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AC Air Conditioning System

Precautions:

It is required to observe the following notices when air conditioning system is inspected and maintained, or otherwise it may cause vehicle damage and personal injury.

■ It is required to use gloves and goggles so as to avoid chilblain, blindness, and other effects on skin during skin contact, as the freezing point of refrigerant is low but the volatility is strong.

■ It is required to flush the contact place immediately with clear water, and required to go to ophthalmology and dermatology for diagnosis and treatment, in case when refrigerant splashes into the eye or gets in touch with the skin. It is not allowed to rub the eye with hand or handkerchief.

■ The site must be ventilated, during refrigerant related operations. Discharge of refrigerant in large quantities at enclosed site may lead to oxygen deficiency.

■ Refrigerant Discharge Allowance: 1000ppm (4184mg/m2)

It may give rise to anomaly or susceptibility of heart and cardiovascular system, as well as immune system, and anomaly of respiratory system or skin diseases, if the quantity of discharge is excessive.

■ It is not allowed for moisture, dust, and other extraneous substances to be present in the surrounding environment, during refrigerant related operations, and these extraneous substances may be harmful to the air conditioning system when they flow inside.

■ Gas leak detector shall be prepared when operations related to refrigerant are conducted. R-134a refrigerant may generate harmful gas when it gets into contact with high-temperature objects, and therefore attention shall be paid to leak prevention.

■ R-134a refrigerant must be used for the air conditioning system of this vehicle type. It may cause adverse impact on the system parts if other refrigerants are used.

■ R-134a refrigerant and R-12 refrigerant are incompatible, and so blending is not allowed even in a very little quantity.

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■ It is not allowed for pyrophorus or ignitable materials to be present around the vehicle, during operations related to refrigerant, and special attention shall be paid, as explosion may be aroused in the case when refrigerant tank is exposed into heat source.

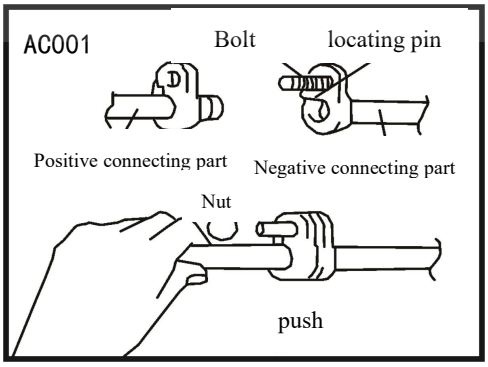
■ R134a container is in the high-pressure state, and it is absolutely not allowed to be placed under high-temperature environment. Moreover it is required to check whether or not the temperature of storage environment is below 52℃.

■ Dust covers are generally used for air conditioning parts in order to prevent the inflow of sewage, dust, and water content. Dust covers shall be removed before operation and sealed after operation.

■ The refrigeration oil synthetic oil (PAG) applicable to R-134a is easier to absorb moisture than R-12, and the absorptivity is higher by 10 times than the refrigeration oil of mineral oil. It will affect the compressor, the lubricating function, and the durability when moisture is excessive.

■ Humidity produces extremely bad impact on air conditioning system, and therefore it is advisable to avoid operation on rainy days.

Refrigeration oil must be coated on “O”-ring, when air conditioning system is re-assembled after removal, and especially, the bolt connected parts shall be manual installed before they are installed by two wrenches.



Positive connecting part Negative connecting part sembled,

Nut

the nuts and bolts shall be connected at the same time while the pipeline is gently pushed

■ When the air-conditioner is installed, applying torque above the standard to assemble or clamping “O”-ring with excessive force will lead to the leak of refrigerant, and therefore operations should be in accordance with the provisions.

■ It is not allowed for hose to be twisted.

■ It is absolutely not allowed to separate the air conditioning system before refrigerant is fully recovered. Refrigerant and refrigeration oil will discharge under

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the impact of system pressure, which will pollute the surrounding environment, if the system is separated before recovery.

■ Refrigeration oil (Model: PAG) must be added when refrigerant is refilled, during replacement of air conditioning parts.

Table for Filling Capacity of Refrigeration Oil

refrigerant pipe	10 cc	Replacement of Evaporator	30 cc
Replacement of Condenser	30 cc	Replacement of Pipeline	30 cc
Replacement of Drying Bottle	30 cc	-	-

When replacing the compressor, the required amount 120ML shall reduce the amount of discharged refrigeration oil from the old compressor, and the result is the amount of refrigeration oil needed to be discharged from the new compressor.

Specified amount - the amount of refrigeration oil discharged from the old compressor = the amount of refrigeration oil discharged from the new compressor.

Note: Even if there is no discharged oil from the removed compressor, it is not allowed to discharge the oil from the new compressor more than 50ML.

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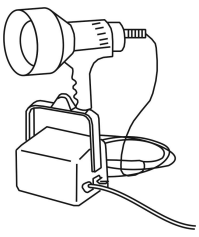
Service tools:

Common and special tools necessary for the maintenance

Table of Special Tools for Inspection and Maintenance of Air Conditioning System

Name of Tool	Picture of Tool	Name of Tool	Picture of Tool
Digital Multimeter		High-Strength Lamp of Invisible Light	

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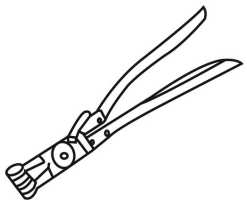
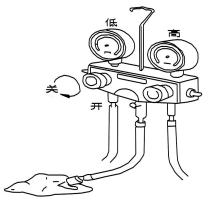
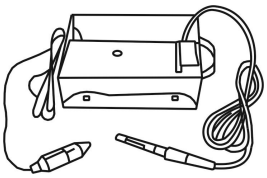
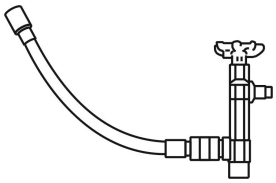
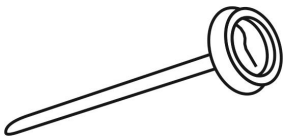
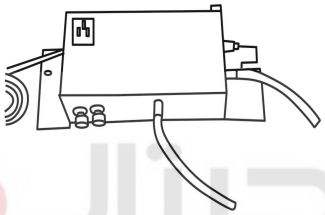
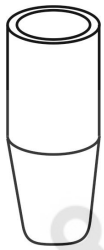
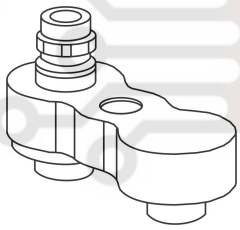
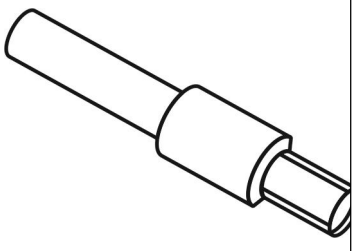
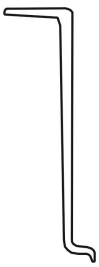
Ripping Pincers		R-134A Manifold Measuring Apparatus	
Halogen Leakage Detector		Tracing Color Injector	
R134A Tracing Paint		Microtherm ometer	
Positive Flow Control Valve		Shaft Seal Protection Device	
50lb Refillable Recovery Tank		Pressure Test Adapter	

Name of Tool	Picture of Tool	Name of Tool	Picture of Tool
Air Conditioning System Lip Seal Detaching Tool		“O”-Ring Detaching Tool	

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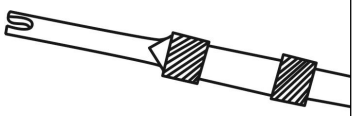
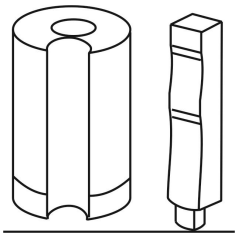
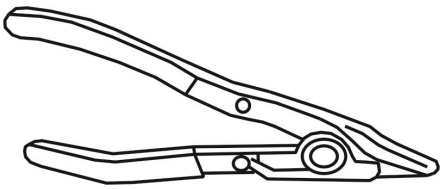
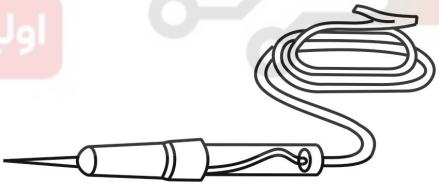
Valve Core Removal and Installation Tool		“O”-Ring Installation Tool	
Spring Caliper		Spring Caliper	
refrigerant Recovery/ Regeneration, and Refilling System		passive Test Light	

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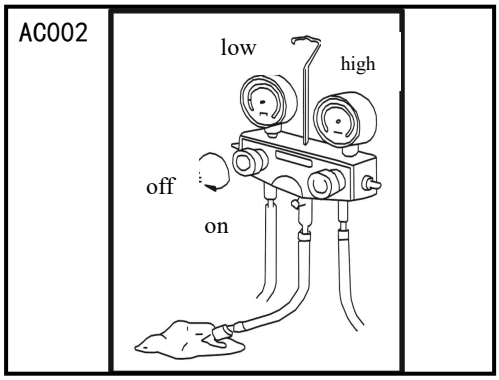
Inspection of Air Conditioning System and Filling of Refrigerant



1. Installation of refrigerant filling instrument

1) Close the manual valves on both ends of refrigerant filling instrument.

2) Install the filling pipe of refrigerant filling instrument in the connecting place. Connect the LP pipe at LP pipe nozzle and the HP pipe at HP pipe nozzle, and then tighten the nuts with hand.

2. Operation of Refrigerant Discharge

1) Connect the refrigerant filling instrument to the system.

2) Put the cleanly cleaning cloth in the open place of central hose.

3) Gradually open the HP manual valve and discharge the refrigerant.

Caution:

The compressor refrigeration oil will discharge from the system, if the exhaust velocity is too fast.

4) Check whether or not the trace of refrigeration oil is present on the cleaning cloth, and slightly close the manual valve when trace is present.

5) Slowly open the LP manual valve, after the measuring scale of filling instrument is dropped to 3.5kg/cm2.

6) It is required to slowly open the HP and LP manual valves, in order to reduce system pressure, until the measuring scale displays 0 kg/ cm2.

3. Evacuation Operation of Refrigeration System

Caution:

■ The system must be evacuated after refrigerant discharge. It is to remove the air and moisture through this operation, for 15 minutes after respective parts have been assembled.

1) Confirm whether or not engine is under “Close” status.

2) Connect the filling instrument to the joint place of compressor, and close the two ends.

3) Confirm whether or not refrigerant is discharge from the system.

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4) Connect the central pipeline to the air suction place of vacuum pump.

5) Open the HP and LP valves of filling instrument after vacuum pump is operated.

6) The measuring scale of LP detector is larger than 0.96kg/ cm2 vacuum after 10 minutes, otherwise air leak exists with the system, repair as follows.

Make use of the filling system for the refrigerant container.

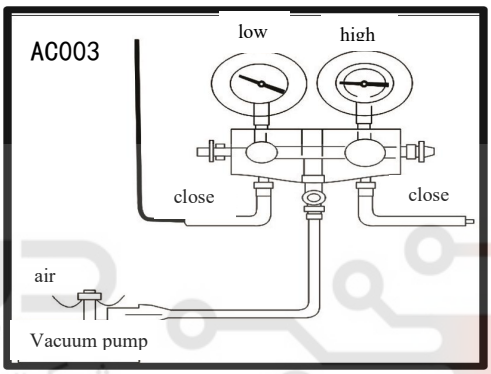
Inspect the leak place with leak detector, and repair it if any.

Discharge the refrigerant and evacuate the system.

Continue evacuation, if no leak evidence is found.

7) Re-operate vacuum pump.

8）The measuring scales of filling instrument on both ends shall maintain 0.96kg/cm2 vacuum

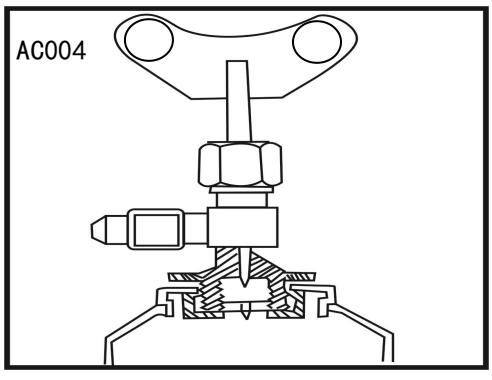


8) Continue evacuation until measuring scale displays 0.96kg/cm2.

Stop evacuation after 15 minutes of evacuation and close the pressure valve of filling instrument, then disconnect pipes from the pump. This allows refrigerant to be filled.

4. Use of Refrigerant Control Valve

Fully turn the Handle in counterclockwise direction, before valve and refrigerant container are connected.



2) Place the disc to the top position in counterclockwise direction.

3) Turn the disc with hand in clockwise direction, after central pipeline is connected to valve device.

4) Turn the handle in clockwise direction and drill in the upper part of the seal.

5) Loosen the nut of connecting pipeline for connecting joint of filling

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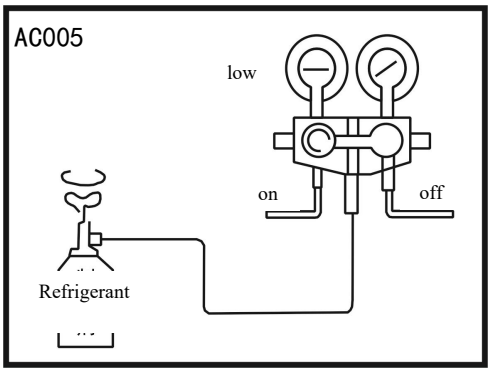
instrument.

6) Tighten the nut after exhaust for several seconds.

5. Filling of Refrigerant (in Gaseous State)



Caution:

■ It is to fill the gas refrigerant to the system through LP end device, and the refrigerant in gaseous state will flow into the system, when the refrigerant container is placed in a straight way.

1) Install the refrigerant container to the regulating valve.

2) Open the LP valve, and adjust the valve for the LP measuring scale to be controlled below 4.2kg/cm2.

3) Start the engine and turn on the air conditioning system.

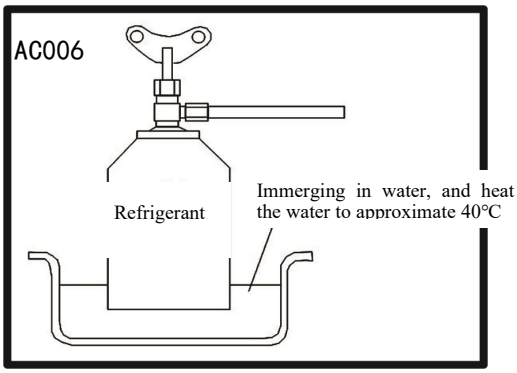
Caution:

■ Place the container in a straight way, in order to prevent the liquid refrigerant from being filled into compressor through air suction port.

4) Close the LP valve after specified quantity is filled.

■ Specified Refrigerant Filling Capacity:480±20g

5) The container may be put into a water tank of about 40℃, if refrigerant filling speed is too slow.



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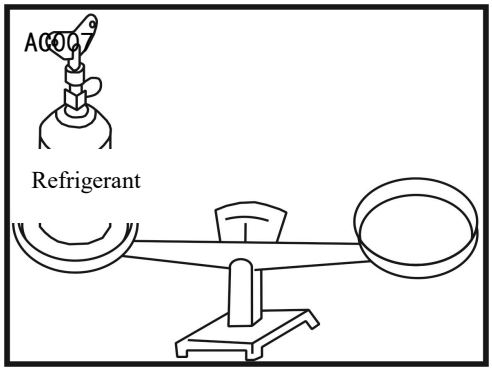
Caution:

■ It is not allowed to heat water up to higher than 52℃, under whatever circumstances.

■ It is not allowed for high-temperature light to get in touch with the container.

6. Filling of Refrigerant (in Liquid State)



Caution:

■ This operation is to be used for filling through HP end. Upend the refrigerant container, and the refrigerant will then be able to enter into the system.

1) Close the two ends of HP and LP valves completely, after system is evacuated.

2) Install the regulating valve for refrigerant container.

3) Fully open the HP valve and then upend the container.

4) Excessive system filling will increase discharge pressure, and therefore, it is required to fill refrigerant and close the HP valve with correct capacity at the same time while the weight of refrigerant is measured.

■ Specified Refrigerant Filling Capacity:480±20g

5) Close the valve of filling instrument after specified refrigerant is filled.

6) Check whether or not air leak exists by leak detector.

Caution:

■ Don’t start the engine when HP end is used for filling.

■ It is not allowed to open the LP valve when liquid refrigerant is used for filling.

■ Performance test must be made before separation of filling detector.

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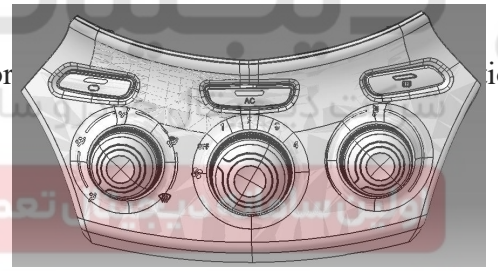
System Control

1. System Overview

Electric controlled air conditioning system is applied to this vehicle type. Supercooling type is used for air conditioning condenser, and therefore the refrigeration performance is enhanced. In order to contribute to defrosting performance, automatic switch to external circulation mode is selected during the mixed and defrosting pattern. Control of condenser fan is divided into low and high two phases according to vehicle speed, temperature of cooling water, and difference in pressures of air conditioning refrigerant. Increase in air delivery and air mixing capacity of blower may improve the refrigerating and heating performances.

Drawing for ioning System



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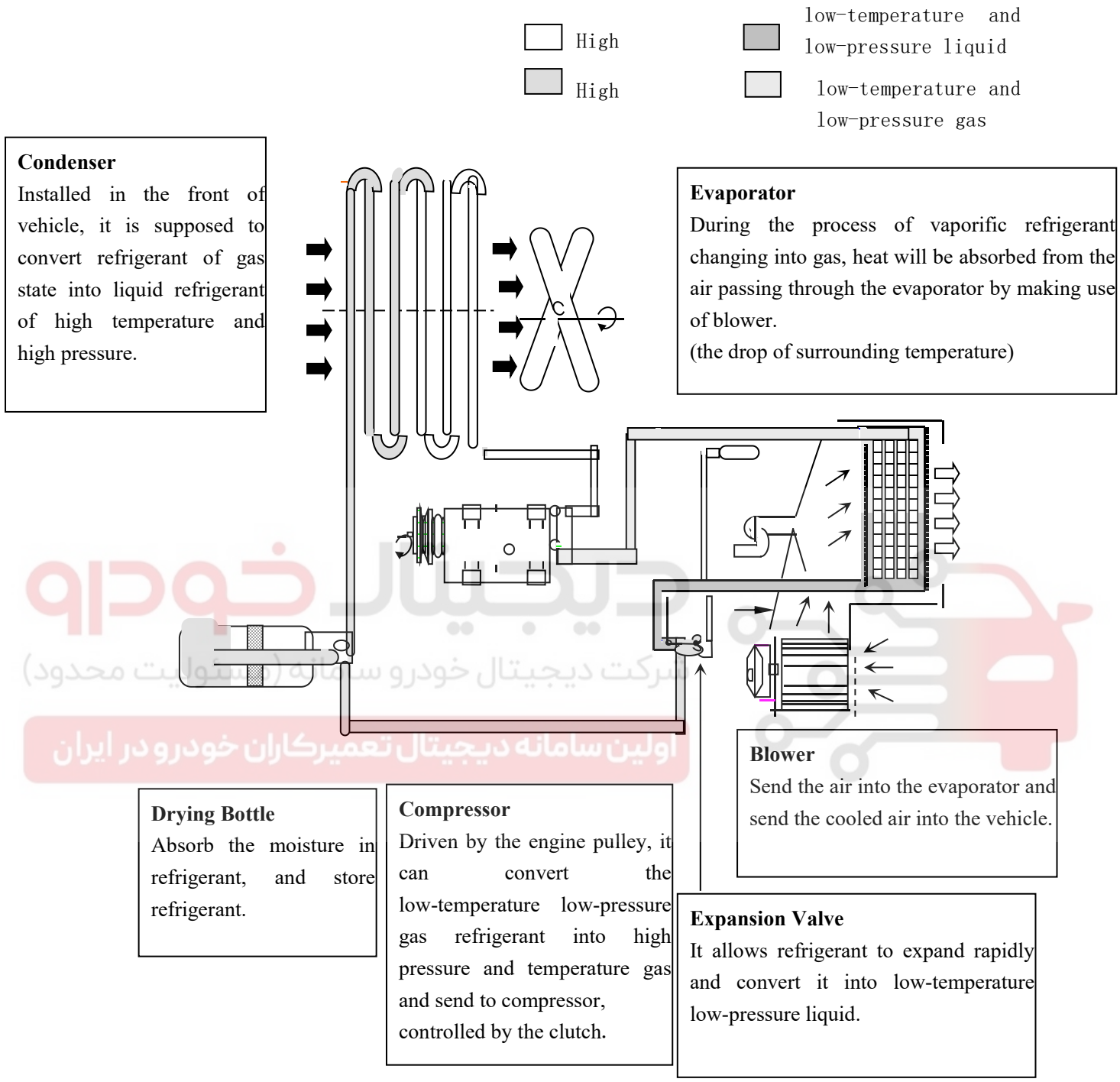
2. Schematic Drawing for Refrigeration



Condenser
Installed in the front of vehicle, it is supposed to convert refrigerant of gas state into liquid refrigerant of high temperature and high pressure.

Evaporator
During the process of vaporific refrigerant changing into gas, heat will be absorbed from the air passing through the evaporator by making use of blower.
(the drop of surrounding temperature)

Blower
Send the air into the evaporator and send the cooled air into the vehicle.

Drying Bottle
Absorb the moisture in refrigerant, and store refrigerant.

Compressor
Driven by the engine pulley, it can convert the low-temperature low-pressure gas refrigerant into high pressure and temperature gas and send to compressor, controlled by the clutch.

Expansion Valve
It allows refrigerant to expand rapidly and convert it into low-temperature low-pressure liquid.

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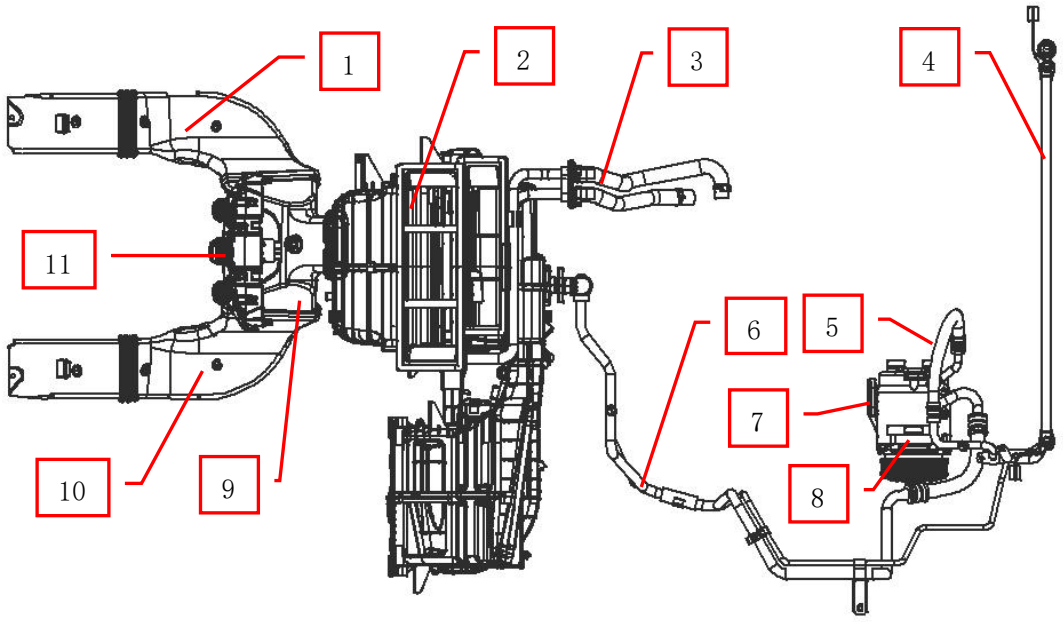
3. Schematic Drawing of Components



Schematic Drawing for Components of Air Conditioning System

1- lower air passage II 2 - Air conditioner assembly 3 - Warm Air water pipe assembly 4 - condenser and guide plate assembly

5 - exhaust pipe assembly 6-pipeline and expansion valve bracket 7-Compressor bracket 8-Compressor Assembly

9-lower air passage I 10-lower air passage III 11 - AC controller assembly

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4. Control Form of Air Conditioning Control Panel and Description about Functions

Fully electric control method is applied to air conditioning control, and the rear defrosting/reversing/rearview mirror heating switch is integrated on the panel, while servo motor control is applied to the internal and external air circulation patterns as well as air blowing pattern. Backlight/LED is used for panel illumination, and the key symbols are spray painted and radium carved. The functions of keys and knobs on air conditioning panel are indicated as in the following figure.

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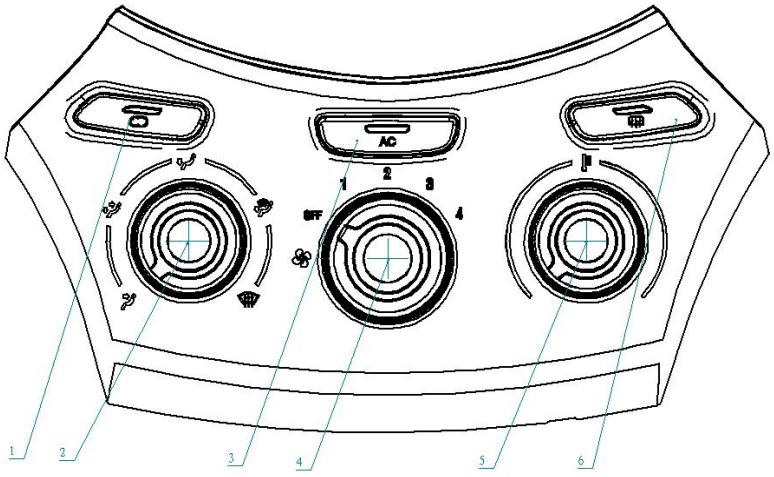
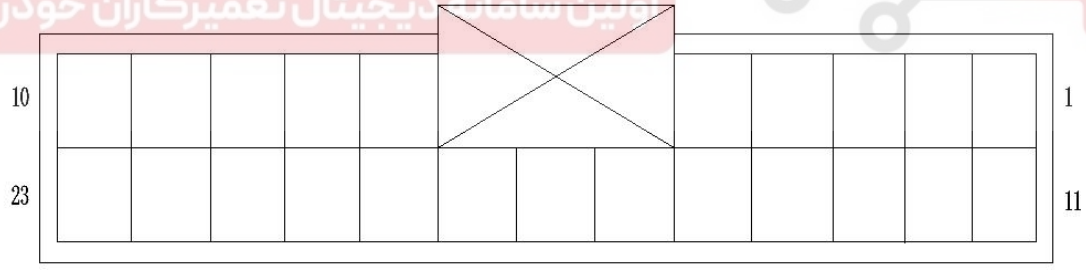


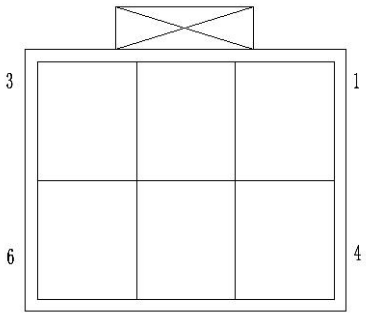
Schematic Drawing for Air Conditioning Control Panel

1 - internal and external air circulation patterns switch 2 - air-conditioning Mode Knob 3 - A/C air conditioning switch 4 - air blower knob 5 - Temperature Control knob 6 - Rear defrosting heating switch

5.Schematic Drawing of Control Circuit and Description about Connecting Pins

Air conditioning controller
Sheath: MG651563 KET
Terminal: ST730751-3(APPLT to 0.3-0.5mm2)KET





Air conditioner volume SW
Sheath: MG610049 KET
Terminal: ST730268-3(Apply to 1.0mm2) KET
Terminal: ST730269-3(Apply to 2.0m-3.0m2) KET

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Diagram of Control Module Terminals

I/NO	USE	Connector type	NO .	Remark
A	A/C control panel	ST730751-3 KET MG 651563 KET	1	———
			2	AC output signal
			3	Evaporation sensor (5V)
			4	Blower switch on signal
			5	Temperature motor positive pole
			6	Motor temperature feedback voltage
			7	Temperature motor negative pole
			8	Rear defrosting open/close signal
			9	Rear defrosting switch indicator
			10	———
			11	———
			12	Backlight negative pole
			13	Backlight positive pole
			14	New Air Blow Motor negative pole
			15	New Air Blow Motor positive pole
			16	Sensor bottom wire
			17	Mode Motor Reference Voltage (5V)
			18	Mode Motor feedback voltage
			19	Mode motor negative pole
			20	Mode motor positive pole
			21	ground wire
			22	Battery positive pole
			23	Ignition switch
B	Airflow switch plug-in	ST730268-3 KET ST730269-3 KET MG 610049 KET	1	Medium and high speed
			2	Public end
			3	Ground
			4	High Speed
			5	Medium and low speed
			6	Low speed

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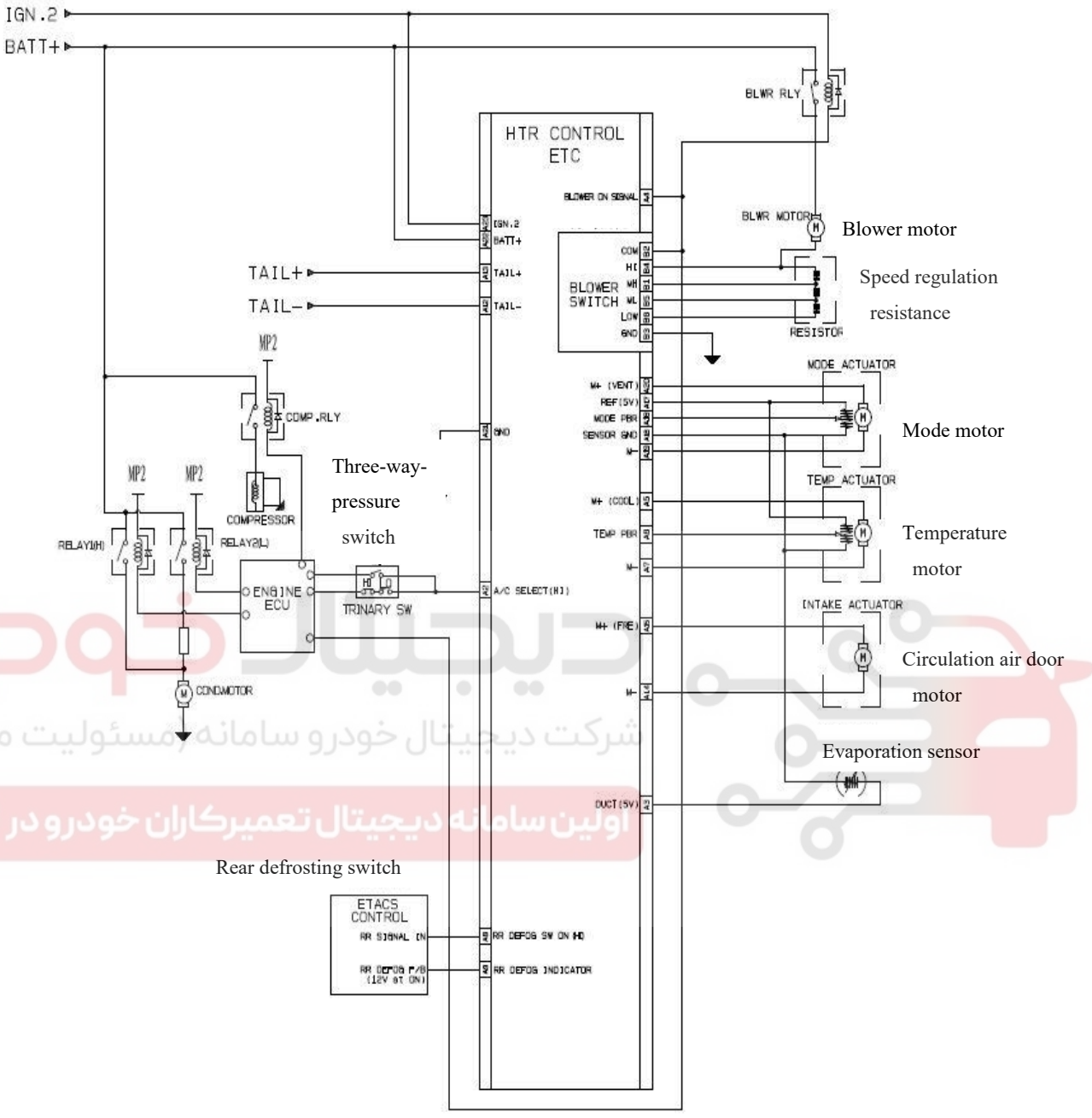
Schematic Diagram of Control Circuit



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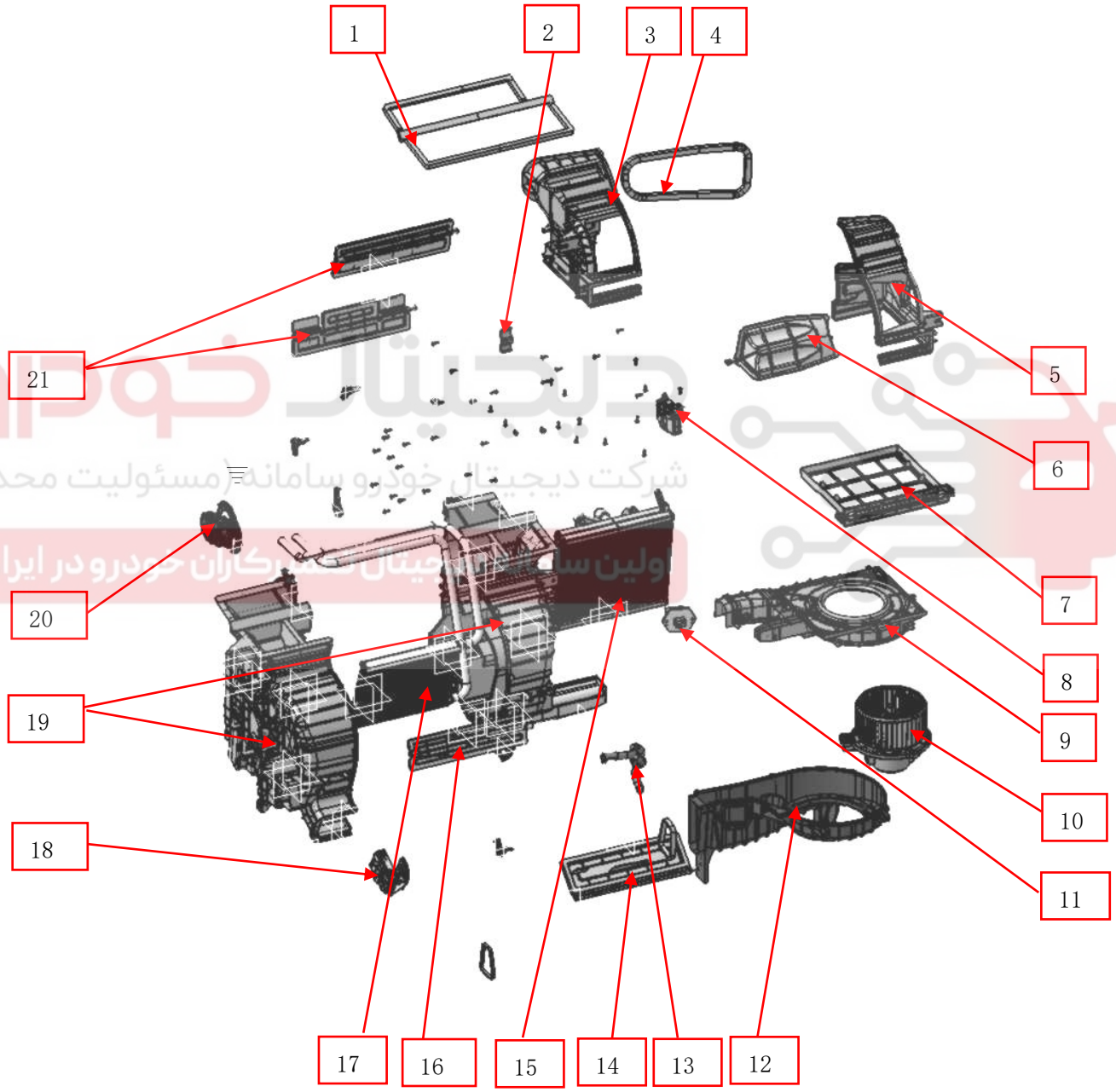
Functions, Positions, and Inspection of System Components

1. Air conditioner assembly

Air conditioner assembly consists of the blower, expansion valve and evaporator, heater, and housing, and so forth. The air from the outside sucked by blower, passes through evaporator, heater, etc, entering the vehicle, in order to achieve air-conditioning normal performance.



Explosive view air conditioner

1- defrosting outlet sponge 2 - heater water inlet/oulet hose bracket 3-air-cycle inlet left housing 4-air-cycle inlet sponge 5-air-cycle inlet right-shell 6 - circulation air door 7 - Filter Element 8

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-circulation air door motor 9 - blower upper housing 10 - Blower Assembly 11 - speed resistor 12 - blower lower housing13 - weep pipe 14-lower air passage throttle 15 - evaporator core 16 - Temperature throttle 17 - heater core 18 - Temperature throttle motor 19 - distribution box 20 - Mode Motor 21 - mode damper

2. Blower

The blower comprises motor and fan, and the air door motor at air suction port is used to transit internal/external air mode, and to suck in the internal air or the external air.

The function of air door motor at air suction port is achieved through the button for internal/external air of controller. The air enters through the two side intakes, when it is in the internal circulation mode, and the air enters through the filter on the front-end shield of vehicle while it is in the external circulation mode. The blower is used to suck in the air at this point, and for heat exchange through evaporator, for the refrigerated air to enter into the vehicle.

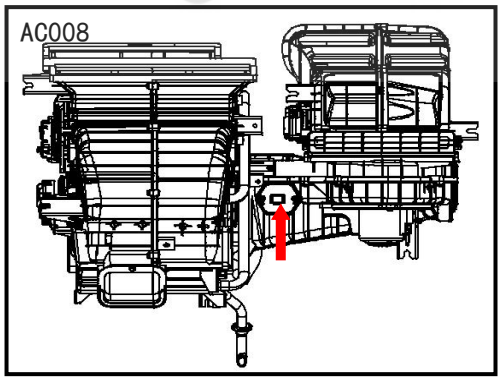
3. Speed Regulation Resistor

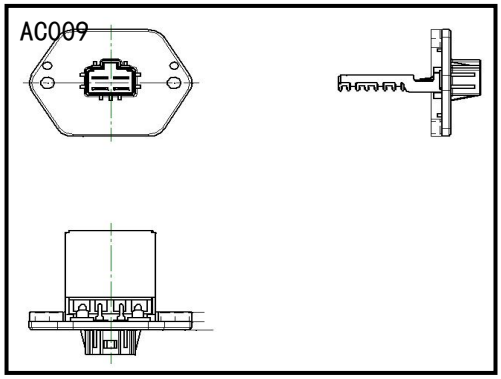
1) Function

To randomly regulate the blower motor speed according to the change in output current

2) Installation Position

The installation position of speed regulation resistor is indicated as in the figure AC008





3) Appearance

The appearance of the speed regulation resistor is indicated as in the figure AC009

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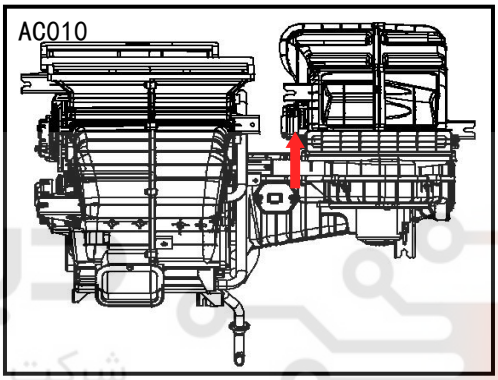
4. Internal/External Circulation Air Door Motor

1) Function

To be installed on blower assembly, and controlled by the internal/external circulation selection button on automatic air conditioner, to actuate the internal/external circulation air door, and to achieve the transition of air inlet mode.

2) Installation Position

The installation position is indicated as in the figure AC010.



5. Blower Motor

1) Function

Rotate the fan to form the air delivery required by air conditioning system by making use of the vehicle power supply.

2) Drawing of Component

3) Test Method:

Add random voltage to “+” terminal, and inspect it after “-” terminal is earthed. It is namely normal when the rotating speed of blower is faster if higher voltage is applied.

6. Evaporator Temperature Sensor

1) Function

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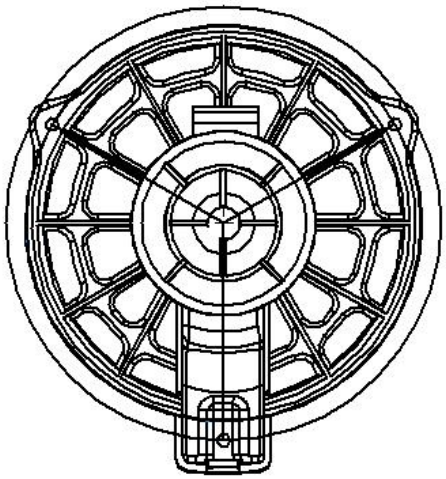
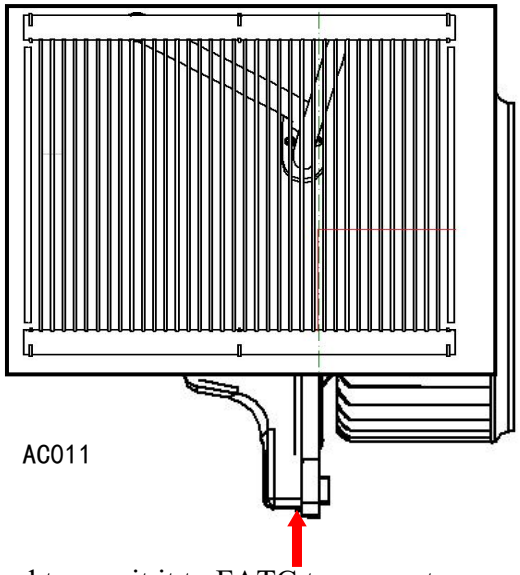




Sense the temperature of evaporator core and transmit it to FATC to prevent freezing of evaporator

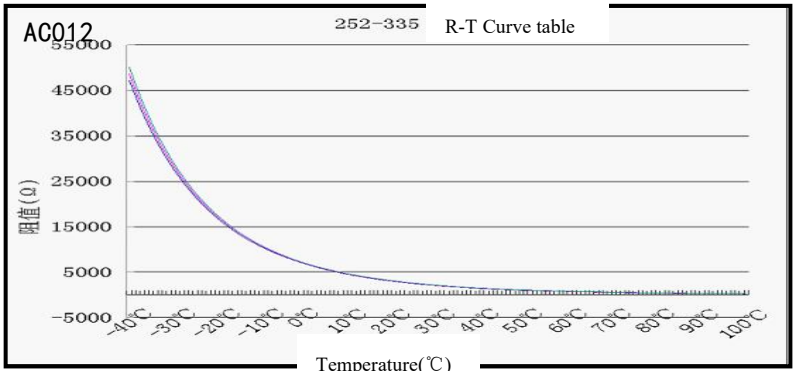
2) Installation Position

It is assembled inside the evaporator core as im the figure. The sensor is internally provided with thermosensitive resistor for negative temperature coefficient, and therefore the resistance increases when temperature drops, while the resistance drops when temperature rises.

3) Table of Parameters (Temperature – Resistance – Output Voltage)

The compressor will disconnect when the temperature stays at 0 degrees C (6.9 K Ω) compressor, and will actuate when the temperature reaches 3.5 °C (5.9 K Ω).

Table of Parameters for Evaporator Temperature Sensor AC012.



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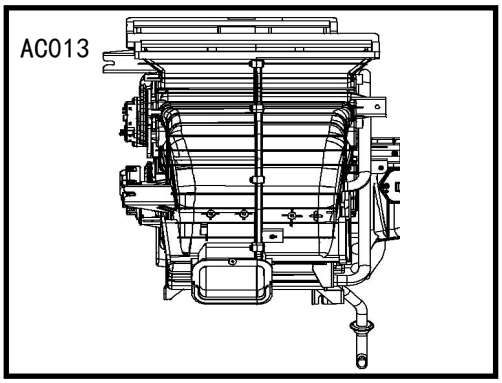
7. Evaporator & Heater



The air delivered by blower will firstly be cooled down through evaporator.

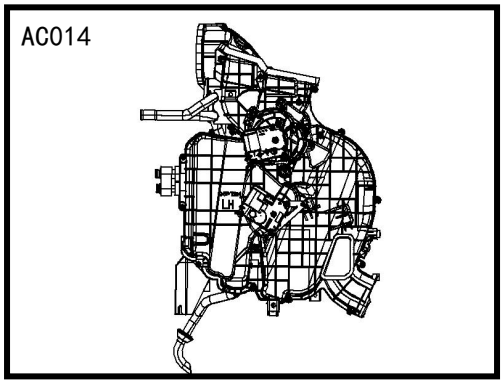
According to the different open & close degree of temperature control air door, part of the air through the evaporator will be sent to heater core, and the rest air will be sent to the upper housing. In order to control indoor temperature and air mixing, the rear part of heater housing is the place for the mixture of the air through the heater core and the air into the upper housing. Thus mixed air through the effect of mode air door motor is sent to the required air outlet, to achieve the performance of indoor temperature adjustment amd defrosting/demisting. Namely the heater assembly adjusts air mixing, temperature control, and air outlet direction.

8. Mode Air Door Motor

1) Function

To be assembled in the left part of heater shell, controlled by the signal of mode switch for air conditioning panel (FATC), to start the position of air door with small-sized motor in regulation mode inside the air door motor - The changing differences in voltage when motor is started are reflected to FATC, and FATC judges the feedback signal. When air door reaches required position, the work of motor will stop.

2) Installation Position



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3）Schematic Diagram of Control Circuit

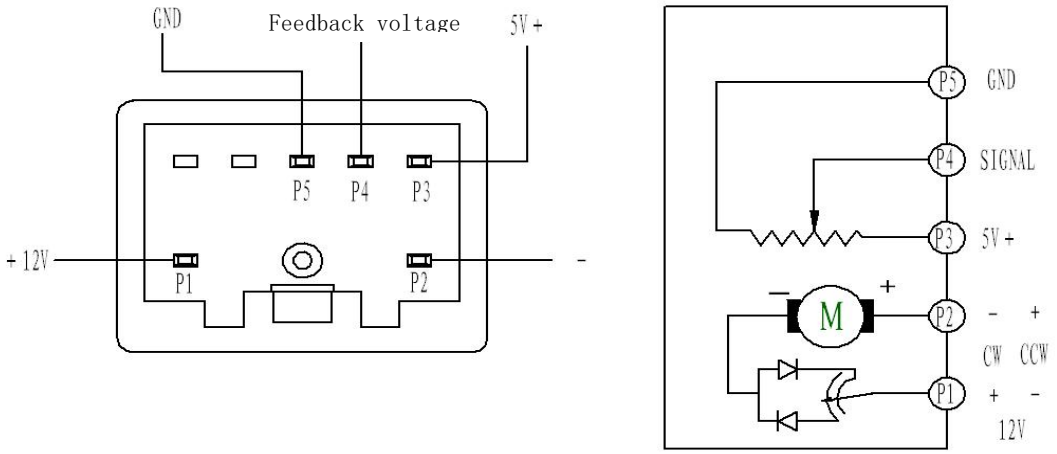


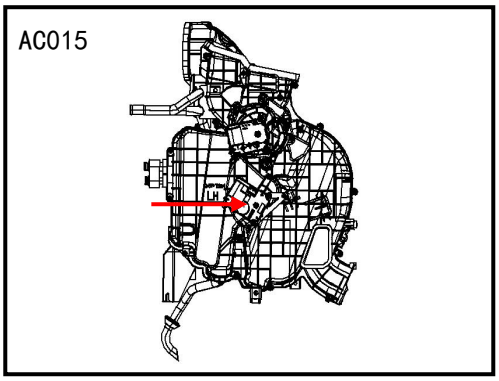
Diagram for Circuit of Mode Air Door Motor

9. Temperature Control Air Door Motor

1) Function

To be installed on the right side of heater shell, controlled by the operating signal of temperature control knob on AC controller, to start the small-sized motor to regulate the position of temperature control air door - The changing differences in motor voltage when motor is started are reflected to AC Controller, which will judge the reflected signal. When air door reaches required position, the work of motor will stop.

2) Installation Position



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Schematic Diagram of Control Circuit

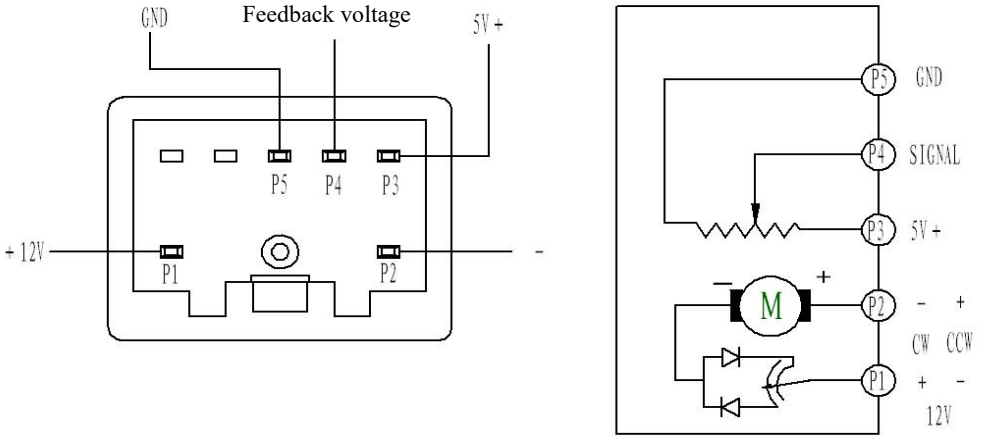


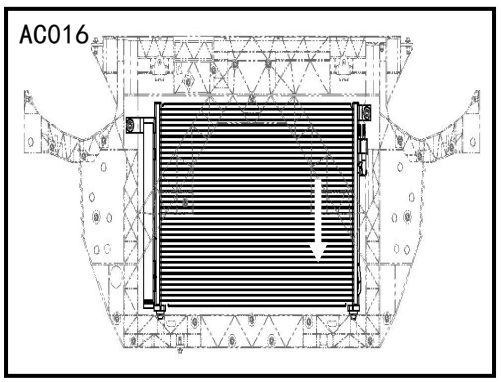
Diagram for Circuit of Temperature Control Air Door Motor

10. Condenser and Drying Bottle

1) Function

The HTHP gas refrigerant from compressor cools down at normal temperature. Cooling of condenser depends on the forced air delivery of running air and fan. The condenser for this vehicle type is in the parallel flow type, combined together with drying bottle. The refrigerating performance is enhanced, the quantity of refrigerant required by the system is reduced, through cooling, and the number of parts is reduced through combination with drying bottle. It used to replace drying bottle in the past, when contamination arises with system, but it is only required to replace the drying agent after the cover of drying bottle in the lower-end part is detached for this vehicle type.

2) Installation Position



11. Engine Cooling System

1） Concept of Cooling Fan Control

The engine cooling unit (ECU) controls the rotating speed of cooling fan by two

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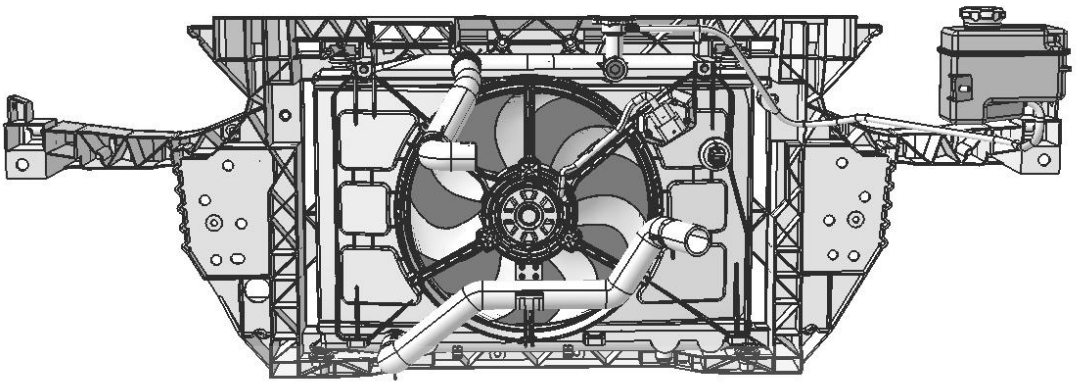
phases (High/Low) after the input vehicle speed, air conditioner load, and temperature value of cooling water are compared.

When vehicle speed sensor and cooling water temperature sensor are confronted with failure, it drives the cooling fan, and as high-speed operation at the same time.

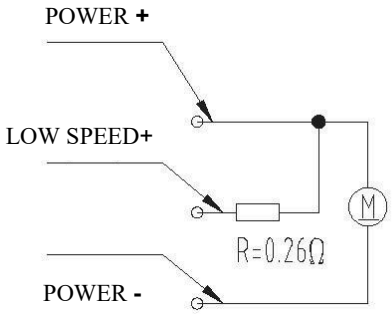
2) Cooling Fan picture



Cooling fan is integrated into the front-end module, and it switches high/low speed operation by acquiring cooling water temperature, speed, and related information.

The power of cooing fan at high speed is 180 to 220 W, and at low speeds is 120 to 150 W.

3） Cooling Fan Control circuit



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Cooling Fan Control circuit

Cooling Fan Pin Definition

THE SHAPE OF THE CONNECTOR	DEFINITION OF THE CONNECTOR (PART END)		
	1	HIGH SPEED GEAR	POSITIVE
	2	LOW SPEED GEAR	POSITIVE
	3	NEGATIVE	NEGATIVE

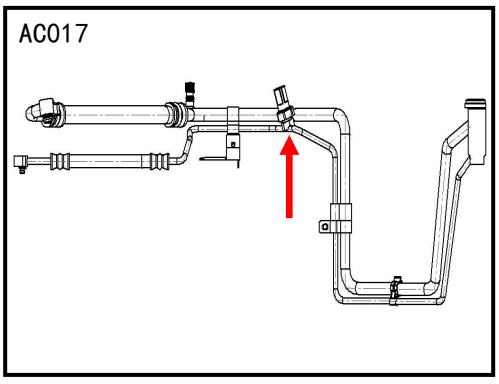
12. Three-Way Pressure Switch

1) Function

Medium-pressure switch is added in the past air conditioning two-way pressures for the three-way pressure switch, and the medium-pressure switch is started and sends signal to the engine control unit, when system pressure rises. At this point the water tank fan and the condenser fan are under the high-speed status, thereby to prevent the performance drop arising when pressure rises, and to be able to protect the air conditioning system when pressure (HP/LP) is under anomalous condition.

2) Installation Position

The installation position is indicated as in the figure.



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3） Circuit Diagram

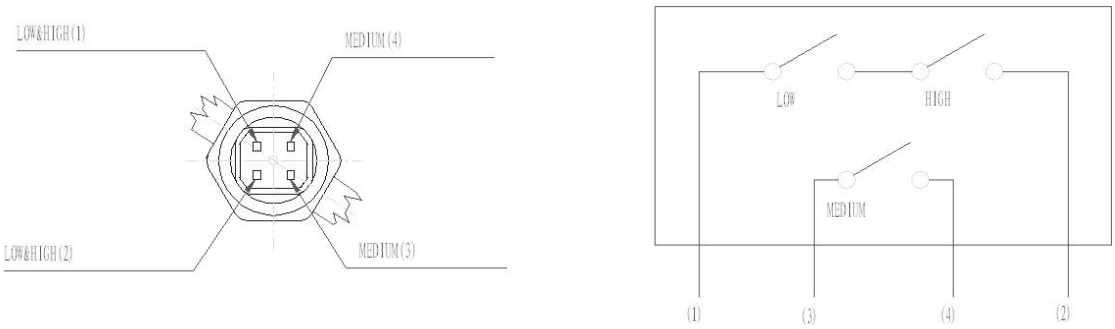


Diagram for Circuits of Three-Phase Pressure Switch

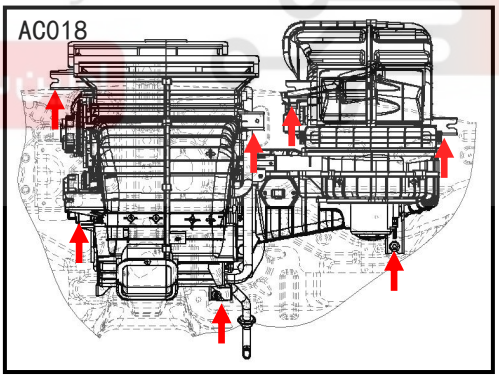
4） Specifications and Parameters

Table of Specifications and Parameters for Three-Phase Pressure Switch

	HFC - 134 a	
High-pressure	OFF	3.14 Mpa
medium-pressure	ON	1.77 Mpa
Low-pressure	OFF	0.196 Mpa

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)
سامانه دیجیتال تعمیرکاران خودرو در ایران

System Removal and Installation



1. Removal and installation of air conditioner assembly

1) Removal

① Recover the refrigerant in the system with special refrigerant recovery equipment.

② Disconnect the batter negative connection.

③ Open the engine compartment, and disconnect the warm air water pipe joint.

④ Remove the fastening bolts for expansion valve.

⑤ Remove the instrument panel assembly.

⑥ Loosen the bolts for bracket of instrument panel, and carry off the bracket of instrument panel.

⑦ Remove the fastening bolts and nuts for the air conditioner assembly.

⑧ Disconnect the circuit plug-in connector, and take out the air conditioner

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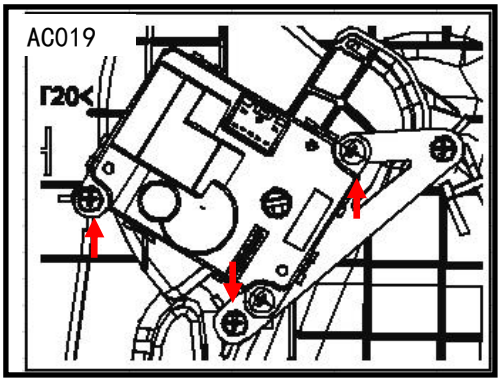
assembly.

2) Installation.

Assembly is the reversed order of removal.

2. Removal and installation of Temperature Control Motor



1) Removal

① Disconnect the battery negative connection.

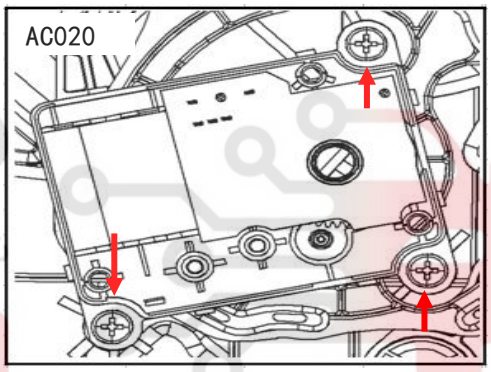
② Remove the instrument panel.

③ Disconnect the plug-in connector, and remove the fastening screws for temperature control motor.

④ Take off the temperature control motor.

2) Installation.

Assembly is the reversed order of removal.



3. Removal and installation of mode damper motor

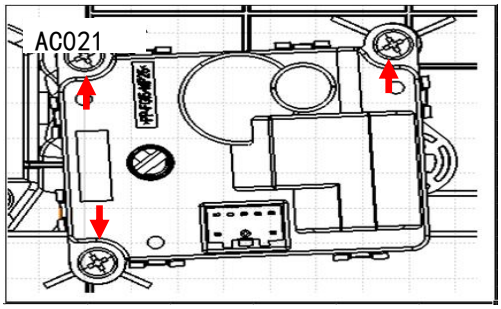
1）Removal:

① Disconnect the battery negative connection.

② Remove the instrument panel.

③ Disconnect the plug-in connector, and remove the fastening screws for mode damper motor.

④ Take out the mode damper motor.



2) Installation.

Assembly is the reversed order of removal.

4. Removal and installation of internal/external circulation air door motor.

1) Removal

① Disconnect the battery negative connection.

② Remove the instrument panel.

③ Disconnect the plug-in connector, and remove the fastening screws for internal/external circulation air door motor.

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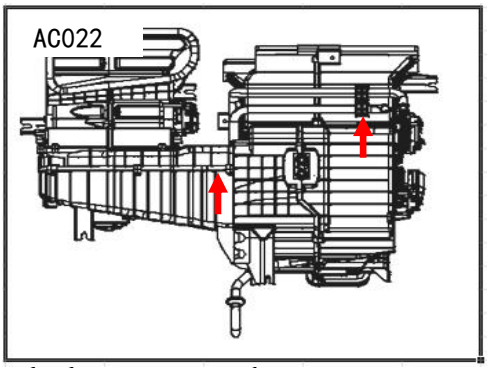
④ Take out the internal/external air door motor.

2) Installation.

Assembly is the reversed order of removal.



5. Removal and installation of Heater

1) Removal

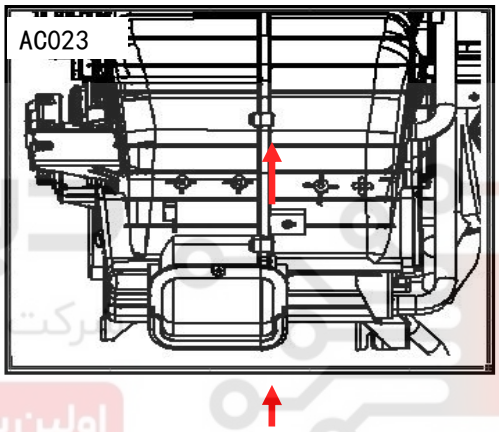
① Remove air conditioner assembly

② Remove the fastening bolts for heater.

③ Take off the stationary baffle, and pull out the heater outwards.

2) Installation

Assembly is the reversed order of removal.



6. Removal and installation of Evaporator

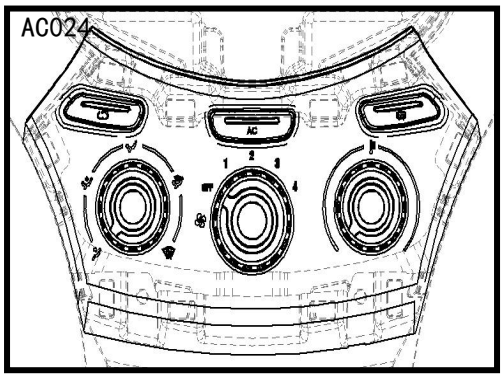
1) Removal

① Remove air conditioner assembly

② Remove the screw and buckle in the middle of the distribution box assembly (Not all included in the picture).

③ Remove the fastening screws around the evaporator.

④ Pull apart the evaporator and the heater assembly from the middle, and take out the evaporator.



2) Installation

Assembly is the reversed order of removal.

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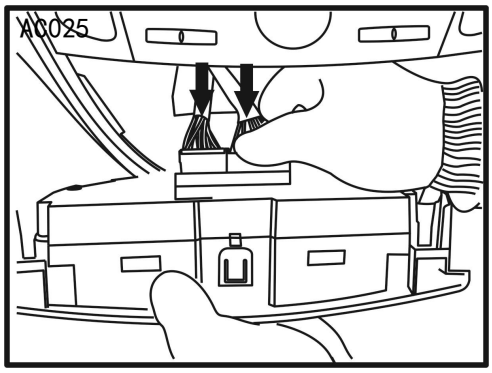
7. Removal and installation of Air Conditioning Panel



1) Removal

① Unclench the edge frame of air conditioning panel by slotted screwdriver.

② Pull out the controller (all the buckles in connection).

③ Pull out the air conditioning control panel outwards and disconnect the two plug-in connectors behind.

2) Installation.

Assembly is in the reversed order of removal.

8. Removal and installation of Condenser

1) Removal

① Recover the refrigerant in the system with special refrigerant recovery equipment.

② Disconnect the batter negative connection.

③ Remove the front bumper.

④ Remove the framework of front bumper.

⑤ Discharge the refrigerant and disconnect the connection with respective pipelines.

⑥ Remove the front-end module assembly.

⑦ Remove the mounting bolts for condenser.

⑧ Take out the condenser assembly.

2) Assembly is the reversed order of removal.

9. Removal and installation of Air Conditioning Filter

1) Function

Foreign matters outside the car will be prevented entering inside so as to keep a comfortable inner environment by the use of the air-conditioning filters.

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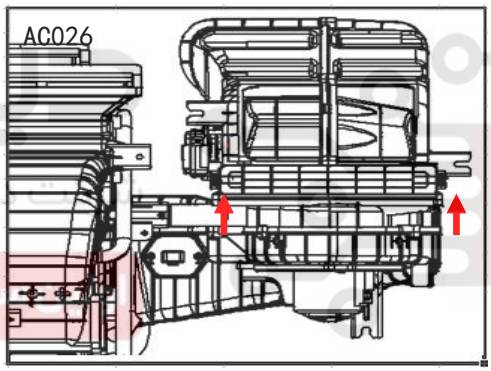
2）Replacement Cycle

It may cause blockage with extraneous matters, increase in noise of blower, reduction of air outlet delivery, and other failures, if the filter is not replaced for a long time.

The replacement cycle is 5000~12000 km, and it shall be frequently inspected and replaced in the areas where atmospheric pollution is severe or road conditions are not good. Frequent wash and change is recommended.

3) Replacement Steps

① Hold down the two sides of storage box and remove it downwards.



② Press down and Pull out the buckle of the air conditioning filter cover, and remove the cover.

③ Take our the air conditioning filter from air conditioning filter cover.

④ The air conditioning filter installation is the reversed order of the above mentioned.

Caution:

■ To replace the filter, put the concave side upwards, and cannot be reversed.

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Periodic Maintenance

Maintenance item		Content	Maintenance cycle				
			Every day	Every week	Every Month	Every quarter	Every year
Refrigeration System	Refrigerant amount	to observe whether or not the flowing liquid has bubbles through the observation glass.	★				
	Pipeline	Whether or not hoses have cracks or damage				★	
		Whether or not there is leak in each joint place				★	
		Whether or not each fixed clamp has loose or damage.			★		
Compressor	Refrigeration Oil	Refrigeration Oil Replacement					★
	Belt	Check the belt tension and whether there is wear			★		
	Compressor Bracket	Check whether there is any loose bolts and damaged brackets			★		
Condenser	Condenser Core	Check whether there is dirt clogged, and clean if necessary	★				
	Fan Motor	Whether it functions well and whether it has strange sound.				★	
Evaporator	Water Inlet/Outlet Hose	Check whether the clamp has loose.				★	
	Fan Motor	Whether it functions well and whether it has strange sound.				★	
Electrical apparatus components	Control box	Check whether the electrical apparatus components are intact				★	
	plug-in connector	Check whether the wire head and the plug-in connector have loose or got off.			★		
	Pressure Switch	Check whether the high and low pressure is normal			★		
	Temperature Control	Check whether the wind speed is normal in Position 3.			★		
	Electromagnetic Clutch	Check whether it can properly close or disconnect		★			

Notice: ★ indicates the checking, adjustment, repair and replace if necessary. To replace refrigeration oil, the compressor shall replace the new oil according to the

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regulations.

Failure analysis and troubleshooting summary table

Symptom	Possible fault Cause	Solution
AC System without refrigerant	Leakage exists in the system	1. Check with eyes: ① To observe whether there is oil stain in the connection place of each part, once there is oil stain, which means the system has leakage. Soap water can be applied to the suspicious area, and then observe whether there are bubbles.. ② Observe each part to detect the abnormal fault. For instance, there are scratches, squash and impact damage on the surface of the condenser and evaporator core.
		2. Through the vacuum method, listen carefully near the parts to catch sizzle sound; if any, there is leakage here.
		3. Inspect with equipment: ① Apply electronic Leak detector of high sensitivity. ② Dye tracing for leakage.
Improper amount of refrigeration oil in system.	Replacement of the system parts, increase or reduce in accordance with the regulations.	1. First confirm refrigeration oil specifications and should not be blended; specifications of common use: PAG;
		2. After recovering refrigerant: add approximately 30 g refrigeration oil.
		3. To replace the compressor, pour out all the refrigeration oil in the compressor, and add the oil same as that in the changed compressor.
		4. Replacement of pipeline: add approximately 30g refrigeration oil.
		5. Replacement of condenser: add approximately 60g refrigeration oil.
		6. Replacement of evaporator: add approximately 50g refrigeration oil.
		7. Replacement of drying agent: add approximately 10g refrigeration oil.
Airflow is abnormal	Air conditioning without wind.	1. Circuit Fault. ① Check whether the motor circuit or plug-in connector has loose or got off. ② If fuse gets off or damaged, replace it. If relay breaks down, replace it..
		2. Mechanical Failure ① IF motor breaks down, replace it. ② If temperature air door mechanism gets damaged, unable to adjust throttle to the cooling state, replace it; ③ If controller breaks down, replace it. If the speed regulation module is damaged,

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		replace it.
	Airflow of air conditioning is slightly small.	1. Low voltage, check the Power Supply Battery.
		2. Whether the air duct is congested, and whether all the grilles are opened.
		3. Whether the blow surface has leakage, check.
		4. The speed regulation module fails and needs to be replaced
		5. Whether the wind resistance of the air filter is excessive, resulting in the block of dust and extraneous matters.
		6. Reversed direction of motor rotation , switch the positive and negative pole of the plug-in connector.
Air Conditioning without Cooling	System without refrigerant	Pressure gage test, please refer to check of refrigerant leak.
	No air blow	Please refer to Check of abnormal airflow.
	Compressor does not work	1. Electromagnetic Clutch does not work ① Fuse blown, replace it; ② If the plug-in connector in the circuit gets off and damaged, check the circuit and replace it. ③ Replace the burnt relay. ④ Remove the damaged clutch assembly, repair or replace.
		2. If drive belt is broken, replace it.
		3. Signal is not clear. ① Pressure switch is damaged, no pressure signal; by short circuit signal detection, if damaged, replace it.; ② ECU failure, inspection and maintenance.
		4. If the compressor has an internal damage, replace it.
Air conditioning cooling is not very good	Insufficient refrigerant	1. Test the pressure to see whether it is in the normal range of values; refill the refrigerant if it is insufficient.
		2. Check whether the system has a microleakage.
	Excessive refrigeration Oil	1. Discharge superfluous refrigeration oil and fill the required amount of refrigeration oil.
	Compressor is not in normal state	1. The slip of compressor belt or clutch.
	Airflow of air conditioning is slightly small.	Please refer to Check of abnormal airflow.

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	Pressure is not normal	1. High pressure is lower than normal value, and low pressure is lower than normal value ① If there is blockage in the expansion valve, clear obstructions. ② If expansion valve is not fully opened, adjust the valve or replace it. ③ Add the refrigerant if it is insufficient.
		2. High pressure is higher than normal value, and low pressure is higher than normal value ① If the condenser cooling is poor, check the condenser fan airflow and replace the defective parts; ② If refrigerant is excessive, discharge some.
		3. High pressure is lower than normal value, and low pressure is higher than normal value ① compressor failure, lack of capacity and necessary to be replaced. ② Insufficient refrigerant, and refill.
		4. High pressure is higher than normal value, and low pressure is lower than normal value ① The impurity exists in the system, leading to congestion.
No heating performance in AC System	no hot water in the core	There is blockage in the warm air water pipe. Clear the blockage.
		Water valve is damaged, resulting in the blockage for water to enter into the core for circulation; inspection and maintenance is needed.
		The wrong outlet position of water from the engine prevents water entering into the core for circulation; inspection and maintenance is needed.
	No air blow in AC system	Please refer to Check of abnormal airflow.
	Failure control	Temperature control of controller is damaged so as not to adjust the temperature damper to the maximum heating. Replace the controller.
Poor heating performance in AC System	insufficient hot water circulation	Check whether the water supply to the engine is sufficient, or the engine failure.
	The internal flow of hot core is not smooth.	Clear the internal blockage or a replace heat exchanger.
	Small airflow.	Please refer to Check of abnormal airflow.
	Mode damper is not correct	The rotation of temperature damper is not in place, with the mixture of heat and coldness.
AC System with abnormal sound	Compressor with abnormal sound	Turn on the air conditioner and start the compressor to see if the clutch has grinding noise. If there is abnormal sound, replace the compressor.
	Pipeline expansion valve with abnormal sound	Whether there is flowing chirps sound in the expansion valve after the air conditioner is started; adjust expansion valve and replace.

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	Damper mechanism with abnormal sound	Whether there is resistance when adjusting the damper mechanism, and whether there is "tick" or "chuckling" sound; in such a situation, the damper mechanism shall be coated with lubricating oil or some parts shall be replaced;
	Blower with abnormal sound	Abnormal sound in the blower volute: ① There is a booming sound, check the motor has no reversed rotation; adjust plug-in circuit. ② "Creak" or "sizzle" sound comes, indicating motor damage. Replace the motor. ③ A "bang-bang" sound indicates the extraneous matters in the volute. Remove and check.
		The blower is not installed firmly, resulting in vibration sounds.
AC System with peculiar smell	Filter with mildew	Remove the filter and check whether there is serious contamination on the surface. Replace in time.
	Radiator surface contamination	Whether there is oil stain on the surface of evaporator and heater in production. Replace and clean if necessary;
	Discharge of condensate water is not smooth	Condensate water is not fully discharged, resulting in water deteriorating in the housing. Replace drain port location.

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