Section 1 Safety Precautions for A/C System

1. Do not handle the refrigerant in the unventilated location or near fire.

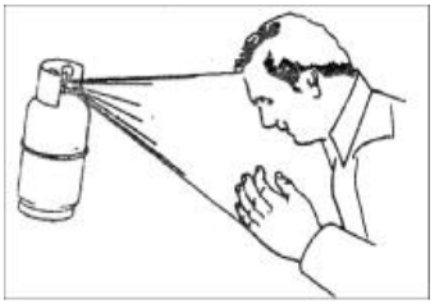


2. Wear a safety goggle.

3. Take care not to let the refrigerant liquid splash onto your skin or into your eyes.

If the refrigerant splashes into your eyes or onto your skin,

(a) wash them with cool clean water.



WARNING:

Do not wipe your eyes or skin.

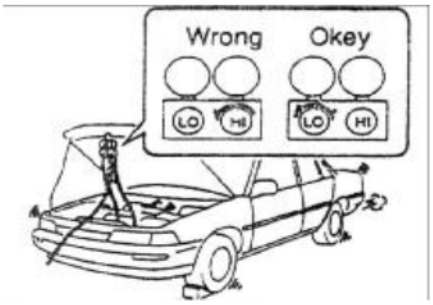
(b) appropriately clean the oil on your skin.

(c) go to a hospital immediately and consult a doctor.

4. Do not heat the container or place it near fire.

5. Take care to move the refrigerant container gently so as to prevent the container from being impacted by the sharp objects.

6. The refrigeration system shall fill with sufficient refrigerant during outdoor use.



If an insufficient refrigerant level is detected in the refrigeration system, the oil lubrication will be poor and the compressor may be damaged. Thus, sufficient refrigerant shall be added to the refrigeration system in order to avoid the occurrence of the conditions above.

7. Do not open the pressure combination vacuum valve during the course of the operation of compressor.

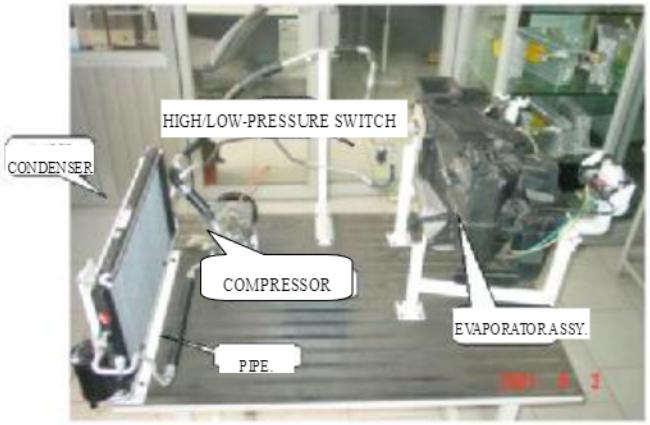
If the high-pressure valve is left open, the refrigerant will flow back into the refrigeration cycle and cause the refrigerant container damaged. Thus, only the low-pressure valve can be opened / closed.

8. Take care not to let the system (with refrigerant) overloaded.

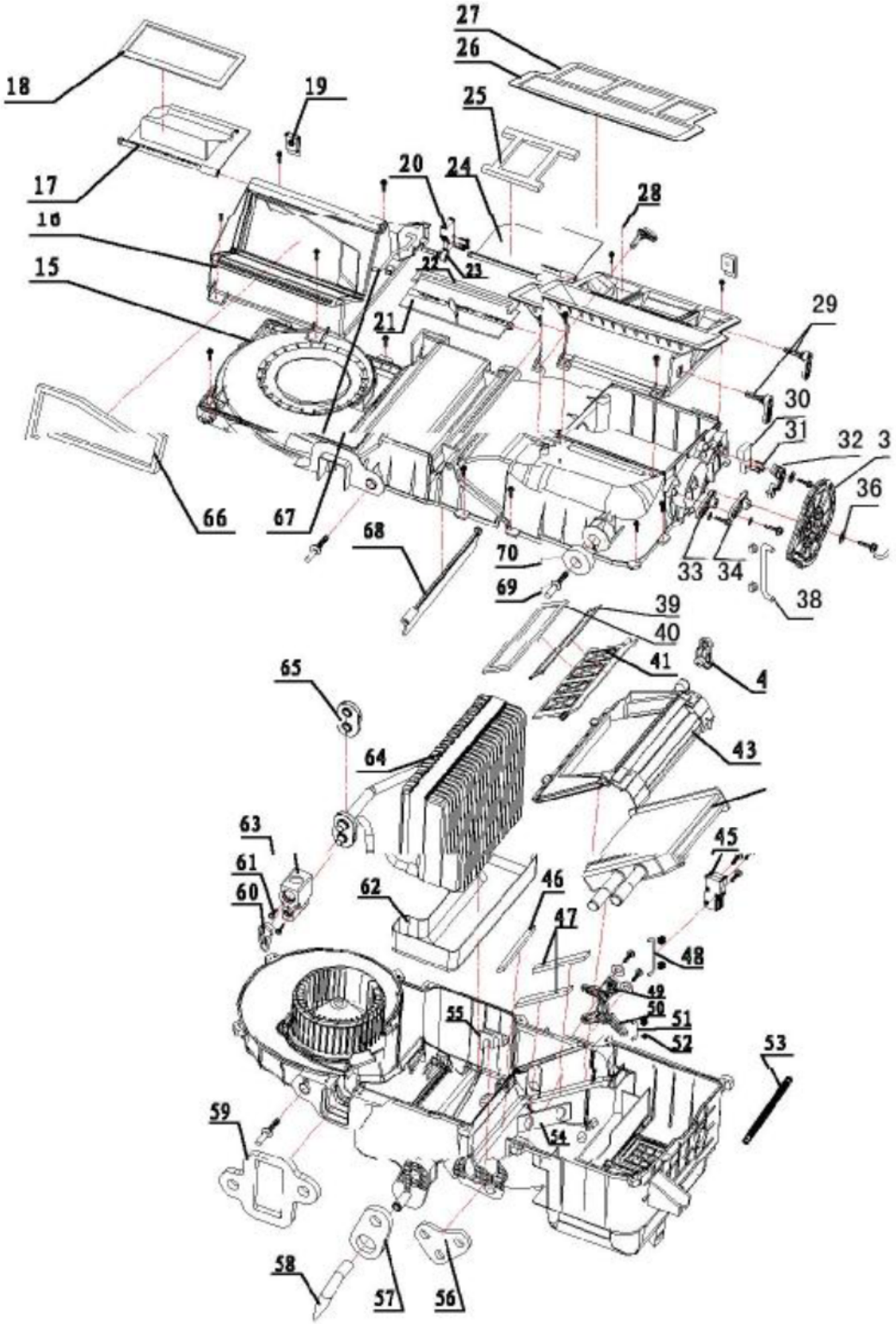
Section 2 Parts and Components Location Index

3. STRUCTURE OF VEHICLE A/C REFRIGERATION SYSTEM

3.0.1: STRUCTURE OF CHERY AUTO A/C REFRIGERATION SYSTEM

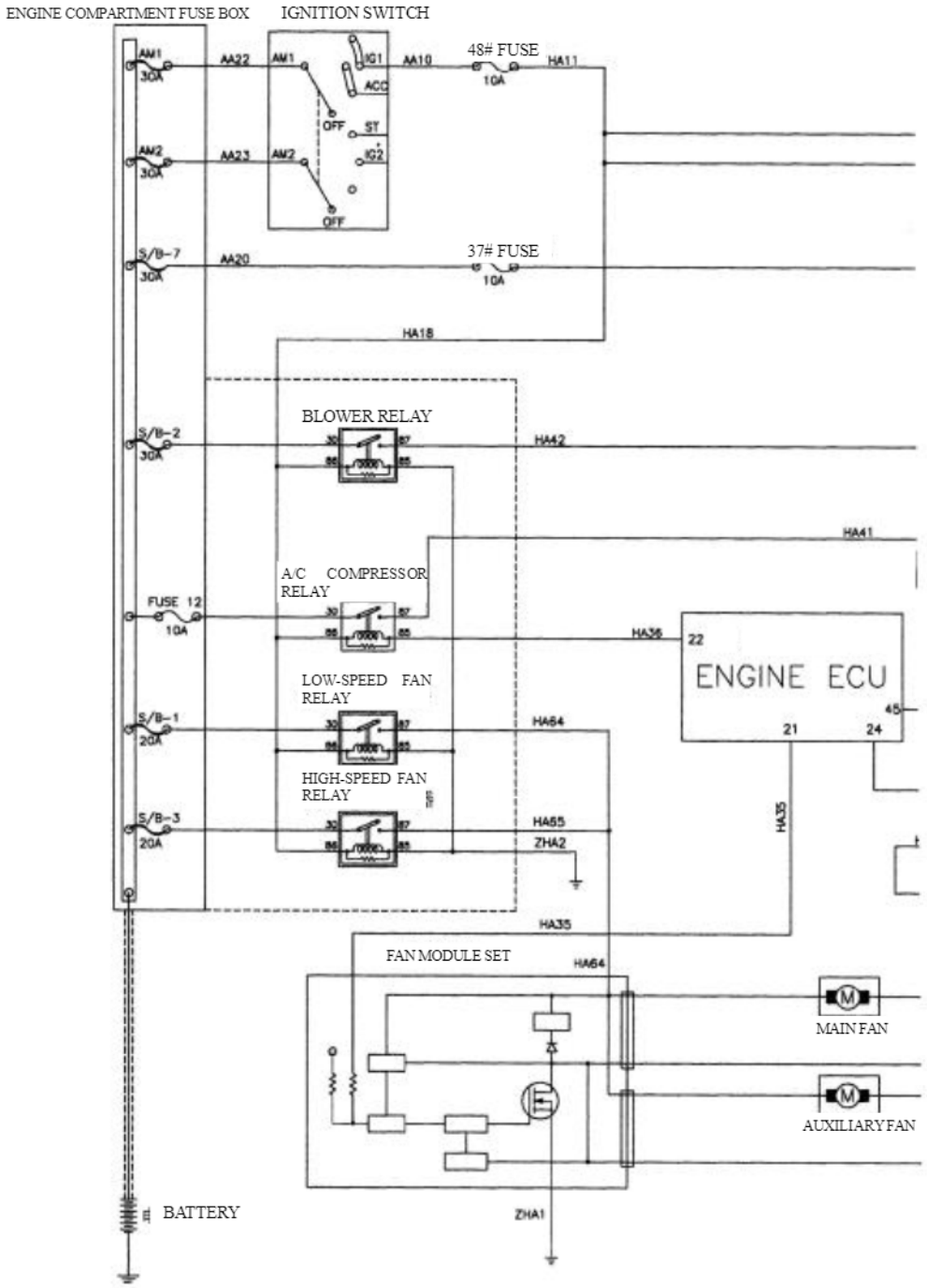


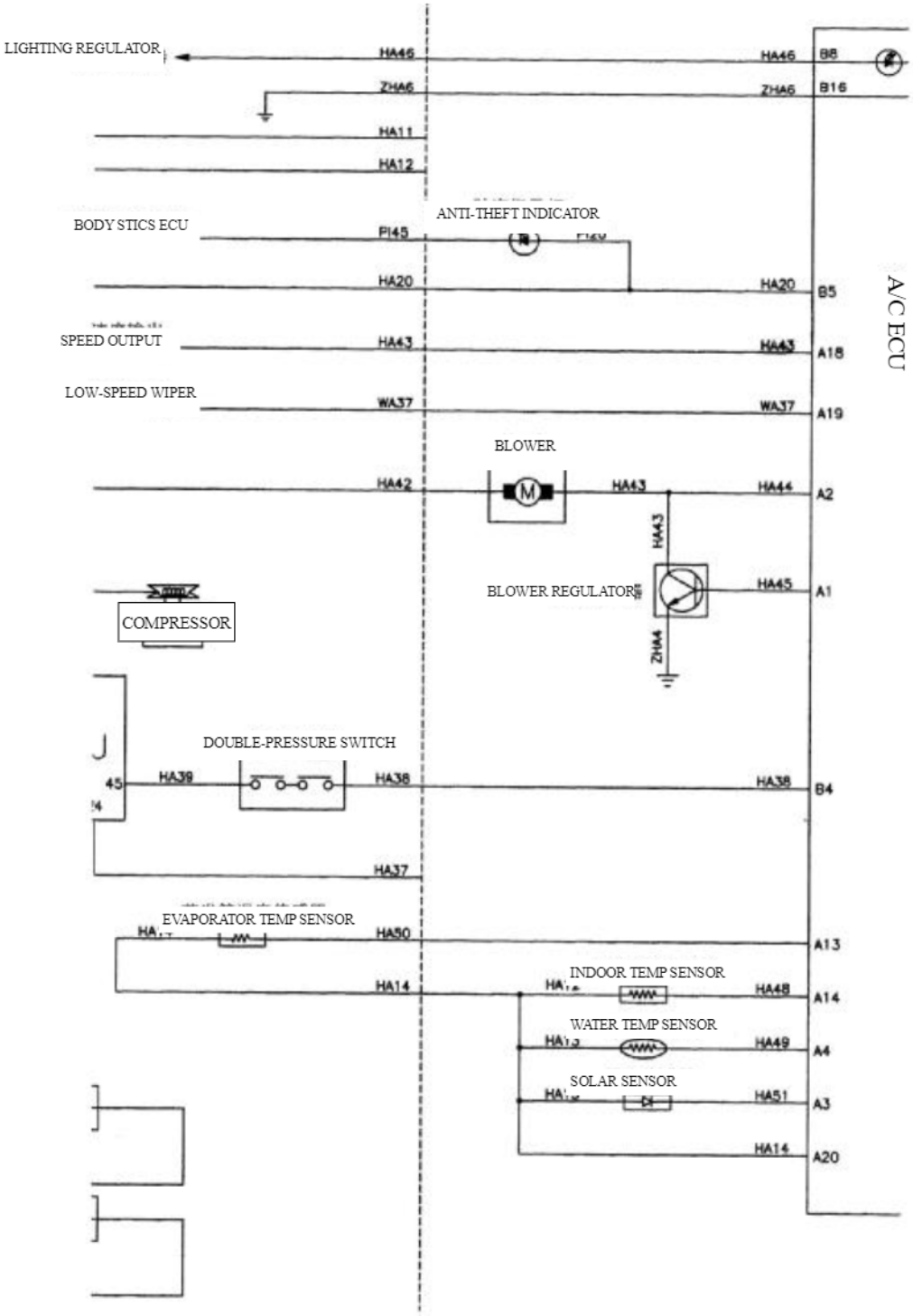
1	HVAC lower case	19	Bolt mounting clip	37	Metal connecting rod 4	55	Radiator tube clamp
2	Damper 5 shaft	20	Internal cycle regulation actuator assy.	38	Metal connecting rod 3	56	Radiator outlet sponge
3	Damper 5 sealing strip 1	21	Damper 3	39	Damper 4 sealing sponge 2	57	Drainpipe sponge
4	Damper 5	22	Damper 3 sealing strip	40	Damper 4 sealing sponge 1	58	Drainpipe assy.
5	Damper 5 sealing strip 2	23	Damper 6 shaft	41	Damper 4	59	Evaporator outlet sponge
6	Lower air outlet case	24	Damper 2	42	Damper 4 shaft	60	Expansion valve sealed cap
7	Lower air outlet sponge	25	Damper 2 sealing strip	43	Cold/Warm air distribution bracket	61	Hexagon socket head cap screw
8	Tapping screw	26	Upper air outlet sealing sponge 1	44	Warm-air radiator	62	Evaporator lower heat insulating mattress
9	Harness clip (white)	27	Upper air outlet sealing sponge 2	45	Temperature regulation actuator assy.	63	H type expansion valve
10	Metal harness clip	28	Damper 1 shaft	46	Radiator core heat insulating mattress 1	64	Evaporator core components
11	Relay	29	Damper 2 and 3 shaft	47	Radiator core heat insulating mattress 2	65	Rubber-hose clamp
12	Blower motor assy.	30	Wind direction regulation actuator assy.	48	Metal connecting rod 2	66	Air inlet sealing sponge
13	Electronic speed regulation module	31	Tapping screw2	49	Double connecting rod 1(white)	67	Metal connecting rod 5
14	Harness assy.	32	Double connecting rod 2(white)	50	Triple connecting rod (white)	68	Damper 1
15	Upper case	33	Double connecting rod 3(white)	51	Metal connecting rod 1	69	Stud
16	Air inlet case	34	Double connecting rod 4(white)	52	Connecting rod fixing clip	70	Upper case circular spongy cushion
17	Damper 6	35	Combination console panel (white)	53	Air pipe assy.		
18	Damper 6 sealing strip	36	Platen	54	Radiator foam guard strip		

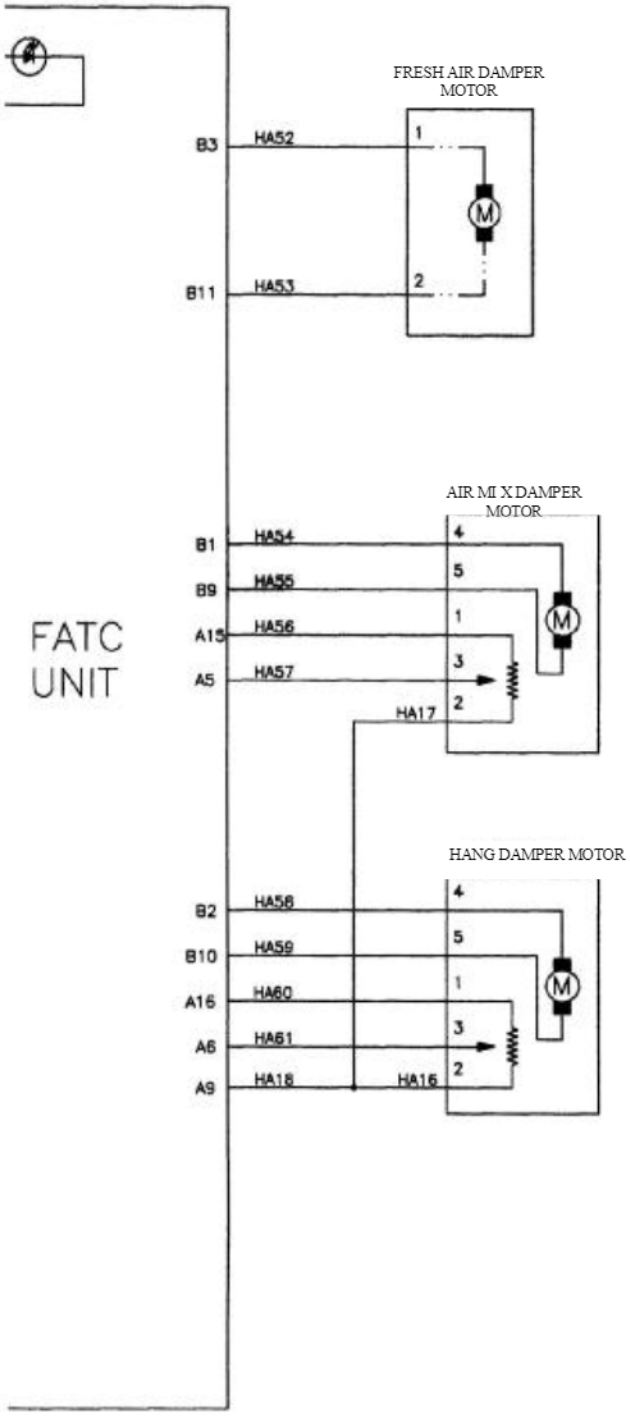

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Section 3 Schematic Diagrams of Circuits

CIRCUIT DIAGRAM OF COOLING FAN AND A/C

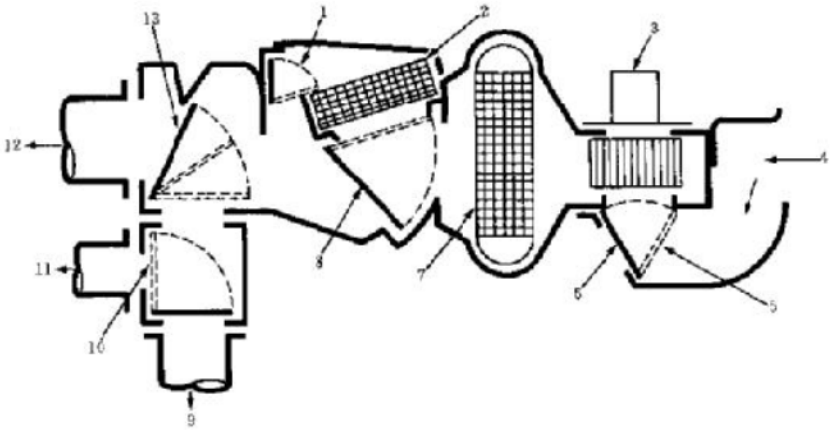



LIGHTING REGULATOR
HA46
HA46
B8
ZHA6
ZHA6
B16
HA11
HA12
BODY STICS ECU
ANTI-THEFT INDICATOR
PI45
HA20
HA20
B5
A/C ECU
SPEED OUTPUT
HA43
HA43
A18
LOW-SPEED WIPER
WA37
WA37
A19
BLOWER
HA42
HA43
HA44
A2
HA43
BLOWER REGULATOR
HA45
A1
ZHA4
COMPRESSOR
DOUBLE-PRESSURE SWITCH
45
HA39
HA38
HA38
B4
HA37
EVAPORATOR TEMP SENSOR
HA50
A13
INDOOR TEMP SENSOR
HA14
HA48
A14
WATER TEMP SENSOR
HA49
A4
SOLAR SENSOR
HA51
A3
HA14
A20


FRESH AIR DAMPER MOTOR
B3
HA52
1
M
B11
HA53
2
AIR MI X DAMPER MOTOR
B1
HA54
4
B9
HA55
5
A15
HA56
1
A5
HA57
3
HA17
2
FATC UNIT
HANG DAMPER MOTOR
B2
HA58
4
B10
HA59
5
A16
HA60
1
A6
HA61
3
A9
HA18
HA16
2

Section 4 Windshield Location

3.0.9: CHERY AUTO CASE/AIR PIPE SYSTEM



The separate type casing system with a blower

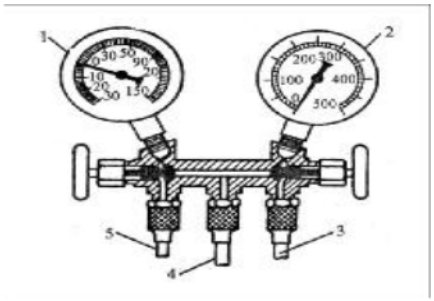
1—Choke 2—Heater core 3—Blower motor 4—Fresh air 5—Fresh/Recirculation air damper 6—Recirculation air 7—Evaporator core 8—Mixed air damper 9—To panel 10—A/C defroster damper 11—To defroster 12—To the bottom outlet 13—Heater defroster damper

Section 5 Particulars for Tools and Equipment

Air conditioner maintenance kit		
Service valve for draining refrigerant		
Refrigerant charging gauge		
Refrigerant charging hose		Green
Refrigerant charging hose		Blue
Refrigerant charging hose		Orange yellow
Stop valve		
Complete charging hose kit with stop valve		If a stop valve is required, please order this kit.
Magnetic clutch remover		
Magnetic clutch retainer		
Clasp forceps		
Clasp forceps		
Lip sealing protection		

Section 6 Manifold Pressure Gauge Operation Guide

The manifold pressure gauge is a most popular tool available for the maintenance of A/C unit, shown in the right figure. The low-pressure gauge is not only used to indicate the pressure, but to indicate the degree of vacuum with the reading range of 0 to $5x10^5$Pa (0—760mmHg), the pressure scale of which starts from 0 and its range is no less than $4.2X10^5$Pa (approx. 4.2kgf/cm^2). The pressure scale of high-pressure gauge starts from 0 and its range is no less than $21.1X10^5$Pa (approx. 21.1 kgf/cm^2). These two pressure gauges are installed on a gauge stand. Both ends of gauge stand are respectively equipped with one manual valve, and there are three channel interfaces in the bottom of the gauge stand.



Manifold Pressure Gauge

1 - Low-pressure gauge (blue).
2 - High-pressure gauge (red).
3 - High-pressure side hose (red).
4 - Hose for maintenance (yellow).
5 - High-pressure side hose (blue).

The interface of low-pressure gauge connects to the low-pressure pipe joint via a hose while the interface of high-pressure gauge connects to the high-pressure pipe joint via a hose. The middle interface connects to the vacuum pump or refrigerant tank via a hose. With the help of the combination action of two manual valves and three hoses, the manifold pressure gauge has four functions (shown in the table below).

Function of Manifold Pressure Gauge

Location of High- and Low-pressure Valves	Functions
High- and low-pressure valves close simultaneously	Refrigeration system failure diagnosis
Low-pressure valve open, and high-pressure valve close	Refrigeration system is charged with refrigerant or refrigerating machine oil
Low-pressure valve close, and high-pressure valve open	Refrigeration system leakage check and quick refrigerant charging
High- and low-pressure valves open simultaneously	Refrigeration system vacuum pumping

Note: The high- and low-pressure valves open means that the high- and low-pressure valves connect to the refrigeration system and intermediate pipe respectively. The high- and low-pressure valves close means that the high- and low-pressure valves do not connect to the intermediate pipe but connect to the refrigeration system respectively.

Section 7 Refrigerant Recycling Equipment Operation Guide

Recycle the refrigerant from the refrigeration device

When the refrigerant is removed from the refrigeration device under the following conditions, a recycling receiver shall be applied to recycle the refrigerant.

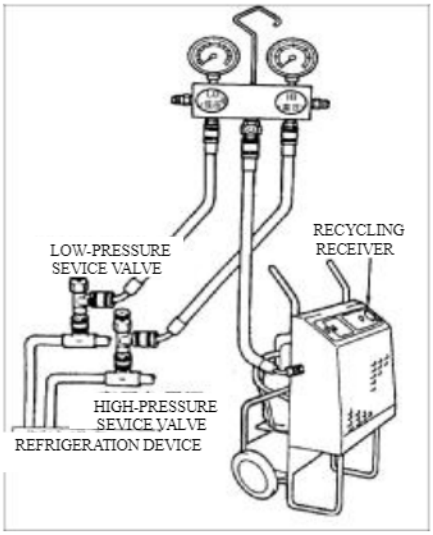
Before the components on the refrigerant pipe are replaced.

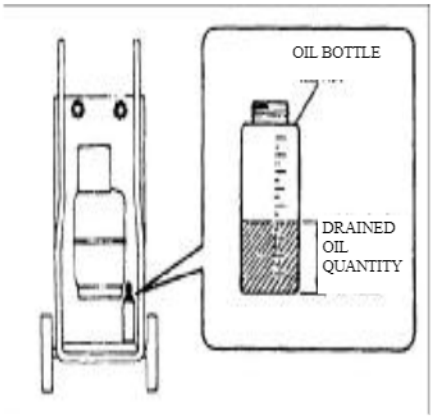
When moisture or air enters into the refrigerant pipe.

When excessive refrigerants are charged into the system.

WARNING:

- When the recycling receiver is required, take care to operate it according to the requirements of device manufacturer's instructions.
- After the completion of recycling work, measure the level of compressor oil recycled so that the same quantity of oils are added to the refrigeration device in the future.





Operation guide for refrigerant recycling receiver

1. Install the manifold pressure gauge kit on the service valve.
2. Recycle the refrigerant from the refrigeration device.

(a) Connect the intermediate hose to the recycling receiver.

(b) Operate the recycling receiver.

(c) Open the manual high- and low-pressure valves on the refrigeration pressure gauge kit.

1. After the completion of recycling work, turn off the recycling receiver.
2. Remove the manifold pressure gauge kit from the service valve.

Section 8 Failures and Troubleshooting Analysis Table

The regular failures and its causes of A/C unit are shown in the table below.

Phenomenon	Possible Cause	Method of Troubleshooting
Warm air no hot	(1) Water pipe fall off (2) Hot water valve failure (3) Water pipe jam (4) Low blower speed (5) Blower no rotation (6) Temperature damper not reset	(1) Remount the water pipe (2) Replace the hot water valve (3) Dredge the water pipe or replace the radiator (4) Check the series resistance of blower (5) Check the A/C motor and its circuit (6) Adjust the temperature damper
Cooling inadequate or airflow insufficient	(1) Poor battery connection (2) Air channel broken (3) Dust filter jam (4) Evaporator frosted (5) Blower motor, relay or its circuit failure (6) A/C unit blown fuse broken (7) Refrigeration system with outside air leakage (8) Central damper solenoid valve or fresh air/recirculation air vacuum valve damaged	(1) Check the battery voltage and connector (2) Reconnect the air channel (3) Rinse or replace the dust filter (4) Check the anti-frosting switch and A/C relay (5) Check blower motor, relay and its circuit (6) Replace the blown fuse (7) Vacuumize, and charge the refrigerant again (8) Check or replace the central damper solenoid valve or fresh air/recirculation air vacuum valve
Cooling inadequate or airflow insufficient	(9) Refrigerant insufficient (10) Refrigerant overabundant (11) Refrigeration system with air (12) Condenser radiating pin jam or distortion (13) Radiator fan failure (14) Refrigeration system with moisture (15) Throttle pipe (CCOT valve) jam (16) Low compressor speed (17) Compressor no operation (18) High-pressure pipe or components jam or flattened	(9) Find out the leaking location, and charge refrigerant (10) Drain the appropriate refrigerant (11) Fully vacuumize, and charge the refrigerant again (12) Rinse or replace the condenser (13) Check fan motor and its circuit, and remove the failure (14) Replace the container, and vacuumize repeatly (15) Replace the throttle pipe (16) Check and adjust the driving V belt (17) Check the compressor, electromagnetic clutch and high- and low-pressure protection switches, and remove the failures (18) Rinse or replace the components
Compressor abnormal noise	(1) Electromagnetic clutch slip or damaged (2) Refrigerant insufficient or excessive (3) Compressor bearing loose or worn seriously (4) Compressor refrigerating oil level low (5) Compressor internal worn or damaged	(1) Adjust the clearance of electromagnetic clutch, and repair the coil of electromagnetic clutch (2) Charge the refrigerant as per the specified (3) Replace the compressor bearing (4) Add the compressor refrigerating oil (5) Replace the compressor components or assy.

Section 9 Check Refrigeration Device by Using Manifold Pressure Gauge Kit

This is a method to check the location of failure with the help of manifold pressure gauge kit. Under the following conditions, the reading of manifold pressure gauge is recorded:

(a) When the switch is turned to "RECIRC" (air recirculation), the temperature of air inlet is 30 to 35℃ (86 to 95F℃).

(b) The engine speed is 2,000 rpm.

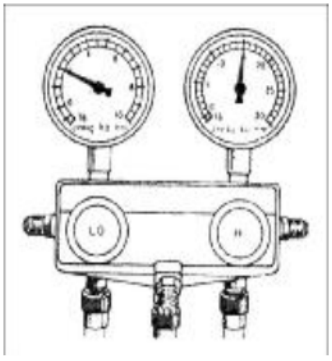
(c) The blower fan control switch is turned to "HI-SPEED" position.

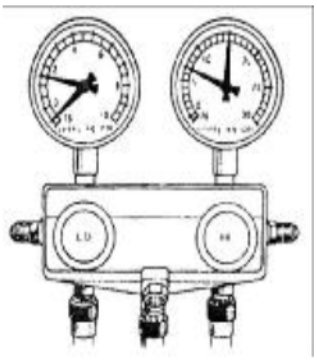
(d) The temperature controlled switch is turned to "COLD" position.

Hint: Take care that the value displayed on the instrument may change gently with the various ambient temperatures.

WARNING:

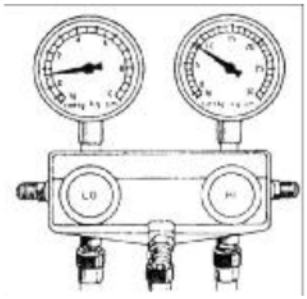
- Take care to recycle the refrigerant before the components removal from the refrigerant pipe and the air drainage .
- The air must be drained after the components are installed on the refrigerant pipe, and the appropriate purified refrigerant shall be charged.

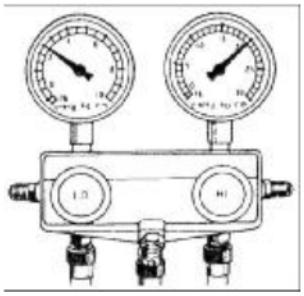
No.	Manifold Pressure Gauge Reading: KPa (Kgf/cm^2, lb/sq.in.)	Condition	Possible Cause	Method of Troubleshooting
1	LO (Low-Pressure): 147 to 196 (1.5 to2.0, 21 to 28) HI (High-Pressure): 1,422 to 1,471 (14.5 to 15.0, 206 to 213) 	Cold air normal	Refrigeration device operation normal	

2	During the course of operation, the pressure of low-pressure end is vacuum, and, sometimes, normal 	Intermittent refrigeration, and then refrigeration failure	Refrigeration device with moisture	(1) Replace the container (2) Remove the moisture from the refrigeration device via the repeat air drainage

WARNING:

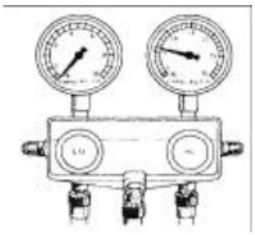
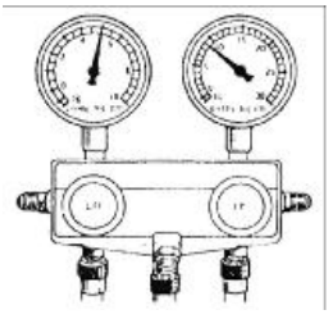
- Take care to recycle the refrigerant before the components removal from the refrigerant pipe and the air drainage.
- The air must be drained after the components are installed on the refrigerant pipe, and the appropriate purified refrigerant shall be charged.

No.	Manifold Pressure Gauge Reading: KPa (Kgf/cm^2, lb/sq.in.)	Condition	Possible Cause	Method of Troubleshooting
3	The pressures of both the low-pressure end and high-pressure end are low 	● Refrigeration insufficient ● Air bubble visible from the sight glass	Refrigerant insufficient	(1) Apply the leak detector to detect the leaking condition, and repair it as required (2) Charge the refrigerant till that the air bubbles disappear fully
		● Refrigeration insufficient ● Pipe from the container to the refrigeration device frosting	The dirt deposited in the container obstructs the flow of refrigerant	Replace the container
4	The pressures of both the low-pressure end and high-pressure end are over-high.	Refrigeration insufficient	Condenser refrigeration insufficient	(1) Replace the condenser (2) Check the operation of fan motor

5			Excessive refrigerant charged	(1) Check the refrigerant dosage, such as excessive refrigerant (2) Recycle the refrigerant (3) Drain the air, and charge appropriate purified refrigerant
6			Refrigeration device with air	(1) Replace the container (2) Check whether the compressor oil is dirt or not (3) Repeatedly conduct the air drainage operation to remove the air from the refrigeration device
7		● Refrigeration insufficient ● In the low-pressure side pipe, a large amount of water beads appear or the frosting phenomenon occurs	Expansion valve installation incorrect, and/or the heat sensing tube failure. (The opening is too wide)	(1) Check the installation of heat sensing tube If the result of (1) is right, (2) check the expansion valve If the expansion valve failure, replace it

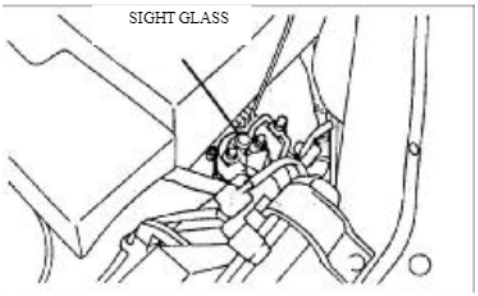
WARNING:

- Take care to recycle the refrigerant before the components removal from the refrigerant pipe and the air drainage .
- The air must be drained after the components are installed on the refrigerant pipe, and the appropriate purified refrigerant shall be charged.

No.	Manifold Pressure Gauge Reading: KPa (Kgf/cm^2, lb/sq.in.)	Condition	Possible Cause	Method of Troubleshooting
8	The low pressure end is displayed as vacuum, and the high pressure end is displayed as too low pressure 	● No cold air (under some conditions, with cold air but sometimes without it) ● Frost or dew visible in the front/rear of container or expansion valve	Refrigerant fails to recirculate.	(1) Check if the heat sensing tube leaks. If the expansion valve failure, replace it. If the result of (1) is normal, (2) Blow the air into the expansion valve to remove the dirt from the expansion valve. If it is difficult to remove it, replace the expansion valve. (3) Replace the container
9	Too high pressure of low-pressure end, and/or too low pressure of high-pressure end 	No cold air	Compression insufficient	Repair or replace the compressor

Section 10 Refrigerant Charge Check

Check the refrigerant charge



1. Enable the engine to operate at the idle speed
2. Let the air conditioner operate for several minutes under the maximum cold air condition
3. Check the refrigerant charge

Observe it from the sight glass on the refrigerant pipe.

Item	Phenomenon	Refrigerant Dosage	Method of Troubleshooting
1	Air bubbles appear in the sight glass	Insufficient*	(1) Apply leak tester to check the air leakage, and replace it as required (2) Charge the refrigerant, till that the air bubbles disappear
2	No air bubble appears in the sight glass	None, sufficient or excessive	Refer to Item 3 and 4
3	Temperature difference between the compressor's air inlet and outlet	Null or almost null	(1) Apply leak tester to check the air leakage, and replace it as required (2) Charge the refrigerant, till that the air bubbles disappear
4	Obvious temperature difference between the compressor's air inlet and outlet	Appropriate or excessive	Refer to Item 5 and 6
5	After the air conditioner is shut down, the refrigerant of sight glass changes immediately to transparent one	Excessive	(1) Recycle the refrigerant (2) Drain the air, and charge appropriate purified refrigerant
6	After the air conditioner is shut down, the refrigerant firstly is foam state , and then change and keep transparent	Appropriate	-

*: If refrigeration sufficient, there are some air bubbles in the sight glass at the higher ambient temperature, and it can be regarded as a normal condition.

Refrigerant charge

Specified value: R134a, 850 g±25 g.

Section 11 Charging Method of Refrigerant

I. Precautions for Refrigerant Concerned

(1) Avoid the refrigerant contacting with your skin, and wear rubber gloves and safety goggles while handling the refrigerant.

(2) Handle the refrigerant concerned at a well ventilated location. Since the refrigerant is a colorless gas at room temperature and its density is greater than that of air, the refrigerant will deposit in the maintenance location, which may easily cause the maintenance personnel choked.

(3) Do not allow the refrigerant to contact with fire. otherwise it may generate the toxic gas.

(4) The O-ring can be applied once only.

(5) The Chery automobile with carburetor engine adopts the refrigerant R12 while the one with electronic fuel injection type engine adopts the refrigerant R134a. The two kinds of refrigerants can't be applied in common use, and the compressor oils can't also be mixed. During the course of handling, it is unallowable that the tools contacting with one refrigerant contact with the other refrigerant.

II. Method to Charge Refrigerant

If the 400g tanked refrigerant is required, a refrigerant tank unlock valve shall be applied (shown in the picture below). The operation procedures are as follows:

(1) Before the unlock valve is installed on the refrigerant tank, turn the butterfly handle 1 in the counterclockwise direction till the valve needle return back completely.

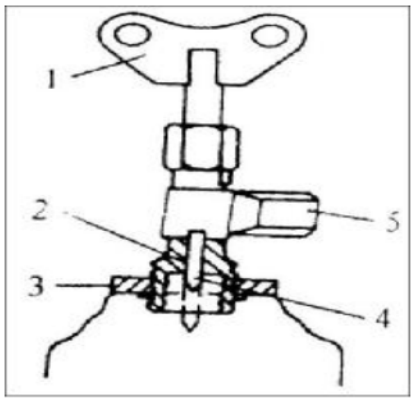
(2) Turn the plate-shaped nut 3 in the counterclockwise direction to lift it up to the highest position, and then tighten the valve and the dummy club at the center of refrigerant tank.

(3) Install the intermediate charging hose of manifold pressure gauge on the joint 5, and then turn the plate-shaped nut in the clockwise direction and tighten it by hand as possible.

(4) Turn the butterfly handle 1 in the clockwise direction to make the valve needle 4 in its front end punch a small hole in the dummy club of refrigerant tank.

(5) Turn the butterfly handle 1 in the counterclockwise direction, which the refrigerant will flow into the manifold pressure gauge along the charging hose.

(6) Then turn the butterfly handle 1 in the clockwise direction to the lowest position, and it can close down the refrigerant tank again. However, do not detach the unlock valve, otherwise the refrigerant inside the tank will leak out.



Refrigerant Tank Unlock Valve

1-Butterfly handle 2-Refrigerant tank charging valve

3-Plate-shaped nut 4-Valve needle 5-Charging valve joint

Refrigerant charging procedures are as follows:

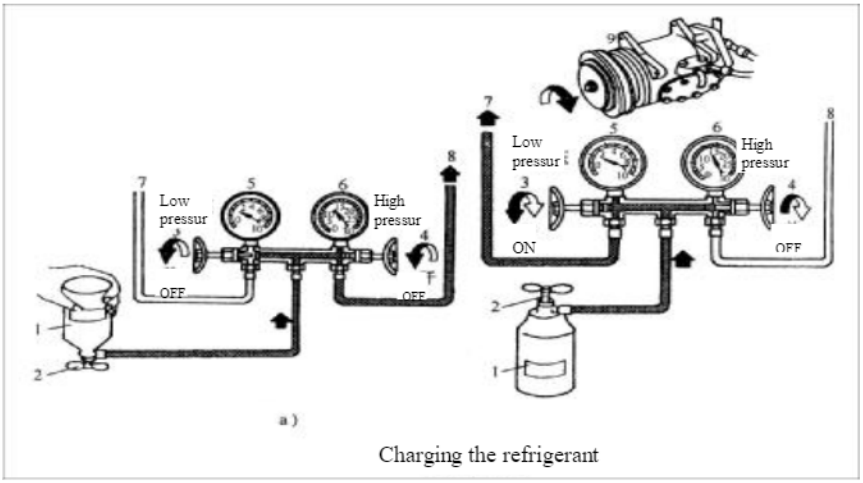
(1) Connect the manifold pressure gauge to the refrigerant tank, shown in the picture below.

(2) Unscrew the handle of unlock valve 2 in the counterclockwise direction to enable the refrigerant to enter the intermediate charging hose. In this case, do not open the handle valves in the both sides.

(3) Unscrew the nuts of intermediate hose of manifold pressure gauge, and then tighten the nuts of intermediate hose after the air inside the intermediate hose are drained when you see the white refrigerant gas overflow and heard the "fizzle" sound.

(4) Turn on the high-pressure manual valve 4, shown in the figure below, stand the refrigerant tank 1 upside down so as to let the refrigerant in liquid-state charge into the refrigeration system. In this case, do not switch on the A/C unit to prevent the refrigerant from returning back to the tank. 200 g or more refrigerants shall be charged every time, and turn the compressor several times by hand after the completion of charging.

(5) Turn off the high-pressure manual valve 4, shown in the figure below, and turn on the low-pressure manual valve 3 to let the refrigerant in gas-state charge into the refrigeration system. The refrigerant charged from the low-pressure manual valve must be gas-state. If it is liquid state, the liquid hammer phenomenon may appear to damage the compressor. Turn off the low-pressure manual valve when the reading of low-pressure gauge reaches $2.8X10^5$ Pa.



Charging the refrigerant

1-Refrigerant tank
2-Unlock valve
3-Low-pressure manual valve
4-High-pressure manual valve
5-Low-pressure gauge
6-High-pressure gauge
7-Connect to low-pressure service valve hose
8-Connect to high-pressure service valve hose
.9-A/C compressor

Section 12 Methods of Refrigerant Vacuumizing

It is difficult to pump out the water from the refrigeration system when vacuumizing. But the vacuumizing can reduce the fluidization point of water after the vacuum is generated in the refrigeration system, which enables the water to boil at the lower temperature, and pump out it in the form of steam from the system.

Conduct the leak check firstly before vacuumizing. If vacuumizing without the leak check, it is difficult to find out the leaking position after vaccumizing when there is a certain leakage phenomenon.

The purpose of vacuumizing is to further check the air tightness of the refrigeration system under the vacuum condition, and prepare for the system's refrigerant charging. Its procedures are as follows:

(1) Connect the high-pressure gauge hose to the high-pressure service valve joint of refrigerant tank, shown in the figure below, connect the low-pressure gauge hose to the low-pressure service valve joints on the pipe from the evaporator to the A/C compressor, and connect the intermediate hose to the interface of vacuum pump.

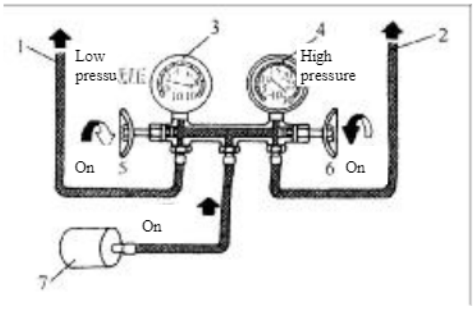
(2) Turn on the high- and low-pressure valves of manifold pressure gauge, and start up the vacuum gauge.

(3) The vacuum pump works for at least 15 min to make the vacuum reading of low-pressure gauge below 0.07×10^{5}Pa (708mmHg) . If the vacuum reading can't be obtained, turn off the manual valves at the high- and low-pressure sides, stop vacuumizing, and check the leaking position.

(4) Turn off the valves, and the gauge needle doesn't return back within 10 min, which it is called the vacuum leakage check method. If the vacuum down, it shows that there is a leaking position which can be found out by using a leakage detector.

(5) If the gauge needle doesn't considerably return back within 10 min, it indicates that the system is normal and the refrigerant can be charged into the system.

(6) Restart the vacuum pump, and turn on the low-pressure valve of the manifold pressure gauge to continuously vacuumize 15 min. Then, turn off the low-pressure valve to stop vacuumizing, and prepare for charging the refrigerant.



Vacuumizing

1-Connect to low-pressure service valve hose
2-Connect to high-pressure service valve hose
3-Low-pressure gauge
4-High-pressure gauge
5-Low-pressure manual valve
6-High-pressure manual valve
7-Vacuum pump

Section 13 Methods of Refrigeration Oil Charging

There are two methods for refrigeration oil charging: direct charging method and vacuum inhaling method.

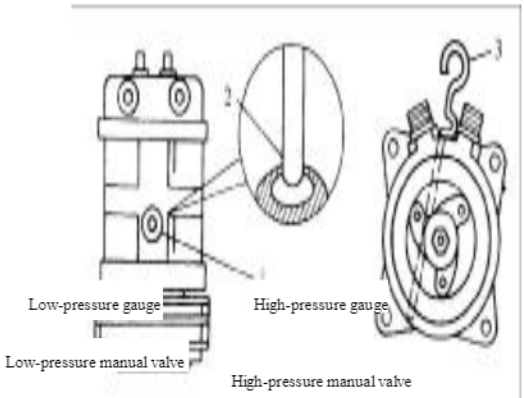
I Direct charging (shown in the right figure)

(1) Remove the oil charging plug 1, and charge the specified model of refrigeration oil.

(2) Observe the level of oil through the plug hole, and turn the clutch front plate to enable the piston connecting rod just at the central position of the plug hole.

(3) Insert the dip stick 3 into the right side of piston connecting rod till the dip stick end touches the compressor casing.

(4) Take out the dip stick, and check the reading (mark) of refrigeration oil which shall be within the scale 4 to 6 of dip stick.



Direct Charging of Refrigeration Oil
1-Oil charging plug. 2-Piston connecting

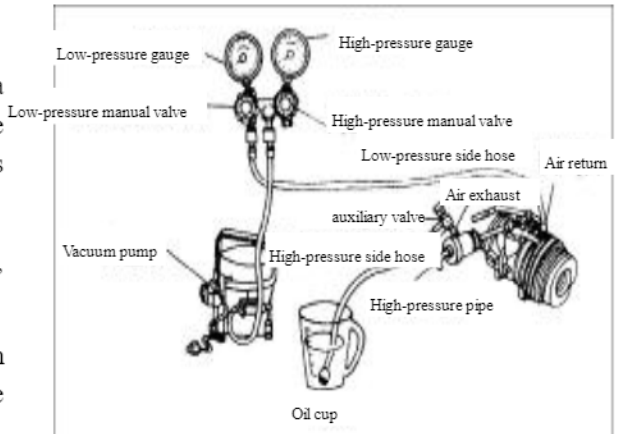
II Vacuum inhaling (shown in the right figure)

Vacuumize the refrigeration system to 0.2X105 Pa (737 mmHg), and then start to charge the refrigeration oil, the procedures of which are as follows:

(1) Turn off the high-pressure manual valve, and turn off the auxiliary valve.

(2) Remove the high-pressure side hose from the manifold pressure gauge, and insert the hose into the oil cup.

(3) Turn off the auxiliary valve to inhale the refrigeration oil into the refrigeration system from the oil cup.



Vacuumizing and Charging the Refrigeration Oil

(4) When the refrigeration oils in the cup are nearly evacuated, immediately turn off the auxiliary valve so as to prevent the air from being inhaled into the system.

(5) Connect the high-pressure side hose joint to the manifold pressure gauge, turn on the high-pressure manual valve, and start up the vacuum pump to vacuumize the high-pressure side hose. And turn on the auxiliary valve to vacuumize for the system to $0.02X10^5$ Pa

(737mmHg), and then vacuumize 15 min again so as to remove the air entering into the system together with the oils. In this case, the refrigeration oils are in the high-pressure side, and the oils will return back to the compressor after the operation of the system.

Refrigeration oil charge

Specified quantity: SP10 model, 150ml. It is unnecessary to charge the refrigeration oil into the newly-mounted A/C system, and it is required to complement some refrigeration oils only when a certain part is needed to repair or when the vehicle is driven a specified mileage. The quantity of implementing oil required when replacing parts is as follows:

Evaporator and condenser: 30ml. Drier: 20ml. and pipe: 10ml.

Section 14 Leak Check of Refrigeration System

Three effective methods can be used to check the air tightness of refrigeration system: check with electronic leak detector, soap solution and halogen leak detector.

(I) Check with Electronic Leak Detector

As shown in the figure, connect the power supply connector 2 of electronic leak detector 1 to the power supply, and move probe 3 slowly (30 mm/s), which should be placed 3 mm away from the check point. And if any alarming sound is emitted, it means there is a leak phenomenon occurred at that place. If the leakage occurs at the joints of refrigeration pipes, the relevant O-rings shall be replaced.

(II) Check with Soap Solution

Apply the soap solution to the possible leak position.

Observe whether air bubbles appear. If there are air bubbles, it indicates a leaking accident occurs.

Check with Electronic Leak Detector.



1-Electronic leak detector. 2-Power supply connector. 3-Probe

(III) Check with Halogen Leak Detector

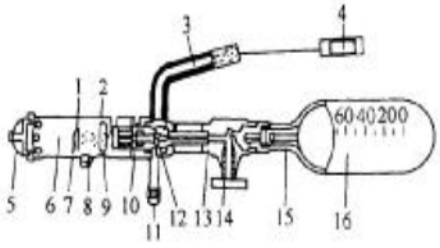
As shown in the right figure, the halogen leak detector is in principle a propane blowtorch.

The inspection procedure is described below:

(1) Check the liquid propane capacity in the reservoir.

(2) Tighten the propane reservoir 16 to the leak detector.

(3) Insert a lighting match into lighting device 9, and then slowly turn the adjusting handle 14 in the counterclockwise direction till the torch is lit.



Check with Halogen Leak Detector

1-Upper limit of flame. 2-Lower limit of flame. 3-Suck pipe. 4-Rough filter. 5-Cover. 6-Combustion chamber. 7-Flame ring. 8-Screw for flame ring. 9-Lighting device. 10-Spraying hole. 11-Base. 12-Nozzle. 13-Valve body. 14-Adjusting handle. 15-Reservior nozzle. 16-Propane reservoir

(4) Adjust the flame to smallest. The smaller the flame, the more sensitive to the leak of refrigerant.

(5) Move suck pipe 3 to the possible leak position.

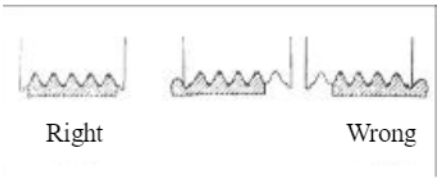
(6) Observe the change of flame color. The flame has no color if there is no leakage. The flame is tint green if there is very small leakage or be blue if there is relatively big leakage, and it will become purple if there is too much leakage.

Section 15 Driven Belt Check

Check the driven belt tension

1 Check the installation of the driven belt

Check whether the belt is correctly engaged with its pulley, shown in the figure.



2 Check the tension of the belt



Tension of driven belt under 98N (10kg/22.0P)

Check value: 7.0 to 9.5 mm

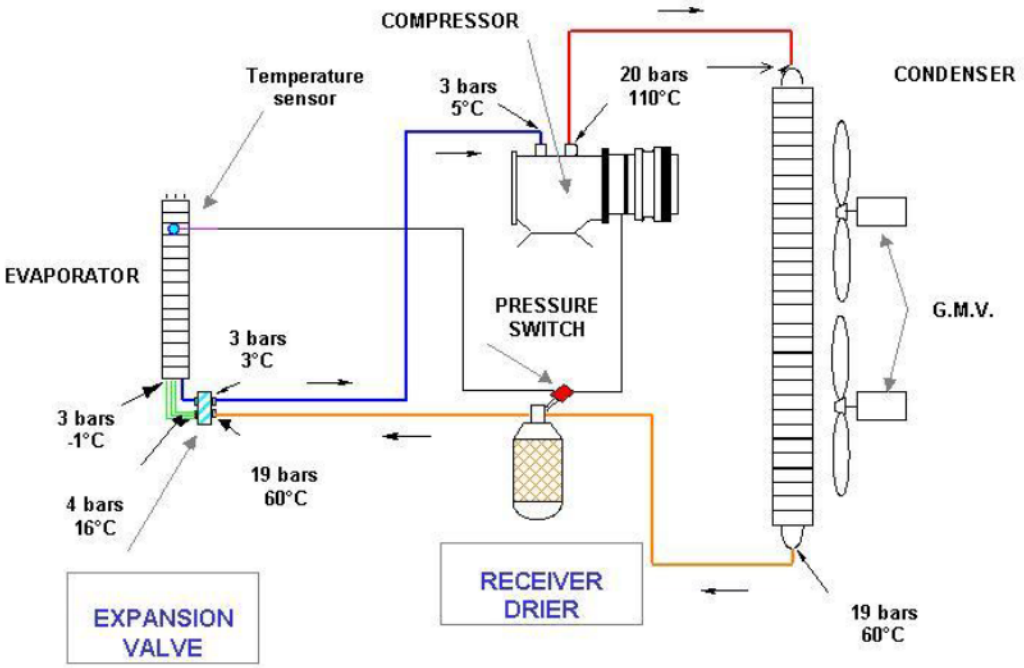
Adjusting value:

New belt: 6.0~7.0mm

Old belt: 8.0~9.0mm

- "New belt" means a belt that is used less than 5 min on the engine operating.
- "Old belt" means a belt that is used no less than 5 min on the engine operating.
- After the installation of driven belt, check if it is installed correctly as described above.

Section 16 Refrigerant Pipe Diagram



Section 17 Compressor and Electromagnetic Clutch



On-Vehicle Check

1. Check the oil leakage of clutch bearing part.
2. Check the oil stain on the pressure plate.
3. Check the noise from the electromagnetic clutch bearing.

(1) Start the engine.

(2) Check whether the abnormal noise from the compressor part when the air conditioner is shut down. If there are some abnormal noises, replace the electromagnetic clutch.

4. Check the attracting action of electromagnetic clutch.

(1) Detach the joint of electromagnetic clutch



(2) Connect the positive (+) of battery to the connector of electromagnetic clutch, and connect the negative (-) to the vehicle body.

(3) Check the attracting action of electromagnetic clutch.



If the attracting action failure, replace the electromagnetic clutch.

5. Check whether there is noise from the pressure plate.

   Check whether there is abnormal metal noise from the pressure plate when the air conditioner is switched on. If there are some abnormal metal noises, replace the electromagnetic clutch.

6. Check the pressure of refrigerant.

   See the related information.

7. Check the leakage of refrigerant.

   Apply a gas measurement instrument or other methods to detect the leak of refrigerant.

   If the leak occurs, check the tightening torque at joints or replace the compressor.

Remove the compressor

Tools required:

6cm inner-hexagon spanner, 14cm socket, 12cm socket, short connecting rod, speeder wrench, and A/C recycling receiver.

1. Enable the engine to operate at idle speed, and the air conditioner to operate more than 10 min.

2. Shut down the engine.

3 Remove the connecting wire from the electromagnetic clutch.

4 Apply the recycling receiver to recycle the refrigerant of system.

5 Loosen the hexagon socket head cap screws on the high- and low-pressure pipes, and detach the high- and low-pressure pipes.





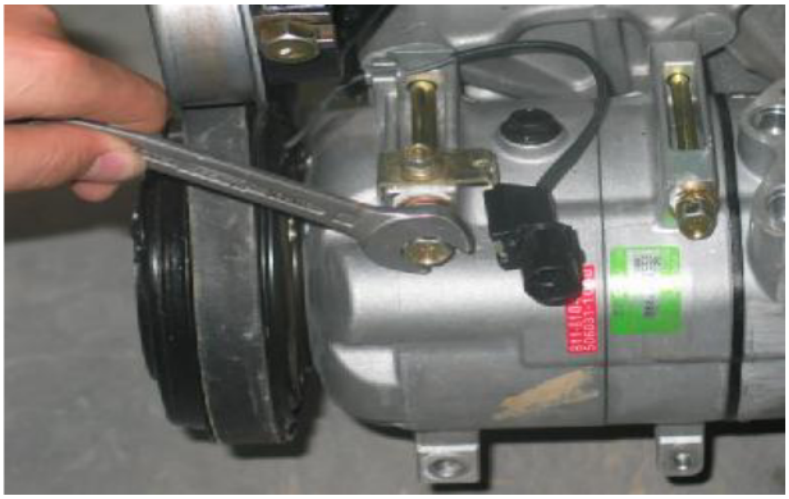
6 Loosen the fixing bolts on the tensioner.



7 Loosen the tensioner adjusting bolts, and remove the compressor belt.



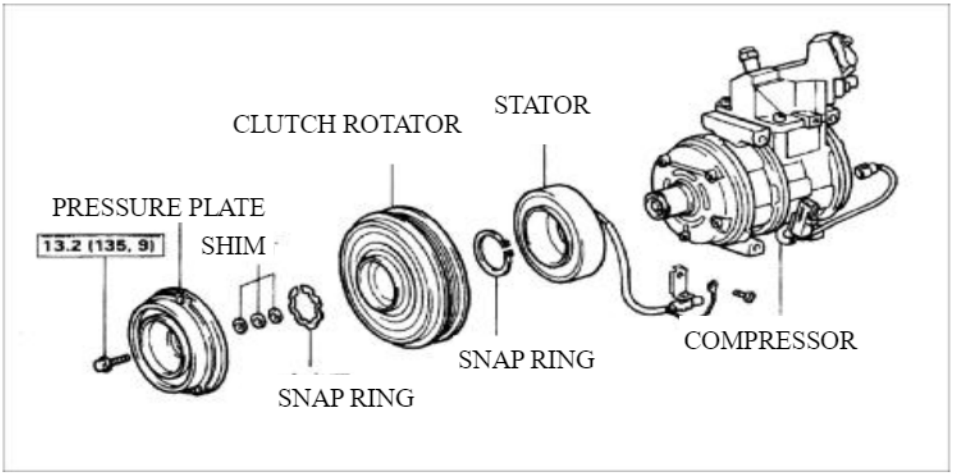
8. Remove the four fixing bolts available for mounting the compressor on its support.



9 Remove the compressor.

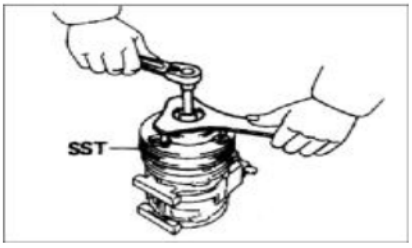


Disassemble the electromagnetic clutch

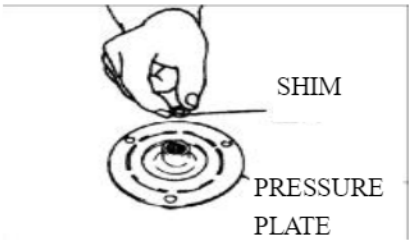


1. Remove the pressure plate

(1) Apply the special tool and pipe wrench to remove the nuts from the shaft.

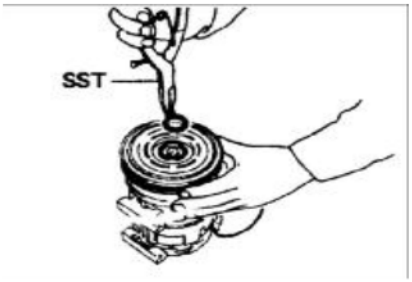


(2) Remove the shim from the shaft.



2. Remove the rotator

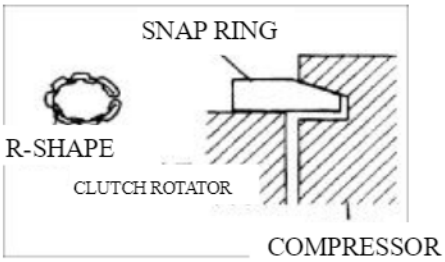
(1) Apply a special tool to remove the snap ring.



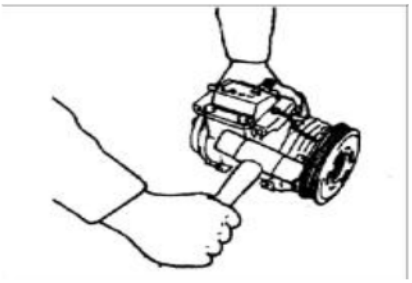
WARNING:

When installation, please take care the following item(s).

The snap ring's surface with bevel faces up.



(2) Apply a rubber hammer to tap the rotator gently.

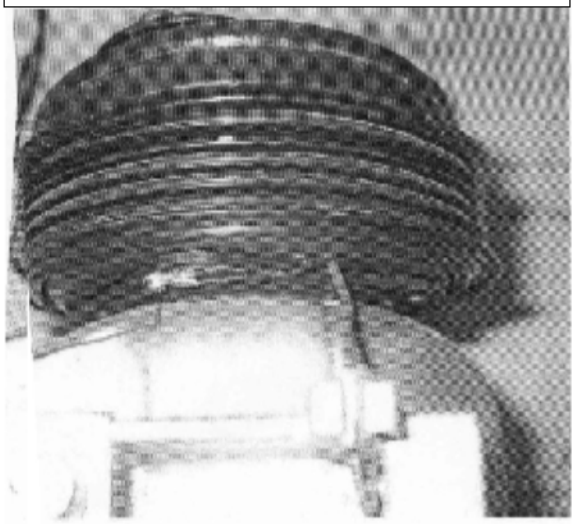


3. Remove the stator

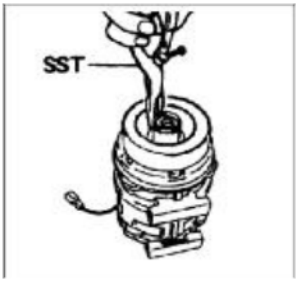
(1) Detach the joint on the stator;

(2) Remove the screws and stator harness;

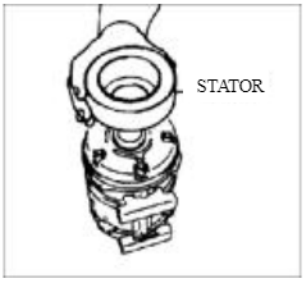
ELECTROMAGNETIC CLUTCHEARTH (640 X480 X24b jpeg)



(3) Apply a special tool to remove the snap ring from the stator.



(4) Remove the stator.

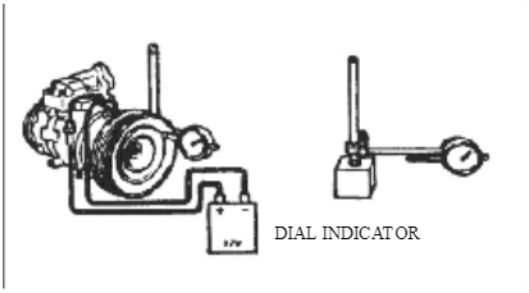


Assemble the electromagnetic clutch

Assemble the electromagnetic clutch in the reverse order of disassembly.

Check the clearance of electromagnetic clutch

1. Place a dial indicator on the pressure plate of electromagnetic clutch.
2. Connect the lead wire of electromagnetic clutch connector to the positive terminal of battery.
3. Check the clearance between the pressure plate and stator when the negative terminal of battery is connected.



Specified clearance:

0.5±0.15 mm

When the clearance exceeds the specified clearance range, apply a shim to adjust the clearance to the specified range.

Thickness of shim:

0.1 mm

0.3 mm

0.5 mm

Install the compressor

1. Apply four bolts with the torque of 35 N·m to secure the support on the engine.
2. Engage the compressor with the support according to the proper assembly position, apply four bolts with the torque of 40 N·m to secure the compressor, and tighten the bolts.
3. Regulate the compressor belt, and tighten the bolts of tensioner.
4. Vacuumize the system, keep the pressure, charge the refrigerant, and check the leakage.

Section 18 Condenser

On-Vehicle Check

1. Check whether the condenser fins are jammed or damaged.

If the fins are jammed, apply clean water to wash them, and then use the compressor to dry them.

WARNING: Take care not to damage the fins.

If the fins are bent, apply a screwdriver or plier to straighten them.

2. Check the air tightness of condenser and connecting pieces.

Apply an electronic leakage detector or other devices to check the air tightness of condenser.

If the leaking phenomenon occurs, check the tightening torque of any joint.

Remove the condenser

Tools required:

10cm wrench, 7cm wrench, 6cm inner-hexagon spanner, short connecting rod, speeder wrench, and A/C recycling receiver.

1. Enable the engine to operate at idle speed, and the air conditioner to operate more than 10 min.
2. Shut down the engine.
3. Apply the recycling receiver to recycle the refrigerant of system.
4. Loosen the bolts of low-pressure pipe on the compressor, and detach the low-pressure pipe.



5. Loosen the bolts of high-pressure pipe from the compressor to the condenser.



6. Loosen the two fixing bolts on the radiator, and detach the radiator.

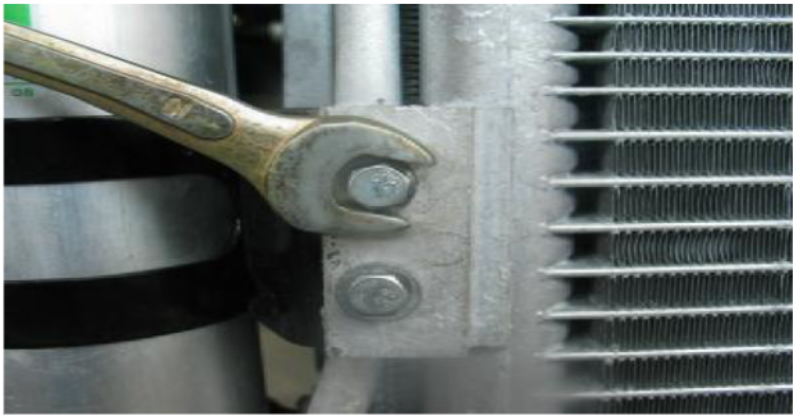




7. Loosen the bolts for the condenser and drying bottle, and detach the condenser from the drying bottle.



8. Loosen the two fixing bolts on the drying bottle.



9. Loosen the nuts (M6) at two positions where the condenser is mounted on the cross member.





10. Remove the radiator and fan, and, after this, then detach the condenser.

Install the condenser

Install the condenser in the reserve order of removal. And vacuumize the system, keep the pressure, charge the refrigerant, and check the leakage.

Section 19 Drying Bottle

On-Vehicle Check

Check the airtightness of the connecting pieces

Apply an electronic leakage detector or other methods to check the airtightness of the connecting pieces.

If the leaking phenomenon occurs, check the tightening torque of any joints

Disassemble the drying bottle

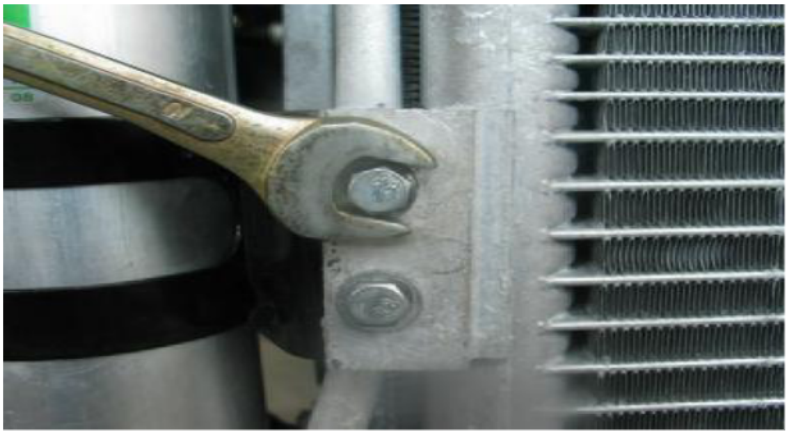
Tools required:

10cm wrench, and 7cm wrench.

1. Enable the engine to operate at idle speed, and the air conditioner to operate more than 10 min.
2. Shut down the engine.
3. Apply the recycling receiver to recycle the refrigerant of system.
4. Loosen the fixing bolts of two high-pressure pipes on the drying bottle, and detach the high-pressure pipes.



5. Loosen the two bolts on the drying bottle, and remove the drying bottle.



Install the drying bottle

Install the drying bottle in the reverse order of removal. And vacuumize the system, keep the pressure, charge the refrigerant, and check the leakage.

Section 20 Expansion Valve

On-Vehicle Check

1. Check the air flow during the course of refrigeration cycle.
2. Install the manifold pressure gauge.
3. Enable the engine to operate.

   Enable the engine to operate at least 5 min at the speed of 2000 rpm, and then check the reading of high-pressure gauge which shall reach 1,275 to 1,471 KPa.
4. Check the expansion valve.

If the expansion valve failure, the reading of low pressure will drop down to 0 KPa.

Hint: When the reading of low pressure drops down to 0 KPa, touch the inlet/outlet ends of the drying bottle by your hands, which shall have no temperature difference.

Disassemble the expansion valve

Tools required:

10cm socket, connecting rod, 13cm socket, 6cm inner-hexagon spanner, universal joint, A/C recycling receiver, and speeder wrench.

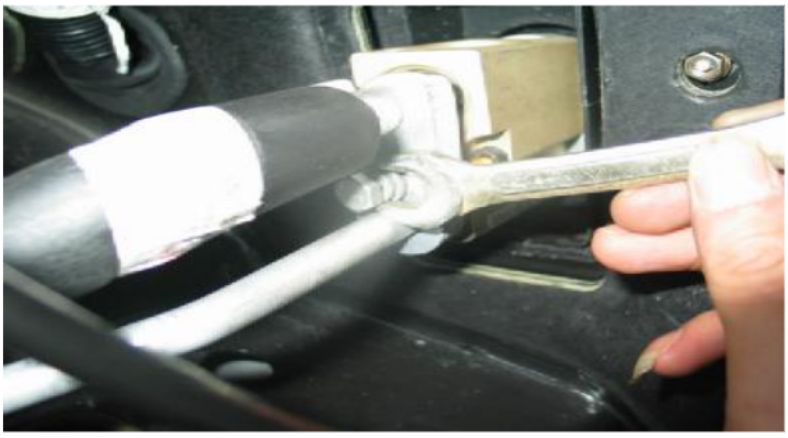
1. Enable the engine to operate at idle speed, and the air conditioner to operate more than 10 min.
2. Shut down the engine.
3. Apply the recycling receiver to recycle the refrigerant of system.
4. Loosen the hexagon socket head cap screws on the low-pressure pipe.



5. Loosen the fixing bolts on the high-pressure pipe.



6. Loosen the fixing bolts available for fastening the high- and low-pressure pipes to the expansion valve, and draw out the high- and low-pressure pipes outwards.



7. Loosen the two fixing bolts on the expansion valve.
8. Pull out the expansion valve outwards.

Install the expansion valve

Install the expansion valve in the reverse order of removal. And vacuumize the system, keep the pressure, charge the refrigerant, and check the leakage.

Section 21 Evaporator

Disassemble the evaporator

Tools required:

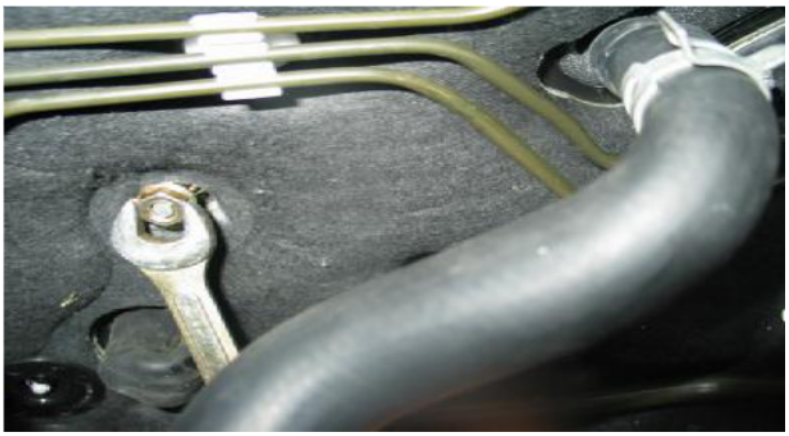
Thinnose plier, 10 cm socket, connecting rod, 6 cm inner-hexagon spanner, 13 cm socket, speeder wrench, and cross screwdriver.

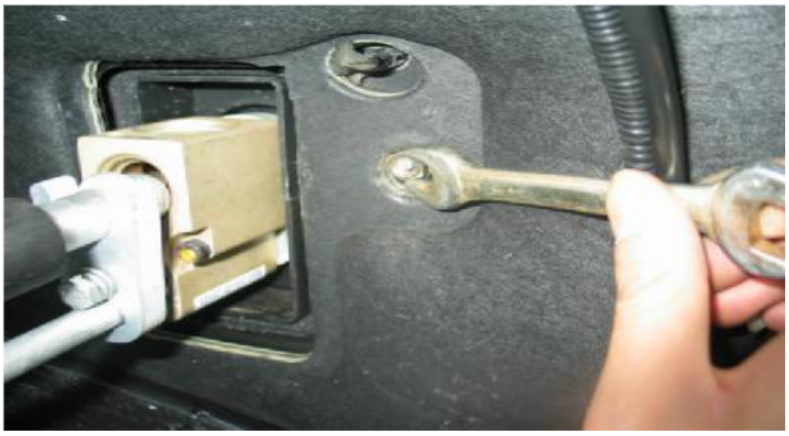
1. Enable the engine to operate at idle speed, and the air conditioner to operate more than 10 min.
2. Shut down the engine.
3. Apply the recycling receiver to recycle the refrigerant of system.
4. Remove the instrument panel trim frame (See the *Description of Body*), and then loosen the four tapping screws available for securing the control panel, and pull out the corresponding wire connection.
5. Disassemble the instrument console (See the *Description of Body*).
6. Loosen the expansion valve (See the *Disassembly of Expansion Valve*).
7. Remove the two water pipes mounted on the water outlet/inlet pipes of the A/C assy.



8. Loosen the five fixing bolts on the bellows assy.



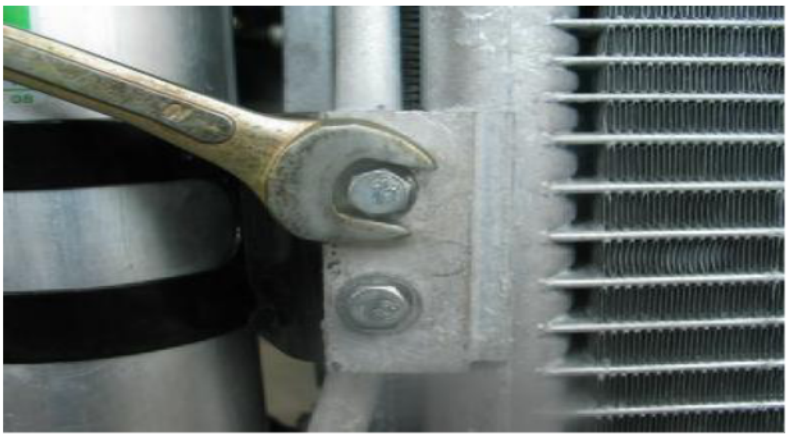








9. Pull out the harness connecting with the evaporator.
10. Detach the bellows assy..
11. Loosen the connection of the upper half of bellows, remove the damper rod, unscrew the four fixing bolts on the inside/outside recirculating dampers, and remove the damper.
12. Remove all cross recessed pan head screws from the upper half of bellows assy..
13. Take out the upper half of bellows assy..



14. Take out the evaporator upwards.



Check the evaporator

1.Check whether the fins are jammed.

If the fins are jammed, apply the compressed air to clear the jammed.

WARNING: DO NOT apply the water to rinse the evaporator.

2.Check whether the connecting pieces have cracks or scratches.

Repair them as required.

Install the evaporator

1. Assemble the evaporator. Assemble the five bolts, water inlet/outlet pipes and etc on the evaporator into the corresponding proper holes on the front side of vehicle.
2. Apply three tapping screws with torque of 3.5±0.5 N·m and five nuts with torque of 5.5±0.5 N·m to secure the evaporator which is mounted respectively to the turning crossbeam and to the front side.
3. Connect the butted harnesses, assemble the instrument console, and then apply four tapping screws with torque of 3.5±0.5 N·m to fix the control panel with the instrument console.
4. Connect the evaporator to the parts inside the engine compartment.

Section 22 A/C Pipes

Remove the A/C pipes

1. Remove the bolts or nuts available for mounting the pipes to the expansion valve, drying bottle and compressor, and loosen the fixing nuts for fastening the dual-pipe clamps at the front right wheelhouse, and the fixing bolts for fastening the low-pressure pipes.
2. Remove the harnesses butted with the pressure switches, and then detach the pipes (firstly remove the other parts assembled on the pipes, refer to the related documents).
3. Apply some plugs to jam up the A/C pipes and other joints.

Install the A/C pipes

1. Align the pipes with the joints of any parts, and apply the related standard parts to secure them reliably.
2. Tighten the hexagon socket head cap screws at the expansion valve, with the torque of 7±1 N.m. the fixing nuts at the drying bottle, with 5.5±0.5 N·m. the bolts at the compressor, with 25±1 N·m. and the bolts, nuts for fastening the pipes and body, with 3.5±0.5 N·m.

Section 23 Heater Radiator

Remove the heater radiator

Tools required:

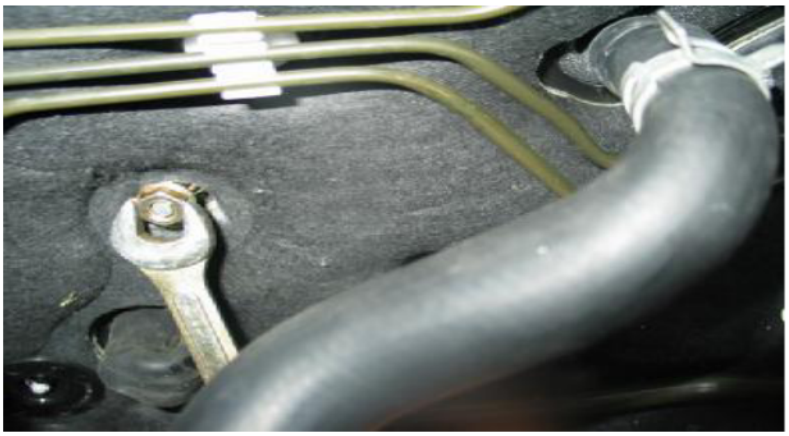
Thinnose plier, 10 cm socket, connecting rod, 6 cm inner-hexagon spanner, 13 cm socket, speeder wrench and cross screwdriver.

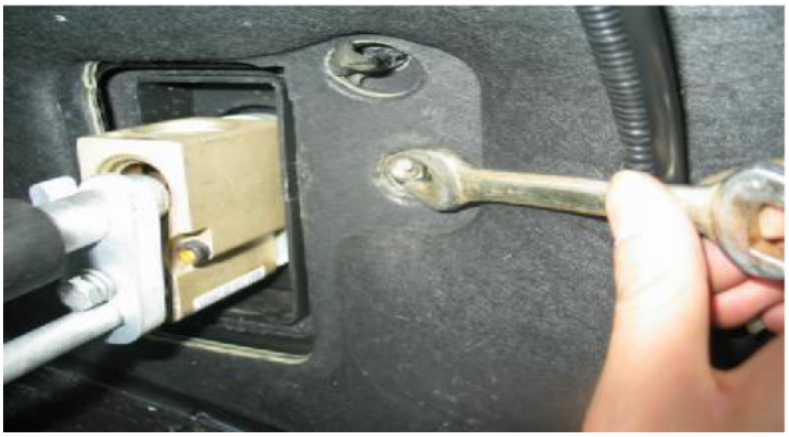
1. Enable the engine to operate at idle speed, and the air conditioner to operate more than 10 min.
2. Shut down the engine.
3. Apply the recycling receiver to recycle the refrigerant of system.
4. Remove the instrument panel trim frame (See the *Description of Body*), and then loosen the four tapping screws available for securing the control panel, and pull out the corresponding wire connection.
5. Disassemble the instrument console (See the *Description of Body*).
6. Loosen the expansion valve (See the *Disassembly of Expansion Valve*).
7. Remove the two water pipes mounted on the water outlet/inlet pipes of the A/C assy.



8. Loosen the five fixing bolts on the bellows assy.







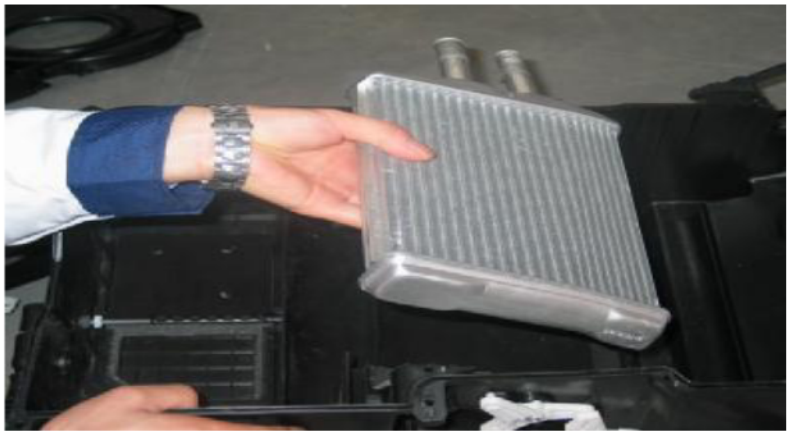




9. Pull out the harness connecting with the evaporator.
10. Detach the bellows assy.
11. Loosen the four fixing bolts for air mix damper on the heater radiator, and take out the air mix damper.
12. Remove the heater radiator temperature sensor.
13. Detach the heater radiator guide holder upwards.



14. Take out the heater radiator upwards.



Check the heater radiator

Check whether the fins are jammed.

If the fins are jammed, apply the compressed air to clear the jammed.

Install the heater radiator

Install the heater radiator in the reverse order of removal. And vacuumize the system, keep the pressure, charge the refrigerant, and check the leakage.

Section 24 Replacement of A/C Cleaner

Remove the A/C cleaner

Tools required:

Cross screwdriver and straight screwdriver.

1. Gently pull out the sealing strip upwards.



2. Loosen the plastic bolts on the trim panel.



3. Move outwards the trim panel.



4. Take out the A/C cleaner upwards.



Install the A/C cleaner

Install the A/C cleaner in the reverse order of removal.

Section 25 Maintenance of Blower



1. Loosen the connector lugs on the blower.
2. Unscrew the three fixing bolts on the blower, and pull out the blower downwards.
3. Remove the two fixing bolts for the blower and blower base.



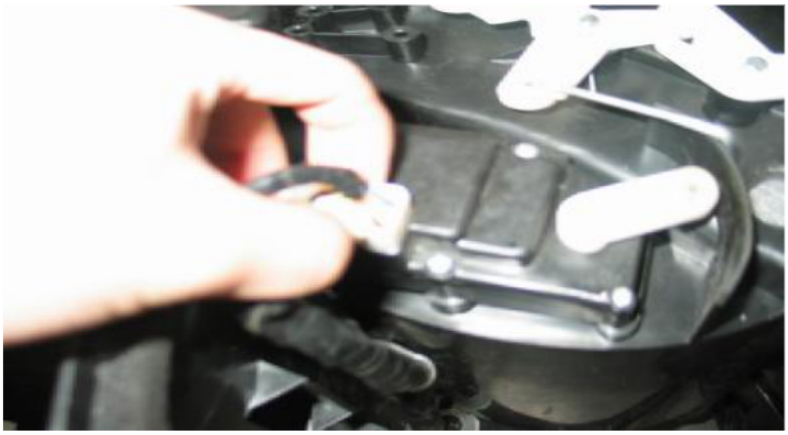
4. Conduct the corresponding checks, and, if necessary, add the lubricating oil.

Section 26 Air Mix Damper Motor

Remove the air mix damper motor

Step 1 Remove the right storage box assy. (See *Disassembly of Water Temperature Sensor*)

Step 2 Loosen the harness plug on the air mix damper, and remove the connecting rod.



Step 3 Loosen the three fixing bolts on the air mix damper, and detach the motor.







Install the air mix damper motor

Install the air mix damper in the reverse order of removal.

Section 27 Inside/Outside Recirculating Damper Motors

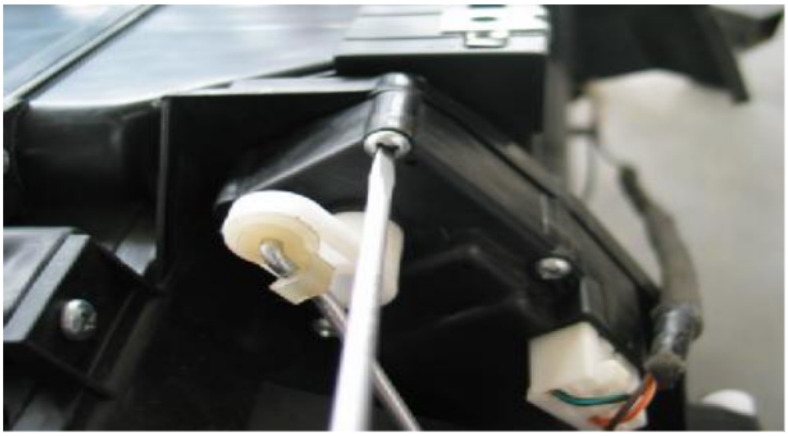
Remove the inside/outside recirculating damper motor

Step 1 Remove the right storage box assy.

Step 2 Loosen the harness plug on the motor, and remove the connecting rod.



Step 3 Loosen the three bolts on the motor, and detach the motor.



Install the inside/outside recirculating damper motor

Install the air mix damper in the reverse order of removal.

Mode Damper Motor

Remove the mode control motor

Step 1 Remove the bolts on the lower pedal of left instrument console. (See *Disassembly of Instrument Console*)

Step 2 Loosen the two fixing bolts. (See *Disassembly of Instrument Console*)

Step 3 Forcefully pull out the trim panel outwards, and take care its position. (See *Disassembly of*

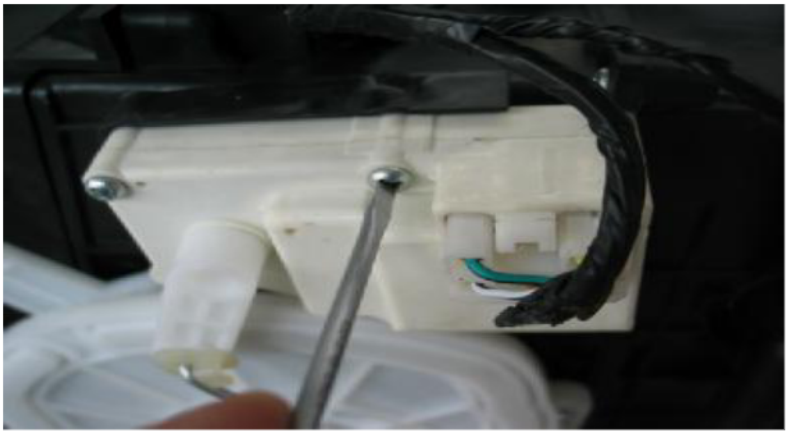
Instrument Console)

Step 4 Loosen the engine lock control cable. (See *Disassembly of Instrument Console*)

Step 5 Loosen the harness plug on the motor, and remove the connecting rod.



Step 6 Loosen the three fixing bolts on the wind direction motor, and remove the motor.





Install the mode control motor

Install the mode control motor in the reverse order of removal.

Section 28 Defroster Outlet

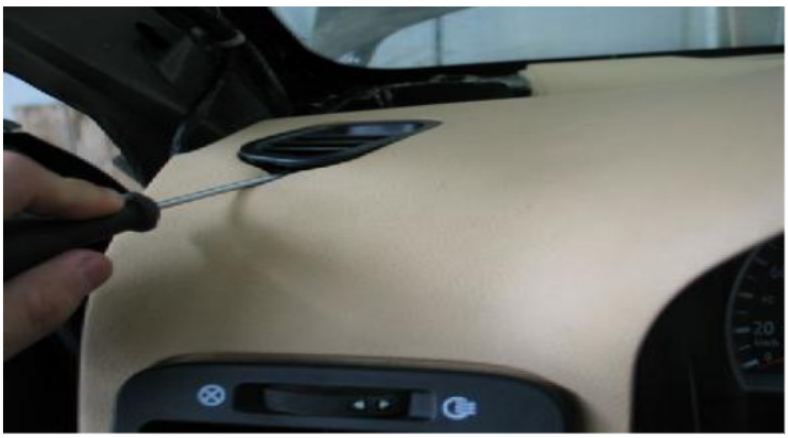
Remove the defroster outlet

Pry and loosen the four fasteners, and remove the defroster outlet.



Remove the side defroster outlet

Apply a screwdriver to pry and loosen the fasteners, and remove the side defroster outlet.



Section 29 Positive Blower Vent Duct

Remove the positive blower damper pipe

Step 1 Remove the instrument console. (See *Disassembly of Instrument Console*)

Step 2 Loosen the one fixing bolt on the central outlet pipe, and remove the outlet pipe. (See *Disassembly of Instrument Console*)

Section 30 Defroster Outlet Pipe

Replace the defroster outlet pipe

Step 1 Remove the instrument console. (See *Disassembly of Instrument Console*)

Step 2 Detach the instrument console from the inner frame, and loosen the four fixing bolts. (See *Disassembly of Instrument Console*)

Step 3 Loosen the eight fixing bolts on the defroster outlet pipe, and remove the outlet pipe. (See *Disassembly of Instrument Console*)

Section 31 Rear Seat Air Outlet

Remove the rear seat air outlet pipe

Step 1 Remove the front/rear consoles. (See *Disassembly of Instrument Console*)

Step 2 Remove the left/right front seats. (See *Disassembly of Left/Right Front Seats*)

Step 3 Pull out the carpet and heat insulating mattress, and remove the air outlet.

Section 32 Indoor Temperature Sensor

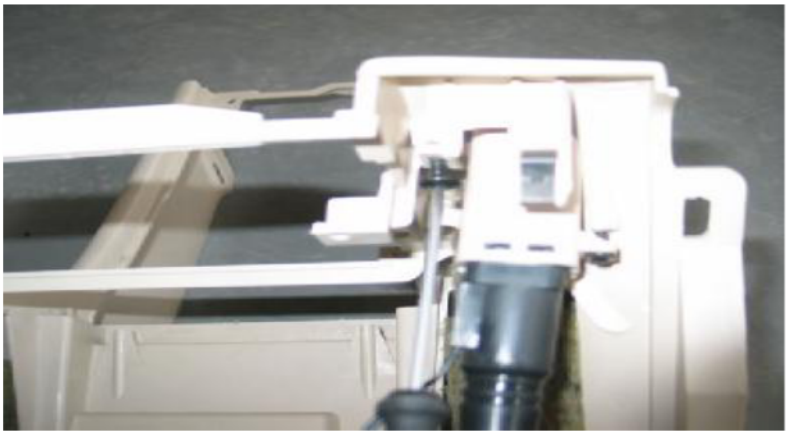
Remove the indoor temperature sensor

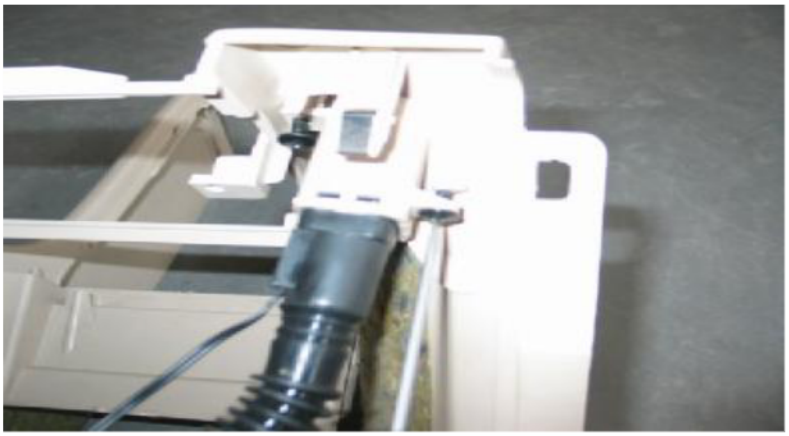
Step 1 Remove the left instrument lower trim panel. (See *Disassembly of Instrument Console*)

Step 2 Remove the right glove box. (Refer to Heater Radiator Temperature Sensor, see the step 1 through 4)

Step 3 Remove the front/rear consoles. (See *Disassembly of Instrument Console*)

Step 4 Loosen the two fixing bolts of the indoor temperature sensor, and remove the sensor.





Install the indoor temperature sensor

Install the indoor temperature sensor in the reverse order of removal.

Section 33 Heater Radiator Temperature Sensor

Remove the heater radiator temperature sensor

Step 1 Remove the three fixing bolts on the right glove box cover. (See *Disassembly of Glove Box*)

Step 2 Take out the glove box cover outwards at a slant. (See *Disassembly of Glove Box*)）

Step 3 Loosen the six cross-bolts on the inner plate of glove box. (See *Disassembly of Glove Box*)

Step 4 Remove the inner plate from the glove box (See *Disassembly of Glove Box*)

Step 5 Switch out the three fixing bolts on the instrument console and inner frame.







Step 6 Loosen the fixing bolts for the glove box support and blower.

Step 7 Remove the peach plate from the outside of audio panel. (See *Disassembly of Instrument Console*)

Step 8 Loosen the four fixing bolts on the audio system: (See *Disassembly of Instrument Console*)

Step 9 Unscrew the four fixing bolts on the support of glove box. (See *Disassembly of Instrument Console*)

Step 10 Loosen the harness plugs of heater radiator temperature sensor, and screw out the water temperature sensor.





Install the heater radiator temperature sensor

Install the heater radiator temperature sensor in the reverse order of removal.

Section 34 A/C Case Assy.







Replace the A/C cleaner

Remove the A/C cleaner

Tools required:

Cross screwdriver and straight screwdriver

1. Gently pull out the sealing strip upwards.



2. Loosen the plastic bolts on the trim panel.



3. Remove the trim panel outwards.



4. Take out the A/C cleaner core upwards.



Install the A/C cleaner

Install the A/C cleaner in the reverse order of removal.

Section 35 Automatic A/C System

The air condition for this vehicle has functions of heating and refrigeration, which applies a control system of variable displacement compressor and expansion valve.

The AC refrigeration system works only under following conditions:

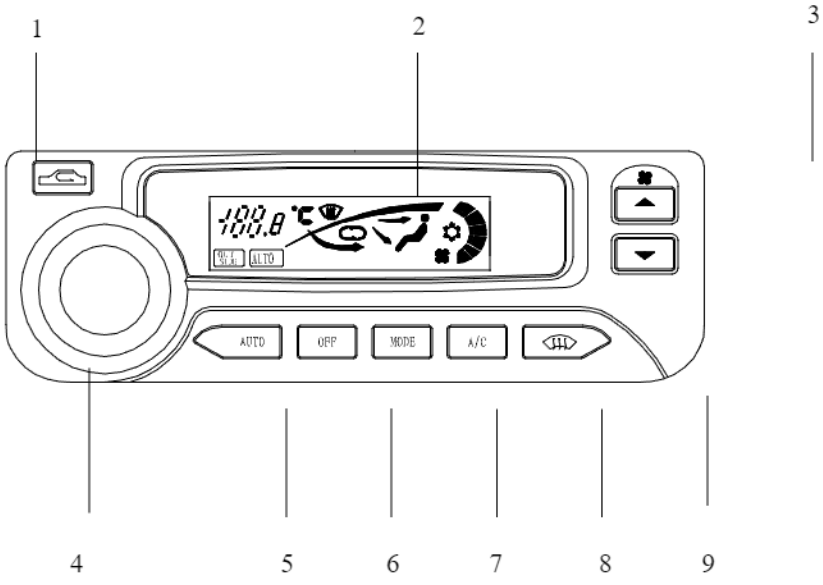
- Engine is running
- Ambient temperature is higher than –1 ℃℃
- The blower switch is at a position of 1 to 4

When the refrigeration system is working, it can not only decrease the compartment temperature and air humidity, but also make passengers more comfortable if the outside air humidity is very high. Furthermore, it can prevent the fogging of windshield.

To achieve the best refrigeration effect, all the windows should be closed when the refrigeration system is working.

Description

The following figure shows the control panel of A/C system.



Controls of A/C system

Push button 1: cycle switch

2: A/C display Panel

Push button 3-fan control

The fan has six speeds.

The blower should be placed at lower position when the vehicle is driving under low speed.

Knob 4-temperature control

Clockwise-hot

Anticlockwise-cold

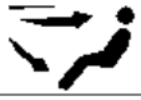
The knob can adjust the air temperature steplessly. The refrigerant will be increased after turning the switch anticlockwise when the refrigeration system is working.

Push button 5: Auto mode

Push button 6: A/C off

Push button 7: air flow mode

The air flow mode is changed every time after this button is pressed:

Symbol	Air flow mode
	Air flow to feet
	Air flow to face
	Air flow to feet and face

Push button 8-AC switch

Press "AC" button to start the operation of refrigeration system. There is an indicator on each button.

Push button 9-Defogging and defrosting switch

- The switch is used for the defogging of windshield. Press the switch 9 and change the air intake mode to outside re-circulation mode, the defogging will also function.

Economical Operation of A/C System

The AC compressor has to use the engine power for refrigeration, thus increase the fuel consumption. In order to reduce the AC system operation time, pay attention to the followings:

- The inside of vehicle compartment is very hot due to sun shining, we suggest to open the windows or doors for the flowing of hot air.
- Do not turn on the AC system during driving when the windows are open.

Clarification

- The air inlet in front of windshield shall not be blocked by ice, snow or leaves to ensure the

normal operation of heating and ventilation system.

- The heating performance is determined by the engine coolant temperature. Therefore, only if the engine is warming up, can the heating system functions normally.
- The dirty air in the compartment escapes from the side lining in luggage compartment. So be careful not to block the air ventilation hole when loading luggage.
- All the control components can be set on any positions except knob A and key D.
- In high temperature and high humidity, the water may drop from the evaporator because the water in air is condensing on the evaporator, and maybe lots of water can be found on the floor, which is normal but not leaking.
- In order not to be covered by fog, the blower should be placed at a lower position when driving at low speed (knob A).

Statements on the A/C System

- In the case of high outside air temperature and air humidity, it is possible that the condensed water may drop off from the evaporator and they will generate a pool of water under the vehicle. This is a normal phenomenon rather than leakage.
- It is recommended not to let the cold air directly blow your body.

Section 36 Description of B11 A/C Control Panel

Key	Function	Detailed Description
Inside/outside re-circulation cycle	Shifting between inside re-circulation and outside re-circulation	1. If the key is pressed for one time, the actuator shifts the operation condition of inside or outside air re-circulation for one time. 2. If it is changed to inside air re-circulation, the blower voltage is lowered for 1V (which is run within 4.9~10V). if changed to outside air re-circulation, the voltage return to its original status. 3. The key does not affect AUTO mode.
Temperature adjusting	1. Adjust the set temperature, which is stepless. 2. The temperature is adjusted every 0.5 ℃ (increase 0.5 ℃ if turn clockwise for one grade, decrease 0.5 ℃ if turn anticlockwise for 1 grade). 3. If the rotary button is pressed, outside temperature will display for 3s, and it return to set temperature if press it again.	1. Under AUTO mode, adjust the set temperature of the system. under MANUAL mode, the temperature set value lead to the air mix damper directly. 2. The key does not affect AUTO mode. 3. During the period (3s) of displaying outside temperature, the rotation of rotary button will not change the set temperature. 4. The range of set temperature is 18~32℃, it displays LO if lower than 18℃, and HI if higher than 32℃.
AUTO	Shift to operation mode AUTO	1. The system will adjust the air flow rate of blower, position of air mix damper, AC status and inside/outside air switch according to change of the set temperature, outside temperature, and compartment temperature. 2. The default status of airflow mode is airflow to feet and face (FD mode), which can be changed by MODE key. And AUTO key functions separately from MODE key. 3. Defrosting key is related to wiper, i.e., the AC system will be in defrosting mode automatically if wiper is started (while air flow rate etc. is not changed). 4. The working of compressor is determined by the set temperature (if set temperature is higher than 28℃, the compressor will not work). 5. The system will shift to inside re-circulation mode if

		any of the following requirements is met: AC system is beginning to work (i.e., the compressor is just started). The vehicle is driving at 10Km/h for more than 10s or the vehicle is stopped. 6. The system will memorize the last set operation mode or interface and work according to that.
OFF	Shut off the system	1. The system goes into OFF status if this key is pressed, and the display is off, all the actuators will stop at the same time. 2. Under OFF status, the system will start to work according to the last set operation mode or interface if one of AUTO, A/C or defrosting is pressed.
MODE	Adjust the air flow mode	1. There are 6 air flow modes: 4 basic modes, i.e., to face (F), to feet (D), to face and feet (FD) and defrosting (T), and 2 combination modes, i.e., to face and feet as well as defrosting (FDT) and to feet and defrosting (DT). 2. If the key is pressed, the system will change the airflow mode in cycle, and sequence is: F-FDT-DT-T-FD-D. 3. The key functions separately from AUTO key.
AC	AC compressor ON/OFF	1. Shift the operation status of AC compressor. 2. If the key is pressed, the default status is airflow to face and feet (FD), airflow rate at position 4, inside re-circulation mode. And the system will memorize the last set operation mode and interface and works according to that. 3. Under AUTO mode, the pressing of the key will shift the operation mode of compressor and shift to MANUAL mode from AUTO mode. 4. Under MANUAL mode, the compressor will not work if the set temperature is lower than 28 ℃.
Defrosting	Shift to compulsory defrosting	1. Default status: air flow mode at defrosting (T), outside air re-circulation, air flow rate at 4 position (fully heating if ambient temperature is lower than 12℃, and fully cooling if higher than 14℃). And the system will memorize the last set operation mode and interface and works according to that. 2. The voltage of the blower will be increased for 2V

		(which is running within 4.9~10V).
Air flow rate decreasing	Decrease the air flow rate	1. The airflow rate will be decreased for 1 grade until position 1 if the key is pressed for one time, and it remains at the lowest position if it is pressed. 2. Under AUTO mode, if the airflow rate is lowered to 1 position, the system will shift to MANUAL mode.
Air flow rate increasing	Increase the air flow rate	1. The airflow rate will be increased for 1 grade until position 6 if the key is pressed for one time, and it remains at the lowest position if it is pressed. 2. Under AUTO mode, if the airflow rate is increased to position 6, the system will shift to MANUAL mode.

Section 37 Diagnosis System

1. Self-check when starting up: The system enters the operating mode after the self-check of control panel (if a failure occurs, the temperature indicator bit continuously flashes five times with the frequency of one time/second) when the operating switch of the system is turned on.
2. Compulsive self-check: Within 3 seconds after the temperature is set at 29.5 ℃, simultaneously press the AUTO button and MODE button three times, and then the control panel will enter into the self-check program after 3 seconds, and the temperature indicator bit will display the fault code (if there are multiple codes, they will be displayed circularly at the time interval of 2s), and the self-check will stop automatically after 14s (Restarting the vehicle or pressing the OFF button can be able to compulsively terminate the diagnosis function).
3. Apply the 3 bit characters available for setting the temperature indication value to display the fault code information, where, the round figure means the display contents of fault code while the decimal place means the display item indication:

If the displayed fault code is a dual-digital hexadecimal figure XX, its corresponding binary figure is EEEEEEEE.

E0: normal

E1：Internal air temperature sensor error

E2: Ambient air temperature sensor error

E3: Water temperature sensor error

E4: Solar radiation sensor error

E5: Blower error

E6: Air mix damper adjustment error

E7: Mode damper adjustment error

Display Item	Fault Code Display Content	Remarks
0	E0 (Normal)	This item is the current failure state of the system
1	E1 (Internal air temperature sensor failure count)	Records of system failure state, if there is no failure occurred when the continuous mileage reaches 10 Km during the operation of A/C system, the failure count will be cleared.
2	E2 (Ambient air temperature sensor failure count)	
3	E3 (Water temperature sensor failure count)	
4	E4 (Solar radiation sensor error failure count)	
5	E5 (Blower failure count)	
6	E6 (Air mix damper adjustment failure count)	
7	E7 (Mode damper adjustment failure count)	

Error Compensation Function of Control Panel:

When there is an error in the input value of sensor, the control panel creates an error compensation value in order to determine the correct operand value, which is determined as follows:

1. Take 25 ℃ as the reference operand value when the internal/ambient air temperature sensors failure.
2. Take the sensor ON as the reference operation when the water temperature sensor error.
3. Take the daily radiation quantity of 0 as the reference when the solar radiation sensor error.

A/C ECU's PIN Voltage Graphics (Table)