

8 Heating, Ventilation and A/C System

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8-2 Warnings and Notices

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8.1 Warnings and Notices

8.1.1 Warnings and Notices

Warning!

Carry out the refrigerant related work in a well-ventilated environment. Do not breathe refrigerant vapor. To avoid inhalation of air-conditioning refrigerant R-134a (PTFE oxide), and lubricant vapor or mist. Contact with them will stimulate the eyes, nose and throat. Operate in a well-ventilated area. When removing R-134a from the air-conditioning system, use certified maintenance equipment (R-134a recycling equipment) that meets the requirements. If the system accidentally discharges, before continuing to repair, the work area must be ventilated. Other relevant health and safety information can be obtained from refrigerant and lubricant manufacturers.

Warning!

Before servicing the electrical system, disconnect the battery negative cable. It is prohibited to carry out welding or steam cleaning operations near the vehicle with air-conditioning pipelines or parts installed.

Air-conditioning refrigerant Notice

Note

- Skin contact may cause frostbite.
- Must comply with the instructions provided by the manufacturer. During operation, wearing proper goggles and protective gloves.

To avoid following air-conditioning refrigerant operations

Note

- Do not store refrigerant under direct sunlight or near a heat source.
- During filling, do not place the refrigerant bottle upright, keep the valves facing down.
- Do not expose the refrigerant bottle to the frost or snow.
- Do not drop the refrigerant bottle.
- Do not in any case, directly discharge the refrigerant to the atmosphere.
- Do not be mix refrigerants, such as R134a (PTFE ethane) and R12 (2 fluoro-2 chlorinated methane).

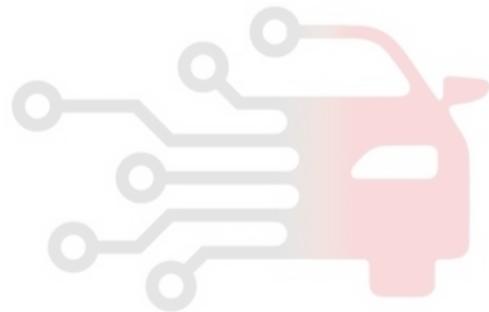
Frozen Oil Notice

Note

Must use compressor manufacturers recommended types and grades of lubricant. Do not mix different types and grades of lubricant, otherwise it will damage the compressor. Minimize lubricant contact with air, as it is highly absorbent.

Note

Do not use water, corrosive or flammable and explosive solvent to clean the air-conditioning system. It is recommended to use R-141b, heptane and other cleaning agents.



8.2 Automatic Air-conditioning

8.2.1 Specifications

8.2.1.1 Fastener Tightening Specifications

Applications	Model	Specifications	
		Metric (Nm)	US English (lb-ft)
Condenser Cylindrical Side Nut	M8	10-12	7.4-8.9
Air-conditioning Retaining Screw	ST6.3 × 19	5-7	3.7-5.2
Air-conditioning Retaining Nut	M6	5-7	3.7-5.2
Air-conditioning Retaining Bolts	M6 × 20	8-10	5.9-7.4
Air-conditioning Inlet Pipe Nut	M6	5-7	3.7-5.2
Compressor Retaining Bolts	M8 × 1.25 × 80	23-28	17.0-20.7
Compressor Suction Hose Retaining Bolts	M6 × 30	10-12	7.4-8.9
Compressor Discharge Hose Retaining Bolts	M6 × 30	10-12	7.4-8.9
High-pressure Pipe Fittings	M19	27-29	19.9-21.4
Low Pressure Pipe Fittings	M24	37-39	27.3-28.8
Air-conditioning High-pressure Pipe Bracket Bolts	M6 × 12	5-7	3.7-5.2
Air-conditioning Control Panel Retaining Bolts	M5 × 16	5-7	3.7-5.2
Suction Hose Bracket Bolts	M6	5-7	3.7-5.2
Condenser Upper Pipe	M6 × 25	9-11	6.7-8.1
Condenser Lower Pipe	M6 × 25	9-11	6.7-8.1
Expansion Valve Retaining Bolts	M8 × 20	16-20	11.8-14.8
Blower Speed Control Module Retaining Screws	ST4.8 × 16	2-4	1.5-3.0

8.2.1.2 Cooling System Parameters

Applications		Parameters
Compressor	Displacement (ml/r)	167
	Model	CHD115
	Electromagnetic Clutch Power Consumption (W)	45
Blower	Maximum Air Volume (m ³ / h)	≥480
	Air Volume Control	7-speed Automatic

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Applications		Parameters
	Electrical Power Consumption (W)	180
Condenser	Dimensions (mm)	16 × 445 × 694
	Heat Transfer (W)	≥11,000
Evaporator	Cooling Capacity (W)	≥5,000
	H-type Expansion Valve (Cold t)	1.5
System Cooling Capacity (W)		4,500

8.2.1.3 System Capacity

Applications	Specifications	
	Metric	US English
Refrigerant Lubricant (100 PG)		
Refrigerant Sudden Loss	40ml *	1.34 oz *
Compressor Replacement		
Note If lubricating oil released during the refrigerant recovery is not replaced, the compressor will be damaged.		
The vehicle compressor is pre-filled with 150 ml ** (5 oz **) refrigerant lubricant (100 PG).		
Condenser Replacement	40 ml **	1.34 oz **
Evaporator Replacement	60 ml **	2.0 oz **
Drier Core Replacement	20 ml #	0.67 oz #
Added 100 PG oil amount should be equal to the sum of the old drier core and the prescribed amount.		
Any Piping Component (Hose / Pipe or Pipe Assembly) Replacement	30 ml **	1.0 oz **
Entire System Refrigerant Lubricating Oil Capacity	150 ml	5.0 oz
R-134a		
Refrigerant Filling Amount	600 ± 10 g	1.37 ± 0.04 b
* It may lead to the refrigerant leakage but not refrigerant oil (100 PG) loss. A serious leakage, hose broken, collision or pressure relief valve open will lead to refrigerant sudden loss. When replacing components that lead to a large amount of refrigerant loss, add adequate amount of lubricating oil to the components.		
** If the loss of refrigerant components lubricant (100 PG) exceeds the prescribed amount, add lubricating oil according to the loss amount.		

8.2.1.4 Indoor / Outdoor Temperature Sensor Resistance Properties

Temperature (°C / °F)	Lower Limit (kΩ)	Nominal Value (kΩ)	Upper Limit (kΩ)
-20/-4	15.73	16.45	17.19
-15/5	12.27	12.77	13.30
-10/14	9.652	10.00	10.35
-5/23	7.626	7.886	8.151
0/32	6.019	6.270	6.520
5/41	4.833	5.024	5.215
10/50	3.908	4.050	4.192
15/59	3.170	3.285	3.399
20/68	2.600	2.680	2.760
25/77	2.134	2.200	2.266
30/86	1.762	1.816	1.870
35/95	1.441	1.507	1.576
40/104	1.198	1.258	1.319
45/113	1.001	1.056	1.110
50/122	0.840	0.890	0.937
55/131	0.708	0.751	0.797
60/140	0.601	0.643	0.680
65/149	0.511	0.546	0.582
70/158	0.437	0.468	0.501
75/167	0.375	0.402	0.432
80/176	0.323	0.348	0.375
85/185	0.279	0.300	0.326

8.2.2 Description and Operation

8.2.2.1 Description and Operation

1. Overview

Automatic air-conditioning system is designed to provide a comfortable riding environment to passengers regardless of the external weather conditions. The system consists of the following main components:

- Cooling System
- Heating System
- Air Distribution System
- Mode / Temperature Control System

2. Compressor

Air-conditioning compressor is driven by compressor clutch pulley, which is driven by the drive belt driven by the engine crankshaft. When the electromagnetic clutch coil is not powered, the compressor pulley is free to rotate and does not drive the compressor shaft. When the clutch coil is powered, the clutch piece and the hub are pushed to the pulley, magnetic clutch chip and pulley locks will be integrated to drive the compressor shaft. The compressor has a unique lubrication system. Crankcase suction fluid discharge through the mouth of the ramp plate spinning, this path allows the lubricating bearing swash plate. Rotation produce the oil separation effect. some oil removed from the crankcase mouth suction liquid discharge liquid separated flows back into the crankcase. Return oil lubricates compressor mechanical parts.

In the following circumstances, the compressor is turned off:

- The throttle body is fully open.
- Low idle
- Ambient Temperature Low
- Engine Coolant Temperature Too High
- Refrigerant pressure is higher than 3,140 kPa(455.4 psi) or less than 196 kPa (28.4 psi).

Note

Do not crash, drop or place the compressor upside down, if the compressor is impacted or placed upside down. Rotate the compressor clutch by hand 5-6 times to recirculate the engine oil in the cylinder. When engine oil is in the cylinder, the sudden rotation will cause valve damage and a negative impact on durability.

3. Condenser, Fluid Reservoir Dryer

High temperature and high pressure refrigerant vapor flows out from the air-conditioning compressor into the condenser. The condenser is made from aluminum tubes and cooling fins that can rapidly transfer heat. Through heat transfer, cooling fins condenses the high temperature and high pressure refrigerant vapor into liquid with mild temperature and high pressure. The drier is located in the left side of the condenser, and welded with condenser into one part. Drier internal structure design ensures that the mild temperature and high pressure refrigerant air liquid mixture enter, while the mild temperature and high pressure liquid refrigerant flows out from the reservoir.

Dryer reservoir has the desiccant that absorbs cooling system water. The desiccant can not be reused. When leakage occurs due to the following reasons reservoir drier core can not repaired, but replace:

- Piercing
- Containment Damage
- Outside air entering into the system for a long time

4. Inside Temperature Sensor, Outside Temperature Sensor

The following sensors affect the inside air temperature automatic control:

- Inside Temperature Sensor
- Outside Temperature Sensor

These sensors are temperature sensitive thermal elements. the sensor resistance and temperature has corresponding inverse relationship. The resistance determines to the air-conditioning control module signal levels. Air-conditioning control module uses this information to instruct the following components.

- Inside and Outside Circulation Motor
- Warm and Cold Air Motor
- Blower Motor Control Module

Hose is used to connect the inside temperature sensor housing to the suction device. The air-conditioning outlet air flow form a small vacuum in the suction hose end. This vacuum has the following functions

- Let the air flow through the inside temperature sensor
- Improves the inside temperature sensor sensing accuracy

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Outside temperature sensor is located in the vehicle front grille below the front bumper area. Air-conditioning control module uses this sensor to learn the surrounding air temperature information, and display the outside temperature in the instrument cluster.

5. Ambient and Sun Light Sensor

Ambient and sun light sensor is located in the instrument panel upper middle panel. ambient and sun light sensor is light energy sensor that measure sunlight generated heat, providing additional compensation parameters to air-conditioning control module. Air-conditioning control module in real time automatically adjusts the air-conditioning air volume and cold / hot air mixture ratio, according to light intensity, the vehicle status and the vehicle air-conditioning demand conditions, so that all occupants feel comfortable.

6. Inside Air-conditioning Assembly

Inside air-conditioning assembly is located in instrument panel, and consists the blower motor, blower motor control module, air-conditioning filter, heater core, evaporator, expansion valve, warm and cold air direction control motor and various air deflection damper, ventilation duct.

A. Blower Motor

Note

Do not place the blower motor on the blower motor fan wheel.

Do not touch the fan wheel blades to prevent damage.

Blower consists of the following components:

- Permanent Magnet Motor
- Mouse-cage Fan

Blowers operate at different speeds depending on the changes in speed by the blower motor speed control device controlled by the blower motor control module. If the user selects the maximum air-conditioning mode, the vast majority of air into blower is from the passenger compartment (inside circulation).

Under most operating conditions, outside air entering the vehicle in the following ways:

- Blower motor draws outside air.
- Vehicle forward movement draws the outside air.

Blower motor blows air along the following lines:

- Through the evaporator core

- Through heater core
- Into the passenger compartment

B. Heater Core

Heater core is the main heating system component. Heater Core is located inside the air-conditioning. Whenever the engine runs, the engine coolant from the engine is pumped into the heater core. Heater core will transfer the engine coolant heat to the air flowing through the heater core body. Heater core has specific inlet and outlet air pipes. To remove the heater core body, the heater core warm pipe must be completely discharged. For service, the heater core warm pipe must already be installed. Heater core is equipped with a temperature sensor. The sensor send the heater core surface temperature signal to the air-conditioning control module, providing more compensation parameters.

C. Evaporator and Expansion Valve

Evaporator is located in the left hand side of the air-conditioning assembly. To remove and install the evaporator and expansion valve, the air-conditioning assembly must be removed first. When removing, the evaporator refrigerant piping must be completely discharged. When servicing, evaporator with separate refrigerant pipelines must already be installed. Expansion valve is connected to the evaporator, installed in one end of the evaporator, located in the evaporator inlet. Expansion valve one end is connected to the air-conditioning compressor inlet and outlet pipes, the other is connected to the evaporator inlet and outlet pipes. Within the pipeline, the high pressure refrigerant is regulated to low pressure refrigerant and flows to the evaporator.

Expansion valve changes the location according the air-conditioning lower pressure limit and the upper pressure limit.

Evaporator cools the air and removes the moisture from the air before the air enters into passenger compartment. Following procedures happen in the evaporator:

- Low-voltage low-temperature liquid / vapor refrigerant entering into the evaporator.
- Refrigerant flows through the evaporator.
- Refrigerant evaporation.
- Evaporated refrigerant absorbs heat from the air flowing through the evaporator.
- Low-pressure low temperature refrigerant enters into the evaporator, steam leaves the evaporator.

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When the air heat passes the evaporator core, the air moisture will condense on the evaporator core external surface, forms water and flows out.

Evaporator is equipped with a temperature sensors to prevent it from freezing. The sensor measures the evaporator heat sink surface temperature. If the temperature is below 2°C (36 °F), the compressor clutch will not continue to work. If the temperature increases to 4°C (39 °F) or above, the compressor resume working. In the system equipped with automatic temperature control, the sensor signal will first be transferred to the air-conditioning module, and then transferred to the air pressure switch through dedicated circuit. If the air pressure meets the requirements, the corresponding air-conditioning signal will be sent to ECM. ECM controls the compressor clutch closing.

7. Refrigerant R-134a and Lubricant

Air-conditioning system refrigerant has the following roles

- Absorb heat
- Carry heat
- Release heat

This vehicle uses R-134a refrigerant, which is a non-toxic, flame retardant, transparent, colorless liquefied gas.

Before servicing the air-conditioning system. Refer to the refrigerant piping and fittings disposal and the chemical stability instructions

R-134a system uses special synthetic lubricant 100 PG refrigerant oil, which absorbs water. Refrigerant needs to be stored in airtight containers. R-134a air-conditioning systems can only use 100 PG synthetic refrigerant oil for internal circulation. Only apply fossil based 525 viscosity refrigerant oil to installation thread and O-ring. Using other lubricants will cause the compressor or components malfunction.

Follow the manual steps in the following repairs:

- Refrigerant recovery and recycling
- Adding oil
- Drain cooling system
- Refill cooling system

8. Air-conditioning High Pressure Pipe, Air-conditioning Low Pressure Pipe, Air-conditioning Pressure Switch

This vehicle uses high pressure pipe and low pressure pipe (air-conditioning hard pipes and / or hose) to form a closed system. Refrigerant and lubricating oil flow in this closed system, to complete the refrigerant cycle. Air-conditioning hard pipe consists of the aluminum pipe and the corresponding joints, air-conditioning hose consists rubber hose and the corresponding joints.

Air pressure switch is a three-state pressure switch, transmitting the air pressure signal.

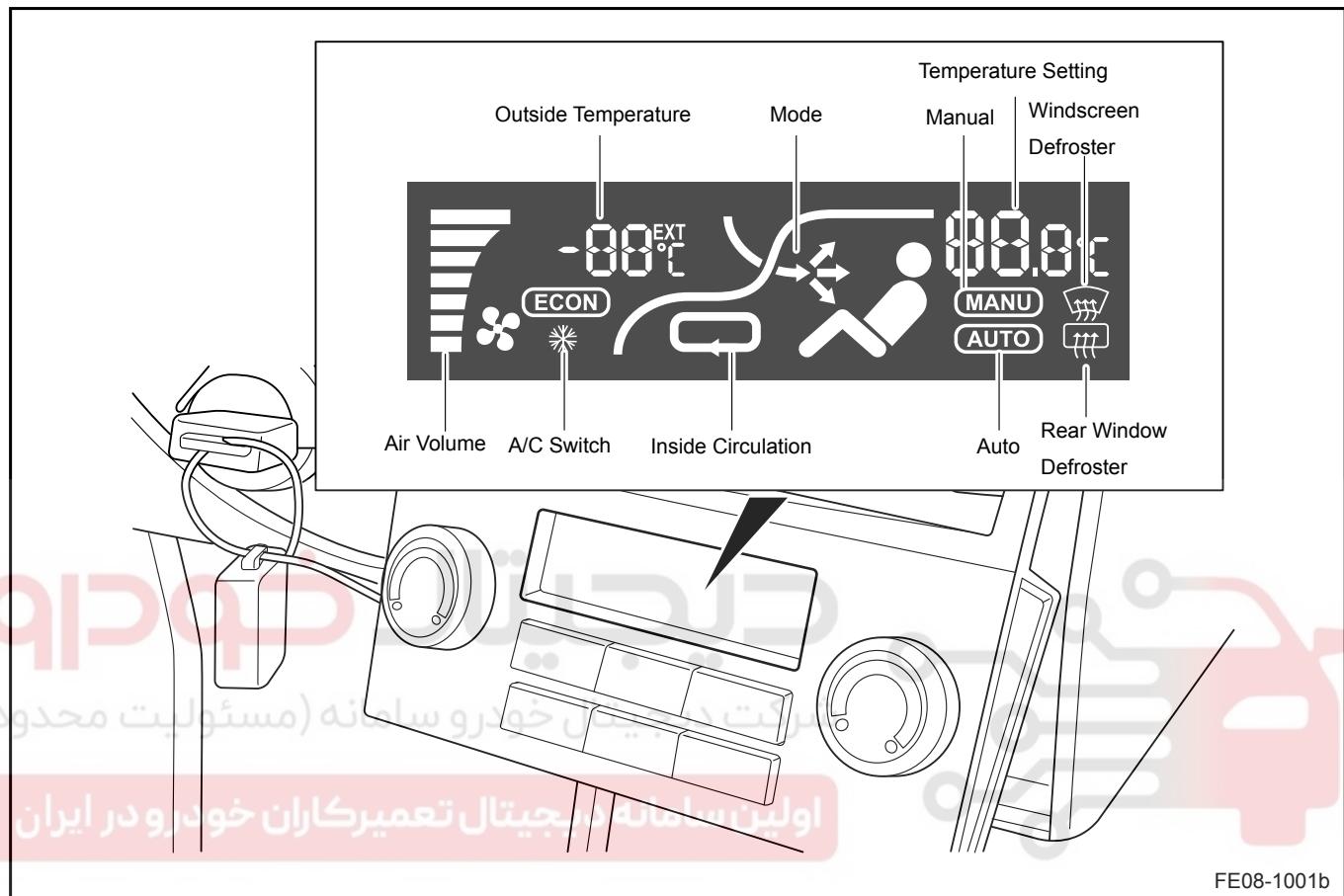
Pressure Switch Values:

Name	Pressure Value		Signal Values
	Metric (MPa)	US English (psi)	
High Voltage Switch	2.51-3.14	364.0-455.3	OFF
Medium Voltage Switch	1.52	220.4	ON
Low Voltage Switch	0.196-0.201	28.4-29.1	OFF

8.2.3 System Working Principle

8.2.3.1 Air-conditioning Control Panel Features Description

1. Control Panel Icons



2. Temperature Settings

Temperature setting knob is used to set the inside temperature. The temperature value is shown on the LCD as user information. The temperature is set within the range of 16-32°C (61-90 °F) the temperature regulation step is 0.5°C (33 °F). When the temperature is set below 16°C (61 °F) , LCD displays LO, When the temperature is set higher than the 32°C (90 °F) LCD displays HI.

Temperature setting will not change the air-conditioning system operating mode. In automatic mode, when access to LO / HI, the system will remain the largest amount of wind blowing. Measure the warm and cold conditioning motor Hi and Lo motor position angle and voltage as the following table:

Warm and Cold Conditioning Motor	Angle (°)	Voltage (V)

Low (Lo)	302.11	4.62
High (Hi)	84.70	1.07

3. Air Volume Settings

Air volume control knob is used to manually set the fan speed. In automatic mode, blower speed will be automatically controlled by the system. Air volume control knob operation will make the system state change from automatic mode to manual mode. AUTO disappears, MANU displays. Air-conditioning system uses 4.4-13.1 V voltage linear regulator control the fan 1-7 speeds.

Air Volume	Fan Speed	Air Volume Ratio (%)	Blower Terminal Voltage (V)
0	0	0	0

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Air Volume	Fan Speed	Air Volume Ratio (%)	Blower Terminal Voltage (V)
1	1	15	4.4
2	2	30	5.1
3	3	40	6.7
4	4	50	8.2
5	5	60	9.9
6	6	75	11.7
7	7	100	13.1

In manual mode, users can operate air volume control knob to set the right air volume, air volume change from 1 to 7 level. In automatic mode, blower speed is part of the automatic control logic. Blower speed is not limited to the level 7 in manual mode, but the LCD only displays 7. The bar in the display shows the nearest fan speed.

4. Manual Adjustment / Automatic Adjustment of the Wind Patterns

Automatic air-conditioning controller provides two kinds of manual and automatic modes for users to choose out of wind. By adjusting the face / feet / windshield of the throttle to control the wind patterns. Blowing head and legs blown difference is that the temperature distribution of feet in order to provide a more warm air, and to provide more cool air head to ensure the driver is always in a comfortable driving environment. The temperature range of the distribution will be subject to the impact of vehicle space.

Automatic air-conditioning, heater and evaporator controller uses temperature sensors to determine the temperature of gas mixture.

In manual mode, users can choose 5 wind modes:

1. Blow Facial
2. Two-way (Blow surface and blow feet)
3. Blow Feet
4. Hybrid (Blow feet and defrost)
5. Defrost

LCD displays appropriate wind mode icons. When the air-conditioning system uses two DC motor control ventilation mode, the air-conditioning controller can affect the air flow

distribution. The wind pattern corresponding to the angle and voltage of the following table:

Manual Configuration	Throttle Angle (°)	Wind Motor Voltage (V)
Blow Facial	21.17	0.29
Two-way (Blow surface and blow feet)	112.94	1.57
Blow Feet	180.70	2.51
Hybrid (Blow feet and defrost)	286.58	3.98
Defrost	341.64	4.75

In automatic mode, the wind model is the automatic control logic, as part of the wind mode is automatically selected by the controller. When the wind mode button to operate the system from the automatic mode to manual mode. In order to achieve the degree of comfort, head to reach a certain temperature, foot temperature is higher than the head temperature 4-6°C (39-43 °F). Air-conditioning system may result in certain restrictions in certain special cases, the level of comfort not be achieved. Air-conditioning control module to choose a time closest to the pattern displayed in the LCD.

5. Inside and Outside Circulation Control

User can select inside and outside circulation mode:

1. Outside circulation mode, the outside circulation throttle open, inside circulation throttle close.
2. Inside circulation mode, the inside circulation throttle open, outside circulation throttle close.

Inside and outside circulation control button is used for manual adjustment. In automatic mode, the throttle is controlled by the system automatically. When inside and outside circulation control button is operated, the system will enter the manual mode. According to inside temperature, automatic control logic automatically controls the throttle work. Users can switch modes between inside and outside circulations. when the inside circulation continues 20min, the system will automatically switch to the outside circulation 2min, and then back to inside circulation. Manually switch to the outside circulation, the system will not interfere with this operation.

In automatic mode, the throttle is controlled by the system automatically. When inside and outside circulation control button is operated, the system will enter the manual mode. Cooling effect at high temperature is poor, in principle, the system maintains the inside circulation, in order to replace the fresh air, ventilation will be carried out (keep 20min inside circulation, switch to outside circulation for 2min, and then back to inside circulation, manually switch to the outside circulation is an exception).

6. Defrosting Control

Defrost button is used to start the windscreen defrost function. At this point the fan speed is the maximum to exit the inside circulation (because the inside circulation may affect the defrost effect), and issued a request for compressor enabled.

Defrost Status

At any working status (auto, manual, off), press the defrost button, the system enters into the defrost mode. After defrosting is finished, the system returns to the state before defrost. (automatic, manual, off).

In the defrost mode, the blower speed adjusts to the maximum, throttle position adjusts to blow the glass, the outlet temperature increased by a compensation constant. Compressor start, throttle opens as in outside circulation mode. In the defrost mode, pressing the button will adjust wind speed to increase or decrease accordingly. Keep defrosting working condition, the compressor continues to work to keep the wind blowing glass pattern.

Exit the defrost mode, the following parameters return to previous state:

1. Wind Speed
2. Wind Patterns

In the defrosting process, in addition to wind speed, temperature adjustment, and rear window defrost, operation of other buttons will cause the system to leave the defrost mode and back to the previous mode (except newly selected function). Exit defrosting, the system returns to the state before defrost. (automatic, manual, off).

Rear Defrost Function

Rear defrost button is used for the rear window defrost. During the rear window defrosting, LCD displays the corresponding logos. Press the defrost button again to exit.

7. Automatic and Manual Working Status

System has automatic (AUTO), Manual (MANU) and stop (OFF) three states.

Manual mode, to achieve the following features:

- Manual speed adjustment
- Manual wind mode control
- Set the automatic temperature control according to the temperature

Automatic mode, to achieve the following features:

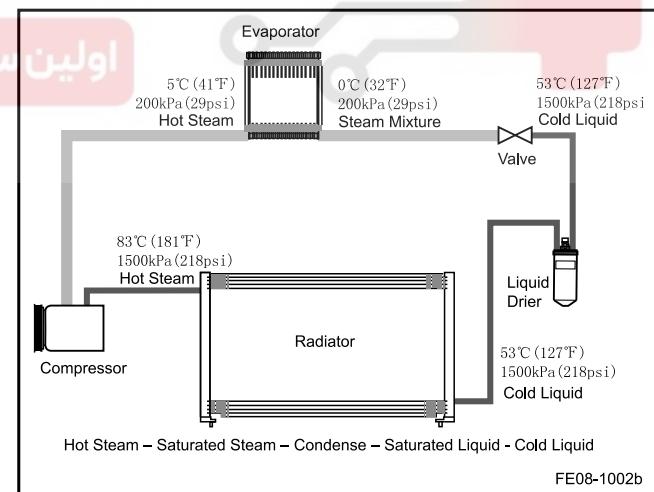
- Automatic speed adjustment
- Automatic wind control mode
- Automatic temperature control

8.2.3.2 Automatic Air-conditioning Working Principle

1. System Diagnostics

Through the Data Link Connector, air-conditioning control module can send the appropriate diagnostic information to the scan tool. Scan tool can read the air-conditioning control module manufacturers, and software version numbers.

2. Cooling System Working Principle

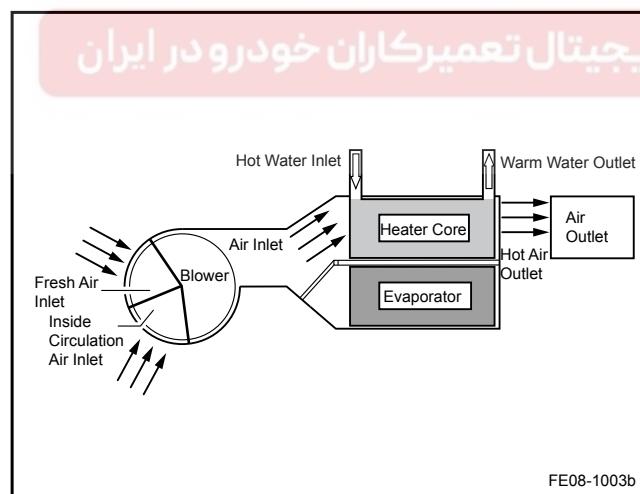


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Compressor is driven by the drive belt, which is driven by engine. extract compress gaseous refrigerant from the evaporator. Refrigerant temperature rises to 83-110°C (181-230 °F), the pressure reaches 1,470 kPa (213.2 psi). Heat is transferred to the condenser by high-pressure refrigerant, and then taken away by the condenser air. because of the heat dissipation, refrigerant is cooled. The temperature drops to 53-70°C (127-158 °F) under high pressure refrigerant fluid is sent to dryer storage. The reservoir fluid dryer is an intermediary, filters water mixed in the refrigerant. Dried refrigerant is transported to the expansion valve. Expansion valve decompresses the refrigerant, from the expansion valve the refrigerant mist pressure is 200 kPa (29 psi), the temperature drops to 0-2°C (32-36 °F). Refrigerant mist is heated in the evaporator and evaporates. Finally, the air blower blows air through the evaporator surface to each outlet. because inside the evaporator refrigerant evaporation absorbs heat, so the outlet air temperature is far below the environment temperature. After evaporation the low-pressure refrigerant to the air stream from the evaporator expansion valve box, at this time the refrigerant pressure is 200 kPa (29 psi), the temperature rises to 5-8°C (41-46 °F). The low-pressure refrigerant returns to the compressor through the air once again compressed, air-conditioning refrigeration agent completes a working cycle.

3. Heating System Working Principle

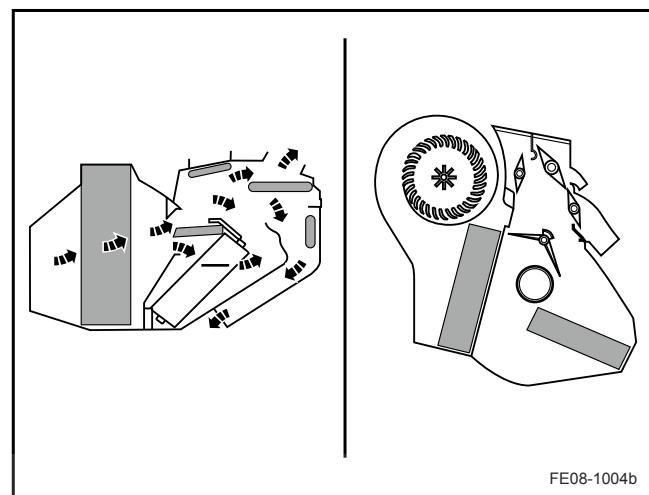


When the automatic air-conditioning system is in heating mode, the heating and cooling control motor will transfer the temperature control device to warm location, air entering the heater core has the following effect:

- Some air by-pass the heater core
- Heat Transfer

Any air that does not need to be heated will enter the passenger compartment, mixing with heated air to obtain the appropriate air temperature. Engine coolant state is a key factor to the heater system normal working.

4. Ventilation Control System Working Principle



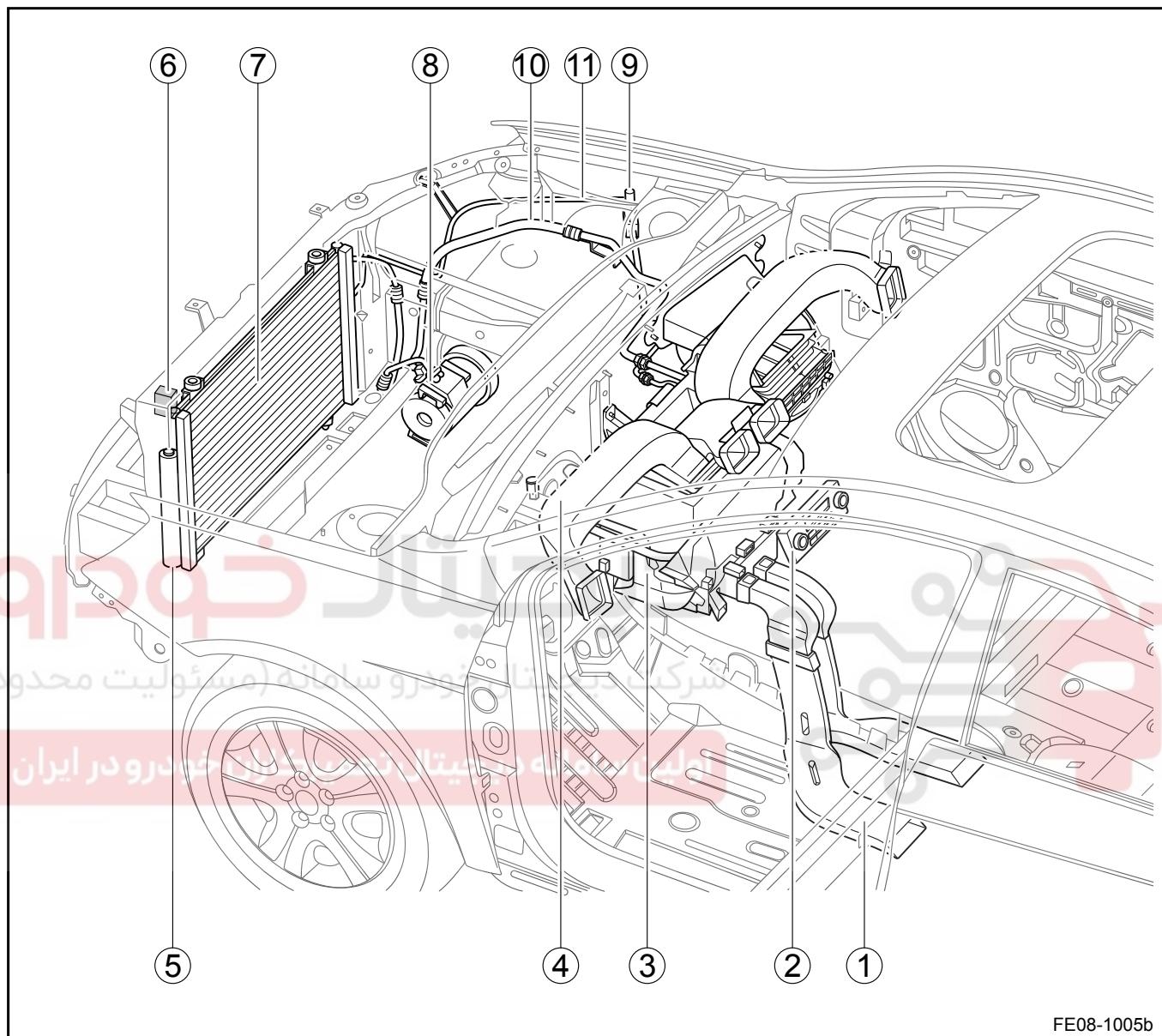
A variety of locations in the ventilation control system, enables the model valve draw cold air, hot air and outside air through the air duct to the air-conditioning system. Air enters into the passenger compartment through the air duct.

In the "AUTO (Auto)" mode, the system will automatically select the appropriate mode. Press the "MODE (mode)" button to change the vehicle air supply mode. If the system currently displays an air supply mode, press the "MODE (mode)" button to select the next mode.

Air flow pattern changes according to the following:

- Face - through the instrument panel air duct
- Two way - through the instrument panel air duct, floor vent
- Feet - through the floor vent
- Mixing - through the floor vent, the Windshield vent
- Defrosting - Windshield vent

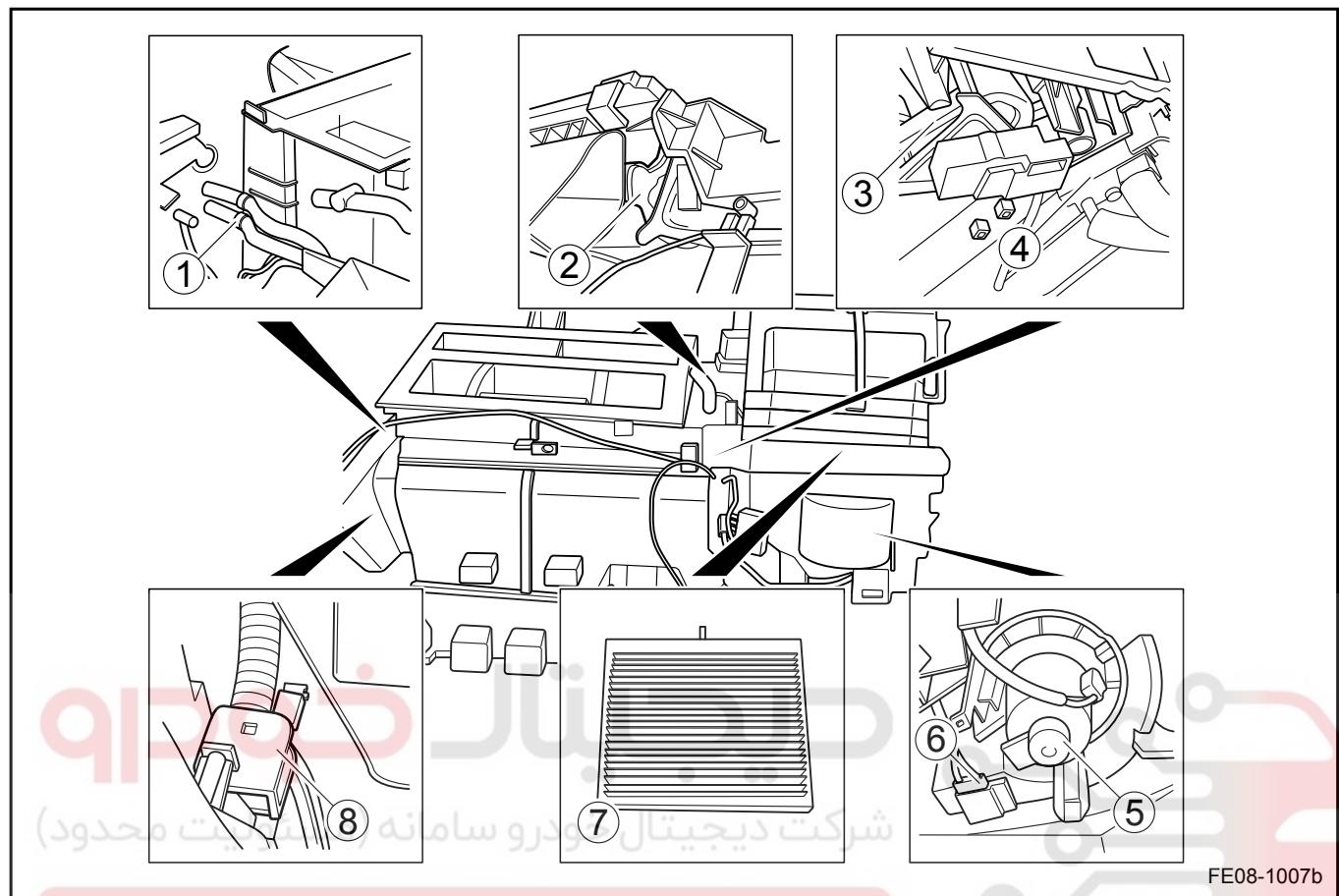
8.2.4 Component Locator

8.2.4.1 Air-conditioning System Component
Component Locator

Legend

1. Floor Air Duct	8. Compressor
2. Air-conditioning Panel (Control Module)	9. Pressure Switch
3. Air-conditioning	10. Air-conditioning Low Pressure Pipe
4. Instrument Panel Air Duct	11. Air-conditioning High Pressure Pipe
5. Drier	
6. Outside Temperature Sensor	
7. Condenser	

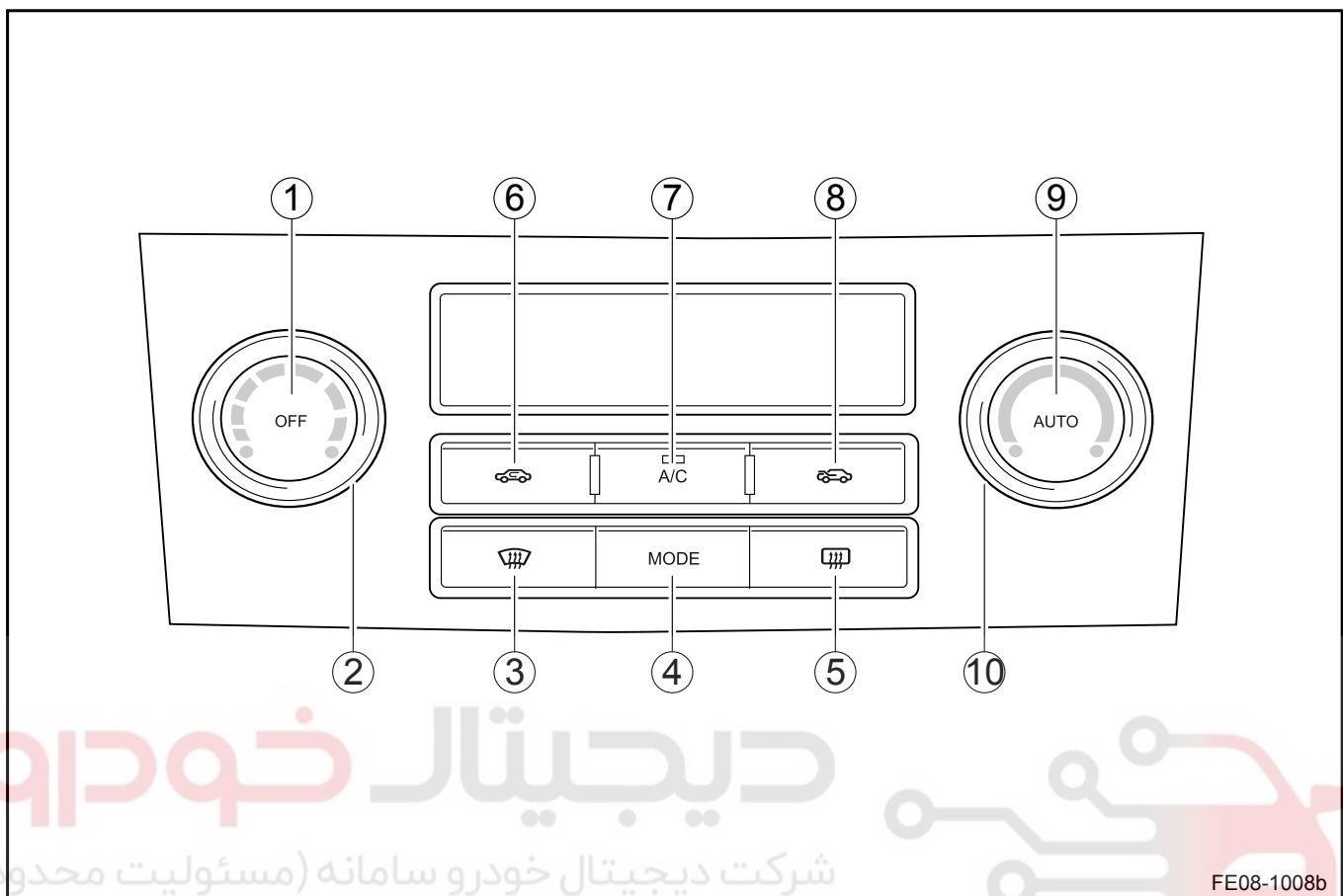
8.2.4.2 Air-conditioning Assembly Component Locator



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Legend

1. Heater Core Inlet and Outlet Pipes	6. Blower Speed Adjusting Module
2. Inside and Outside Circulation Control Motor	7. Air-conditioning Filter
3. Cold and Warm Air Control Motor	8. Inside Temperature Sensor
4. Expansion Valve	
5. Blower	

8.2.4.3 Air-conditioning Panel Diagram



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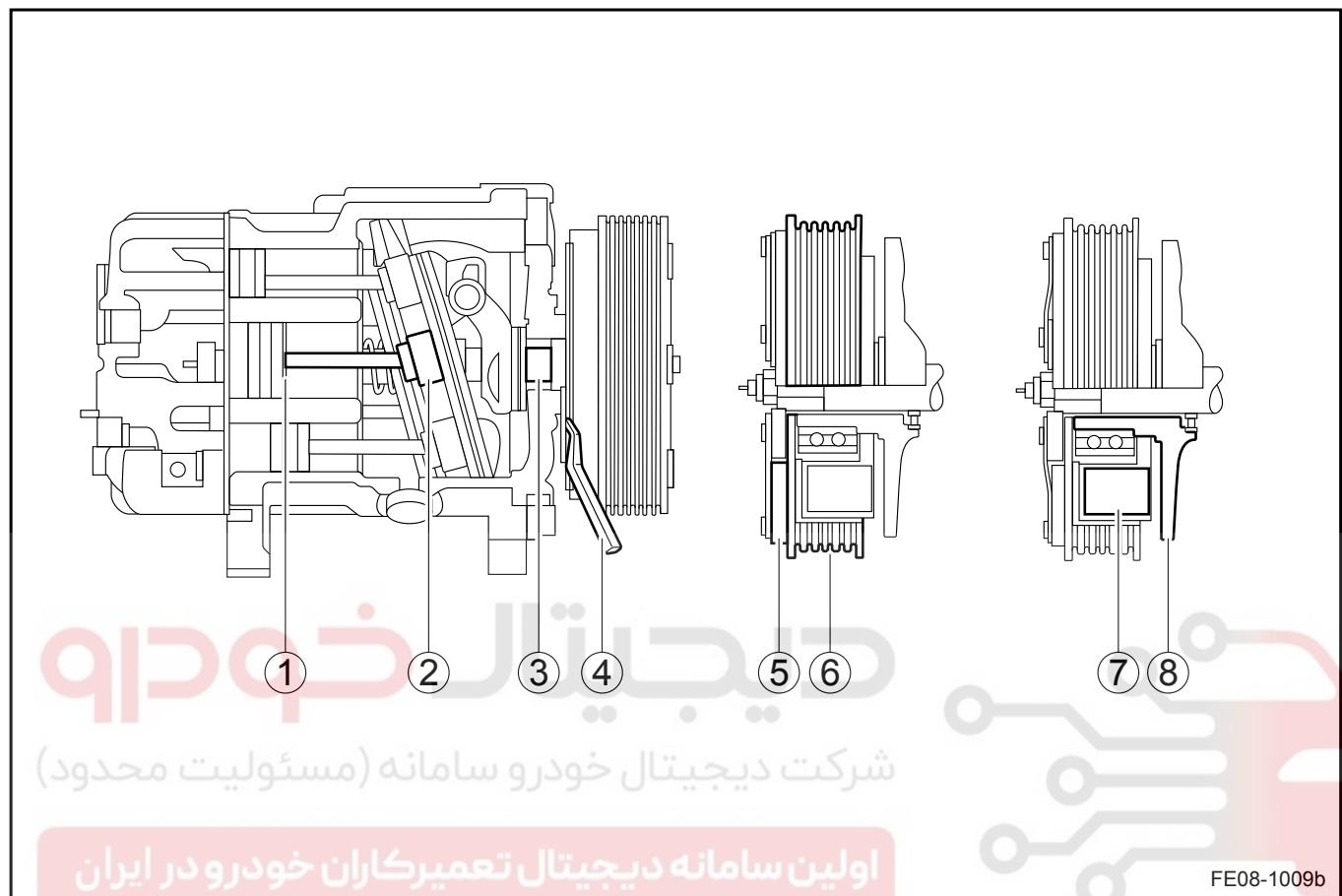
Legend

1. OFF Button	7. Compressor Button
2. Air Volume Control Knob	8. Outside Circulation Button
3. Defrost Button	9. Auto Button
4. Mode Button	10. Temperature Setting Knob
5. Rear Window Defroster Button	
6. Inside Circulation Button	

8.2.5 Disassemble View

8.2.5.1 Disassemble View

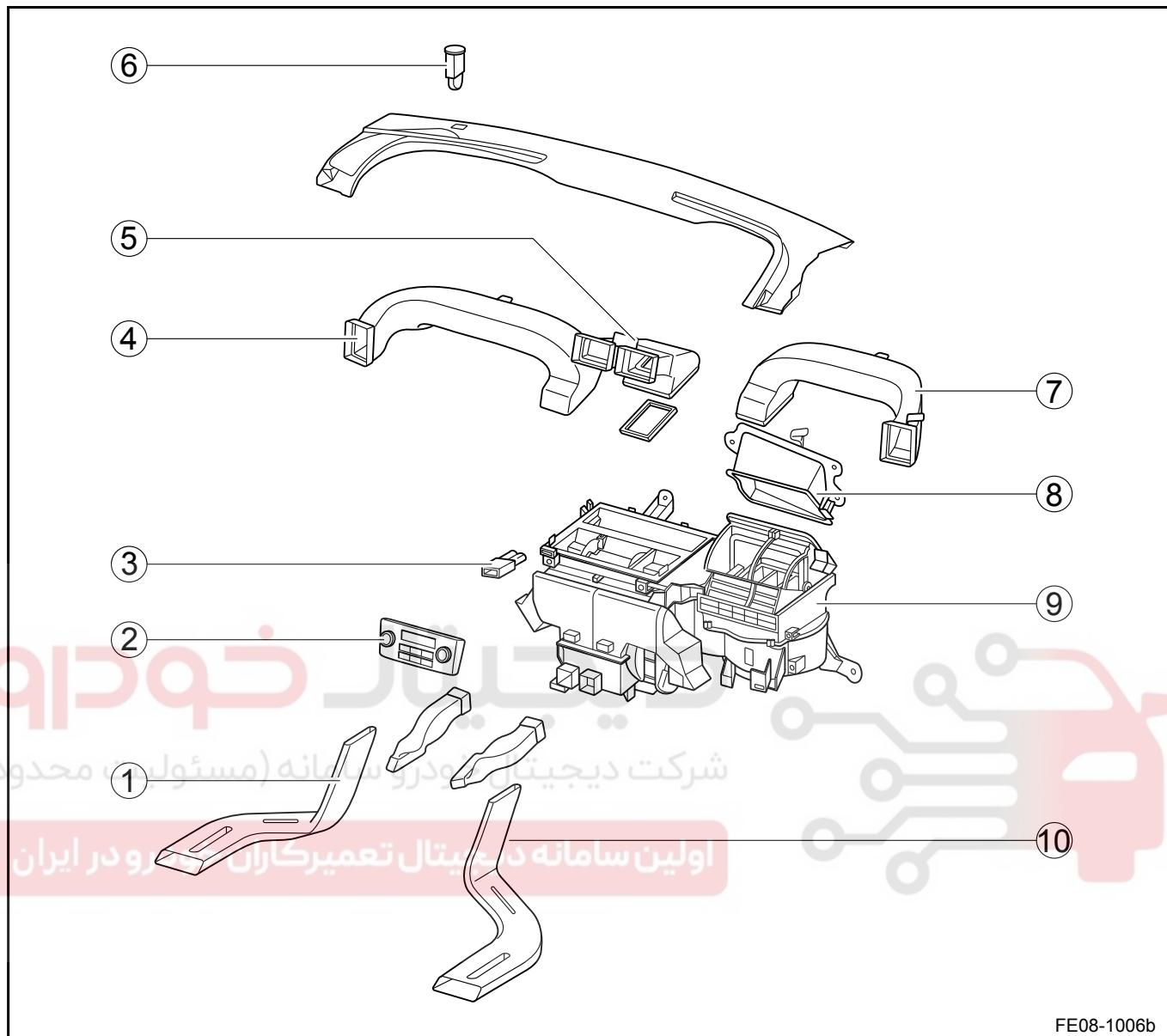
Compressor



Legend

1. Piston and Cylinder	6. Pulley
2. Swash Plate	7. Clutch Coil
3. Compressor Shaft	8. Pressure Plate
4. Clutch Coil Plugs	
5. Pallet	

Air-conditioning System Indoor Components Disassemble View

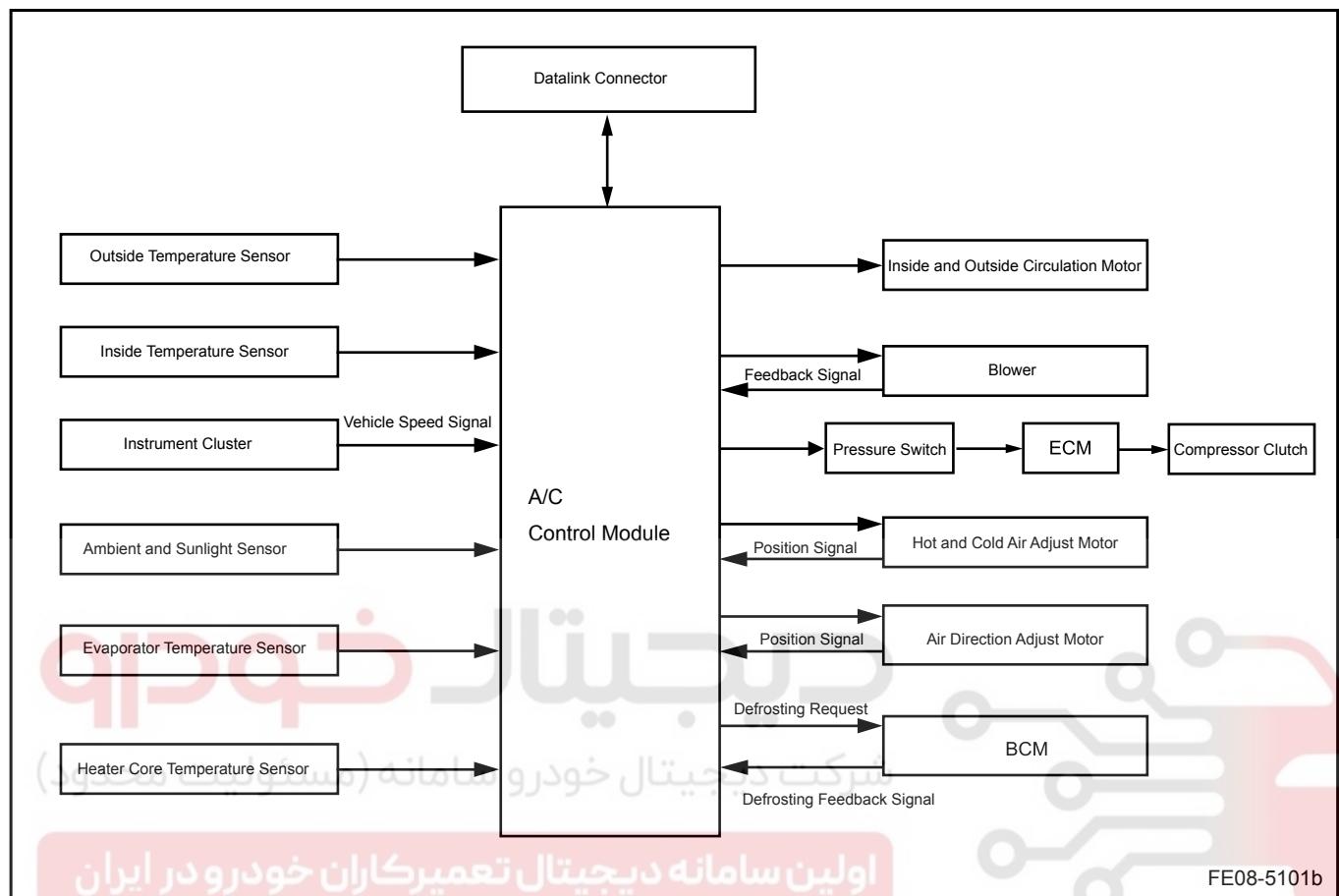


Legend

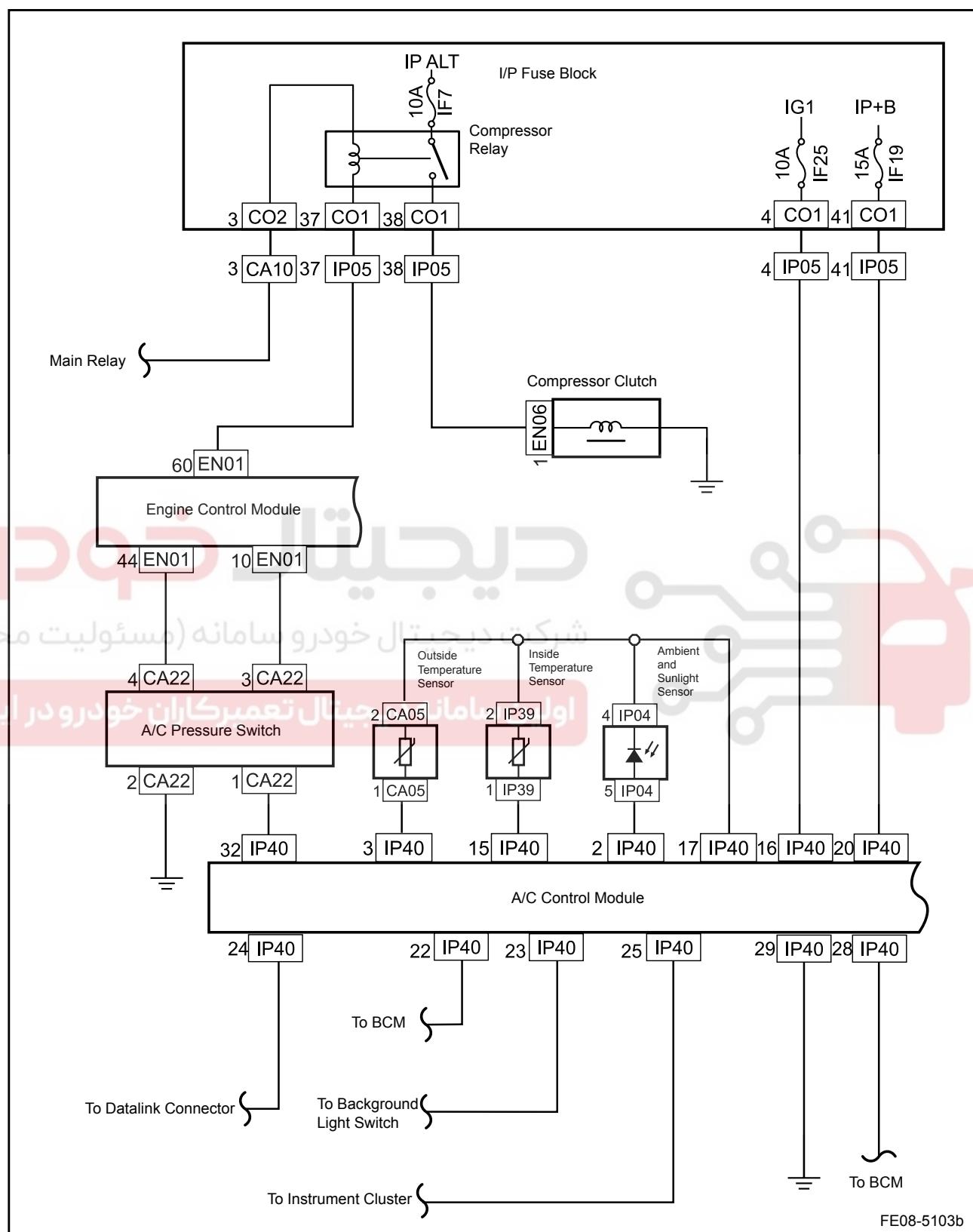
1. Left floor Air Duct	7. Instrument Panel Right Air Duct
2. Air-conditioning Control Panel	8. Outside Circulation Inlet
3. Inside Temperature Sensor	9. Air-conditioning Assembly
4. Instrument Panel Left Air Duct	10. Right floor Air Duct
5. Instrument Panel Center Air Duct	
6. Ambient Light and Sun Light Sensor	

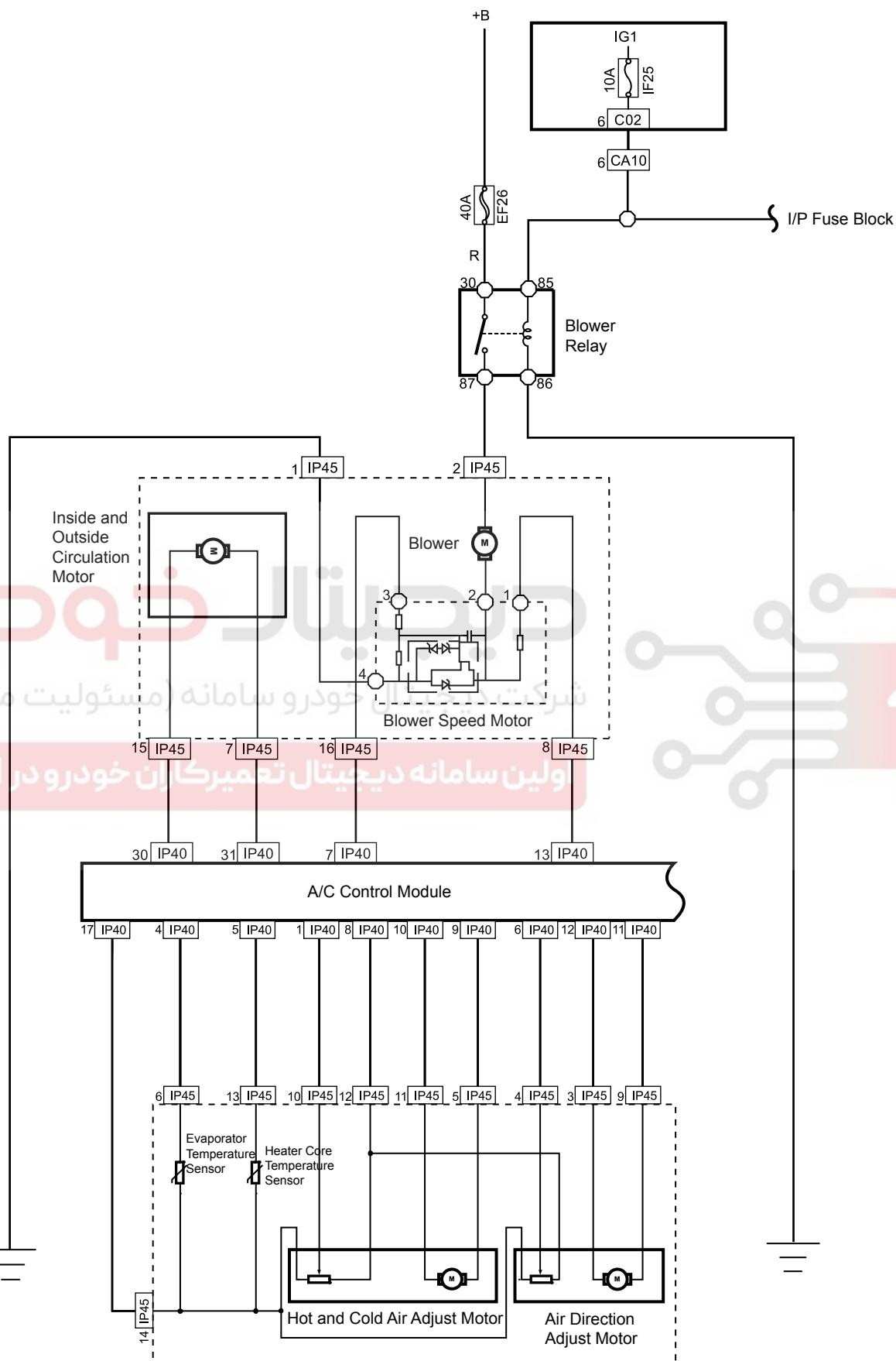
8.2.6 Schematic

8.2.6.1 Air-conditioning Control System Schematic



8.2.6.2 Air-conditioning System Circuit Schematic





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8.2.7 Diagnostic Information and Procedures

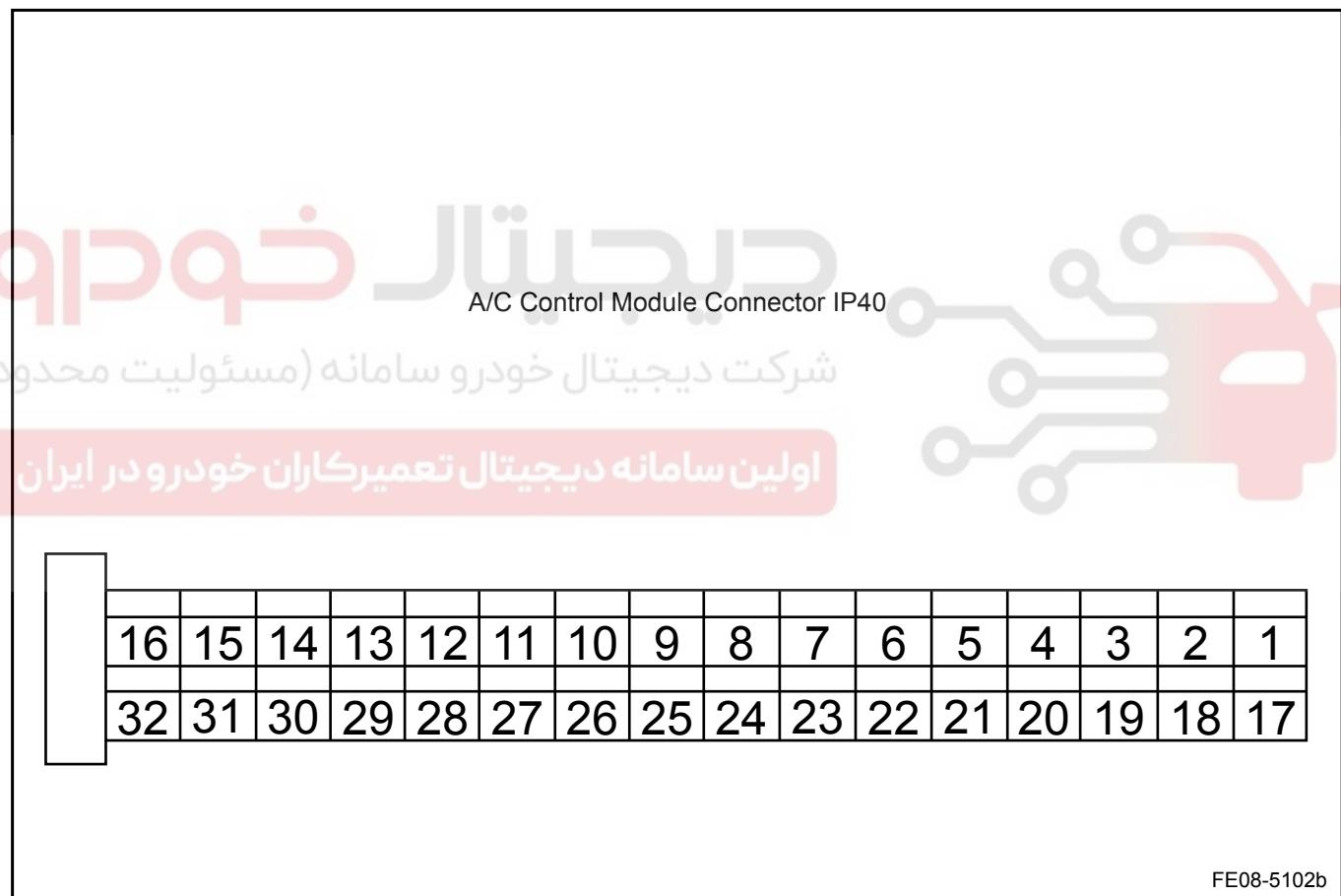
8.2.7.1 Diagnosis Description

Refer to [8.2.2 Description and Operation](#) to get familiar with the system functions and operation before start system diagnostics, so that it will help to determine the correct troubleshooting steps, more importantly, it would also help to determine whether the customer described the situation is normal.

8.2.7.2 Visual Inspection

- Check installed aftermarket equipments that may affect the air-conditioning system performance.
- Check easy to access air-conditioning system components and circuits, to identify whether there is significant damage or potential fault.
- Check easy to access air-conditioning system pipelines, to identify whether there is a leakage.

8.2.7.3 Air-conditioning Control Module Terminal List



A/C Control Module Connector IP40

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	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17

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Comments

- UB IS the battery voltage.
- If there is no instruction, GND is 0 V or close to 0 V.

Terminal ID	Terminal Definition	Wire Color	Terminal Status	Specified Conditions (Voltage, Current, Waveform)
1	Warm and Cold Motor Feedback	0.3 G/Y	Input	GND-5V DC Signal

Terminal ID	Terminal Definition	Wire Color	Terminal Status	Specified Conditions (Voltage, Current, Waveform)
2	Sunshine Value	0.3 W/L	Input	GND-5V DC Signal
3	Outside Temperature	0.3 P/L	Input	GND-5V DC Signal
4	Evaporator Temperature	0.3 W/R	Input	GND-5V DC Signal
5	Heater Core Temperature	0.3 Y/L	Input	GND-5V DC Signal
6	Air Mode Motor Feedback	0.3 G/R	Input	GND-5V DC Signal
7	Blower Control	0.5 L/B	Output	GND-5V PWM Signal
8	5V Voltage	0.3 L/W	Output	5V DC Signal
9	Heating and Cooling Motor - Hot	0.5B / P	Output	GND or UB
10	Heating and Cooling Motor - Cold	0.5 B/G	Output	GND or UB
11	Mode Motor - Face Mode	0.5 B/W	Output	GND or UB
12	Mode Motor - Defrost	0.5 B/Y	Output	GND or UB
13	Blower Feedback	0.5 B/R	Input	GND-UB DC Signal
14	Spare 6	-	-	-
15	Inside Temperature	0.3 W/G	Input	GND-5V DC Signal
16	IG1	0.5 R/O	Power	UB
17	Ground	0.3 Br/G	-	GND
18	Spare 5	-	-	-
19	Spare 4	-	-	-
20	IP + B	0.85 R	Power	UB
21	Spare 3	-	-	-
22	Defrost Feedback	0.5 L	Input	GND or UB
23	Lighting Control	0.3 O/G	Input	GND-UB PWM Signal
24	Data Link Connector	0.5 Gr/P	Input / Output	K_BUS
25	Vehicle Speed Signal	0.3 G	Input	Frequency Signal
26	Spare 2	-	-	-
27	Spare 1	-	-	-
28	Defrost ON / OFF	0.3 L	Output	GND or UB
29	Ground	0.85 B	Power	GND
30	Inside Circulation	0.5 W/L	Output	GND or UB
31	Outside Circulation	0.5 Br/L	Output	GND or UB
32	Compressor ON / OFF	0.5 P/W	Output	GND or UB

8.2.7.4 Data Stream List

Serial Number	Name	Data Range
1	Inside Temperature Sensor	-40°C -80°C
2	Outside Temperature Sensor	-40°C -80°C
3	Evaporator Temperature Sensor	-40°C -80°C
4	Heater Temperature Sensor	-40°C -80°C
5	Ambient and Sun Light Sensor	0-1,250 W
6	Temperature Adjust Motor	0% -100%
7	Air Direction Adjust Motor	0% -100%
8	Inside and Outside Circulation Motor	Inside / Outside
9	Background Light Adjustment	PWM Signal, 0% -100%
10	Compressor Control	On / Off
11	Rear Defrosting Control	On / Off
12	Vehicle Speed Signal	0-255 km/h
13	Blower Voltage	0-16.5 V
14	Battery Voltage	0-18.5 V

8.2.7.5 DTC Code Table

Serial Number	Content	Possible Reasons
1	Inside temperature sensor circuit open or short to power supply or ground	<ol style="list-style-type: none"> 1. Inside Temperature Sensor Malfunction 2. Harness Malfunction 3. Control Module Malfunction
2	Outside temperature sensor circuit open or short to power supply or ground	<ol style="list-style-type: none"> 1. Outside Temperature Sensor Malfunction 2. Harness Malfunction 3. Engine Temperature Abnormal 4. Control Module Malfunction
3	Evaporator temperature sensor circuit open or short to power supply or ground	<ol style="list-style-type: none"> 1. Evaporator Temperature Sensor Malfunction 2. Evaporator temperature sensor is not installed correctly 3. Harness Malfunction 4. Control Module Malfunction

Serial Number	Content	Possible Reasons
4	Heater temperature sensor circuit open or short to power supply or ground	<ol style="list-style-type: none"> 1. Heater Temperature Sensor Malfunction 2. Heater temperature sensor is not installed correctly 3. Harness Malfunction 4. Control Module Malfunction
5	Ambient and sun light sensor circuit open or short to power supply or ground	<ol style="list-style-type: none"> 1. Ambient and Sun Light Sensor Malfunction 2. Harness Malfunction 3. Control Module Malfunction
6	Temperature control motor circuit open or short to power supply or ground	<ol style="list-style-type: none"> 1. Temperature Control Motor Malfunction 2. Throttle Control System Malfunction 3. Harness Malfunction 4. Control Module Malfunction
7	Mode motor circuit open or short to power supply or ground	<ol style="list-style-type: none"> 1. Mode Motor Malfunction 2. Throttle Control System Malfunction 3. Harness Malfunction 4. Control Module Malfunction
8	Inside and outside circulation motor locked or other obstruction	<ol style="list-style-type: none"> 1. Inside and Outside Circulation Motor Malfunction 2. Inside and Outside Circulation Air Duct Malfunction 3. Harness Malfunction 4. Control Module Malfunction
9	Blower circuit open or short to power supply or ground, or speed adjust module abnormal	<ol style="list-style-type: none"> 1. Blower Speed Control Module Malfunction 2. Blower Malfunction 3. Harness Malfunction 4. Control Module Malfunction
10	System voltage is too high or too low	<ol style="list-style-type: none"> 1. Generator Malfunction 2. Control Module Malfunction

8.2.7.6 Air-conditioning Clutch Inoperative

Schematic:

Refer to [8.2.6.2 Air-conditioning System Circuit Schematic](#).

Diagnostic Steps:

Step 1	Check the air-conditioning system related DTC code.
	<p>(a) Connect scan tool, read air-conditioning system related to DTC codes.</p>

(b) Repair the fault indicated by the DTC.

(c) Clear DTC.

Is air-conditioning clutch working properly?

Yes

System normal

No

Step 2 Repair according to the fault symptom table.

(a) Repair as the following fault symptom table.

Symptoms	Suspected Faulty Components	Repair Procedure
Engine Coolant Temperature Too Low	<ol style="list-style-type: none"> ECT sensor malfunction. ECT sensor wiring harness malfunction. Engine cooling system work in the big loop. ECM malfunction. 	<ol style="list-style-type: none"> Repair the ECT harness. Replace the ECT. Replace the thermostat. Repair the ECM, if necessary, replace it.
Air Pressure Switch Signal Abnormal	<ol style="list-style-type: none"> Pressure switch indicates the air pressure signal not comply with the Standard Value:. Pressure switch wiring harness malfunction. ECM malfunction. 	<ol style="list-style-type: none"> Repair the pressure switch wiring harness. Repair the pressure switch. Repair the ECM, if necessary, replace it.

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Symptoms	Suspected Faulty Components	Repair Procedure
Outside Temperature Sensor Signal Abnormal	1. Outside temperature sensor indicates that the temperature below 4°C. 2. Outside temperature sensor wiring harness malfunction. 3. Air-conditioning control module malfunction.	1. Repair the outside temperature sensor wiring harness. 2. Repair the outside temperature sensor. 3. Repair the air-conditioning control module, if necessary, replace it.
Evaporator Temperature Sensor Signal Abnormal	1. Evaporator temperature sensor indicates that the temperature is below 2°C (35.6 °F). 2. Evaporator temperature sensor wiring harness malfunction. 3. Air-conditioning control module malfunction.	1. Replace the evaporator outside temperature sensor wiring harness. 2. Replace the evaporator temperature sensor. 3. Repair the air-conditioning control module, if necessary, replace it.

Symptoms	Suspected Faulty Components	Repair Procedure
Refrigerant Pressures Abnormal	<ol style="list-style-type: none"> 1. Air-conditioning high pressure over 3.14 MPa (455.4 psi). 2. Air-conditioning low pressure lower than 0.196 MPa (28.4 psi). 	<ol style="list-style-type: none"> 1. Discharge the excessive emission of refrigerant. 2. Repair the vehicle cooling malfunction. 3. Repair the engine malfunction. 4. Repair the air-conditioning systems blockage. 5. Repair the air-conditioning systems leakage.

(b) Confirm the repair completed.

Is the air-conditioning clutch working properly?

Yes

System normal

No

Step 3 Check the compressor fuse.

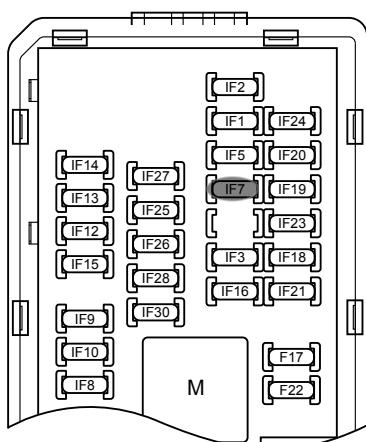
(a) Check the compressor fuse IF7.

Fuse Rating: 10 A

Is the fuse blown?

No

Go to step 5



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Yes

Step 4 Repair the compressor clutch power supply circuit.

(a) Repair compressor clutch power supply circuit short to ground.

Is the air-conditioning clutch working properly?

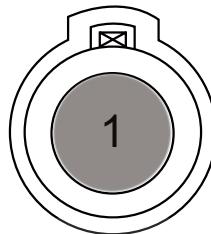
Yes

System normal

No

Step 5 Measure the compressor clutch power supply voltage.

Compressor Harness Connector EN06



FE08-5106b

(a) Start the engine, press the air-conditioning control switch (A / C switch), and measure the compressor clutch terminal EN06-1 voltage.

Standard Voltage: 11-14 V

Is the voltage specified value?

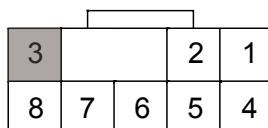
Yes

Replace the compressor clutch.

No

Step 6 Measure the I/P fuse block terminal C02-3 voltage.

I/P Fuse Block Harness Connector C02



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(a) Measure the I/P fuse block terminal C02-3 voltage.

Standard Voltage: 11-14 V

Is the voltage specified value?

No

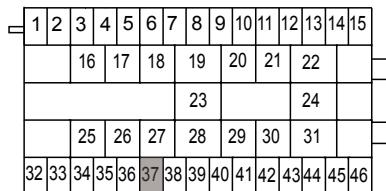
Repair the main relay circuit malfunction.

Refer to [2.2.7.37 DTC P0560 P0562 P0563](#).

Yes

Step 7 Test the I/P fuse block terminal C01-37 working conditions.

I/P Fuse Block Harness Connector C01



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(a) Start the engine.

(b) Connect one end of a test lamp to the battery negative terminal, the other to the I/P fuse block terminal C01-37.

Is the test lamp lit?

Is the test lamp lit?

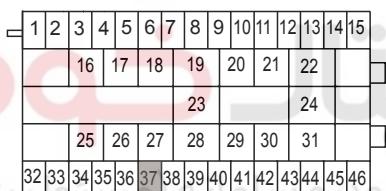
No

Replace the I/P fuse block.

Yes

Step 8 Test the ECM terminal EN01-60 working status.

I/P Fuse Block Harness Connector C01



- (a) Start the engine.
- (b) Connect one end of a test lamp to the battery negative terminal, the other to ECM connector EN01-60.

Is the test lamp lit?

No

Repair the open circuit between ECM terminal EN01-60 and the I/P fuse block terminal C01-37.

Engine Control Module Harness Connector EN01



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Yes

Step 9 | Check the ECM circuit.

- (a) Check the ECM power supply circuit and ground circuit.
- (b) Confirm that ECM power supply circuit and ground circuit are normal.

Is the air-conditioning clutch working properly?

8-30 Automatic Air-conditioning

Heating, Ventilation and A/C System

Yes

System normal

No

Step 10 Replace the ECM.

(a) Replace the ECM. Refer to [2.2.8.8 Engine Control Module Replacement](#).

Is the air-conditioning clutch working properly?

Yes

System normal

No

Step 11 Test the air pressure switch terminals CA22-1 working status.

(a) Start the engine, press the air-conditioning control switch (A / C switch).

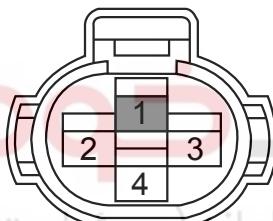
(b) Connect one end of a test lamp to the battery positive terminal, the other to the air pressure switch terminal CA22-1.

Is the test lamp lit?

Yes

Replace the air-conditioning pressure switch.

A/C Pressure Switch Harness Connector CA22



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No

Step 12 Test the air-conditioning control module terminal IP40-32 working status.

(a) Start the engine, press the air-conditioning control switch (A / C switch).

(b) Connect one end of a test lamp to the battery positive terminal, the other to the air control module terminal IP40-32.

Is the test lamp lit?

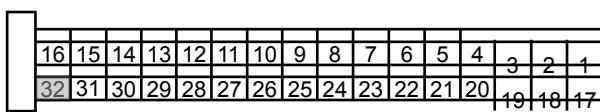
Yes

Repair the open circuit between air-conditioning control module terminal IP40-32 and air-conditioning Pressure Switch Terminal CA22-1.

A/C Pressure Switch Harness Connector CA22



A/C Control Module Harness Connector IP40



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No

Step 13 Check the air-conditioning control module circuit.

- (a) Check the air-conditioning control module power supply circuit and ground circuit.
- (b) Confirm that the air-conditioning control module power supply circuit and ground circuit are normal.

Is air-conditioning clutch working properly?

Yes

System normal

No

Step 14 Replace the air-conditioning control module.

- (a) Replace the air-conditioning control module. Refer to [8.2.8.1 Air-conditioning Control Panel Replacement](#).

Confirm the repair completed.

Next

Step 15 System normal.

8.2.7.7 Air-conditioning Blower Inoperative

Schematic:

Refer to [8.2.6.2 Air-conditioning System Circuit Schematic](#)

Diagnostic Steps:

Step 1 Check air-conditioning system failure codes DTC.

- (a) Connect scan tool, read air-conditioning system related to DTC codes.
- (b) Clear DTC.

Is blower working properly?

Yes

System normal

No

Step 2 Check blower relay L.

- (a) Repair according to the fault symptom table.

Symptoms	Suspected Faulty Components	Repair Procedure
Blower relay terminal No. 30 has no battery voltage	1. Fuse EF26 (40A) Blown 2. Harness Malfunction	1. Repair the harness. 2. Replace the fuse EF26.

Symptoms	Suspected Faulty Components	Repair Procedure
Blower relay terminal No.85 has no battery voltage	1. Fuse IF25 (10 A) Blown 2. Harness Malfunction	1. Repair the harness. 2. Replace the fuse IF25.
Blower assembly IP45-2 has no battery voltage	1. Blower Relay Malfunction 2. Harness Malfunction	1. Replace the blower relay. 2. Repair the harness.
Blower relay terminal No.86 poor connection to ground	1. Harness Malfunction 2. Ground G3 Malfunction	1. Repair the harness. 2. Repair ground G3 poor connection.
Blower relay terminal No. 86 and No. 85 between the resistance does not meet the standard	Blower relay Malfunction.	Replace the blower relay.

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(b) Confirm the repair completed.

Is blower working properly

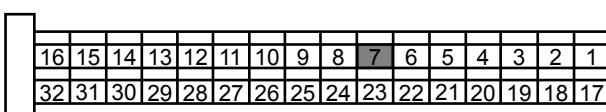
No

Step 3	Check the air-conditioning control module terminal IP40-7 voltage.
--------	--

A/C Control Module Harness Connector IP40

(a) Start the engine.
 (b) Adjust the air-conditioning air flow knob on the control panel.
 (c) Measure air-conditioning control module terminal IP40-7 voltage with a multimeter.
 (d) Each air flow speed voltage standard values are as shown.

Air Low	Blower	Blower Terminal Voltage
0	0	0
1	1	4.4 ± 0.3
2	2	5.1 ± 0.3
3	3	6.7 ± 0.3
4	4	8.2 ± 0.3



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5	5	9.9 ± 0.3
6	6	11.7 ± 0.3
7	7	13.1 ± 0.3

Are the voltages specified values?

Yes

System normal

No

Step 4 Check the air-conditioning control module circuit.

- (a) Check the air-conditioning control module power supply circuit and ground circuit.
- (b) Confirm that the air-conditioning control module power supply circuit and ground circuit are normal.

Is the blower working properly?

Yes

System normal

No

Step 5 Replace the air-conditioning control module.

- (a) Replace the air-conditioning control module. Refer to [8.2.8.1 Air-conditioning Control Panel Replacement](#).

Is the blower working properly?

Yes

System normal

No

Step 6 Measure the blower assembly plug terminal IP45-16 voltage.

- (a) Start the engine.

- (b) Adjust the air-conditioning air flow knob on the control panel.
- (c) Measure the blower assembly plug terminal IP45-16 voltage with a multimeter.

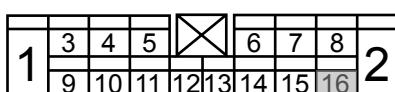
Voltage Standard Value: 4.1-13 .4 V

Is the terminal IP45-16 voltage specified value?

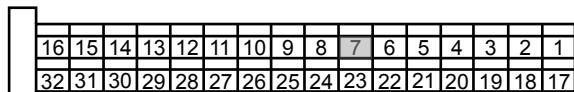
Yes

Repair the open circuit between air-conditioning control module terminal IP40-7 and the blower plug terminal IP45-16 assembly.

A/C Actuator Harness Connector IP45



A/C Control Module Harness Connector IP40



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No

Step 7 Replace the blower speed control module.

(a) Replace the blower speed control module. Refer to [8.2.8.8 Blower Speed Control Module Replacement](#).

Is the blower working properly?

Yes

System normal

No

Step 8 Repair the blower according to the fault symptom table.

(a) Repair the blower according to the fault symptom table as following.

Symptoms	Suspected Malfunction Components	Repair Procedure
Blower catching	1. Blower fan blade has foreign matter. 2. Blower fan blade damaged. 3. Blower motor has foreign matter, catching.	1. Clean the blower fan blade foreign matter. 2. Clean the blower fan blade foreign matter. 3. Replace the blower motor assembly, including fan blade.
Blower motor inoperative	Blower motor damaged	Replace the blower motor assembly, including fan blade.

(b) Make sure the blower is working correctly.
Confirm the repair completed.

Next

Step 9 System normal.

8.2.7.8 Insufficient Cooling

Malfunction Symptom Table

Symptoms	Suspected Malfunction Components	Repair Procedure
Engine coolant temperature is too high	1. Engine runs at idle for too long. 2. Engine runs with heavy load for too long. 3. Lack of engine coolant 4. Engine coolant performance does not meet the requirements 5. Thermostat Malfunction 6. Engine Malfunction 7. Cooling fan is running exception 8. Cooling fan does not work properly 9. Radiator Malfunction 10. Cooling fan cover is damaged	1. Reduce the engine idle running time. 2. Reduce the engine running time under heavy load. 3. Inspect for engine coolant leakage, add the engine coolant to the standard amount. 4. Replace the engine coolant with coolant comply with Geely requirements. 5. Replace the thermostat. 6. Inspect the engine cooling system. 7. Inspect the engine working condition. 8. Inspect the cooling fan motor and its circuit, if necessary, replace it. 9. Clean the coolant reservoir. 10. Inspect the coolant reservoir, if necessary, replace it. 11. Inspect the cooling fan cover, if necessary, replace it.
(Condenser temperature is too high)	1. Poor condenser radiation 2. The engine coolant temperature is too high.	1. Clean the condenser. 2. Inspect the condenser, if necessary, replace it. 3. Repair according to "the engine coolant temperature is too high," symptom in this table.
Compressor Operation Abnormal	1. Compressor belt slipping 2. Compressor clutch slipping 3. Compressor abnormal sound 4. Frequent compressor start 5. Compressor inoperative	1. Adjust the compressor belt, if necessary, replace it. 2. Inspect the compressor clutch, if necessary, replace it. 3. Check refrigerant, lubricant quantity. Refer to "air-conditioning system pressure abnormal" symptom in this table. 4. Inspect the compressor clutch circuit. 5. Inspect the compressor, if necessary, replace it. 6. Inspect the air-conditioning pressure switch, if necessary, replace it. 7. Inspect the air-conditioning control module, if necessary, replace it. 8. Inspect the engine control module, if necessary, replace it.

Symptoms	Suspected Malfunction Components	Repair Procedure
Instrument Air Duct Air Flow Too Small	1. Instrument air duct blocked 2. Instrument air duct leakage 3. Air direction control mechanism abnormal 4. Air direction control motor abnormal 5. Blower speed too low 6. Blower Speed Control Module abnormal 7. Air-conditioning pipes frozen 8. Air-conditioning control module abnormal	1. Clean the instrument air duct, if necessary, replace it. 2. Inspect the Instrument air duct, if necessary, replace it. 3. Inspect the air direction control mechanism 4. Inspect the air direction control motor. 5. Inspect the circuits. 6. Repair the blower motor, if necessary, replace it. 7. Replace the blower speed control module. 8. Replace the old refrigerant with the refrigerant comply with Geely standard. 9. Replace the expansion valve. 10. Inspect the air-conditioning control module circuits, if necessary, replace the module.
Instrument air duct air temperature is too high	1. Switched to the outside circulation 2. The ambient temperature is too high 3. Outside circulation valve catching or not closed 4. Inside circulation motor malfunction 5. Temperature control mechanism abnormal 6. Temperature control motor abnormal 7. Ambient and sun light temperature sensor abnormal 8. Air-conditioning control module abnormal	1. Switch to the inside circulation. 2. Move the vehicle to a cool place. 3. Adjust the outside circulation valve, if necessary, replace it. 4. Replace the inside and outside circulation regulation motor. 5. Inspect the temperature control motor, if necessary, replace it. 6. Inspect the ambient and sun light temperature sensor, if necessary, replace it. 7. Inspect the air-conditioning control module circuits, if necessary, replace it.
Air-conditioning high pressure too high, low pressure too high	1. Air entering the cooling system 2. Refrigerant overfill 3. Refrigerant lubricant overfill 4. Expansion valve opening too wide	1. Inspect the cooling system ducts airtight, re-fill refrigerant. 2. Excessive discharge refrigerant. 3. Excessive discharge refrigerant lubricant. 4. Replace the expansion valve.
Air-conditioning high pressure too high, low pressure too low	1. High-pressure pipe before the expansion valve blocked 2. Expansion valve blocked 3. The expansion valve opening too small	1. Clean or replace the blocked high pressure pipes. 2. Replace the expansion valve.

Symptoms	Suspected Malfunction Components	Repair Procedure
Air-conditioning high pressure too low, low pressure too high	1. Lack of compressor oil 2. Compressor damaged	1. Add compressor refrigerant lubricant. 2. Replace the compressor.
Air-conditioning high pressure too low, low pressure too low	1. Insufficient refrigerant 2. Refrigerant Leakage	1. Fill refrigerant according to Geely standard. 2. Inspect the air-conditioning systems leakage, replace the leaking air-conditioning system components.
Air-conditioning high pressure too low, low pressure close to vacuum	1. Seriously expansion valve blockage 2. Expansion valve blocked by ice 3. Evaporator temperature sensor malfunction 4. Low pressure pipe leakage	1. Replace the expansion valve. 2. Extend the system vacuuming time, fill air-conditioning refrigerant according to Geely standard. 3. Replace the reservoir dryer. 4. Replace the evaporator temperature sensor. 5. Clean or replace blocked low pressure pipes.

8.2.7.9 Insufficient Heating

Fault Symptom Table

Symptoms	Suspected Malfunction Components	Repair Procedure
The engine coolant temperature does not reach 82°C (180 °F)	1. Thermostat Malfunction 2. The engine running time is not long enough. 3. Air entering the cooling system 4. Poor engine working conditions.	1. Extend the engine running time. 2. Bleed the air in the cooling system. 3. Replace the thermostat. 4. Inspect the engine working conditions.
Warm and Cold Air Leakage	1. Throttle body heating and cooling mechanical malfunction 2. Warm and cold air motor malfunction 3. Air duct leakage 4. Air-conditioning control module malfunction	1. Adjust the throttle body heating and cooling mechanism. 2. Replace the heating and cooling regulation motor. 3. Replace the throttle body heating and cooling mechanism. 4. Repair the leaking air duct. 5. Replace the leaking air duct. 6. Replace the air-conditioning control module.

Inside and Outside Circulation Valve Leakage	<ol style="list-style-type: none"> 1. Switch to outside circulation. 2. Outside circulation closing valve catching or not closed. 3. Inside and outside circulation motor malfunction 4. Air-conditioning control module malfunction 	<ol style="list-style-type: none"> 1. Switch to the inside circulation. 2. Adjust the outside circulation mechanism. 3. Replace the inside and outside circulation motor. 4. Replace the inside and outside circulation mechanism. 5. Replace the air-conditioning control module.
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8.2.7.10 Air-conditioning Refrigerant Recovery and Filling

Air-conditioning (A/C) system, operating efficiency and service life depend on the the cooling system chemical stability. When the cooling system is contaminated by foreign matter (such as dust, air or moisture), the pollutants will change the refrigerant and compressor oil 100 PG stability. and, also affect the relationship between pressure and temperature, reduce work efficiency, and may lead to abnormal wear of internal components corrosion. Please ensure that the system chemical stability as following:

1. Before open joints, wipe the oil around the joints, reducing the possibility of oil entering into the system.
2. Disconnect the connector, immediately using a cap, plug, or tape to seal joints at both ends to prevent oil, foreign matter and moisture entering.
3. Keep all the tools clean, dry, including the manifold pressure gage components, and all replacement parts.
4. With clean, dry delivery devices and containers to add 100 PG refrigerant oil, ensure the refrigerant oil is not affected by moisture.
5. During operation, minimize the time the air-conditioning system exposed to air.
6. Empty and fill the air-conditioning system after exposing to air. All repairs must be dried and sealed before leaving the factory. Only open the sealed parts before the upcoming installation. All parts should be at room temperature to prevent moisture condensation in the air entering into the system, and re-seal all the parts as soon as possible.

Bleed air-conditioning system, add lubricant, emptying and filling process

Warning!

Refer to "Breathing R-134a Warning" in "Warnings and Notices". Other relevant health and safety information can be obtained from refrigerant and lubricant manufacturers.

Warning!

Refer to "Protective Goggles and Glove Warning" in "Warnings and Notices".

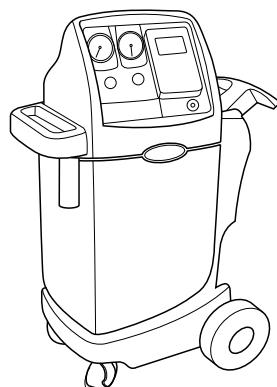
Filling air-conditioning systems, bleeding, emptying and re-filling process can be done within one connection. During the recovery and evacuation, refrigerant must be filtered in order to ensure the air-conditioning system refrigerant clean and dry.

1. Do not use R-12 filling machine for filling R-134a system. The two systems refrigerant and refrigerant oil are not compatible and must not mix, even a small amount is not allowed, mixed with residual refrigerant may damage the equipment.
2. Do not use different-diameter joints in order to ensure airtight within the system.

Filling Machine Installation and Maintenance

There are a lot filling machine types. All filling machines implement air-conditioning system bleeding, refrigerant recovery, system evacuation, adding refrigerant oil and cooling agent filling tasks. Refer to the filling machine manual, grasp the initial setup and maintenance procedures.

A/C Refrigerant Recycling and Filling Machine



FE08-0063b

Control Panel Features

Filling machine operators can use control buttons and indicator light to control and monitor operations. Refer to filling machine manual, which should include the following:

1. Main Power Supply Switch: Control panel power supply.
2. Display: Programmed vacuum time and re-filling weight of the refrigerant. Refer to the manufacturer's instruction manual to understand the detailed programming information.
3. Low-pressure Side Manifold Pressure Gage: System low pressure.
4. High-pressure Side Manifold Pressure Gage: System high pressure.
5. Control Panel: It includes control of various operational functions of the control.
6. Low-pressure Side Valve: The valve is used to connect low-pressure side and air-conditioning systems filling machine.
7. Humidity Indicator: This indicator is indicative of refrigerant wet.
8. High-pressure Side Valve: The valve is used to connect high-pressure side and air-conditioning systems filling machine.

Refrigerant Recovery

Note

Only use machine specially designed for filling the refrigerant tank. Anti-overcharge filling machine body is designed for the use of such refrigerant tank and calibration. The refrigerant tank valve is manufactured specifically for the device.

1. Connect the high pressure side hose quick connector to the vehicle air-conditioning system.
2. Open the high pressure side connector valve.
3. Connect the low pressure side hose quick connector to the vehicle air-conditioning system.
4. Open the low pressure side connector valve.

Note

If the refrigerant runs out, immediately stop recovery operations, otherwise the air will be inhaled into the recovery tank.

5. Check the filling machine control panel high pressure and low pressure gage to ensure that air-conditioning systems are under pressure. If there is no pressure, then there is no recyclable refrigerant.
6. Open high pressure and low pressure valves.
7. Open the refrigerant air and liquid valve.

8-40 Automatic Air-conditioning

Heating, Ventilation and A/C System

8. Empty refrigerant oil in the oil separator.
9. Close release valve.
10. Connect the filling machine to the appropriate power outlet.
11. Connect the main power switch.

Note

Do not mix the old refrigerant oil and the new refrigerant oil together. The old oil may have aluminum deposit or mixed with other foreign matter. Re-fill the air-conditioning system, make sure use the new refrigerant oil. Properly discard the used refrigerant oil.

Note

Part of the air-conditioning systems 100 PG lubricant may be recycled along with the refrigerant. Filling machine separates the lubricant and the refrigerant, it can determine the amount of recovered oil. When re-filling system, add the equivalent weight lubricant. Refer to the manufacturer's manual to learn more about filling machine.

12. Start the recycling process. Refer to the manufacturer's manual to learn more about filling machine.
13. Wait for 5 min, and then check the control panel low pressure gage. If the air-conditioning system maintains the vacuum, then the recovery is completed.

Note

If the control panel indicator light showing refrigerant can full in the recovery period, and the filling machine is turned off, then load an empty can, for the refrigerant storage. Do not use other types of refrigerant cans.

14. If the low pressure gage readings increase from zero, it indicates that system still has refrigerant. Recover the remaining refrigerant. Repeat this step until the system maintains a vacuum 2 min.

Emptying

Refrigerant tank filling machine must be equipped with sufficient amount of R-134a refrigerant for filling. Check refrigerant tank. If the cooling agent is less than 3.6 kg (8 lb), add new refrigerant to the refrigerant tank. Refer to filling machine instruction manual to find ways to add refrigerant.

1. Check whether high pressure and low pressure hoses are connected to the air-conditioning system, open the filling machine Control Panel high pressure and low pressure valves.
2. Open the refrigerant tank air and liquid valves.

Note

Refer to the manufacturer's instruction manual to learn more about filling machine. The system must first be emptied in order to re-fill new refrigerant or regenerated refrigerant.

3. Start the vacuum pump and start emptying process. In the recycling process, the non-condensed gas (mostly air) automatically discharges from the tank. You will hear the sound of pressure relief.

Note

Regularly change the vacuum pump oil. Refer to the manufacturer's instruction manual to learn more about filling machine.

4. Check whether the system leaks. Refer to the manufacturer's instruction manual to learn more about filling machine.

Air-conditioning System Lubricant Filling

Add lubrication oil, as the oil is discharged during the air-conditioning system recovery.

1. Use lubricant with a scale of bottled 100 PG exclusively for R-134a system.

2. Refer to the manufacturer's instruction manual to learn more about filling machine. add the appropriate amount 100 PG lubricant to the system.
3. When the fuel injection meet the requirement, close the valve.

Note

Remember to tighten the oil cap to prevent moisture or contaminants entering. This operation requires air-conditioning systems to have a certain degree of vacuum. Do not open filling valve when the air-conditioning system has a positive pressure, otherwise it will lead to oil flow back to the Oil Bottle. When filling or adding lubricant, the oil level can not be lower than the oil-absorbing tube, otherwise air will enter the air-conditioning system.

Filling

Note

Empty before filling the air-conditioning system.

1. Close the Control Panel low pressure valve.
2. Close the Control Panel high pressure valve.
3. Refer to the manufacturer's instruction manual to learn more about filling machine.
4. Fill the air-conditioning refrigerant with necessary amount to ensure that the correct units measurement (i.e. kilograms or pounds).
5. Start Filling.

Refrigerant filling successfully completed

1. Close filling machine control panel high pressure and low pressure valves. two valves should be closed.
2. Start the vehicle and turn on the air-conditioning system.
3. Keep the engine running, until the high pressure and low pressure gage pressure readings are stable.
4. Compare the reading with the system specifications.
5. Check the evaporator outlet temperature to ensure that air-conditioning system operating system specifications.
6. Keep the air-conditioning running.
7. Close high pressure quick connector valve.
8. Disconnect the high pressure hose from the vehicle.
9. On the control panel, open high pressure and low pressure valves. The system will quickly inhale refrigerant through the low pressure hose.
10. Disconnect the low pressure quick connector valves.
11. Disconnect the low pressure hose from the vehicle.

Refrigerant filling unsuccessful

Sometimes refrigerant entering the air-conditioning system does not meet the total filling volume. There are two reasons for this situation:

1. Filling machine pressure and the air-conditioning refrigerant pressure is similar. It will lead to filling too slowly. Refer to the manufacturer's instruction manual to learn more about filling machine.
2. There is not enough refrigerant in refrigerant tank for filling. In this regard, recover the refrigerant from the vehicle, and then empty the air-conditioning system, add refrigerant to refrigerant tank, then finally re-fill. Refer to the manufacturer's instruction manual to learn more about filling machine instructions.

8.2.8 Removal and Installation

8.2.8.1 Air-conditioning Control Panel Replacement

Removal Procedure

Warning!

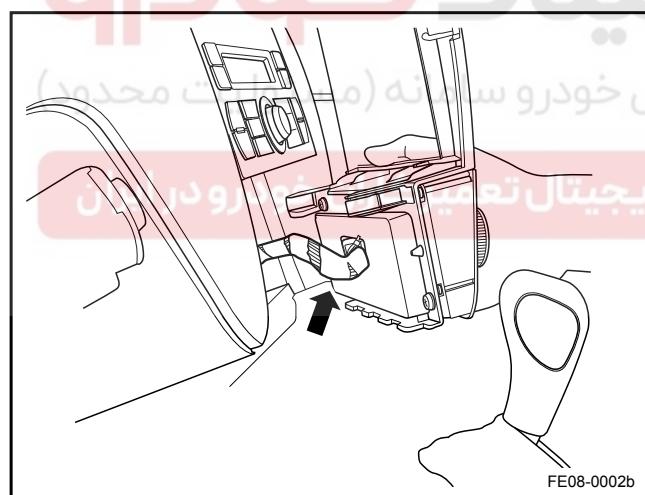
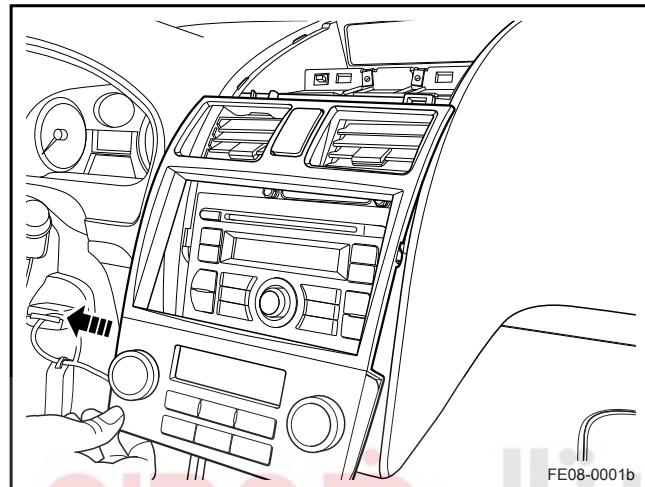
Refer to "Battery Disconnect Warning" in "Warnings and Notices".

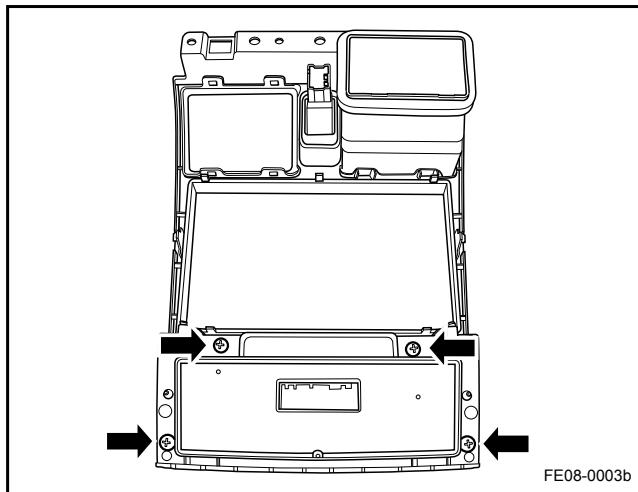
1. Disconnect the battery negative cable. Refer to [2.11.8.1 Battery Disconnection](#).

Note

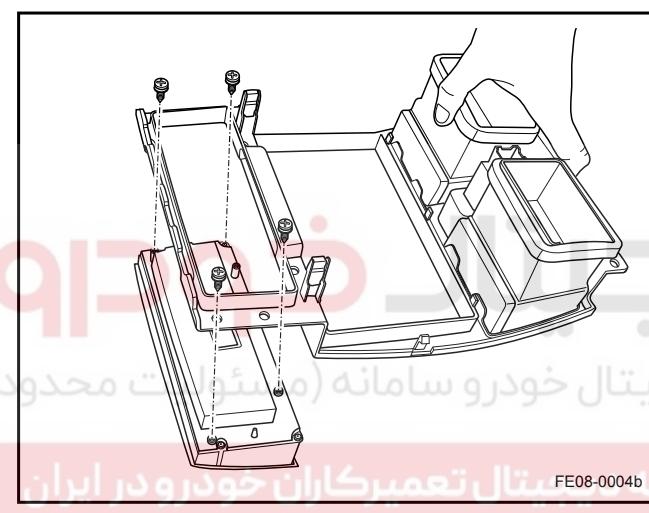
Please use special tools to remove interior panels, otherwise panels will be easily scratched.

2. Remove the instrument cluster. Refer to [11.15.8.1 Instrument Cluster Replacement](#).
3. Remove the instrument cluster center air duct (the air-conditioning control module is retained on the center air duct panel). Refer to [8.2.8.11 Instrument Panel Air Duct Replacement](#).
4. Disconnect the air-conditioning control module harness connector from the back of the center air duct panel.



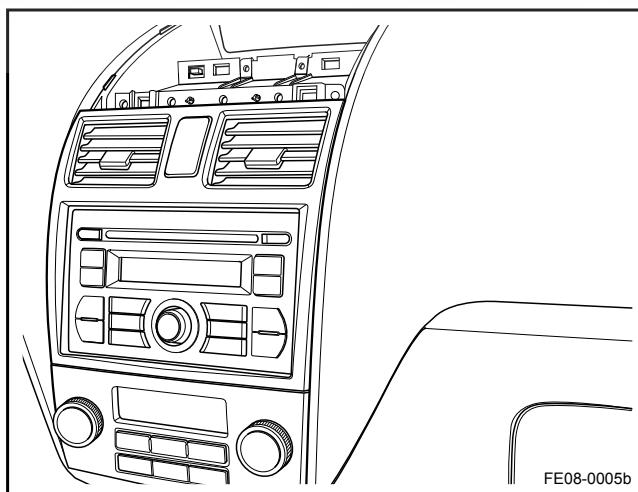


5. Remove the air-conditioning control module retaining screw from the center air duct panel and remove the air-conditioning control module.



Installation Procedure:

1. Install the air-conditioning control module and tighten the air-conditioning control module to the center air duct panel retaining screw.
2. Connect the air-conditioning control module harness connector on the back of the center air duct panel..
3. Install the center air duct panel.
4. Install the instrument cluster.



8.2.8.2 Air-conditioning Pipe Replacement

Cooling Pipe Replacement

Removal Procedure

Warning!

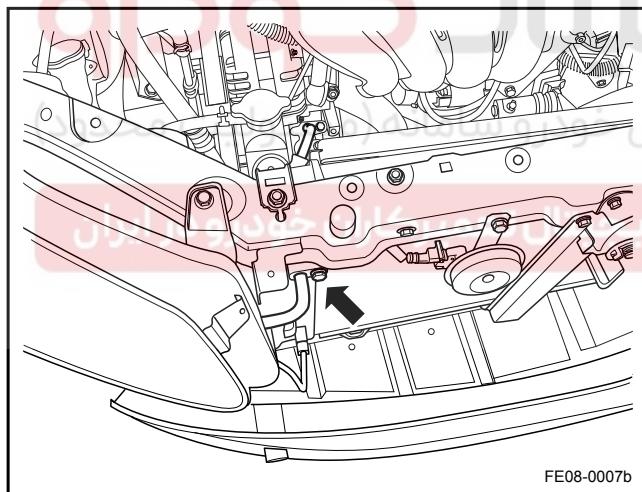
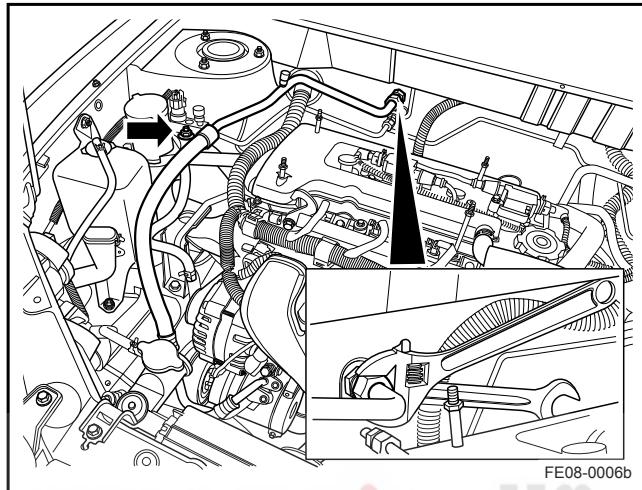
Refer to "Breathing R-134a Warning" in "Warnings and Notices".

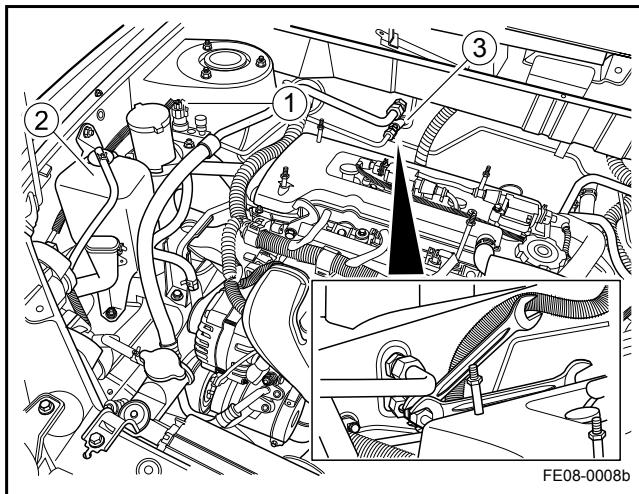
1. Carry out the air-conditioning refrigerant recovery procedure. Refer to [8.2.7.10 Air-conditioning Refrigerant Recovery and Filling](#).
2. Disconnect the battery negative cable. Refer to [2.11.8.1 Battery Disconnection](#).
3. Remove the evaporator to the air-conditioning compressor low pressure pipe.

Note

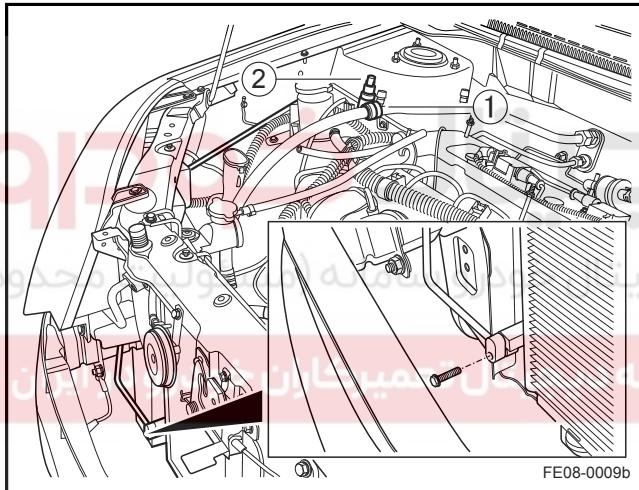
To remove the evaporator, use two wrenches. One is to hold the evaporator side pipe to prevent damage to pipes.

4. Remove the front bumper. Refer to [12.4.3.1 Front Bumper Replacement](#).
5. Remove the air-conditioning compressor to the condenser high pressure pipe.





6. Disconnect the air-conditioning refrigerant pressure switch harness connector (1), remove the coolant reservoir (2), remove the evaporator to the air-conditioning compressor high pressure pipe and bracket (3).



Installation Procedure:

Note

During the installation, replace all the used O-rings.

1. Install evaporator to the air-conditioning compressor high pressure pipe and bracket (1), connect the air-conditioning refrigerant pressure switch harness connector (2), install the coolant reservoir.

Evaporator side high-pressure pipe fittings

Torque: 18 Nm (Metric) 13.3 lb-ft (US English)

Condenser side lower high pressure pipe fittings

Torque: 9 Nm (Metric) 6.7 lb-ft (US English)

Air-conditioning high-pressure pipe bracket bolts

Torque: 6 Nm (Metric) 4.4 lb-ft (US English)

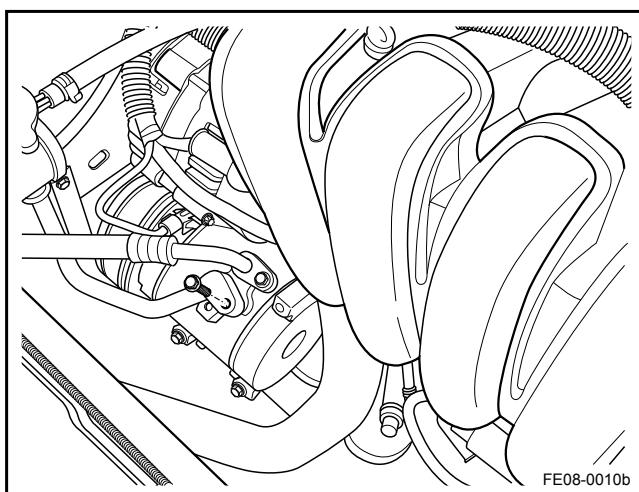
Note

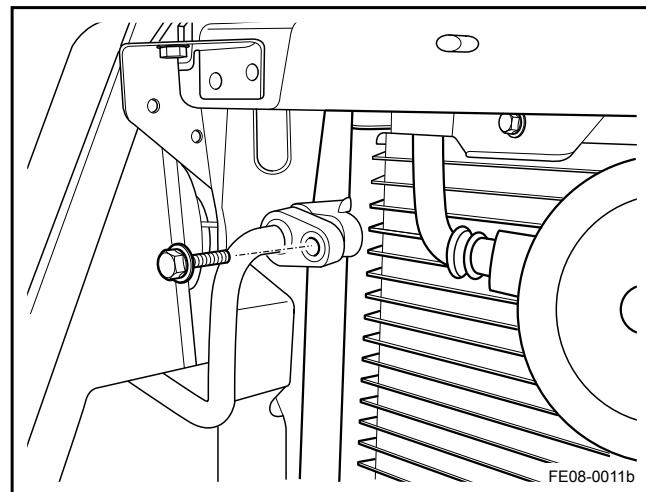
To install the air-conditioning pipes, firstly insert the pipes all the way and then tighten the retaining bolts or nuts, to prevent damage to O-rings and pipe joints.

2. Install the air-conditioning compressor to the condenser high pressure pipe.

Compressor side bolt

Torque: 11 Nm (Metric) 8.1 lb-ft (US English)





Condenser side bolt

Torque: 9 Nm (Metric) 6.7 lb-ft (US English)

3. Install the evaporator to the air-conditioning compressor low pressure pipe.

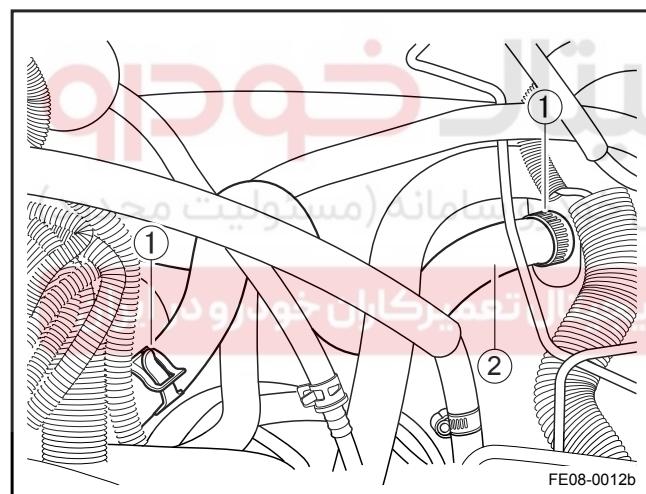
Compressor side bolt

Torque: 11 Nm (Metric) 8.1 lb-ft (US English)

Evaporator-side hard-pipe connection

Torque: 25 Nm (Metric) 18.5 lb-ft (US English)

4. Carry out the air-conditioning refrigerant recovery procedure.
5. Install the front bumper.



Warm Air Pipe Replacement

Removal Procedure

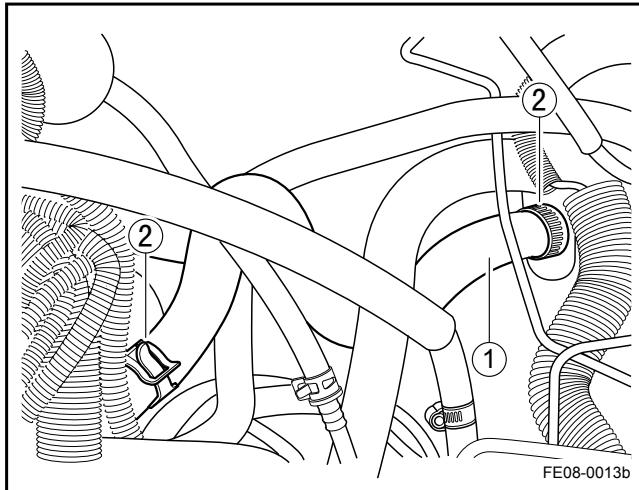
1. Discharge the engine coolant. Refer to [2.8.8.1 Engine Coolant Discharge and Filling](#).
2. Release the pipe retaining clamp (1) and remove the warm air pipe (2).

Installation Procedure:

1. Install the warm air pipe (1) and tighten the retaining clamp (2).

Note

Inlet and outlet warm air pipe removal is similar.



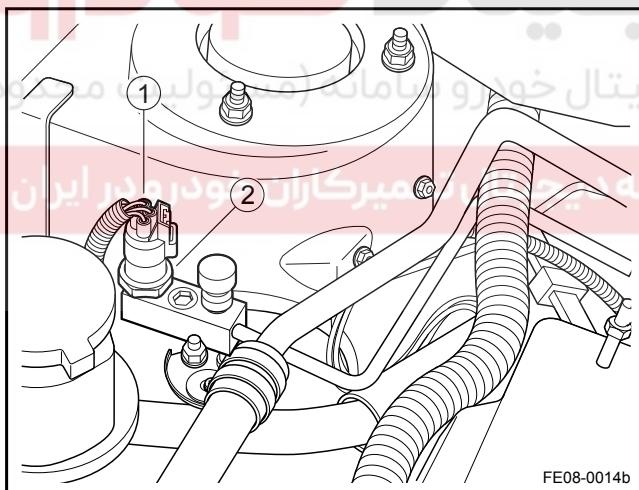
8.2.8.3 Air-conditioning Pressure Switch Replacement

Removal Procedure

Warning!

Refer to "Breathing R-134a Warning" in "Warnings and Notices".

1. Carry out the air-conditioning refrigerant recovery procedure. Refer to [8.2.7.10 Air-conditioning Refrigerant Recovery and Filling](#).
2. Disconnect the battery negative cable. Refer to [2.11.8.1 Battery Disconnection](#).
3. Disconnect the air-conditioning refrigerant pressure switch harness connector (1) and remove the air-conditioning refrigerant pressure switch (2).



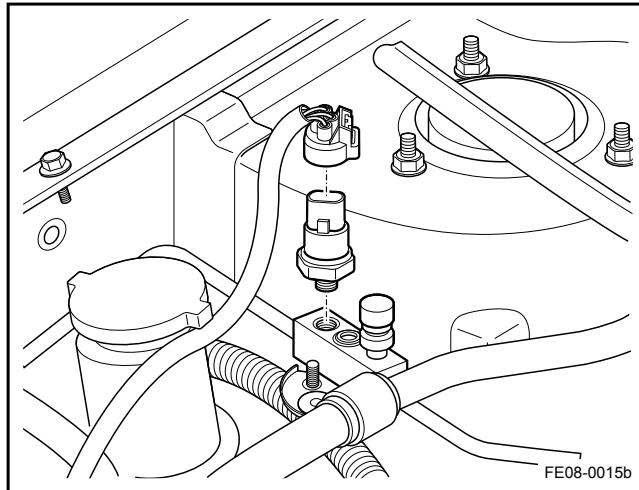
Installation Procedure:

1. Connect the air-conditioning refrigerant pressure switch (1) and connect the air-conditioning refrigerant pressure switch harness connector (2).

Note

During installation, all the O-rings must be replaced.

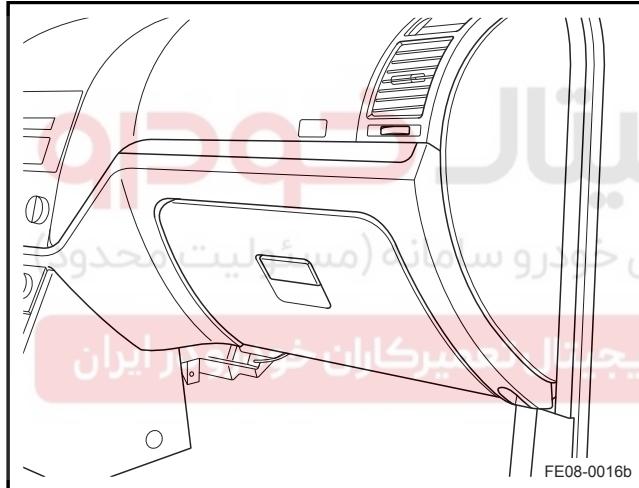
2. Carry out air-conditioning refrigerant filling process.
3. Connect the battery negative cable.



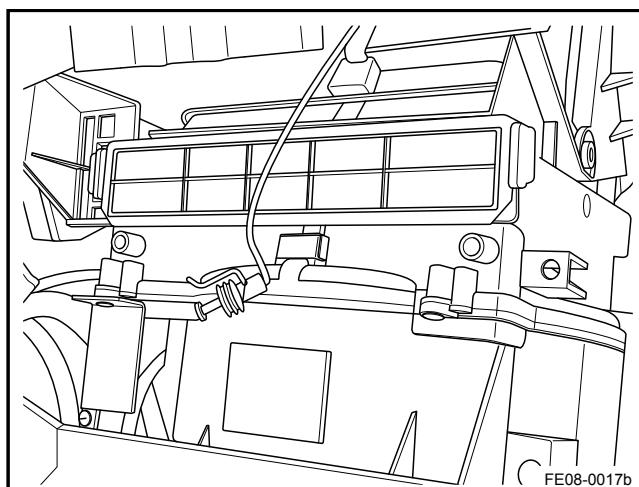
8.2.8.4 Air Filter Replacement

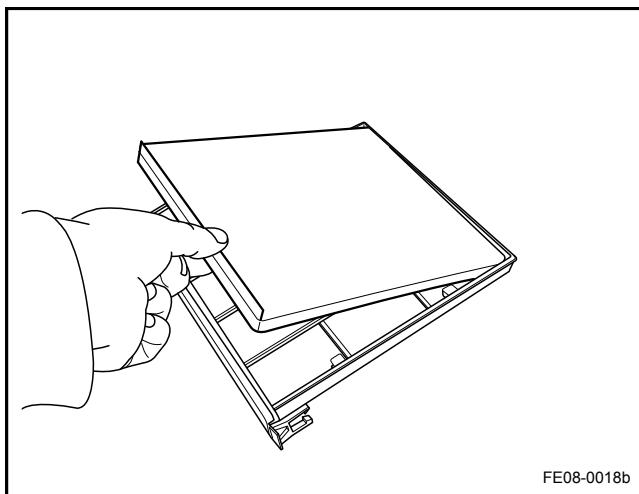
Removal Procedure

1. Remove the glove box. Refer to [12.8.3.2 Glove Box Replacement](#).

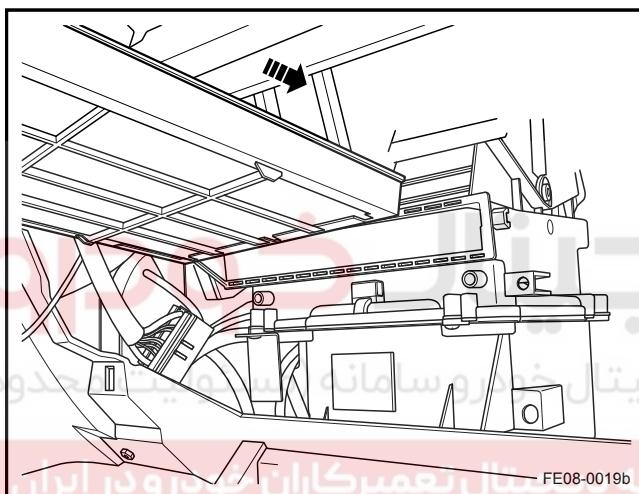


2. Pull out the air-conditioning filter housing.



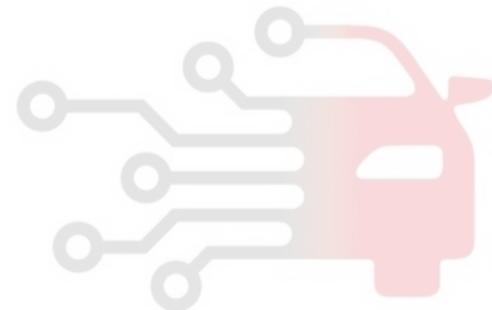


3. Remove the air-conditioning filter.



Installation Procedure:

1. Install the air-conditioning filter.
2. Install the air-conditioning filter housing.
3. Install the glove box.

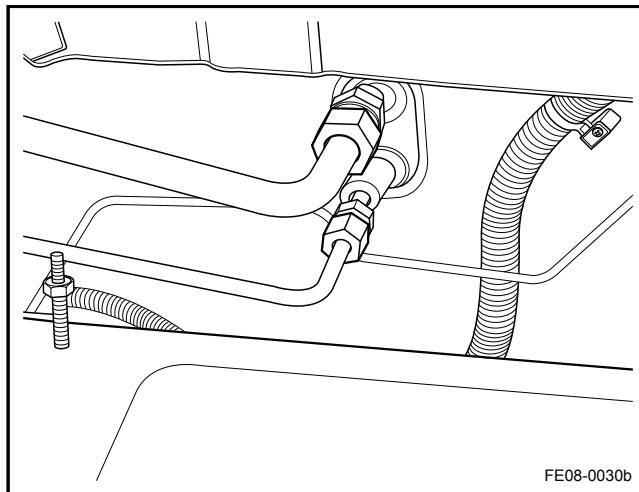


8.2.8.5 Air-conditioning Replacement Assembly

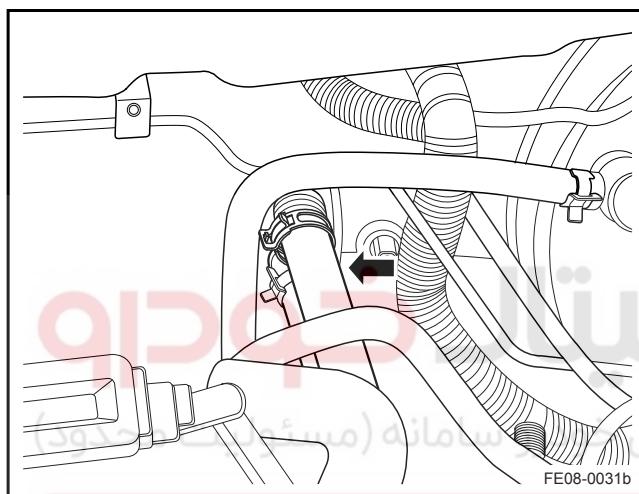
Removal Procedure

Warning!

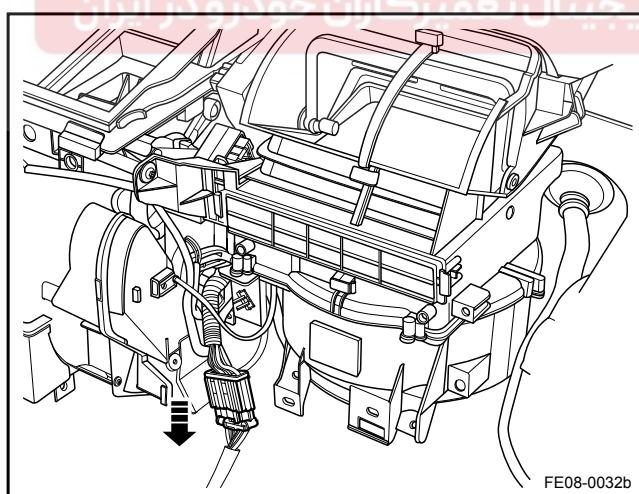
Refer to "Breathing R-134a Warning" in "Warnings and Notices".



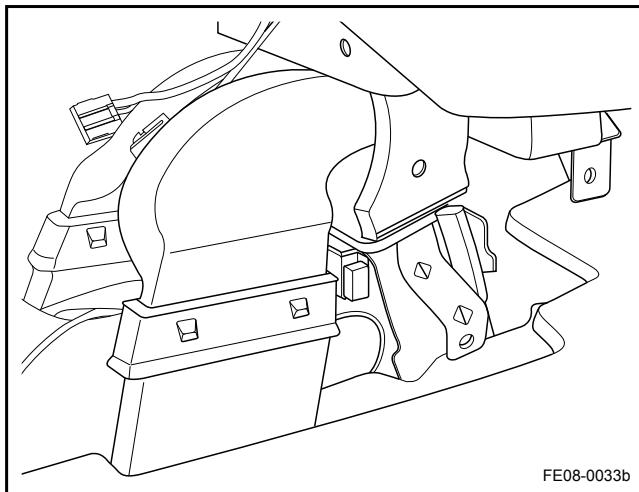
1. Carry out air-conditioning refrigerant recovery procedure. Refer to [8.2.7.10 Air-conditioning Refrigerant Recovery and Filling](#).
2. Discharge the engine coolant. Refer to [2.8.8.1 Engine Coolant Discharge and Filling](#).
3. Remove the evaporator side high and low pressure pipe connection nuts.



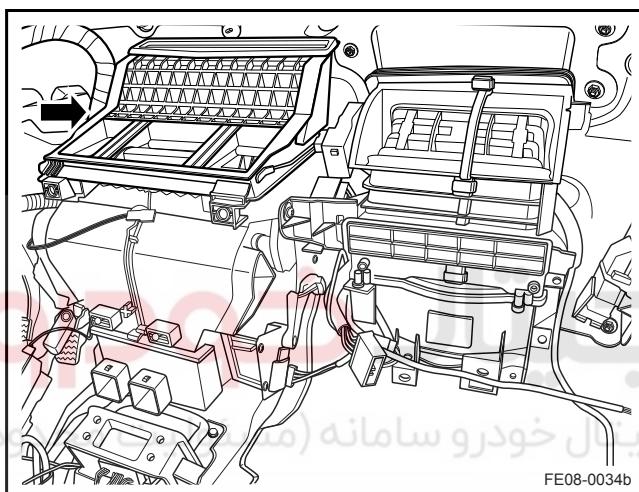
4. Remove the heater core side warm air inlet and outlet pipe clamps and remove the inlet and outlet pipes from the heater core.



5. Remove the instrument panel. Refer to [12.8.3.1 Instrument Panel Replacement](#).
6. Remove the instrument panel retainers. Refer to [12.8.3.3 Instrument Panel Carrier Replacement](#).
7. Disconnect the air-conditioning assembly harness connector.



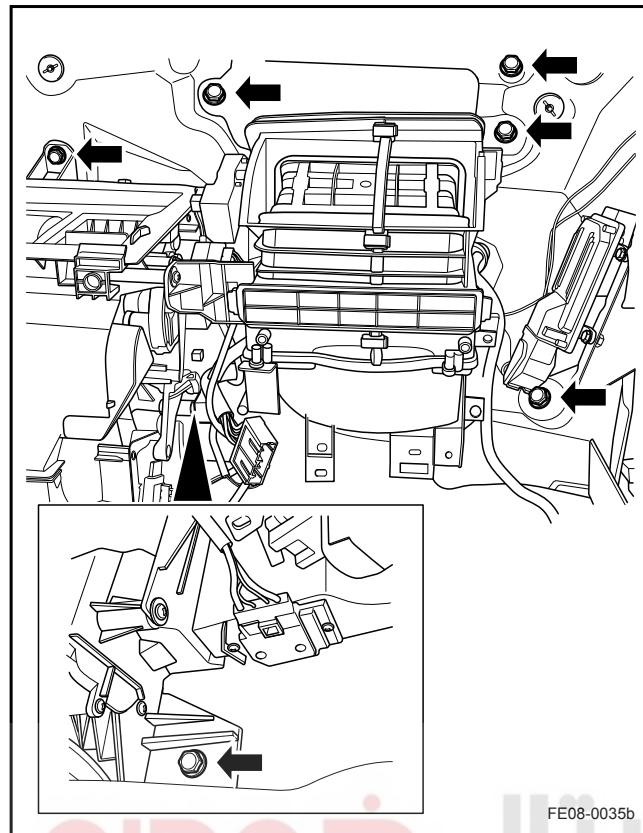
8. Remove the left and right lower air-conditioning ventilation pipes.



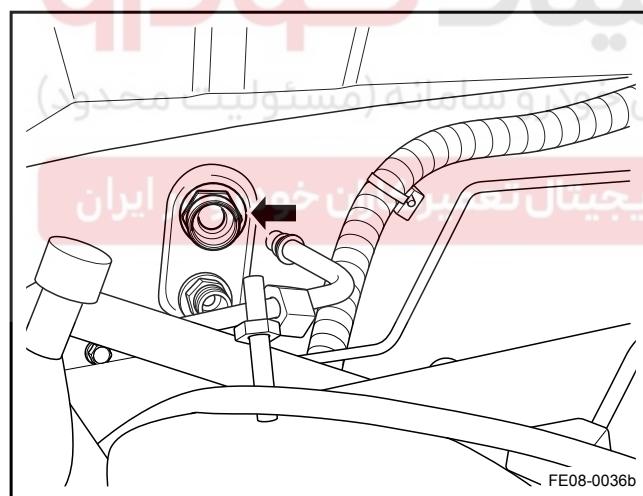
9. Remove the air-conditioning assembly upper air duct.

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10. Remove the air-conditioning assembly retaining nuts.



11. Remove the air-conditioning evaporator side hard rubber sleeve.

12. Remove the air-conditioning assembly.

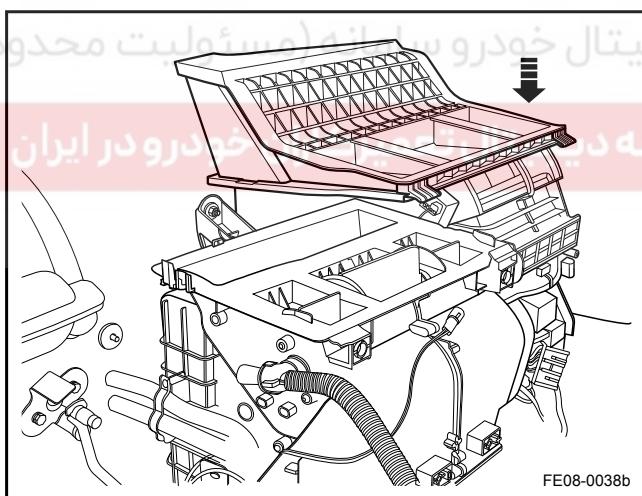
Installation Procedure:

1. Install the air-conditioning assembly.
2. Install the air-conditioning assembly retaining nuts and bolts.

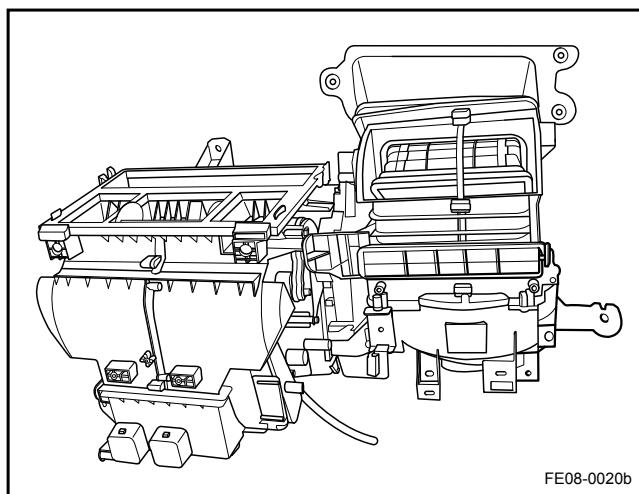
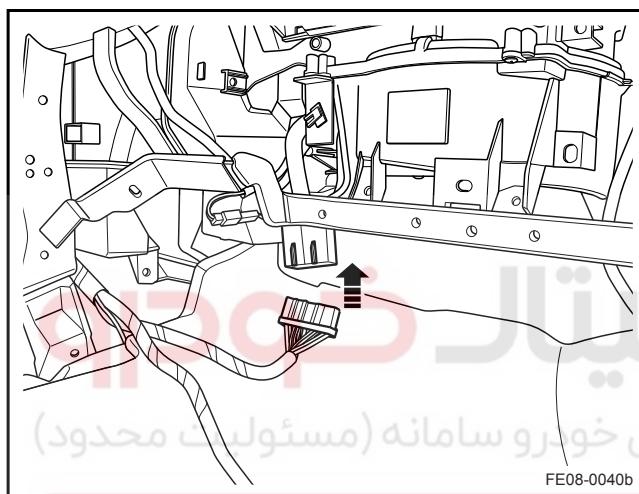
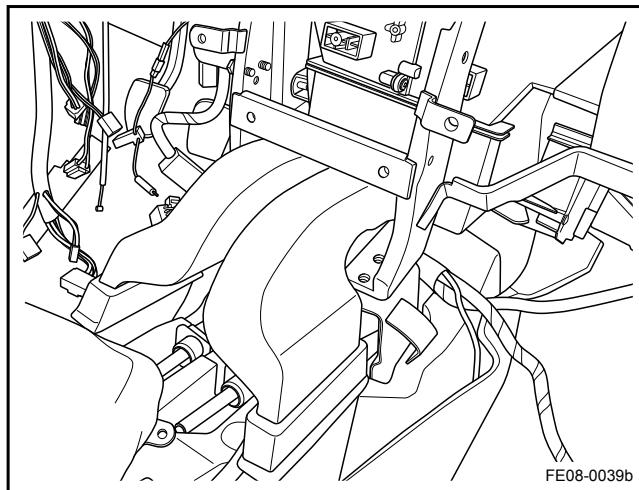
Torque:

Nut 10 Nm (Metric) 7.4 lb-ft (US English)

Bolt 6 Nm (Metric) 4.4 lb-ft (US English)



3. Install the air-conditioning evaporator side hard rubber sleeve.
4. Install the air-conditioning assembly upper air duct.



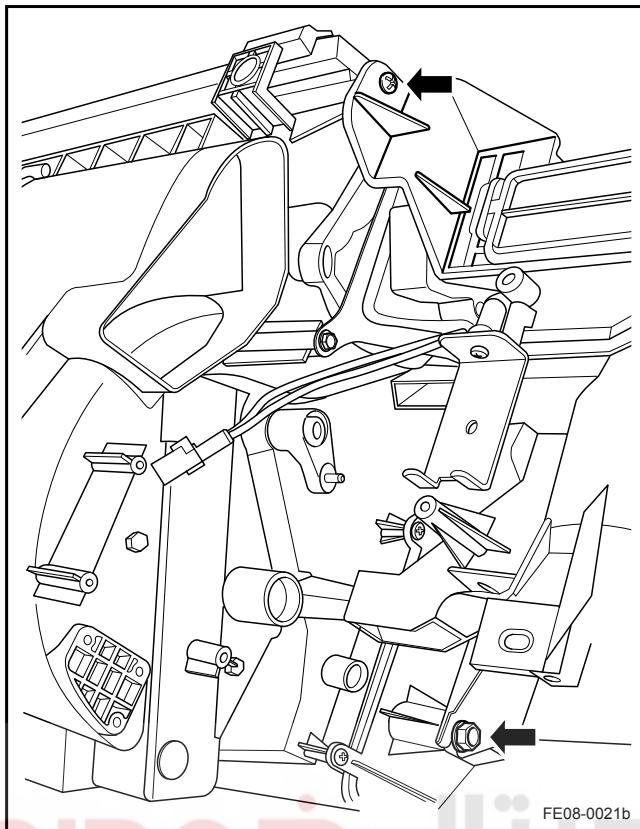
5. Install the left and right lower air-conditioning ventilation pipes.

6. Connect the air-conditioning assembly harness connector.
7. Install the instrument panel retainers.
8. Install the instrument panel.
9. Install inlet/outlet warm air pipes, fastening the clamps.
10. Remove the heater core side warm air inlet and outlet pipes and clamps
Torque: 8-10 Nm (Metric) 5.9-7.4 lb-ft (US English)
11. Fill the engine coolant.
12. Carry out the air-conditioning refrigerant filling process.

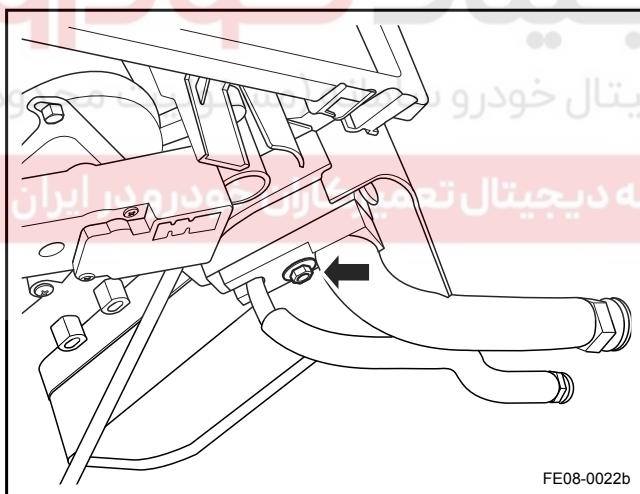
8.2.8.6 Expansion Valve Replacement

Removal Procedure

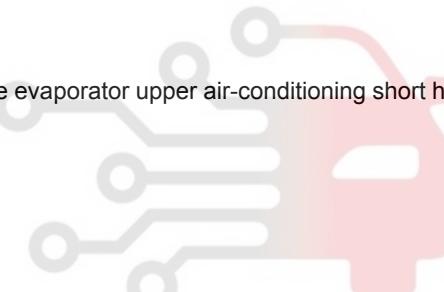
1. Remove the air-conditioning assembly. Refer to [8.2.8.5 Air-conditioning Assembly Replacement](#).

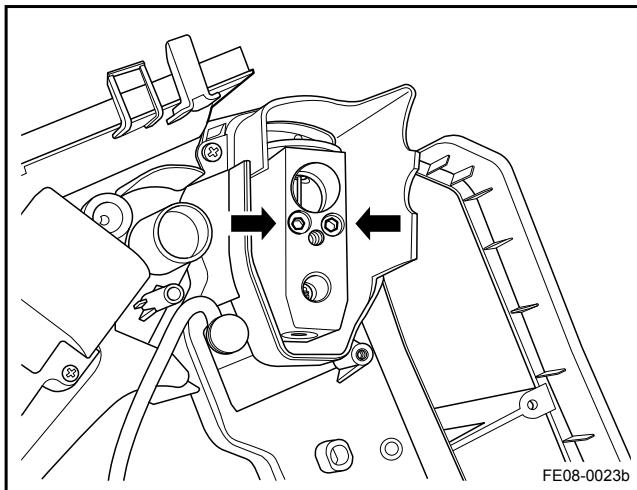


2. Separate the radiator and the blower.

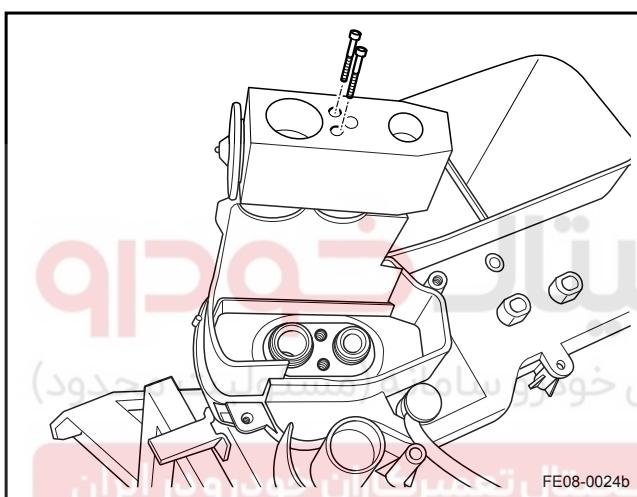


3. Remove the evaporator upper air-conditioning short hard pipe.



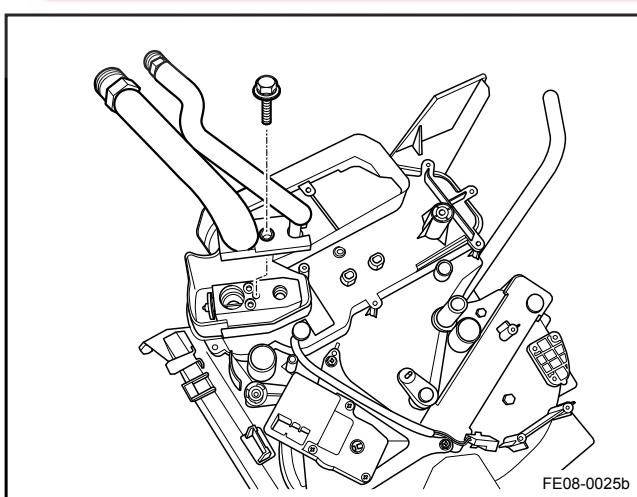


4. Remove the expansion valve retaining bolts and remove the expansion valve.



Installation Procedure:

1. Install the expansion valve and tighten the retaining bolts.
Torque: 18 Nm (Metric) 13.3 lb-ft (US English)



2. Install the evaporator upper air-conditioning short hard pipe.
Torque: 18 Nm (Metric) 13.3 lb-ft (US English)
3. Assemble the radiator and the blower assembly.
4. Install the air-conditioning assembly.

Note

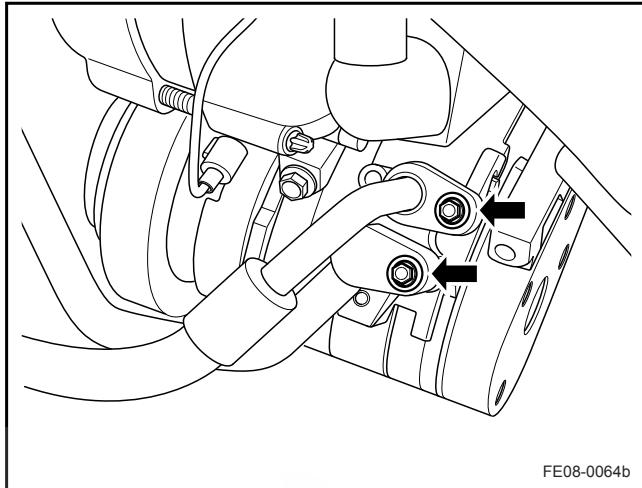
During the installation, all the O-rings must be replaced.

8.2.8.7 Air-conditioning Compressor Replacement

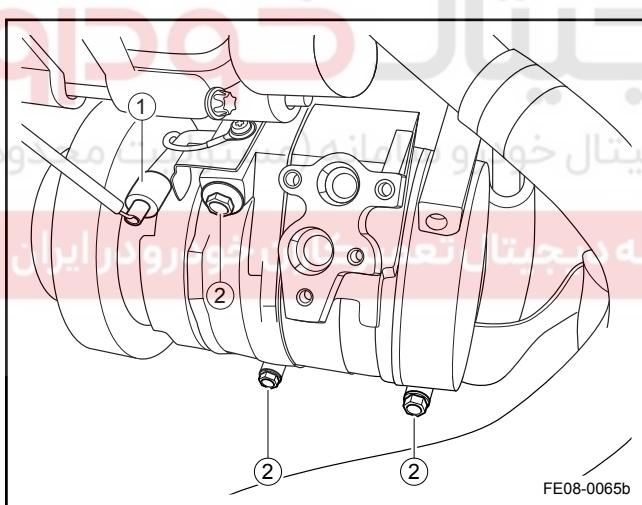
Removal Procedure

Warning!

Refer to "Breathing R-134a Warning" in "Warnings and Notices".



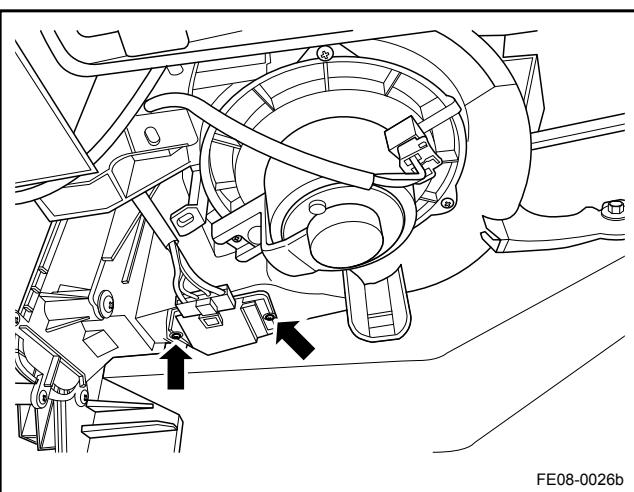
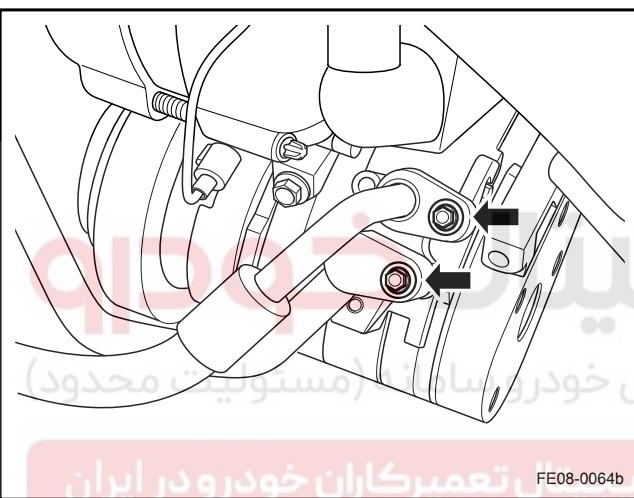
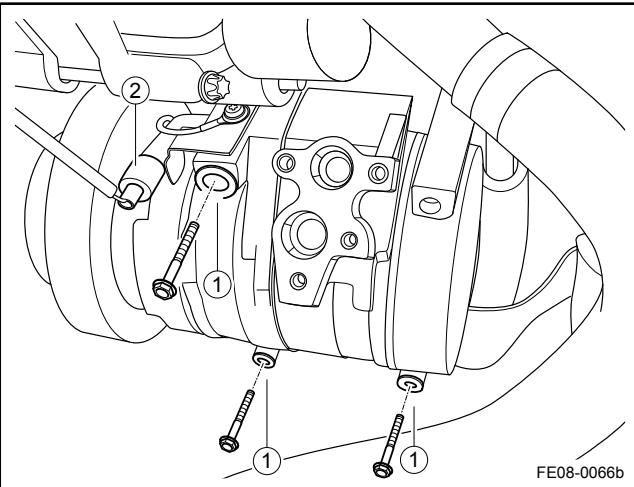
1. Carry out the air-conditioning refrigerant recovery procedure. Refer to [8.2.7.10 Air-conditioning Refrigerant Recovery and Filling](#).
2. Disconnect the battery negative cable. Refer to [2.11.8.1 Battery Disconnection](#).
3. Remove the drive belt. Refer to [2.6.8.3 Drive Belt Replacement](#).
4. Disconnect the compressor to air-conditioning high and low pressure pipes.



5. Disconnect the compressor harness connector (1).
6. Remove the compressor retaining screws and remove the compressor (2).

Note

To prevent impurities and moisture in air condensed on the parts entering the system, seal all the parts as soon as possible.



Installation Procedure:

1. Install and tighten the compressor retaining bolts (1).
Torque: 28 Nm (Metric) 20.7 lb-ft (US English)
2. Connect the compressor harness connector (2).
3. Install the compressor to air-conditioning high and low pressure pipes.
Torque: 11 Nm (Metric) 8.1 lb-ft (US English)
4. Install the driver belt.
5. Connect the battery negative cable.
6. Carry out the air-conditioning refrigerant filling procedure.

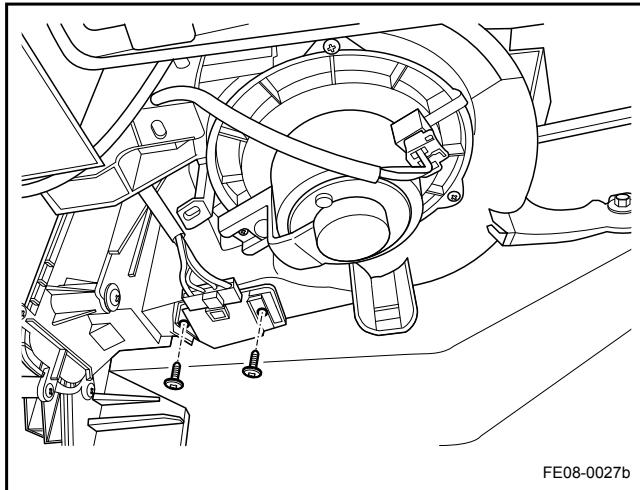
8.2.8.8 Blower Speed Control Module Replacement

Removal Procedure

1. Disconnect the battery negative cable. Refer to [2.11.8.1 Battery Disconnection](#).
2. Disconnect blower speed control module harness connector.
3. Remove the blower speed control module retaining screws.

Installation Procedure:

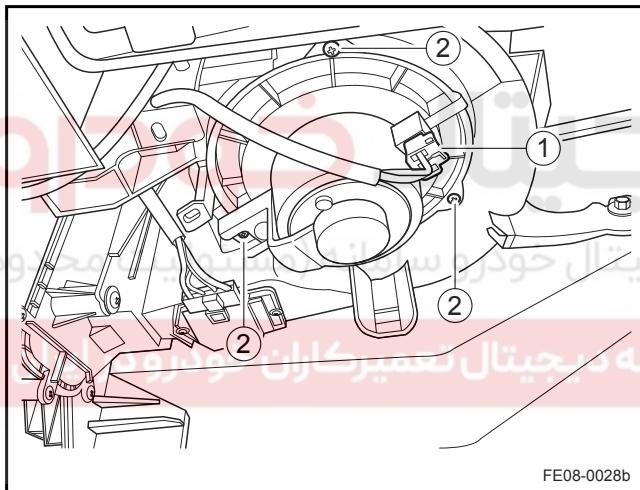
1. Install the blower speed control module and tighten the retaining screws.
Torque: 3 Nm (Metric) 2.2 lb-ft (US English)
2. Connect the blower speed module harness connector.



8.2.8.9 Blower Motor Replacement

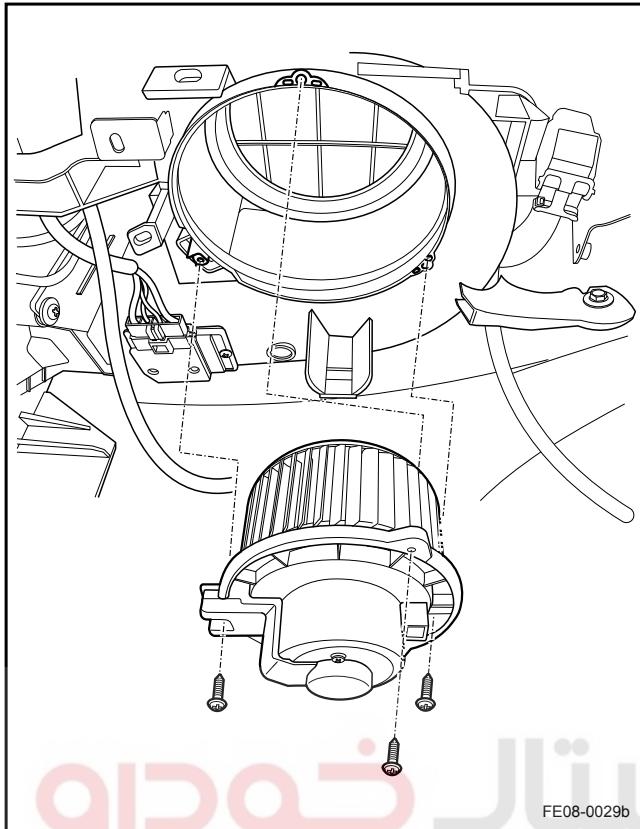
Removal Procedure

1. Disconnect the battery negative cable. Refer to [2.11.8.1 Battery Disconnection](#)
2. Disconnect the blower motor harness connector (1).
3. Remove the blower motor retaining screws (2) and remove the blower motor.



Installation Procedure:

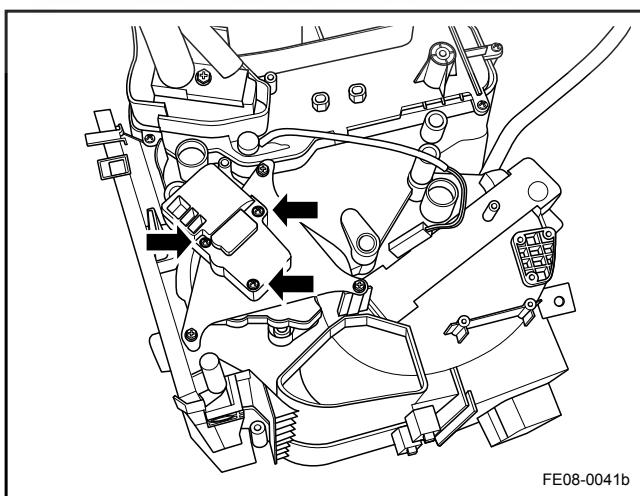
1. Install the blower motor and tighten the retaining screws.
Torque: 3 Nm (Metric) 2.2 lb-ft (US English)
2. Connect the blower motor harness connector.



8.2.8.10 Warm and Cold Air Adjust Motor and Inside and Outside Circulation Motor Replacement

Removal Procedure

1. Remove the air-conditioning assembly. Refer to [8.2.8.5 Air-conditioning Assembly Replacement](#).
2. Separate the radiator and the blower assembly.
3. Remove the warm air and cold air adjust motor retaining screws.

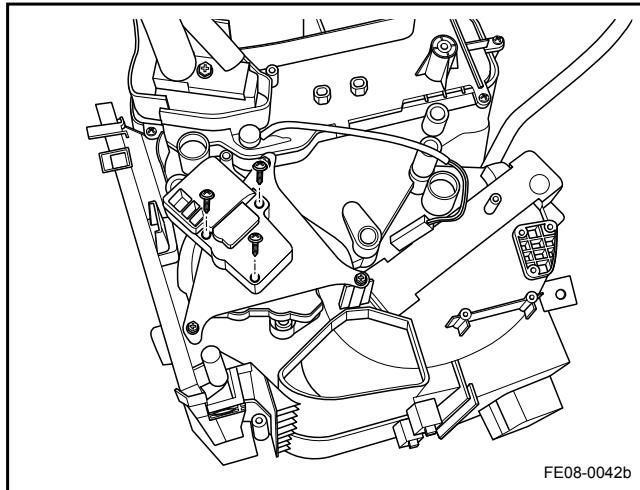


Installation Procedure:

1. Install the warm air and cold air adjust motor retaining screws
Torque: 3 Nm (Metric) 2.2 lb-ft (US English)
2. Assemble the radiator and the blower assembly.
3. Install the air-conditioning assembly.

Note

Inside and Outside Circulation Motor Replacement is the same as that of Warm and Cold Air Adjust Motor.



8.2.8.11 Instrument Panel Air Duct Replacement

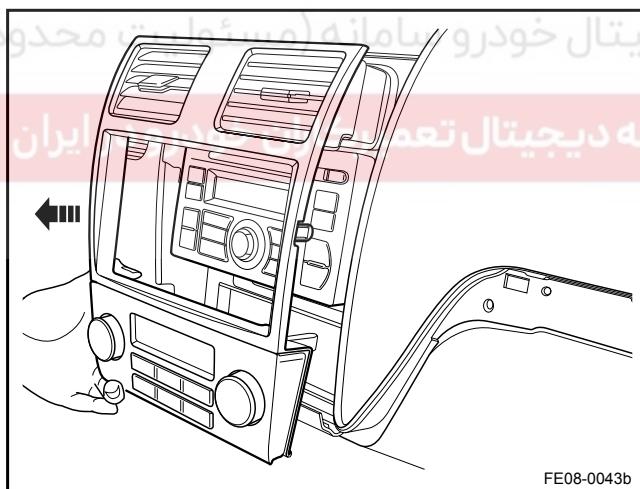
Center Air Duct Replacement

Removal Procedure

Note

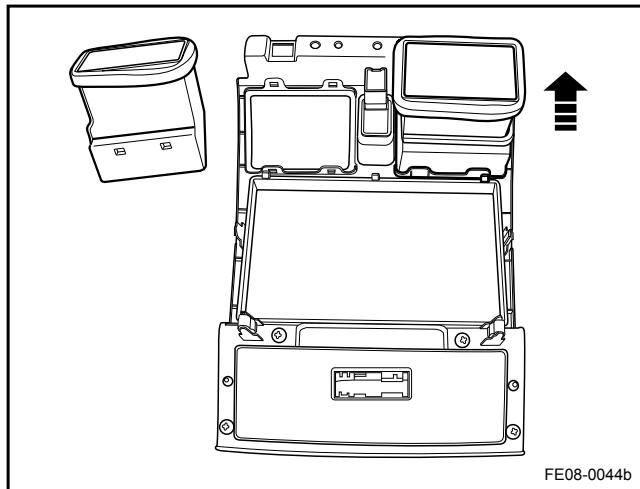
Please use special tools to remove interior panels, otherwise panels will be easily scratched.

1. Remove the instrument panel. Refer to [11.15.8.1 Instrument Cluster Replacement](#).
2. Remove the center air duct panel.
3. Remove the center air duct.



Installation Procedure:

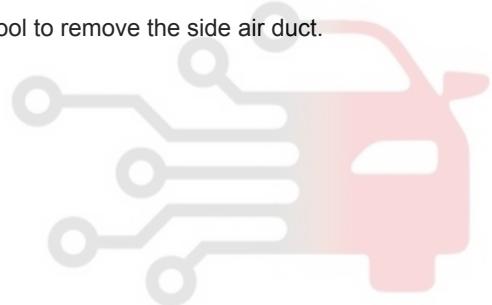
1. Install the center air duct.
2. Install the center air duct panel.
3. Install the instrument panel.



Instrument Panel Side Air Duct Replacement

Removal Procedure

1. Remove the instrument panel side panel.
2. Remove the air duct retaining screw.
3. Use a special tool to remove the side air duct.



Installation Procedure:

1. Press the side air duct into place.

Note

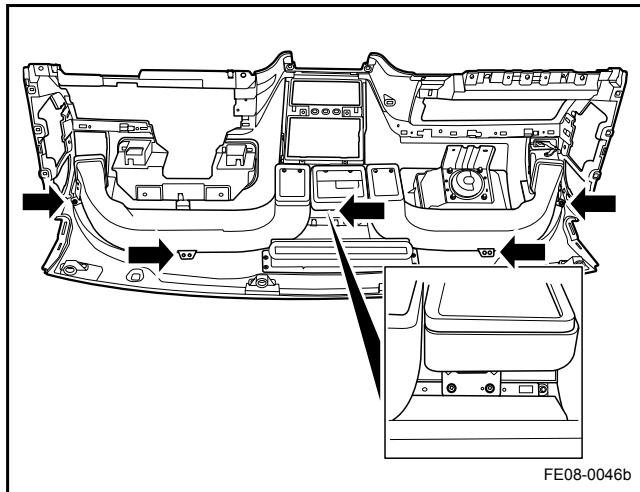
Both side air ducts replacement is the same.

2. Install the air duct retaining screw.
3. Install the instrument panel side panel.

8.2.8.12 Air-conditioning Ventilation Pipe Replacement

Removal Procedure

1. Remove the instrument panel. Refer to [12.8.3.1 Instrument Panel Replacement](#).
2. Remove the ventilation pipe retaining screws.



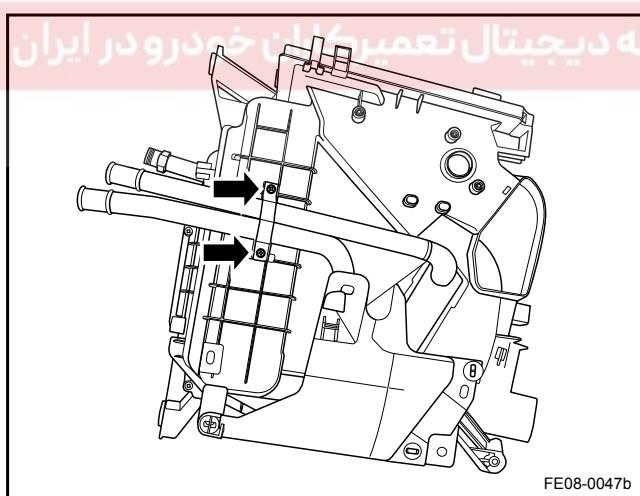
Installation Procedure:

1. Install and tighten the ventilation pipe retaining screws.
Torque: 6 Nm (Metric) 4.5 lb-ft (US English)
2. Install the instrument panel.

8.2.8.13 Heater Core Replacement

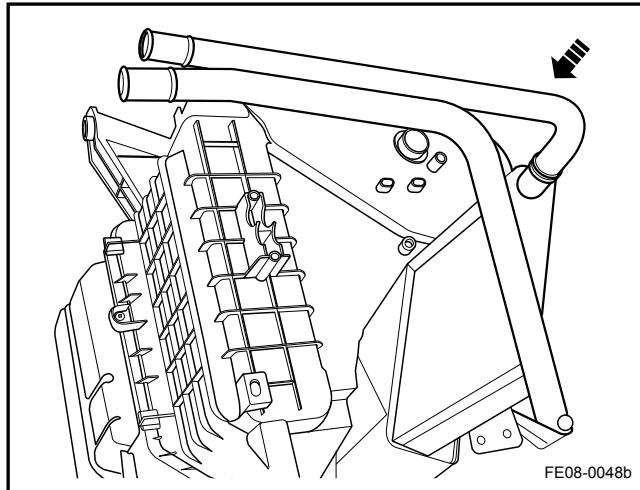
Removal Procedure

1. Remove the air-conditioning assembly. Refer to [8.2.8.5 Air-conditioning Assembly Replacement](#).
2. Remove the heater core body hard tube clamp.
3. Remove the heater core body.



Installation Procedure:

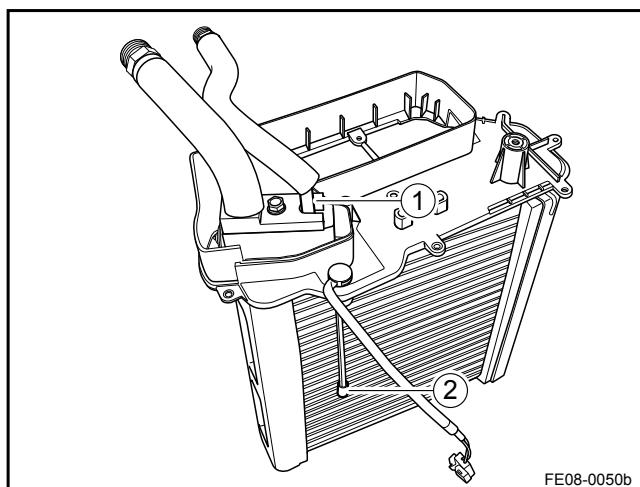
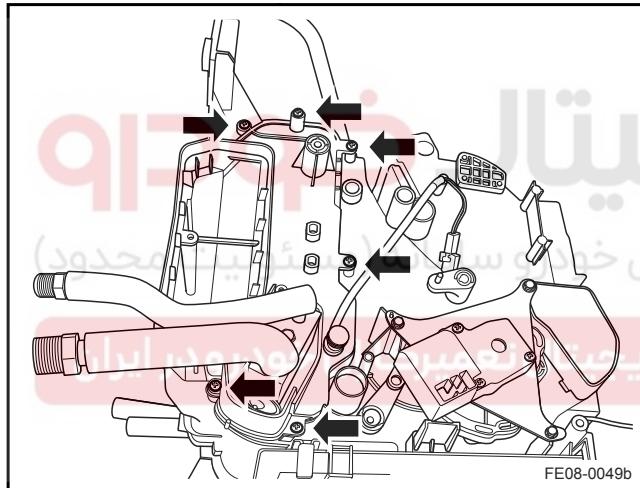
1. Insert the heater core body.
2. Install and tighten the heater core body hard tube clamp and tighten the retaining screw.
Torque: 3 Nm (Metric) 2.2 lb-ft (US English)
3. Insert the air-conditioning assembly.



8.2.8.14 Evaporator Core Replacement

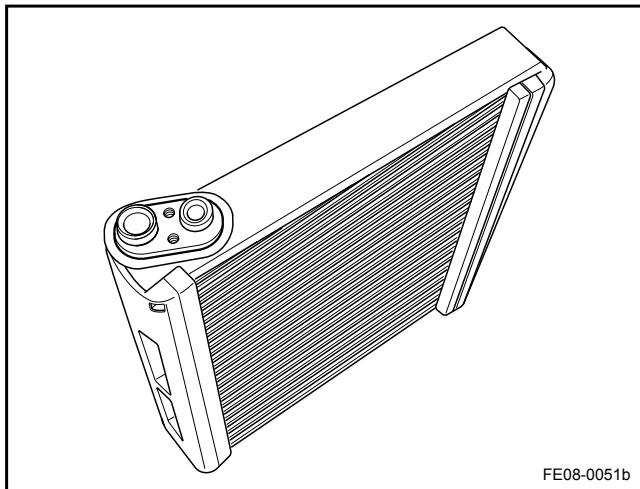
Removal Procedure

1. Remove the air-conditioning assembly. Refer to [8.2.8.5 Air-conditioning Assembly Replacement](#).
2. Separate the radiator and the blower assembly.
3. Remove the evaporator core body retaining screw.
4. Remove the evaporator core body.
5. Remove the expansion valve (1). Refer to [8.2.8.6 Expansion Valve Replacement](#).
6. Remove the evaporator temperature sensor (2). Refer to [8.2.8.19 Evaporator Temperature Sensor and Heat Core Temperature Sensor Replacement](#).

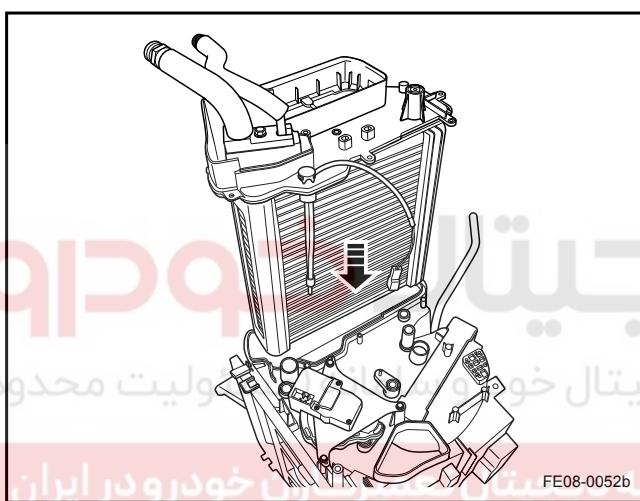


Installation Procedure:

1. Install the evaporator temperature sensor.
2. Install the expansion valve.

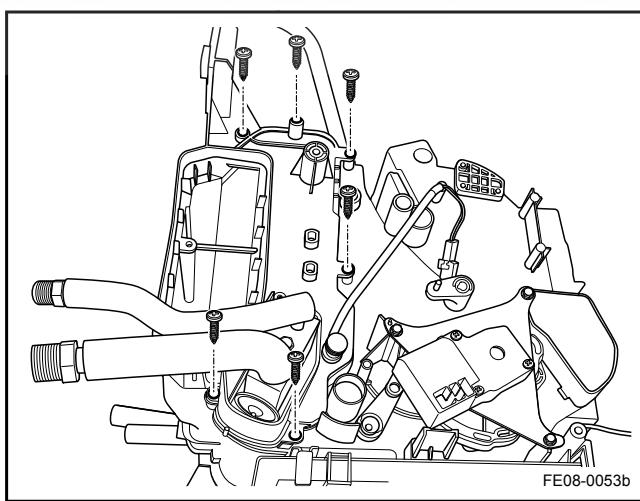


FE08-0051b



FE08-0052b

3. Insert the evaporator core body.



FE08-0053b

4. Install and tighten the evaporator core body retaining screw.
Torque: 3 Nm (Metric) 2.2 lb-ft (US English)
5. Assemble the evaporator and the blower assembly.
6. Install the air-conditioning assembly.

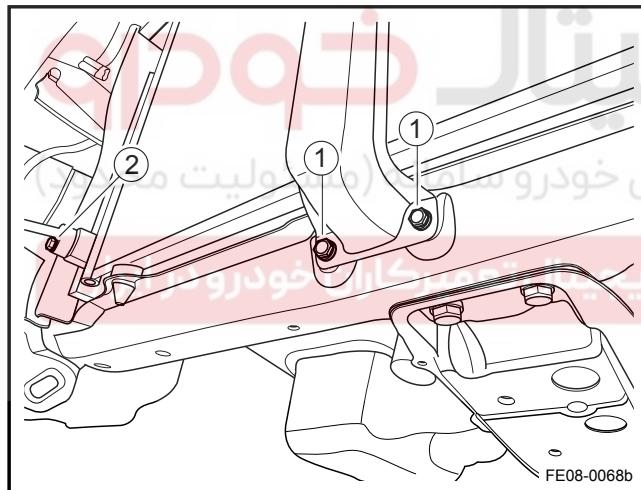
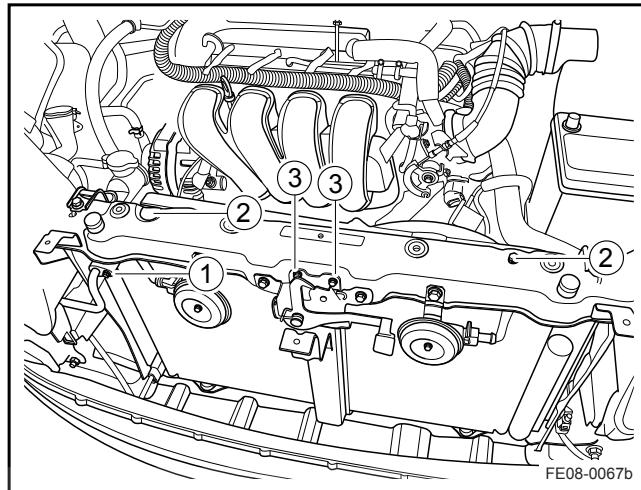
8.2.8.15 Condenser Replacement

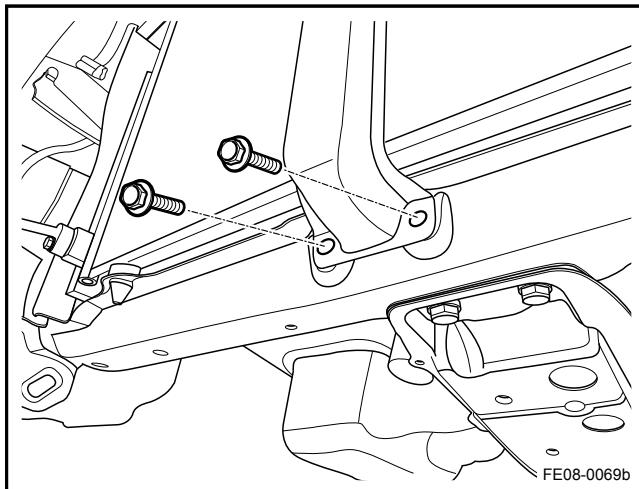
Removal Procedure

Warning!

Refer to "Breathing R-134a Warning" in "Warnings and Notices".

1. Carry out the air-conditioning refrigerant recovery procedure. Refer to [8.2.7.10 Air-conditioning Refrigerant Recovery and Filling](#).
2. Remove the radiator upper grille.
3. Remove the condenser upper air-conditioning hard pipe fittings (1).
4. Remove the condenser upper retaining bolts (2).
5. Remove the condenser front baffle upper retaining bolts (3).
6. Lift the vehicle. Refer to [1.3.1.1 Lifting and Jacking the Vehicle](#).
7. Remove the engine bottom shield. Refer to [12.10.1.7 Left and Right Engine Bottom Shield Replacement](#).
8. Remove the condenser front baffle lower retaining bolts and remove the baffle.
9. Remove the condenser lower air-conditioning hard pipe fittings (2).
10. Remove the condenser from the vehicle bottom.

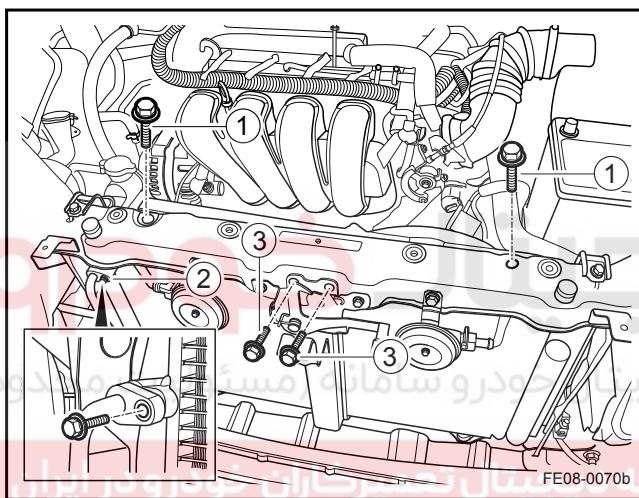




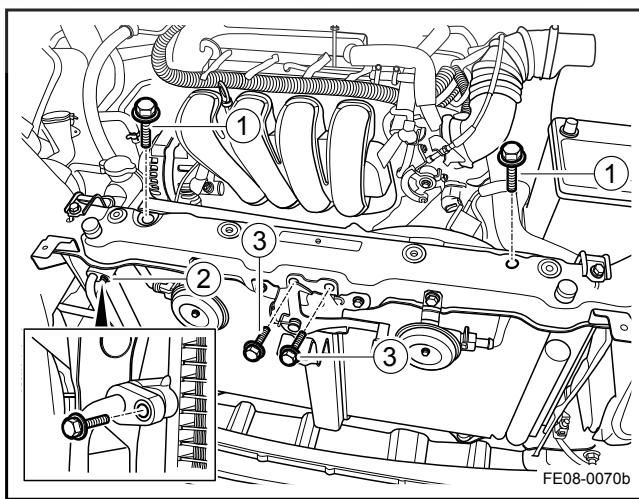
Installation Procedure:

1. Install the condenser to the mount from the vehicle bottom.
2. Install the condenser front baffle and tighten the lower retaining bolts.

Torque: 10-12 Nm (Metric) 7.4-8.9 lb-ft (US English)



3. Lower the vehicle.
4. Install and tighten the condenser top retaining bolts (1).
Torque: 11 Nm (Metric) 8.1 lb-ft (US English)
5. Install and tighten the condenser upper air-conditioning hard pipe fittings (2).
Torque: 10 Nm (Metric) 7.4 lb-ft (US English)
6. Install and tighten the condenser front baffle upper retaining bolts (3).
Torque: 12 Nm (Metric) 8.9 lb-ft (US English)



7. Lift the vehicle, install and tighten the condenser lower air-conditioning hard pipe fittings (1).
Torque: 10 Nm (Metric) 7.4 lb-ft (US English)
8. Install and tighten the condenser front baffle lower retaining bolts (2).
Torque: 12 Nm (Metric) 8.9 lb-ft (US English)
9. Install the engine bottom shield.
10. Lower the vehicle and install the radiator upper grille.
11. Carry out the air-conditioning refrigerant filling procedure. Refer to [8.2.7.10 Air-conditioning Refrigerant Recovery and Filling](#).

8.2.8.16 Ambient and Sun Light Sensor Replacement

Refer to [11.4.8.20 Ambient and Sun Light Sensor Replacement](#).

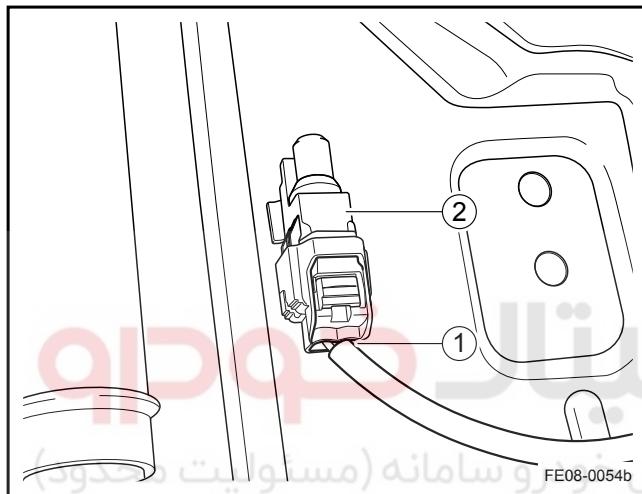
8.2.8.17 Outside Temperature Sensor Replacement

Removal Procedure

Warning!

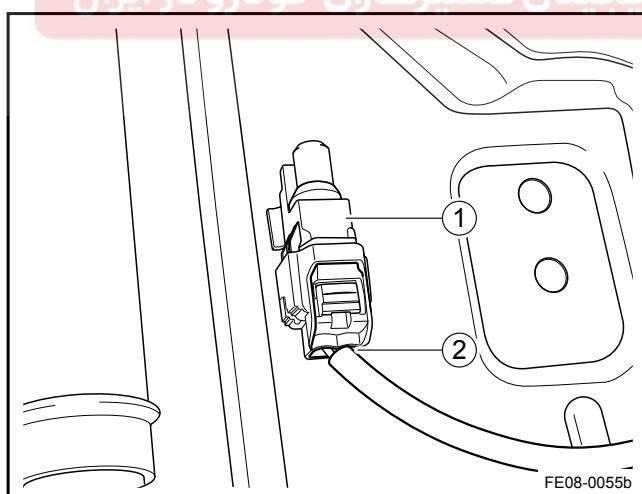
Refer to "Battery Disconnect Warning" in "Warnings and Notices".

1. Disconnect the battery negative cable. Refer to [2.11.8.1 Battery Disconnection](#).
2. Remove the engine bottom shield. Refer to [12.10.1.7 Left and Right Engine Bottom Shield Replacement](#).
3. Disconnect the outside temperature sensor wiring harness connector (1).
4. Remove the outside temperature sensor (2).



Installation Procedure:

1. Install the outside temperature sensor (1).
2. Connect the outside temperature sensor wiring harness connector (2).
3. Install the engine bottom shield.
4. Connect the battery negative cable.



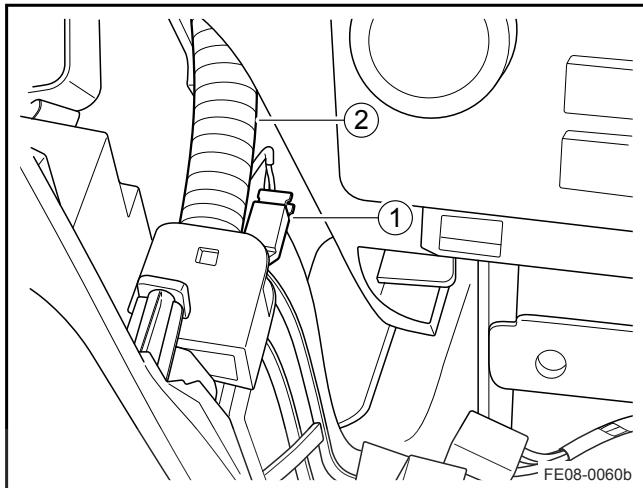
8.2.8.18 Inside Temperature Sensor Replacement

Removal Procedure

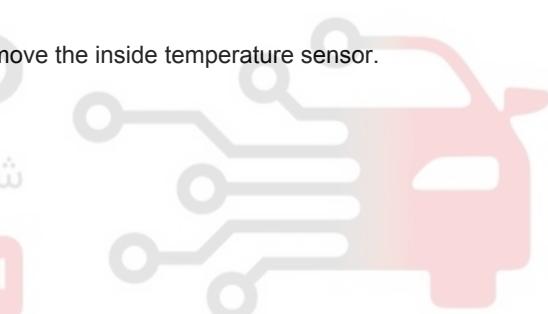
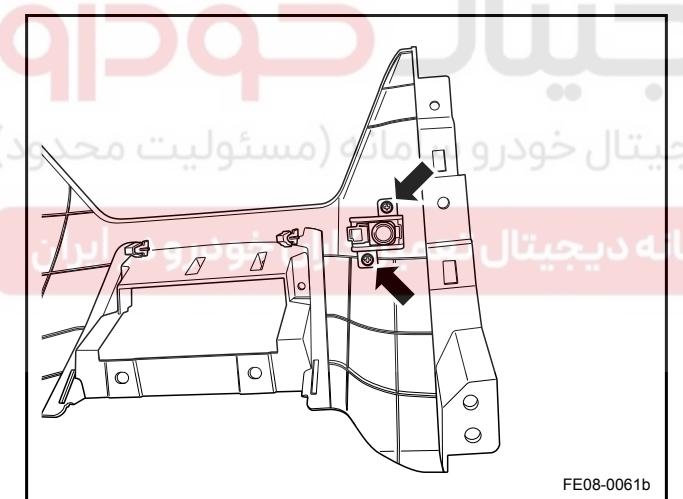
Warning!

Refer to "Battery Disconnect Warning" in "Warnings and Notices".

1. Disconnect the battery negative cable. Refer to [2.11.8.1 Battery Disconnection](#).
2. Remove the instrument panel lower right side panel. Refer to [12.8.3.1 Instrument Panel Replacement](#).
3. Disconnect the inside temperature sensor wiring harness connector (1).
4. Disconnect the air hose connection (2).

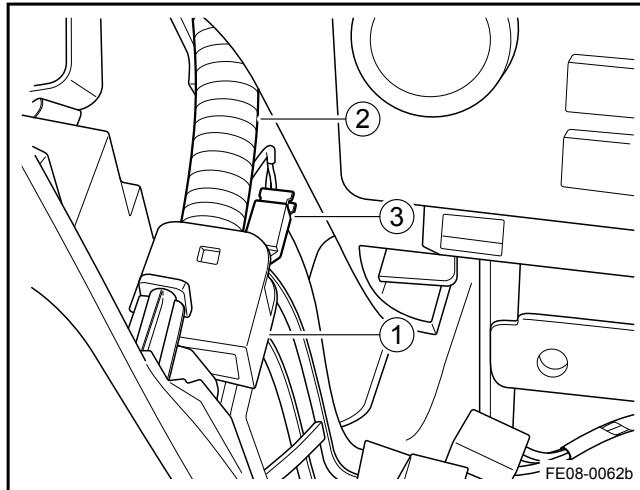


5. Remove the inside temperature sensor.



Installation Procedure:

1. Install the inside temperature sensor (1).
2. Connect the air hose connection (2).
3. Connect the inside temperature sensor wiring harness connector (3).
4. Install the instrument panel lower right side panel.
5. Connect the battery negative cable.



8.2.8.19 Evaporator Temperature Sensor and Heat Core Temperature Sensor Replacement

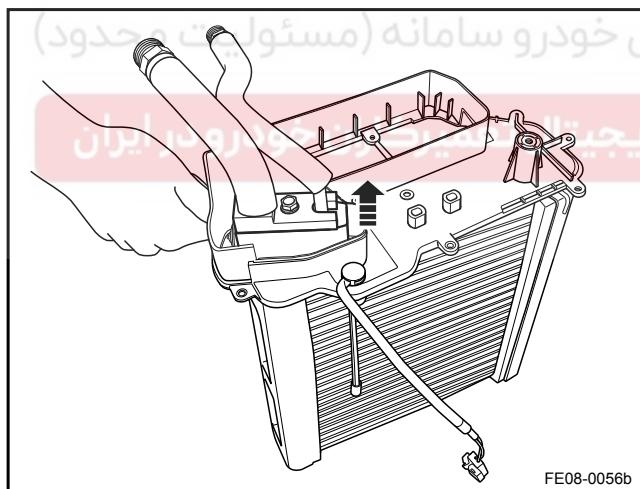
Evaporator Temperature Sensor Replacement

Removal Procedure

Warning!

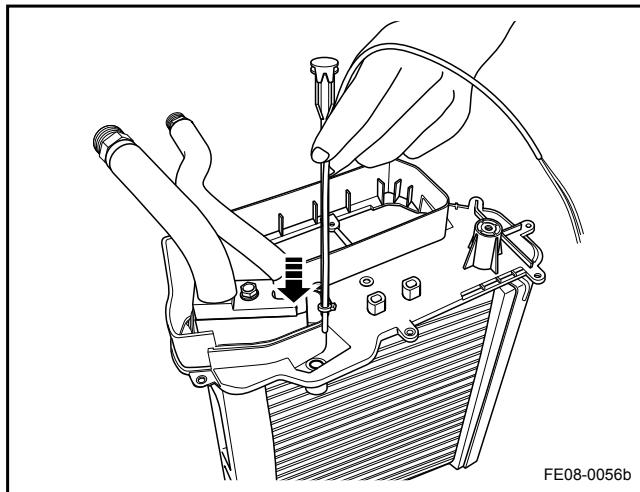
Refer to "Battery Disconnect Warning" in "Warnings and Notices".

1. Disconnect the battery negative cable. Refer to [2.11.8.1 Battery Disconnection](#).
2. Remove the air-conditioning assembly. Refer to [8.2.8.5 Air-conditioning Assembly Replacement](#).
3. Separate the radiator and the blower assembly.
4. Remove the evaporator core body. Refer to [8.2.8.14 Evaporator Core Replacement](#).
5. Remove the evaporator temperature sensor.



Installation Procedure:

1. Insert and tighten the retaining evaporator temperature sensor.
2. Install the evaporator core body.
3. Assemble the evaporator and the blower assembly.
4. Install the air-conditioning assembly.
5. Connect the battery negative cable.



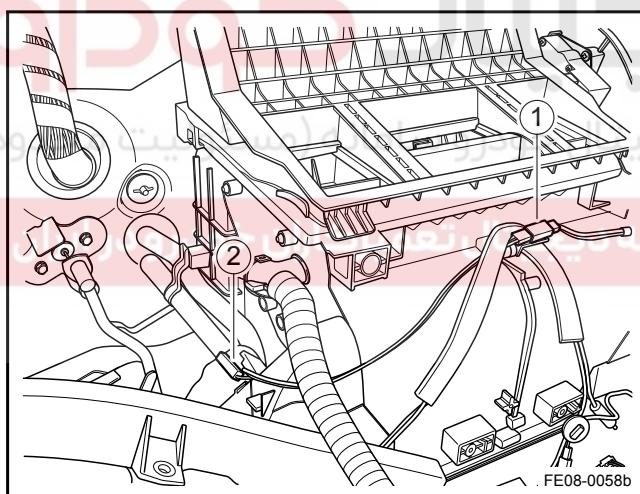
Heat Core Temperature Sensor Replacement

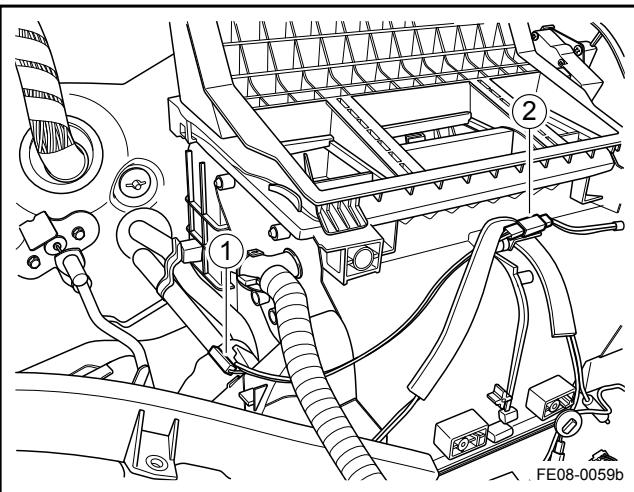
Removal Procedure

Warning!

Refer to "Battery Disconnect Warning" in "Warnings and Notices".

1. Disconnect the battery negative cable. Refer to [2.11.8.1 Battery Disconnection](#).
2. Remove the instrument panel. Refer to [12.8.3.1 Instrument Panel Replacement](#).
3. Disconnect the heat core temperature sensor wiring harness connector (1).
4. Push aside the plastic insulation, remove the heat core temperature sensor (2).





Installation Procedure:

1. Wrap the plastic insulation around the sensor probe and the heater core hard tube (1).
2. Connect the heater core temperature sensor wiring harness connector (2).
3. Install the instrument panel.
4. Connect the battery negative cable.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

