AIR CONDITIONING CONTROL SYSTEM

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Warnings and precautions

Precautions

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

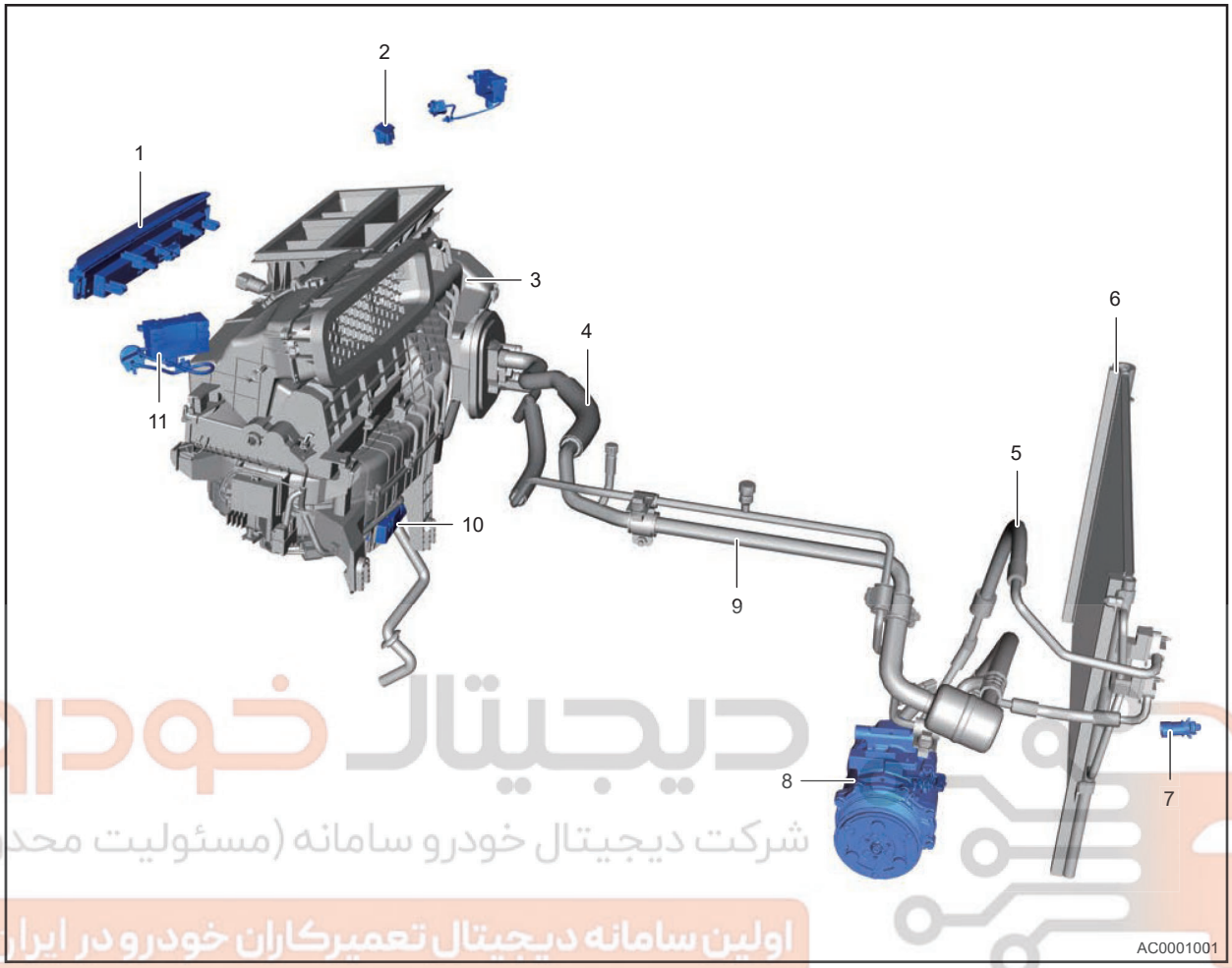
1. Take extra care when servicing A/C system under high pressure.
2. Because there is refrigerant under high pressure in A/C system. It must be serviced by professional technician. Otherwise, a wrong service procedure may cause a serious danger or fatal injury.
3. If A/C system pressure is released unexpectedly, 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.

System Overview

System Description

Air conditioning and distribution system: Air mixing and distributor part of HVAC, rear evaporator (not equipped on single-evaporator air conditioning), inner/outer circulation inlet, outlet and air filter. Control system: Automatic A/C control module, electric/automatic A/C control panel assembly, left/right mix damper motor, mode damper motor, inner/outer circulation motor, blower, blower speed regulation module, A/C pressure switch and evaporator temperature sensor as well as inside and outside PM2.5 sensors and air quality sensor for high-configuration automatic air conditioning.
Heating system: Heater core assembly, heating inlet hose, heating outlet hose and engine cooling circulation system.
Refrigerating system: Compressor assembly, condenser assembly, expansion valve, evaporator core assembly and A/C high and low pressure lines.

System Components Diagram



1	A/C Control Panel	7	Outside Temperature Sensor
2	Solar Sensor	8	A/C Compressor Assembly
3	HVAC Assembly	9	Condenser - Evaporator Line Assembly
4	Evaporator - Compressor Line Assembly	10	Automatic A/C Control Module
5	Compressor - Condenser Line Assembly	11	Anion Generator
6	Condenser Assembly (w/ Receiver Drier)		

A/C System Function Description

Blower Advanced ON Function

Conditions for blower advanced ON for 30 seconds:

1. Outside temperature is higher than 20°C
2. Battery voltage is higher than 12.5 V
3. Vehicle fortifying is released

Stopping conditions for blower advanced ON function:

1. Blower advanced ON operates for more than 30 seconds
2. Open any door
3. Vehicle is in fortifying mode

Blower Delay OFF Function
Enabling conditions for blower delay OFF function:

1. A/C was turned on during the last driving
2. Battery voltage is higher than 12.5 V
3. Blower starts to operate for 1 minute and then stops after vehicle enters fortifying mode for more than 5 minutes

PM2.5 Function
Inside air is repeatedly purified by an efficient A/C element. If the interior environment quality is poor, system will give corresponding prompts. Operate according to the prompts, press PM2.5 button, and the air purification function will be turned on.
Disabled conditions for purification function:

1. Outside temperature is lower than 2°C, room temperature is lower than 15°C, and engine coolant temperature is lower than 70°C
2. Front defroster is turned on
3. Wiper is turned on for more than 30 seconds

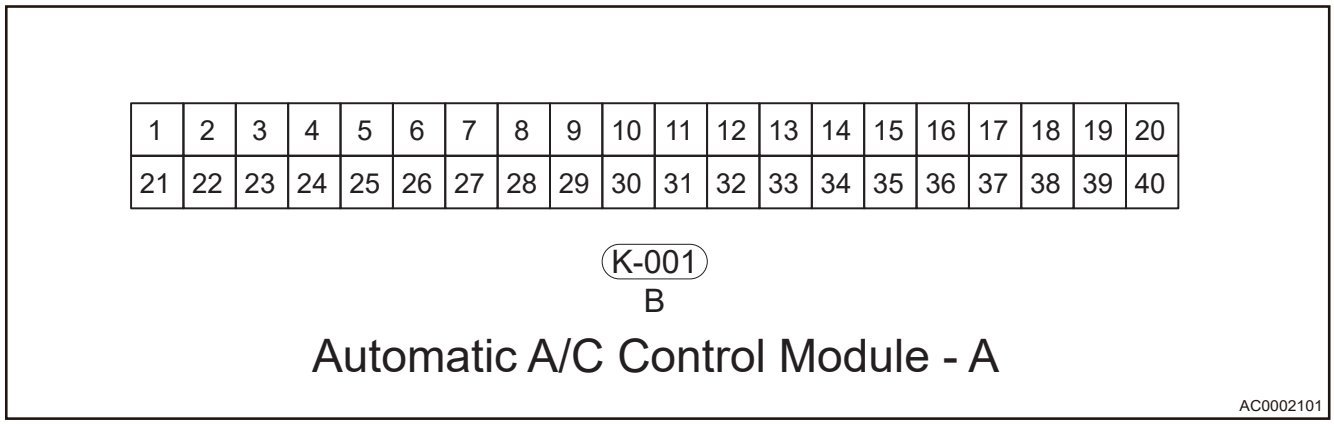
Anion Function (If Equipped)
Anion function and one-button purification function are turned on at the same time.
Purification process of anion: The activated charged anion has a strong adsorption and decomposition effect, which makes PM2.5 and other particles fall and settle down. At the same time, it decomposes harmful viruses and bacteria to make them lose vitality and become nourishing water molecules, so as to achieve the purpose of air purification.

Automatic Defogging Function
After the automatic defogging function is turned on, the air conditioning will automatically remove the fog from front windshield when a fogging risk is collected on front windshield to ensure the driving safety.

System Schematic Diagram

Module Terminal Definition

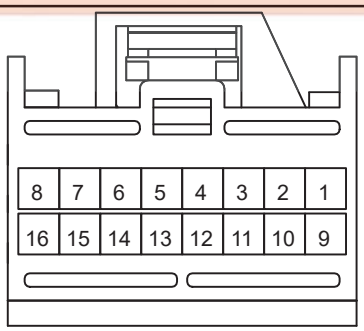
Automatic A/C module A



Pin	Definition	Pin	Definition
1	Left Mix Damper Motor P1	2	Left Mix Damper Motor P4
3	Left Mix Damper Motor P3	4	Right Mix Damper Motor P2

Pin	Definition	Pin	Definition
5	Right Mix Damper Motor P1	6	Right Mix Damper Motor P4
7	Right Mix Damper Motor P3	8	Blower Relay
9	-	10	CAN-H
11	CAN-L	12	KL15
13	Mode Damper Motor P2	14	Mode Damper Motor P1
15	Mode Damper Motor P4	16	Mode Damper Motor P3
17	Inner/Outer Circulation Motor P4	18	Inner/Outer Circulation Motor P3
19	Inner/Outer Circulation Motor P2	20	Inner/Outer Circulation Motor P1
21	Ground	22	Sensor Ground
23	-	24	Right Solar Sensor
25	Left Solar Sensor	26	-
27	Outlet Temperature Sensor	28	Evaporator Temp Sensor +
29	Outer Temp Sensor +	30	-
31	Left Foot Outlet	32	Feedback Signal
33	Blower Speed Control	34	Right Foot Outlet
35	Sensor Power Supply	36	-
37	KL30	38	ECV+
39	ECV-	40	Left Mix Damper Motor P2

Automatic A/C Control Panel



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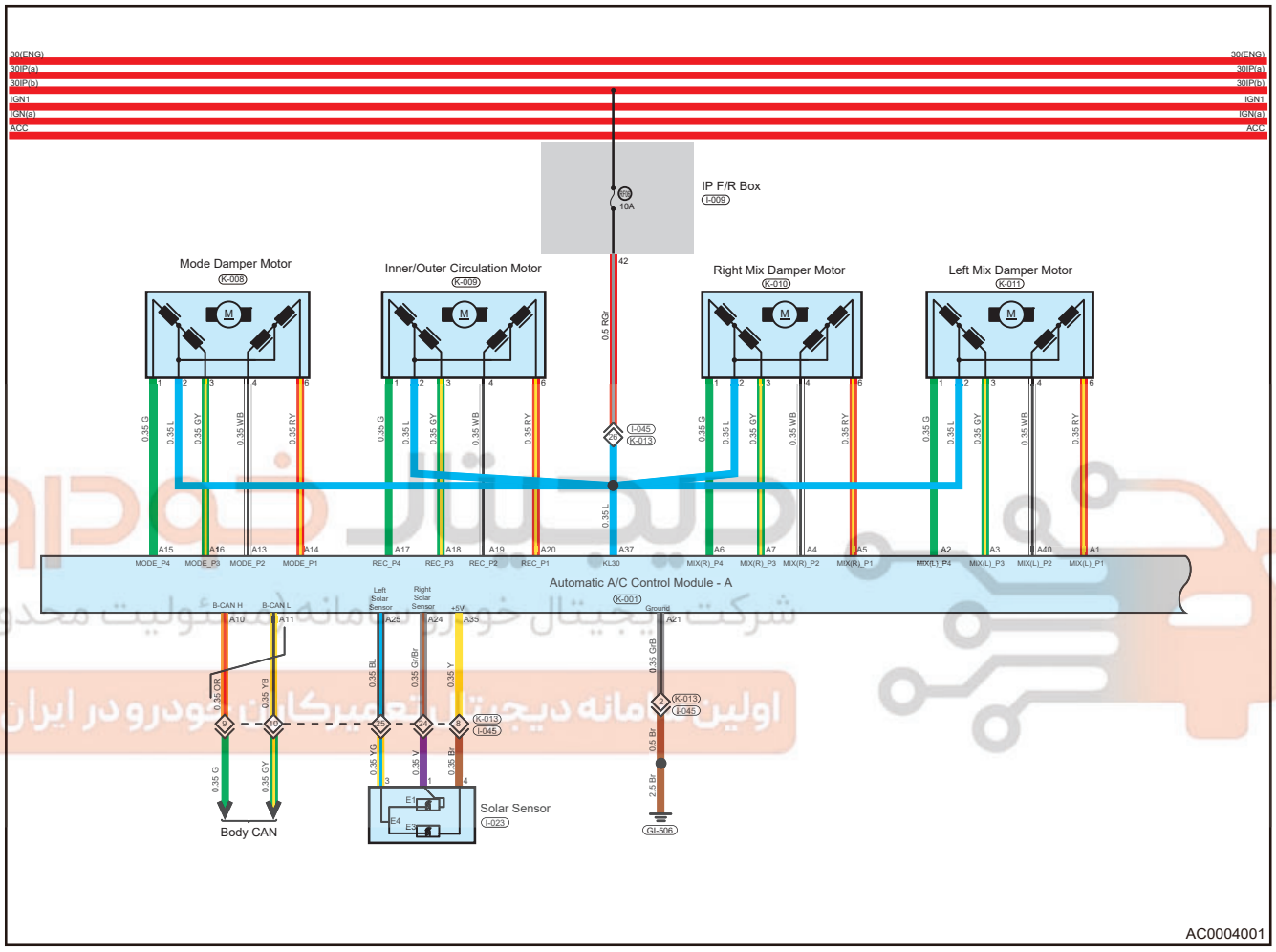
Pin	Definition	Pin	Definition
1	-	2	-
3	Rear Defroster Output	4	B-CAN H
5	B-CAN L	6	-
7	Ground	8	KL15
9	-	10	-

Pin	Definition	Pin	Definition
11	-	12	-
13	-	14	-
15	-	16	KL30

Circuit Diagram



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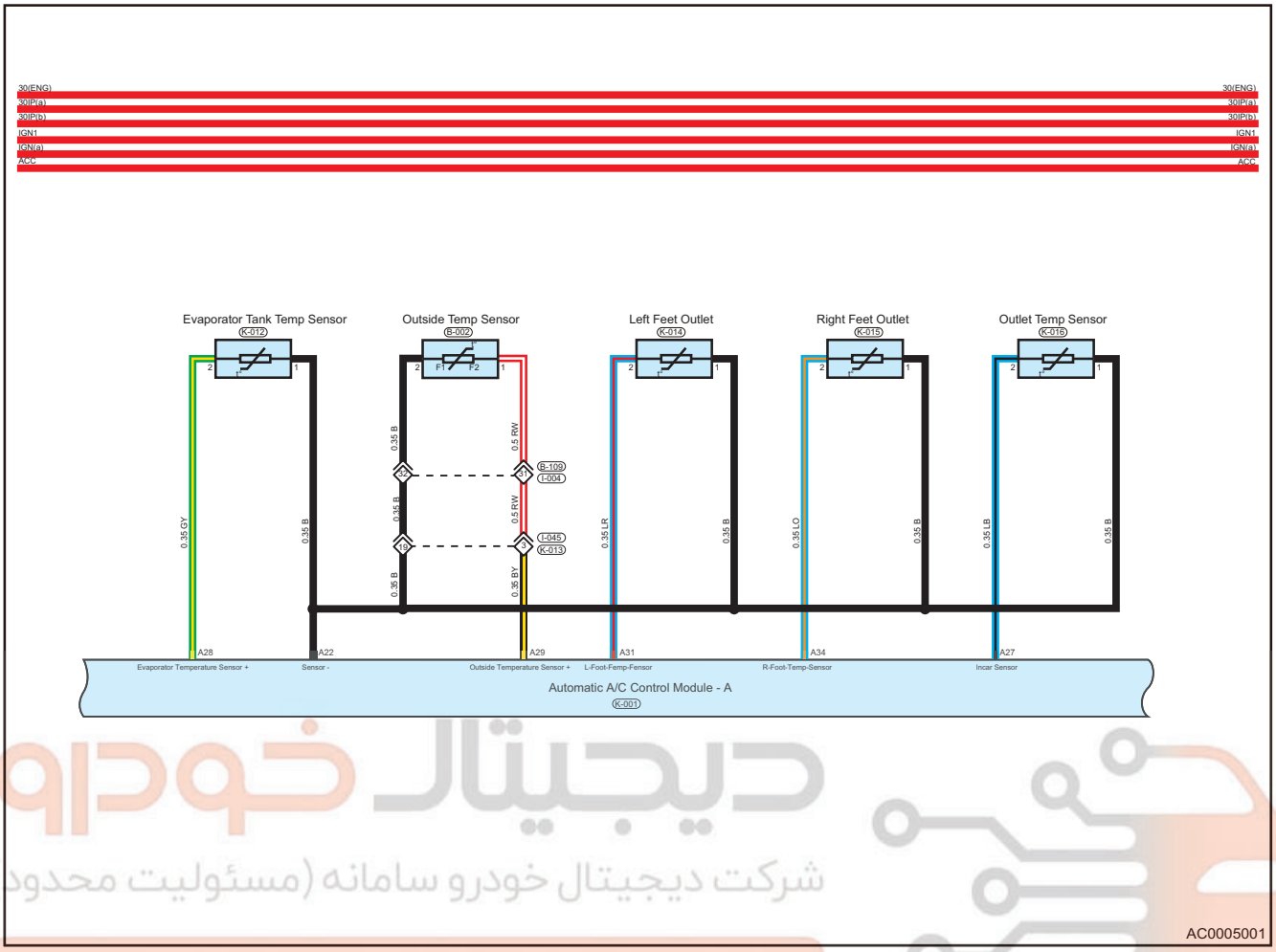
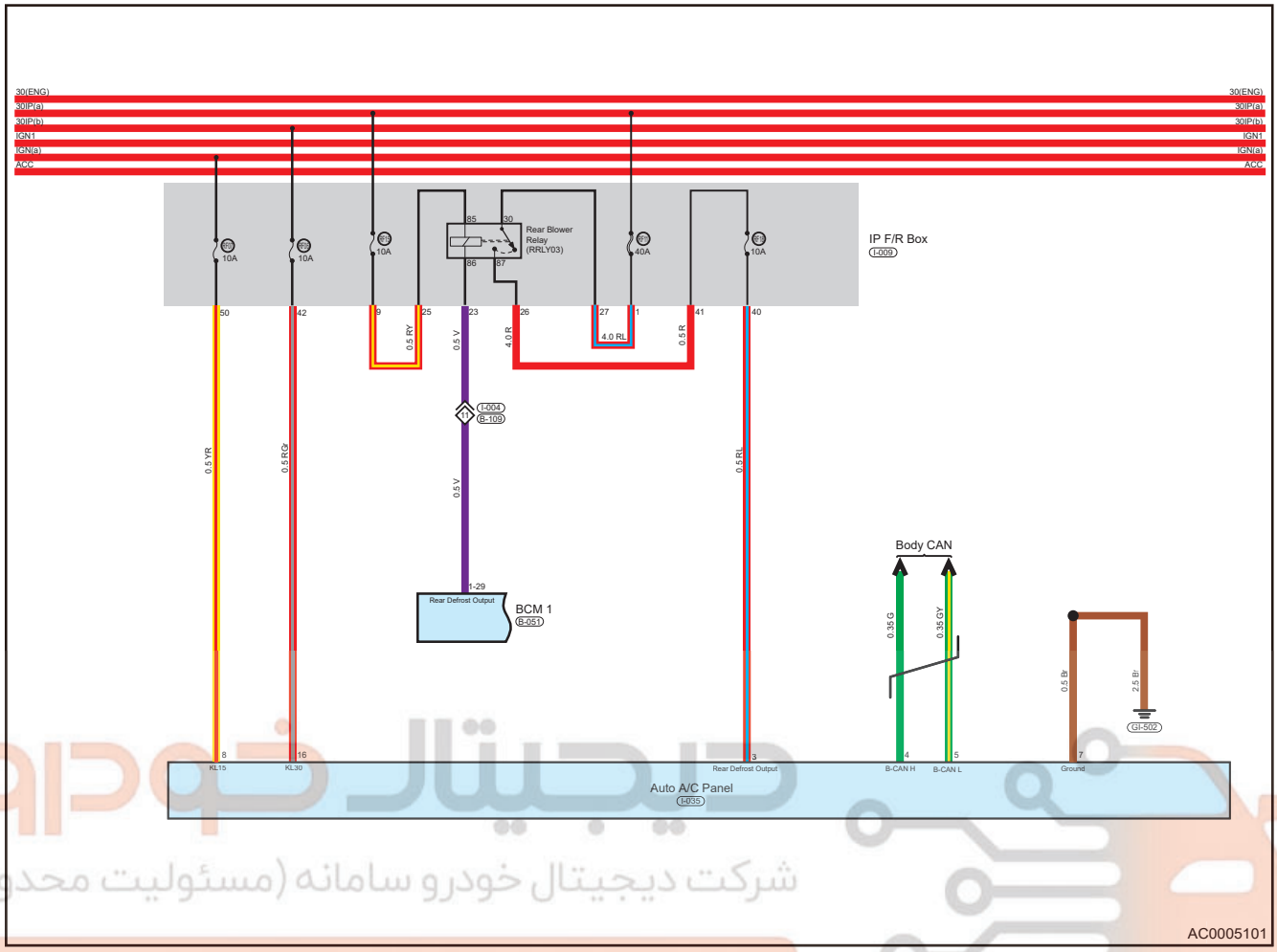
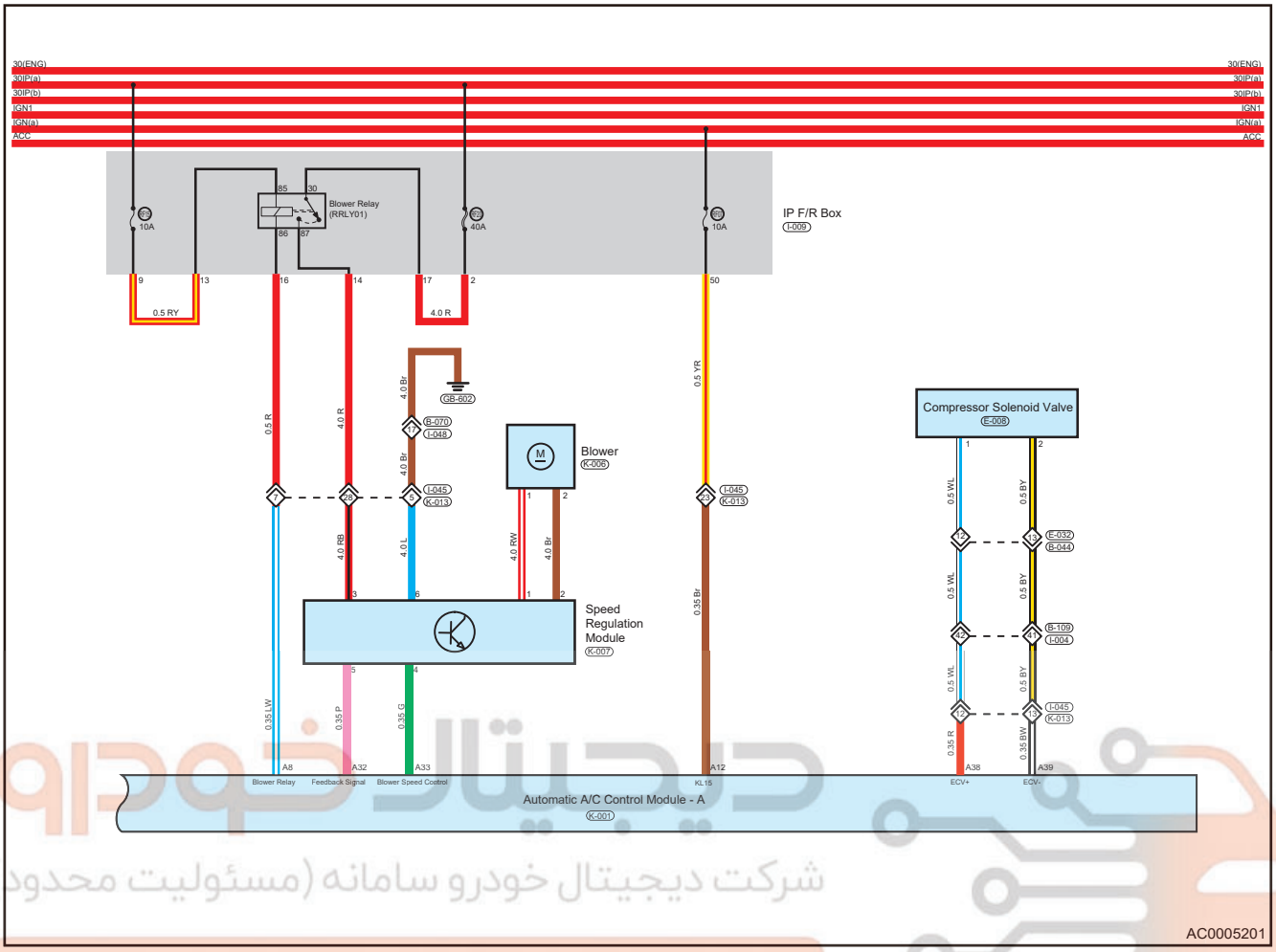






Diagnostic Information and Steps

Problem Symptoms Table

Hint:

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)
	Heating pipe (blocked or damaged)
	Heater core assembly (blocked or damaged)
	Wire harness or connector (open or short)

Symptom	Possible Cause
A/C no cooling	Leak in system
	Refrigerant (overcharged)
	A/C pressure switch (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
	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)

Symptom	Possible Cause
	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)
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 Tools

Digital Multimeter
When using digital multimeter:

- Troubleshoot electrical malfunctions and wire harness system.
- Look for basic malfunction.
- Measure voltage, current and resistance.

Diagnostic Help

- Connect diagnostic tester (the latest software) to diagnostic interface, and make it communicate with vehicle electronic module through data network.
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If Diagnostic Trouble Code (DTC) cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all system grounds related to the latest DTCs.
- If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Turn ENGINE START STOP switch to ON.
- Use the diagnostic tester to record and clear DTCs stored in the system.
- Turn ENGINE START STOP switch to OFF and wait several seconds.
- Turn ENGINE START STOP switch to ON and check DTCs in the system again.
- If DTC is detected, it indicates current malfunction.
- 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.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate the conditions under which DTC was reset.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect the mounting areas of instrument cluster, wire harness or wire harness connector and so on for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- Remove instrument cluster from malfunctioning vehicle, then install it to a new vehicle and perform a test. If this DTC cannot be cleared, instrument cluster is malfunctioning. If DTC can be cleared, reinstall instrument cluster to original vehicle.
- 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

Groundings are very important to entire circuit system, which are normal or not can seriously affect the entire circuit system. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) and oxidation may increase load resistance. This case will seriously affect normal operation of circuit. Check the ground points as follows:

- Remove ground bolt or nut.

- Check all contact surfaces for tarnish, dirt and rust, etc.
- Clean as necessary to ensure that contact is in good condition.
- Reinstall ground bolt or nut securely.
- Check if any additional accessories interfere with ground circuit.
- 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.

Diagnosis Procedure

Hint:
Use following procedures to troubleshoot the air conditioning 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	Proceed 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	Proceed to
Problem is not resolved	A
Problem is resolved	B

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

B

5	**According to air conditioning system malfunction repair completion inspection and delivery, confirm if malfunction is repaired**

Result

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

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

B

6	**Finished**

Diagnostic Trouble Code (DTC) Chart

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
B1404_11	Filtered Evaporator Temperature Circuit Short to Ground	CLM detects that sensor output voltage is equal to 0 V continually	CLM detects that normal function can be restored only after temperature sensor side voltage returns to a stable normal value.	• Short in temperature sensor itself • Short in connecting wire between CLM and temperature sensor • Internal fault in CLM	Sensor uses a pull-up resistor of 6.8K for 5 V power supply. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B1404_15	Filtered Evaporator Temperature Circuit Short to Battery or Open	CLM detects that sensor output voltage is equal to 5V continually		• Short in temperature sensor itself • Short in connecting wire between CLM and temperature sensor • Internal fault in CLM	Sensor uses a pull-up resistor of 6.8K for 5 V power supply. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B1409_11	Mode Motor Step Circuit Short to Ground	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and the returned data is not all 0.	SPI data of each step motor driver IC sent by MCU is the same as the returned data of step motor driver IC, which indicates that step motor connection is normal,	• Short to power supply in connecting wire • Short to power supply in step motor internal circuit • Short to power supply in CLM internal circuit	Integrated chip overcurrent protection

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
B1409_12	Mode Motor Step Circuit Short to Battery	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and all the returned data are 0.	and then the normal function can be restored.	• Open or short to ground in connecting wire • Open or short to ground in step motor internal circuit • Open or short to ground in CLM internal circuit	Integrated chip overcurrent protection
B1410_11	Rec Motor Step Circuit Short to Ground	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and all the returned data are 0.	SPI data of each step motor drive IC sent by MCU is the same as return data of step motor drive IC, which indicates the step motor connection is normal, and normal function can be restored.	• Open or short to ground in connecting wire • Open or short to ground in step motor internal circuit • Open or short to ground in CLM internal circuit	Integrated chip overcurrent protection
B1410_12	Rec Motor Step Circuit Short to Battery	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and all the returned data are 0.		• Short to power supply in connecting wire • Short to power supply in step motor internal circuit • Short to power supply in CLM internal circuit	Integrated chip overcurrent protection
B1414_11	Mix Flap Motor Step (-Right Side) Circuit	SPI data of each step motor driver IC sent by MCU is different	SPI data of each step motor drive IC sent by MCU is the same as return data	• Open or short to ground in connecting wire • Open or short to ground in step motor internal circuit	Integrated chip overcurrent protection

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
	Short to Ground	from the returned data of step motor driver IC, and all the returned data are 0.	of step motor drive IC, which indicates the step motor connection is normal, and normal function can be restored.	• Open or short to ground in CLM internal circuit	
B1414_12	Mix Flap Motor Step (-Right side) Circuit Short to Battery	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and all the returned data are 0.		• Short to power supply in connecting wire • Short to power supply in step motor internal circuit • Short to power supply in CLM internal circuit	Integrated chip overcurrent protection
B1412_11	Mix Flap Motor Step (-Left Side) Circuit Short to Ground	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and all the returned data are 0.	SPI data of each step motor drive IC sent by MCU is the same as return data of step motor drive IC, which indicates the step motor connection is normal, and normal function can be restored.	• Open or short to ground in connecting wire • Open or short to ground in step motor internal circuit • Open or short to ground in CLM internal circuit	Integrated chip overcurrent protection
B1412_12	Mix Flap Motor Step (-Left Side) Circuit Short to Battery	SPI data of each step motor driver IC sent by MCU is different from the returned data of step motor driver IC, and all the		• Short to power supply in connecting wire • Short to power supply in step motor internal circuit • Short to power supply in CLM internal circuit	Integrated chip overcurrent protection

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
		returned data are 0.			
B1408_29	Blower Voltage Gear Not Adjustable	The blower feedback voltage is 0 when CLM detects that the blower is in 1st gear, however, it will not generate corresponding feedback voltage as the change of blower gear.	When CLM detects that blower feedback voltage changes with band (-tolerance of ±10% is allowable), the normal function can be restored only when blower operates normally.	• CCP button invalid • CLM output PWM signal fault • VLCL blower driver circuit fault	Integrated chip overcurrent protection
B1408_31	Blower Voltage Not Output	Blower voltage outputs low level continuously when CLM detects that blower is in 1st gear.		• CCP button invalid • CLM output PWM signal fault • VLCL blower driver circuit fault	Integrated chip overcurrent protection
B1403_11	Ambient Temperature Sensor	CLM detects that sensor output voltage is equal to 0 V continually	CLM detects that normal function can be restored only after temperature sensor side voltage returns to a stable normal value.	• Short in temperature sensor itself • Short in connecting wire between CLM and temperature sensor • Internal fault in CLM	Sensor uses a pull-up resistor of 10K for 5 V power supply. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
B1403_15	External Ambient Temperature Sensor Open	CLM detects that sensor output voltage is equal to 5V continually	CLM returns to normal function until it detects that voltage at solar sensor end returns to stable normal value.	• Short in temperature sensor itself • Short in connecting wire between CLM and temperature sensor • Internal fault in CLM	Sensor uses a pull-up resistor of 10K for 5 V power supply. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B1406_14	Solar Sensor (-Left) Circuit Short to Ground or Open	CLM detects that sensor output voltage is equal to 0 V continually		• Short in sensor itself • Short in connecting wire between CLM and sensor • Internal fault in CLM	Sensor connects a pull-down resistor of 7.68K to ground. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B1406_12	Solar Sensor (-Left) Short to Power Supply	CLM detects that sensor output voltage is equal to 5V continually		• Open in sensor itself • Open in connecting wire between CLM and sensor • Internal fault in CLM	Sensor connects a pull-down resistor of 7.68K to ground. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
B1407_14	Solar Sensor (Right)	CLM detects that sensor output voltage is equal to 0 V continually	CLM returns to normal function until it detects that voltage at solar sensor end returns to stable normal value.	• Short in sensor itself • Short in connecting wire between CLM and sensor • Internal fault in CLM	Sensor connects a pull-down resistor of 7.68K to ground. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B1407_12	Solar Sensor (-Right) Short to Power Supply	CLM detects that sensor output voltage is equal to 5V continually		• Open in sensor itself • Open in connecting wire between CLM and sensor • Internal fault in CLM	Sensor connects a pull-down resistor of 7.68K to ground. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B1418_11	Incar PM2.5 Sensor Circuit Short to Ground	When sensor output is continuou-sly low level	Duty ratio of sensor output is within normal range	Short to ground in sensor output	Sensor acquisition circuit collects high and low level signals by itself, it will not cause any adverse effects on the hardware circuit no matter port is short to ground or power supply.
B1418_15	Incar PM2.5 Sensor Circuit Short to Battery or Open	When sensor output is continuou-sly high level		Short to power supply or open in sensor output circuit	Sensor acquisition circuit collects high and low level signals by itself, it will not cause any adverse effects on the hardware circuit no

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
					matter port is short to ground or power supply.
B141B_11	Incar Temperature Sensor Circuit Short to Ground	CLM detects that sensor output voltage is equal to 0 V continually	CLM detects that normal function can be restored only after temperature sensor side voltage returns to a stable normal value.	• Short to ground in sensor output • Short in connecting wire between CLM and temperature sensor • Internal fault in CLM	Sensor connects a pull-down resistor of 10K to ground. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B141B_12	Incar Temperature Sensor Circuit Short to Battery	CLM detects that sensor output voltage is equal to 5V continually		• Short in temperature sensor itself • Short in connecting wire between CLM and temperature sensor • Internal fault in CLM	Sensor connects a pull-down resistor of 10K to ground. ADC sampling end is connected to the sampling point through a 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B141A_11	Outcar PM2.5 Sensor Circuit Short to Ground	When sensor output is continuously low level	Duty ratio of sensor output is within normal range	Short to ground in sensor output	Sensor acquisition circuit collects high and low level signals by itself, it will not cause any adverse effects on the hardware circuit no matter port is short to ground or power supply.
B141A_15	Outcar PM2.5 Sensor Circuit	When sensor output is		Short to power supply or open in sensor output circuit	Sensor acquisition circuit collects high and low level signals

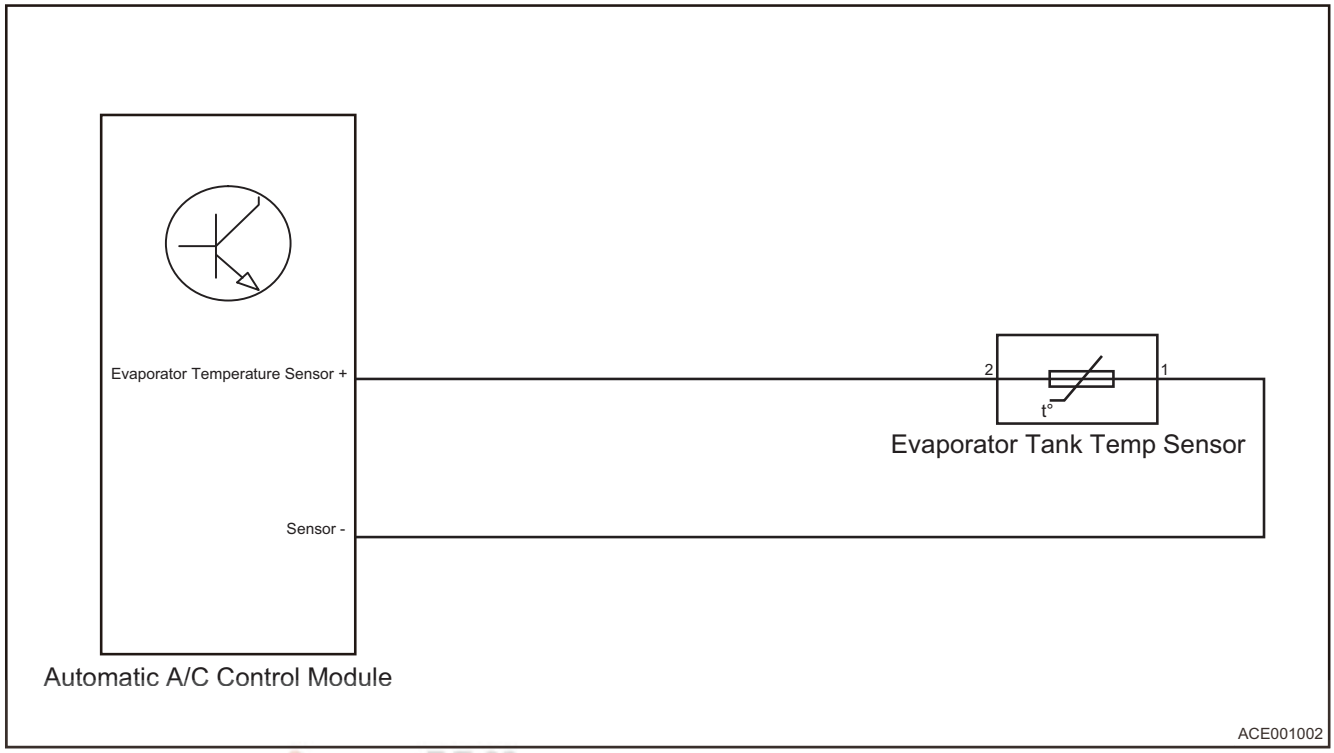
DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
	Short to Battery or Open	continuously high level			by itself, it will not cause any adverse effects on the hardware circuit no matter port is short to ground or power supply.
B1419_11	AQS Sensor Circuit Short to Ground	When sensor output is continuously low level	Duty ratio of sensor output is within normal range	Short to ground in sensor output	Sensor acquisition circuit collects high and low level signals by itself, it will not cause any adverse effects on the hardware circuit no matter port is short to ground or power supply.
B1419_15	AQS Sensor Circuit Short to Battery or Open	When sensor output is continuously high level		Short to power supply or open in sensor output circuit	Sensor acquisition circuit collects high and low level signals by itself, it will not cause any adverse effects on the hardware circuit no matter port is short to ground or power supply.
B1419_09	AQS Sensor Component Failure	The feedback pwm of component is 97±1%		Air quality sensor self-diagnosis error	Sensor acquisition circuit collects high and low level signals by itself, it will not cause any adverse effects on the hardware circuit no matter port is short to ground or power supply.
B1416_1C	Left Anion Generator	CLM detects that anion feedback voltage is out of normal range of 0.1 to 4.9 V	CLM returns to normal function until it detects that anion feedback voltage returns to stable normal value.	1: Anion generator itself fault 2: Short in connecting wire between CLM and anion 3: Internal fault in CLM	After anion feedback circuit divides the voltage signal via resistors of 51K and 36K, it will be connected to sampling point through 4.7K resistor. When there is open or short in temperature resistor, ADC sampling pin is pulled to 5 V through
B1417_1C	Right Anion	CLM detects that anion			

DTC	Description	Detection Condition	Recovery Condition	Possible Causes	Malfunction Protection Measures
	Generator	feedback voltage is out of normal range of 0.1 to 4.9 V			a 4.7K resistor or grounded, which will not cause any adverse effects on the hardware circuit.
B141C_01	Fragrance Controller Step Motor	LIN bus receives 0x2B message that indicates a step motor fault	LIN bus receives 0x2B message that does not indicate a step motor fault	1: Short to power supply in connecting wire2: Short to power supply in step motor internal circuit3: Short to power supply in fragrance internal circuit	Integrated chip overcurrent protection
B141D_01	Fragrance Controller Fan	LIN bus receives 0x2B message that indicates a fan fault	LIN bus receives 0x2B message that does not indicate a fan fault	Fan driver circuit fault	Integrated chip overcurrent protection
B1BE0_16	Power Supply Undervoltage	Less than 9 V	Returns to normal function until the voltage returns to stable normal value.	1: Battery2: Wire harness or connector	/
B1BE0_17	Power Supply Overvoltage	More than 16 V			/

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 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 the 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**

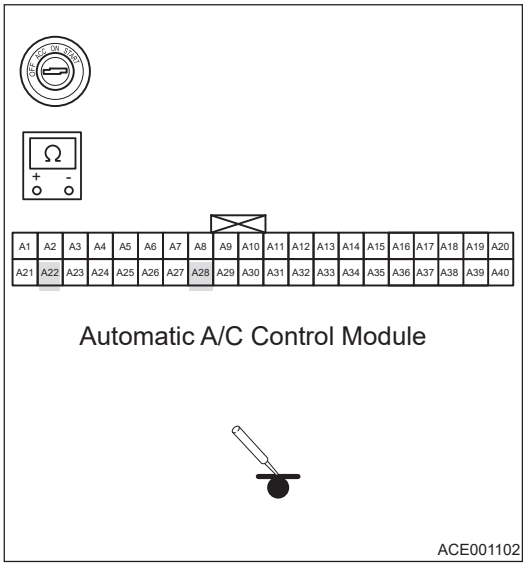
OK

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
A/C control module (to evaporator + terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to evaporator - terminal) - Body ground	Ignition switch OFF	∞



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

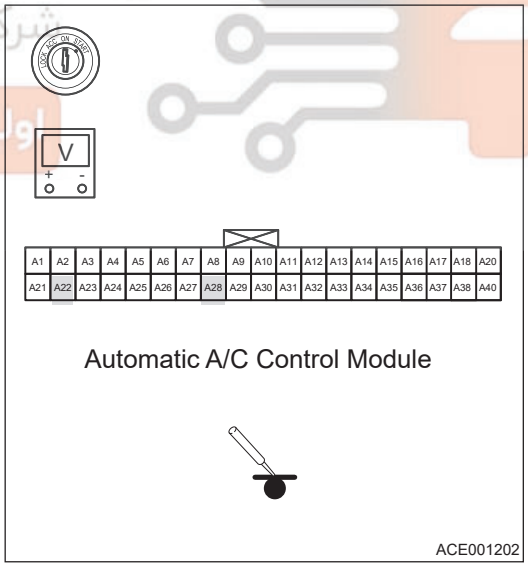
OK

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
A/C control module (to evaporator + terminal) - Body ground	Ignition switch ON	0 V
A/C control module (to evaporator - terminal) - Body ground	Ignition switch ON	0 V



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

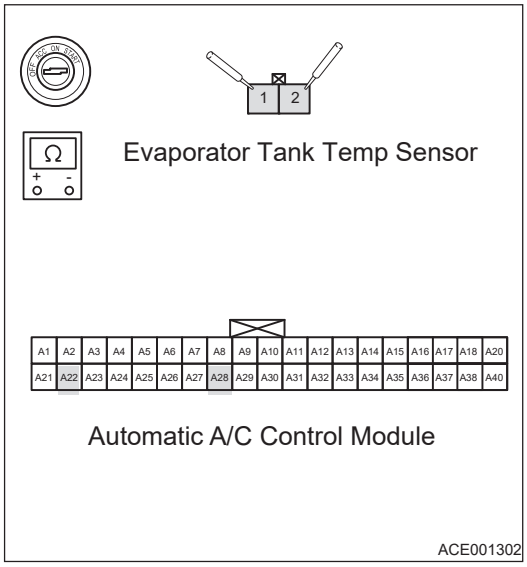
OK

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
A/C control module (to evaporator + terminal) - Evaporator temperature sensor (2)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to evaporator - terminal) - Evaporator temperature sensor (1)	Ignition 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.

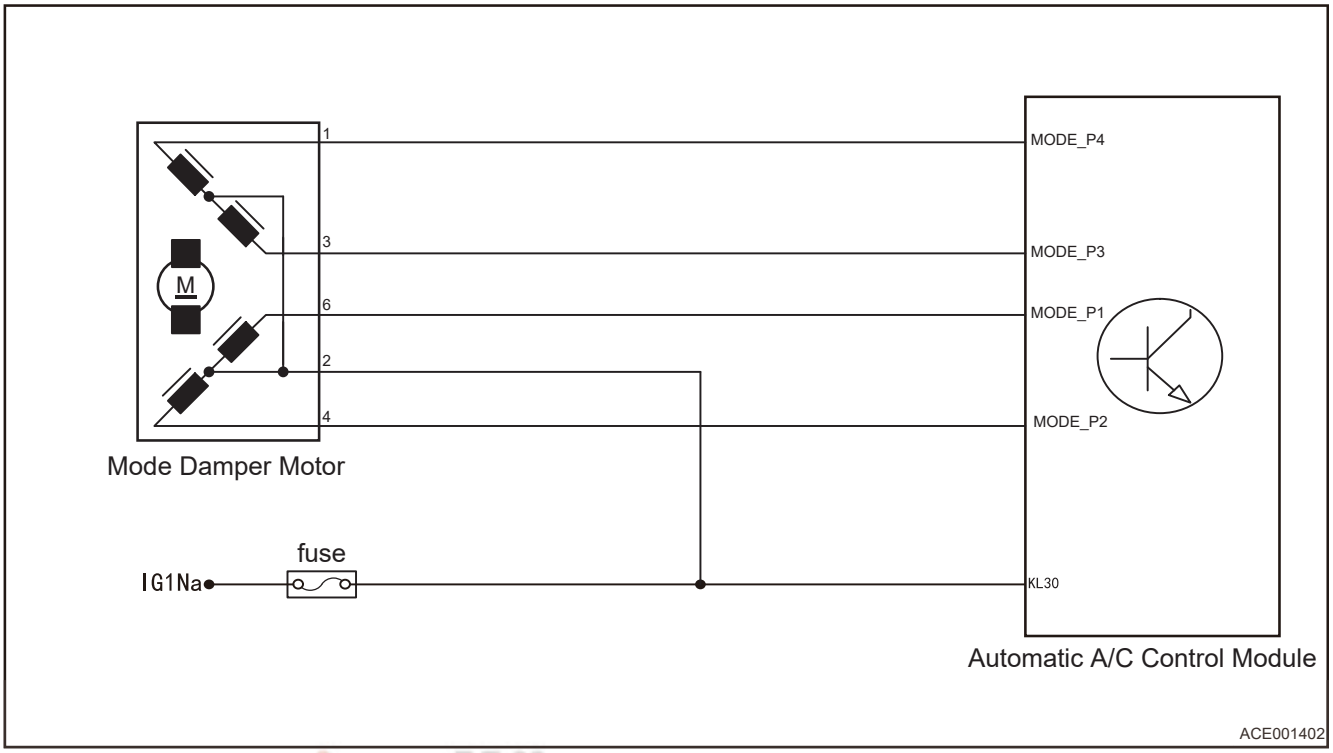
NG → **Replace with a new ECU to check if fault reoccurs.**

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 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

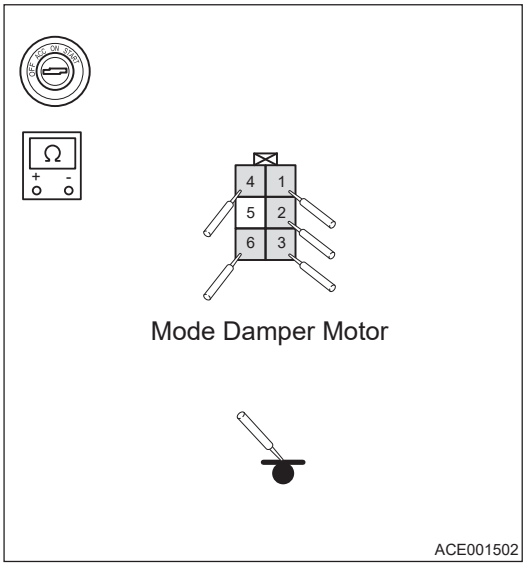
2	**Check resistance between mode motor and ground**

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
Mode damper motor (1) - Body ground	Ignition switch OFF	∞
Mode damper motor (3) - Body ground	Ignition switch OFF	∞
Mode damper motor (6) - Body ground	Ignition switch OFF	∞
Mode damper motor (2) - Body ground	Ignition switch OFF	∞
Mode damper motor (4) - Body ground	Ignition switch OFF	∞



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

OK →

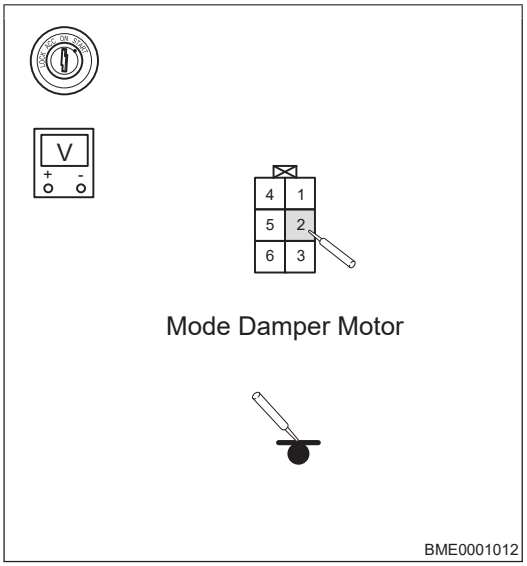
3	**Check mode motor power supply voltage**

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
Mode damper motor (2) - Body ground	Ignition switch ON	12 V



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

OK

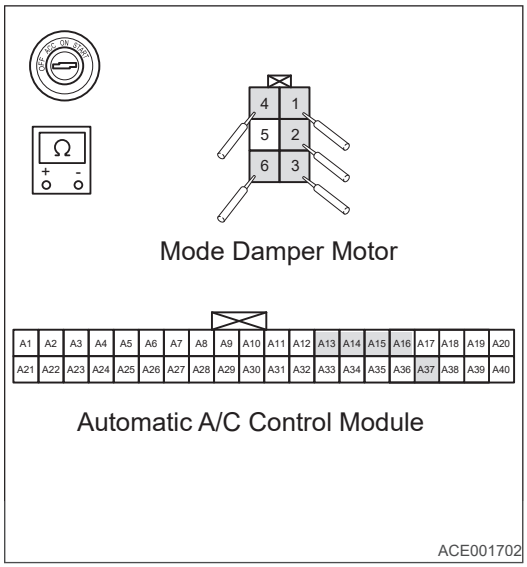
4	Check resistance between mode motor and A/C control module

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
Mode damper motor (1) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mode damper motor (3) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mode damper motor (6) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mode damper motor (2) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mode damper motor (4) - A/C control module (to terminal)	Ignition 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.

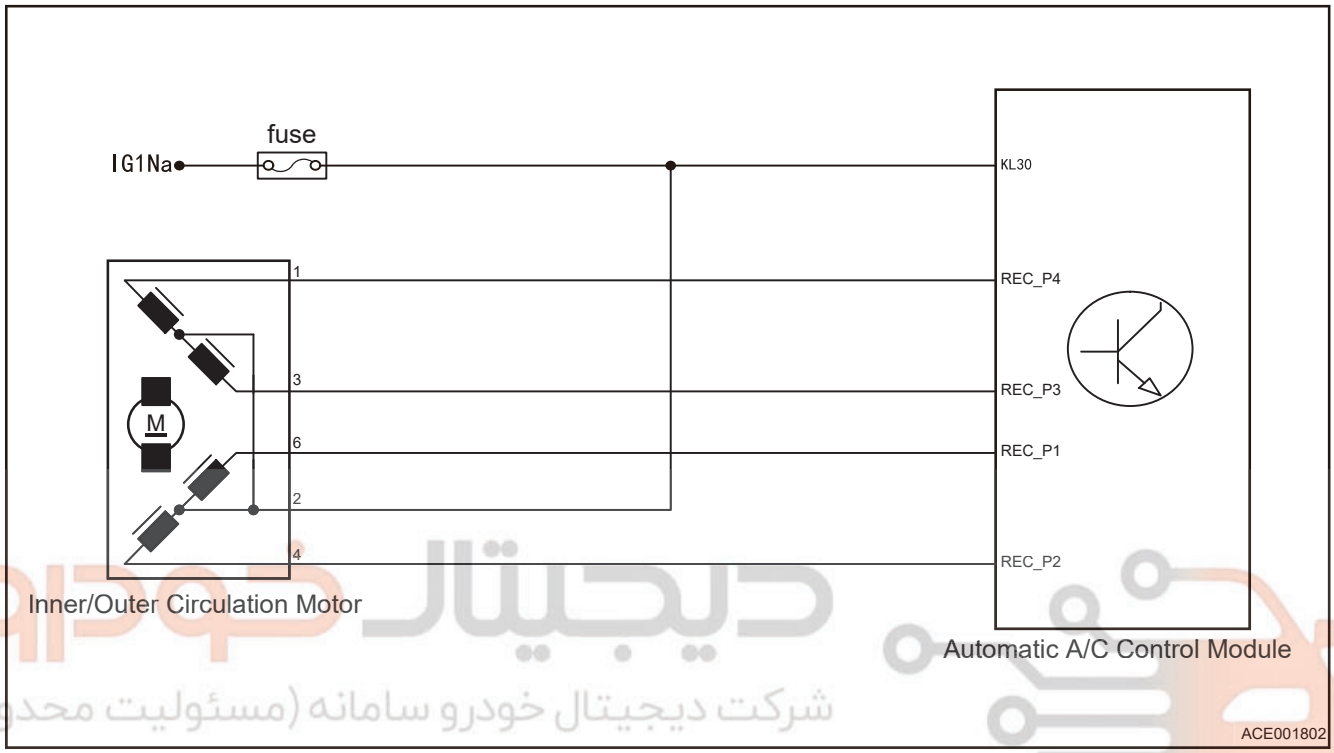
NG → **Replace with a new ECU to check if fault reoccurs.**

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 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

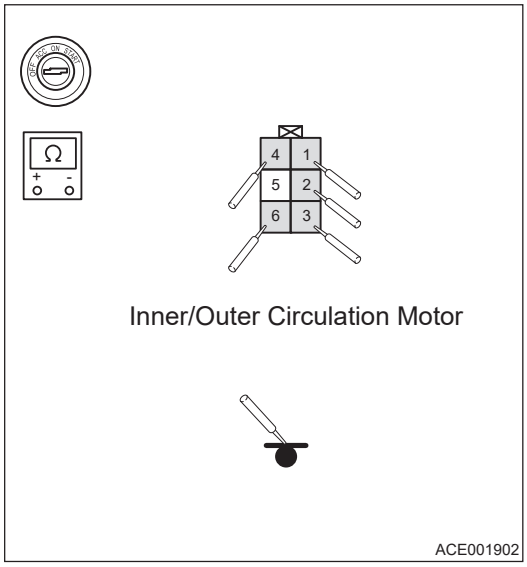
2	**Check resistance between inner/outer circulation motor and ground**

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
Inner/outer circulation motor (1) - Body ground	Ignition switch OFF	∞
Inner/outer circulation motor (2) - Body ground	Ignition switch OFF	∞
Inner/outer circulation motor (3) - Body ground	Ignition switch OFF	∞
Inner/outer circulation motor (4) - Body ground	Ignition switch OFF	∞
Inner/outer circulation motor (6) - Body ground	Ignition switch OFF	∞



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

OK →

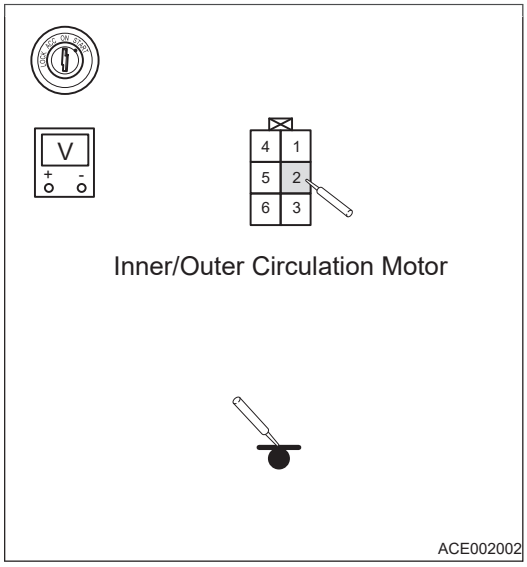
3	**Check inner/outer circulation motor power supply voltage**

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
Inner/outer circulation motor (2) - Body ground	Ignition switch ON	12 V



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

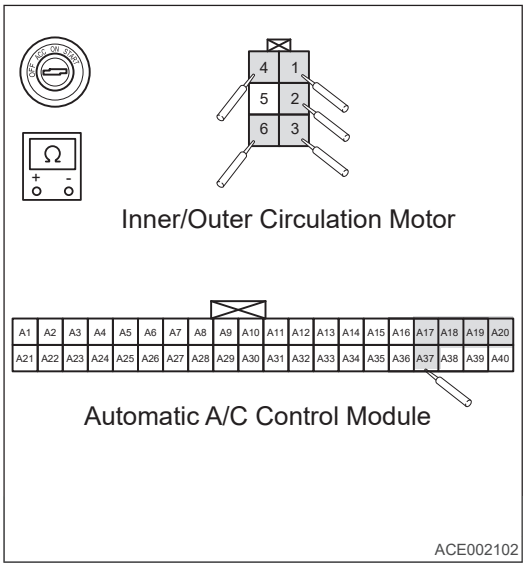
OK

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
Inner/outer circulation motor (1) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Inner/outer circulation motor (3) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Inner/outer circulation motor (6) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Inner/outer circulation motor (2) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Inner/outer circulation motor (4) - A/C control module (to terminal)	Ignition 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.

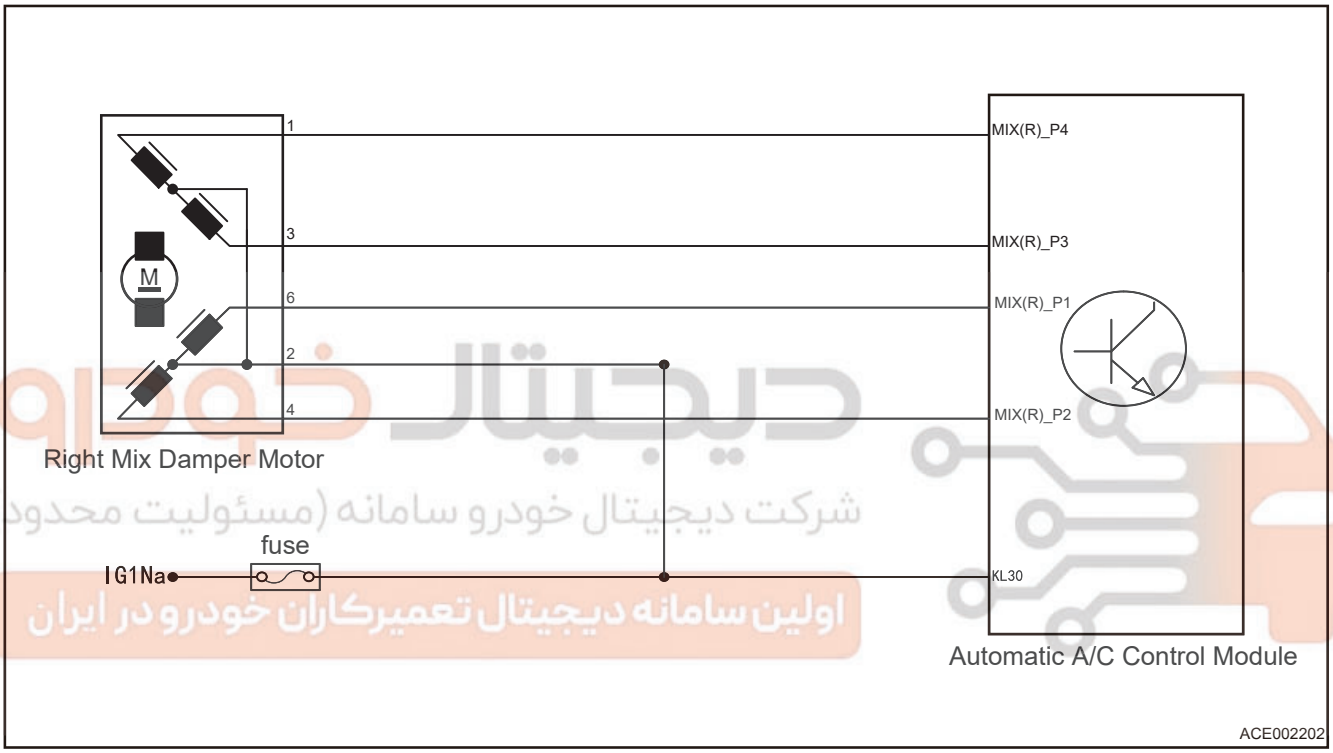
(c) Read the fault information and confirm that the fault has been solved.

NG	**Replace with a new ECU 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 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

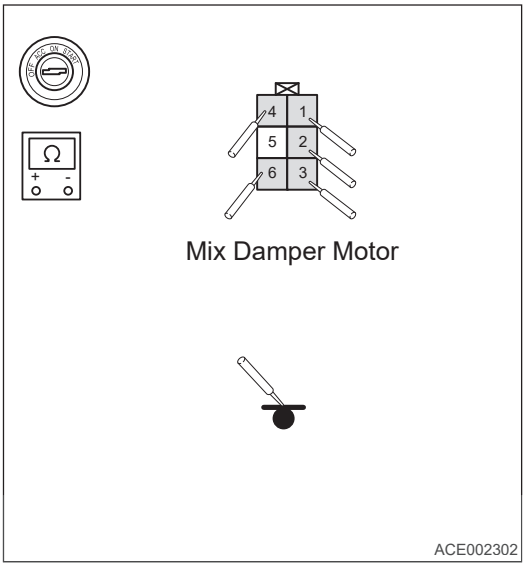
2	Check resistance between mix damper motor and ground

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
Mix damper motor (1) - Body ground	Ignition switch OFF	∞
Mix damper motor (3) - Body ground	Ignition switch OFF	∞
Mix damper motor (6) - Body ground	Ignition switch OFF	∞
Mix damper motor (2) - Body ground	Ignition switch OFF	∞
Mix damper motor (4) - Body ground	Ignition switch OFF	∞



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

OK

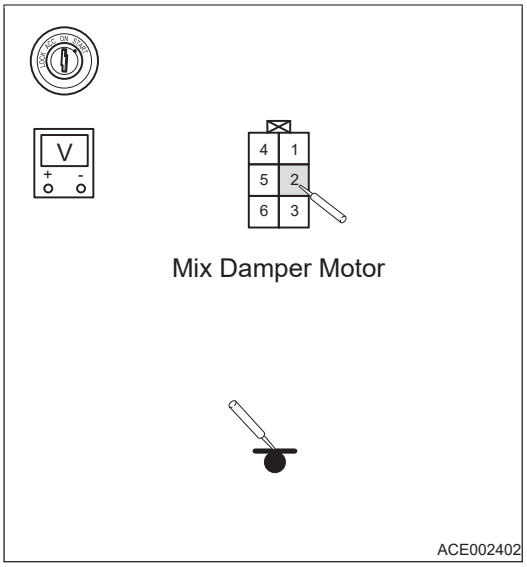
3	Check mix damper motor power supply voltage

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
Mix damper motor (2) - Body ground	Ignition switch ON	12 V



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

OK

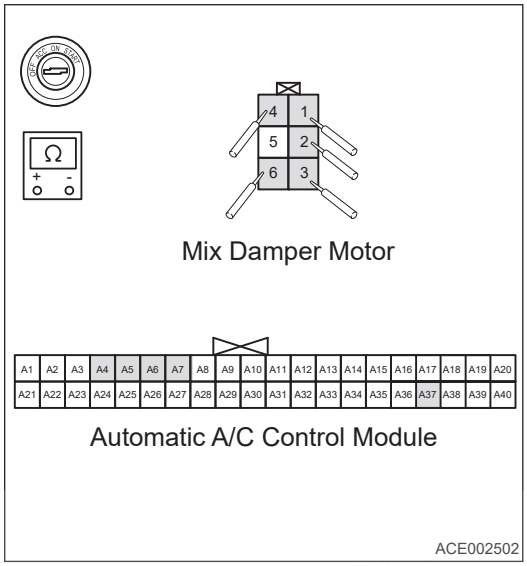
4	Check resistance between mix damper motor and A/C control module

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
Mix damper motor (1) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mix damper motor (3) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mix damper motor (6) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mix damper motor (2) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Mix damper motor (4) - A/C control module (to terminal)	Ignition 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

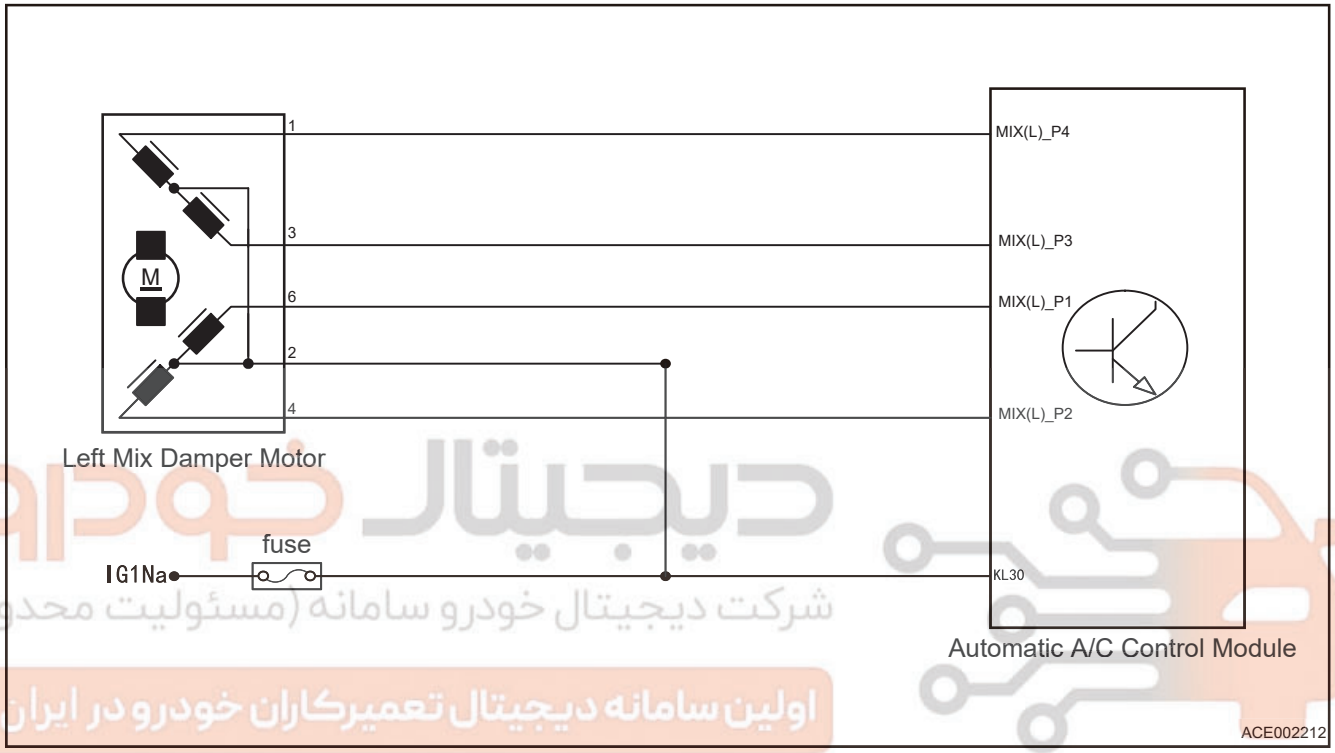
Replace with a new ECU to check if fault reoccurs.

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 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

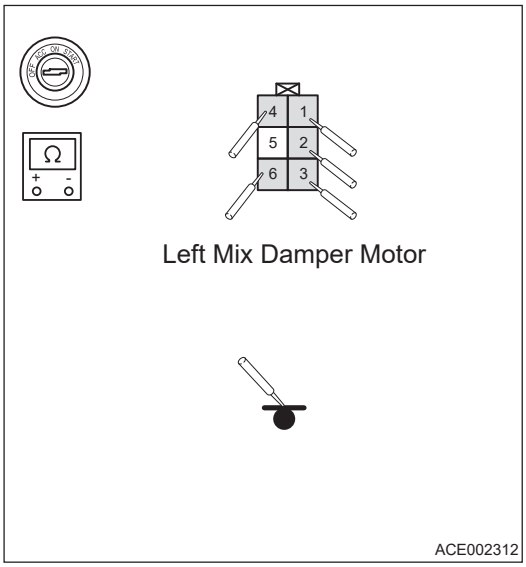
2	Check resistance between mix damper motor and ground

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
Left mix damper motor (1) - Body ground	Ignition switch OFF	∞
Left mix damper motor (3) - Body ground	Ignition switch OFF	∞
Left mix damper motor (6) - Body ground	Ignition switch OFF	∞
Left mix damper motor (2) - Body ground	Ignition switch OFF	∞
Left mix damper motor (4) - Body ground	Ignition switch OFF	∞



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

OK →

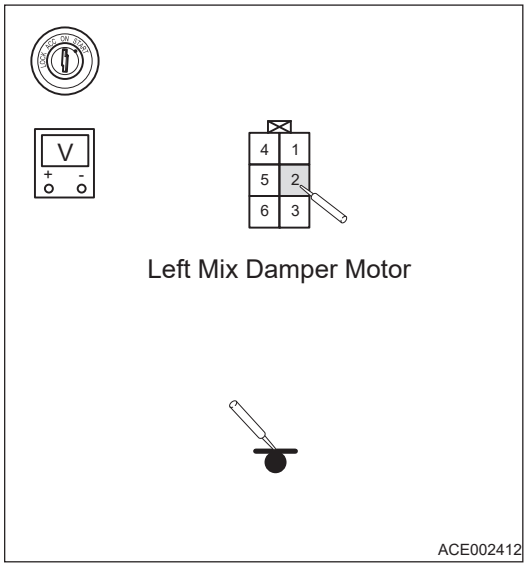
3	Check mix damper motor power supply voltage

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
Left mix damper motor (2) - Body ground	Ignition switch ON	12 V



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

OK

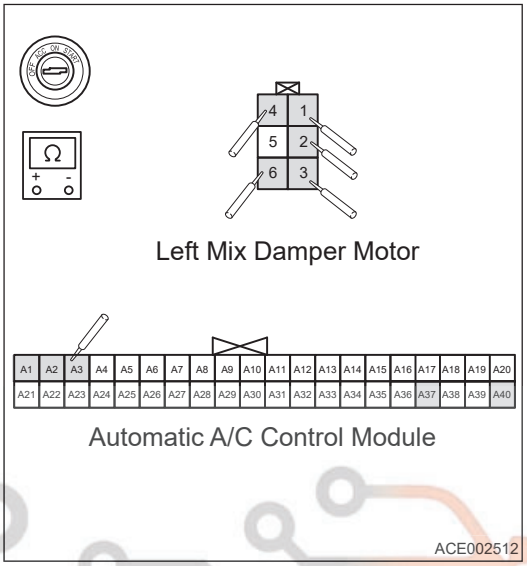
4	Check resistance between mix damper motor and A/C control module

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
Left mix damper motor (1) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Left mix damper motor (3) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Left mix damper motor (6) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Left mix damper motor (2) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω
Left mix damper motor (4) - A/C control module (to terminal)	Ignition 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.

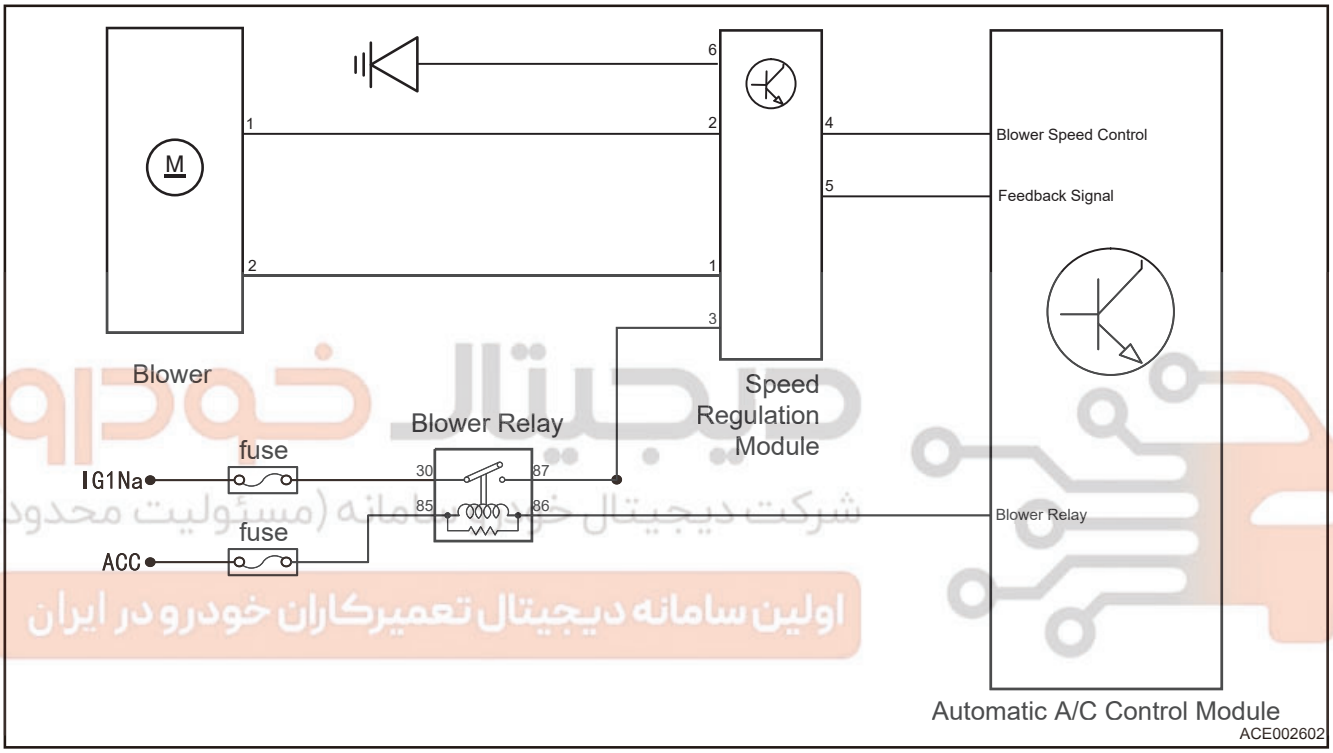
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

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

NG	**Replace with a new ECU to check if fault reoccurs.**
OK	**Conduct test and confirm malfunction has been repaired.**

DTC	**B1408_29**	**Blower Voltage Gear Not Adjustable**
DTC	**B1408_31**	**Blower Voltage Not Output**

Description
Control Schematic Diagram



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

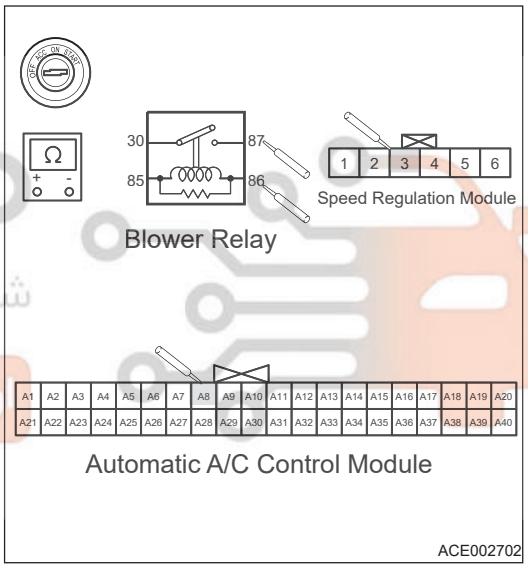
3	Check resistance between blower relay and A/C control module

(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
Relay (87) - Speed regulation module (3)	Ignition switch OFF	Less than 1 Ω
Relay (86) - A/C control module (to terminal)	Ignition switch OFF	Less than 1 Ω



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

OK

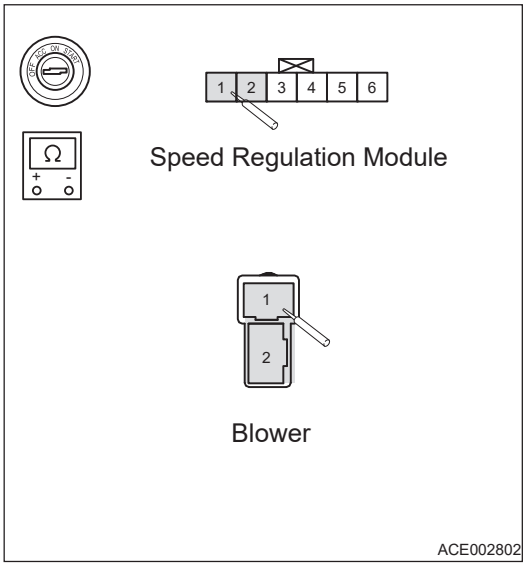
4	Check resistance between speed regulation module and blower

(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
Blower (1) - Speed regulation module (2)	Ignition switch OFF	Less than 1 Ω
Blower (2) - Speed regulation module (1)	Ignition switch OFF	Less than 1 Ω



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

OK

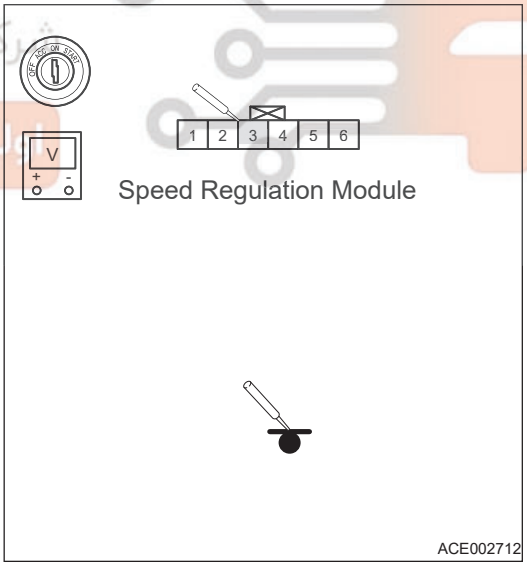
5 **Check voltage between speed regulation module and power supply**

(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
Speed regulation module (3) - Body ground	Ignition 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
Speed regulation module (6) - Body ground	Ignition switch OFF	Less than 1 Ω

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

OK →

7	**Check blower**

(a) Using 12 V battery, test the blower with power on.
(b) Check if blower is operating normally.

NG → **Repair or replace blower**

OK →

8	**Reconfirm DTCs**

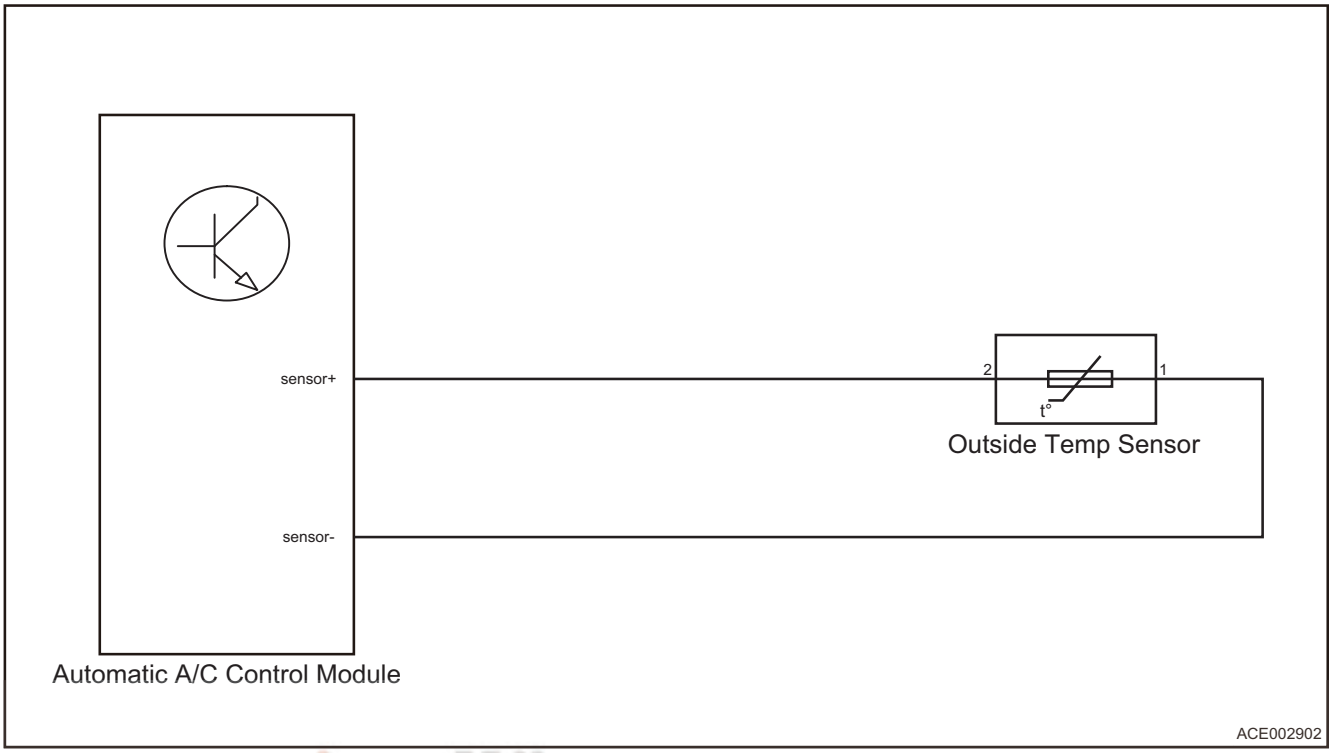
Use circuit diagram as a guide to perform the following inspection procedures:
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

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

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

DTC	**B1403_11**	**External Ambient Temperature Sensor Short to Ground**
DTC	**B1403_15**	**External Ambient Temperature Sensor Open**

Description
Control Schematic Diagram



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**

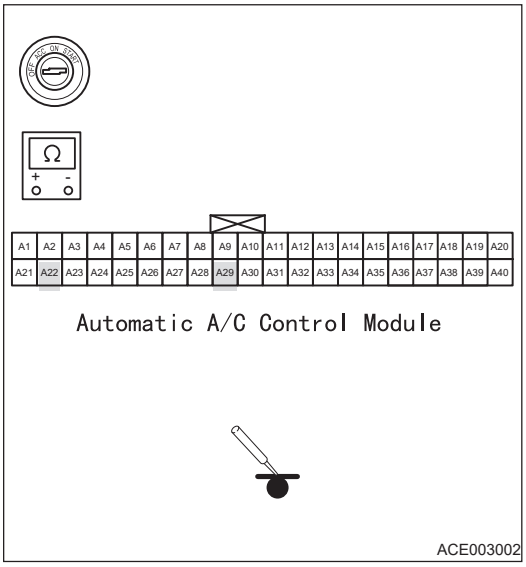
OK

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
A/C control module (to outside temperature sensor terminal +) - Body ground	Ignition switch OFF	∞
A/C control module (to outside temperature sensor terminal -) - Body ground	Ignition switch OFF	∞



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

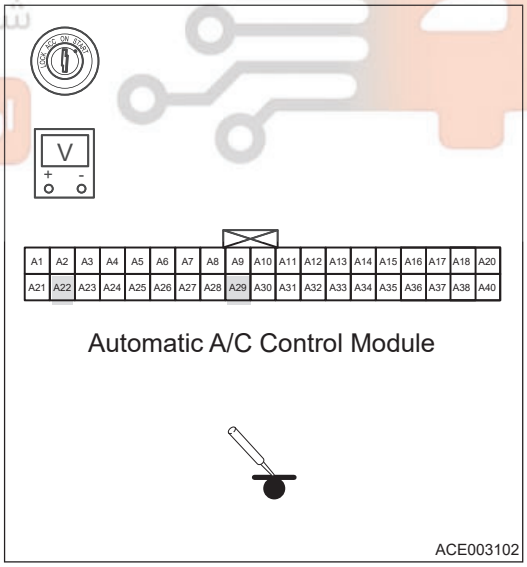
OK

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
A/C control module (to outside temperature sensor terminal +) - body ground	Ignition switch ON	0 V
A/C control module (to outside temperature sensor terminal -) - Body ground	Ignition switch ON	0 V



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

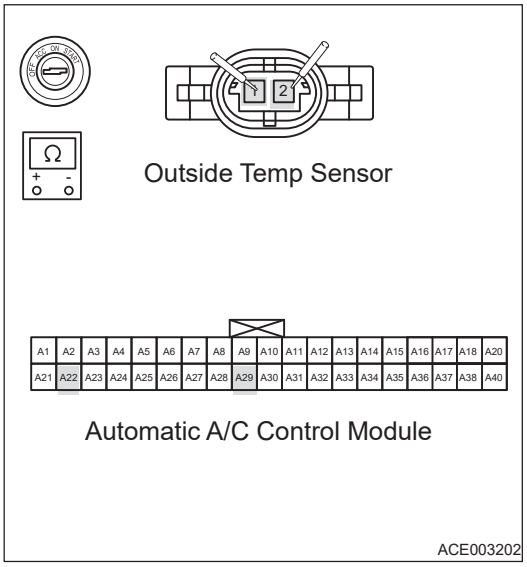
OK

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
A/C control module (to terminal) - Outside temperature sensor (2)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - Outside temperature sensor (1)	Ignition 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.

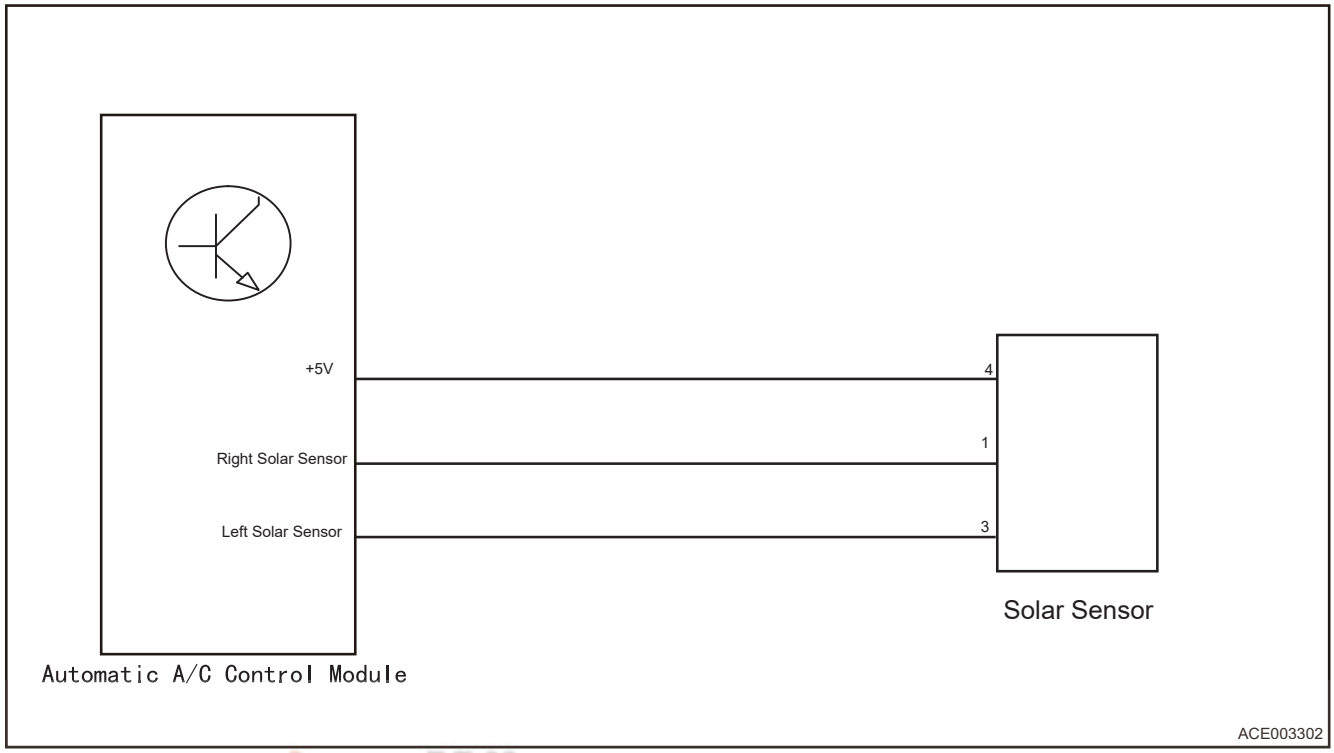
NG → **Replace with a new ECU to check if fault reoccurs.**

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 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.

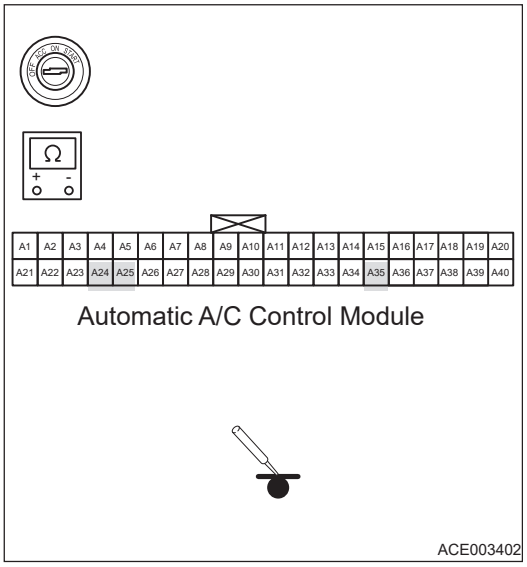
NG → **Repair or replace solar sensor connector**

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
A/C control module (to solar sensor terminal - left) - Body ground	Ignition switch OFF	∞
A/C control module (to solar sensor terminal - right) - Body ground	Ignition switch OFF	∞
A/C control module (to solar sensor terminal - power supply) - Body ground	Ignition switch OFF	∞



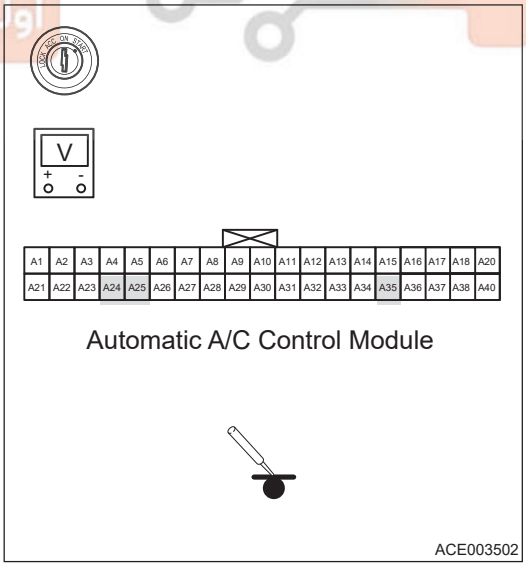
NG → **Repair or replace solar sensor ground wire harness**

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
A/C control module (to solar sensor terminal - left) - Body ground	Ignition switch ON	0 V
A/C control module (to solar sensor terminal - right) - Body ground	Ignition switch ON	0 V
A/C control module (to solar sensor terminal - power supply) - Body ground	Ignition switch ON	0 V



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

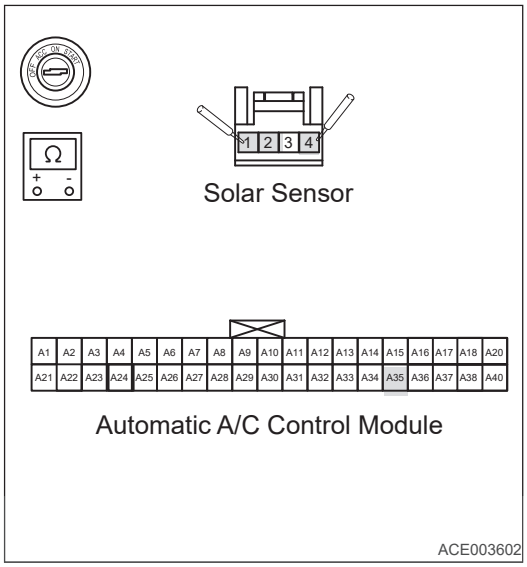
OK

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
A/C control module (to terminal) - solar sensor (4)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - solar sensor (2)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - solar sensor (1)	Ignition 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.

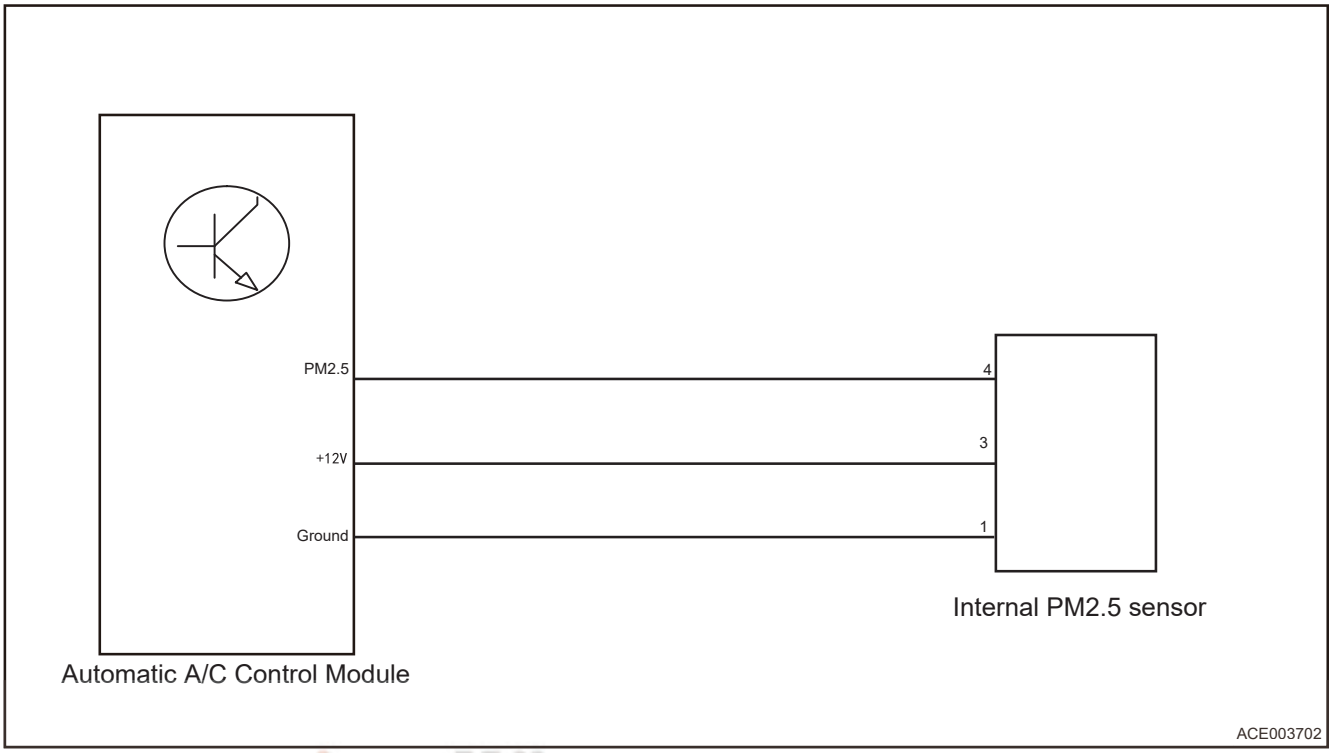
NG → **Replace with a new ECU to check if fault reoccurs.**

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

DTC	B1418_11	Incar PM2.5 Sensor Malfunction-Sensor Output to Ground
DTC	B1418_15	Incar PM2.5 Sensor Malfunction-Sensor Power Supply is Shut Off or Open

Description

Control Schematic Diagram



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 incar 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 incar PM2.5 sensor connector**

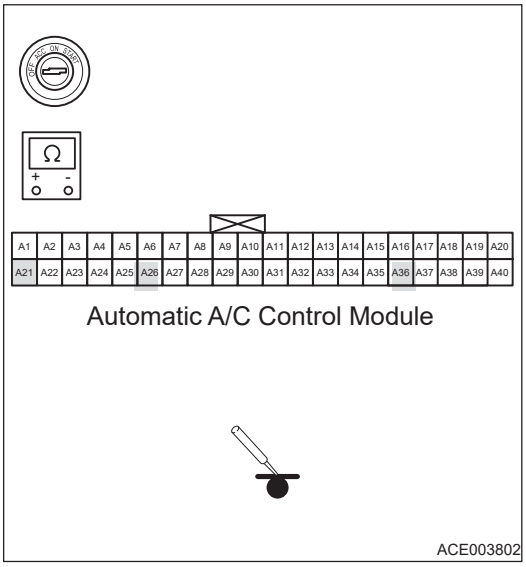
OK

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

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to incar PM2.5 sensor-signal) - Body ground	Ignition switch OFF	∞
A/C control module (to incar PM2.5 sensor - power supply) - Body ground	Ignition switch OFF	∞
A/C control module (to incar PM2.5 sensor - ground) - Body ground	Ignition switch OFF	0



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

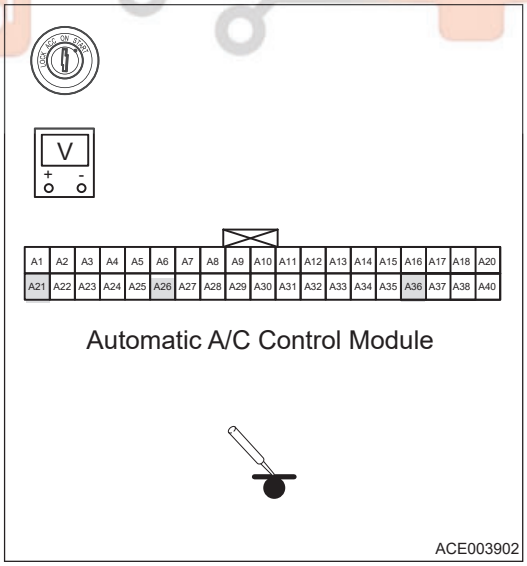
OK →

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

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to incar PM2.5 sensor-signal) - Body ground	Ignition switch ON	0 V
A/C control module (to incar PM2.5 sensor - power supply) - Body ground	Ignition switch ON	0 V
A/C control module (to incar PM2.5 sensor - ground) - Body ground	Ignition switch ON	0 V



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

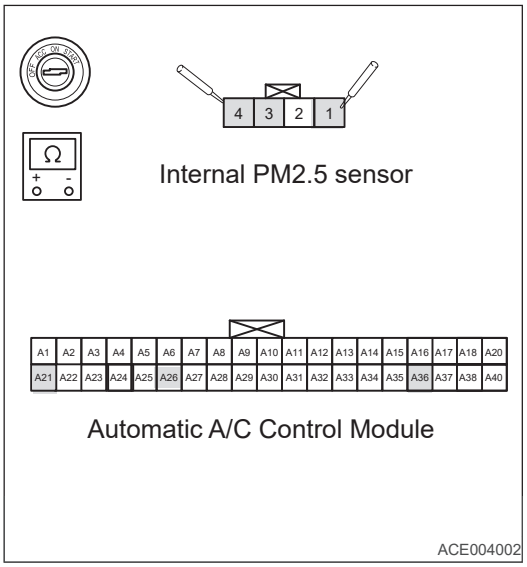
OK

4	Check resistance between incar 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
A/C control module (to terminal) - Incar PM2.5 sensor (4)	Ignition switch OFF	⩽ 1 Ω
A/C control module (36) - Incar PM2.5 sensor (1)	Ignition switch OFF	⩽ 1 Ω
A/C control module (21) - Incar PM2.5 sensor (3)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace incar 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.

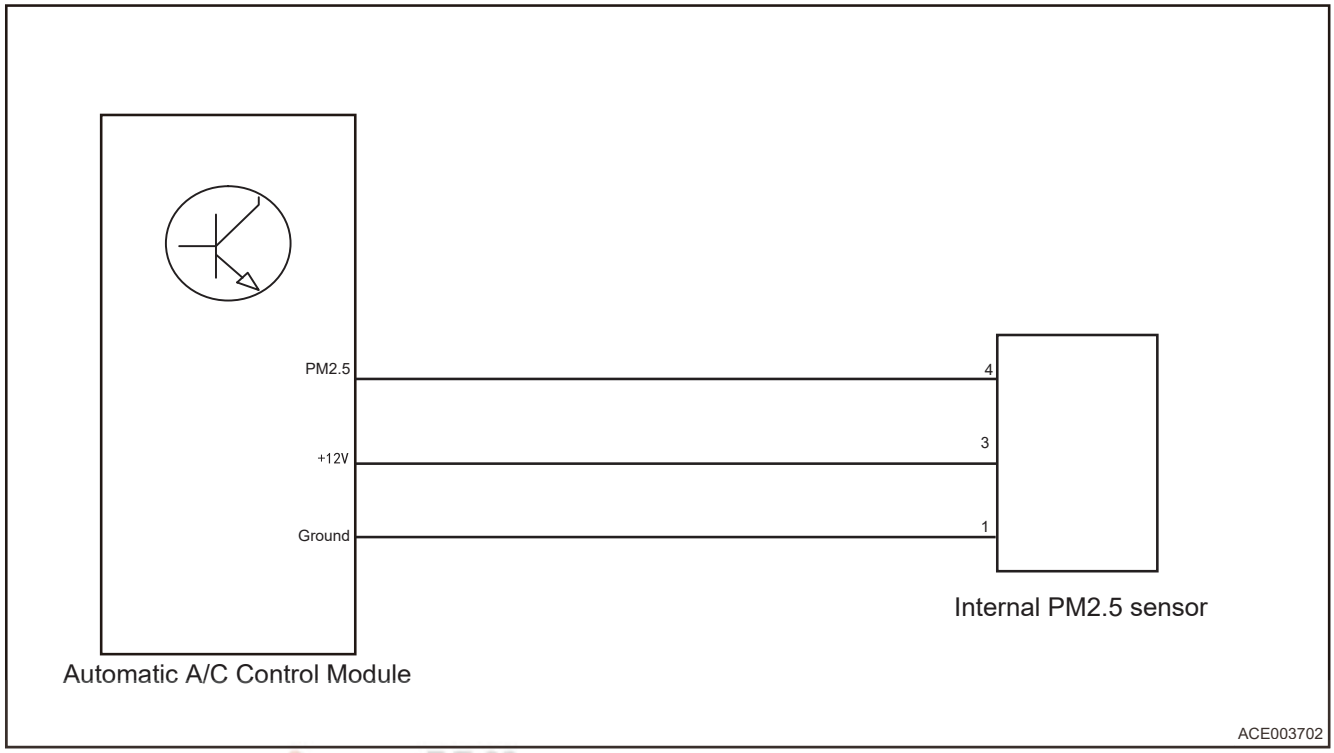
NG → **Replace with a new ECU to check if fault reoccurs.**

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

DTC	**B141A_11**	**Outcar PM2.5 Sensor-Circuit Short to Ground**
DTC	**B141A_15**	**Outcar PM2.5 Sensor-Circuit Power Supply is Shut Off or Open**

Description

Control Schematic Diagram



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 outcar 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 outcar PM2.5 sensor connector**

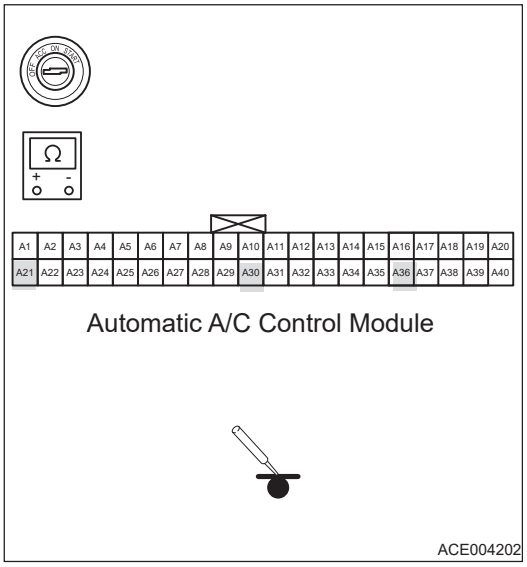
OK

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

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to outcar PM2.5 sensor- signal terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to outcar PM2.5 sensor - power supply terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to outcar PM2.5 sensor - ground terminal) - Body ground	Ignition switch OFF	0



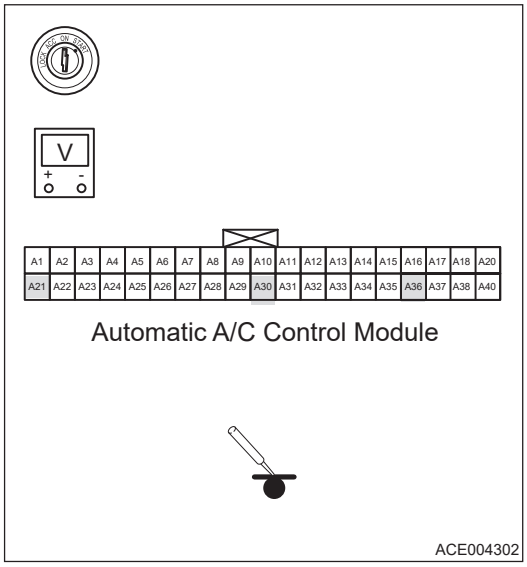
NG → **Repair or replace outcar PM2.5 sensor ground wire harness**

OK → **3 Check voltage between outcar PM2.5 sensor and power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to outcar PM2.5 sensor- signal terminal) - Body ground	Ignition switch ON	0 V
A/C control module (to outcar PM2.5 sensor - power supply terminal) - Body ground	Ignition switch ON	0 V
A/C control module (to outcar PM2.5 sensor - ground terminal) - Body ground	Ignition switch ON	0 V



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

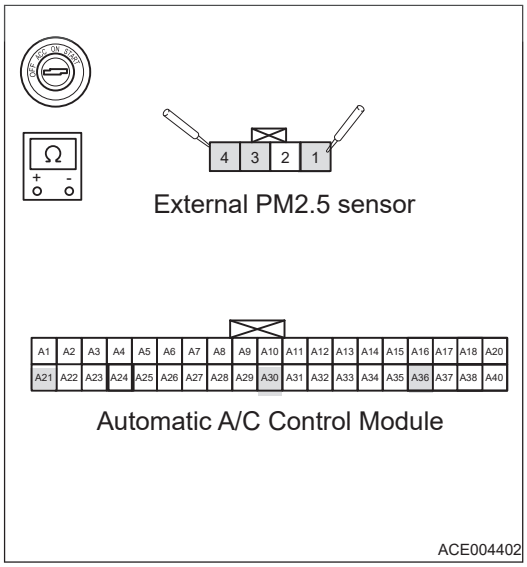
OK →

4	**Check resistance between outcar 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
A/C control module (to terminal) - Outcar PM2.5 sensor (4)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - Outcar PM2.5 sensor (1)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - Outcar PM2.5 sensor (3)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace incar 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.

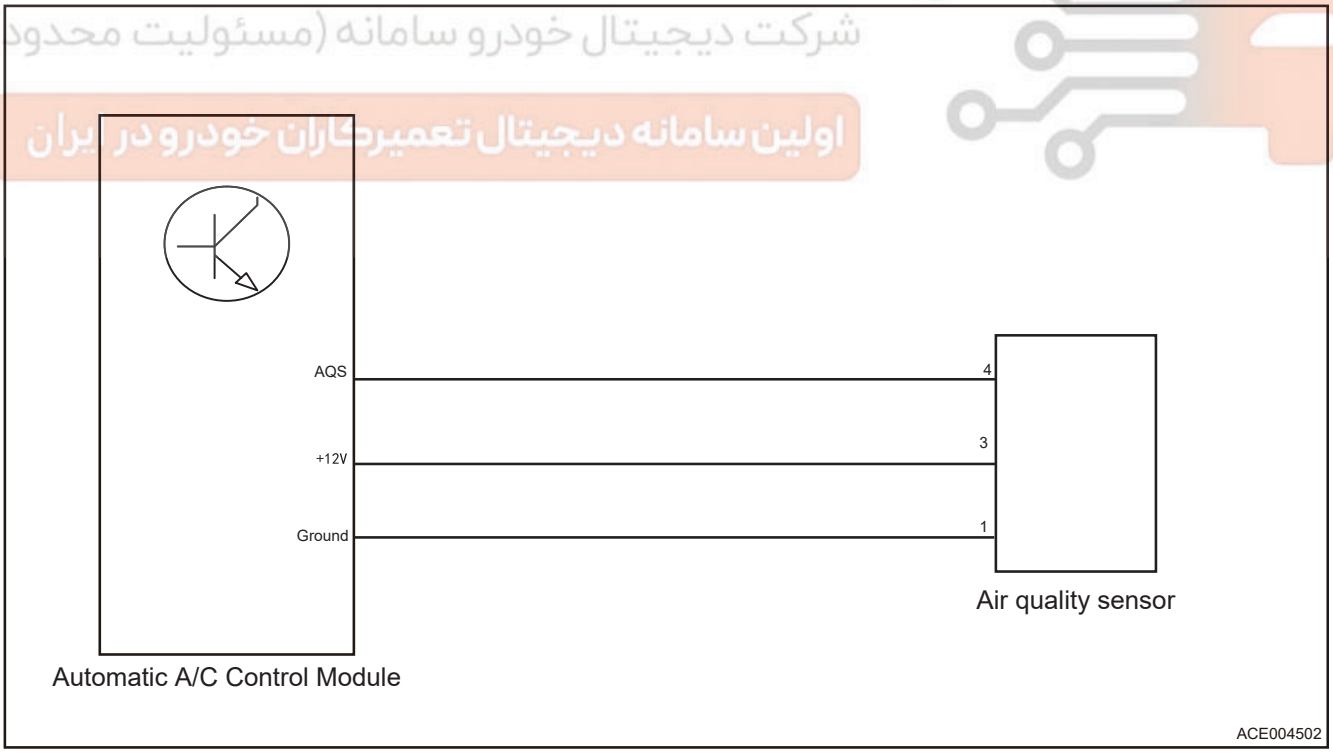
NG → **Replace with a new ECU to check if fault reoccurs.**

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 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.

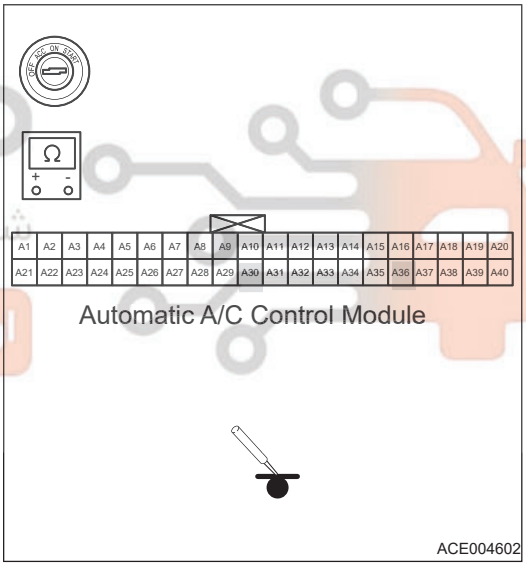
NG → **Repair or replace air quality sensor connector**

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
A/C control module (to air quality sensor - signal terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to air quality sensor - power supply terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to air quality sensor - ground terminal) - Body ground	Ignition switch OFF	0



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

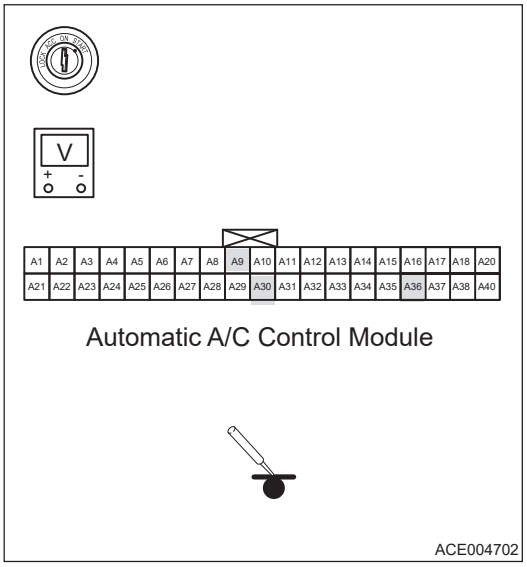
OK

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
A/C control module (to air quality sensor - signal terminal) - Body ground	Ignition switch ON	0 V
A/C control module (to air quality sensor - power supply terminal) - Body ground	Ignition switch ON	0 V
A/C control module (to air quality sensor - ground terminal) - Body ground	Ignition switch ON	0 V



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

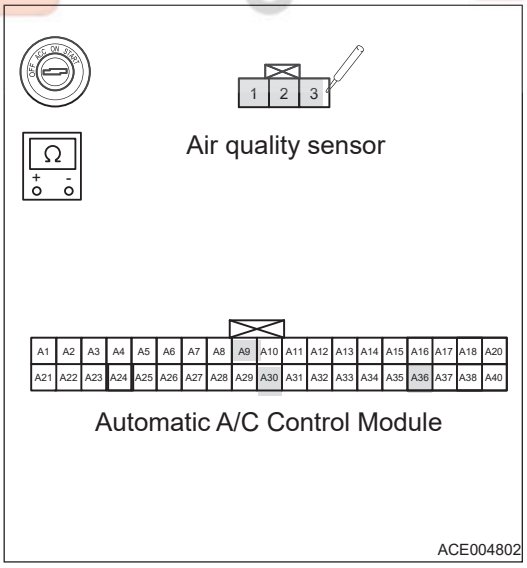
OK →

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
A/C control module (to terminal) - Air quality sensor (3)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - Air quality sensor (1)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - Air quality sensor (2)	Ignition switch OFF	⩽ 1 Ω



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

OK

5	**Reconfirm DTCs**

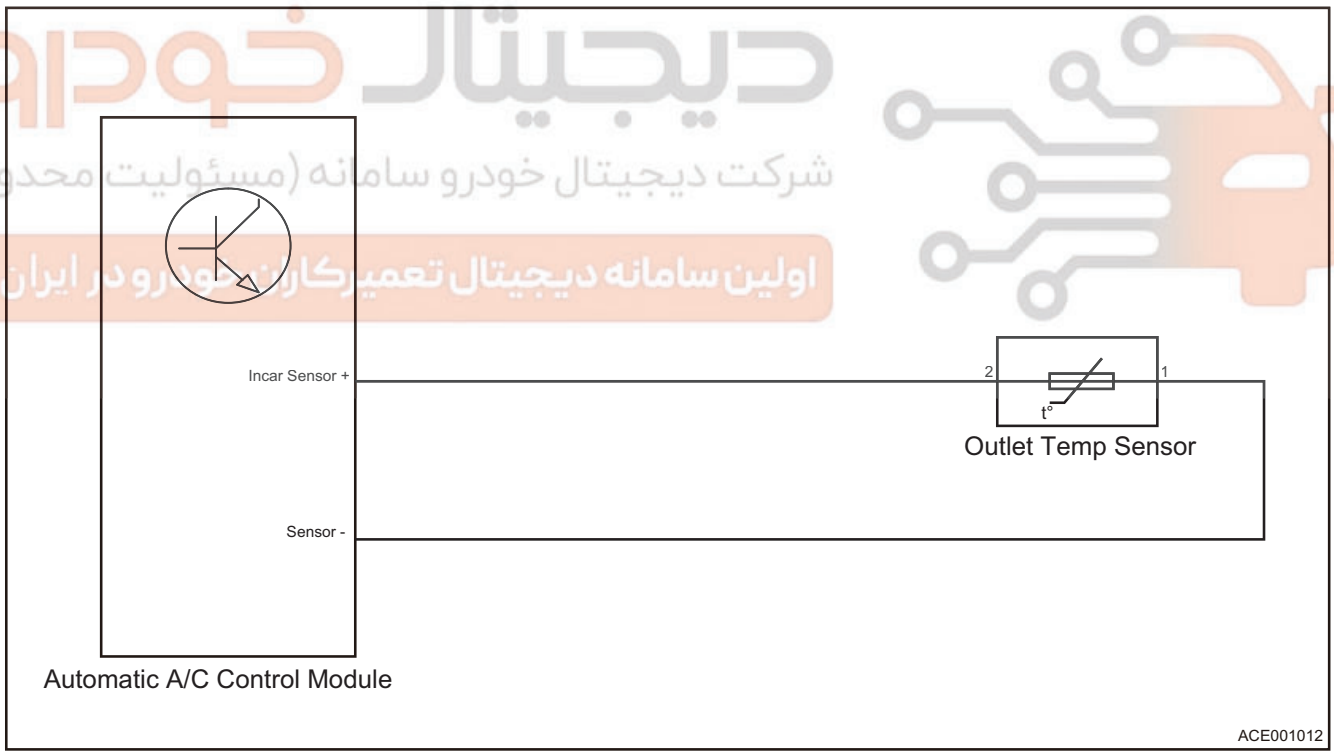
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace with a new ECU 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 Battery**

Description
Control Schematic Diagram



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 the room temperature sensor connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

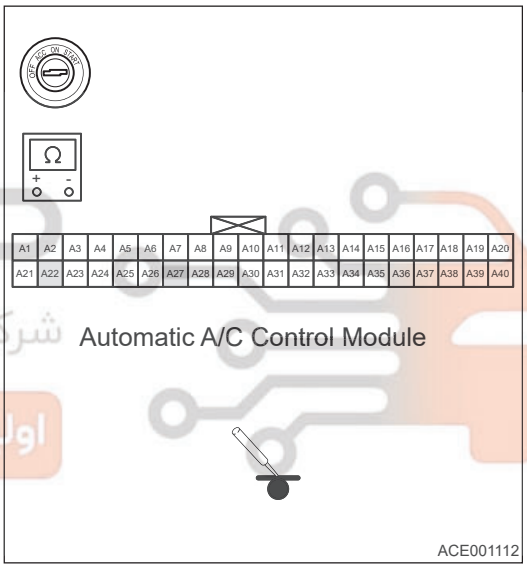
NG → **Repair or replace room temperature sensor connector.**

OK

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

(a) Turn ENGINE START STOP switch to OFF.
(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to room temperature sensor + terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to room temperature sensor - terminal) - Body ground	Ignition switch OFF	∞



NG → **Repair or replace room temperature sensor ground wire harness.**

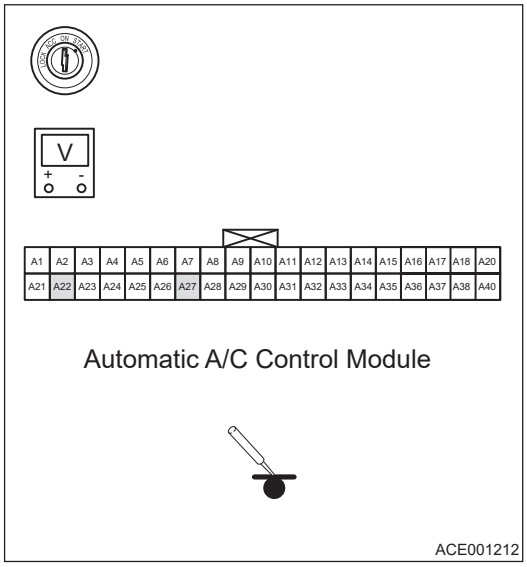
OK

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

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to room temperature sensor + terminal) - body ground	Ignition switch ON	0 V
A/C control module (to room temperature sensor - terminal) - Body ground	Ignition switch ON	0 V



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

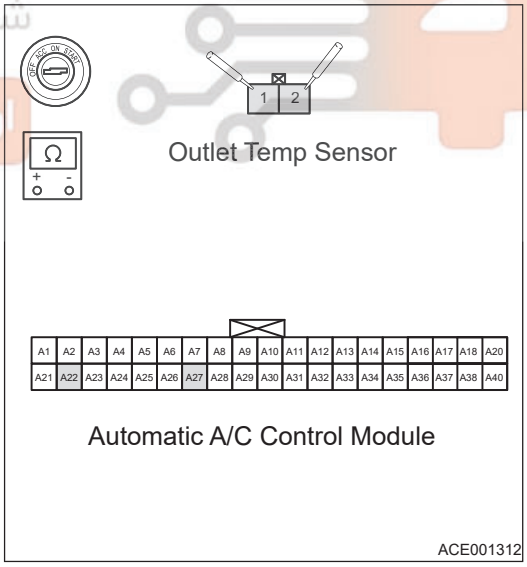
OK

4 Check resistance between room 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
A/C control module (to room temperature sensor + terminal) - room temperature sensor (2)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to room temperature sensor - terminal) - room temperature sensor (1)	Ignition switch OFF	⩽ 1 Ω



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

OK

5	**Reconfirm DTCs**

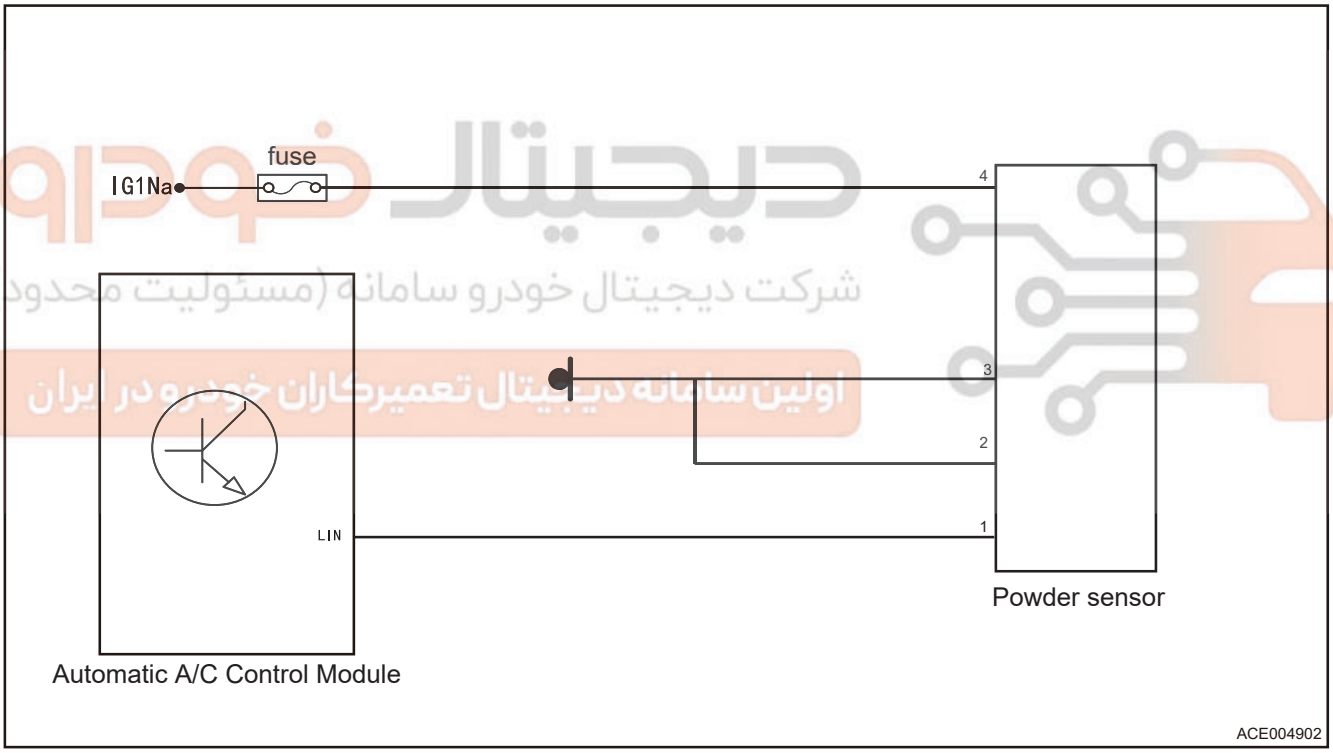
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

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

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

DTC	**B141C_01**	**Fragrance Controller Step Motor**
DTC	**B1419_15**	**Fragrance Controller Fan**

Description
Control Schematic Diagram



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 fragrance sensor fuse**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check fragrance sensor fuse for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace corresponding fuse**

OK

2	**Check fragrance 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 fragrance sensor connector**

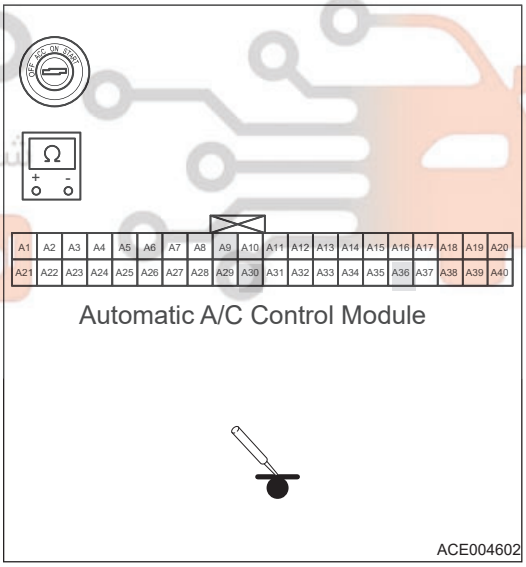
OK

3	**Check resistance between fragrance sensor wire harness and ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to fragrance sensor - signal terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to fragrance sensor - power supply terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to fragrance sensor - ground terminal) - Body ground	Ignition switch OFF	0



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

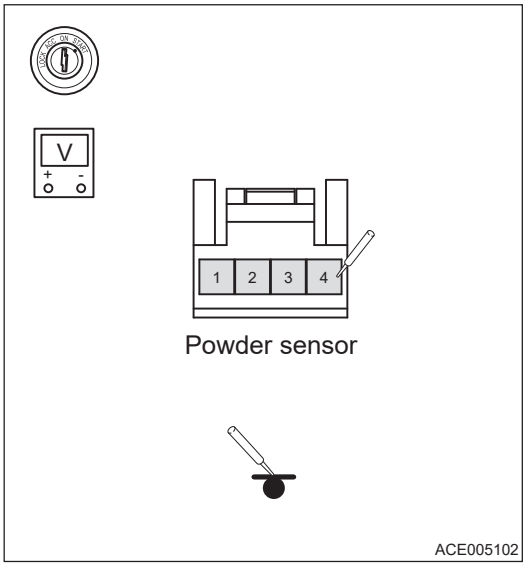
OK

4	**Check voltage between fragrance sensor and power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to fragrance sensor - signal terminal) - Body ground	Ignition switch ON	0 - 11 V
A/C control module (to fragrance sensor - power supply terminal) - Body ground	Ignition switch ON	12 V
A/C control module (to fragrance sensor - ground terminal) - Body ground	Ignition switch ON	0 V



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

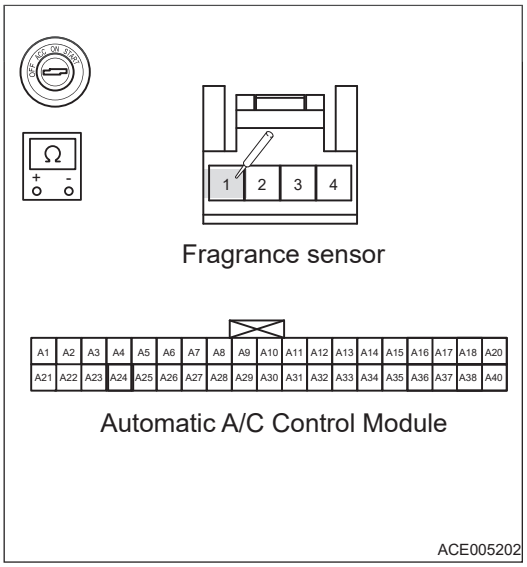
OK →

5 Check resistance between fragrance sensor and A/C control module wire harness

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - Fragrance sensor (1)	Ignition switch OFF	⩽ 1 Ω



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

OK

6	Reconfirm DTCs

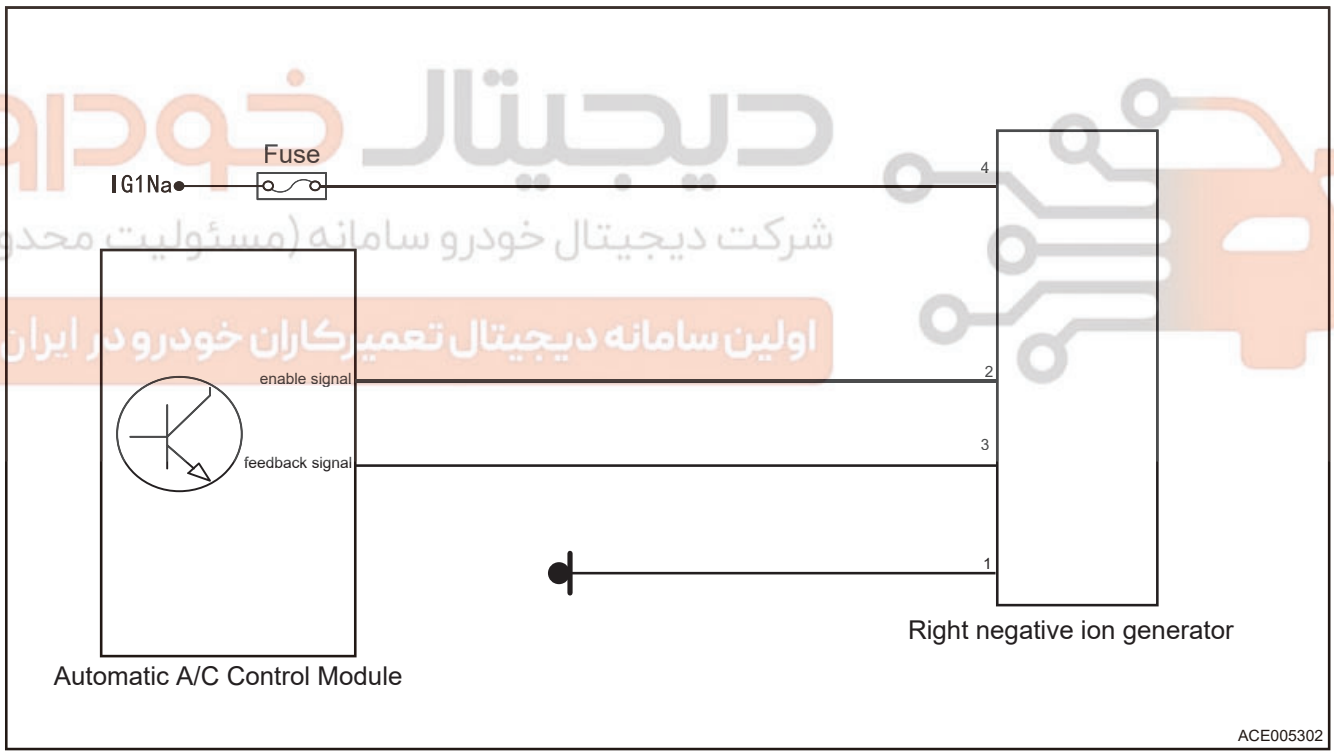
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

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

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

DTC	B1417_1C	Right Anion Generator

Description
Control Schematic Diagram



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 right anion generator fuse**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check right anion generator fuse for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace corresponding fuse**

OK →

2	**Check right anion generator connector**

(a) Turn ENGINE START STOP switch to OFF.
(b) Check connector for bad contact, bending, distortion, poor contact, etc.

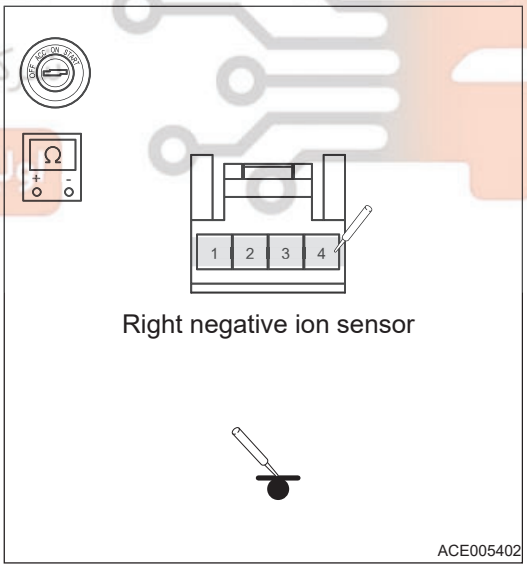
NG → **Repair or replace right anion generator connector**

OK →

3	**Check resistance between right anion generator wire harness and ground**

(a) Turn ENGINE START STOP switch to OFF.
(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to right anion generator - signal terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to right anion generator - power supply terminal) - Body ground	Ignition switch OFF	∞
A/C control module (to right anion generator - ground terminal) - Body ground	Ignition switch OFF	0



NG → **Repair or replace right anion generator ground wire harness**

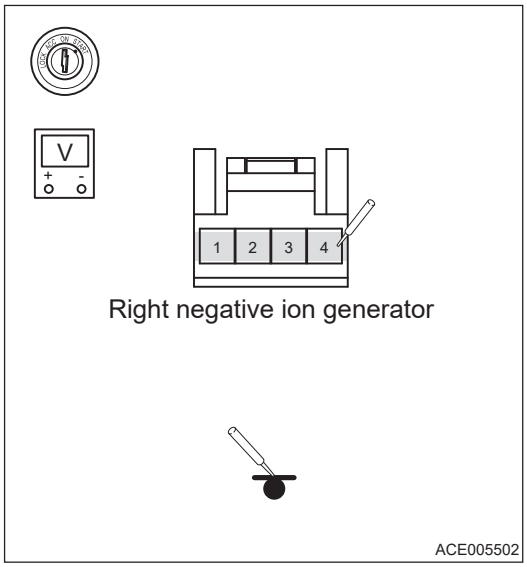
OK →

4	Check voltage between right anion generator and power supply

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to right anion generator - signal terminal) - Body ground	Ignition switch ON	0.1 ~ 4.9V
A/C control module (to right anion generator - power supply terminal) - Body ground	Ignition switch ON	12 V
A/C control module (to right anion generator - ground terminal) - Body ground	Ignition switch ON	0 V



Right negative ion generator

NG → **Repair or replace right anion generator power supply wire harness**

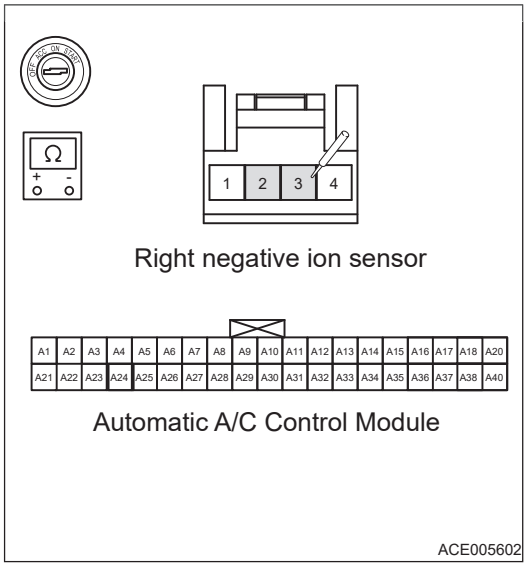
OK

5	Check resistance between right anion generator and A/C control module wire harness

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - Right anion generator (2)	Ignition switch OFF	⩽ 1 Ω
A/C control module (to terminal) - Right anion generator (3)	Ignition switch OFF	⩽ 1 Ω



Right negative ion sensor

Automatic A/C Control Module

NG → **Repair or replace right anion generator and A/C control module wire harness**

OK

6	Reconfirm DTCs

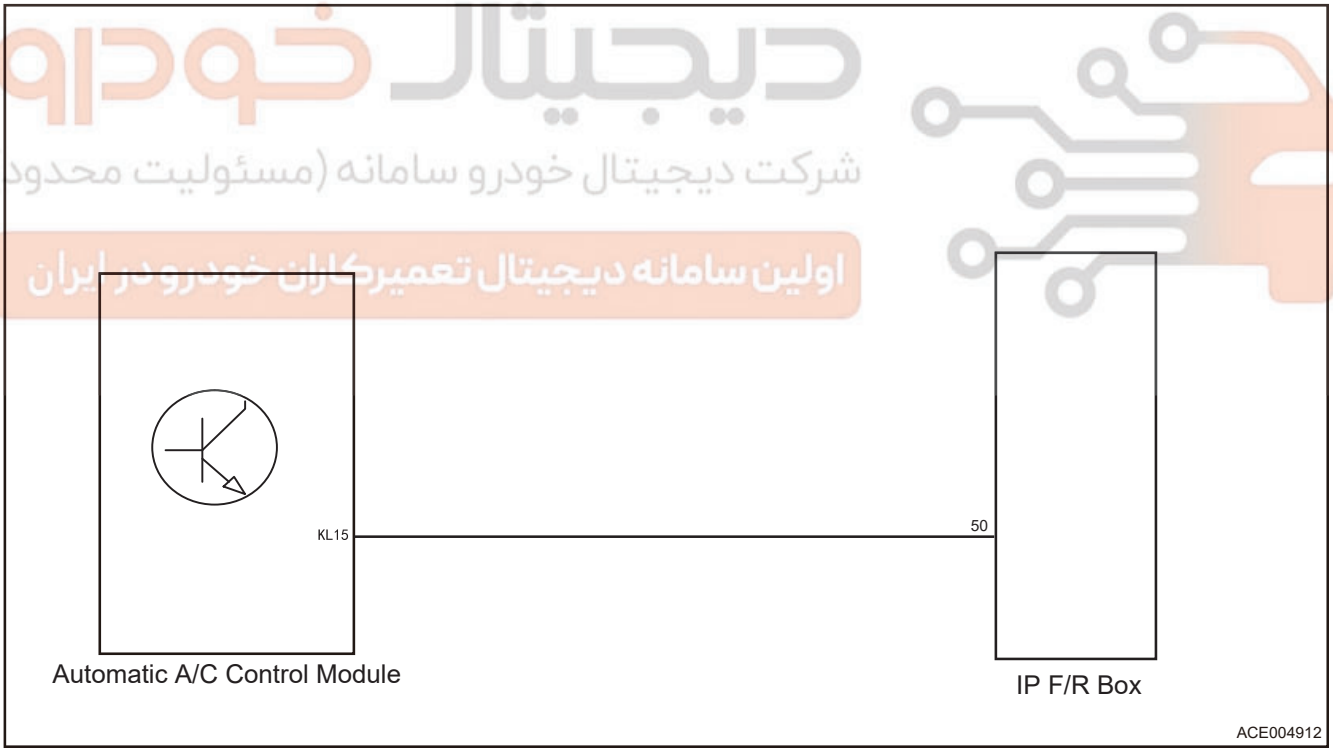
(a) Connect diagnostic tester and clear DTCs.
(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.
(c) Read the fault information and confirm that the fault has been solved.

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

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

DTC	**B1BE0_16**	**Power Supply Undervoltage**
DTC	**B1BE0_17**	**Power Supply Overvoltage**

Description
Control Schematic Diagram



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 battery voltage**

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

(a) Check battery voltage. Standard voltage: 9 - 16 V.

NG → **Check or replace charging system or battery.**

OK ↓

2	**Check the fuse in instrument panel fuse and relay box**

(a) Turn ENGINE START STOP switch to OFF.

(b) Check the fuse in instrument panel fuse and relay box for bad contact, bending, distortion, poor contact, etc.

NG → **Repair or replace corresponding fuse**

OK ↓

3	**Check A/C controller connector**

(a) Turn ENGINE START STOP switch to OFF.

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

NG → **Repair or replace A/C controller connector.**

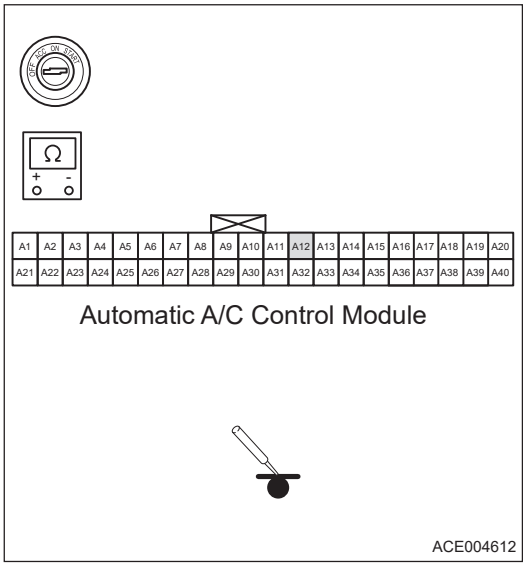
OK ↓

4	**Check resistance between A/C controller wire harness and ground**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - Body ground	Ignition switch OFF	∞



NG → **Repair or replace A/C control module ground wire harness.**

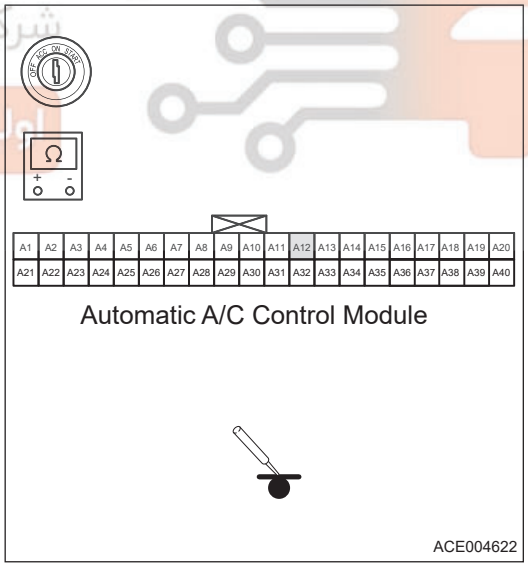
OK

5	**Check voltage between A/C controller and power supply**

(a) Turn ENGINE START STOP switch to ON.

(b) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to power supply terminal) - Body ground	Ignition switch ON	12 V



NG → **Repair or replace A/C controller power supply wire harness.**

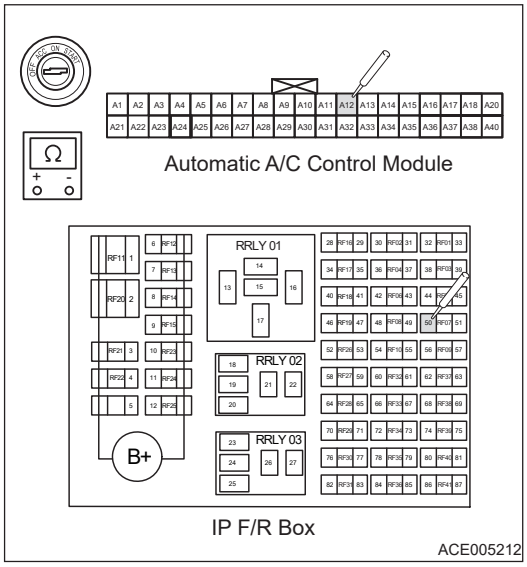
OK

6	**Check resistance between A/C controller and instrument panel fuse and relay box wire harness**

(a) Turn ENGINE START STOP switch to OFF.

(b) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
A/C control module (to terminal) - Instrument panel fuse and relay box (50)	Ignition switch OFF	⩽ 1 Ω



NG → **Repair or replace instrument panel fuse and relay box and A/C control module wire harness.**

OK →

7	**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 ECU to check if fault reoccurs.**

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

Network fault

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

A/C COOLING

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Take extra care when servicing A/C system under high pressure.
2. 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.
3. 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.
4. Never drain refrigerant in A/C system into the atmosphere directly, and avoid environmental contamination.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

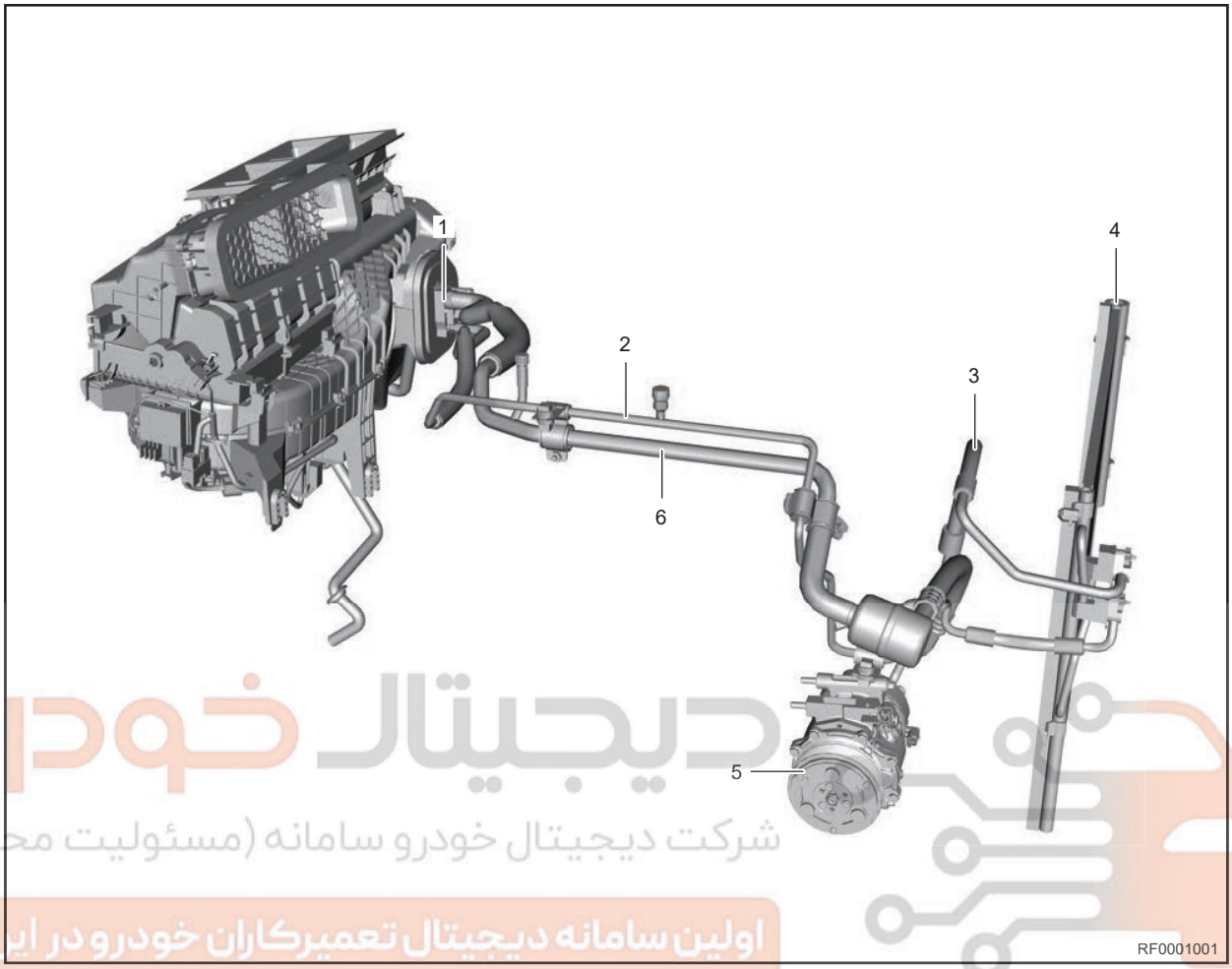
1. Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant.
2. Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

System Overview

System Description

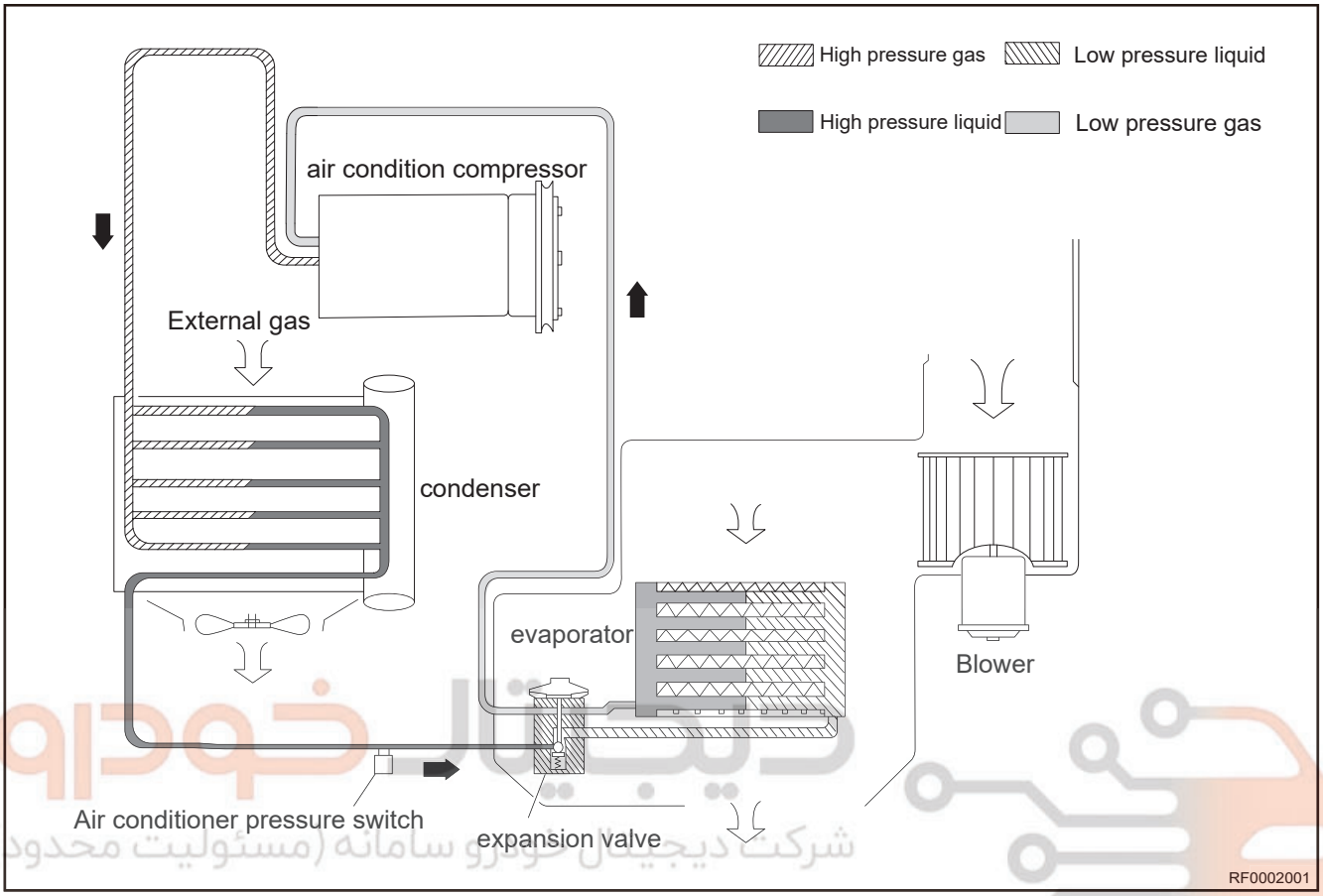
A/C system of this model is integrated cold and warm air conditioning, which adopts external control variable displacement compressor and expansion valve control method, and uses environment-friendly refrigerant R134a Refrigerant / R1234yf (European Union). This system consists of compressor, condenser, HVAC, line, AIPM (front A/C control panel), CLM (A/C control module) and other accessories including pressure switch, O-ring, etc.

System Components Diagram



1	Evaporator Assembly	4	Condenser Assembly (w/ Receiver Drier)
2	Evaporator - Condenser Line Assembly	5	A/C Compressor Assembly
3	Compressor - Condenser Line Assembly	6	Evaporator - Compressor Line Assembly

System Schematic Diagram



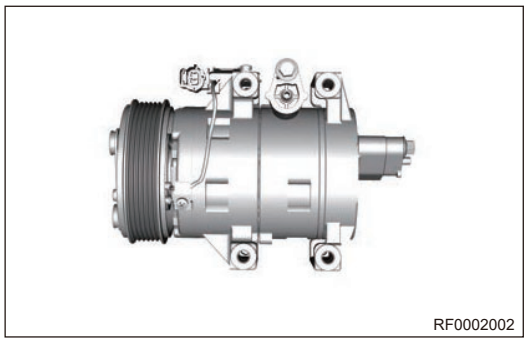
A/C cooling system of vehicle is mainly composed of compressor, expansion valve, condenser, evaporator and blower. The various components are connected by high pressure rubber pipes and steel pipes to form a closed system. When the refrigeration system is operating, the refrigerant circulates in this space in different states. And this cycle is divided into four processes:

1. Compression process: The compressor sucks the low temperature/pressure refrigerant gas at the outlet of evaporator, then compresses it to high temperature/pressure gas and discharges it from compressor.
2. Cooling process: High temperature/pressure superheated refrigerant gas enters the condenser. Due to the decrease in pressure and temperature, the refrigerant gas condenses into liquid and discharges a large amount of heat.
3. Throttling process: The refrigerant liquid with higher temperature and pressure becomes larger after passing through the expansion device, the pressure and temperature drop sharply, and it is discharged from expansion device with mist (small droplets).
4. Heat absorption process: The mist refrigerant liquid enters the evaporator. At this time, the boiling point of the refrigerant is much lower than the temperature in the evaporator, so the refrigerant liquid evaporates into gas. In the evaporation process, a large amount of surrounding heat is absorbed, and then the low temperature/pressure refrigerant vapor enters the compressor again. The above process is operated cyclically, so as to achieve the purpose of reducing the air temperature around the evaporator.

Component Operation Description

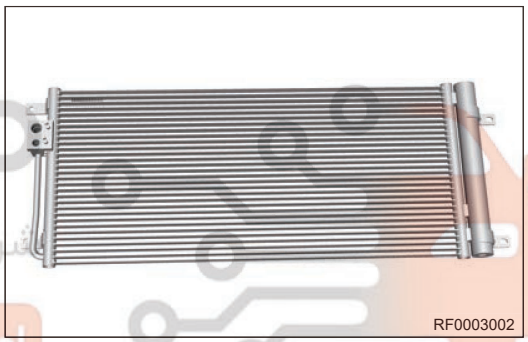
A/C Compressor

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.


RF0002002

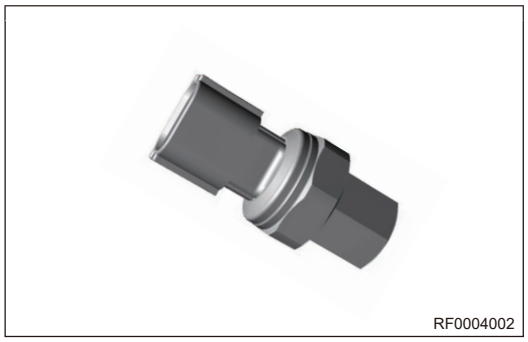
Condenser

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.


RF0003002

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.


RF0004002

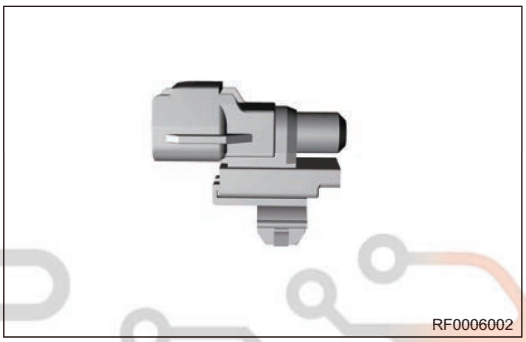
Solar Sensor

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.


RF0005002

Outside Temperature Sensor

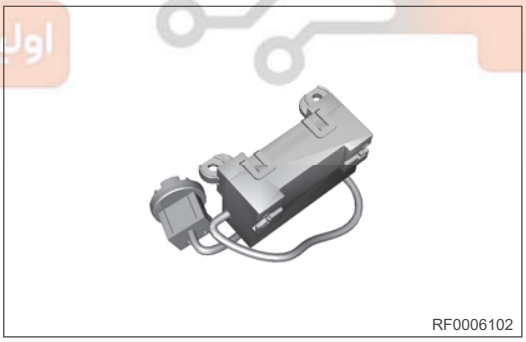
Outside temperature sensor is installed at lower left of front impact beam and used to detect the outside temperature and control the automatic mode of air conditioning. The sensor sends signal to automatic A/C module. The resistance of outside temperature sensor changes with the change of ambient temperature.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


RF0006002

Anion Generator (If Equipped)

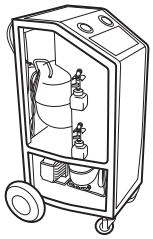
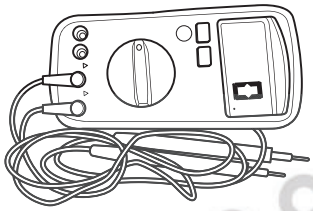
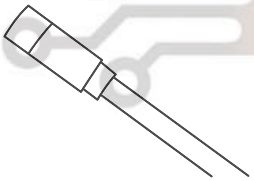
Anion generator is installed on blower air duct. The anion generator boosts the low voltage into positive high voltage and negative high voltage by booster circuit, and ionizes the air under the action of positive high voltage electric field and negative high voltage electric field to generate a large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

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


RF0006102

On-vehicle Service

Tools

Tool Name	Tool Drawing
Refrigerant Recycling Machine	 RCH004606
Digital Multimeter	 RCH000206
Gas Leak Detector	 RCH009206

Specifications

Torque Specifications

Description	Torque (N · m)
A/C High/Low Pressure Line Clamp Fixing Bolt	9 ± 1
Expansion Valve Fixing Bolt	9 ± 1
Evaporator - Compressor Line Fixing Bolt	9 ± 1
Compressor Line Fixing Bolt	25 ± 3
Condenser - Evaporator Line Fixing Nut	9 ± 1
A/C High Pressure Line Clamp Fixing Bolt	9 ± 1
Compressor - Condenser Line Fixing Nut	9 ± 1

Description	Torque (N · m)
Compressor Fixing Bolt	22.5 ± 2.5
Condenser Assembly Fixing Bolt	5 ± 1

Refrigerant Charging Specification

Type	Charging Capacity
R134a Refrigerant/R1234yf (European Union)	550 ± 15g

Refrigerant Oil Charging Specifications

Description	Charging Capacity
Evaporator Replacement	30ml
Compressor Assembly Replacement	Supplement according to actual pouring amount
Condenser Replacement	30ml
A/C Line Replacement	10ml

Newly installed air conditioning system does not need to be recharged. Recharge when repairing a part or after driving a certain distance. The reference quantity is: Evaporator: TBDg, Condenser: TBDg, Pipe: TBDg, compressor oil is refilled according to the actual amount of oil poured out.

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

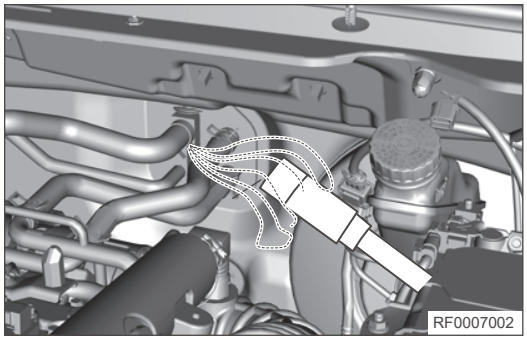
DO NOT race engine when vacuum pump operates or vacuum exists in A/C system. Otherwise, A/C compressor assembly will be damaged seriously.

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. Mixture of air and R134a Refrigerant/ R1234yf (European Union) is 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 switch connector, and use same procedures to check A/C pressure switch for leakage. Replace the A/C pressure switch 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

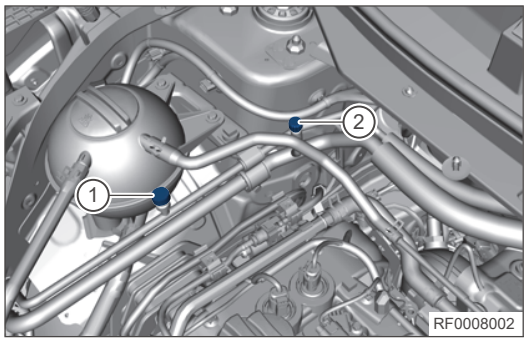
- Take extra care when servicing A/C system under high pressure.
- Because there is refrigerant under high pressure in A/C system. It must be serviced by professional technician. Otherwise, a wrong service procedure may cause a serious danger or fatal injury.
- If A/C system pressure is released unexpectedly, 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

- R134a Refrigerant/R1234yf (European Union) special recycling device 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.

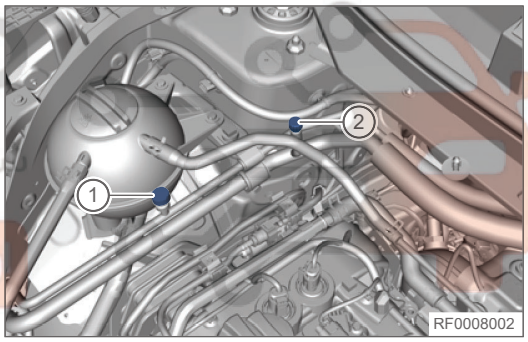
2. Connect the refrigerant recycling machine to A/C high/low pressure line joint.
   a. Connect the blue connector to A/C low pressure line joint (1).
   b. Connect the red connector to A/C high pressure line joint (2).



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.

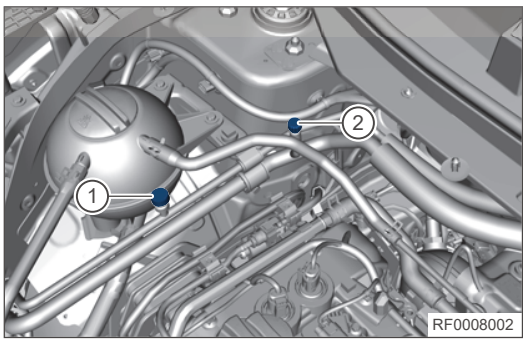
Refrigerant Oil Recovering and Charging

Refrigerant Oil Recovering

⚠ Caution

- Special service device for R134a Refrigerant/R1234yf (European Union) 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.

Item	A/C Compressor Assembly Replacement	Condenser Replacement	Evaporator Tank Replacement	Line Replacement
Refrigerant Oil Charging Amount	Supplement according to actual pouring amount	30ml	30ml	10ml

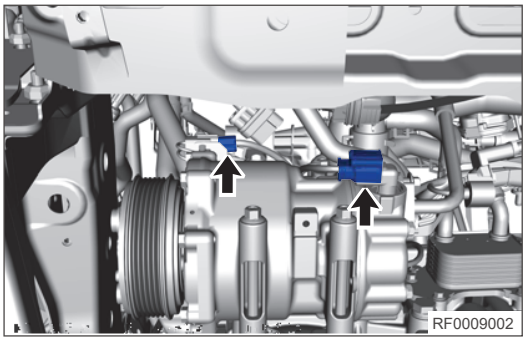
Compressor Assembly

Removal

⚠ Caution

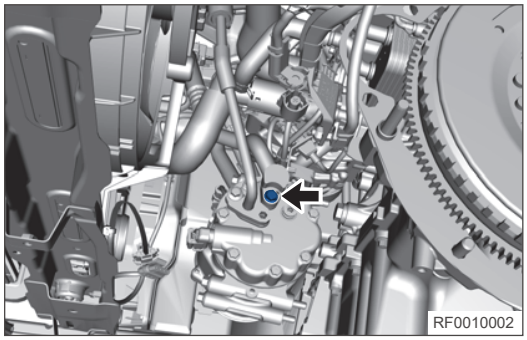
- Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant.
- Always keep work area in good ventilation.
- Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.
- If A/C compressor assembly has an 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 the 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 2 connectors (arrow) from compressor assembly wire harness.



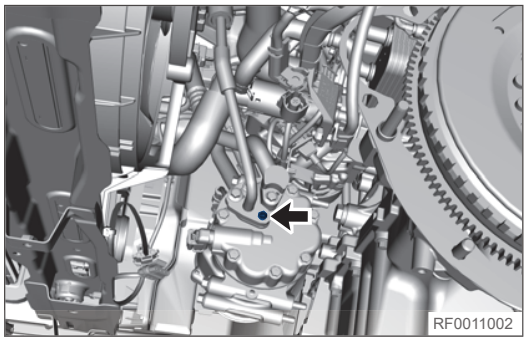
b. Remove compressor low pressure line fixing bolt, and disconnect compressor low pressure line.

Tightening torque: 25 ± 3 N • m



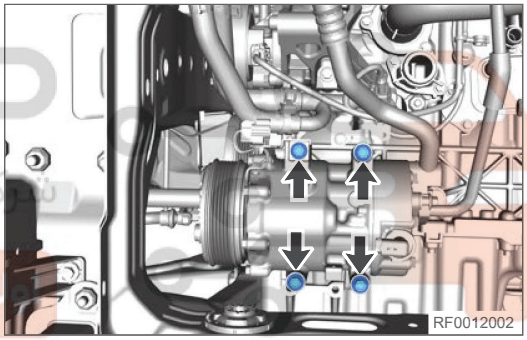
c. Remove compressor high pressure line fixing bolt, and disconnect compressor high pressure line.

Tightening torque: 25 ± 3 N • m



d. Remove 4 fixing bolts (arrow) between compressor assembly and mounting bracket.

Tightening torque: 22.5 ± 2.5 N • m



e. Remove A/C compressor 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.

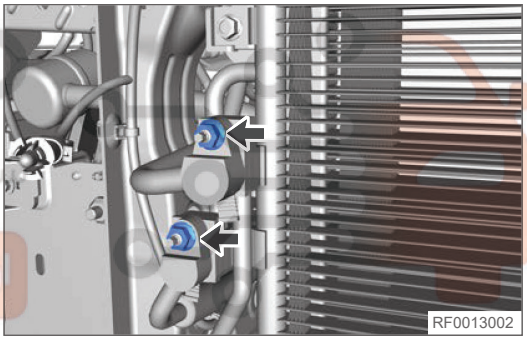
Replacement of Condenser Assembly

Removal

⚠ Caution

- Be sure to follow safety precautions before performing this procedure. Failure to do so may result in serious personal injury or even death.
- 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 the ignition switch.
3. Disconnect the negative battery cable.
4. Remove the front bumper assembly.
5. Remove the front impact beam assembly.
6. Remove the left/right air deflector assembly.
7. Remove the condenser assembly.
   a. Remove 2 fixing nuts (arrow) of condenser A/C line (-arrow), and disconnect A/C line.
      Tightening torque: 9 ± 1 N·m



   b. Remove 2 fixing bolts (arrow) between radiator assembly and condenser assembly.
      Tightening torque: 5 ± 1 N·m

   c. Remove the condenser 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.

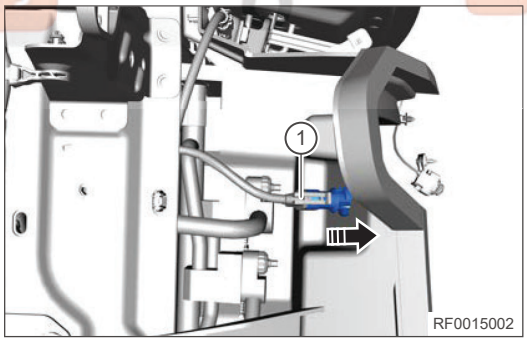
Replacement of Outside Temperature Sensor

Removal

⚠ Caution

- Be sure to wear necessary safety equipment to prevent accidents, when removing front bumper assembly.
- Appropriate force should be applied, when removing front bumper assembly. Be careful not to operate roughly.
- Try to prevent body paint surface from being scratched, when removing front bumper assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the front grille 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 front impact beam.
   b. Remove the wire harness connector (1).
   c. Remove the outside temperature sensor.



Installation

1. Installation is in the reverse order of removal.

Replacement of Pressure Sensor

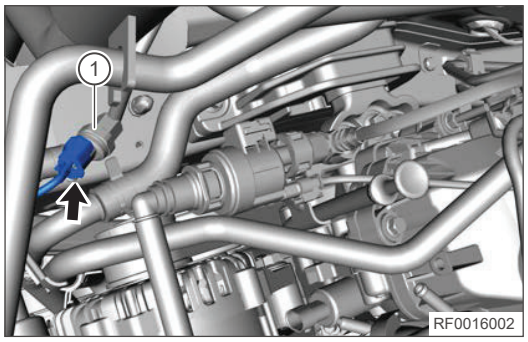
Removal

⚠ Caution

- Appropriate force should be applied when removing pressure sensor. Be careful not to operate roughly.

1. Recover the refrigerant from A/C system assembly.

2. Turn off all electrical equipment and ENGINE START STOP switch.
3. Disconnect the negative battery cable.
4. Turn off all electrical equipment and the ignition switch.
5. Disconnect the pressure sensor connector.
6. Use wrench to remove the pressure sensor (1).



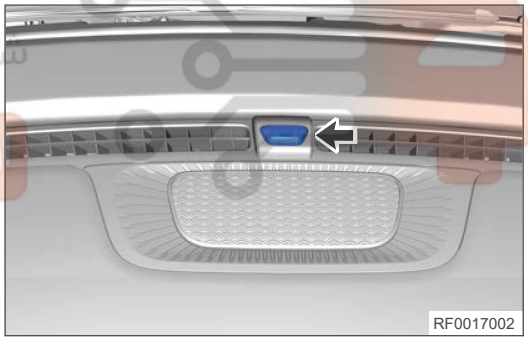
Installation

1. Installation is in the reverse order of removal.

Solar Sensor

Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the solar sensor.
   a. The solar sensor adopts clip assembly. Use a flat tip screwdriver to carefully insert about 3 mm from the gap between solar sensor and instrument cluster (put a soft object under it to avoid damage to the surface of instrument cluster). Use a little force to pry solar sensor out from instrument cluster.
   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 into the corresponding fixing hole, and a "click" sound is heard, indicating that it is installed in place.

Compressor - Condenser Line

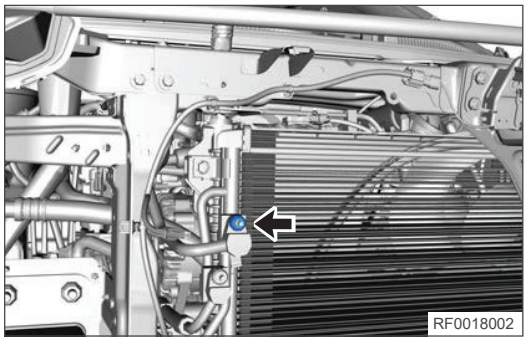
Removal

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.

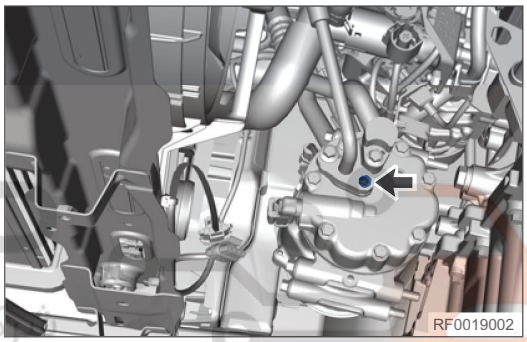
1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and the ignition switch.
3. Disconnect the negative battery cable.
4. Remove the front bumper assembly.
5. Remove the compressor to condenser line assembly.
   a. Remove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

      Tightening torque: 9 ± 1 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



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 - Evaporator Line and Evaporator - Condenser Line

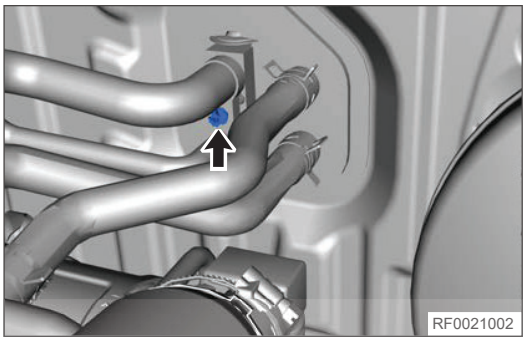
Removal

⚠ 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.

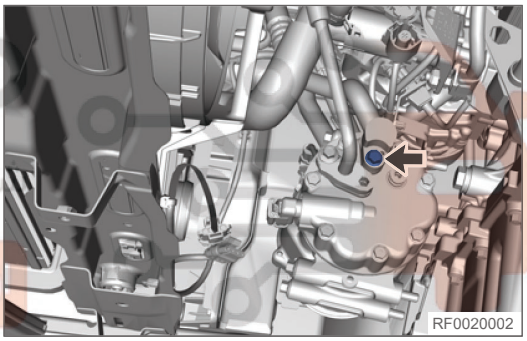
1. Recover the refrigerant from A/C system (For details, refer to replacement of refrigerant).
2. Turn off all electrical equipment and the ignition switch.
3. Disconnect the negative battery cable.
4. Remove the engine lower protector.
5. Remove the A/C pressure sensor.
6. Remove the front bumper.
7. Remove the right air deflector.
8. Remove the compressor - evaporator line and evaporator - condenser line.
   a. Remove the evaporator - compressor line fixing bolt (- arrow) at expansion valve.

      Tightening torque: 9 ± 1 N·m



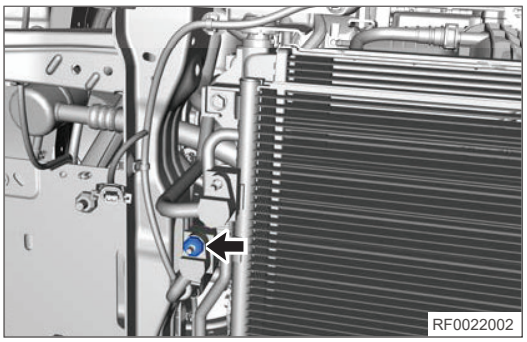
   b. Remove evaporator - compressor line assembly fixing bolt (arrow), and detach line.

      Tightening torque: 25 ± 3 N·m



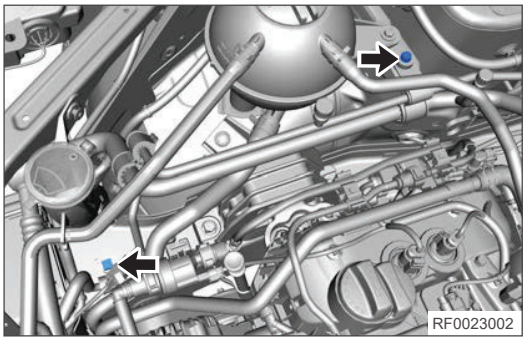
   c. Remove A/C condenser - evaporator line assembly fixing nut (arrow), and detach line.

Tightening torque: 9 ± 1 N•m



   d. Remove 2 fixing bolts (arrow) from A/C line clamp.

Tightening torque: 9 ± 1 N•m



9. Remove the compressor - evaporator line and evaporator - 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.

AC FAN BODY AND AIR DUCT

Warnings and Precautions

Warnings

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Take extra care when servicing A/C system under high pressure.
2. 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.
3. 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.
4. Never drain refrigerant in A/C system into the atmosphere directly, and avoid environmental contamination.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

1. Special service device for R134a Refrigerant / R1234yf (European Union) must be used to recover/ charge refrigerant.
2. Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

System Overview

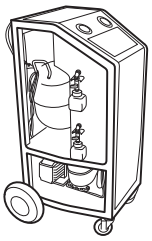
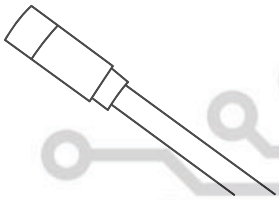
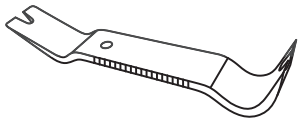
HVAC Assembly

1	A/C Control Panel	6	Mode Damper Motor
2	Evaporator	7	Blower Speed Regulation Module
3	A/C Control Module	8	Blower Assembly

4	Mix Damper Motor	9	HVAC Transition Duct
5	A/C Element		

On-vehicle Service

Tools

Tool Name	Tool Drawing
Refrigerant Recycling Machine	 S00034
Gas Leak Detector	 S00100
Interior & Exterior Remover	 RCH002506

Specifications

Torque Specifications

Description	Torque (N · m)
HVAC Fixing Nut	7 ± 1
HVAC Fixing Bolt	7 ± 1
Inlet Air Duct Fixing Screw	1.2 ± 0.2
Inlet Air Duct Fixing Bolt	1.2 ± 0.2
Inner/Outer Damper Set Fixing Bolt	1.2 ± 0.2

Description	Torque (N · m)
Heater Core Fixing Screw	1.2 ± 0.2
Heater Core Plate Fixing Screw	1.2 ± 0.2
Damper Set Fixing screw	1.2 ± 0.2
Damper Drive Set Fixing Screw	1.2 ± 0.2
Damper Drive Set Fixing Bolt	1.2 ± 0.2
Fixing Screw Between Evaporator Housing and Evaporator Case	1.2 ± 0.2
Rear Right Outlet Fixing Screw	1.2 ± 0.2
Rear Left Outlet Fixing Screw	1.2 ± 0.2
Evaporator Case Fixing Screw	1.2 ± 0.2
Damper Set Housing Fixing Screw	1.2 ± 0.2
Anion Generator Fixing Screw	1.5 ± 0.5

A/C Control Panel Assembly

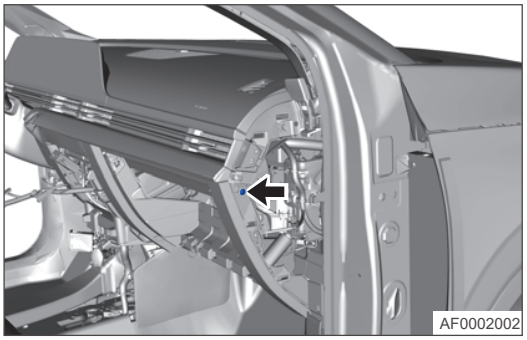
Removal

⚠ Caution

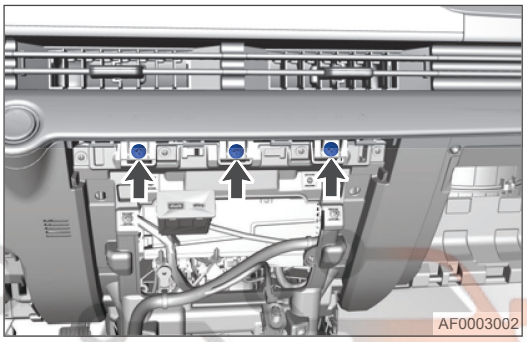
- Be careful not to scratch instrument cluster surface when removing central control panel cover and A/C panel.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Remove the instrument panel right end plate assembly.
3. Remove the auxiliary fascia console control panel.
4. Remove the A/C control panel assembly.

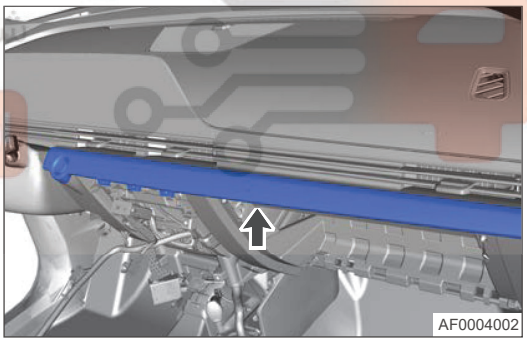
e. Remove A/C control panel right fixing screw (arrow).



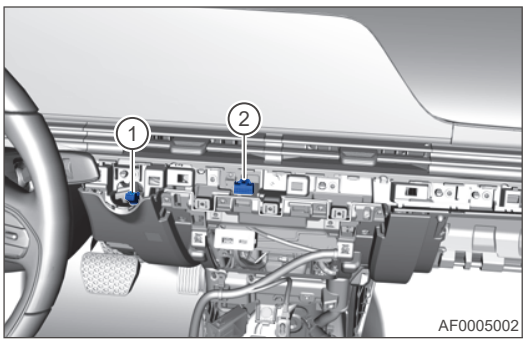
f. Remove 3 A/C control panel middle fixing screws (arrow).



g. Using an interior crow plate, carefully pry off the A/C control panel assembly (arrow).



h. Disconnect the ENGINE START STOP switch connector (1) and A/C control panel connector (2).



i. Remove the A/C control panel.

Installation

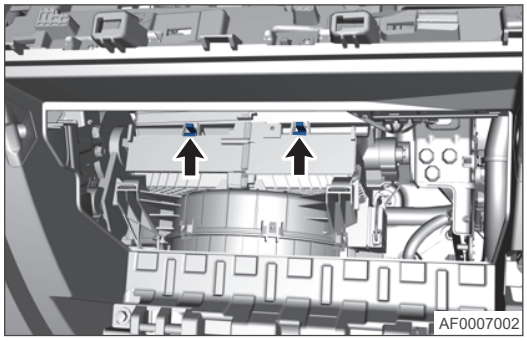
⚠ Caution
• Be careful not to scratch the panel and instrument panel parts during installation.

1. Installation is in the reverse order of removal.

Replacement of 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

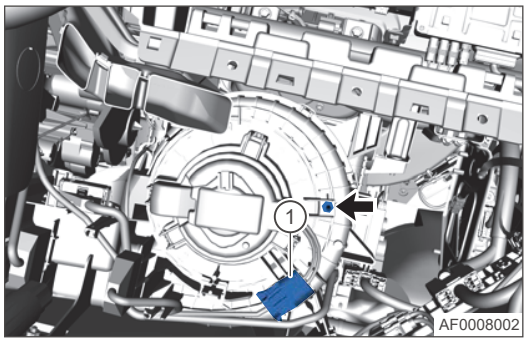
- If A/C element is too dirty or damaged, replace it with a new one.
- When installing A/C element, make arrow mark on the element face downward.

1. Installation is in the reverse order of removal.

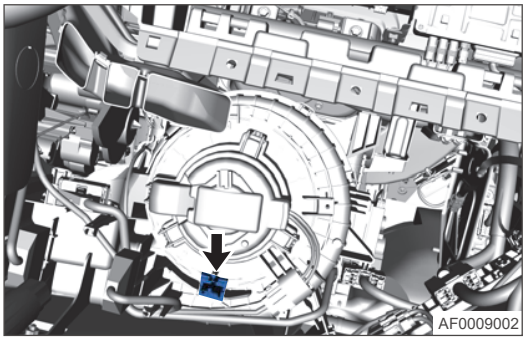
Replacement of Front Blower Assembly

Removal

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

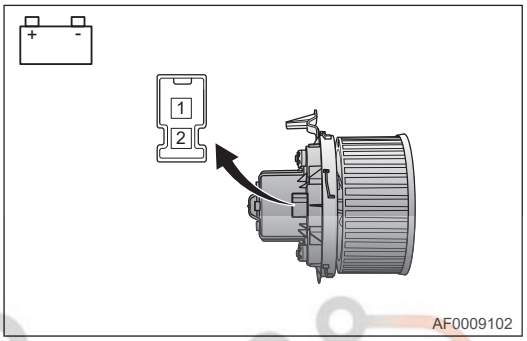


b. Detach blower fixing claw (arrow), and rotate blower counterclockwise to remove blower.



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.

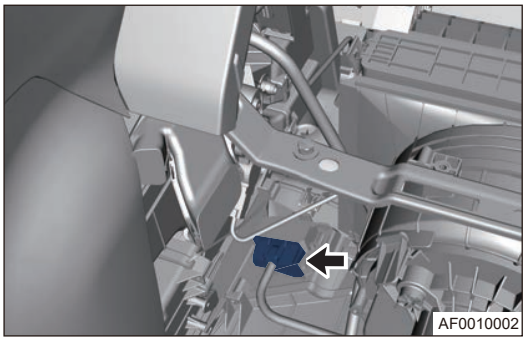
Blower Speed Regulation Module

Removal

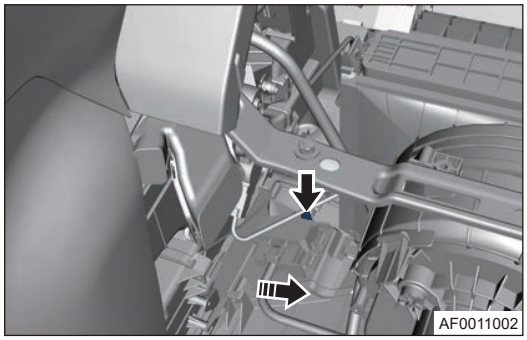
Warning

- 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 (1).



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.

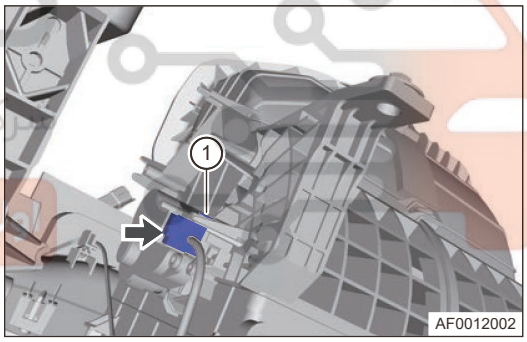
Installation

1. Installation is in the reverse order of removal.

Inner/Outer Circulation Damper Servo Motor

Removal

1. Turn off all electrical equipment and the 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

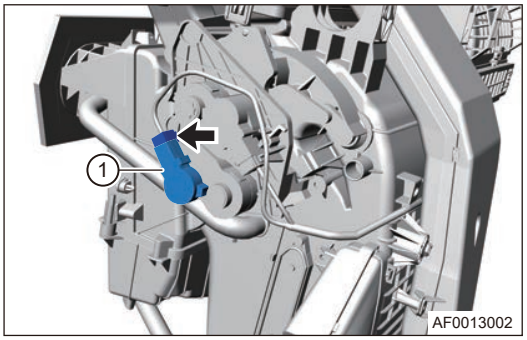
1. Installation is in the reverse order of removal.

Mode Damper Motor

Removal

1. Turn off all electrical equipment and the 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

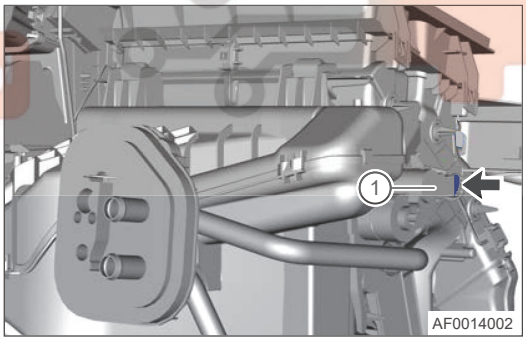
1. Installation is in the reverse order of removal.

> **⚠ 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.

Right Mix Damper Motor

Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the instrument panel right lower protector 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 (1).



Installation

1. Installation is in the reverse order of removal.

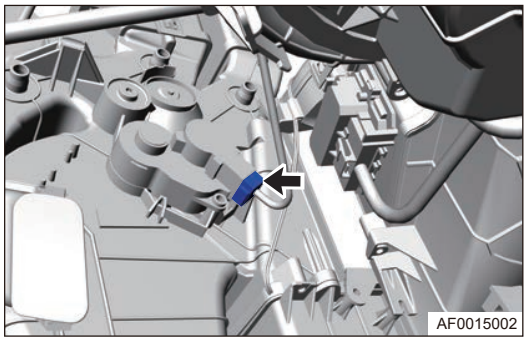
> **⚠ Caution**
>
> • When installing, apply a small amount of grease to contact surface of the right mix damper motor lever and the mix damper set to ensure the motor operates smoothly.

Left Mix Damper Motor

Removal

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the glove box 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.



Installation

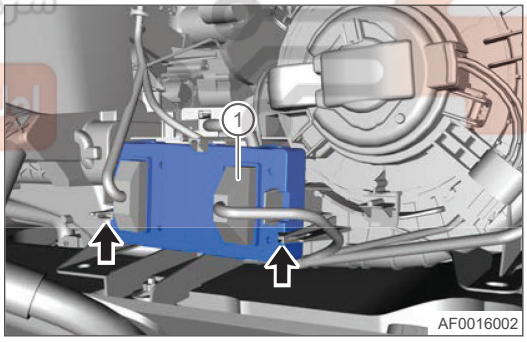
1. Installation is in the reverse order of removal.

> ⚠ **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.

Automatic A/C Control Module

Removal

1. Turn off all electrical equipment and the 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

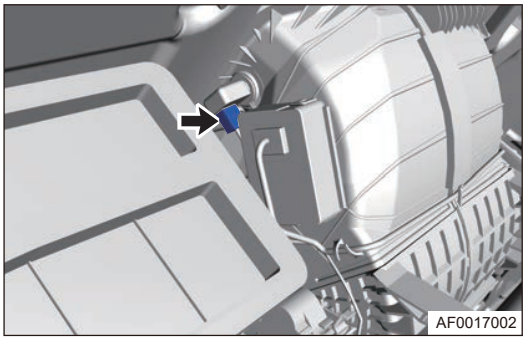
1. Installation is in the reverse order of removal.

Air Quality Sensor

Removal

1. Turn off all electrical equipment and the 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.



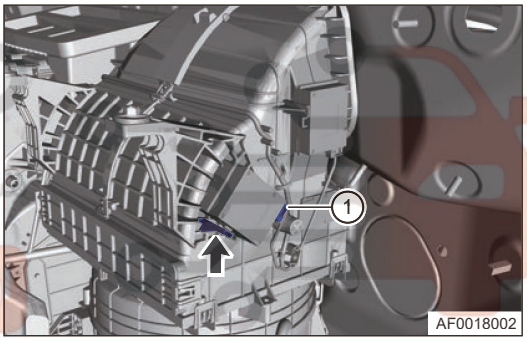
Installation

1. Installation is in the reverse order of removal.

Inside PM2.5 Sensor (If Equipped)

Removal

1. Turn off all electrical equipment and the 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.



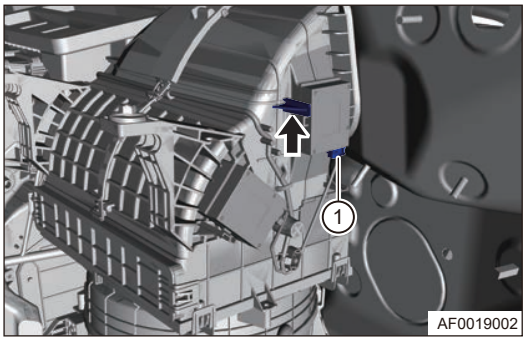
Installation

1. Installation is in the reverse order of removal.

Outside PM2.5 Sensor (If Equipped)

Removal

1. Turn off all electrical equipment and the 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.



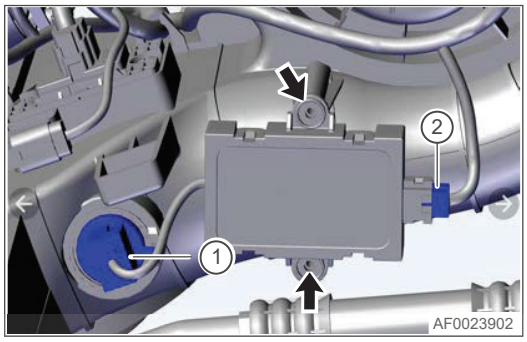
Installation

1. Installation is in the reverse order of removal.

Anion Generator (If Equipped)

Removal

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



Installation

1. Installation is in the reverse order of removal.

HVAC Assembly

Removal

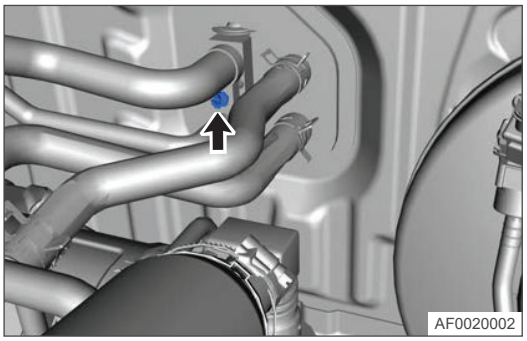
⚠ Caution

- 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 the 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).

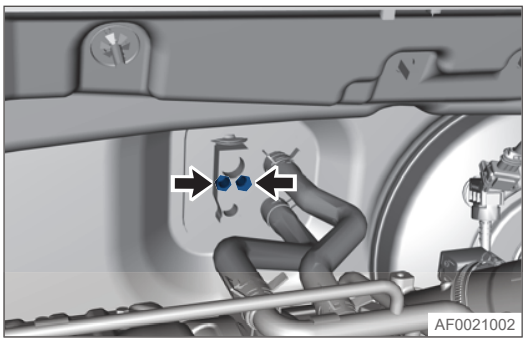
9. Remove the HVAC assembly.
   a. Remove the A/C high/low pressure line fixing bolt (arrow).

      Tightening torque: 9 ± 1.5 N • m

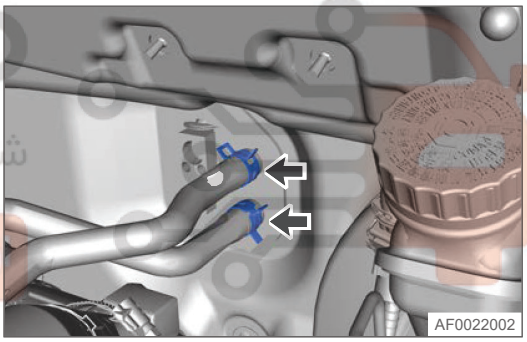


   b. Remove 2 fixing bolts (arrow) from expansion valve and remove expansion valve assembly.

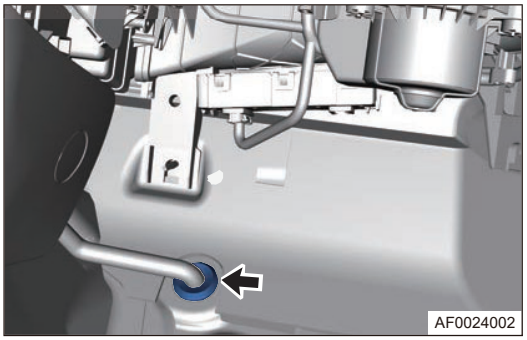
      Tightening torque: 9 ± 1.5 N • m



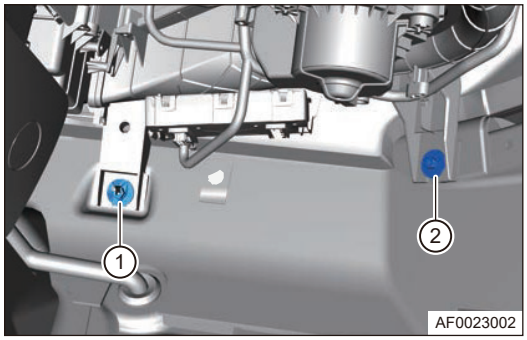
   c. Using snap spring pliers, disengage fixing clamps (-arrow) from heating inlet and outlet hoses to detach the inlet and outlet hoses.



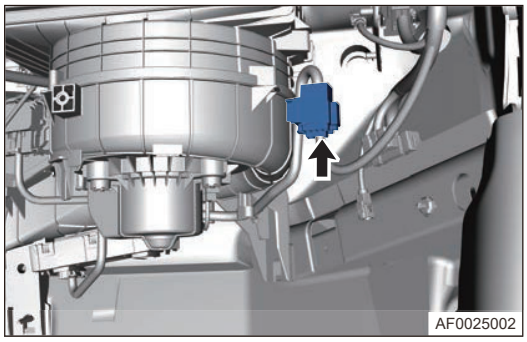
   d. Disengage the outlet hose of HVAC and fixing bush rubber (arrow) of body.



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



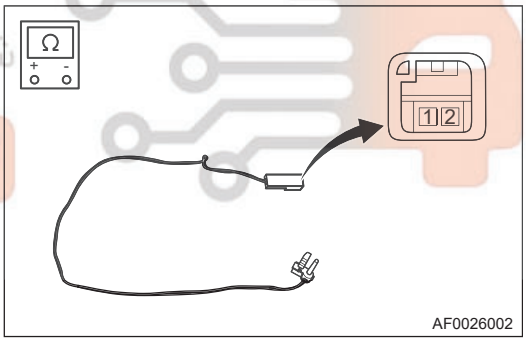
f. Disconnect HVAC assembly and interior wire harness (arrow).



g. Carefully remove HVAC assembly from cabin.

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:

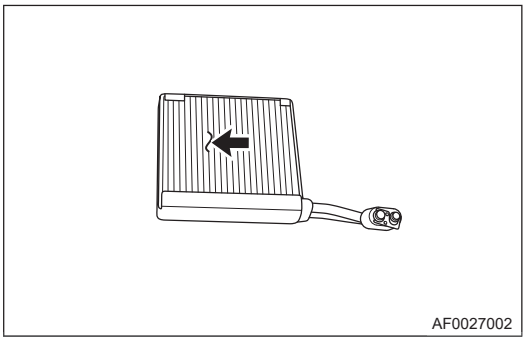
- Resistance decreases as temperature increases.
- If result is not as specified, replace evaporator temperature sensor.

⚠ 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.

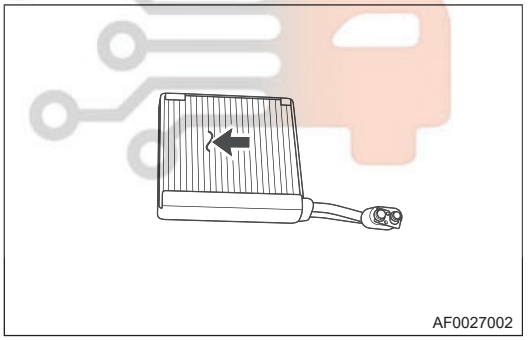
2. Check the evaporator core assembly.
   a. Check if evaporator core assembly is cracked, damaged and leaked. If any problem is found, replace evaporator core assembly.
   b. Check fin for bends.

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



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.



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.

Installation

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. Only use specified O-ring, as it is made of special materials for R134a Refrigerant / R1234yf (-European Union) system.
13. Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle.
14. Be sure to recharge refrigerant and check for refrigerant leakage after installation.
15. Be sure to recharge engine cooling system and check for coolant leakage after installation.