AIR CONDITIONING SYSTEM

AIR CONDITIONING SYSTEM

Warnings and Precautions

Precautions

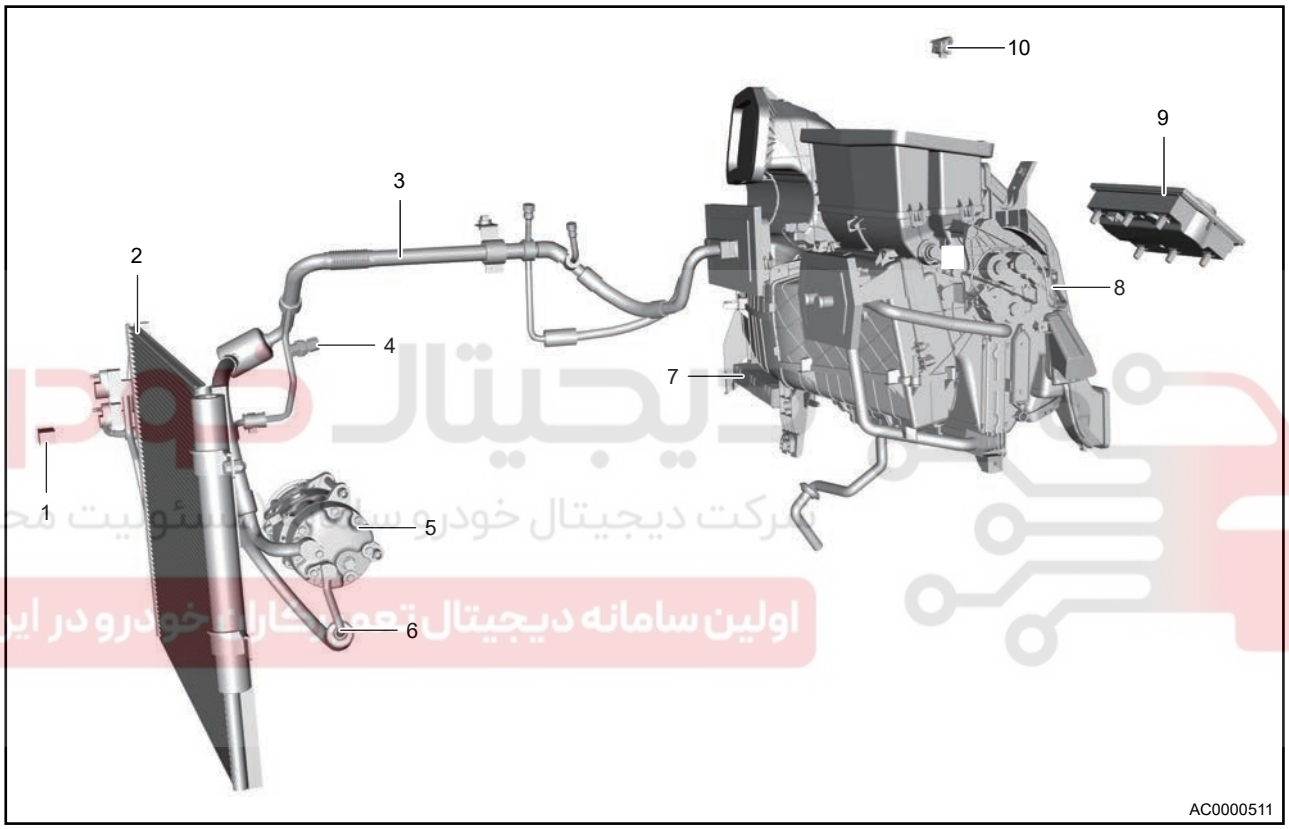
1. The connector of anion generator must be disconnected when cleaning the air conditioning line after sale to avoid fire.
2. To prevent battery is depleted, turn off A/C system after engine stopping if it is not necessary.
3. Do not insert or stick anything to each vent, or use the spray around vents; Otherwise, these objects may cause system can not operate normally.
4. When you find that the air volume or speed at the air outlet is obviously reduced, please check whether the A/C element is dirty or blocked. If so, please clean or replace the air conditioning element in time; It is recommended to check or replace A/C element every 5000 km.
5. When you find that the refrigeration effect is obviously reduced, check whether the refrigerant in A/C system is sufficient, and check whether there is dirt blockage on the windward side of the condenser. If so, please add refrigerant or clean the dirt on the condenser surface.
6. When the air quality outside vehicle is poor (during dusty or air pollution), it is recommended to use the inner air circulation mode of air conditioning (when the button character shows blue, the mode is in inner air circulation mode; when the character shows white, the mode is in outer air circulation mode).
7. When the air conditioning system is not in use for a long time, it is recommended to start air conditioning once every month and operate it for about 5 minutes. The purpose is to ensure the good sealing of main shaft of A/C compressor. At the same time, it can also avoid electrolytic corrosion of compressor internal parts, resulting in poor refrigeration effect of A/C system.
8. During assembly of line, it is necessary to confirm that O-ring is installed into groove first, if there is wear on O-ring during assembly, it is necessary to replace O-ring.
9. Before refrigerant filling, nitrogen leakage detection, pressure keeping and vacuum pre-pumping must be performed through nitrogen vacuum pre-pumping equipment.
10. After the completion of nitrogen leakage detection and pressure keeping process, screw on the A/C pipe filler cap in time to avoid touching the valve core in filler by mis-operation, so that A/C system can be communicated with atmosphere.
11. When filling refrigerant, the filling gun should be vertically installed on the filler. Do not shake filling gun left and right to avoid touching the valve core in filler after install it into place.

GENERAL INFORMATION

System Description

Automobile A/C system is a device which can refrigerate, heat, exchange air and purify air in the cabin. It can provide comfortable riding environment for passengers, reduce fatigue intensity of driver and improve driving safety.A/C system is integrated cold and warm air conditioning, which adopts variable displacement compressor and heating expansion valve control method, and uses environment-friendly refrigerant R134a Refrigerant / R1234yf (European Union). It consists of compressor, condenser, HVAC, rear evaporator, line and other accessories including pressure switch, O-ring, etc.

System Component Diagram (Without 3rd Row A/C)

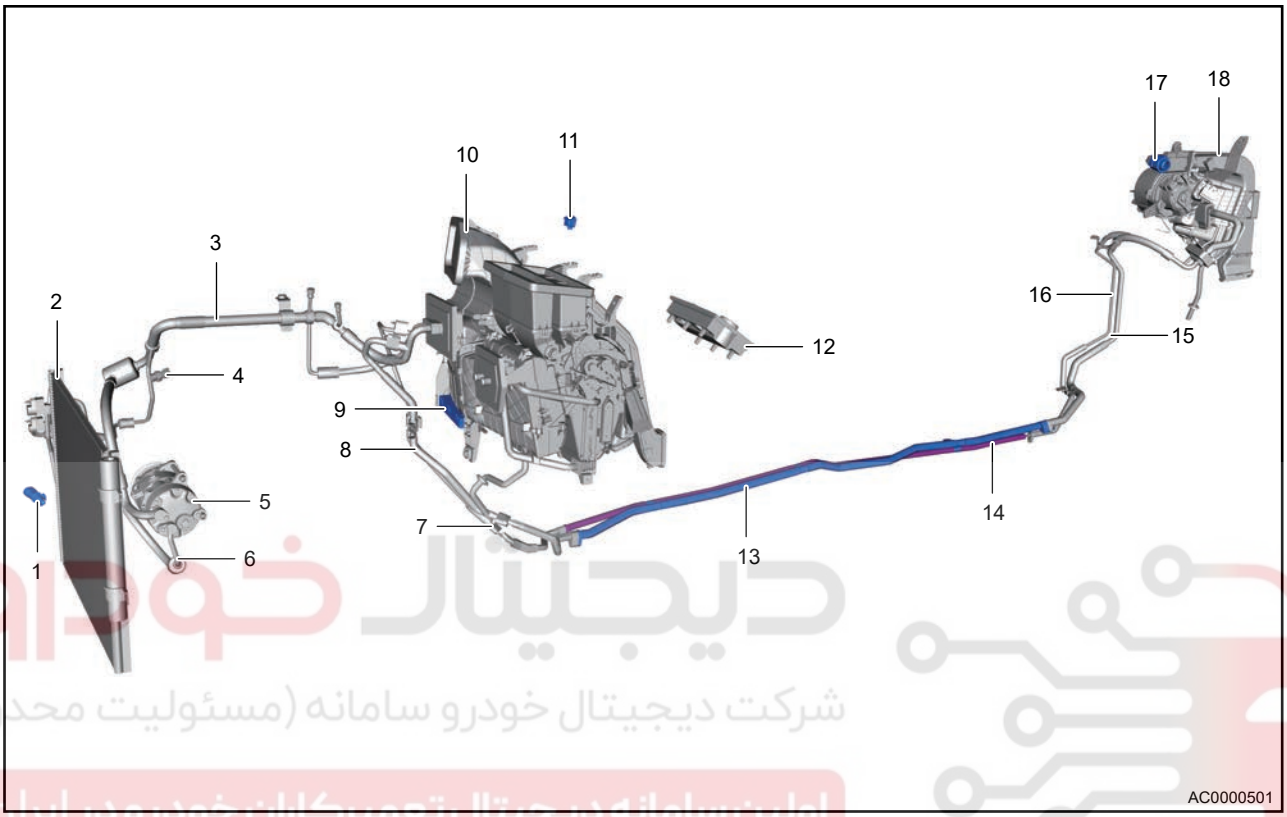


1	Outside Temperature Sensor	6	Condenser - Compressor Line Assembly
2	Condenser Assembly (w/ Receiver Drier)	7	A/C Control Module
3	A/C Coaxial Line Assembly	8	HVAC
4	Pressure Sensor	9	Front A/C Control Panel
5	Compressor Assembly	10	Dual-zone Solar Sensor

- Air conditioning and distribution system: Air mixing and distributor part of HVAC, inner/outer circulation inlet, outlet and air filter.
- Control system: Central control integration panel assembly, inner/outer circulation damper servo motor, blower, blower speed regulation module, A/C pressure sensor, evaporator temperature sensor and outside temperature sensor. Automatic air conditioning is also equipped with internal and external PM2.5 sensors, air quality sensor and anion generator (Exalted I only).

- Heating system: Heater core assembly, heating inlet hose, heating outlet hose and engine cooling circulation system.
- Refrigerating system: Compressor assembly, condenser assembly (w/ receiver drier), expansion valve (H type), evaporator core assembly and A/C high/low pressure line.

System Component Diagram (With 3rd Row A/C)

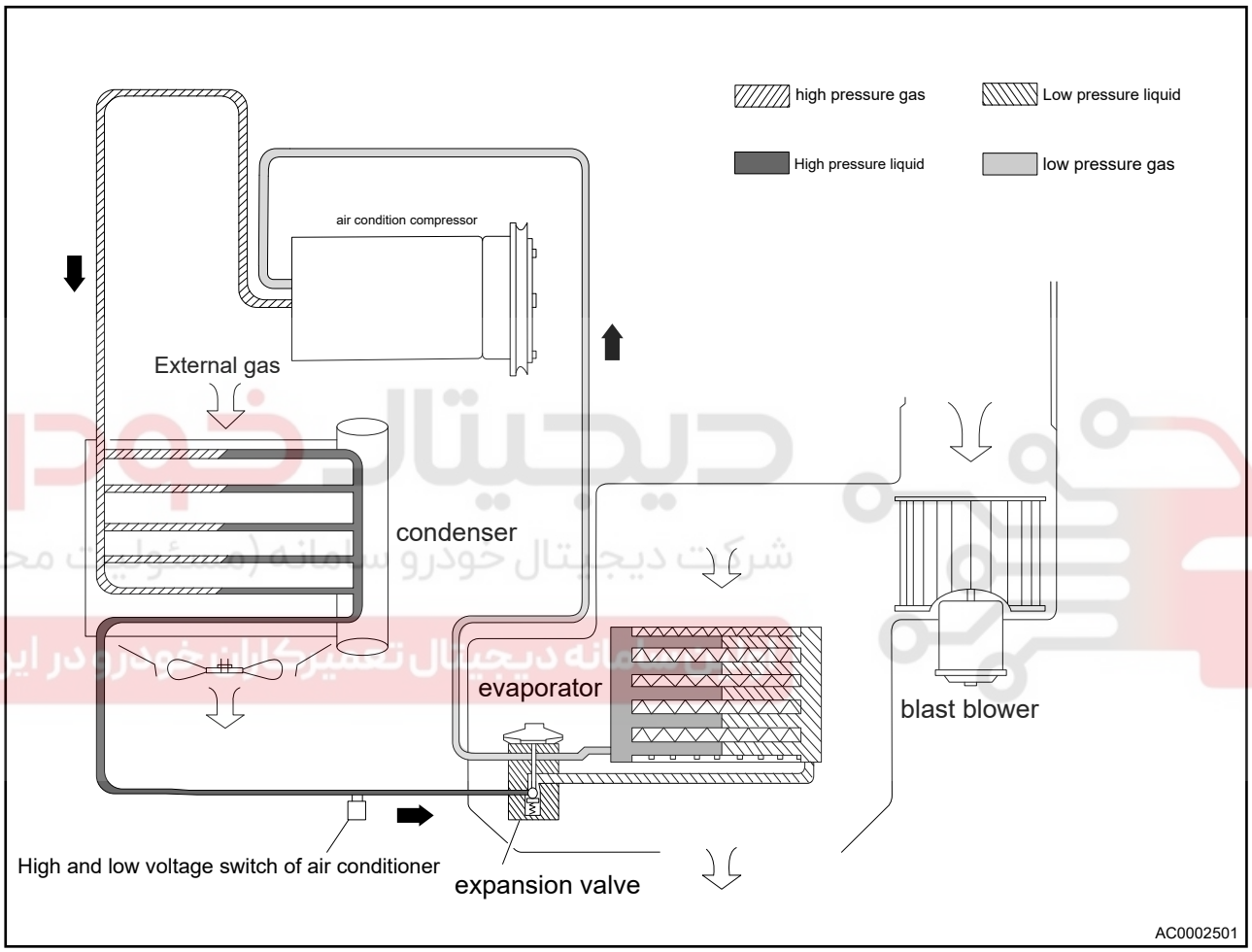


1	Outside Temperature Sensor	10	HVAC (Front)
2	Condenser Assembly (w/ Receiver Drier)	11	Dual-zone Solar Sensor
3	A/C Coaxial Line Assembly	12	Front A/C Control Panel
4	Pressure Sensor	13	Condenser to Rear Evaporator Line Assembly Ⅰ
5	Compressor Assembly	14	Rear Evaporator to Compressor Line Assembly Ⅰ
6	Condenser - Compressor Line Assembly	15	Condenser to Rear Evaporator Line Assembly Ⅱ
7	Rear Evaporator to Compressor Line (Front)	16	Rear Evaporator to Compressor Line Assembly Ⅱ
8	Condenser to Rear Evaporator Line (Front)	17	Rear A/C Control Panel
9	A/C Control Module HVAC (Front)	18	HVAC (Rear)

- Air conditioning and distribution system: Air mixing and distributor part of HVAC, inner/outer circulation inlet, outlet and air filter.

- Control system: Central control integration panel assembly, inner/outer circulation damper servo motor, blower, blower speed regulation module, A/C pressure sensor, evaporator temperature sensor and outside temperature sensor. Automatic air conditioning is also equipped with internal and external PM2.5 sensors, air quality sensor and anion generator (if equipped).
- Heating system: Heater core assembly, heating inlet hose, heating outlet hose and engine cooling circulation system.
- Refrigerating system: Compressor assembly, condenser assembly (w/ receiver drier), expansion valve (H type), evaporator core assembly and A/C high/low pressure line.

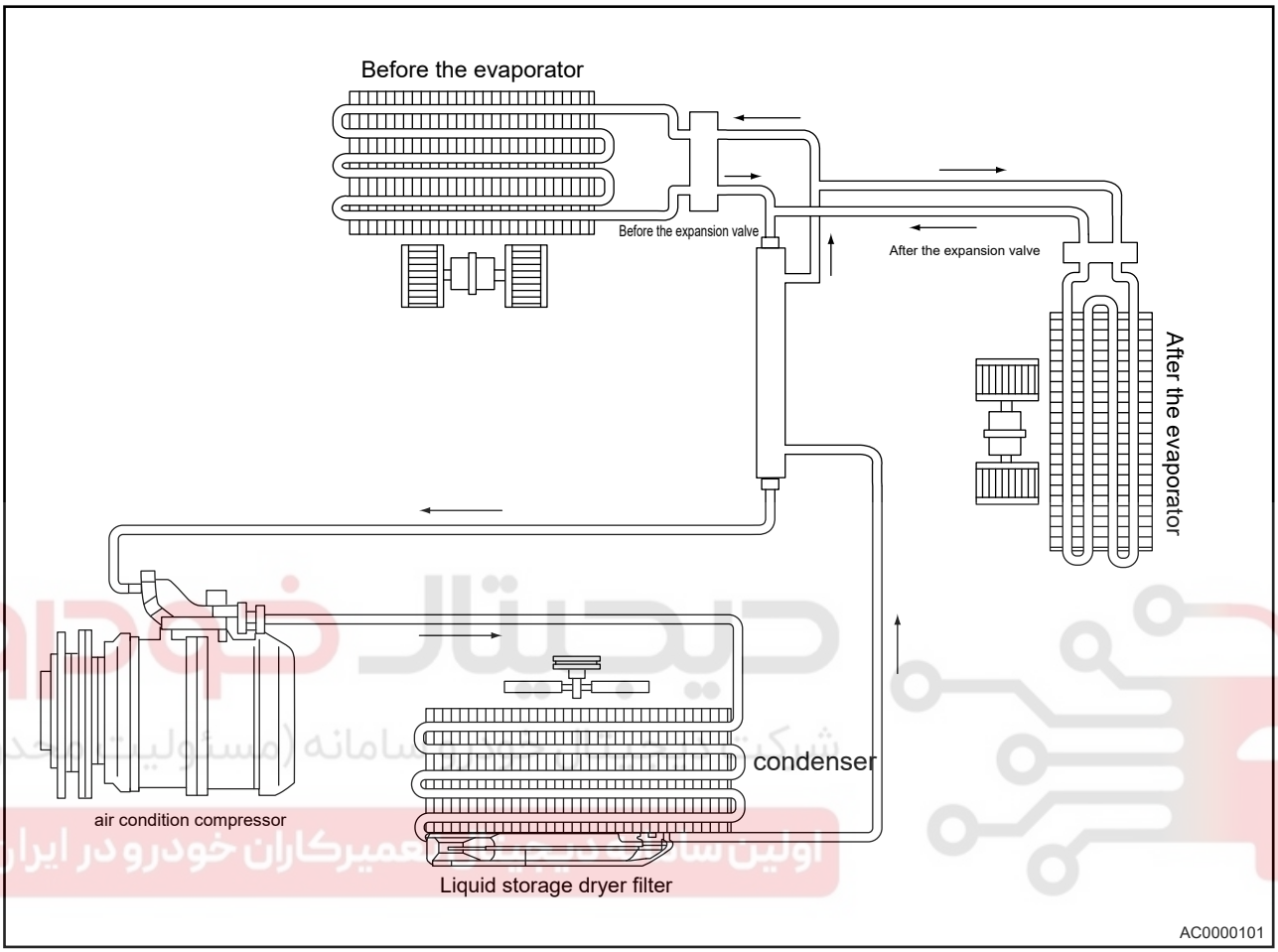
Operation (Without 3rd Row Independent A/C)



- Outside fresh air enters air inlet filter assembly through cowl top opening at the right side of windshield base. Fresh air flows through evaporator core and heater core, and then enters vehicle through outlets on instrument panel and floor.
- Temperature can be adjusted by air volume adjustment button on A/C control panel.
- Turn on the compressor assembly by pressing A/C switch. Refrigerant is compressed by compressor assembly and converted into high temperature/pressure gas, which is then condensed into high pressure liquid in the condenser. Then the liquid is filtered and dried by receiver drier and delivered to expansion valve and becomes low-pressure liquid through throttling and depressurization. Finally the liquid enters evaporator in vehicle and absorbs heat and evaporates, thus refrigeration is achieved.
- A/C heating is realized by engine coolant circulation system. Heater core is a main component of heating system. With engine running, engine coolant flows from engine water pump to heater core, and the heater core transmits the heat from engine coolant to the air that flows through heater core. At this time, A/C switch is off. The air flowing through heater core becomes hot wind through heat exchanging, thus providing heating. Temperature adjustment control mechanism can be controlled by

rotating temperature adjustment knob. Mix damper closes when temperature adjustment button is rotated counterclockwise to MAX COOL position. If airflow does not flow through heater core, the heat transmission will not occur.

Operation (With 3rd Row Independent A/C)

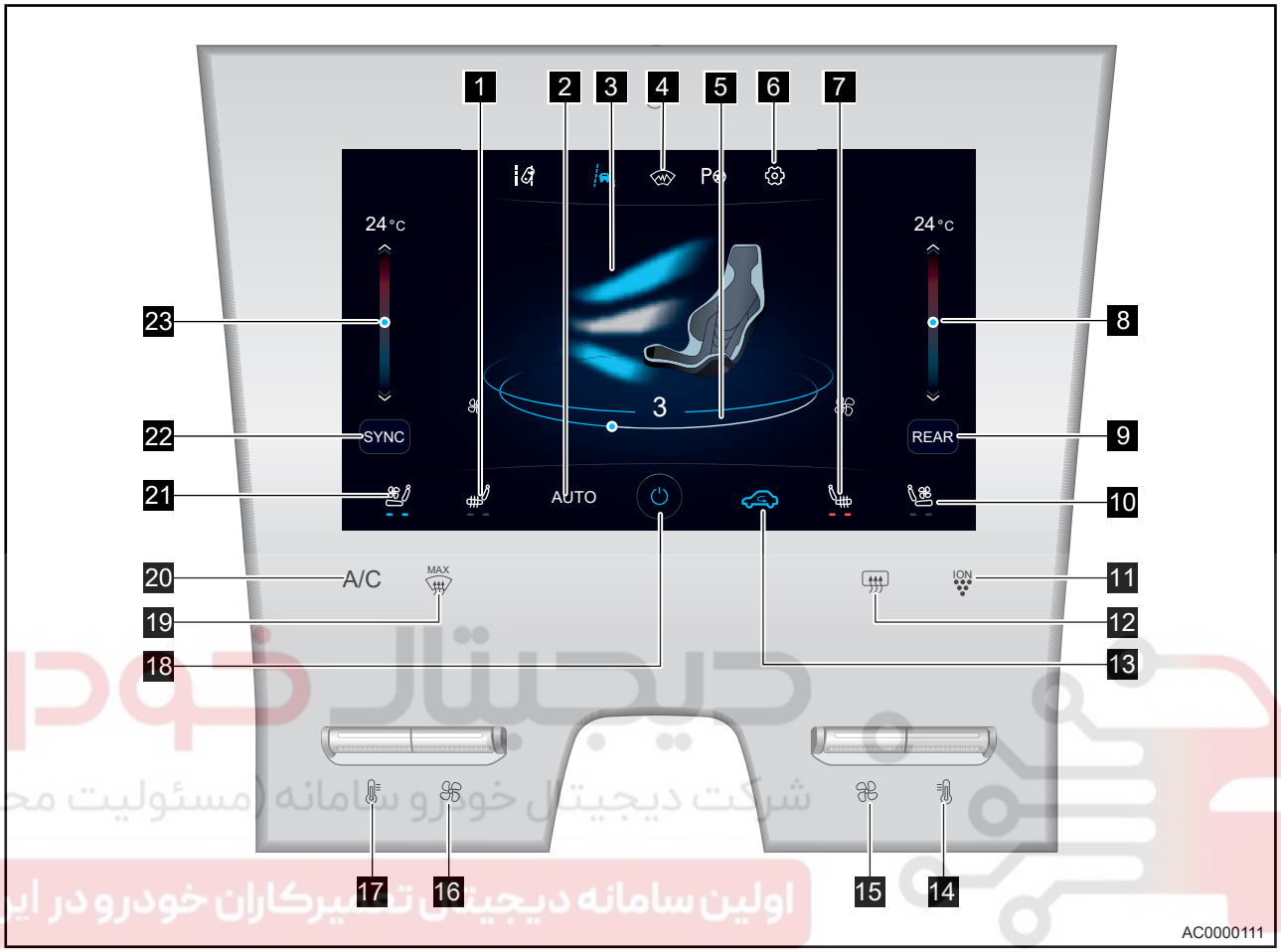


- The 3rd row A/C and the front row A/C share a compressor, and the refrigerant is transferred from rear compressor to compressor pipeline to rear evaporator through the rear expansion valve.
- When the engine is operating: Press the rear A/C switch button on the front A/C control panel to turn on the rear A/C, turn on the A/C button, and operate the 3rd row rear A/C fan speed adjustment knob to enter the rear A/C cooling mode.

  Hint:
  Only cooling function is available for rear A/C.

System Function Description

A/C Usage Method (Front Control Panel (Color Screen))



Note: The A/C panel of this model includes: Front control panel (segment screen/color screen), rear control panel (7-seat).

Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
1	Driver Seat Heater Button	12	Rear Defroster Button
2	AUTO Button	13	Inner/Outer Circulation Button
3	Mode Adjustment Button	14	Front Passenger Temperature Adjustment Switch
4	Front Windshield Heater Button	15/16	Vehicle Fan Speed Adjustment Switch
5	Airflow Volume Adjustment Area	17	Driver Side Temperature Adjustment Switch
6	A/C Setting Button	18	A/C Switch Button

Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
7	Front Passenger Seat Heater Button	19	Front Windshield Defroster And Defogger Button
8	Front Passenger Temperature Adjustment Knob	20	A/C Button
9	Rear A/C Switch Button	21	Driver Seat Ventilation Button
10	Front Passenger Seat Ventilation Button	22	Dual-zone Mode Button
11	Air Purification Button	23	Driver Temperature Adjustment Area

No.	Function	Usage Method	Note
1	Temperature adjustment	There are two methods to adjust temperature: Operate the temperature bar on air conditioning panel display or operate the button on panel. When adjusting temperature, the corresponding temperature value will be displayed on the panel display.	/
2	Airflow volume adjustment	There are two methods to adjust airflow volume: Operate the airflow volume bar on air conditioning panel display or operate the airflow volume button on panel. When adjusting airflow volume, the corresponding airflow volume level will be displayed on the panel display. There are 7 airflow volume levels. Select proper level according to actual situation. Airflow volume can be adjusted by the knob.	
3	Mode adjustment	Operate different positions to achieve different blow mode.Face mode: It can adjust airflow blowing out from center and face outlets on both sides.Hints: The face airflow direction can be adjusted by adjusting grilles of face outlet.Face/foot mode: It can adjust airflow blowing out from center outlet, face outlets on both sides and foot outlet.Foot mode: It can adjust airflow blowing out from foot outlet. Foot/defrosting mode: It can adjust airflow blowing out from foot outlet and defrosting outlet.	/
4	Maximum front defrosting button	Most of the airflow blows to front windshield, a small amount of airflow blows to side windshield. In order to defog rapidly, when the maximum front defrost button is operated, airflow volume will be forced to level 4 (if the airflow volume is lower than level 4 before the button is operated, it will be switched to level 4; if the airflow volume is higher than level 4 before the button is operated, it will be maintain the current state), compressor and outer circulation mode will turn on. When the maximum front defrosting function is operating, the button character is orange, when it is not operating, the button character is white.	/
5	Inner/outer circulation button	Select the inner circulation mode. The inner circulation indicator comes on, indicating that the air conditioning is in inner circulation mode, heating or cooling the inner air according to selected function. Select the outer circulation (fresh air) mode. The outer circulation indicator comes on, indicating that air conditioning is in outer circulation mode, heating or cooling the outside air entering the	/

No.	Function	Usage Method	Note
		vehicle according to selected function.Hints: The inner/outer circulation mode is distinguished by the color of button character. The character is blue in inner circulation mode, and the character is white in outer circulation mode.	
6	Dual-zone mode button	This button can turn on and off the dual-zone mode of air conditioning. Press this button or adjust the front passenger temperature, air conditioning will enter dual-zone mode automatically. The button character is white in dual-zone mode, and the temperature of driver and front passenger can be set separately. Press the button again to exit dual-zone mode and enter single-zone mode, the character color is blue.	/
7	One-button purification button	The button can trigger one-button purification function of air conditioning. The color of button character is orange during performing one-button purification function, the color of button character is white when one-button purification function ends.For the air conditioning with anion, when operating the button to turn on air purification function, the anion can be turned on synchronously, and then anion can be individually controlled on and off.	/
8	Rear A/C switch	This button is rear air conditioning switch. After pressing this button, the button character is blue, rear air conditioning is turned on at this time. Press this button again, the button character will be white, rear air conditioning will be turned off.	/
9	AUTO button	Press AUTO button, the button character turns blue, indicating that the mode is switched to automatic mode, the button character turns white, indicating that the mode is switched to manual mode.	/
10	ON/OFF button	Press the button, the button character turns blue, indicating that the head unit is ON, the button character turns white, indicating that the head unit is OFF.	/
11	A/C setting button	After operating the button, A/C setting screen pops up. The setting screen is as shown in the figure below. After the setting screen is opened, personalized setting for A/C system can be set based on the user’ s usage habits.	/

Hint:
For detailed operation method, please refer to Owner’ s Manual.

Hint:
The function for button depends on the model configuration.
Please refer to the actual vehicle configuration.

Function Description of Air Conditioning

Interaction logic between A/C panel and head unit			
No.	Function	Function Definition (DVD Operation)	Note
1	AUTO function	1. When entering AUTO status, AUTO displays in blue, at the same time, air volume/temperature/mode/inner and outer circulation/ compressor enter automatic control status.2. When switching between inner and outer circulations manually, this function exits automatic control while other functions are still in AUTO status, and AUTO still displays in blue.3. When switching air volume, mode and compressor manually, or when temperature is low or high, this function exits	/

Interaction logic between A/C panel and head unit			
		automatic control while other functions are still in AUTO status, and AUTO displays in white. 4. In AUTO status, when AUTO button is pressed again, it will not exit AUTO mode.	
2	Inner and outer circulation function	1. In manual control status, there are only two circulation modes (inner and outer), which can be changed manually in any status.2. In automatic control status, it can stay at any position according to control algorithm. 1. When ambient temperature is lower than 25℃, the circulation should always be in outer circulation, except for the response period of the air purification strategy, idle speed to inner circulation, reverse to inner circulation, and oil temperature to inner circulation.2. When outside temperature is between 26℃ and 28℃, it switches to outer circulation partially.3. When outside temperature is between 28℃ and 38℃, timed ventilation strategy is available. Timed ventilation outer circulation level is 50% of outer circulation at 28~32℃ and 30% of outer circulation at 32~38℃. The ventilation period continues for 1.5 minutes. Air exchange is performed every 15 minutes.When inner/outer circulation operates manually (automatic A/C), outer circulation position is at 30% of outer circulation while switching to outer circulation manually at 30℃ or above.4. When air conditioning is off and ignition switch is turned off, the air conditioning is forced to switch to outer circulation and mode switches to foot and MAX COOL.5. When air conditioning is in AUTO status, outer circulation switches to inner circulation automatically while parking at idle in the city.	
3	AC function	1. AC button can be used to start the air conditioning regardless of the outside temperature (blower can be turned on).2. AC indicator comes on when AC button is operated once regardless of the outside temperature, and it turns off if AC button is operated again.3. When the current AC request signal is valid with AC in automatic running status, if the outside temperature decreases to -2.5°C or less, the AC signal will change from valid to invalid, and the operating indicator will remain on; after that, if the current outside temperature increases, AC request signal will change to valid from invalid only when the outside temperature increases to -1.5℃ or more.	/
4	Temperature adjustment function	1. Definition of temperature range: Low-18-32-HI with step of 1℃.2. Except Low and HI, the other positions are always under automatic control.3. Set temperature of 22℃ is defined as the unique comfort temperature of automatic A/C in the four seasons.4. When it is set to Low under AUTO mode, inner circulation operates, compressor is turned on forcibly, maximum air volume is selected, mix damper sets at the max. cold position and face mode works. AUTO is not displayed. All these does not operate in manual mode.5. When it is set to HI under AUTO mode, maximum air volume is selected, mix damper is set at the max. hot position and compressor is turned off forcibly, AUTO is not displayed, all these does not operate in manual mode.6. Under AUTO/DUAL mode, when set temperature of 18-32 ℃ switches to Low or HI, AUTO is not displayed. If AUTO button is operated again at this time, AUTO displays. It works at LOW or HI and only AUTO indicator light comes on.7. Under AUTO mode, when set temperature of 18-32℃ switches to LOW or HI, AUTO is not displayed. If the set temperature returns to 18-32℃, AUTO displays.10. Temperature and mode are not operational when A/C is turned off, and inner/outer circulation is operational.	/

Interaction logic between A/C panel and head unit			
5	Airflow volume adjustment function	1. Definition of airflow volume range: 1st to 7th level, the 1st level is minimum volume.2. No matter which level the air volume is in, low voltage start is performed, voltage of blower in unit time can only increase/decrease by a certain value, avoiding voltage shock and variation of air volume. (1) Airflow volume increases/decreases by 2.5 V/S in manual status.(2) Airflow volume increases/decreases by 1 V/S in automatic status.(3) Airflow volume becomes 0 when A/C is turned off.3. In order to improve comfort, precautionary measures, such as warm air blowing face adjustment in summer, cooling water adjustment in winter, fogging prevention adjustment in winter, should be added. For specific implementation scheme, it should be controlled separately according to each item, which must exist.4. In automatic control status, sudden change of air volume is not allowed.	/
6	DVD voice control of air conditioning	1. Operate voice control button on steering wheel to enter voice control status. 2. The DVD sends the corresponding signal to CLM via CAN after receiving the voice command to adjust the air conditioning. CLM performs corresponding operations to adjust the status of air conditioning.3. For specific voice control logic, refer to regulation “Table 1”.	/
7	Dual temperature zone independent control	1. When the color of DUAL button character is white, it enters dual-zone independent control; when the color of button character is blue, it is single-zone control.2. In dual-zone independent control mode, the control temperature of left and right zones should have obvious temperature difference according to the set temperature.3. In dual-zone independent control mode, temperature values in left and right zones are independent.4. In AUTO status (single-zone or dual-zone), air conditioning operation status (except temperature) only changes with the change of temperature set by driver.5. In single-zone AUTO status, when adjusting the driver side temperature, set temperature of left and right zones change simultaneously.6. In single-zone AUTO mode, when adjusting the front passenger side temperature, it switches to dual-zone mode automatically.7. When the air conditioning is turned on, it starts to operate in mode (single-zone or dual-zone) when it turned off last time.	/

Interaction logic between A/C panel and head unit			
8	Air purification function	1. The outside and inside PM2.5 values are both displayed on panel screen.2. Make sure front windshield is not fogged up during operation of air purification system.3. For A/C control strategy during operation of air purification system, take the rapidity of air purification into consideration while guaranteeing NVH.4. After air purification function is turned on, operate air purification switch on air conditioning panel again to turn off the air purification function.5. After air purification system is turned on, switch vehicle power supply to OFF to turn off the air purification system.6. After air purification function is turned on, turn the blower off to turn off the air purification function.7. After air purification function is turned on, if inner/outer circulation mode of the vehicle changes, air purification function will be turned off.8. After air purification function is turned on, if defroster or defogger is turned on, air purification function will be turned off.9. After air purification function is turned on, if air conditioning is in the max. cool/ hot, air purification function will be turned off.10. After the function exits, it needs to be turned on again next time, and it will not resume automatically. (For example, if the function exits after changing the circulation mode of vehicle, air purification function needs to be turned on again before operating the button to resume the original circulation mode)	/
9	Max. front defrost function	Enter the max. front defrosting status, adjust the air flow mode to window, force to operate outer circulation and turn on the compressor; if the air volume level before operating the max. front defrost function is less than 4, the air volume is forced to the level 4. If the previous level of air volume is 4 or higher, it maintains the previous air volume, and the air volume is adjustable. 7. In the max. front defrosting status, operate A/C button or inner/outer circulation button, the max. defrosting does not exit, and all air volume maintains unchanged.	/

Table 1

Main Function	Function Description	Voice Command	Function Application Scenario
Turn on air conditioning	User uses voice to turn on air conditioning	Turn on air conditioning	1. Turn key to ON position;2. Automatic air conditioning or electric air conditioning with CAN network
Turn off air conditioning	User uses voice to turn off air conditioning	Turn off air conditioning	1. Turn key to ON position;2. Automatic air conditioning or electric air conditioning with CAN network
Turn on AUTO mode	User uses voice to turn on AUTO mode	Turn on AUTO mode	1. Turn key to ON position; 2. Automatic air conditioning
Turn off AUTO mode	User uses voice to turn off AUTO mode	Turn off AUTO mode	1. Turn key to ON position; 2. Automatic air conditioning;
Turn on air purification	User uses voice to turn on air purification function	Turn on air purification	1. Turn key to ON position; 2. Automatic air conditioning;

Table 1			
Main Function	**Function Description**	**Voice Command**	**Function Application Scenario**
Adjust air speed to level **	User uses voice to adjust air speed to level **	Increase fan speed, decrease fan speed, adjust to max. air speed, adjust to min. air speed, adjust air speed to level **	1. Turn key to ON position; 2. Automatic air conditioning or electric air conditioning with CAN network
Set temperature of air conditioning to ** (18-32)	User uses voice to adjust temperature to **℃	Increase temperature (-increased by 1°C after each command)Decrease temperature (decreased by 1° C after each command)adjust to the highest temperature, adjust to the lowest temperatureMy temperature (-adjust to the temperature preset by user)	1. Turn key to ON position; 2. Automatic air conditioning;
Switch airflow mode of air conditioning	User uses voice to adjust blow mode of air conditioning	Face mode, foot mode, face and foot mode, foot and defrost mode, switch airflow mode of air conditioning	1. Turn key to ON position; 2. Automatic air conditioning or electric air conditioning with CAN network;
Turn on front defroster	User uses voice to turn on front defroster	Turn on front defroster	1. Turn key to ON position; 2. Automatic air conditioning or electric air conditioning with CAN network;
Turn off front defroster	User uses voice to turn off front defroster	Turn off front defroster	1. Turn key to ON position; 2. Automatic air conditioning or electric air conditioning with CAN network
Switch circulation mode	User uses voice to switch circulation mode	Turn on inner circulation, turn on inner circulation and switch circulation mode	1. Turn key to ON position; 2. Automatic air conditioning or electric air conditioning with CAN network;
Turn on cooling (compressor)	User uses voice to turn on cooling	Turn on cooling	1. Turn key to ON position; 2. Engine starts; 3. Automatic air conditioning or electric air conditioning with CAN network;
Turn off cooling (compressor)	User uses voice to turn off cooling	Turn off cooling	1. Turn key to ON position; 2. Engine starts; 3. Automatic air conditioning or electric air conditioning with CAN network;
Turn on MAX cooling	User uses voice to turn on MAX cooling	Turn on MAX cooling/Turn on MAX AC	1. Turn key to ON position; 2. Engine starts; 3. Automatic air conditioning or electric air conditioning with CAN network

Note:

1. OFF status:
   - Air conditioning system: Compressor does not operate and blower stops, each damper stops after operating in place according to the off command.
2. ON status:
   - Air volume level of air conditioning system is not 0, all actuators perform corresponding functions according to user’s operation.
3. Standby status:
   - Blower and compressor of air conditioning system stop operating, inner/outer circulation is adjustable, set temperature and mode adjustment are not operational.
4. Air conditioning will be turned on if air volume, AC, AUTO, air purification button, DVD or ON/OFF button on panel and max. front defroster are operated.
5. Introduction of inner circulation button
   - Function: Switch between inner and outer circulations.
   - Structure type: Touch the screen to operate.
   - Control logic:
     - Operation is available when air conditioning is OFF.
     - In inner circulation mode, press inner circulation button to switch to outer circulation mode, meanwhile, inner/outer circulation button character displays in white and air conditioning enters outer circulation status.
     - Linked with max. front defrost function, and it is used to enter the max. front defrost status, force to operate outer circulation and turn on the compressor. When operating AC button or the inner/outer circulation button under the max. front defrost status, the operation is invalid, and the max. front defrost mode will not exit.

Self-diagnostic Function of A/C Panel

1. Enter the self-diagnostic button definition: Press AC + inner/outer circulation buttons simultaneously for more than 5 seconds;
2. The module enters diagnostic program, A/C system automatically runs each actuator and sends fault information to panel display. If there are multiple faults, each fault detected will send a DTC to the panel, the panel will store it and display all DTCs after receiving them. It will exit self-diagnostic state after displaying for 5 seconds and return to the state before entering self-diagnostic. Perform the self-test function after the self-diagnostic is completed.

   Note: For A/C panel equipped with segment screen, the diagnostic display information is completed by DVD.

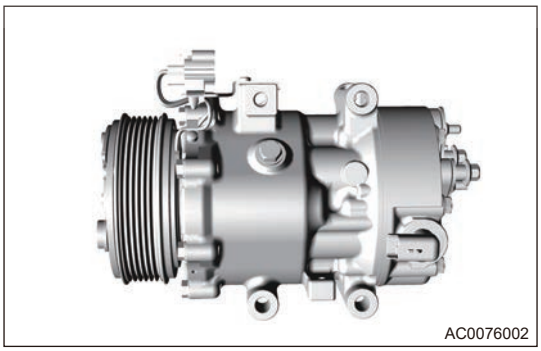
Auto air conditioning fault code and corresponding fault content	
Symbols	**Trouble Content**
00	System is normal
01	Outside Temperature Sensor Error (Open or Short)
02	Room Temperature Sensor Error (Open or Short)
03	Room Right Temperature Sensor Error (Open or Short)
04	Solar Sensor Error (Open or Short)
05	Solar Sensor (Right) Error (Open or Short)
06	Humidity Sensor Error

Auto air conditioning fault code and corresponding fault content	
Symbols	**Trouble Content**
07	Air Quality Sensor Error
08	Evaporator Temperature Sensor Error (Short or Open)
09	Heater Temperature Sensor Error (Short or Open)
10	AQM Fault
11	Blower Error (Failure of Adjustment)
12	Circulation Damper Motor Error (Failure of Adjustment)
13	Mode Damper Motor Error (Failure of Adjustment)
14	Mode Damper Motor 2 Error (Failure of Adjustment)
15	Temperature Mix Damper Motor Error (Failure of Adjustment)
16	Temperature Mix Damper Motor (Right) Error (Failure of Adjustment)
17	Lost Communication with ICM
18	Lost Communication with EMS
19	Lost Communication with BSM
20	Lost Communication with RRM
21	Lost Communication with BCM
22	Lost Communication with IPM

System Components Description

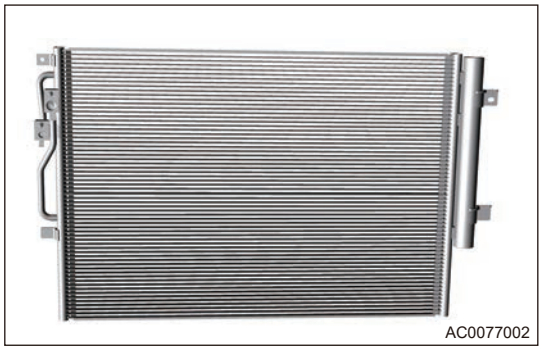
Compressor

Compressor is an important element of refrigeration system. It compresses the low temperature/pressure refrigerant vapor from evaporator and makes it become high temperature/pressure refrigerant vapor. This model uses a variable capacity compressor. When refrigeration system is operating, the electromagnetic clutch of variable capacity compressor is always in the engaged status. It can change the piston displacement continuously and steadily within a certain range by external control valve according to the change of refrigeration load and engine speed, so as to realize the regulation of system flow.



Condenser

Condenser contains desiccant that is used to remove water from the refrigerant in line. Compressor compresses the refrigerant into high temperature/pressure refrigerant gas, which is then discharged into the condenser, in which heat is released to the cooling medium air and condensed into high pressure liquid.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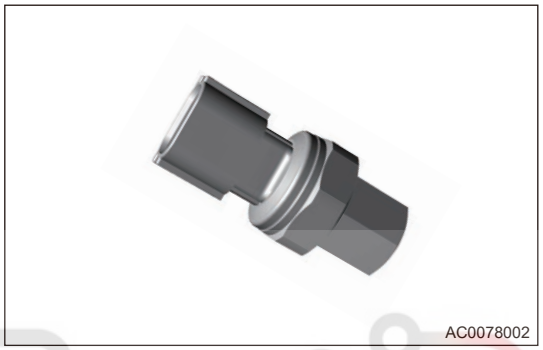
A/C Pressure Sensor

A/C pressure sensor is installed on high pressure pipe and used to monitor the refrigerant pressure and output the refrigerant pressure signal to ECM. ECM controls compressor based on the signal transmitted from A/C pressure sensor.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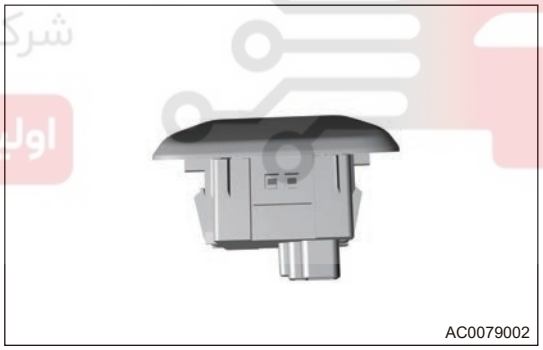
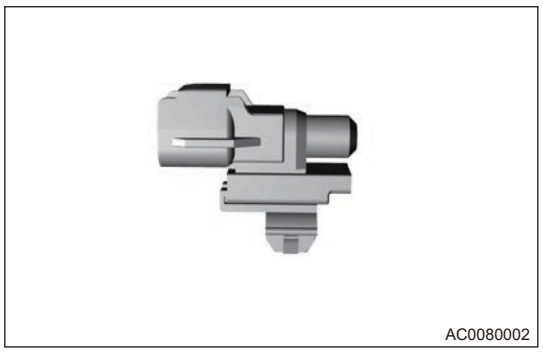
Solar Sensor

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.


AC0079002

Outside Temperature Sensor

Outside temperature sensor is installed at lower left of front impact beam and used to detect the outside temperature and control the automatic mode of air conditioning. The sensor sends signal to automatic A/C module. The resistance of outside temperature sensor changes with the change of ambient temperature. Resistance increases as temperature decreases. Resistance decreases as temperature increases.


AC0080002

Anion Generator (If Equipped)

Anion generator is installed on air duct on left side of instrument panel. The anion generator boosts the low voltage into positive high voltage and negative high voltage by booster circuit, and ionizes the air under the action of positive high voltage electric field and negative high voltage electric field to generate a large number of positive and anions.

Hint:
The connector of anion generator must be disconnected when cleaning the air conditioning line after sale to avoid fire.

Specifications

Torque Specifications

Description	Torque (N•m)
Compressor Fixing Bolt	22.5 ± 2.5
A/C Line Fixing Point	9 ± 1
Intake and Exhaust Pressure Plate Fixing Point	25 ± 3
A/C Line Fixing Point	9 ± 1
A/C Line Fixing Point	9 ± 1
Fixing Point Between A/C Line and Condenser	9 ± 1
Fixing Point Between A/C Line and A/C Line	9 ± 1
Rear Evaporator A/C Line Fixing Point	9 ± 1
Condenser Fixing Bolt	5 ± 1
Screw - HVAC to Instrument Panel Crossmember	2.5 ± 0.5
Nut - HVAC to Body Sheet Metal	7 ± 1
Bolt - Shim - HVAC to Body Sheet Metal	7 ± 1
Shim - HVAC Assembly to Body Sheet Metal	7 ± 1
Nut - HVAC to Instrument Panel Crossmember	5 ± 1
Nut - Rear HVAC to Body Sheet Metal	5 ± 1
Bolt - Rear HVAC to Body Sheet Metal	5 ± 1
Nut - Ground to Body Sheet Metal	9 ± 1
Bolt - HVAC to Instrument Panel Crossmember	5 ± 1
Screw - Anion Generator to Air Duct	1.5 ± 0.5
Fixing Bolt between Expansion Tank and Body Bracket	5 ± 1
Fixing Bolt Between Cooling Pipe Assembly Bracket and Cylinder Head Assembly	5 ± 1

Description	Torque (N•m)
Fixing Bolt Between Expansion Tank Inlet Pipe Assembly and Cylinder Head Assembly	5 ± 1
Fixing Bolt Between Engine Inlet Pipe Fixing Bracket 1 and Intercooler Outlet Pipe Assembly II	5 ± 1
Fixing Bolt Between Engine Inlet Pipe Fixing Bracket 2 and Filter	9 ± 1
Fixing Bolt Between Intercooler Assembly and Radiator	5 ± 1
Fixing Bolt Between Cooling Fan Assembly and Radiator	5 ± 1
Left Air Deflector Assembly Fixing Bolt	5 ± 1
Right Air Deflector Assembly Fixing Bolt	5 ± 1

Refrigerant Charging Capacity

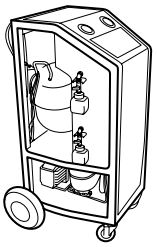
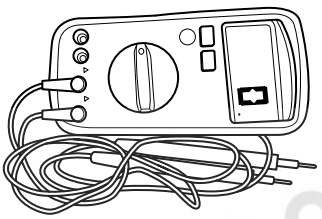
Layout	Type	Charging Capacity
Single Evaporator	R134a Refrigerant/R1234yf (-European Union)	550 ± 15g
Dual Evaporator		925g ± 15g

Cooling Oil Charging Capacity

Type	Charging Capacity
SP-10	150ml
Newly installed air conditioning system does not need to be refilled. Refill when repairing a part or after driving a certain distance. The reference quantity of oil to be added when replacing parts: Evaporator, condenser, rear evaporator: 30 ml for each; Line: 10 ml, Rear evaporator pipe: 10ml; Compressor: Pour out all the oil inside newly replaced compressor, add oil according to the replaced actual oil amount in the compressor (required to turn the compressor pulley in the manual suction state to pour out as much lubricating oil as possible).	

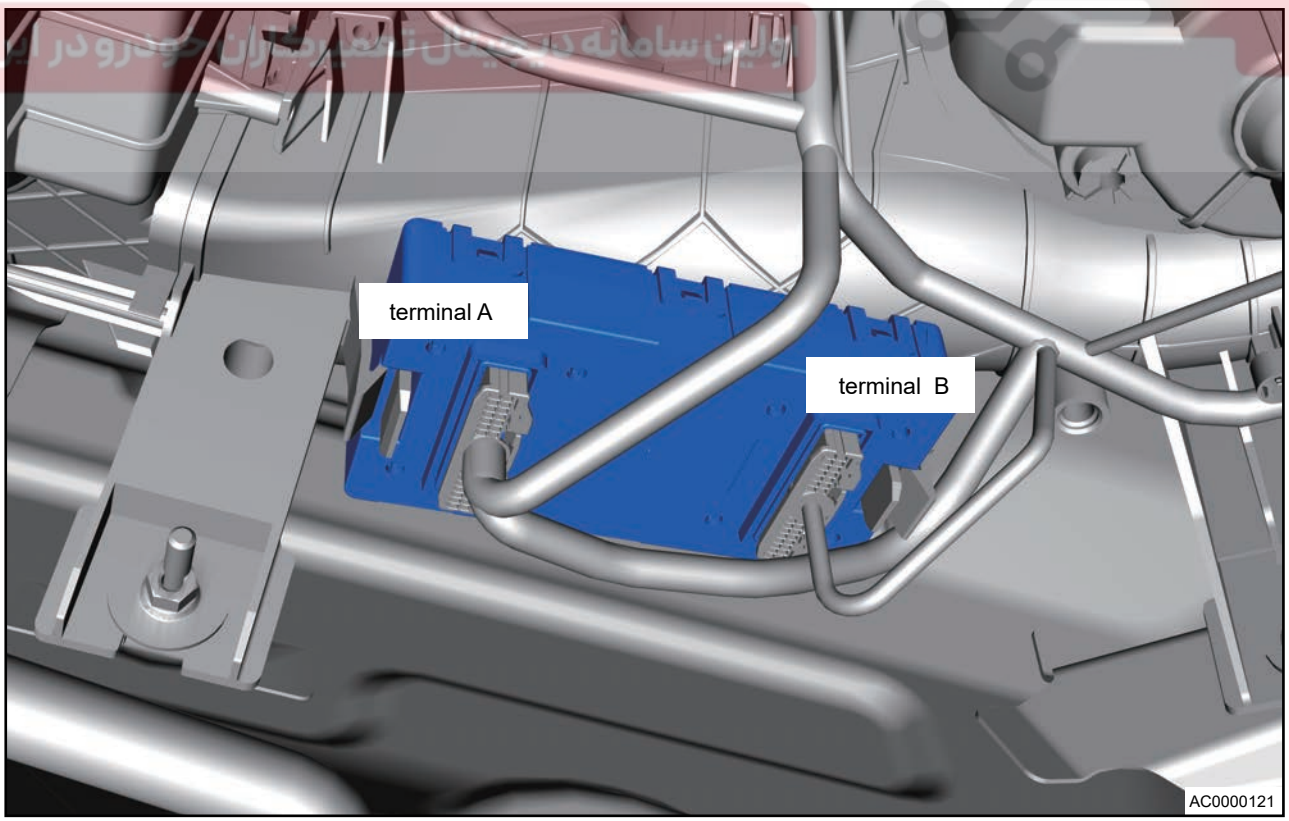
Tools

General Tools

Tool Name	Tool Drawing
Refrigerant Recycling Machine	 RCH004606
Digital Multimeter	 RCH000206

Module Terminal Definition

A/C Control Module Terminal List



Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
A1	Left Mix Damper Motor P3	A21	Ground
A2	Left Mix Damper Motor P2	A22	Sensor Ground
A3	Left Mix Damper Motor P1	A23	-
A4	Right Mix Damper Motor P4	A24	Right Solar Sensor
A5	Right Mix Damper Motor P3	A25	Left Solar Sensor
A6	Right Mix Damper Motor P2	A26	PM2.5 Sensor 2 Signal
A7	Right Mix Damper Motor P1	A27	-
A8	Blower Relay	A28	Evaporator Temperature Sensor +
A9	AQS Signal	A29	Outside Temperature Sensor +
A10	CAN-H	A30	PM2.5 Sensor 1 Signal
A11	CAN-L	A31	-
A12	KL15	A32	Feedback Signal
A13	Mode Damper Motor P4	A33	Blower Speed Control
A14	Mode Damper Motor P3	A34	-
A15	Mode Damper Motor P2	A35	Sensor Power Supply
A16	Mode Damper Motor P1	A36	Sensor Power Supply
A17	Inner/Outer Circulation Motor P4	A37	KL30
A18	Inner/Outer Circulation Motor P3	A38	ECV+
A19	Inner/Outer Circulation Motor P2	A39	ECV-
A20	Inner/Outer Circulation Motor P1	A40	Left Mix Damper Motor P4

Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
B1	–	B21	–
B2	–	B22	–
B3	–	B23	–
B4	–	B24	–
B5	–	A25	–

Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
B6	-	B26	-
B7	-	B27	-
B8	-	B28	-
B9	-	B29	-
B10	-	B30	-
B11	-	B31	-
B12	-	B32	-
B13	-	B33	-
B14	-	B34	-
B15	-	B35	-
B16	-	B36	-
B17	-	B37	-
B18	-	B38	Left Anion Generator
B19	-	B39	-
B20	Left Anion Generator	B40	-

Front A/C Control Panel

Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
A1	-	A9	Rear Blower Relay
A2	-	A10	-
A3	Rear Defrost Output	A11	-
A4	CAN_H	A12	-
A5	CAN_L	A13	-
A6	Rear Defrost Request	A14	-
A7	Ground	A15	-
A8	IGN	A16	KL30

Rear A/C Control Panel

Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
A1	ILL+	A4	Blower Feedback
A2	KL15	A5	Blower Control
A3	GND	A6	NC

Diagnosis & Test

Problem Symptoms Table

Caution
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	Possible Cause
A/C no heating	Blower fuse (damaged)
	Blower relay (damaged)
	Blower speed regulation switch (damaged)
	Blower motor (damaged)
	Mix damper control mechanism (stuck or damaged)
	Mix damper control knob (stuck or damaged)
	Heating pipe (blocked or damaged)
	Heater core assembly (blocked or damaged)
	Wire harness or connector (open or short)
A/C no cooling	Leak in system
	Refrigerant (overcharged)
	A/C pressure sensor (damaged)
	Evaporator temperature sensor (damaged)
	A/C switch (damaged)
	Compressor assembly fuse (damaged)
	Compressor assembly relay (damaged)
	Compressor assembly belt (loose)
	Compressor assembly (damaged)
	Condenser assembly (blocked or damaged)
	Expansion valve (blocked or frosted)
	Evaporator core assembly (blocked or damaged)
	Wire harness or connector (open or short)
A/C intermittent cooling	Moisture in system
	Refrigerant (overcharged)
A/C insufficient cooling	Leak in system

Symptom	Possible Cause
	Refrigerant (insufficient)
	Refrigerant (overcharged)
	Air in refrigerant
	Moisture in refrigerant
	Condenser (dirty or blocked)
	Expansion valve (dirty or blocked)
	Condenser core (dirty or blocked)
	A/C high/low pressure line (dirty or blocked)
	Blower speed regulation switch (damaged)
	Blower motor (damaged)
	Compressor assembly belt (loose)
Too much noise in system	Compressor assembly belt (slip)
	Compressor assembly clutch bearing (worn or excessive clearance)
	Compressor assembly solenoid coil (faulty or loose connector)
	Compressor assembly belt (over tightened)
	Compressor assembly mounting bolt (loose)
	Cooling fan blade (distorted)
	Refrigerant oil (insufficient)
During operation, pressure on low pressure side switches between normal and vacuum	Moisture in refrigerant (excessive)
Pressure is too low for low pressure side and high pressure side, cooling performance is insufficient	A/C system (leaked)
	Refrigerant (insufficient)
Pressures at low pressure side and high pressure side are low, frost exists on line from condenser to A/C unit	Condenser (dirty or blocked)
Vacuum occurs at low pressure side, and pressure at high pressure side is too low, frost exists on lines on both sides of condenser or expansion valve	Moisture in refrigerant (excessive)
	Expansion valve (dirty or blocked)
	A/C line (leaked)
	Condenser (dirty or blocked)
Pressure at low pressure side and pressure at high pressure side is too high	Expansion valve (faulty)
	Refrigerant oil (excessive)

Symptom	Possible Cause
Pressure at low pressure side is normal or slightly low, and pressure at high pressure side is too high	Condenser surface (dirty)
	Cooling fan (not operating)
	Refrigerant (overcharged)
	Air in refrigerant
	Engine (overheating)
Pressure at low pressure side is too high, and pressure at high pressure side is too low	Compressor assembly belt (slip)
	Compressor assembly (faulty)
Pressure at low pressure side is too low, and pressure at high pressure side is too high	A/C high pressure line (blocked)
	Expansion valve (faulty)

Diagnosis Procedure

Hint:
Use following procedures to troubleshoot the control system.

1	**Vehicle brought to workshop**

Next

2	**Examine vehicle and check basic items**

Check system power supply voltage, and check that fuse, wire harness and connector are connected normally.

OK

Standard voltage: Not less than 12 V.

Result

NG → **Check and replace malfunctioning parts**

OK

3	**Using a diagnostic tester, read related DTC and data stream information**

Result

Result	Go to
No DTC	A
DTC occurs	B

A → **Perform troubleshooting procedure without DTCs according to malfunction symptom**

B

4	**Troubleshoot according to DTCs troubleshooting procedure**

Result

Result	Go to
Problem is not resolved	A
Problem is resolved	B

A → **Return to procedure 1 and troubleshoot the process again**

B

5	**According to system malfunction repair completion inspection and delivery, confirm if malfunction is resolved.**

Result

Result	Go to
Delivery inspection is failed	A
Delivery inspection is qualified	B

A → **Return to procedure 1 and troubleshoot the process again**

B

6	**Finished**

DTC Confirmation Procedure

Confirm that battery voltage is normal before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn ENGINE START STOP switch to ON.
- Use diagnostic tester to record and clear DTCs stored in supplemental restraint system.
- Turn the ENGINE START STOP switch to OFF and wait for several seconds.
- Turn ENGINE START STOP switch to “ON”, and then select read DTC.
- If DTC is detected, it indicates current malfunction. Go to inspection procedure - Step 1.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnostic Trouble Code (DTC) Chart

DTC	Description
B141B_11	Incar Temperature Sensor-Circuit Short to Ground
B141B_12	Incar Temperature Sensor-Circuit Short to Power Supply
B1403_11	Filtered Ambient Temperature-Circuit Short to Ground
B1403_15	Filtered Ambient Temperature-Circuit Short to Battery or Open
B1404_11	Filtered Evaporator Temperature-Circuit Short to Ground
B1404_15	Filtered Evaporator Temperature-Circuit Short to Battery or Open
B1406_14	Solar Radiation (Left Side)-Circuit Short to Ground or Open

DTC	Description
B1406_12	Solar Radiation (Left side)-Circuit Short to Power Supply
B1407_14	Solar Radiation (Right Side)-Circuit Short to Ground or Open
B1407_12	Solar Radiation (Right Side)-Circuit Short to Power Supply
B1408_29	Blower Voltage - Signal Invalid
B1408_31	Blower Voltage - No Signal
B1409_11	Mode Motor Step Circuit Short to Ground
B1409_12	Mode Motor Step - Circuit Short to Battery
B1410_11	Rec Motor Step Circuit Short to Ground
B1410_12	Rec Motor Step-Circuit Short to Battery
B1412_11	Mix Flap Motor Step (Left Side)-Circuit Short to Ground
B1412_12	Mix Flap Motor Step (Left Side)-Circuit Short to Battery
B1414_11	Mix Flap Motor Step (Right Side)-Circuit Short to Ground
B1414_12	Mix Flap Motor Step (Right side)-Circuit Short to Battery
U0073_88	Bus off
U0140_87	Lost Communication with CLM-Missing Message
U0155_87	Lost Communication with CLM-Missing Message
U0151_87	Lost Communication with CLM-Missing Message
U0245_87	CLM Lost Communication with IHU-Missing Message
U0100_87	Lost Communication with Engine Control System Module-Missing Message
U0129_87	Lost Communication with Brake System Module-Missing Message
U0160_87	Lost Communication with Auto A/C Control Panel-Missing Message
U0214_87	Lost Communication With Passive Entry Passive Start Unit
U1300_55	Software Configuration Error-Not Configured
B1416_1C	Left Anion Generator Circuit Voltage Out of Range Failure

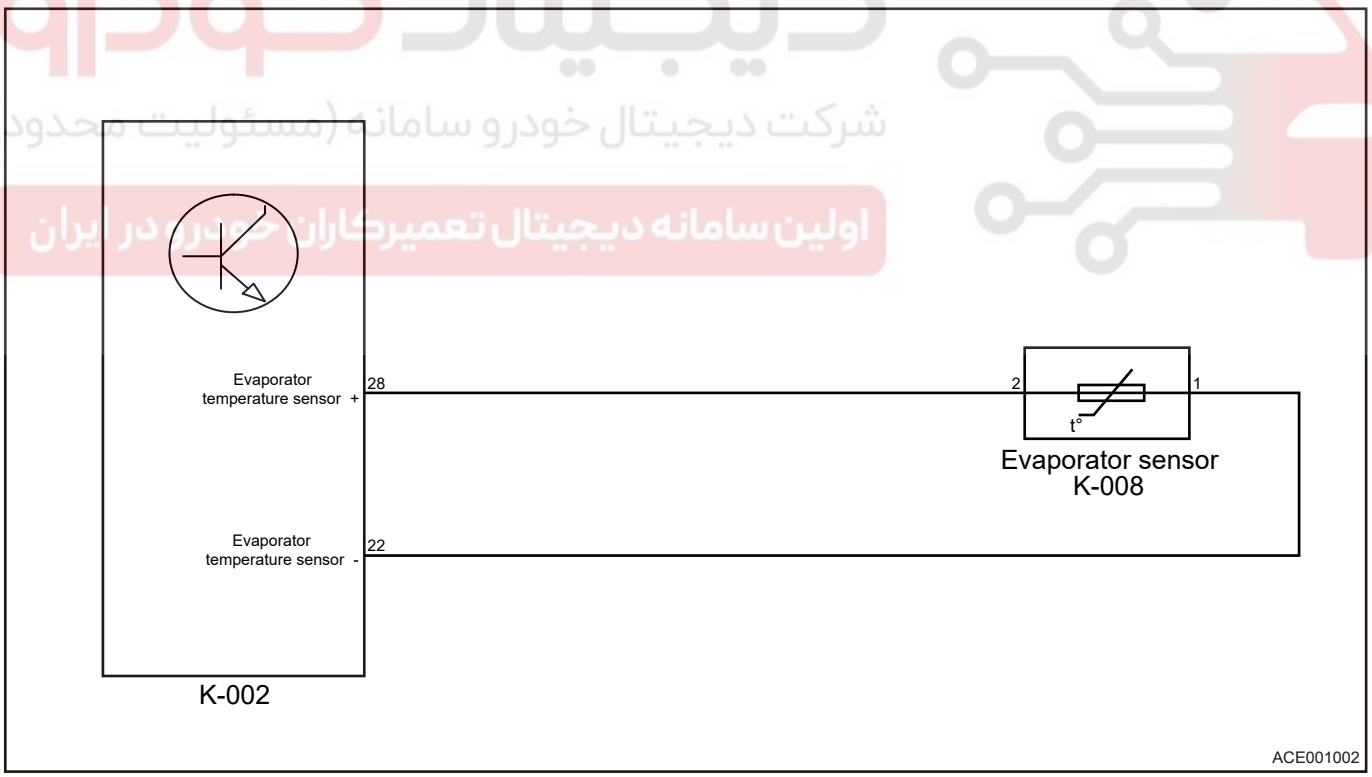
DTC	Description
B1418_11	Incar PM2.5 Sensor-Circuit Short to Ground
B1418_15	Incar PM2.5 Sensor-Circuit Short to Battery or Open
B1419_11	AQS Sensor-Circuit Short to Ground
B1419_15	AQS Sensor-Circuit Short to Battery or Open
B1419_09	AQS Sensor-Component Failure
B141A_11	Outcar PM2.5 Sensor-Circuit Short to Ground
B141A_15	Outcar PM2.5 Sensor-Circuit Short to Battery or Open

DTC Diagnosis Procedure

DTC	B1404_11	Filtered Evaporator Temperature-Circuit Short to Ground
DTC	B1404_15	Filtered Evaporator Temperature Circuit Open

Description

Control Schematic Diagram



DTC	Description	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-04_11	Filtered Evaporator Temperature-Circuit Short to Ground	CLM detects that sensor output voltage is 0 V continually.	Normal function resumes after CLM detects that voltage at temperature sensor terminal returns to a stable normal value	• Temperature sensor is short circuit • Connecting wire between CLM and temperature sensor is short • Internal CLM malfunction occurs	Sensor uses 6.8 K pull-up resistor for 5 V power supply. The ADC sampling terminal is connected to the sampling point through a 4.7K resistor. When the temperature resistor circuit is open or short, ADC sampling pin is pulled to 5V or ground through a 4.7K resistor, which will not cause any bad effects on the hardware circuit.
B14-04_15	Filtered Evaporator Temperature-Circuit Short to Battery or Open	CLM detects that sensor output voltage is 5 V continually.		• Temperature sensor is open • Connecting wire between CLM and temperature sensor is open • Internal CLM malfunction occurs	Sensor uses 6.8 K pull-up resistor for 5 V power supply. The ADC sampling terminal is connected to the sampling point through a 4.7K resistor. When the temperature resistor circuit is open or short, ADC sampling pin is pulled to 5V or ground through a 4.7K resistor, which will not cause any bad effects on the hardware circuit.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check evaporator temperature sensor connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace evaporator temperature sensor connector**

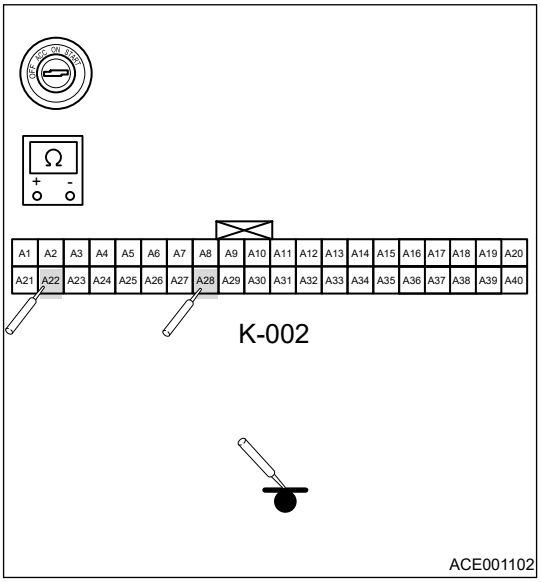
OK

2	**Check resistance between evaporator temperature sensor and ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (22) - Body ground	ENGINE START STOP switch OFF	∞
K-002 (28) - Body ground	ENGINE START STOP switch OFF	∞



NG → **Repair or replace evaporator temperature sensor ground wire harness**

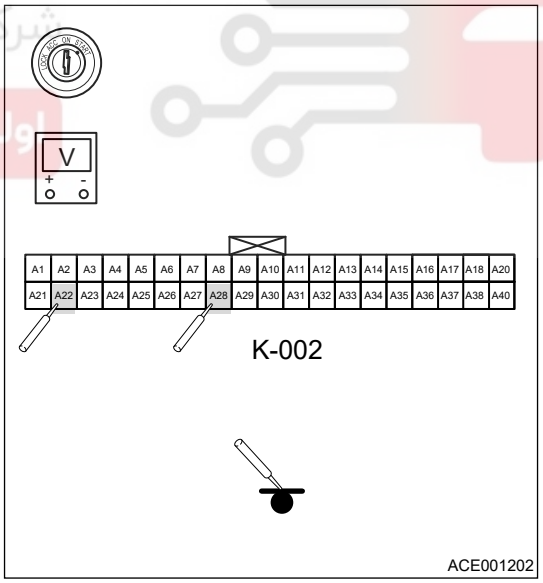
OK →

3	**Check voltage between evaporator temperature sensor and power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (22) - Body ground	ENGINE START STOP switch ON	0 V
K-002 (28) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace evaporator temperature sensor power supply wire harness**

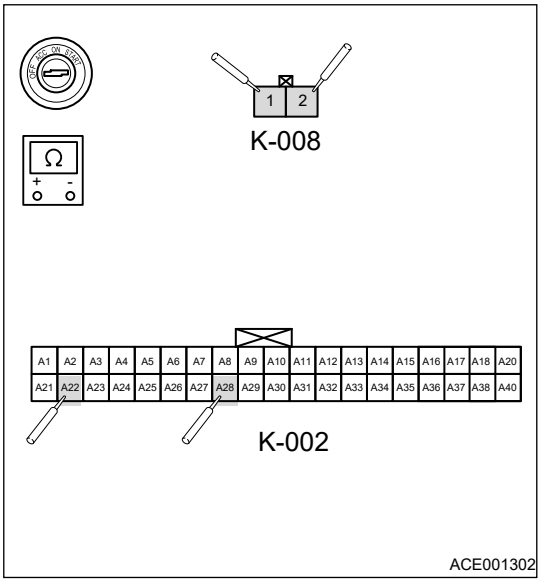
OK →

4	**Check resistance between evaporator temperature sensor and A/C control module**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (22) - K-008 (2)	ENGINE START STOP switch OFF	⩽ 1 Ω
K-002 (28) - K-008 (1)	ENGINE START STOP switch OFF	⩽ 1 Ω



NG → **Repair or replace evaporator temperature sensor and A/C control module wire harness**

OK

5	**Reconfirm DTCs**

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

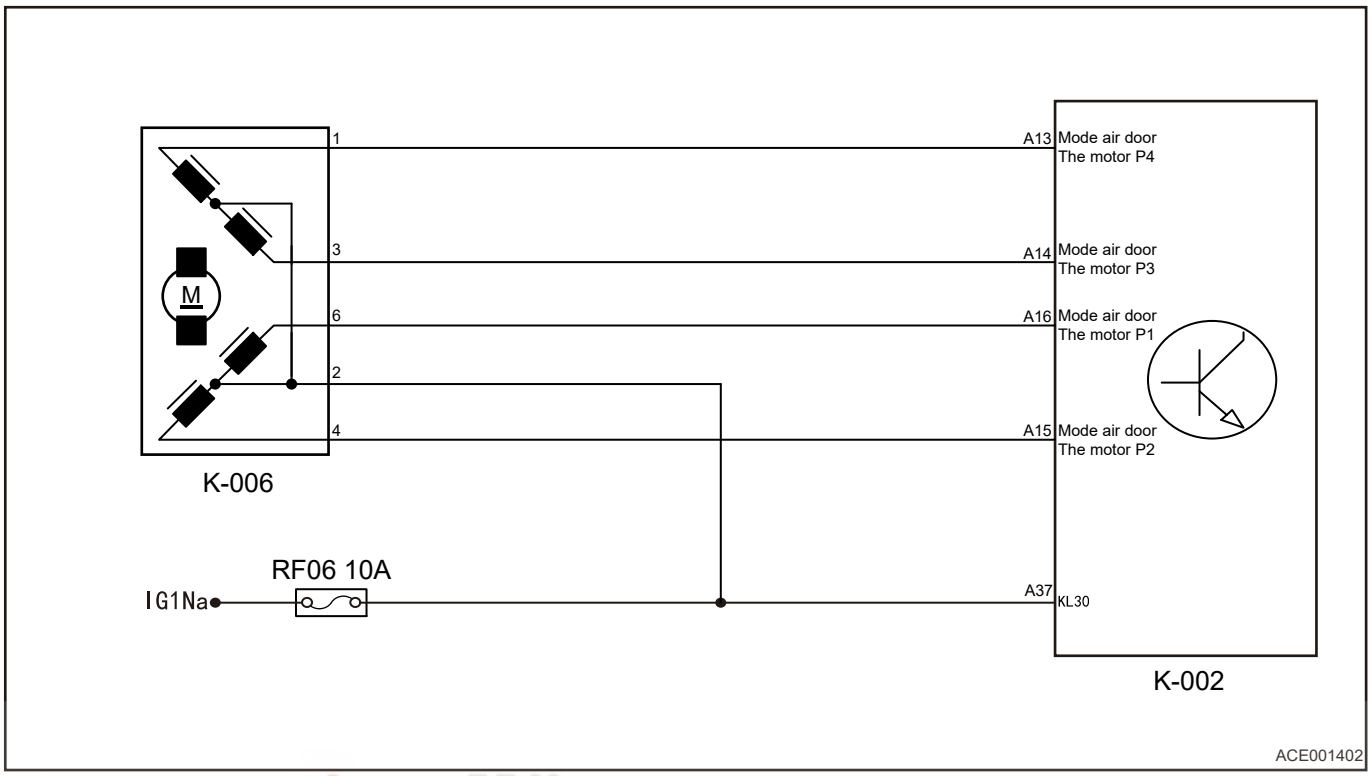
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**B1409_11**	**Mode Motor Step Circuit Short to Ground**
DTC	**B1409_12**	**Mode Motor Step - Circuit Short to Battery**

Description

Control Schematic Diagram



DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-09_-11	Mode Motor Step Circuit Short to Ground	The SPI data of each step motor driver IC sent by MCU is different from the data returned from step motor driver IC, and the returned data is not all 0.	The SPI data of each step motor driver IC sent by MCU is the same as the data returned from step motor driver IC, which indicates that step motor can resume the normal function only when it is connected normally.	• Connecting wire is short to power supply • Step motor internal circuit is short to power supply • CLM internal circuit is short to power supply	Chip integrated over current protection

DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-09_12	Mode Motor Step - Circuit Short to Battery	The SPI data of each step motor driver IC sent by MCU is different from the data returned from step motor driver IC, and the returned data is all 0.		• Connecting wire is open or short to ground • Step motor internal circuit is open or short to ground • CLM internal circuit is open or short to ground	Chip integrated over current protection

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check mode motor connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace mode motor connector**

OK

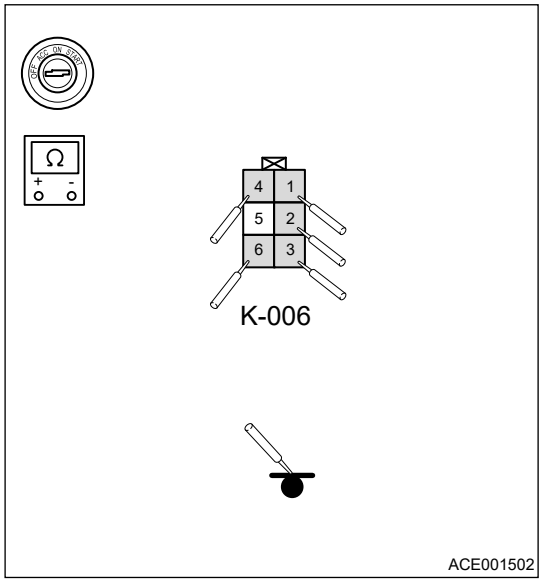
2	**Check resistance between mode motor and ground**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-006 (1) - Body ground	ENGINE START STOP switch OFF	∞
K-006 (3) - Body ground	ENGINE START STOP switch OFF	∞
K-006 (6) - Body ground	ENGINE START STOP switch OFF	∞
K-006 (2) - Body ground	ENGINE START STOP switch OFF	∞
K-006 (4) - Body ground	ENGINE START STOP switch OFF	∞



NG → **Repair or replace mode motor ground wire harness**

OK

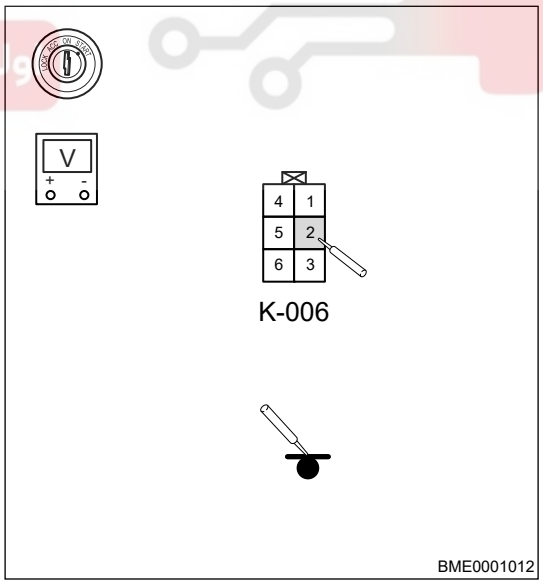
3	**Check mode motor power supply voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
K-006 (2) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair or replace mode motor power supply wire harness**

OK

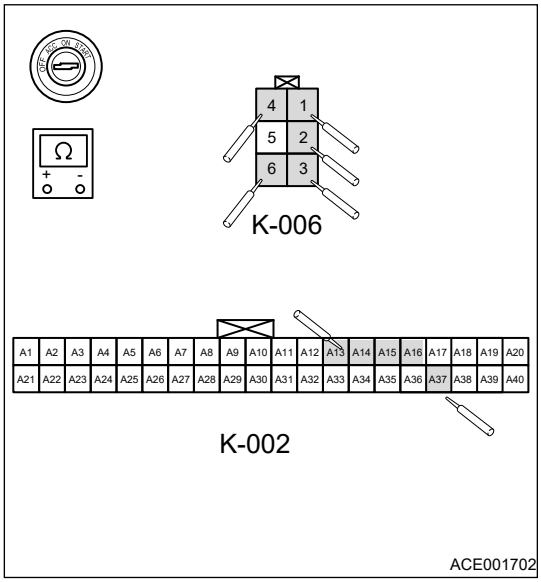
4	**Check resistance between mode motor and A/C control module**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-006 (1) - K-002 (13)	ENGINE START STOP switch OFF	Less than 1 Ω
K-006 (3) - K-002 (14)	ENGINE START STOP switch OFF	Less than 1 Ω
K-006 (6) - K-002 (16)	ENGINE START STOP switch OFF	Less than 1 Ω
K-006 (2) - K-002 (37)	ENGINE START STOP switch OFF	Less than 1 Ω
K-006 (4) - K-002 (15)	ENGINE START STOP switch OFF	Less than 1 Ω



NG → **Repair or replace mode motor power supply wire harness**

OK →

5	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

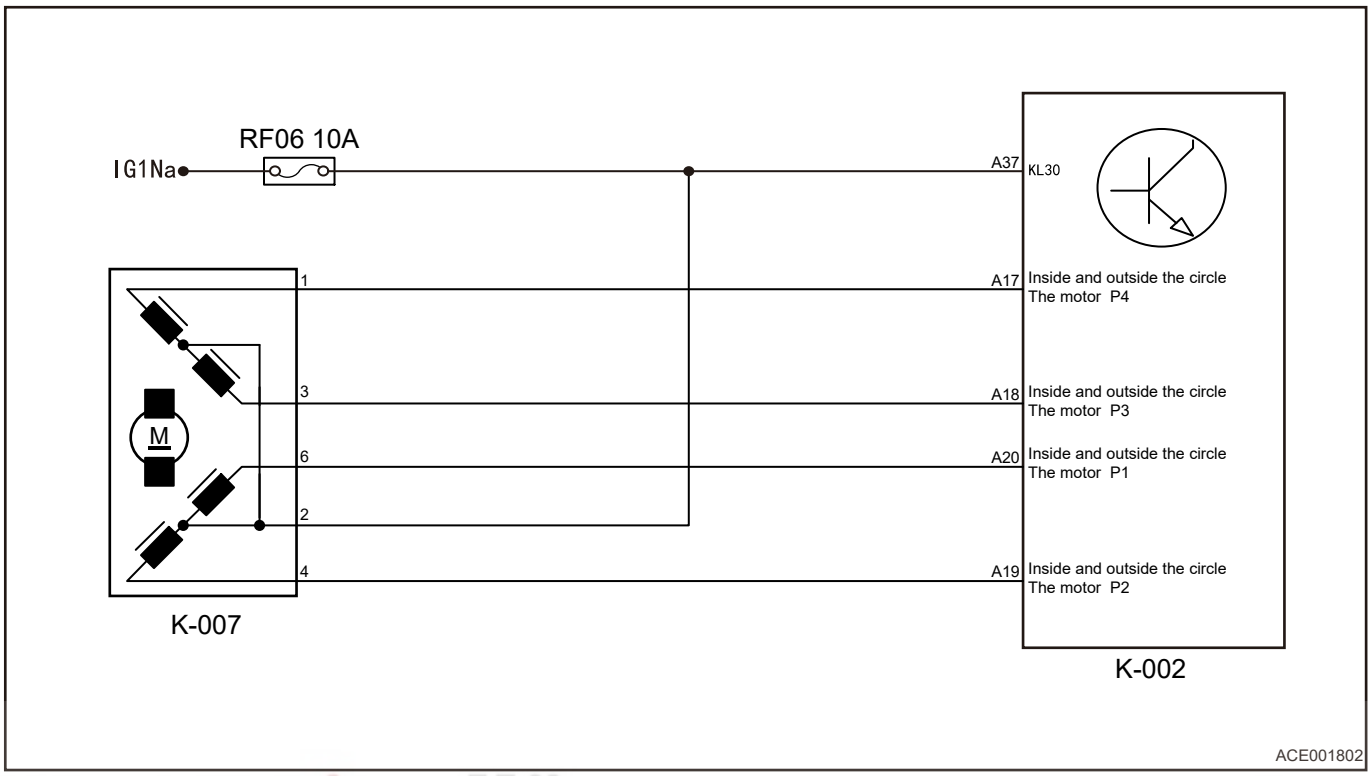
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	B1410_11	Rec Motor Step Circuit Short to Ground
DTC	B1410_12	Rec Motor Step-Circuit Short to Battery

Description

Control Schematic Diagram



DTC	Description	Possible Causes
B1410_11	Rec Motor Step Circuit Short to Ground	• Circuit is short • Inner/outer circulation motor • A/C control panel
B1410_12	Rec Motor Step-Circuit Short to Battery	• Circuit is short to power supply • Inner/outer circulation motor • A/C control panel

DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-10_11	Rec Motor Step Circuit Short to Ground	The SPI data of each step motor driver IC sent by MCU is different from the data returned from step motor driver IC, and the returned data is all 0.	The SPI data of each step motor driver IC sent by MCU is the same as the data returned from step motor driver IC, which indicates that step motor can resume the normal function only when it is connected normally.	• Connecting wire is open or short to ground • Step motor internal circuit is open or short to ground • CLM internal circuit is open or short to ground	Chip integrated over current protection
B14-10_12	Rec Motor Step-Circuit Short to Battery	The SPI data of each step motor driver IC sent by MCU is different from the data returned from step motor driver IC, and the returned data is all 0.		• Connecting wire is short to power supply • Step motor internal circuit is short to power supply • CLM internal circuit is short to power supply	Chip integrated over current protection

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check inner/outer circulation motor connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace inner/outer circulation motor connector**

OK

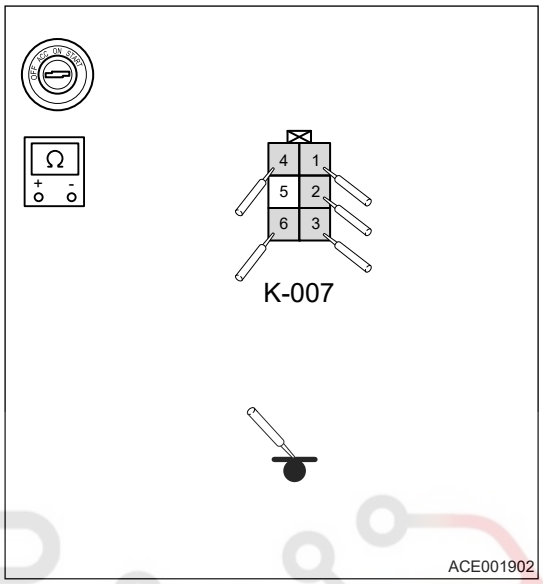
2	**Check resistance between inner/outer circulation motor and ground**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-007 (1) - Body ground	ENGINE START STOP switch OFF	∞
K-007 (2) - Body ground	ENGINE START STOP switch OFF	∞
K-007 (3) - Body ground	ENGINE START STOP switch OFF	∞
K-007 (4) - Body ground	ENGINE START STOP switch OFF	∞
K-007 (6) - Body ground	ENGINE START STOP switch OFF	∞



NG → **Repair or replace inner/outer circulation motor ground wire harness**

OK

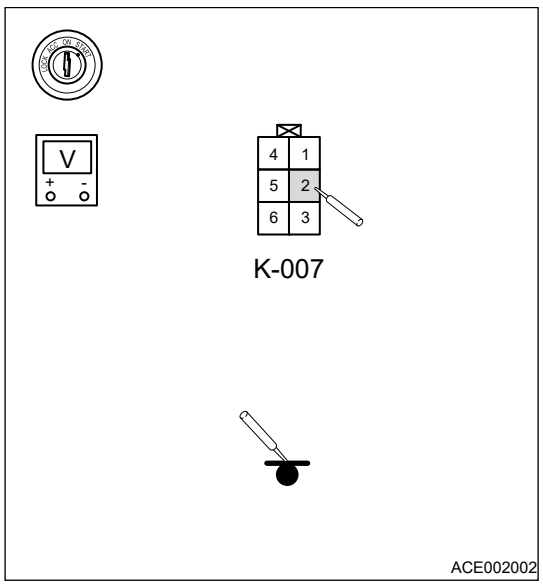
3	**Check inner/outer circulation motor power supply voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
K-007 (2) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair or replace inner/outer circulation motor power supply wire harness**

OK

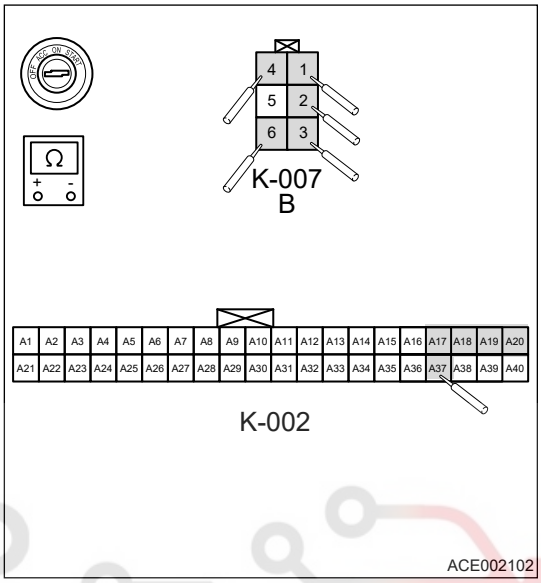
4	Check resistance between inner/outer circulation motor and A/C control module

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-007 (1) - K-002 (17)	ENGINE START STOP switch OFF	Less than 1 Ω
K-007 (3) - K-002 (18)	ENGINE START STOP switch OFF	Less than 1 Ω
K-007 (6) - K-002 (20)	ENGINE START STOP switch OFF	Less than 1 Ω
K-007 (2) - K-002 (37)	ENGINE START STOP switch OFF	Less than 1 Ω
K-007 (4) - K-002 (19)	ENGINE START STOP switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between inner/outer circulation motor and A/C control module**

OK

5	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

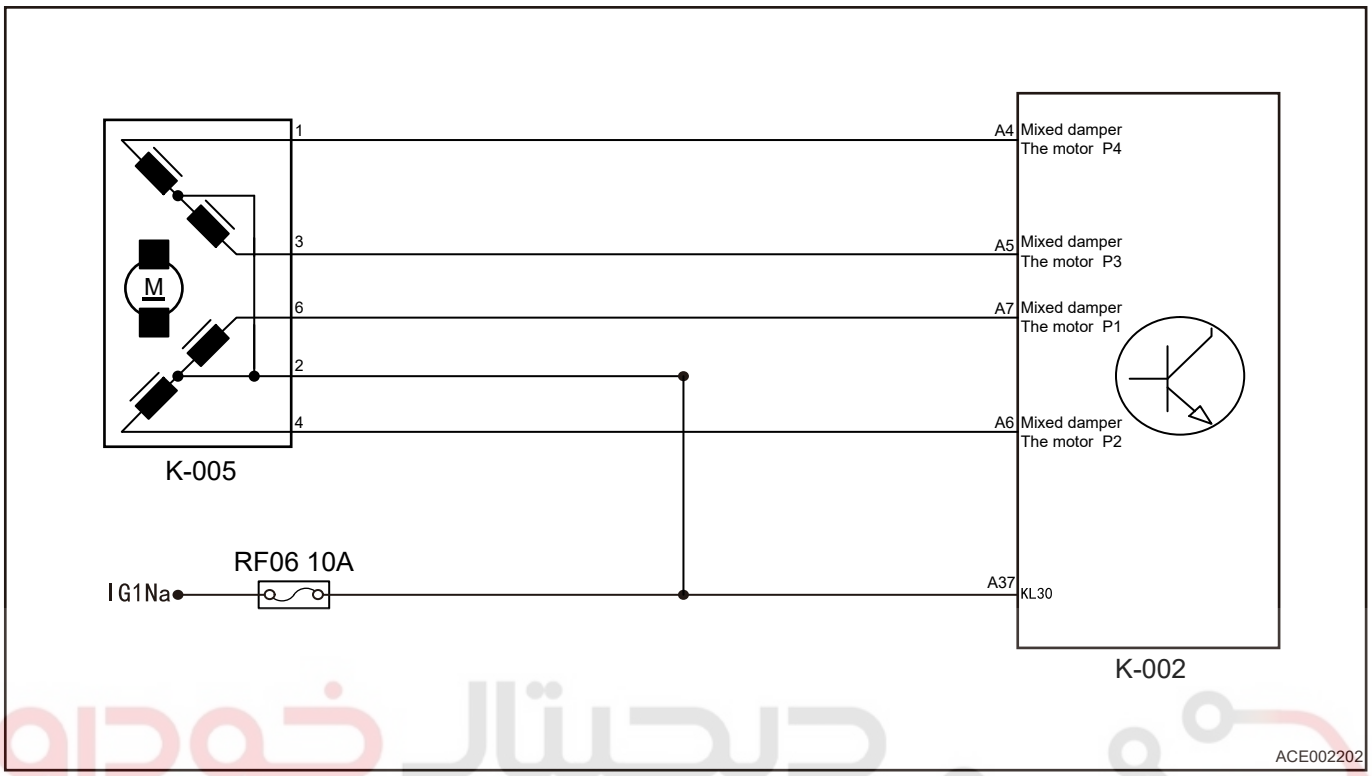
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**B1414_11**	**Mix Flap Motor Step (Right Side)-Circuit Short to Ground**
DTC	**B1414_12**	**Mix Flap Motor Step (Right side)-Circuit Short to Battery**

Description
Control Schematic Diagram



DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-14_11	Mix Flap Motor Step (-Right Side)-Circuit Short to Ground	The SPI data of each step motor driver IC sent by MCU is different from the data returned from step motor driver IC, and the returned data is all 0.	The SPI data of each step motor driver IC sent by MCU is the same as the data returned from step motor driver IC, which indicates that step motor can resume the normal function only when it is connected normally.	• Connecting wire is open or short to ground • Step motor internal circuit is open or short to ground • CLM internal circuit is open or short to ground	Chip integrated over current protection

DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-14_12	Mix Flap Motor Step (-Right side)-Circuit Short to Battery	The SPI data of each step motor driver IC sent by MCU is different from the data returned from step motor driver IC, and the returned data is all 0.		• Connecting wire is short to power supply • Step motor internal circuit is short to power supply • CLM internal circuit is short to power supply	Chip integrated over current protection

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check mix damper motor connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace mix damper motor connector**

OK

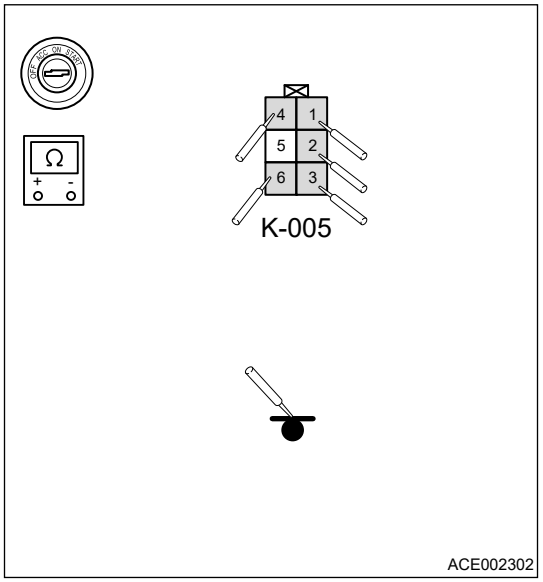
2	**Check resistance between mix damper motor and ground**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-005 (1) - Body ground	ENGINE START STOP switch OFF	∞
K-005 (3) - Body ground	ENGINE START STOP switch OFF	∞
K-005 (6) - Body ground	ENGINE START STOP switch OFF	∞
K-005 (2) - Body ground	ENGINE START STOP switch OFF	∞
K-005 (4) - Body ground	ENGINE START STOP switch OFF	∞



NG → **Repair or replace mix damper motor ground wire harness**

OK

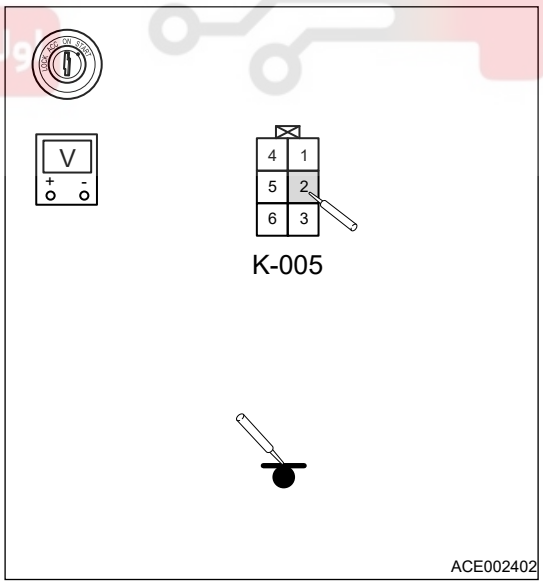
3	**Check mix damper motor power supply voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
K-005 (2) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair or replace mix damper motor power supply wire harness**

OK

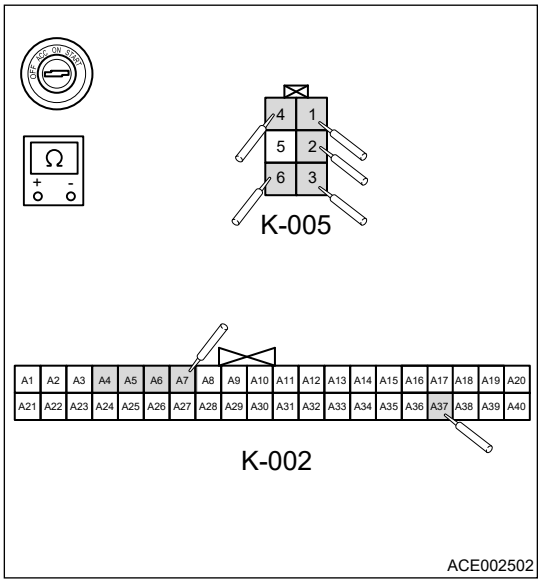
4	Check resistance between mix damper motor and A/C control module

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-005 (1) - K-002 (4)	ENGINE START STOP switch OFF	Less than 1 Ω
K-005 (3) - K-002 (5)	ENGINE START STOP switch OFF	Less than 1 Ω
K-005 (6) - K-002 (7)	ENGINE START STOP switch OFF	Less than 1 Ω
K-005 (2) - K-002 (37)	ENGINE START STOP switch OFF	Less than 1 Ω
K-005 (4) - K-002 (6)	ENGINE START STOP switch OFF	Less than 1 Ω



NG → **Repair or replace wire harness between inner/outer circulation motor and A/C control module**

OK →

5	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

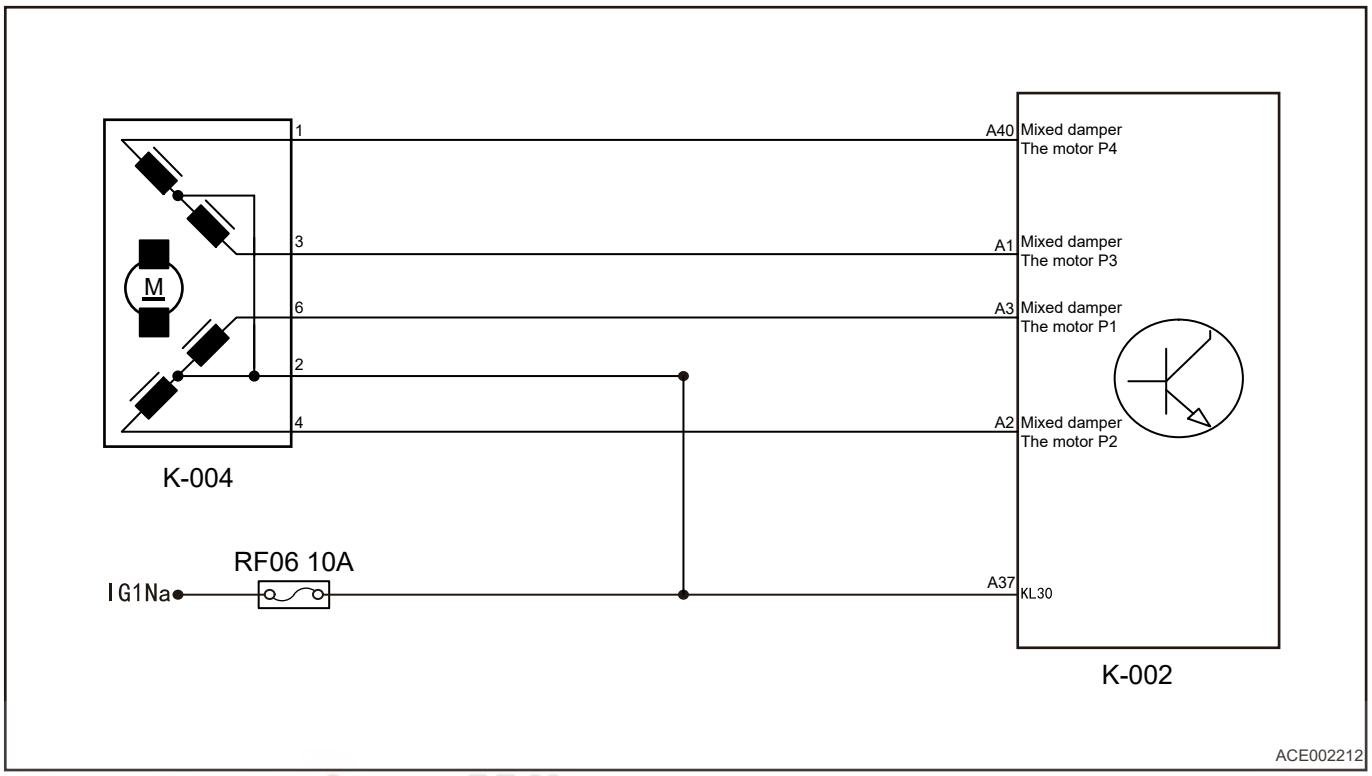
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	B1412_11	Mix Flap Motor Step (Left Side)-Circuit Short to Ground
DTC	B1412_12	Mix Flap Motor Step (Left Side)-Circuit Short to Battery

Description

Control Schematic Diagram



DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-12_-11	Mix Flap Motor Step (-Left Side)-Circuit Short to Ground	The SPI data of each step motor driver IC sent by MCU is different from the data returned from step motor driver IC, and the returned data is all 0.	The SPI data of each step motor driver IC sent by MCU is the same as the data returned from step motor driver IC, which indicates that step motor can resume the normal function only when it is connected normally.	• Connecting wire is open or short to ground • Step motor internal circuit is open or short to ground • CLM internal circuit is open or short to ground	Chip integrated over current protection

DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-12_12	Mix Flap Motor Step (-Left Side)-Circuit Short to Battery	The SPI data of each step motor driver IC sent by MCU is different from the data returned from step motor driver IC, and the returned data is all 0.		• Connecting wire is short to power supply • Step motor internal circuit is short to power supply • CLM internal circuit is short to power supply	Chip integrated over current protection

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check mix damper motor connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace mix damper motor connector**

OK

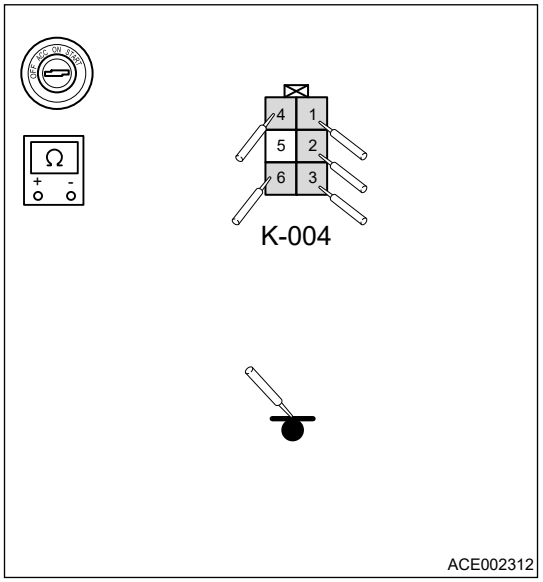
2	**Check resistance between mix damper motor and ground**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-004 (1) - Body ground	ENGINE START STOP switch OFF	∞
K-004 (3) - Body ground	ENGINE START STOP switch OFF	∞
K-004 (6) - Body ground	ENGINE START STOP switch OFF	∞
K-004 (2) - Body ground	ENGINE START STOP switch OFF	∞
K-004 (4) - Body ground	ENGINE START STOP switch OFF	∞



NG → **Repair or replace mix damper motor ground wire harness**

OK →

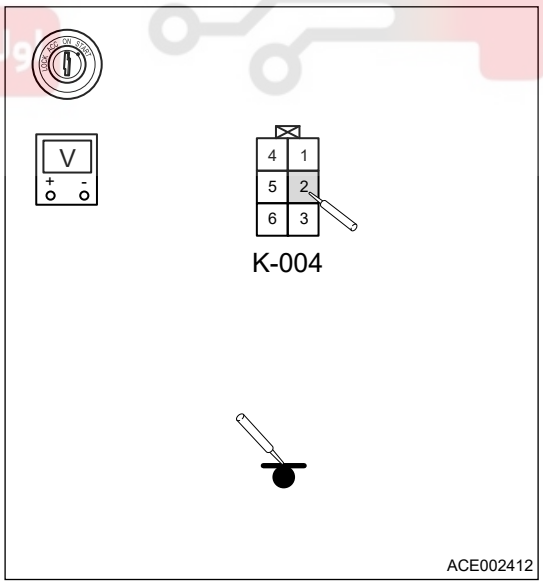
3	**Check mix damper motor power supply voltage**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
K-004 (2) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair or replace mix damper motor power supply wire harness**

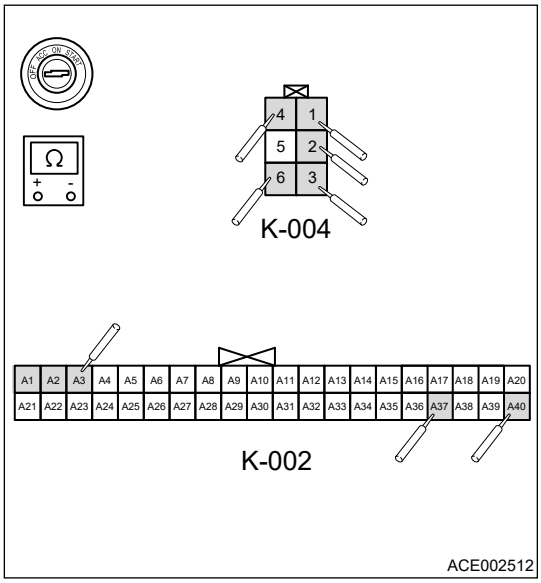
OK →

4	Check resistance between mix damper motor and A/C control module

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.



Multimeter Connection	Condition	Specified Condition
K-004 (1) - K-002 (40)	ENGINE START STOP switch OFF	Less than 1 Ω
K-004 (3) - K-002 (1)	ENGINE START STOP switch OFF	Less than 1 Ω
K-004 (6) - K-002 (3)	ENGINE START STOP switch OFF	Less than 1 Ω
K-004 (2) - K-002 (37)	ENGINE START STOP switch OFF	Less than 1 Ω
K-004 (4) - K-002 (2)	ENGINE START STOP switch OFF	Less than 1 Ω

NG → **Repair or replace wire harness between inner/outer circulation motor and A/C control module**

OK →

5	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

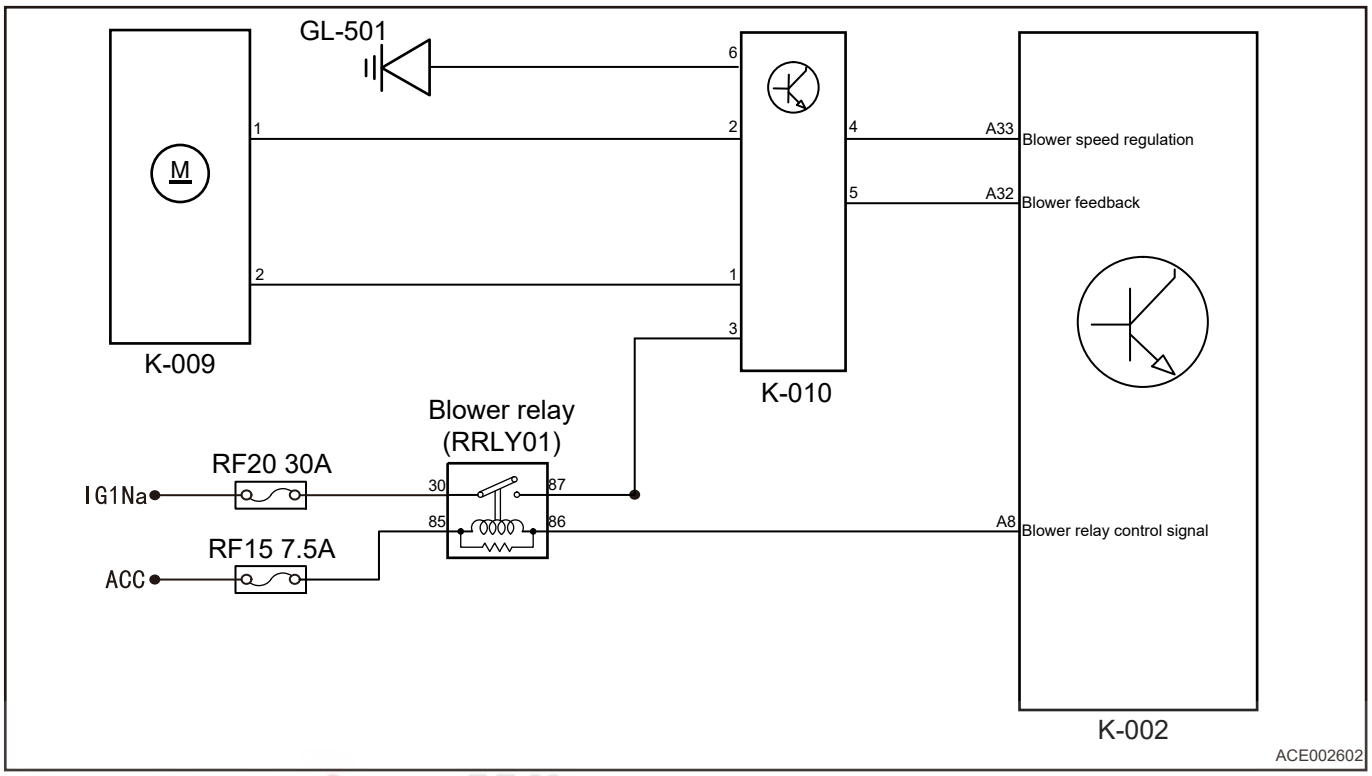
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	B1408_29	Blower Voltage - Signal Invalid
DTC	B1408_31	Blower Voltage Not Output

Description

Control Schematic Diagram



DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-08_29	Blower Voltage - Signal Invalid	CLM detects that blower feedback voltage is 0 when blower level is 1, and correspon-ding blower feedback voltage will be not generated as the change of blower level.	CLM detects that blower feedback voltage changes with the level (±10% error is allowed), and normal function resumes only when blower operates normally.	• CCP button is invalid • CLM output PWM signal is faulty • VLCL blower drive circuit is faulty	Chip integrated over current protection

DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-08_31	Blower Voltage Not Output	CLM detects that blower voltage outputs low level continuou-sly when blower level is 1.		• CCP button is invalid • CLM output PWM signal is faulty • VLCL blower drive circuit is faulty	Chip integrated over current protection

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check fuse**

(a) Use circuit diagram as a guide to perform the following inspection procedures:

(b) Check if fuse RF20/RF15 is blown or no power.

NG → **Replace fuse or check the cause for no power**

OK

2	**Check blower connector**

(a) Use circuit diagram as a guide to perform the following inspection procedures:

(b) Turn ENGINE START STOP switch to OFF.

(c) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace blower connector**

OK

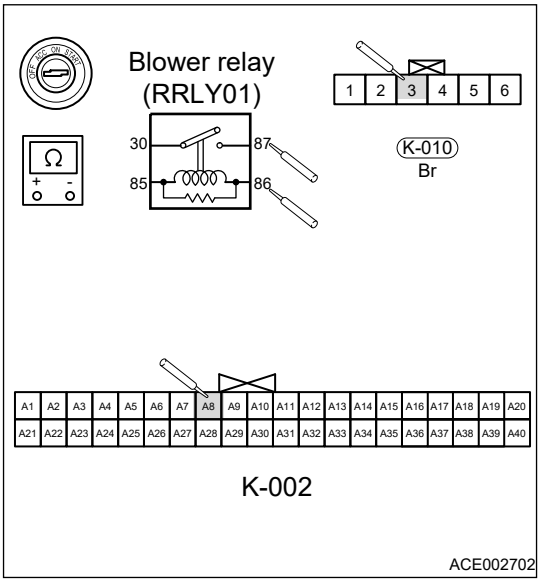
3	**Check resistance between blower relay and A/C control module**

(a) Use circuit diagram as a guide to perform the following inspection procedures:

(i) Turn ENGINE START STOP switch to OFF.

(ii) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
RRLY01 (87) - K-010 (3)	ENGINE START STOP switch OFF	Less than 1 Ω
RRLY01 (86) - K-002 (8)	ENGINE START STOP switch OFF	Less than 1 Ω



NG → **Repair or replace blower relay and A/C control module wire harness**

OK

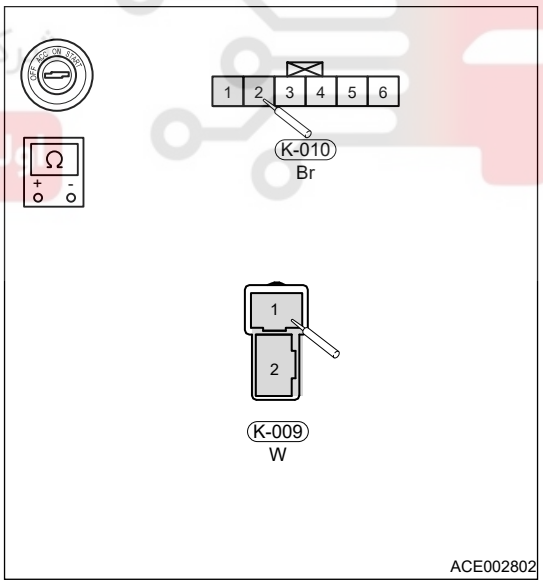
4	Check resistance between speed regulation module and blower

(a) Use circuit diagram as a guide to perform the following inspection procedures:

(i) Turn ENGINE START STOP switch to OFF.

(ii) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-009 (1) - K-010 (2)	ENGINE START STOP switch OFF	Less than 1 Ω
K-009 (2) - K-010 (1)	ENGINE START STOP switch OFF	Less than 1 Ω



NG → **Repair or replace speed regulation module and blower wire harness**

OK

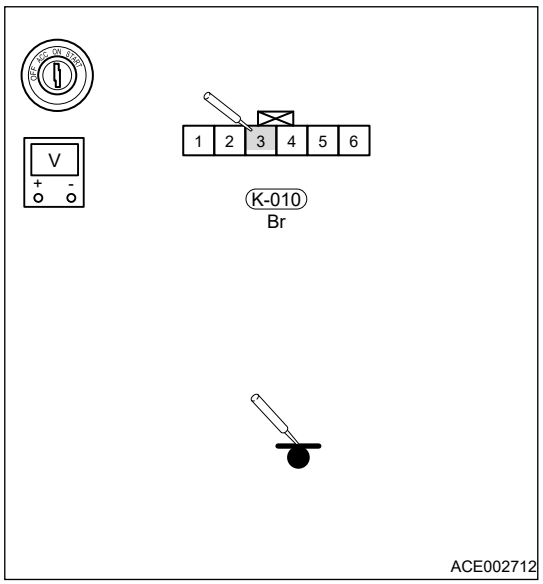
5	Check voltage between speed regulation module and power supply

(a) Use circuit diagram as a guide to perform the following inspection procedures:

(i) Turn ENGINE START STOP switch to ON.

(ii) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
K-010 (3) - Body ground	ENGINE START STOP switch ON	12 V



NG → **Repair or replace speed regulation module power supply wire harness**

OK →

6	Check resistance between speed regulation module and ground

(a) Use circuit diagram as a guide to perform the following inspection procedures:

(i) Turn ENGINE START STOP switch to OFF.

(ii) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-010 (6) - Body ground	ENGINE START STOP switch OFF	Less than 1 Ω

NG → **Repair or replace speed regulation module ground wire harness**

OK →

7	Check blower

(a) Test the blower with 12 V battery voltage.

(b) Check if blower operates normally.

NG → **Repair or replace blower**

OK →

8	Reconfirm DTCs

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

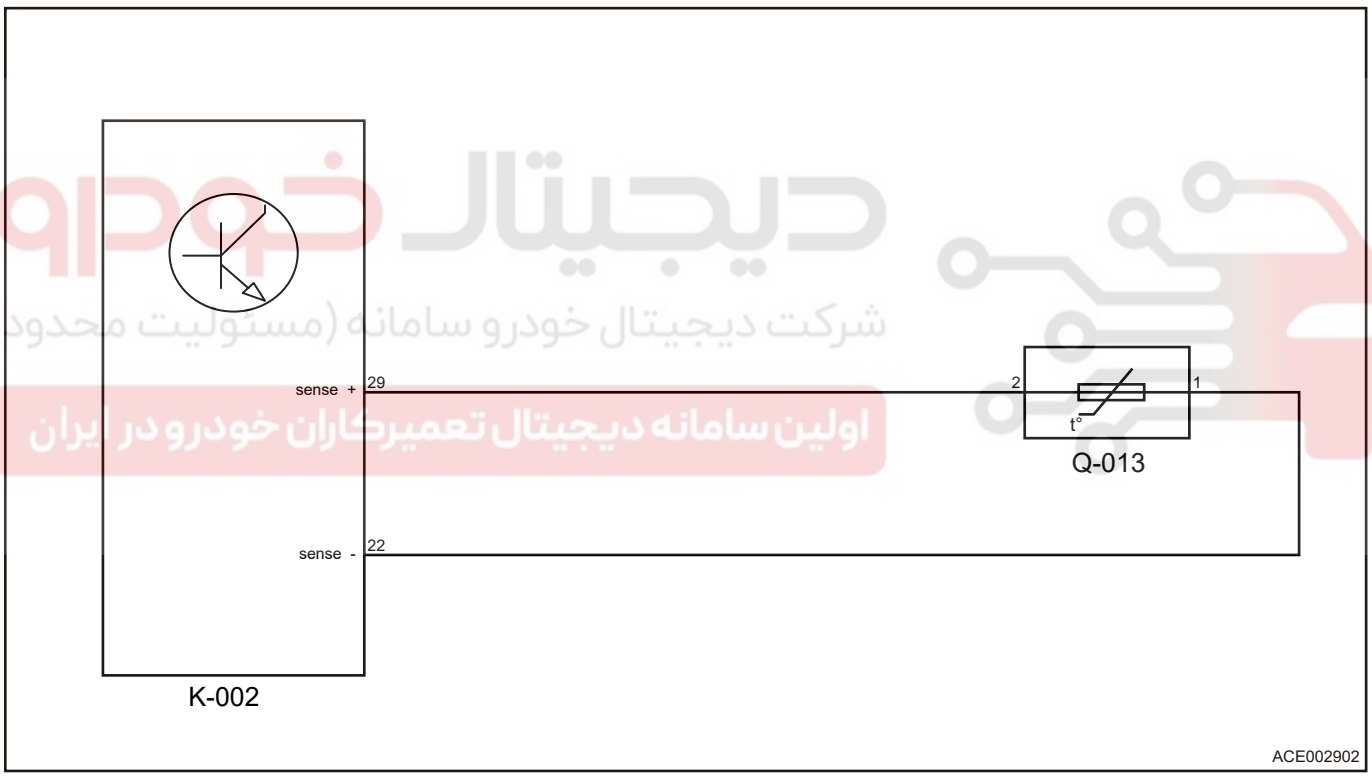
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**B1403_11**	**Outside Ambient Temperature Sensor Short to Ground**
DTC	**B1403_15**	**Outside Ambient Temperature Sensor Open Circuit**

Description

Control Schematic Diagram



DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-03_11	Ambient Temper-ature Sensor	CLM detects that sensor output voltage is 0 V continually.	Normal function resumes after CLM detects that voltage at temperatu-re sensor terminal returns to a stable normal value.	• Temperature sensor is short circuit • Connecting wire between CLM and temperature sensor is short • Internal CLM malfunction occurs	Sensor uses 10K pull-up resistor for 5 V power supply. The ADC sampling terminal is connected to the sampling point through a 4.7K resistor. When the temperature resistor circuit is open or short, ADC sampling pin is pulled to 5V or ground through a 4.7K resistor, which will not cause any bad effects on the hardware circuit.
B14-03_15	Outside Ambient Temper-ature Sensor Open Circuit	CLM detects that sensor output voltage is 5 V continually.		• Temperature sensor is open • Connecting wire between CLM and temperature sensor is open • Internal CLM malfunction occurs	Sensor uses 10K pull-up resistor for 5 V power supply. The ADC sampling terminal is connected to the sampling point through a 4.7K resistor. When the temperature resistor circuit is open or short, ADC sampling pin is pulled to 5V or ground through a 4.7K resistor, which will not cause any bad effects on the hardware circuit.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check outside temperature sensor connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace outside temperature sensor connector**

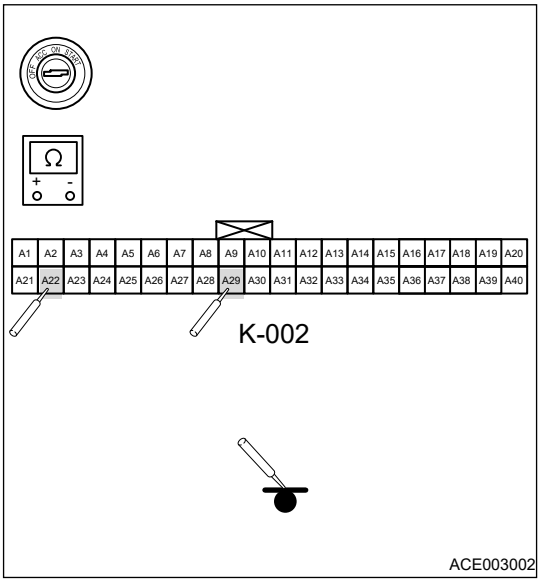
OK ↓

2	**Check resistance between outside temperature sensor and ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (22) - Body ground	ENGINE START STOP switch OFF	∞
K-002 (29) - Body ground	ENGINE START STOP switch OFF	∞



NG → **Repair or replace outside temperature sensor ground wire harness**

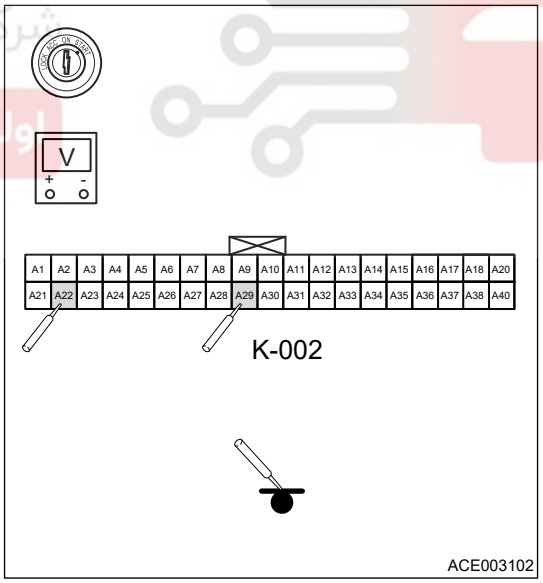
OK

3	Check voltage between outside temperature sensor and power supply

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (22) - Body ground	ENGINE START STOP switch ON	0 V
K-002 (29) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace outside temperature sensor power supply wire harness**

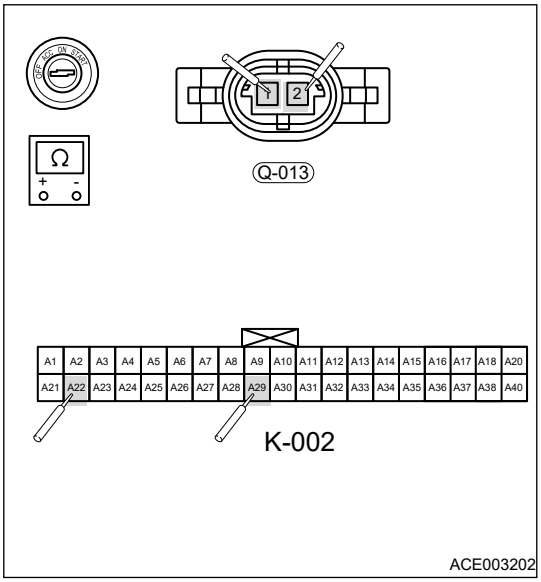
OK

4	Check resistance between outside temperature sensor and A/C control module

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (22) - Q-013 (2)	ENGINE START STOP switch OFF	⩽ 1 Ω
K-002 (29) - Q-013 (1)	ENGINE START STOP switch OFF	⩽ 1 Ω



NG → **Repair or replace outside temperature sensor and A/C control module wire harness**

OK →

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

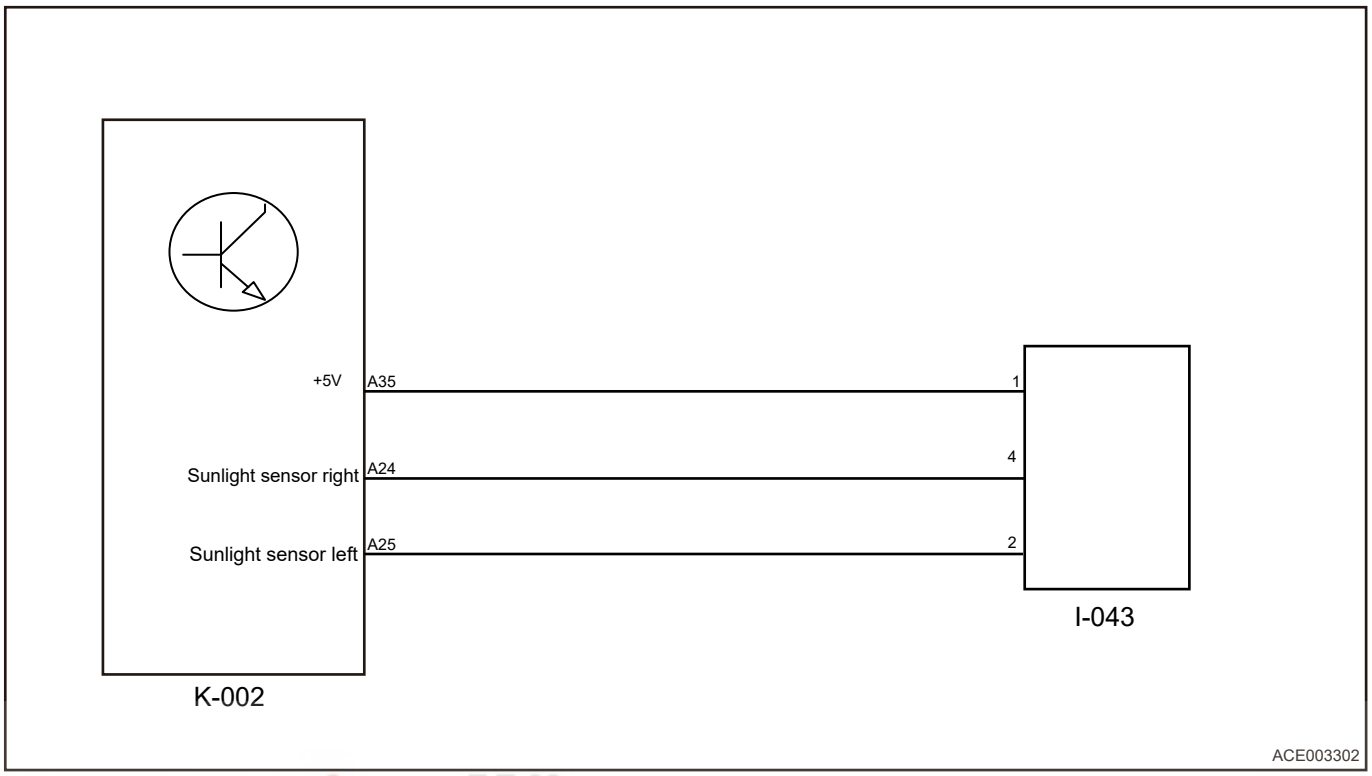
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**B1406_14**	**Solar Radiation (Left Side)-Circuit Short to Ground or Open**
DTC	**B1406_12**	**Solar Radiation (Left side)-Circuit Short to Battery**
DTC	**B1407_14**	**Solar Radiation (Right Side)-Circuit Short to Ground or Open**
DTC	**B1407_12**	**Solar Radiation (Right Side)-Circuit Short to Battery**

Description

Control Schematic Diagram



DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-06_14	Solar Radiati-on (Left) Sensor Short to Ground or Open	CLM detects that sensor output voltage is 0 V continually.	Normal function resumes after CLM detects that voltage at solar sensor terminal returns to a stable normal value	• Sensor is short • Connecting wire between CLM and sensor is short • Internal CLM malfunction occurs	Sensor uses 7.68K pull-down resistor to ground. The ADC sampling terminal is connected to the sampling point through a 4.7K resistor. When the temperature resistor circuit is open or short, ADC sampling pin is pulled to 5V or ground through a 4.7K resistor, which will not cause any bad effects on the hardware circuit.
B14-06_12	Solar Radiati-on (Left) Sensor Short to ECM	CLM detects that sensor output voltage is 5 V continually.		• Sensor is open • Connecting wire between CLM and sensor is open • Internal CLM malfunction occurs	Sensor uses 7.68K pull-down resistor to ground. The ADC sampling terminal is connected to the sampling point through a 4.7K resistor. When the temperature resistor circuit is open or short, ADC sampling pin is pulled to 5V or ground through a 4.7K resistor, which will not cause any bad effects on the hardware circuit.

DTC	Description	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-07_14	Solar Radiation (-Right) Sensor	CLM detects that sensor output voltage is 0 V continually.	Normal function resumes after CLM detects that voltage at solar sensor terminal returns to a stable normal value	• Sensor is short • Connecting wire between CLM and sensor is short • Internal CLM malfunction occurs	Sensor uses 7.68K pull-down resistor to ground. The ADC sampling terminal is connected to the sampling point through a 4.7K resistor. When the temperature resistor circuit is open or short, ADC sampling pin is pulled to 5V or ground through a 4.7K resistor, which will not cause any bad effects on the hardware circuit.
B14-07_12	Solar Radiation (-Right) Sensor Short to Battery	CLM detects that sensor output voltage is 5 V continually.		• Sensor is open • Connecting wire between CLM and sensor is open • Internal CLM malfunction occurs	Sensor uses 7.68K pull-down resistor to ground. The ADC sampling terminal is connected to the sampling point through a 4.7K resistor. When the temperature resistor circuit is open or short, ADC sampling pin is pulled to 5V or ground through a 4.7K resistor, which will not cause any bad effects on the hardware circuit.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check solar sensor connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace solar sensor connector**

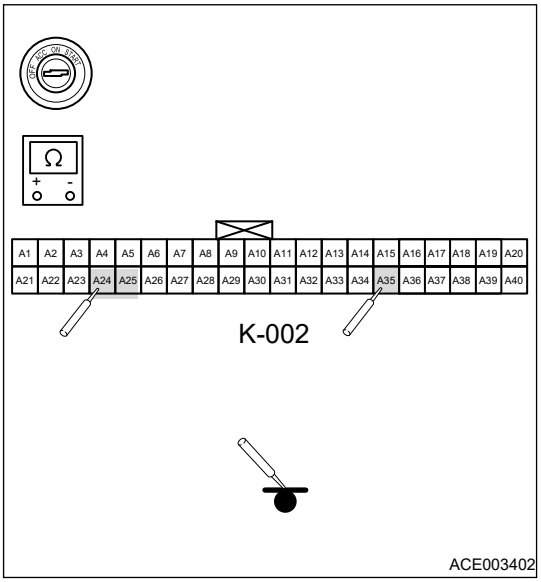
OK ↓

2	**Check resistance between solar sensor and ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (24) - Body ground	ENGINE START STOP switch OFF	∞
K-002 (25) - Body ground	ENGINE START STOP switch OFF	∞
K-002 (34) - Body ground	ENGINE START STOP switch OFF	∞



NG → **Repair or replace solar sensor ground wire harness**

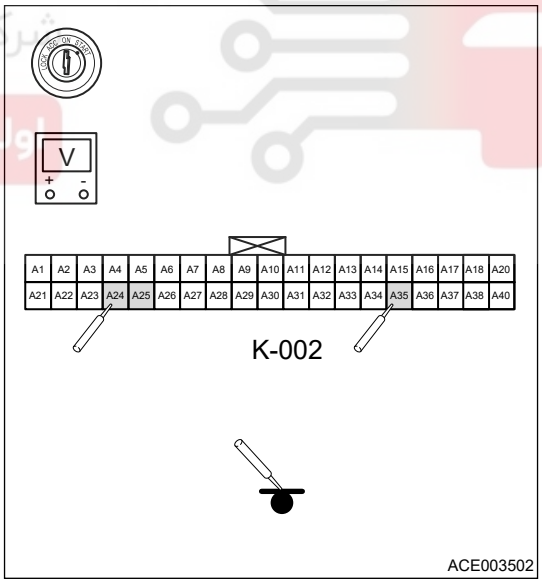
OK

3	Check voltage between solar sensor and power supply

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (24) - Body ground	ENGINE START STOP switch ON	0 V
K-002 (25) - Body ground	ENGINE START STOP switch ON	0 V
K-002 (34) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace solar sensor power supply wire harness**

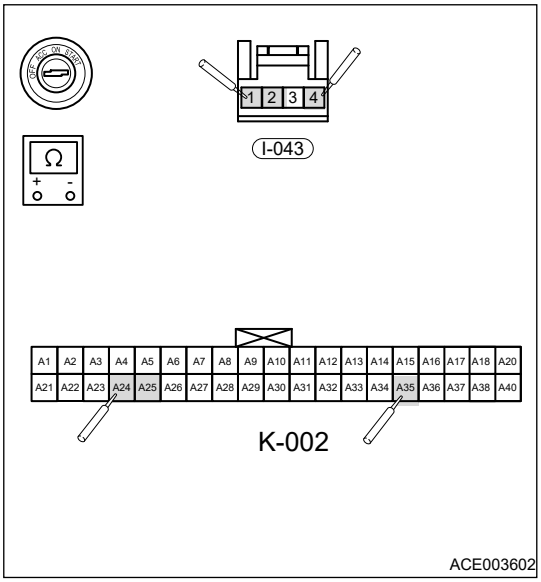
OK

4	Check resistance between solar sensor and A/C control module

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (24) - I-043 (4)	ENGINE START STOP switch OFF	⩽ 1 Ω
K-002 (25) - I-043 (2)	ENGINE START STOP switch OFF	⩽ 1 Ω
K-002 (35) - I-043 (1)	ENGINE START STOP switch OFF	⩽ 1 Ω



NG → **Repair or replace solar sensor and A/C control module wire harness**

OK

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

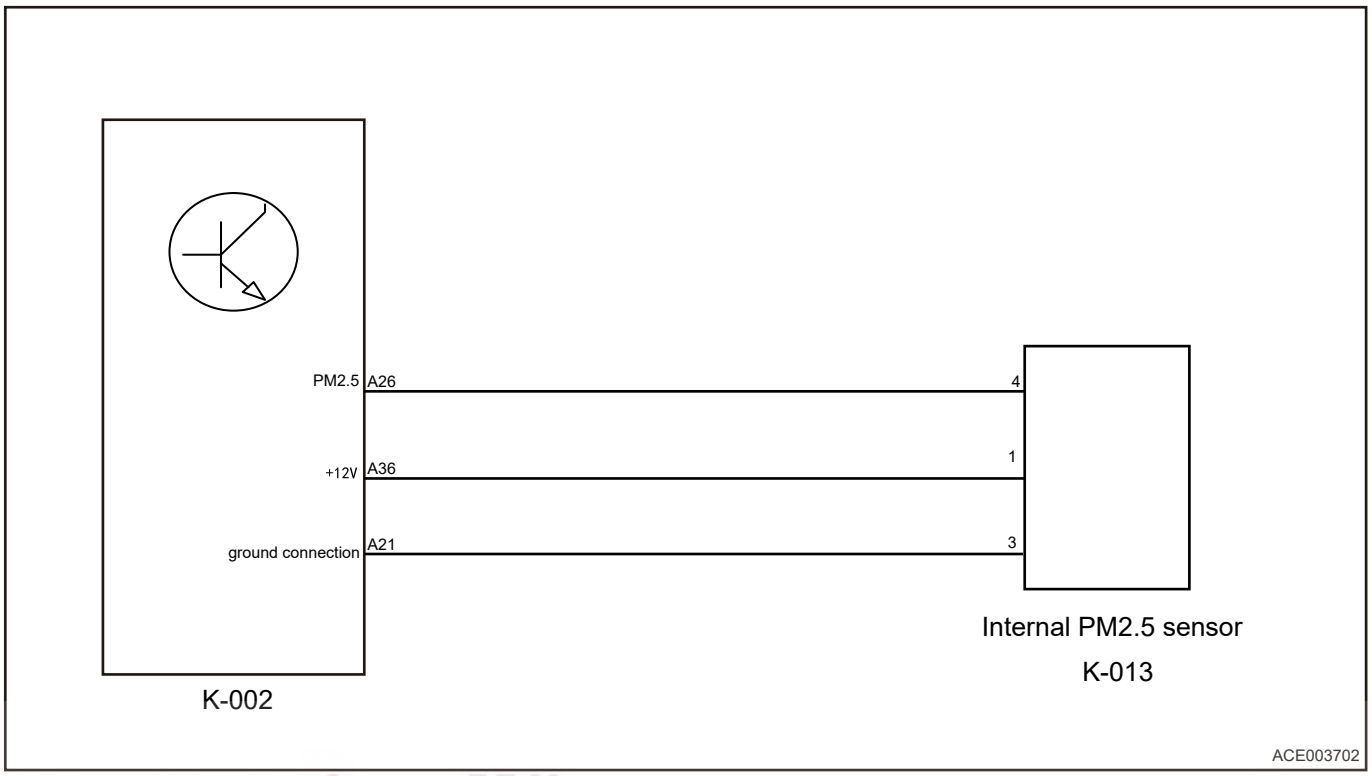
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**B1418_11**	**Incar PM2.5 Sensor Malfunction - Sensor Output Short to Ground**
DTC	**B1418_15**	**Incar PM2.5 Sensor Malfunction - Sensor Power Off or Open**

Description

Control Schematic Diagram



DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-18_11	Incar PM2.5 Sensor-Circuit Short to Ground	When sensor output is low level continuou-sly	Sensor output duty is within normal range	Sensor output is short to ground	Sensor acquisition circuit collects the high and low level signals, which will not cause any bad effects on the hardware circuit no matter whether terminal is short to ground or power supply.
B14-18_15	Incar PM2.5 Sensor-Circuit Short to Battery or Open	When sensor output is high level continuou-sly		Sensor output is short to power supply or open	Sensor acquisition circuit collects the high and low level signals, which will not cause any bad effects on the hardware circuit no matter whether terminal is short to ground or power supply.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check inside PM2.5 sensor connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace inside PM2.5 sensor connector**

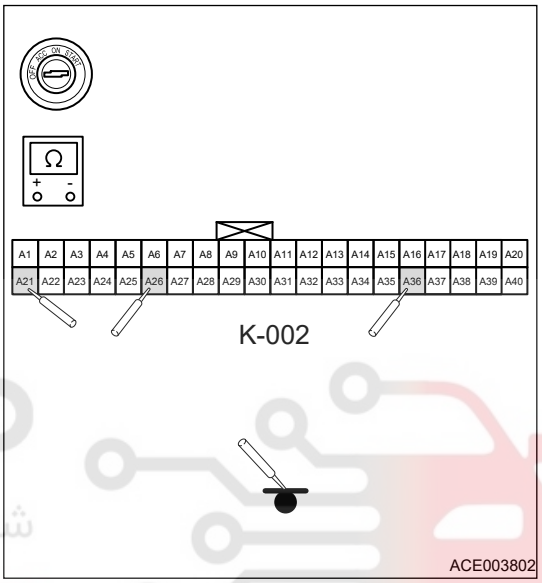
OK

2	**Check resistance between inside PM2.5 sensor and ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (26) - Body ground	ENGINE START STOP switch OFF	∞
K-002 (36) - Body ground	ENGINE START STOP switch OFF	∞
K-002 (21) - Body ground	ENGINE START STOP switch OFF	0



NG → **Repair or replace inside PM2.5 sensor ground wire harness**

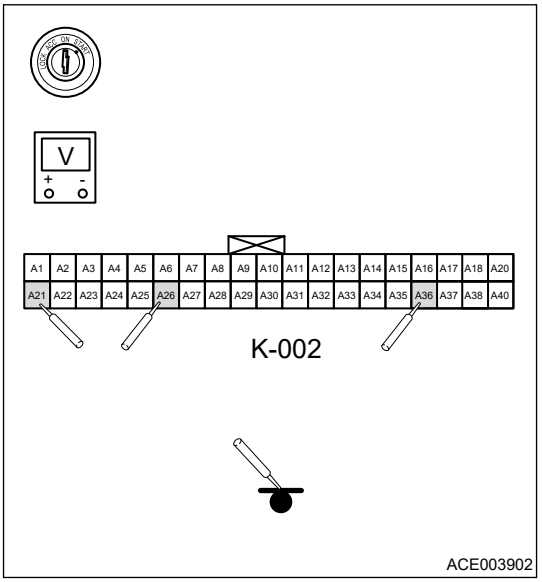
OK

3	**Check voltage between inside PM2.5 sensor and power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (26) - Body ground	ENGINE START STOP switch ON	0 V
K-002 (36) - Body ground	ENGINE START STOP switch ON	0 V
K-002 (21) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace inside PM2.5 sensor power supply wire harness**

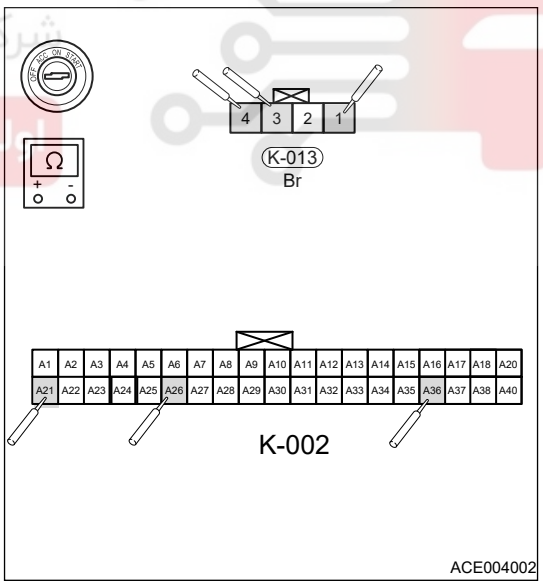
OK

4	Check resistance between inside PM2.5 sensor and A/C control module

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (26) - K-013 (4)	ENGINE START STOP switch OFF	⩽ 1 Ω
K-002 (36) - K-013 (1)	ENGINE START STOP switch OFF	⩽ 1 Ω
K-002 (21) - K-013 (3)	ENGINE START STOP switch OFF	⩽ 1 Ω



NG → **Repair or replace inside PM2.5 sensor and A/C control module wire harness**

OK

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

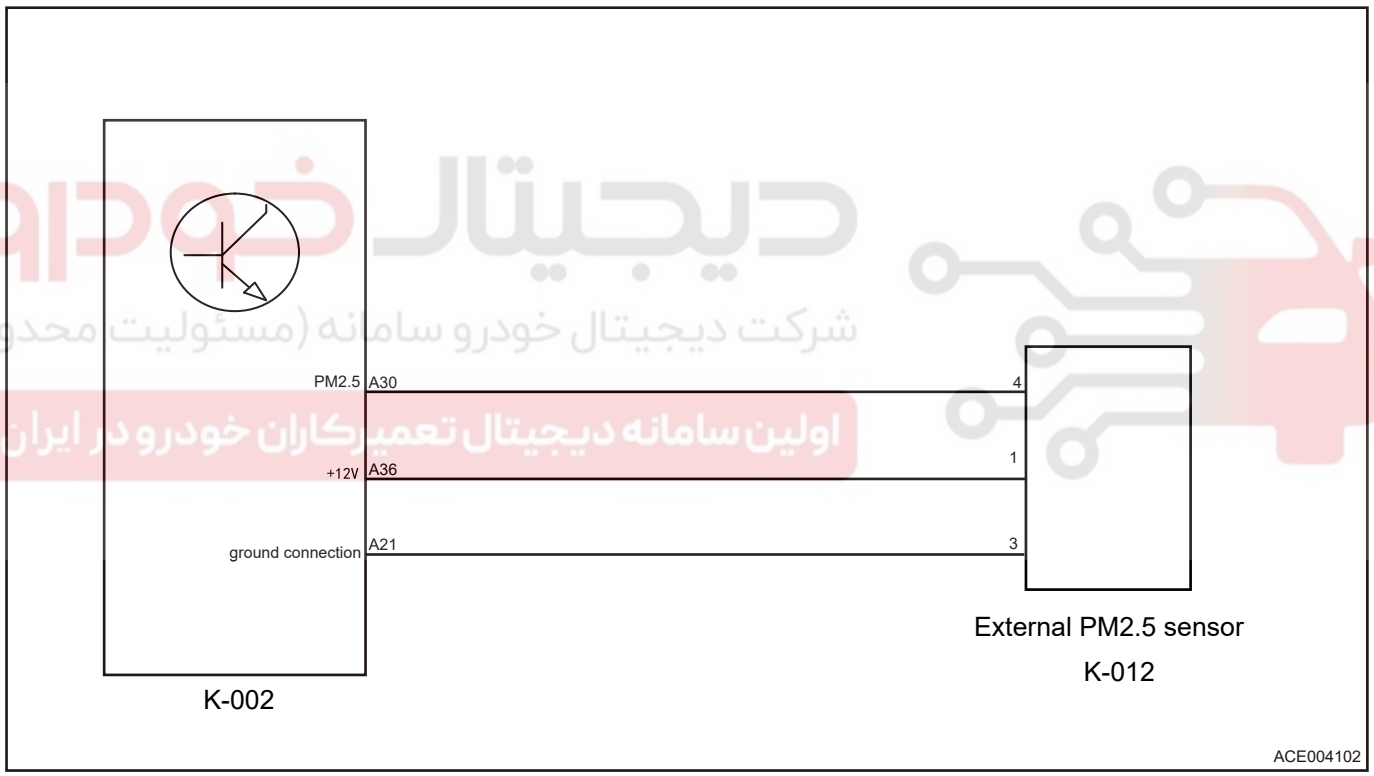
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**B141A_11**	**Outcar PM2.5 Sensor Malfunction - Sensor Output Short to Ground**
DTC	**B141A_15**	**Outcar PM2.5 Sensor Malfunction - Sensor Power Off or Open**

Description

Control Schematic Diagram



DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-1A_11	Outcar PM2.5 Sensor-Circuit Short to Ground	When sensor output is low level continuou-sly	Sensor output duty is within normal range	Sensor output is short to ground	Sensor acquisition circuit collects the high and low level signals, which will not cause any bad effects on the hardware circuit no matter whether terminal is short to ground or power supply.

DTC	Descri-ption	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-1A_15	Outcar PM2.5 Sensor-Circuit Short to Power Supply or Open	When sensor output is high level continuou-sly		Sensor output is short to power supply or open	Sensor acquisition circuit collects the high and low level signals, which will not cause any bad effects on the hardware circuit no matter whether terminal is short to ground or power supply.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Check outside PM2.5 sensor connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace outside PM2.5 sensor connector**

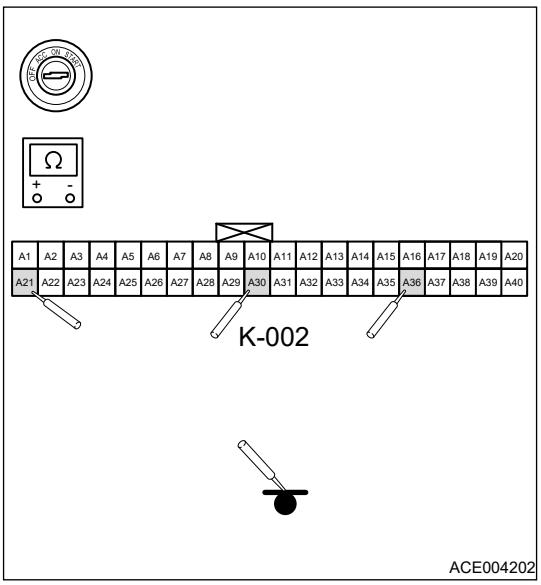
OK

2	Check resistance between outside PM2.5 sensor and ground

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (30) - Body ground	ENGINE START STOP switch OFF	∞
K-002 (36) - Body ground	ENGINE START STOP switch OFF	∞
K-002 (21) - Body ground	ENGINE START STOP switch OFF	0



NG → **Repair or replace outside PM2.5 sensor ground wire harness**

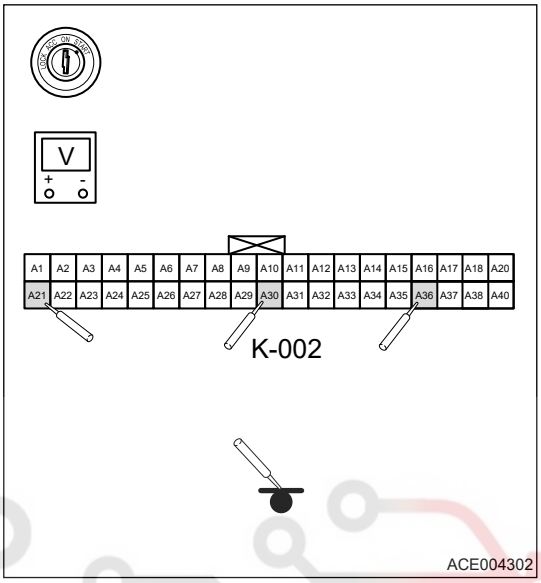
OK

3	Check voltage between outside PM2.5 sensor and power supply

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (30) - Body ground	ENGINE START STOP switch ON	0 V
K-002 (36) - Body ground	ENGINE START STOP switch ON	0 V
K-002 (21) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace outside PM2.5 sensor power supply wire harness**

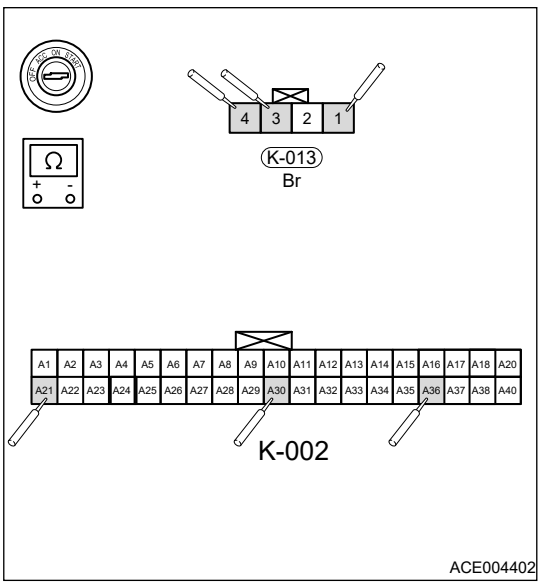
OK

4	Check resistance between outside PM2.5 sensor and A/C control module.

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (30) - K-012 (4)	ENGINE START STOP switch OFF	⩽ 1 Ω
K-002 (36) - K-012 (1)	ENGINE START STOP switch OFF	⩽ 1 Ω
K-002 (21) - K-012 (3)	ENGINE START STOP switch OFF	⩽ 1 Ω



NG → **Repair or replace inside PM2.5 sensor and A/C control module wire harness**

OK

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

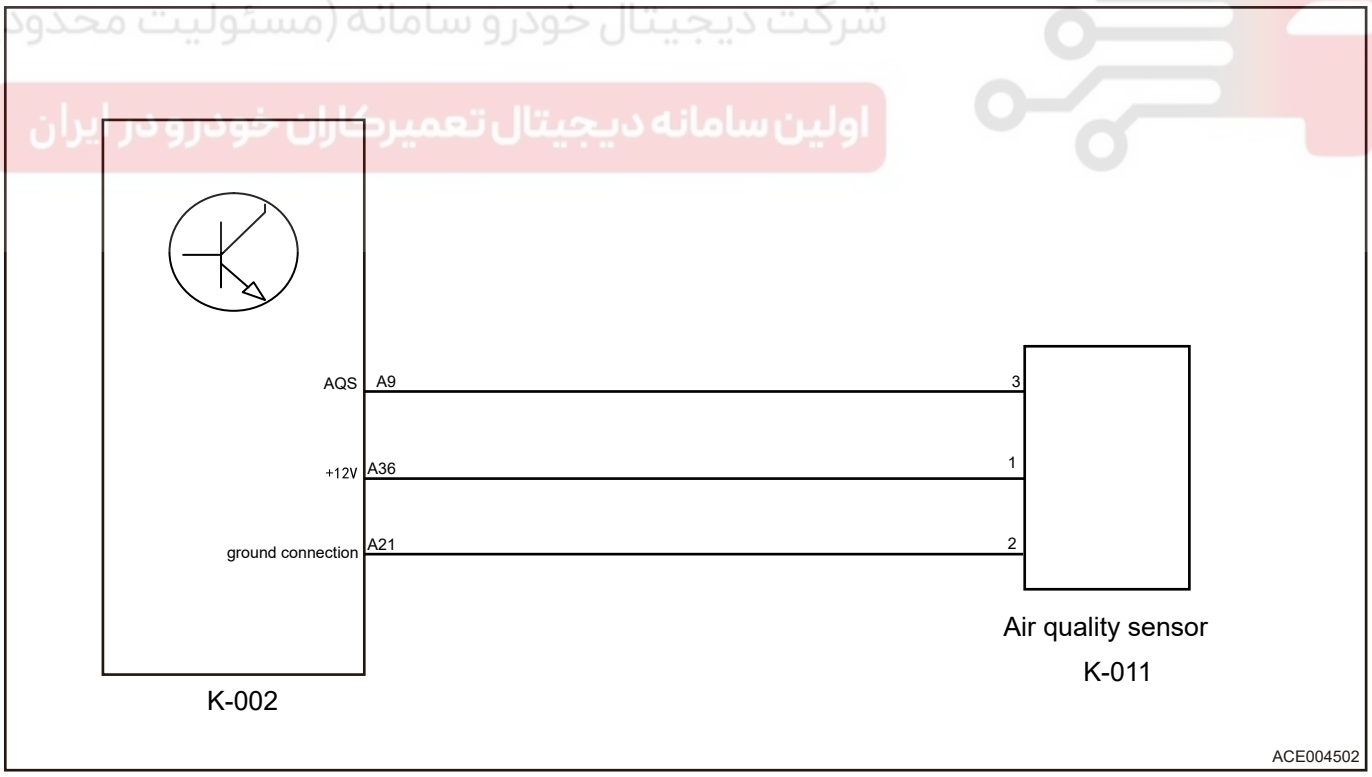
NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	B1419_11	AQS Sensor-Circuit Short to Ground
DTC	B1419_15	AQS Sensor-Circuit Short to Battery or Open
DTC	B1419_09	AQS Sensor-Component Failure

Description

Control Schematic Diagram



DTC	Description	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-19_11	AQS Sensor-Circuit Short to Ground	When sensor output is low level continuously	Sensor output duty is within normal range	Sensor output is short to ground	Sensor acquisition circuit collects the high and low level signals, which will not cause any bad effects on the hardware circuit no matter whether terminal is short to ground or power supply.
B14-19_15	AQS Sensor-Circuit Short to Battery or Open	When sensor output is high level continuously		Sensor output is short to power supply or open	Sensor acquisition circuit collects the high and low level signals, which will not cause any bad effects on the hardware circuit no matter whether terminal is short to ground or power supply.
B14-19_09	AQS Sensor-Component Failure	PWM sent from parts is 97 ± 1%		Air quality sensor self-diagnosis report error	Sensor acquisition circuit collects the high and low level signals, which will not cause any bad effects on the hardware circuit no matter whether terminal is short to ground or power supply.

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Check air quality sensor connector**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check connector for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace air quality sensor connector**

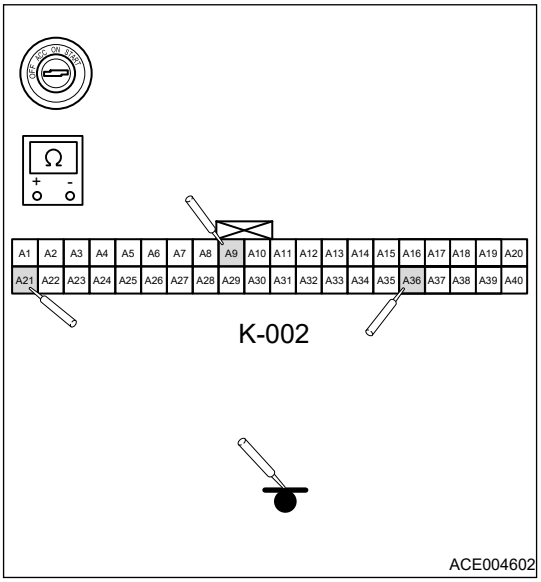
OK

2	**Check resistance between air quality sensor and ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (9) - Body ground	ENGINE START STOP switch OFF	∞
K-002 (36) - Body ground	ENGINE START STOP switch OFF	∞
K-002 (21) - Body ground	ENGINE START STOP switch OFF	0



NG → **Repair or replace air quality sensor ground wire harness**

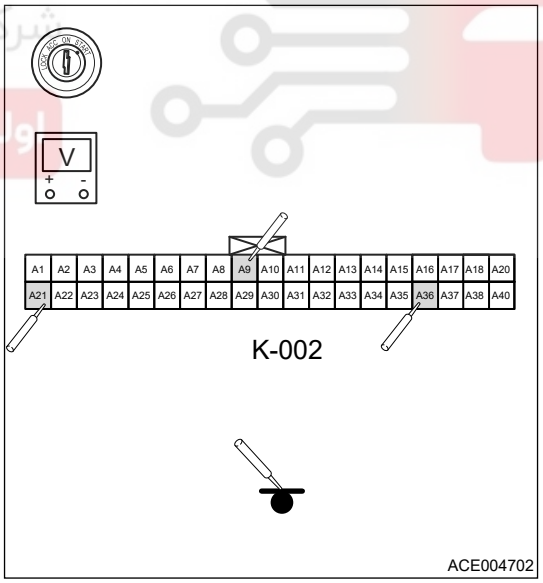
OK

3	Check voltage between air quality sensor and power supply

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (9) - Body ground	ENGINE START STOP switch ON	0 V
K-002 (36) - Body ground	ENGINE START STOP switch ON	0 V
K-002 (21) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace air quality sensor power supply wire harness**

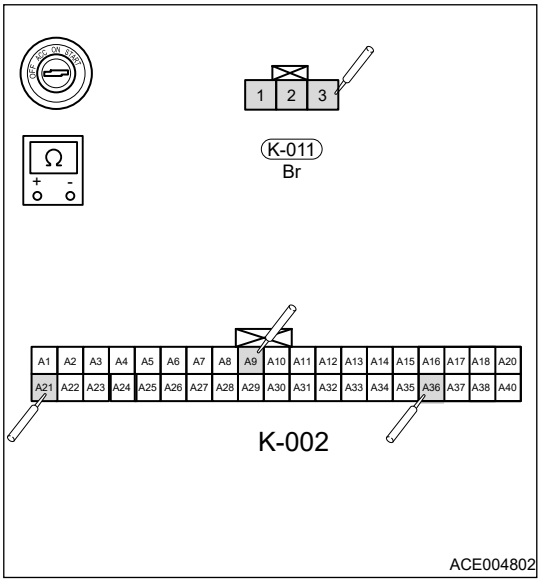
OK

4	Check resistance between air quality sensor and A/C control module

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
K-002 (9) - K-011 (3)	ENGINE START STOP switch OFF	⩽ 1 Ω
K-002 (36) - K-011 (1)	ENGINE START STOP switch OFF	⩽ 1 Ω
K-002 (21) - K-011 (2)	ENGINE START STOP switch OFF	⩽ 1 Ω



NG → **Repair or replace inside PM2.5 sensor and A/C control module wire harness**

OK

5	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECM to check if fault reoccurs**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	**B141B_11**	**Incar Temperature Sensor-Circuit Short to Ground**
DTC	**B141B_12**	**Incar Temperature Sensor-Circuit Short to Power Supply**

DTC	Description	Detection Condition	Resume Condition	Possible Causes	Malfunction Protection Measures
B14-1B_11	Incar Temperature Sensor-Circuit Short to Ground	CLM detects that sensor output voltage is 0 V continually.	Normal function resumes after CLM detects that voltage at temperature sensor terminal returns to a stable normal value	• Sensor output is short to ground • Connecting wire between CLM and temperature sensor is open • Internal CLM malfunction occurs	Sensor uses 10K pull-down resistor to ground. The ADC sampling terminal is connected to the sampling point through a 4.7K resistor. When the temperature resistor circuit is open or short, ADC sampling pin is pulled to 5V or ground through a 4.7K resistor, which will not cause any bad effects on the hardware circuit.
B14-1B_12	Incar Temperature Sensor-Circuit Short to Power Supply	CLM detects that sensor output voltage is 5 V continually.		• Temperature sensor is short circuit • Connecting wire between CLM and temperature sensor is short • Internal CLM malfunction occurs	Sensor uses 10K pull-down resistor to ground. The ADC sampling terminal is connected to the sampling point through a 4.7K resistor. When the temperature resistor circuit is open or short, ADC sampling pin is pulled to 5V or ground through a 4.7K resistor, which will not cause any bad effects on the hardware circuit.

Network Malfunction

1	**Refer to “CAN network system” for troubleshooting.**

ON-VEHICLE SERVICE

On-vehicle Inspection

On-vehicle Inspection

Hint:
A/C refrigerant lines and hoses are used to transfer refrigerant among A/C system components. Any twist or bend in refrigerant lines and hoses will reduce performance of A/C system and refrigerant flow in system.
There remains high pressure in refrigerant when A/C compressor assembly is operating. It is necessary to ensure that each connecting part in A/C system is sealed well. Check all system lines at least once a year to ensure that they are in good condition and properly routed. Refrigerant lines and hoses cannot be repaired and must be replaced if leakage or damage exists.

1. General inspection
    a. Check if there exists any oil or dust in each joint of A/C line. If this occurs, there may exist leak.
    b. Check if condenser surface is dirty and if fins are deformed.
    c. Check if there are harsh noises while compressor assembly is operating normally.
    d. Temperature difference should be noticeable by touching intake line and exhaust line of compressor assembly with hand. Normally, temperature of low pressure line is relatively low and that of high pressure line is relatively hot. Feel the temperature difference between condenser inlet pipe and outlet pipe, under normal conditions, temperature of inlet pipe is higher than that of outlet pipe. If you feel the temperature difference between expansion valve inlet and outlet line with hand, under normal conditions, temperature of expansion valve inlet line is relatively hot and that of outlet line is relatively cool, and the temperature difference between them is noticeable.
2. Using pressure gauge set, check the refrigerant pressure.
   Connect the manifold pressure gauge set. After following conditions are met, read pressure values on pressure gauge. Measurement Condition:
   - Inner/outer circulation switch is in outer circulation position.
   - Engine runs at approximately 2,000 rpm.
   - Adjust temperature knob to Max. Cool.
   - Set blower speed control switch to highest band.
   - Turn on A/C switch.

   Observe the pressure value on the pressure gauge.

Compressor Assembly Noise Inspection

When checking noise related to A/C system, you must first know the conditions under which the noise occurs. These conditions include: weather, vehicle speed, engine speed, engine temperature and any other special conditions. Loud noises during A/C operation can often mislead someone. For example, some sounds, like a failed bearing, may be caused by loose bolts, mounting brackets or a loose compressor assembly.

Warning
• A/C compressor assembly must be replaced if any abnormal noise is heard from compressor assembly. • Noise may occur from drive belt at different engine speeds, and you may mistake it for a noise from A/C compressor assembly.

1. Select a quiet place for testing.
2. Duplicate customer's feedback information as much as possible.
3. Turn on and off A/C several times to identify compressor assembly noise clearly.

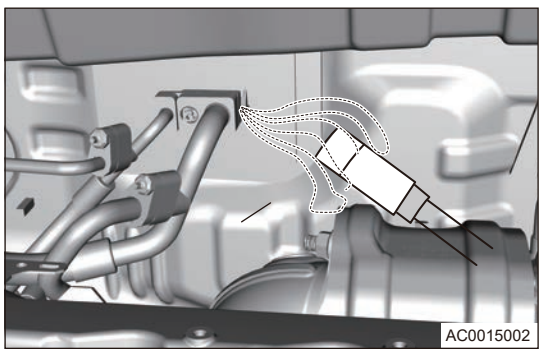
4. Check the condition of compressor assembly belt.
5. Check the hub, pulley, bearing assembly of compressor assembly. Make sure that hub and pulley are aligned correctly, and pulley bearing is securely installed to A/C compressor assembly.
6. Check if refrigerant line routes incorrectly, and if it is damaged or has an interference that could result in an abnormal noise. Also, check the refrigerant line for twist or bend, otherwise the refrigerant will be limited to flow, which will cause a noise.
7. Loosen all compressor assembly tightening bolts and retighten them.
8. If noise occurs when liquid refrigerant in A/C suction line is under a slugging condition, replace the condenser and check refrigerant oil level and charging condition for refrigerant.
9. If the slugging condition still exists after replacing condenser, replace the A/C compressor assembly.

Caution
DO NOT race engine when vacuum pump operates or vacuum exists in A/C system. Otherwise, A/C compressor assembly will be damaged seriously.

Refrigerant Leakage Inspection

Warning
• DO NOT perform pressure test or leakage test to R134a Refrigerant/R1234yf (European Union) service device or vehicle A/C system with compressed air. Air mixture and R134a Refrigerant/ R1234yf (European Union) are inflammable under high pressure. This mixture has potential danger, and it may cause a fire or explosion, resulting in vehicle damage, personal injury or death. • Avoid inhaling vapor or moisture from the A/C refrigerant and refrigerant oil. • Only use special service device to discharge R134a Refrigerant/R1234yf (European Union) system. If system discharges unexpectedly, ventilate work place before servicing. • If A/C refrigerant filling amount is empty or low, A/C system may have leak. Check all A/C lines, joints and parts for remaining oil. The remaining oil is indication mark of A/C system leaking position.

1. Check refrigerant for leakage
   a. After recharging refrigerant, use gas leak detector to check refrigerant gas for leakage.
   b. Perform operations under following conditions:
      - Stop the engine.
      - Ensure the ventilation is well (gas leak detector may react to volatile gases which are not from refrigerant, such as gasoline vapor or exhaust gas).
      - Repeat the test for 2 or 3 times.
      - Make sure that there is some refrigerant remaining in the refrigeration system.



   c. Place gas leak detector near the joint of A/C line, and check the A/C line for leakage. If gas leak detector makes a sound, it indicates that a leakage exists. Repair or replace the leakage A/C line as necessary.
   d. Disconnect A/C pressure sensor connector, and use same procedures to check A/C pressure sensor for leakage. Replace the A/C pressure sensor as necessary.
   e. Insert gas leak detector into evaporator tank assembly, and use same procedures to check evaporator for leakage. Clean or replace the evaporator core assembly as necessary.
   f. Use same procedures to check condenser for leakage. Clean or replace the condenser assembly as necessary.

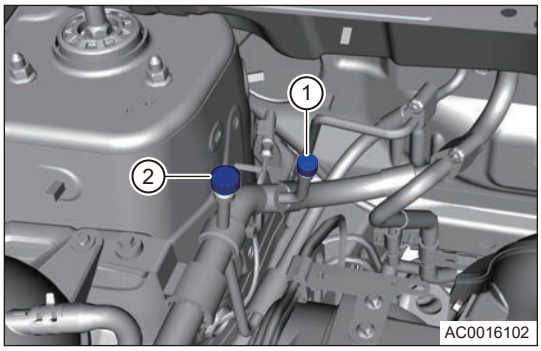
Refrigerant Recovering, Vacuum Pumping and Recharging

Refrigerant Recovering/Draining

Warning
• Take extra care when servicing A/C system under high pressure. • Because there is refrigerant under high pressure in A/C system. It must be serviced by professional technician. Otherwise, a wrong service procedure may cause a serious danger or fatal injury. • If A/C system pressure is released unexpectedly, ventilate work area before servicing. In a closed work place, if a large amount of refrigerant is discharged, it may cause oxygen reduction and result in smothering, causing a serious or fatal injury. • Never drain refrigerant in A/C system into the atmosphere directly, and avoid environmental contamination.

Caution
• Special recycling device R134a Refrigerant/R1234yf (European Union) must be used to recover refrigerant. • DO NOT work near open flames. • Always dispose of recovered refrigerant as specified. • Never charge R-12 to refrigerant system which is designed to use R134a Refrigerant/R1234yf (-European Union). This refrigerant is incompatible, which could damage the A/C system. • DO NOT race engine when vacuum pump operates or vacuum exists in A/C system. Otherwise, A/C compressor assembly will be damaged seriously.

1. Open the engine hood and loosen the joint cover of A/C high/low pressure line.
2. Connect the refrigerant recycling machine to A/C high/low pressure line joint.
   a. Connect the blue connector to A/C low pressure line joint (1).
   b. Connect the red connector to A/C high pressure line joint (2).

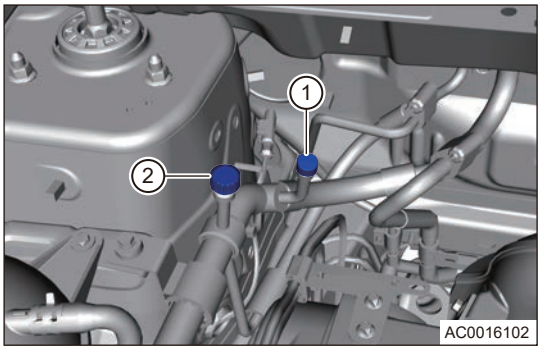


3. Open the high pressure valve and low pressure valve of refrigerant recycling machine.
4. Choose "recovering" item on machine and make it start to operate.
5. Check the low pressure value on pressure gauge to ensure that recycling is completed, and then turn off machine.
6. Disconnect the connection between refrigerant recycling machine and A/C line joint.
7. Reinstall the cover onto refrigerant line joint.

Vacuum Pumping

1. Open the engine hood and loosen the joint cover of A/C high/low pressure line.

2. Connect the refrigerant recycling machine to A/C high/low pressure line joint.
   a. Connect the blue connector to A/C low pressure line joint (1).
   b. Connect the red connector to A/C high pressure line joint (2).



3. Open the high pressure valve and low pressure valve of refrigerant recycling machine.
4. Choose "vacuum pumping" item on machine and the time setting is 15 minutes, then choose OK and make it start to operate.
5. Wait for 10 minutes after completing operation, check if there is any change in A/C system vacuum. If there is any change, the A/C system leakage may exist, you should check and repair the A/C system. If there is no change, proceed to perform refrigerant charging procedures.

Refrigerant Recharging

Caution
• A small amount of refrigerant oil in A/C system will be discharged when recovering and draining refrigerant. When filling A/C system, be sure to supplement refrigerant oil, as some amount of refrigerant oil are lost during recovering. • DO NOT fill excessive refrigerant. Otherwise, it will cause excessive pressure to compressor assembly, resulting in compressor assembly noise and A/C system failure. • Always perform vacuum pumping before recharging refrigerant.

1. Perform vacuum pumping with a vacuum pump.
2. Add refrigerant oil after checking that there is no leakage in A/C system.
3. Perform vacuum pumping for 3 minutes again after adding refrigerant oil, then charge refrigerant.
4. Choose "charging" item on machine and set the amount of charging to specified value, then choose "OK" and make it start to operate.
5. Open the suction valve and close the discharging valve, and then open the charging valve to allow refrigerant to flow into the system.
6. When the delivery of refrigerant has stopped, close the charging valve.
7. If charged refrigerant is not delivered to specified position, start the engine to operate the A/C compressor assembly.
8. Open the charging valve to deliver the remaining refrigerant to A/C system.

Warning
At this time, do not open exhaust (high pressure) valve. Failure to do so may result in personal injury or even death.

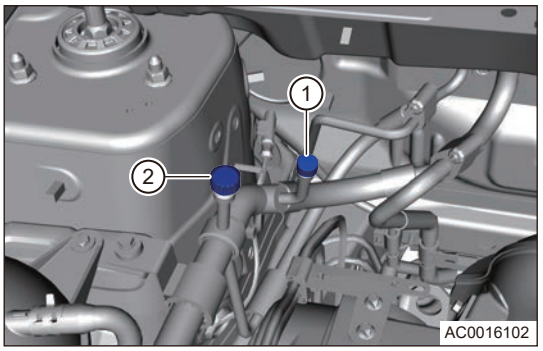
9. Perform A/C system pressure test after charging.
10. Remove the connecting pipe for refrigerant charging after the test is completed.
11. Reinstall the cover onto A/C line joint.

Refrigerant Oil Recovering and Charging

Refrigerant Oil Recovering

Caution
• Special service device for R134a Refrigerant/R1234yf (European Union) refrigerant must be used. • Always keep work area in good ventilation, because A/C system is easy to leak. • Always dispose of recovered refrigerant as specified. • Refrigerant oil must be charged after replacing A/C system components or recovering refrigerant.

1. Open the engine hood and loosen the joint cover of A/C high/low pressure line.
2. Connect the refrigerant recycling machine to A/C high/low pressure line joint.
   a. Connect the blue connector to A/C low pressure line joint (1).
   b. Connect the red connector to A/C high pressure line joint (2).



3. Open the high pressure valve and low pressure valve of refrigerant recycling machine.
4. Recover refrigerant oil according to instructions on the machine.
5. Record amount of recovered refrigerant oil.
6. Disconnect the connection between refrigerant recycling machine and A/C line joint.
7. Reinstall the joint cover onto refrigerant line joint.

Refrigerant Oil Charging

1. Perform vacuum pumping with a vacuum pump. Wait for 10 minutes after completing operation, check if there is any change in A/C system pressure. If there is any change, the A/C system leakage may exist, you should check and repair the A/C system. If there is no change, proceed to perform refrigerant oil charging procedures.
2. Open the suction valve and close the exhaust valve, and then open the charging valve to allow refrigerant oil to flow into the system.
3. Close the charging valve after refrigerant oil charging is completed.
4. Perform vacuum pumping again for 3 minutes.
5. Continue to perform refrigerant charging procedures after operation is completed.
   Refrigerant oil charging amount specifications: Type: SP-10; capacity: 150 ml. Newly installed air conditioning system does not need to be refilled. Refill when repairing a part or after driving a certain distance. The reference quantity of oil to be added when replacing parts: Evaporator, condenser: 30 ml for each; Line: 10 ml; Compressor: Pour out all the oil inside newly replaced compressor, add oil according to the replaced actual oil amount in the compressor (required to turn the compressor pulley in the manual suction state to pour out as much lubricating oil as possible).

Front Auto A/C Control Panel Assembly

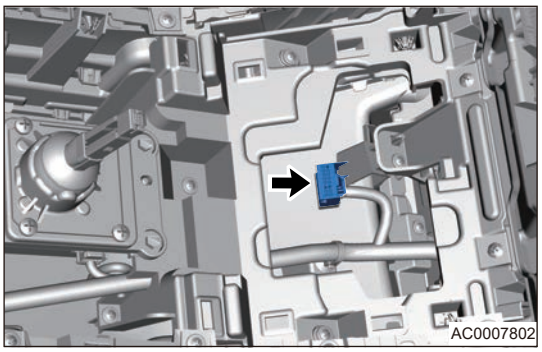
Removal

Caution
• Be careful not to scratch instrument cluster surface when removing central control panel cover and A/C panel.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Remove the center control panel assembly.
3. Remove the auxiliary fascia console control panel assembly.
4. Remove the shift knob assembly.
5. Remove the auto A/C control panel assembly.

   a. Pry up auto A/C control panel assembly (arrow) carefully with an interior crow plate.

   b. Disconnect connector (arrow), and remove auto A/C control panel assembly.



Installation

Caution
• Be careful not to scratch the panel and instrument panel parts during installation.

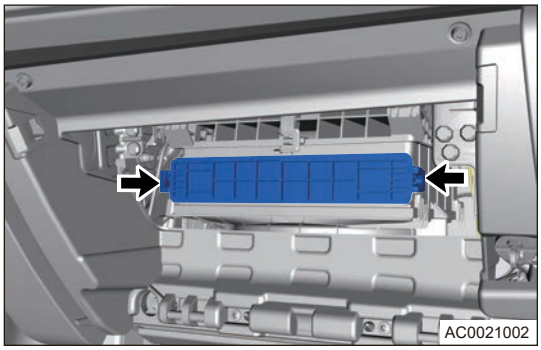
1. Installation is in the reverse order of removal.

A/C Element

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the glove box assembly.

4. Remove the A/C element.
   a. Detach 2 clips (arrow) from A/C element protector cover, and remove A/C element protector cover.
   b. Remove the A/C element assembly.



Installation

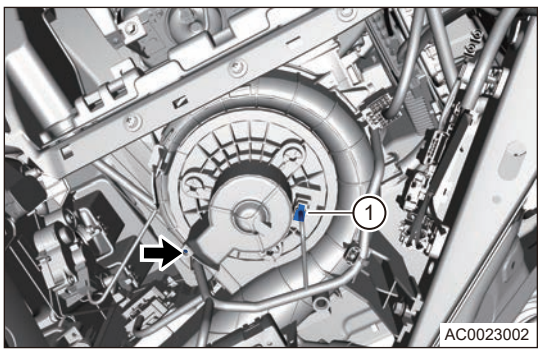
Caution
• If A/C element is too dirty or damaged, replace it with a new one. • When installing A/C element, make arrow mark on the element face downward.

1. Installation is in the reverse order of removal.

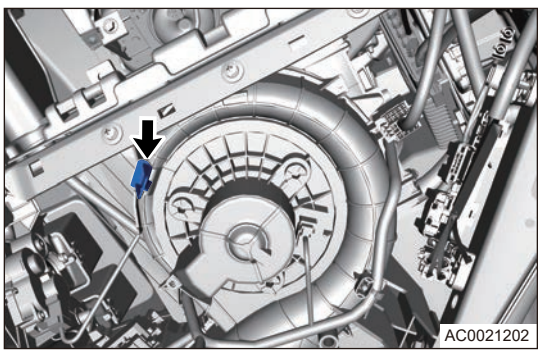
Removal and Installation of Front Blower Assembly

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the blower assembly.
   a. Disconnect blower assembly connector (1), and remove 1 fixing bolt (arrow) from blower.



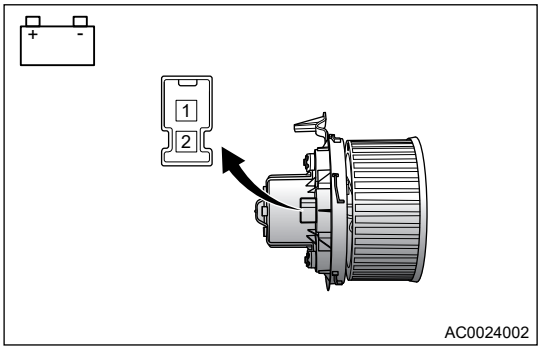
   b. Detach blower fixing claw (arrow), and rotate blower counterclockwise to remove blower.



Inspection

1. Remove the blower assembly.

a. Connect the positive (+) battery lead to terminal 1 and negative (-) battery lead to terminal 2. Check that the blower motor operates smoothly.



Installation

1. Installation is in the reverse order of removal.

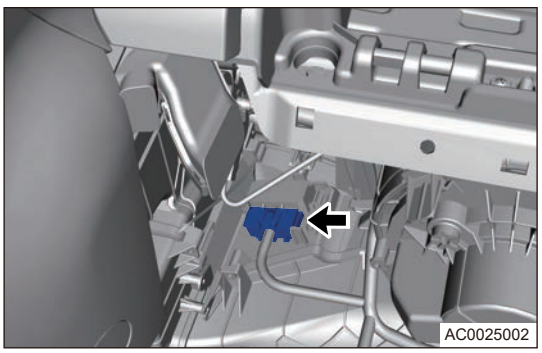
Front Blower Speed Regulation Module

Removal

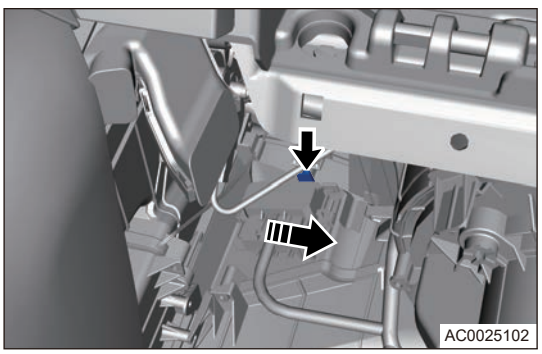
Warning
• During normal operation, blower speed regulation module may be very hot. Turn off blower and wait for a few minutes to cool it before diagnosing or servicing, in order to avoid burns. • DO NOT operate blower assembly when removing the blower speed regulation module from vehicle. Failure to do so may result in damage to the blower assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the glove box assembly.
4. Remove the blower speed regulation module.

a. Disconnect the blower speed regulation module connector (arrow).



b. Detach blower speed regulation module fixing claw (-arrow), and move blower speed regulation module to right side.



c. Remove the blower speed regulation module.

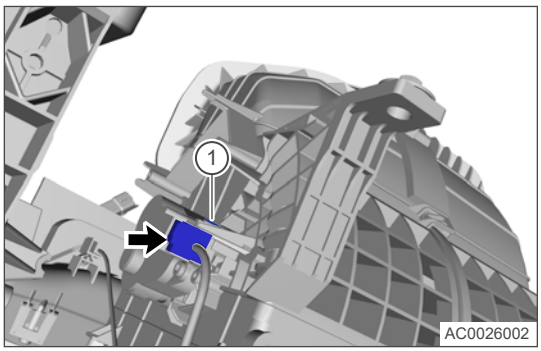
Installation

1. Installation is in the reverse order of removal.

Inner/Outer Circulation Damper Servo Motor

Removal

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the glove box assembly.
4. Remove the inner/outer circulation damper servo motor.
   a. Disconnect the inner/outer circulation damper servo motor connector (arrow).
   b. Detach the fixing clip (1) from inner/outer circulation motor.
   c. Rotate counterclockwise to remove the inner/outer circulation damper motor.



Installation

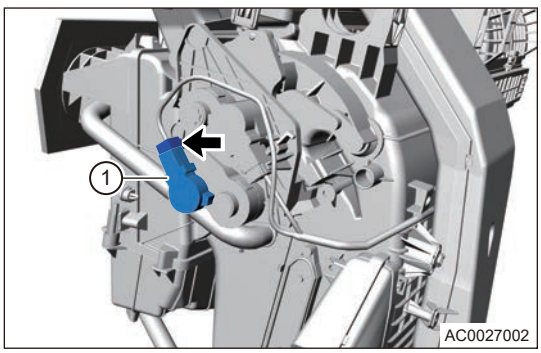
1. Installation is in the reverse order of removal.

Caution
• When installing, apply a small amount of grease to contact surface of the inner/outer circulation damper motor lever and the inner/outer circulation damper set to ensure the motor operates smoothly.

Mode Damper Motor

Removal

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel lower left protector assembly.
4. Remove the mode damper motor.
   a. Disconnect the mode damper motor connector (arrow).
   b. Detach the fixing clip (1) from mode damper motor.
   c. Rotate counterclockwise to remove the mode damper motor.



Installation

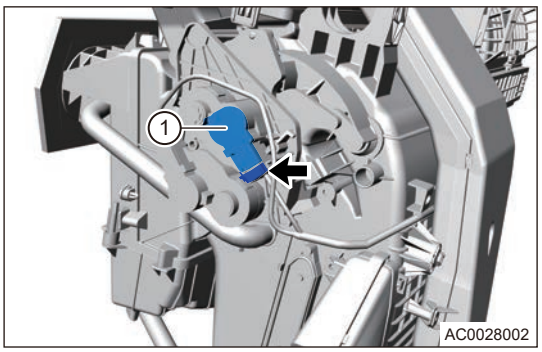
1. Installation is in the reverse order of removal.

Caution
• When installing, apply a small amount of grease to contact surface of the mode damper motor lever and the mode damper set to ensure the motor operates smoothly.

Left Mix Damper Motor

Removal

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel lower left protector assembly.
4. Remove the left mix damper motor.
   a. Disconnect the left mix damper motor connector (arrow).
   b. Detach the mix damper motor fixing clip.
   c. Rotate counterclockwise to remove left mix damper motor (1).



Installation

1. Installation is in the reverse order of removal.

Caution
• When installing, apply a small amount of grease to contact surface of the left mix damper motor lever and the mix damper set to ensure the motor operates smoothly.

Right Mix Damper Motor

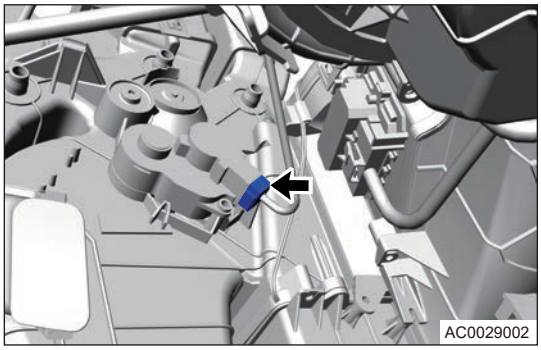
Removal

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the glove box assembly.
4. Remove the right mix damper motor.

a. Disconnect the right mix damper motor connector (arrow).

b. Detach the mix damper motor fixing clip.

c. Rotate counterclockwise to remove right mix damper motor.



Installation

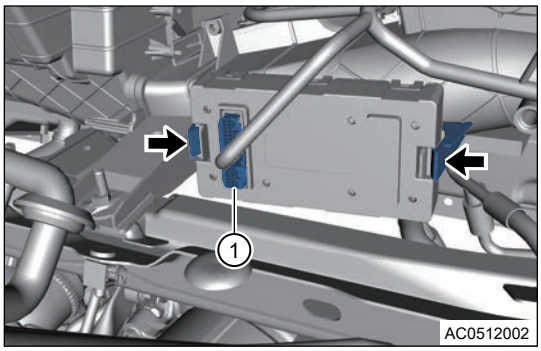
1. Installation is in the reverse order of removal.

Caution
• When installing, apply a small amount of grease to contact surface of the right mix damper motor lever and the mix damper set to ensure the motor operates smoothly.

Automatic A/C Control Module

Removal

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the automatic A/C control module.
   a. Disconnect the automatic A/C control module connector (1).
   b. Loosen 2 fixing clips (arrow) and remove automatic A/C control module.



Installation

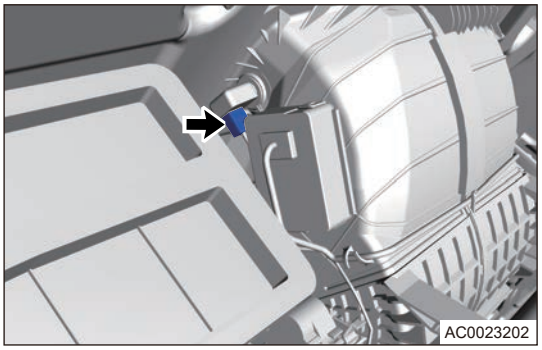
1. Installation is in the reverse order of removal.

Air Quality Sensor

Removal

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel assembly.
4. Remove the air quality sensor.

a. Disconnect air quality sensor connector (arrow), and rotate counterclockwise to remove air quality sensor.



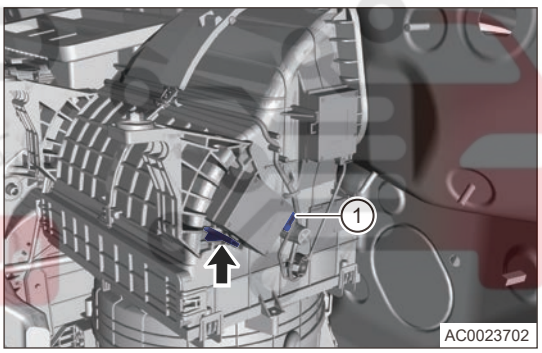
Installation

1. Installation is in the reverse order of removal.

Inside PM2.5 Sensor (If Equipped)

Removal

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel assembly.
4. Remove the inside PM2.5 sensor.
   a. Disconnect the inside PM2.5 sensor (1).
   b. Detach inside PM2.5 sensor fixing claw (arrow) and move inside PM2.5 sensor upward.
   c. Remove the inside PM2.5 sensor.



Installation

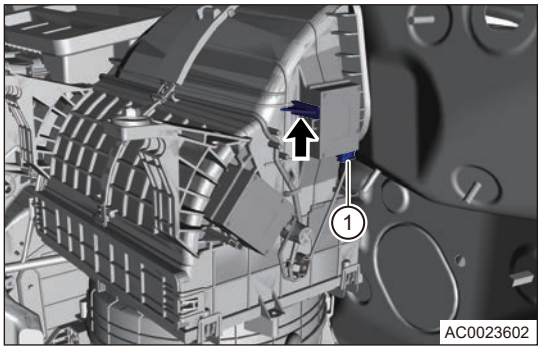
1. Installation is in the reverse order of removal.

Outside PM2.5 Sensor (If Equipped)

Removal

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel assembly.
4. Remove the outside PM2.5 sensor.

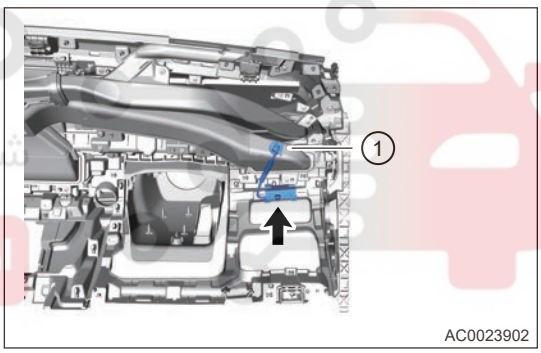
a. Disconnect the outside PM2.5 sensor (1).
b. Detach outside PM2.5 sensor fixing claw (arrow) and move outside PM2.5 sensor upward.
c. Remove the outside PM2.5 sensor.



Installation
1. Installation is in the reverse order of removal.

Anion Generator (If Equipped)

Removal
1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel assembly.
4. Remove the anion generator.
   a. Disconnect the anion emitter wire harness fixing clip.
   b. Rotate and remove anion emitter (1).
   c. Remove 2 fixing screws (arrow) and anion generator.



Inspection
1. Use air ion concentration tester to measure the concentration directly in front of the anion generator.
2. Take a transparent container with a cover, put smoke dust into it, and then put the anion generator into it, the dust will disappear after working for 1-8 seconds.

Installation
1. Installation is in the reverse order of removal.

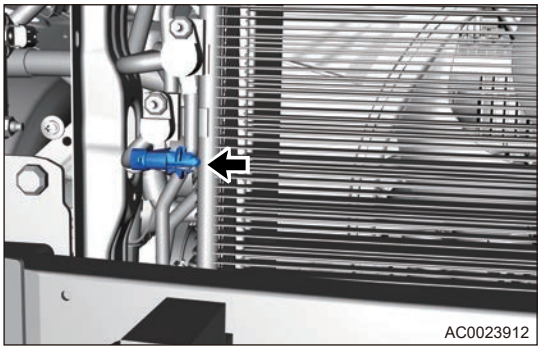
Outside Temperature Sensor

Removal
1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly.
4. Remove the outside temperature sensor.

a. Pinch clip of outside temperature sensor and push it outward in direction of arrow to remove outside temperature sensor from air deflector.

b. Remove the wire harness connector.

c. Remove the outside temperature sensor.



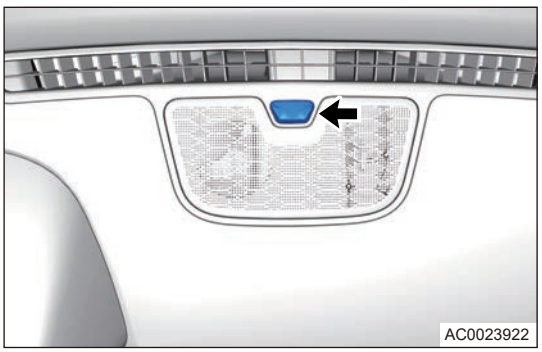
Installation

1. Installation is in the reverse order of removal.

Solar Sensor

Removal

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the solar sensor.
   a. A clamp type assembly is used for solar sensor. Carefully insert a flat tip screwdriver about 3 mm into the gap between solar sensor and instrument panel (- place a soft object under it to avoid damage to the surface of instrument panel), and pry up solar sensor from the instrument panel with a bit force.
   b. Remove the wire harness connector.
   c. Remove the solar sensor.



Installation

1. Installation is in the reverse order of removal.

   Hint:
   Install solar sensor to corresponding fixing hole and it is installed into place after a “click” sound is heard.

Front HVAC Assembly

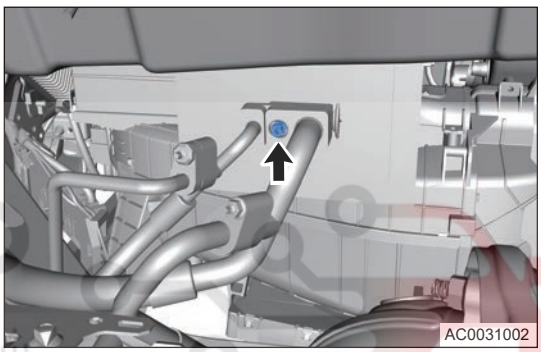
Removal

Caution
• Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant. • Be careful not to damage hoses during removal and installation. • Always keep work area in good ventilation. • Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).

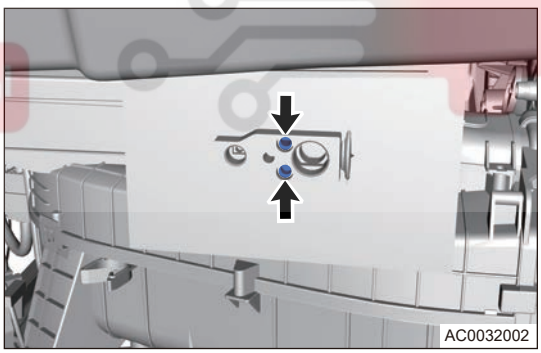
2. Turn off all electrical equipment and ignition switch.
3. Disconnect the negative battery cable.
4. Remove the driver airbag. (For details, refer to removal and installation of driver airbag).
5. Remove the steering wheel assembly (For details, refer to removal and installation of steering wheel assembly).
6. Remove the auxiliary fascia console assembly (For details, refer to removal and installation of auxiliary fascia console body assembly).
7. Remove the instrument panel body assembly (For details, refer to removal and installation of instrument panel body assembly).
8. Remove the instrument panel crossmember assembly (For details, refer to removal and installation of instrument panel crossmember).
9. Remove the HVAC assembly.
   a. Remove the A/C high/low pressure line fixing bolt (arrow).

      Tightening torque: 9 ± 1.5 N•m

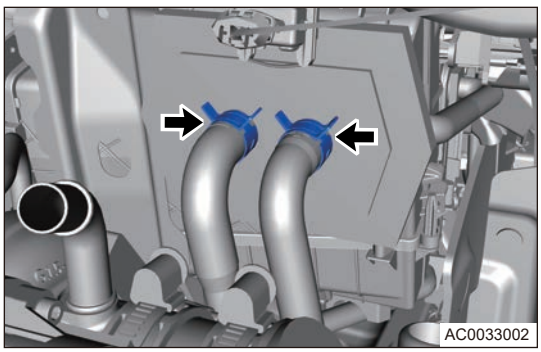


   b. Remove 2 fixing bolts (arrow) from expansion valve and remove expansion valve assembly.

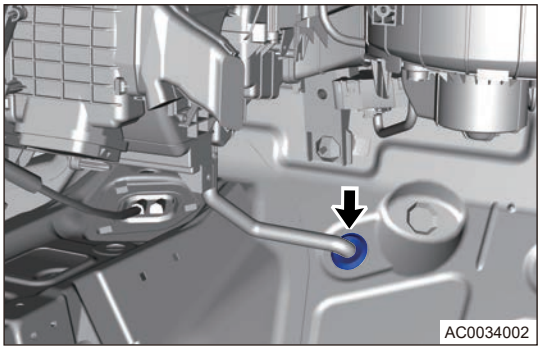
      Tightening torque: 9 ± 1.5 N•m



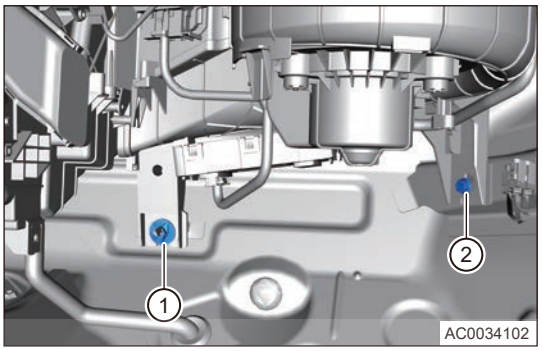
   c. Using snap spring pliers, disengage fixing clamps (-arrow) from heating inlet and outlet hoses to detach the inlet and outlet hoses.



d. Disengage the outlet hose of HVAC and fixing bush rubber (arrow) of body.



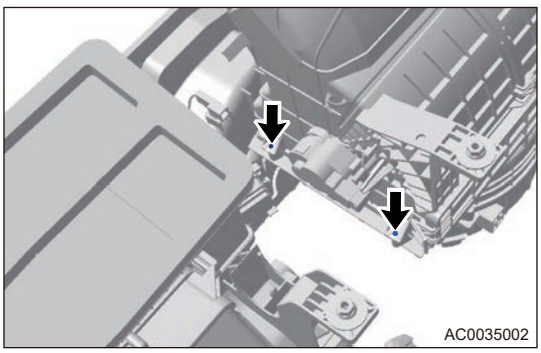
e. Remove HVAC fixing nut (1) and fixing bolt (2).
Tightening torque: 7 ± 1.5 N•m



f. Carefully remove HVAC assembly from cabin.

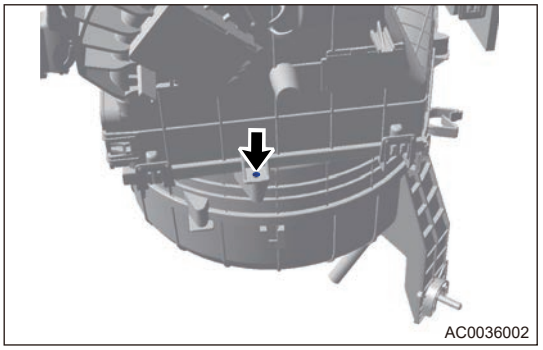
Disassembly

1. Remove the blower assembly.
2. Remove the blower speed regulation module.
3. Remove the inner/outer circulation damper motor.
4. Remove the left mix damper servo motor.
5. Remove the mode damper motor.
6. Remove the right mix damper motor (automatic A/C).
7. Remove the A/C element assembly.
8. Remove the inner/outer damper set.
   a. Remove 2 fixing screws (arrow) from inlet air duct assembly.
   Tightening torque: 1.2 ± 0.2 N•m



b. Remove 1 fixing bolt (arrow) from inlet air duct assembly.

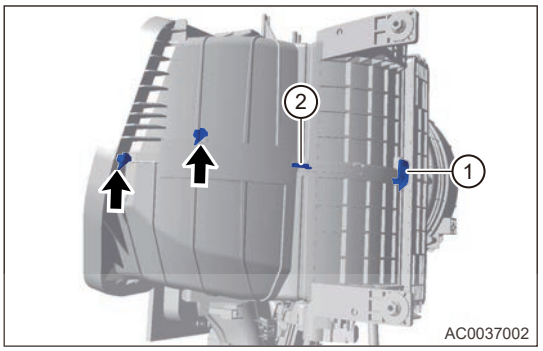
Tightening torque: 1.2 ± 0.2 N•m



c. Remove the inlet air duct assembly.

d. Remove 2 fixing bolts (arrow) from inner/outer damper set, and disengage 2 fixing clips.

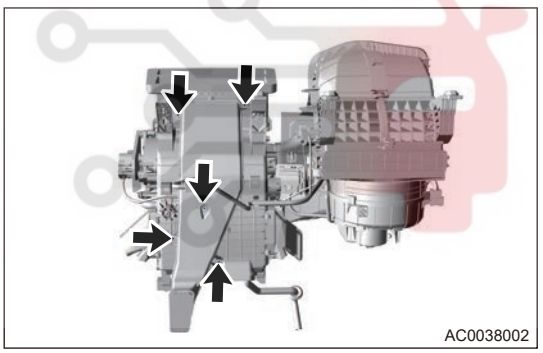
Tightening torque: 1.2 ± 0.2 N•m



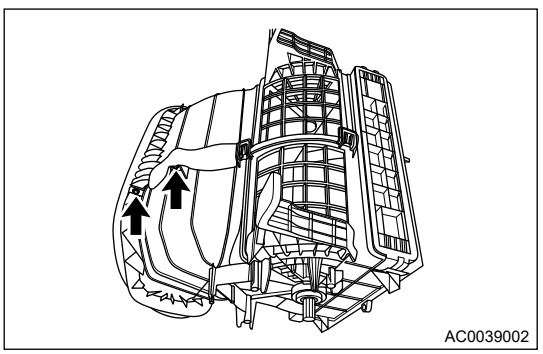
9. Remove the A/C wire harness assembly.

a. Remove 5 fixing screws (arrow) from rear duct.

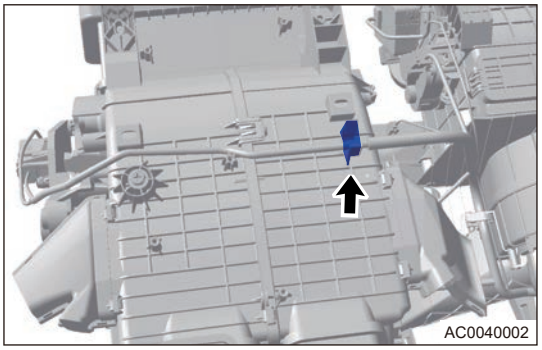
Tightening torque: 1.2 ± 0.2 N•m



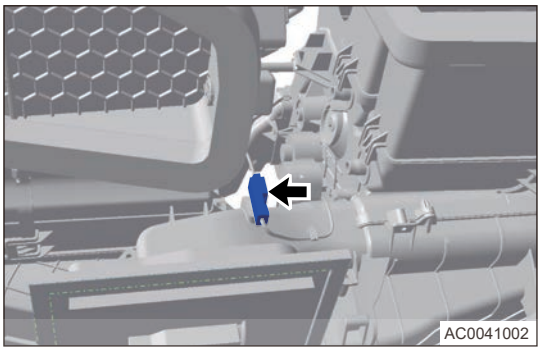
b. Disengage 2 wire harness fixing clip (arrow).



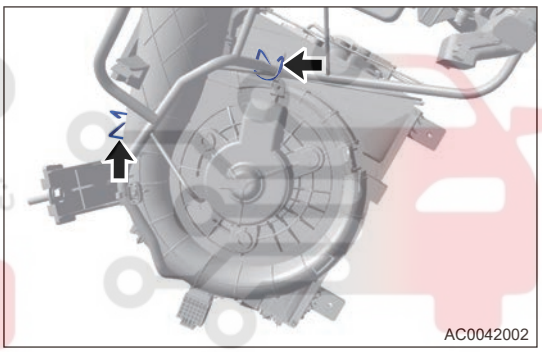
c. Disengage 1 wire harness fixing clip (arrow).



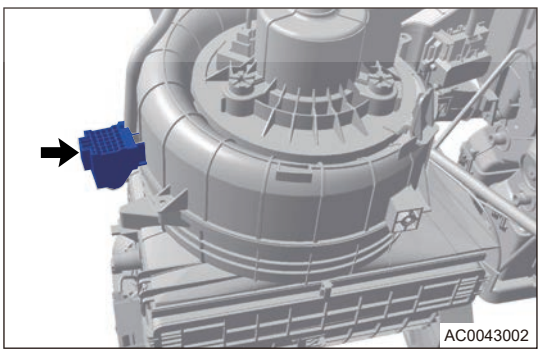
d. Disconnect the evaporator tank temperature sensor (arrow).



e. Disengage 2 fixing clips (arrow) of A/C wire harness from HVAC.



f. Disengage the A/C wire harness connector (arrow) from HVAC.

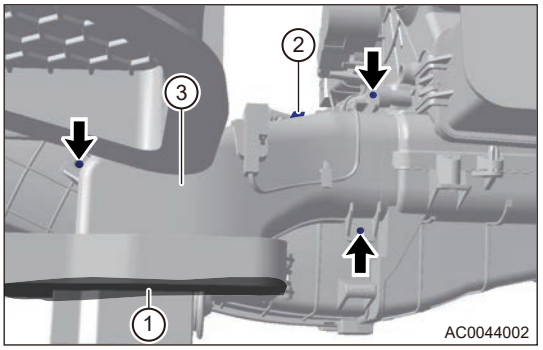


g. Remove the electric A/C wire harness.

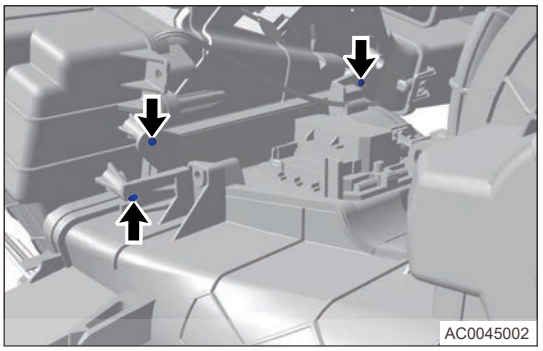
10. Remove the blower volute assembly.

a. Disengage fixing clip from evaporator tank temperature sensor. Remove the sponge (1) and 3 fixing screws (arrow), disengage fixing clip (2) and open case (3).

Tightening torque: 1.2 ± 0.2 N•m

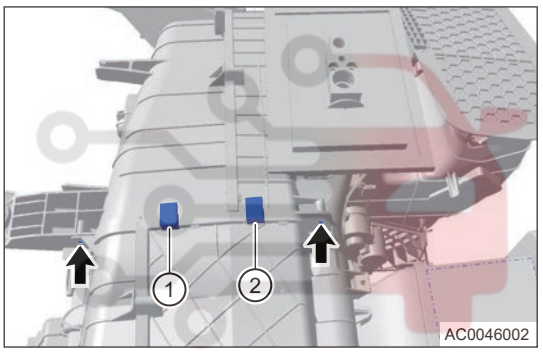


b. Remove 3 fixing screws (arrow).



c. Remove 2 fixing screws (arrow), disengage 2 fixing clips (1) and (2).

Tightening torque: 1.2 ± 0.2 N•m

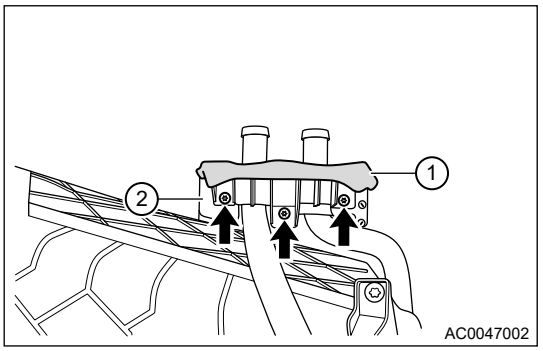


d. Remove the blower volute assembly.

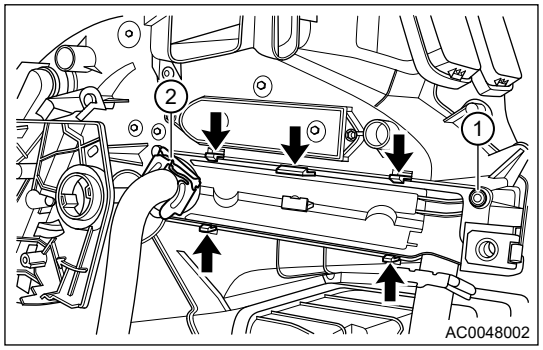
11. Remove the heater core assembly

a. Remove 3 fixing screws (arrow), disengage sponge (1) and open pressing plate (2).

Tightening torque: 1.2 ± 0.2 N•m

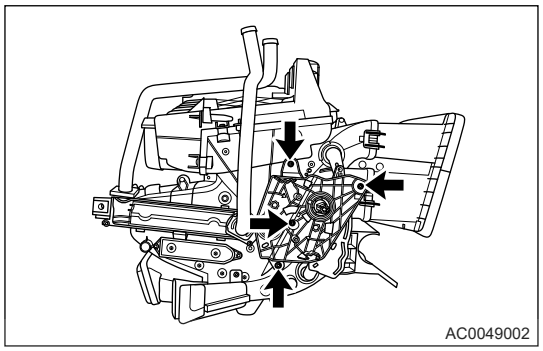


b. Remove 2 screws (1) and (2) from heater core fixing panel, disengage 5 clips (arrow) from heater core fixing panel.



c. Remove 4 fixing screws (arrow) and damper set pressing plate.

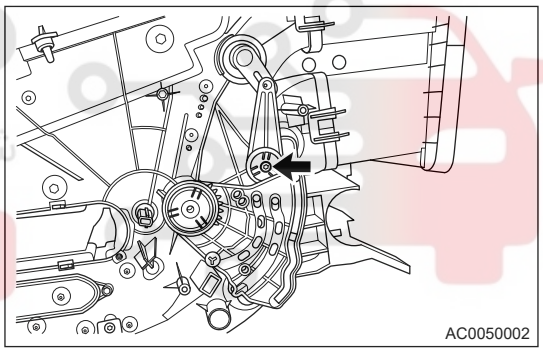
Tightening torque: 1.2 ± 0.2 N•m



12. Remove the damper drive set.

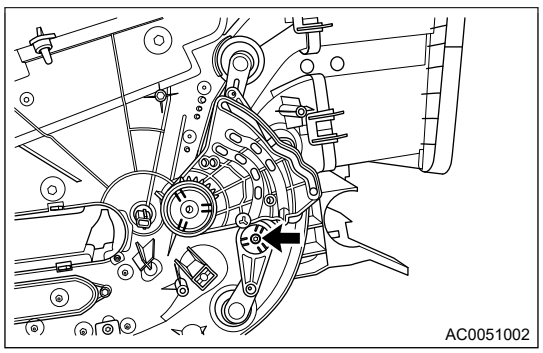
a. Remove the fixing screw (arrow) from damper drive set.

Tightening torque: 1.2 ± 0.2 N•m



b. Remove the fixing bolt (arrow) from damper drive set.

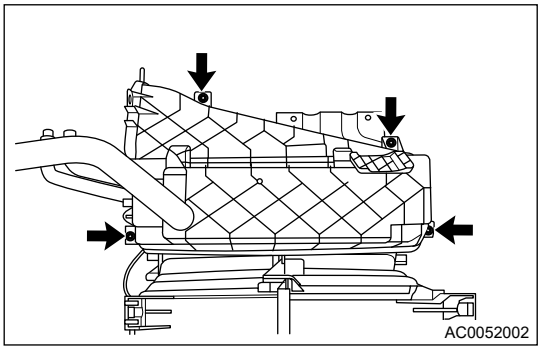
Tightening torque: 1.2 ± 0.2 N•m



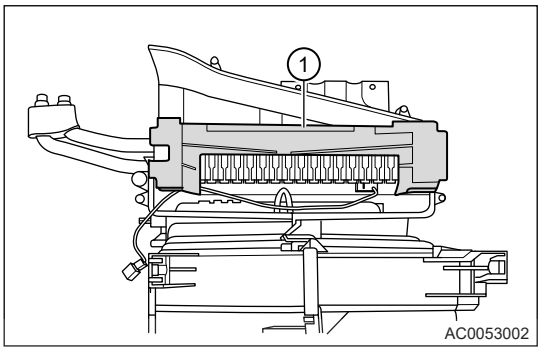
13. Remove the evaporator assembly

a. Remove 4 fixing screws (arrow) between evaporator housing and evaporator tank.

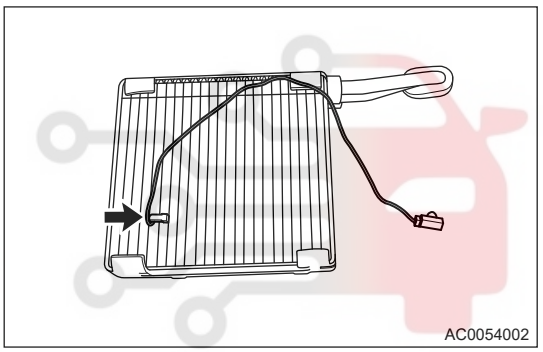
Tightening torque: 1.2 ± 0.2 N•m



b. Remove evaporator assembly (1) from evaporator tank.

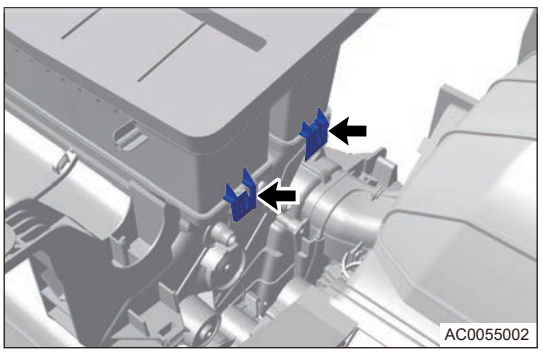


c. Remove the evaporator tank temperature sensor (- arrow) from evaporator assembly.

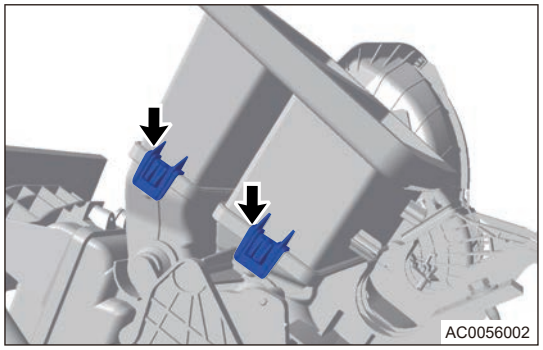


14. Remove the damper set

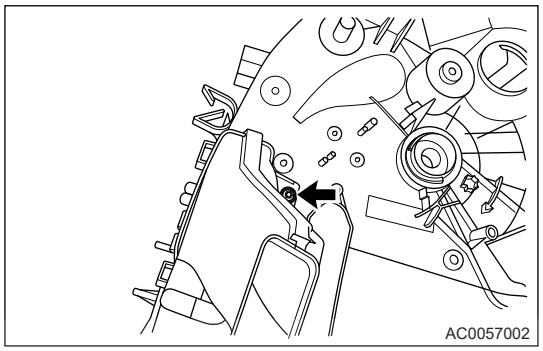
a. Disengage 2 fixing clips (arrow) from outlet shield.



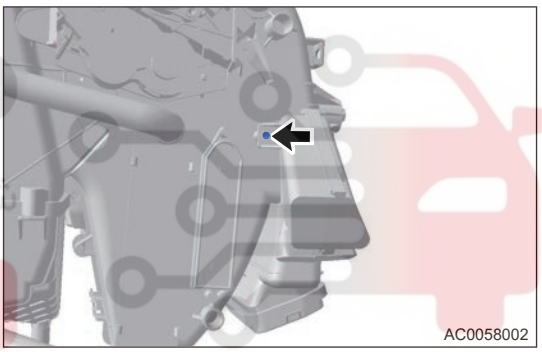
b. Disengage 2 fixing clips (arrow) from outlet shield.



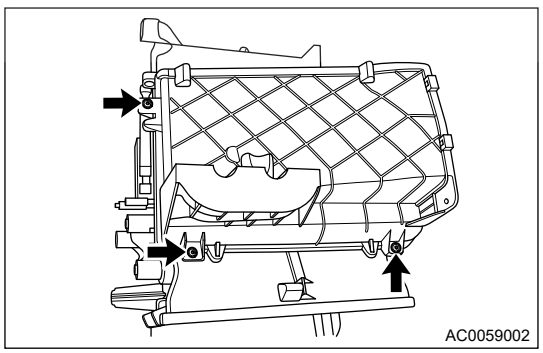
c. Remove 1 fixing screw (arrow) and rear right outlet.
Tightening torque: 1.2 ± 0.2 N•m



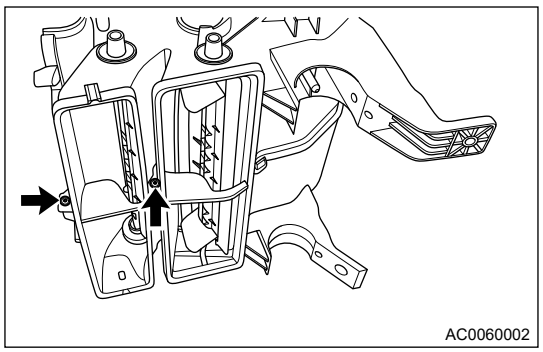
d. Remove 1 fixing screw (arrow) and rear left outlet.
Tightening torque: 1.2 ± 0.2 N•m



e. Remove 3 fixing screws (arrow) from evaporator tank.
Tightening torque: 1.2 ± 0.2 N•m

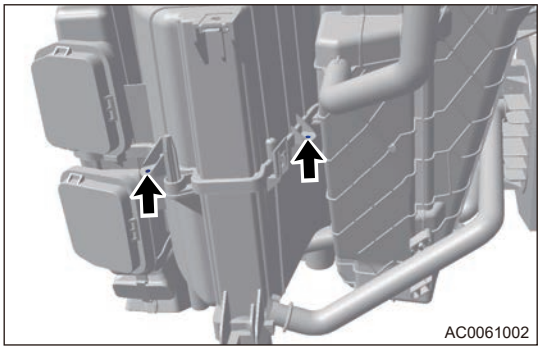


f. Remove 2 fixing screws (arrow) from damper set housing.
Tightening torque: 1.2 ± 0.2 N•m

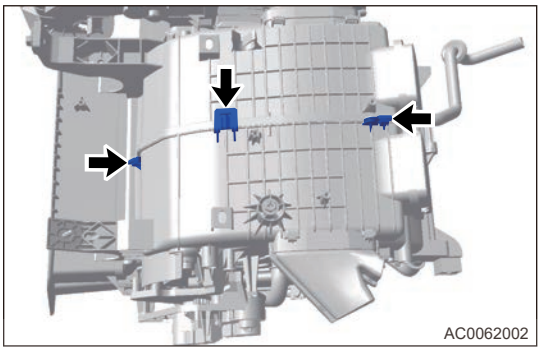


g. Remove 2 fixing screws (arrow) from damper set housing.

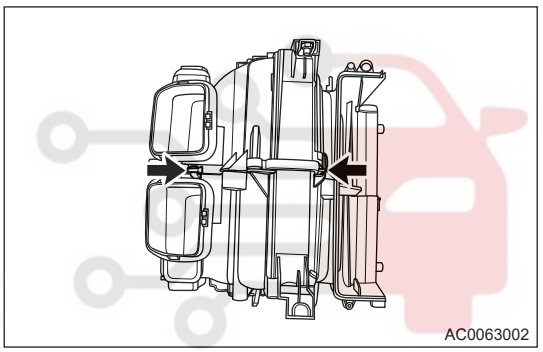
Tightening torque: 1.2 ± 0.2 N•m



h. Remove 3 fixing clips (arrow) from damper set housing.

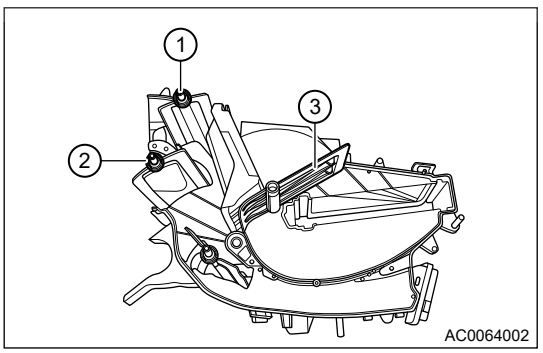


i. Remove 2 fixing clips (arrow) from damper set housing.

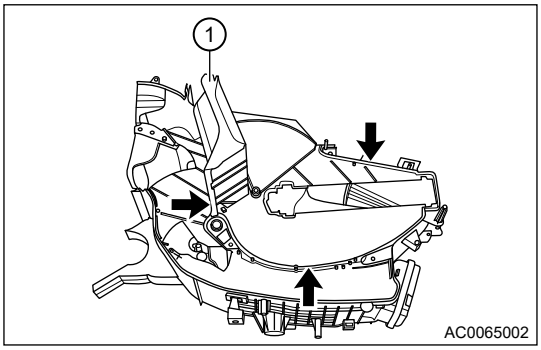


j. Disengage the damper set housing.

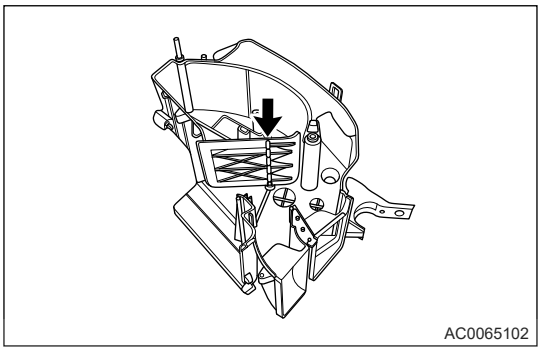
k. Remove defroster damper set (1), face damper set (2) and right inner damper set (3).



l. Remove 3 locating plates (arrow) and air deflector (1) from damper housing.



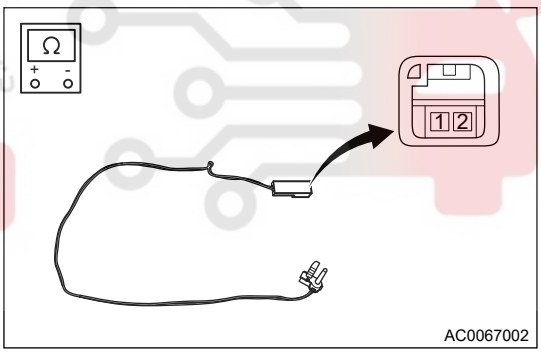
m. Remove the right inner damper set (arrow).



Inspection

1. Check the evaporator temperature sensor.

a. Using ohm band of digital multimeter, measure the resistance of evaporator temperature sensor according to the table below.



Multimeter Connection	Temperature (˚C)	Standard Resistance (Ω)
Terminal 1 - Terminal 2	-5	7790
Terminal 1 - Terminal 2	0	6194
Terminal 1 - Terminal 2	5	4963
Terminal 1 - Terminal 2	10	4001
Terminal 1 - Terminal 2	15	3245
Terminal 1 - Terminal 2	20	2648

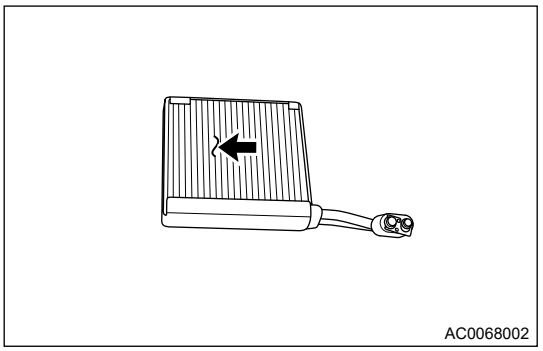
Hint:

- Resistance decreases as temperature increases.
- If result is not as specified, replace evaporator temperature sensor.

Caution
• Resistance value may change even if sensor is touched slightly. Make sure that connector of sensor is held firmly. • During measurement, sensor temperature must be almost the same as the ambient temperature.

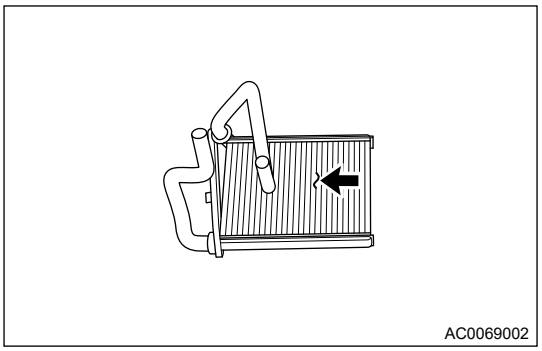
2. Check the evaporator core assembly.
   a. Check if evaporator core assembly is cracked, damaged and leaked. If any problem is found, replace evaporator core assembly.
   b. Check fin for bends.

   Hint:
   If any fin is bent, carefully straighten it with a screwdriver or pliers.


AC0068002

3. Check the heater core assembly.
   a. Check if heater core assembly is cracked, damaged or leaked. Check if heater core assembly is cracked, damaged or leaked.
   b. Check fin for bends.

   Hint:
   If any fin is bent, carefully straighten it with a screwdriver or pliers.


AC0069002

4. Check the damper control mechanism assembly.
   a.Check if inner/outer circulation damper adjustment mechanism is stuck, deformed, damaged or if it has fallen out. Replace as necessary.
   b.Check if mode damper adjustment mechanism is stuck, deformed, damaged or if it has fallen out. Replace as necessary.
   c.Check if face/defrost damper set is stuck, deformed, damaged or if it has fallen out. Replace as necessary.

Reassembly

1. Installation is in the reverse order of removal.

Caution
1. If evaporator core is reused, do not insert evaporator temperature sensor into its original position. Insert it to a location that is 1 fin to the right or left of its previous location. 2. During installation, apply a small amount of grease to contact surface of the inner/outer circulation damper adjustment mechanism to ensure that it can operate smoothly. 3. During installation, apply a small amount of grease to contact surface of the mix damper adjustment mechanism set to ensure that it can operate smoothly. 4. During installation, apply a small amount of grease to contact surface of the face damper adjustment mechanism to ensure that it can operate smoothly. 5. During installation, apply a small amount of grease to contact surface of the defrost damper adjustment mechanism to ensure that it can operate smoothly. 6. Always check that inner/outer circulation damper mechanism assembly operates normally after installation. 7. Always check that mix damper mechanism assembly operates normally after installation. 8. Always check that face damper mechanism assembly operates normally after installation. 9. Always check that defrost damper mechanism assembly operates normally after installation. 10. Tighten fixing bolts and nuts to specified torques. 11. It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks. 12. It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks. 13. Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system. 14. Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle. 15. Be sure to recharge refrigerant and check for refrigerant leakage after installation. 16. Be sure to recharge engine cooling system and check for coolant leakage after installation.

Installation

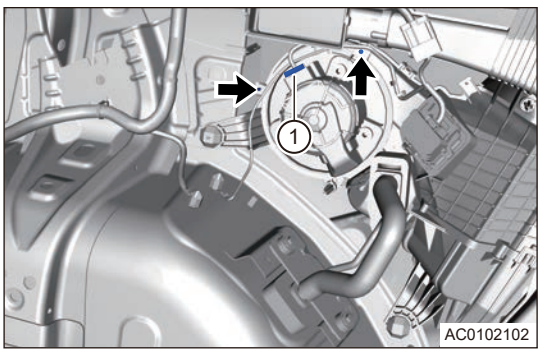
1. Installation is in the reverse order of removal.

Rear Blower Assembly

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the C-pillar lower protector.
4. Remove the C-pillar upper protector.
5. Remove the rear blower assembly.
   a. Disconnect blower assembly connector (1), remove 2 fixing screws from blower and detach clips (arrow).

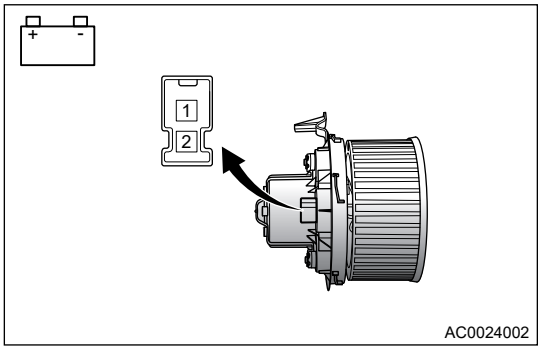
      Tightening torque: 1.2 ± 0.2 N•m



b. Remove the blower assembly.

Inspection

1. Check the rear blower motor.
   a. Remove the blower assembly.
   b. Connect the positive (+) battery lead to terminal 1 and negative (-) battery lead to terminal 2. Check that the blower motor operates smoothly.



Installation

Caution
• Tighten fixing bolts to specified torques.

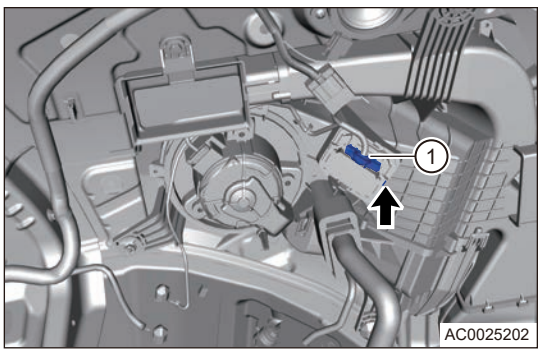
1. Installation is in the reverse order of removal.

Rear Blower Speed Regulation Module

Removal

Caution
• During normal operation, blower speed regulation module may be very hot. Turn off blower and wait for a few minutes to cool it before diagnosing or servicing, in order to avoid burns. • DO NOT operate blower assembly when removing the blower speed regulation module from vehicle. Failure to do so may result in damage to the blower assembly.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the C-pillar lower protector.
4. Remove the C-pillar upper protector.
5. Remove the rear blower speed regulation module assembly.
6. Remove the rear blower speed regulation module.
   a. Disconnect the blower speed regulation module connector (1).
   b. Detach the attachment structure (arrow) of blower speed regulation module.
   c. Remove the blower speed regulation module assembly.



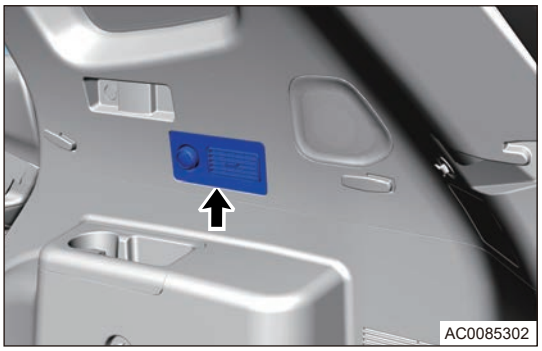
Installation

1. Installation is in the reverse order of removal.

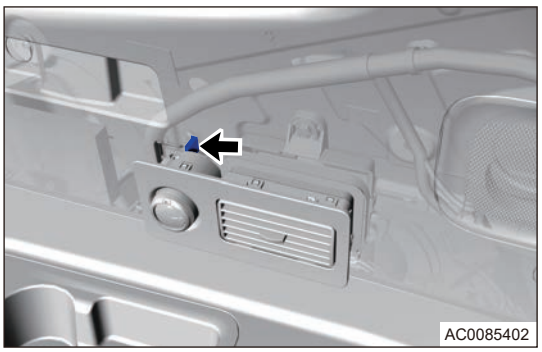
Rear A/C Control Panel Assembly (If Equipped)

Removal

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the rear A/C control panel assembly.
   a. Pry up rear A/C control panel assembly (arrow) with an interior crow plate.



   b. Disconnect the rear A/C control panel assembly (arrow).
   c. Remove rear A/C control panel assembly from cabin.



Installation

1. Installation is in the reverse order of removal.

Rear HVAC Assembly

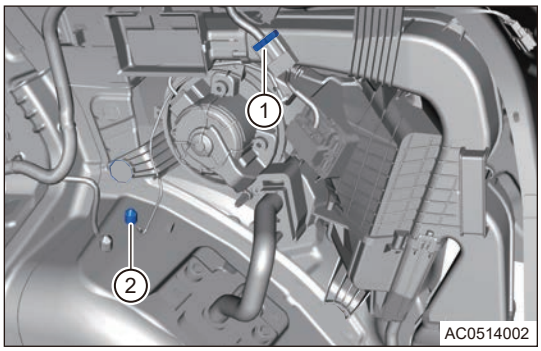
Removal

Caution
• Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant. • Be careful not to damage hoses during removal and installation. • Always keep work area in good ventilation. • Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and ignition switch.
3. Disconnect the negative battery cable.
4. Remove the C-pillar lower protector.

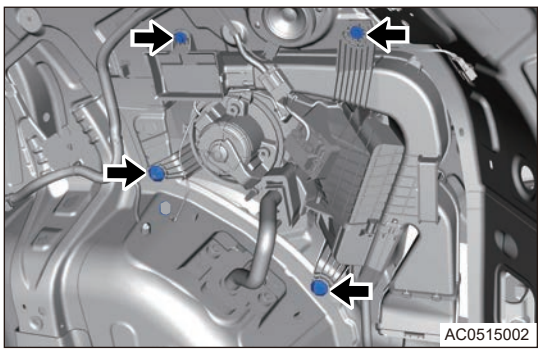
5. Remove the C-pillar upper protector.
6. Remove the transition line.
7. Remove the rear expansion valve.
8. Remove the rear blower assembly.
9. Remove the rear speed regulation module.
10. Remove the rear HVAC assembly.
    a. Disconnect rear A/C wire harness connector (1) and remove ground fixing nut (2).

       Tightening torque: 5 ± 1.5 N•m

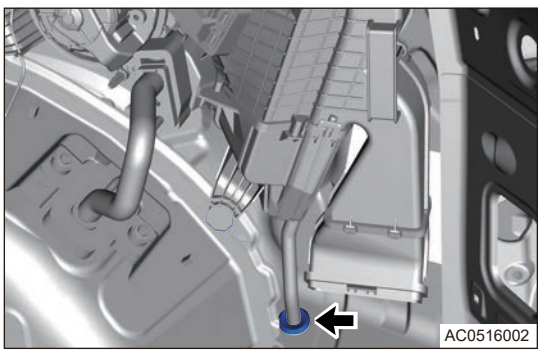


    b. Remove 4 fixing nuts (arrow) from rear evaporator tank.

       Tightening torque: 5 ± 1.5 N•m



    c. Disengage the drain hose and carefully remove rear HVAC assembly from cabin.



Installation

1. Installation is in the reverse order of removal.

Caution
• Install drain hose of rear HVAC assembly to corresponding hole through air outlet. • When installing the ground point, loose the bolt set first, and then clip the ground point in and tighten it (tightening torque: 9 ± 1 N•m).

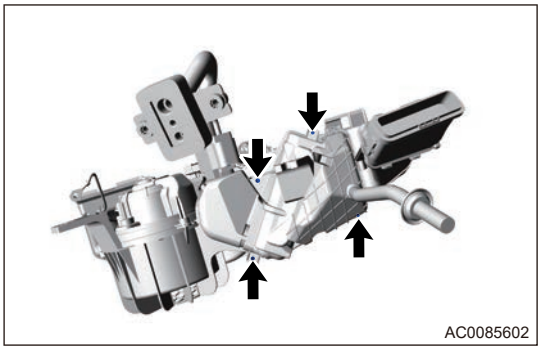
Rear Evaporator Tank Assembly

Removal

Caution
• Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant. • Be careful not to damage hoses during removal and installation. • Always keep work area in good ventilation. • Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and ignition switch.
3. Disconnect the negative battery cable.
4. Remove the rear HVAC assembly.
5. Remove the rear evaporator tank assembly.
   a. Remove 4 fixing screws (arrow) from rear evaporator tank case.

      Tightening torque: 1.2 ± 0.2 N•m



Installation

1. Installation is in the reverse order of removal.

A/C Coaxial Line Assembly

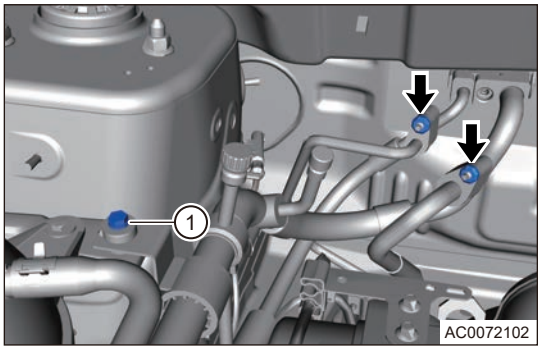
Removal

Warning
• Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant. • Always keep work area in good ventilation. • Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and ignition switch.
3. Disconnect the negative battery cable.
4. Remove the front bumper assembly.
5. Remove the A/C coaxial line assembly.

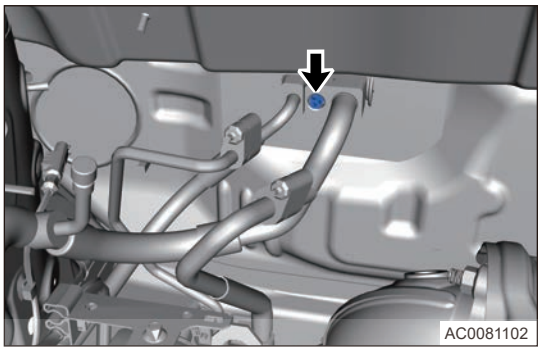
a. Remove fixing bolt (1) from A/C coaxial line.
b. Remove 2 fixing nuts (arrow) from rear evaporator high/low pressure line and detach rear evaporator high/low pressure line.

.Tightening torque: 9 ± 1 N•m



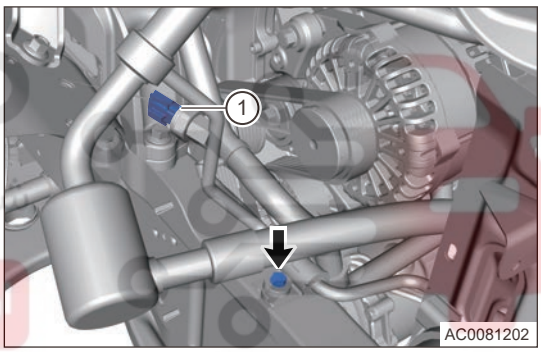
c. Remove fixing bolt (arrow) between A/C high/low pressure line and expansion valve, and disengage the A/C high/low pressure line.

Tightening torque: 9 ± 1 N•m



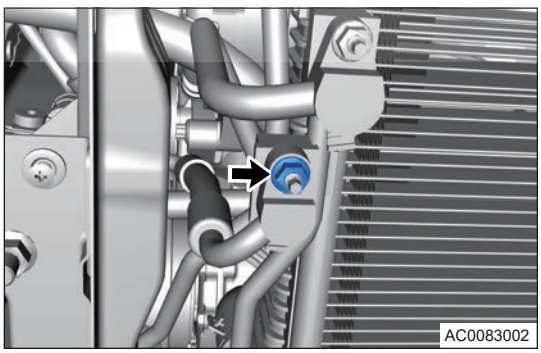
d. Disconnect the A/C pressure switch connector (1), and remove the coupling bolt (arrow) between A/C high pressure line fixing bracket and body.

Tightening torque: 9 ± 1 N•m



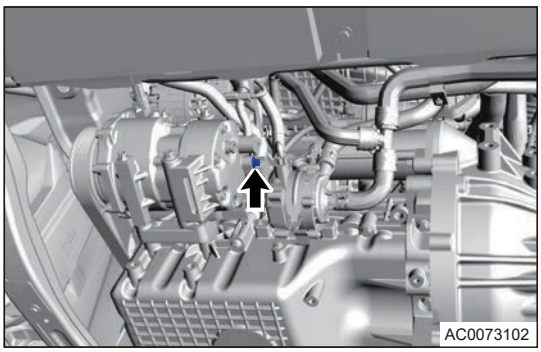
e. Remove 1 fixing nut (arrow) between A/C coaxial line assembly and condenser assembly.

Tightening torque: 9 ± 1 N•m



f. Remove 1 fixing nut (arrow) between A/C coaxial line assembly and A/C compressor assembly.

Tightening torque: 25 ± 3 N•m



Installation

Caution
• Tighten fixing bolts and nuts to specified torques. • It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks. • Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint. • Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system. • Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle. • Perform recharging for A/C system and check for refrigerant leakage.

1. Installation is in the reverse order of removal.

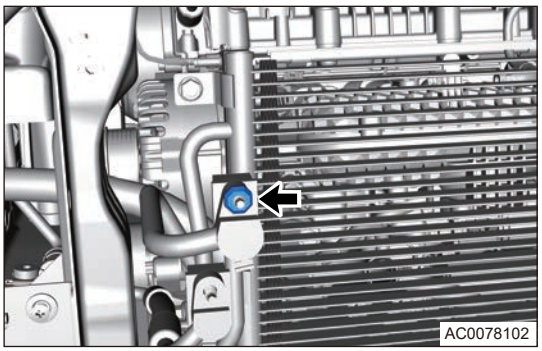
Compressor to Condenser Line Assembly

Removal

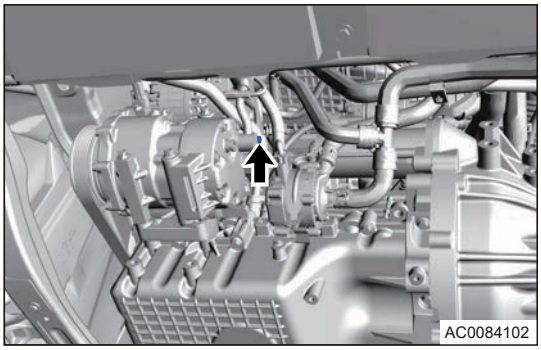
Warning
• Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant. • Always keep work area in good ventilation. • Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and ignition switch.
3. Disconnect the negative battery cable.
4. Remove the front bumper assembly.
5. Remove the compressor to condenser line assembly.
   a. Remove the fixing nut (arrow) from compressor to condenser line assembly.

      Tightening torque: 9 ± 1.5 N•m



b. Remove the fixing bolt (arrow) between compressor to condenser line assembly and compressor assembly, and disengage the compressor to condenser line assembly from compressor assembly.



Tightening torque: 25 ± 3 N•m

c. Remove the compressor to condenser line assembly.

Installation

Caution
• Tighten fixing bolts and nuts to specified torques. • It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks. • Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint. • Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system. • Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle. • Perform recharging for A/C system and check for refrigerant leakage.

1. Installation is in the reverse order of removal.

Condenser to Rear Evaporator Line Assembly (Front) & Rear Evaporator to Compressor Line Assembly (Front)

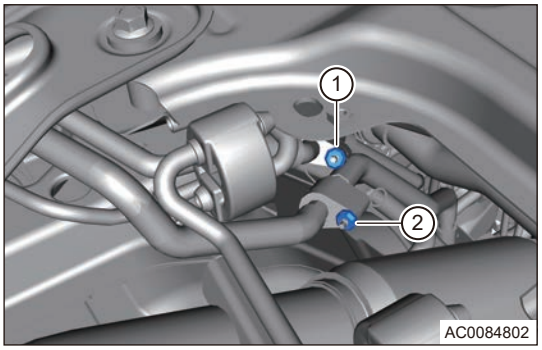
Removal

Warning
• Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/charge refrigerant. • Always keep work area in good ventilation. • Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

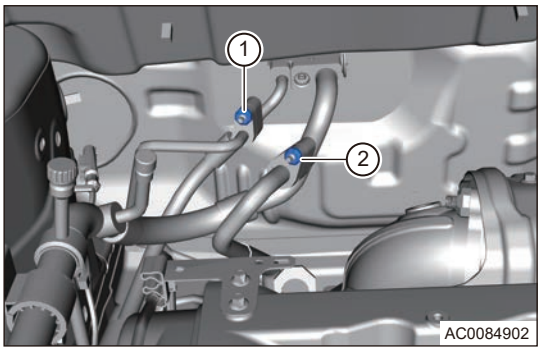
1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and ignition switch.
3. Disconnect the negative battery cable.
4. Remove the condenser to rear evaporator line assembly (front) & rear evaporator to compressor line assembly (front).

a. Remove coupling nut (1) between rear evaporator to compressor line assembly (rear) and rear evaporator to compressor line assembly (front).
b. Remove coupling nut (2) between condenser to rear evaporator line assembly (rear) and condenser to rear evaporator line assembly (rear).

Tightening torque: 9 ± 1 N•m



c. Remove coupling nut (1) between condenser to rear evaporator line assembly (front) and coaxial line.
Tightening torque: 9 ± 1 N•m
d. Remove coupling nut (2) between rear evaporator to compressor line assembly (front) and coaxial line.
e. Remove condenser to rear evaporator line assembly (-front) and compressor to condenser line assembly (front).



Installation

Caution
• Tighten fixing bolts and nuts to specified torques. • It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks. • Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint. • Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system. • Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle. • Perform recharging for A/C system and check for refrigerant leakage.

1. Installation is in the reverse order of removal.

Condenser to Rear Evaporator Line Assembly (Rear) & Rear Evaporator to Compressor Line Assembly (Rear)

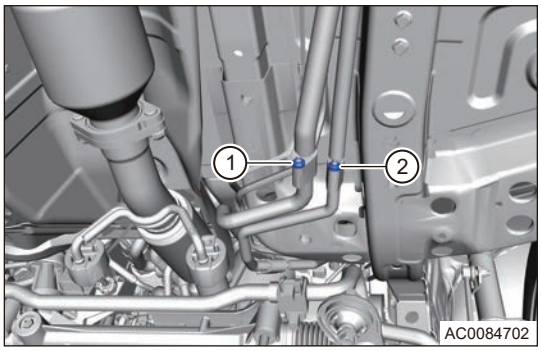
Removal

Warning
• Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/charge refrigerant. • Always keep work area in good ventilation. • Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

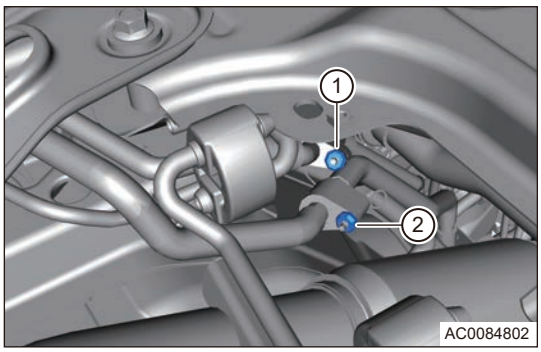
1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and ignition switch.

3. Disconnect the negative battery cable.
4. Remove the condenser to rear evaporator line assembly (rear) & rear evaporator to compressor line assembly (rear).
   a. Remove 1 coupling nut (1) between rear evaporator to compressor line assembly Ⅰ and condenser to rear evaporator line assembly (rear). Remove 1 coupling nut (2) between condenser to rear evaporator line assembly Ⅰ and condenser to rear evaporator line assembly (rear).

      Tightening torque: 9 ± 1 N•m



   b. Remove coupling nut (1) between rear evaporator to compressor line assembly (rear) and rear evaporator to compressor line assembly (front).
   c. Remove coupling nut (2) between condenser to rear evaporator line assembly (rear) and condenser to rear evaporator line assembly (rear).**Tightening torque: 9 ± 1 N•m**
   d. Remove condenser to rear evaporator line assembly (-rear) and compressor to condenser line assembly (rear).



Installation

Caution
• Tighten fixing bolts and nuts to specified torques. • It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks. • Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint. • Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system. • Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle. • Perform recharging for A/C system and check for refrigerant leakage.

1. Installation is in the reverse order of removal.

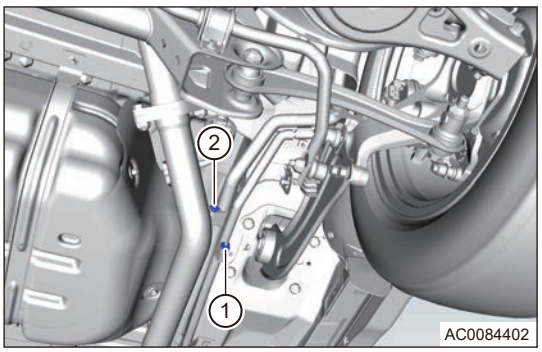
Rear Evaporator to Compressor Line Assembly Ⅰ and Condenser to Rear Evaporator Line Assembly Ⅰ

Removal

Warning
• Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/charge refrigerant. • Always keep work area in good ventilation. • Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

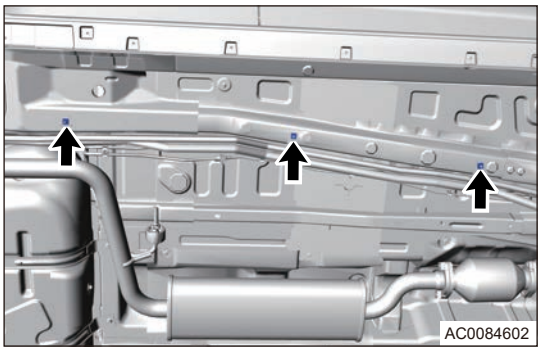
1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and ignition switch.
3. Disconnect the negative battery cable.
4. Remove rear evaporator to compressor line assembly Ⅰ and condenser to rear evaporator line assembly Ⅰ.
   a. Remove coupling nut (1) between condenser to rear evaporator line assembly Ⅰ and condenser to rear evaporator line assembly Ⅱ.

      Remove coupling nut (2) between rear evaporator to compressor line assembly Ⅰ and rear evaporator to compressor line assembly Ⅱ.



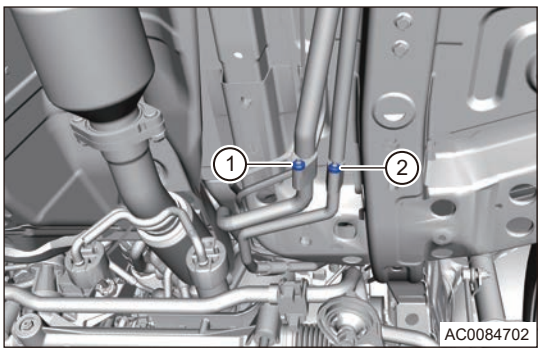
Tightening torque: 9 ± 1 N•m

   b. Remove 3 fixing nuts (arrow) between rear evaporator to compressor line assembly Ⅰ and condenser to rear evaporator line assembly Ⅰ.



Tightening torque: 9 ± 1 N•m

   c. Remove 1 coupling nut (1) between rear evaporator to compressor line assembly Ⅰ and condenser to rear evaporator line assembly (rear). Remove 1 coupling nut (2) between condenser to rear evaporator line assembly Ⅰ and condenser to rear evaporator line assembly (rear).



Tightening torque: 9 ± 1 N•m

   d. Remove rear evaporator to compressor line assembly Ⅰ and condenser to rear evaporator line assembly Ⅰ.

Installation

Caution
• Tighten fixing bolts and nuts to specified torques. • It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks. • Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint. • Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system. • Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle. • Perform recharging for A/C system and check for refrigerant leakage.

1. Installation is in the reverse order of removal.

Rear Evaporator to Compressor Line Assembly Ⅱ and Condenser to Rear Evaporator Line Assembly Ⅱ

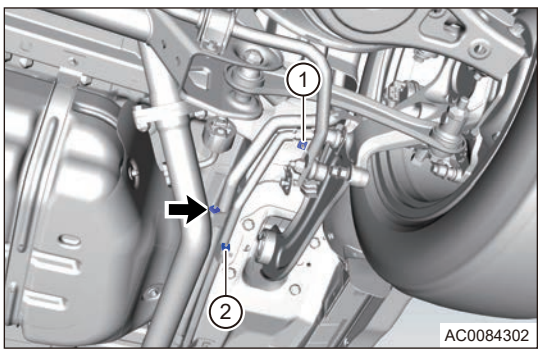
Removal

Warning
• Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant. • Always keep work area in good ventilation. • Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and ignition switch.
3. Disconnect the negative battery cable.
4. Remove rear evaporator to compressor line assembly Ⅱ and condenser to rear evaporator line assembly Ⅱ.
   a. Remove coupling nut (1) between condenser to rear evaporator line assembly Ⅰ and condenser to rear evaporator line assembly Ⅱ.

      Remove coupling nut (2) between rear evaporator to compressor line assembly Ⅰ and rear evaporator to compressor line assembly Ⅱ.

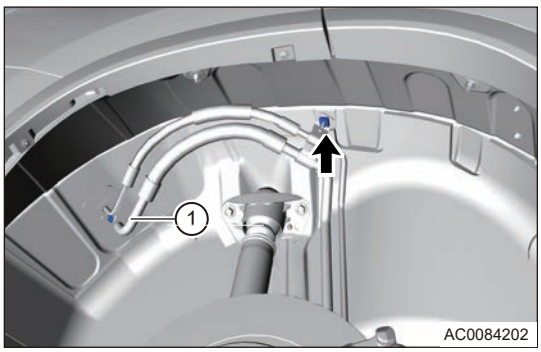
      Tightening torque: 9 ± 1 N•m



   b. Remove fixing nut (1) between rear evaporator to compressor line assembly Ⅱ and body.

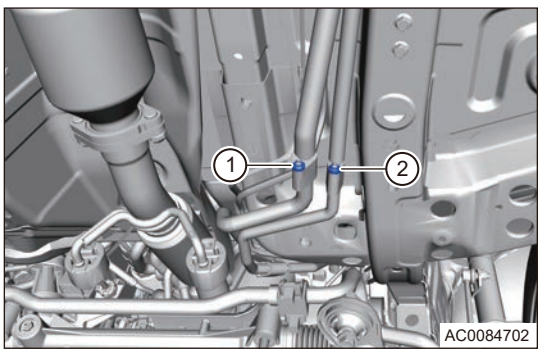
   c. Remove fixing bolt (1) between rear evaporator to compressor line assembly Ⅱ and condenser to rear evaporator line assembly Ⅱ and rear expansion valve. **Tightening torque: 9 ± 1 N•m**

   d. Remove fixing nut (arrow) between rear evaporator to compressor line assembly Ⅱ and condenser to rear evaporator line assembly Ⅱ and body.



   e. Remove 1 coupling nut (1) between rear evaporator to compressor line assembly Ⅰ and condenser to rear evaporator line assembly (rear). Remove 1 coupling nut (2) between condenser to rear evaporator line assembly Ⅰ and condenser to rear evaporator line assembly (rear).**Tightening torque: 9 ± 1 N•m**

   f. Remove rear evaporator to compressor line assembly Ⅱ and condenser to rear evaporator line assembly Ⅱ.



Installation

Caution
• Tighten fixing bolts and nuts to specified torques. • It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks. • Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint. • Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system. • Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle. • Perform recharging for A/C system and check for refrigerant leakage.

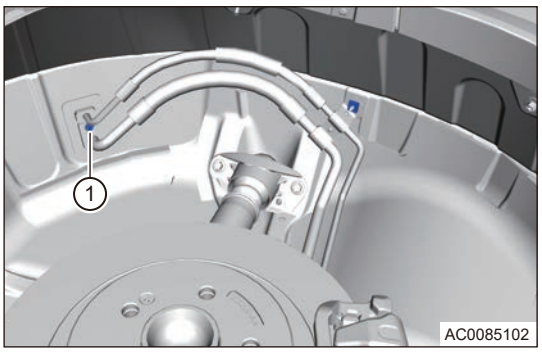
1. Installation is in the reverse order of removal.

Transition Line Assembly

Removal

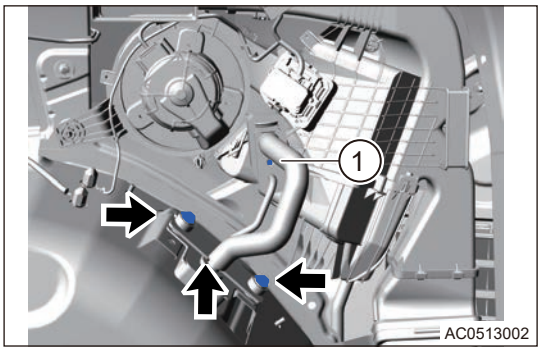
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the C-pillar lower protector.
4. Remove the C-pillar upper protector.
5. Remove the transition line assembly.
   a. Remove fixing bolt (1) between rear evaporator to compressor line assembly ｜ and condenser to rear evaporator line assembly ｜ and rear expansion valve.

      Tightening torque: 9 ± 1 N•m



   b. Remove 3 fixing bolts (arrow) from high/low pressure line clamp and remove fixing bolt (1) between transition line and rear expansion valve.

      Tightening torque: 9 ± 1 N•m



Installation

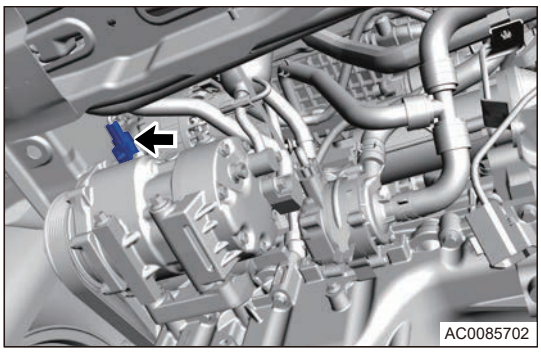
1. Installation is in the reverse order of removal.

Compressor Assembly

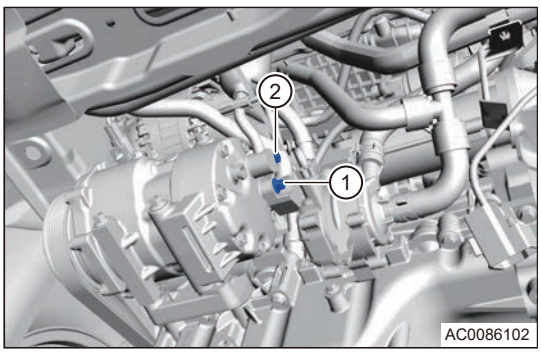
Removal

Caution
• Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant. • Always keep work area in good ventilation. • Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering. • If A/C compressor assembly has an internal malfunction, it is necessary to replace the A/C fluid line. Failure to do so may result in serious damage to A/C compressor assembly after replacing. • When replacing compressor assembly, it is necessary to measure the refrigerant oil amount removed from new A/C compressor assembly.

1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and ignition switch.
3. Disconnect the negative battery cable.
4. Remove the accessory drive belt.
5. Remove the engine lower protector assembly.
6. Remove the compressor assembly.
   a. Disconnect the compressor assembly wire harness connector (arrow).



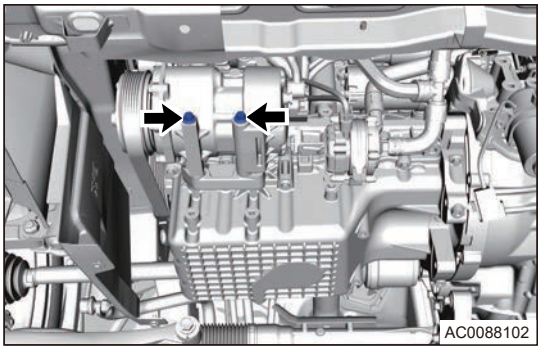
   b. Remove high/low pressure line from compressor.
      Remove 1 fixing bolt (1) between A/C low pressure line and compressor assembly, disengage A/C low pressure line from compressor assembly.
      Remove 1 fixing bolt (2) between A/C high pressure line and compressor assembly, disengage A/C high pressure line from compressor assembly.



Tightening torque: 25 ± 3 N•m

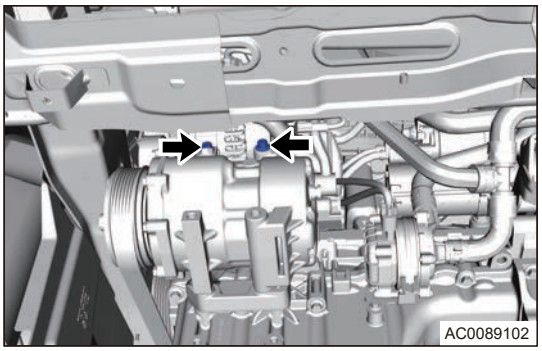
c. Remove 2 fixing bolts (arrow) between compressor assembly and lower mounting bracket.

Tightening torque: 22.5 ± 2.5 N•m



d. Remove 2 fixing bolts (arrow) between compressor assembly and upper mounting bracket.

Tightening torque: 22.5 ± 2.5 N•m



Installation

Caution
• Tighten fixing bolts and nuts to specified torques. • It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks. • Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint. • Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system. • Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle. • Perform recharging for A/C system and check for refrigerant leakage.

Installation is in the reverse order of removal.

A/C Pressure Switch

Removal

1. Turn ENGINE START STOP switch to OFF, unplug the wire harness connector of pressure switch.
2. Remove the pressure switch with tools. (There is a small amount of refrigerant leakage, pay attention to make protective measures.)

   Tightening torque: 10 ~ 12 N•m

Installation

1. Installation is in the reverse order of removal.

Caution

- Tighten fixing bolts to specified torques.
- It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks.
- Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint.
- Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system.
- Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle.
- When installing a new compressor assembly, always remove a certain amount of refrigerant oil from new A/C compressor assembly as specified.
- Perform recharging for A/C system and check for refrigerant leakage.

Condenser Assembly (w/ Receiver Drier)

Removal

Warning

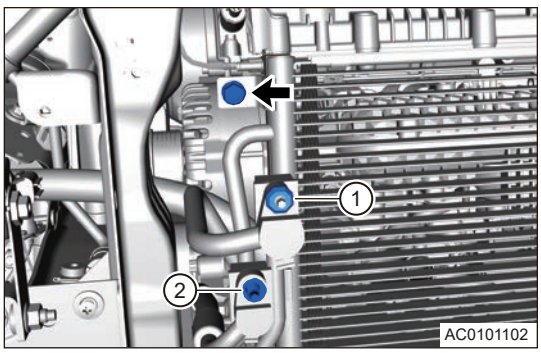
- Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant.
- Always keep work area in good ventilation.
- Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and ignition switch.
3. Disconnect the negative battery cable.
4. Remove the front bumper assembly (For details, refer to removal and installation of front bumper).
5. Remove the condenser assembly (w/ receiver drier).
   a. Using a tool, remove fixing bolt (arrow) between compressor to condenser line (2) and A/C coaxial (1), and detach A/C high/low pressure line from condenser assembly.

      Tightening torque: 9 ± 1 N•m

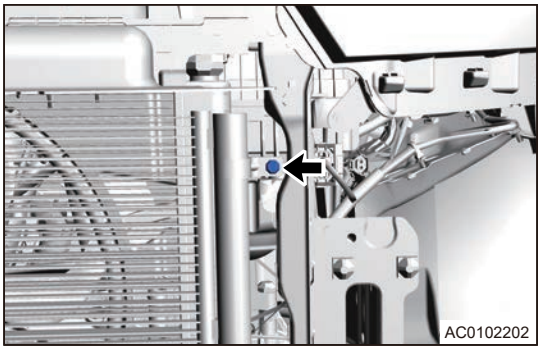
      - Remove fixing bolt (arrow) between radiator assembly and condenser assembly.

      Tightening torque: 5 ± 1 N•m



b. Remove fixing bolt (arrow) between radiator assembly and condenser assembly (left).

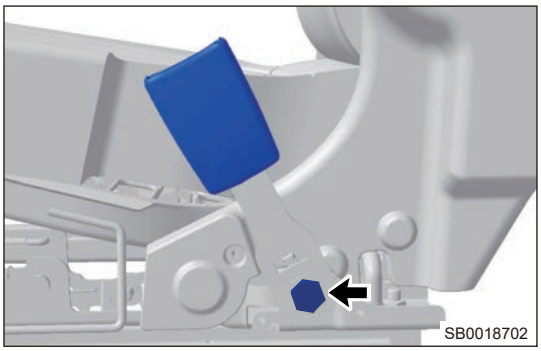
Tightening torque: 5 ± 1 N•m



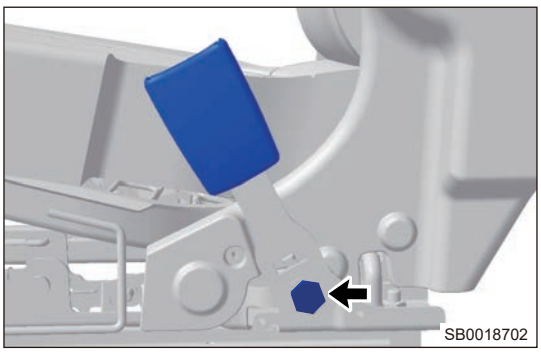
c. Carefully remove the condenser assembly (w/ receiver drier) from bottom.

Inspection

1. Check the condenser fins.
   a. If condenser fins are dirty, wash with water. And then dry fins with compressed air.



   b. If any condenser fin is bent, straighten it with the screwdriver or pliers.



Caution
DO NOT damage condenser fins.

Installation

1. Installation is in the reverse order of removal.

Caution

- Tighten fixing bolts to specified torques.
- It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks.
- Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint.
- Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system.
- Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle.
- When installing a new compressor assembly, always remove a certain amount of refrigerant oil from new A/C compressor assembly as specified.
- Perform recharging for A/C system and check for refrigerant leakage.