

AIR CONDITIONING

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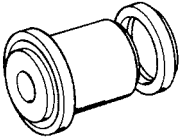
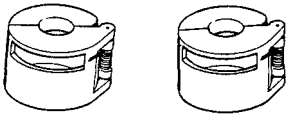
SPECIFICATION

Heater unit	
Type	Three-way-flow full-air-mix system
Heating Capacity	3800 Kcal/h
Heater control assembly	Rotary type (Vacuum Control System)
Air Conditioner	
Cooling capacity	3700 Kcal/h
Compressor	
Model	TRF 090 (Scroll type)
Refrigerant unit lubricant cc (cu. in)	SUNISO 5GS or Equivalent 120 (7.3)
Refrigerant temperature sensor	OFF 115 ± 3°C (239 ± 5°F) ON 100 ± 6°C (212 ± 11°F)
Dual pressure switch	
High pressure switch	OFF 27 kg/cm (2,700 kPa, 384 psi) ON 21 kg/cm (2,100 kPa, 299 psi)
Low pressure switch	OFF 2.0 kg/cm (200 kPa, 28 psi) ON 2.1 kg/cm (210 kPa, 30 psi)
Freezer prevention	Air temperature thermostat OFF : 0° (32°F) ON : 4°C (39°F)
Fusible plug	Burn out temperature 105°C (221°F)
Refrigerant and quantity	R-12, Approx. 900 g (2-1 lbs)

SERVICE STANDARDS

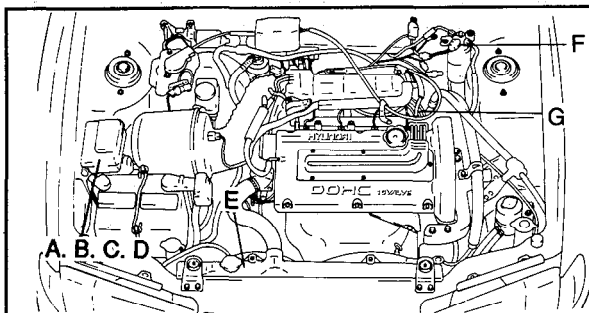
Amount of deflection of V belt	
New belt	55.5 mm (0.20-0.21 in.)
Used belt	6-7 mm (0.23-0.28 in.)
Clutch clearance	0.3-0.6 mm (0.01-0.02 in.)
V belt size	
Type	4 PK
Length	910 mm (35.9 in.)

SPECIAL TOOLS

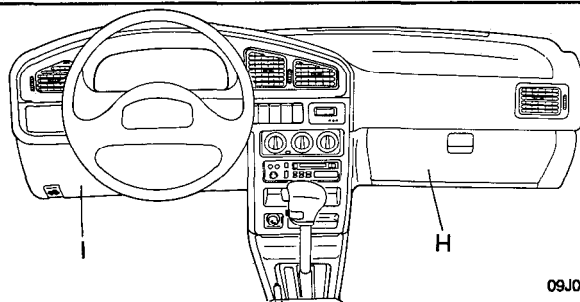
Tool (Number and name)	Illustration	Use
09977-21811 Bearing remover and installer and pulley installer		Removal and installation of the bearing from the pulley.
09977-33600 Tube remover		Separation of air-conditioner line.

LOCATION OF COMPONENTS

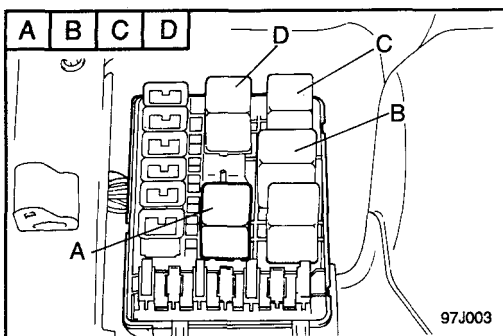
Name	Symbol	Name	Symbol
Air Conditioner relay	A	Dual pressure switch	F
Condenser fan relay	B	Refrigerant temperature sensor	G
Condenser fan control relay	C	Thermostat	H
Radiator fan relay	D	Blower relay	I
Thermo sensor	E		



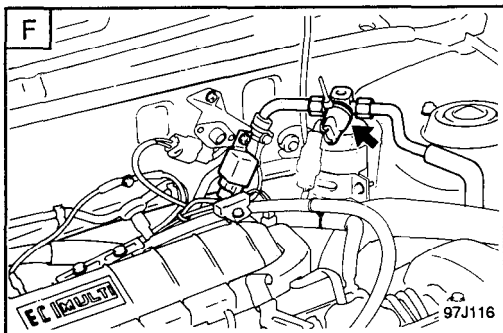
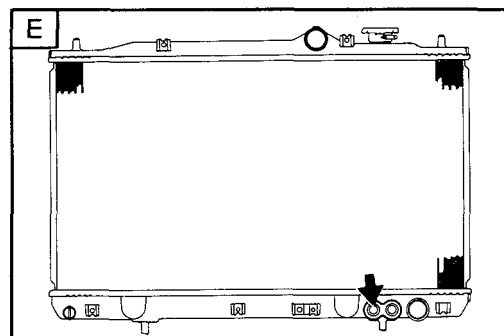
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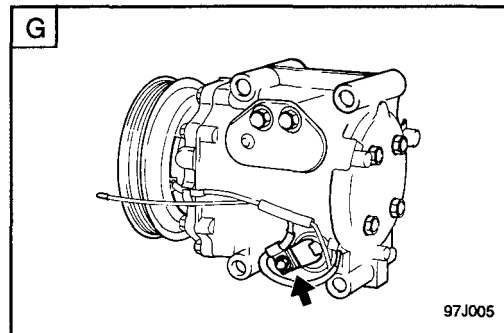
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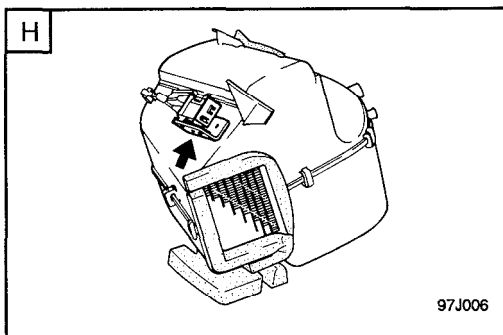
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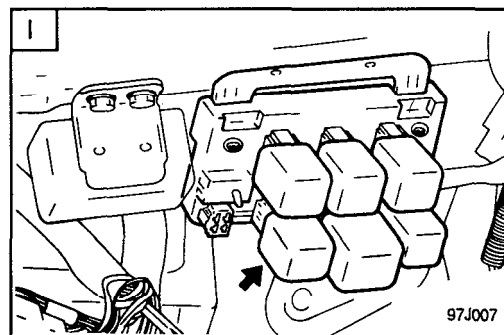
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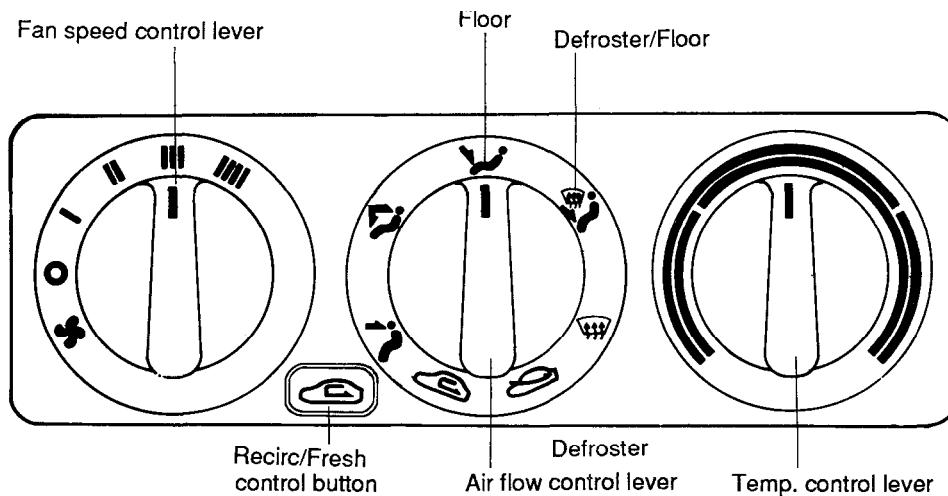
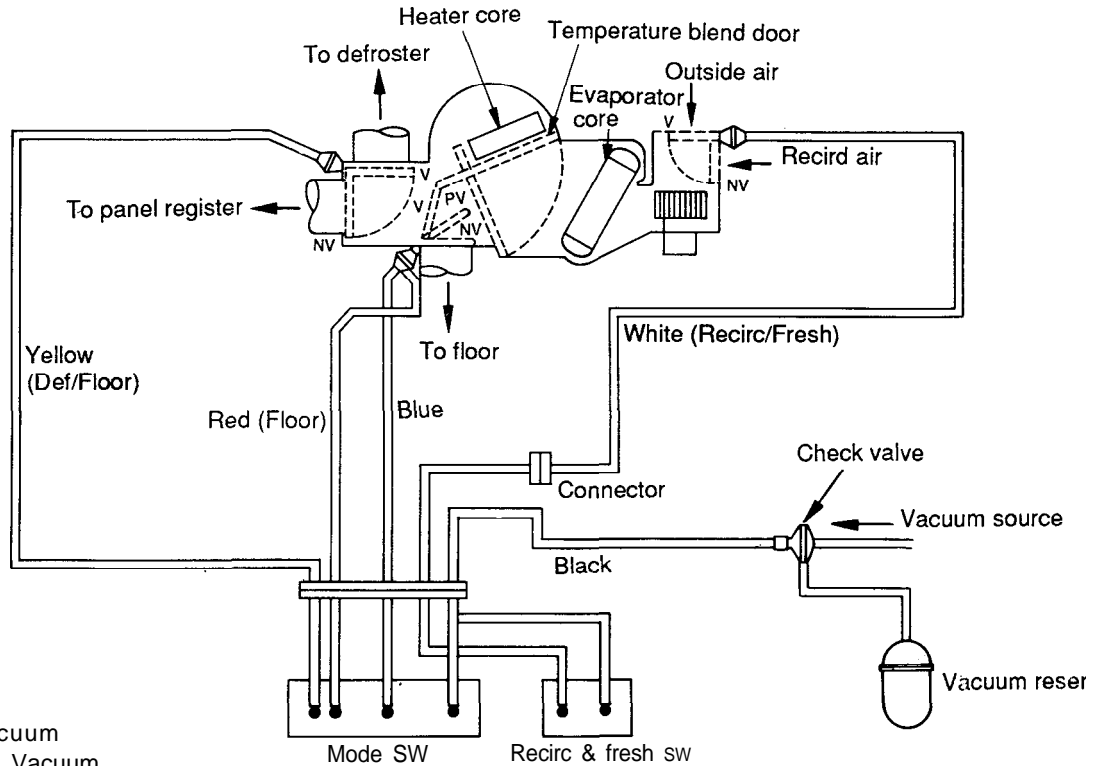


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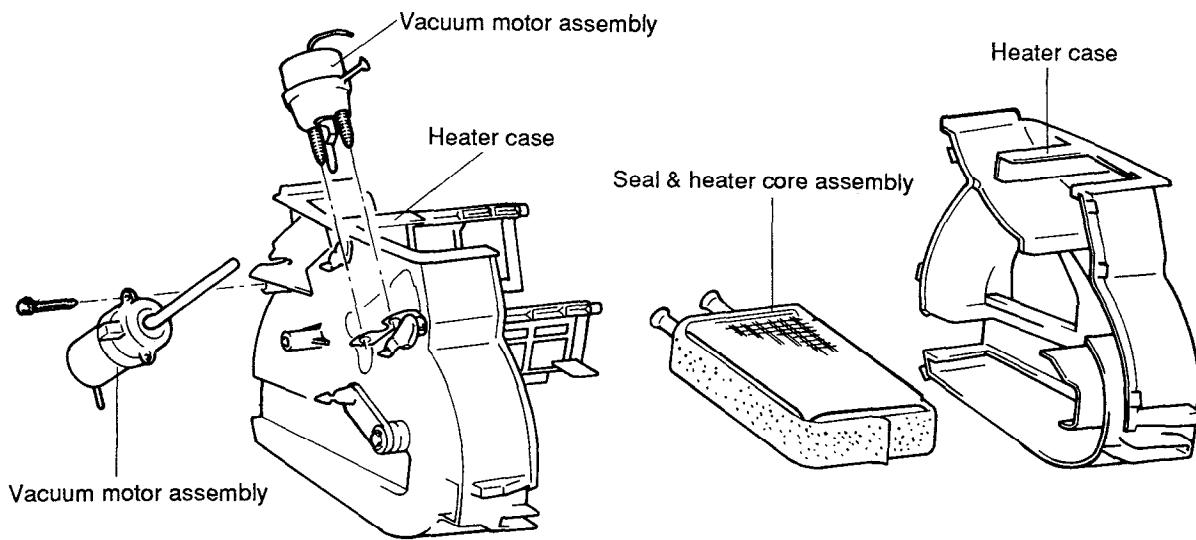
VACUUM SYSTEM SYMPTOM AND PROBABLE CAUSE



Symptom	Probable cause
On "FLOOR" position. All air through defroster or DEF/FLOOR.	<ul style="list-style-type: none"> o Blue and/or red vacuum hose pinched or disconnected at vacuum motor. o Black source hose pinched or disconnected at the connector. o Engine compartment vacuum source hose pinched or disconnected at the vacuum manifold. o Defective vacuum motor.
On "DEF/FLOOR" position. All air through defroster.	<ul style="list-style-type: none"> o Blue hose pinched or disconnected at vacuum motor. o Blue vacuum hoses installed improperly (reversed). o Black source hose pinched or disconnected at the connector. o Engine compartment vacuum source hose pinched or disconnected at the vacuum manifold. o Defective vacuum manifold.
On "PANEL VENTS" position. All air through defroster.	<ul style="list-style-type: none"> o Yellow vacuum hose pinched or disconnected at vacuum motor. o Black source hose pinched or disconnected at the connector. o Engine compartment vacuum source hose pinched or disconnected at the vacuum manifold. o Defective vacuum motor.
On "PANEL/FLOOR" position. All air through defroster or panel	<ul style="list-style-type: none"> o Yellow vacuum hose pinched or disconnected at vacuum motor. o Blue hose pinched or disconnected at vacuum motor. o Black source hose pinched or disconnected at the connector. o Engine compartment vacuum source hose pinched or disconnected at the vacuum manifold. o Defective vacuum motor.
On "DEF" position. (No vacuum) On "RECIRC" position. All air through fresh.	<ul style="list-style-type: none"> o White vacuum hose disconnected at the connector or recirc duct vacuum motor. o Black source hose pinched or disconnected at the connector. o Engine compartment vacuum source hose pinched or disconnected at the vacuum manifold. o Defective vacuum motor.

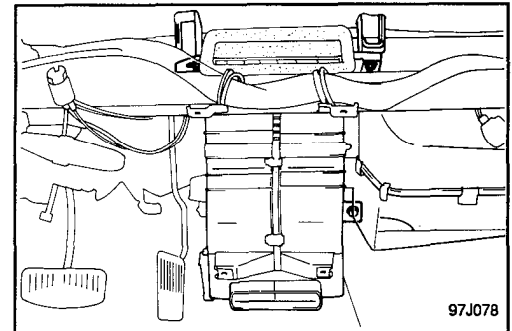
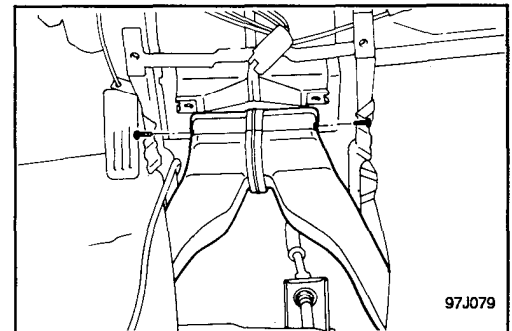
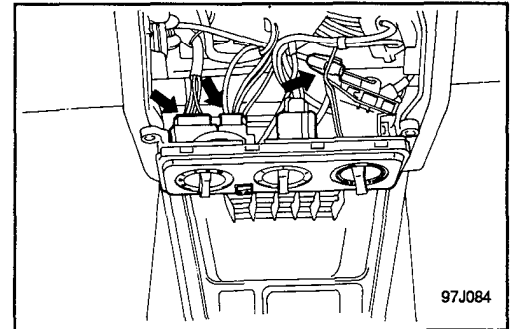
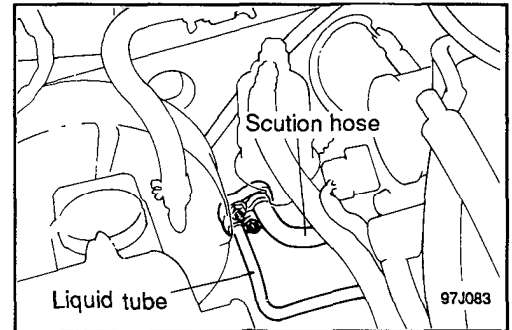
HEATER

COMPONENTS



REMOVAL

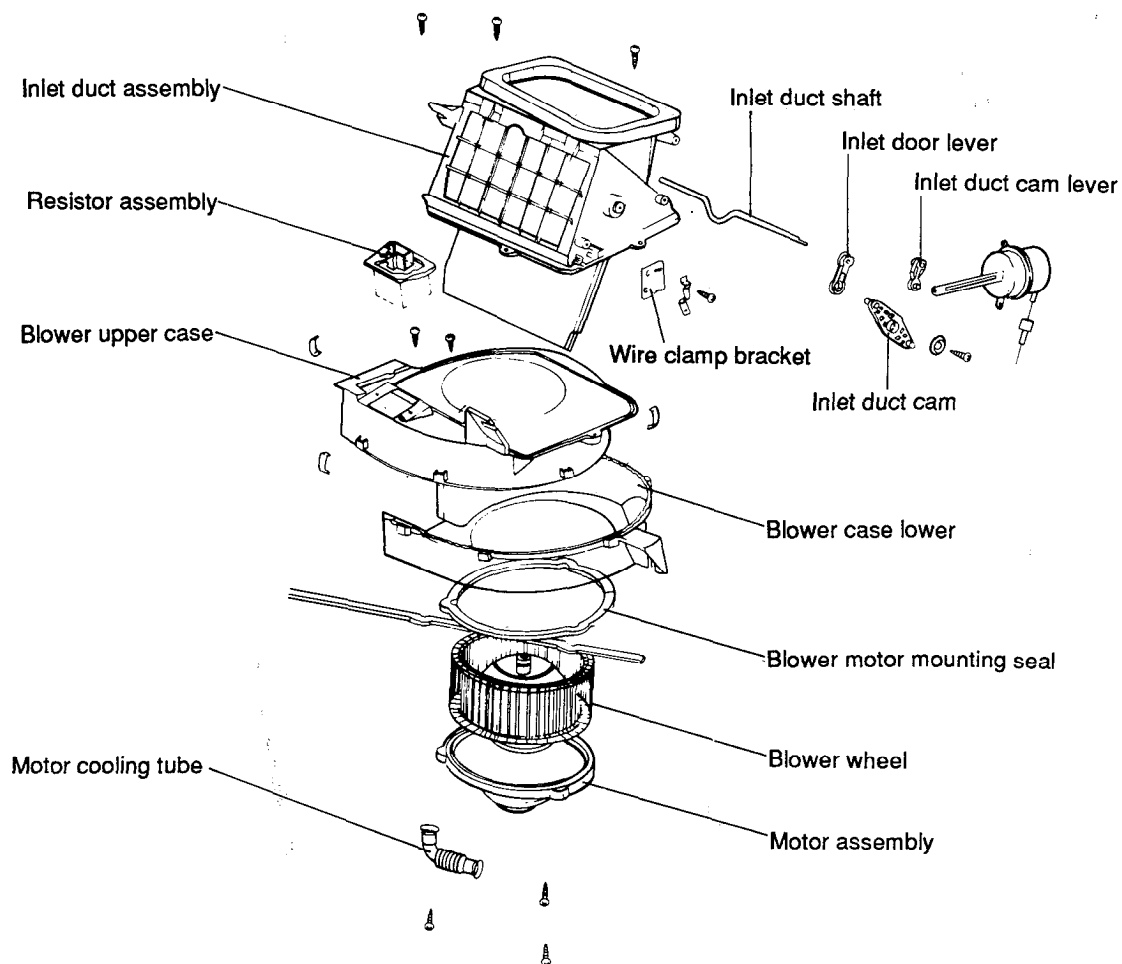
1. Disconnect the negative terminal at the battery.
2. Drain the coolant from the radiator.
3. Remove the heater hoses and the evaporator water drain hose.
4. Remove the suction line and the liquid line.
5. Remove the console assembly (Refer to BODY GROUP).
6. Remove the glove box assembly, main lower crash pad assembly and lower crash pad center facia panel assembly (Refer to BODY GROUP).
7. Remove the heater control assembly.
8. Remove the lower crash pad center skin assembly (Refer to BODY GROUP).
9. Remove the crash pad center support bracket assembly (Refer to BODY GROUP).
10. Remove the rear heating joint duct assembly.
11. Remove the heater unit assembly.

**INSPECTION**

1. Check the linkage mechanism for operation.
2. Check the heater core for restrictions or leakage.

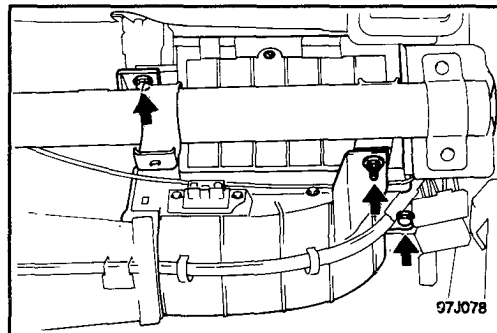
BLOWER ASSEMBLY

COMPONENTS



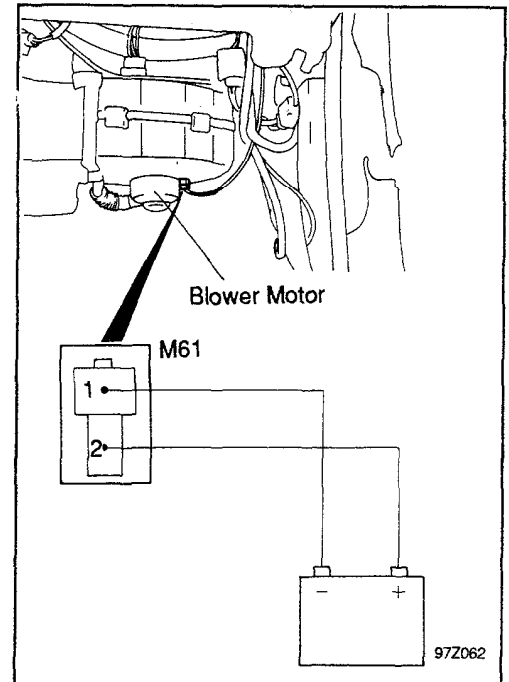
REMOVAL AND INSTALLATION

1. Remove the glove box housing cover assembly.
2. Remove the lower crash pad assembly.
3. Disconnect the resistor and blower motor connector.
4. Loosen the three mounting bolts for evaporator unit.
5. Remove the three nuts from the blower unit mounting bracket.
6. Pull out the blower unit and then disconnect the fresh/recirc vacuum connector.
7. Installation is the reverse of removal.

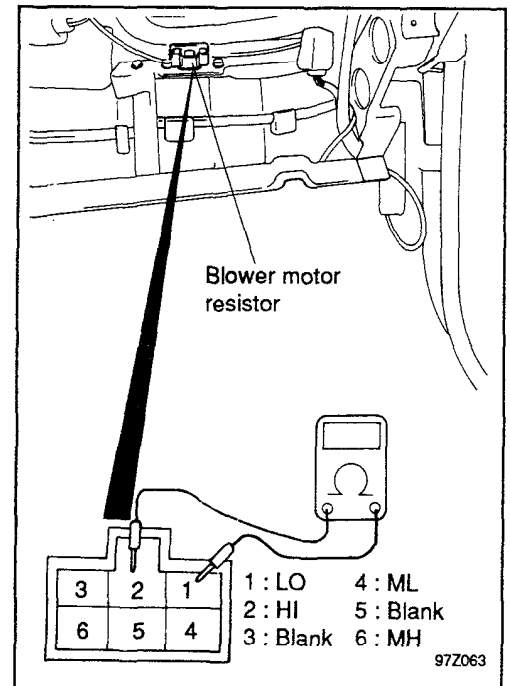
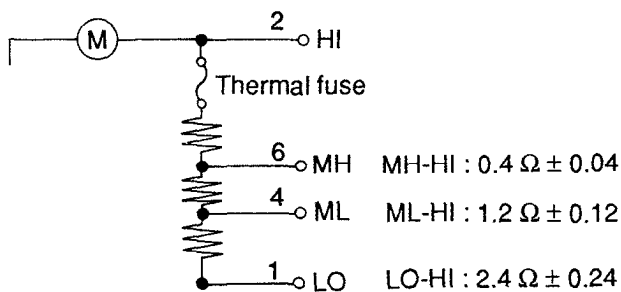


INSPECTION

1. Check for bending or abnormal deflection of the rotating shaft of the blower motor assembly.
2. Check for cracking or deterioration of the packing.
3. Check for damage to the fan.
4. Check for damage to the blower case.
5. Check the operation of the inside/outside selection damper, and for damage 6
6. Connect the blower motor terminals directly to the battery and check that the blower motor operates smoothly.
7. Next, reverse the polarity and check that the blower motor operates smoothly in the reverse direction.

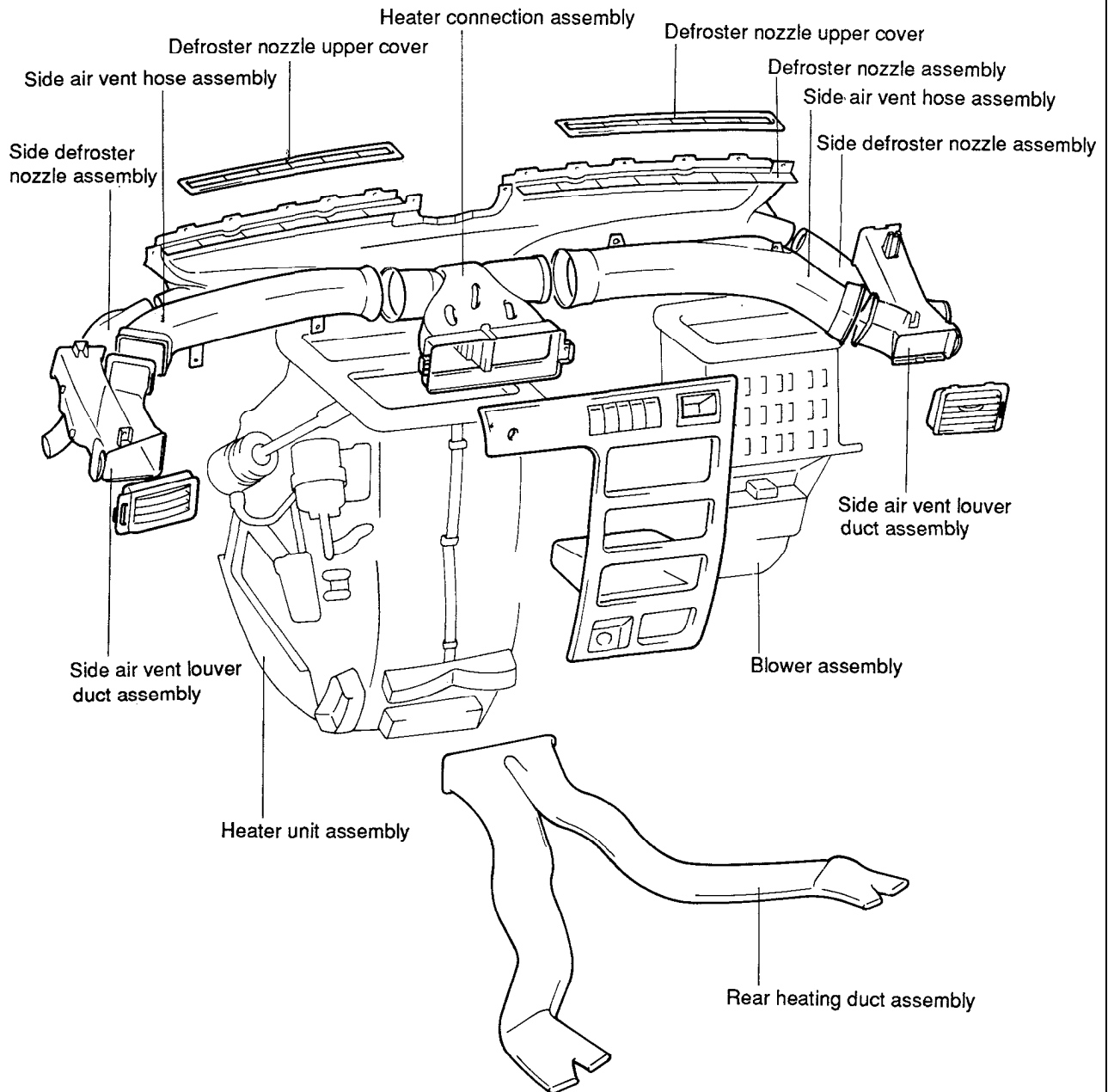


8. Using an ohmmeter, check that there is continuity between terminals 1 and 2.
- If there is no continuity, replace the resistor.



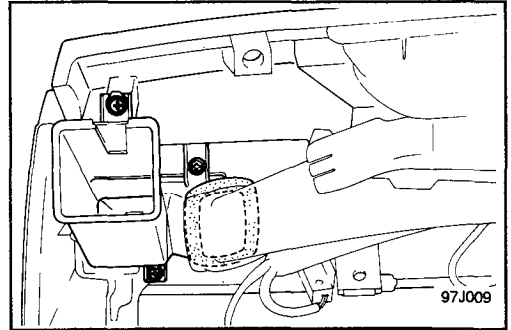
VENTILATOR

COMPONENTS

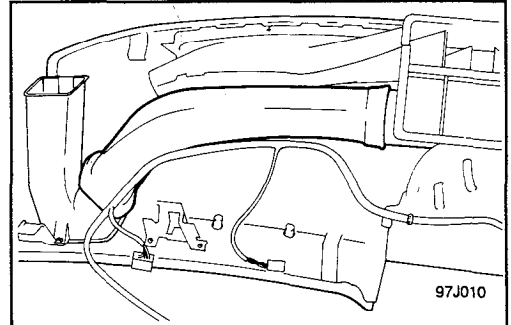


REMOVAL AND INSTALLATION

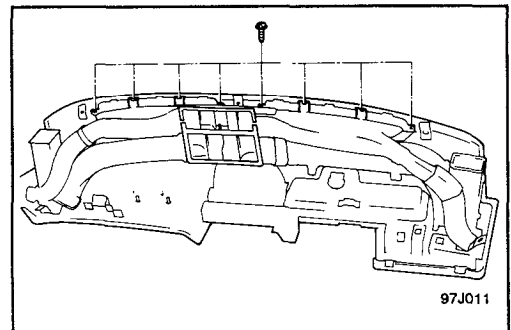
1. Remove the main crash pad assembly (Refer to BODY GROUP)
2. Remove the side air vent louver duct assembly (LH/RH).



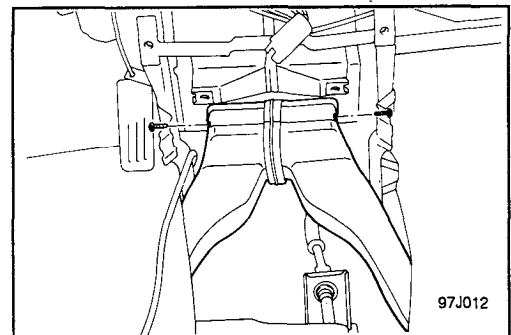
3. Remove the side air vent hose assembly (LH/RH).
4. Remove the side air vent louver assembly (LH/RH).



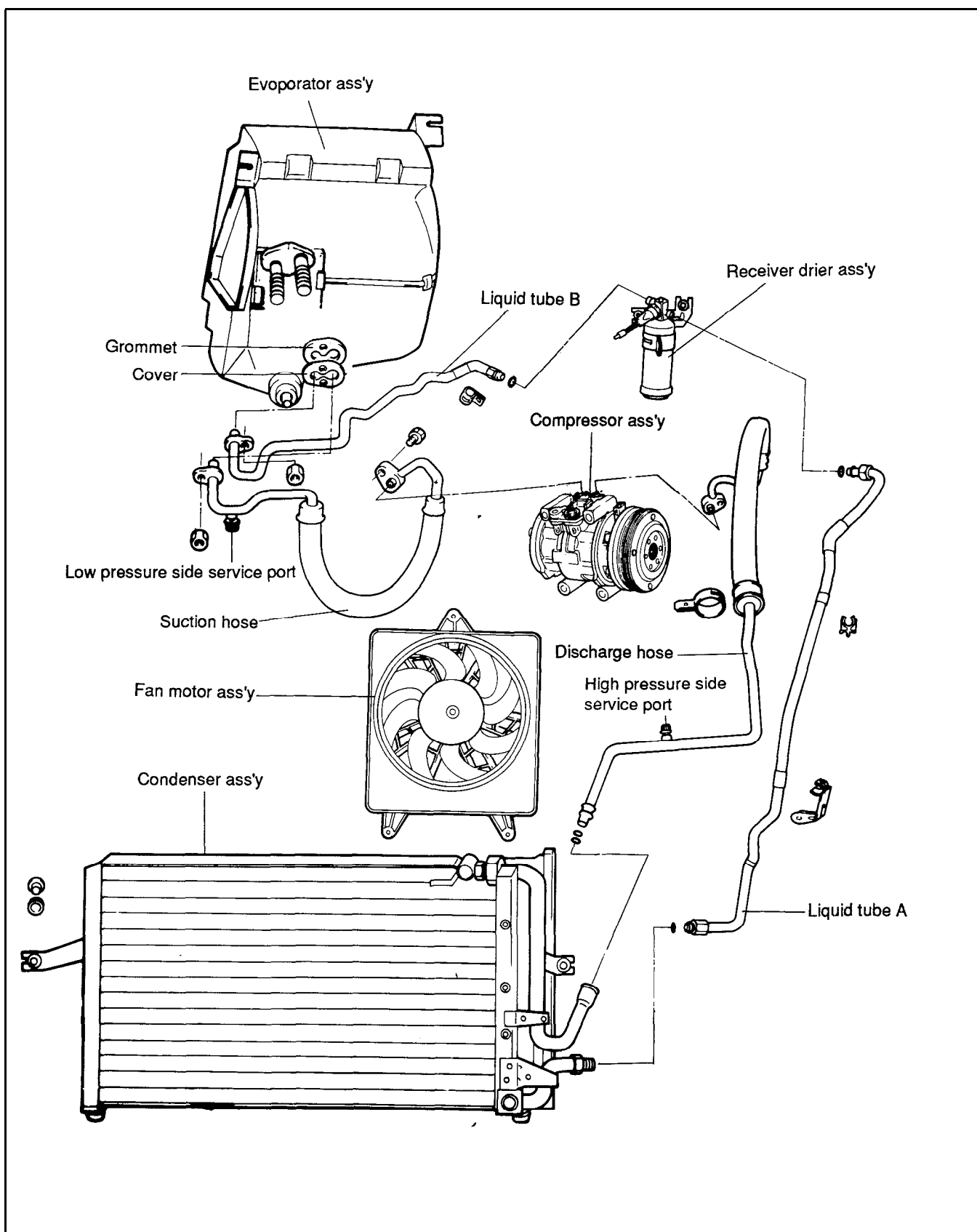
5. Remove the heater connection assembly.
6. Remove the defroster nozzle assembly.
7. Remove the side defroster nozzle assembly (LH/RH).
8. Remove the crash pad upper cover assembly.



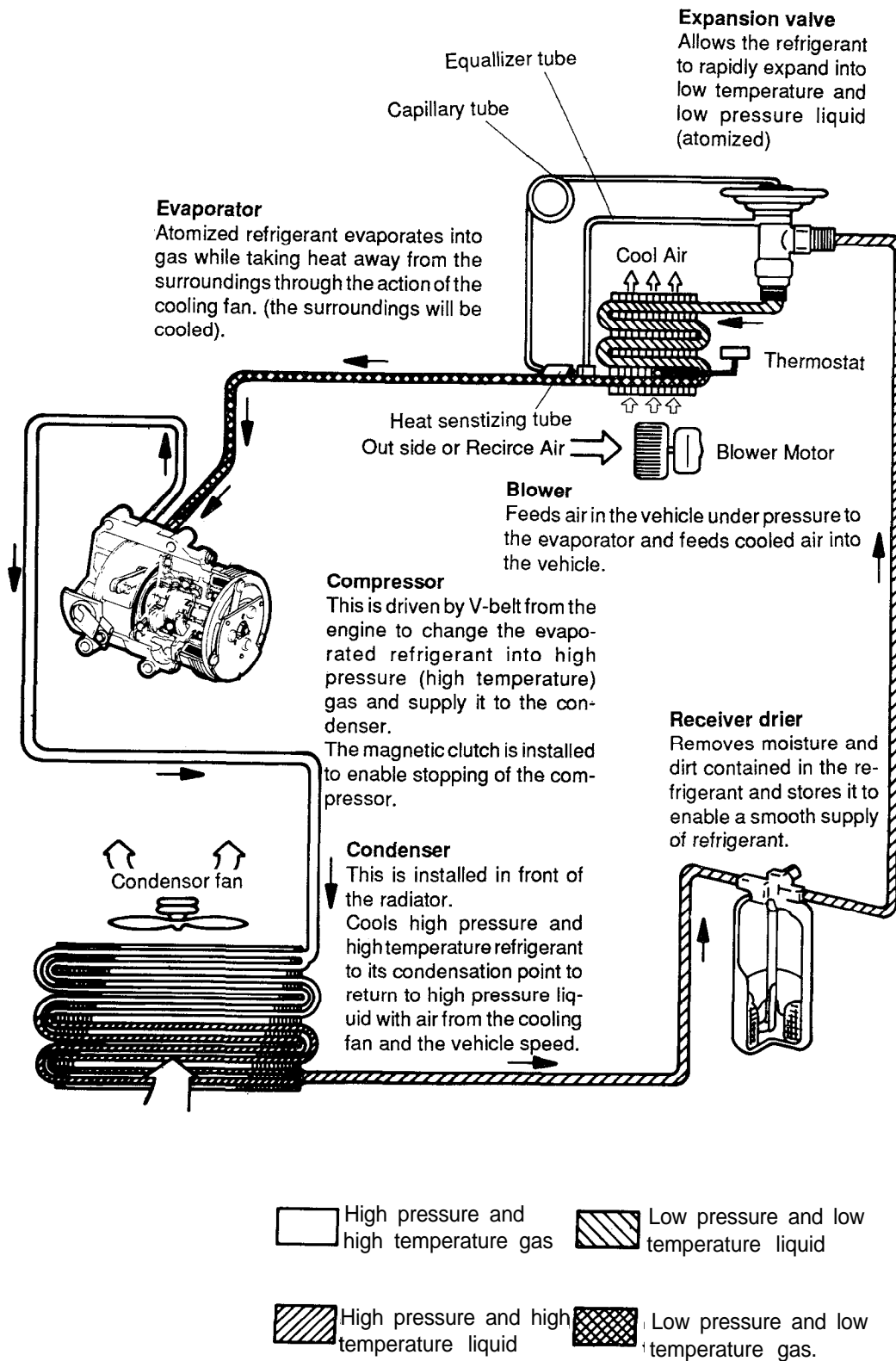
9. Remove the rear heating joint duct assembly and rear heating side duct assembly (LH/RH).
10. Installation is the reverse of removal procedures.



AIR CONDITIONER COMPONENTS



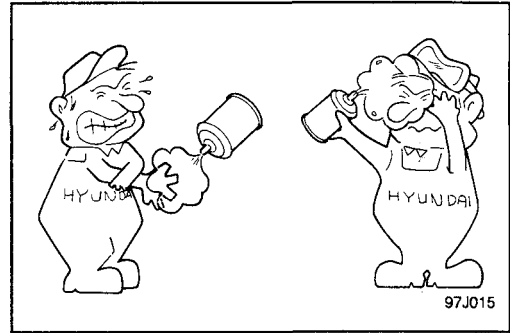
REFRIGERATION CYCLE



GENERAL SERVICE INSTRUCTIONS

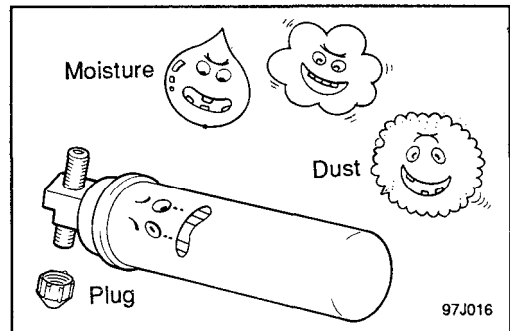
SAFETY PRECAUTIONS

1. R-12 liquid refrigerant is highly volatile. A drop on the skin could result in localized frostbite. When handling the refrigerant, be sure to wear gloves.
2. If the refrigerant splashes into your eyes, wash them with clean water immediately. It is standard practice to wear goggles or glasses to protect your eyes, and gloves to protect your hands.
3. The R-12 container is highly pressurized, never leave it in a hot place, and check that the storage temperature is below 52°C (126°F).
4. A halide leak detector is often used to check the system for refrigerant leakage. Bear in mind that R-12, upon coming into contact with flame (this detector burns propane to produce a small flame), produces phosgene, a toxic gas.
5. The discharge of R12 refrigerant into the atmosphere depletes the earth's protective ozone layer. Hyundai recommends that R12 refrigerant should be recovered and recycled when possible.



WHEN REPLACING PARTS ON A/C SYSTEM

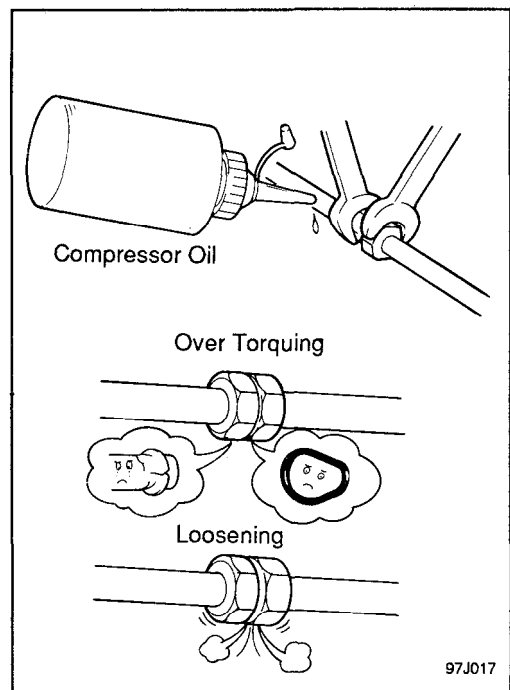
1. Never open or loosen a connection before discharging the system.
2. Seal the open fittings with a cap or plug immediately in disconnected parts to prevent intrusion of moisture and dust.
3. Do not remove the sealing caps from a replacement component until it is ready to be installed.
4. Before connecting an open fitting, always install a new sealing ring. Coat the fitting and seal with refrigerant oil before making the connection.



HOW TO INSTALL CONNECTING PARTS

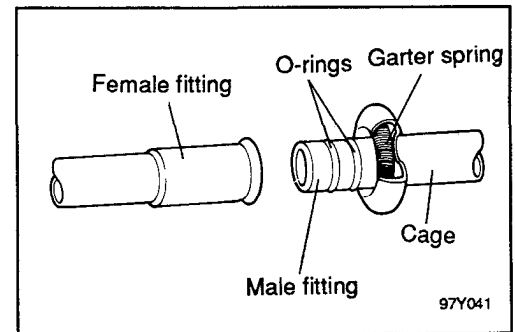
Bolt/nut coupling type

1. Lubricate O-ring fittings with compressor oil for easy tightening and to prevent leaking of refrigerant gas.
2. Tighten the nut using two wrenches to avoid twisting the tube.
3. Tighten the O-ring fittings to the specified torque.



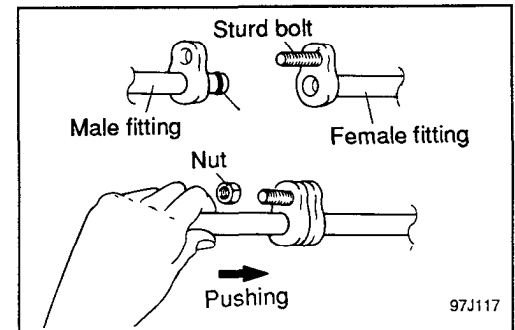
Spring Lock Coupling Type

1. Check for missing or damaged garter spring.
2. After cleaning the fittings, install the new O-rings (use only specified one) and lubricate using compressor oil.
3. Assemble the fitting together by pushing with a slight twisting motion.
4. To ensure coupling engagement, visually to be sure the garter spring is over flared end of the female fitting.



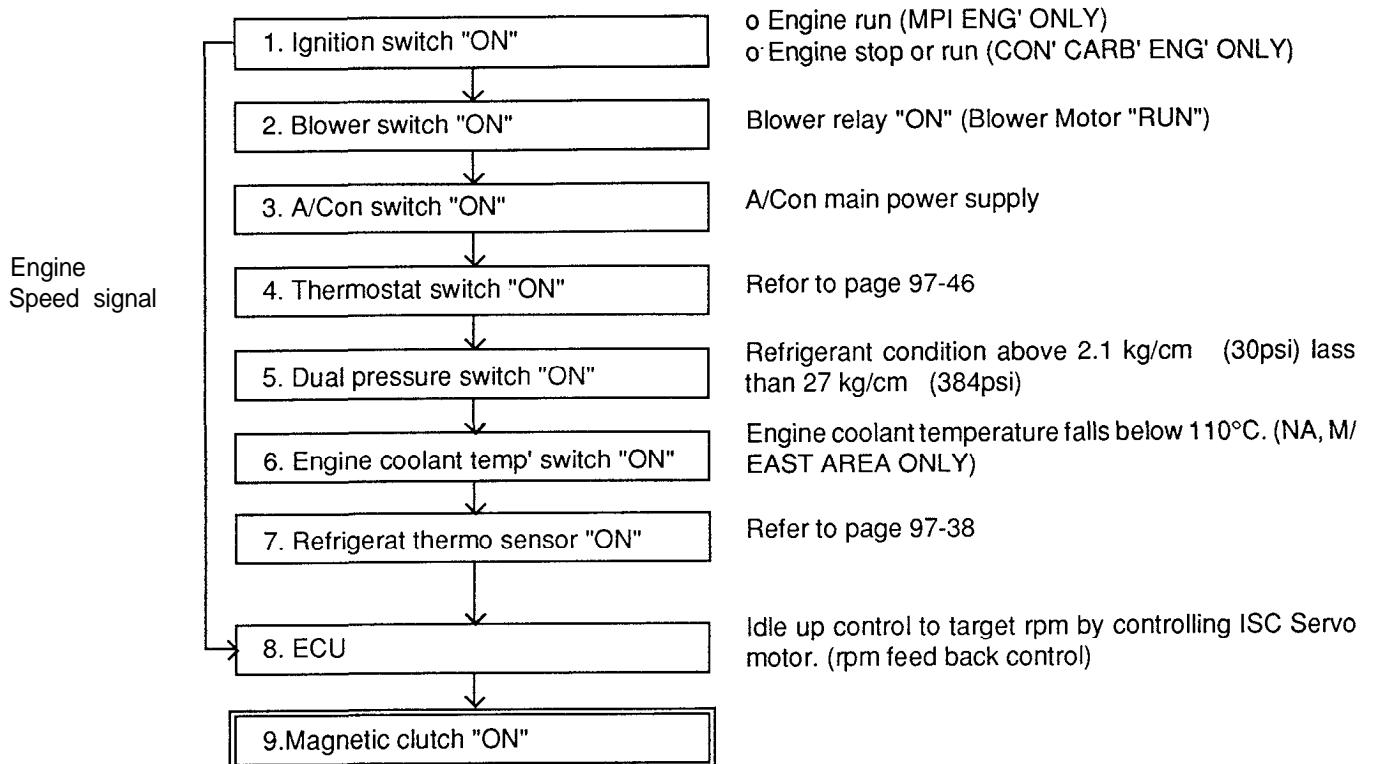
Plange coupling Type

1. Check for missing or damaged the new O-ring (use only specified one) and lubricate with compressor oil.
2. Hand tighten the nut or bolt by pushing the one side pipe.
3. Tighten the nut or bolt to the specified torque.

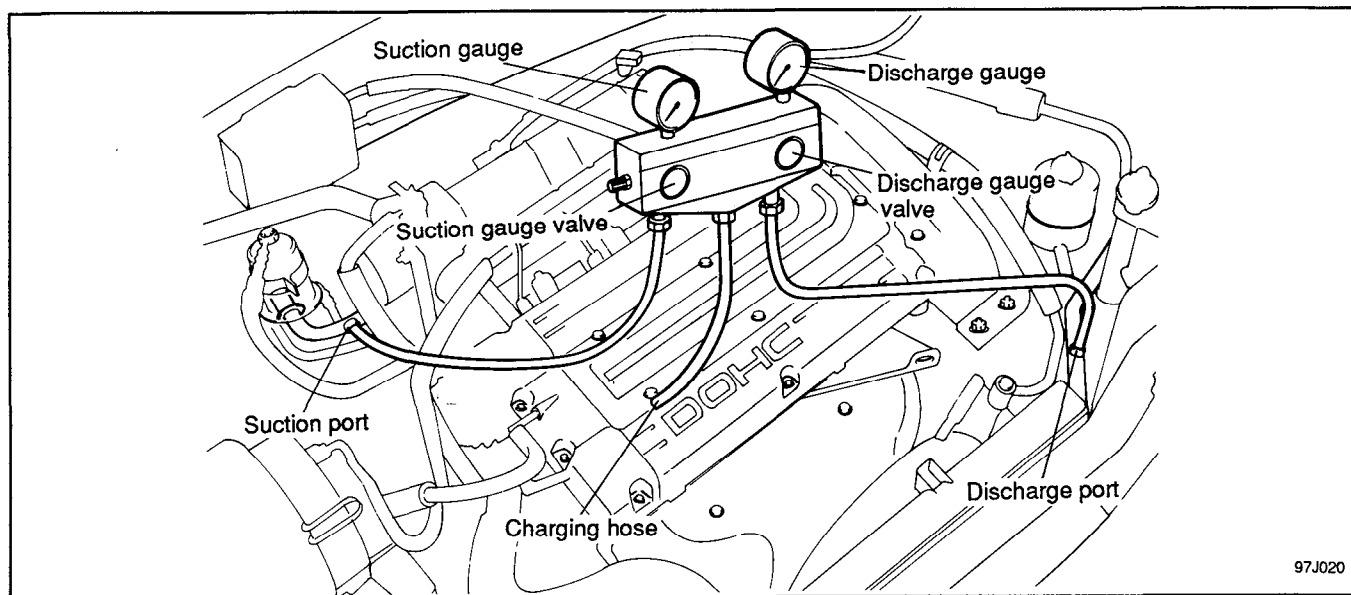


HOW IS THE MAGNETIC CLUTCH ENERGIZED ?

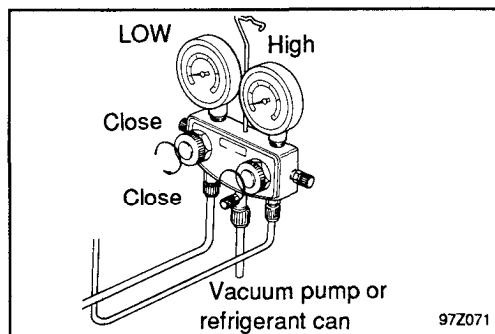
The general process until the magnetic clutch is energized as shown below.



AIR CONDITIONER SYSTEM SERVICE INSTALLATION OF MANIFOLD GAUGE SET.



1. Close both hand valves of manifold gauge set.
2. Install charging hoses of gauge set to service ports. Connect the low pressure hose to the low pressure service port in the suction pipe and the high pressure hose to the high pressure service port in the discharge hose.
3. Tighten the hose nuts by hand.



DISCHARGING THE REFRIGERANT SYSTEM

CAUTION

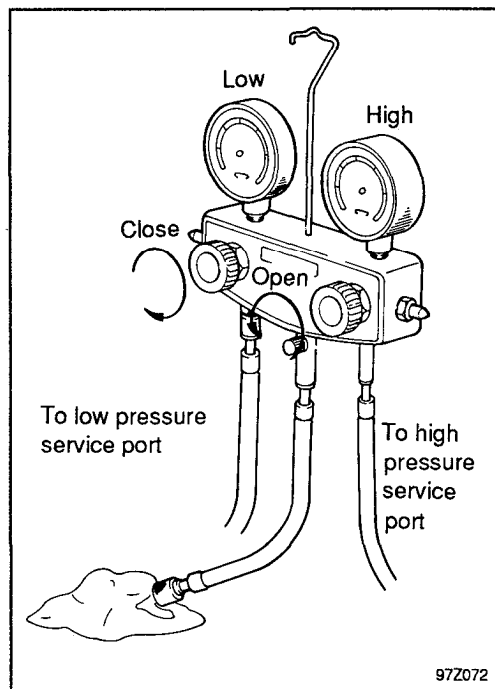
It has been determined that the discharge of R-12 refrigerant into the atmosphere depletes the earth's protective ozone layer. Hyundai recommends that R-12 be recovered and recycled when possible.

1. Connect the manifold gauge set to the system.
2. Place the free end of the center hose on a shop towel.
3. Slowly open the high-pressure hand valve to adjust the refrigerant flow. Open the valve slightly.

NOTE:

If refrigerant is allowed to escape too fast, compressor oil will be drawn out of the system.

4. Check the shop towel to make sure no oil is being discharged. If oil is present, partially close the hand valve.
5. After the manifold gauge reading drops below 434 kPa (3.5 kg/cm², 50 psi), slowly open the low-pressure hand valve.
6. As the system pressure drops, gradually open both the high and the low-pressure hand valves until both gauges read 1 kPa (0 kg/cm², 0 psi).



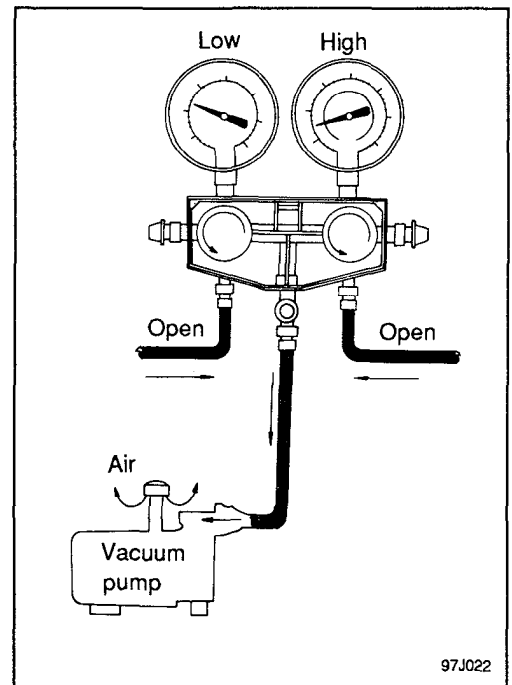
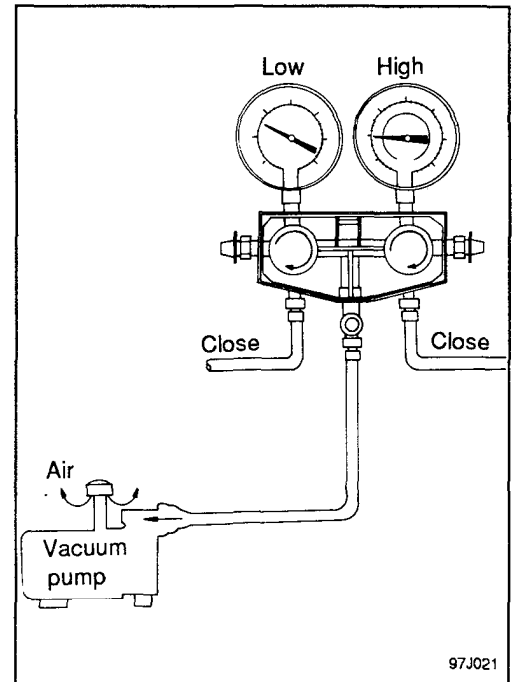
EVACUATING REFRIGERANT SYSTEM

NOTE:

It is necessary to evacuate the air conditioning system any time the system has been opened. Evacuation is necessary to purge all of that air and moisture that may have entered the system.

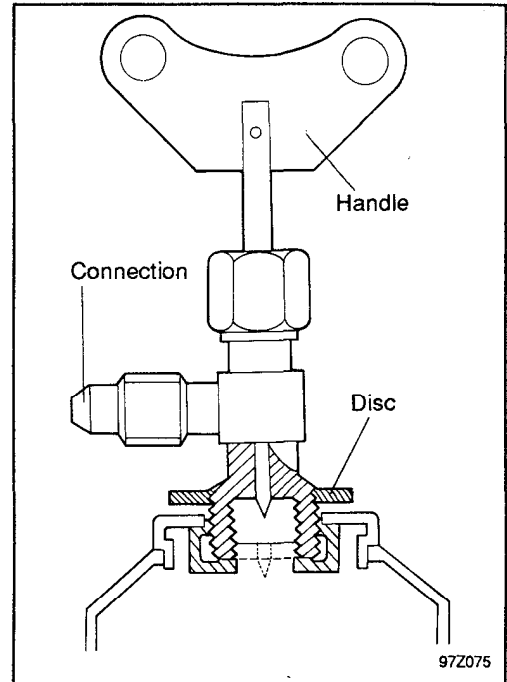
After installation of a component, the system should be evacuated for approximately 15 minutes. A component in service that has been opened for repair should be evacuated for 30 minutes.

1. Engine should be off.
2. Connect a manifold gauge set to the service ports. Close both high and low pressure valves.
3. Make sure the refrigerant has been discharged from the system.
4. Connect the center hose of the gauge set to the vacuum pump inlet.
5. Start the vacuum pump and then open the high and low manifold pressure valves.
6. After about ten minutes, check that the low pressure gauge reads more than 94.39 kPa (0.96 kg/cm², 28" HG) vacuum. If negative pressure can not be obtained, there is a leak in the system. In this case, repair the leak as described in the following.
 - 1) Close both the manifold valves and stop the vacuum pump.
 - 2) Charge the system with a can of refrigerant [about 0.4 kg (0.9 lb)]. Refer to Charging Refrigerant.
 - 3) Check for refrigerant leakage with a leak detector.
 - 4) Repair any leakage found. Refer to Checking Refrigerant Leaks.
 - 5) Discharge the system again, and then evacuate the system.
7. Start the vacuum pump.
8. Open both manifold pressure valves to obtain 94.39 kPa (0.96 kg/cm², 28" HG) of vacuum.
9. After the low pressure manifold gauge indicates as close to 94.39 kPa (0.96 kg/cm², 28" HG) as possible, continue evacuating for 15 minutes.
10. After evacuating for 15 minutes, close both manifold pressure valves and stop the vacuum pump. Disconnect the hose from the vacuum pump. The system is now ready for charging.



HANDLING REFRIGERANT SERVICE TAP VALVE

1. Before connecting the valve to the refrigerant container, turn the handle fully counterclockwise.
2. Turn the adapter counterclockwise until it reaches its highest position.
3. Connect the center hose to the valve fitting. Turn the adapter fully clockwise by hand.
4. Turn the handle clockwise to make a hole in the sealed top.
5. Turn the handle fully counterclockwise to fill the center hose with air. Do not open the high and low-pressure hand valves.
6. Loosen the center hose nut connected to the center fitting of the manifold gauge.
7. Allow air to escape for a few seconds, and then tighten the nut.



CHARGING REFRIGERANT SYSTEM (VAPOR)

NOTE

This step is to charge the system through the low pressure side with refrigerant in a vapor state. When the refrigerant container is placed rightside up, refrigerant will enter the system as a vapor.

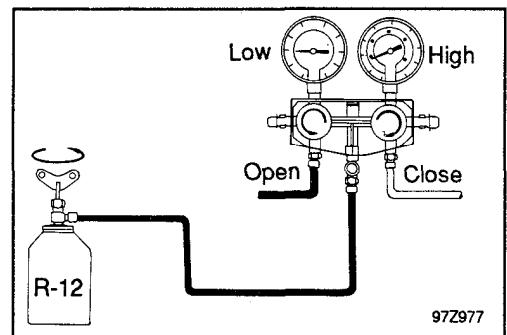
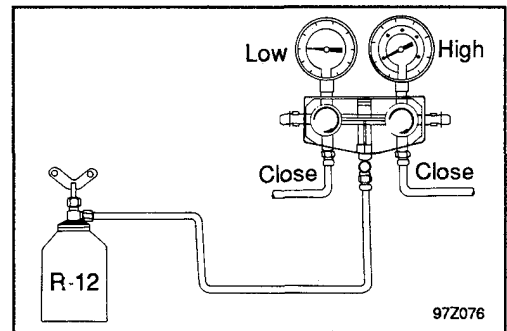
1. Install the refrigerant can tap valve as described in Handling the Refrigerant Service Tap Valve section.
2. Open the low pressure valve. Adjust the valve so that the low pressure gauge does not read over 412 kPa (4.2 kg/cm², 60 psi)
3. Put the refrigerant in a pan of warm water (maximum temperature 40°C or (104°F) to keep vapor pressure in the container slightly higher than vapor pressure in the system.
4. Run the engine at fast idle, and operate the air conditioner.

NOTE:

Be sure to keep the container upright to prevent liquid refrigerant from being charged into the system through the suction side, resulting in possible damage to the compressor.

5. Charge the system to the specified amount. Then, close the low pressure valve.

Specified amount: 900g (2.1 lb)



When refrigerant charging speed is slow, immerse the refrigerant can in water, heated to a temperature of about 40°C (104°F).

WARNING

- o Under no circumstances should the refrigerant can be warmed in water heated to a temperature of over 52°C (126°F).
- o A blow torch or stove must never be used to warm-up the can.

CHARGING REFRIGERANT SYSTEM (LIQUID)

NOTE

This step is to charge an empty system through the high pressure side with refrigerant in a liquid state. When the refrigerant container is held upside down, refrigerant will enter the system as a liquid.

CAUTION:

Never run the engine when charging the system through the high pressure side.

Do not open the low pressure valve when the system is being charged with liquid refrigerant.

1. Close both the high and low pressure valves completely after the system is evacuated.
2. Install the refrigerant tap valve as described in "Handling Refrigerant Service Tap Valve" section.
3. Open the high pressure valve fully, and keep the container upside down.
4. Charge the system to the specified amount by weighing the refrigerant with a scale. Overcharging will cause discharge pressure (high side) to rise. Then, close the high pressure valve.

Specified amount: 900 kg (2.1 lb)

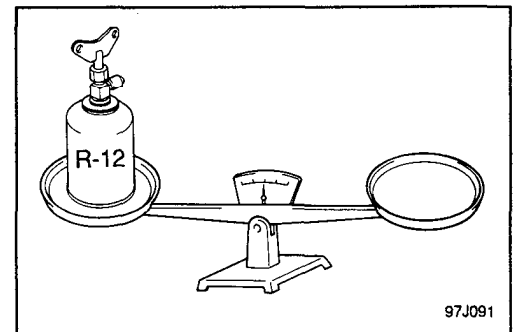
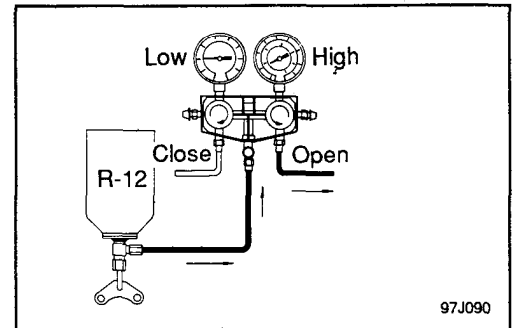
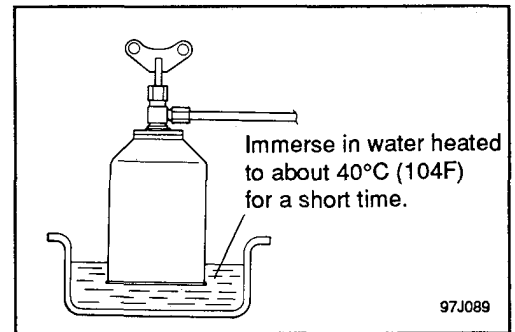
NOTE:

If the low pressure gauge does not show a reading, the system is restricted and must be repaired.

5. After the specified amount of refrigerant has been charged into the system, close the manifold gauge valve.
6. Check that there are no leaks in the system with a leak detector. Refer to Checking Refrigerant Leaks.

NOTE:

Conducting a performance test prior to removing the manifold gauge is a good service operation.



COMPRESSOR OIL LEVEL CHECK

The oil used to lubricate the compressor circulates in the system while the compressor is operating. Whenever replacing any component of the system or when a large amount of gas leakage occurs, add oil to maintain the original total amount of oil.

Total amount of oil in the system: 120 cc (4.0 US fl oz, 4.4 Imp fl oz)

Adding Oil for Replacement Component Parts

When replacing the system's component parts, be sure to add the following amount of oil to the parts being replaced.

Component parts to be replaced	Amount of oil cc (US fl oz, Imp fl oz)
Evaporator core	50 (1.6, 1.8)
Condenser	30 (1.0, 1.1)
Receiver-drier	10 (0.3, 0.36)

CHECKING REFRIGERANT LEAKS

Conduct a leak test with an electronic leak detector whenever leakage of refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening of connection fittings.

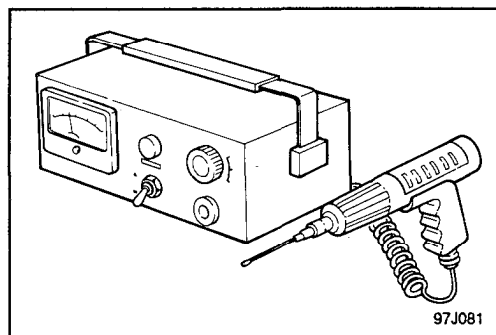
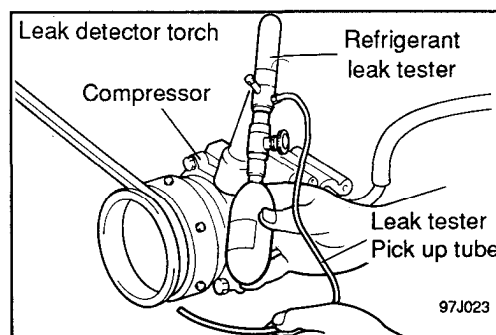
Electronic Leak Detector

The leak detector is a delicate device that detects small amounts of halogen.

In order to use the device properly, read the manuals supplied by the manufacturer to perform the specified maintenance and inspections.

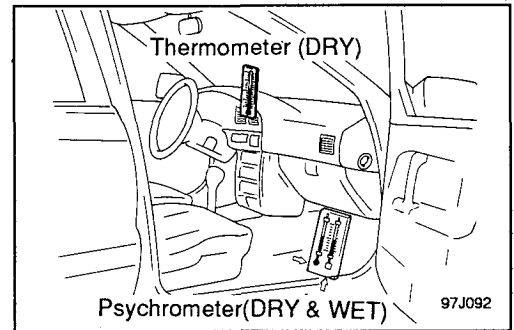
If a gas leak is detected, proceed as follows:

1. Check the torque on the connection fitting and, if necessary, tighten to the proper torque. Check for leakage with the leak detector.
2. If leakage continues even after the fitting has been retightened, discharge the refrigerant from the system, disconnect the fitting, and check the seat for damage. Replace fitting, even if the damage is slight.
3. Check compressor oil and add oil if required.
4. Charge the system and recheck for leaks. If no leaks are found, evacuate and charge the system.



PERFORMANCE TEST

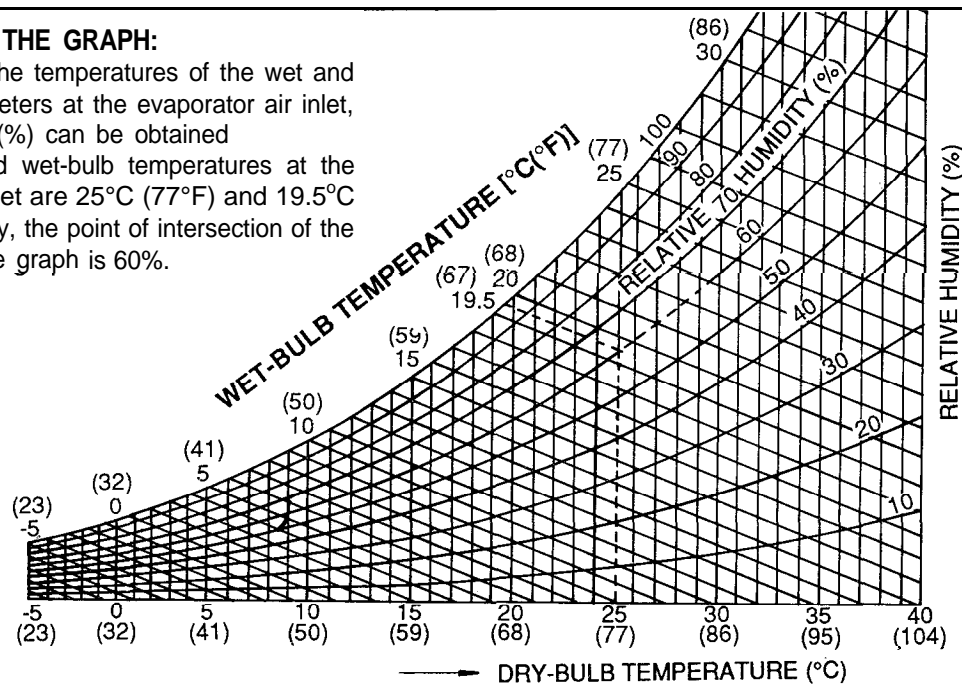
1. Install the manifold gauge set.
2. Run the engine at 2,000 rpm and set the controls for maximum cooling and high blower speed.
3. Keep all windows and doors open.
4. Place a dry-bulb thermometer in the cool air outlet.
5. Place a psychrometer close to the inlet of the cooling unit.
6. Check that the reading on the high pressure gauge is 1,373-1,575 kPa (14-16 kg/cm², 199-228 psi).
If the reading is too high, pour water on the condenser.
If the reading is too low, cover the front of the condenser.
7. Check that the reading on the dry-bulb thermometer at the air inlet at 25-35°C (77-95°F).
8. Calculate the relative humidity from the psychrometric graph by comparing the wet-and dry-bulb reading of the psychrometer at the air inlet.



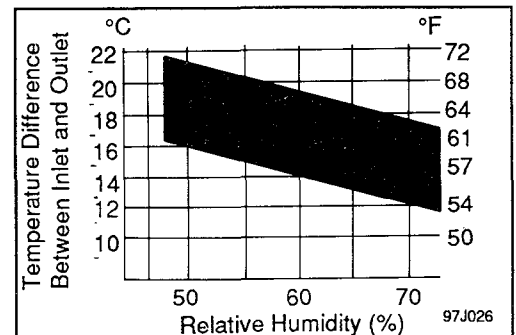
HOW TO READ THE GRAPH:

After measuring the temperatures of the wet and dry-bulb thermometers at the evaporator air inlet, relative humidity (%) can be obtained.

Example: Dry-and wet-bulb temperatures at the evaporator air inlet are 25°C (77°F) and 19.5°C (67°F) respectively, the point of intersection of the dotted lines in the graph is 60%.

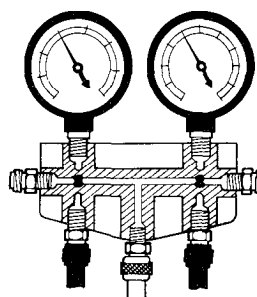
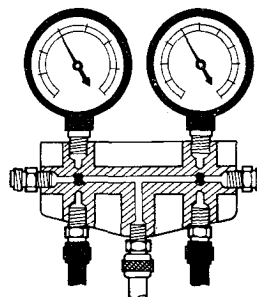
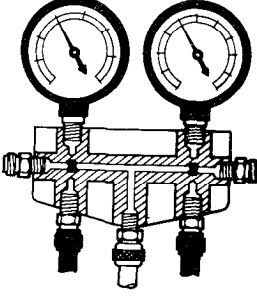


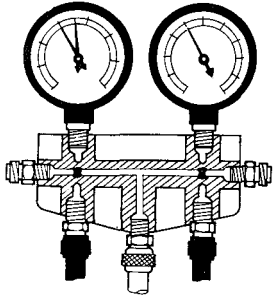
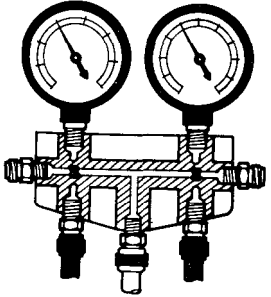
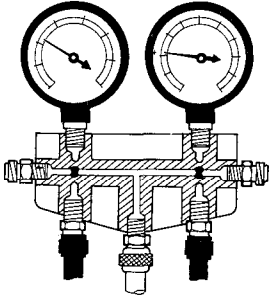
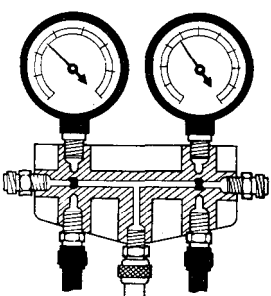
9. Measure the dry-bulb temperature at the cool air outlet, and calculate the difference between the inlet dry-bulb and outlet dry-bulb temperatures.
10. Check that the intersection of the relative humidity and temperature difference is between the two hatched lines. If the intersection is within the two lines, cooling performance is satisfactory.

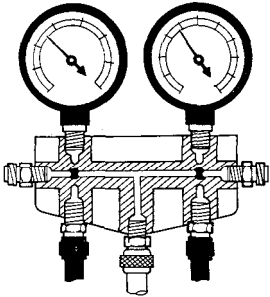
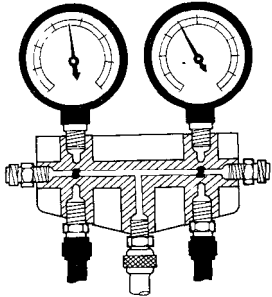
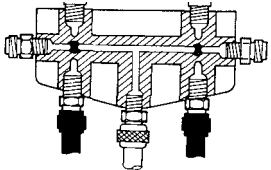
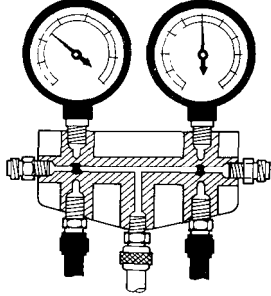


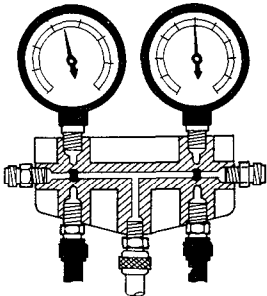
PERFORMANCE TEST DIAGNOSIS

The test gauge indicators shown on the following chapter are to be used as typical examples of common problems which you may need to diagnose.

GAUGE READINGS	OTHER SYMPTOMS	DIAGNOSIS	CORRECTION
<div data-bbox="86 386 134 449">1</div> <div data-bbox="150 407 437 470">Low side NORMAL High side NORMAL</div>  <div data-bbox="469 764 517 785">97J031</div>	<ul style="list-style-type: none"> o Sight glass: clear or few bubbles. o Discharge air: slightly cool. o Thermostatic switch: Low side gauge doesn't fluctuate with switch "ON" and "OFF" cycle. 	Some air and moisture in system.	<ol style="list-style-type: none"> 1. Leak test system. 2. Discharge refrigerant from system. 3. Repair leaks as located. 4. Replace receiver-drier. The drier is probably saturated with moisture. 5. Evacuated the system for at least 30 minutes. 6. Charge system with R-12. 7. Operate system and check performance.
<div data-bbox="86 785 134 848">2</div> <div data-bbox="150 806 437 869">Low side NORMAL High side NORMAL</div>  <div data-bbox="469 1163 517 1184">97J031</div>	<ul style="list-style-type: none"> o Sight glass: Tiny bubbles. o Discharge air: Becomes warm as low side cycles into vacuum. o Discharge air: Becomes warm all the time during hot part of day. 	Excessive moisture in system	<ol style="list-style-type: none"> 1. Discharge refrigerant 2. Replace receiver-drier 3. Evacuate system with a vacuum pump. 4. Recharge system to proper capacity. 5. Operate system and check performance.
<div data-bbox="86 1184 134 1247">3</div> <div data-bbox="150 1226 437 1289">Low side NORMAL High side NORMAL</div>  <div data-bbox="469 1562 517 1583">97J031</div>	<ul style="list-style-type: none"> o Compressor: Cycles on and off too fast. o Low side gauge: Not enough range shown on low side gauge. 	Defective thermostatic switch	<ol style="list-style-type: none"> 1. Stop engine and turn air conditioner "OFF" 2. Replace thermostatic switch when installing new thermostatic switch, make sure that capillary tube is installed in the same position and to the same depth in evaporator core as old switch tube. 3. Operate system and check performance.

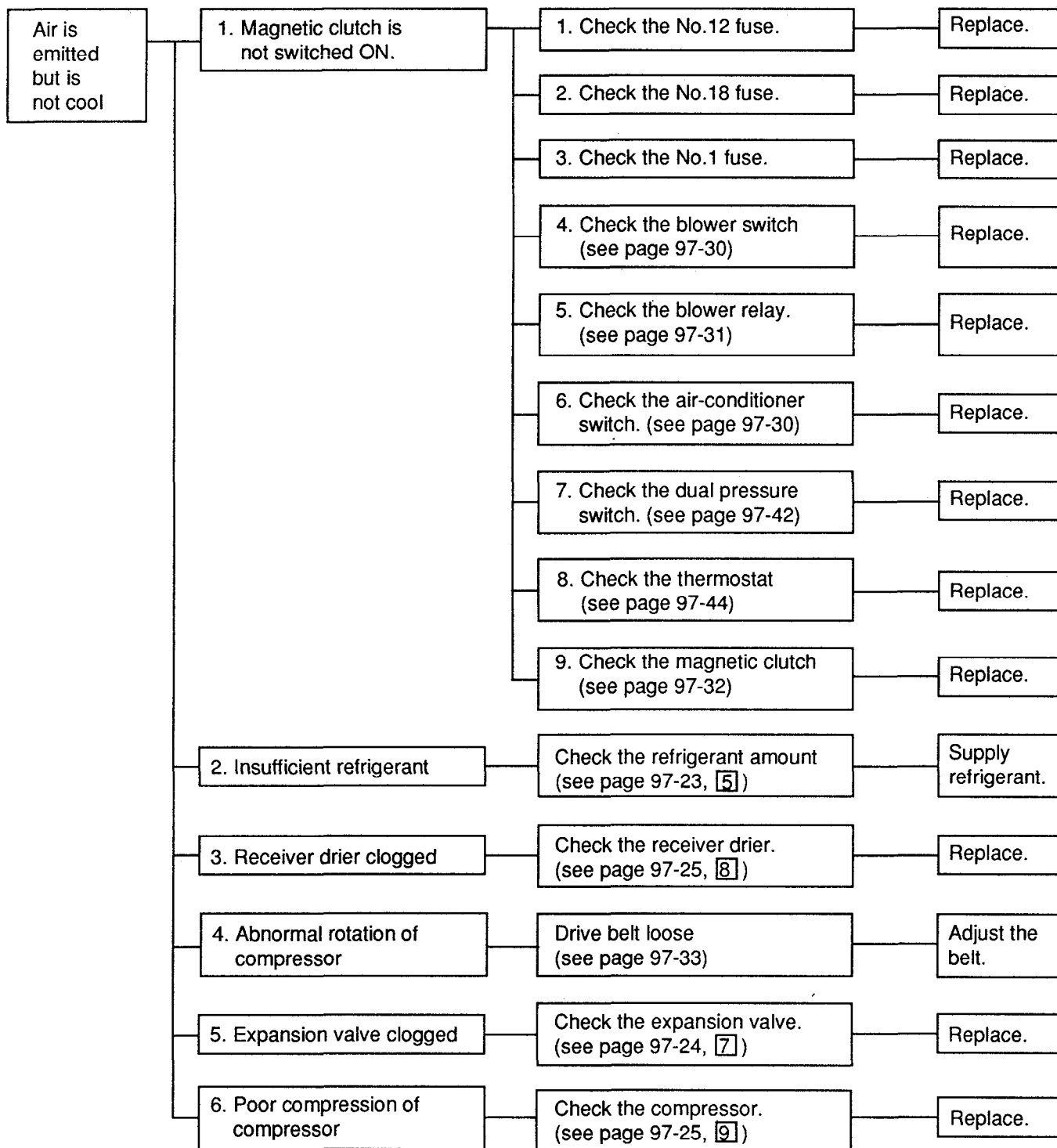
GAUGE READINGS	OTHER SYMPTOMS	DIAGNOSIS	CORRECTION
<p>4 Low side High side NORMAL to HIGH NORMAL</p> 	<ul style="list-style-type: none"> Compressor: low side pressure builds too high before compressor turns on (cycle "ON" point too high) 	<p>Faulty thermostatic switch</p>	<ol style="list-style-type: none"> Stop engine and turn air conditioner "OFF" Repair or replace thermostatic switch (make sure that all wiring is positioned so that no short circuiting can occur). Operate system and check performance.
<p>5 Low side High side LOW LOW</p> 	<ul style="list-style-type: none"> Discharge air: Slightly cool. Sight glass: Some bubbles. 	<ul style="list-style-type: none"> System slightly low on R-12 	<ol style="list-style-type: none"> Check leaks. Discharge refrigerant. Repair leaks. Check compressor oil level. Evacuate system using a vacuum pump. Charge system with R-12 Operate system and check performance.
<p>6 Low side High side LOW LOW</p> 	<ul style="list-style-type: none"> Discharge air: Warm Sight glass: Clear 	<ul style="list-style-type: none"> System very low on R-12 Possible leak in system. 	<ol style="list-style-type: none"> Check leaks. Leak test compressor seal area very carefully. Discharge refrigerant. Check compressor oil level. Evacuate system using a vacuum pump. Charge system with R-12. Operate system and check performance.
<p>7 Low side High side LOW LOW</p> 	<ul style="list-style-type: none"> Discharge air: Slightly cool. Expansion valve: Sweating or frost build up. 	<ul style="list-style-type: none"> Expansion valve stuck closed. Screen plugged. Sensing bulb malfunction. 	<ol style="list-style-type: none"> Discharge system. Disconnect inlet line at expansion valve and remove and inspect screen. Clean and replace screen and reconnect inlet line. Evacuate system using a vacuum pump. Charge system with R-12.

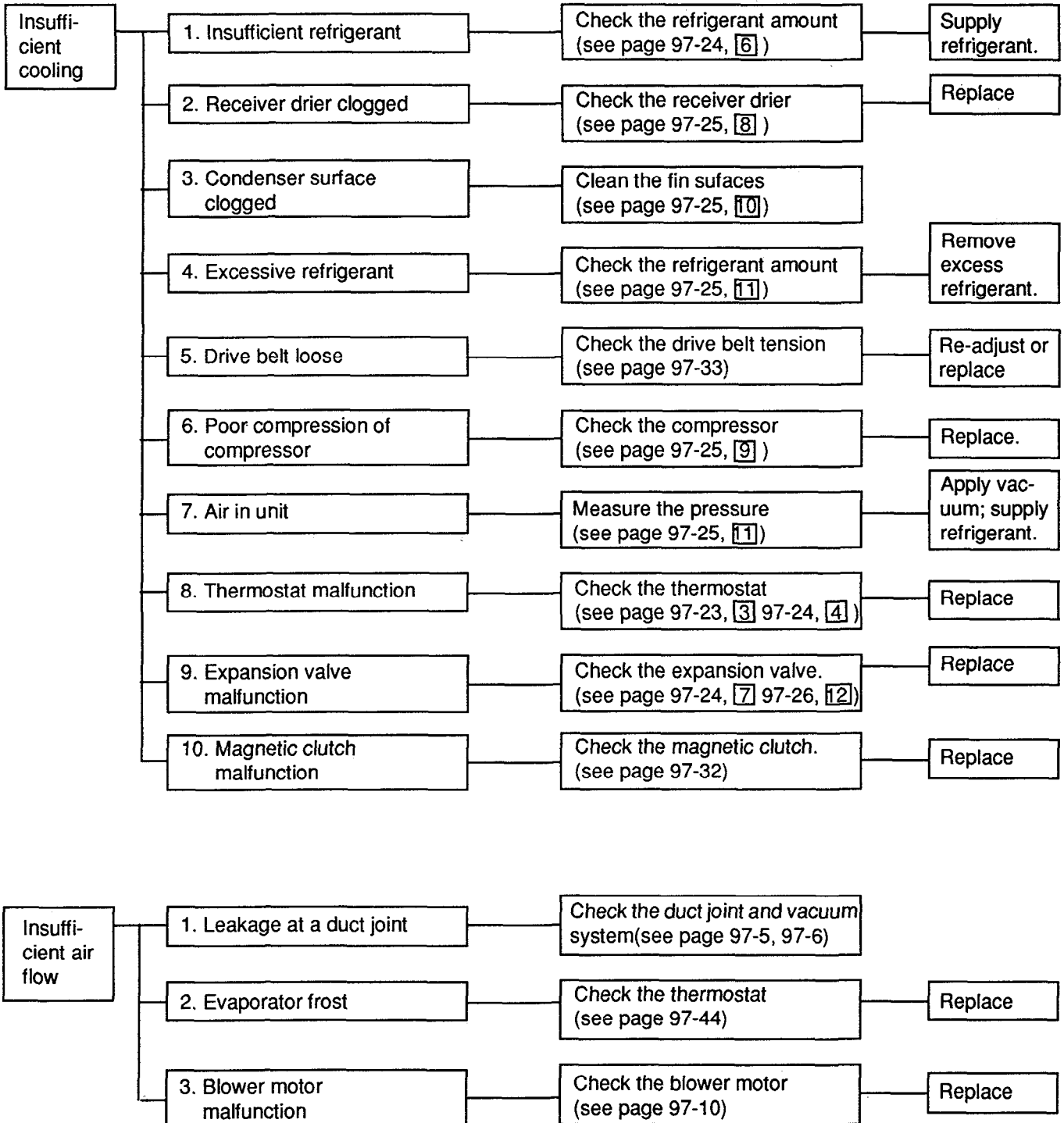
GAUGE READINGS	OTHER SYMPTOMS	DIAGNOSIS	CORRECTION
<p>8</p> <p>Low side LOW</p> <p>High side LOW</p> 	<ul style="list-style-type: none"> o Discharge air: slightly cool. o High side pipe: Cool and also shows sweating or frost. 	<ul style="list-style-type: none"> o Restriction in high side of system or receiver drier Clogged 	<ol style="list-style-type: none"> 1. Discharge system. 2. Remove and replace receiver-drier, liquid pipes or other defective components. 3. Evacuate system using a vacuum pump. 4. Charge system with R-12 5. Operate system and check performance.
<p>9</p> <p>Low side HIGH</p> <p>High side LOW</p> 	<ul style="list-style-type: none"> o Compressor: Noisy o Insufficient cooling 	<ul style="list-style-type: none"> o Compressor malfunction 	<ol style="list-style-type: none"> 1. Isolate compressor. 2. Remove compressor cylinder head and inspect compressor. 3. Check compressor oil level. 4. Replace receiver-drier. 5. Operate system and check performance.
	<ul style="list-style-type: none"> o Discharge air: Warm. o Sight glass: Bubbles. o High side pipe: Very hot 	<ul style="list-style-type: none"> o Malfunctioning condenser or Overcharge. 	<ol style="list-style-type: none"> 1. Check for loose or worn fan belt. 2. Inspect condenser for clogged air passage. 3. Inspect condenser mounting for proper radiator clearance. 4. Check for refrigerant overcharge. 5. Operate system and check performance.
<p>11</p> <p>Low side HIGH</p> <p>High side HIGH</p> 	<ul style="list-style-type: none"> o Sight glass: Occasional bubbles o Discharge air: Slightly cool. 	<ul style="list-style-type: none"> o Large amount of air and moisture 	<ol style="list-style-type: none"> 1. Discharge refrigerant from system. 2. Replace receiver-drier which may be saturated with moisture. 3. Evacuate system using vacuum pump. 4. Charge system with R-12. 5. Operate system and check performance.

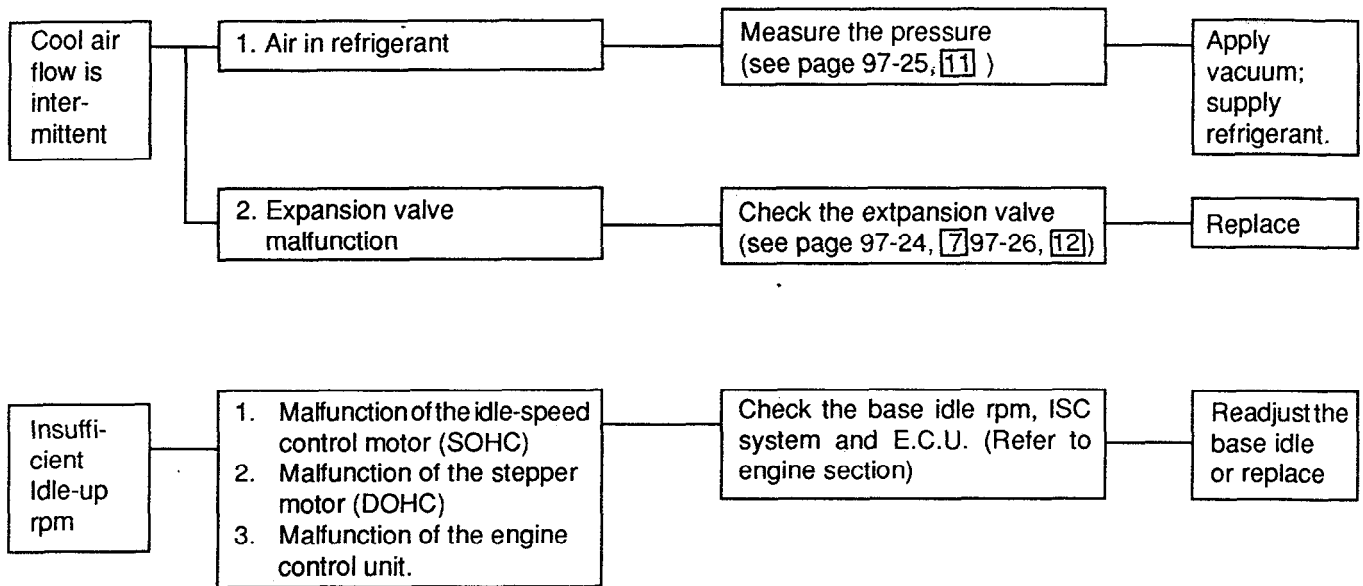
GAUGE READINGS	OTHER SYMPTOMS	DIAGNOSIS	CORRECTION
<div data-bbox="164 233 212 279">12</div> <div data-bbox="225 247 331 310">Low side HIGH</div> <div data-bbox="448 247 555 310">High side HIGH</div> <div data-bbox="248 317 515 611"></div>	<ul style="list-style-type: none">o Discharge air: Warm.o Evaporator: Sweating or frost.	<ul style="list-style-type: none">o Expansion valve stuck open	<ol style="list-style-type: none">1. Discharge system.2. Replace expansion valve, making sure all contacts are clean and secure.3. Evacuate system using vacuum pump, then recharge system with R-12.4. Operate system and check performance.

TROUBLESHOOTING-Malfunction Causes and Remedies.

You will find the cause of the malfunction easily by using the following diagnostic chart. In this chart, the numbers indicate the order of priority of the cause of malfunction.

MALFUNCTION CAUSES AND REMEDIES (Numbers indicate checking/inspection order.)





AIR CONDITIONER SWITCH CHECK

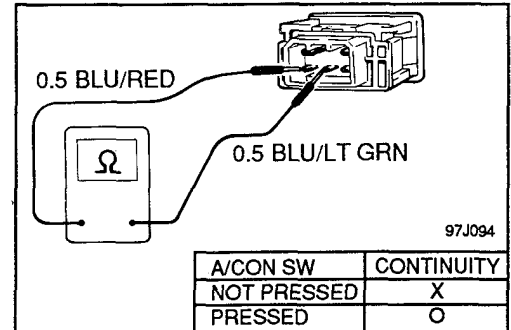
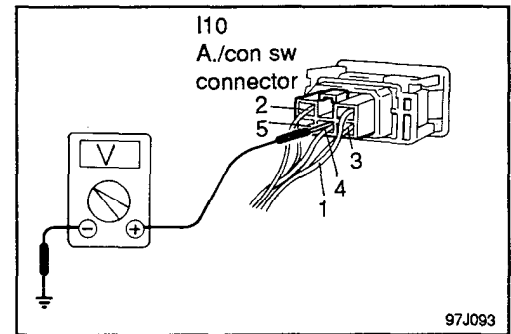
1. Remove the air conditioner switch with connector still connected.
2. Measure voltage between terminal 4 of A/Con switch (I10) connector and body ground when blower switch is on and off.

IG SW	A/Con sw	Blower sw	Voltage
ON (Do not start)	OFF	OFF	0 V
		ON	Battery Voltage

If not ok, check fuse No. 18 and blower circuit.

If ok, perform next check 3.

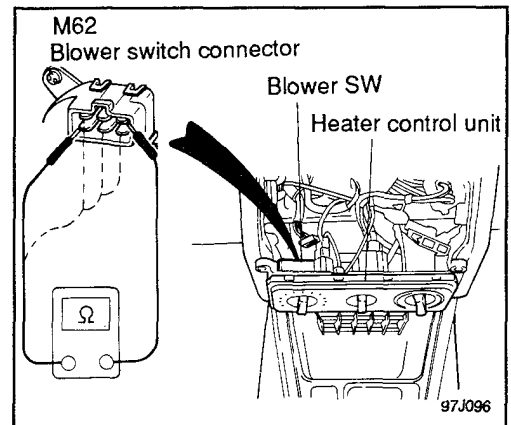
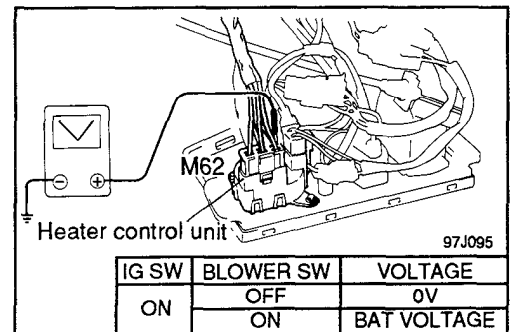
3. Disconnect the I10 connector from the air conditioner switch.
 4. Check continuity between terminal 4 and 5 of air conditioner switch.
- If not ok, replace the air conditioner switch.



BLOWER SWITCH CHECK

1. Remove the heater control assembly with connector still connected.
2. Connect jumper wire between M62; 2 terminal and body ground.
3. Measure voltage between terminal 6 of blower switch (M62) connector and body ground when blower switch is on and off.
If not ok, check fuse No. 12 and blower relay.
If ok, perform next check 3.
4. Disconnect the blower switch (M62) connector from the heater control unit assembly.
5. Check continuity between blower switch terminals.

Terminal	SW position				
	OFF	1	2	3	4
1		○	○	○	○
2		○	○	○	○
3				○	
4		○			
5			○		
6					○

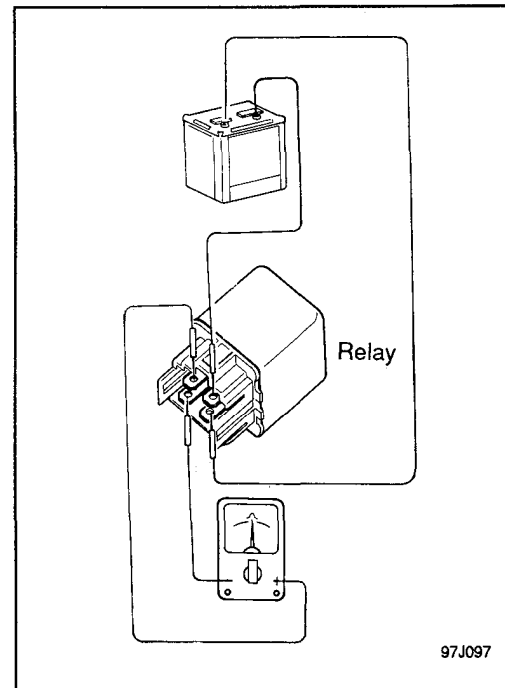
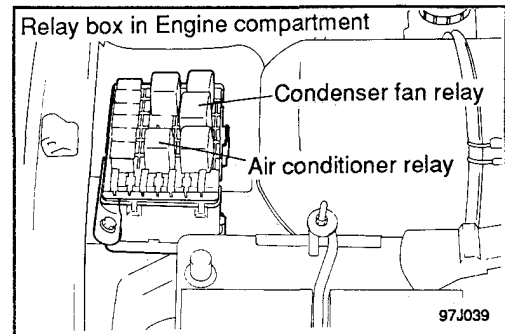


5. If not ok, replace the blower switch.

POWER RELAY CHECK**AIR-CONDITIONER RELAY, AND CONDENSER FAN RELAY.**

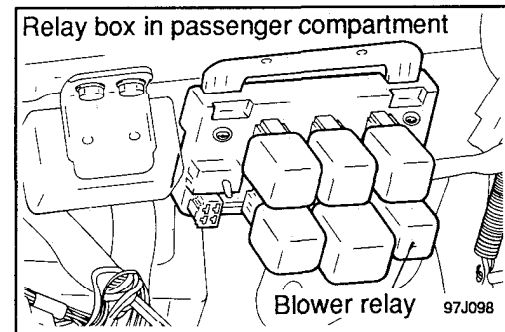
1. Remove the battery ground cable.
2. Remove the cover of relay box located in engine compartment.
3. Remove the relays from relay box.
4. Check for continuity between the terminals.

When power is supplied	Between terminals 2 - 4	Continuity
	Between terminals 1 - 3	
When power is not supplied	Between terminals 2 - 4	No Continuity
	Between terminals 1 - 3	Continuity

**BLOWER FAN MOTOR RELAY**

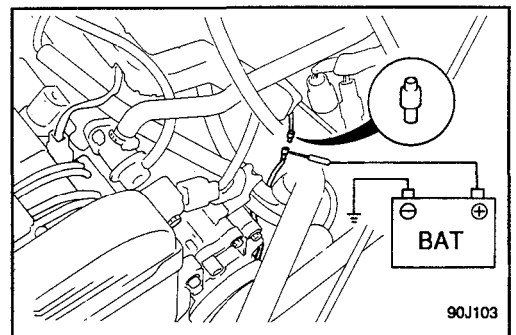
1. Remove the battery ground cable.
2. Remove the of relay box located behind the crash pad.
3. Remove the relay and check for continuity between the terminals.

When power is supplied	Between terminals 2 - 4	Continuity
	Between terminals 1 - 3	
When power is not supplied	Between terminals 2 - 4	No Continuity
	Between terminals 1 - 3	Continuity



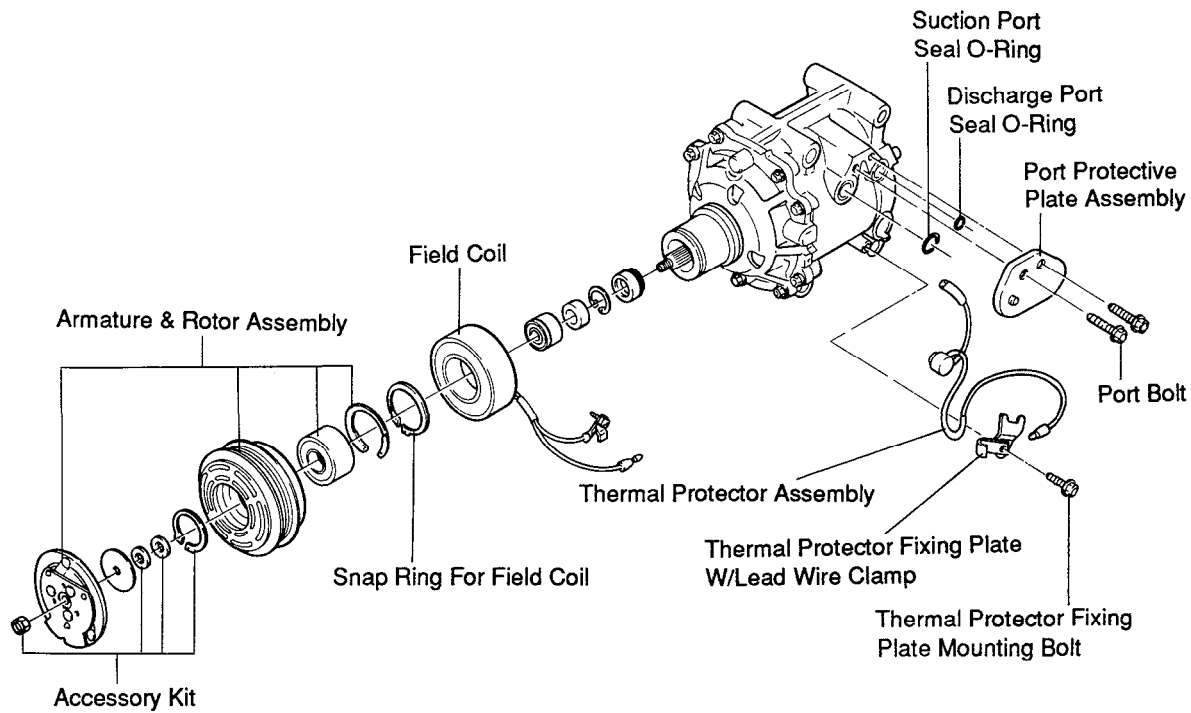
ON-VEHICLE INSPECTION**Magnetic clutch**

1. Check compressor drive belt tension.
2. Start engine.
3. Inspect clutch bearing for noise.
 - 1) Check for abnormal noise from the compressor when the A/c on switch is off.
 - 3) If abnormal noise is being emitted, replace the compressor pulley bearing or magnetic clutch.
4. Stop engine.
5. Make the following visual checks.
 - 1) Leakage of grease from the clutch bearing.
 - 2) Signs of oil on the pressure plate or rotor.Repair or replace, as necessary.
6. Inspect operation
 - 1) Disconnect the connector from the compressor magnetic clutch.
 - 2) Connect the positive@ lead from the battery to the terminal on the magnetic clutch connector and the negative - lead to the body ground.
 - 3) Check that the magnetic clutch is energized.If operation is not as specified, replace the magnetic clutch.



90J103

COMPONENT

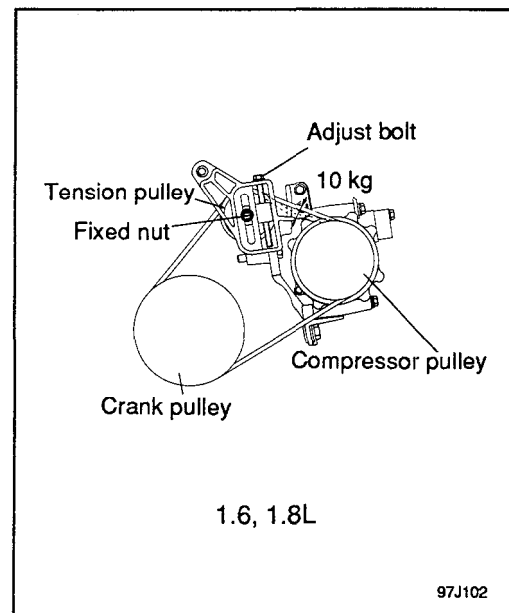


COMPRESSOR DRIVE BELT

Satisfactory performance of the air conditioning system is dependent upon drive belt condition and tension. If the proper tensions are not maintained, belt slippage will greatly reduce air conditioning performance and drive belt life. To avoid such adverse effects, the following service procedure should be followed.

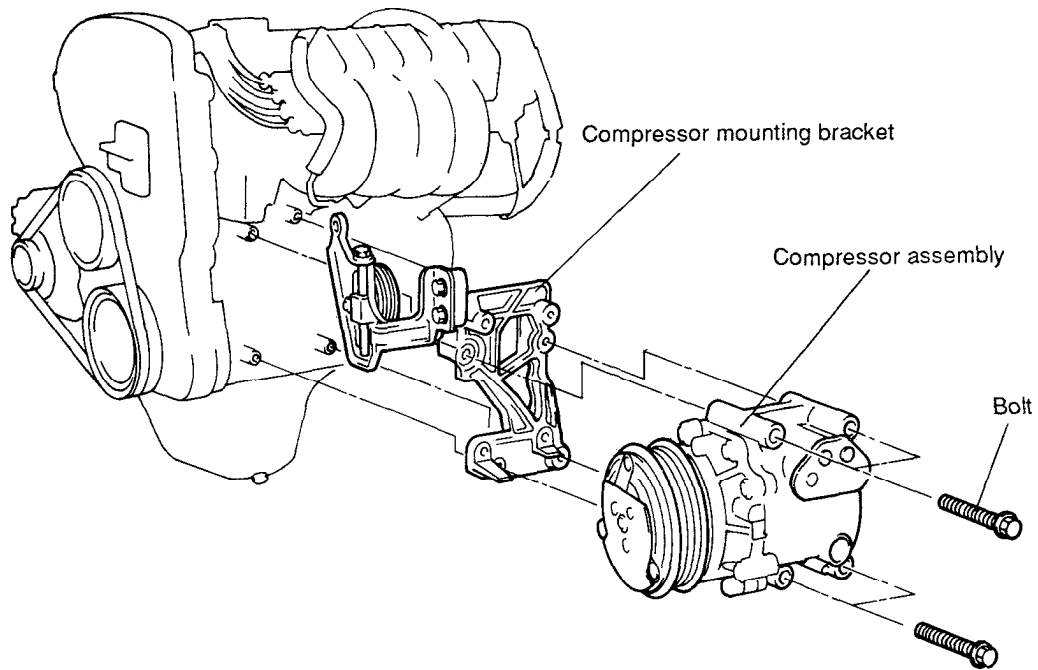
- 1) Any belt that has operated for a minimum of one half-hour is considered to be a "used" belt. Adjust air conditioning drive belt at the time of new-car preparation.
- 2) Check drive belt tension at regular service intervals and adjust as needed.

	1.6L, 1.8L
NEW	5-5.6 mm (0.2-0.22 in.)
USED	6-7 mm (0.23-0.27 in.)
V-Belt Type	V-Ribbed Type



REMOVAL AND INSTALLATION

COMPONENTS



1. Discharge the refrigerant.
2. Loosen the tension pulley and then remove the V belt.
3. Disconnect the magnetic switch.
4. Remove the discharge hose and suction hose.
5. Remove the compressor.
6. Installation is the reverse of removal.

DISASSEMBLY CLUTCH FRONT PLATE

Removal

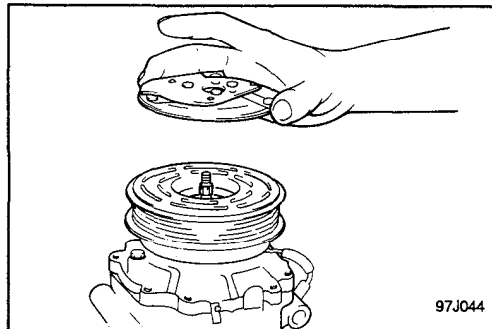
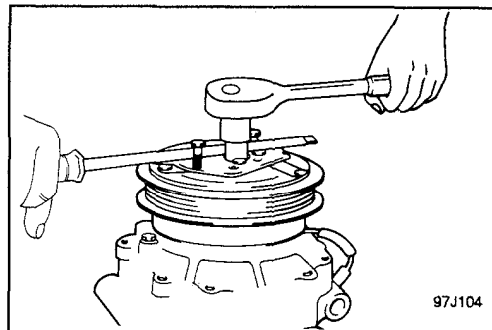
1. Removal of U-NUT

- 1) Temporarily install two M6 bolts, 25 mm (.98 in.) or longer, in the bolt holes of the clutch front plate.

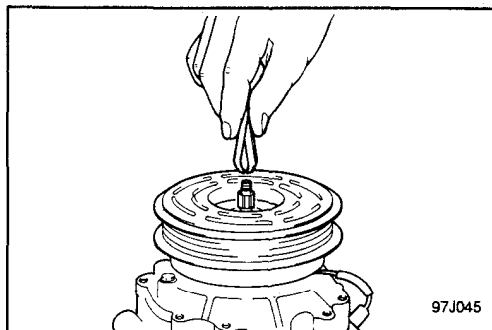
NOTE:

Make a sure the ends of the bolts do not contact the front housing.

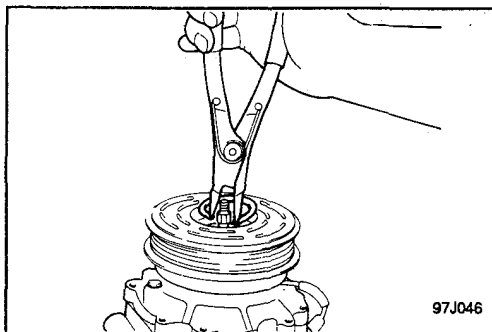
- 2) Use two box-end wrenches to hold the bolts (so as to prevent the clutch front plate from turning). Then remove the nut with 8 mm socket.
2. Remove clutch the front plate assembly by hand.



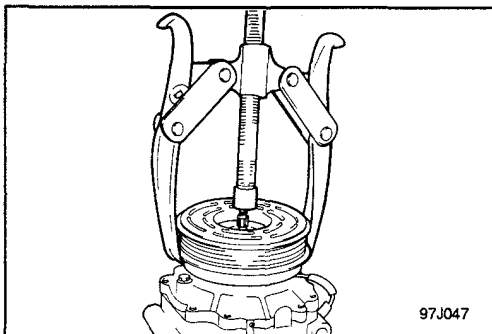
3. Remove shim for water proof using pinset.
4. Remove the clutch shim by using fingers.



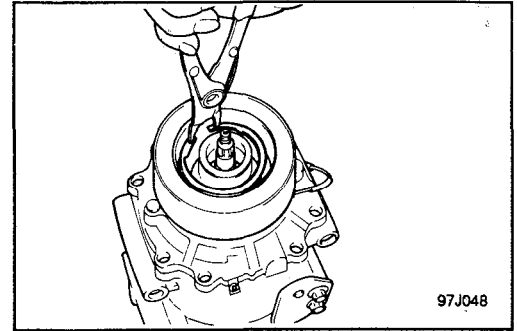
5. Remove the external front housing snap ring.



6. Using the puller, remove the rotor pulley assembly.



7. Loosen the clutch lead wire from the clip on top of the compressor front housing.
8. Using snap ring pliers, remove the snap ring and field coil.



INSPECTION

Clutch disc

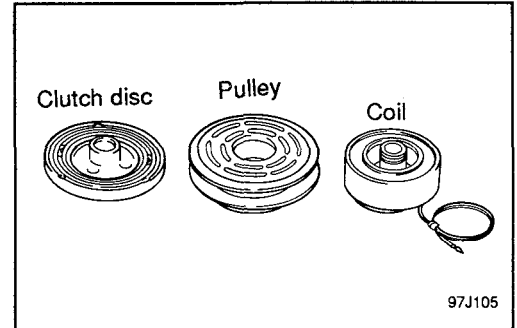
If the contact surface shows signs of damage due to excessive heat, the drive plate and pulley should be replaced.

Pulley

Check the appearance of the pulley assembly. If the contact surface of the pulley shows signs of excessive grooving due to slippage, both the pulley and drive plate should be replaced. The contact surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.

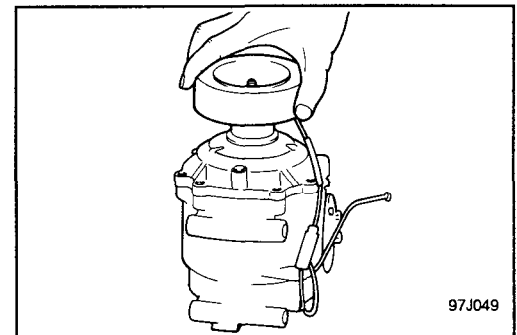
Coil

Check coil for loose connection or cracked insulation.



INSTALLATION

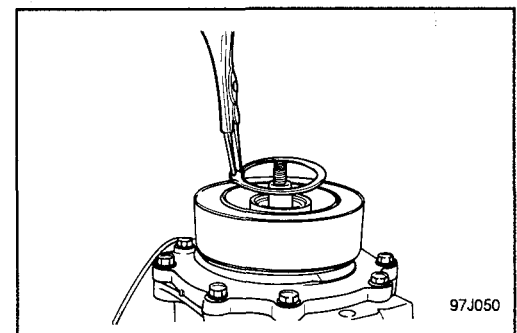
3. The coil flange protrusion must match the hole in the front housing to prevent coil movement and to correctly position the lead wire.



2. Place the coil snap ring into position using pliers.

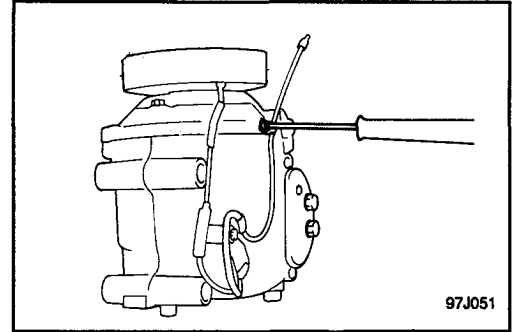
NOTE

Make sure the snap ring is firmly in place.



3. Tighten the wire clip

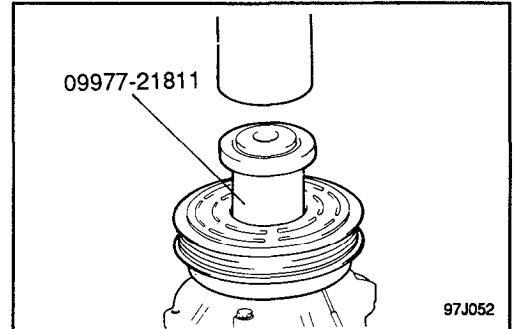
Torque 20-25 Nm(200-250 kg.cm, 14-18)



4. Install the pulley assembly using the special tool. (09977-21811).

NOTE

- 1) Press in the rotor bearing outer race.
- 2) After installation, rotate the pulley assembly and check for proper installation.

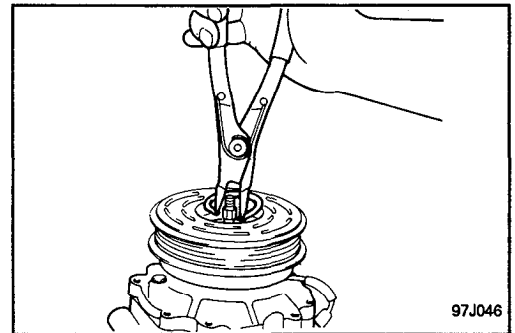


5. Reinstall the external bearing snap ring with pliers.

NOTE

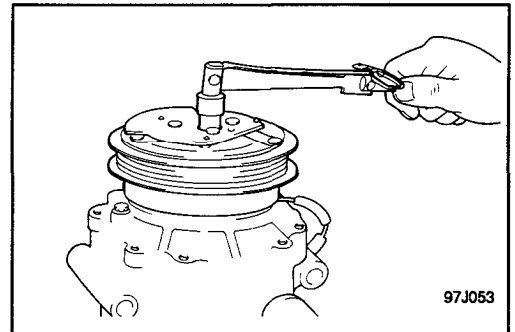
When installing the snap ring, be careful not to scratch the surface of the bearing with pliers.

6. Install snap ring into the snap ring groove of the front housing with snap ring pliers.
7. Replace the shim onto the shaft.
8. Install the shim for water proof onto the shaft.
9. Install the clutch armature assembly, aligning flat on end of compressor shaft with corresponding flat on armature.



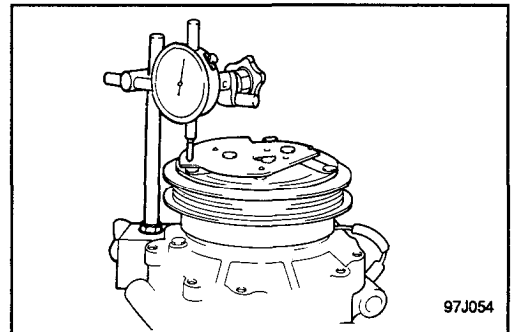
10. With the torque wrench, tighten the U-Nut to specifications.

Torque 17-19 Nm (170-190 kg.cm, 12-14 lb.ft)



11. Check the air gap and clutch engagement.

- 1) Place a dial gauge onto the clutch front plate.
- 2) Apply 8-12V DC to the coil and check clutch engagement. The air gap (readings before and after the engagement) should be as follows.
Air gap between the front plate and clutch rotor:
0.35 - 0.65 mm (0.014 - 0.026 in.)
- 3) If the air gap is out of specifications, remove the U-Nut and front plate.
- 4) Replace the shims with ones of different thickness to adjust the air gap.



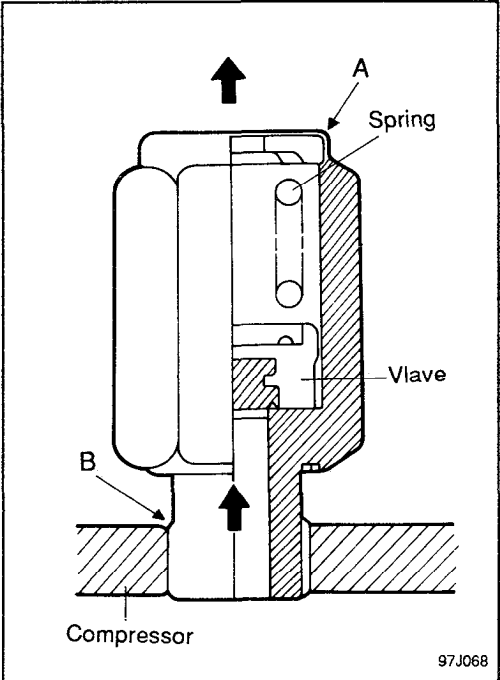
HIGH PRESSURE RELIEF VALVE CHECK

A high pressure relife valve is installed on the high side of the compressor.

The high pressure relief valve is a safety feature which releases part of the refrigerant charge into the atmosphere when the high pressure level exceeds 3,550 kPa (505 psi).

Once the pressure inside the system drops to 2,400 kPa (341 psi) or lower, the high pressure relief valve closes.

- (1) If a leak is detected at section A, replace the high pressure relief valve. The valve can be used unless there is a leak from that section.
- (2) If a leak is detected at section B, retighten the valve. If the leak still persists after retightening the valve, replace the packing.



REFRIGERANT THERMO SENSOR

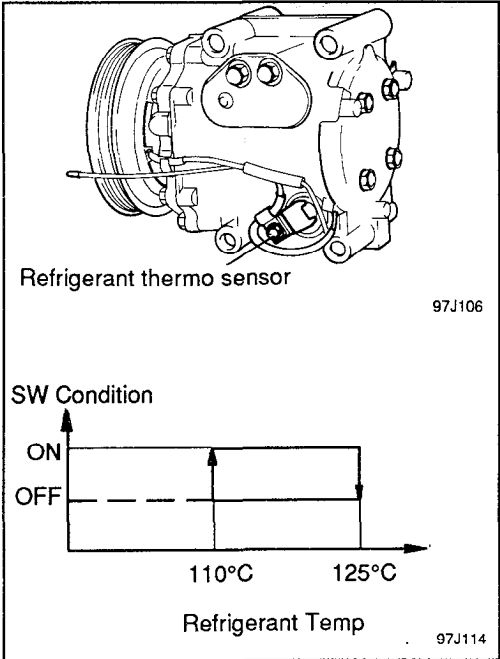
A thermo sensor is installed on the high side of the compressor to serve as safety device.

If the condenser ventilation becomes bad, or cooling load become excessively large the pressure at the high pressure side of the compressor will becomes abnormally large and create danger of compressor seizing.

The points of the thermo sensor are normally closed. But when the temperature at the high pressure side 110°C (256°F) the electric contact point opens in the thermo sensor.

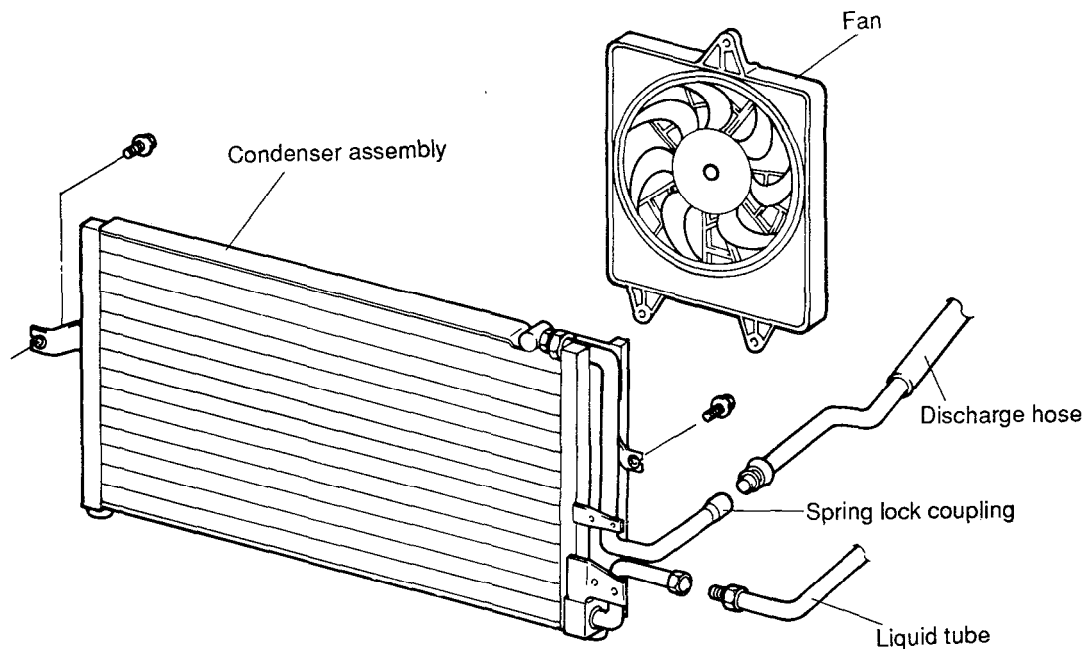
By the point opening the magnetic clutch is tuned off.

	ON	OFF
REFRIGERANT THERMOSENSOR	110°C (256°F)	125°C (283°F)



CONDENSER

COMPONENT



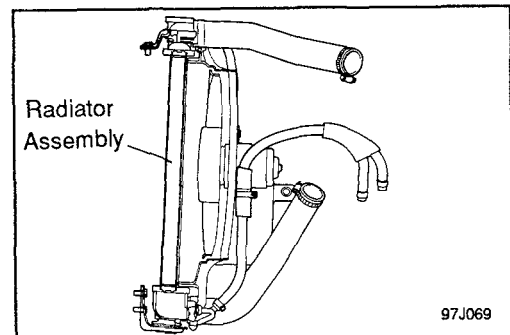
TORQUE : Nm (kg.cm, lb.ft)

ON-VEHICLE INSPECTION

1. Check the condenser fins for blockages or damage. If the fins are clogged, clean them with compressed air. If the fins are bent, straighten them with a screwdriver or a pair of pliers.
2. Check the condenser fittings for leakage. Repair or replace if necessary.

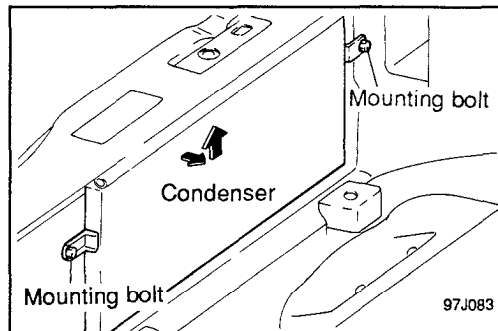
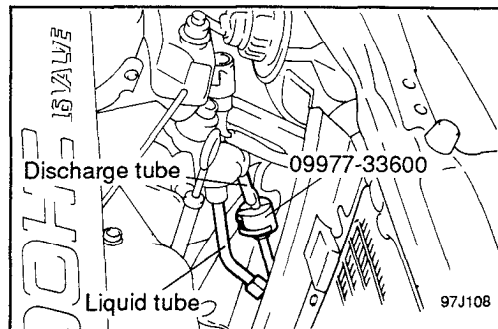
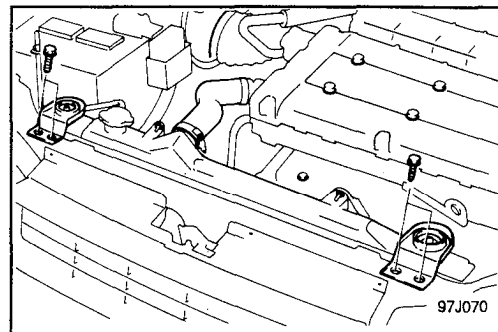
REMOVAL AND INSTALLATION

1. Discharge the refrigerant from the PVC system
2. Drain the radiator coolant.
3. Remove the radiator inlet and outlet hose.
4. For vehicles with an automatic transaxle, disconnect the oil cooler from the automatic transaxle.



97J069

5. Remove the radiator assembly.
 - a) Remove the radiator mounting bolt.
 - b) Remove the radiator with the fan motor.
6. Disconnect the discharge hose using special tools (09977-33600) and liquid tube using two wrenches to avoid twisting the tube.
7. After removing the condenser mounting bolts (2EA), remove condenser assembly.



INSTALLATION

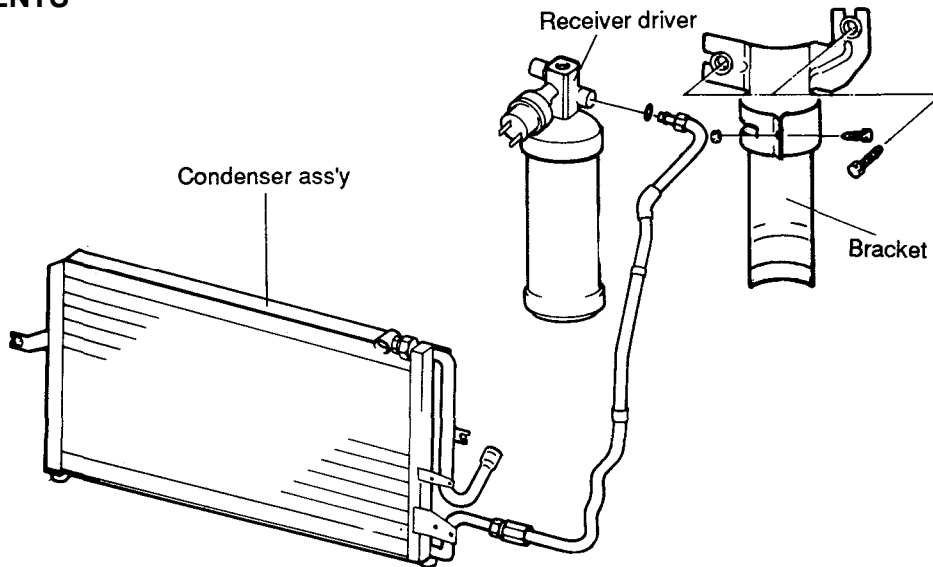
Installation is the reverse of removal.

NOTE

When a condenser is replaced, it will be necessary to replace the receiver-drier.

RECEIVER DRIER

COMPONENTS



ON-VEHICLE INSPECTION

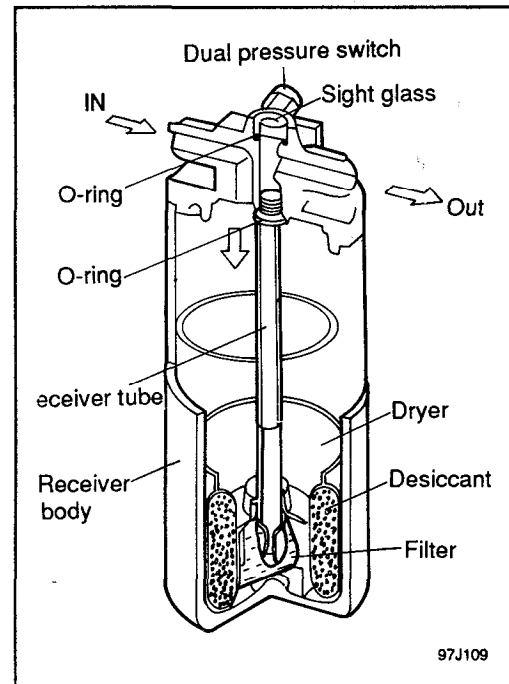
1. Check the sight glass, fusible plug and the fittings for leakage, using a leak detector.
2. Check the receiver-drier for clogging.
 - (a) Run the engine at fast idle with the air conditioner ON.
 - (b) Check both the inlet and outlet temperatures. If difference in temperatures between the inlet and outlet is large, replace the receiver-drier.

REMOVAL

1. Discharge the air conditioner system.
2. Disconnect the two liquid line pipes from the receiver-drier.
3. Remove the receiver-drier from the bracket.

NOTE

Plug the all open fittings immediately to keep moisture out of the system.



INSTALLATION

1. Install the receiver-drier in the bracket.

NOTE

Do not remove the blind plugs until ready for connection.

2. Connect the two liquid line pipes to the receiver drier at specified torque.
3. If the receiver-drier is replaced with a new unit, add 10 cc's of compressor oil to the compressor.

DUAL PRESSURE SWITCH

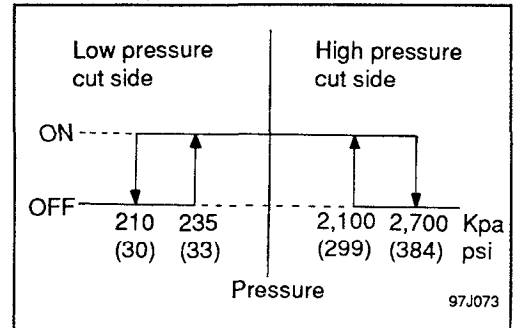
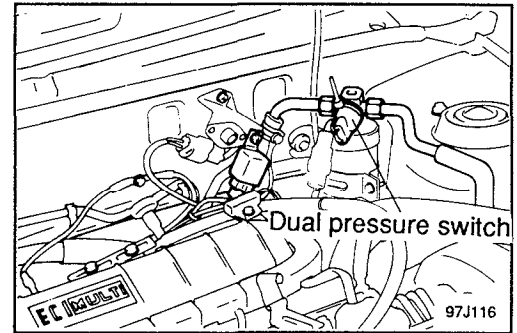
The dual pressure switch is a combination of the low pressure switch (for checking the quantity of refrigerant) and the high pressure switch (for prevention of overheating). It is installed in the receiver, and, when the pressure becomes approximately 210 kPa (30 psi) or lower, the compressor stops, thus preventing the compressor from being damaged by heat.

When the pressure reaches 2,700 kPa (384 psi) or higher, the compressor stops, thus preventing overheating. There is generally no necessity for inspection; if, however, an unusual condition, such as non-operation of the compressor is encountered, check by following the procedures below.

- (1) Check for continuity of the dual pressure switch.

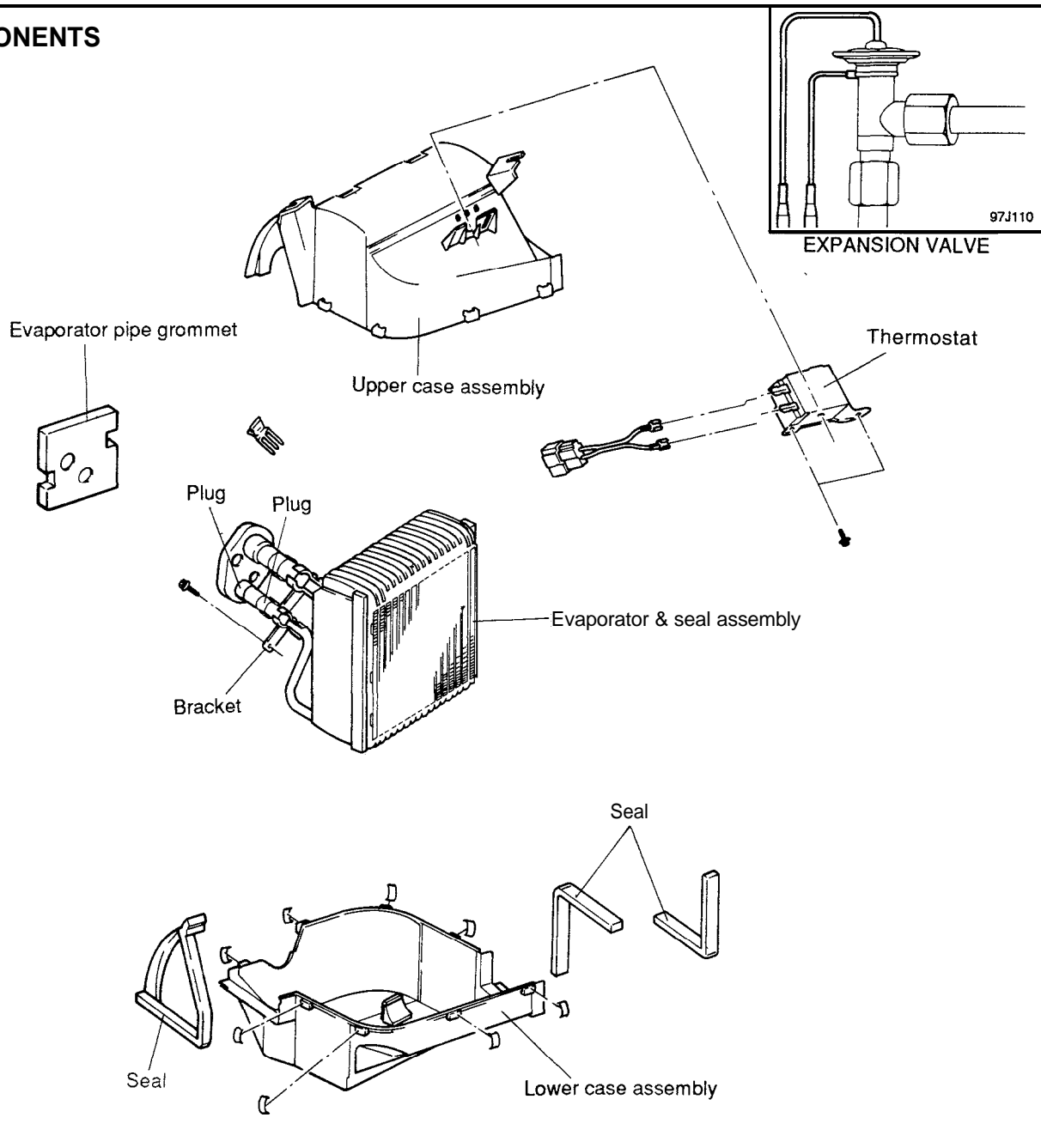
Usual condition	Continuity
Insufficient refrigerant	No continuity
Unusually high temperature	

- (2) If there is an insufficient amount of refrigerant, check the refrigerant amount by looking through the sight glass of the receiver; supply refrigerant if necessary.
- (3) Set the gauge manifold in place and check whether or not the pressure at the high pressure side has become the dual pressure switch activation pressure.
- (4) Replace the switch if, under ordinary conditions, there is no continuity.



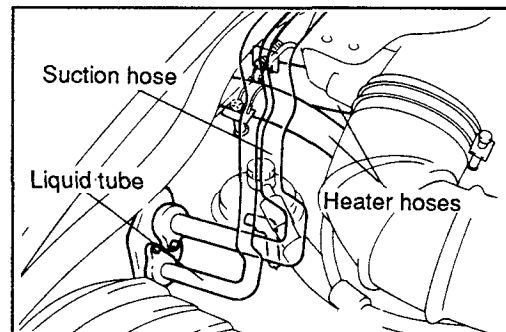
EVAPORATOR

COMPONENTS

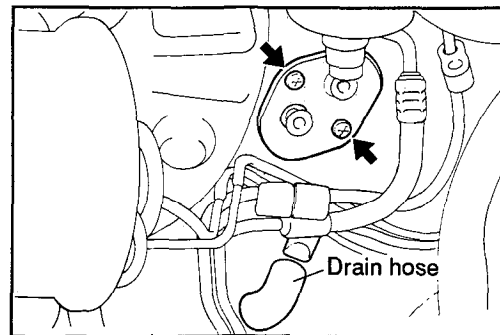


REMOVAL AND INSTALLATION

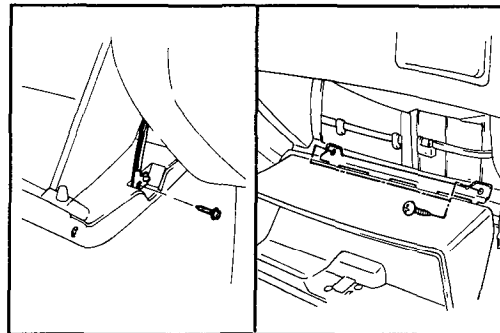
1. Disconnect the negative terminal from the battery.
2. Discharge the refrigerant from the system.
3. Remove the air intake hose.
4. Disconnect the suction and liquid lines.



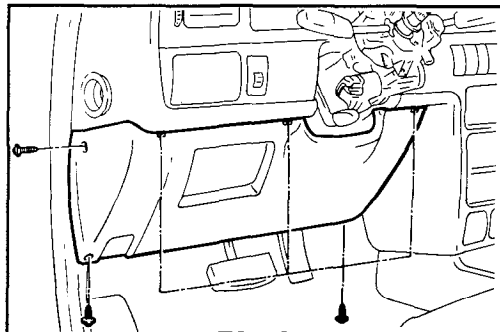
5. Remove the water drain hose from the evaporator.
6. Remove the grommet cover from the dash panel. (2 screws)



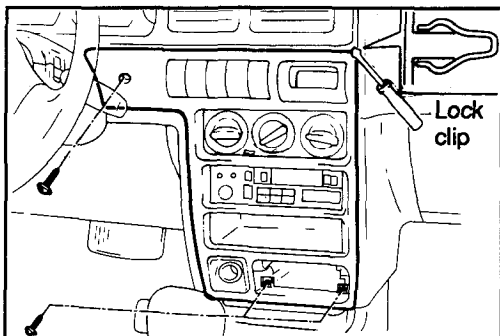
7. Remove the glove box assembly (3 screws)



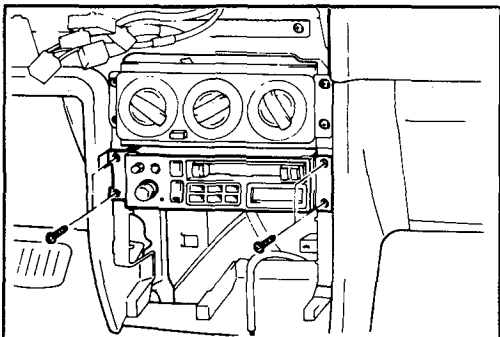
8. Remove the side lower crash pad. (6 screws)



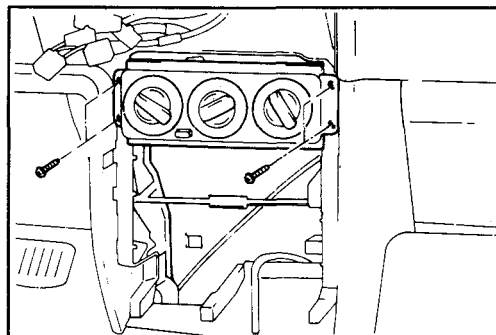
9. Remove the ash tray.
10. Remove the lower crash pad center facia panel and disconnect the connectors.
NOTE : Using a screwdriver, pry loose one clip.
* Tape the screwdriver tip before use.



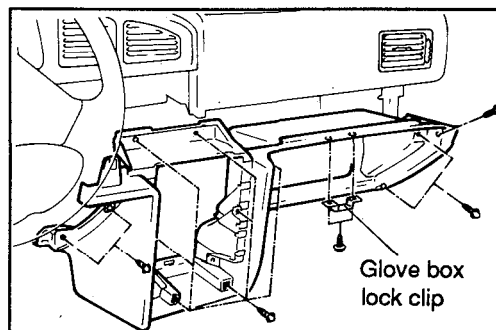
11. Remove the radio and disconnect the connectors.



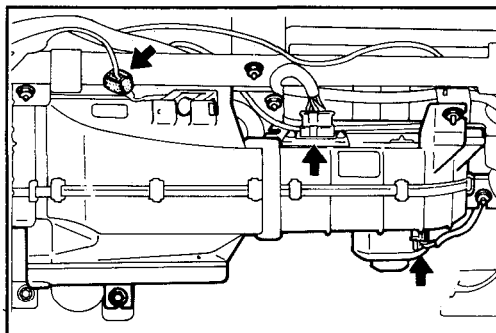
12. Remove 4 mounting bolts for heater control unit assembly.



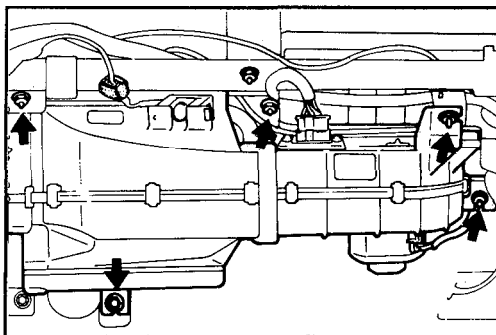
13. Remove the main lower crash pad. (14 screws)



14. Disconnect the connectors for blower resistor (M63), blower motor (M61), thermostat (I12), and the vacuum hose from the recirc/fresh vacuum motor.



15. Remove the blower motor and the evaporator assembly. (2 bolts and 3 nuts)
16. Installation is the reverse of removal.



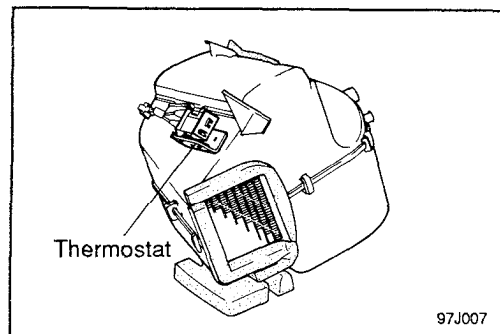
INSPECTION

- o Check for damage of evaporator fin.
- o Check for damage or collapse of drain hose.
- o Check for peeling or cracking of the insulator.

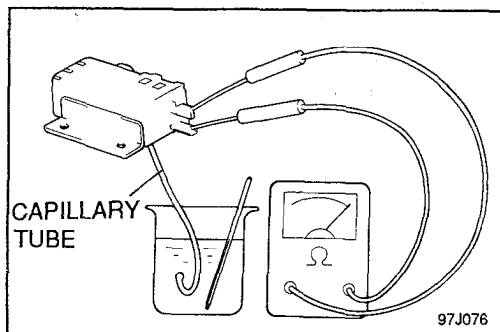
THERMOSTAT

1. Place the thermostat capillary tube in cold water and check for continuity.

cut-off $0 \pm 1^{\circ}$
Cut-in $4 \pm 1^{\circ}$

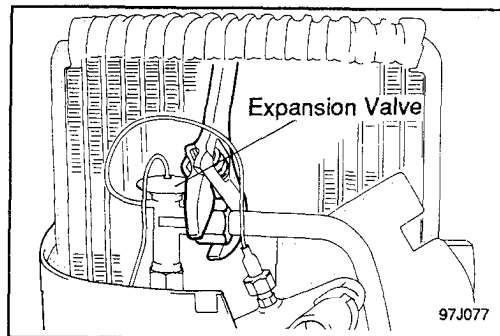


2. If cut-off or cut-in temperature is too low or too high, replace the thermostat.

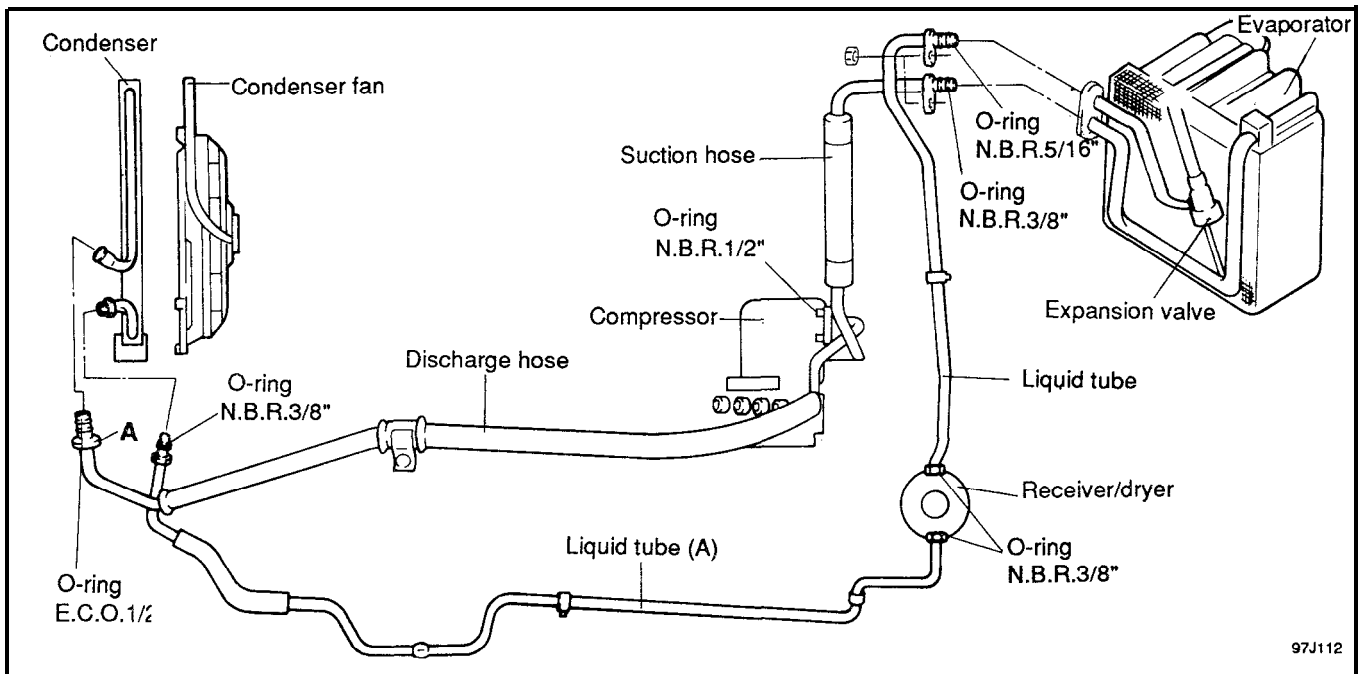


EXPANSION VALVE

1. Disconnect the liquid tube from the inlet fitting of the expansion valve.
2. Remove the packing and heat sensing tube from suction tube of evaporator.
3. Remove the expansion valve.



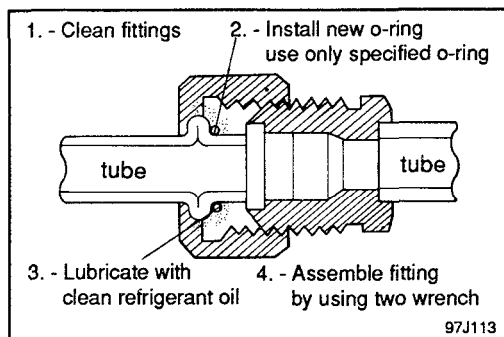
HANDLING TUBING AND FITTINGS



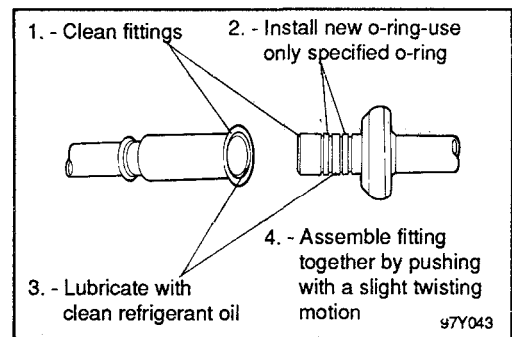
The internal parts of the refrigeration system will remain in a state of chemical stability as long as pure-moisture free R-12 and refrigerant oil is used. Abnormal amounts of dirt, moisture or air can upset the chemical stability and cause troubles or even serious damage.

The following precautions must be observed

1. When it is necessary to open the refrigeration system, have everything you will need to service the system ready so the system will not be left open any longer than necessary.
2. Cap or plug all lines and fittings as soon as they are opened to prevent the entrance of dirt and moisture.
3. All lines and components in parts stock should be capped or sealed until they are ready to be used.
4. Never attempt to rebend formed lines to fit. Use the correct line for the installation you are servicing.
5. All tools, including the refrigerant dispensing manifold, the gage set manifold and test hoses should be kept clean and dry.



BOLT-NUT TYPE COUPLING
(Except A positions)



SPRING LOCK COUPLING
(A positions Only)