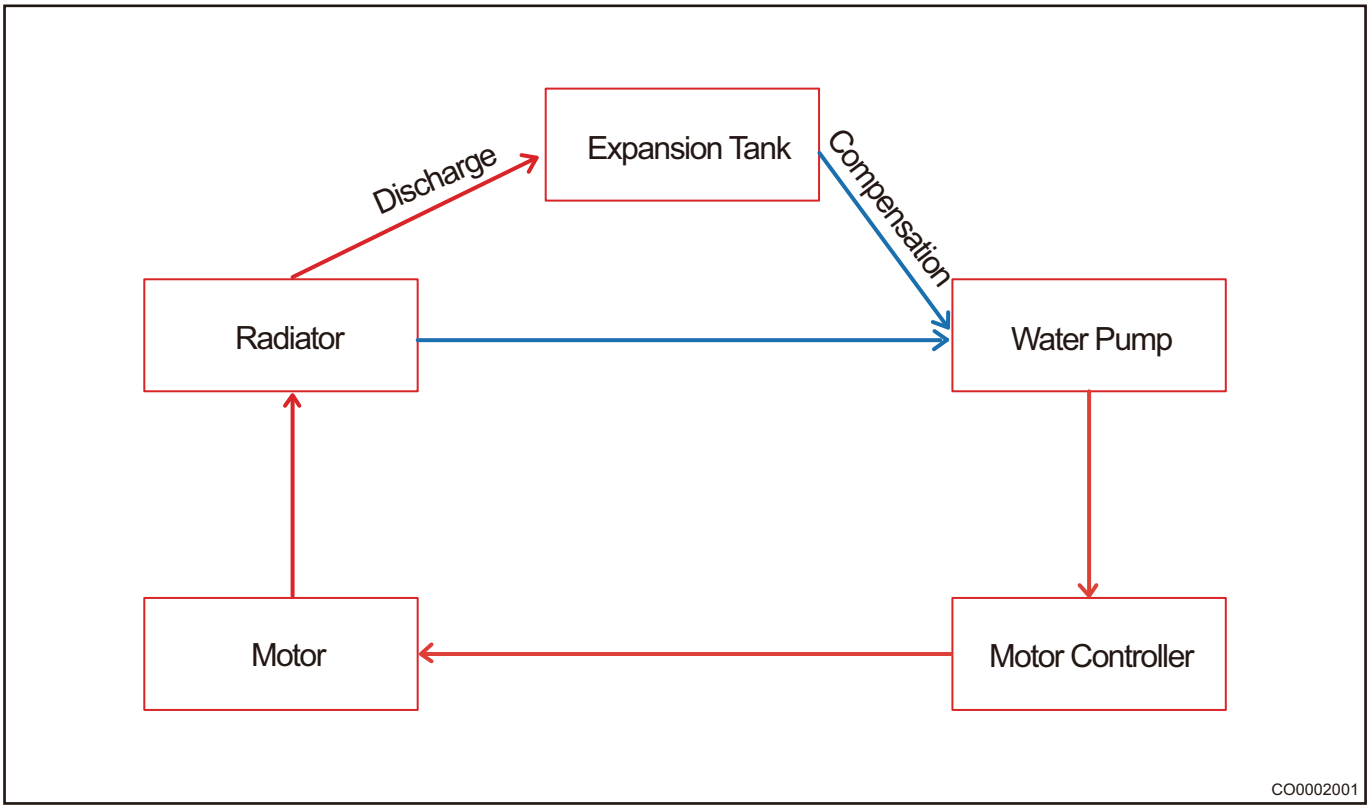
System Component Diagram



CO0001001

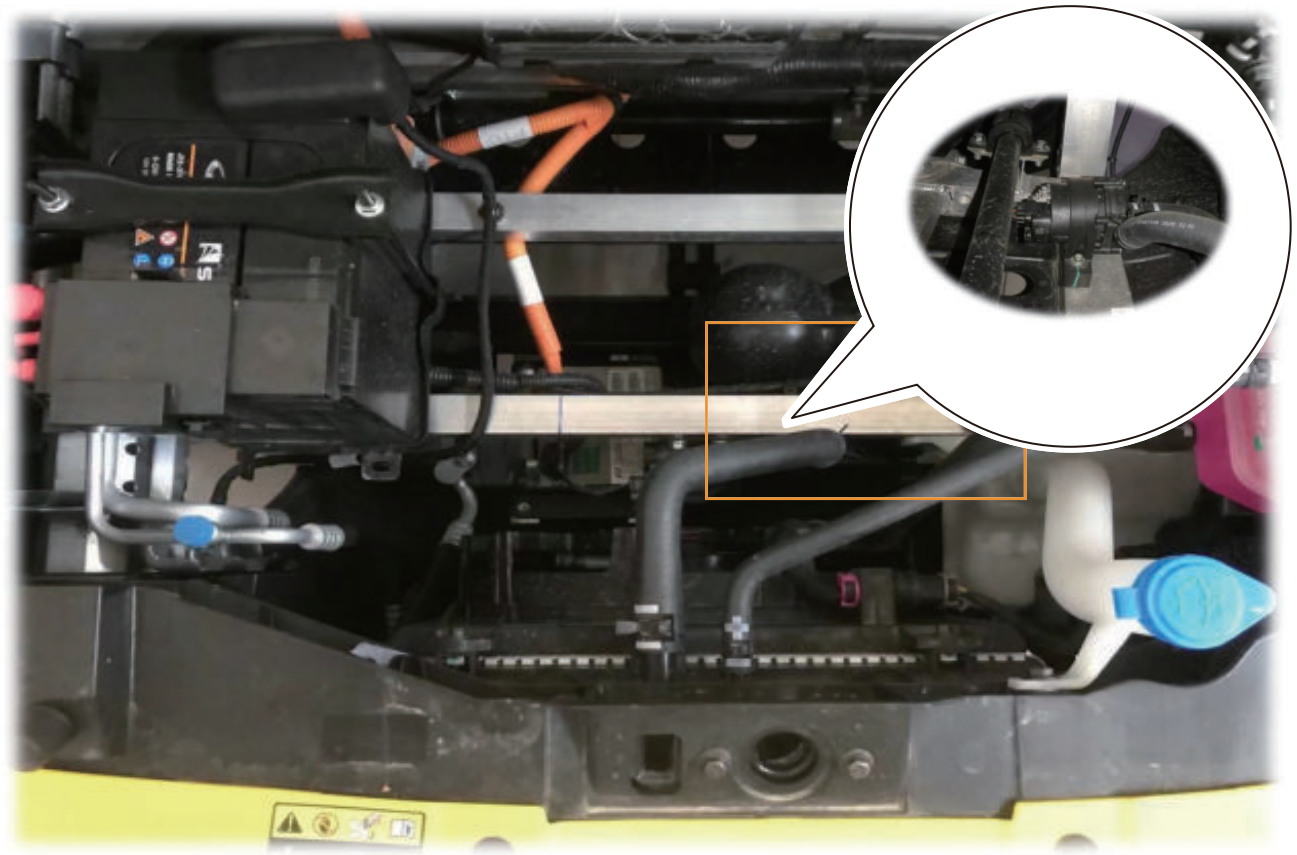
No.	Name	No.	Name
1	Expansion Tank Cap	2	Expansion Tank
3	Expansion Tank Bracket	4	Radiator Discharge Pipe
5	Radiator Assembly	6	Cooling Fan Assembly
7	Radiator Inlet Pipe	8	Water Pump Inlet Pipe Assembly
9	Electric Water Pump Assembly	10	Water Pump Outlet Pipe
11	Front Compartment Cooling Pipe Ⅰ	12	Front Compartment Cooling Pipe Ⅱ
13	Floor Cooling Pipe Ⅰ	14	Floor Cooling Pipe Ⅱ
15	Motor Outlet Pipe	16	Motor Inlet Pipe
17	Rear Compartment Cooling Pipe Assembly	18	Motor Controller Inlet Pipe

Operation Principle Diagram of Cooling System



Cooling Water Pump

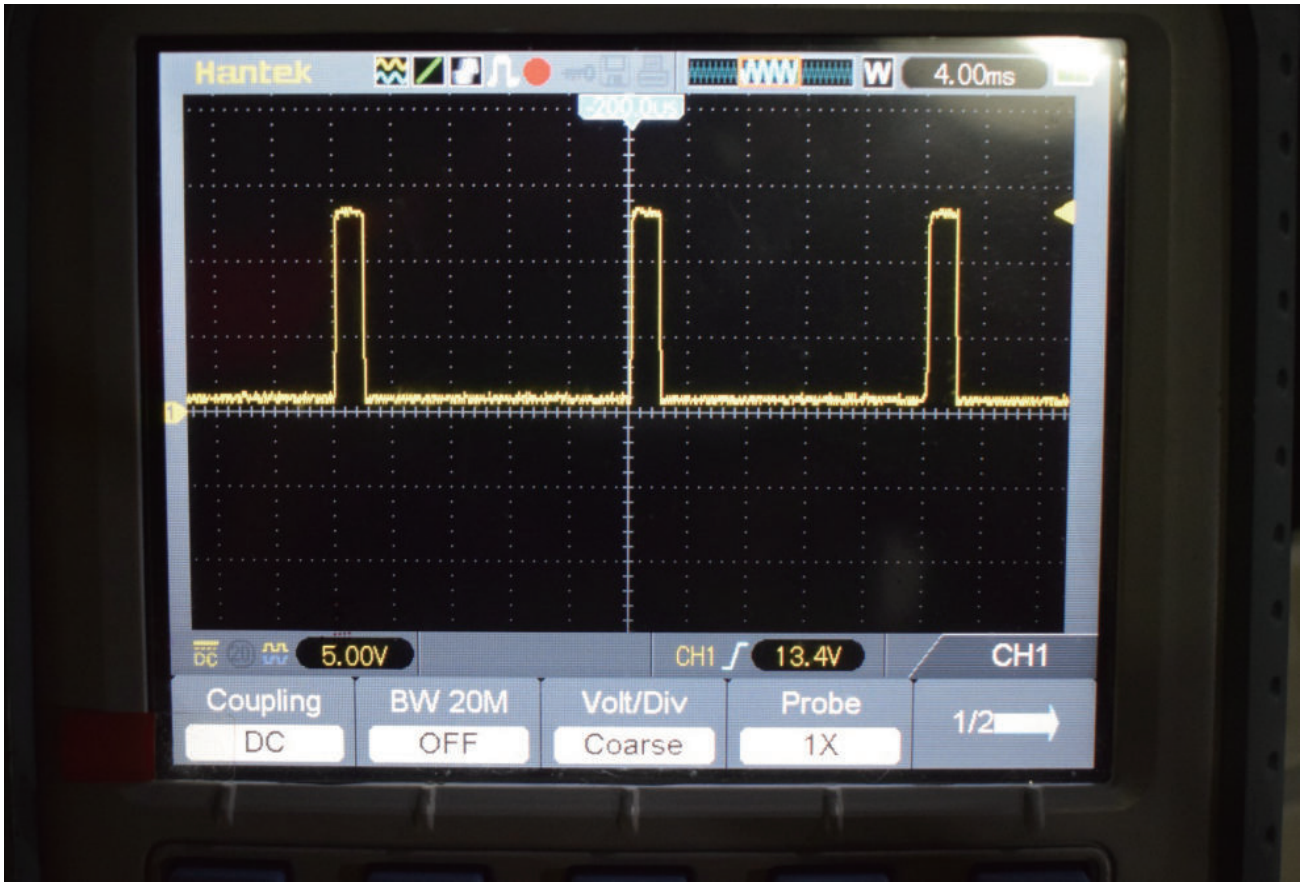
Installation Position
Left lower part of front compartment frame.



CO0006001

Control Method

1. Duty cycle control mode.
2. Controlling speed depends on the water involved.
3. Adjust temperature of cooling high pressure component.

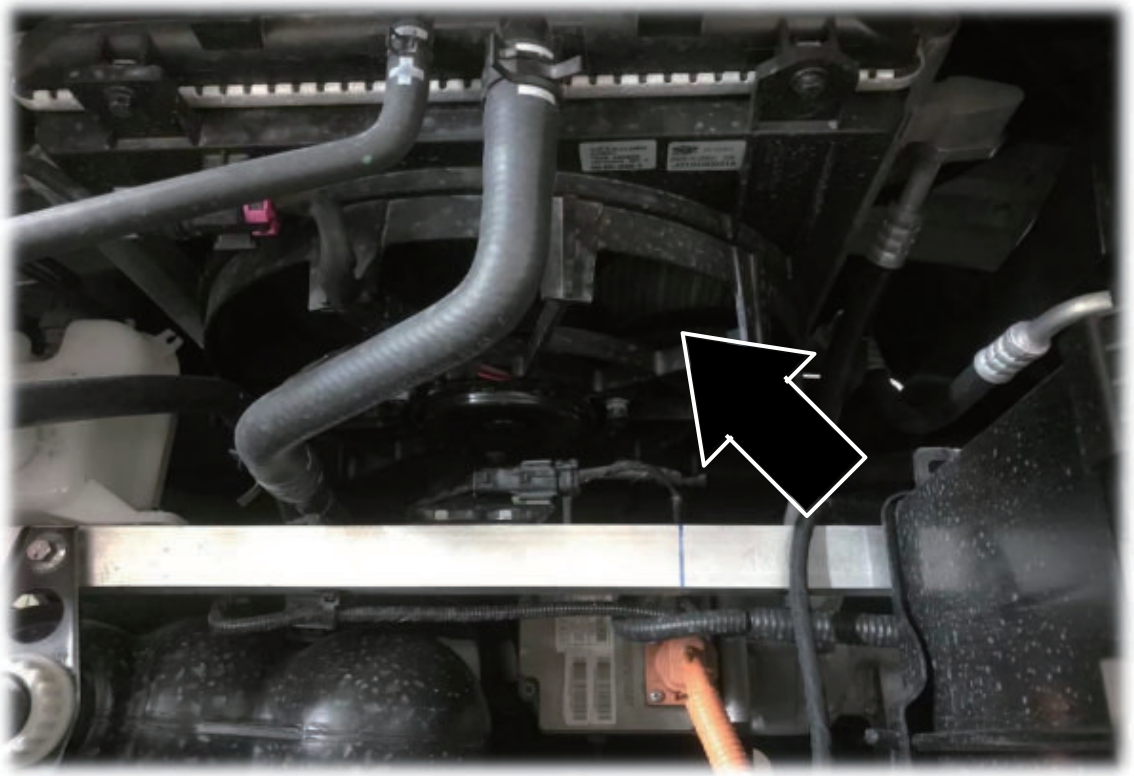


CO0008001

Temperature Corresponding to Water Pump Speed Setting

Maximum Temperature of Motor, Inverter, DCDC	⩽ 65℃	⩽ 75℃	⩽ 85℃	> 85℃
Water Pump Speed (rpm)	0	1500	2000	3000

Cooling Fan



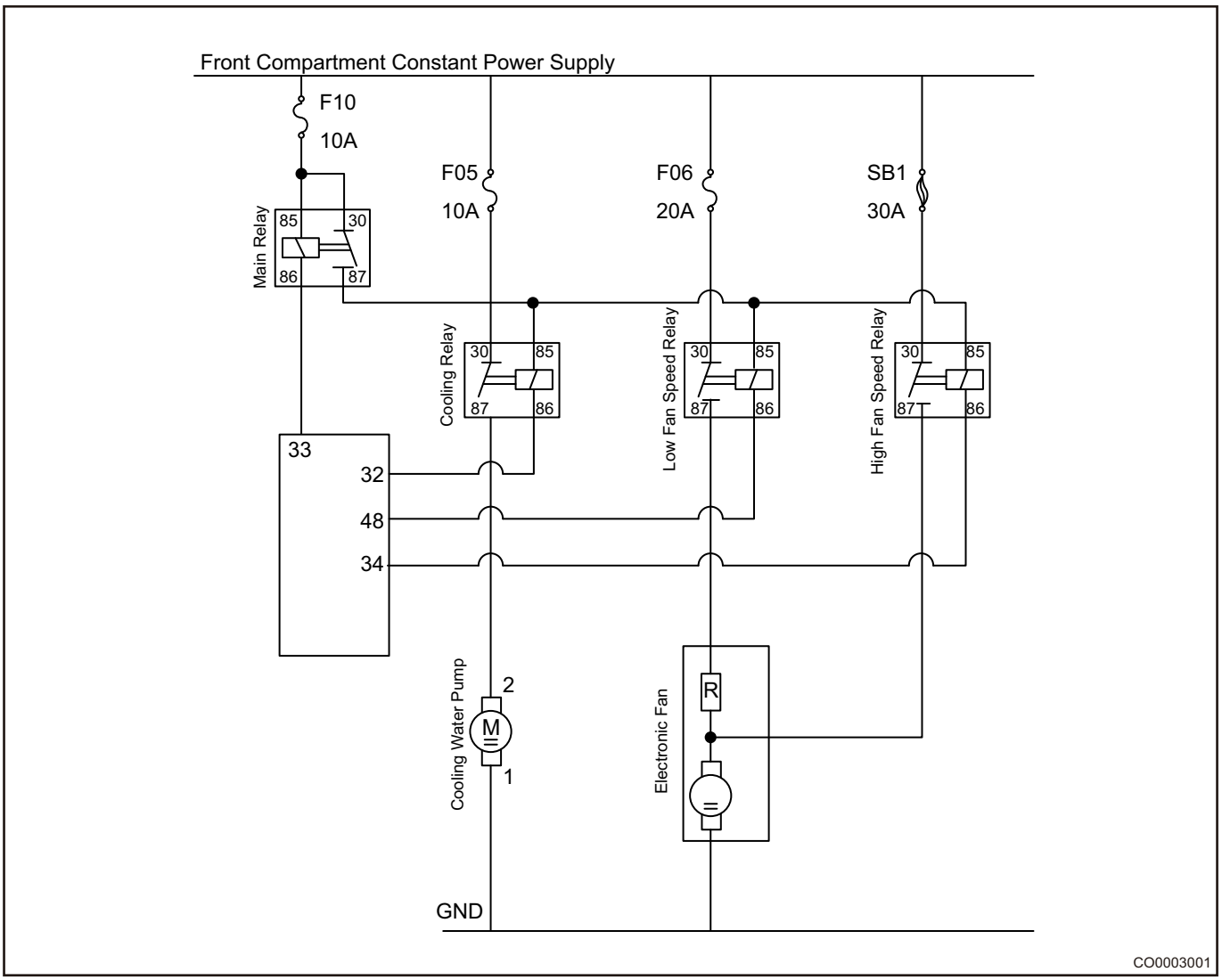
CO0009001

Operating Conditions

1. Fan operating condition: When motor or motor control temperature is higher than 65°, fan works at low speed.
2. Fan operates at low speed when A/C is operating, and fan operates at high speed when pressure of A/C system pipe is too high.

System Circuit Diagram

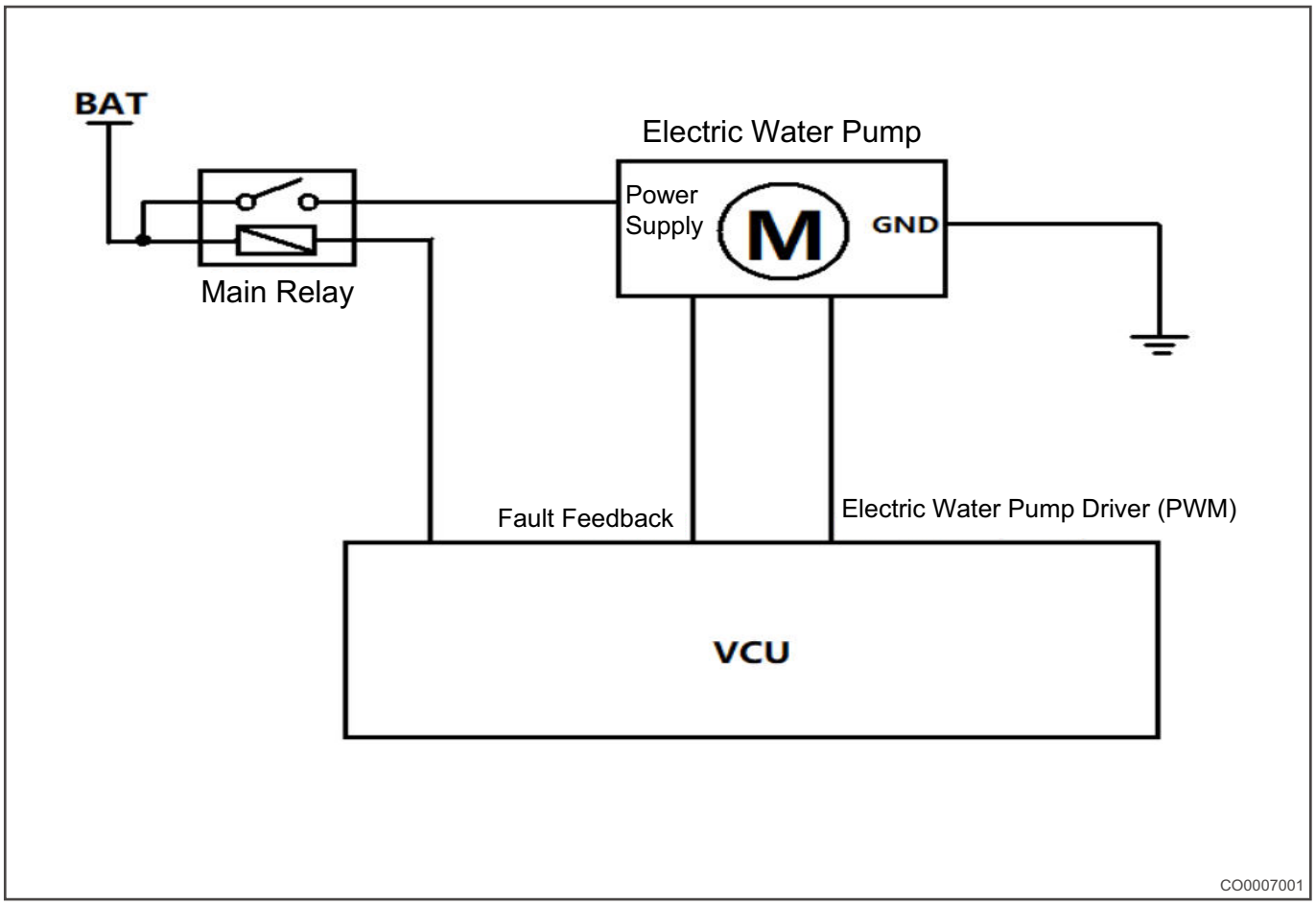
Control Principle Diagram of Cooling System



Operating conditions for fan

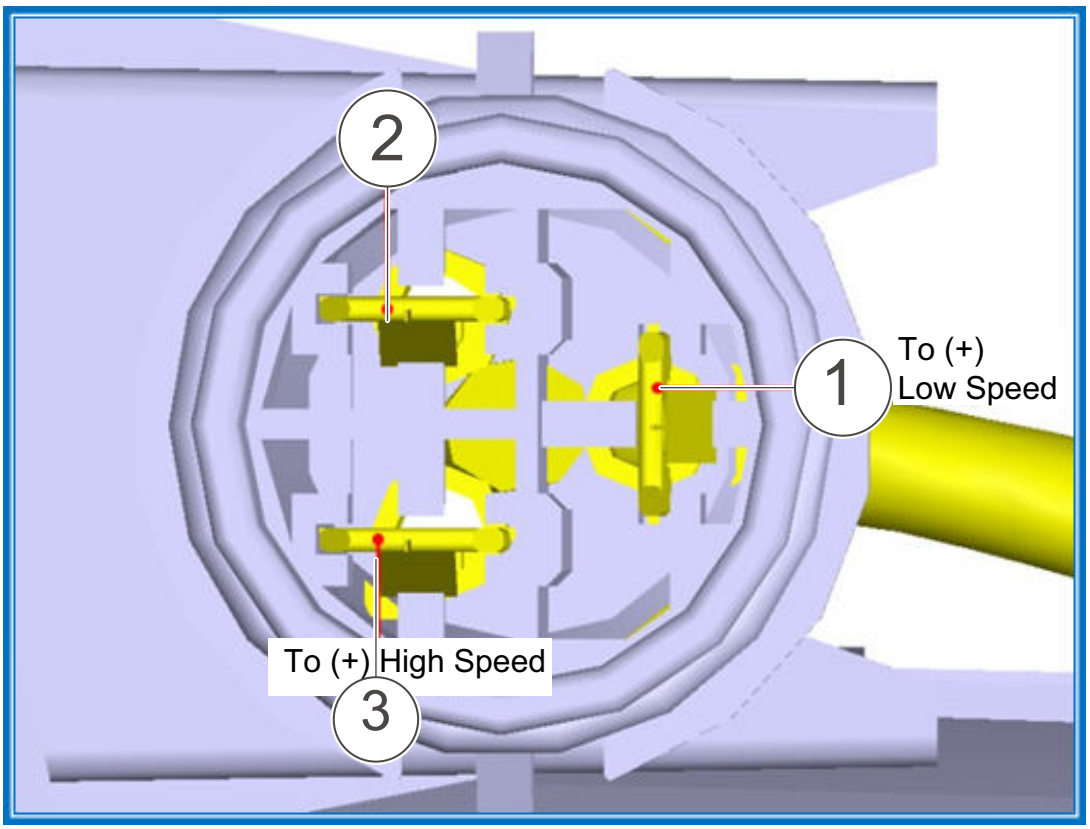
- When motor or motor control temperature is higher than 65°, fan works at low speed.
- Fan operates at low speed when A/C is operating, and fan operates at high speed when pressure of A/C system loop is too high.

Control Circuit

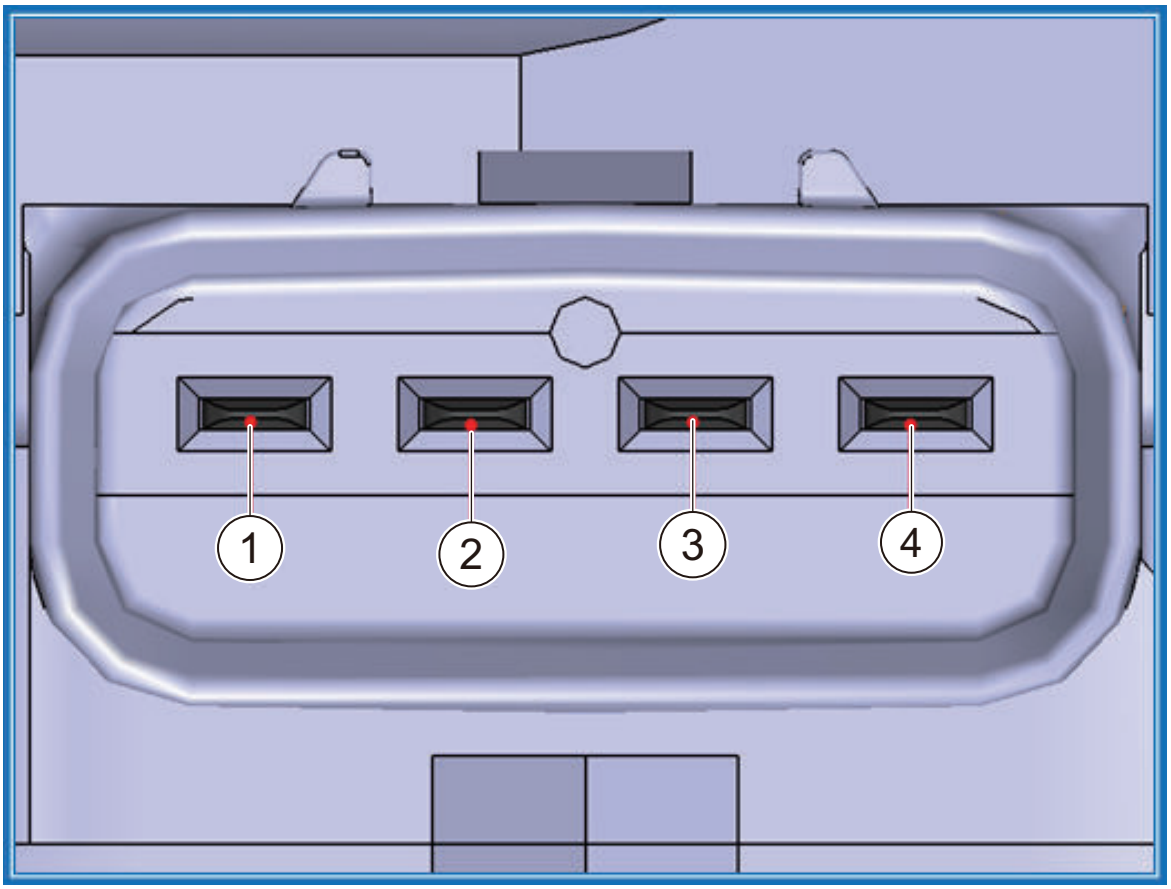


Module Terminal Definition

High Voltage Terminal Definition for Electric Compressor



Pin	Name	Pin	Name
1	To positive low speed	2	To negative
3	To positive high speed		



CO0005001

Pin	Name	Pin	Name
1	Positive	2	—
3	—	4	Negative

On-vehicle Service

Tools

Tools
Clamp plier, socket, labor protection appliances

Auxiliary Material
Coolant

Protection Appliances
Gloves, work cloth, safety helmet, working shoes

Specifications

Torque specifications

Part Name	Torque (N·m)
Water Pump Inlet and Outlet Pipe Assembly Clamp	25 ± 4
Expansion Tank Bracket Bolt	10 ± 1
Radiator Bracket Mounting Bolt	10 ± 1

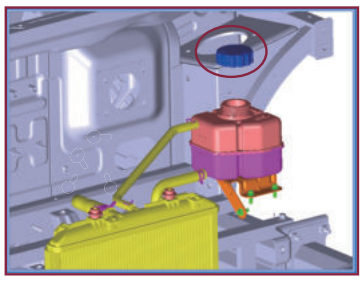
Removal and Installation for Cooling System Component

Removal

⚠

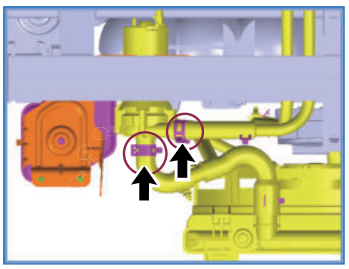
- Removal and installation should be carried out after a period of shut down to prevent scalding by residual coolant temperature.
- Wear labor protection appliances before removal and installation, failure to do so may cause burn and scratches.
- Turn power supply to OFF before removal and installation.
- Drain coolant before removal and installation, failure to so it may splash to high voltage electrical equipment when removing cooling pipe.

1. Remove front bumper and front bumper crossmember (for removal procedure, refer to “Interior” and “Exterior” sections in “Body”).
2. Unscrew expansion tank cap when temperature of motor and controller is low, lift the vehicle with a lift, pay attention to safety when lifting.

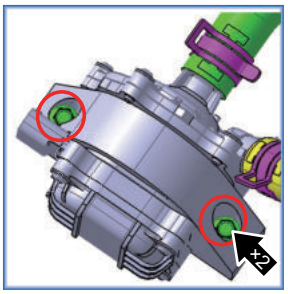

CO0004002

3. Prepare an antifreeze collection bucket, loose clamps (-arrow) from water pump inlet and outlet pipe assembly with clamp plier, and drain coolant.

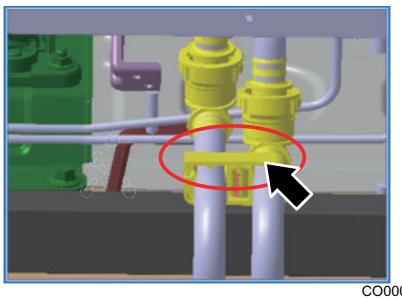
   Torque: 25 ± 4 N·m


CO0005002

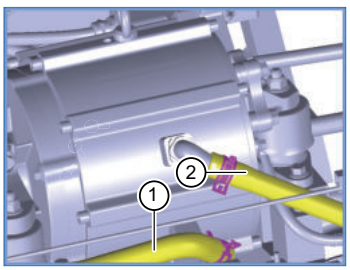
4. Pull out water pump connector, remove 2 mounting bolts (- arrow) with 8# socket and electric water pump assembly.


CO0006002

5. Remove water pipe connector and pull out water pipe fixing clip (arrow).

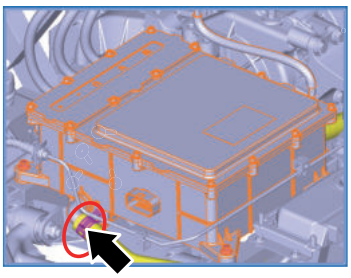

CO0007002

6. Remove clamp between motor outlet pipe and floor cooling outlet pipe assembly, drain motor coolant (1 is motor inlet pipe, 2 is motor outlet pipe).

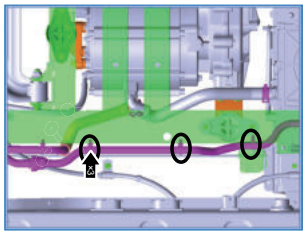


CO0008002

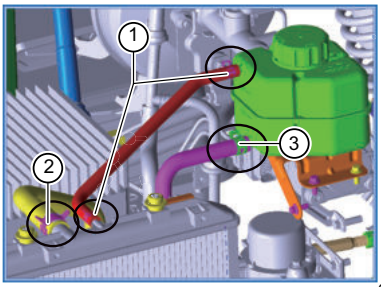
7. Remove clamp (arrow) between motor controller inlet pipe and floor cooling outlet pipe assembly.


CO0009002

8. Unplug fixing clips (arrow) from rear compartment cooling pipe assembly.

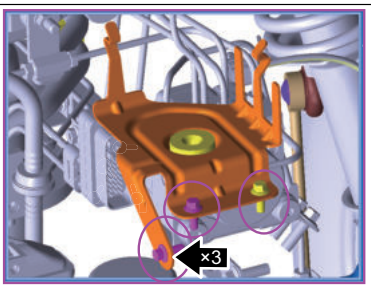


9. Lower the vehicle and remove radiator discharge pipe clamps (both sides), radiator inlet hose clamp and expansion tank outlet pipe (1 is radiator discharge pipe, 2 is radiator inlet hose, 3 is expansion tank outlet pipe).

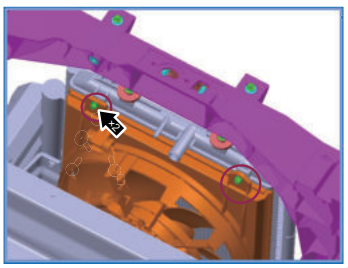


10. Gently break expansion tank clip to take out expansion tank, remove 3 fixing bolts (arrow) from expansion tank bracket with 6# socket, take out bracket.

    Tightening torque: 10 ± 1 N·m



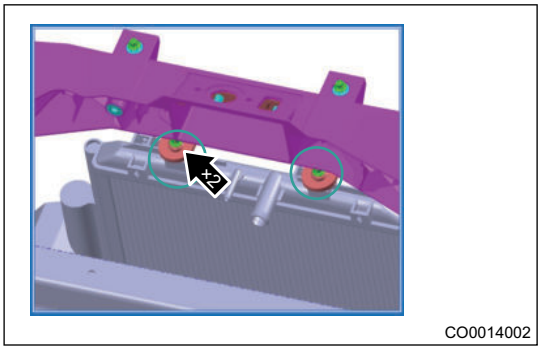
11. Using 6# socket, remove mounting bolt (arrow) from electronic fan, unplug fan connector, take out the fan.



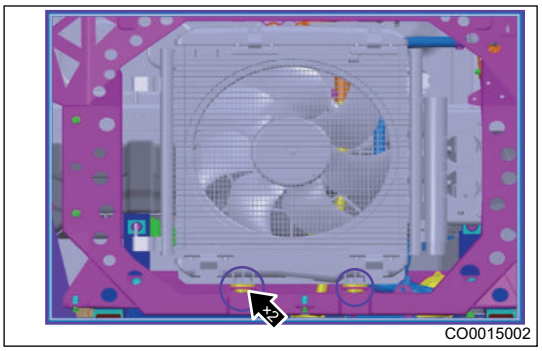
12. Remove front bumper assembly, front bumper lower protector, front bumper crossmember assembly (refer to “Interior” and “Exterior” sections in “Body”).
13. Remove inlet and outlet pipes from condenser after pumping out refrigerant from air conditioning system (refer to “A/C System” in “Vehicle Electrical”).

14. Remove 2 mounting bolts (arrow) from radiator upper bracket, take out radiator and condenser assembly.

    Tightening torque: 10 ± 1 N·m



15. Remove 2 mounting cushions (arrow) from radiator lower beam.



Installation

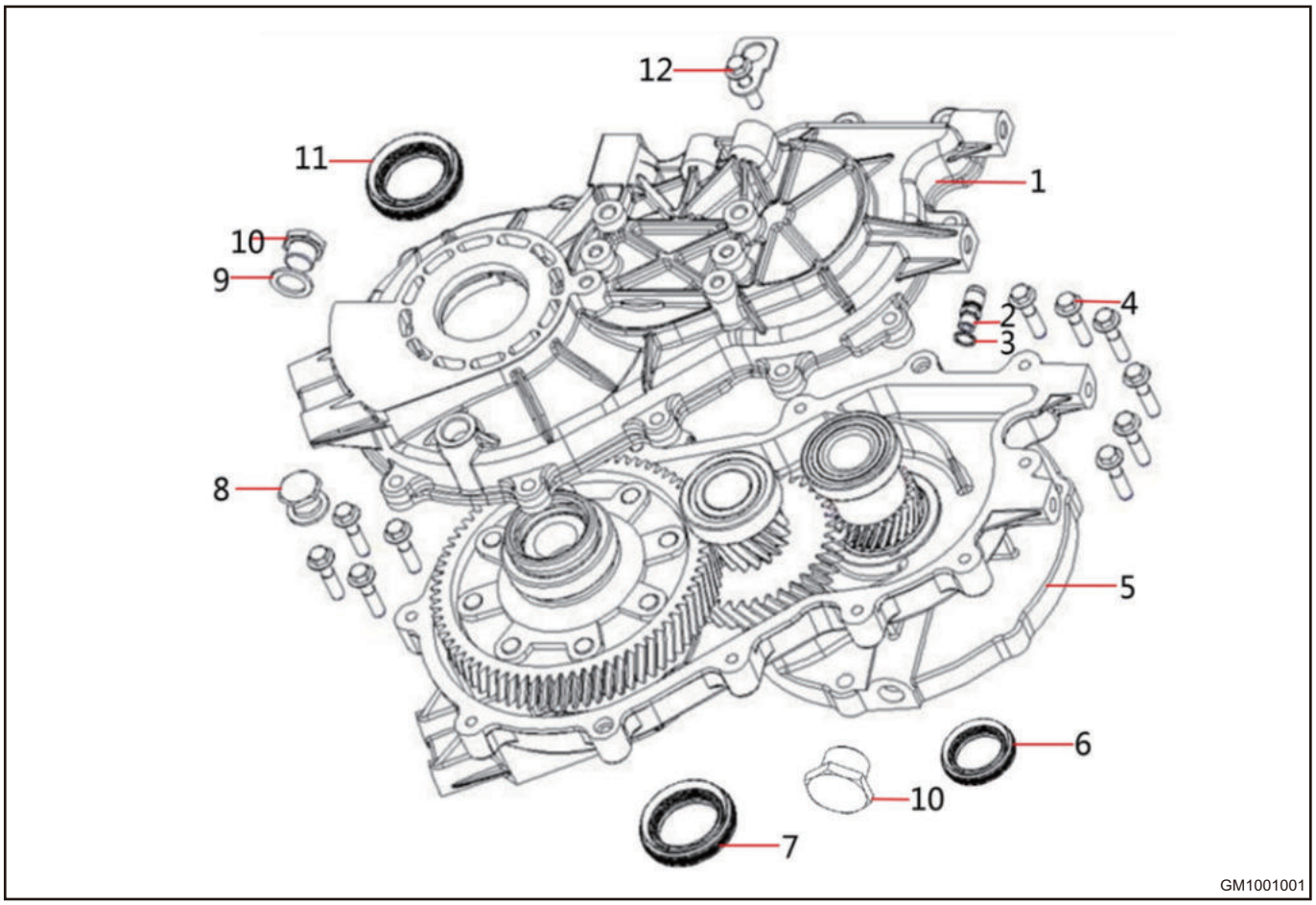
1. Installation is in the reverse order of removal.

FINAL DRIVE

FINAL DRIVE SYSTEM

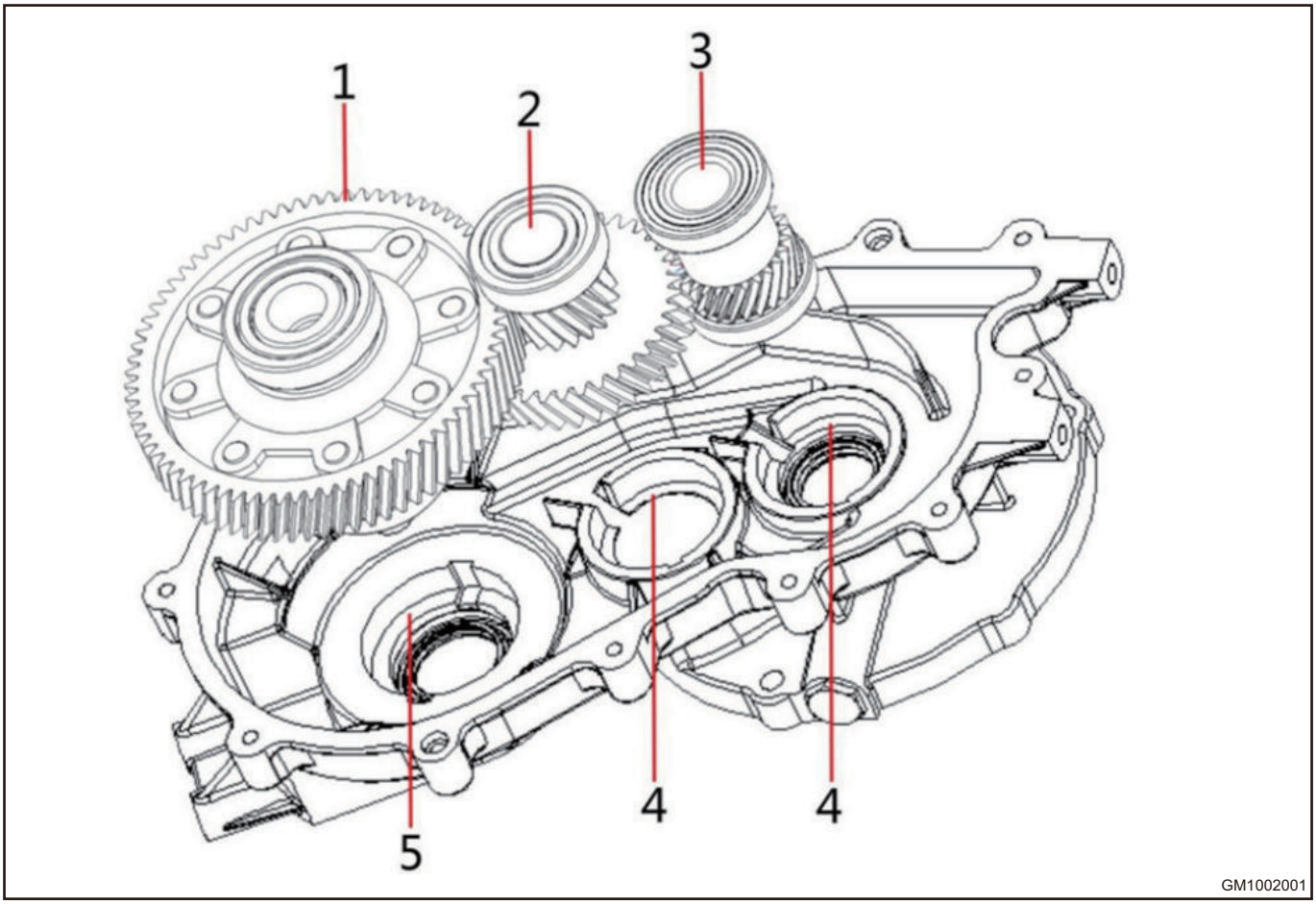
System Overview

Assembly System Disassembly Component Diagram



1	Rear Case	2	Breather Valve
3	Aluminum Washer	4	Assembling Bolt
5	Front Case	6	Primary Shaft Oil Seal
7	Differential Front Oil Seal	8	Drain Plug
9	Flat Washer	10	Filler Bolt
11	Differential Rear Oil Seal	12	Lifting Hook

Drive Train Disassembly Component Diagram



1	Differential Assembly	2	Second Shaft Assembly
3	Primary Shaft Assembly	4	Adjusting Shim with Outer Diameter 62
5	Differential Adjusting Shim		

Technical Parameters and Torque

Main Technical Parameters

No.	Name	Parameter
1	Rated torque	145 N·m
2	1st drive ratio	2.08
3	2nd drive ratio	3.789
4	1st central distance	79 mm
5	2nd central distance	110 mm
6	Lubricant type	75W - 90 GL-4
7	Oil amount	0.8 L
8	Maximum input speed	9000 rpm
9	Final drive weight	15 kg

Assembly Tightening Torque

Name	Assembly Torque (N·m)
Differential bolt M12×1-6g	90 ± 2
Drain plug M18×1.5	40 ± 2
Limit bolt M18×1.5	40 ± 2
Assembling bolt between front case and rear case M8×35	30 ± 2
Breather valve	15 ± 2

Sealant and Adhesive

Item	Specified Sealant and Adhesive
Joint surface between front case and rear case	1596F silicone rubber plane sealant or equivalent
Vent	1243 thread seal gum or equivalent
Differential drive gear bolt	

Lubricant Standard

Item	Specified Grease	Quantity/L
Final drive oil	75W-90 GL-4 synthetic gear oil	0.8
Drive shaft oil seal lip		As needed
Input shaft oil seal lip	Extreme pressure grease	

Maintenance Regulation

Check and replace (or replenish) the final drive lubricant regularly. The distance and time (unit: month) are indicated in the items, the inspection shall be subject to whichever comes first. Specified transmission oil: 75W-90 GL-4 synthetic gear oil. Oil amount: 0.8 L.
○: Check fluid level, tighten or adjust; ★: Replace lubricant

Item	Inspection and repair interval (for odometer reading and month, whichever comes first)											
	Month	1	3	6	12	18	24	30	36	42	48	54
	Odometer reading × 1000 km	1	5	10	20	30	40	50	60	70	80	90
Internal inspection of final drive case												
Check gear oil level in final drive case				○		○		○		○		○

Replace gear oil in final drive case	General usage condition		★		★		★		★		★	
	Severe usage condition		★		★	★	★	★	★	★	★	
Others inspection: Gear oil level inspection of final drive												

Note: "Severe usage condition" includes the following:

- Drive in dusty areas or vehicle is exposed to salty air or salt water frequently.
- Drive on uneven and flooded roads or mountain roads.
- Drive in cold areas.
- In cold season, motor runs at idle speed for a long time or the vehicle drives for a short distance frequently.
- The vehicle is used as a taxi or rental vehicle.
- Drive the vehicle slowly in urban area with heavy traffic at high temperature above 32°C for more than 50% of the total driving time.
- Drive with overload.

Diagnosis & Test

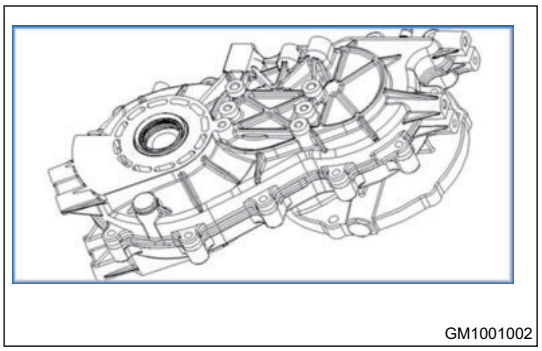
Problem Symptoms Table

Malfunction Condition	Possible Cause	Troubleshooting Method
Excessive or abnormal noise	Damaged primary shaft, second shaft and differential bearing	Replace bearing
	Bumps, burrs of gear tooth surface or pitting or poor contact on tooth surface	Repair or replace gear
	Improper gear axial position and clearance	Check, adjust
	Too low oil level, insufficient lubrication	Add oil to specified position
	There is foreign matter in assembly	Check, repair
Oil leakage	Excessive wear or damage of oil seal	Damaged differential oil seal
	Uneven seal gum or damaged gasket	Replace gasket, apply seal gum
	The joint surface is bumped and not repaired in time	Check, repair
	Invalid breather valve	Replace breather valve
	Damaged differential oil seal	Replace
Bearing is damaged abnormally	Lubricant contains metal impurities	Replace
	Lubrication is insufficient or lubricant does not meet the requirements	Replace
	Use unqualified bearing	Replace

On-vehicle Service

Disassembly of Final Drive Assembly

1. Remove the final drive assembly.
2. Place final drive on mounting bracket.
3. Remove the case bolt. (To be confirmed from the digital module)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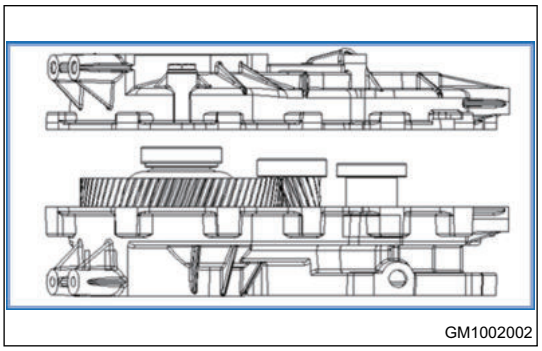
4. Separate case from middle on case joint surface (slightly tap front case with a mallet and separate case at the place with positioning pin on case joint surface). (To be confirmed from the digital module)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5. Remove differential assembly, second shaft assembly and primary shaft assembly. (To be confirmed from the digital module)

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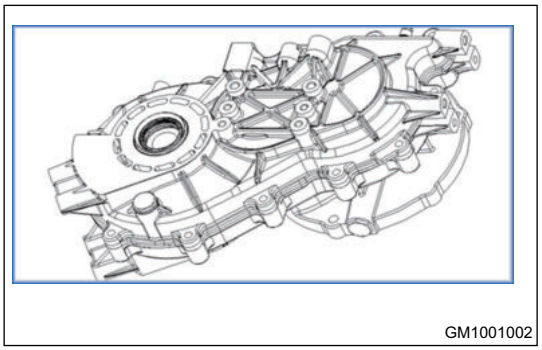
- Output shaft of final drive can only be repaired as a unit and cannot be removed and installed, otherwise the final drive may be damaged.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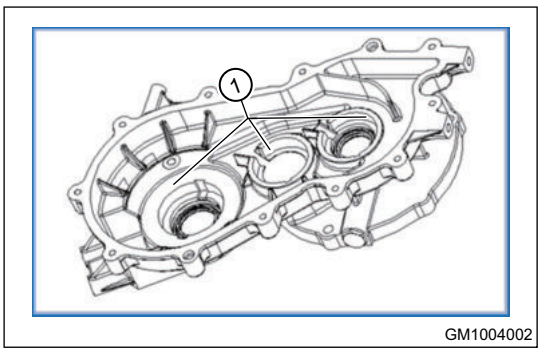
6. Note: There is bearing adjusting shim in each shaft bearing hole at the end of front case.



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Checking Use for Each Final Drive Part

1. Check tooth surface of each gear for wear. If shaft breakage, tooth breakage, pitting, gluing, tooth surface burnout, tooth surface plastic deformation and other phenomena occur, it is necessary to replace the gear.
2. Check each bearing for wear. If there are indentation, loose frame, pitting, burn and other phenomena in the inner/outer raceway and rolling body of bearing, and the radial clearance is more than 0.1 mm, please replace it.
3. Check each oil seal for wear. If there is abnormal wear, damage, please replace it.

⚠

- When replacing the 1st drive gear shaft, bowl type expansion plug shall be applied with plane sealing silicon rubber to prevent leakage.
- When replacing oil seal, apply lithium-based grease to groove between oil seal lip and dust lip.

Assembly of Final Drive

Cleaning

1. Clean gear, shaft, bearing, oil seal, front case and rear case with solvent, dry them in the air or dry with compressed air. Check gear, bearing and shaft. If roller is damaged or twisted, replace it. If the gear teeth are worn or broken, replace them.
2. Using a seal gum scraper or wire brush to remove foreign matters on the sealing surface. Confirm that the sealing surface is flat and smooth without oil and foreign matters. DO NOT forget to remove the old seal gum in the assembly hole and threaded hole.

Assembly

1. Assemble according to the reverse process of disassembly process.
   Tightening torque of differential screw: 90 ± 2 N·m
2. The knurled cylindrical pin of planetary gear shaft shall be riveted at the hole after assembly to prevent exit.
3. Assembling bolt.
   Tightening torque: 30 ± 2 N·m
4. Filler bolt and drain plug.
   Tightening torque: 40 ± 2 N·m
5. The joint surface of front/rear case must be applied with silicone rubber plane sealant, which shall be applied evenly and continuously without disconnection or excessive application.
6. Each part is assembled in place, preventing rough assembly and damaging to part.

Bearing Adjustment Procedure

Replacing Bearing in Pairs

If one of differential bearings is defective, replace two differential bearings; If one of primary shaft bearings is defective, replace two bearings on the primary shaft; If one of second shaft bearings is defective, replace two bearings on the second shaft.

Adjusting Bearing

After adjusting with the bearing adjusting shim, the axial movement of primary shaft/second shaft is adjusted to less than 0.1 mm through adjusting shim, and the differential bearing is pre-tightened by 0.1 - 0.2 mm. The shaft rotation torque shall not be less than 5 N·m due to interference assembly. If it does not meet the requirements, adjust it again.

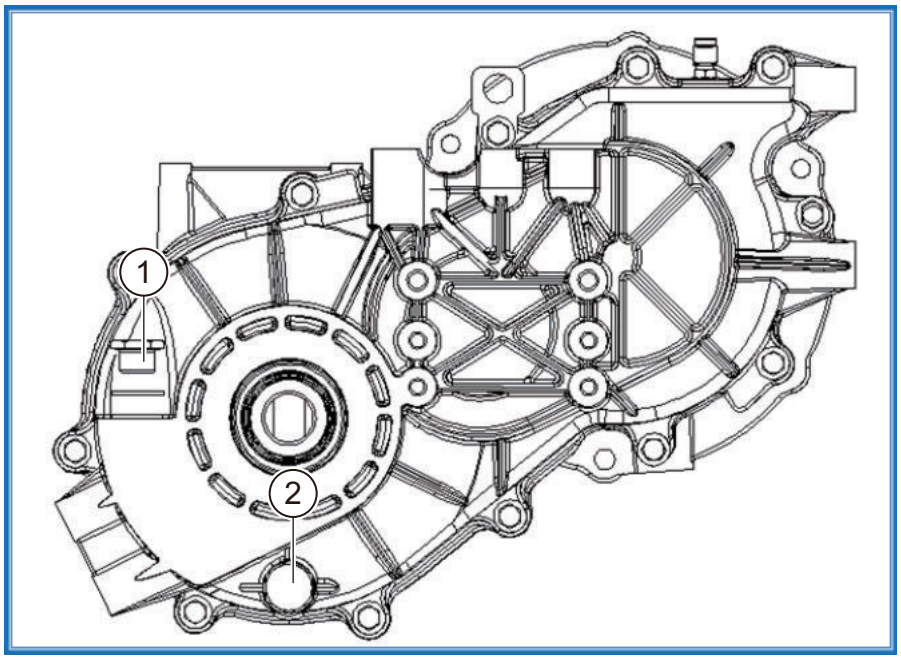
⚠

- The parts shall be cleaned before assembly, ensuring the cleanliness of case and the service life of transmission.
- Be careful during installation, try to prevent oil seal from being scratched and leaking. It can be protected with special boot.
- The joint surface must be cleaned before applying seal gum, and avoid impact to the joint surface to prevent oil leakage.
- When installing primary shaft oil seal and differential oil seal, apply grease on oil seal lip, press the oil seal fully into case with special tool.

Installation of Final Drive Assembly

1. Install final drive assembly to motor assembly, pay attention that the breather valve assembly of final drive is in upper part.
2. Tightening torque for assembling final drive and motor assembly bolt is 60 ± 2 N·m, and tightening torque of drain plug is 40 ± 2 N·m.
3. Tightening torque for assembling motor and mounting bolt is 60 ± 2 N·m.
4. Tightening torque for assembling final drive and mounting bolt is 60 ± 2 N·m.
5. Assemble other parts according to the vehicle requirements.
6. Apply gear oil with the required number and calibration capacity, tightening torque for tightening filler bolt is 40 ± 2 N·m.
7. Perform road test and check for leakage.
8. During performing road test, remove nut at joint surface between front case and motor, and check primary shaft oil seal for leakage.

Inspection and Replacement of Final Drive Gear Oil



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1	Filler Bolt	2	Drain Plug

1. Checking oil level.
   - Check each component for trace of oil leakage.
   - Unscrew filler bolt and check if oil level is at the position below filler bolt hole.
   - Check if final drive oil has become obviously dirty and has appropriate viscosity.
   - Tighten the filler bolt to the specified torque.
     Tightening torque: 40 ± 2 N·m
2. Replacing final drive oil
   a. Unscrew the final drive drain plug.
   b. Drain the final drive oil.
   c. Tighten the drain plug to specified torque.
      Tightening torque: 40 ± 2 N·m
   d. Unscrew the filler bolt, fill the specified final drive oil until oil level reaches the position below the filler bolt hole.
   e. Tighten the filler bolt to the specified torque.
      Tightening torque: 40 ± 2 N·m

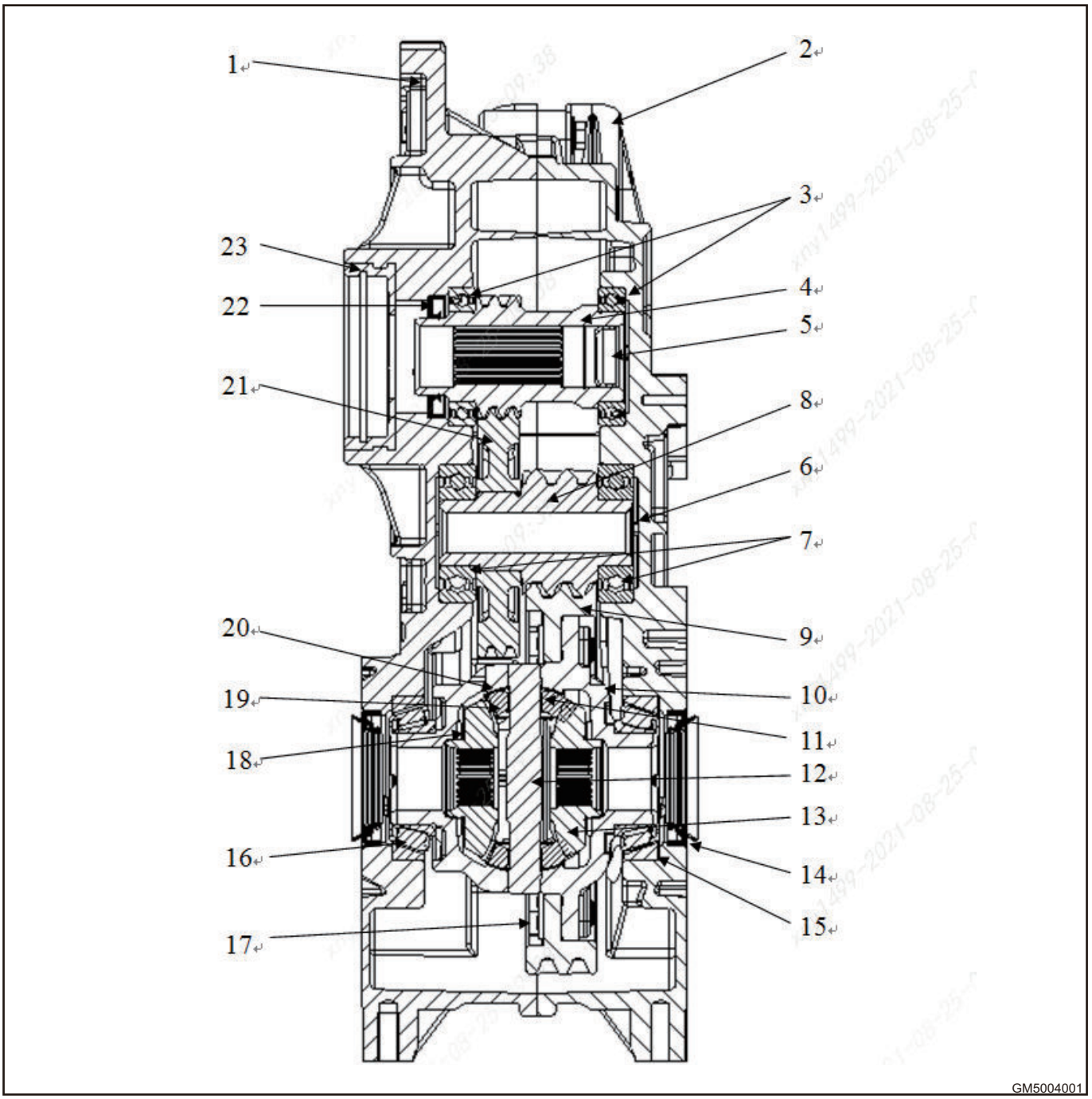
THREE-IN-ONE FINAL DRIVE

THREE-IN-ONE FINAL DRIVE

System Overview

System Components Diagram

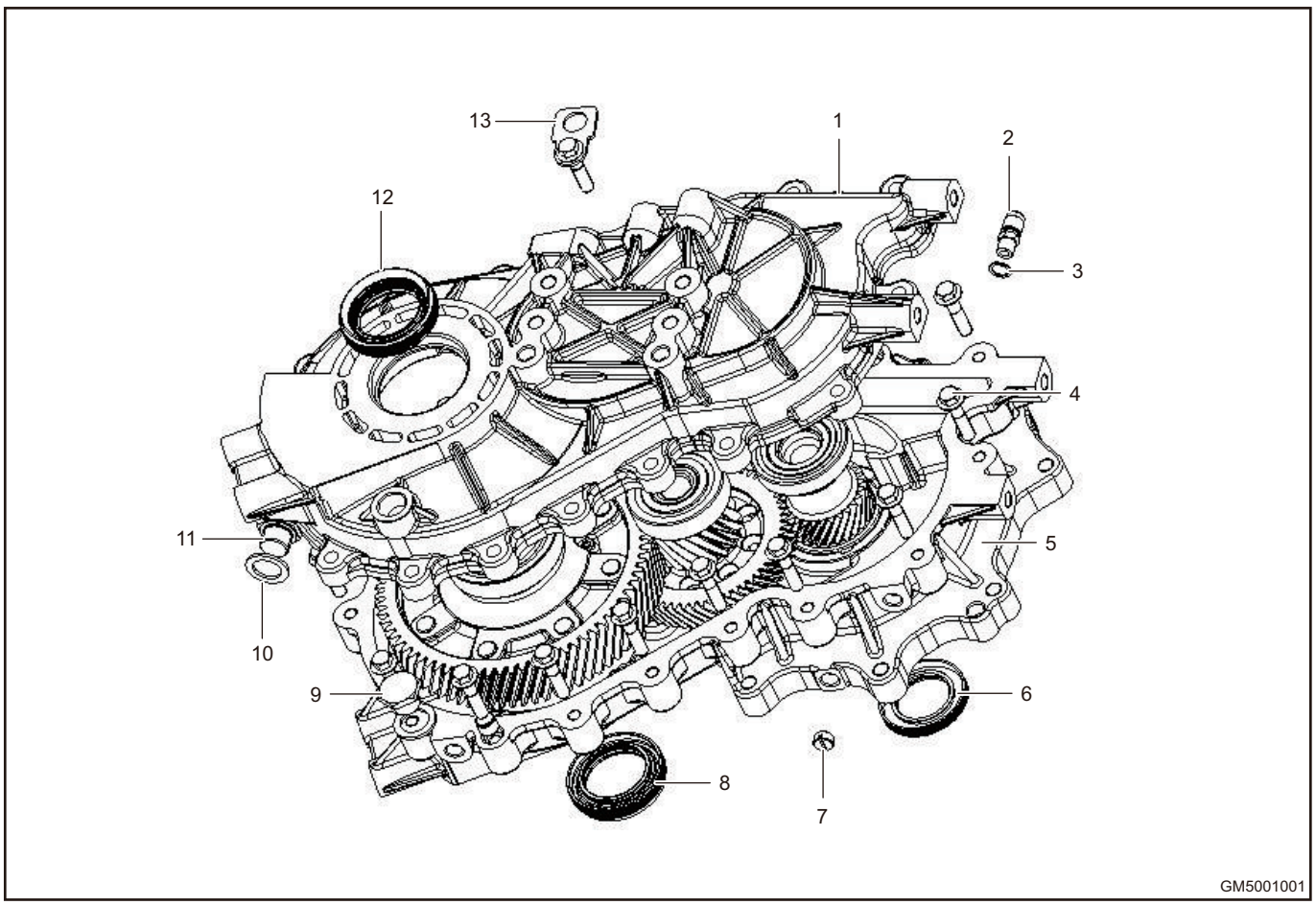
Cutaway View of Three-in-one Final Drive



No.	Name	No.	Name
1	Front Case	2	Rear Case
3	Primary Shaft Bearing	4	1st Drive Gear Shaft

5	Bowl Type Expansion Plug	6	Bearing Shim with Outer Diameter of 62
7	Second Shaft Bearing	8	2nd Drive Gear Shaft
9	Driven Gear of Final Drive	10	Differential Case
11	Knurled Cylindrical Pin - Planetary Gear Shaft	12	Planetary Gear Shaft
13	Drive Shaft Gear	14	Oil Seal - Differential
15	Adjusting Shim - Differential Bearing Outer Race	16	Differential Bearing
17	Connection between Bolt and Driven Gear of Final Drive	18	Drive Shaft Gear Washer
19	Planetary Gear	20	Planetary Gear Washer
21	1st Driven Gear	22	Primary Shaft Oil Seal

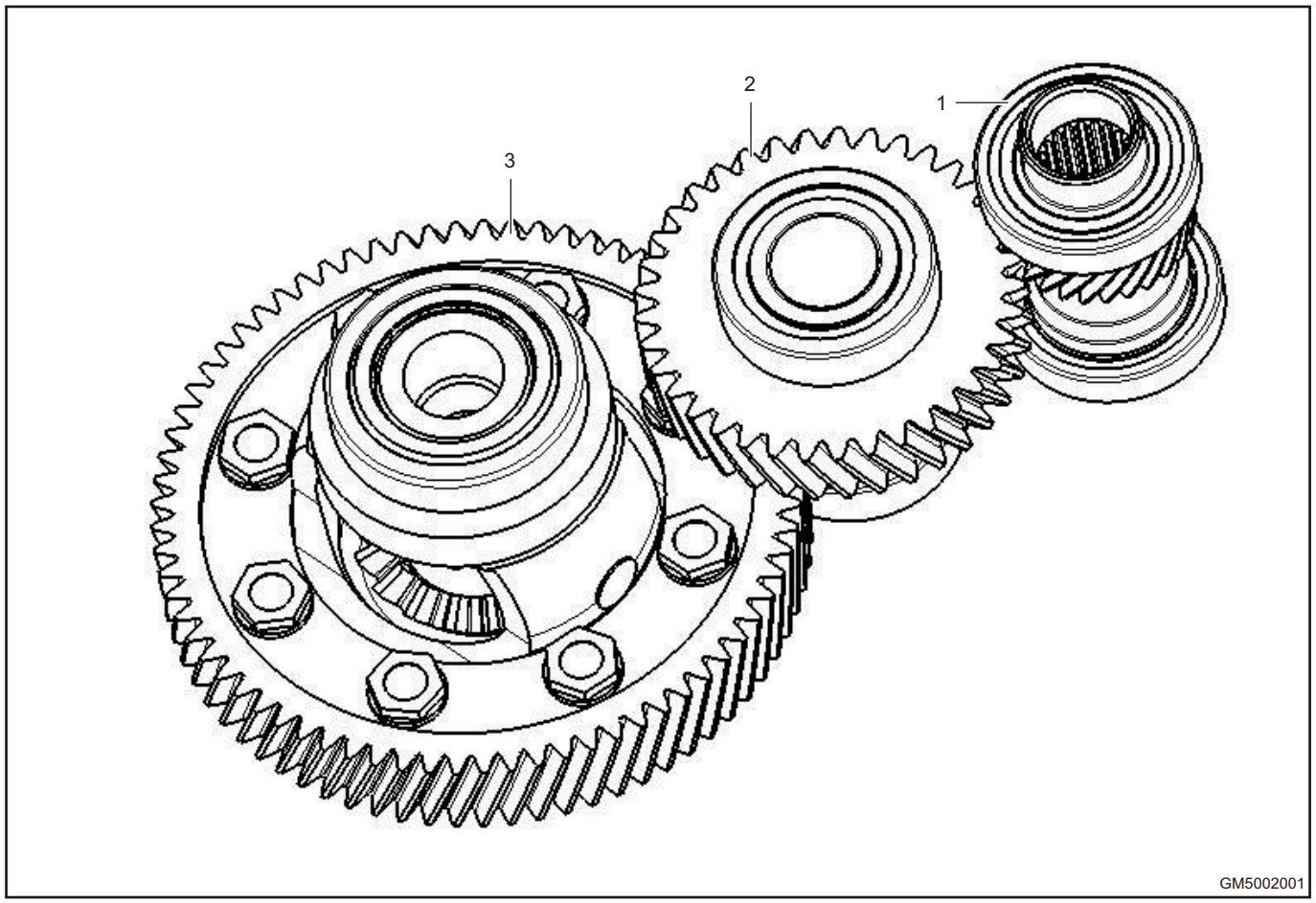
Exploded View of Final Drive Assembly



No.	Name	No.	Name
1	Rear Case	2	Breather Valve
3	Aluminum Washer	4	Assembling Bolt
5	Front Case	6	Primary Shaft Oil Seal

7	Porthole Plug	8	Differential Front Oil Seal
9	Drain Plug	10	Flat Washer
11	Filler Bolt	12	Differential Rear Oil Seal
13	Lifting Hook		

Drive Train Structure Diagram



No.	Name	No.	Name
1	Primary Shaft Assembly	2	Second Shaft Assembly
3	Differential Assembly		

Component Function Description

Three-in-one Final Drive

- Main technical parameters

No.	Name	Parameter
1	Rated torque	150 N•m
2	1st drive ratio	2.08
3	2nd drive ratio	3.789
4	1st central distance	79 mm
5	2nd central distance	110 mm
6	Lubricant type	75 W - 90 GL - 4
7	Oil amount	0.8 L
8	Maximum input speed	9000 rpm
9	Final drive weight	16.3 kg

- Transport and storage
  1. Place final drive on mounting bracket.
  2. The final drive should be packed before transportation, and the packing box should ensure that the final drive will not be damaged under normal transportation conditions.
  3. The final drive should be stored in a ventilated and dry warehouse.

Repair and Maintenance

1. Check and replace (or replenish) the final drive lubricant regularly.

   Drive in dusty areas or vehicle is exposed to salty air or salt water frequently.

   Drive on uneven and flooded roads or mountain roads.

   Drive in cold areas.

   In cold season, motor runs at idle speed for a long time or the vehicle drives for a short distance frequently.

   Towing the vehicle.

   The vehicle is used as a taxi or rental vehicle.

   Drive the vehicle slowly in urban area with heavy traffic at high temperature above 32 ˚C for more than 50 % of the total driving time.

   Drive with overload.

Diagnosis & Test

Problem Symptoms Table

1. If there are abnormal sound, obvious heavy operation and other abnormal phenomena in final drive during using, stop immediately for inspection and continue driving after troubleshooting.
2. Slowly decelerate or accelerate during operation, which can prevent from damaging component due to sudden changes in torque and reducing service life.

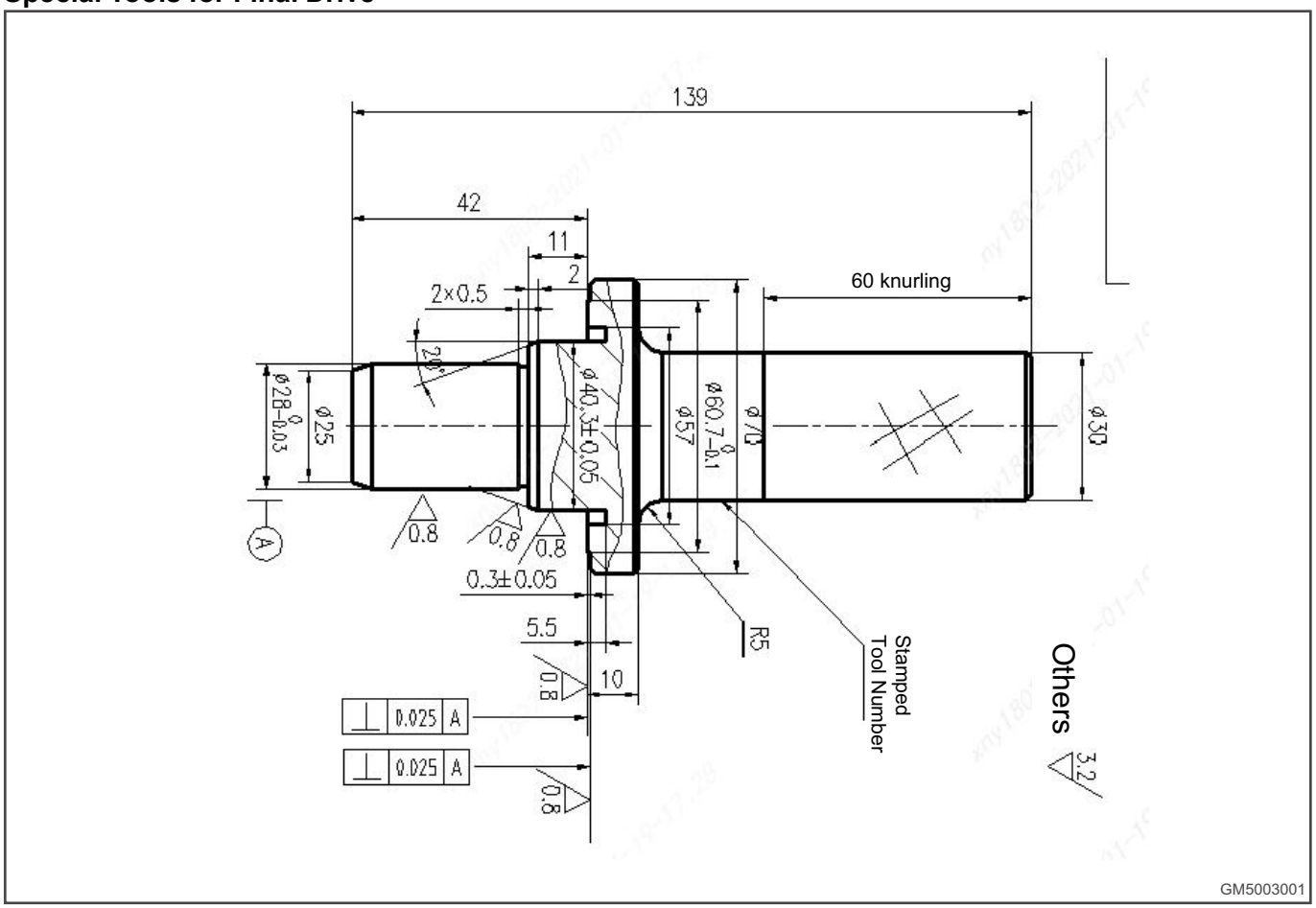
3. If there are abnormal conditions and problems that cannot be solved by yourself for final drive, contact the local service station or professionals. For detailed disassembly diagram and part number, refer to the Repair Manual.

Symptom	Possible Cause	Troubleshooting Method
Excessive or abnormal noise	Damaged primary shaft, second shaft and differential bearing	Replace bearing
	Bumps, burrs of gear tooth surface or pitting or poor contact on tooth surface	Repair or replace gear
	Improper gear axial position and clearance	Check, adjust
	Too low oil level, insufficient lubrication	Add oil to specified position
	There is foreign matter in assembly	Check, repair
Oil leakage	Excessive wear or damage of oil seal	Replace
	Uneven seal gum or damaged gasket	Replace gasket, apply seal gum
	The joint surface is bumped and not repaired in time	Check, repair
	Invalid breather valve	Replace breather valve
	Damaged differential oil seal	Replace
Bearing is damaged abnormally	Lubricant contains metal impurities	Replace
	Lubrication is insufficient or lubricant does not meet the requirements	Replace
	Use unqualified bearing	Replace

On-vehicle Service

Tools

Special Tools for Final Drive



Specifications

Torque Specifications

Part Name	Torque (N·m)
Differential bolt M12×1-6g	90 ± 2
Drain plug M18×1.5	40 ± 3
Limit bolt M18×1.5	40 ± 3
Assembling bolt between front case and rear case M8×35	30 ± 2
Bolt between final drive and motor	60 ± 2
Bolt between motor and mounting	60 ± 2
Bolt between final drive and mounting	60 ± 2
Breather valve	15 ± 2

Lubricant

Name	Type	Amount
Final drive oil	75W - 90 GL - 4 synthetic gear oil	0.8 L
Drive shaft oil seal lip		As needed
Input shaft oil seal lip	Extreme pressure grease	

Sealant and Adhesive

Name	Specified Sealant and Adhesive
Joint surface between front case and rear case	1596F silicone rubber plane sealant or equivalent
Vent	1243 thread seal gum or equivalent
Differential drive gear bolt	

Field Molding Seal Gum (FIPG)
Field molding seal gum (FIPG) is used in many areas of final drive. When using this seal gum, pay special attention to the application amount, application position and application surface state for adequate sealing. Too little application amount will cause leakage. Too much application amount will cause seal gum overflow, resulting in a blocking to water channel or oil channel, or narrow channel. Therefore, correct application amount without disconnection is absolutely necessary to prevent leakage on the joint surface.
RTV (room temperature hardened type seal gum) hardens after reacting with water in the atmosphere, so it is usually used for metal flange.
When disassembling, the parts assembled with seal gum can be easily removed without using special method. However, in some cases, it is necessary to slightly tap component with a mallet or equivalent to destroy seal gum on the joint surface, or slightly tap into the joint surface with a flat, smooth and thin seal gum scraper, but be fully careful not to damage the joint surface.
When cleaning the sealing surface, remove foreign matters on the sealing surface with a seal gum scraper or wire brush. Confirm that the sealing surface is flat and smooth without oil and foreign matters.
DO NOT forget to remove the old seal gum in the assembly hole and threaded hole.

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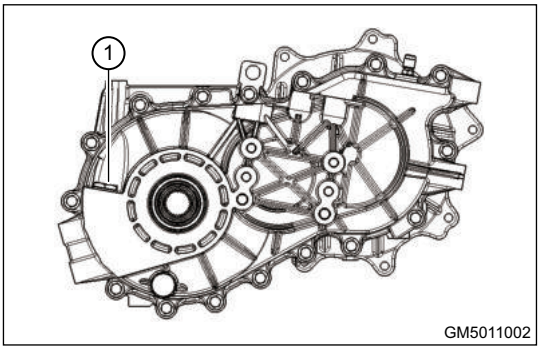
- Apply seal gum evenly on the specified diameter to surround the assembly hole. The seal gum that has not hardened can be wiped off. When the seal gum is wet (within 15 minutes), install parts to the specified position. Be careful not to stick seal gum to unnecessary position during installation. After the parts are installed, wait for the seal gum to fully harden (about 1 hour). Do not oil or wet the application area in this period of time. The application steps for FIPG seal gum vary according to the component shape. Please refer to the application method described in the text.

On-vehicle Inspection

Gear Oil Level Inspection of Final Drive
Check each component for trace of oil leakage, and unscrew filler bolt to check the oil level. If the oil has become dirty, it must be replaced with new oil.

1. The oil level should be at the position below filler bolt hole.
2. Check if final drive oil has become obviously dirty and has appropriate viscosity.

3. Tighten filler bolt (1) to the specified torque.
   Tightening torque: 40 ± 3 N·m



Three-in-one Final Drive Assembly

Disassembly

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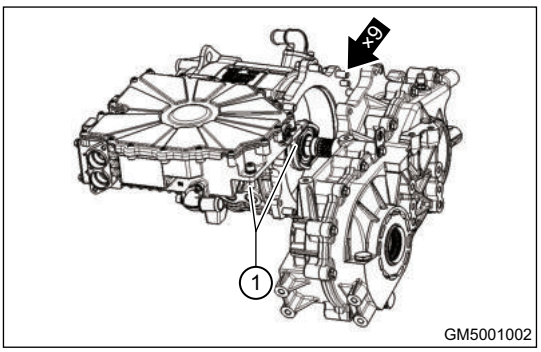
- Before three-in-one final drive assembly is removed from the vehicle, drain the final drive oil.

1. Place three-in-one assembly on mounting bracket.
2. Remove 9 bolts (arrow) from joint surface between motor and final drive front case, and remove 2 bolts (1) between motor controller and final drive front case controller bracket.



3. Remove motor output shaft from final drive input shaft.

Installation

1. Install final drive assembly to motor assembly, pay attention that the breather valve assembly of final drive is in upper part.
2. Tightening torque for assembling final drive and motor assembly bolt is 60 ± 2 N·m, and tightening torque of drain plug is 40 ± 3 N·m.
3. Tightening torque for assembling motor and mounting bolt is 60 ± 2 N·m.
4. Tightening torque for assembling final drive and mounting bolt is 60 ± 2 N·m.
5. Assemble other parts according to the vehicle requirements.
6. Apply gear oil with the required number and calibration capacity, tightening torque for tightening filler bolt is 40 ± 3 N·m.
7. Perform road test and check for leakage.
8. During performing road test, remove porthole plug at joint surface between front case and motor, and check primary shaft oil seal for leakage.

Final Drive

Removal

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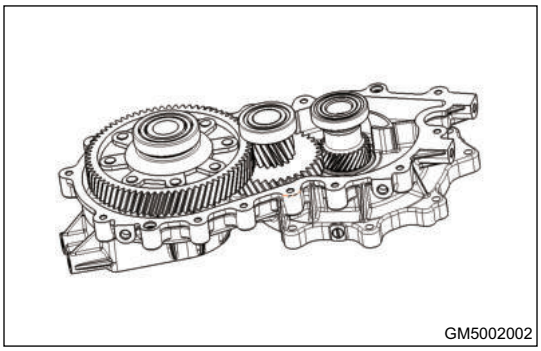
- To repair 1T15 three-in-one final drive internal elements, final drive needs to be removed from rear case.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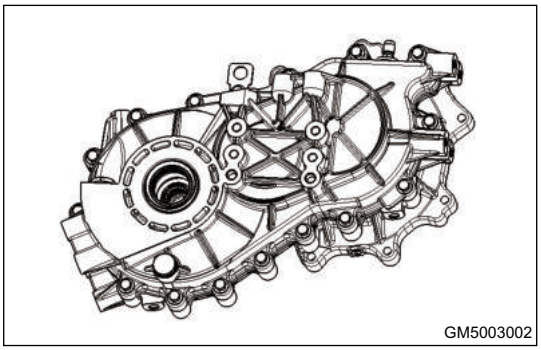
- Output shaft of final drive can only be repaired as a unit and cannot be removed and installed, otherwise the final drive may be damaged.

1. Place final drive on mounting bracket.
2. Remove the case bolt.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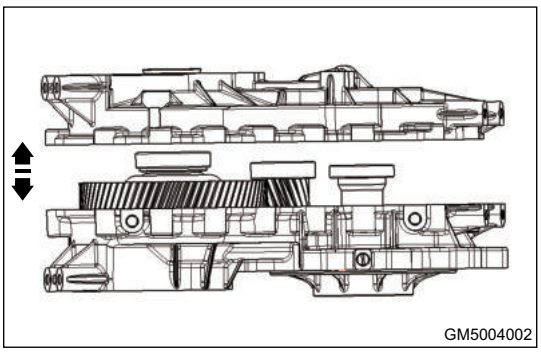
3. Separate the case from middle on the case joint surface.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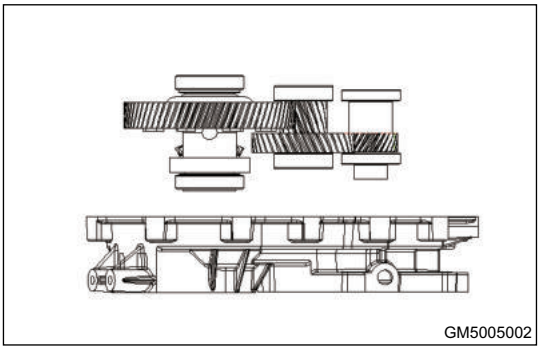
- Slightly tap the front case with a mallet, there is positioning pin on the case joint surface.

4. Remove differential assembly, second shaft assembly and primary shaft assembly.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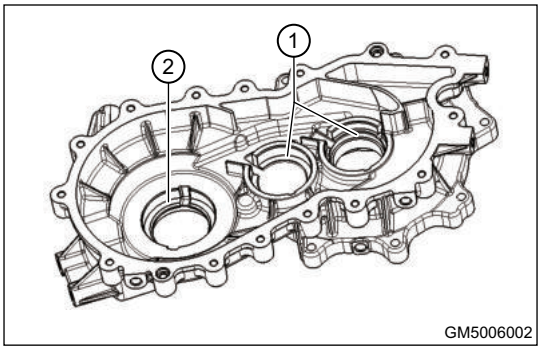
- There is 1 adjusting shim (1) with outer diameter of 62 in primary shaft and second shaft bearing holes at the end of front case respectively.
- There is 1 final drive adjusting shim (2) in final drive bearing hole at the end of front case.



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Checking Use for Each Part

1. Check tooth surface of each gear for wear. If shaft breakage, tooth breakage, pitting, gluing, tooth surface burnout, tooth surface plastic deformation and other phenomena occur, it is necessary to replace the gear.
2. Check each bearing for wear. If there are indentation, loose frame, pitting, burn and other phenomena in the inner/outer raceway and rolling body of bearing, and the radial clearance is more than 0.1 mm, please replace it.
3. Check each oil seal for wear. If there is abnormal wear, damage, please replace it.

⚠

- When replacing the 1st drive gear shaft, bowl type expansion plug shall be applied with plane sealing silicon rubber to prevent leakage.
- When replacing oil seal, apply lithium-based grease to groove between oil seal lip and dust lip.

Assembly

1. Cleaning

   Clean gear, shaft, bearing, oil seal, front case and rear case with solvent, dry them in the air or dry with compressed air.

   Check gear, bearing and shaft. If roller is damaged or twisted, replace it. If the gear teeth are worn or broken, replace them.

2. Assembly
   a.Assemble according to the reverse process of disassembly process. Tightening torque for differential screw is 90 ± 2 N·m.
   b.The knurled cylindrical pin of planetary gear shaft shall be riveted at the hole after assembly to prevent exit.
   c.Tightening torque for assembling bolt is 30 ± 2 N·m.
   d.Tightening torques for filler bolt and drain plug are 40 ± 3 N·m.
   e.The joint surface of front/rear case must be applied with silicone rubber plane sealant, which shall be applied evenly and continuously without disconnection or excessive application.
   f.Each part is assembled in place, preventing rough assembly and damaging to part.

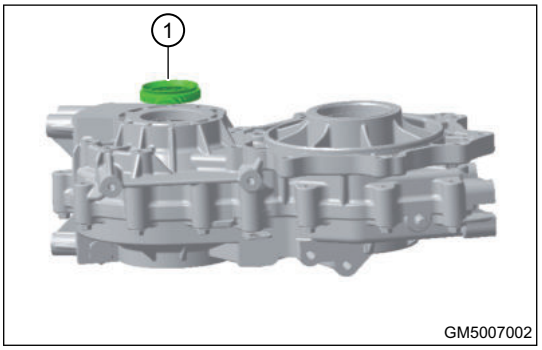
Bearing Adjustment Procedure

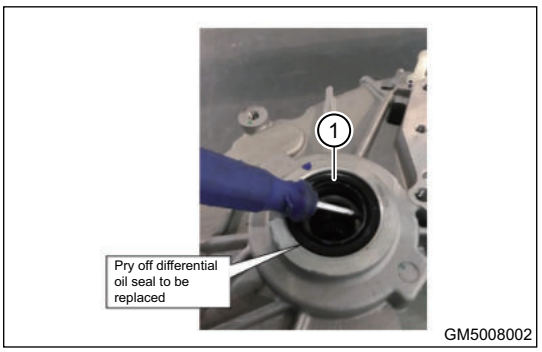
1. Replace bearing in pairs: If one of differential bearings is defective, replace two differential bearings; If one of primary shaft bearings is defective, replace two bearings on the primary shaft; If one of second shaft bearings is defective, replace two bearings on the second shaft.
2. After adjusting with the bearing adjusting shim, the axial movement of primary shaft/second shaft is adjusted to less than 0.1 mm through adjusting shim, and the differential bearing is pre-tightened by 0.1 - 0.2 mm. The shaft rotation torque shall not be less than 5 N·m due to interference assembly. If it does not meet the requirements, adjust it again.

Removal and Installation for Oil Seal

If it is necessary to replace differential oil seal, replaced it without disassembling final drive assembly. The replacement method is as follows:

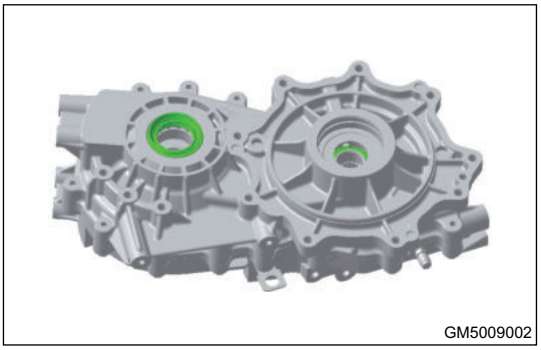
1. Using appropriate tool (such as flat tip screwdriver and needle nose plier), first pry out the original oil seal (1) from final driver case.

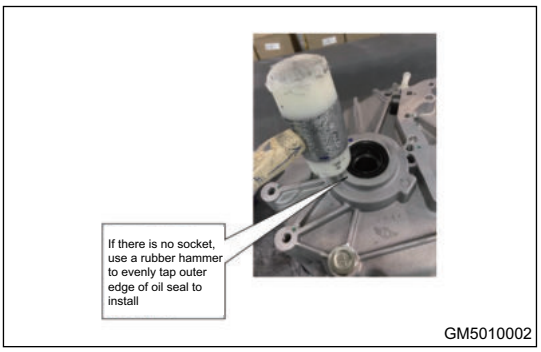




2. Wipe off the oil seal mounting hole on the case.
3. Apply a coat of lithium-based grease to the inner race and lip of new oil seal evenly.

4. Align oil seal with mounting hole and press oil seal fully into case with special tool. When there is no special tool, slightly tap the outer upper edge of oil seal with a rubber hammer, so that oil seal enters evenly until upper surface of oil seal is flush with outer plane of case.


GM5009002



GM5010002

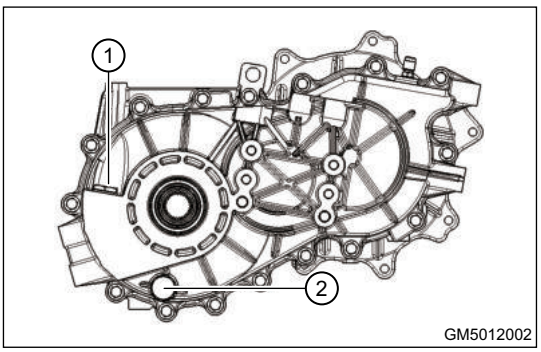
⚠

- The parts shall be cleaned before assembly, ensuring the cleanliness of case and the service life of transmission.
- Be careful during installation, try to prevent oil seal from being scratched and leaking. It can be protected with special boot.
- The joint surface must be cleaned before applying seal gum, and avoid impact to the joint surface to prevent oil leakage.
- When installing the differential oil seal, apply grease on oil seal lip, press the oil seal fully into case with special tool.

Final Drive Gear Oil

Replacement

1. Unscrew the final drive drain plug (2).
2. Drain the final drive oil.
3. Tighten drain plug (2) to the specified torque.
   Tightening torque: 40 ± 3 N·m
4. Unscrew filler bolt (1), fill specified final drive oil until oil level reaches the position below filler bolt hole.
   Specified transmission oil: 75W - 90GL - 4
   Synthetic gear oil amount: 0.8 L
5. Tighten filler bolt (1) to the specified torque.
   Tightening torque: 40 ± 3 N·m



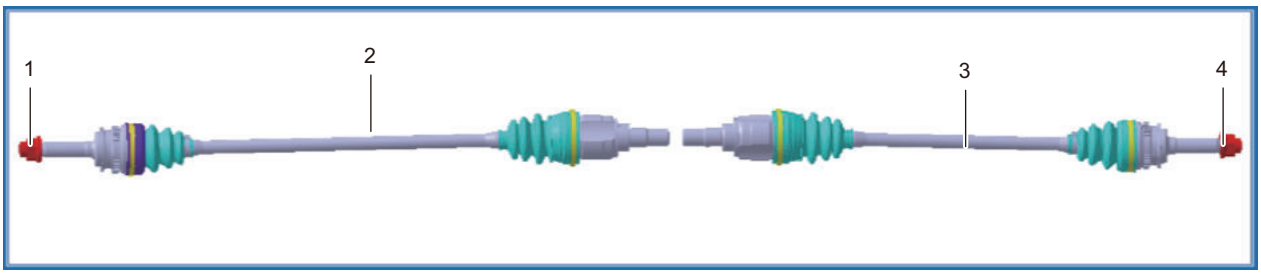
GM5012002

DRIVE SHAFT

DRIVE SHAFT

System Overview

System Components Diagram



DS0001001

No.	Name	No.	Name
1	Hexagon Flange Locking Nut	2	Rear Left Constant Velocity Universal Joint Drive Shaft Assembly
3	Rear Right Constant Velocity Universal Joint Drive Shaft Assembly	4	Hexagon Flange Locking Nut

On-vehicle Service

Tools

Tools: 10# socket, 17# socket, 18# socket, 30# socket, ratchet wrench, crowbar, screwdriver, nut punch and hammer

Specifications

Torque Specifications

Part Name	Torque (N•m)
Coupling nut between rear steering knuckle and control arm ball pin	110 ± 10
Drive shaft fixing nut	260 ± 20
Wheel speed sensor fixing bolt	10 ± 1
Wheel fixing bolt	110 ± 10

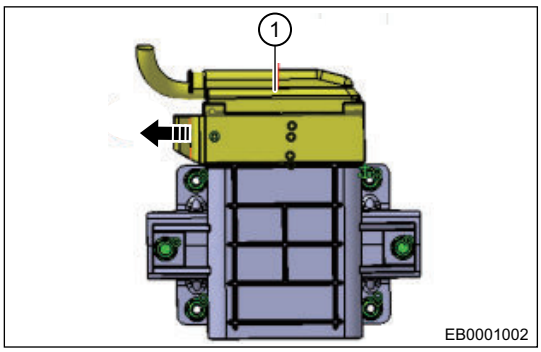
Propeller Shaft

Removal

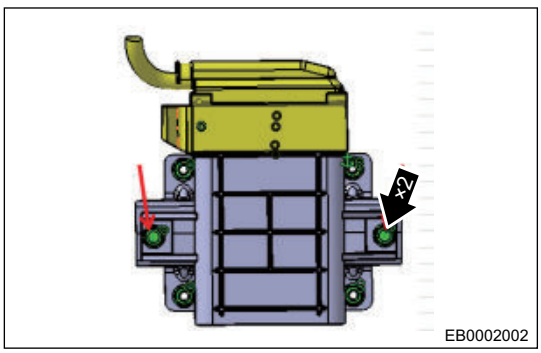
⚠

- Use same removal and installation procedures for left and right constant velocity drive shafts.

1. Turn off all electrical equipment and the POWER switch.
2. Disconnect the negative battery cable.
3. Using 17# socket, remove 4 wheel bolts and rear wheels.



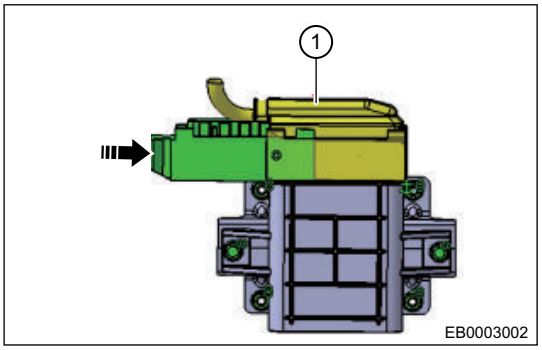
4. Using 8# socket, remove 1 fixing bolt (arrow) from rear left wheel speed sensor and wheel speed sensor.



5. Remove fixing nut from rear axle left drive shaft.

a. Using a nut punch and a hammer, loosen staked part of nut.

b. Remove 1 fixing nut (arrow) from drive shaft with 30# socket while applying brake.



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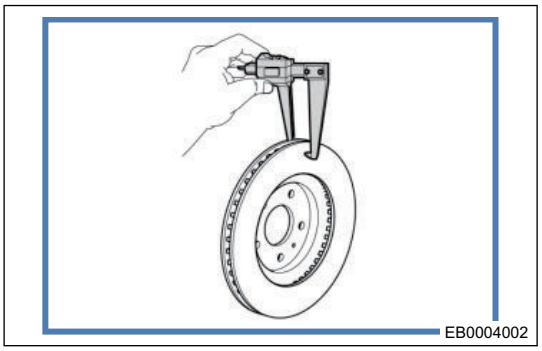
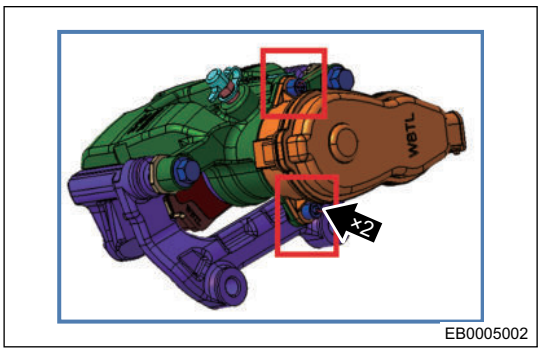
- Loosen staked part of nut completely, otherwise, it will damage threads of drive shaft.

6. Remove holding reed (arrow) from rear left brake hose.



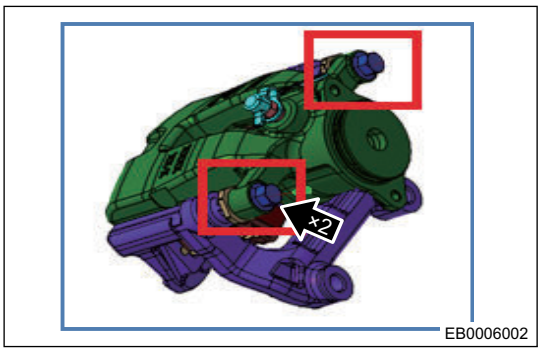
7. Using 18# socket, remove 1 coupling nut (arrow) between rear left steering knuckle and control arm ball pin and separate control arm ball pin from steering knuckle.



⚠

- DO NOT damage constant velocity universal joint dust boot.

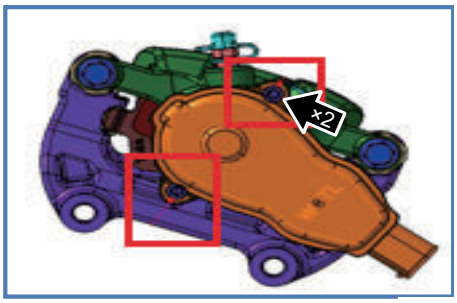
8. Remove tire and rotate rear suspension with brake drum assembly, pry out drive shaft using crowbar, and remove it from side to separate it from brake drum.



⚠

- Use crowbar carefully to prevent damage to oil seal.

9. Remove the set ring.



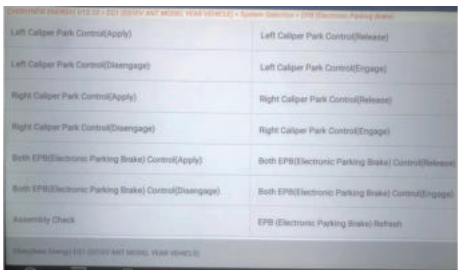
EB0007002

Installation

1. Install the set ring.


EB0008002

2. Insert left constant velocity universal joint drive shaft assembly inner ball cage spline into final drive output end, so that set ring drops in final drive left output end snap spring groove.


EB0009002

⚠

- Check if snap spring retainer is assembled in place after assembly. The common method is to hold inner ball cage housing and pull it horizontally outward. If it cannot be pulled out, it indicates that it has been assembled in place. DO NOT use excessive force to pull drive shaft, doing so may prevent inner constant velocity universal joint from dropping.

3. Insert left constant velocity universal joint drive shaft assembly outer ball cage spline into hub end inner spline, close control arm ball pin with steering knuckle, and install coupling nut between rear left steering knuckle and control arm ball pin with 18# socket.
   Tightening torque: 110 ± 10 N•m
4. Install holding reed to fix rear left brake hose.
5. Install fixing nut to rear axle left drive shaft.
   a. Using 30# socket, install fixing nut to drive shaft.
      Tightening torque: 260 ± 20 N m
   b. Using a nut punch and a hammer, tighten staked part of nut.
6. Install wheel speed sensor and tighten fixing bolt to wheel speed sensor with 10# socket.
   Tightening torque: 10 ± 1 N m

7. Using 17# socket, install the rear wheel (refer to “Wheel and Tire” section).
   Tightening torque: 110 ± 10 N m
8. Connect the negative battery cable.
9. Connect all electrical equipment and POWER switch.

⚠
• Check final drive oil. If there is leakage or insufficient oil, refill in time.

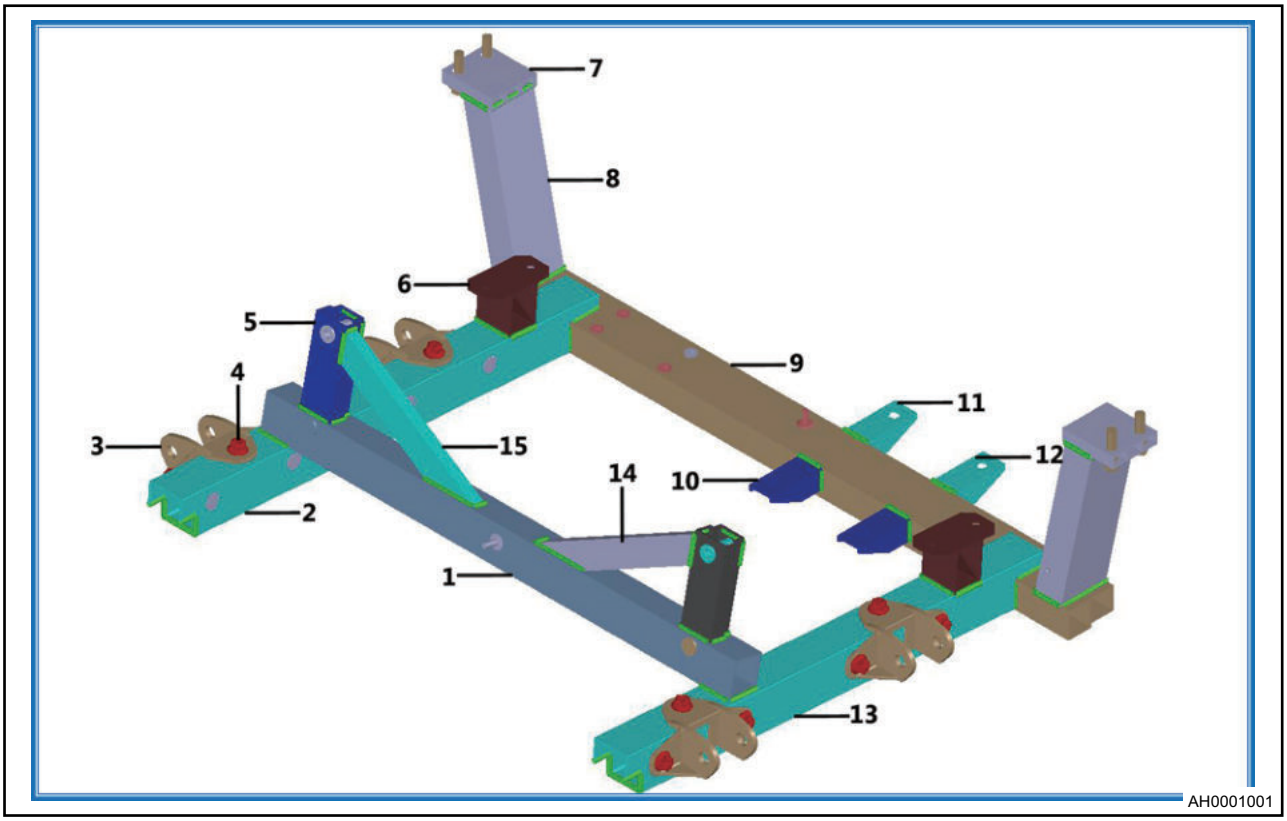
AXLE

AXLE

System Overview

System Components Diagram

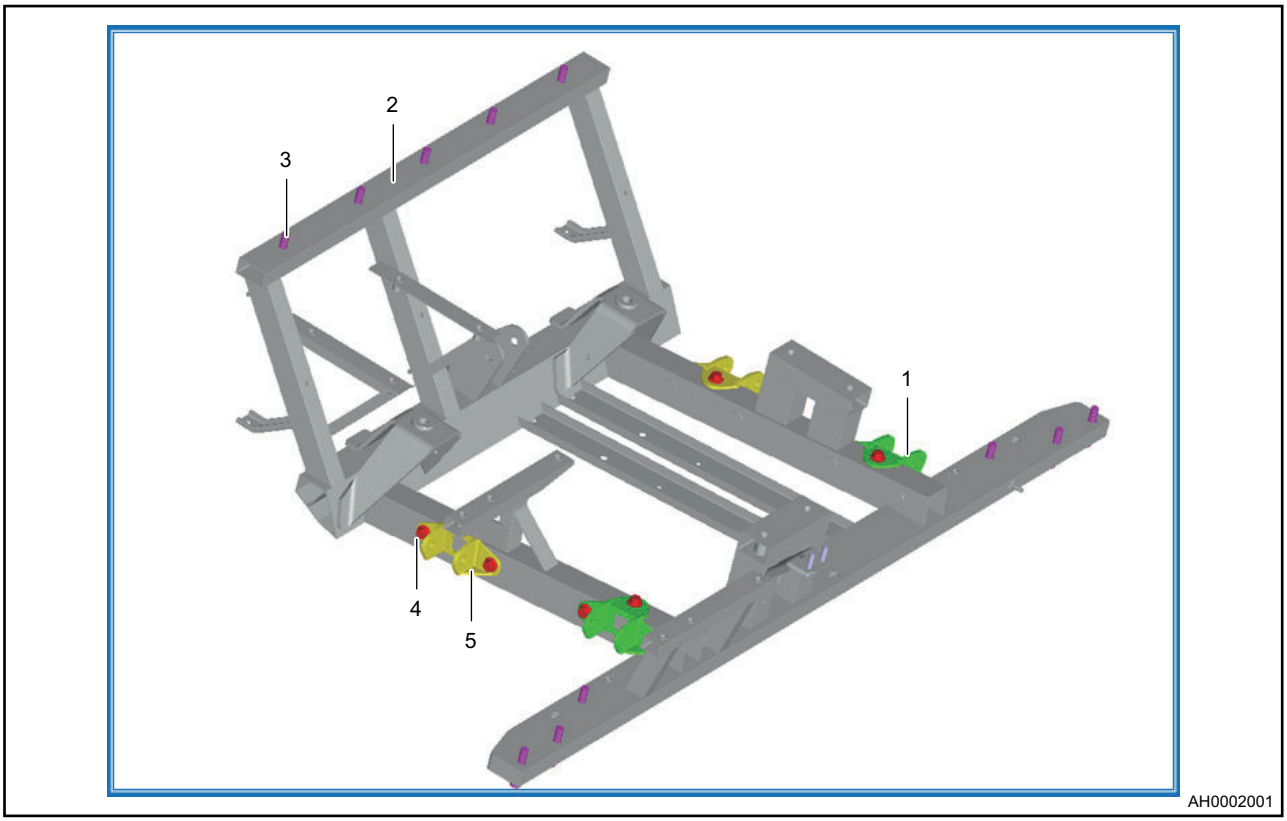
Front Sub Frame Structure Diagram



No.	Name	No.	Name
1	Steering Gear Mounting Beam	2	Left Side Rail
3	Swing Arm Rear Mounting Bracket	4	Hexagon Flange Bolt
5	Steering Gear Mounting Support	6	Stabilizer Bar Mounting Support
7	Front Body Lap Beam	8	Front Lap Side Rail
9	Front Crossmember	10	A/C Compressor Rear Mounting Bracket
11	A/C Compressor Front Left Mounting Bracket	12	A/C Compressor Front Right Mounting Bracket

13	Right Side Rail	14	Steering Gear Mounting Support Right Support Beam
15	Steering Gear Mounting Support Left Support Beam	16	Swing Arm Front Mounting Bracket

Rear Sub Frame Structure Diagram



No.	Name	No.	Name
1	Swing Arm Rear Mounting Bracket	2	Rear Sub Frame Assembly
3	Hexagon Flange Bolt	4	Hexagon Flange Bolt
5	Swing Arm Front Mounting Bracket		

On-vehicle Service

Tools

Tools: A set of TORX wrench, a set of common size socket, a torque wrench, a vernier caliper and a dial indicator, a plastic hammer and an iron hammer
Protection equipments: Gloves, working cloth, safety helmet, working shoes

Specifications

Torque Specifications

Part Name	Torque (N•m)
Tightening bolts on both sides of front part of front sub frame	65 ± 5
Tightening bolt on rear part of front sub frame	65 ± 5
Tightening bolt between swing arm front mounting bracket and front sub frame	65 ± 5

Part Name	Torque (N•m)
Tightening bolt between swing arm rear mounting bracket and front sub frame	65 ± 5
Rear sub frame front mounting body lap bracket tightening bolt	25 ± 4
Tightening bolts on both sides of front part of rear sub frame	65 ± 5
Tightening bolt on rear part of rear sub frame	65 ± 5
Tightening bolt between swing arm front mounting bracket and rear sub frame	65 ± 5
Tightening bolt between swing arm rear mounting bracket and rear sub frame	65 ± 5

Front Sub Frame

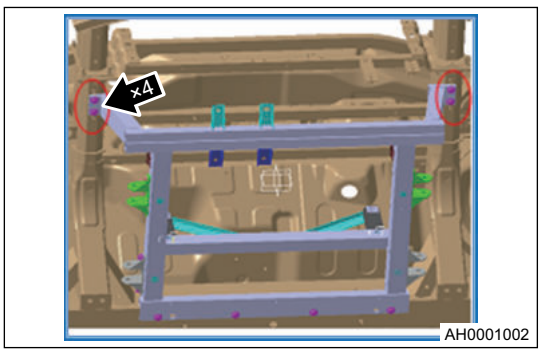
Removal

⚠

- Be sure to wear necessary safety equipment to prevent accidents.
- Disconnect the corresponding pipe and cable before removing front sub frame.
- When removing front sub frame, front sub frame should be supported by a tray in lower part.

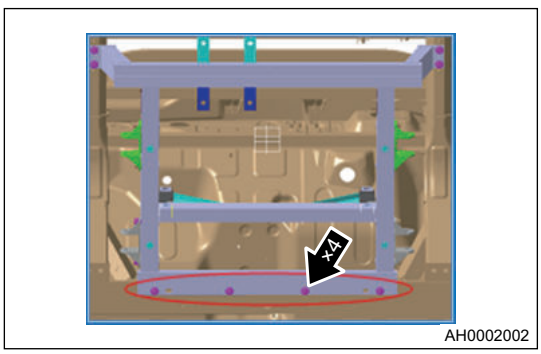
1. Using 15# socket and torque wrench, remove 4 tightening bolts (arrow) from both sides of front part of front sub frame.

   Tightening torque: 65 ± 5 N•m



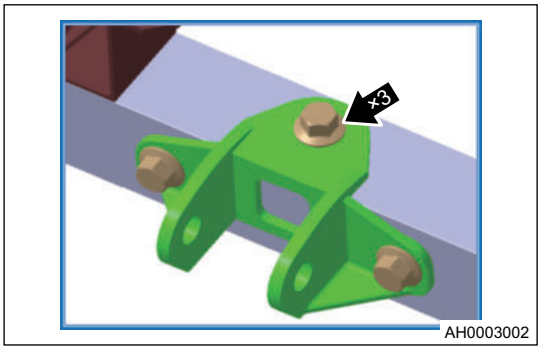
2. Using 15# socket and torque wrench, remove 4 tightening bolts (arrow) from rear part of front sub frame and front sub frame.

   Tightening torque: 65 ± 5 N•m



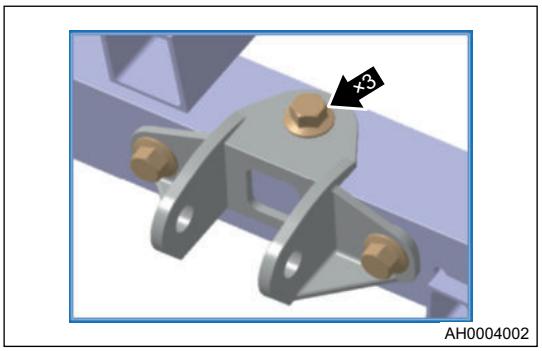
3. Using 15# socket and torque wrench, remove 3 tightening bolts (arrow) from swing arm front mounting bracket (left).

   Tightening torque: 65 ± 5 N•m



4. Using 15# socket and torque wrench, remove 3 tightening bolts from swing arm front mounting bracket (right).
5. Using 15# socket and torque wrench, remove 3 tightening bolts (arrow) from swing arm rear mounting bracket (left).

   Tightening torque: 65 ± 5 N•m



6. Using 15# socket and torque wrench, remove 3 tightening bolts from swing arm rear mounting bracket (right).

Installation

1. For installation steps, refer to the removal steps and carry out in the reverse order. All bolts need to be tightened again and marked with a marking pen after installation.

Rear Sub Frame

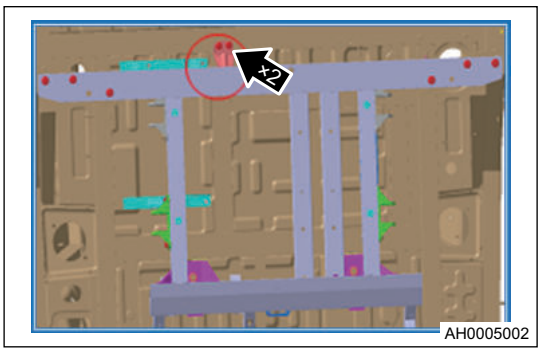
Removal

⚠

- Be sure to wear necessary safety equipment to prevent accidents.
- Disconnect the corresponding pipe and cable before removing rear sub frame.
- When removing rear sub frame, rear sub frame should be supported by a tray in lower part.

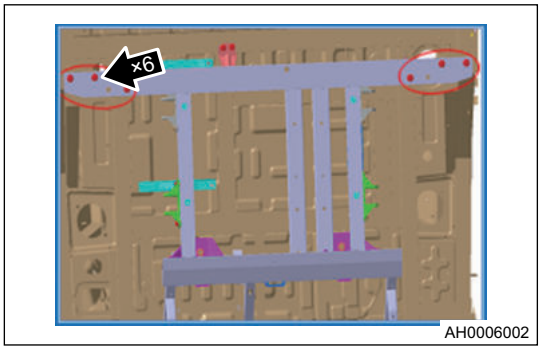
1. Using 15# socket and torque wrench, remove 2 tightening bolts (arrow) from rear sub frame front mounting body lap bracket.

   Tightening torque: 25 ± 4 N•m



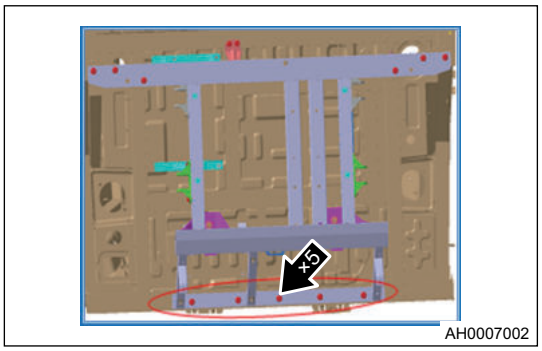
2. Using 15# socket and torque wrench, remove 6 tightening bolts (arrow) from both sides of front part of rear sub frame.

   Tightening torque: 65 ± 5 N•m



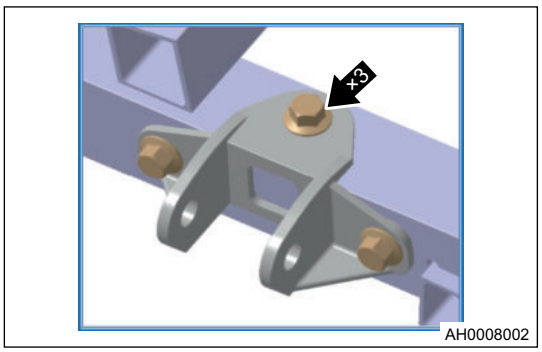
3. Using 15# socket and torque wrench, remove 5 tightening bolts (arrow) from rear part of rear sub frame and rear sub frame.

   Tightening torque: 65 ± 5 N•m



4. Using 15# socket and torque wrench, remove 3 tightening bolts (arrow) from swing arm front mounting bracket (left).

   Tightening torque: 65 ± 5 N•m

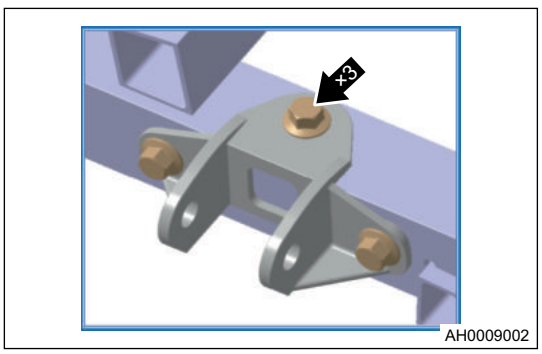


5. Using 15# socket and torque wrench, remove 3 tightening bolts from swing arm front mounting bracket (right).

   Tightening torque: 65 ± 5 N•m

6. Using 15# socket and torque wrench, remove 3 tightening bolts (arrow) from swing arm rear mounting bracket (left).

   Tightening torque: 65 ± 5 N•m



7. Using 15# socket and torque wrench, remove 3 tightening bolts from swing arm rear mounting bracket (right).

   Tightening torque: 65 ± 5 N•m

Installation

1. For installation steps, refer to the removal steps and carry out in the reverse order. All bolts need to be tightened again and marked with a marking pen after installation.

SUSPENSION

SUSPENSION

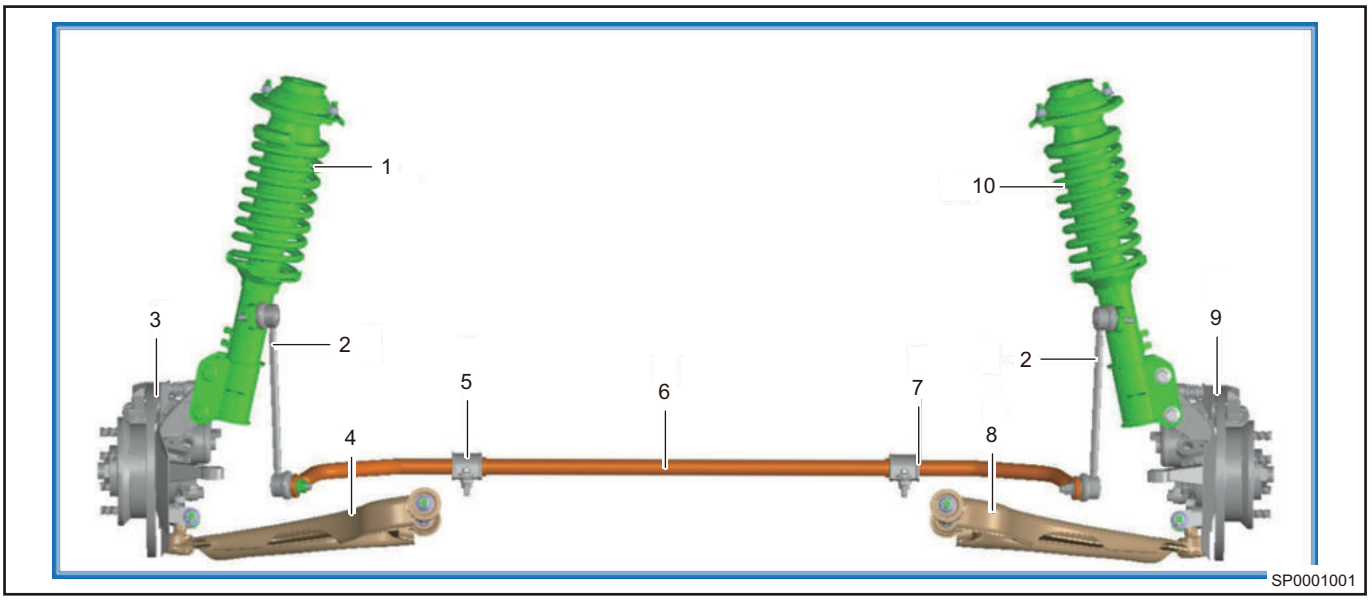
System Overview

System Description

Chery new energy eQ1 model is a RR type electric vehicle, front suspension adopts Macpherson independent suspension. Rear suspension system is Macpherson independent suspension, rear drive mode is disconnected half-shaft driving.

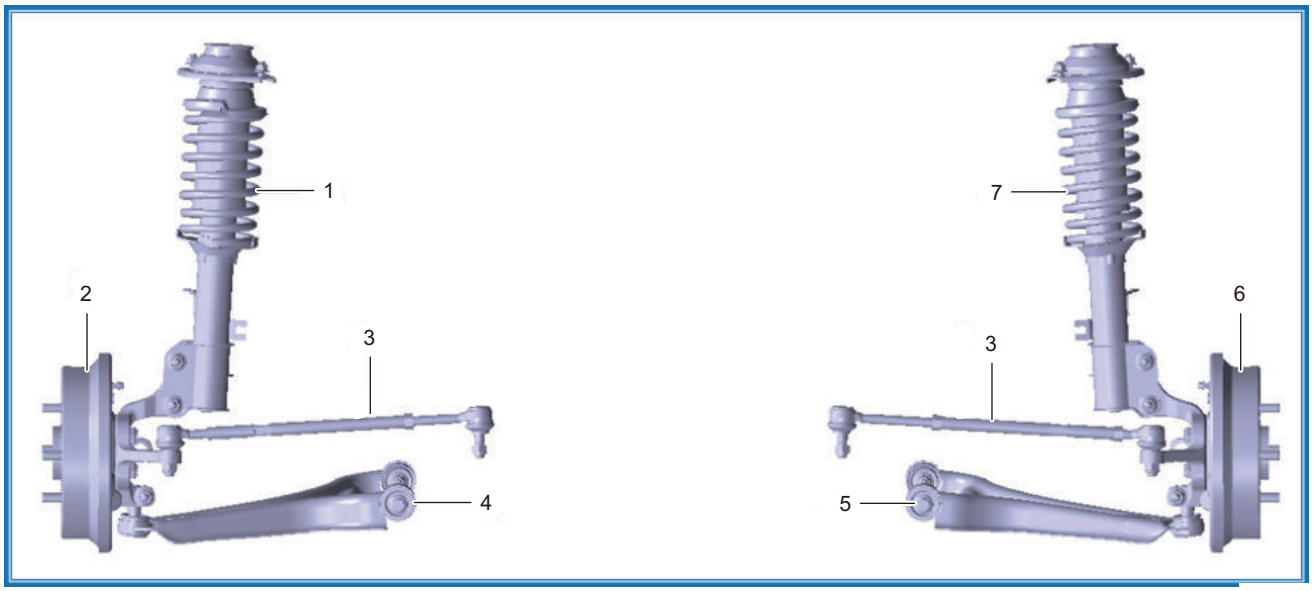
System Components Diagram

Front Suspension System Composition Diagram
Front suspension of Chery new energy eQ1 model uses disconnected steering axle, suspension adopts Macpherson independent suspension. As shown in illustration below.



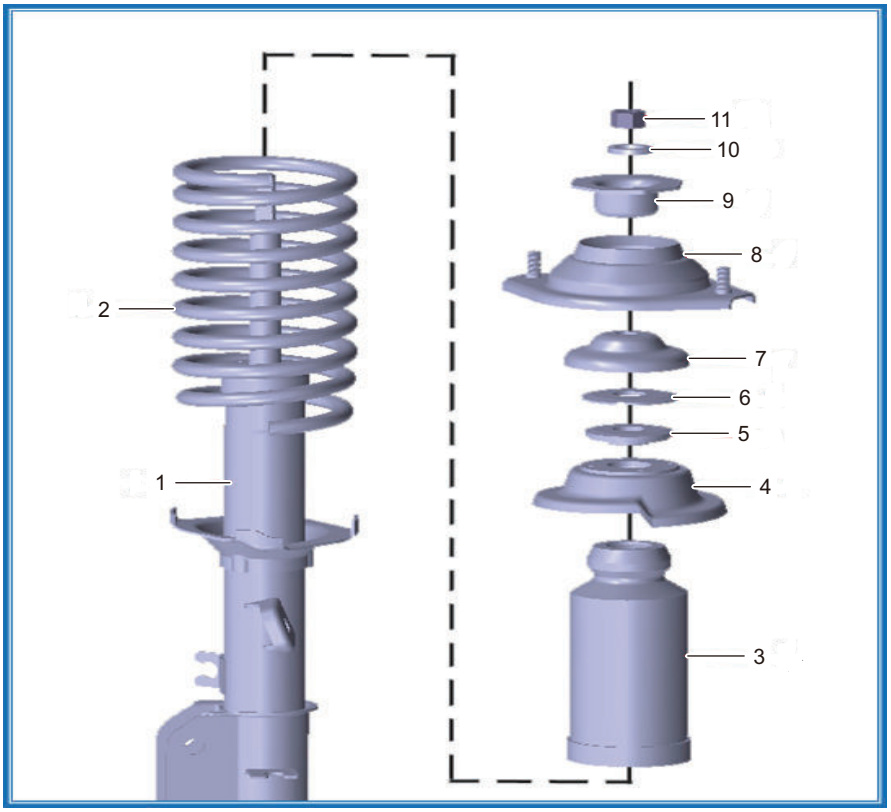
No.	Part Name	No.	Part Name
1	Front Left Strut Assembly	2	Front Stabilizer Bar Connecting Rod
3	Front Left Steering Knuckle with Disc Brake Assembly	4	Front Left Control Arm Assembly
5	Front Stabilizer Bar Clamp	6	Front Stabilizer Bar Assembly
7	Front Stabilizer Bar Clamp Bushing	8	Front Right Control Arm Assembly
9	Front Left Steering Knuckle with Disc Brake Assembly	10	Front Right Strut Assembly

Rear Suspension System Composition Diagram



No.	Part Name	No.	Part Name
1	Rear Left Strut Assembly	2	Rear Left Brake with Steering Knuckle Assembly
3	Rear Tie Rod Assembly	4	Rear Left Control Arm Assembly
5	Rear Right Control Arm Assembly	6	Rear Right Brake with Steering Knuckle Assembly
7	Rear Right Strut Assembly		

Exploded View of Front Left Strut Assembly



SP0002001

No.	Part Name	No.	Part Name
1	Front Left Shock Absorber Assembly	2	Front Coil Spring
3	Front Dust Buffer Boot	4	Front Spring Upper Tray Assembly
5	Bearing Assembly	6	Bearing Upper Supporting Gasket
7	Insulator Inner Frame	8	Connection Bracket Assembly
9	Front Shock Absorber Connecting Plate	10	Spring Washer
11	Type II Hexagon Nut		

Diagnosis & Test

Problem Symptoms Table

Symptom	Possible Cause	Recommended Repair Method
Vehicle pulls	• Front tire (worn or improperly inflated) • Rear tire (worn or improperly inflated)	Replace excessively or abnormally worn tires; Adjust tire pressure to specified value
	Front wheel alignment (incorrect)	Perform front wheel alignment
	Rear wheel alignment (incorrect)	Perform rear wheel alignment

Symptom	Possible Cause	Recommended Repair Method
	Steering tie rod	Replace tie rod ball pin (perform front wheel alignment after replacement)
	Steering gear train (loose or worn)	Adjust the clearance of corresponding components, tighten bolts and nuts of corresponding components to specified torque, and replace worn components if necessary
	Front hub bearing (worn)	Replace front hub bearing
	Rear hub bearing (worn)	Replace rear hub bearing
	Steering gear (misaligned or damaged)	Adjust rack and pinion clearance or replace steering gear
	Front suspension part (worn)	Replace front suspension part
	Rear suspension part (worn)	Replace rear suspension part
Droop	Vehicle (overloaded)	Unload
	Front coil spring (soft)	Replace front coil spring
	Front shock absorber (worn)	Replace front shock absorber
	Rear coil spring (soft)	Replace rear coil spring
	Rear shock absorber (worn)	Replace rear shock absorber
Tilt	• Front tire (worn or improperly inflated) • Rear tire (worn or improperly inflated)	Replace excessively or abnormally worn tires; Adjust tire pressure to specified value
	Front stabilizer bar (bent or broken)	Replace front stabilizer bar
	Front shock absorber (worn)	Replace front shock absorber
	Rear shock absorber (worn)	Replace rear shock absorber
Wheel shimmy	• Front tire (worn or improperly inflated) • Rear tire (worn or improperly inflated)	Replace excessively or abnormally worn tires; Adjust tire pressure to specified value
	• Front wheel (out of balance) • Rear wheel (out of balance)	Perform wheel dynamic balance
	Front shock absorber (worn)	Replace front shock absorber
	Front wheel alignment (incorrect)	Perform front wheel alignment
	Rear shock absorber (worn)	Replace rear shock absorber

Symptom	Possible Cause	Recommended Repair Method
	Rear wheel alignment (incorrect)	Perform rear wheel alignment
	Front steering ball pin (worn)	Replace front steering ball pin
	Front hub bearing (worn)	Replace front hub bearing
	Rear hub bearing (worn)	Replace rear hub bearing
	Steering gear train (loose or worn)	Adjust the clearance of corresponding components, tighten bolts and nuts of corresponding components to specified torque, and replace worn components if necessary
	Steering gear (misaligned or damaged)	Adjust rack and pinion clearance or replace steering gear
Abnormal tire wear	• Front tire (worn or improperly inflated) • Rear tire (worn or improperly inflated)	Replace excessively or abnormally worn tires; Adjust tire pressure to specified value
	Front wheel alignment (incorrect)	Perform front wheel alignment
	Front shock absorber (worn)	Replace front shock absorber
	Front suspension part (worn)	Replace front suspension part
	Rear wheel alignment (incorrect)	Perform rear wheel alignment
	Rear shock absorber (worn)	Replace rear shock absorber
	Rear suspension part (worn)	Replace rear suspension part

On-vehicle Service

Tools

Tools: A set of TORX wrench, a set of common size socket, a torque wrench, flat tip screwdriver and cross screwdriver, a vernier caliper and a dial indicator, a vice and a needle nose pliers, a plastic hammer and an iron hammerProtection appliances: Gloves, work cloth, working shoes, safety helmet

Specifications

Torque Specifications

Part Name	Torque (N•m)
Mounting bolt between front stabilizer bar connecting rod and strut assembly	65 ± 5
Mounting bolt between upper end of front shock absorber and upper support	25 ± 4
Coupling nut between front shock absorber and steering knuckle assembly with brake disc	130 ± 10

Part Name	Torque (N•m)
Coupling nut between front connecting rod and stabilizer bar	65 ± 5
Mounting nut of front stabilizer bar clamp	25 ± 4
Fixing nut of front steering knuckle lower end ball pin	110 ± 10
Mounting bolt between front control arm and sub frame upper control arm mounting bracket	110 ± 10
Mounting bolt between upper end of rear shock absorber and upper support	25 ± 4
Coupling nut between rear shock absorber and steering knuckle assembly with brake disc	110 ± 10
Tightening nut between tie rod and steering knuckle seat	35 ± 3
Tightening nut between inner side of tie rod and sub frame bracket	35 ± 3
Wheel bolt	110 ± 10

Wheel Alignment Parameters (Unloaded)

Item		Parameter
Vehicle model		SQR7000BEVJ72
Front wheel	Front wheel camber	0.5° ± 30′
	Kingpin caster	7.8° ± 30′
	Kingpin inclination	15.2° ± 30′
	Front wheel toe-in	0.17° ± 10′
Rear wheel	Rear wheel camber	0° ± 30′
	Rear wheel toe-in	-0.3° ± 10′
Sideways sliding		⩽ 3 m/km

Front Suspension Device

Removal

⚠

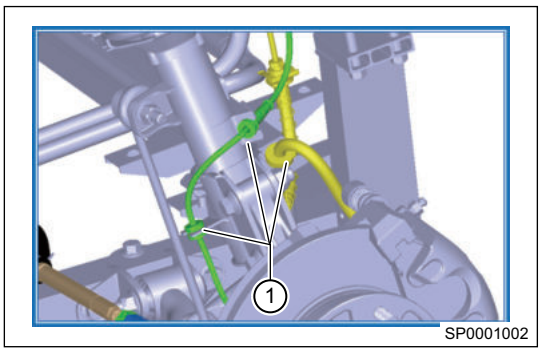
- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis.
- When removing and installing shock absorber spring, prevent spring from popping out accidentally and hurting.
- It is not allowed to weld or modify bearing parts of wheel suspension and guide parts of wheel.
- When removing chassis parts, replace self-locking nuts and rusted nuts for safety.

1. Remove the front strut assembly.

a. Remove the front compartment cover (refer to “Removal and Installation” section in “Front Compartment Cover”)

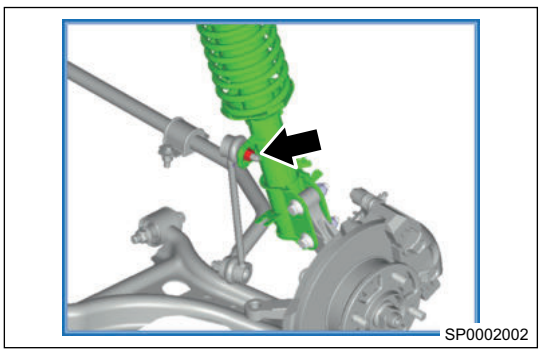
b. Remove front wheel assembly; Remove 4 wheel nuts and wheel assembly. (Refer to “Removal and Installation” section in “Wheel Assembly”)

c. Using a flat tip screwdriver, disconnect connections (1) between brake line and bracket.



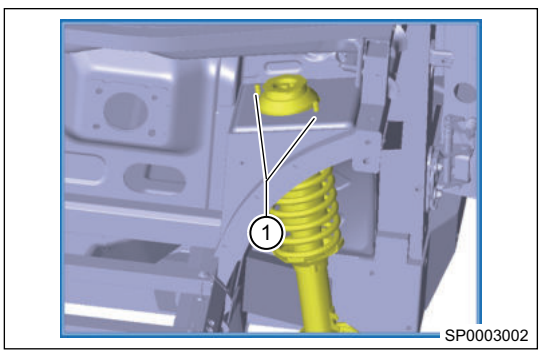
d. Using 15# socket wrench, remove 1 mounting bolt (-arrow) between stabilizer bar connecting rod and strut assembly.

Tightening torque: 65 ± 5 N•m



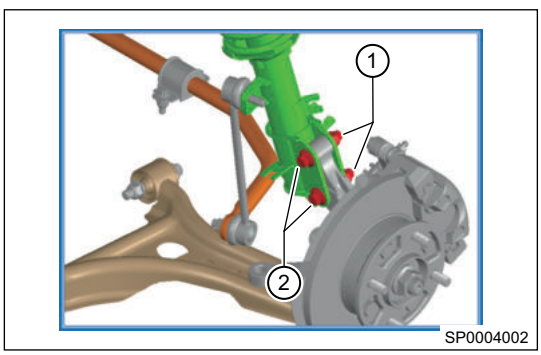
e. Using 13# socket wrench, remove 2 mounting bolts (1) from upper end of shock absorber and upper support to separate shock absorber from body.

Tightening torque: 25 ± 4 N m

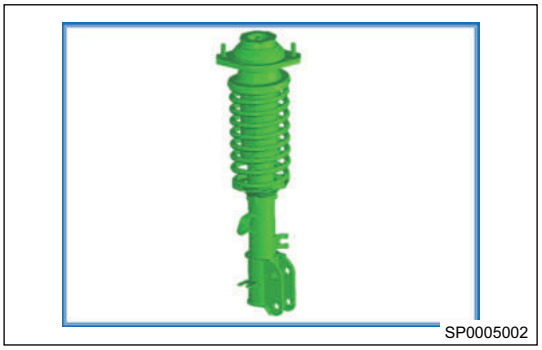


f. Using 18# socket with 14# wrench, remove 2 bolts (2) and 2 nuts (1) from front shock absorber and steering knuckle assembly with brake disc.

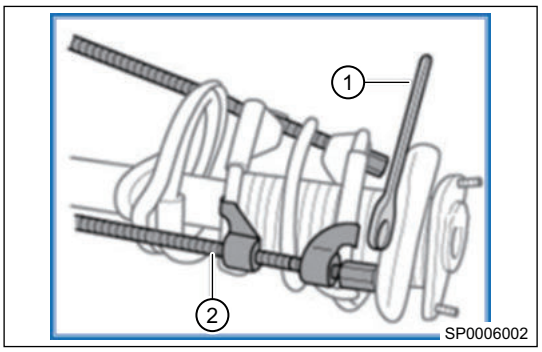
Tightening torque: 130 ± 10 N•m



g. Remove the front strut assembly.


SP0005002

2. Remove the front suspension spring.
   a. Using spring compressor (2) and wrench (1), tighten spring compressor nut to compress spring.

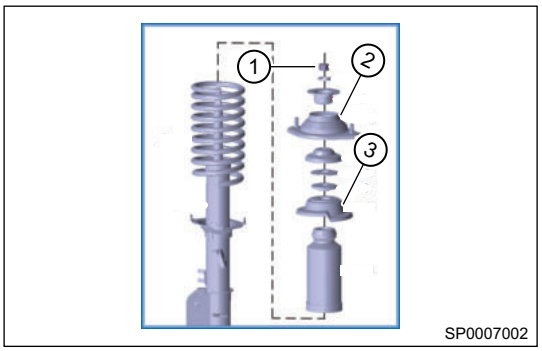


SP0006002

⚠

- When operating shock absorber coil spring, compress spring until nut can be rotated. DO NOT compress spring more than necessary, avoid damaging spring and personal injury.

   b. Using a shock absorber nut socket wrench, loosen 1 locking nut (1) from strut.
   c. Remove upper connecting bracket assembly (2) and coil spring upper tray (3) from shock absorber.
   d. Remove coil spring with spring compressor from shock absorber strut.
   e. Remove the dust boot etc. in order.

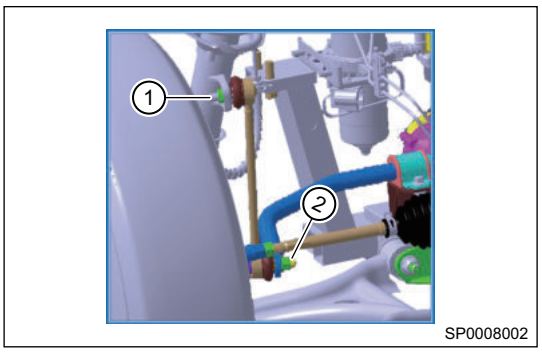


SP0007002

3. Remove the stabilizer bar connecting rod.
   a. Using 15# socket, remove coupling nut (1) between front connecting rod and front strut welding lug and then remove coupling nut (2) between front connecting rod and stabilizer bar.

      Tightening torque: 65 ± 5 N m

   b. Remove the front stabilizer bar connecting rod.

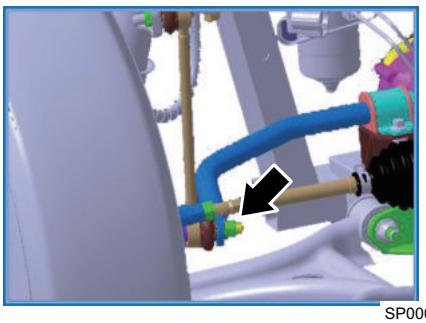


SP0008002

4. Remove the stabilizer bar.
   a. Using a jack, raise front part of vehicle so that it has enough operating space.

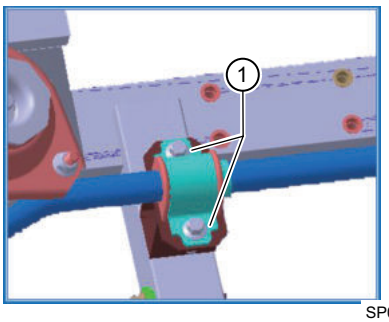
b. Using 15# socket, remove 1 mounting nut (arrow) from end of left stabilizer bar, and then remove 1 mounting nut from end of right stabilizer bar.

Tightening torque: 65 ± 5 N•m


SP0009002

c. Using 13# socket with 10# wrench, remove 2 mounting nuts (1) from front left stabilizer bar clamp, and then remove 2 mounting nuts from front right stabilizer bar clamp, remove stabilizer bar.

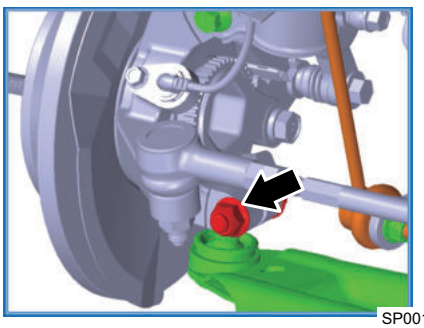
Tightening torque: 25 ± 4 N•m



SP0010002

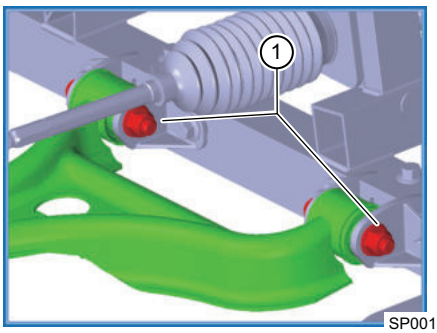
5. Removal procedures for control arm assembly (take left side as an example).
   a. Remove front wheel assembly; Remove 4 wheel nuts and wheel assembly.
   b. Turn front left (or front right) brake assembly to leave operating space. Using 18# socket with 14# wrench, remove fixing bolt and nut (arrow) from front steering knuckle lower end ball pin.

      Tightening torque: 110 ± 10 N•m


SP0011002

   c. Using 18# socket with 14# wrench, remove mounting bolt (1) between control arm and sub frame upper control arm mounting bracket.

      Tightening torque: 110 ± 10 N•m



SP0012002

   d. Remove the front left control arm assembly.

Installation

1. Refer to the removal steps of front suspension in reverse order.

⚠

- During installation, first make sure that 3 points of control arm are pre-installed on sub frame and steering knuckle before tightening bolt and nut.

Front Strut Inspection

Inspection

⚠

- Shock absorber contains nitrogen and oil, which are under negative pressure. Before handling, be sure to wear goggles and release pressure inside shock absorber to avoid personal injury.

1. Check shock absorber for leakage. Refer to warranty identification conditions for handling as necessary.
2. Check damping force of shock absorber. If it is unqualified, refer to warranty identification conditions for handling.
3. Check bearing for excessive wear, abnormal noise and stuck. Refer to warranty identification conditions for handling as necessary.
4. Check spring lower seat for cracks or deformation. Refer to warranty identification conditions for handling as necessary.
5. Check buffer block for damage. Refer to warranty identification conditions for handling as necessary.
6. Check coil spring and rubber gasket for wear, cracks or deformation. Refer to warranty identification conditions for handling as necessary.

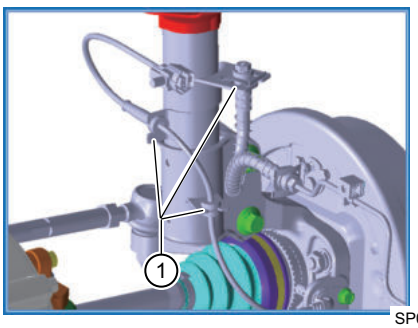
Rear Suspension Device

Removal

⚠

- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis.
- When removing and installing shock absorber spring, prevent spring from popping out accidentally and hurting.

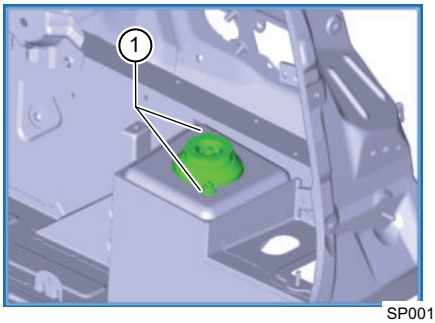
1. Remove the rear strut assembly (take left side as an example).
   a. Remove rear wheel assembly; Remove 4 wheel nuts and wheel assembly.
   b. Using a flat tip screwdriver, disconnect connections (1) between brake line and bracket.



SP0013002

c. Using 13# socket wrench, remove 2 mounting bolts (1) from upper end of shock absorber and upper support to separate shock absorber from body.

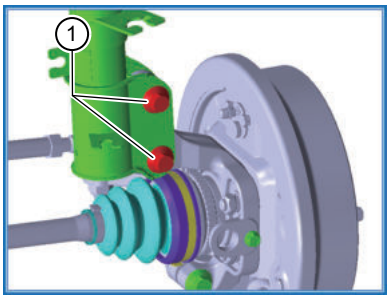
Tightening torque: 25 ± 4 N•m



SP0014002

d. Using 18# socket with 14# wrench, remove 2 bolts (1) and 2 nuts from rear shock absorber and steering knuckle assembly with brake disc.

Tightening torque: 110 ± 10 N•m



SP0015002

e. Remove the rear strut assembly with coil spring.

2. Remove the rear suspension spring.

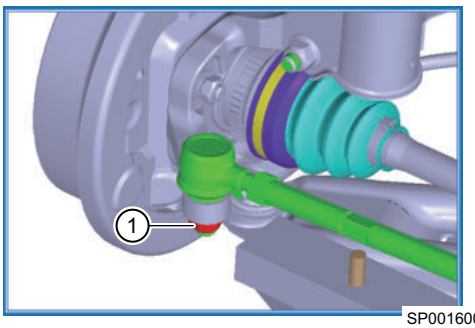
Use same procedures for rear suspension spring and front suspension spring. Please refer to procedures of front suspension spring.

3. Remove the rear tie rod (take left side as an example).

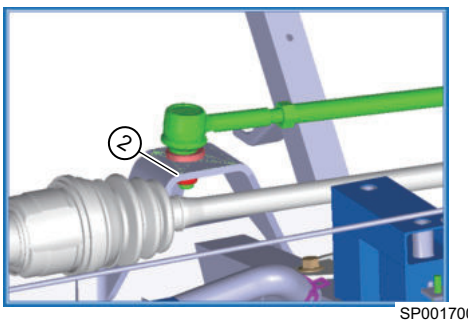
a. Using a jack, raise front part of vehicle so that it has enough operating space.

b. Turn rear left (or rear right) wheel assembly to leave space. Using 19# socket, remove 1 tightening nut (1) between tie rod and steering knuckle seat, and 1 tightening nut (2) between inner side of tie rod and sub frame bracket, remove pull rod.

Tightening torque: 35 ± 3 N•m



SP0016002



SP0017002

4. Remove the rear control arm assembly.

- Use same procedures for rear suspension lower control arm and front suspension lower control arm. Please refer to procedures of front suspension lower control arm.

Installation

1. Refer to the removal steps of rear suspension in reverse order.

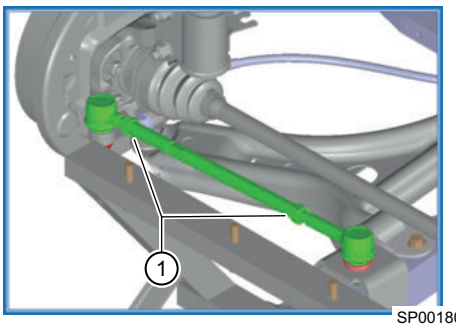
⚠

- After installing rear tie rod, detect rear wheel toe-in; If qualified, no adjustment is required.

Adjusting tie rod:

a.Make others adjusting preparation according to requirement of test.
b.Loosen rear tie rod assembly locking nuts (1), adjust length of steering tie rod until toe-in is qualified, and tighten locking nut.

Tightening torque: 35 ± 3 N•m



Adjustment for Four-wheel Alignment

Preparation before Four-Wheel Alignment

1. Check tire pressure, and adjust it to specified pressure.
2. Check the body height.
   a.Front measurement.
   b.Rear measurement.
3. Check wheel bearing clearance, and replace front wheel bearing as necessary.
4. Check the conditions of rim and tire.
5. Check the looseness of steering drive link and ball joint.
6. Park the vehicle on a level ground without luggage or people.
7. Check the wheel and the looseness of front suspension.
8. Check if shock absorber can operate properly.

⚠

- Four-wheel alignment adjustment sequence: Adjust rear wheel first and then front wheel.

Adjustment for Front Wheel Toe-in

- The toe-in can be adjusted with optical tester or mechanical toe-in adjuster.

1. Make adjusting preparation for wheel alignment according to requirement of tester.
2. Loosen the locking nut and elastic jacket snap ring from right steering tie rod, and rotate toe-in adjusting rod to adjust the length as required to specified value.

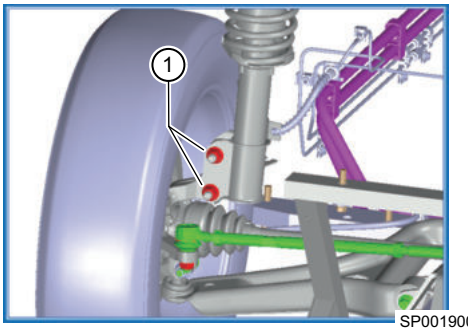
   Toe-in value: 0.17° ± 10′
3. Tighten locking nut and reinstall elastic jacket snap ring. Check if locking nut is tightened and if jacket position is correct.

   Tightening torque: 35 ± 3 N•m
4. After adjusting front wheel toe-in, check if steering wheel is horizontal. If not, loosen steering wheel locking nut and adjust steering wheel to horizontal position, and tighten steering wheel locking nut to specified torque.

Adjustment for Front Wheel Camber

1. In normal conditions, it is not necessary to adjust camber after assembling independent suspension and wheel steering knuckle. If wheel camber is not within the tolerance due to other reasons, adjust coupling bolts (1) of independent suspension and steering knuckle to correct.

   Front wheel camber: 0.5° ± 30′



2. Visually check driving system components for damage before correction. Replace damaged parts.
3. If front wheel camber is not within the tolerance, loosen coupling bolt from front shock absorber and steering knuckle, and move wheel to correct.

Adjustment for Kingpin Caster and Inclination

- Kingpin caster and inclination are assured by design structure without adjustment during use.
- Kingpin caster: 7° 48′ ± 30′ .
- Kingpin inclination: 15° 12′ ± 30′ .
- If the parameters are out of specified range, steering knuckle can be replaced only.

Adjustment for Front Wheel Camber

1. Rear wheel camber: 0° ± 30′ .

   The rear wheel camber of this vehicle cannot be adjusted. It has been matched at the factory. Check rear wheel camber and toe-in. If they are not within standard range, check parts for deformation and replace defective parts.
2. Rear wheel toe-in: - 0.3° ± 10′ .

   The rear wheel toe-in of this vehicle can be adjusted through rear tie rod. Loosen inner and outer locking nuts of rear tie rod assembly, adjust length of steering tie rod until toe-in is qualified, and tighten locking nuts.

   Tightening torque: 35 ± 3 N•m

Tire Installation and Pressure Adjustment

Assembling Valve Core

Before installing valve core, check if valve hole of wheel is smooth without any burrs, and apply glycerin to valve core rubber surface or dip valve core into glycerin fluid, and then pull or press locating ring of valve core by force with a force of 200 - 400 N via a special tool to pass it through wheel hole and install it into place (it is possible to use soapy water instead of glycerin).

Assembling Tire

Before assembling tire, apply glycerin or soapy water to tire bead along circumference direction, and pay attention to:

- When there is "light point" mark on rim, align the uniformity testing mark on tire with "light point" mark on rim.
- When there is no "light point" mark on rim, align the dynamic balance testing mark on tire with the valve core.
- When there is no "light point" mark on rim, and no dynamic balance testing mark on tire and static balance testing mark, align the valve core with the static balance testing mark.
- The tire uniformity, dynamic balance and static balance testing mark instructions shall be provided in writing by Chery company product department or supplier and indicated in the process card.
- According to the regulation of tire air pressure, the air pressure during inflation should not exceed 10% of rated air pressure. Before performing four-wheel alignment work, check the four tires pressure and adjust the pressure: 220 kPa of front wheel and 220 kPa of rear wheel.

Tire Dynamic Balance

Screw protective cap of valve core to perform dynamic balance test after tire inflation, and install balance blocks with appropriate weight to inside and outside of rim edge as required, the requirements of final assembly unbalance degree is less than 100 g·cm, which is about 5 g of balance block on inside and outside of rim edge.

⚠

- Each wheel shall be equipped with a maximum of one balancing block, and the maximum mass shall not be greater than 70 g. DO NOT tap balance blocks forcibly during assembling. If so, the balance block needs to be replaced in time. The replaced balance block is not allowed to be used again.

Installing Wheel And Tire Assembly

- When installing wheel and tire assembly, first screw wheel bolt to hub by hand to pre-tighten it, and then use a special tool to tighten it in diagonal order.
- Tightening torque: 110 ± 10 N•m.
- To avoid damage to tire or under/over tightening, never use an impact wrench.
- Do not apply grease to the wheel bolt.
- For newly installed wheel and tire assembly, after 100 km of first driving, tighten the wheel bolt to ensure the tightening torque. Inspection of wheel bolt tightening torque is one of the daily maintenance items.

Tightening Method of Wheel Nut

Fixing nut shall be tightened in the cross method, tightening degree shall be similar, and wheel can rotate freely. When final tightening, the wheel should be located on the ground.

Installing Aluminum Rim Trim Cover

- Install trim cover or place trim cover as required.
- When installing clamp type trim cover, tap it by hand or with a rubber tool.

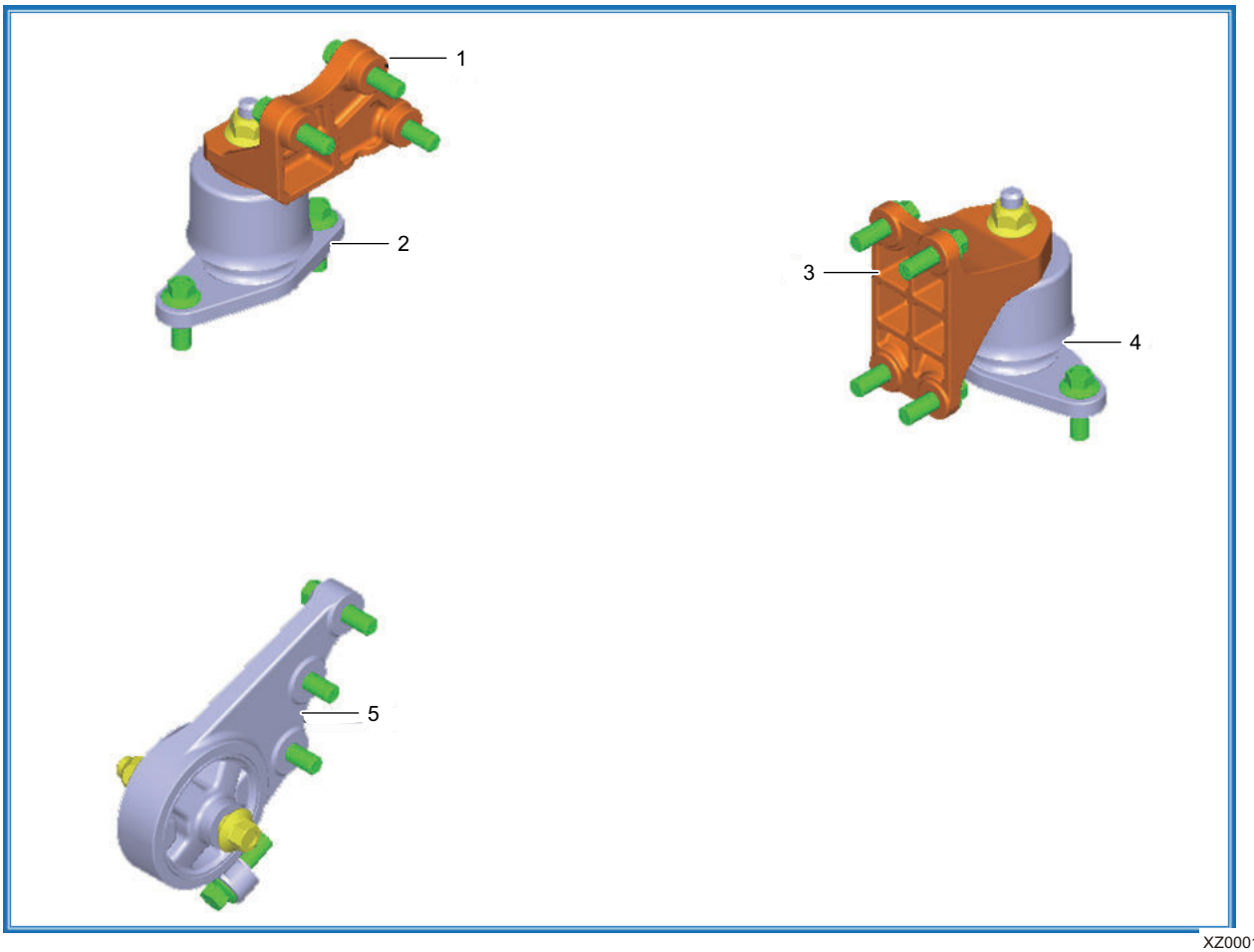
MOUNTING SYSTEM DEVICE

MOUNTING SYSTEM DEVICE

System Overview

System Components Diagram

Mounting System Device Structure Diagram



No.	Name	No.	Name
1	Left Mounting Bracket	2	Left Mounting Cushion Assembly
3	Front Mounting Bracket	4	Front Mounting Cushion Assembly
5	Front Mounting Cushion Assembly		

On-vehicle Service

Tools

Tools: 12# wrench, 12# socket, 10# socket， ratchet wrench

Specifications

Torque Specifications

Part Name	Torque (N•m)
Coupling bolt between rear mounting and frame	110 ± 10
Coupling bolt between rear mounting and final drive	65 ± 5
Coupling bolt between mounting cushion and frame	65 ± 5
Coupling bolt between mounting bracket and motor	65 ± 5
Coupling bolt between mounting bracket and final drive	65 ± 5
Fixing nut between mounting cushion and mounting bracket	110 ± 10

Mounting System Device

Removal

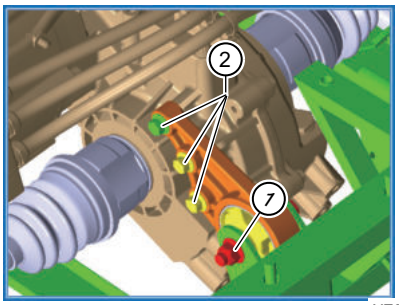
⚠

- For safety, be sure to wear necessary safety equipment to prevent accidents.
- Appropriate force should be applied during removal. Do not operate roughly.
- For safety, using a tray or other tools, stabilize motor and final drive during removal to prevent accidents.

1. **Removal for rear mounting**: Hold motor and final drive assembly with a tray, hold bolt with 12# wrench, and remove 1 coupling bolt (1) between rear mounting and frame with 12# socket and ratchet wrench; Remove 3 coupling bolts (2) from rear mounting and final drive with 10# socket.

   Tightening torque of bolt at frame connection: 110 ± 10 N•m

   Tightening torque of bolts at final drive connection: 65 ± 5 N•m

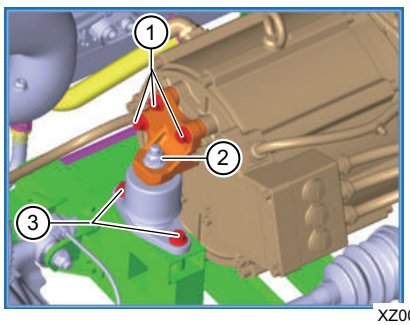


XZ0001002

2. **Removal for left mounting**: Remove 2 coupling bolts (3) from left mounting cushion and frame, and 3 coupling bolts (1) from left mounting bracket and motor with 10# socket and ratchet wrench; Remove 1 fixing nut (2) between mounting cushion and mounting bracket with 12# socket.

   Tightening torque of coupling bolts of mounting cushion and frame, mounting bracket and motor: 65 ± 5 N•m

   Tightening torque of fixing nut between mounting cushion and mounting bracket: 110 ± 10 N•m



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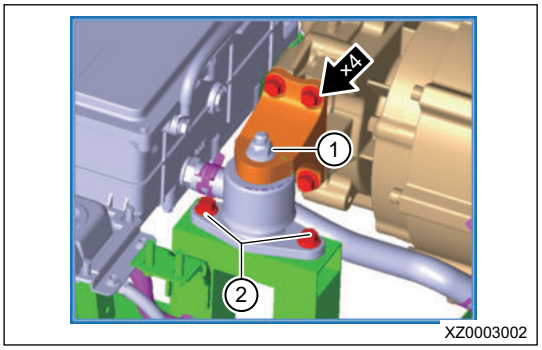
3. **Removal for front mounting:** Remove 2 coupling bolts (2) from front mounting cushion and frame, and 4 coupling bolts (arrow) from front mounting bracket and final drive with 10# socket and ratchet wrench; Remove 1 fixing nut (1) between mounting cushion and mounting bracket with 12# socket.

   Tightening torque of coupling bolts of mounting cushion and frame, mounting bracket and final drive: 65 ± 5 N•m

   Tightening torque of fixing nut between mounting cushion and mounting bracket: 110 ± 10 N•m



Installation

1. Installation is in the reverse order for removal of mounting system. All bolts need to be tightened again and marked with a marking pen after installation.

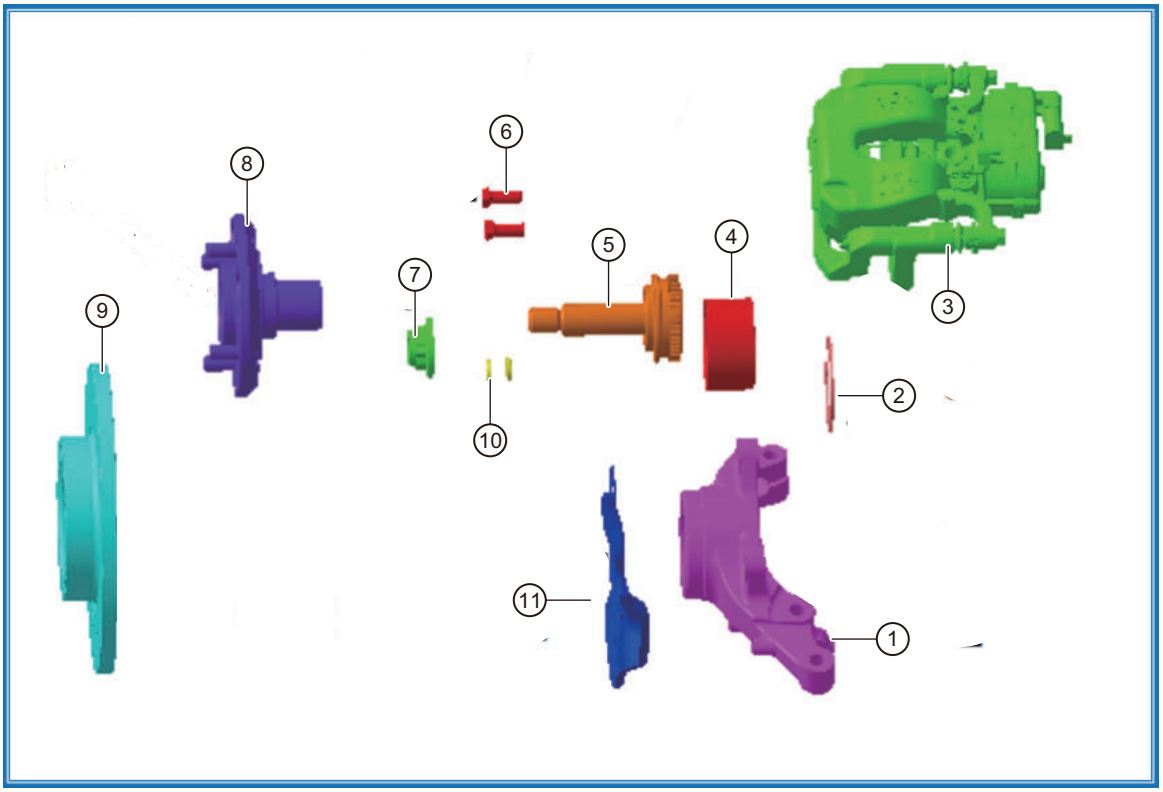
BRAKE SYSTEM

BRAKE SYSTEM

System Overview

System Components Diagram

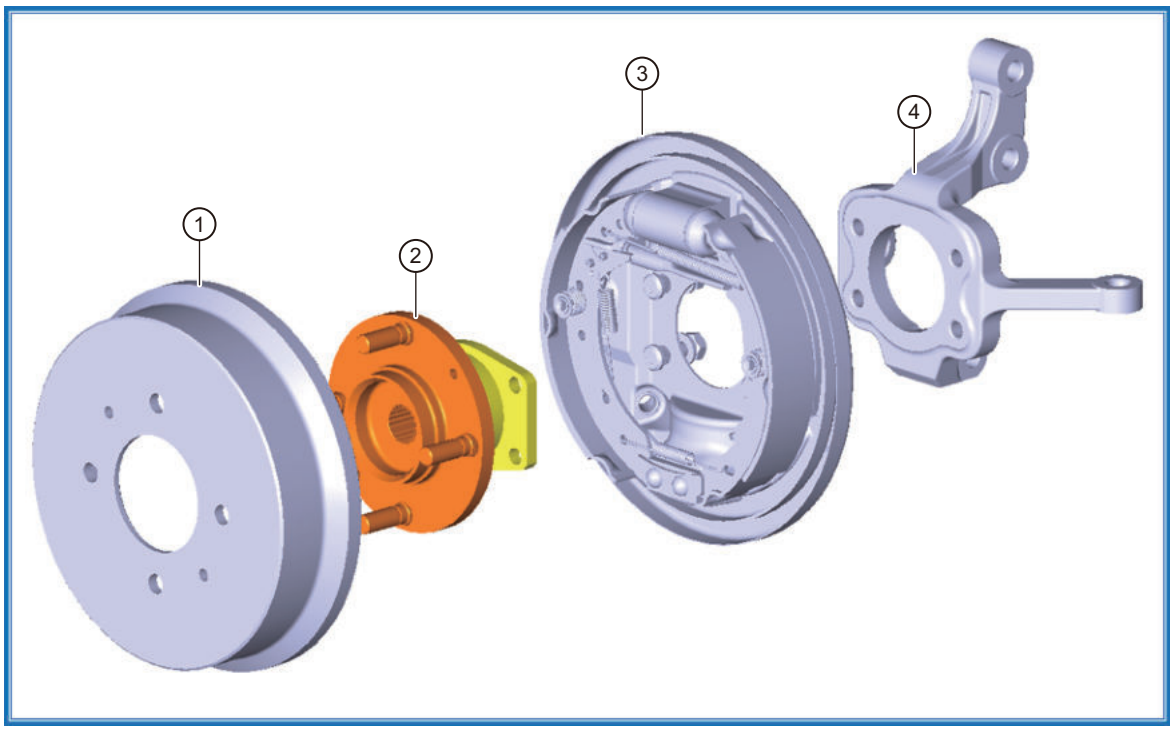
Front Steering Knuckle with Disc Brake Assembly Structure Diagram



BC0001001

No.	Name	No.	Name
1	Front Steering Knuckle	2	Snap Spring
3	Brake Caliper Assembly	4	Front Bearing Friction Block
5	Hub Shaft Brake Disc	6	Bracket Bolt
7	Hexagon Flange Locking Nut	8	Front Hub
9	Brake Disc	10	Washer
11	Fender Apron		

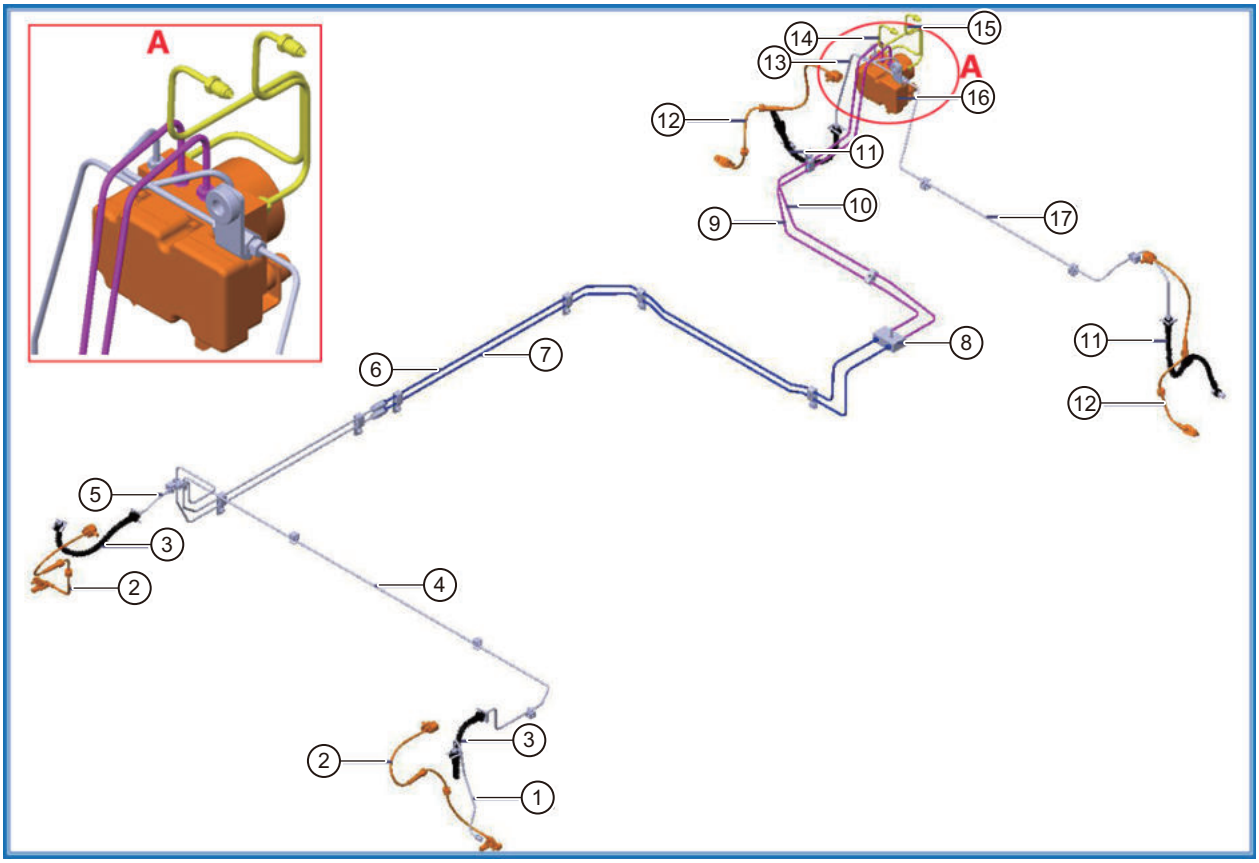
Rear Steering Knuckle with Drum Brake Assembly Structure Diagram



BC0002001

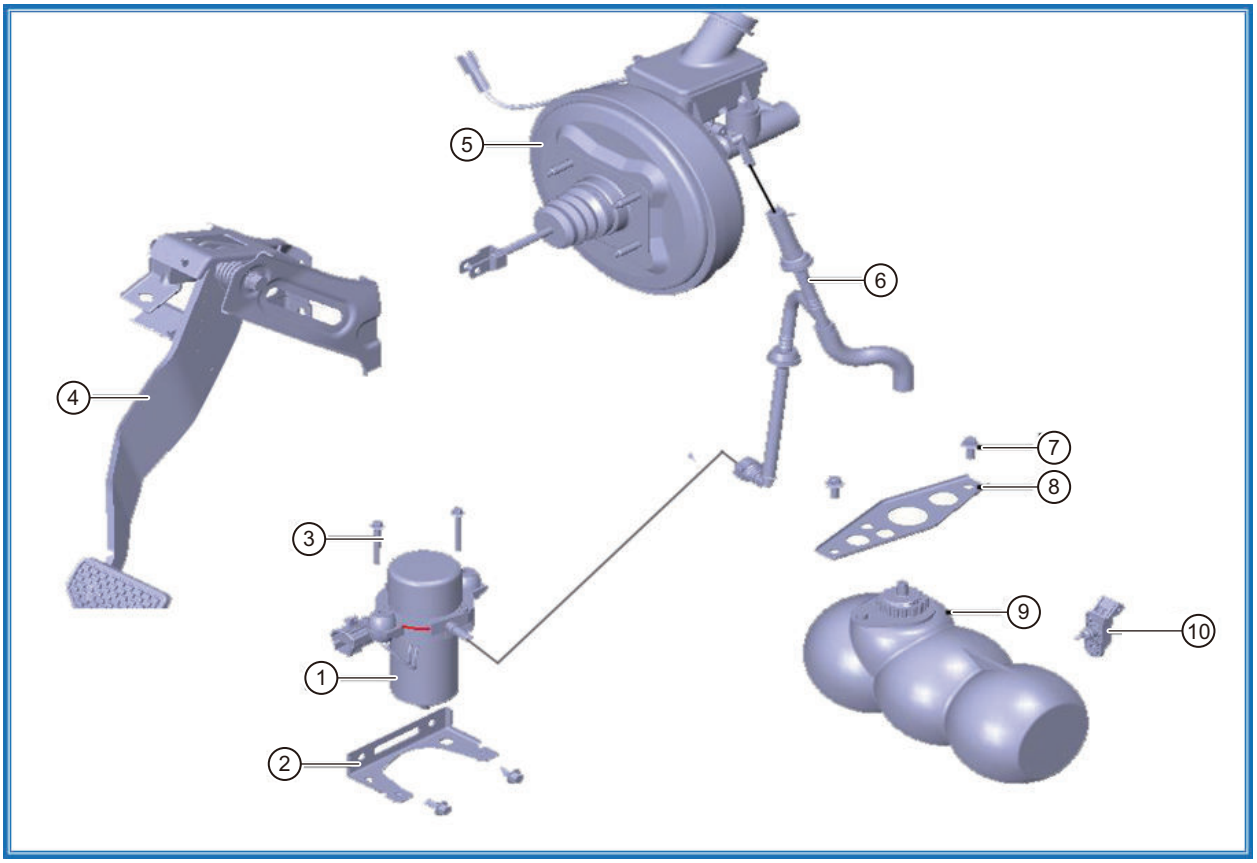
No.	Name	No.	Name
1	Brake Drum	2	Hub Bearing Unit Assembly
3	Rear Brake Assembly	4	Rear Steering Knuckle

Brake Line and ABS System Structure Diagram



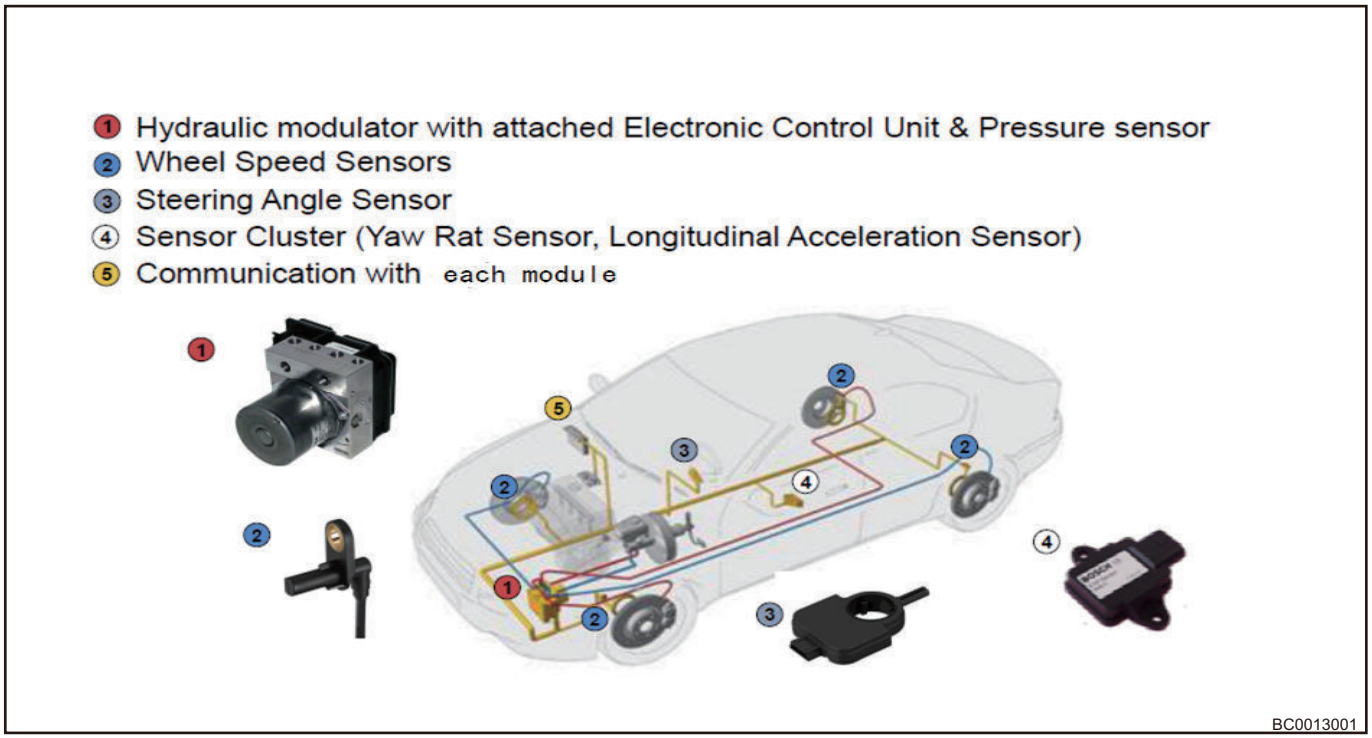
No.	Name	No.	Name
1	Rear Axle Right Brake Pipe Assembly	2	Rear Wheel Speed Sensor Assembly
3	Rear Brake Hose Assembly	4	Rear Axle Brake Pipe II
5	Rear Axle Brake Pipe I	6	Rear Right Brake Pipe Assembly II
7	Rear Left Brake Pipe Assembly II	8	Two-way
9	Rear Right Brake Pipe Assembly I	10	Rear Left Brake Pipe Assembly I
11	Front Hose Assembly	12	Front Wheel Speed Sensor Assembly
13	Front Left Brake Pipe Assembly	14	Rear Chamber (First) Brake Pipe Assembly
15	Front Chamber (Second) Brake Pipe Assembly	16	ABS Controller
17	Front Left Brake Pipe Assembly		

Vacuum Booster and Control Device Structure Diagram



No.	Name	No.	Name
1	Vacuum Pump Assembly	2	Vacuum Pump Mounting Bracket
3	Hexagon Flange Bolt	4	Foot Rest Mechanism Assembly
5	Vacuum Booster with Brake Master Cylinder Assembly	6	Vacuum Tube Assembly
7	Hexagon Flange Bolt	8	Vacuum Tank Mounting Bracket
9	Vacuum Tank Assembly	10	Atmospheric Pressure Sensor

ESC System Composition Structure Diagram

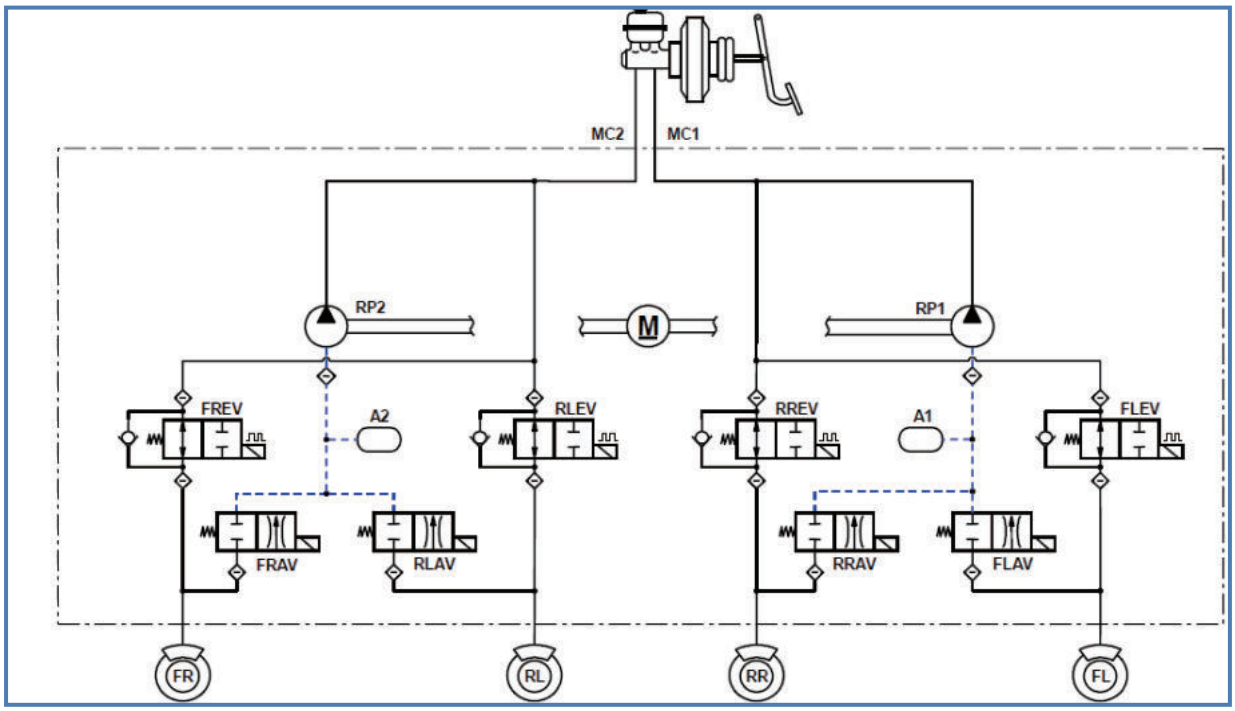


No.	Name	No.	Name
1	Hydraulic Control Unit	2	Wheel Speed Sensor
3	Steering Wheel Angle Sensor	4	Yaw Rate Sensor
5	Communication with Each Module		

Brake System Schematic Diagram

ABS System Schematic Diagram

The brake system of this vehicle adopts X type arrangement as shown below, ABS hydraulic regulator includes 1 motor, 2 return pumps, 2 accumulators and 8 solenoid valves.

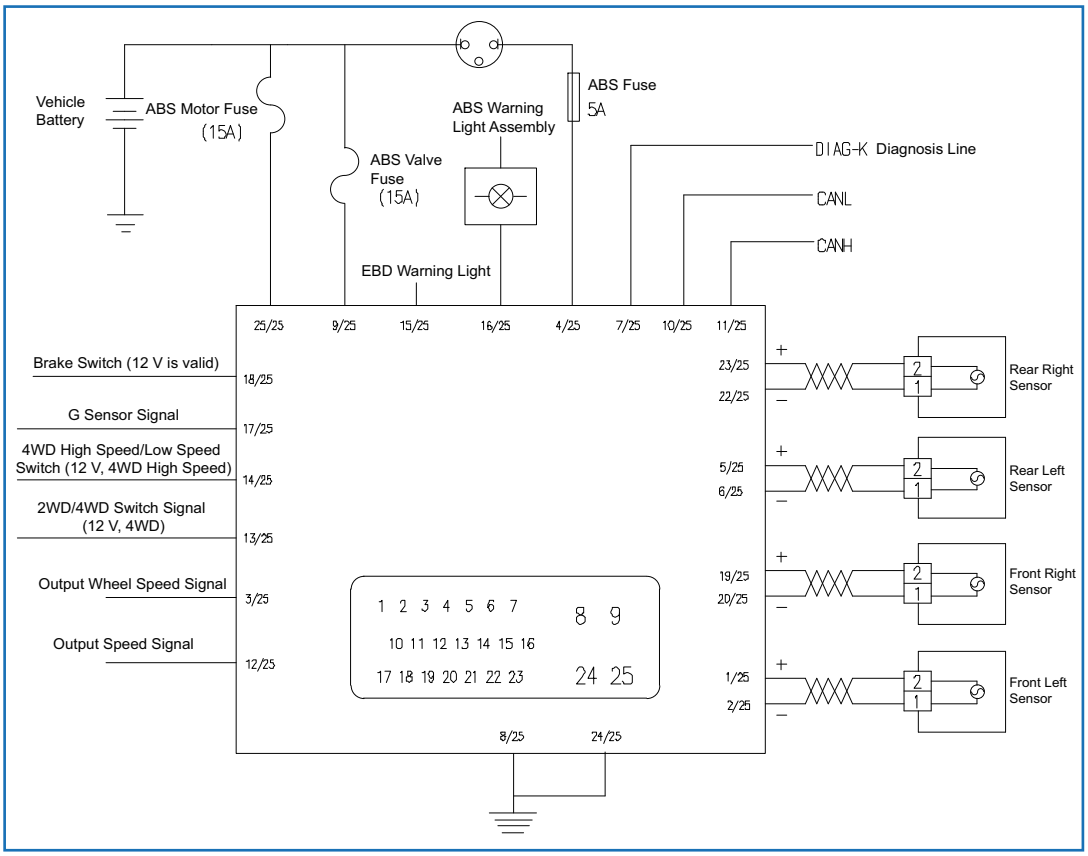


BC0004001

English Abbreviations	Definition	English Abbreviations	Definition
MC 1	Brake Master Cylinder Circuit 1	RR	Rear Right Wheel
MC 2	Brake Master Cylinder Circuit 2	FLEV	Front Left Wheel Inlet Valve
M	Motor	FLAV	Front Left Wheel Outlet Valve
RP 1	Return Pump 1	FREV	Front Right Wheel Inlet Valve
RP 2	Return Pump 2	FRAV	Front Right Wheel Outlet Valve
A 1	Accumulator 1	RLEV	Rear Left Wheel Inlet Valve
A 2	Accumulator 2	RLAV	Rear Left Wheel Outlet Valve
FL	Front Left Wheel	RREV	Rear Right Wheel Inlet Valve
FR	Front Right Wheel	RRAV	Rear Right Wheel Outlet Valve
RL	Rear Left Wheel		

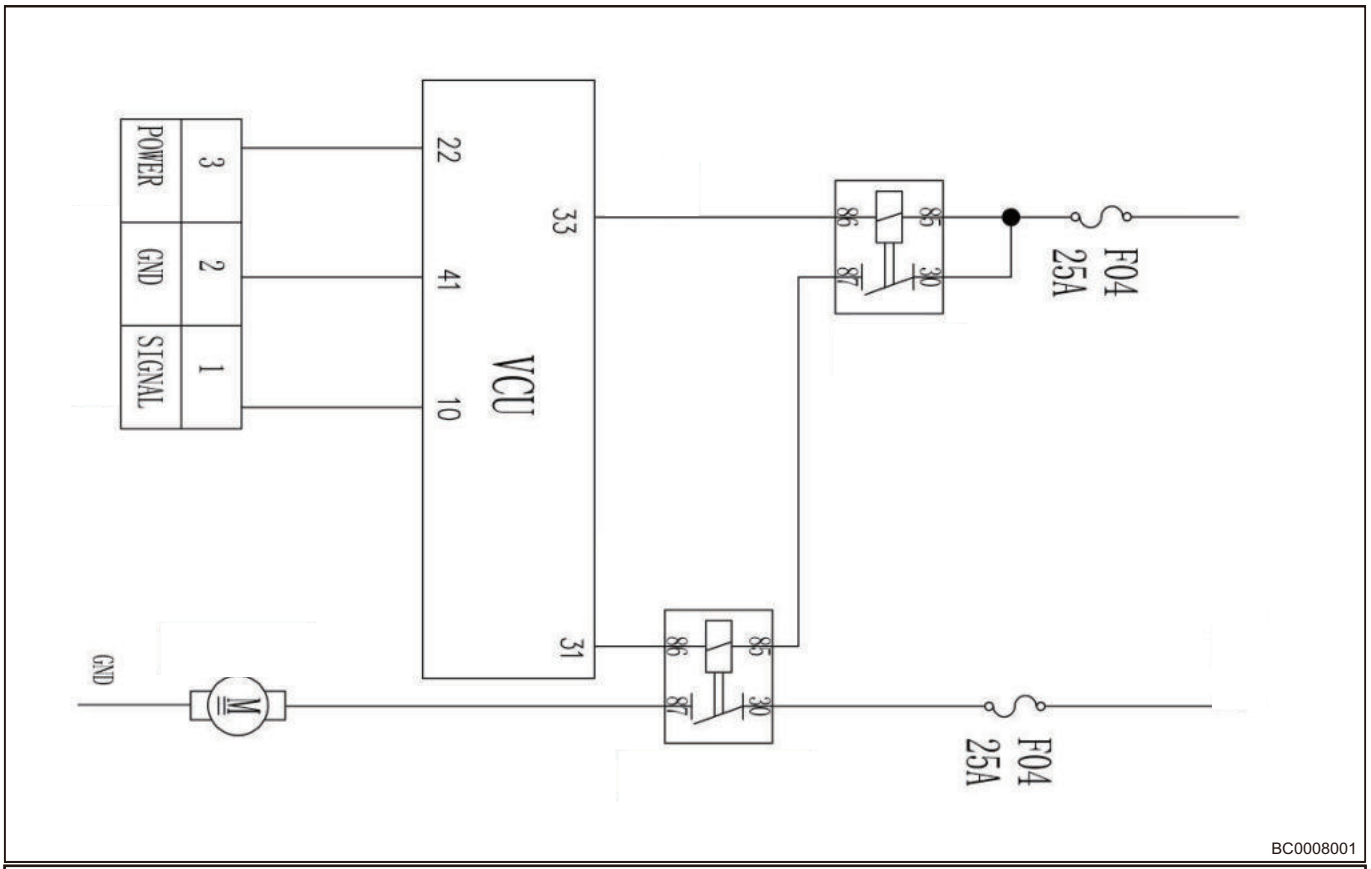
Brake System Control Schematic Diagram

ABS System Control Schematic Diagram

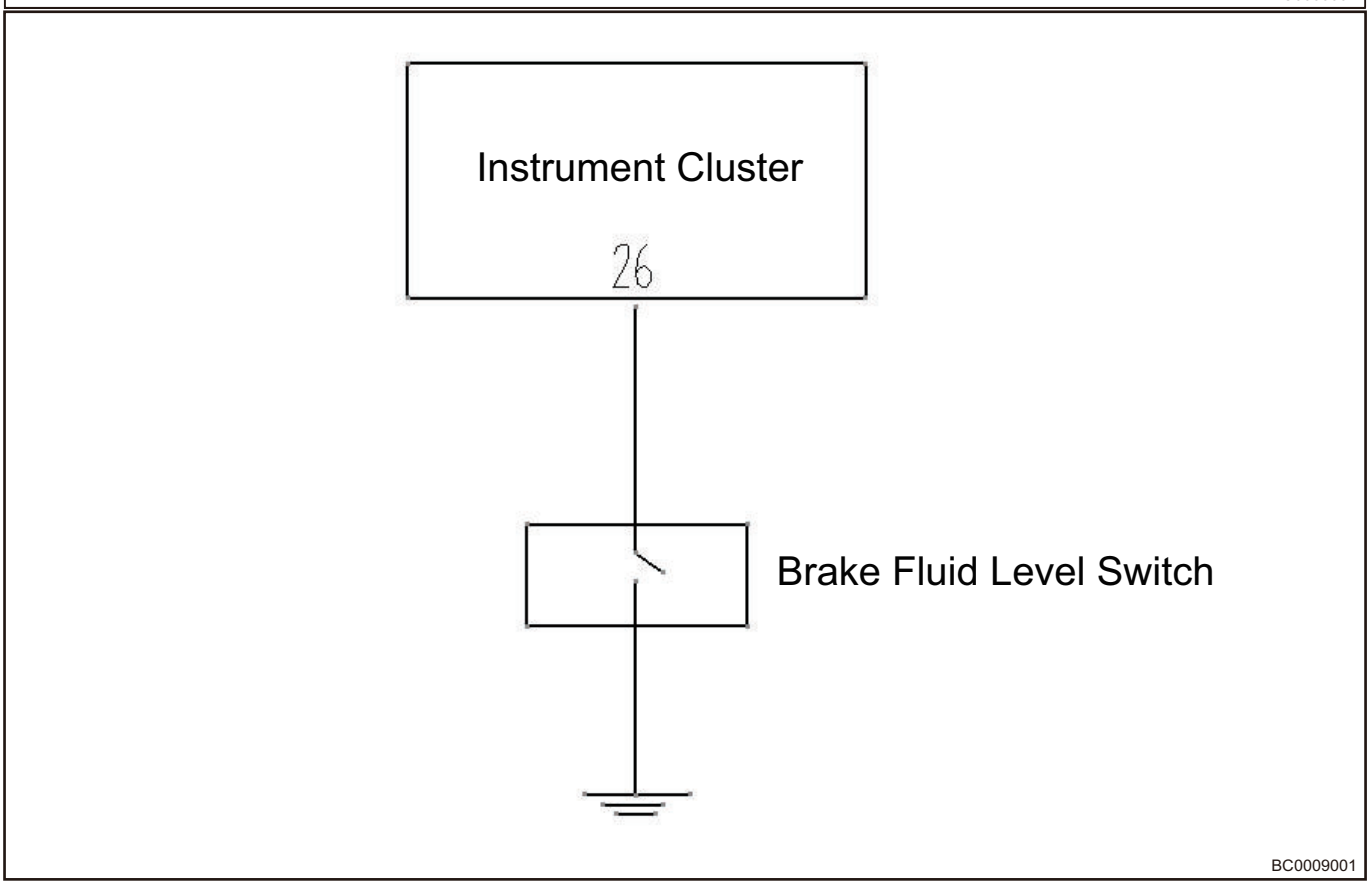


BC0005001

Vacuum System Control Schematic Diagram

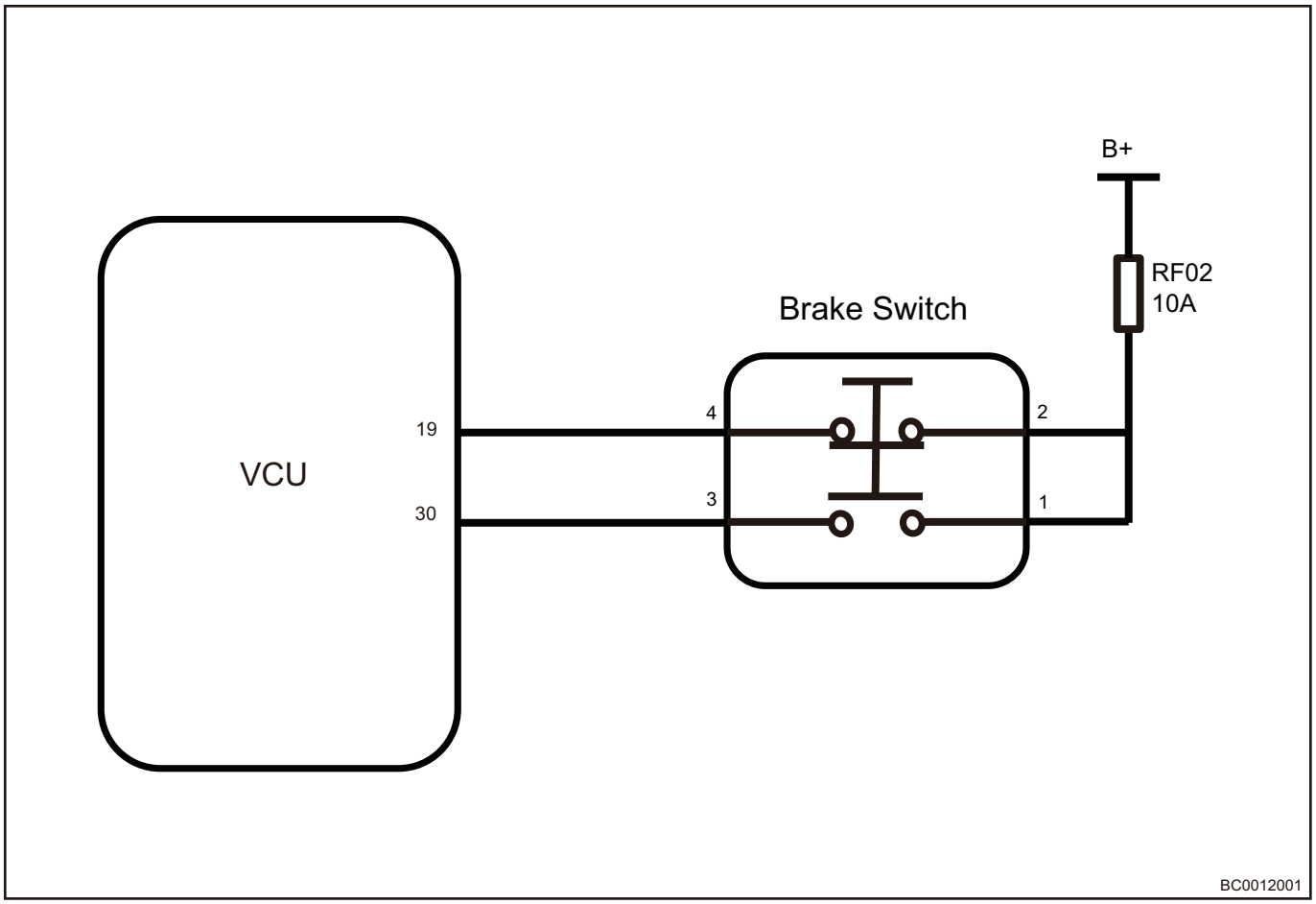


BC0008001



BC0009001

Brake Switch Control Schematic Diagram

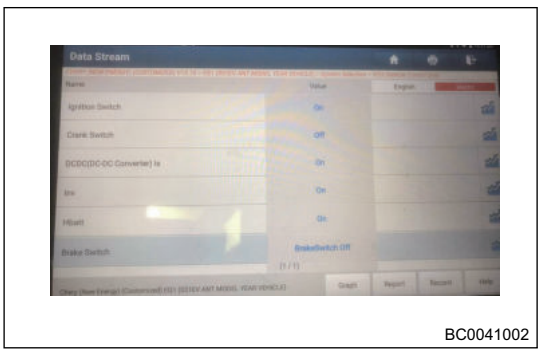


Component Function Description

Brake Switch

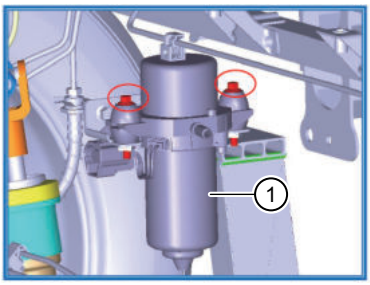
Role: The brake switch sends brake signal to VCU, and VCU informs MCU to achieve torque control and energy recovery of the drive motor according to brake signal.

Brake Switch Datastream



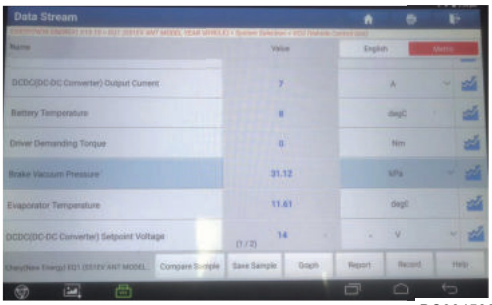
Vacuum Pump

Vacuum pump (1) installation position: it is located on the left side of the front compartment.Role: Provide effective vacuum degree for the brake booster system.



BC0044002

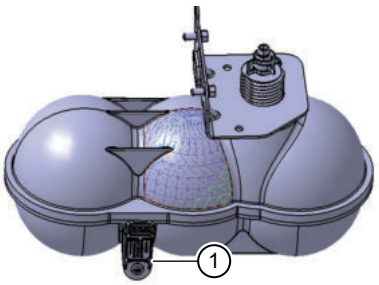
Vacuum pump data stream analysis



BC0045002

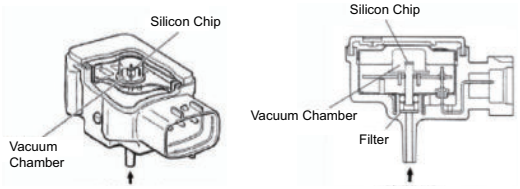
Atmospheric Pressure Sensor

Atmospheric pressure sensor (1) installation position: it is located on the vacuum tank assembly.Role: Monitor the absolute pressure in the vacuum booster system and control the operation of vacuum pump for reference.



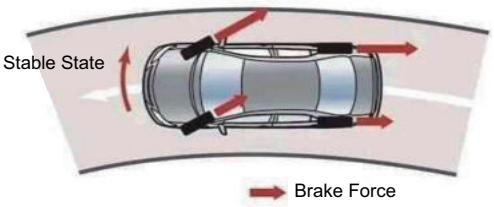
BC0042002

Operation:The vacuum pressure sensing element consists of a piece of silicon chip. Etch a piece of pressure diaphragm on silicon chip. There are 4 piezoresistors on pressure diaphragm, and the 4 piezoresistors form a Wheatstone bridge as strain element. Except for the pressure diaphragm, silicon chip is also integrated with signal processing circuit and compensating circuit. Reference vacuum chamber is integrated into silicon chip, and absolute pressure in reference space is near zero. This will form a microelectronic mechanical system.



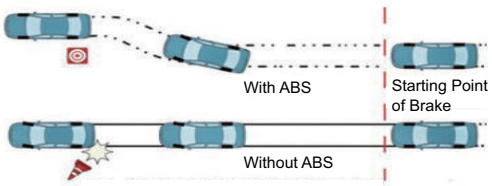
BC0043002

Electronic Brake Force Distribution System (EBD)
Role: Adjust the rear wheel brake pressure during braking, so that the rear wheel locking is later than the front wheel locking to ensure the vehicle stability.Function: The wheel speed sensor detects four wheel speed states to calculate slip rate; when the slip rate of rear wheel is too large, adjust the rear wheel brake force.



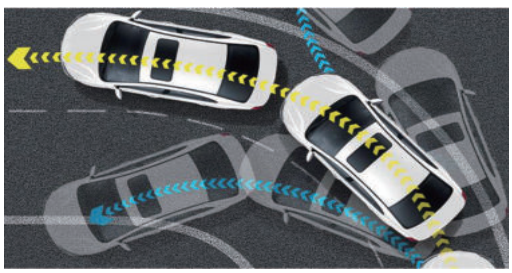
BC0046002

Anti-lock Brake System (ABS)
Role: Prevent the wheels from locking on all roads and maintain the vehicle steering ability.Function: The wheel speed sensor detects four wheel speed states to calculate slip rate; Adjust the slip rate of wheel during sudden braking, ensuring that the vehicle does not lock.

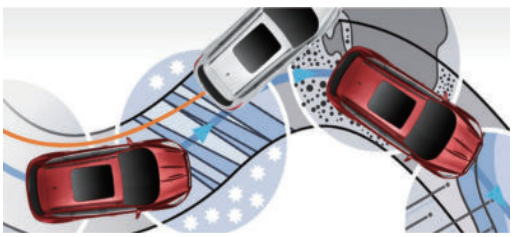


Brake Schematic Diagram of ABS (Anti-lock Brake System)
BC0047002

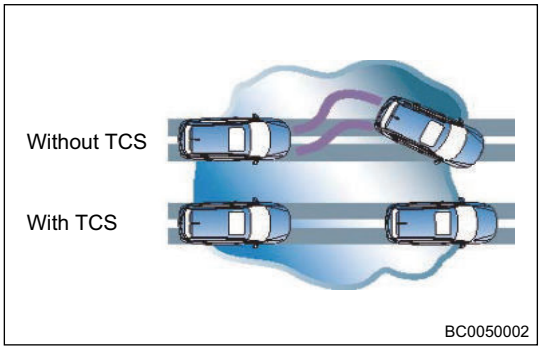
Vehicle Dynamics Control System (VDC)
Role: Improve vehicle stability under limit operation condition and prevent loss of vehicle control.Function: Identify the difference between the actual status of the whole vehicle and the driving intent; Adjust the wheel brake pressure or intervene power system management control.


BC0048002

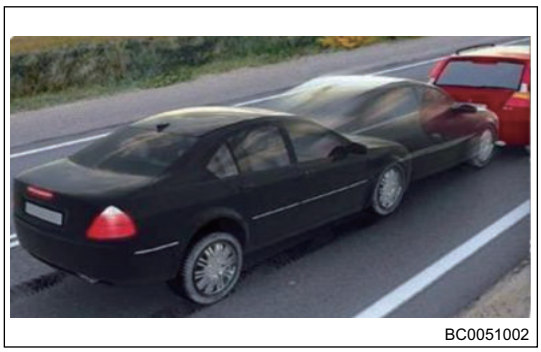
Roll Movement Intervention Function (RMI)
Role: Avoid rolling over of the vehicle on a high dynamic driving.Function: Identify the difference between the actual status of the whole vehicle and the driving intent; Reduce the trend of the vehicle rolling over through applying brake torque to outside wheel and reducing power system torque.


BC0049002

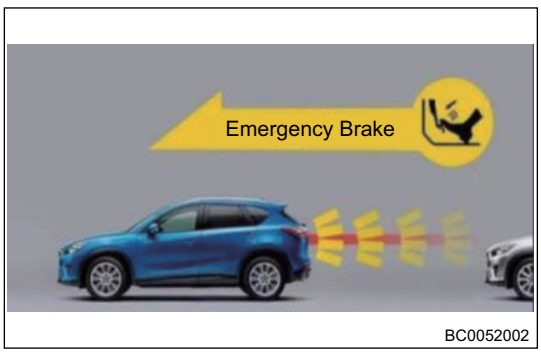
Traction Control System (TCS)
Role: Prevent drive wheels from slipping on a slippery road; Increase the traction capacity and stability of the vehicle.
Function: Wheel speed sensor detects the state of the drive wheels; The slip rate of the slip wheels is controlled in the stable range by reducing the vehicle drive motor torque and applying brake to slip wheels.



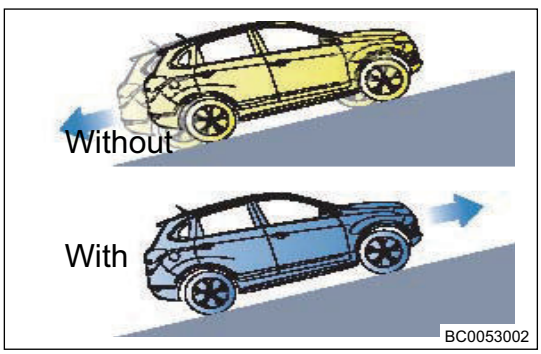
Sudden Braking Hazard Warning Lights (HAZ)
Role: The purpose is to remind the rear vehicle during sudden braking.Function: Vehicle speed is > 50 km/h, sudden brake is performed and hazard warning light signal is sent and hazard warning light comes on when ABS is activated.



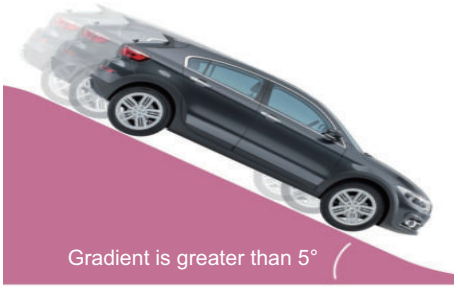
Hydraulic Brake Assist (HBA)
Role: During sudden braking, provide the maximum brake assist to the driver to reduce the braking distance.Function: Identifies driver intention to apply brake; The ESC motor increases pressure actively to the level of ABS intervention.



Hill-start Assist Control System (HHC)
Role: When the vehicle is going uphill, it prevents the vehicle from moving backward after releasing brake pedal by driver.
Function: After releasing the brake pedal, ensure that the vehicle is stopped and parked within 2 s by ESC.



Hill Descent Control (HDC)
Role: It can help driver downhill at low speed without active brake intervention by driver.Function: Use ESC to actively increase pressure to four wheels for deceleration, control the vehicle to drive downhill at a average speed. The vehicle speed when the driver release the brake pedal or accelerator pedal is the control speed.



BC0054002

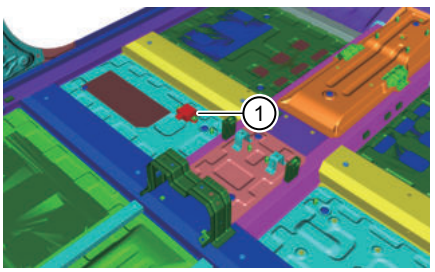
Auto Vehicle Hold (AVH)
Role: It is used to assist driver to prevent the vehicle coasting when the vehicle is shifted to the P position.Function: Control the 4 wheels to keep the brake force for 3 minutes, and park the vehicle by EPB after 3 minutes.Enable condition: The driver door is closed; the driver seat belt is fastened; the button is pressed, the button indicator comes on.


BC0055002

Controlled Deceleration for Parking Brake (CDP)
Role: No brake while the brake pedal is depressed, long pull EPB switch to apply brake.Function: When long pulling EPB switch to apply the sudden braking, EPB requests ESC to apply hydraulic brake for 4 wheels and reduce the brake distance.


BC0056002

Yaw Rate Sensor
Installation position: Under the driver seat



BC0057002

Calibration requirements:

1. Maximum tilting angle of four-wheel alignment device must be within allowable range, that both are met ± 0.57° (± 1%) in two positive directions;
2. Four-wheel alignment device or vehicle must be static;
3. Turn steering wheel to straight ahead position;
4. Tire pressure is normal;
5. It is in unloaded status;
6. Vehicle stands on its own wheels;
7. Additional interference is prohibited, such as interference due to closing doors or front compartment cover, etc.

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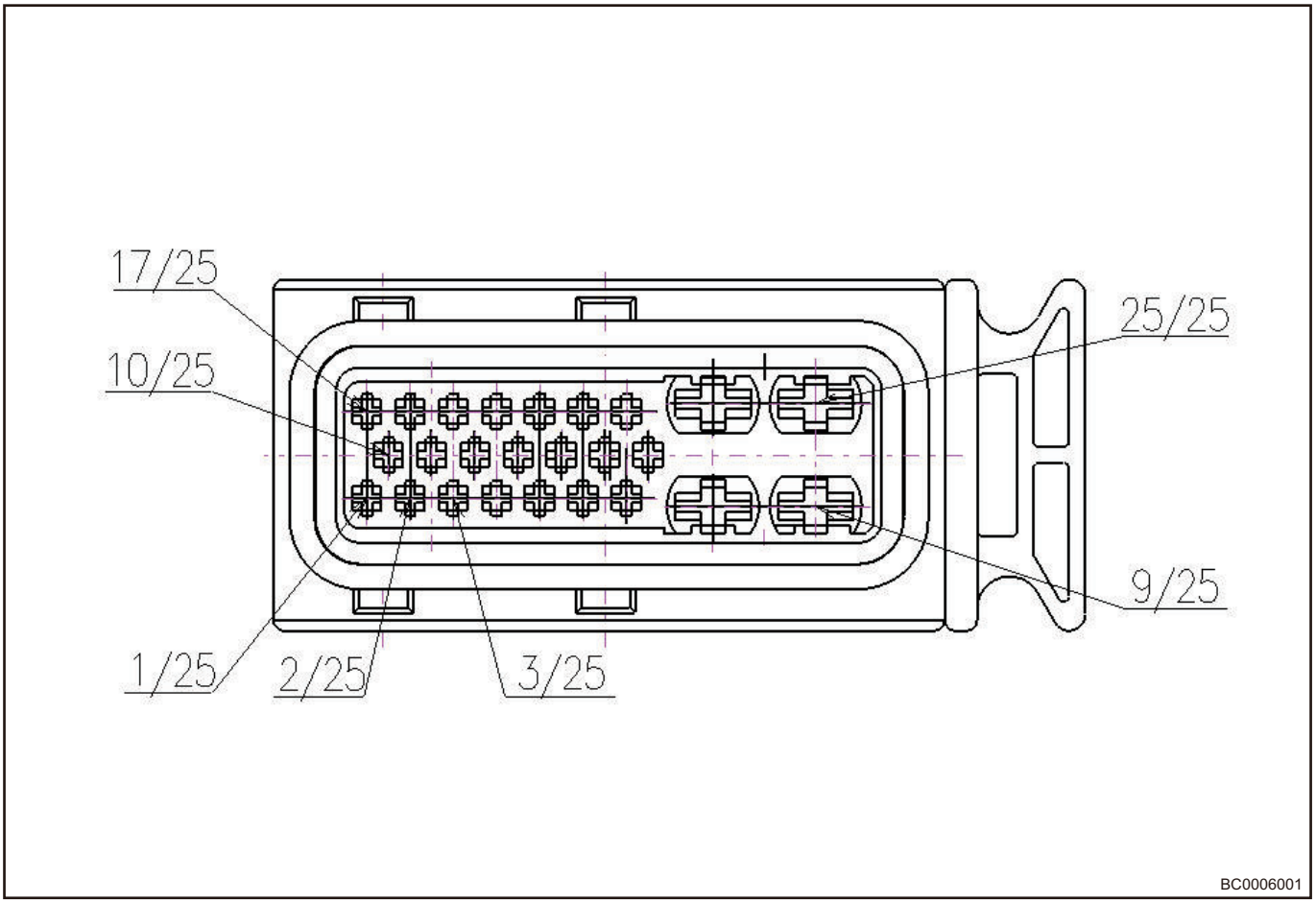
- During calibration, ECU will write the measured new data into EEPROM for use by ESC. Ensure the above calibration conditions are right, because ESC cannot determine whether the above mentioned preconditions are proper or not. If offset is too large, system will reject the calibration.

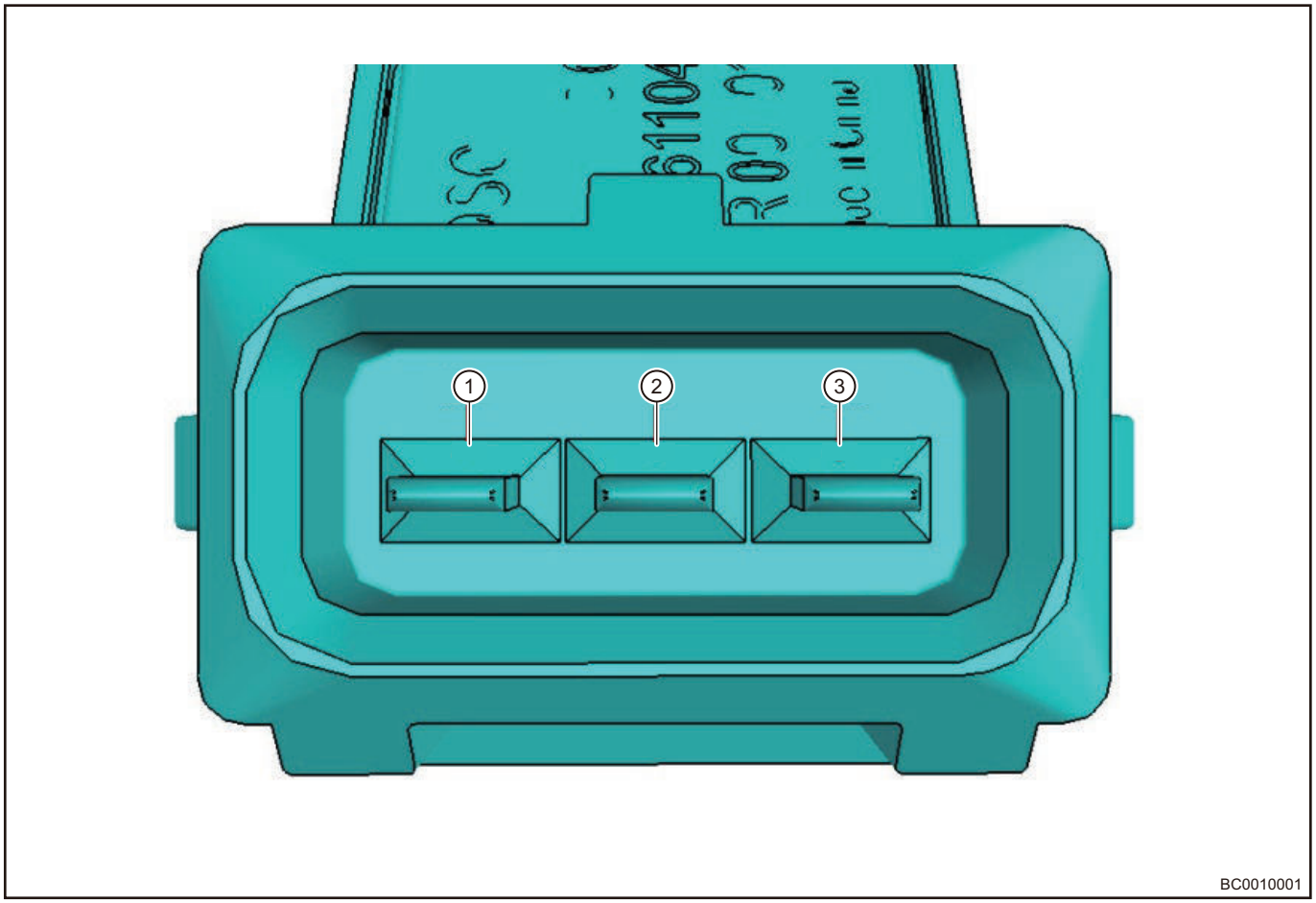
System Circuit Diagram

Module Terminal Definition

ABS Connector Definition

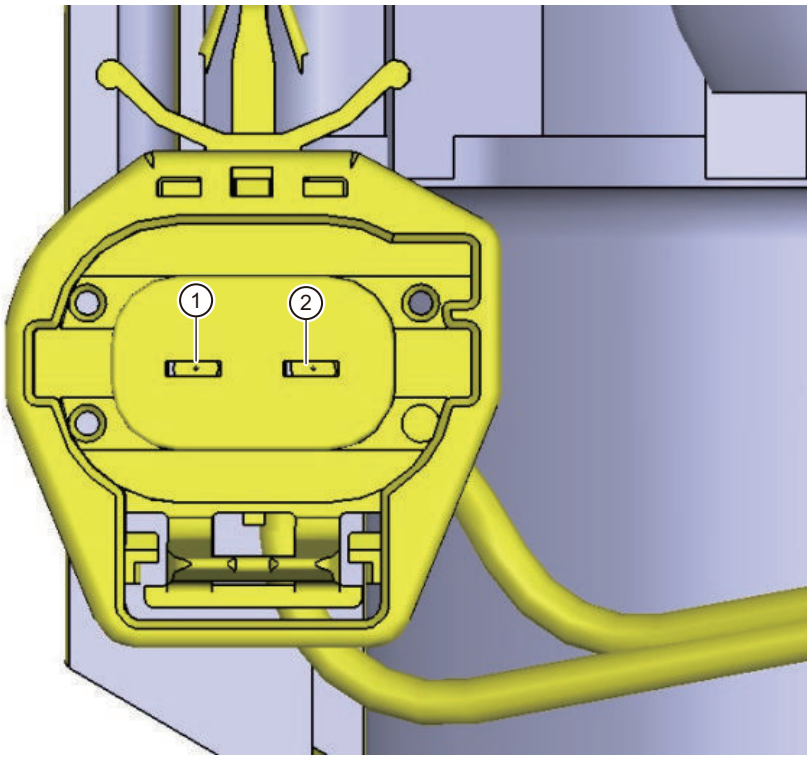


Atmospheric Pressure Sensor Connector Definition



No.	Terminal Definition	No.	Terminal Definition
1	Signal	2	Ground
3	Power Supply		

Vacuum Pump Connector Definition



BC0011001

No.	Terminal Definition	No.	Terminal Definition
1	Positive	2	Negative

Diagnosis & Test

Problem Symptoms Table

Brake Problem Symptoms Table

Symptom	Possible Cause	Recommended Repair Method
Brake disc sounds a squeak	Brake disc is attached with small particles impurities, the brake disc runout is too excessive	Check and clear foreign matters. Replace the brake disc as necessary.
Brake disc sounds a gurgle or the sound is dull	1. Brake caliper guide pin bolt is loose2. Support shim is lost.3. Metal particles.	1. Tighten guide pin bolt.2. Replace support shim.3. Clear metal particles.
The brake disc sounds a short squeak at low speed (when the applied brake pedal force is small)	Brake shoe lining	Replace brake pad

Scratching or swishing occurs during braking	ABS wheel speed sensor collision counting gear teeth	Inspect, repair or replace malfunctioning components
Hard pedal	1. The brake pedal is stuck.2. The brake booster is inefficient.3. The brake pad moves to the brake disc.	1. Check and clear obstacles.2. Check if the vacuum booster system leaks, repair or replace as necessary.3. Replace brake disc or brake pad as necessary.
Hard pedal (unable to lock the wheels by firmly depressing)	Brake booster runout (vacuum booster)	Check if the sufficient vacuum is applied to vacuum booster hose and engine
Excessive pedal travel (vehicle stops normally)	Air exists in the brake line	Bleed the brake
Pedal pulsates/jumps during braking	Brake disc thickness error is too large	Replace the brake disc as necessary
Spongy pedal	Air exists in the brake line	Bleed the brake
Vehicle moves to left or right during brakingRunning deviation	1. Brake caliper piston is frozen.2. Brake pad / brake shoe lining is dirty, the brake line is twisted.3. Piston seal is leaked.4. Suspension is faulty.	1. Replace frozen piston or brake caliper. Bleed the brake.2. Inspect, clean or replace brake pad / brake shoe.3. Replace the twisted line.4. Replace piston seal or brake caliper.5. Replace the suspension parts.

ABS Problem Symptoms Table

Symptom	Possible Cause	Recommended Repair Method
Turning POWER switch to “ON”，ABS warning light does not come on	Instrument cluster is damaged	Check and repair instrument cluster
After starting vehicle, ABS warning light remains on	Instrument cluster is damagedCAN communication line is faultyABS control system is faulty	Check and repair instrument clusterCheck and repair CAN lineCheck and repair according to the Repair Manual
ABS operation is abnormal	Power supply is faultySensor is damagedSensor is installed improperlySensor wire harness is faultySensor is attached with foreign matterRing gear is damagedWheel bearing is damagedABS controller is damaged	Check and repair power supply or groundCheck or replace sensorInstall sensor correctlyCheck or replace sensor wire harnessClear foreign mattersCheck or replace ring gearCheck or replace wheel bearingCheck or replace ABS controller
Unable to communicate with diagnostic tester	Fault diagnostic tester is faultyPower supply is faultyCommunication line or other nodes are faultyABS controller is damaged	Replace fault diagnostic tester and detect againCheck power supply or groundCheck communication line or other nodesCheck or replace ABS controller

Brake pedal is over-travel or weak and brake force is abnormal	Parking brake is adjusted improperlyBrake fluid leaksThe brake disc is worn seriouslyNormal close valve leaksAir exists in systemBooster or brake master cylinder is faultyBrake fluid moisture is out of specified range	Check and repair parking brakeCheck or replace brake fluid line and brake pumpCheck or replace brake and liningCheck or replace ABS controllerPerform bleeding procedures for brake systemCheck or replace booster or brake master cylinderReplace brake fluid
Hard brake pedal	Booster is faultyBrake line is blocked	Check or replace boosterCheck or replace brake fluid line

Diagnostic Trouble Code (DTC) Chart

DTC	DTC (Hex)	Description
C1900	0x590004	
C1901	0x590104	POWER SUPPLY VOLTAGE IS TOO LOW
C1000	0x500004	ECU ERROR (HARDWARE MOTOR CONTROL ERROR)
C1010	0x501008	ECU FAILURE (SOFTWARE)
C006B	0x406B06	ABS CONTROL TIME IS UNREASONABLE
C0031	0x403108	THE SIGNAL OF THE LEFT FRONT WHEEL SENSOR IS OUT OF TOLERANCE
C0032	0x403200	THE SIGNAL OF THE LEFT FRONT WHEEL SENSOR IS OPEN
C00A0	0x40A000	LEFT FRONT WHEEL SENSOR GROUND SHORT CIRCUIT
C00A1	0x40A100	LEFT FRONT WHEEL SENSOR SIGNAL SHORT CIRCUIT
C00A9	0x40A900	FAULTLY LEFT FRONT WHEEL SENSOR LINE NOT ACCURATE REASON FOR FAILURE
C0034	0x403408	THE SIGNAL OF THE RIGHT FRONT WHEEL SENSOR IS OUT OF TOLERANCE
C0035	0x403500	RIGHT FRONT WHEEL SENSOR SIGNAL OPEN CIRCUIT
C00A2	0x40A200	RIGHT FRONT WHEEL SENSOR GROUND SHORT CIRCUIT
C00A3	0x40A300	RIGHT FRONT WHEEL SENSOR SIGNAL SHORT CIRCUIT
C00AA	0x40AA00	RIGHT FRONT WHEEL SPEED SENSOR HARNESS FAILURE (NO ACCURATE ERROR DETECTABLE)
C0037	0x403708	LEFT REAR WHEEL SENSOR SIGNAL OUT OF TOLERANCE
C0038	0x403800	LEFT REAR WHEEL SENSOR SIGNAL OPEN CIRCUIT
C00A4	0x40A400	THE RIGHT REAR SIGNAL SENSOR IS SHORTED TO GROUND
C00A5	0x40A500	LEFT REAR WHEEL SENSOR SIGNAL SHORT CIRCUIT
C00AB	0x40AA00	LEFT REAR WHEEL SPEED SENSOR HARNESS LOSS (NO ACCURATE ERROR DETECTABLE)
C003A	0x403A08	THE SIGNAL OF THE RIGHT REAR WHEEL SENSOR IS OUT OF THE TOLERANCE
C003B	0x403B00	RIGHT REAR WHEEL SENSOR SIGNAL OPEN CIRCUIT

C00A6	0x40A600	THE SIGNAL OF THE RIGHT REAR WHEEL SENSOR IS SHORTED TO GROUND
C00A7	0x40A700	RIGHT REAR WHEEL SENSOR SIGNAL SHORT CIRCUIT
C00AC	0x40AC00	FAILED RIGHT REAR SPEED SENSOR HARNESS (NO EXACT ERROR DETECTABLE)
C1099	0x509904	WRONG SOURCE OF WHEEL SPEED SENSOR SIGNAL (SENSOR EXCHANGE, MULTIPLE SENSOR ERRORS)
C0010	0x401004	LEFT FORWARD FLUID VALVE PRESSURE ERROR
C0011	0x401104	LEFT FRONT OUTLET VALVE PRESSURE ERROR
C0014	0x401404	RIGHT FORWARD FLUID VALVE PRESSURE ERROR
C0015	0x401504	RIGHT FRONT OUTLET VALVE PRESSURE ERROR
C0018	0x401804	LEFT REAR INLET VALVE PRESSURE ERROR
C0019	0x401904	LEFT REAR OUTLET VALVE PRESSURE WRONG
C001C	0x401C04	RIGHT REAR INLET VALVE PRESSURE WRONG
C001D	0x401D04	RIGHT REAR OUTLET VALVE PRESSURE ERROR
C1095	0x509504	ABNORMAL POWER SUPPLY OF ABS VALVE RELAY
C0020	0x402004	ABS MOTOR FAILURE
C0072	0x407208	MASTER VALVE FAILURE (OVERHEAT PROTECTION, NO SIGNAL FAILURE, HARDWARE ERROR)
U0005	0xC00500	CAN LINE VOLTAGE OVERVOLTAGE
U0007	0xC00700	CAN LINE VOLTAGE ULTRA LOW
U0001	0xC00104	CAN LINE ERROR
U1001	0xD00104	CAN LINE NEGATIVE ERROR

No Diagnostic Trouble Code (DTC) Fault

If there is a problem in brake system, but no DTC is stored in ABS / ESP, this problem is called a problem without DTC. A problem without DTC is caused by basic brake system malfunction. For example:

- Brake fluid leakage (it may result in weak braking, brake pedal over-travel or even ineffective braking).
- Using inferior brake fluid (it can result in corrosion of brake line and ABS/ESP hydraulic regulating module internal elements, or even ineffective braking).
- Air in brake line (it may result in weak braking or even ineffective braking).
- Brake line blockage (it may result in hard braking, braking deviation or even ineffective braking).
- Excessive wear of brake disc (it may result in weak braking, brake pedal over-travel).
- Brake booster malfunction (it may result in weak or hard braking, brake pedal over-travel or even ineffective braking).
- Incorrect brake line connection (it may result in ABS/ESP performance decreasing, drift, long braking distance etc.) For correct installation method, please refer to mark near oil hole on ABS/ESP hydraulic regulating module: MC1 represents No. 1 master cylinder oil pipe; MC2 represents No. 2 master cylinder oil pipe; FL represents front left wheel cylinder oil pipe; FR represents front right wheel cylinder oil pipe; RL represents rear left wheel cylinder oil pipe; RR represents rear right wheel cylinder oil pipe.

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- No power supply to ABS/ESP or abnormally interrupted power supply will cause brake warning light, ABS warning light and ESP multi-functional warning light remaining on without storing any DTC.

On-vehicle Service

Tools

Tools: Brake fluid reservoir, pneumatic wrench, tightening torque wrench, a TORX wrench, a set of common large and small socket, flat tip screwdriver and cross screwdriver, a vernier caliper and a dial indicator, a vice and a needle nose plier, a plastic hammer and a ferric hammer, Chery special diagnostic tester, a adjustable wrench and a ratchet wrench
Protection equipments: Gloves, working cloth, safety helmet, working shoes
Auxiliary material: Brake fluid

Specifications

Torque Specifications

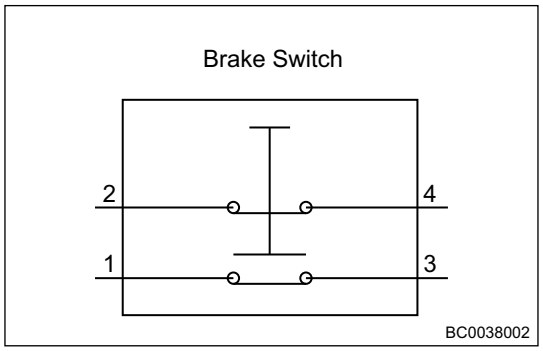
Part Name	Torque (N·m)
M12 Bolt Between Front Shock Absorber and Steering Knuckle	130 ± 10
M12 Nut Between Front Swing Arm and Steering Knuckle	110 ± 10
M12 Nut Between Front Tie Rod and Steering Knuckle	35 ± 5
M10 Eye Bolt Between Font Hose and Front Brake	25 ± 4
M6 Bolt Between Front Wheel Speed Sensor and Steering Knuckle	10 ± 1
M12 Wheel Nut Between Rim and Front Brake	110 ± 10
M12 Bolt Between Rear Shock Absorber and Steering Knuckle	130 ± 10
M12 Nut Between Rear Swing Arm and Steering Knuckle	110 ± 10
M12 Nut Between Rear Tie Rod and Steering Knuckle	35 ± 5
M10 Eye Bolt Between Rear Axle Brake Pipe and Rear Brake	25 ± 4
M6 Bolt Between Rear Wheel Speed Sensor and Steering Knuckle	10 ± 1
M12 Wheel Nut Between Rim and Rear Brake	110 ± 10
M6 Hexagon Head Bolt of Vacuum Pump Fixing Bracket	10 ± 1
Atmospheric Pressure Sensor Fixing Bolt	6 ± 1

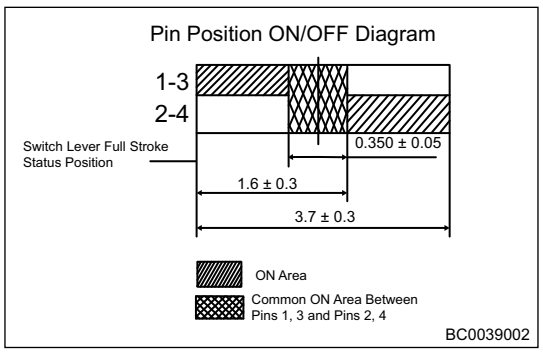
Part Name	Torque (N·m)
Coupling Bolt Between ABS Controller and Brake Line	18 ± 2
Fixing Bolt of ABS Controller Fixing Bracket	25 ± 4
Coupling Bolt Between ABS Controller and Fixing Bracket	9 ± 1

On-Vehicle Inspection

1. Brake switch (test method)

   - Turn POWER switch to ON and use 2 multimeters to measure if voltages between brake switch signal (4 #), (3 #) and ground are 12 V and 0 V separately without brake pedal depressed. Depress brake pedal slowly to observe if voltages of 2 multimeters change at about the same time;
   -
   - For the contact continuity, please refer to the pin continuity diagram to check.





Front Brake

Removal

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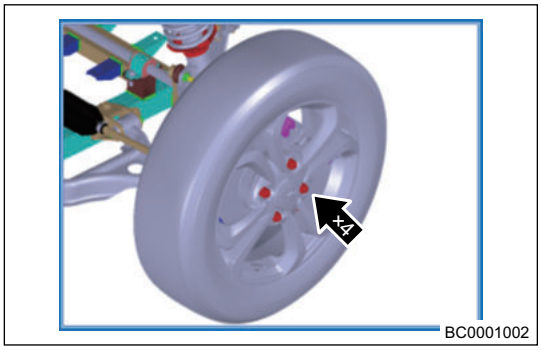
- Be sure to wear necessary safety equipment to prevent accidents.
- Brake fluid is a toxic liquid, if your skin or eyes accidentally come into contact with the fluid, please wash with large amount of water and get medical attention if necessary.
- Waste brake fluid should be stored in a container. It is not allowed to pour it in sewer or pile up with household waste.
- During removal and installation, do not depress the brake pedal and move the vehicle.
- It is not allowed to remove the brake caliper piston casually, remove and install it only by the specialized person or with guidance of specialized person.
- During assembly, never allow lining or brake disc to contact with oil fluid. If there is oil fluid, wipe it off and polish it with abrasive paper.

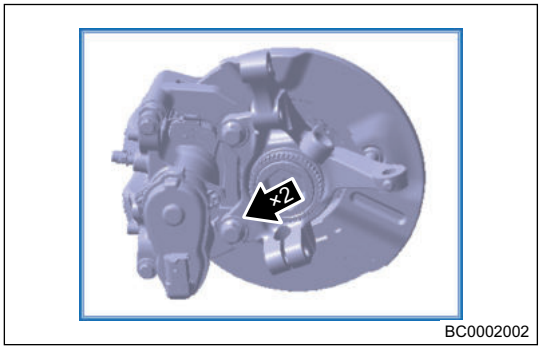
1. Use 17# socket and tightening torque wrench to remove 4 tightening bolts (arrow) from front right tires, and then remove the tires. (Removal and installation method of tires is same as other models, and will not repeat it here.)

   Tightening torque: 110 ± 10 N·m



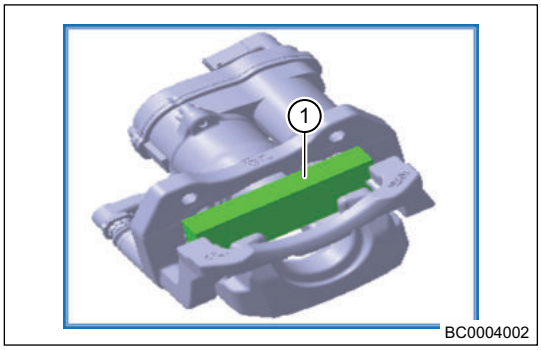
2. Remove 2 bolts (arrow) between steering knuckle and brake caliper assembly with 17# socket and ratchet wrench, then place brake caliper on the fender apron and steering knuckle steadily.

   Tightening torque: 85 ± 5 N·m



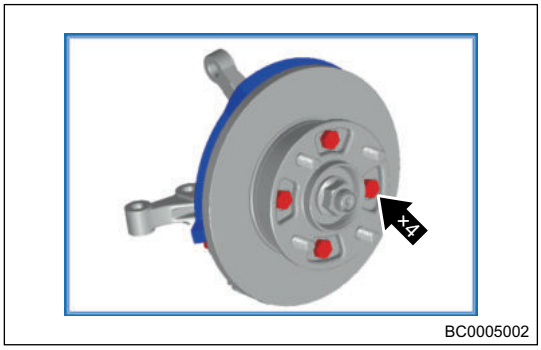
3. Pry the brake wheel cylinder with a flat tip screwdriver.

4. Remove caliper and brake lining, jam cylinder block with a filler (wood or foam) (1) and avoid piston sliding out.



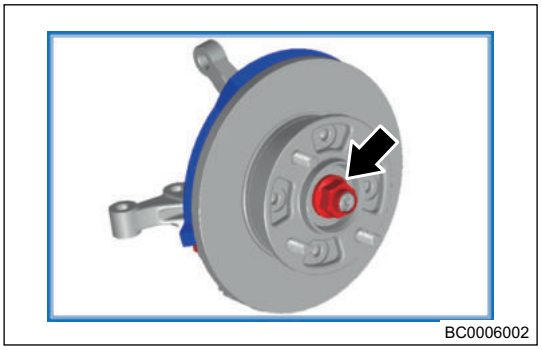
5. Remove 4 bolts (arrow) between front hub and brake disc with 14# socket and ratchet wrench.

   Tightening torque: 110 ± 10 N·m

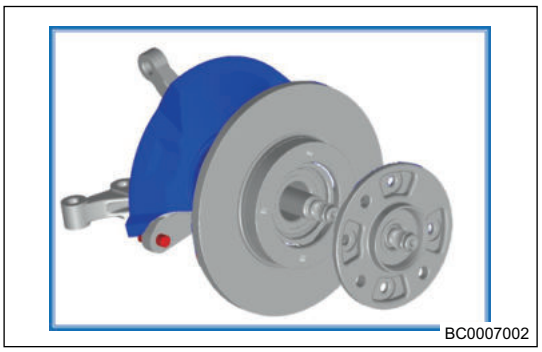


6. Remove 1 locking nut (arrow) from front hub shaft with 30# socket and pneumatic wrench.

   Tightening torque: 260 ± 20 N·m

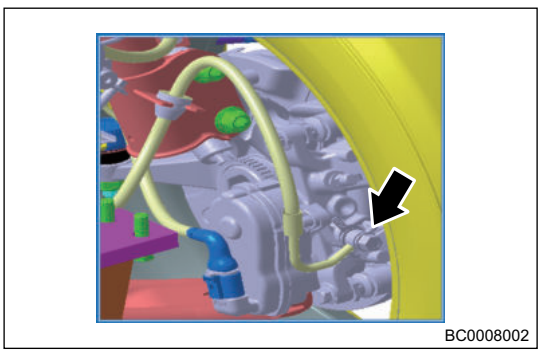

BC0006002

7. Remove front hub and then remove brake disc.


BC0007002

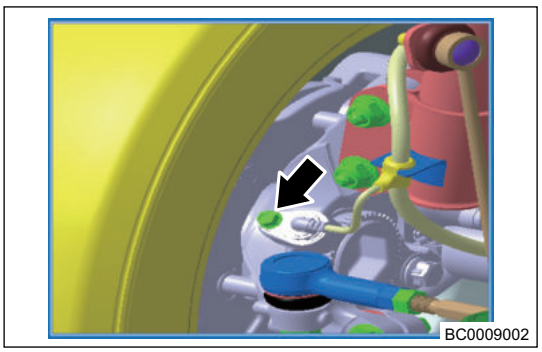
8. Remove coupling nut (arrow) between brake fluid pipe and brake wheel cylinder with 13# speed wrench and save 2 shims. Recycle brake fluid in a clean container and then remove brake wheel cylinder (if only replace brake disc, it is not required to disconnect brake line.)

   Tightening torque: 25 ± 4 N·m


BC0008002

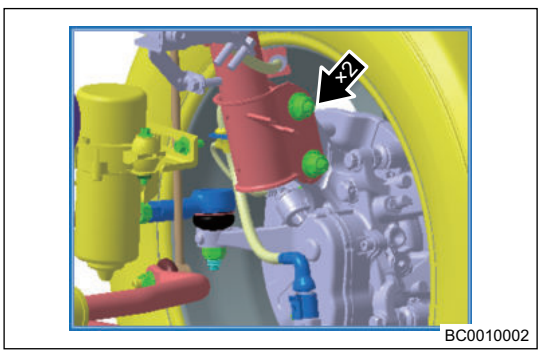
9. Remove 1 M6 fixing bolt (arrow) from front wheel speed sensor with 8# speed wrench, remove connector from wheel speed sensor.

   Tightening torque: 10 ± 1 N·m


BC0009002

10. Remove 2 nuts (arrow) between shock absorber and steering knuckle with pneumatic wrench and 18# socket.

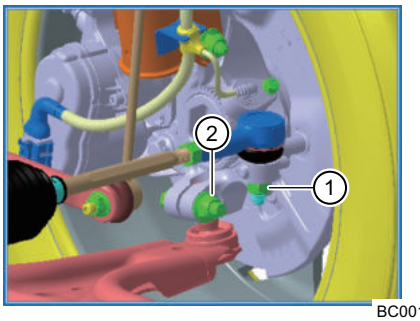
    Tightening torque: 130 ± 10 N·m


BC0010002

11. Remove 1 nut (1) between steering tie rod and steering knuckle with pneumatic wrench and 19# socket, and then remove 1 bolt (2) between swing arm and steering knuckle with pneumatic wrench and 18# socket, finally remove front steering knuckle.

    Tightening torque of steering knuckle ball joint nut: 35 ± 3 N•m;

    Tightening torque of nut corresponding to bolt connected to swing arm: 110 ± 10 N•m



BC0011002

Installation

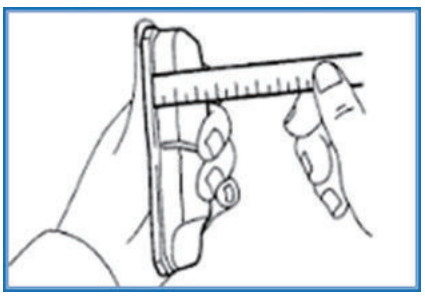
⚠

- After installing, fill brake fluid between MIN and MAX scale lines, the air is discharged, and the four-wheel alignment is performed again.

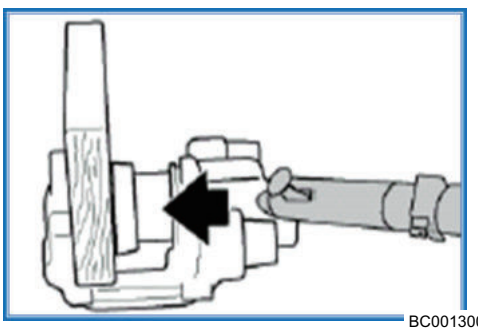
1. Installation is in the reverse order of removal.

Check and repair

1. Standard thickness of front brake lining is 10.2 mm, replace it when the thickness is less than 2 mm.


BC0012002

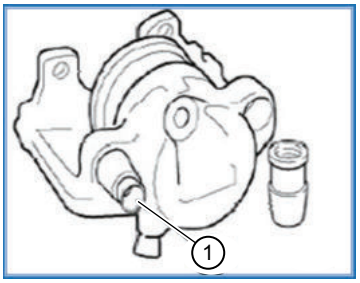
2. Remove the piston. Prepare a wood board to block the piston, place the wood board between piston and brake caliper wall. Carefully press piston out with compressed air through the connecting hole.


BC0013002

⚠

- Do not hold the piston by hand to prevent being jammed.

3. Check the guide socket. Push guide socket (1) by hand flexibly and freely. If there is a stuck or not flexible, it should be replaced.



BC0014002

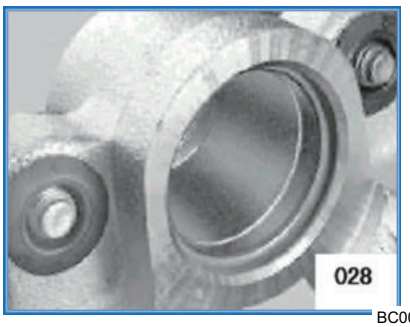
⚠

- Apply grease on the guide socket during assembling.

4. Carefully remove the seal ring with a plastic needle to clean brake cylinder and other components with alcohol. And dry it with compressed air. Check brake cylinder, piston and flange surface carefully, and it is not allowed to perform mechanical processing of brake cylinder and piston.

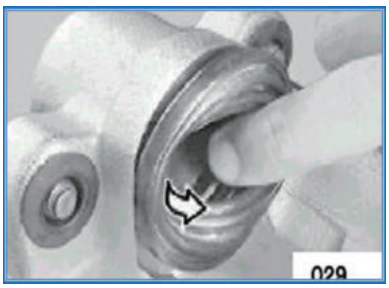

BC0015002

5. (Installation of brake wheel cylinder) apply a thin film of brake cylinder grease on cylinder block, plunger and sealing boot. Install seal ring in the rear ring groove of brake cylinder. Install dust seal ring in the front ring groove and press it fully.



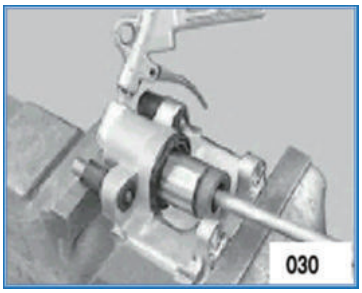
BC0016002

6. The area between dust seal ring and brake caliper housing must be kept dry. Do not allow to contact with brake cylinder grease or brake fluid to ensure the correct position of dust seal ring.



BC0017002

7. Brake piston is fixed with a extended part or a screwdriver and gently press it onto the dust seal ring. Blow the dust seal ring with compressed air (max 3.0 bar), install the piston ring on piston.

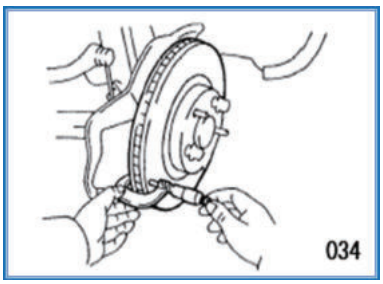


BC0018002

⚠

- Dust sealing ring and piston are soaked with brake fluid, so that the seal ring is easier to pass.

8. (Brake disc inspection) Inspect the thickness of brake disc, the standard thickness of front brake disc is 11 mm, replace it when the thickness is less than 9 mm.

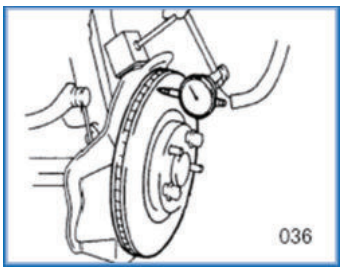


BC0019002

⚠

- Two brake discs on the same axle should be replaced together, and the brake lining should be replaced when replacing a new brake disc.

9. Inspect the maximum runout of brake disc end surface with a dial indicator. If it is larger than 0.025 mm, replace it (Appropriate machining can also be performed to meet the maximum runout amount under the premise of ensuring the thickness of brake disc).



BC0020002

⚠

- After replacing brake lining or brake disc, depress brake pedal several times to run in brake lining and brake disc. Ensure the safety!
- After replacing brake lining, check if the brake fluid level is between “MIN” and “MAX” lines.

Rear Brake

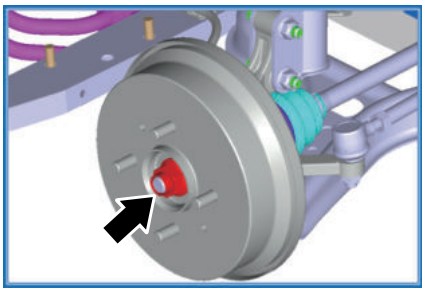
Removal

⚠

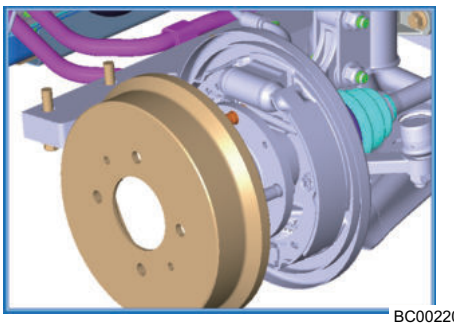
- Be sure to wear necessary safety equipment to prevent accidents.
- Brake fluid is a toxic liquid, if your skin or eyes accidentally come into contact with the fluid, please wash with large amount of water and get medical attention if necessary.
- Waste brake fluid should be stored in a container. It is not allowed to pour it in sewer or pile up with household waste.
- During removal and installation, do not depress the brake pedal and move the vehicle.
- It is not allowed to remove the brake caliper piston casually, remove and install it only by the specialized person or with guidance of specialized person.
- During assembly, never allow lining or brake disc to contact with oil fluid. If there is oil fluid, wipe it off and polish it with abrasive paper.

1. Remove rear tires with pneumatic wrench and 17# socket.
2. Pry the dented part of left drive shaft locking nut with a punch, remove 1 locking nut (arrow) from rear hub with 30# socket and torque wrench.

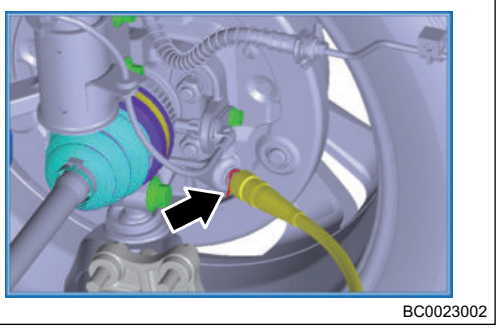
   Tightening torque: 300 ± 10 N·m


BC0021002

3. Remove the brake drum.

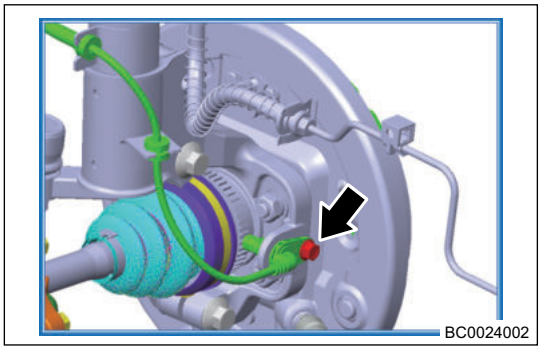

BC0022002

4. Remove positioning snap spring (arrow) from parking brake cable with a needle nose plier, remove cable from groove of the parking brake arm with a flat tip screwdriver.


BC0023002

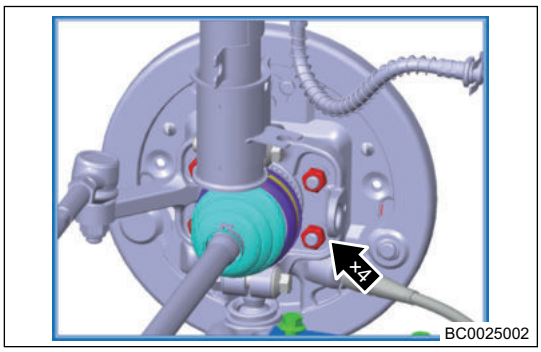
5. Remove 1 M6 fixing bolt (arrow) from front wheel speed sensor with 8# speed wrench, remove connector from wheel speed sensor.

   Tightening torque: 10 ± 1 N·m

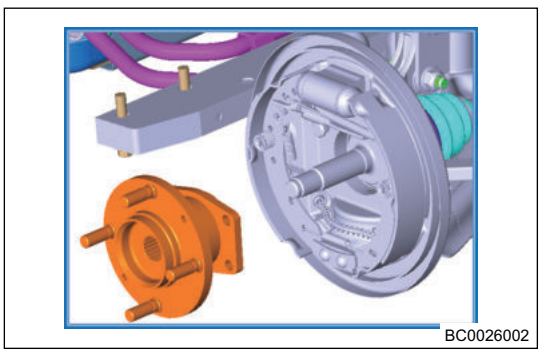


6. Remove 4 fixing nuts (arrow) from steering knuckle and hub bearing unit assembly with 16# socket and pneumatic wrench.

   Tightening torque: 80 ± 1 N·m

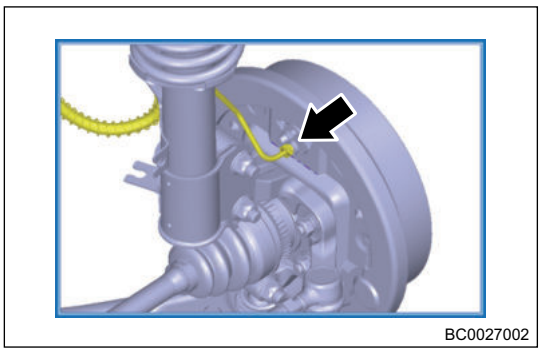


7. Remove the hub bearing unit assembly.



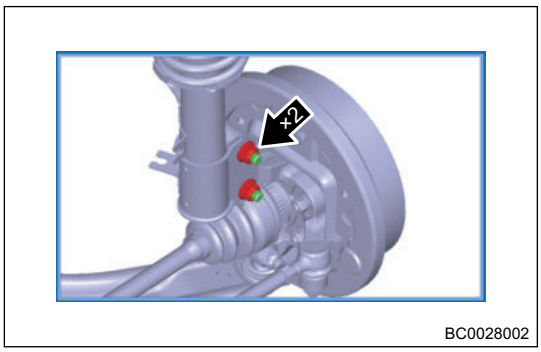
8. Remove 1 nut (arrow) from rear brake pipe with 10# speed wrench. Recycle brake fluid in a clean container.

   Tightening torque: 18 ± 2 N·m



9. Remove 2 nuts (arrow) between shock absorber and steering knuckle with pneumatic wrench and 18# socket.

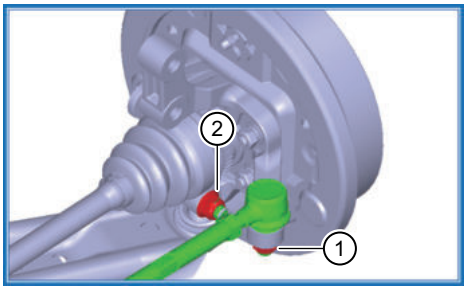
   Tightening torque: 130 ± 10 N·m



10. Remove 1 nut (1) between rear tie rod and steering knuckle with pneumatic wrench and 19# socket, and then remove 1 bolt (2) between swing arm and steering knuckle with pneumatic wrench and 18# socket, finally remove rear steering knuckle.

    Tightening torque of steering knuckle ball joint nut: 35 ± 3 N•m;

    Tightening torque of nut corresponding to bolt connected to swing arm: 110 ± 10 N•m



BC0029002

Installation

⚠

- After installing, fill brake fluid between MIN and MAX scale lines, the air is discharged, and the four-wheel alignment is performed again.
- After installing drive shaft and brake nut, the edge gap is smashed with a hammer and a flat tip screwdriver.

1. Installation is in the reverse order of removal.

Check and repair

Check the brake lining every 15,000 km.

- When removing wheels and performing tire rotation, check brake lining at any time.
- Remove rubber plug from brake lining observation hole.
- Check the thickness of brake lining.
- Whenever the thickness of brake lining is worn within 2 mm, replace the brake lining.

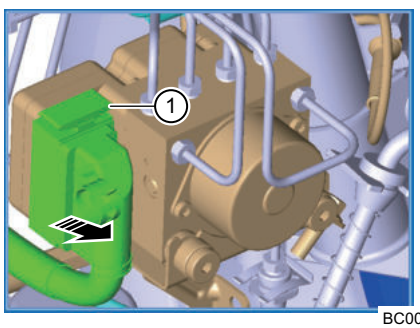
Brake Line and ABS System

Removal

⚠

- When POWER switch is turned to ON position, do not remove and install the electronic elements and wire harness connector in the system, to avoid damage to the electronic control unit. Turn POWER switch to off before removing and installing electronic elements and wire harness connector in the system.
- Do not supply excessive voltage to ABS controller, otherwise it is easy to damage the electronic control unit.
- Pay attention to avoid collision and knock to electronic control unit to avoid damage.
- High temperature environment is also easy to damage the electronic control unit. Therefore, electronic control unit should be removed from the vehicle when painting the vehicle. In addition, weld components or line in the system, remove wire harness connector from electronic control unit.
- Do not make the electronic control unit contaminated by oil, especially junction terminals. Otherwise, junction terminals may be in poor contact.
- When the battery voltage is too low, system cannot enter operation status. Therefore, note that the battery voltage should be checked. Especially, when the vehicle is parked for a long time, pay attention to start for the first time.
- Keep wheel speed sensor away from oil or other foreign matter. Otherwise wheel speed signal generated by wheel speed sensor may be inaccurate, which affects the system control accuracy, and the system may even fail to operate normally. In addition, do not knock the speed sensor. Otherwise, it is easy to cause the sensor degaussing, which may affect the normal system operation.
- When repairing hydraulic system, first release high pressure brake fluid in accumulator fully, to prevent high pressure brake fluid from spraying out and causing injury. When releasing high pressure brake fluid in accumulator, first turn POWER switch to off, then depress and release brake pedal repeatedly, until brake pedal is hard. In addition, do not turn on POWER switch before hydraulic brake system is installed completely to prevent the electric pump from energizing and running.
- Brake system should use the special line due to high pressure in brake system. Otherwise, it is easy to cause damage.
- Wheel speed sensor, electronic control unit and brake pressure adjustment unit in ASB system are irreparable. If it is damaged, it should be replaced in whole.
- After repairing hydraulic brake or when the brake pedal is weak during use, bleed the brake system in the required method and order. For the details of bleeding, refer to Fault Diagnosis in this section.
- Try to select the recommenced tires by the vehicle manufacturer. If using other type tires, tires with outer diameter, adhesion performance and moment of inertia of tires used in the original vehicle should be selected. Do not mix the different specification of tires, it may affect the control of ABS system.
-

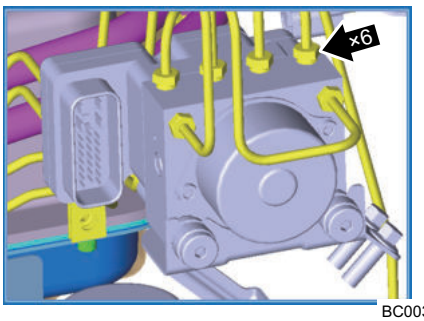
1. Turn POWER switch to off. Remove ABS module connector. First pull the insert piece (1) upward, and then pull connector outward, remove ABS module connector.



BC0030002

2. Remove 6 coupling bolts (arrow) between ABS and line with 10# adjustable wrench.

   Tightening torque: 18 ± 2 N·m



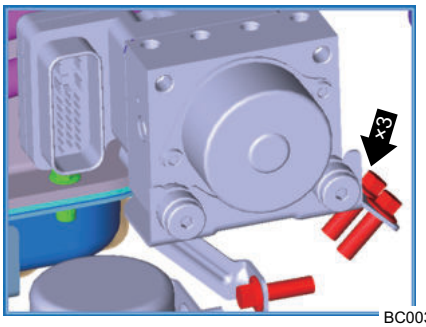
BC0031002

⚠

- Prevent the foreign objects from falling in ABS assembly while removing line. It is best to block oil hole on ABS with a clean gauze while removing line.

3. Remove 3 fixing bolts (arrow) from ABS bracket with wrench, and remove ABS controller and bracket assembly.

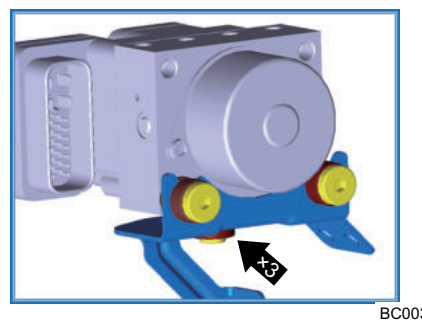
   Tightening torque: 25 ± 4 N·m



BC0032002

4. Remove 3 bolts (arrow) between controller and bracket with inner hexagon wrench.

   Tightening torque: 9 ± 1 N·m



BC0033002

Installation

⚠

- After installation, turn on the power supply, enter the system with diagnostic tester, read and clear DTCs. Test again after completion.

1. Installation is in the reverse order of removal.

Brake System Bleeding Method

There are 3 brake system bleeding methods:

First method: Bleeding can be performed with filling unit (bleeding pressure is 2 bar)

1. Connect bleeding/filling unit to fluid reservoir, confirm that brake fluid is enough to turn on the switch and set pressure to 2 bar.
2. Disengage bleeder plug from wheel cylinder until bubbles are drained. Order: rear left/front left/front right/rear right
3. Check the pedal travel.
4. If it is not successful, repeat the bleeding for each wheel.
5. Check that the brake fluid level is between maximum value and minimum value.

HINT：

- During the whole bleeding, brake fluid level in fluid reservoir cannot be lower than minimum mark. Add brake fluid as necessary.
- After bleeding is completed, fill master cylinder brake fluid reservoir with brake fluid to “MAX” level.
- Perform running test to confirm that brakes operate properly with good depressing feel.

Second method: Bleeding can be performed with manual pedal

1. Fill fluid reservoir (up to the bottleneck of filter).
2. Repeat the following bleeding procedures for each wheel cylinder. Order: rear left/front left/front right/rear right.
3. Disengage the bleeder bolt.
4. Depress brake pedal repeatedly.
5. Engage the bleeder bolt.
6. Release the brake pedal.
7. Check the pedal travel.
8. If it is not successful, repeat the bleeding.
9. Check that the brake fluid level is between maximum value and minimum value.

HINT:

- During the whole bleeding, brake fluid level in fluid reservoir cannot be lower than minimum mark. Add brake fluid as necessary.
- After bleeding is completed, fill master cylinder brake fluid reservoir with brake fluid to “MAX” level.
- Perform running test to confirm that brakes operate properly with good depressing feel.

Third method: Bleeding can be performed with manual pedal and filling unit

1. Connect bleeding/filling unit to fluid reservoir, confirm that brake fluid is enough to turn on the switch and set pressure to 2 bar.
2. Disengage bleeder plug from wheel cylinder until bubbles are drained. Order: rear left/front left/front right/rear right.
3. Depress pedal repeatedly.
4. Check the pedal travel.
5. If it is not successful, repeat the bleeding for each wheel.
6. Check that the brake fluid level is between maximum value and minimum value.

HINT:

- During the whole bleeding, brake fluid level in fluid reservoir cannot be lower than minimum mark. Add brake fluid as necessary.
- If it is necessary to repeat part or whole bleeding procedure, be sure to wait for 5 minutes to cool solenoid valve down, otherwise solenoid valve may be damaged due to overheat.
- After bleeding is completed, fill master cylinder brake fluid reservoir with brake fluid to “MAX” level.
- Perform running test to confirm that brakes operate properly with good depressing feel.

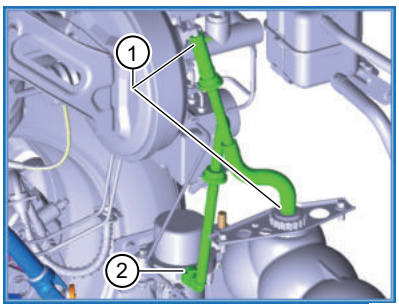
Vacuum Booster and Control Device

Removal

⚠

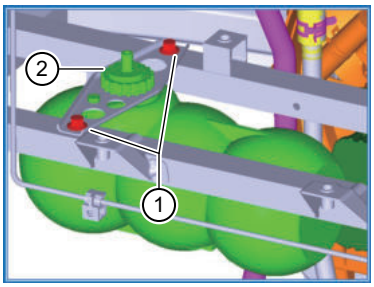
- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis.
- Turn off the power supply.
- During assembly, pay special attention to apply appropriate force and It is forbidden to operate savagely.

1. First remove elastic clamp (1) at the upper and lower ends of vacuum pipe with a needle nose plier.
2. Press connector (2) between vacuum pipe and vacuum pump by hand, then pull out the connector firmly to remove vacuum pipe.



BC0034002

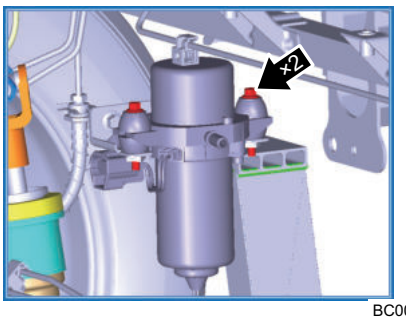
3. Remove 2 bolts (1) from vacuum tank bracket with 10# hexagon head T-wrench.
4. Loose 1 plastic nut (2) from vacuum tank by hand to remove vacuum tank.



BC0035002

5. Remove 2 M6 hexagon head bolts (arrow) from vacuum pump fixing bracket with 8# hexagon wrench, and remove vacuum pump.

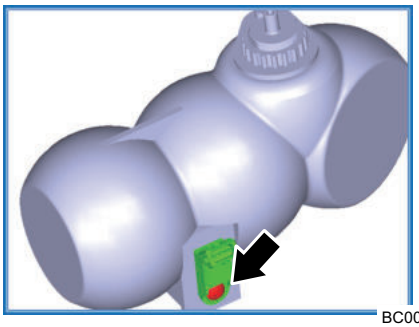
   Tightening torque: 10 ± 1 N·m



BC0036002

6. Unscrew cross-recessed self-tapping screw with large half round head using a cross screwdriver to remove atmospheric pressure sensor.

   Tightening torque: 6 ± 1 N·m


BC0037002

Installation

1. Installation is in the reverse order of removal.

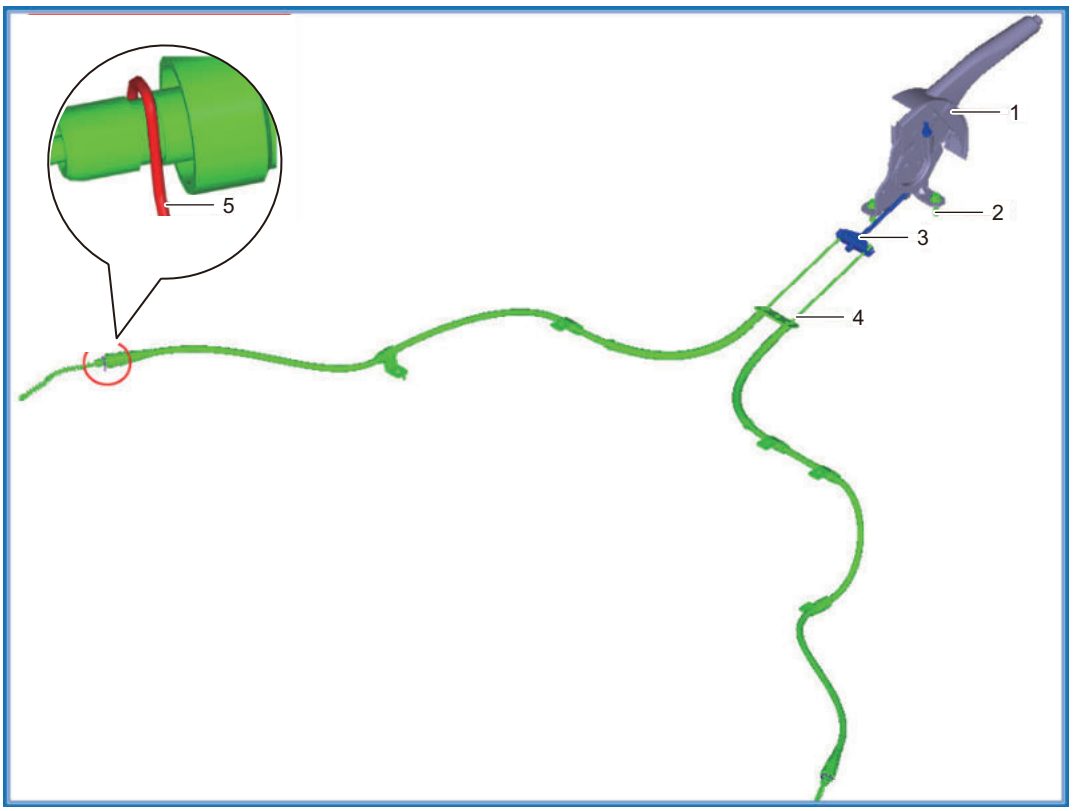
MECHANICAL PARKING BRAKE SYSTEM

MECHANICAL PARKING BRAKE SYSTEM

System Overview

System Components Diagram

Mechanical Parking Brake System Structure Diagram



HB0001001

No.	Name	No.	Name
1	Parking Brake Control Mechanism Assembly	2	Hexagon Flange Bolt
3	Front Parking Brake Cable Assembly	4	Rear Parking Brake Cable Assembly
5	Parking Brake Cable Clamp		

On-vehicle Service

Tools

Tools: Needle nose pliers, a adjustable wrench, a ratchet wrench, a set of socket
Protection appliances: Gloves, uniform and working shoes

Specifications

Torque Specifications

Part Name	Torque (N·m)
Parking Brake Cable Fixing Bracket Bolt	10 ± 1
Parking Brake Control Mechanism Assembly and Parking Brake Mounting Board Fixing Bolt	25 ± 4

Mechanical Parking Brake System Device

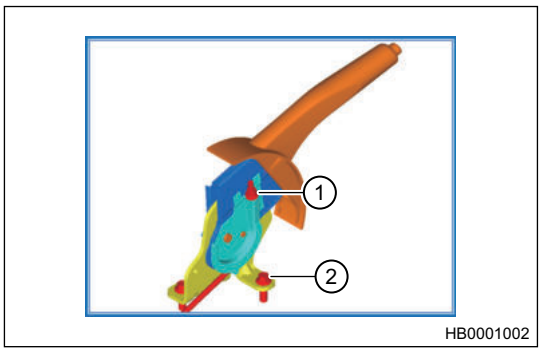
Removal

⚠

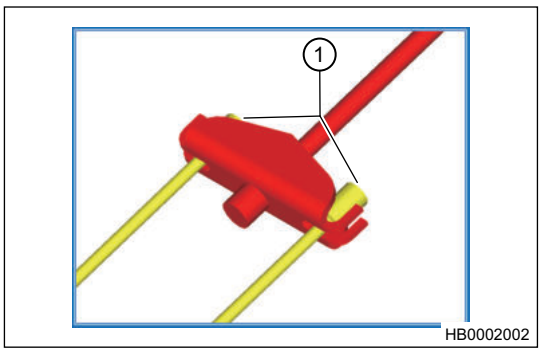
- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing chassis.
- Appropriate force should be applied during removal and installation, and never operate roughly.

1. The electric vehicle stalls, push the vehicle on a lift and raise it, remove rear wheel and rear brake drum.
2. Remove rear instrument cluster, disconnect parking brake switch assembly wire harness connector. Remove a adjustment nut (1) with 10# hexagon head T-wrench. Remove front cable, then remove 3 M8 bolts (2) from parking brake mounting board with 10# hexagon head T-wrench to remove parking brake control mechanism assembly.

   Tightening torque: 25 ± 4 N m

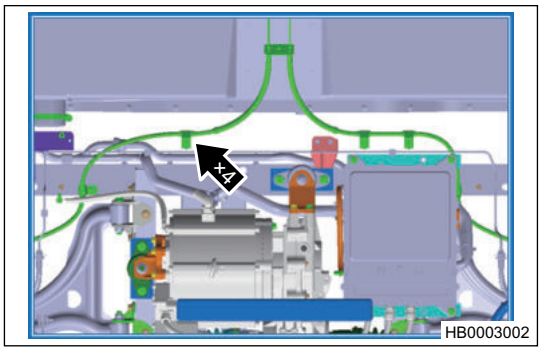


3. Loose front parking brake cable, remove 2 terminal connectors (1) of rear cable from the balance block.



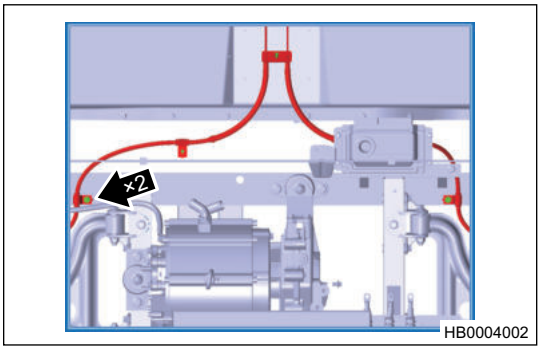
4. Remove 4 fixing bolts (arrow) with 10# hexagon head T-wrench or speed wrench as shown in illustration below.

   Tightening torque: 10 ± 1 N m

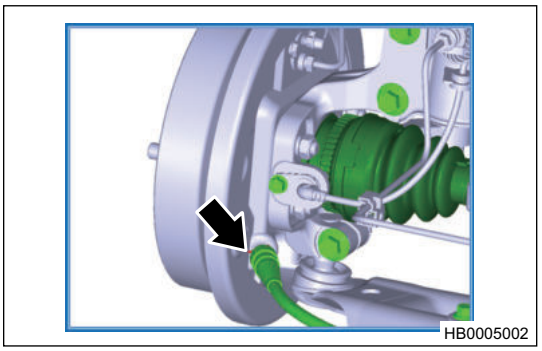


5. Remove 2 bolts (arrow) with 10# hexagon head T-wrench or speed wrench as shown in illustration below.

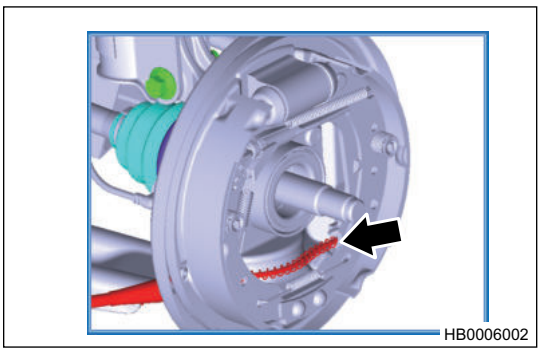
   Tightening torque: 10 ± 1 N m



6. Remove brake cable clamp (arrow) with needle nose pliers as shown in illustration.



7. Remove terminal connector (arrow) at the end of cable from the groove of rear parking brake arm with needle nose pliers and a flat tip screwdriver.



8. Pull out parking brake cable from rear brake by hand, then hold the front end of rear parking brake cable assembly and take it out.

Installation

1. Installation is in the reverse order of removal.