
ELECTRICAL SYSTEM

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33.1 Air Conditioning Control System

1 Warnings and Precautions

1.1 Precautions

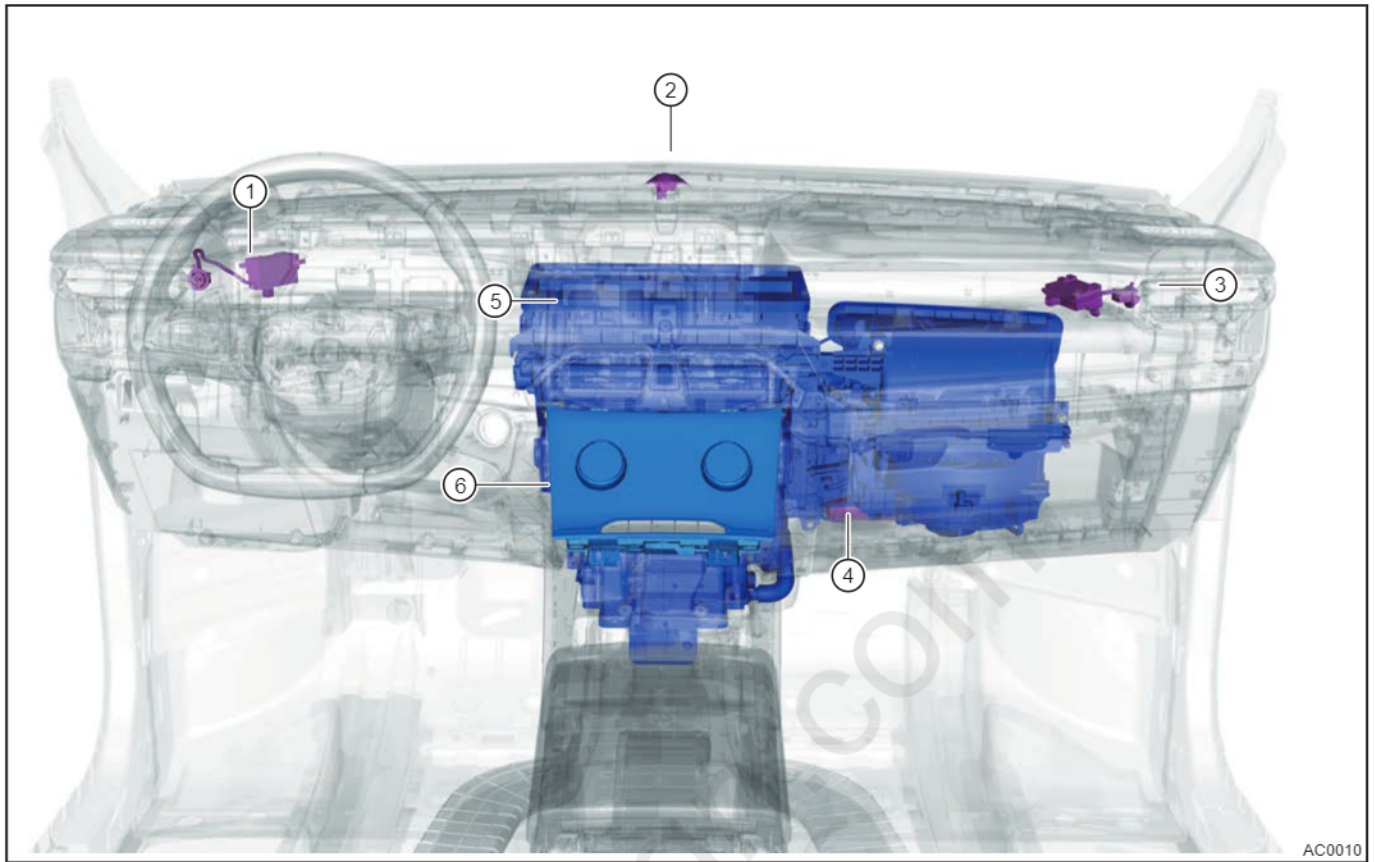
- (1) The connector of negative ion generator must be disconnected when cleaning the air conditioning line after sale to avoid fire.
- (2) To prevent battery is depleted, turn off A/C system after engine stopping if it is not necessary.
- (3) Do not insert or stick anything to each vent, or use the spray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

2 General Information

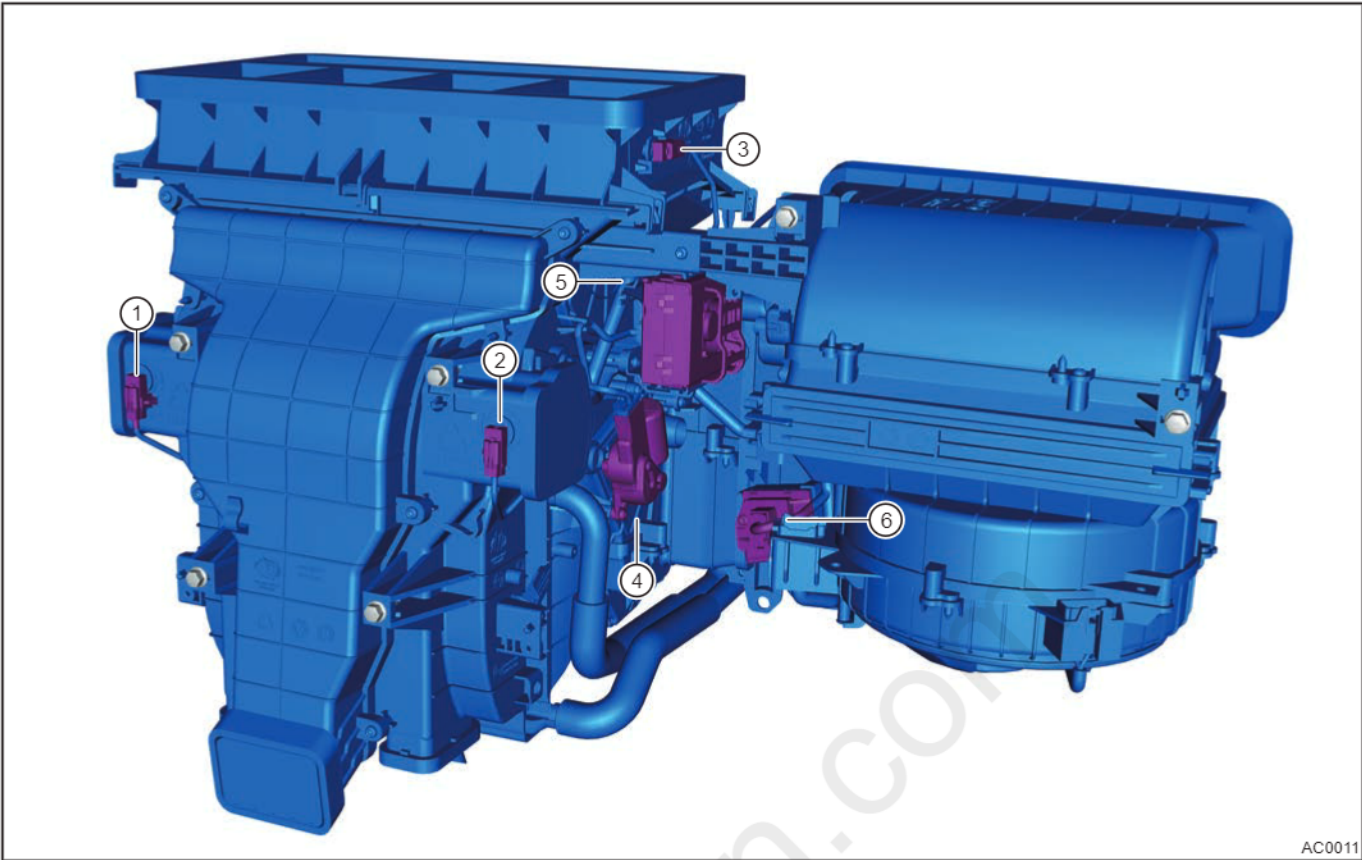
2.1 System Description

Automobile A/C system is a device which can refrigerate, heat, exchange air and purify air in the cabin. It can provide comfortable riding environment for passengers, reduce fatigue intensity of driver and improve driving safety. Air conditioning system is a micro-motor driven, constant displacement, multiple function, integrated heating and cooling, single-zone system. Use environmentally friendly refrigerant R134a. The system consists of five basic components: constant displacement compressor, cooling condenser, electric HVAC assembly, line (including expansion valve) and electric control panel assembly. It also includes other accessories (such as pressure switch, O-ring).

2.2 System Components Diagram

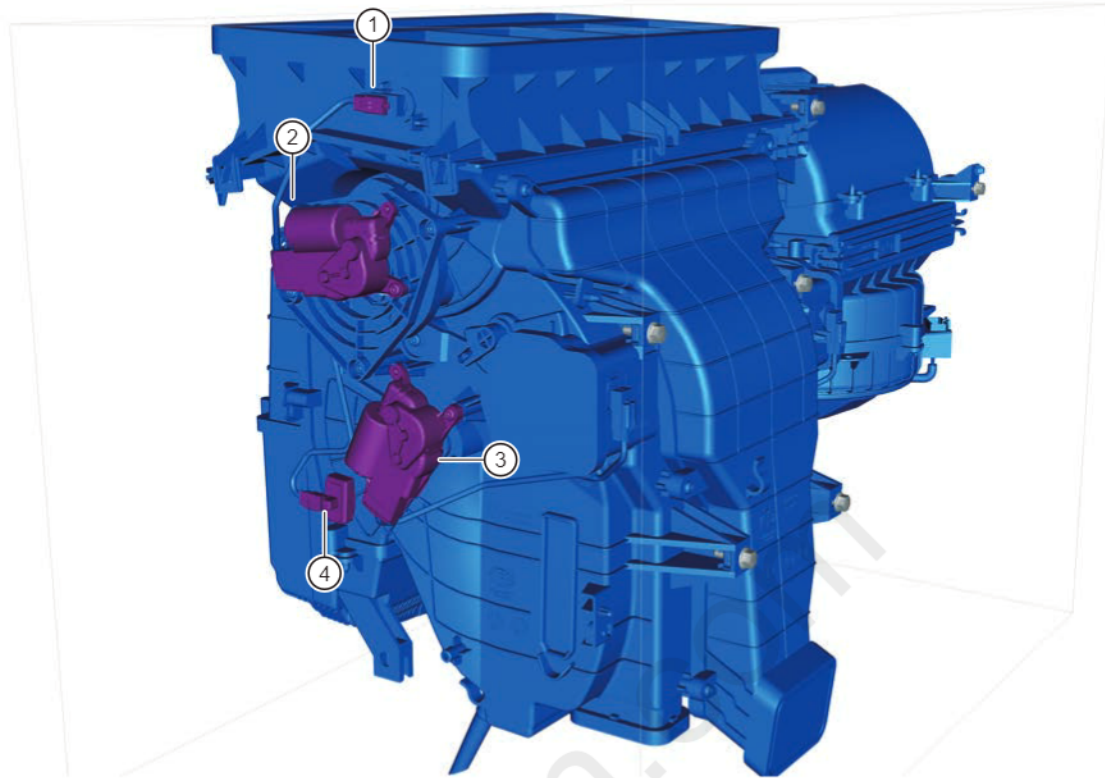


1	Left Anion Generator	4	A/C Control Module
2	Solar Sensor	5	HVAC Assembly
3	Right Anion Generator	6	A/C Control Panel



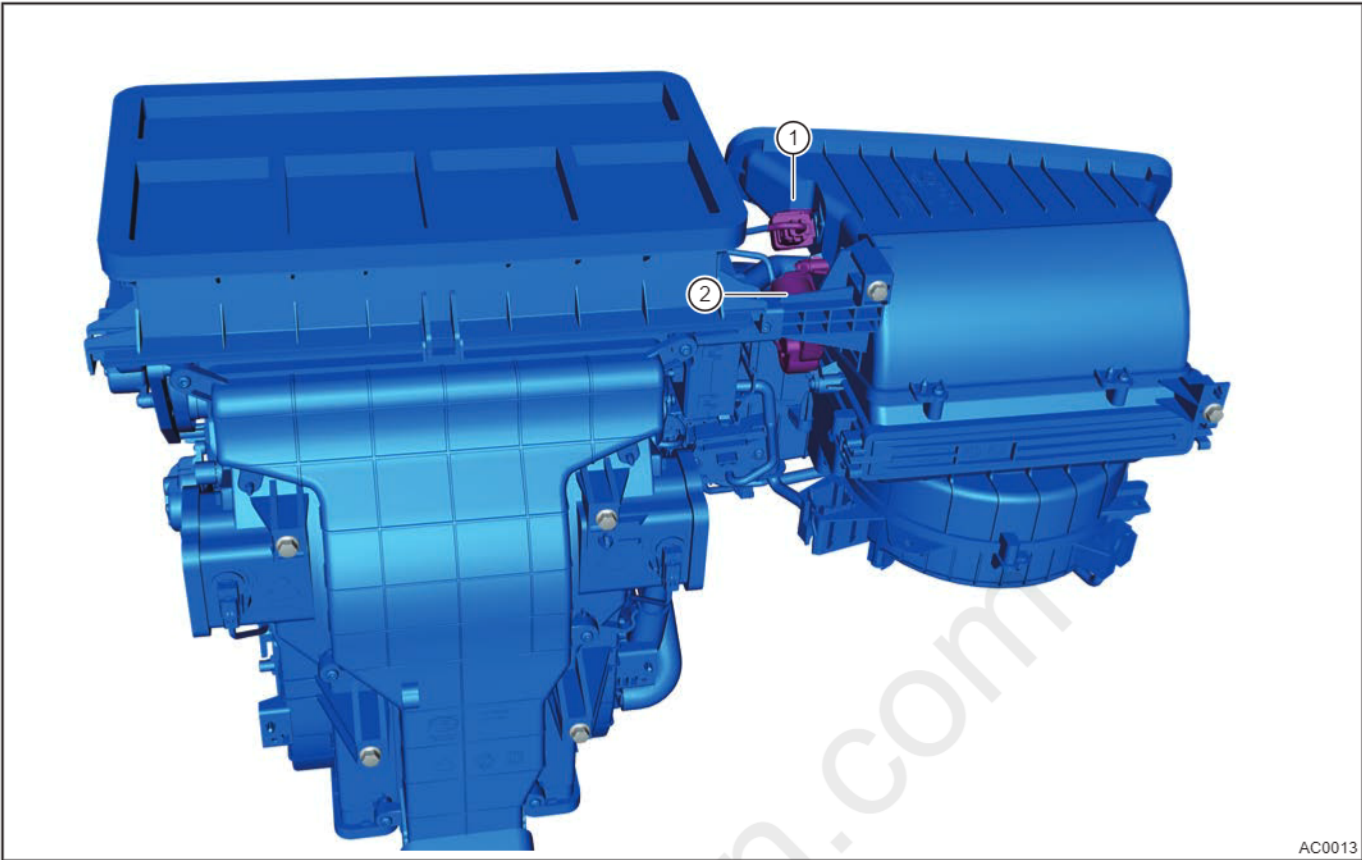
AC0011

1	Left Foot Temperature Sensor	4	Right Temperature Damper Servo Motor
2	Right Foot Temperature Sensor	5	PM2.5 Sensor
3	Right Face Temperature Sensor	6	Blower Speed Regulation Module



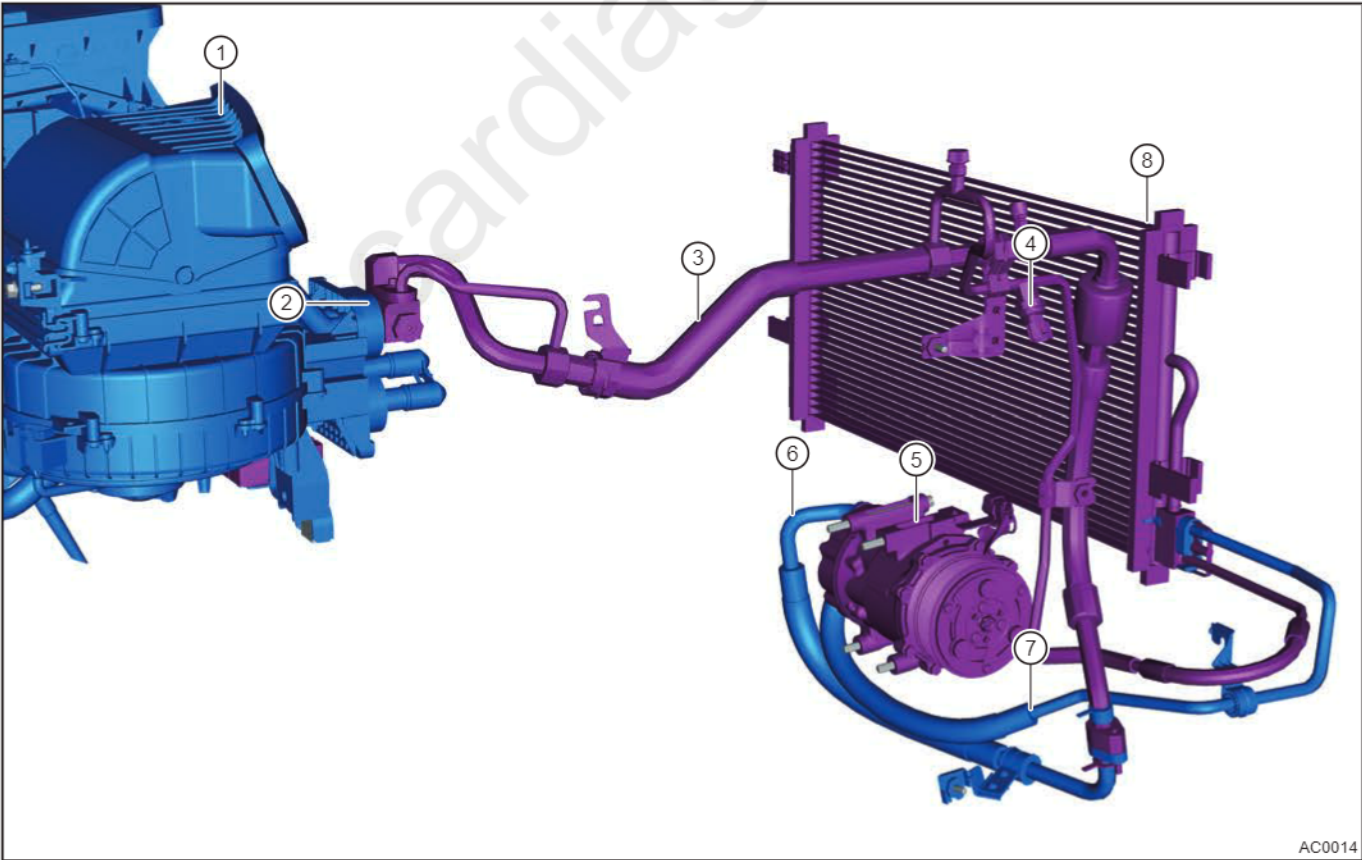
AC0012

1	Left Face Temperature Sensor	3	Left Temperature Damper Servo Motor
2	Left Mode Damper Servo Motor	4	Evaporator Tank Temperature Sensor



AC0013

1	Air Quality Sensor	2	Inner/Outer Circulation Damper Servo Motor
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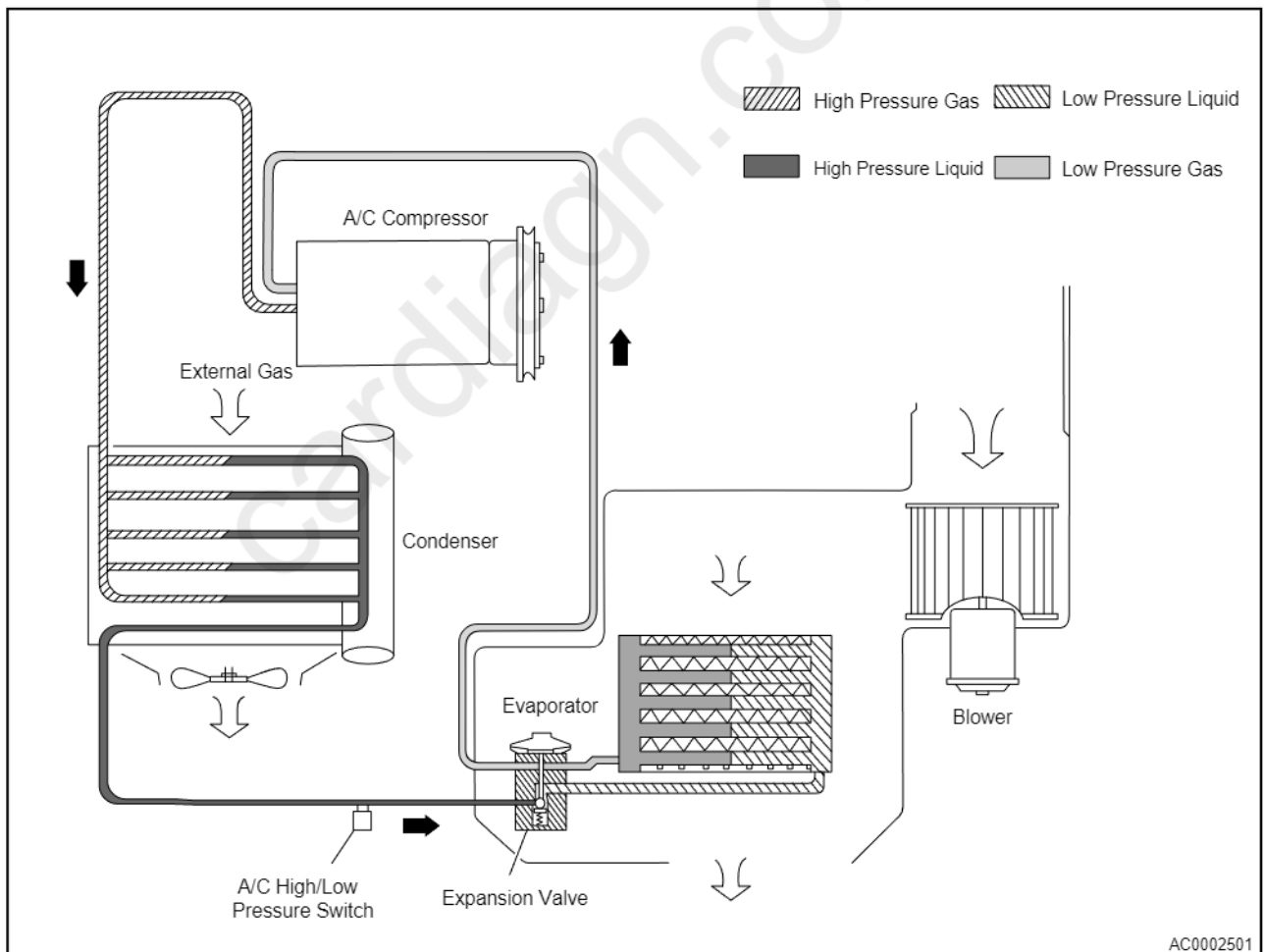


AC0014

1	HVAC	5	Compressor Assembly
2	Expansion Valve	6	A/C Coaxial Line - Compressor Line Assembly
3	A/C Coaxial Line Assembly	7	Condenser - Compressor Line Assembly
4	A/C Pressure Sensor	8	Condenser Assembly (w/ Receiver Drier)

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

3 Functional Principle

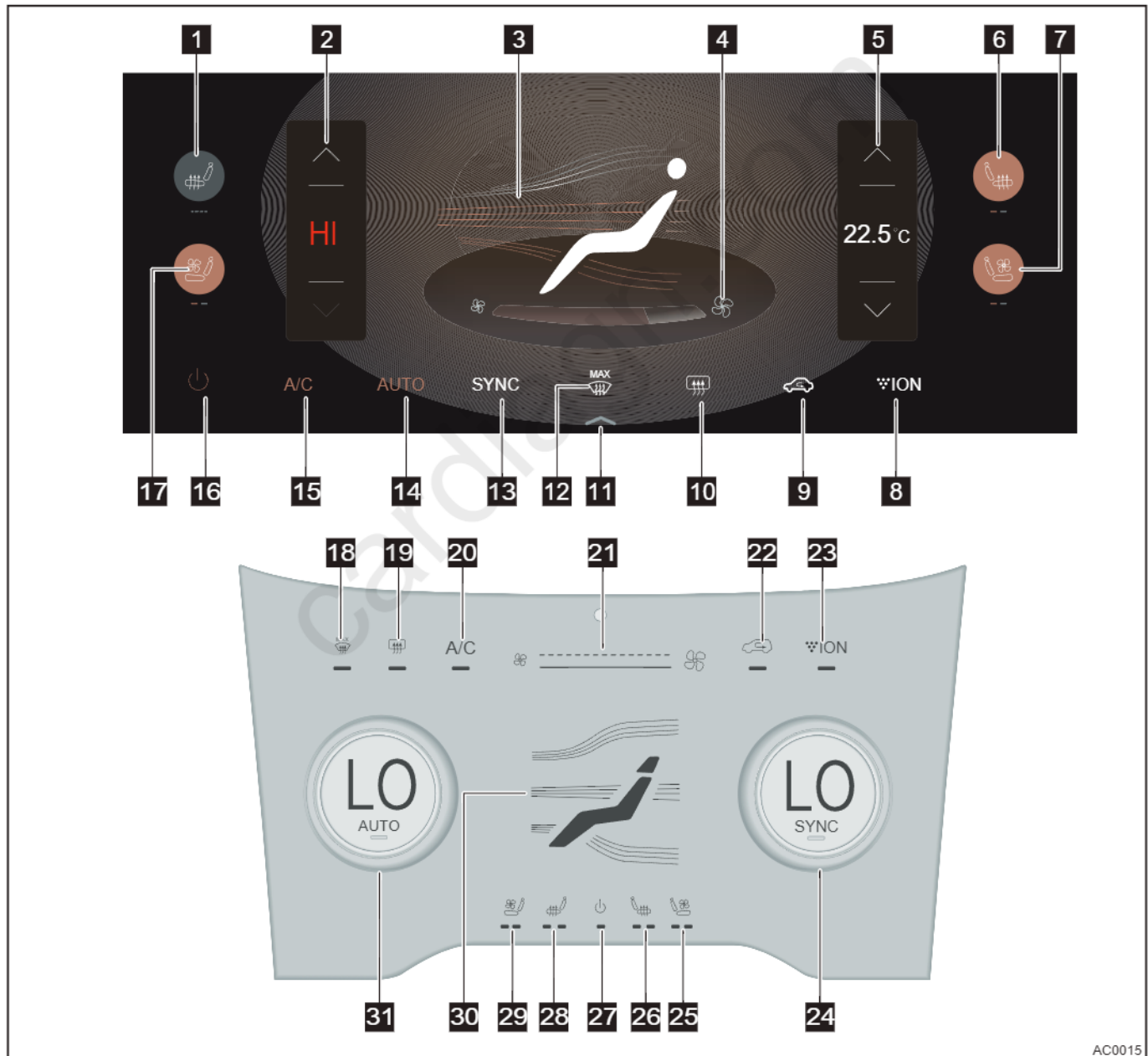


- Outside fresh air enters air inlet filter assembly through cowl top opening at the right side of windshield base. Fresh air flows through evaporator core and heater core, and then enters vehicle through outlets on instrument panel and floor.
- Temperature can be adjusted by air volume adjustment button on A/C control panel.

- Turn on the compressor assembly by pressing A/C switch. Refrigerant is compressed by compressor assembly and converted into high temperature/pressure gas, which is then condensed into high pressure liquid in the condenser. Then the liquid is filtered and dried by receiver drier and delivered to expansion valve and becomes low-pressure liquid through throttling and depressurization. Finally the liquid enters evaporator in vehicle and absorbs heat and evaporates, thus refrigeration is achieved.
- A/C heating is realized by engine coolant circulation system. Heater core is a main component of heating system. With engine running, engine coolant flows from engine water pump to heater core, and the heater core transmits the heat from engine coolant to the air that flows through heater core. At this time, A/C switch is off. The air flowing through heater core becomes hot wind through heat exchanging, thus providing heating. Temperature adjustment control mechanism can be controlled by rotating temperature adjustment knob. Mix damper closes when temperature adjustment button is rotated counterclockwise to MAX COOL position. If airflow does not flow through heater core, the heat transmission will not occur.

3.1 System Function Description

■ A/C Usage Method (Front Control Panel)



AC0015

No.	Definition	No.	Definition	No.	Definition
1	Driver seat heater soft button	12	Front windshield maximum defrosting and defogging soft button	23	Air purification button
2	Driver temperature adjustment soft button	13	Air conditioning synchronous control soft button	24	Front passenger temperature adjustment knob/Air conditioning synchronous control button
3	Mode status adjustment soft button	14	AUTO soft button	25	Front passenger seat ventilation button
4	Airflow volume adjustment soft button	15	A/C soft button	26	Front passenger seat heater button
5	Front passenger temperature adjustment soft button	16	A/C switch soft button	27	A/C switch button
6	Front passenger seat heater soft button	17	Driver seat ventilation soft button	28	Driver seat heater button
7	Front passenger seat heater button	18	Front windshield maximum defrosting and defogging button	29	Driver seat ventilation button
8	Air purification soft button	19	Rear defrosting button	30	Mode status adjustment button
9	Inner/outer circulation mode soft button	20	A/C button	31	Driver side temperature adjustment knob/AUTO button
10	Rear defrosting soft button	21	Airflow volume adjustment button	32	/
11	Air conditioning screen hidden soft button	22	Inner/outer circulation mode button	33	/

No.	Function	Usage Method	Note
1	Temperature adjustment	There are two methods to adjust temperature: Operate the temperature bar on air conditioning panel display or operate the button on panel. When adjusting temperature, the corresponding temperature value will be displayed on the panel display.	/
2	Airflow volume adjustment	There are two methods to adjust airflow volume: Operate the airflow volume bar on air conditioning panel display or operate the airflow volume button on panel. When adjusting airflow volume, the corresponding airflow volume level will be displayed on the panel display. There are 7 airflow volume levels. Select proper level according to actual situation. Airflow volume can be adjusted by the knob.	
3	Mode adjustment	Operate different positions to achieve different blow mode. Face mode: It can adjust airflow blowing out from center and face outlets on both sides. Hints: The face airflow direction can be adjusted by adjusting grilles of face outlet. Face/foot mode: It can adjust airflow blowing out from center outlet, face outlets on both sides and foot outlet. Foot mode: It can adjust airflow blowing out from foot outlet.	/

No.	Function	Usage Method	Note
		Foot/defrosting mode: It can adjust airflow blowing out from foot outlet and defrosting outlet.	
4	Maximum front defrosting button	Most of the airflow blows to front windshield, a small amount of airflow blows to side windshield. In order to defog rapidly, when the maximum front defrost button is operated, airflow volume will be forced to level 4 (if the airflow volume is lower than level 4 before the button is operated, it will be switched to level 4; if the airflow volume is higher than level 4 before the button is operated, it will be maintain the current state), compressor and outer circulation mode will turn on. When the maximum front defrosting function is operating, the button character is orange, when it is not operating, the button character is white.	/
5	A/C button	Select the inner circulation mode. The inner circulation indicator comes on, indicating that the air conditioning is in inner circulation mode, heating or cooling the inner air according to selected function. Select the outer circulation (fresh air) mode. The outer circulation indicator comes on, indicating that air conditioning is in outer circulation mode, heating or cooling the outside air entering the vehicle according to selected function. Hints: The inner/outer circulation mode is distinguished by the color of button character. The character is blue in inner circulation mode, and the character is white in outer circulation mode.	/
6	Dual-zone mode button	This button can turn on and off the dual-zone mode of air conditioning. Press this button or adjust the front passenger temperature, air conditioning will enter dual-zone mode automatically. The button character is white in dual-zone mode, and the temperature of driver and front passenger can be set separately. Press the button again to exit dual-zone mode and enter single-zone mode, the character color is blue.	/
7	One-button purification button	The button can trigger one-button purification function of air conditioning: The color of button character is orange during performing one-button purification function, the color of button character is white when one-button purification function ends. For the air conditioning with anion, when operating the button to turn on air purification function, the anion can be turned on synchronously, and then anion can be individually controlled on and off.	/
8	Rear A/C switch	This button is rear air conditioning switch. After pressing this button, the button character is blue, rear air conditioning is turned on at this time. Press this button again, the button character will be white, rear air conditioning will be turned off.	This function is applicable to the model equipped with rear air conditioning function
9	AUTO button	Press AUTO button, the button character turns blue, indicating that the mode is switched to automatic mode, the button character turns white, indicating that the mode is switched to manual mode.	/

No.	Function	Usage Method	Note
10	ON/OFF button	Press the button, the button character turns blue, indicating that the head unit is ON, the button character turns white, indicating that the head unit is OFF.	/
11	A/C setting button	After operating the button, A/C setting screen pops up. The setting screen is as shown in the figure below. After the setting screen is opened, personalized setting for A/C system can be set based on the user's usage habits.	/

Hint:

For detailed operation method, please refer to Owner's Manual.

■ Signal Interaction

When system is operating, the indicators and backlights of related functions should operate correspondingly, the brightness and flash should meet the requirements.

Front Panel Button Input			
No.	Function	Function Description	Note
1	Maximum defrosting button	Receive a request - maximum defrosting - 1 and the signal is valid, CLM performs the maximum defrosting function, meanwhile, update STAT maximum defrosting on the front panel display	
2	A/C button	Receive a request for A/C compressor and the signal is valid, CLM performs the corresponding function, meanwhile, update A/C operating status signal STAT-AC compressor request to the bus	
3	PM2.5 button	Receive a request for APM2.5 - 1 and the signal is valid, CLM performs the corresponding function, meanwhile, update STAT-PM2.5 - 1, AQS-Sts	PM2.5 and AQS are turned on and off at the same time
4	REAR button	Receive a request for _rear temperature adjustment and the signal is valid, CLM performs the corresponding function, meanwhile, update STAT rear temperature KeyOnOff	This function is applicable to the model equipped with rear air conditioning function
5	Circulation button	Receive a request for - inner circulation mode - 1 and the signal is valid, CLM performs the corresponding function, meanwhile, update STAT inner/outer circulation	
6	ON/OFF button	Receive a request for _front A/C temperature control OnOff and the signal is valid, CLM performs the corresponding function, meanwhile, update STAT-Front A/C control OnOff	

Front Panel Button Input			
No.	Function	Function Description	Note
7	Mode button	Receive request - face, request - foot, request-defrost and the signals are valid, CLM performs the mode switching function, for the specific switching method, please refer to the function description in mode control chapter, meanwhile, update STAT-FInterAirDistribution	
8	Auto button	Receive a request - Auto and the signal is valid, CLM performs the corresponding function, meanwhile, update STAT-Front A/C control Auto	
9	SYNC button	Receive a request - SYNC and the signal is valid, CLM performs the corresponding function, meanwhile, update STAT-Front A/C control SYNC	
10	Airflow volume level adjustment button	Receive request - blower speed increase/decrease, request - blower speed, request - blower speed increase, request - blower speed decrease and signals are valid, CLM performs the following functions: When A/C controller receives a request signal about blower speed increase, the speed increases from low speed to high speed, the speed range is level 1 to level 7. When A/C controller receives a request signal about blower speed decrease, the speed decreases from high speed to low speed, the speed range is level 1 to level 7. Note: Airflow volume slider cannot turn on the air conditioning. If the request - blower speed increase is valid, CLM airflow volume level is increased by 1 level; If the request - blower speed decrease is valid, CLM airflow volume level is decreased by 1 level; Note: Airflow volume button request_blower speed increase can turn on the air conditioning. Meanwhile, update STAT blower speed. Long-press button function: If received request - blower speed increase is 1, perform the function once and start timing. After the time reaches 1s (to be determined), it is regarded as a long-press, and then the airflow volume will increase by one level every 0.6s (to be determined). If received request - blower speed decrease is 1, perform the function once and start timing. After the time reaches 1s (to be determined), it is regarded as a long-press, and then the airflow volume will decrease by one level every 0.6s (to be determined).	Long-press button function is added
11	Left temperature adjustment button	Receive request - left zone temperature increase/decrease, request - left zone temperature adjustment step and signals are valid, CLM performs the following functions: If request - left zone temperature increase/decrease is increase, CLM left zone temperature increases; If request - left zone temperature increase/decrease is decrease, CLM left zone temperature decreases; Meanwhile, update SetFrontCelsTempLeftZone, SetFrontFahrTempLeftZone	
12	Right temperature adjustment button	Receive request - right zone temperature increase/decrease, request - TempAdjustStepRightZone and signals are valid, CLM performs the following functions: If request - right zone temperature increase/decrease is increase, CLM right zone temperature increases; If request - right zone temperature increase/decrease is decrease, CLM right zone temperature decreases, and request_TempAdjustStepRightZone; Meanwhile, update front centigrade temperature left zone setting and front centigrade temperature right zone setting	

Front Panel Button Input			
No.	Function	Function Description	Note
13	Self-learning	Receive a request - self-learning and CLM signal is valid, CLM performs the corresponding function	
14	Self-diagnostic	Receive a request - self-diagnostic and CLM signal is valid, CLM performs the corresponding function and sends the message to network	

Voice Control			
No.	Function	Function Description	Note
1	Voice control function is the same as the button press effect	Each control signal function is the same as button function	
2	Voice - A/C control OnOff	Receive voice - A/C control OnOff and signal is valid, CLM performs the following functions: If voice - A/C control OnOff is 0, there is no response If voice - A/C control OnOff is 1, request air conditioning to turn on If voice - A/C control OnOff is 2, request air conditioning to turn off	
3	Voice - A/C control Auto	Receive voice - A/C control Auto and signal is valid, CLM performs the following functions: If voice - A/C control Auto is 0, there is no response If voice - A/C control Auto is 1, request to enter AUTO If voice - A/C control Auto is 2, request to exit AUTO (the signal is reserved, IHU will not send out the signal)	PM2.5 and AQS are turned on and off at the same time
4	Voice - blower status	Receive voice - blower status and signal is valid, CLM performs the following functions: If voice - blower status is 0, turn off A/C; If voice - blower status is 1 to 7, set airflow volume of blower to level 1 to 7	
5	Voice - mode adjustment	Receive voice - mode adjustment and signal is valid, CLM performs the following functions: If voice - mode adjustment is 1 to 6, set mode motor to the corresponding position	
6	Voice - maximum defrosting	Receive voice - maximum defrosting and signal is valid, CLM performs the following functions: If voice - maximum defrosting is 0, turn off the maximum defrosting function If voice - maximum defrosting is 1, turn on the maximum defrosting function	
7	Voice - inner/outer circulation	Receive voice - inner/outer circulation and signal is valid, CLM performs the following functions: If voice - inner/outer circulation is 0, the mode is outer circulation If voice - inner/outer circulation is 1, the mode is inner circulation	
8	Voice - AC status	Receive voice - AC status and signal is valid, CLM performs the following functions: If voice - AC status is 0, turn off AC; If voice - AC status is 1, turn on AC;	
9	Voice - PM2.5	Receive voice - PM2.5 and signal is valid, CLM performs the following functions:	

Voice Control			
No.	Function	Function Description	Note
		If voice - PM2.5 is 0, turn off PM2.5 and AQS functions; If voice - PM2.5 is 1, turn on PM2.5 and AQS functions	
10	Voice - right zone temperature 1	Receive voice - right zone temperature 1 and signal is valid, CLM adjusts the right temperature to the corresponding temperature	Long-press button function is added
11	Voice - A/C control Sync	Receive voice - A/C control Sync and signal is valid, CLM performs the following functions: If voice - A/C control Sync is 0, CLM exits SYNC mode and enters three-zone mode If voice - A/C control Sync is 1, CLM enters SYNC mode	
12	Voice - left zone temperature 1	Receive voice - left zone temperature 1 and signal is valid, CLM adjusts the left temperature to the corresponding temperature Adjust left temperature, and right and rear temperature change according to SYNC status	
13	Voice - rear zone temperature	Receive voice - rear zone temperature and signal is valid, CLM adjusts the rear temperature to the corresponding temperature	If equipped
14	Voice - rear mode adjustment	Receive voice - rear mode adjustment and signal is valid, CLM performs the following functions: If voice-mode adjustment is 0 to 2, set mode motor to the corresponding position	If equipped

■ Default Setting

If CCU is initialized by battery KL30, set CCU operating state to default setting.

Auto air conditioning fault code and corresponding fault content			
No.	Function	Function Description	Note
1.	Initial battery power-on state	1. Initial state of front A/C after battery is powered on is: Set temperature 22°C, airflow volume level 0, blower OFF, A/C OFF, SYNC, AUTO, temperature motor is corrected to macro definition position (max cool), mode is corrected to macro definition position (foot), and inner/outer circulation is corrected to outer circulation. Initial state of rear A/C is: Set temperature 22°C, airflow volume level 0, blower OFF, A/C OFF, AUTO, temperature motor is corrected to max cool, mode is corrected foot. 2. When powered-on for the first time and IGN ON, after pressing ON button, front A/C status is: Set temperature 22°C, airflow volume, AC, circulation, mode in auto control status, SYNC, AUTO. Rear A/C state: Set temperature 22°C, airflow volume, AC, mode in auto control status, AUTO.	Rear A/C control is applicable to models equipped with rear A/C.
2.	IGN OFF → ON	Restore the state before IGN OFF, PM2.5 function is turned off by default	

■ Automatic A/C Function

No.	Function	Function Description	Note
1	AUTO button operation	When A/C control module receives front AUTO button or rear AUTO button pressing signal, both front CLM and rear CLM enter AUTO mode. (When exiting, the front and rear CLM exit respectively, that is, when operating the front CLM button, front CLM enters non-AUTO state; when operating the rear CLM button, rear CLM enters non-AUTO state).	Rear A/C control is applicable to models equipped with rear A/C.
2	Circulation state	In AUTO state, as committed to comfort, CLM automatically controls circulation motor position.	
3	Mode state	In AUTO state, as committed to comfort, CLM automatically controls mode motor position.	
4	Blower state	In AUTO state, as committed to comfort, CLM automatically controls blower output percentage.	
5	Compressor state	Select AUTO function and activate compressor request at the same time (indicator is displayed according to ambient temperature status. When ambient temperature is higher than -1.5°C, AC indicator light comes on, and when it is below -3°C, the indicator turns off).	If equipped with the rear CLM, the status of the AC indicator will follow the front row when the CLM is turned on.
6	Temperature damper position	In AUTO state, as committed to comfort, CLM automatically controls temperature motor position.	
7	Other state	The set temperature and SYNC state maintain the previous state when entering AUTO. It can be manually modified during AUTO and does not affect the operating status of PM2.5 and AQS.	

No.	Function	Function Description	Note
9	Automatically switching to semi-automatic state	In AUTO state, when the following signals are received, it enters semi-automatic mode, and AUTO message state becomes non-AUTO: 1. Mode button: The mode will exit automatic control and enter selected mode, but other actuators or functions will maintain automatic control; 2. Airflow volume increasing or decreasing: The airflow volume will exit automatic control, but other actuators or functions will maintain automatic control; 3. Front or rear A/C button: Front and rear AC indicators turn on or off according to the previous state. But other actuators or functions will maintain automatic control; 4. Circulation: Exit the full automatic mode, circulation damper will be controlled manually, and other actuators will maintain automatic control. 5. Maximum defrosting: Exit the automatic mode and enter the maximum defrosting mode. 6. Power button: Turn off A/C. 7. When actuator is only in AUTO state and turning driver temperature knob to left to LO (or turning driver temperature knob to right to HI), the corresponding actuator exits AUTO state and enters the maximum cooling/heating mode. 8. In AUTO state, if pressing AUTO, SYNC (change the temperature zone synchronization state), PM2.5 button and temperature knob (change the set temperature, except for LO and HI), the AUTO state will not exit.	
10	Rear AUTO state	When AC, rear airflow volume and mode are in automatic control, rear AUTO indicator comes on.	Rear A/C control is applicable to models equipped with rear A/C.

■ Multi-zone Function

No.	Function	Function Description	Note
1.	Enter three-zone state	With A/C ON in single zone status, perform following operation to enter the three-zone status: 1. Rotate the right temperature knob; 2. Operate the rear temperature button; 3. Press SYNC button.	Rear A/C control is applicable to models equipped with rear A/C.
2.	Three-zone state	1. SYNC indicator turns off, left, right and rear set temperatures are individually set; 2. The status of damper, blower and compressor is affected by respective set temperature; 3. The right and rear temperatures are adjusted from the left temperature value; 4. In three-zone state, the left, right and rear set temperatures do not affect each other.	Rear A/C control is applicable to models equipped with rear A/C.

No.	Function	Function Description	Note
3.	Enter SYNC state	With A/C ON, perform following operation to enter SYNC status: 1. Press SYNC button in non-SYNC status.	
4.	SYNC state	SYNC indicator comes on, right and rear set temperatures follow the left set temperature in real time.	

■ Temperature Adjustment Function

No.	Function	Function Description	Note														
1.	Temperature motor control	According to the set temperature, the system automatically adjusts the temperature damper position. When the temperature mode is in LO, temperature damper position is max cool; when the temperature mode is in Hi, temperature damper position is max hot.															
2.	Temperature display	Set the temperature from 18 to 32 at a interval of 0.5 seconds. LO is maximum cooling, HI is maximum heating. The automatic control logic considers stable control to each set temperature, sunlight, circulations and increases/ decreases temperature.															
3.	Correspondence between Celsius and Fahrenheit	<table><tr><td>Celsius</td><td>Fahrenheit</td></tr><tr><td>LO</td><td>LO</td></tr><tr><td>18</td><td>65</td></tr><tr><td>18.5 - 31</td><td>66 - 91</td></tr><tr><td>31.5</td><td>92</td></tr><tr><td>32</td><td>93</td></tr><tr><td>HI</td><td>HI</td></tr></table>	Celsius	Fahrenheit	LO	LO	18	65	18.5 - 31	66 - 91	31.5	92	32	93	HI	HI	
Celsius	Fahrenheit																
LO	LO																
18	65																
18.5 - 31	66 - 91																
31.5	92																
32	93																
HI	HI																
4.	Switching temperature unit	Switch between °C and °F according to the bus temperature unit switching signal (Set_TempUnit)															
5.	AUTO indicator status in max hot mode	After entering max hot in AUTO state, AUTO indicator will turn off. At this time, if operating AUTO button, AUTO indicator will come on and enter automatic control.															
6.	Limitation of Tcool and Ta to temperature motor	When Tcool is less than 30°C and Ta is less than -15°C, the temperature motor is controlled at the coldest end, after 300s or when Tcool is more than 30°C or Ta is more than -15°C, exit the control.															
7.	Temperature motor priority	Tcool and Ta limit the temperature motor maximum heating/coldling > cold start/purification															

■ Maximum Heating Function

No.	Function	Function Description	Note
1	Maximum heating	User can select the maximum heating operation by adjusting driver controller temperature to HI. This adjustment automatically leads to the following settings: Fan speed is set to level 7 (turn on all fan indicators); Temperature motor is set to panel control position (max hot); Intake air volume is set to fresh air mode (turn off intake air volume indicator); Compressor is turned off (turn off A/C indicator).	
2	Exiting maximum heating	Maximum heating function will be exited when operating the following buttons or knobs and enter other functions: Enter the previous settings. If the setting was manually operated previously, please continue to use it; The maximum defrosting request will enter the maximum defrosting function, and the set temperature will not change; Press ON/OFF button to enter OFF function; Press automatic button and CCU will enter automatic mode.	

■ Maximum Cooling Function

No.	Function	Function Description	Note
1	Maximum cooling function	User can select the maximum cooling operation by adjusting driver controller temperature to LO. This adjustment automatically leads to the following settings: Maximum fan speed; Temperature damper position is set to 0% (max cool); Inner circulation air is activated; Compressor is activated.	
2	Exiting maximum cooling	CCU will exit the maximum cooling function when operating the following buttons or knobs and enter other functions: When control temperature setting is not in LO, CLM will enter the previous settings. If the setting was manually operated previously, the previous setting will resume; When sending the maximum defrosting request, CCU will enter the maximum defrosting function and the set temperature will not change; Press ON/OFF button, CCU will enter OFF function; Press automatic button and CCU will enter automatic mode.	

■ Blower Control Function

No.	Function	Function Description	Note
1	Blower ON	A/C OFF: 1. Power button; 2. AUTO button; 3. Right airflow volume knob (the same as Power button); 4. Maximum defrosting button.	
2	Blower relay	If airflow volume is not 0, the relay is turned on; if airflow volume is 0, the relay is turned off.	

3	Blower speed control	Manual mode: Receive airflow volume level information, adjust blower speed, the adjustment range is level 1 to 7; The voltage of each level in manual mode is as follows, and the voltage error is ± 0.3 V: <table><tr><td>Level</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>Voltage value/V</td><td>3.60</td><td>4.20</td><td>5.20</td><td>6.20</td><td>7.30</td><td>8.80</td><td>11.5-0</td></tr><tr><td>PWM</td><td>24</td><td>29</td><td>35</td><td>42</td><td>49</td><td>59</td><td>78</td></tr></table> In automatic mode: Perform automatic control according to automatic A/C algorithm, airflow volume uses stepless speed regulation.	Level	1	2	3	4	5	6	7	Voltage value/V	3.60	4.20	5.20	6.20	7.30	8.80	11.5-0	PWM	24	29	35	42	49	59	78	
Level	1	2	3	4	5	6	7																				
Voltage value/V	3.60	4.20	5.20	6.20	7.30	8.80	11.5-0																				
PWM	24	29	35	42	49	59	78																				
4	Airflow volume level	User can adjust the blower level from 1 to 7 using the knob. Turn the knob clockwise to set the airflow volume level increasing by 1 level; turn the knob counterclockwise to set airflow volume level decreasing by 1 level.																									
5	Impact of Loadshed restrictions and transportation mode restrictions on airflow volume and indicator lights	When Loadshed level and transportation mode limit the airflow volume output, airflow volume indicator shows the actual status of airflow volume. When the limitation conditions disappear, actual blower airflow volume and indicator status maintain normal status.																									
6	Keep defrosting airflow volume	1. When airflow volume state is switched from automatic or manual to the maximum defrosting state, airflow volume maintains automatic or manual airflow volume value for a period of time, and airflow volume starts to slowly increase to level 7.																									
7	Rear controller LO/HI	When the rear airflow volume is in automatic control state, the set temperature is LO or HI, and rear airflow volume is level 7.	If equipped with rear A/C																								

■ Blow Mode Control Function

No.	Function	Function Description	Note
1	Mode damper motor position	There are 7 positions from face to front defrosting: Face, face and foot, full blowing, foot, maximum heating (Mix-1), foot and window (Mix-2), window.	
2	Manual operation control	When A/C is turned on, switch in 5 modes by pressing the up/middle/down blow mode buttons: face, face and foot, foot, foot and window (Mix-2), and window.	
3	Auto control	Mode damper is in automatic control status, damper position control follows the automatic control strategy.	

■ Maximum Defrosting Function

No.	Function	Function Description	Note
1	The maximum defrost mode is associated with the state	Only front A/C is equipped with the maximum defrosting function. When pressing the maximum defrosting button, enter the maximum defrosting state. Maximum defrosting state correlation: 1. The mode is window, mode status sends Defrost; 2. A/C request ON; 3. Outer circulation; 4. Max airflow volume; 5. Others are not affected, and rear A/C function is not affected.	
2	Switching maximum defrosting mode	In maximum defrosting mode: If entering the maximum defrosting from LO/HI, operate the mode button, the mode enters manual mode, only the mode enters the modified position, and the rest maintains the previous state. If entering the maximum defrosting from automatic/manual, operate the mode button, mode, airflow volume, REC, AC enter manual mode, the mode enters the modified position, compressor, blower and circulation motor maintain the previous state; If entering the maximum defrosting from LO/HI, change the airflow volume, airflow volume enters manual mode, airflow volume is modified to the changed gear, and the rest maintains the previous state; if entering the maximum defrosting from automatic/manual, change the airflow volume, airflow volume is modified to the changed gear, compressor, mode motor and circulating motor maintain the previous state; 3. Press the maximum defrosting button again to exit the maximum defrosting and enter the previous state (A/C, airflow volume, circulation, mode), if the previous state is in OFF, it will return to AUTO; 4. Press Auto button to exit maximum defrosting and enter Auto state; 5. Press Power button to exit the maximum defrosting and enter OFF mode (if pressing Power button/operating airflow volume + button again, it will return to the previous non-maximum defrosting state); 7. Press A/C, the maximum defrosting will not exit, all maintain the previous state; 8. Perform circulation, the maximum defrosting will not exit, all maintain the previous state; 9. The set temperature, SYNC, PM2.5 can operate normally without affecting the maximum defrosting state.	
3	Impact of IGN to maximum defrosting	IGN ON→OFF→ON, the maximum defrosting is memorized at this time.	

■ Inner and Outer Circulation Control Function

No.	Function	Function Description	Note
1	Manual operation control	In manual control status, there are only two states (inner circulation and outer circulation); In Auto state, when pressing circulation button, it switches according to the current circulation state; In maximum cooling state, when pressing circulation button, it enters outer circulation; In maximum heating state, when pressing circulation button, it enters inner circulation.	
2	Auto control	In automatic control, the circulation indicator is displayed according to the real-time status of the message, damper can stay at any position according to the algorithm.	
3	Timed ventilation	1. When left zone set temperature is LO, there is no timed ventilation function; 2. If circulation motor is in the inner circulation position and the duration exceeds 20 minutes (calibration amount), switch to partial circulation, circulation motor will go to the 70% position, and return to the inner circulation after 1 minutes (calibration amount), and so on;	
4	Part inner circulation	1. In order to meet the cooling demand in winter, in automatic control, it enters part internal circulation control according to factors such as airflow volume, vehicle speed, air outlet temperature, interior temperature, setting temperature. Damper is at 20% position; 2. When the following conditions are met at the same time, it enters a part circulation: 1. External temperature is no more than -10°C (reference value, calibration amount) 2. Water temperature is no more than 55°C (reference value, calibration amount) 3. DT (target temperature and Ti) is 2°C (reference value, calibration amount) 4. Automatically control inner and outer circulation.	
5	IGN OFF logic	When IGN OFF changes from ON to OFF: 1. If circulation motor position is greater than 50%, when the ambient temperature is lower than 5°C, the target of circulation motor is the outer circulation position, otherwise, it is the 50% motor position; 2. If circulation motor position is less than 50%, the current position is maintained.	
6	Defogging mode	When adjusting mode to window or foot and window mode manually, the outer circulation is forced to turn on.	

■ AC Control Function

No.	Function	Function Description	Note
1.	AC request status	When AC requests to turn on, STAT_AC compressor request is set to 1, and whether compressor is turned on needs to be judged according to actual state. When PM2.5 is enabled, if the current ambient temperature is higher than -1.5°C, the associated AC requests to turn on. When manual adjustment mode is window or foot and window mode, the associated AC requests to turn on.	
2.	AC actual operating status (the status of requesting compressor ON/OFF)	Send REQ_AC compressor Activation to EMS according to the actual status, representing the actual compressor request. That is the actual compressor request after performing some limitations such as current protection, allowable turning on conditions.	
3.	Actual compressor allowable turning on conditions	1. Compressor is only allowed to turn on when engine is operating. 2. Only with IGN ON, compressor is allowed to turn on. 3. Any request for front and rear airflow volume is not level 0. The above three conditions should be met at the same time, and are not affected by the minimum ON/OFF time.	

■ Compressor External Control Valve Control

No.	Function	Function Description	Note
1.	Output enable control	When compressor output is enabled, ECV- pin output is controlled to decrease.	
2.	Output quantity control	Adjust PWM duty ratio of 400Hz output on ECV+, control the current through solenoid valve, the maximum current is 750MA (calibration amount).	
3.	External control valve control	1. On the premise of AC request output ON, and EMS message signal ACState is ON (CLM requests compressor to turn on, sends the request signal to EMS, and EMS feedback that CLM only outputs current when ACState is ON), according to airflow volume, temperature level and mode position, etc. adjust solenoid valve current in a real-time to control compressor displacement. 2. When compressor is requested to turn off, it is not affected by ACState.	
4.	Calculating torque information with compressor ON	1. According to the torque information table, torque on compressor terminal is sent to bus. 2. There are three conditions that affect torque: Compressor pressure, compressor speed (converted by engine speed), solenoid valve feedback current. 3. Speed ratio: 1.6T engine is standard for the whole series, 2.0T reserved, 1.6T engine speed ratio is 1.364. 4. When compressor feedback state ACState is off, the torque is 0.	
5.	External temperature protection	1. When the temperature drops, the protection starts at -1°C (calibration amount), and it is fully protection at -3°C (-calibration amount). When the temperature value is in the middle value, the protection percentage is obtained according to the linear difference. 2. When the temperature rises, the fully protected will exit at -1.5°C (calibration amount), the protection will exit at 0°C	

No.	Function	Function Description	Note																
		(calibration amount). When the temperature value is the middle value, the protection percentage will be obtained according to the linear difference (if it rises to -1.5℃ or higher, but it has not reached 0℃, at this time the temperature drops to -1.5℃ or lower, it will enter full protection).																	
6.	Evaporator temperature protection	1. When the temperature drops, the protection starts at 1.5℃ (calibration amount), and it is fully protection at 0℃ (-calibration amount). When the temperature value is the middle value, the protection percentage is obtained according to the linear difference. 2. When the temperature rises, the fully protection will exit at 1.5℃ (calibration amount), and the protection will exit at 2.5℃ (calibration amount). When the temperature value is the middle value, the protection percentage is obtained according to the linear difference. (If it rises to 1.5℃ or higher but has not reached 2.5℃, then the temperature drops to 1.5℃ or lower, it will enter full protection).																	
7.	Water temperature protection	1. When the temperature rises, the protection starts at 112.5℃ (calibration amount), and it is fully protection at 115℃ (calibration amount). When the temperature value is the middle value, the protection percentage is obtained according to the linear difference. 2. When the temperature drops, the fully protected will exit at 112.5℃ (calibration amount), the protection will exit at 110℃ (calibration amount). When the temperature value is the middle value, the protection percentage will be obtained according to the linear difference (if it drops to 112.5℃ or lower but has not reached 110℃, then the temperature rises to 112.5℃ or higher, it will enter full protection).																	
8.	Compressor pressure protection	Compressor is protected according to ACPressure value of bus signal, and compressor is limited to turn on. <table><tr><td>Co- mpr- ess- or pre- ssur- e (hP- a)</td><td>5000</td><td>100- 00</td><td>150- 00</td><td>200- 00</td><td>250- 00</td><td>300- 00</td><td>310- 00</td></tr><tr><td>Sol- enoi- d valv- e curr- ent (mA)</td><td>750</td><td>750</td><td>750</td><td>750</td><td>700</td><td>550</td><td>0</td></tr></table>	Co- mpr- ess- or pre- ssur- e (hP- a)	5000	100- 00	150- 00	200- 00	250- 00	300- 00	310- 00	Sol- enoi- d valv- e curr- ent (mA)	750	750	750	750	700	550	0	
Co- mpr- ess- or pre- ssur- e (hP- a)	5000	100- 00	150- 00	200- 00	250- 00	300- 00	310- 00												
Sol- enoi- d valv- e curr- ent (mA)	750	750	750	750	700	550	0												

9.	Request to reduce torque signal	According to the value of bus signal REQ_CCUTorqueReduce, the solenoid valve current is limited. When it is 0, there is no limit; when it is 1, if accelerator pedal signal exceeds 95% (calibration value) and the current solenoid valve current is greater than the minimum current, the output minimum current value (calibration value) will be limited.	
10	Current Ramp function	1. In order to protect compressor and reduce NVH, current Ramp function is available when the compressor is ON and OFF; 2. With compressor OFF, the current will gradually Ramp to 350 (calibration value), and then to turn off; when IGN is OFF/impact/engine speed does not meet the conditions, etc., the current Ramp is also required when compressor is turned off.	

■ ON/OFF Function

No.	Function	Function Description	Note																														
1.	Entering OFF state	1. Power-on initialization is in OFF mode. 2. When A/C is turned on, A/C will enter OFF mode when the A/C switch button is pressed. 3. When entering OFF mode, the current status (airflow volume, circulation, mode, AC, temperature, AUTO, SYNC) will be memorized. 4. When front and rear A/C are turned on, operate front A/C POWER button to turn off front and rear A/C; after operating the A/C OFF button, rear A/C is turned off separately; or when rear A/C is to be turned off separately on front A/C, REAR button comes on, and then press POWER button on the front A/C.																															
2	In OFF state	<table><tr><th>Name</th><th>Load Position</th><th>Can it be operated</th></tr><tr><td>Front blower</td><td>OFF</td><td>Y, A/C exits OFF before turning clockwise</td></tr><tr><td>Front mode</td><td>Maintain (- initialization is in foot mode)</td><td>N</td></tr><tr><td>Front temperature</td><td>Max cool (- calibration value)</td><td>N</td></tr><tr><td>Front circulation</td><td>Position maintaining</td><td>Y, maintain manual operation</td></tr><tr><td>Front AC</td><td>OFF</td><td>Y, front A/C exits OFF</td></tr><tr><td>Front AUTO</td><td>-</td><td>Y, front A/C exits OFF</td></tr><tr><td>SYNC</td><td>-</td><td>N</td></tr><tr><td>Max defrost</td><td>-</td><td>Y, front A/C exits OFF</td></tr><tr><td>PM2.5</td><td>-</td><td>Y, front A/C exits OFF</td></tr></table>	Name	Load Position	Can it be operated	Front blower	OFF	Y, A/C exits OFF before turning clockwise	Front mode	Maintain (- initialization is in foot mode)	N	Front temperature	Max cool (- calibration value)	N	Front circulation	Position maintaining	Y, maintain manual operation	Front AC	OFF	Y, front A/C exits OFF	Front AUTO	-	Y, front A/C exits OFF	SYNC	-	N	Max defrost	-	Y, front A/C exits OFF	PM2.5	-	Y, front A/C exits OFF	
Name	Load Position	Can it be operated																															
Front blower	OFF	Y, A/C exits OFF before turning clockwise																															
Front mode	Maintain (- initialization is in foot mode)	N																															
Front temperature	Max cool (- calibration value)	N																															
Front circulation	Position maintaining	Y, maintain manual operation																															
Front AC	OFF	Y, front A/C exits OFF																															
Front AUTO	-	Y, front A/C exits OFF																															
SYNC	-	N																															
Max defrost	-	Y, front A/C exits OFF																															
PM2.5	-	Y, front A/C exits OFF																															

3	Exit OFF mode	Front CLM is in OFF mode: 1. Operate airflow volume + button, the system will be awakened and return to the previous non-defrosting state (- that is, if it was defrosting before OFF, it will return to the previous state before defrosting); operate airflow volume - button, the system will maintain the previous state. 2. Press the maximum defrosting button, the system will be awakened and enter the maximum defrosting mode, the set temperature will maintain the previous state before OFF. Press the maximum defrosting button again, CLM returns to automatic state. 3. Press front and rear AUTO buttons, front and rear systems will enter AUTO state, the set temperature will maintain the previous state before OFF. 4. Press Power button, the system will be awakened and return to the previous non-defrosting state (that is if it was defrosting before OFF, it will return to the previous state before defrosting). 5. Press AC button, the system will be awakened and AC indicator will come on, AC will enter manual control state, the rest will return to the previous non-defrosting state. 6. Other button signals do not exit OFF. Rear CLM is in OFF mode: 1. Operate airflow volume button (+), the system will be awakened and return to the previous state before OFF; 2. Press Power button, the system will be awakened and return to the previous state before OFF; 3. Operate rear AUTO button, front and rear systems will enter AUTO state, the set temperature will maintain the previous state before OFF; 4. Operate rear AC button, front and rear systems will be awakened and front and rear AC indicators will come on, AC will enter manual control state, front seat will return to previous non-defrosting state. Except for the AC entering manual control, the rear returns to state before rear CLM shuts down.	If equipped with rear A/C function
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■ KL15 - OFF Memory Function

CLM should be stored or store last setting of user before KL15 is turned off, and it can be returned when CLM can operate or operate again. Save or not save the display as shown below:

No.	Request	Function Description	
1	Last setting state for A/C	CLM should be stored or store last setting of user before KL15 is turned off, and it can be returned when CLM can operate or operate again. Save or not save the display as shown below:	
2		Temperature setting	Yes
3		Air adjustment	Yes
4		Inner/outer circulation	Yes
5		Blower	Yes
6		Seat heating	No
7		Rear defroster	No
8		A/C request	Yes
9		Dual-zone request	Yes
10		Maximum defrosting	Yes

No.	Request	Function Description	
11		Auto	Yes
12		OFF	Yes
13		PM2.5	No

■ Parking Brake Function

No.	Function	Function Description	Note
1	Parking mode	Parking mode is divided into normal operating condition parking and cold operating condition parking: 1. When the stall time exceeds 11 minutes (-calibration amount), if the external temperature is lower than 5°C (calibration amount), it is cold operating condition parking, otherwise it is normal operating condition parking;	
2	Normal operating condition parking	Motor goes to the specified position: the data of mode damper (50%), heating and cooling damper (0% position), and circulation damper (100%) can be calibrated.	
3	Cold operating condition parking	Motor goes to the specified position: the data of mode damper (100%), heating and cooling damper (0%), and circulation damper (100%) can be calibrated.	

■ Anti-condensation Function

No.	Function	Function Description	Note
1	Anti-condensation mark position	Determine that compressor solenoid valve current is greater than or equal to the minimum current for 60 minutes (calibration amount), IGN turns from ON to OFF for 10 minutes (calibration amount), and at this time, the vehicle lock signal is 1 and fortifying/deactivation signal is 0, blower is turned on to level 2 (calibration amount), lasting 30 seconds (calibration amount).	
2	Clearing anti-condensation mark	1. Immediately clear with IGN not OFF; 2. The time will be cleared after timing is more than 30 seconds (calibration amount).	Testing can not be concerned

■ Vehicle Pre-collision Function

No.	Function	Function Description	Note
1	Collision signal	When received CAN bus feedback "STAT-vehicle collision" collision signal is valid, if the signal is lost, the previous value will be maintained;	
2	Compressor and blower OFF function when collision occurs	When received CAN bus feedback "STAT-VehicleCrashed" collision signal is valid, turn off front blower, rear blower, compressor and compressor requests to turn off.	Testing can not be concerned

■ Engine Start and Stop Function

No.	Function	Function Description	Note
1.	Enabling condition	The following conditions should be met at the same time: 1. IGN ON; 2. Non-transportation mode; 3. Non-collision state; 4. ESS function in the FD00 optional information is turned on; 5. Enabling switch is ON; 6. A/C is turned on.	
2.	Maximum defrosting request	When ESS starts automatically, if the maximum defrosting is enabled, send 0x1 to limit engine to stop; When ESS starts automatically, if the non-maximum defrosting is enabled, send 0x0 No action; When ESS stops automatically, if the maximum defrosting is enabled, send 0x2 request to engine start.	
3.	Maximum cooling request	When ESS starts automatically, if the maximum cooling is enabled, send 0x1 to limit engine to stop; When ESS starts automatically, if the non-maximum cooling is enabled, send 0x0 No action; When ESS stops automatically, if the maximum cooling is enabled, send 0x2 request to engine start	
4.	Maximum heating request	When ESS starts automatically, if the maximum heating is enabled, send 0x1 to limit engine stop; When ESS starts automatically, if the non-maximum heating is enabled, send 0x0 No action; When ESS stops automatically, if the maximum heating is enabled, send 0x2 request of engine start	
5.	Evaporator temperature request	In AC auto control, when evaporator temperature is higher than 18degC (calibrated, reference value) and compressor actually has a ON request, if ESS starts automatically (StartStopState=0x5 Operation), send 0x1 to limit engine stop; if ESS stops automatically (StartStopState= 0x2 Stopped), send 0x2 request of engine start	
6.	Comfort request	When ESS starts automatically, if the absolute value of temperature difference between inside vehicle temperature and actual setting temperature calculated by CTC does not exceed 2.5 degC (-calibrated), send 0x0 No action, otherwise send 0x1 to limit engine stop; When ESS stops automatically, if the absolute value of temperature difference between inside vehicle temperature and actual setting temperature calculated by CTC is higher than or equal to 2.5 degC (calibrated) and compressor requests to start, send 0x2 request of engine start.	
7.	External temperature request	When ESS starts automatically, if the external temperature is within the calibration range (meeting the upper and lower limits at the same time, such as 3 degC ~ 30 degC, 2 degC reference value,	

No.	Function	Function Description	Note
		calibrated), send 0x0 No action, otherwise send 0x1 to limit engine stop; When ESS stops automatically, if the external temperature is not within the aforementioned calibration range, send 0x2 request of engine start	
8.	Minimum ON time	If ESS starts automatically, if there is any of the above requests, CLM sends signal to limit engine stop. If ESS stops automatically, when it runs again, CLM sends a limit engine stop signal for at least 20 seconds (calibrated), and the time interval between auto stopped again is at least 20 seconds (calibrated)	
9.	Priority	Only when all the conditions are not met, finally send 0x0 No action, otherwise, according to the actual calculation result, send 0x1 inhibit motor stop or 0x2 request motor start.	

■ Voice Control Function

1. Each control signal function is the same as button function; 2. The control signal AUTO OFF is a reserved item, and IHU will not send this signal; 3. Voice - blower status is 0, turn off A/C; 4. Adjust left temperature, and right and rear temperature change according to SYNC status; 5. The blowing mode, mode and indicator position change; 6. When the vehicle IGN is not in OFF, voice control function is effective.

■ PM2.5 Detection Control Function

No.	Function	Function Description	Note										
1	Precondition	IGN OFF, detection is not performed.											
2	PM2.5 concentration collection	Collect PM2.5 Sensor signal on ICD and convert it into PM2.5 concentration level. The relationship between duty ratio and ug/m3 is: 0.1%—1 ug/m3, and PMW from 0.3% to 80% can represent PM2. 5 concentration (3 ug/m3 to 800 ug/m3), and PWM accuracy is ± 1 ug/m3. <table><tr><td>PM2.5 concentration percentage</td><td>0.1~16-%</td><td>17~26-%</td><td>27~37-%</td><td>38~84-%</td></tr><tr><td>PM2.5 level</td><td>1</td><td>2</td><td>3</td><td>4</td></tr></table>	PM2.5 concentration percentage	0.1~16-%	17~26-%	27~37-%	38~84-%	PM2.5 level	1	2	3	4	
PM2.5 concentration percentage	0.1~16-%	17~26-%	27~37-%	38~84-%									
PM2.5 level	1	2	3	4									

No.	Function	Function Description	Note
3	Enabling PM2.5 detection	PM2.5 detection function is directly enabled after IGN ON. PM2.5 button signal is used to turn on PM2.5 purification related functions. Such as control of airflow volume and circulation mode. If PM2.5 sensor fails or the concentration exceeds the range, the collected PM2.5 concentration is 10% concentration percentage by default.	
4	PM2.5 control strategy	After PM2.5 function is turned on (pressing PM2.5 button), PM2.5 concentration controls circulation and airflow volume: 1. If PM2.5 concentration is greater than or equal to 15% (calibration amount), turn on the inner circulation and compensate airflow volume according to PM2.5 concentration; 2. The level is restored. When PM2.5 function is turned off or PM2.5 concentration is less than 15% (-calibration amount), the limitation for circulation and airflow volume will exit.	

■ AQS Control Function

No.	Function	Function Description	Note
1.	Precondition	IGN OFF, detection is not performed.	
2.	Air quality collect	1. Collect AQS Sensor signal on ICD, and 5%-75% PWM duty ratio is effective. 2. The relationship between PWM and air quality level is divided into 6 levels: Fresh air level (5~15%), Level 1 (25%~34%), Level 2 (35%~44%), Level 3 (45%) ~54%), Level 4 (55%~64%), Level 5 (65%~74%). The concentration percentage between two levels keeps the last concentration level.	The installation location is outside the vehicle. Due to filtering time during the test, it is necessary to wait for about 30 seconds before performing the concentration level test. The default value of DBC is sent after the first powered-on.
3	Enabling AQS detection	With IGN ON, AQS starts to detect directly; If AQS sensor fails or the concentration exceeds the range, the collected AQS concentration is 10% concentration percentage by default.	
4	AQS automatically controls inner/outer circulation logic	In automatic circulation control state, when AQS concentration is high, inner circulation is forced to turn on, and when concentration drops to a low level, the forced inner circulation is exited (when automatic circulation control is outer circulation and inner circulation is forced to turn on by AQS, circulation indicator status does not change. Maintain the outer circulation).	

■ Battery Voltage Monitoring Function

No.	Function	Function Description	Note
1.	Voltage mode	A: 9 V - 16 V, all A/C related loads can operate normally. B: If the voltage is lower than 8.5 V or higher than 16.5 V, all outputs are turned off.	
2.	Can communication	CAN communication is not affected by voltage mode. If CAN hardware can operate, CAN communication is supported.	

■ Transportation Mode Function

No.	Function	Function Description	Note
1.	Limited transportation mode function	1. Turn off the solenoid valve load; 2. Front and rear airflow volume is limited to less than 50%. The other actuators function is normal and the communication is normal; 3. Perform a judgment according to the corresponding signal state of BCM.	

■ Load Limit Function

No.	Function	Function Description	Note
1	Energy management level limits load output	CLM limits load output according to energy management level of bus (Load shed Level) Level 0: Normal, unlimited Level 1: The maximum outputs of front and rear blowers are 71%, and PTC can be turned on up to level 2 Level 2: The maximum outputs of front and rear blowers are 50%, and PTC can be turned on up to level 1 Level 3: The maximum outputs of front and rear blowers are 25%, and PTC is turned off	
2	CCU load state	With A/C ON, CLM keeps sending out activation signals.	

■ Remote Start Function

No.	Function	Function Description	Note
1.	Remote control condition	When IGN is ON, the STAT-remote signal is valid and STAT-remote control is in remote mode, A/C controller can enter the selected operation according to TGW-maximum defrosting request, TGWPM2.5 request, TGW-TempAdjust request 1, and then remote control St exits the remote mode and enter the normal mode. A/C controller still keeps running.	
2.	Remote control status	1. After receiving Remote-REQ-Temp-Adjust, CLM enters a single zone, the temperature is the current remote setting temperature. 2. After receiving Remote-REQ-PM2.5, CLM turns on/off PM2.5 function 3. After receiving Remote-REQ_maximum defrosting, CLM enters the maximum defrosting	

■ Self-diagnostic Function of A/C Panel

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

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

No.	Function	Function Description	Note
1.	Function triggering	1. Receive bus REQ-SelfDiag-FrontCLM self-diagnostic request valid signal. During self-diagnostic, it receives the self-diagnostic request signal again and does not respond. 2. When pressing combination button on front panel, a single button is effective and the corresponding function can be performed normally. Normal performing refers to the state after a single button has effectively performed the corresponding function.	
2.	Function procedure	1. Panel enters self-test procedure, and the message "SelfDiagFlag-FrontCLM= Active" sends historical DTC information via CAN communication (S SelfDiagInfoLeft-FrontCLM, SelfDiagInfoRight-FrontCLM). 2. If there is no fault, the left and right DTCs will sent 00, and the self-test mode will be automatically exited after 1 second; if there are multiple group of DTCs, they will be sent in order, switching once every 2 seconds, and self-test mode will be automatically exited after sending. The message is SelfDiagFlag-FrontCLM-Not active. 3. It does not respond A/C function during self-test procedure.	
3.	Function exiting	During self-test procedure, self-test can be exited immediately upon when pressing on-off button, IGN OFF or CLM power-off, and self-test will not exit after receiving other buttons and knob operations. Indicator status, blower airflow volume, temperature damper, mode damper, inner and outer circulation and AC enter the normal state after exiting the self-test.	Function is not memorized

When detecting the fault content and the corresponding screen display content, the corresponding function is optional and not supported, the corresponding DTC will not be generated:

Components	Self-diagnostic Left	Self-diagnostic Right	Problem
Left solar sensor	1	1	Short to ground
		2	Short to power supply or open
Right solar sensor	2	1	Short to ground
		2	Short to power supply or open
Micro light sensor	3	1	Short to ground

Components	Self-diagnostic Left	Self-diagnostic Right	Problem
		2	Short to power supply or open
NATS internal temperature sensor	4	1	Problem
Evaporator	5	1	Short to ground
		2	Short to power supply or open
Left foot air outlet temperature sensor	6	1	Short to ground
		2	Short to power supply or open
Right foot air outlet temperature sensor	7	1	Short to ground
		2	Short to power supply or open
Left face air outlet temperature sensor	8	1	Short to ground
		2	Short to power supply or open
Right face air outlet temperature sensor	9	1	Short to ground
		2	Short to power supply or open
PM2.5 sensor	10	1	Short to ground
		2	Short to power supply or open
PM2.5 sensor enabling	11	1	Short to power supply
		2	Short to ground or open
AQS sensor	12	1	Short to ground
		2	Short to power supply or open
Mode motor drive	13	1	Short to ground
		2	Short to power supply
		3	Open circuit
		4	Blocking
		5	FB feedback short to power supply
		6	FB feedback short to ground or open
Left temperature motor drive	14	1	Short to ground
		2	Short to power supply
		3	Open circuit
		4	Blocking
		5	FB feedback short to power supply
		6	FB feedback short to ground or open
Right temperature motor drive	15	1	Short to ground
		2	Short to power supply

Components	Self-diagnostic Left	Self-diagnostic Right	Problem
		3	Open circuit
		4	Blocking
		5	FB feedback short to power supply
		6	FB feedback short to ground or open
Circulation motor drive	16	1	Short to ground
		2	Short to power supply
		3	Open circuit
		4	Blocking
		5	FB feedback short to power supply
		6	FB feedback short to ground or open
Blower control	17	1	Negative end short to ground
		2	Adjustment error
Blower relay control	18	1	Open or short to ground
		2	Short to power supply
Sensor 12 V power supply	19	1	Short to ground
		2	Short to power supply
Outer control valve	20	1	Short to ground
		2	Short to power supply or open
PTC1 (reserved)	21	1	Short to ground or open
		2	Short to power supply
PTC2 (reserved)	22	1	Short to ground or open
		2	Short to power supply
PTC3 (reserved)	23	1	Short to ground or open
		2	Short to power supply
Ambient temperature sensor	24	1	Short to ground
		2	Short to power supply or open
Battery Voltage	25	1	Power supply voltage is lower than 8.5 V or higher than 16.5 V (B mode)
Humidity sensor (FD00 is optional, NO by default)	26	1	Humidity sensor failure
CAN	27	1	Problem
Control module lost	28	1	Control module signal lost
Rear panel invalid	29	1	Rear panel invalid

Components	Self-diagnostic Left	Self-diagnostic Right	Problem
Front panel lost	30	1	Front panel lost
PEPS lost	31	1	PEPS node lost

■ Wiper Correlation

This function is enabled by calibration amount; When turning on automatic defogging function, in automatic mode, when wiper detection (corresponding signal FrontWiperSwitch = 2 or 3 is turned on) signal is continuously turned on for 1 minutes (recognizing rain conditions), AC needs to increase compression displacement in Auto control (the target evaporator temperature is the calibrated value at this time), the mode is window; it is not processed under non-rainy conditions; Note: (The function is calibrated function. When the calibration amount is enabled, the function is valid. The function has been installed at present).

■ Cold Start and Purification

1	Cold start	1. With IGN ON, if the external temperature is lower than 13°C (calibration amount), the water temperature is lower than 5742°C (calibration amount) and A/C is turned on, the cold start mark is set (the test is not concerned); 2. During the cold start triggers, the water temperature is no less than 45 to 60°C or the external temperature is higher than 15°C, cold start exits; 3. The external temperature is obtained from the sensor original value ExternalTemperatureRaw-C. When the external temperature is invalid, the external temperature conditions are met by default; 4. After the cold start conditions is met, when engine water temperature is lower than 30°C, the maximum limited airflow volume is level 1 (25%); when it is higher than 30°C, the maximum limited airflow volume is level 3 (35%), and the temperature damper is at full heating position (100%), the model damper blows window (100%); 5. In the cold start state, the rear airflow volume is limited to 0 in the automatic state until the engine water temperature rises to 55°C or higher; during this period, the rear airflow volume is displayed as level 1.	
2	Purification	1. After power-on (KL30) or waking up from sleep, if compressor requests to turn on when IGN is ON and evaporator temperature is higher than 30°C (calibration amount), the purification mark is set and maintained for 6 seconds (calibration amount); 2. It is judged only once when the power-on or waking up from sleep. If the condition is not met, no judgment will be made. If the condition is met, the purification mark will be cleared after 6 seconds (calibration amount); 3. When evaporator temperature is invalid, the default is that evaporator temperature conditions are met; 4. After the purification conditions are met, limited airflow volume is level 1 (25%), the temperature damper is in the fully cold position (0%), and the mode damper blows the window (100%).	

3.2 System Components Description

Dual-zone 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. The sensor is a photoresistor (including left solar sensor and right solar sensor), which is connected to the sensor power supply via a 4.7K pull-up resistor to calculate the solar intensity.



AC2010002

Name	Description	Note
Operating voltage range	0.07 ~ 2.19 V	
Measurement range	80 ~ 2000 W	
Accuracy	1 W	
Fault diagnosis	Short to power supply/open: Collecting voltage is 4.9 V	
Invalid default	0W/m2	

Air duct temperature sensor

The sensor is NTC resistance (including right face air outlet temperature sensor, left face air outlet temperature sensor, right foot air outlet temperature sensor, left foot air outlet temperature sensor, ambient temperature sensor and evaporator sensor), which is connected to the sensor power supply via the pull-up resistor. Different temperatures will result in different resistance values. Different voltage values are generated by NTC resistor and pull-up resistor at the sensor terminal and input it to MCU to calculate the temperature.

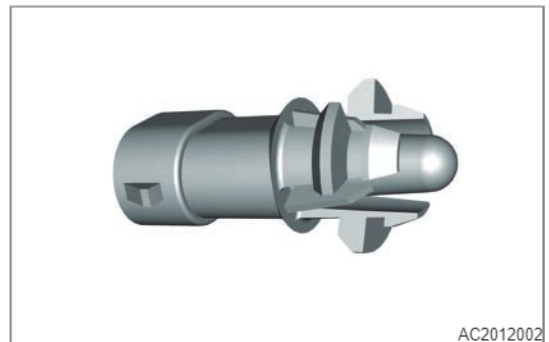


AC2011002

No.	Function	Function Description	Note
1	Left and right face and foot air outlet temperature collecting (air duct temperature sensor)	Collect the local air duct sensor signal and convert it into a temperature signal via RT meter.	
2	Air duct temperature signal abnormal handling	22°C	

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.



AC2012002

No.	Function	Function Description	Note
1	Outside temperature collecting	Obtain the bus temperature value according to RT table, and obtain the actual outside temperature after updating bus outside temperature value (filtered value of outside temperature)	
2	Outside temperature signal abnormal handling	(1) When PowerMode is OFF, the outside temperature maintains the previous value; (2) When the outside temperature diagnosis status is not valid, the outside temperature maintains the previous value. When the outside temperature diagnosis status is valid, the software outside temperature continues to update normally at a maximum of 2°C every 5 seconds.	
3	Read outside temperature value	The ambient temperature signal is the collected value of outside temperature The ambient temperature signal is the filtered value of outside temperature	The maximum outside temperature is $86 \pm 1^{\circ}\text{C}$
4	Initial value of outside temperature	When power-on or waking up for the first time, if the power mode is not in OFF and the outside temperature is valid, the software outside temperature is immediately updated according to bus outside temperature resistance value; otherwise, the outside temperature filtered value uses the default value of 22°C, after the power mode is not in OFF and the outside temperature is valid, it will be updated to the current outside temperature filtered value immediately according to the outside temperature resistance value.	
5	The format of outside temperature diagnostic signal is ambient temperature diagnostic		
5	Signal sending	When power-on for the first time, the outside temperature will first send the initial value of 1 second (86°C), then send a frame of default value (22°C), and then update to the current sensor temperature; after waking up from sleep, the outside temperature will first send the initial value of 1 second (86°C), then update to the current sensor temperature.	

Evaporator temperature sensor

Name	Description	Note
Component property	Thermistor	
Quantity	One	
Operating voltage range	1 ~ 4 V	
Measurement range	-20 ~ 75°C	
Nominal resistance	$R_{0^{\circ}\text{C}} = 6.194 \text{ K}\Omega \pm 1\%$	
Accuracy	0.1°C	

Error	$\pm 1^{\circ}\text{C}$	
Fault diagnosis	Short to power supply/open: Collecting voltage is 4.9 V; Short to ground: Collecting voltage is lower than 0.1 V	
Invalid default	-1°C	

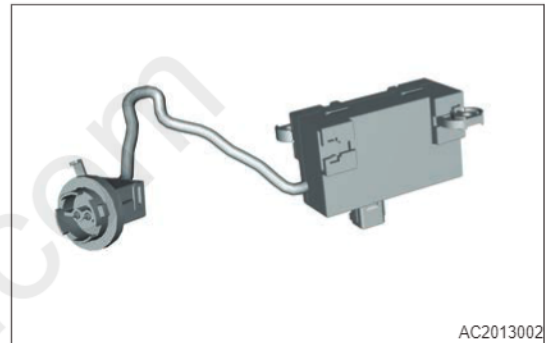
No.	Function	Function Description
1	Evaporator temperature signal collecting	Collect the local evaporator signal and convert it into a temperature signal via RT meter
2	Invalid default	-2°C

Anion generator

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

Hint:

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



AC2013002

AQS sensor

For OC output type, AQS PWM signal is connected to VPP-sleep power supply via a pull-up resistor. After transistor arrives at MCU capture port, the signal is transmitted in the opposite direction. MCU judges the air quality by duty ratio of signal.

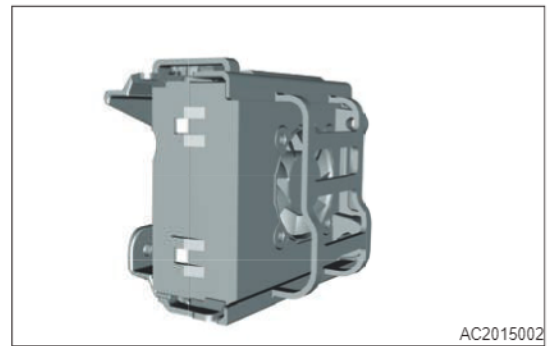


AC2014002

No.	Function	Function Description	Note
1	PM2.5 air quality sensor signal collecting	Collect the corresponding duty ratio of local input and convert it into the corresponding S sensor value.	

PM2.5 sensor

PM2.5 sensor is also called dust sensor or dust sensor, which can be used to detect the concentration of dust in the air around people, that is, the value of PM2.5. Develop based on the principle of light scattering, particles and molecules will scatter light under the irradiation of light, and at the same time, they also absorb part of the irradiated light energy. When a beam of parallel monochromatic light is incident on the particle field under test, it will be affected by the scattering and absorption around the particle, and the light intensity will be attenuated. In this way, the relative attenuation rate of incident light passing through the concentration field to be measured can be obtained. The relative attenuation rate can basically linearly reflect the relative concentration of dust in the field to be measured. The intensity of light is proportional to the intensity of the electrical signal converted by photoelectricity. The relative attenuation rate can be obtained by measuring the electrical signal, and then the concentration of dust in the field to be measured can be determined.



AC2015002

Name	Description	Note
Component property	Laser type, equipped with fan	
Quantity	One	
Operating voltage range	9 ~ 16 V	
Operating current	< 150 mA	
Frequency	1 Hz	
Measurement range	Max: 1~999 μ g/m ³ converted to Pwm recognition Low pulse time/detection period*1000 = dust concentration (μ g/m ³)	
Resolution	1 μ g/m ³	
Fault diagnosis	Short to ground (0%) Short to power supply or open (100%)	Pwm of component and Pwm sampled by MCU are inverse
Invalid default	0 μ g/m ³ d	

4 Specifications

4.1 Torque Specifications

Part No.	Name	Torque (N·m)
FQ18408110TF36	Hexagon Flange Bolt	23 $\pm$ 4
Q1840616F31	Hexagon Head Bolt Flat Washer Set	9 $\pm$ 1
Q32406F38	Hexagon Flange Nut	9 $\pm$ 1
FQ218D0540T1F61	Inner Hexagon Bolt	5 $\pm$ 1
Q1840825TF6	Hexagon Flange Bolt	23 $\pm$ 2

Part No.	Name	Torque (N·m)
Q140B0625F36	Hexagon Flange Bolt	9 ± 1
AQ1400820TF2	Hexagon Flange Bolt	10 ± 1

4.2 Fluid Specifications

Name	Type	Charging Capacity
Refrigerant	R134a	$650 \pm 20\text{g}$
Refrigerant Oil	PAG56	75ml

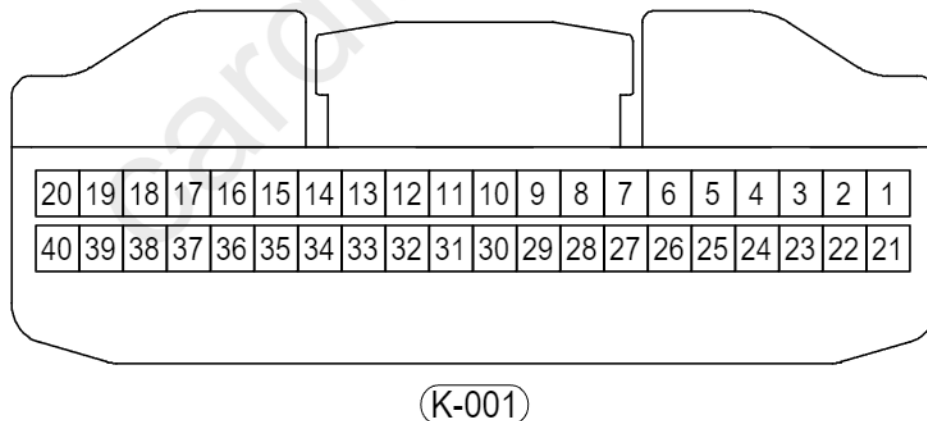
Hint:

- Newly installed air conditioning system refrigeration oil does not need to be refilled. Refill when repairing a part or after driving a certain distance.
- The reference quantity of oil to be added when replacing parts: Evaporator, condenser: 10ml each; Line: 5ml/piece, Compressor: Pour out all the oil inside newly replaced compressor, add oil according to the replaced actual oil amount in the compressor (required to turn the compressor pulley in the manual suction state to pour out as much lubricating oil as possible).

5 System Circuit Diagram

5.1 Module Terminal Definition

Automatic A/C Module (CLM) - A



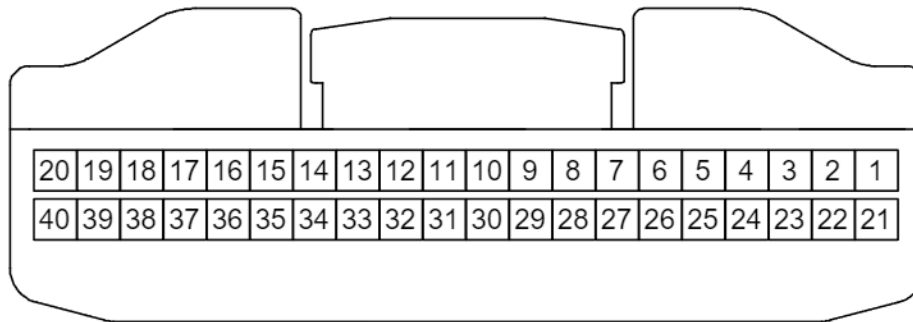
AC0016001

Terminal Inspection		Terminal Definition	Detection Condition	Measured Value
Multimeter Positive	Multimeter Negative			
1	Body ground	CAN-L	Power supply "ON"	2.4 V
2	Body ground	Circulation damper motor drive +	Power supply "ACC"	Constant voltage is 11 V; when inner circulation turns to outer circulation, voltage becomes 0 V and then rises to 11 V
3	Body ground	Mode damper motor drive -	Power supply "ON"	Voltage is 11 V when not operating; Voltage is 0 V when operating
4	Body ground	Right temperature damper motor drive +	Power supply "ON"	Constant voltage is 11 V; when right temperature is adjusted to "LO" position, voltage becomes 0 V and then rises to 11 V
5	Body ground	Mode damper motor drive +	Power supply "ON"	11 V
6	Body ground	Left temperature damper motor drive -	Power supply "ON"	Constant voltage is 11 V; when left temperature is adjusted to "LO" position, voltage becomes 0 V and then rises to 11 V
7	Body ground	Left temperature damper motor drive +	Power supply "ON"	Voltage is 11 V when A/C switch is not turned on, after A/C switch is turned on, instantaneous voltage is 0 V and then to 11 V
8	Body ground	Right temperature damper motor drive -	Power supply "ON"	Constant voltage is 11 V; when right temperature is adjusted to other position from "LO" position, voltage becomes 0 V and then rises to 11 V
9	Body ground	Circulation damper motor drive -	Power supply "ON"	Constant voltage is 11 V; when outer circulation turns to inner circulation, voltage becomes 0 V and then rises to 11 V

Terminal Inspection		Terminal Definition	Detection Condition	Measured Value
Multimeter Positive	Multimeter Negative			
10	/	/	/	/
11	Body ground	IGN	Power supply "ON"	12 V
12	Body ground	Damper motor position sensor total power supply	Power supply "ON"	5 V
13	Body ground	Circulation damper motor position information feedback	Power supply "ON"	Voltage is 1.5 V and turns to 3.5 V when inner circulation is turned on
14	Body ground	Mode damper motor position information feedback	Power supply "ON"	Foot 2.5 V; Face 4 V; Front defrosting 1 V; Face and foot 3.3 V; Defrosting and foot 1.6 V.
15	Body ground	Left temperature damper motor position information feedback	Power supply "ON"	"LO" 3.5 V; Others 1.5 V
16	Body ground	Right temperature damper motor position information feedback	Power supply "ON"	"LO" 1.5V; Others 3.5V
17	Body ground	Ground	Power supply "ON"	0 V
18	Body ground	Ground	Power supply "ON"	0 V
19	Body ground	Power supply	Power supply "ON"	12 V
20	Body ground	Power supply	Power supply "ON"	12 V
21	Body ground	CAN_H	Power supply "ON"	2.7 V
22	/	/	/	/
23	/	/	/	/
24	Body ground	Evaporator temperature sensor	Power supply "ON"	8 °C 1.7 V
25	Body ground	Ambient temperature sensor	Power supply "ON"	8 °C 3.2 V
26	/	/	/	/
27	Body ground	PM2.5 Sensor Signal	Power supply "ON"	8 °C 0.4 V
28	/	/	/	/
29	/	/	/	/

Terminal Inspection		Terminal Definition	Detection Condition	Measured Value
Multimeter Positive	Multimeter Negative			
30	/	/	/	/
31	/	/	/	/
32	Body ground	Blower positive terminal voltage feedback	Power supply "ON"	OFF: 0 V; ON: 12 V
33	/	/	/	/
34	Body ground	Blower speed control signal	Power supply "ON"	OFF: 8.9 V; level 1: 3.6 V; level 2: 4 V; level 3: 5 V; level 4: 6 V; level 5: 7.5 V; level 6: 9 V; level 7: 11 V; others 11.5 V. (Measured value in real vehicle) the voltage is 0 V with OFF, when it is in other levels, the voltage value is uncertain (it will fluctuate according to power supply voltage).
35	Body ground	Blower negative terminal voltage feedback	Power supply "ON"	OFF: 0 V
36	Body ground	Damper motor position sensor ground	Power supply "ON"	0 V
37	Body ground	Temperature sensor ground	Power supply "ON"	0 V
38	Body ground	PM2.5 AQS sensor power supply	Power supply "ON"	12 V
39	Body ground	Compressor solenoid valve drive +	Power supply "ON"	0 V
40	Body ground	Compressor solenoid valve drive -	Power supply "ON"	0 V

Automatic A/C Module (CLM) - B



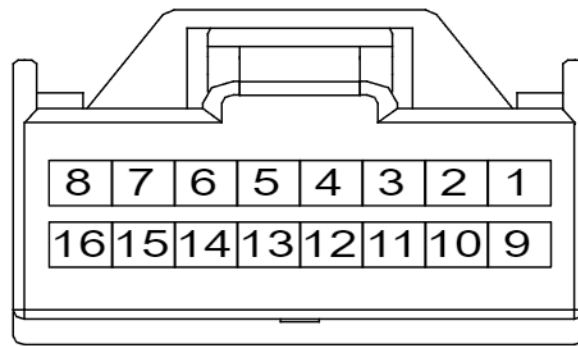
(K-002)

AC0017001

Terminal Inspection		Terminal Definition	Detection Condition	Measured Value
Multimeter positive	Multimeter negative			
1	Body ground	PM2.5 sensor switch (enabling)	Power supply "ON"	0.2 V
2	Body ground	AQS sensor signal	Power supply "ON"	2.1 V
3	/	/	/	/
4	/	/	/	/
5	/	/	/	/
6	/	/	/	/
7	/	/	/	/
8	/	/	/	/
9	/	/	/	/
10	/	/	/	/
11	/	/	/	/
12	/	/	/	/
13	/	/	/	/
14	/	/	/	/
15	/	/	/	/

Terminal Inspection		Terminal Definition	Detection Condition	Measured Value
Multimeter positive	Multimeter negative			
16	/	/	/	/
17	/	/	/	/
18	/	/	/	/
19	/	/	/	/
20	/	/	/	/
21	/	/	/	/
22	/	/	/	/
23	/	/	/	/
24	Body ground	Left face temperature sensor signal	Power supply "ON"	8°C: 3 V
25	Body ground	Right face temperature sensor signal	Power supply "ON"	8°C: 3 V
26	Body ground	Left foot temperature sensor signal	Power supply "ON"	8°C: 3 V
27	Body ground	Right foot temperature sensor signal	Power supply "ON"	8°C: 3 V
28	/	/	/	/
29	Body ground	Micro light sensor signal	Power supply "ON"	5 V
30	Body ground	Left solar sensor signal	Power supply "ON"	5 V
31	Body ground	Right solar sensor signal	Power supply "ON"	5 V
32	/	/	/	/
33	/	/	/	/
34	Body ground	Blower relay control signal	Power supply "ON"	OFF: 12 V; Blower ON: 0.2 V
35	/	/	/	/
36	/	/	/	/
37	/	/	/	/
38	/	/	/	/
39	/	/	/	/
40	/	/	/	/

Front Control Panel



I-011

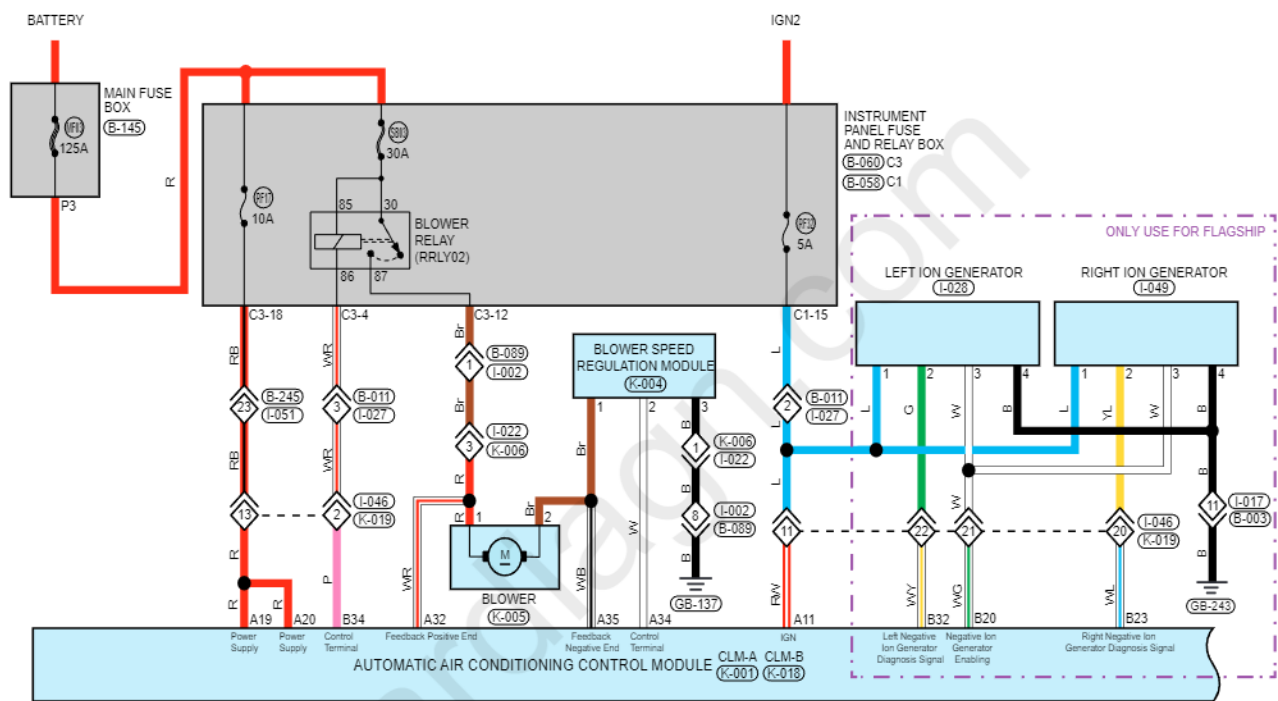
AC0018001

Terminal Inspection		Terminal Definition	Detection Condition	Measured Value
Multimeter positive	Multimeter negative			
1	\	\	\	\
2	\	\	\	\
3	\	\	\	\
4	Body ground	CAN-H	Power supply "ON"	2.6 V
5	Body ground	CAN-L	Power supply "ON"	2.4 V
6	\	\	\	\
7	Body ground	GND	Power supply "ON"	0 V
8	Body ground	\	Power supply "ON"	-
9	Body ground	\	Power supply "ON"	-
10	\	\	\	\
11	\	\	\	\
12	\	\	\	\
13	\	\	\	\
14	\	\	\	\

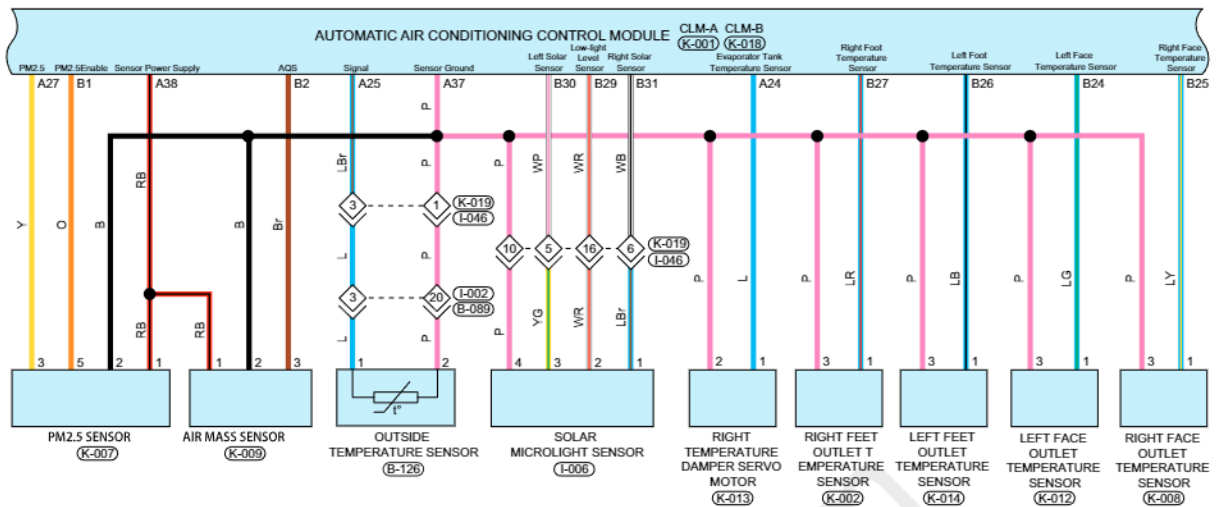
Terminal Inspection		Terminal Definition	Detection Condition	Measured Value
Multimeter positive	Multimeter negative			
15	\	\	\	\
16	Body ground	BATTERY	Power supply "ON"	12 V

5.2 Circuit Diagram

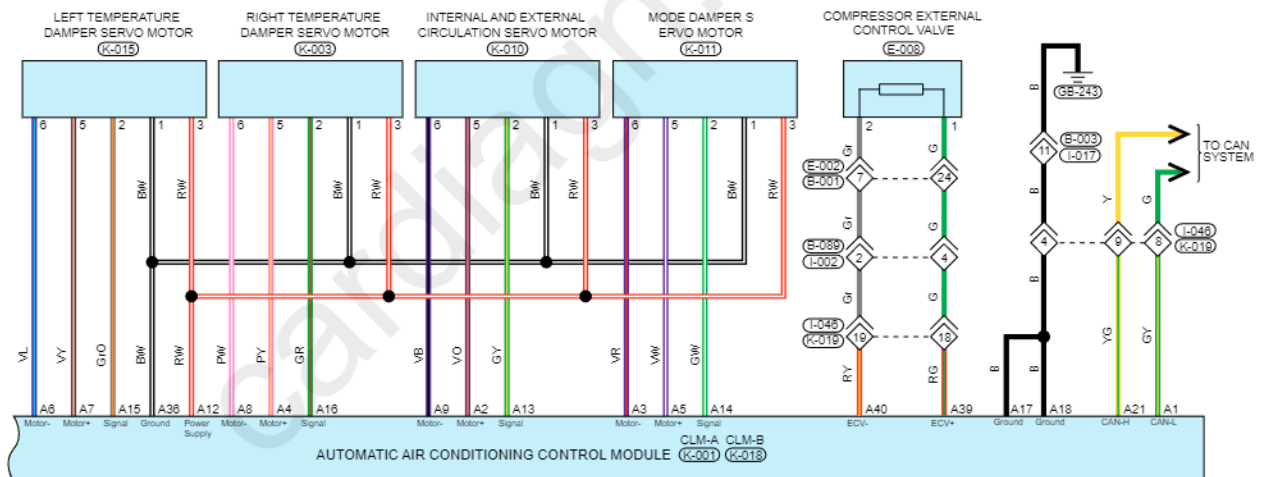
Circuit diagram



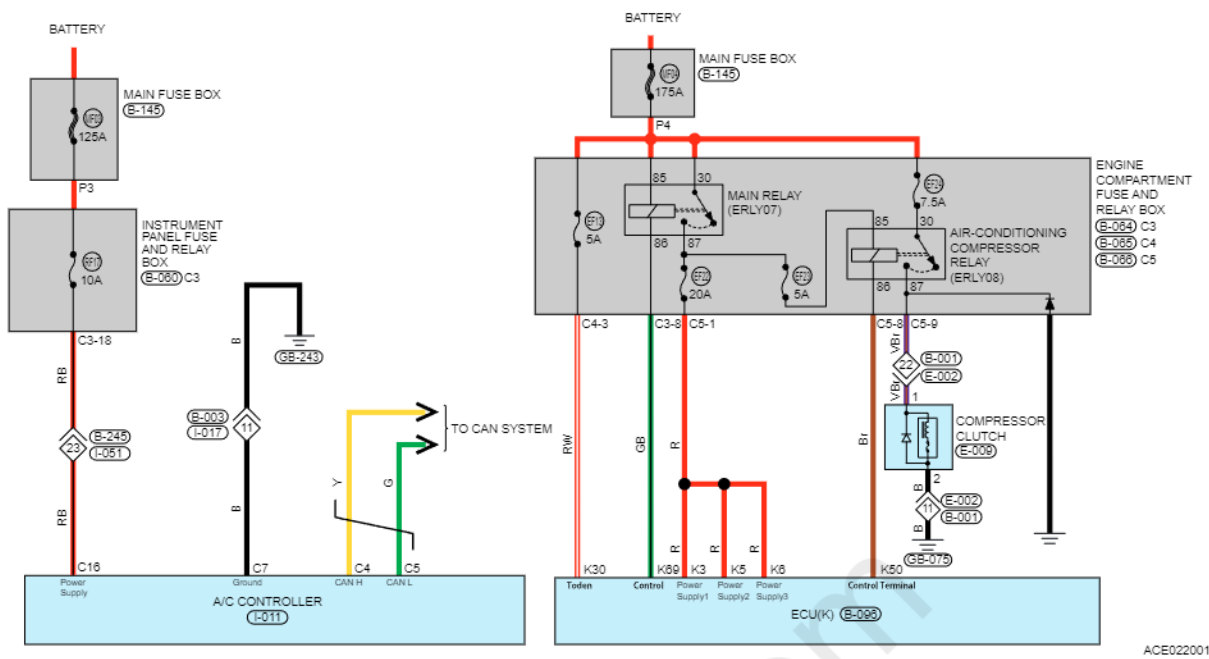
ACE019001



ACE020001



ACE021001



6 DIAGNOSIS & TEST

6.1 Problem Symptoms Table

⚠ Caution Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.	
Symptom	Possible Cause
A/C no heating	Blower fuse (damaged)
	Blower relay (damaged)
	Blower speed regulation switch (damaged)
	Blower motor (damaged)
	Mix damper control mechanism (stuck or damaged)
	Mix damper control knob (stuck or damaged)
	Heating pipe (blocked or damaged)
	Heater core assembly (blocked or damaged)
A/C no cooling	Wire harness or connector (open or short)
	Leak in system
	Refrigerant (overcharged)
	A/C pressure sensor (damaged)
	Evaporator temperature sensor (damaged)
	A/C switch (damaged)
	Compressor assembly fuse (damaged)

Symptom	Possible Cause
	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)
	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)

Symptom	Possible Cause
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)

6.2 Diagnosis Procedure

Hint:

Use following procedures to troubleshoot the control system.

1	Vehicle brought to workshop
---	-----------------------------

Next

2	Examine vehicle and check basic items
---	---------------------------------------

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

OK

Standard voltage: Not less than 12 V.

Result

NG

Check and replace malfunctioning parts

OK

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

Result

Result	Go to
No DTC	A
DTC is output	B

A

Perform troubleshooting procedure without DTCs according to malfunction symptom

B**4**

Troubleshoot according to DTCs troubleshooting procedure

Result

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

A

Return to procedure 1 and troubleshoot the process again

B**5**

According to airbag system malfunction repair completion inspection and delivery, confirm that malfunction is resolved.

Result

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

A

Return to procedure 1 and troubleshoot the process again

B**6**

Finished

6.3 DTC Confirmation Procedure

Confirm that battery voltage is normal before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn ENGINE START STOP switch to ON.

- Use diagnostic tester to record and clear DTCs stored in supplemental restraint system.
- Turn the ENGINE START STOP switch to OFF and wait for several seconds.
- Turn ENGINE START STOP switch to ON, and then select Read DTC.
- If DTC is detected, it indicates current malfunction. Go to inspection procedure - Step 1.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

6.4 Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

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

6.5 Ground Inspection

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

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

6.6 Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B14E011	Left Solar Sensor Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is lower than 0.1 V for more than 2 seconds.	Sensor is damaged or wire harness is short	1. Check if left solar sensor signal is short to ground; 2. Replace solar sensor.
B14E015	Left Solar Sensor Short to Power Supply or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is higher than 4.9 V for more than 2 seconds.	Sensor is not connected, sensor is damaged or wire harness is short	1. Check if solar sensor connector or lead falls off; 2. Check if left solar sensor signal is short to power supply; 3. Replace solar sensor.
B14E111	Right Solar Sensor Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that	Sensor is damaged or wire harness is short	1. Check if right solar sensor signal is short to ground; 2. Replace solar sensor.

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
		the signal input voltage is lower than 0.1 V for more than 2 seconds.		
B14E115	Right Solar Sensor Short to Power Supply or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is higher than 4.9 V for more than 2 seconds.	Sensor is not connected, sensor is damaged or wire harness is short	1. Check if solar sensor connector or lead falls off; 2. Check if right solar sensor signal is short to power supply; 3. Replace solar sensor.
B14E211	Micro Light Sensor Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is lower than 0.1 V for more than 2 seconds.	Sensor is damaged or wire harness is short	1. Check if micro light sensor signal is short to ground; 2. Replace solar sensor.
B14E215	Micro Light Sensor Short to Power Supply or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is higher than 4.9 V for more than 2 seconds.	Sensor is not connected, sensor is damaged or wire harness is short	1. Check if solar sensor connector or lead falls off; 2. Check if micro light sensor signal is short to power supply; 3. Replace solar sensor.
B14E329	Internal Temperature Sensor Signal Invalid	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that inside temperature signal from AIPM has an invalid value.	Inside temperature sensor on AIPM is abnormal	1. Check if inside temperature sensor on AIPM is abnormal (open or short); 2. Replace AIPM.
B14E411	Evaporator Temperature Sensor Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is lower than 0.1 V for more than 2 seconds.	Sensor is damaged or wire harness is short	1. Check if evaporator temperature sensor wire harness is short to ground; 2. Replace evaporator temperature sensor.
B14E415	Evaporator Temperature Sensor Short to Power Supply or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is higher than 4.9 V for more than 2 seconds.	Sensor is not connected, sensor is damaged or wire harness is short	1. Check if evaporator temperature sensor connector or lead falls off; 2. Check if evaporator temperature sensor signal is short to power supply; 3. Replace evaporator temperature sensor.
B14E511	Left Foot Air Outlet Temperature Sensor Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is lower than 0.1 V for more than 2 seconds.	Sensor is damaged or wire harness is short	1. Check if left foot air outlet temperature sensor wire harness is short to ground; 2. Replace left foot air outlet temperature sensor.
B14E515	Left Foot Air Outlet Temperature Sensor Short to Power Supply or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is higher than 4.9 V for more than 2 seconds.	Sensor is not connected, sensor is damaged or wire harness is short	1. Check if left foot air outlet temperature sensor connector or lead falls off; 2. Check if left foot air outlet temperature sensor signal is short to power supply; 3. Replace left foot

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
				air outlet temperature sensor.
B14E611	Right Foot Air Outlet Temperature Sensor Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is lower than 0.1 V for more than 2 seconds.	Sensor is damaged or wire harness is short	1. Check if right foot air outlet temperature sensor wire harness is short to ground; 2. Replace right foot air outlet temperature sensor.
B14E615	Right Foot Air Outlet Temperature Sensor Short to Power Supply or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is higher than 4.9 V for more than 2 seconds.	Sensor is not connected, sensor is damaged or wire harness is short	1. Check if right foot air outlet temperature sensor connector or lead falls off; 2. Check if right foot air outlet temperature sensor signal is short to power supply; 3. Replace right foot air outlet temperature sensor.
B14E911	PM2.5 Sensor Short to Ground (Pulse Width Modulation = 0%)	Meet CLM normal operating condition. Meet PM2.5 sensor normal operating condition, turn on PM2.5 function after power-on for 3 seconds, it is detected that PWM input of PM2.5 is 0% for more than 2 seconds.	Sensor is damaged, wire harness is short or PWM frequency is abnormal	1. Check if PM2.5 sensor signal circuit is short to ground; 2. Replace PM2.5 sensor.
B14E915	PM2.5 Sensor Short to Power Supply or Open (- Pulse Width Modulation = 0%)	Meet CLM normal operating condition. Meet PM2.5 sensor normal operating condition, turn on PM2.5 function after power-on for 3 seconds, it is detected that PWM input of PM2.5 is 100% for more than 2 seconds.	Sensor is damaged, wire harness is short or PWM frequency is abnormal	1. Check if PM2.5 sensor wire harness or lead falls off; 2. Check if PM2.5 sensor signal circuit is short to power supply; 3. Replace PM2.5 sensor.
B14EA12	PM2.5 Enable Short To Power Supply	Meet CLM normal operating condition. After power-on for 3 seconds, and when CLM output is low level, it is detected that the feedback voltage exceeds 1.0 V for more than 2 seconds.	Sensor is damaged, wire harness is short or PWM frequency is abnormal	1. Check if PM2.5 enable signal is short to power supply; 2. Replace PM2.5 sensor.
B14EA14	PM2.5 Enable Short To Ground or Open	Meet CLM normal operating condition. After power-on for 3 seconds, and when CLM output is high level, it is detected that the feedback voltage is lower than 0.5 V for more than 2 seconds.	Sensor is damaged, wire harness is open, short or PWM frequency is abnormal	1. Check if PM2.5 sensor wire harness or lead falls off; 2. Check if PM2.5 enable signal circuit is short to ground; 3. Replace PM2.5 sensor.
B14EB11	Air Quality Sensor Short to Ground (Pulse Width Modulation = 0%)	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that AQS input PWM signal is 0 for more than 2 seconds.	Sensor is damaged, wire harness is short or PWM frequency is abnormal	1. Check if AQS signal is short to ground; 2. Replace AQS sensor.

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B14EB15	Air Quality Sensor Short to Power Supply or Open (Pulse Width Modulation = 100%)	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that AQS input PWM signal is 100% for more than 2 seconds.	Sensor is damaged, wire harness is open, short or PWM frequency is abnormal	1. Check if AQS sensor wire harness or lead falls off; 2. Check if AQS sensor signal circuit is short to ground; 3. Replace AQS sensor.
B14EC10	Mode Motor Blocked (Except Calibration Procedure)	Meet CLM normal operating condition. After power-on for 3 seconds, the motor has no open fault. At this time, there is a demand for mode damper adjustment, but within continuous 2 seconds, motor feedback voltage change rate cannot reach 100 mV/100 ms.	Foreign matter will block motor, damage motor, and damage CLM drive circuit	1. Check if motor is blocked by foreign matter; 2. Replace mode damper motor; 3. Replace CLM.
B14EC11	Mode Motor Control Circuit Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, and when mode motor drive output of CLM is high level, an overcurrent signal is detected for more than 2 seconds.	Wire harness is short or drive chip is damaged	1. Check if mode motor drive circuit is short to ground; 2. Replace CLM; 3. Replace mode motor.
B14EC12	Mode Motor Control Circuit Short to Power Supply	Meet CLM normal operating condition. After power-on for 3 seconds, and when mode motor drive output of CLM is low level, an overcurrent signal is detected for more than 2 seconds.	Wire harness is short or drive chip is damaged	1. Check if mode motor drive circuit is short to power supply; 2. Replace CLM; 3. Replace mode motor.
B14EC13	Mode Motor Control Circuit Open	Meet CLM normal operating condition. After power-on for 3 seconds, and when mode motor drive is available, drive current is too small for more than 2 seconds.	Wire harness is open, drive chip is damaged or drive circuit is open	1. Check if mode motor wire harness connector or lead falls off; 2. Replace CLM; 3. Replace mode motor.
B14ED12	Mode Motor Control Feedback Circuit Short to Power Supply	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that mode motor feedback voltage is higher than 4.9 V for more than 2 seconds.	Wire harness is short or motor is damaged	1. Check if mode motor feedback wire harness is short to power supply; 2. Replace mode motor; 3. Replace CLM.
B14ED14	Mode Motor Control Feedback Circuit Short to Ground or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that mode motor feedback voltage is lower than 0.1 V for more than 2 seconds.	Wire harness is open, short or motor is damaged	1. Check if mode motor wire harness connector or lead falls off; 2. Check if mode motor feedback wire harness is short to ground; 3. Replace mode motor; 4. Replace CLM.
B14EE10	Left Temperature Motor Blocked (- Except Calibration Procedure)	Meet CLM normal operating condition. After power-on for 3 seconds, the motor has no open fault. At this time, there is a demand for left temperature damper	Foreign matter will block motor, damage motor, and damage CLM drive circuit	1. Check if motor is blocked by foreign matter; 2. Replace left temperature damper motor; 3. Replace CLM.

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
		adjustment, but within continuous 2 seconds, motor feedback voltage change rate cannot reach 100 mV/100 ms.		
B14EE11	Left Temperature Motor Control Circuit Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, and when left temperature motor drive output of CLM is high level, an overcurrent signal is detected for more than 2 seconds.	Wire harness is short or drive chip is damaged	1. Check if left temperature motor drive circuit is short to ground; 2. Replace CLM; 3. Replace left temperature motor.
B14EE12	Left Temperature Motor Control Circuit Short to Power Supply	Meet CLM normal operating condition. After power-on for 3 seconds, and when left temperature motor drive output of CLM is low level, an overcurrent signal is detected for more than 2 seconds.	Wire harness is short or drive chip is damaged	1. Check if left temperature motor drive circuit is short to power supply; 2. Replace CLM; 3. Replace left temperature motor.
B14EE13	Left Temperature Motor Control Circuit Open	Meet CLM normal operating condition. After power-on for 3 seconds, and when left temperature motor drive is available, drive current is too small for more than 2 seconds.	Wire harness is open, drive chip is damaged or drive circuit is open	1. Check if left temperature motor wire harness connector or lead falls off; 2. Replace CLM; 3. Replace left temperature motor.
B14EF12	Left Temperature Motor Control Feedback Circuit Short to Power Supply	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that left temperature motor feedback voltage is higher than 4.9 V for more than 2 seconds.	Wire harness is short or motor is damaged	1. Check if left temperature motor feedback wire harness is short to power supply; 2. Replace left temperature motor; 3. Replace CLM.
B14EF14	Left Temperature Motor Control Feedback Circuit Short to Ground or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that left temperature motor feedback voltage is lower than 0.1 V for more than 2 seconds.	Wire harness is open, short or motor is damaged	1. Check if left temperature motor wire harness connector or lead falls off; 2. Check if left temperature motor feedback wire harness is short to ground; 3. Replace left temperature motor; 4. Replace CLM.
B14F010	Right Temperature Motor Blocked (- Except Calibration Procedure)	Meet CLM normal operating condition. After power-on for 3 seconds, the motor has no open fault. At this time, there is a demand for right temperature damper adjustment, but within continuous 2 seconds, motor feedback voltage change rate cannot reach 100 mV/100 ms.	Foreign matter will block motor, damage motor, and damage CLM drive circuit	1. Check if motor is blocked by foreign matter; 2. Replace right temperature damper motor; 3. Replace CLM

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
B14F011	Right Temperature Motor Control Circuit Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, and when right temperature motor drive output of CLM is high level, an overcurrent signal is detected for more than 2 seconds.	Wire harness is short or drive chip is damaged	1. Check if right temperature motor drive circuit is short to ground; 2. Replace CLM; 3. Replace right temperature motor.
B14F012	Right Temperature Motor Control Circuit Short to Power Supply	Meet CLM normal operating condition. After power-on for 3 seconds, and when right temperature motor drive output of CLM is low level, an overcurrent signal is detected for more than 2 seconds.	Wire harness is short or drive chip is damaged	1. Check if right temperature motor drive circuit is short to power supply; 2. Replace CLM; 3. Replace right temperature motor.
B14F013	Right Temperature Motor Control Circuit Open	Meet CLM normal operating condition. After power-on for 3 seconds, and when right temperature motor drive is available, drive current is too small for more than 2 seconds.	Wire harness is open, drive chip is damaged or drive circuit is open	1. Check if right temperature motor wire harness connector or lead falls off; 2. Replace CLM; 3. Replace right temperature motor.
B14F112	Right Temperature Motor Control Feedback Circuit Short to Power Supply	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that right temperature motor feedback voltage is higher than 4.9 V for more than 2 seconds.	Wire harness is short or motor is damaged	1. Check if right temperature motor feedback wire harness is short to power supply; 2. Replace right temperature motor; 3. Replace CLM.
B14F114	Right Temperature Motor Control Feedback Circuit Short to Ground or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that right temperature motor feedback voltage is lower than 0.1 V for more than 2 seconds.	Wire harness is open, short or motor is damaged	1. Check if right temperature motor wire harness connector or lead falls off; 2. Check if right temperature motor feedback wire harness is short to ground; 3. Replace right temperature motor; 4. Replace CLM.
B14F210	Intake Motor Blocked (Except Calibration Procedure)	Meet CLM normal operating condition. After power-on for 3 seconds, the motor has no open fault. At this time, there is a demand for circulation damper adjustment, but within continuous 2 seconds, motor feedback voltage change rate cannot reach 100 mV/100 ms.	Foreign matter will block motor, damage motor, and damage CLM drive circuit	1. Check if motor is blocked by foreign matter; 2. Replace circulation damper motor; 3. Replace CLM.
B14F211	Intake Motor Control Circuit Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, and when circulation motor drive output of CLM is high level, an overcurrent signal is	Wire harness is short or drive chip is damaged	1. Check if circulation motor drive circuit is short to ground; 2. Replace CLM.

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
		detected for more than 2 seconds.		
B14F212	Intake Motor Control Circuit Short to Power Supply	Meet CLM normal operating condition. After power-on for 3 seconds, and when circulation motor drive output of CLM is low level, an overcurrent signal is detected for more than 2 seconds.	Wire harness is short or drive chip is damaged	1. Check if circulation motor drive circuit is short to power supply; 2. Replace CLM.
B14F213	Intake Motor Control Circuit Open	Meet CLM normal operating condition. After power-on for 3 seconds, and when circulation motor drive is available, drive current is too small for more than 2 seconds.	Wire harness is open, drive chip is damaged or drive circuit is open	1. Check if circulation motor wire harness connector or lead falls off; 2. Replace CLM.
B14F312	Intake Motor Control Feedback Circuit Short to Power Supply	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that circulation motor feedback voltage is higher than 4.9 V for more than 2 seconds.	Wire harness is short or motor is damaged	1. Check if circulation motor feedback wire harness is short to power supply; 2. Replace circulation motor; 3. Replace CLM.
B14F314	Intake Motor Control Feedback Circuit Short to Ground or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that circulation motor feedback voltage is lower than 0.1 V for more than 2 seconds.	Wire harness is open, short or motor is damaged	1. Check if circulation motor wire harness connector or lead falls off; 2. Check if circulation motor feedback wire harness is short to ground; 3. Replace circulation motor; 4. Replace CLM.
B14F412	Blower Relay Output Short to Power Supply	Meet CLM normal operating condition. After power-on for 3 seconds, relay control output is low level, but it is detected that feedback voltage is high level for more than 2 seconds.	Wire harness is short or relay is short	1. Check if relay control circuit wire harness is short to power supply; 2. Replace blower relay.
B14F414	Blower Relay Output Short to Ground or Open	Meet CLM normal operating condition. After power-on for 3 seconds, relay control output is high level, but it is detected that feedback voltage is high level or has open fault for more than 2 seconds.	Relay fuse is damaged, wire harness is open, short, relay is damaged	1. Check if relay fuse is damaged; 2. Check if relay control circuit wire harness is open or short to ground; 3. Replace blower relay.
B14F529	Blower Signal Invalid Control Failed	Meet CLM normal operating condition. After power-on for 3 seconds, blower is turned on, feedback voltage is higher than 2 V, but it cannot change with gear change for more than 2 seconds.	Wire harness is short or speed regulation module is damaged	1. Check if blower control signal is short; 2. Check if blower negative terminal circuit is short; 3. Replace blower speed regulation module
B14F531	Blower Control Failed	Meet CLM normal operating condition. After power-on for	Wire harness is short or speed	1. Check if blower control signal is short; 2. Check if

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
		3 seconds, when blower is in the range of 1 to 5, blower negative terminal feedback voltage is lower than 2 V	regulation module is damaged	blower negative terminal circuit is short; 3. Replace blower speed regulation module
B14F611	Sensor PM2.5, AQS + 12 V Output Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, turn on 12 V power supply output, IS pin feedback voltage of 5180 chip is higher than 4.9 V	Wire harness is short, sensor is short, and 5180 chip of CLM is damaged	1. Check if 12 V sensor supply circuit is short to ground; 2. Check if AQS and PM2.5 is short; 3. Replace CLM
B14F612	Sensor PM2.5, AQS + 12 V Output Short to Power Supply	Meet CLM normal operating condition. After power-on for 3 seconds, turn off 12 V power supply output, IS pin feedback voltage of 5180 chip is higher than 4.9 V	Wire harness is short, 5180 chip of CLM is damaged	1. Check if 12 V sensor supply circuit is a short to power supply; 2. Replace CLM
B14F711	ECV Control Circuit Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, turn on external control valve and it is detected that IS pin feedback voltage of 5180 chip is higher than 4.9 V (-short or over current)	Wire harness is short, 5180 chip of CLM is damaged	1. Check if positive drive wire harness of external control valve is short to ground; 2. Replace CLM;
B14F715	ECV Control Circuit Short to Power Supply or Open	Meet CLM normal operating condition. After power-on for 3 seconds, turn on external control valve and it is detected that IS pin feedback voltage of 5180 chip is higher than 4.9 V (-short or over current). Turn on external control valve, it is detected that the IS pin feedback voltage of 5180 chip is lower than 0.1 V (open)	Wire harness is short, 5180 chip of CLM is damaged	1. Check if external control valve wire harness connector or lead falls off, check external control valve wire harness from CLM to HVAC for continuity; 2. Replace CLM; 3. Replace compressor external control valve.
B14FB11	External Temperature Sensor Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is lower than 0.1 V for more than 2 seconds.	Sensor is damaged or wire harness is short	1. Check if ambient temperature sensor wire harness is short to ground; 2. Replace ambient temperature sensor.
B14FB15	External Temperature Sensor Short to Power Supply or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is higher than 4.9 V for more than 2 seconds.	Sensor is not connected, sensor is damaged or wire harness is short	1. Check if ambient temperature sensor connector or lead falls off; 2. Check if ambient temperature sensor signal is short to power supply; 3. Replace ambient temperature sensor
B14FC1C	Abnormal Power Supply Voltage	Network is waked up, IG is powered on, CLM can operate, it is detected that	Battery or alternator malfunction	1. Check if battery is normal; 2. Check if alternator is normal.

DTC	DTC Definition	Detection Condition	Possible Cause	Maintenance Advice
		battery voltage is 8.5 V or higher than 16.5 V		
B14E711	Left Face Air Outlet Temperature Sensor Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is lower than 0.1 V for more than 2 seconds.	Sensor is damaged or wire harness is short	1. Check if left face air outlet temperature sensor wire harness is short to ground; 2. Replace left face air outlet temperature sensor.
B14E715	Left Face Air Outlet Temperature Sensor Short to Power Supply or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is higher than 4.9 V for more than 2 seconds.	Sensor is not connected, sensor is damaged or wire harness is short	1. Check if left face air outlet temperature sensor connector or lead falls off; 2. Check if left face air outlet temperature sensor signal is short to power supply; 3. Replace left face air outlet temperature sensor.
B14E811	Right Face Air Outlet Temperature Sensor Short to Ground	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is lower than 0.1 V for more than 2 seconds.	Sensor is damaged or wire harness is short	1. Check if right face air outlet temperature sensor wire harness is short to ground; 2. Replace right face air outlet temperature sensor.
B14E815	Right Face Air Outlet Temperature Sensor Short to Power Supply or Open	Meet CLM normal operating condition. After power-on for 3 seconds, it is detected that the signal input voltage is higher than 4.9 V for more than 2 seconds.	Sensor is not connected, sensor is damaged or wire harness is short	1. Check if right face air outlet temperature sensor connector or lead falls off; 2. Check if right face air outlet temperature sensor signal is short to power supply; 3. Replace right face air outlet temperature sensor.
B14FD10	Humidity Sensor Failure	Received humidity value signal from BCM node is error	Received humidity value from BCM node is invalid; Received humidity value from BCM node is lost;	1. Check that received humidity signal value from BCM is valid; 2. Check if BCM node loses the signal.

6.7 DTC Diagnosis Procedure

■ Inside Temperature Sensor Fault

DTC	B14E329	Internal Temperature Sensor Signal Invalid
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■ Description

■ 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 AIPM

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Remove AIPM from malfunctioning vehicle.
- (c) Install a new AIPM to malfunctioning vehicle.

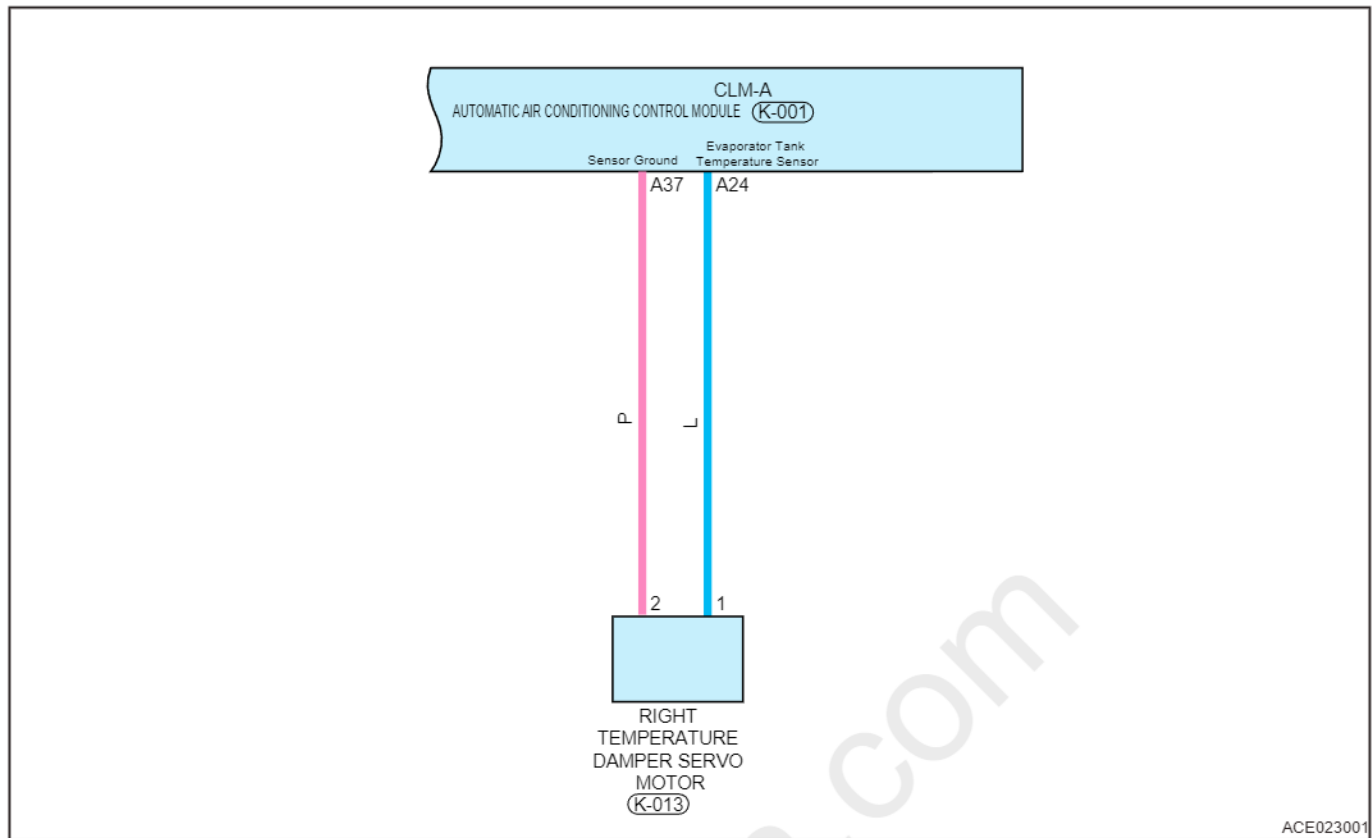
OK**Replace AIPM with a new one.****NG****2 Reconfirm DTCs**

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

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

NG**Replace with a new ECM to check if fault reoccurs.****OK****Conduct test and confirm malfunction has been repaired.****DTC****B14E411****Evaporator Temperature Sensor Short to Ground****■ Description**

Control schematic diagram



■ DTC Confirmation Procedure

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

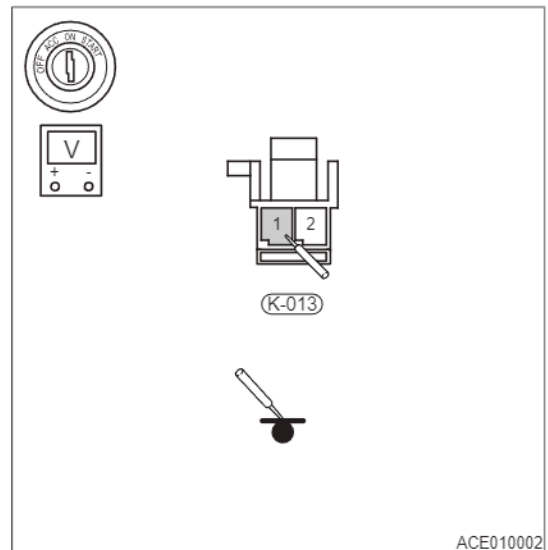
- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

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 signal voltage

- Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
- Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of evaporator temperature sensor signal K-013 (1). Normal signal voltage changes with A/C temperature.



NG

Check if evaporator temperature sensor wire harness or replace evaporator temperature sensor.

OK

2

Reconfirm DTCs

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

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

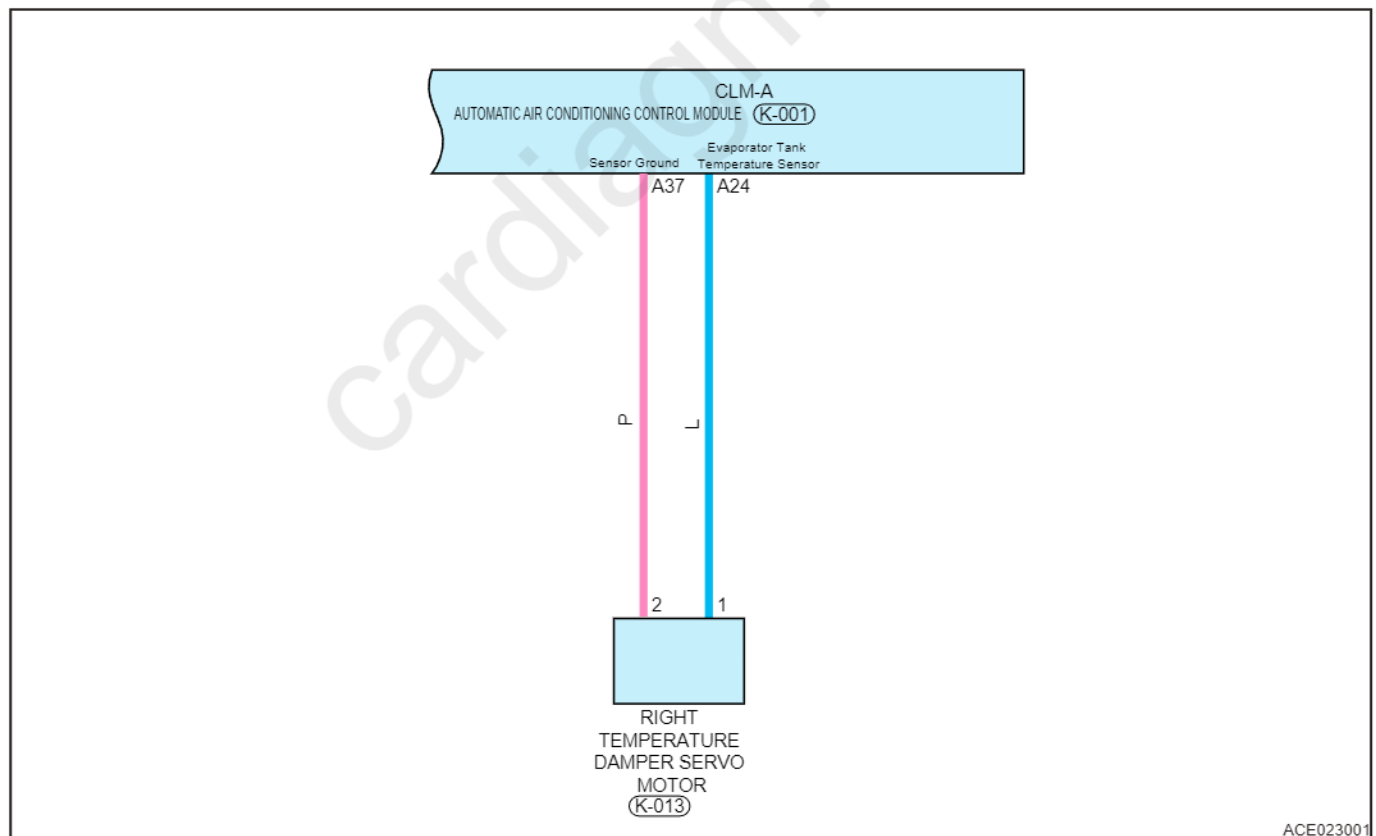
Conduct test and confirm malfunction has been repaired.

■ **Evaporator Temperature Sensor Short to Power Supply Malfunction**

DTC	B14E415	Evaporator Temperature Sensor Short to Power Supply or Open
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■ **Description**

Control schematic diagram



ACE023001

■ **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:

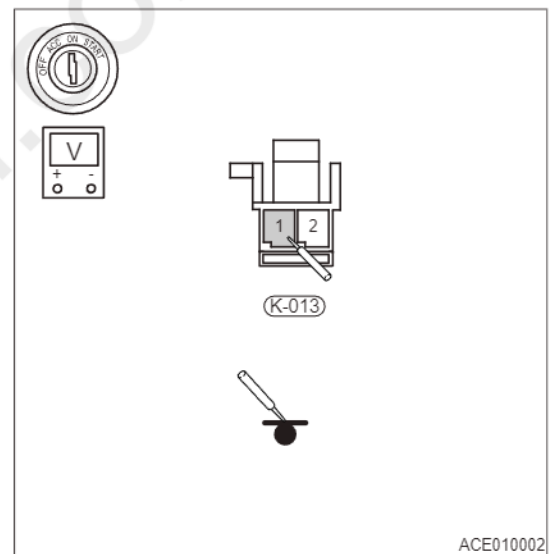
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1 Check wire harness connector

- Use circuit diagram as a guide to perform the following inspection procedures:
- Turn ENGINE START STOP switch to OFF.
- Check connector terminals for abdicated, bend or poor connection, etc.

NG
Repair or replace wire harness.
OK
2 Check the evaporator temperature sensor signal voltage

- Use circuit diagram as a guide to perform the following inspection procedures:
 - Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
 - Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of evaporator temperature sensor signal K-013 (1). Normal signal voltage changes with A/C temperature.


NG
Check if evaporator temperature sensor wire harness or replace evaporator temperature sensor.
OK
3 Reconfirm DTCs

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

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

NG
Replace with a new ECM to check if fault reoccurs.

OK

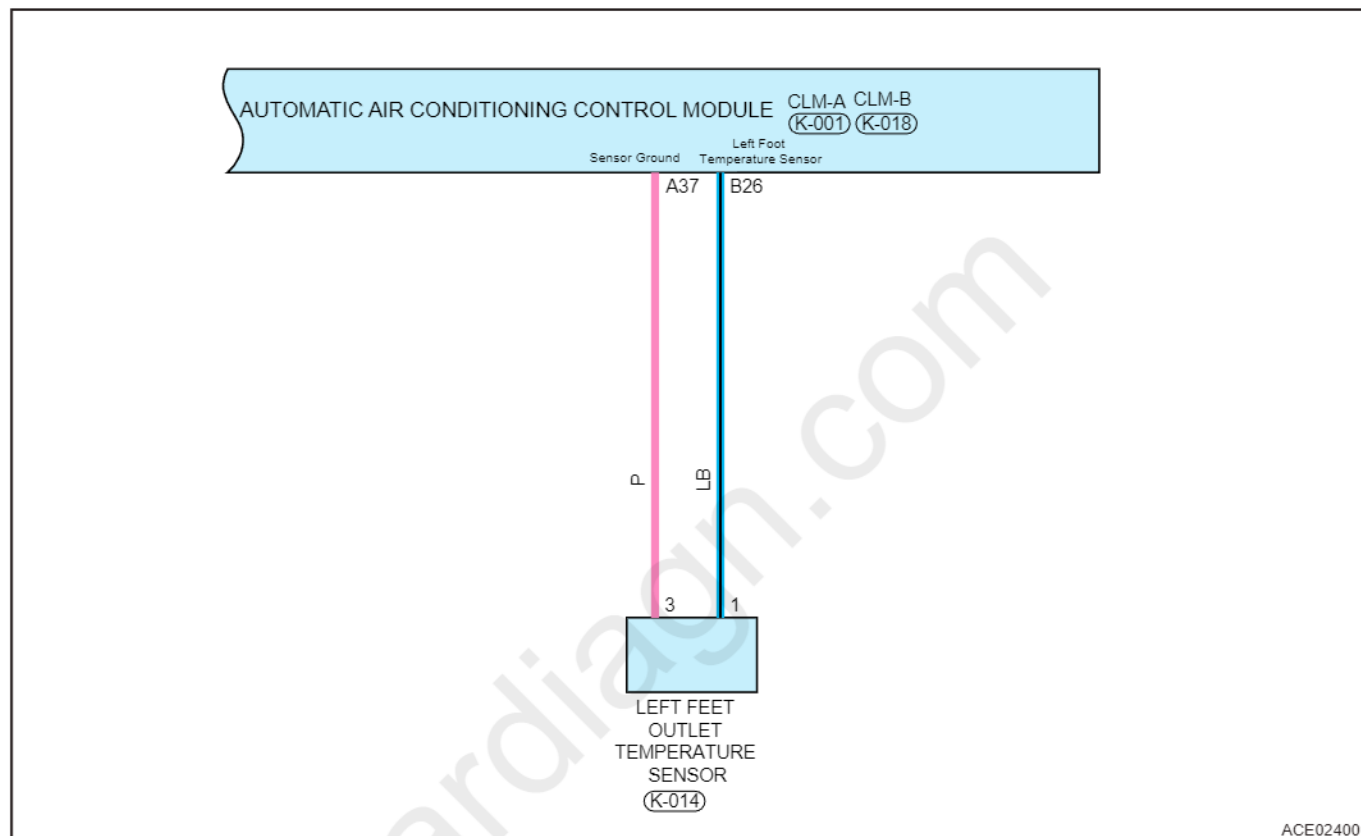
Conduct test and confirm malfunction has been repaired.

■ Left Foot Air Outlet Temperature Sensor Short to Ground Malfunction

DTC	B14E511	Left Foot Air Outlet Temperature Sensor Short to Ground
-----	---------	---

■ Description

Control schematic diagram



ACE024001

■ DTC Confirmation Procedure

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

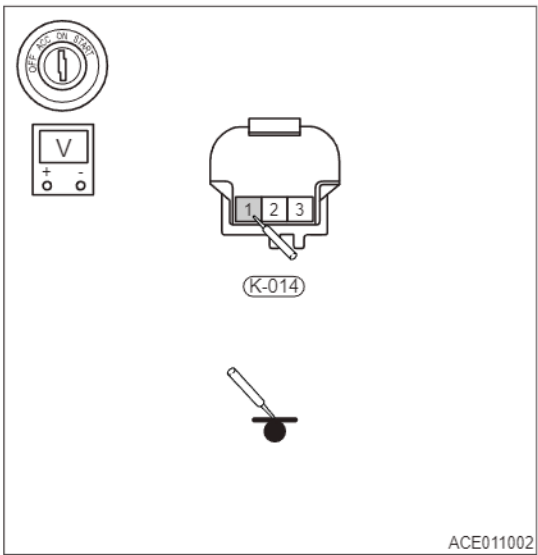
- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check left foot air outlet temperature sensor signal voltage
---	--

- (a) Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
- (b) Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of left foot air outlet temperature sensor signal K-014 (1). Normal signal voltage changes with A/C temperature.



NG

Check if left foot air outlet temperature sensor wire harness or replace left foot air outlet temperature sensor.

OK

2	Reconfirm DTCs
---	----------------

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

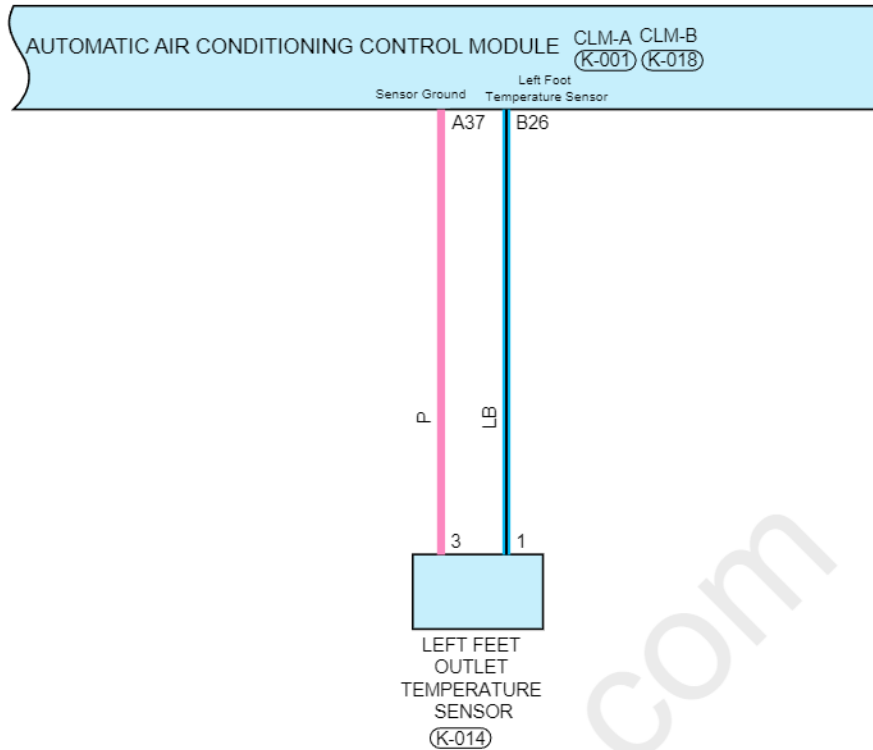
Conduct test and confirm malfunction has been repaired.

■ Left Foot Air Outlet Temperature Sensor Short to Power Supply or Open Malfunction

DTC	B14E515	Left Foot Air Outlet Temperature Sensor Short to Power Supply or Open
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■ Description

Control schematic diagram



ACE024001

■ 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 if left foot air outlet temperature sensor connector or lead falls off

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Check connector terminals for abdicated, bend or poor connection, etc.

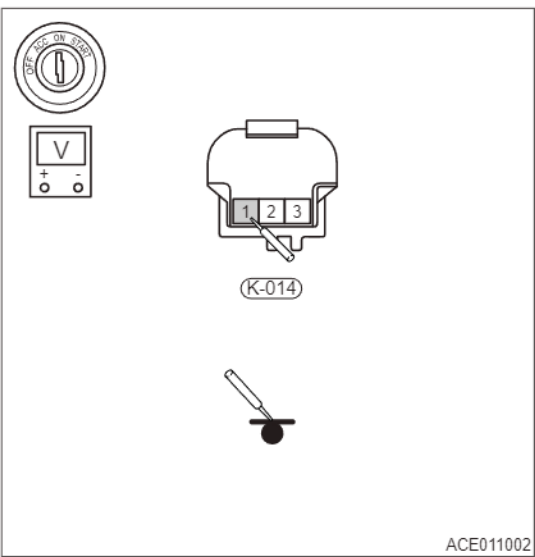
NG

Repair or replace wire harness.

OK

2 Check left foot air outlet temperature sensor signal voltage.

- (a) Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
- (b) Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of left foot air outlet temperature sensor signal K-014 (1). Normal signal voltage changes with A/C temperature.



NG

Check if left foot air outlet temperature sensor wire harness or replace left foot air outlet temperature sensor.

OK

3	Reconfirm DTCs
---	----------------

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

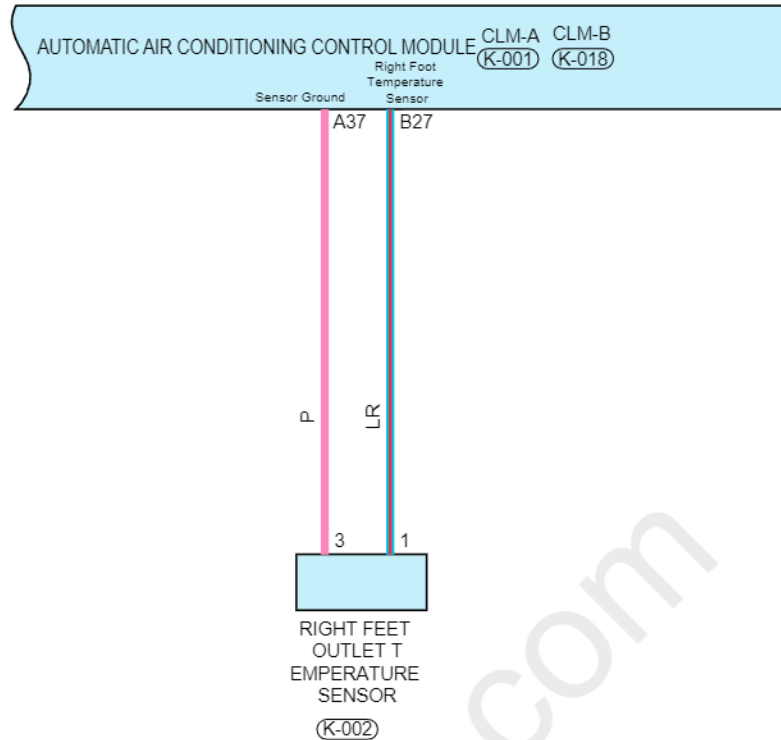
Conduct test and confirm malfunction has been repaired.

■ Right Foot Air Outlet Temperature Sensor Short to Ground

DTC	B14E611	Right Foot Air Outlet Temperature Sensor Short to Ground
-----	---------	--

■ Description

Control schematic diagram



ACE025001

■ DTC Confirmation Procedure

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

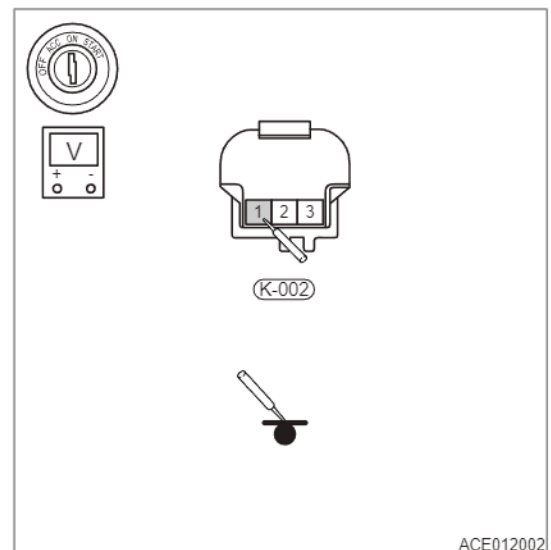
- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1 Check right foot air outlet temperature sensor signal voltage

- Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
- Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of right foot air outlet temperature sensor signal K-002 (1). Normal signal voltage changes with A/C temperature.



ACE012002

NG

Check if right foot air outlet temperature sensor wire harness or replace right foot air outlet temperature sensor.

OK

2

Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

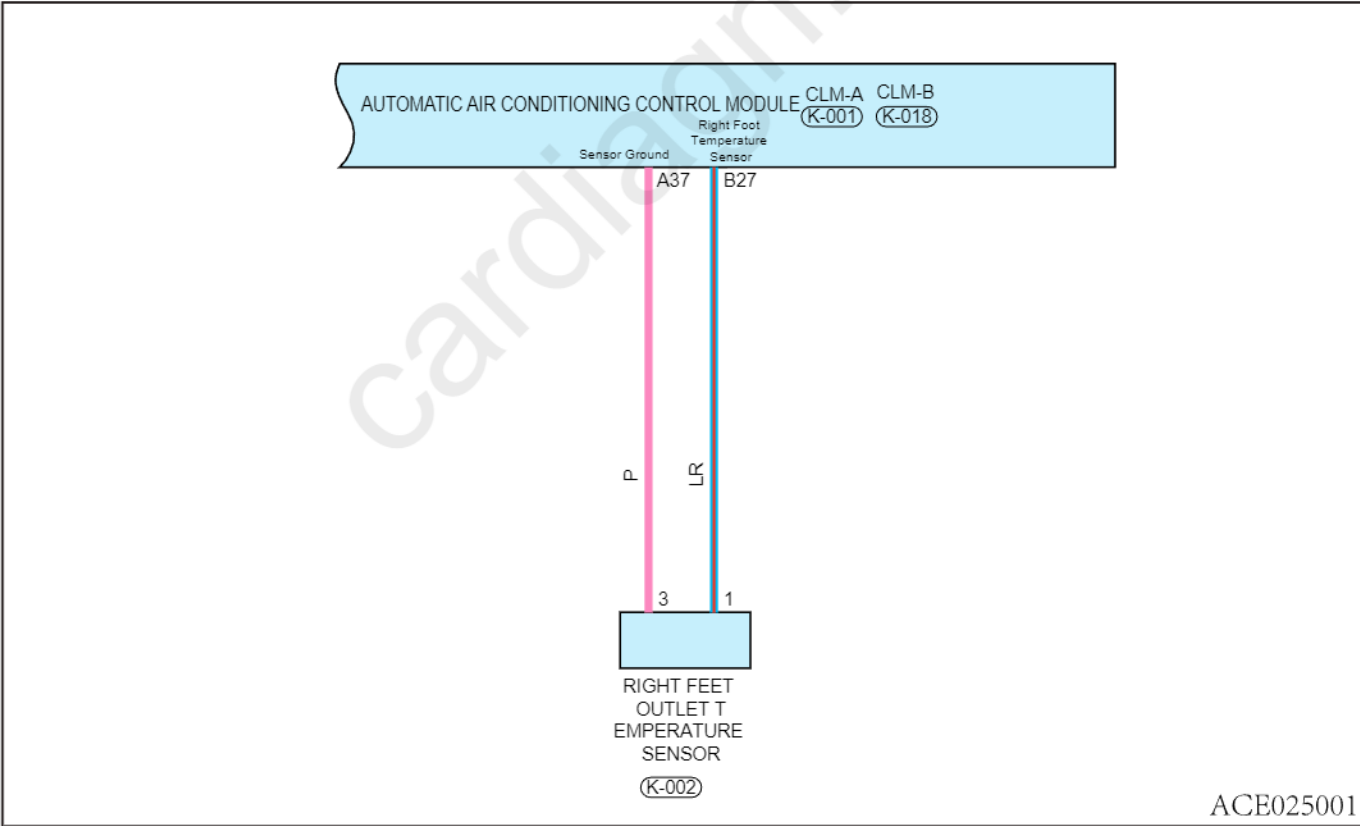
OK

Conduct test and confirm malfunction has been repaired.

DTC	B14E615	Right Foot Air Outlet Temperature Sensor Short to Power Supply 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 if right foot air outlet temperature sensor connector or lead falls off
----------	--

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Check connector terminals for abdicated, bend or poor connection, etc.

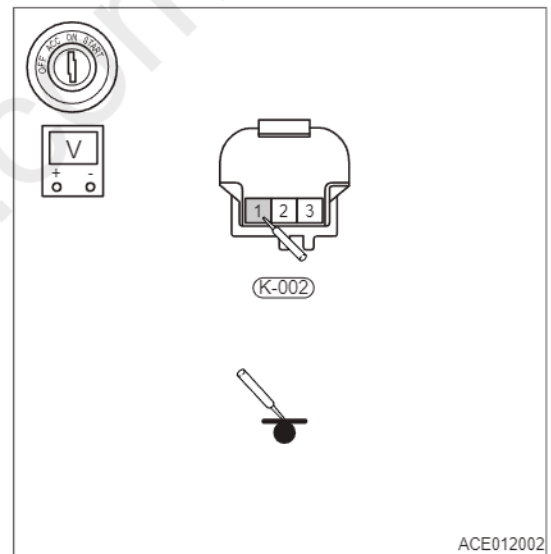
NG

Repair or replace wire harness connector.

OK

2	Check right foot air outlet temperature sensor signal voltage
----------	--

- (a) Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
 (b) Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of right foot air outlet temperature sensor signal K-002 (1). Normal signal voltage changes with A/C temperature.



NG

Check if right foot air outlet temperature sensor wire harness or replace right foot air outlet temperature sensor.

OK

3	Reconfirm DTCs
----------	-----------------------

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

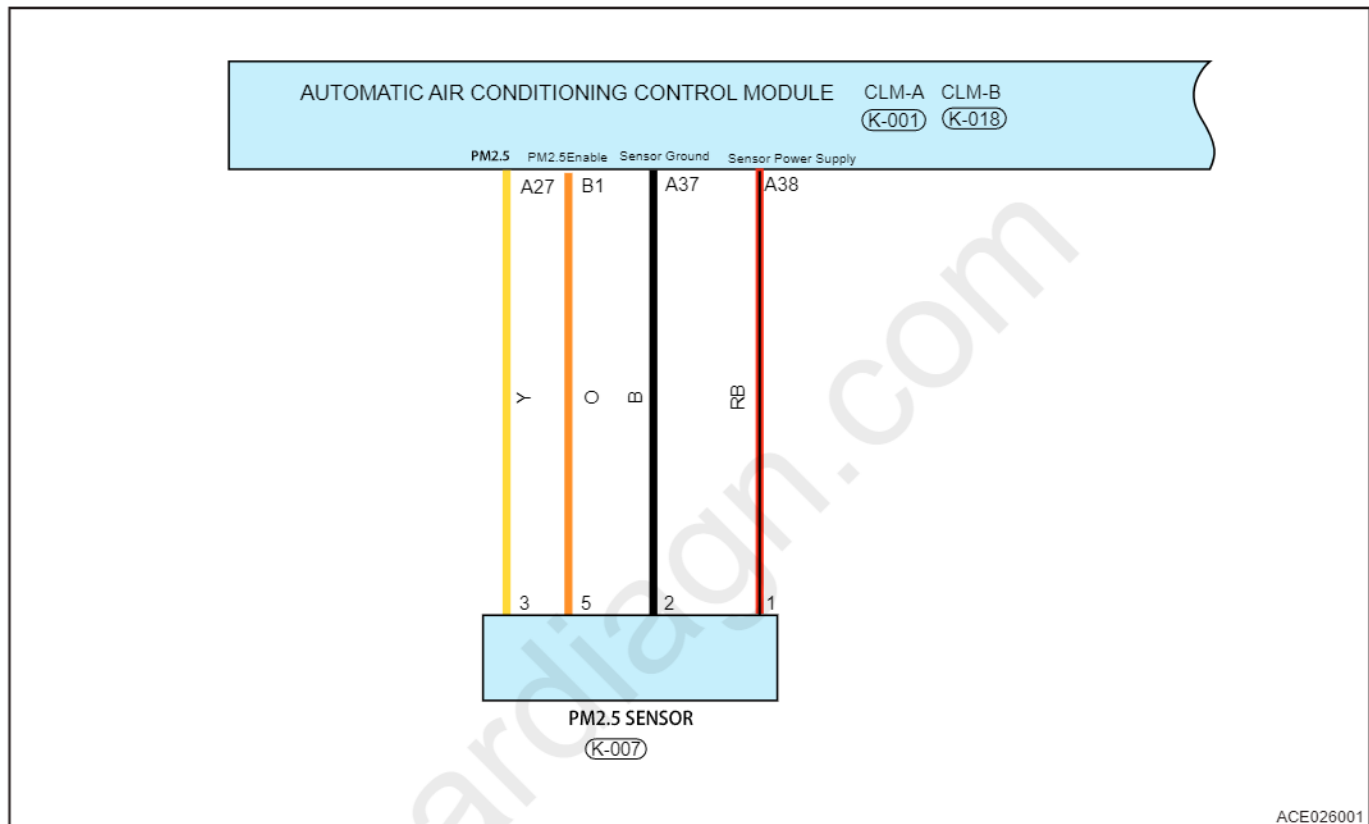
Conduct test and confirm malfunction has been repaired.

PM2.5 Sensor Failure

DTC	B14E911	PM2.5 Sensor Short to Ground (Pulse Width Modulation = 0%)
DTC	B14E915	PM2.5 Sensor Short to Power Supply or Open (Pulse Width Modulation = 0%)
DTC	B14EA12	PM2.5 Enable Short To Power Supply
DTC	B14EA14	PM2.5 Enable Short To Ground Or Open

Description

Control schematic diagram



ACE026001

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 wire harness and connector.
---	-----------------------------------

- Turn ENGINE START STOP switch to OFF.
- Check connector terminals for abdicated, bend or poor connection, etc.
- Disconnect PM2.5 sensor K-007 and automatic A/C module connector K-001.

NG

Repair or replace wire harness.

OK

2 Check PM2.5 sensor

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Remove PM2.5 sensor from malfunctioning vehicle.
- (c) Install new PM2.5 sensor to malfunctioning vehicle.
- (d) Check if DTC exists.

OK

Repair or replace PM2.5 sensor ground wire harness

NG

3 Check wire harness (automatic A/C control module - PM2.5 sensor)

- (a) Turn off all electrical equipment and ENGINE START STOP switch.
- (b) Disconnect the negative battery cable.
- (c) Disconnect PM2.5 sensor connector K-007 and automatic A/C module connector K-001.
- (d) Using a digital multimeter, measure the wire harness between PM2.5 sensor connector K-007 and automatic A/C module connector K-001 according to value(s) in table below.

Multimeter Test Terminal	Condition	Normal Condition
K-007 (1) - K-001 (38)	ENGINE START STOP switch "OFF"	$< 1 \Omega$
K-007 (2) - K-001 (37)	ENGINE START STOP switch "OFF"	$< 1 \Omega$
K-007 (5) - K-018 (1)	ENGINE START STOP switch "OFF"	$< 1 \Omega$
K-007 (3) - K-001 (27)	ENGINE START STOP switch "OFF"	$< 1 \Omega$

NG

Repair or replace related wire harness.

OK

4 Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

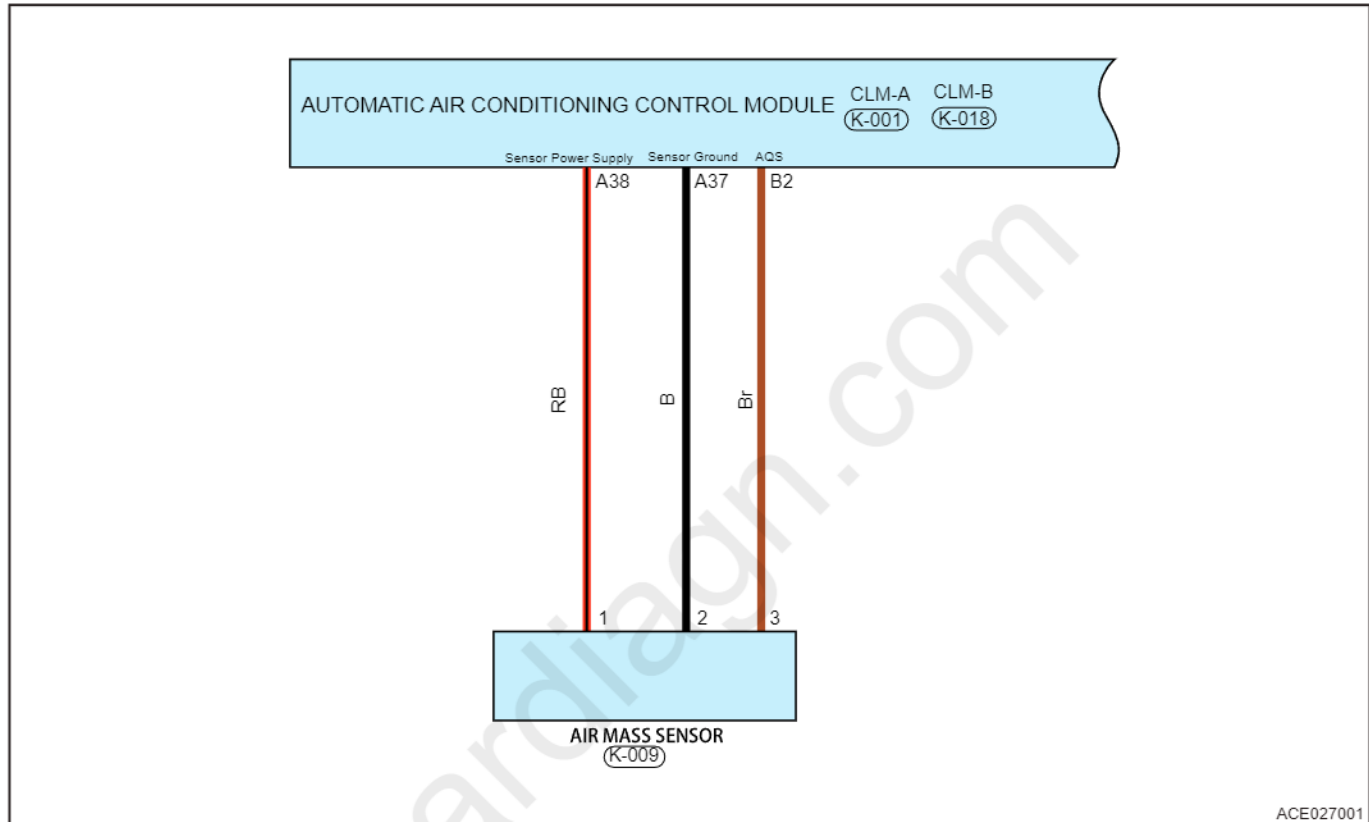
Conduct test and confirm malfunction has been repaired.

■ Air Quality Sensor Malfunction

DTC	B14EB11	Air Quality Sensor Short to Ground (Pulse Width Modulation = 0%)
DTC	B14EB15	Air Quality Sensor Short to Power Supply or Open (Pulse Width Modulation = 100%)

■ Description

Control schematic diagram



ACE027001

■ 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 wire harness and connector.

- Turn ENGINE START STOP switch to OFF.
- Check connector terminals for abdicated, bend or poor connection, etc.
- Disconnect air quality sensor K-009 and automatic A/C module connectors K-001, K-018.

NG

Repair or replace wire harness.

OK

2 Check air quality sensor

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Remove air quality sensor from malfunctioning vehicle.
- (c) Install new air quality sensor to malfunctioning vehicle.
- (d) Check if DTC exists.

OK

Repair or replace air quality sensor ground wire harness.

NG

3 Check wire harness (automatic A/C control module - air quality sensor)

- (a) Turn off all electrical equipment and ENGINE START STOP switch.
- (b) Disconnect the negative battery cable.
- (c) Disconnect air quality sensor connector K-009 and automatic A/C module connector K-001.
- (d) Using a digital multimeter, measure the wire harness between air quality sensor connector K-009 and automatic A/C module connector K-001 according to value(s) in table below.

Multimeter Test Terminal	Condition	Normal Condition
K-009 (1) - K-001 (38)	ENGINE START STOP switch "OFF"	$< 1 \Omega$
K-009 (2) - K-001 (37)	ENGINE START STOP switch "OFF"	$< 1 \Omega$
K-009 (3) - K-018 (2)	ENGINE START STOP switch "OFF"	$< 1 \Omega$

NG

Repair or replace related wire harness.

OK

4 Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

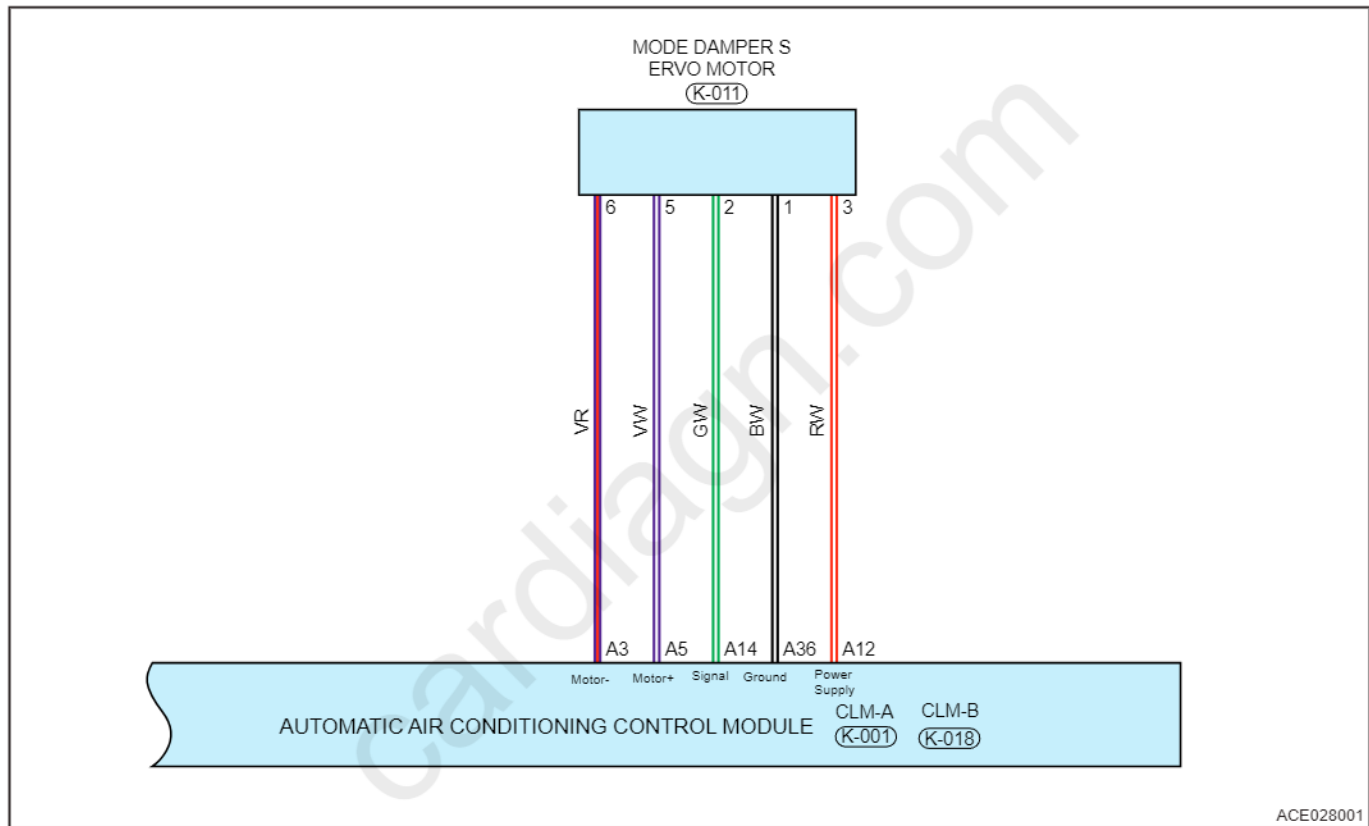
Conduct test and confirm malfunction has been repaired.

■ Mode Motor Error

DTC	B14EC10	Mode Motor Blocked (Except Calibration Procedure)
DTC	B14EC11	Mode Motor Control Circuit Short to Ground
DTC	B14EC12	Mode Motor Control Circuit Short to Power Supply
DTC	B14EC13	Mode Motor Control Circuit Open
DTC	B14ED12	Mode Motor Control Feedback Circuit Short to Power Supply
DTC	B14ED14	Mode Motor Control Feedback Circuit Short to Ground 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 wire harness and connector.
---	-----------------------------------

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Check connector terminals for abdicated, bend or poor connection, etc.
- (c) Disconnect mode damper motor connector K-011 and automatic A/C control module connector K-001.

NG

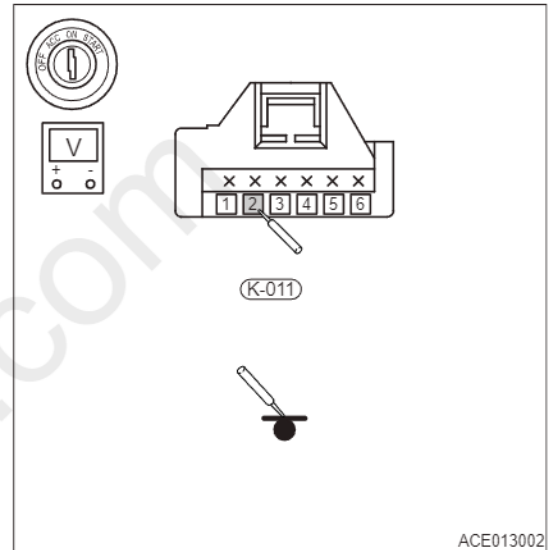
Repair or replace wire harness.

OK

2

Check mode damper motor operating signal voltage

- (a) Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
- (b) Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of mode damper motor signal K-011 (2). Normal signal voltage changes with A/C mode adjustment



ACE013002

NG

Check mode damper motor wire harness or replace mode damper motor.

OK

3

Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

Conduct test and confirm malfunction has been repaired.

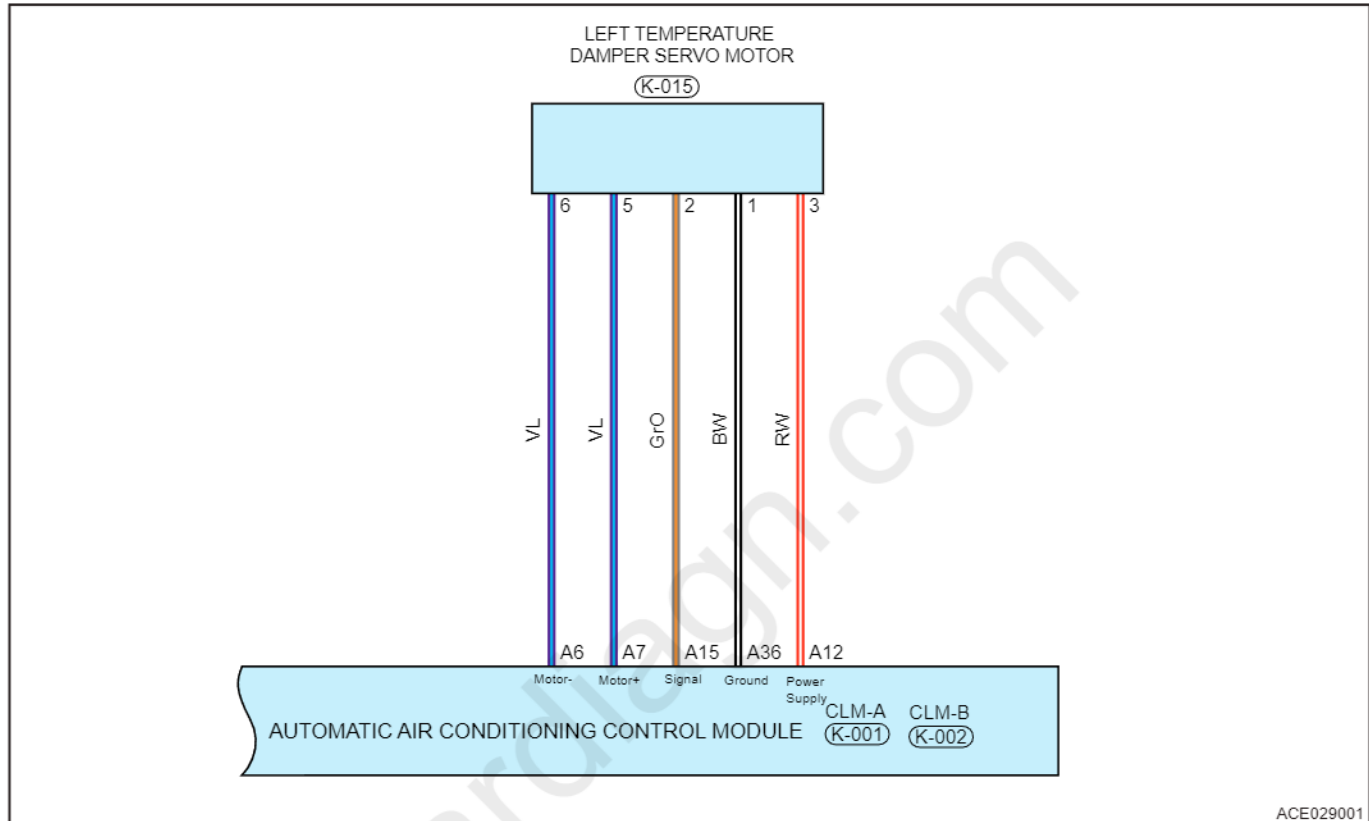
Left Temperature Motor Malfunction

DTC	B14EE10	Left Temperature Motor Blocked (Except Calibration Procedure)
DTC	B14EE11	Left Temperature Motor Control Circuit Short to Ground
DTC	B14EE12	Left Temperature Motor Control Circuit Short to Power Supply

DTC	B14EE13	Left Temperature Motor Control Circuit Open
DTC	B14EF12	Left Temperature Motor Control Feedback Circuit Short to Power Supply
DTC	B14EF14	Left Temperature Motor Control Feedback Circuit Short to Ground or Open

■ Description

Control schematic diagram



ACE029001

■ 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 wire harness and connector.
---	-----------------------------------

- Turn ENGINE START STOP switch to OFF.
- Check connector terminals for abdicated, bend or poor connection, etc.
- Disconnect left temperature adjustment motor connector K-015 and automatic A/C control module connector K-001.

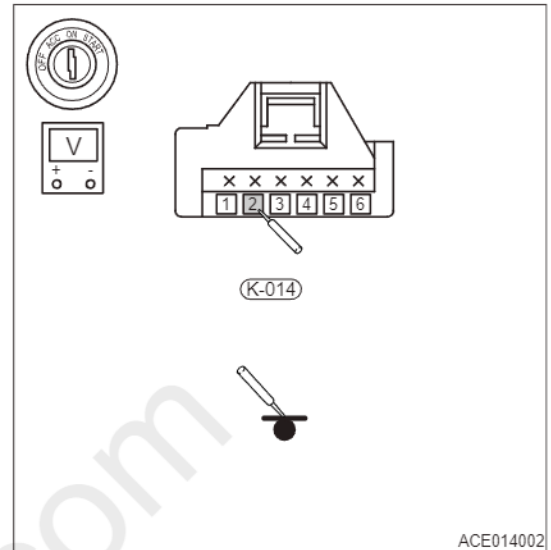
NG

Repair or replace wire harness.

OK

2 Check temperature adjustment motor (left) operating signal voltage

- (a) Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
- (b) Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of temperature adjustment motor (left) signal K-015 (2). Normal signal voltage changes with A/C left temperature adjustment



NG

Check temperature adjustment motor (left) wire harness or replace temperature adjustment motor (left).

OK

3 Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

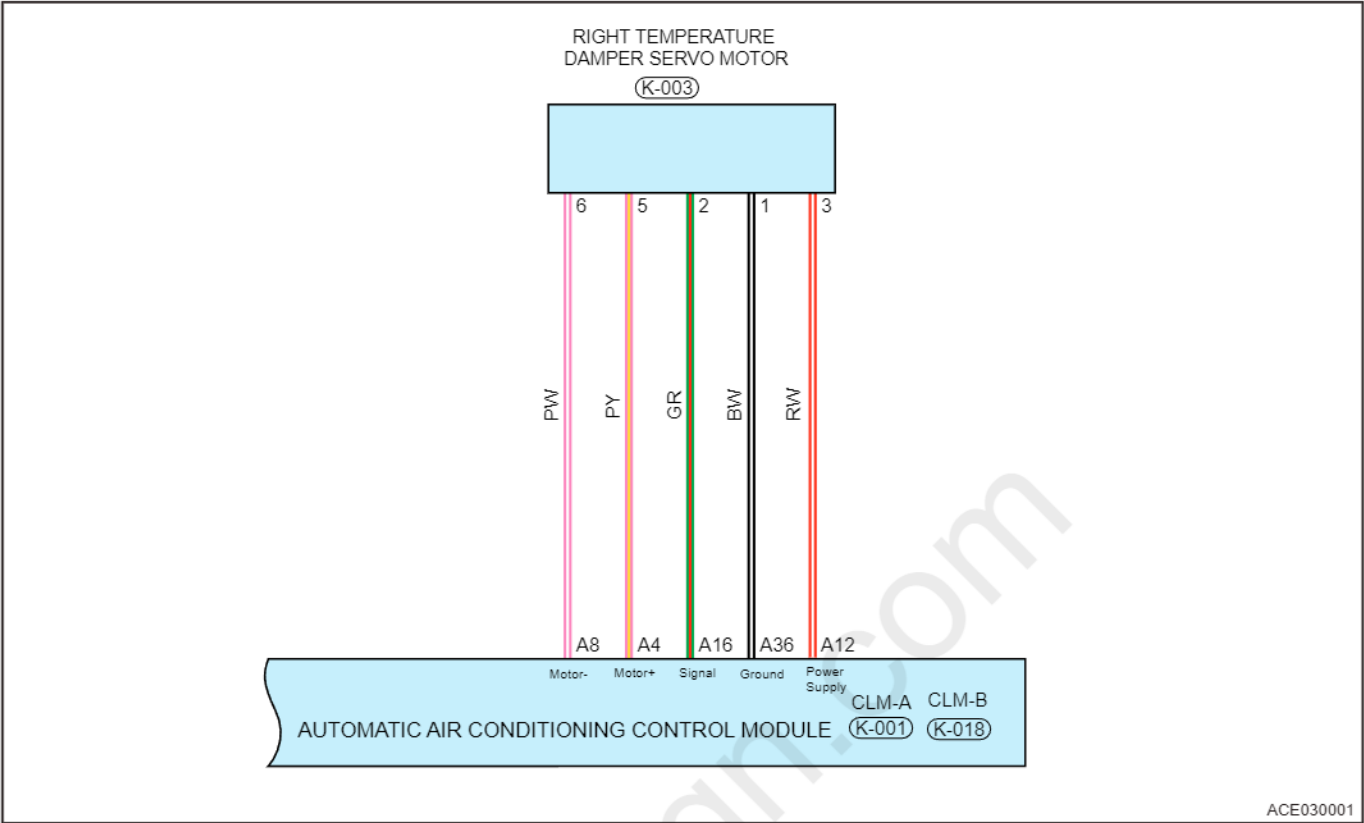
Conduct test and confirm malfunction has been repaired.

■ Right Temperature Motor Malfunction

DTC	B14F010	Right Temperature Motor Blocked (Except Calibration Procedure)
DTC	B14F011	Right Temperature Motor Control Circuit Short to Ground
DTC	B14F013	Right Temperature Motor Control Circuit Open
DTC	B14F013	Right Temperature Motor Control Circuit Open
DTC	B14F112	Right Temperature Motor Control Feedback Circuit Short to Power Supply
DTC	B14F114	Right Temperature Motor Control Feedback Circuit Short to Ground or Open

■ Description

Control schematic diagram



■ DTC Confirmation Procedure

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

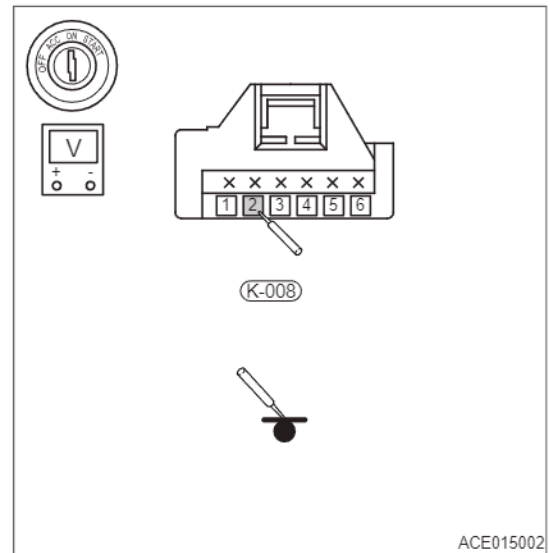
- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check wire harness and connector.
(a) Turn ENGINE START STOP switch to OFF. (b) Check connector terminals for abdicated, bend or poor connection, etc. (c) Disconnect right temperature adjustment motor connector K-003 and automatic A/C control module connector K-001.	
NG	Repair or replace wire harness.
OK	
2	Check temperature adjustment motor (right) operating signal voltage

- (a) Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
- (b) Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of temperature adjustment motor (right) signal K-003 (2). Normal signal voltage changes with A/C right temperature adjustment



NG

Check temperature adjustment motor (right) wire harness or replace temperature adjustment motor (right).

OK

3

Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

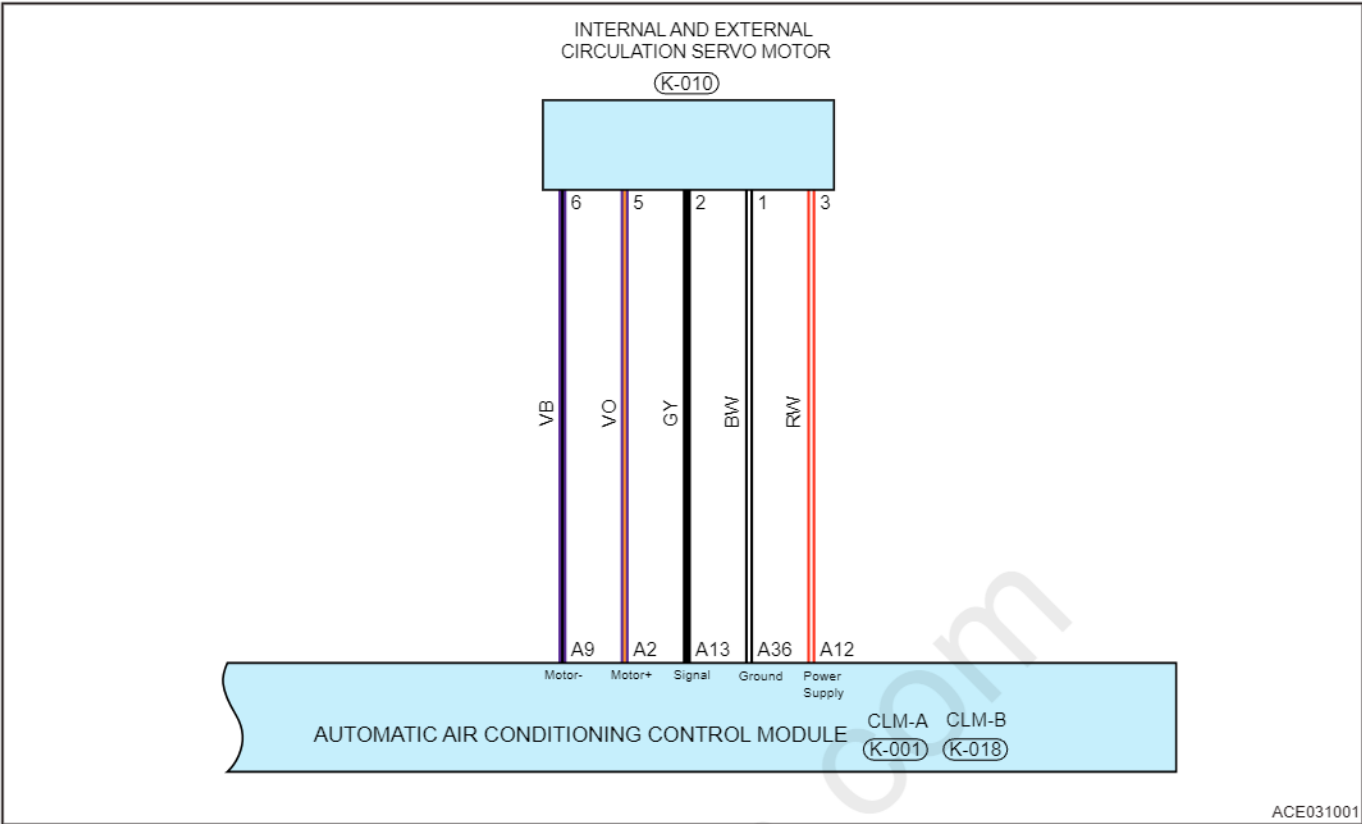
Conduct test and confirm malfunction has been repaired.

Intake Motor Malfunction

DTC	B14F210	Intake Motor Blocked (Except Calibration Procedure)
DTC	B14F211	Intake Motor Control Circuit Short to Ground
DTC	B14F212	Intake Motor Control Circuit Short to Power Supply
DTC	B14F213	Intake Motor Control Circuit Open
DTC	B14F312	Intake Motor Control Feedback Circuit Short to Power Supply
DTC	B14F314	Intake Motor Control Feedback Circuit Short to Ground or Open

Description

Control schematic diagram



ACE031001

■ 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 wire harness and connector.

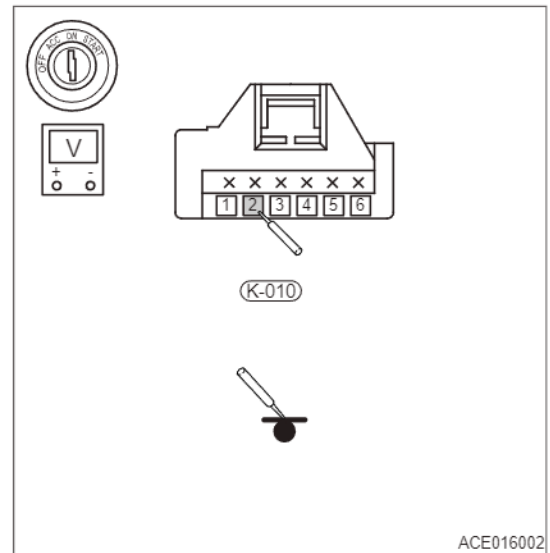
- (a) Turn ENGINE START STOP switch to OFF.
- (b) Check connector terminals for abdicated, bend or poor connection, etc.
- (c) Disconnect inner/outer circulation motor connector K-010 and automatic A/C control module connector K-001.

NG Repair or replace wire harness.

OK

2 Check inner/outer circulation motor operating signal voltage

- (a) Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
- (b) Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of inner/outer circulation motor signal K-010 (2). Normal signal voltage changes with A/C inner/outer circulation adjustment



NG

Check inner/outer circulation motor wire harness or replace inner/outer circulation motor.

OK

3

Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

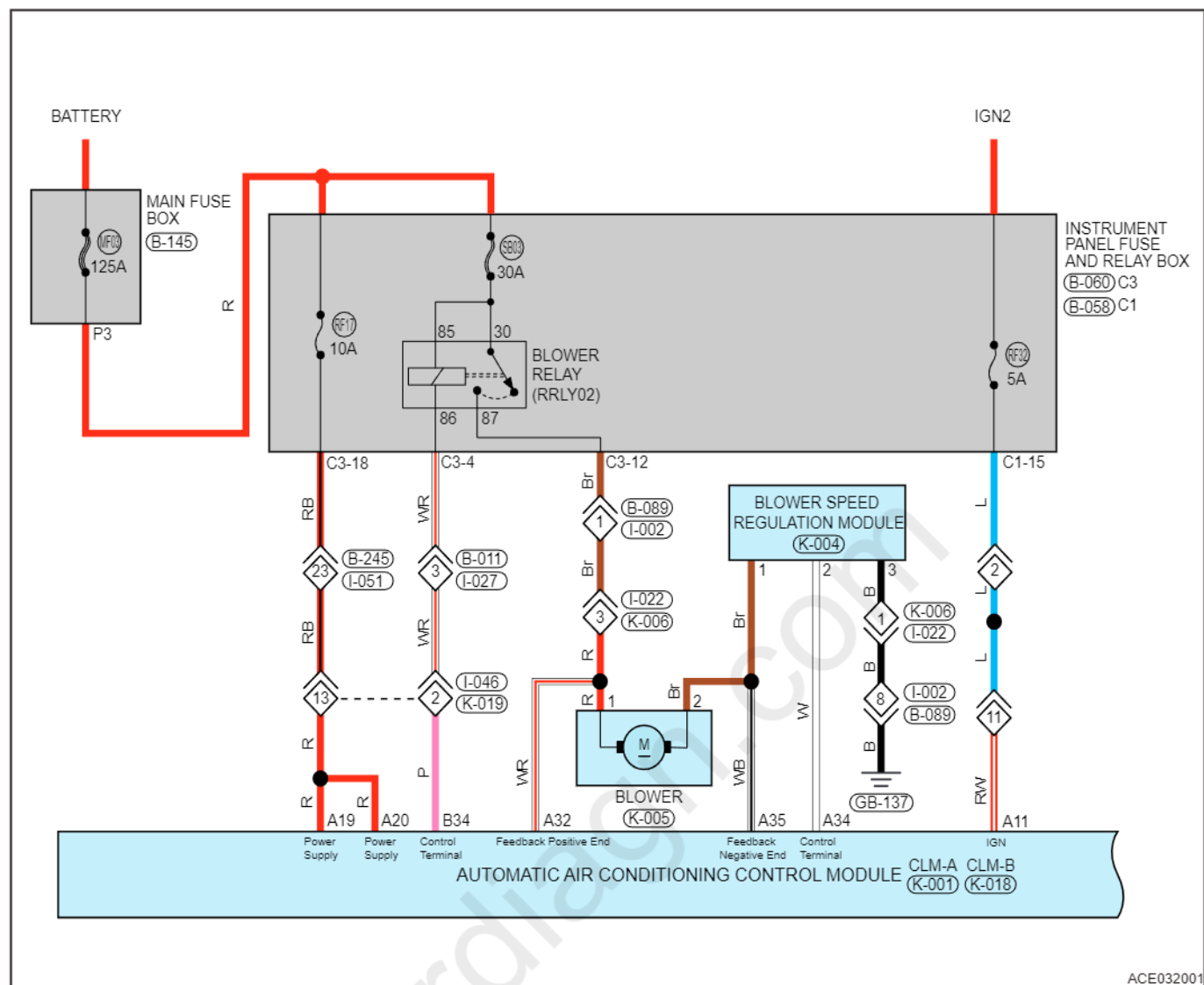
Conduct test and confirm malfunction has been repaired.

■ **Blower Fault**

DTC	B14F412	Blower Relay Output Short to Power Supply
DTC	B14F414	Blower Relay Output Short to Ground or Open
DTC	B14F529	Blower Signal Invalid Control Failed
DTC	B14F531	Blower Control Failed

■ **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 wire harness and connector.
---	-----------------------------------

- Turn ENGINE START STOP switch to OFF.
- Check connector terminals for abdicated, bend or poor connection, etc.
- Disconnect blower connector K-005 and blower speed regulation module connector K-004.

NG

Repair or replace wire harness.

OK

2 Check blower

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Remove the blower from malfunctioning vehicle.
- (c) Install a new blower to malfunctioning vehicle.
- (d) Check if DTC exists.

OK

Replace the blower.

NG

3 Check wire harness connector

- (a) Turn off all electrical equipment and ENGINE START STOP switch.
- (b) Disconnect the negative battery cable.
- (c) Disconnect blower connector K-005 and speed regulation module connector K-004.
- (d) Using a digital multimeter, measure the wire harness between speed regulation module connector K-004 and blower connector K-005 according to value(s) in table below.

Multimeter Test Terminal	Condition	Normal Condition
K-004 (1) - K-005 (2)	ENGINE START STOP switch "OFF"	$< 1 \Omega$
K-005 (1) - B-060 (C3-12)	ENGINE START STOP switch "OFF"	$< 1 \Omega$

- (e) Using a digital multimeter, measure the wire harness between blower connector K-004 and automatic A/C control module connector K-001 according to value(s) in table below.

Multimeter Test Terminal	Condition	Normal Condition
K-004 (1) - K-001 (32)	ENGINE START STOP switch "OFF"	$< 1 \Omega$
K-004 (2) - K-001 (35)	ENGINE START STOP switch "OFF"	$< 1 \Omega$

NG

Repair or replace related wire harness.

OK

4 Check blower speed regulation module circuit

- (a) Use circuit diagram as a guide to perform the following inspection procedures:
- (b) Using a digital multimeter, measure the wire harness between blower speed regulation module connector K-004 and automatic A/C module according to value(s) in table below.

Multimeter Test Terminal	Condition	Normal Condition
K-004 (2) - K-001 (34)	ENGINE START STOP switch "OFF"	< 1 Ω

- (c) Using a digital multimeter, measure the wire harness between blower speed regulation module connector K-004 and body ground according to value(s) in table below.

Multimeter Test Terminal	Condition	Normal Condition
K-004 (3) - GB-137	ENGINE START STOP switch "OFF"	< 1 Ω

NG

Repair or replace related wire harness.

OK

5

Check power circuit of blower

- (a) Connect all connectors and disconnect A/C speed regulation module connector.
- (b) Connect the negative battery cable.
- (c) Turn ENGINE START STOP switch to ON.
- (d) Using a digital multimeter, measure the voltage between terminal 1 of blower connector K-005 and body ground according to value(s) in table below.

Multimeter Test Terminal	Condition	Normal Condition
K-005 (1) - Body ground	ENGINE START STOP switch "ON"	Not less than 12 V

NG

Repair or replace related 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 ECM to check if fault reoccurs.

OK

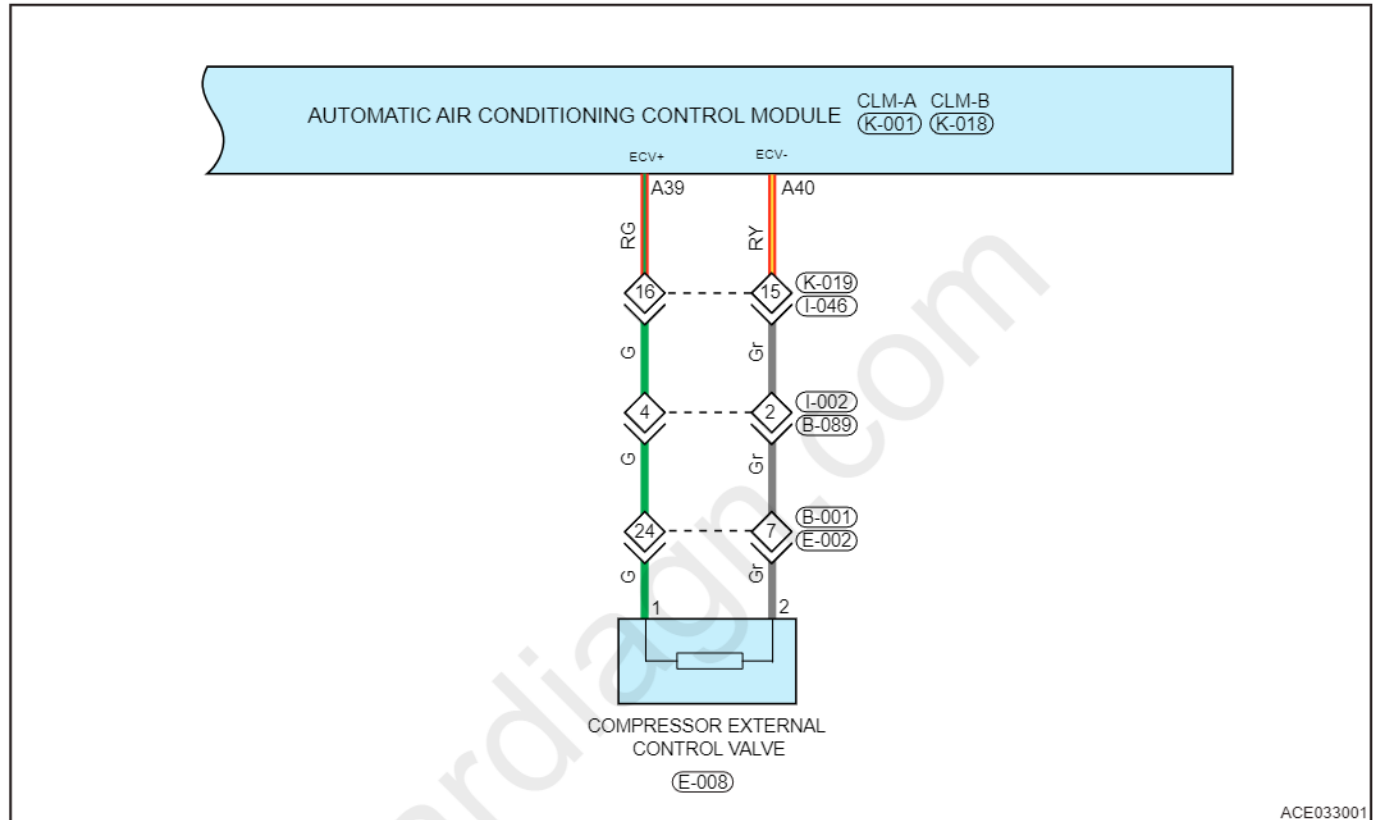
Conduct test and confirm malfunction has been repaired.

■ Compressor External Control Valve Malfunction

DTC	B14F711	ECV Control Circuit Short to Ground
DTC	B14F715	ECV Control Circuit Short to Power Supply 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 wire harness and connector.

- Turn ENGINE START STOP switch to OFF.
- Check connector terminals for abdicated, bend or poor connection, etc.
- Disconnect external control compressor solenoid valve connector E-008 and automatic A/C control module connector K-001.

NG

Repair or replace wire harness.

OK

2 Check external control compressor solenoid valve operating signal

- (a) Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
- (b) Using an oscilloscope, connect black probe to battery negative terminal (or body ground) and use red probe to measure the external control compressor solenoid valve K-001 (40). Duty ratio signal is output normally according to compressor operation.

NG

Check external control compressor solenoid valve wire harness or replace external control compressor solenoid valve.

NG

3 Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

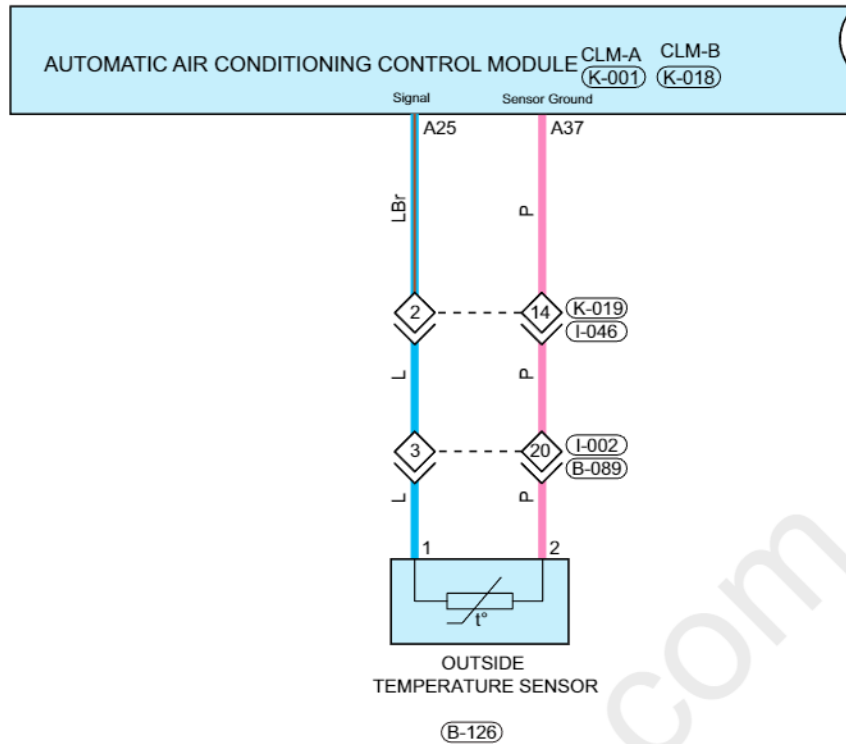
Conduct test and confirm malfunction has been repaired.

■ External Temperature Sensor Fault

DTC	B14FB11	External Temperature Sensor Short to Ground
DTC	B14FB15	External Temperature Sensor Short to Power Supply or Open

■ Description

Control schematic diagram



ACE034001

■ 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 wire harness connector.

- Turn ENGINE START STOP switch to OFF.
- Check connector terminals for abdicated, bend or poor connection, etc.
- Check if ambient temperature sensor connector or lead falls off.

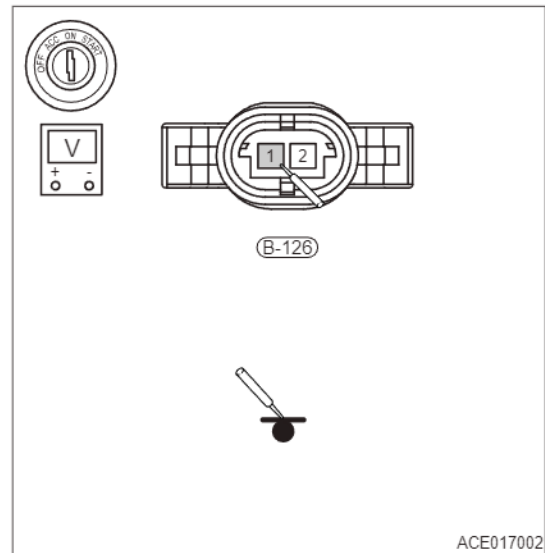
NG

Repair or replace wire harness.

OK

2 Check ambient temperature sensor signal voltage

- (a) Turn ENGINE START STOP switch to ON, start the vehicle.
- (b) Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of ambient temperature sensor signal B-126 (1). Turn on blower to blow ambient temperature sensor, and the voltage normally changes with air temperature.



NG

Check if ambient temperature sensor wire harness or replace ambient temperature sensor.

OK

3

Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

Conduct test and confirm malfunction has been repaired.

■ Power Supply Voltage Abnormal Malfunction

DTC	B14FC1C	Abnormal Power Supply Voltage
DTC	B15461C	Abnormal Power Supply Voltage

■ 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 wire harness and connector.

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Check connector terminals for abdicated, bend or poor connection, etc.
- (c) Check if wire harness between battery to alternator is aging or are connected poorly.

NG

Repair or replace wire harness.

OK

2

Check battery voltage

- (a) Turn ENGINE START STOP switch to ON, start the vehicle.
- (b) Measure battery voltage with multimeter voltage band. Under unloaded status, the normal voltage of the vehicle battery is about 13 V, and the normal load voltage is no less than 11 V. If the voltage is lower than 11 V, it may be difficult to start the next time. After starting, because alternator starts to generate electricity, the normal voltage of the vehicle battery should be between 13.5 V - 14.5 V.

NG

Replace battery.

OK

3

Check alternator

- (a) Remove alternator from malfunctioning vehicle.
- (b) Install a new alternator to malfunctioning vehicle.
- (c) System operates normally.

NG

Repair or replace the corresponding components.

OK

4

Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

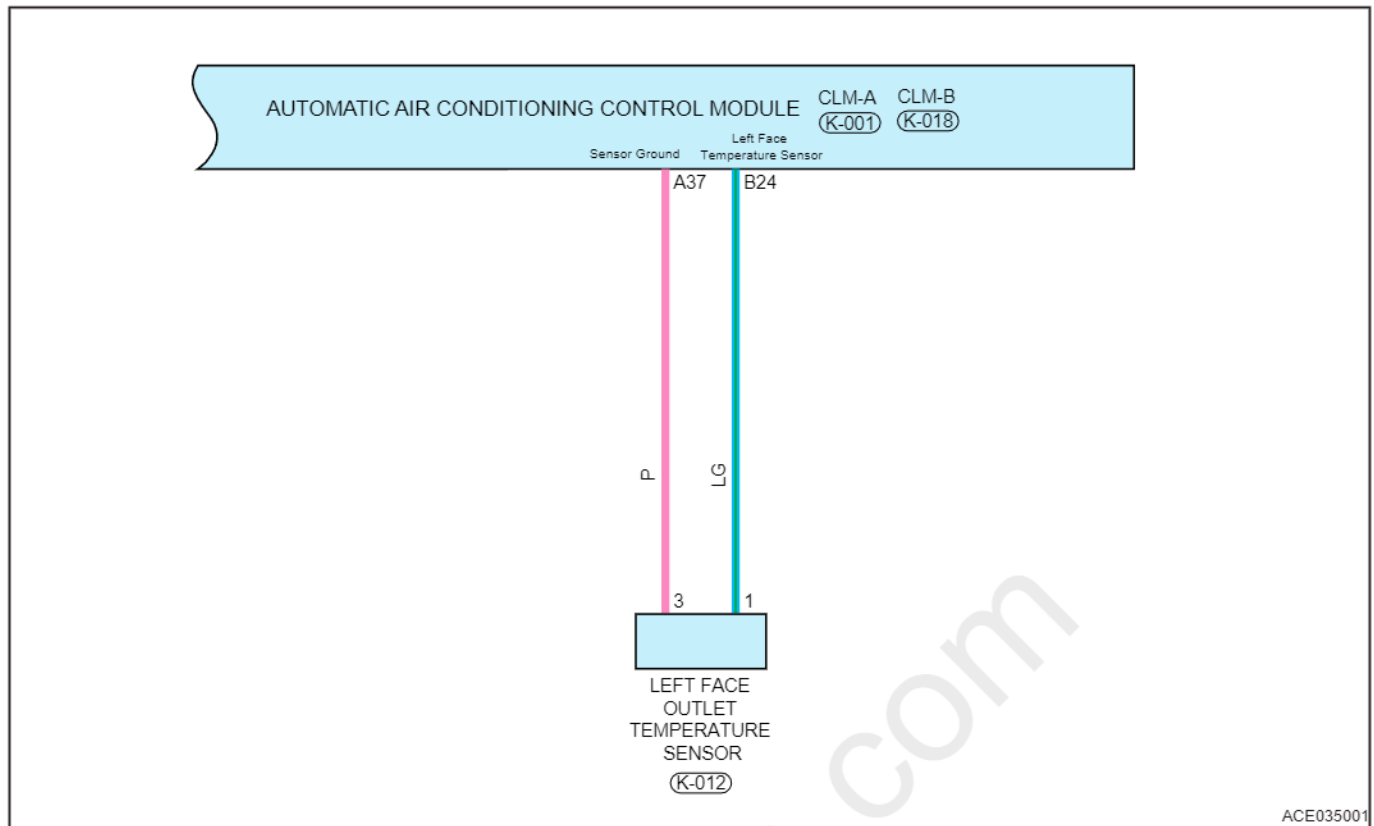
Conduct test and confirm malfunction has been repaired.

■ **Left Face Air Outlet Temperature Sensor Short to Ground Malfunction**

DTC	B14E711	Left Face Air Outlet Temperature Sensor Short to Ground
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■ **Description**

Control schematic diagram



■ DTC Confirmation Procedure

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

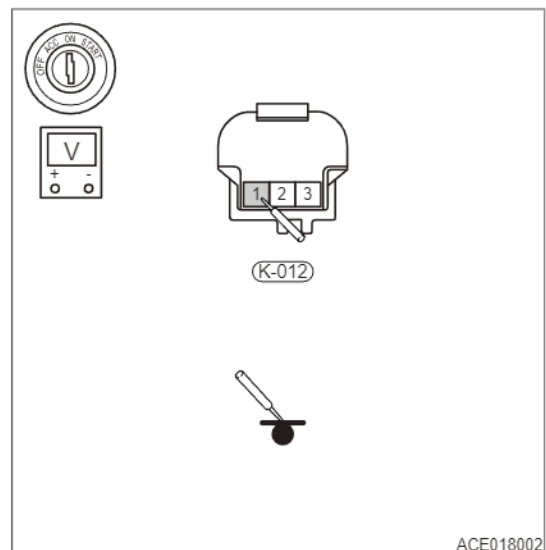
- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1 Check left face air outlet temperature sensor signal voltage.

- Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
- Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of left face air outlet temperature sensor signal K-012 (1). Normal signal voltage changes with A/C temperature.



NG

Check if left face air outlet temperature sensor wire harness or replace left face air outlet temperature sensor.

OK

2

Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

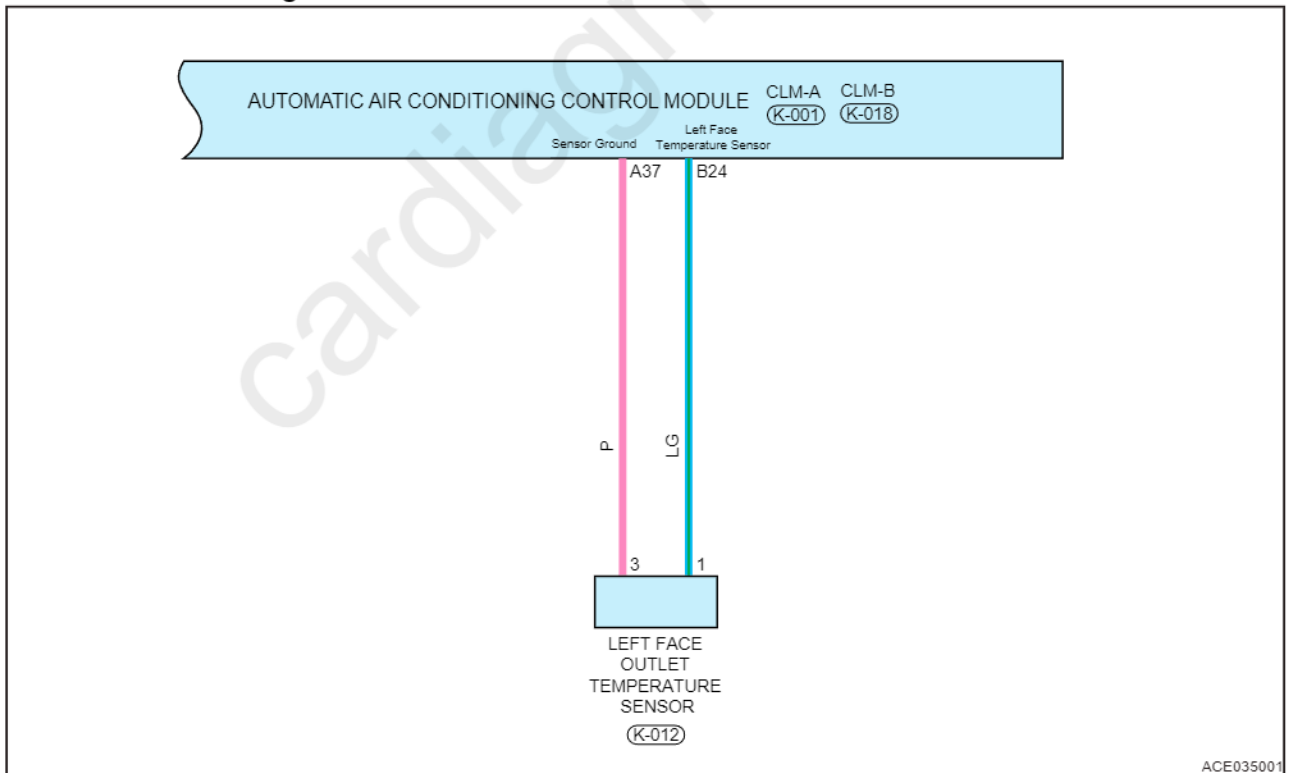
Conduct test and confirm malfunction has been repaired.

■ Check left face air outlet temperature sensor wire harness or replace left face air outlet temperature sensor.

DTC

B14E715

Left Face Air Outlet Temperature Sensor Short to Power Supply 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:

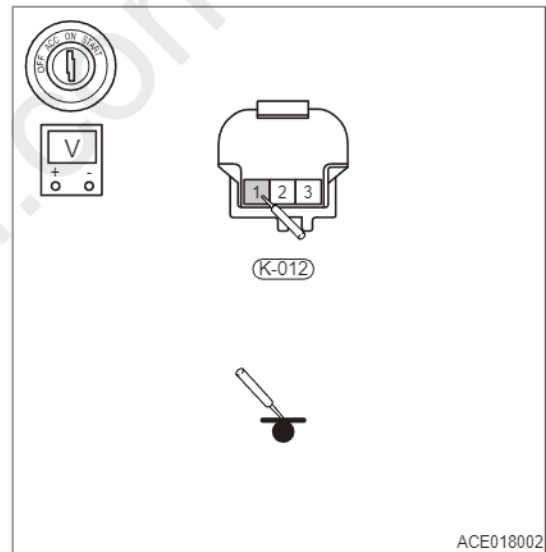
When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1 Check wire harness and connector.

- Turn ENGINE START STOP switch to OFF.
- Check connector terminals for abdicated, bend or poor connection, etc.
- Check if left face air outlet temperature sensor connector or lead falls off.

NG
Repair or replace wire harness.
OK
2 Check left face air outlet temperature sensor signal voltage

- Turn ENGINE START STOP switch to ON, start the vehicle.
- Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of left face air outlet temperature sensor signal K-012 (1). Normal signal voltage changes with A/C temperature.


OK
Check if left face air outlet temperature sensor signal is short to power supply or replace left face air outlet temperature sensor.
NG
3 Reconfirm DTCs

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

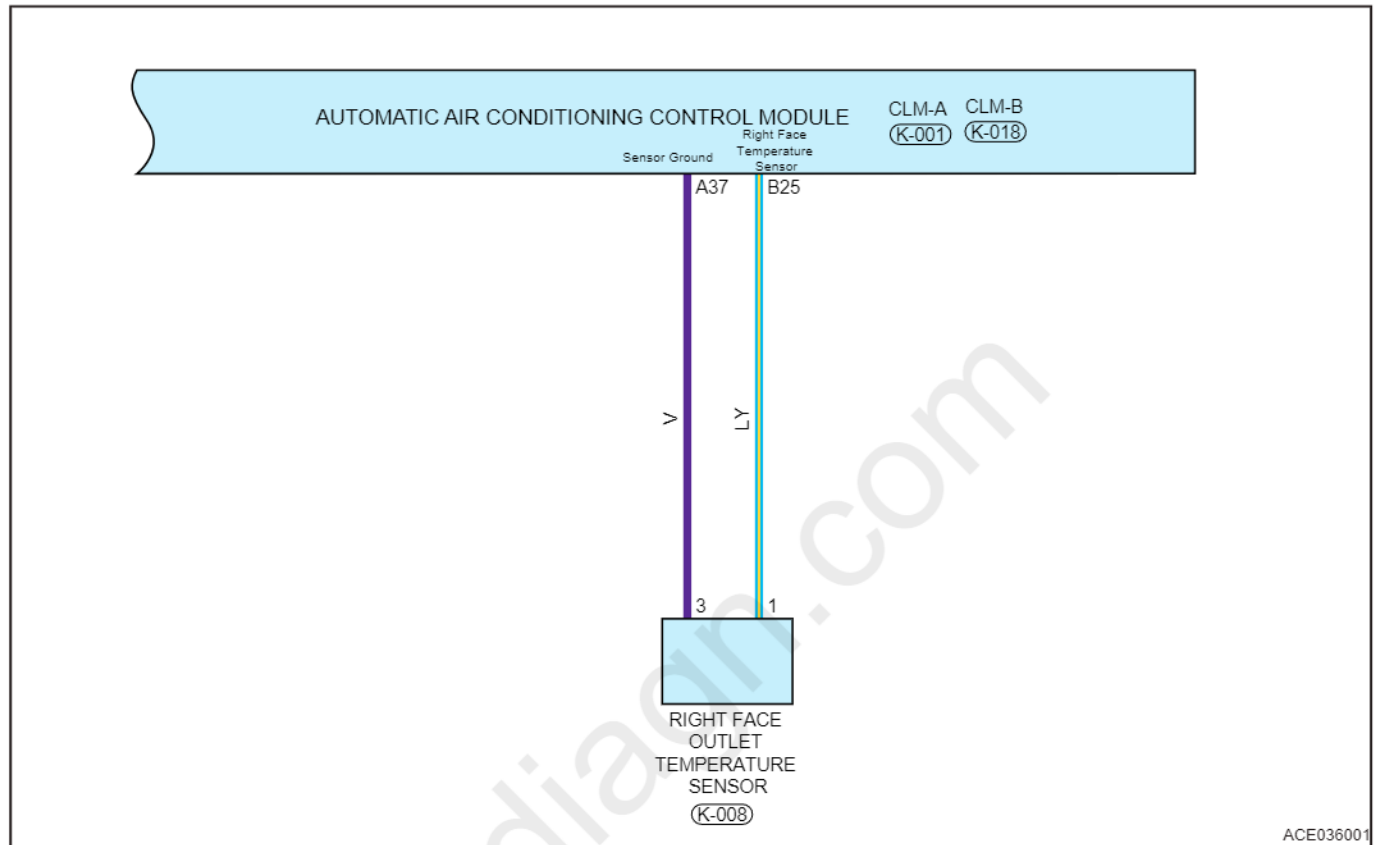
NG
Replace with a new ECM to check if fault reoccurs.
OK
Conduct test and confirm malfunction has been repaired.

■ Right Face Air Outlet Temperature Sensor Short to Ground

DTC	B14E811	Right Face Air Outlet Temperature Sensor Short to Ground
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■ Description

Control schematic diagram



■ DTC Confirmation Procedure

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

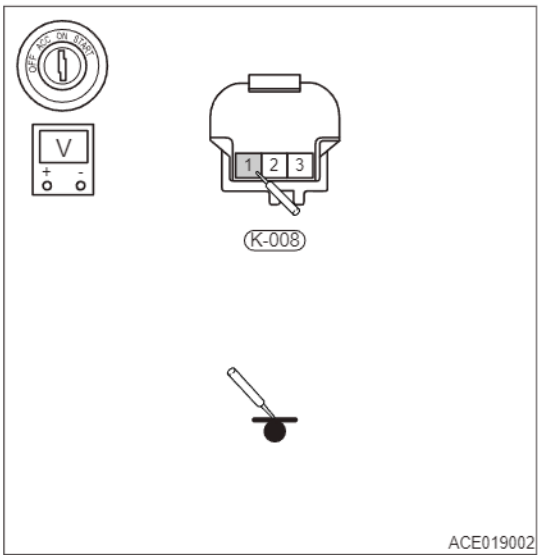
- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

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

1	Check right face air outlet temperature sensor signal voltage.
---	--

- (a) Turn ENGINE START STOP switch to ON, start the vehicle and turn on A/C.
- (b) Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of right face temperature sensor signal K-008 (1). Signal voltage also changes with A/C temperature.



NG

Repair wire harness or replace right face temperature sensor.

OK

2

Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

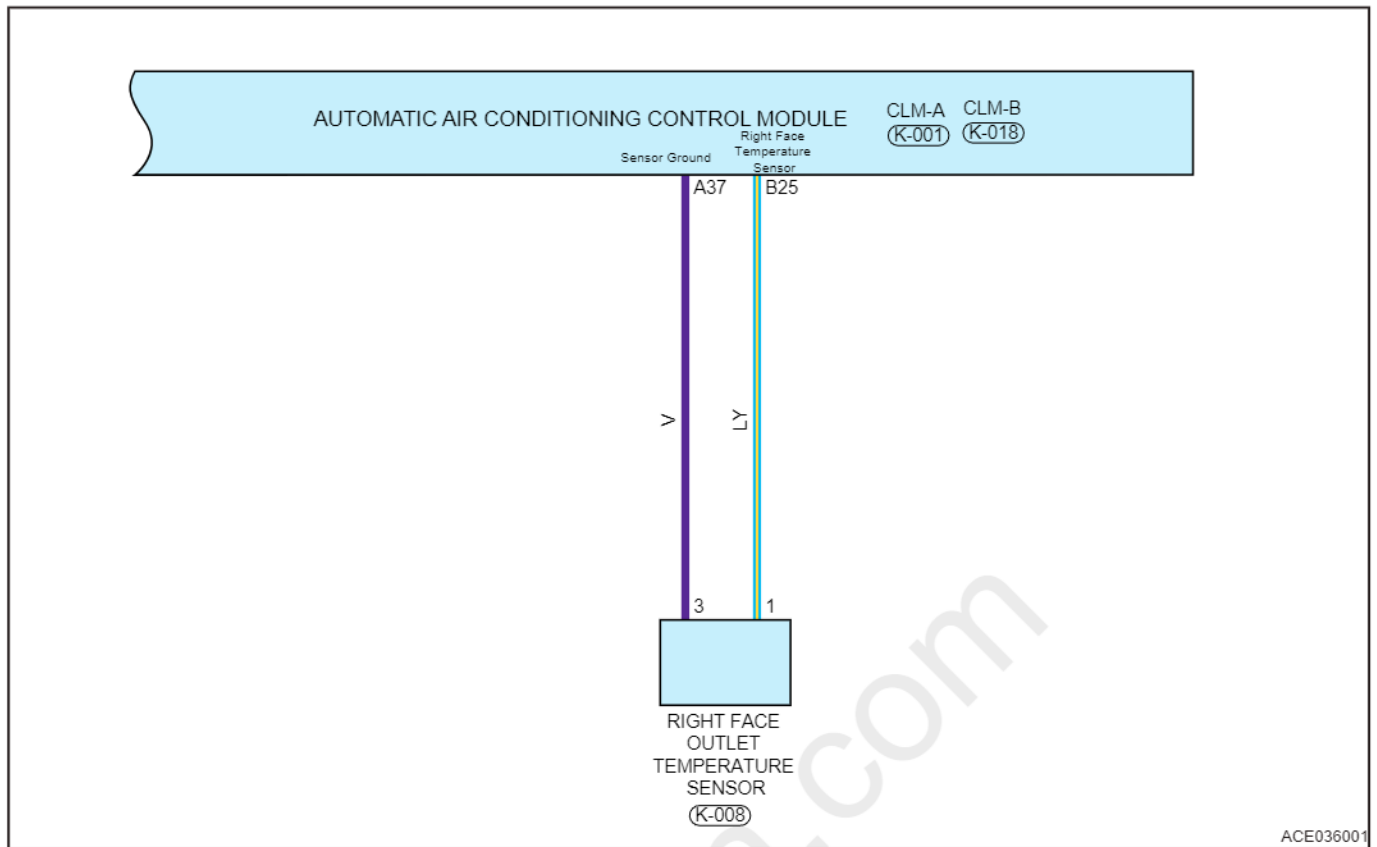
Conduct test and confirm malfunction has been repaired.

■ Right Face Air Outlet Temperature Sensor Short to Power Supply or Open

DTC	B14E815	Right Face Air Outlet Temperature Sensor Short to Power Supply 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 wire harness and connector.

- Turn ENGINE START STOP switch to OFF.
- Check connector terminals for abdicated, bend or poor connection, etc.
- Check if right face air outlet temperature sensor connector or lead falls off.

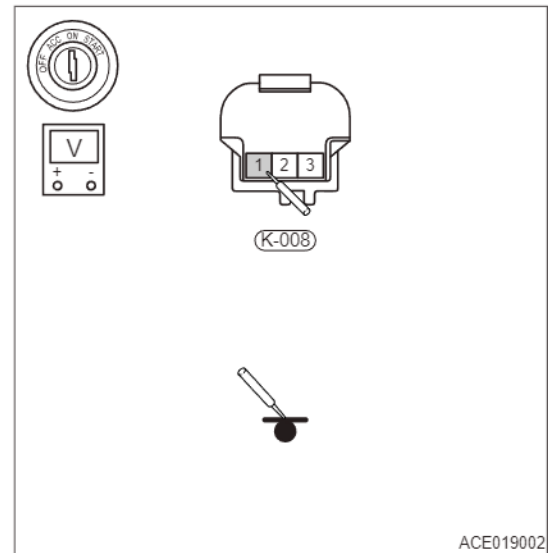
NG

Repair or replace wire harness.

OK

2 Check right face air outlet temperature sensor signal voltage

- (a) Turn ENGINE START STOP switch to ON, start the vehicle.
- (b) Using voltage band of multimeter, connect black probe to battery negative terminal (or body ground) and use red probe to measure the voltage of right face air outlet temperature sensor signal K-008 (1). Normal signal voltage changes with A/C temperature.



ACE019002

NG

Check if right face temperature sensor signal is short to power supply or replace right face temperature sensor.

OK

3

Reconfirm DTCs

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

NG

Replace with a new ECM to check if fault reoccurs.

OK

Conduct test and confirm malfunction has been repaired.

7 ON-VEHICLE SERVICE

7.1 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

- 1) Check if there exists any oil or dust in each joint of A/C line. If this occurs, there may exist leak.
- 2) Check if condenser surface is dirty and if fins are deformed.
- 3) Check if there are harsh noises while compressor assembly is operating normally.

- 4) 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.

7.2 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.

7.3 Refrigerant Leakage Inspection

Warning

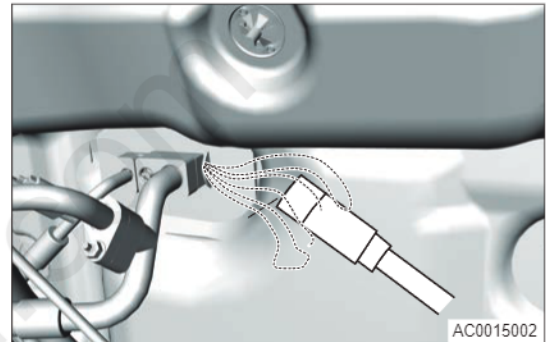
- **DO NOT** perform pressure test or leakage test to R134a\R1234yf (European Union) Refrigerant service device or vehicle A/C system with compressed air. Mixture of air and R134a\R1234yf (European Union) Refrigerant is inflammable under high pressure. This mixture has potential danger, and it may cause 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\R1234yf (European Union) Refrigerant 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

1) After recharging refrigerant, use gas leak detector to check refrigerant gas for leakage.

2) Perform operations under following conditions:

- Stop 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.



- 3) 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.
- 4) 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.
- 5) 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.
- 6) Use same procedures to check condenser for leakage. Clean or replace the condenser assembly as necessary.

7.4 Refrigerant Recovering, Vacuum Pumping and Recharging

■ Refrigerant Recovering/Draining

Warning

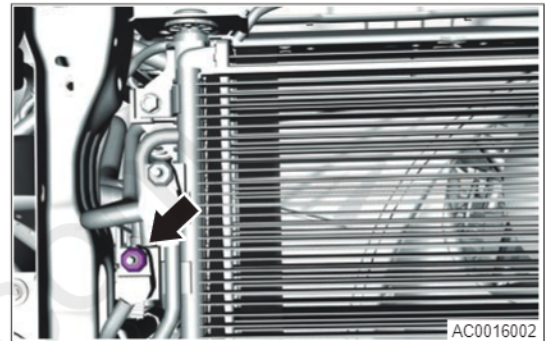
- Take extra care when servicing A/C system under high pressure.
- Because there is refrigerant under high pressure in A/C system. It must be serviced by professional technician. Otherwise, a wrong service procedure may cause a serious danger or fatal injury.
- If A/C system pressure is released unexpectedly, 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\R1234yf (European Union) Refrigerant 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\R1234yf (European Union) Refrigerant. 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.

- 1) Connect the blue connector to A/C low pressure line joint (1).
- 2) Connect the red connector to A/C high pressure line joint (2).

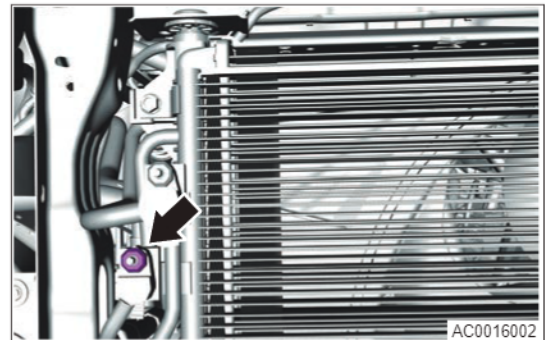


- (3) Open the high pressure valve and low pressure valve of refrigerant recycling machine.
- (4) Choose "recovering" item on machine and make it start to operate.
- (5) Check the low pressure value on pressure gauge to ensure that recycling is completed, and then turn off machine.
- (6) Disconnect the 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.

- 1) Connect the blue connector to A/C low pressure line joint (1).
- 2) 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.

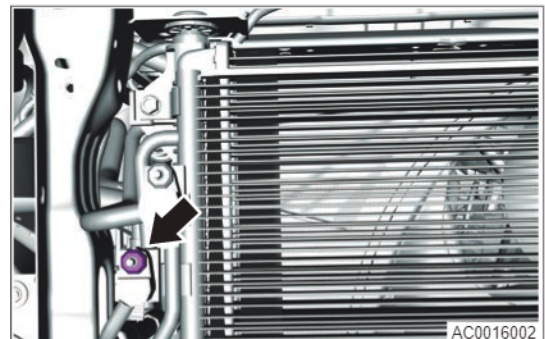
7.5 Refrigerant Oil Recovering and Charging

■ Refrigerant Oil Recovering

⚠ Caution

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

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

Items	A/C Compressor Assembly Replacement	Condenser Replacement	Evaporator Tank Replacement	Line Replacement
Refrigerant Oil Charging Amount	Supplement according to actual pouring amount	20ml	20ml	10ml

7.6 A/C Control Panel Assembly

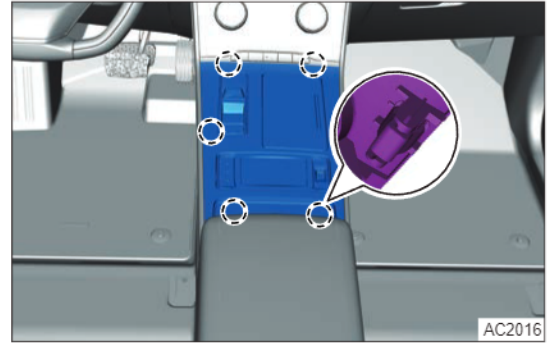
■ Removal

Caution

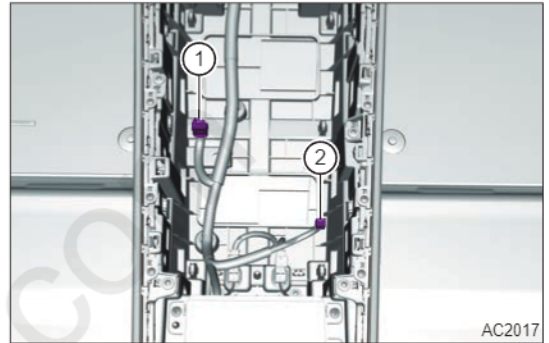
- Be careful not to scratch instrument cluster surface when removing central control panel cover and A/C panel.

- (1) Turn off all electrical equipment and ENGINE START STOP switch.
- (2) Remove the A/C control panel assembly.

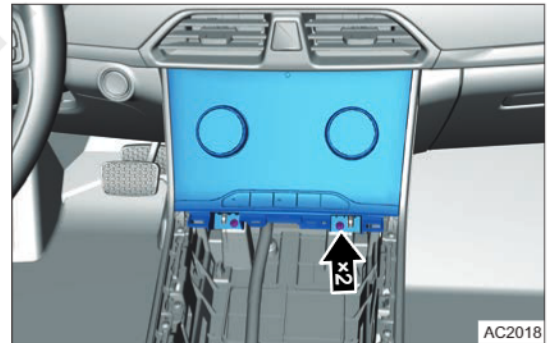
- 1) Using an interior crow plate, pry off auxiliary fascia console trim panel assembly carefully (interior crow plate).



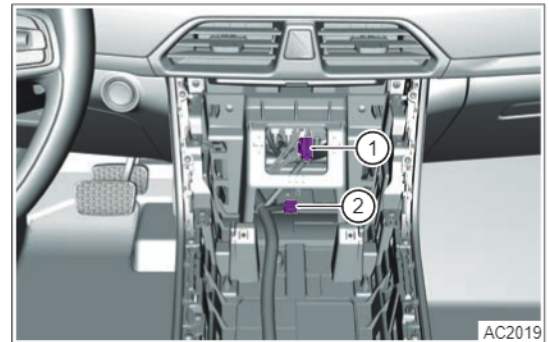
- 2) Disconnect the electronic shift switch connector (1), and audio control panel connector (2).



- 3) Remove 2 fixing screws from A/C control panel assembly (cross screwdriver).



- 4) Using an interior crow plate, pry off A/C control panel assembly carefully, disconnect A/C control panel assembly connector (1) and center console switch assembly connector (2), and remove A/C control panel assembly.



■ Installation

⚠ Caution

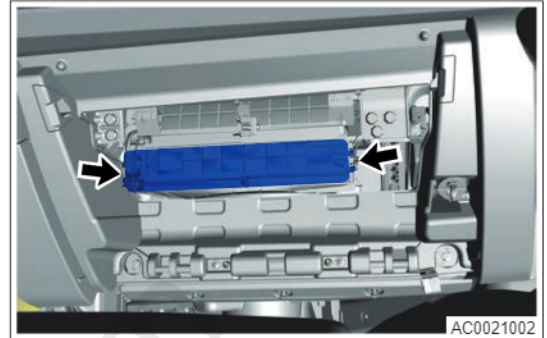
- Be careful not to scratch the panel and instrument panel parts during installation.

- (1) Installation is in the reverse order of removal.

7.7 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.
 - 1) Detach 2 clips (arrow) from A/C element protector cover, and remove A/C element protector cover.
 - 2) Remove the A/C element assembly.



■ Installation

⚠ Caution

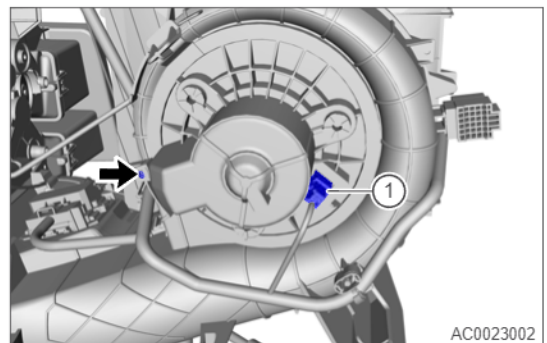
- If A/C element is too dirty or damaged, replace it with a new one.
- When installing A/C element, make arrow mark on the element face downward.

- (1) Installation is in the reverse order of removal.

7.8 Removal and Installation of Blower Assembly

■ Removal

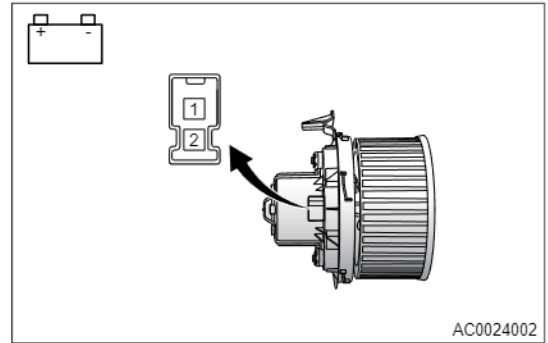
- (1) Turn off all electrical equipment and ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Remove the blower assembly.
 - 1) Disconnect the blower assembly connector (2), remove 1 fixing bolt (arrow) from blower and detach clip (1).



■ Inspection

- (1) Remove the blower assembly.

- 1) 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.

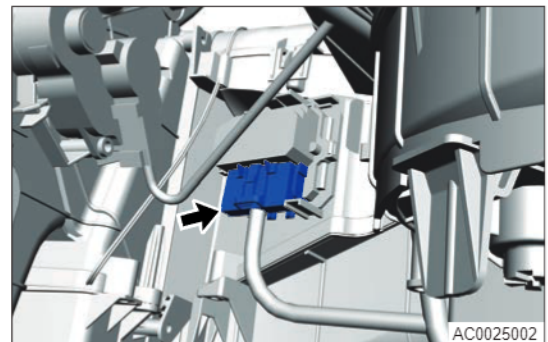
7.9 Blower Speed Regulation Module

■ Removal

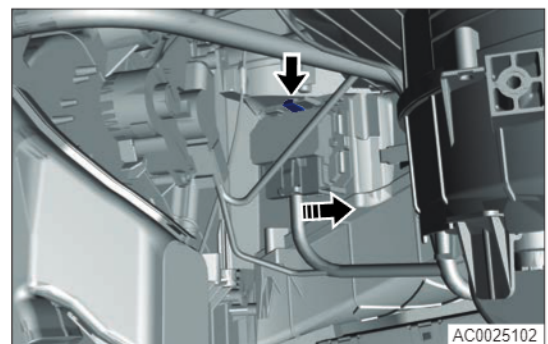
⚠ Warning

- 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.
 - 1) Disconnect the blower speed regulation module connector (1).



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



- 3) Remove the blower speed regulation module.

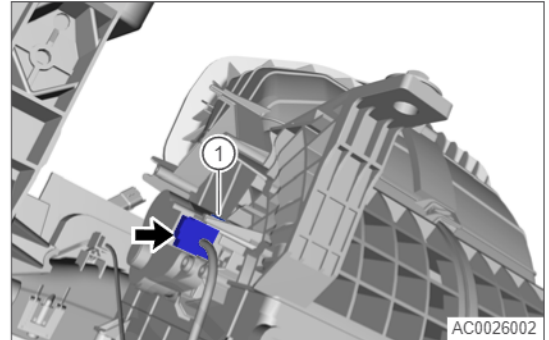
■ Installation

- (1) Installation is in the reverse order of removal.

7.10 Inner/Outer Circulation Damper Servo Motor

■ Removal

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



■ Installation

- (1) Installation is in the reverse order of removal.

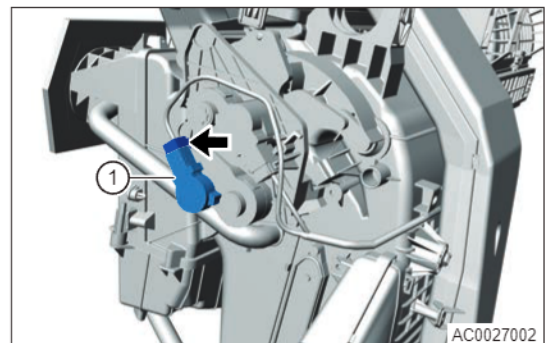
⚠ Caution

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

7.11 Mode Damper Motor

■ Removal

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



■ Installation

- (1) Installation is in the reverse order of removal.

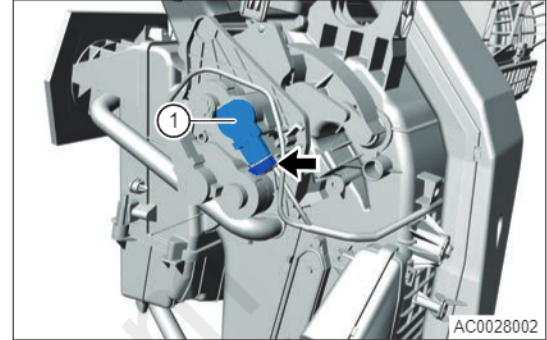
⚠ Caution

- 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.

7.12 Left Mix Damper Motor

■ Removal

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



■ Installation

- (1) Installation is in the reverse order of removal.

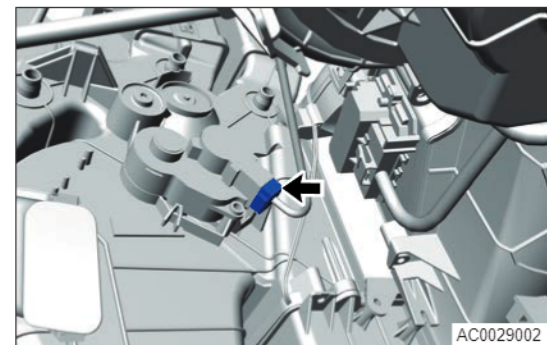
⚠ Caution

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

7.13 Right Mix Damper Motor

■ Removal

- (1) Turn off all electrical equipment and the ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Remove the glove box assembly.
- (4) Remove the right mix damper motor.
 - 1) Disconnect the right mix damper motor connector (arrow).
 - 2) Detach the mix damper motor fixing clip.
 - 3) Rotate counterclockwise to remove right mix damper motor.



■ Installation

- (1) Installation is in the reverse order of removal.

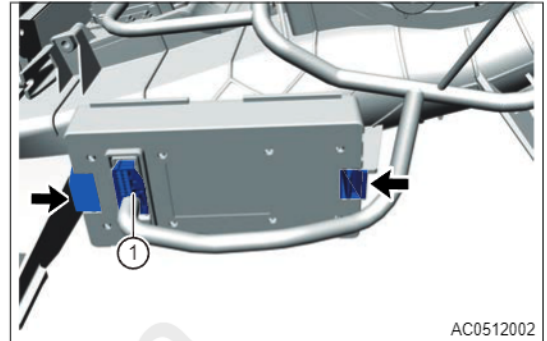
⚠ Caution

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

7.14 Automatic A/C Control Module (If Equipped)

■ Removal

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



■ Installation

- (1) Installation is in the reverse order of removal.

■ Write Automatic A/C Module (CLM) Configuration Data

- (1) Store the configuration data.
- (2) Connect the diagnostic tester, turn ENGINE START STOP switch to ON and select "EXEED New TXL" model.
- (3) Click "CLM (Automatic A/C Module)".
- (4) Click "Special Function".
- (5) Click "Write Automatic A/C Module (CLM) Configuration Data".
- (6) Click "Save and Paste (Transfer Configuration Data in Old Controller To New One Quickly)".
- (7) Click "Store Old Configuration Data in Controller".
- (8) The diagnostic tester interface shows "Read and Store Vehicle Configuration Code Successfully". Click to "OK" and return.

⚠ Caution

If module is damaged, the configuration code of module can be applied to the company by DMS system when it can not be read out with diagnostic tester.

- (9) Write automatic A/C module (CLM) configuration data.
- (10) Click "CLM (Automatic A/C Module)".
- (11) Click "Special Function".
- (12) Click "Write Automatic A/C Module (CLM) Configuration Data".
- (13) Click "Save and Paste (Transfer Configuration Data in Old Controller To New One Quickly)".
- (14) Click "Write configuration data in new controller from old controller".
- (15) The diagnostic tester interface shows "Enter 12-digit Repair Shop Code". Click "OK" after input is completed.
- (16) After confirming that the repair shop code is correct, click "Yes".
- (17) The diagnostic tester interface shows "Last Saved Vehicle Configuration Code", click "Yes" after confirming.
- (18) The diagnostic tester interface shows "Configuration Data Written is Successfully". Click "OK".
- (19) Click "OK" when the diagnostic tester interface shows "Configuration Data Back Up is Successfully".
- (20) Click "OK" when the diagnostic tester interface shows "Configuration data Check is Valid".

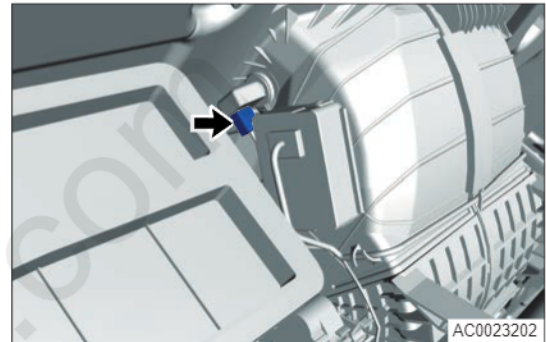
⚠ Caution

- The first 5 digits of repair shop code are the dealer code (ERP), and the last 7 digits can be entered at will.
- The correct vehicle configuration code must be entered, otherwise the normal functions of the vehicle will be affected, so please check again after entering it.

7.15 Air Quality Sensor (If Equipped)

■ Removal

- (1) Turn off all electrical equipment and the ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Remove the instrument panel assembly.
- (4) Remove the air quality sensor.
 - 1) Disconnect air quality sensor connector (arrow), and rotate counterclockwise to remove air quality sensor.



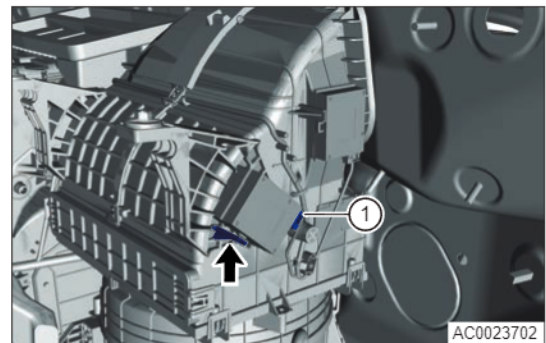
■ Installation

- (1) Installation is in the reverse order of removal.

7.16 Inside PM2.5 Sensor (If Equipped)

■ Removal

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



■ Installation

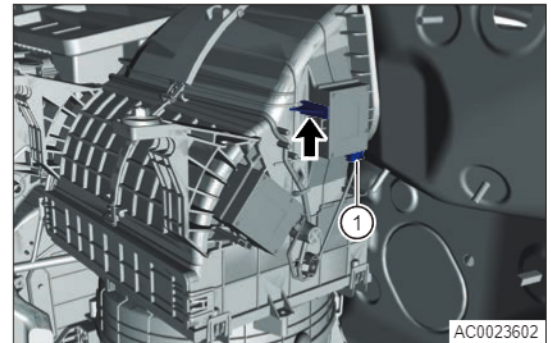
- (1) Installation is in the reverse order of removal.

7.17 Outside PM2.5 Sensor (If Equipped)

■ Removal

- (1) Turn off all electrical equipment and the ENGINE START STOP switch.

- (2) Disconnect the negative battery cable.
- (3) Remove the instrument panel assembly.
- (4) Remove the outside PM2.5 sensor.
 - 1) Disconnect the outside PM2.5 sensor (1).
 - 2) Detach outside PM2.5 sensor fixing claw (arrow) and move outside PM2.5 sensor upward.
 - 3) Remove the outside PM2.5 sensor.



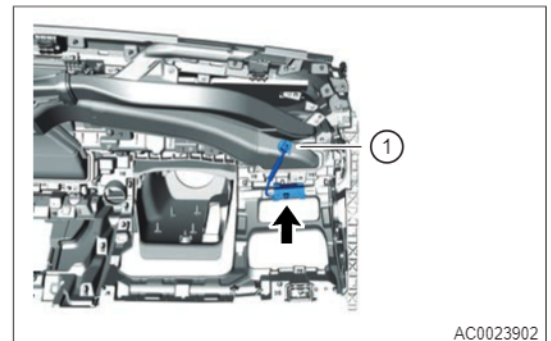
■ Installation

- (1) Installation is in the reverse order of removal.

7.18 Anion Generator (If Equipped)

■ Removal

- (1) Turn off all electrical equipment and the ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Remove the instrument panel assembly.
- (4) Remove the anion generator.
 - 1) Disconnect the anion emitter wire harness fixing clip.
 - 2) Rotate and remove anion emitter (1).
 - 3) Remove 2 fixing screws (arrow) and anion generator.



■ Inspection

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

■ Installation

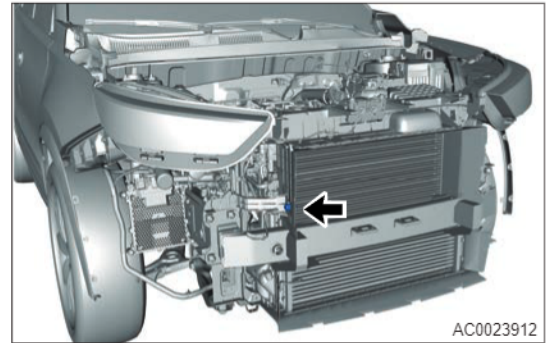
- (1) Installation is in the reverse order of removal.

7.19 Outside Temperature Sensor

■ Removal

- (1) Turn off all electrical equipment and the ENGINE START STOP switch.
- (2) Disconnect the negative battery cable.
- (3) Remove the front bumper assembly.
- (4) Remove the outside temperature sensor.

- 1) Pinch clip of outside temperature sensor and push it outward in direction of arrow to remove outside temperature sensor from air deflector.
- 2) Remove the wire harness connector.
- 3) Remove the outside temperature sensor.



■ Installation

- (1) Installation is in the reverse order of removal.

7.20 HVAC Assembly

■ Removal

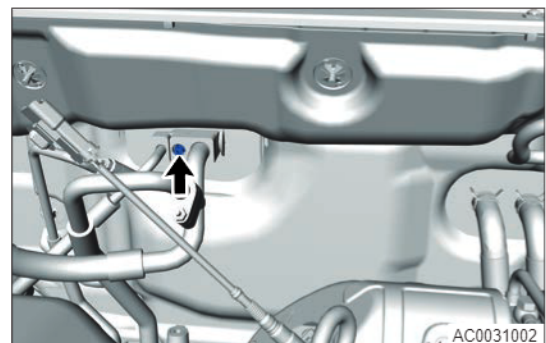
⚠ Caution

- **Special service device for R134a\R1234yf (European Union) Refrigerant 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 ENGINE START STOP 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.

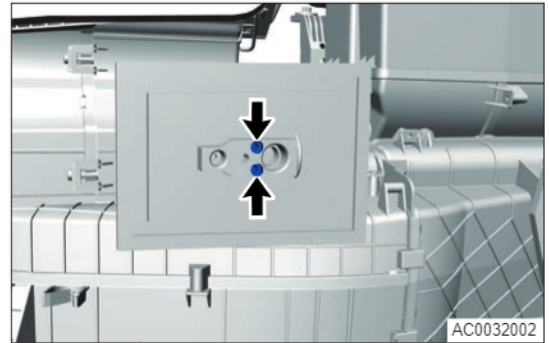
- 1) Remove the A/C high/low pressure line fixing bolt (arrow).

Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$

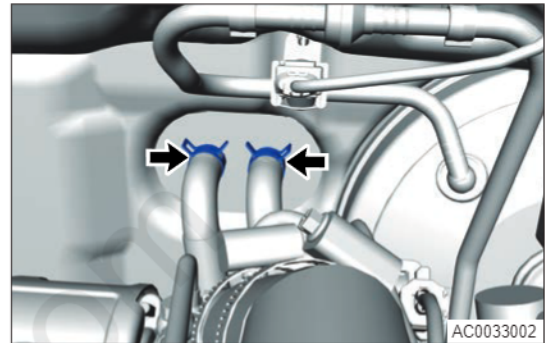


- 2) Remove 2 fixing bolts (arrow) from expansion valve and remove expansion valve assembly.

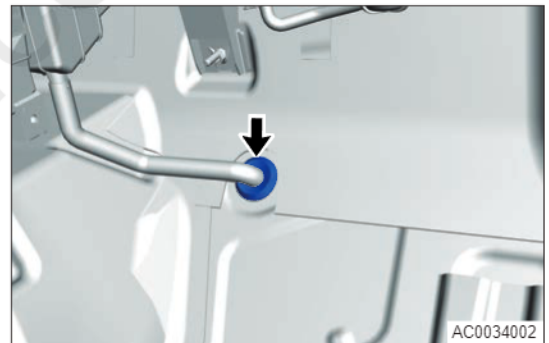
Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$



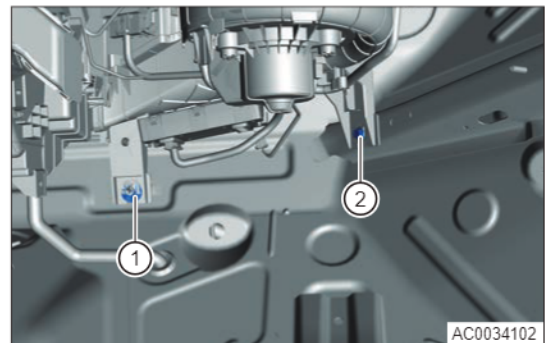
- 3) Using snap spring pliers, disengage the fixing clamp (arrow) from heating inlet and outlet hoses to detach the inlet and outlet hoses.



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



- 5) Remove HVAC fixing nut (1) and fixing bolt (2).
Tightening torque: $7 \pm 1.5 \text{ N}\cdot\text{m}$

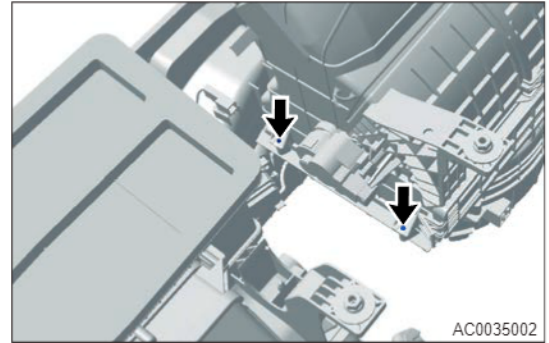


- 6) Carefully remove HVAC assembly from cabin.

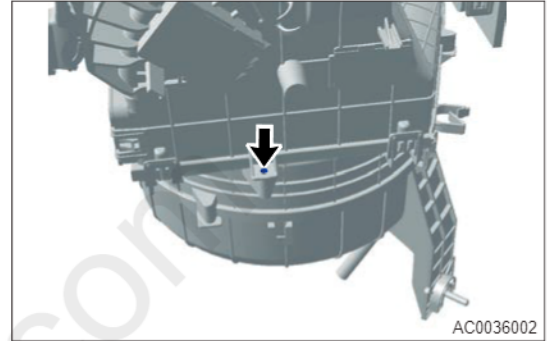
■ Disassembly

- (1) Remove the blower assembly.
- (2) Remove the blower speed regulation module.
- (3) Remove the inner/outer circulation damper motor.
- (4) Remove the left mix damper servo motor.
- (5) Remove the mode damper motor.
- (6) Remove the right mix damper motor (automatic A/C).
- (7) Remove the A/C element assembly.

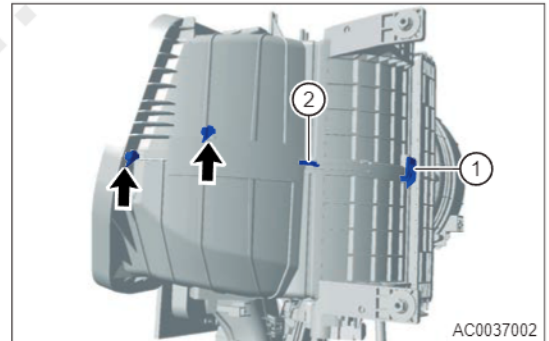
- (8) Remove the inner/outer damper set.
- 7) Remove 2 fixing screws (arrow) from inlet air duct assembly.
Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$



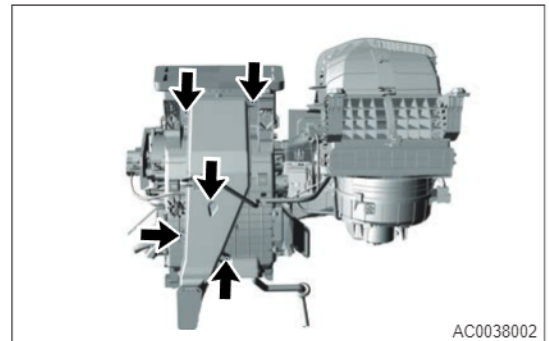
- 8) Remove 1 fixing bolt (arrow) from inlet air duct assembly.
Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$



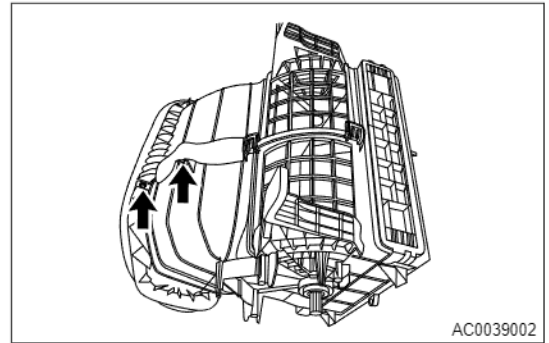
- 9) Remove the inlet air duct assembly.
- 10) Remove 2 fixing bolts (arrow) from inner/outer damper set, and disengage 2 fixing clips.
Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$



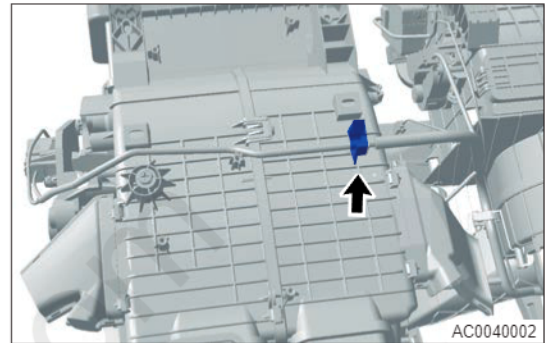
- (9) Remove the A/C wire harness assembly.
- 1) Remove 5 fixing screws (arrow) from rear duct.
Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$



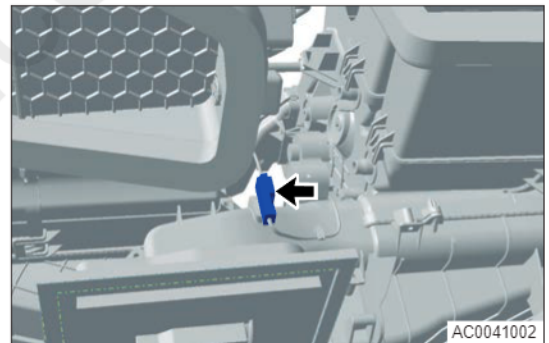
2) Disengage 2 wire harness fixing clips (arrow).



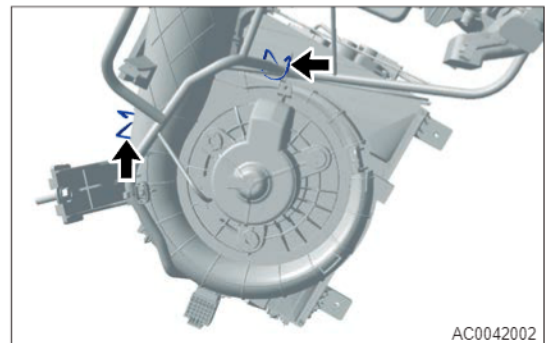
3) Disengage 1 wire harness fixing clip (arrow).



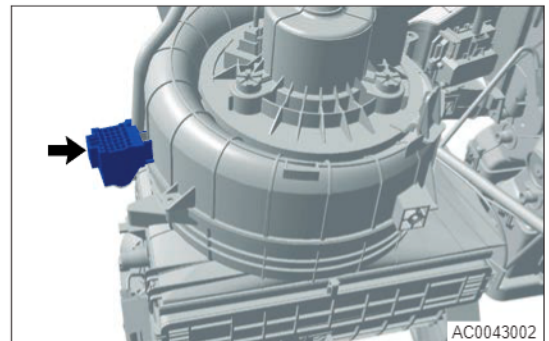
4) Disconnect the evaporator tank temperature sensor (arrow).



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



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

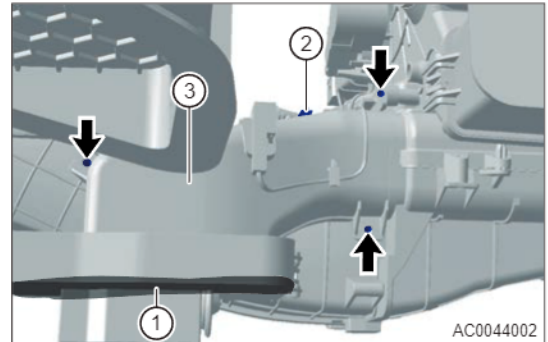


7) Remove the electric A/C wire harness.

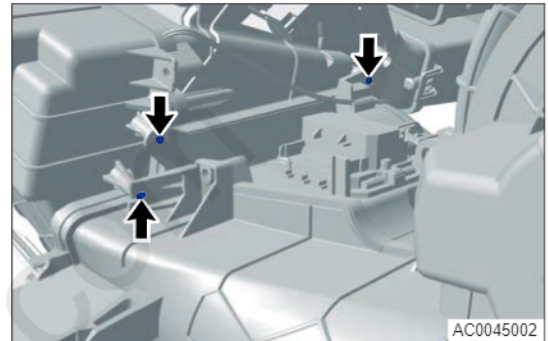
(10) Remove the blower volute assembly.

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

Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$

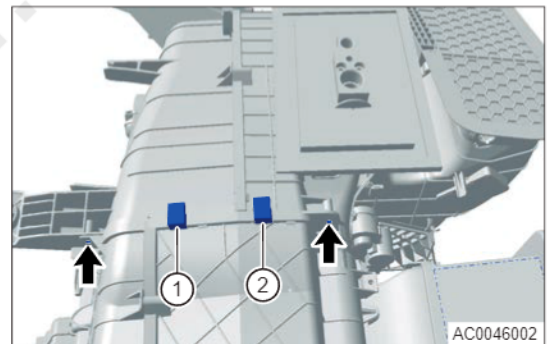


- 2) Remove 3 fixing screws (arrow).



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

Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$

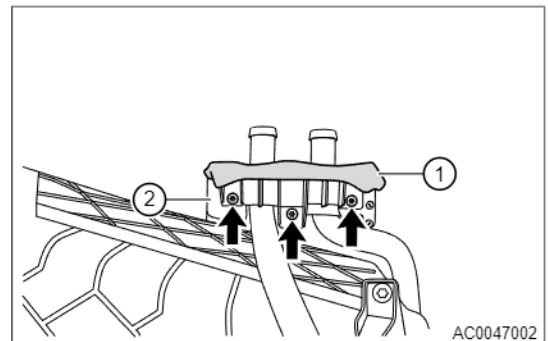


- 4) Remove the blower volute assembly.

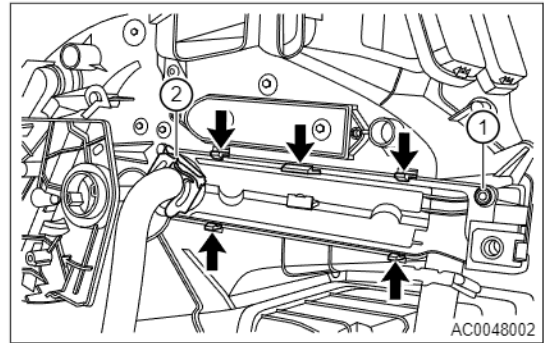
(11) Remove the heater core assembly

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

Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$

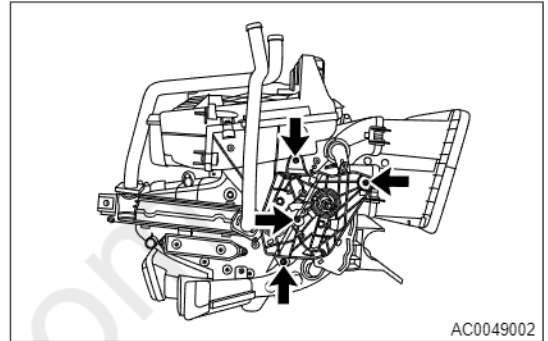


- 2) Remove 2 screws (1) and (2) from heater core fixing panel, disengage 5 clips (arrow) from heater core fixing panel.



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

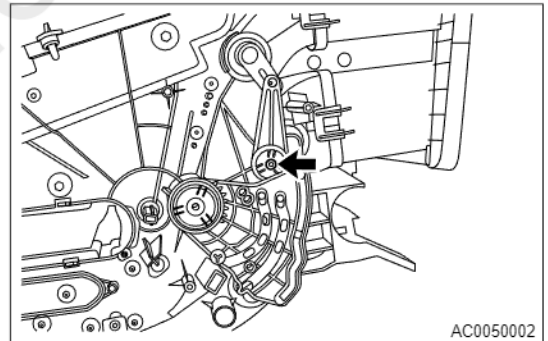
Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$



(12) Remove the damper drive set

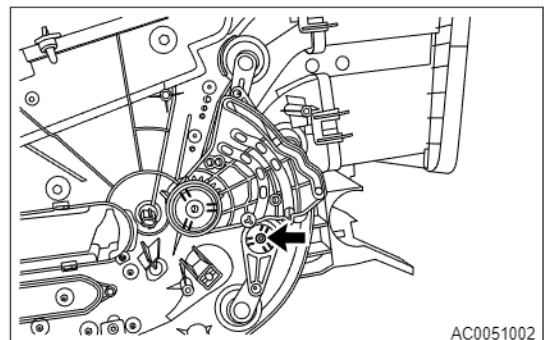
- 1) Remove the fixing screw (arrow) from damper drive set.

Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$



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

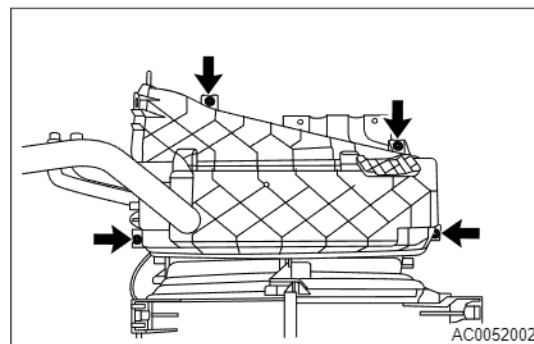
Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$



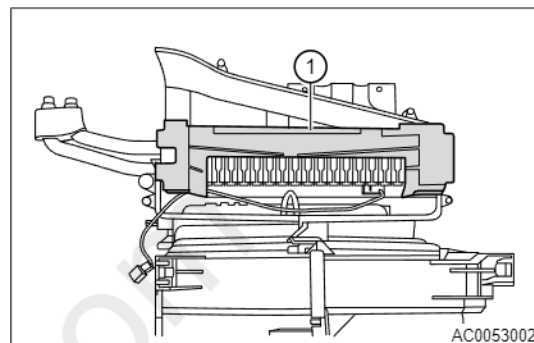
(13) Remove the evaporator assembly

- 1) Remove 4 fixing screws (arrow) between evaporator housing and evaporator case.

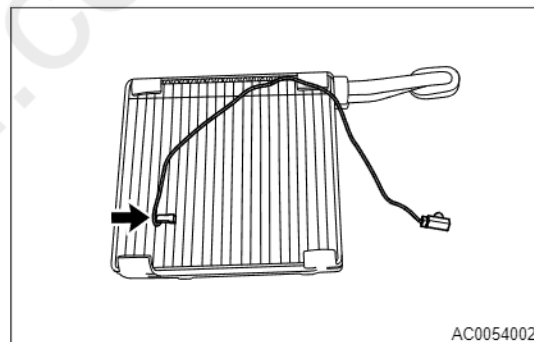
Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$



- 2) Remove evaporator assembly (1) from evaporator tank.

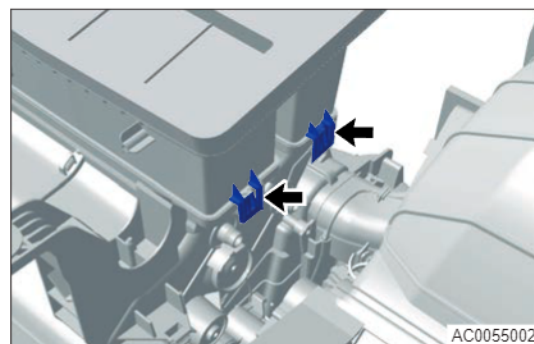


- 3) Remove the evaporator tank temperature sensor (- arrow) from evaporator assembly.

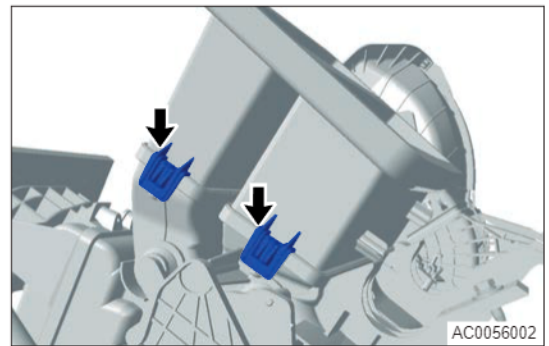


- (14) Remove the damper set

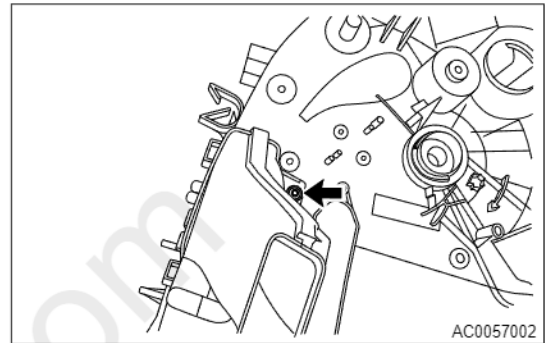
- 1) Disengage 2 fixing clips (arrow) from outlet shield.



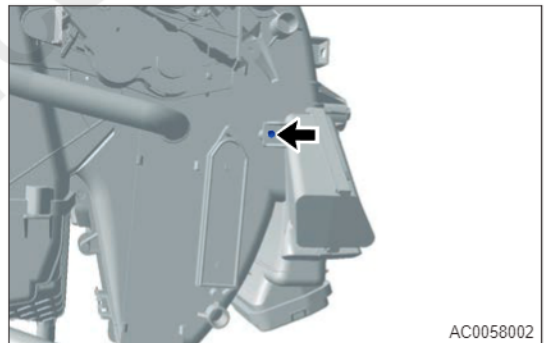
- 2) Disengage 2 fixing clips (arrow) from outlet shield.



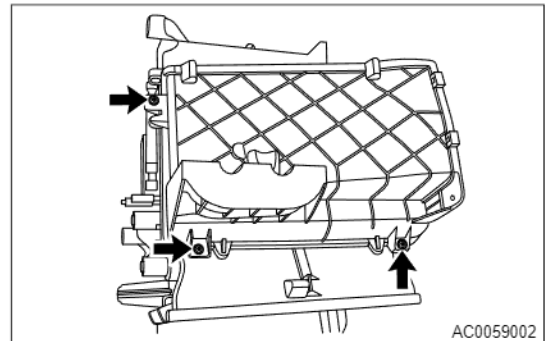
- 3) Remove 1 fixing screw (arrow) and rear right outlet.
Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$



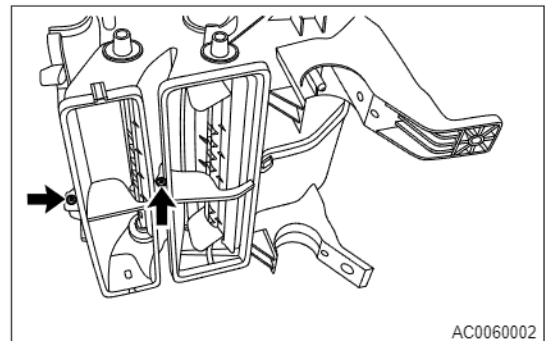
- 4) Remove 1 fixing screw (arrow) and rear left outlet.
Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$



- 5) Remove 3 fixing screws (arrow) from evaporator case.
Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$

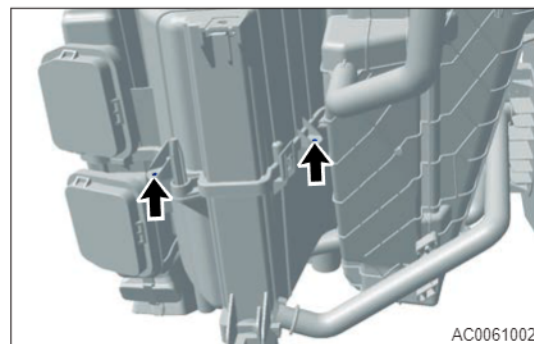


- 6) Remove 2 fixing screws (arrow) from damper set housing.
Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$

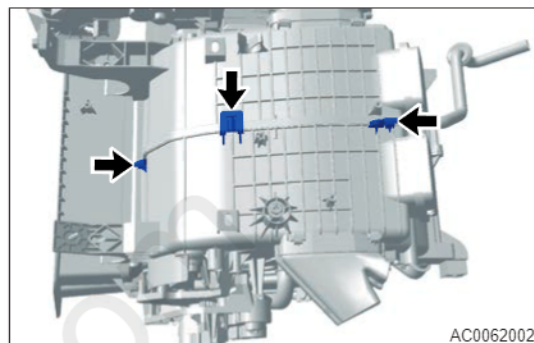


- 7) Remove 2 fixing screws (arrow) from damper set housing.

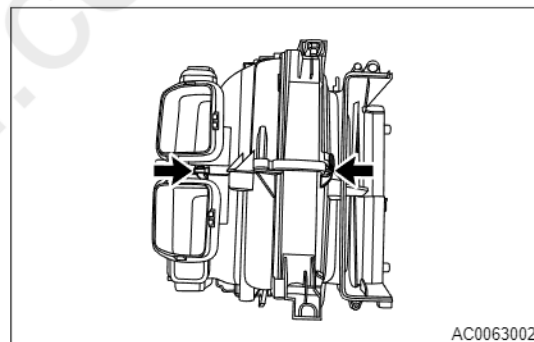
Tightening torque: $1.2 \pm 0.2 \text{ N}\cdot\text{m}$



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

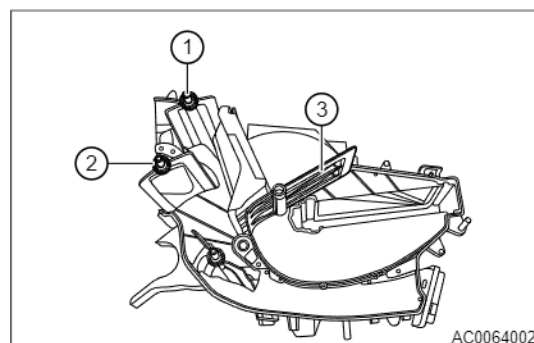


- 9) Remove 2 fixing clips (arrow) from damper set housing.

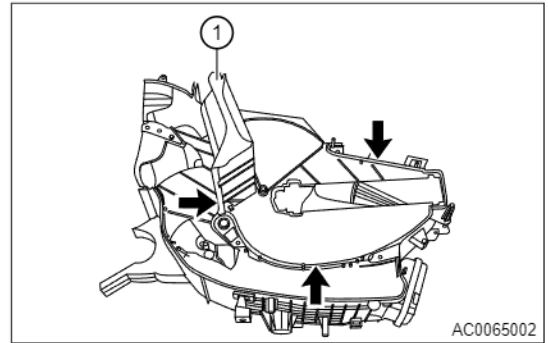


- 10) Disengage the damper set housing.

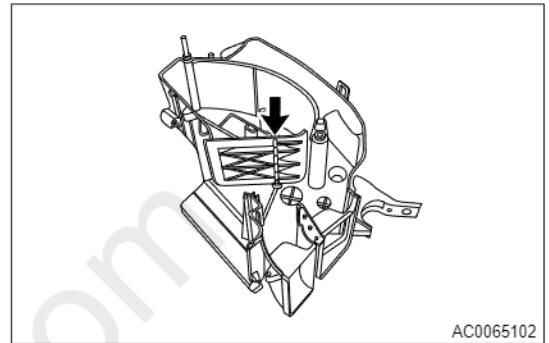
- 11) Remove defroster damper set (1), face damper set (2) and right inner damper set (3).



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

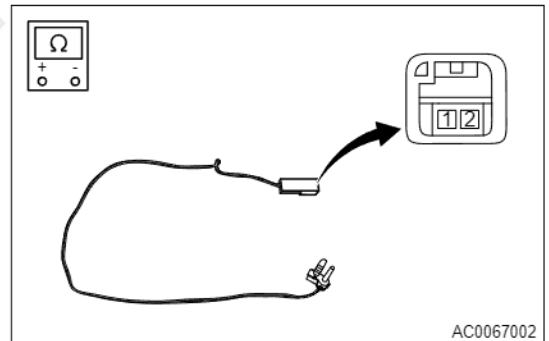


- 13) Remove the right inner damper set (arrow).



■ Inspection

- (1) Check the evaporator temperature sensor.
- 1) 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

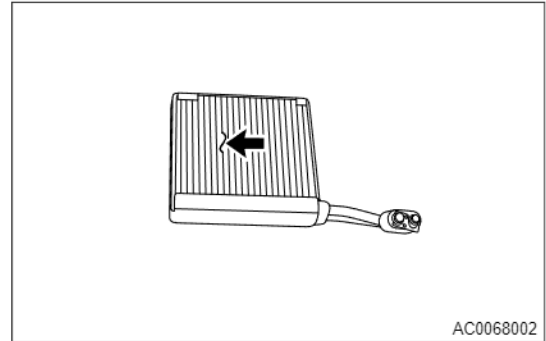
- Resistance value may change even if sensor is touched slightly. Make sure that connector of sensor is held firmly.
- During measurement, sensor temperature must be almost the same as the ambient temperature.

(2) Check the evaporator core assembly

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

Hint:

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

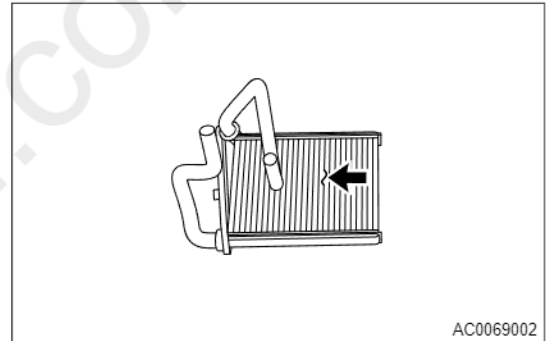


(3) Check the heater core assembly

- 1) Check if heater core assembly is cracked, damaged or leaked. Check if heater core assembly is cracked, damaged or leaked.
- 2) Check fin for bends.

Hint:

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



(4) Check damper control mechanism assembly

- 1) Check if inner/outer circulation damper adjustment mechanism is stuck, deformed, damaged or if it has fallen out. Replace as necessary.
- 2) Check if mode damper adjustment mechanism is stuck, deformed, damaged or if it has fallen out. Replace as necessary.
- 3) Check if face/defrost damper set is stuck, deformed, damaged or if it has fallen out. Replace as necessary.

■ **Assembly**

- (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 in to the right or left of its previous location.
- (2) During installation, apply a small amount of grease to contact surface of the inner/outer circulation damper adjustment mechanism to ensure that it can operate smoothly.
- (3) During installation, apply a small amount of grease to contact surface of the mix damper adjustment mechanism set to ensure that it can operate smoothly.
- (4) During installation, apply a small amount of grease to contact surface of the face damper adjustment mechanism to ensure that it can operate smoothly.
- (5) During installation, apply a small amount of grease to contact surface of the defrost damper adjustment mechanism to ensure that it can operate smoothly.
- (6) Always check that inner/outer circulation damper mechanism assembly operates normally after installation.
- (7) Always check that mix damper mechanism assembly operates normally after installation.
- (8) Always check that face damper mechanism assembly operates normally after installation.
- (9) Always check that defrost damper mechanism assembly operates normally after installation.
- (10) Tighten fixing bolts and nuts to specified torques.
- (11) It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks.
- (12) It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks.
- (13) Only use specified O-ring, as it is made of special materials for R134a\R1234yf (European Union) Refrigerant system.
- (14) Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle.
- (15) Be sure to recharge refrigerant and check for refrigerant leakage after installation.
- (16) Be sure to recharge engine cooling system and check for coolant leakage after installation.

■ Installation

- (1) Installation is in the reverse order of removal.

7.21 A/C Coaxial Line Assembly**■ Removal****⚠ Warning**

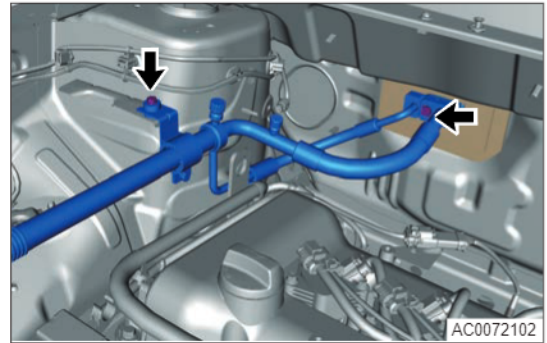
- Special service device for R134a\R1234yf (European Union) Refrigerant must be used to recover/charge refrigerant.
- Always keep work area in good ventilation.
- Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.

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

- 1) Remove fixing bolt (arrow) between A/C coaxial line and expansion valve, and disengage A/C coaxial line.

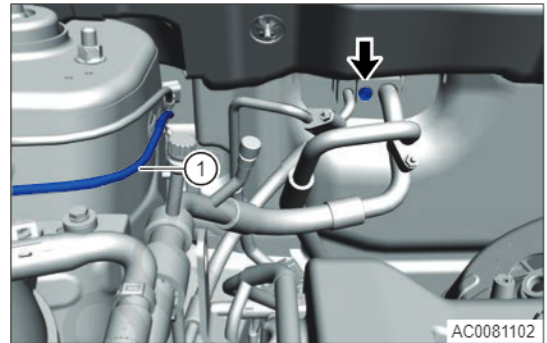
Tightening torque: $9 \pm 1 \text{ N}\cdot\text{m}$

- 2) Remove fixing bolt (arrow) from A/C coaxial line.



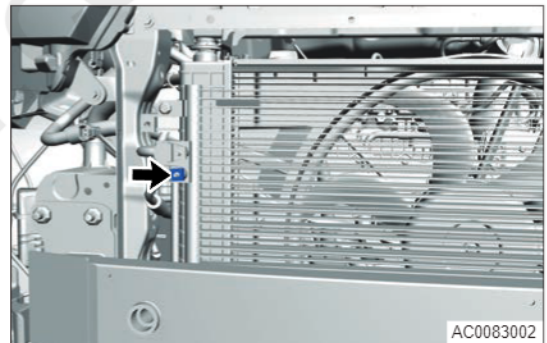
- 3) Disconnect the A/C pressure switch connector (1), and remove the coupling bolt (arrow) between A/C high pressure line fixing bracket and body.

Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$



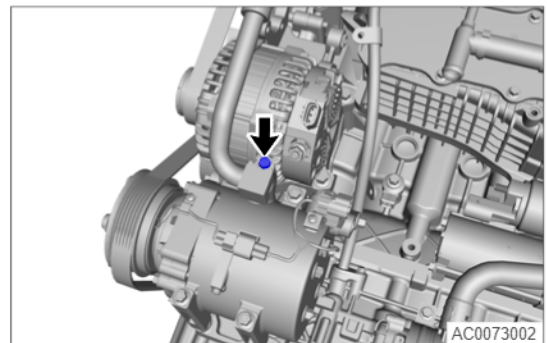
- 4) Remove 1 fixing nut (arrow) between A/C coaxial line assembly and condenser assembly.

Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$



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

Tightening torque: $25 \pm 3 \text{ N}\cdot\text{m}$



■ 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\R1234yf (European Union) Refrigerant 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.

7.22 Compressor to Condenser Line Assembly

■ Removal

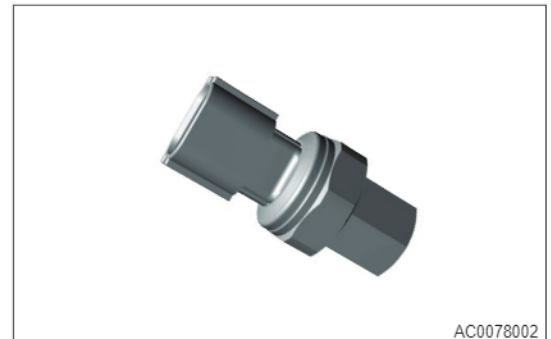
⚠ Warning

- Special service device for R134a\R1234yf (European Union) Refrigerant 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 ENGINE START STOP switch.
- (3) Disconnect the negative battery cable.
- (4) Remove the front bumper assembly.
- (5) Remove the compressor to condenser line assembly.

- 1) Remove the fixing nut (arrow) from compressor to condenser line assembly.

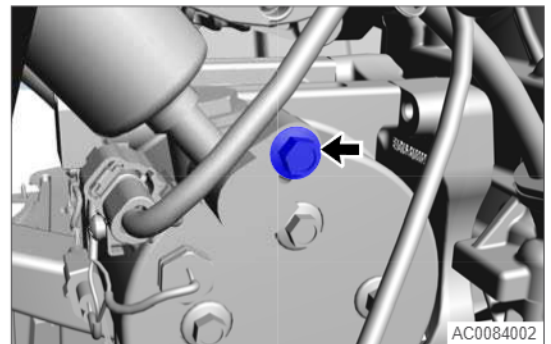
Tightening torque: $9 \pm 1.5 \text{ N}\cdot\text{m}$



- 2) 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: $25 \pm 3 \text{ N}\cdot\text{m}$

- 3) Remove the compressor to condenser line assembly.



■ Installation

⚠ Caution

- Tighten fixing bolts and nuts to specified torques.
- It is necessary to replace refrigerant line O-ring seal when installing refrigerant line. Failure to do so may result in refrigerant leaks.
- Lubricate new rubber O-ring with clean refrigerant oil and install it to refrigerant line joint.
- Only use specified O-ring, as it is made of special materials for R134a\R1234yf (European Union) Refrigerant 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.

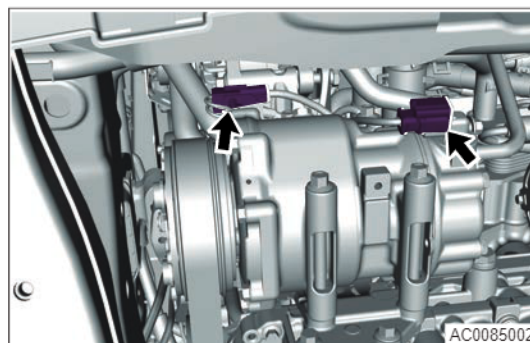
7.23 Compressor Assembly

■ Removal

⚠ Caution

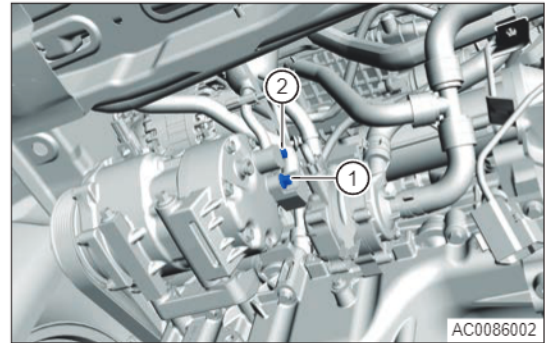
- Special service device for R134a\R1234yf (European Union) Refrigerant must be used to recover/charge refrigerant.
- Always keep work area in good ventilation.
- Disconnected A/C line and connecting part should be sealed to prevent foreign matter from entering.
- If A/C compressor assembly has an internal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



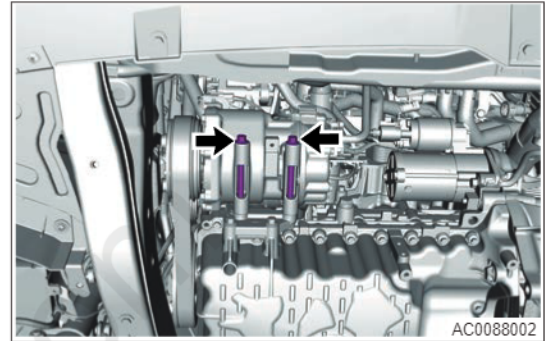
- 2) Remove the high/low pressure line connecting bolts (arrow) from A/C compressor respectively, and disengage high/low pressure line.

Tightening torque: $25 \pm 3 \text{ N}\cdot\text{m}$



- 3) Remove 4 fixing bolts (arrow) between compressor assembly and mounting bracket, remove A/C compressor assembly.

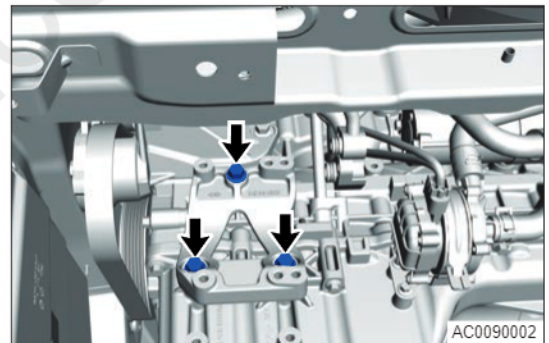
Tightening torque: $25 \pm 3 \text{ N}\cdot\text{m}$



- 4) Remove 3 fixing bolts (arrow) between A/C compressor mounting bracket and engine.

Tightening torque: $25 \pm 3 \text{ N}\cdot\text{m}$

- 5) Remove the A/C compressor mounting bracket 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\R1234yf (European Union) Refrigerant system.
- Only use recommended refrigerant oil which is applicable to A/C compressor assembly on vehicle.
- Perform recharging for A/C system and check for refrigerant leakage.

Installation is in the reverse order of removal.

7.24 A/C Pressure Switch

■ Removal

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

Tightening torque: $10 \sim 12 \text{ N}\cdot\text{m}$

■ Installation

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

⚠ Caution

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

7.25 Condenser Assembly (w/ Receiver Drier)

■ Removal

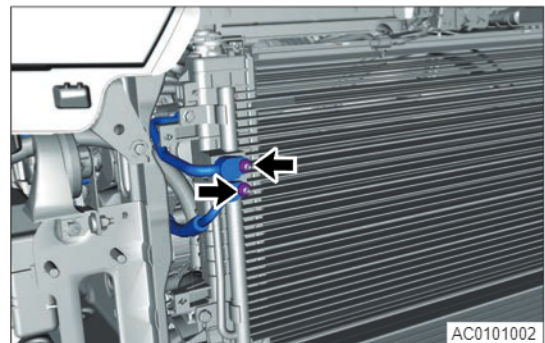
⚠ Warning

- Special service device for R134a\R1234yf (European Union) Refrigerant 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 ENGINE START STOP switch.
- (3) Disconnect the negative battery cable.
- (4) Remove the front bumper assembly (For details, refer to removal and installation of front bumper).
- (5) Remove the condenser assembly (w/ receiver drier).

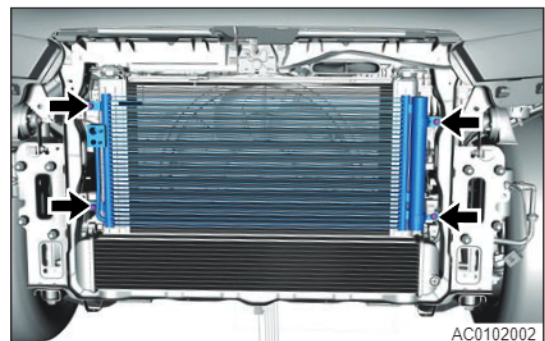
- 1) Remove the fixing bolts (1) and (2) between high/low pressure line and condenser (right), and disengage the high/low pressure line, and remove 2 fixing bolts (arrow) from condenser.

Tightening torque: $9 \pm 1 \text{ N}\cdot\text{m}$



- 2) Remove 2 fixing bolts (arrow) between radiator assembly and condenser assembly (left).

Tightening torque: $5 \pm 1 \text{ N}\cdot\text{m}$



- 3) Carefully remove the condenser assembly (w/ receiver drier) from below.

■ Inspection

- (1) Check the condenser fins.
 - 1) If condenser fins are dirty, wash with water. And then dry fins with compressed air.
 - 2) If any condenser fin is bent, straighten it with the screwdriver or pliers.

Caution

DO NOT damage condenser fins.

■ Installation

- (1) Installation is in the reverse order of removal.

Caution

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