

AIR CONDITIONING

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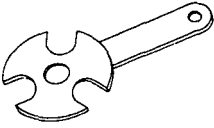
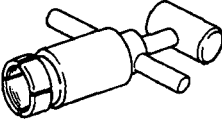

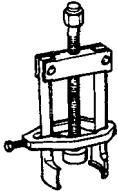
SPECIFICATION (R-134a)

Heater unit	
Type	Three-way-flow full-air-mix system
Heating Capacity	3800 Kcal/h
Heater control assembly	Rotary type (Vacuum Control System)
Air Conditioning	
Cooling capacity	3700 Kcal/h
Compressor	
Model	FX15 (Swash Plate Type)
Refrigerant unit lubricant, cc (cu. in)	PAG oil FD46XG or Equivalent, 140-160 (8.5-9.7)
No. of cylinders and displacement CC/Rev	5 cylinders, 154
Dual pressure switch	
High pressure switch	OFF 32±2 kg/cm ² (3,138 kPa, 455 psi) ON 26±2 kg/cm ² (2,550 kPa, 370 psi)
Low pressure switch	OFF 2.0 kg/cm ² (200 kPa, 28 psi) ON 2.25±0.2 kg/cm ² (220 kPa, 32 psi)
Freezer prevention (Built -in evaporator)	Air temperature thermostat OFF : 0° (32°F) ON : 4°C (39°F)
Pressure relief valve	
Working pressure	MIN. 35.0 kg/cm ² (498 psi), MAX. 42.2 kg/cm ² (600 psi)
Resealed pressure	MIN. 28.1 kg/cm ² (400 psi)
Refrigerant and quantity	R-134a, Approx. 680 g (1.5 lbs)

SERVICE STANDARDS

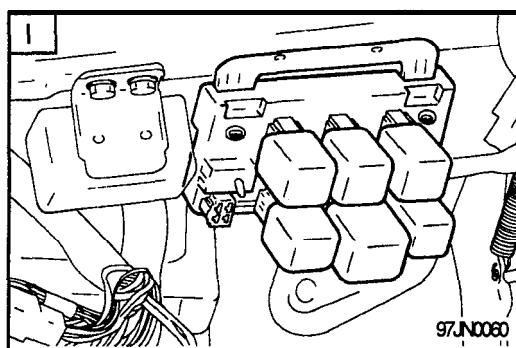
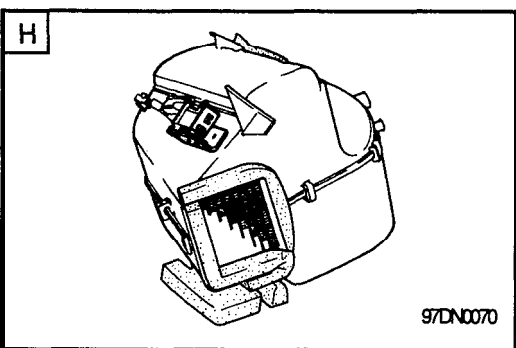
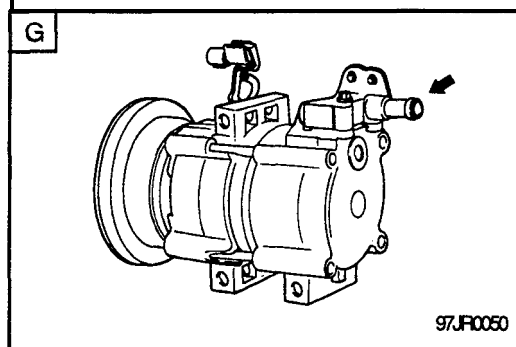
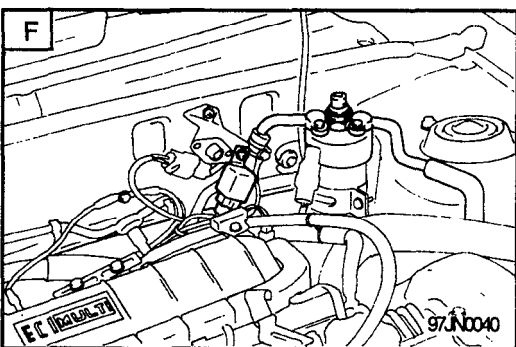
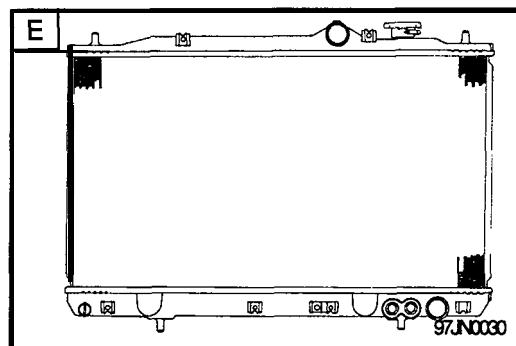
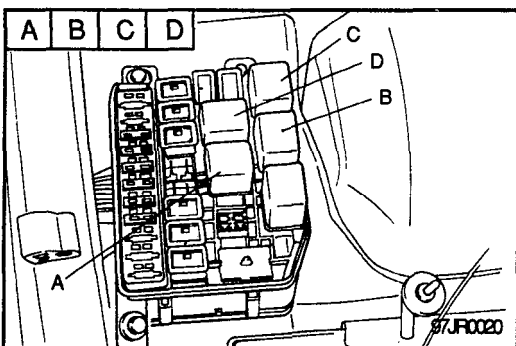
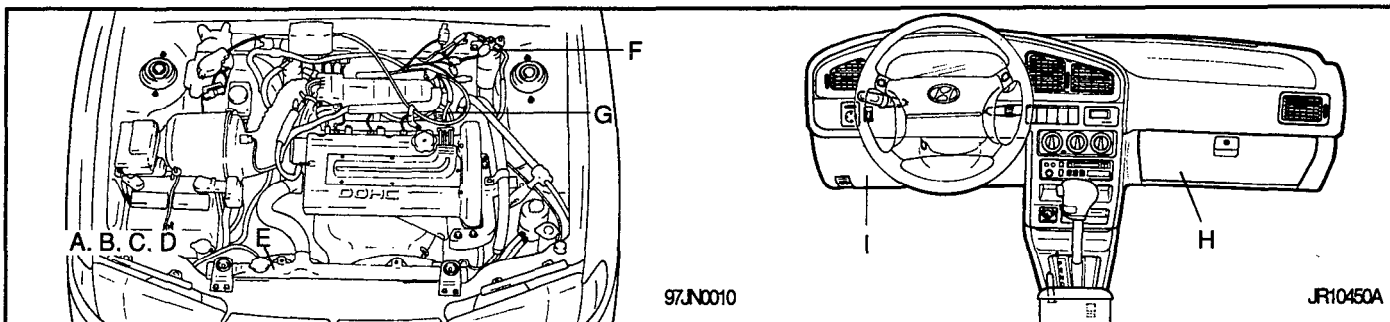
Amount of deflection of V belt	
New belt	5-5.5 mm (0.20-0.21 in.)
Used belt	6-7 mm (0.23-0.28 in.)
After driving	8 mm (0.31 in.)
Clutch clearance	0.35-0.75 mm (0.01-0.03 in.)
V belt size	
Type	4 PK
Length	910 mm (35.9 in.)

SPECIAL TOOLS

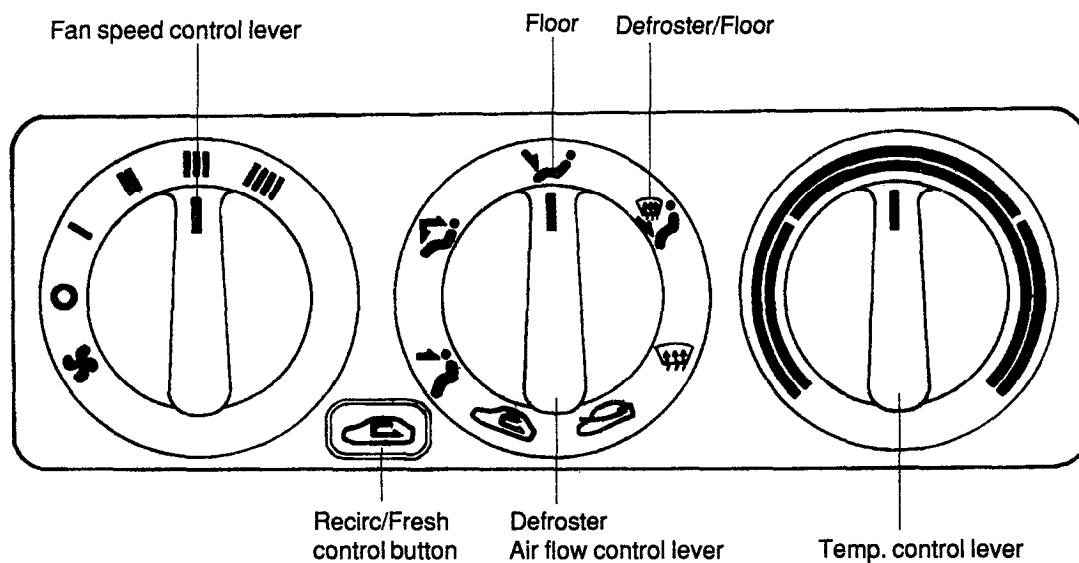
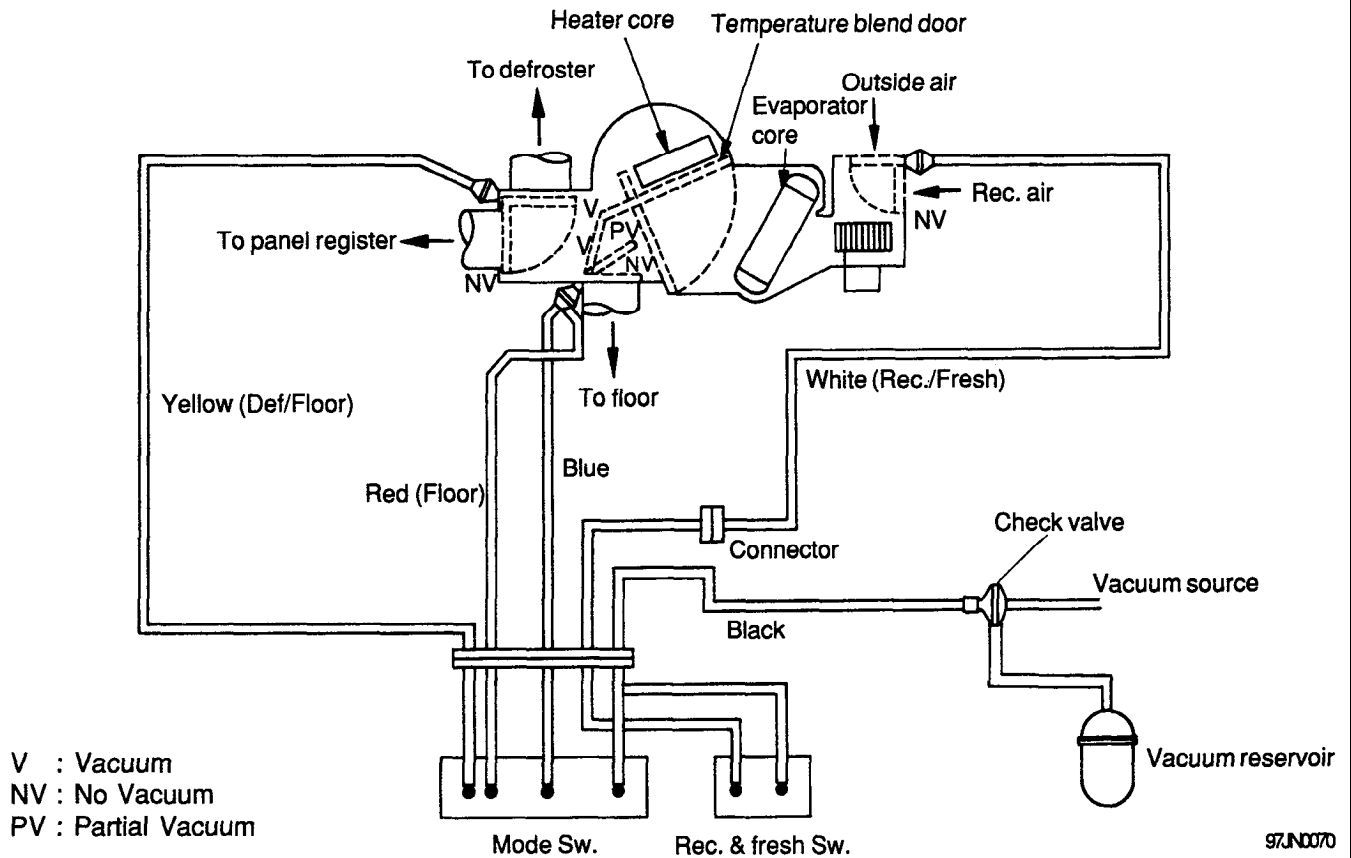
Tool (Number and name)	Illustration	Use
09977-34000 Pressure plate bolt remover		Removal and installation of pressure plate
09977-33700 Shaft seal remover and installer		Removal and installation of the shaft seal.
09977-33800 Snap ring remover		Removal of snap ring.
09455-34000 Bearing and gear puller		Removal of field coil.

LOCATION OF COMPONENTS

Name	Symbol	Name	Symbol
Air Conditioning relay	A	Dual pressure switch	F
Condenser fan relay	B	Pressure relief valve	G
Radiator fan control relay	C	Thermostat	H
Radiator fan relay	D	Blower relay	I
Thermo sensor	E		



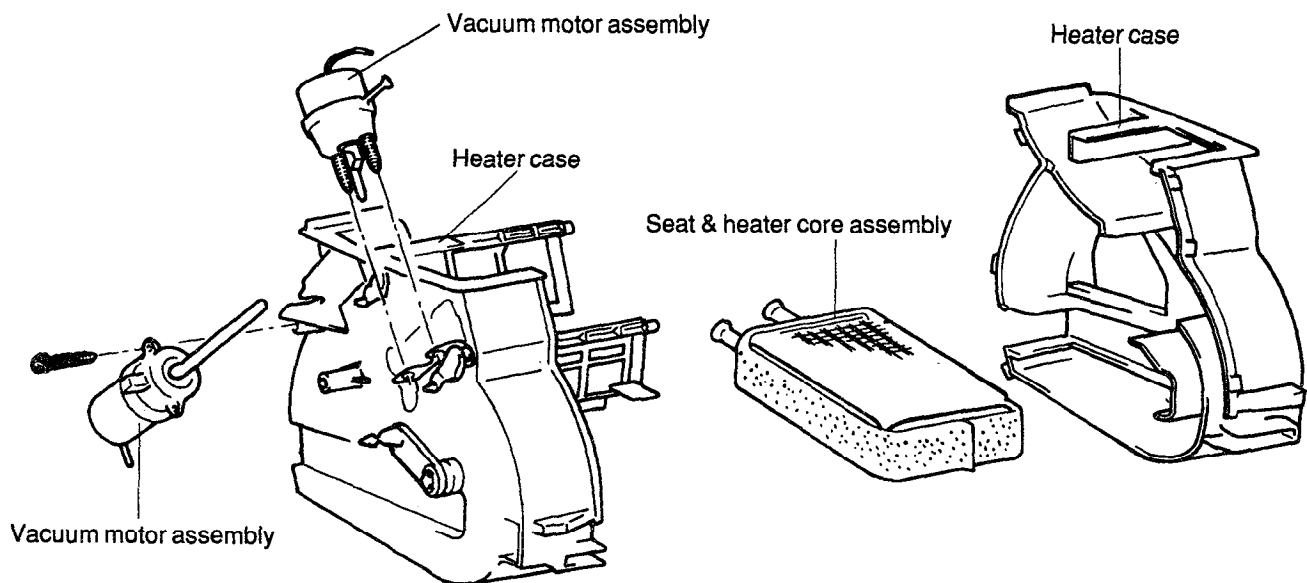
VACUUM SYSTEM SYMPTOM AND PROBABLE CAUSE



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.

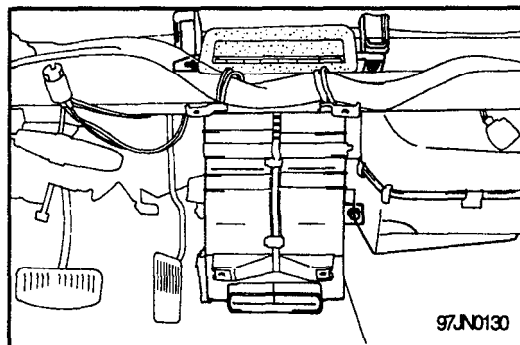
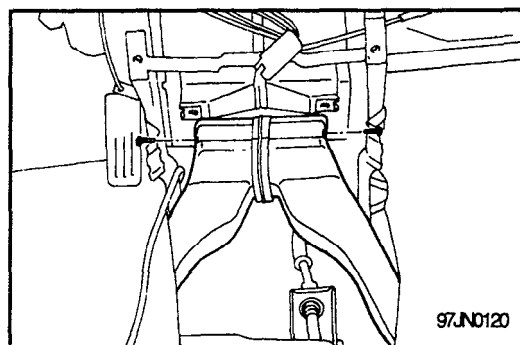
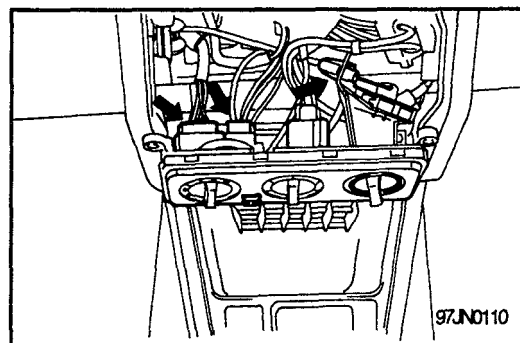
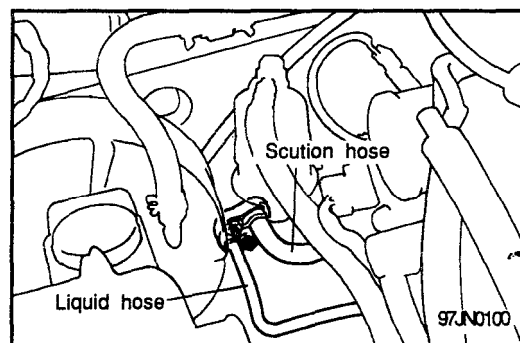
HEATER

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.

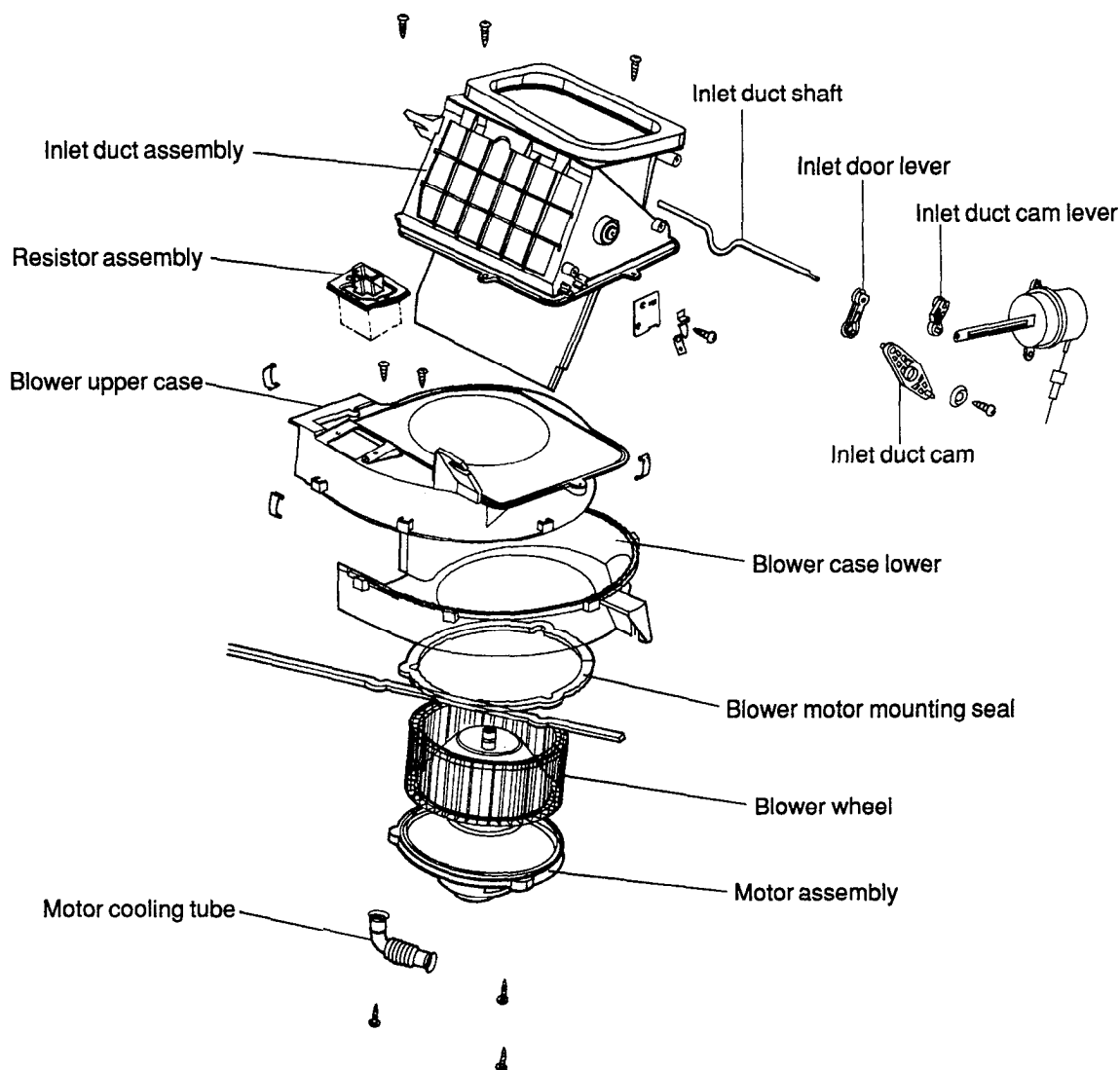


INSPECTION

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

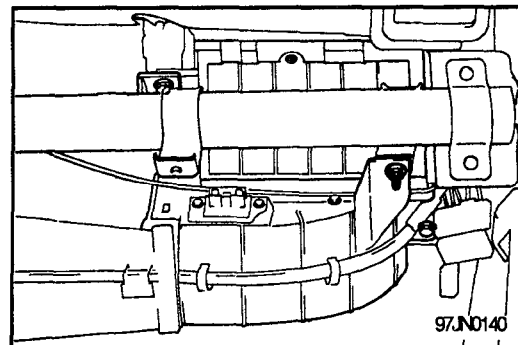
BLOWER ASSEMBLY

COMPONENTS



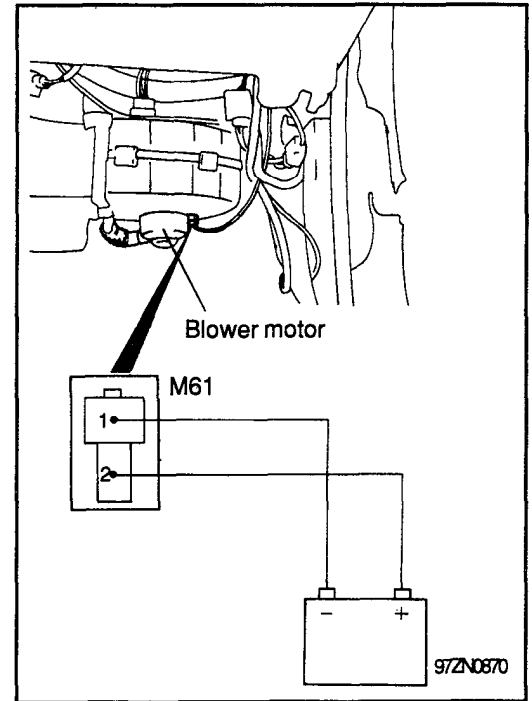
REMOVAL AND INSTALLATION

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.

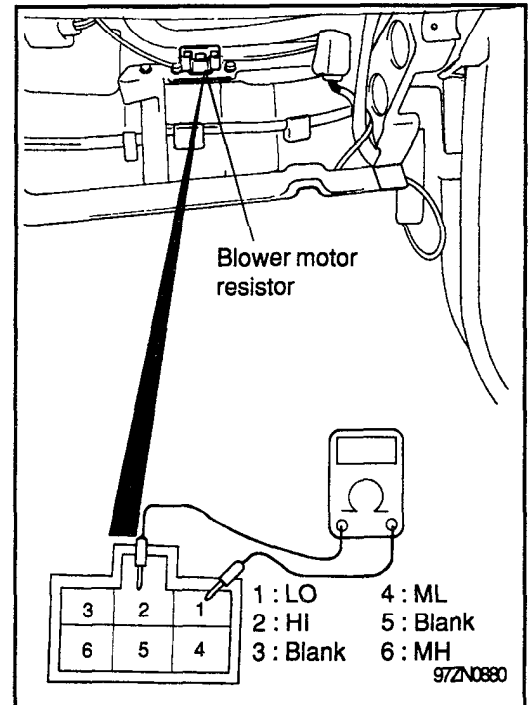
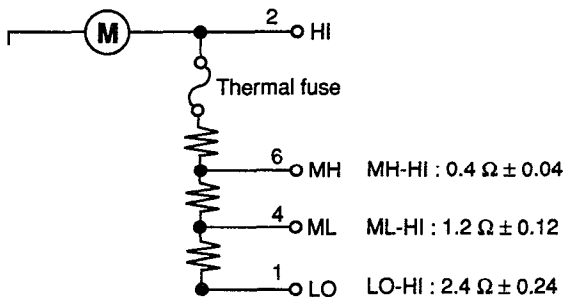


INSPECTION

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.

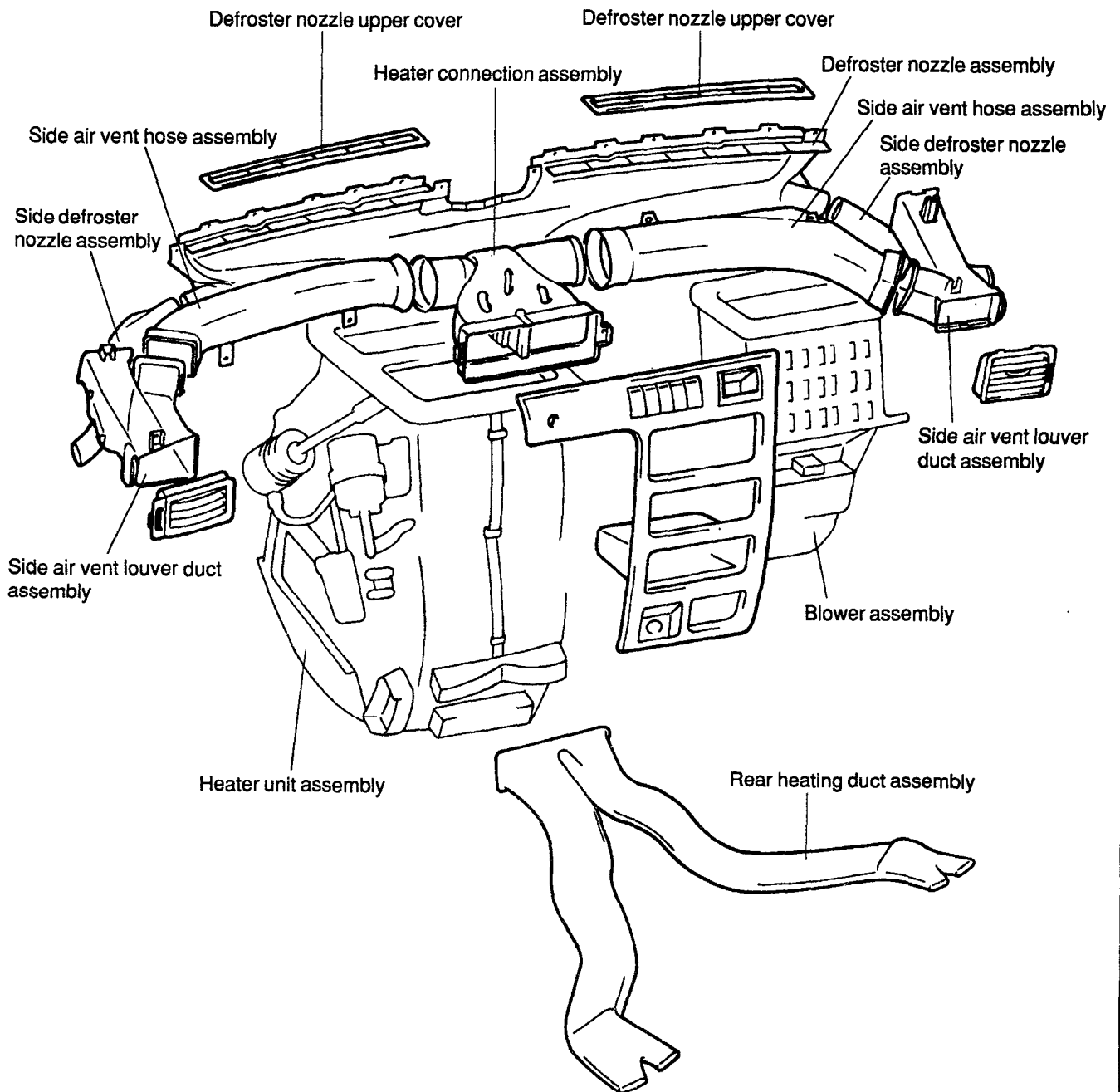


8. Using an ohmmeter, check that there is continuity between terminals 1 and 2. If there is no continuity, replace the resistor.



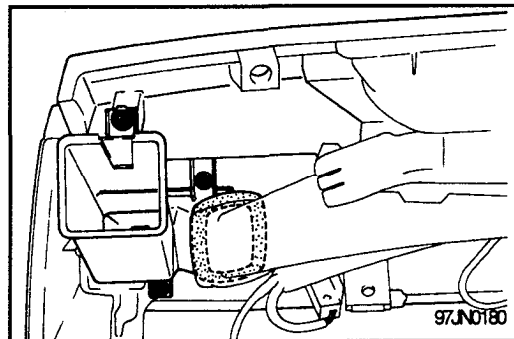
VENTILATOR

COMPONENTS

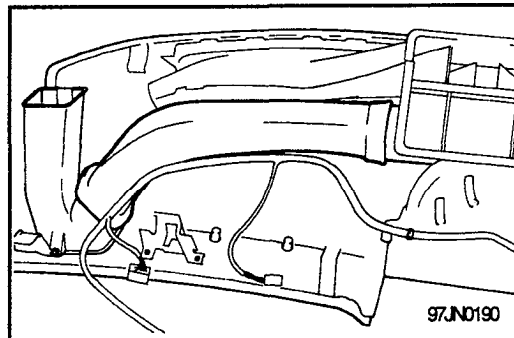


REMOVAL AND INSTALLATION

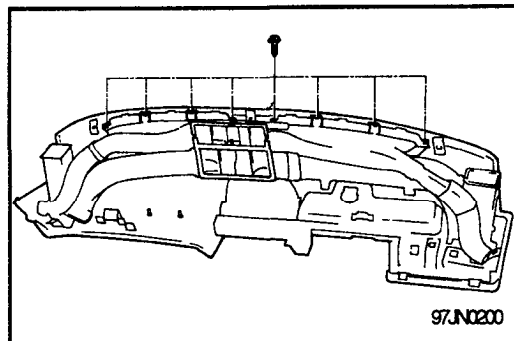
1. Remove the main crash pad assembly (Refer to BODY GROUP)
2. Remove the side air vent louver duct assembly (LH/RH).



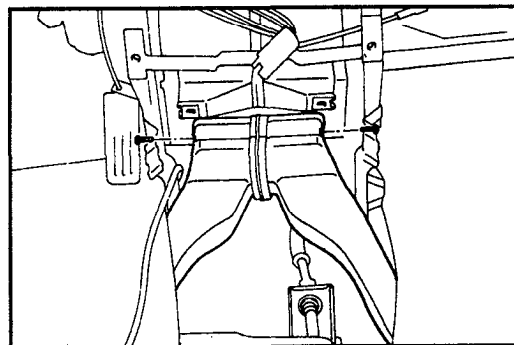
3. Remove the side air vent hose assembly (LH/RH).
4. Remove the side air vent louver assembly (LH/RH).



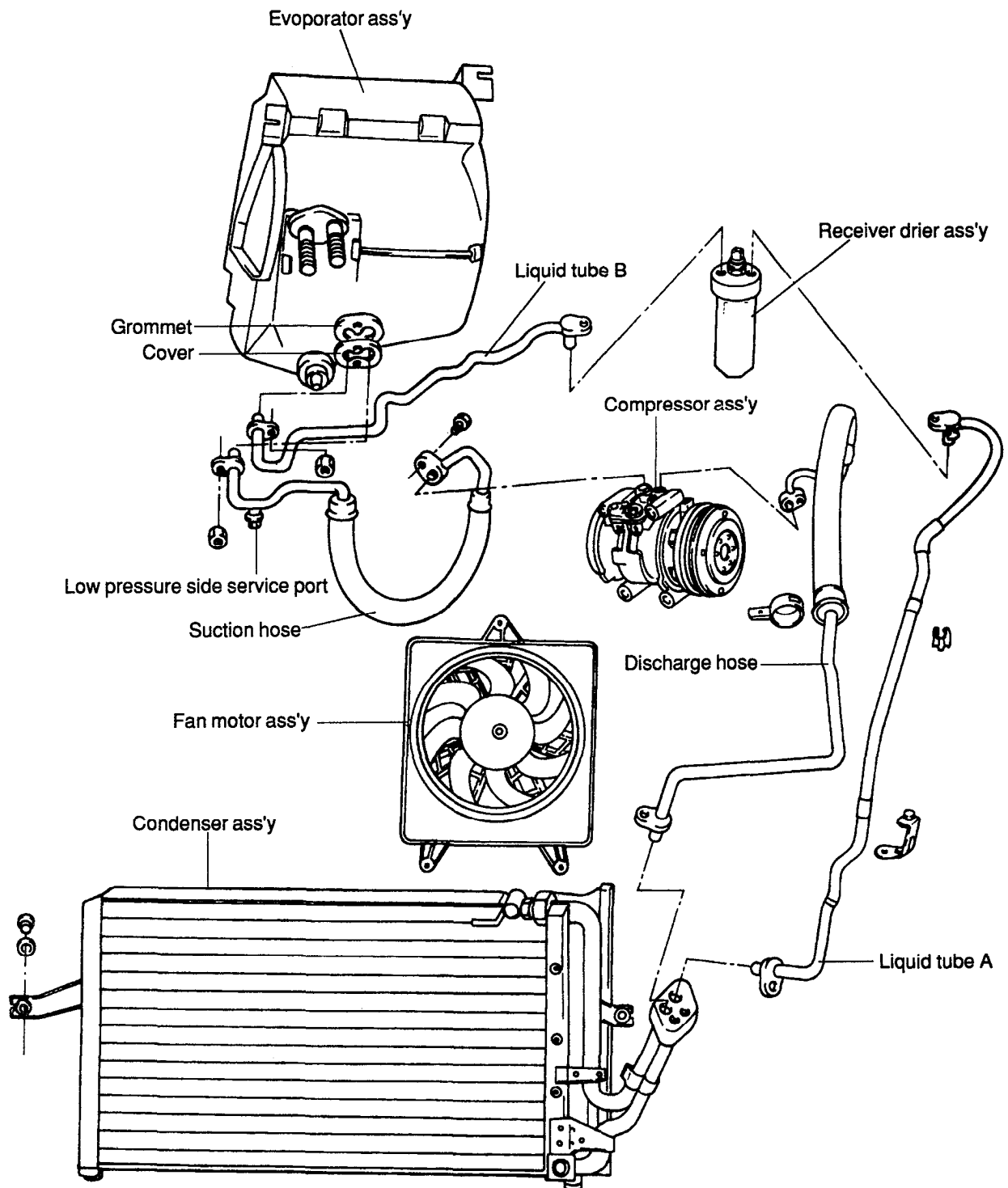
5. Remove the heater connection assembly.
6. Remove the defroster nozzle assembly.
7. Remove the side defroster nozzle assembly (LH/RH).
8. Remove the crash pad upper cover assembly.



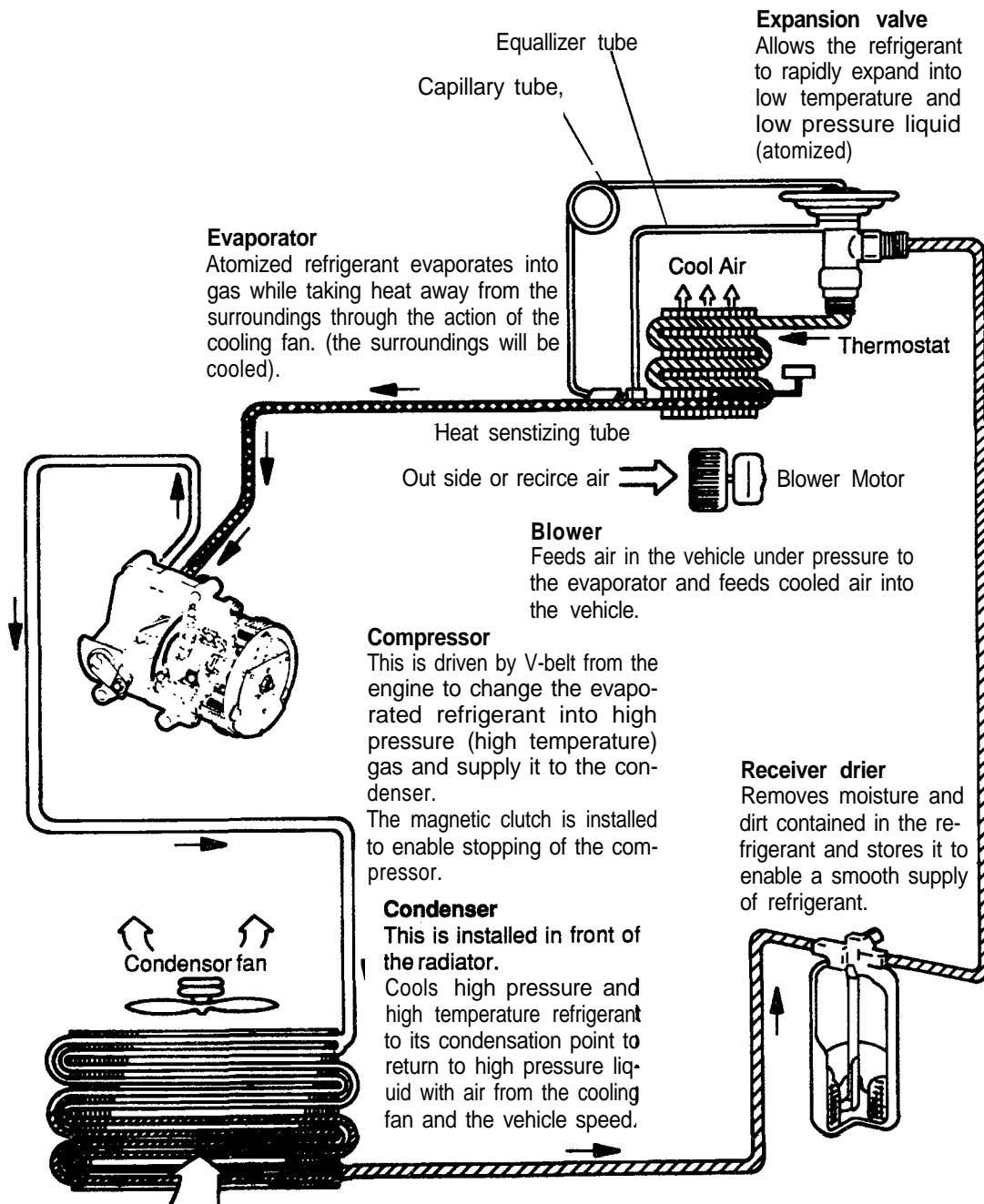
9. Remove the rear heating joint duct assembly and rear heating side duct assembly (LH/RH).
10. Installation is the reverse of removal procedures.







AIR CONDITIONING COMPONENTS



REFRIGERATION CYCLE

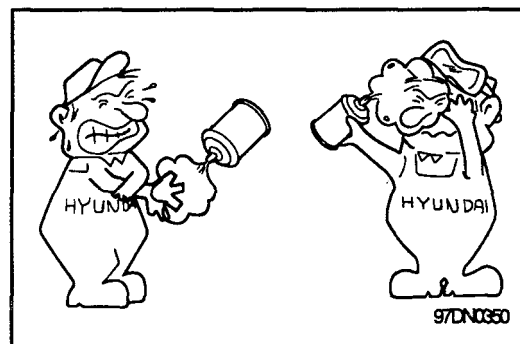


 High pressure and high temperature gas	 Low pressure and low temperature liquid
 High pressure and high temperature liquid	 Low pressure and low temperature gas.

GENERAL SERVICE INSTRUCTIONS

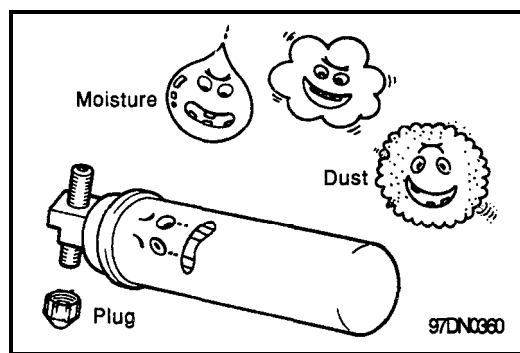
SAFETY PRECAUTIONS

1. R-134a 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-134a 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-134a, upon coming into contact with flame (this detector burns propane to produce a small flame), produces phosgene, a toxic gas.
5. Use only recommended lubricant for R-134a A/C system components. If lubricants other than recommended one used, system failure may occur.
6. The PAG lubricant absorbs moisture from the atmosphere at a rapid rate, therefore the following precautions must be observed.
 - When removing refrigerant components from a vehicle cap immediately the components to prevent A/C system from the entry of moisture.
 - When installing refrigerant components to a vehicle, do not remove the cap until just before connecting the components.
 - Complete the connection of all refrigerant tubes and hoses without delay to prevent the A/C system from entry of moisture.
 - Use the recommended lubricant from a sealed container only.
7. If accidental system discharge occurs, ventilate the work area before resuming service.



WHEN REPLACING PARTS ON A/C SYSTEM

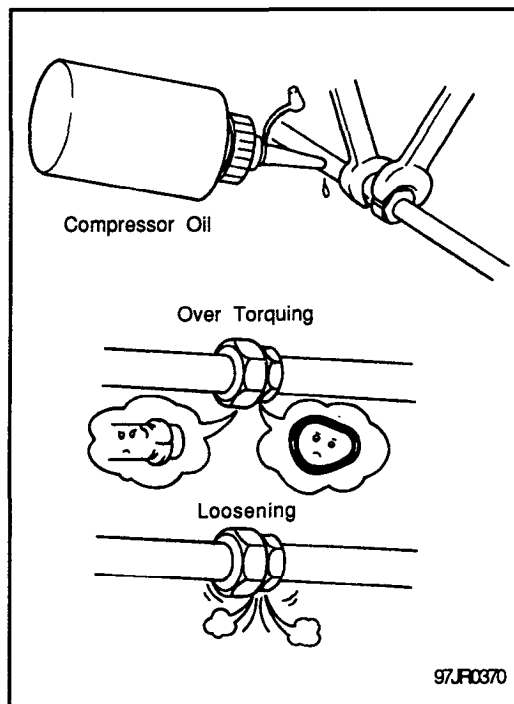
1. Never open or loosen a connection before discharging the system.
2. Seal the open fittings with a cap or plug immediately in disconnected parts to prevent intrusion of moisture and dust.
3. Do not remove the sealing caps from a replacement component until it is ready to be installed.
4. Before connecting 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

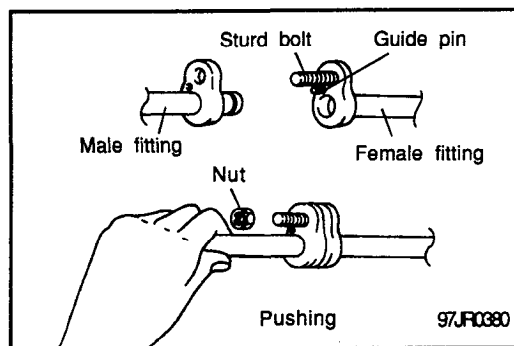
Bolt/nut coupling type

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.



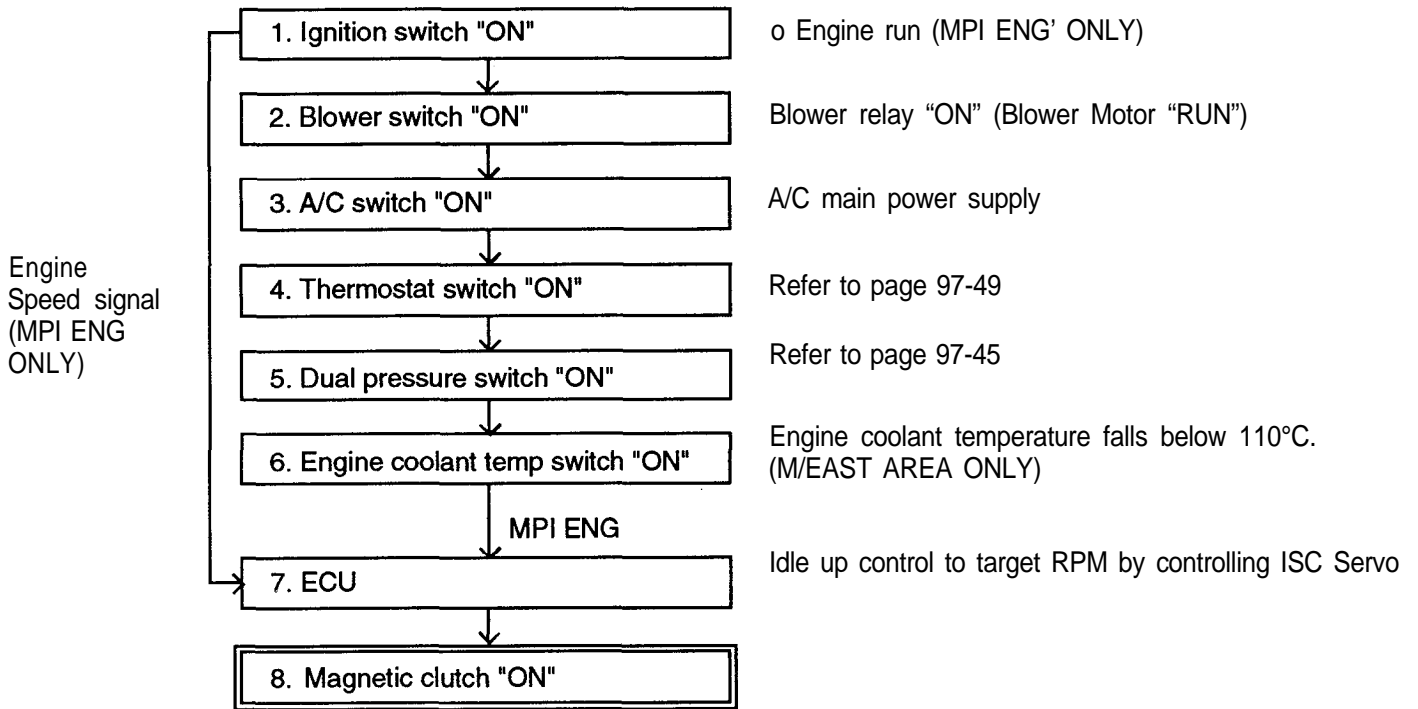
Flange With Guide Pin Type

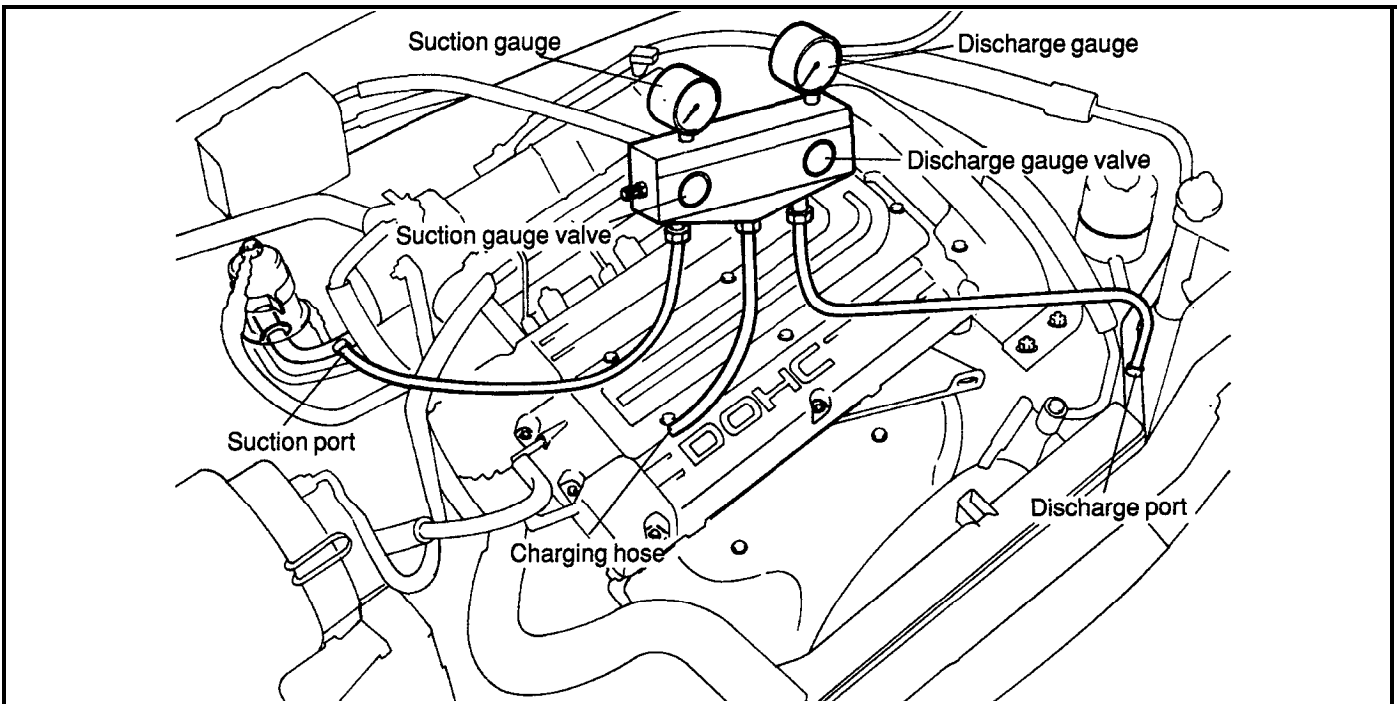
1. Check for missing or damaged the new O-ring (use only specified one) and lubricate with compressor oil.
2. Hand tighten the nut or bolt by pushing the one side pipe.
3. Tighten the nut or bolt to the specified torque.



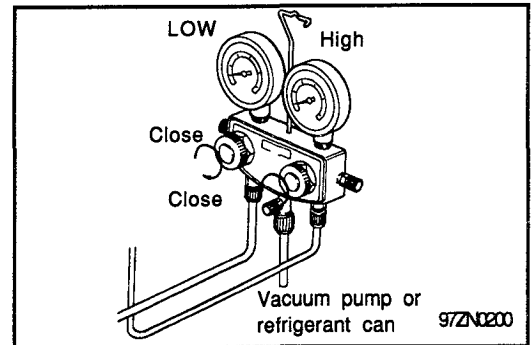
HOW IS THE MAGNETIC CLUTCH ENERGIZED ?

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





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.



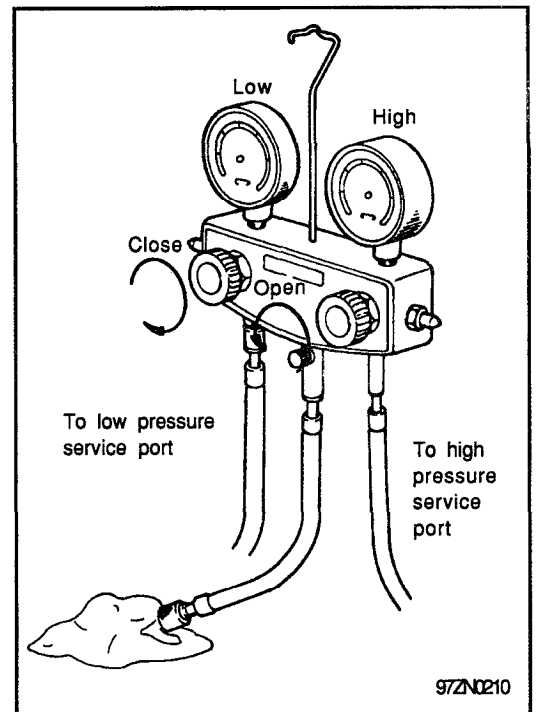
DISCHARGING THE REFRIGERANT SYSTEM

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).



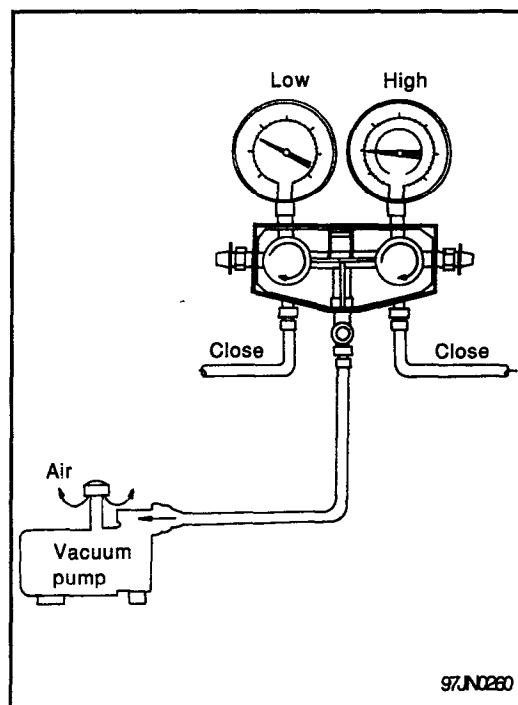
EVACUATING REFRIGERANT SYSTEM

NOTE:

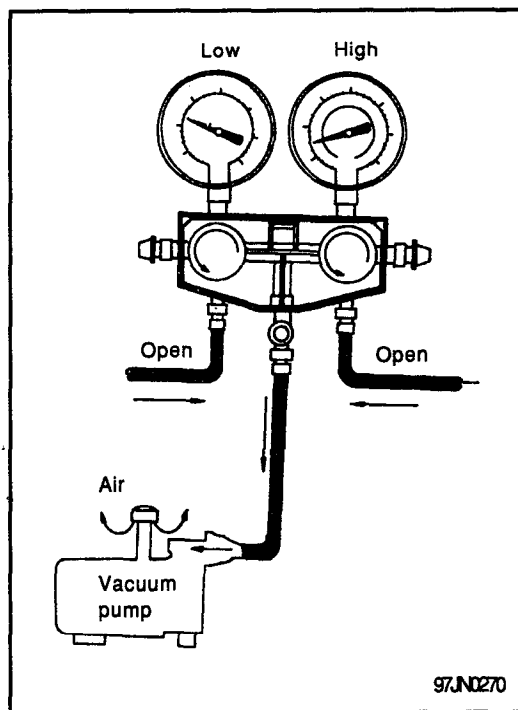
It is necessary to evacuate the air conditioning system any time the system has been opened. Evacuation is necessary to purge all of that air and moisture that may have entered the system.

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.



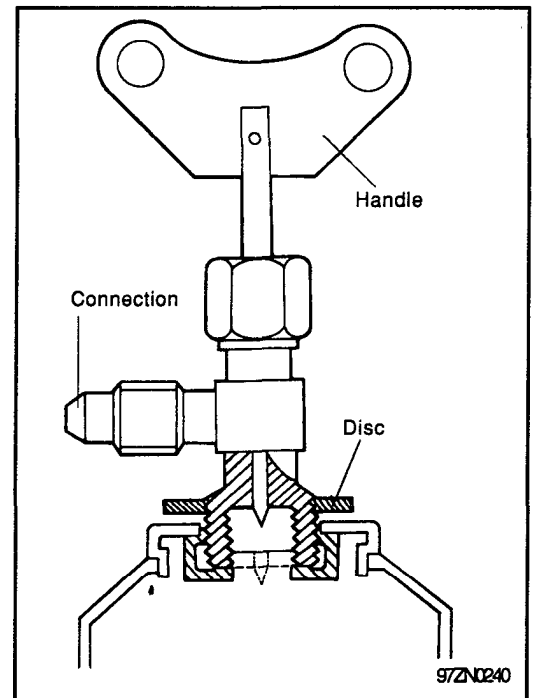
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HANDLING REFRIGERANT SERVICE TAP VALVE

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.

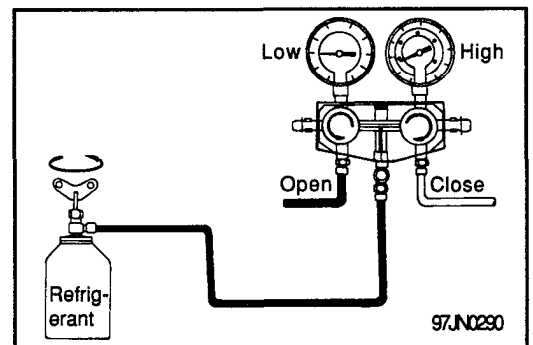
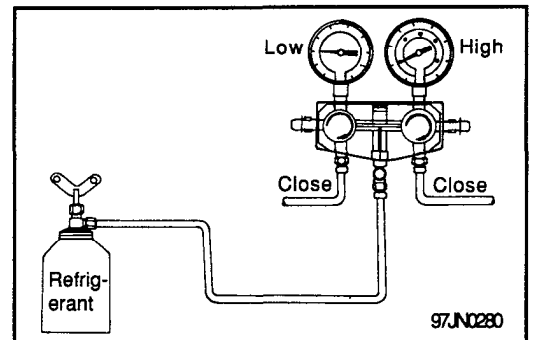
1. Install the refrigerant can tap valve as described in Handling the Refrigerant Service Tap Valve section.
2. Open the low pressure valve. Adjust the valve so that the low pressure gauge does not read over 412 kPa (4.2 kg/cm², 60 psi)
3. Put the refrigerant in a pan of warm water (maximum temperature 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 : 680 g (1.5 lbs)



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 : 680 g (1.5 lbs)

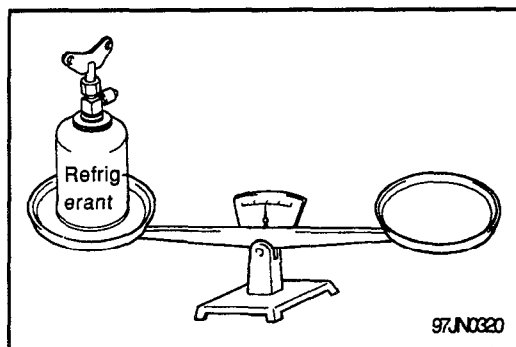
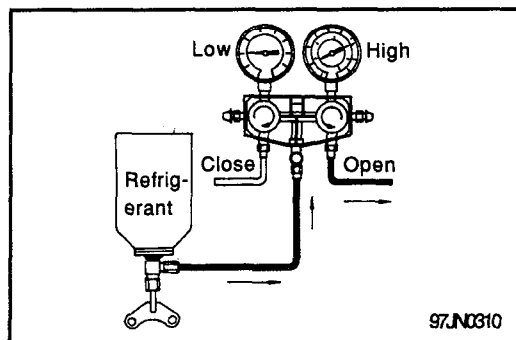
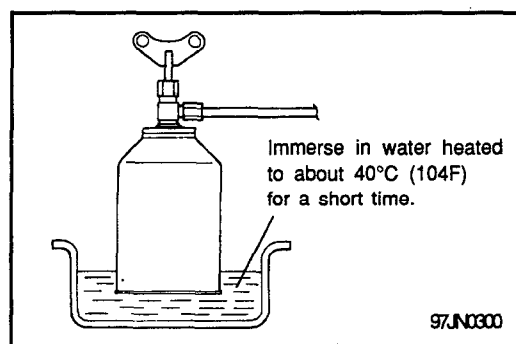
NOTE:

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: 140-160 cc (859.7 in.)

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 (in.)
Evaporator core	40 (2.4)
Condenser	25 (1.5)
Receiver drier	40 (2.4)
Compressor	30 (1.8)
Tube, hose	15 (0.9)

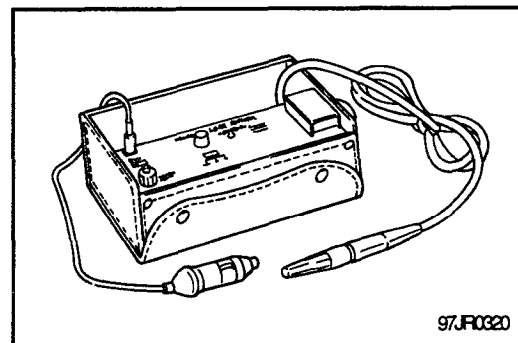
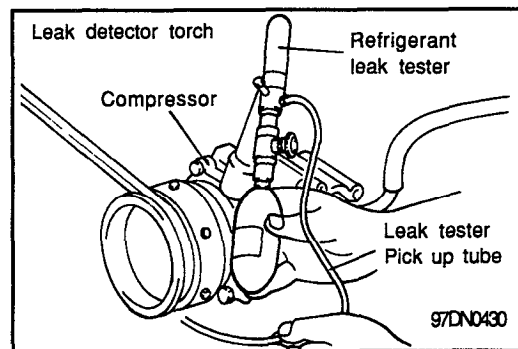
Electronic Leak Detector

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.

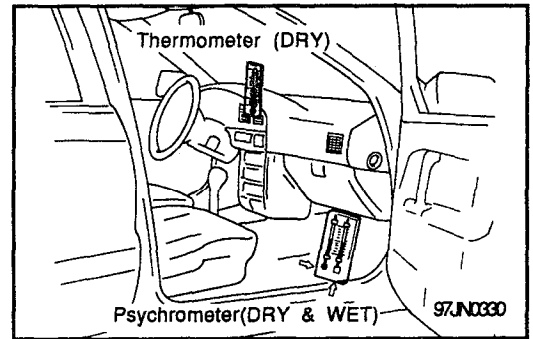
If a gas leak is detected, proceed as follows:

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.



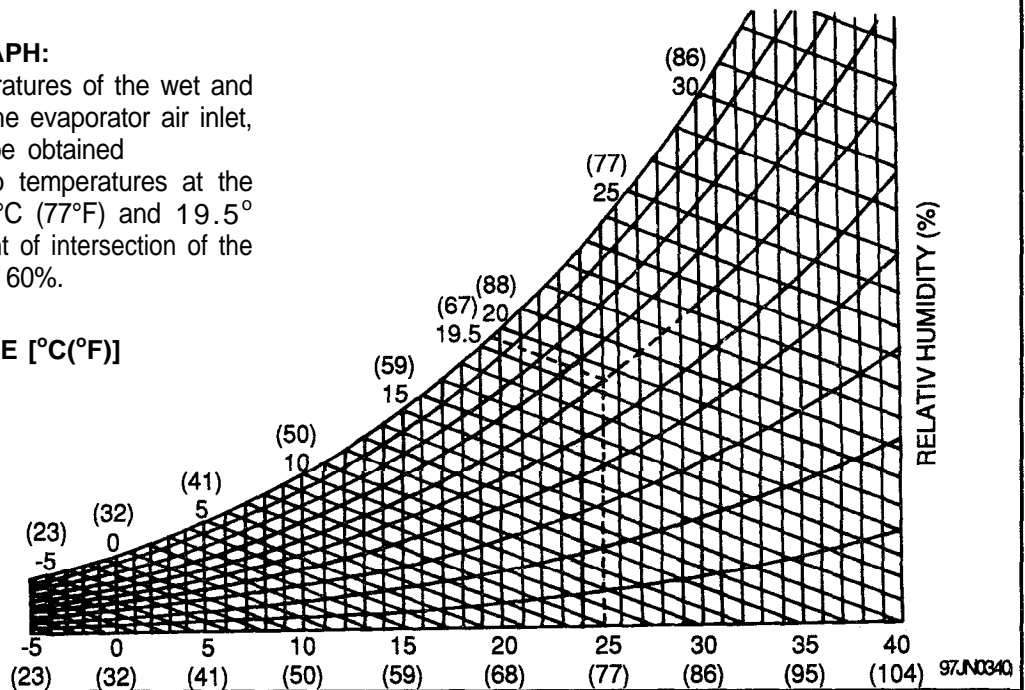
HOW TO READ THE GRAPH:

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

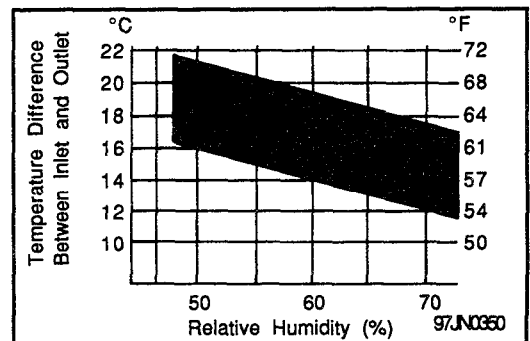
Example: Dry-and wet-bulb temperatures at the evaporator air inlet are 25°C (77°F) and 19.5°C (67°F) respectively, the point of intersection of the dotted lines in the graph is 60%.

WET-BULB TEMPERATURE [°C(°F)]

100
90
80
70
60
50
40
30
20
10

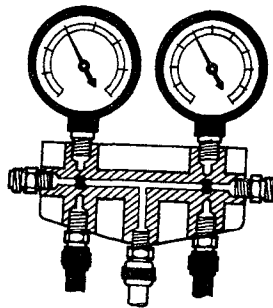
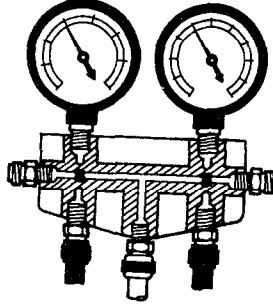
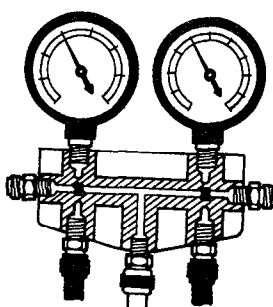


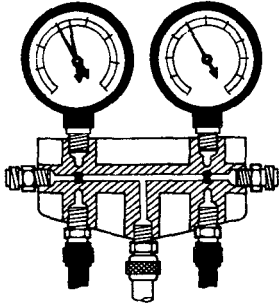
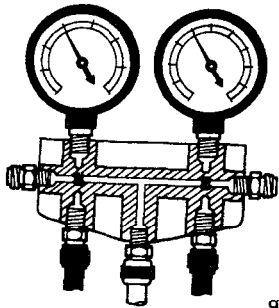
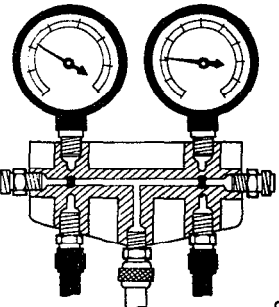
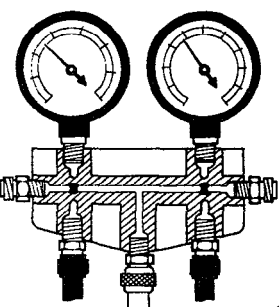
9. Measure the dry-bulb temperature at the cool air outlet, and calculate the difference between the inlet dry-bulb and outlet dry-bulb temperatures.
10. Check that the intersection of the relative humidity and temperature difference is between the two hatched lines. If the intersection is within the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

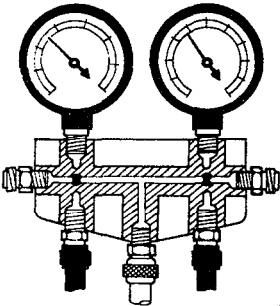
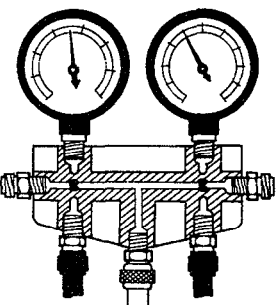
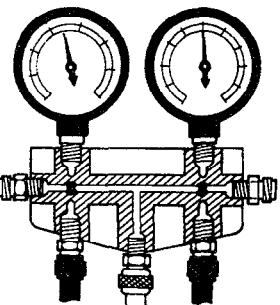
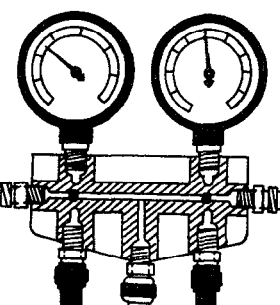


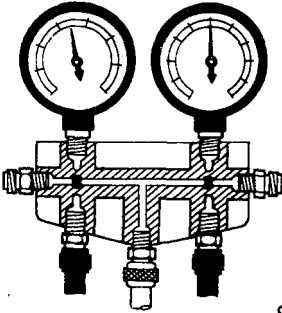
PERFORMANCE TEST DIAGNOSIS

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="113 384 159 441">1</div> <div data-bbox="175 399 478 462">Low side NORMAL High side NORMAL</div>  <div data-bbox="486 766 566 787">97DN0440</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 refrigerant. 7. Operate system and check performance.
<div data-bbox="113 793 159 850">2</div> <div data-bbox="175 808 478 871">Low side NORMAL High side NORMAL</div>  <div data-bbox="486 1165 566 1186">97DN0440</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="113 1203 159 1260">3</div> <div data-bbox="175 1218 478 1281">Low side NORMAL High side NORMAL</div>  <div data-bbox="486 1585 566 1606">97DN0440</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 thermostic 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>  <p>97J030</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 LOW High side LOW</p>  <p>97DN0440</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 refrigerant 	<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 refrigerant. Operate system and check performance.
<p>6 Low side LOW High side LOW</p>  <p>97DN0450</p>	<ul style="list-style-type: none"> Discharge air: Warm Sight glass: Clear 	<ul style="list-style-type: none"> System very low on refrigerant 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 refrigerant. Operate system and check performance.
<p>7 Low side LOW High side LOW</p>  <p>97DN0470</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 refrigerant.

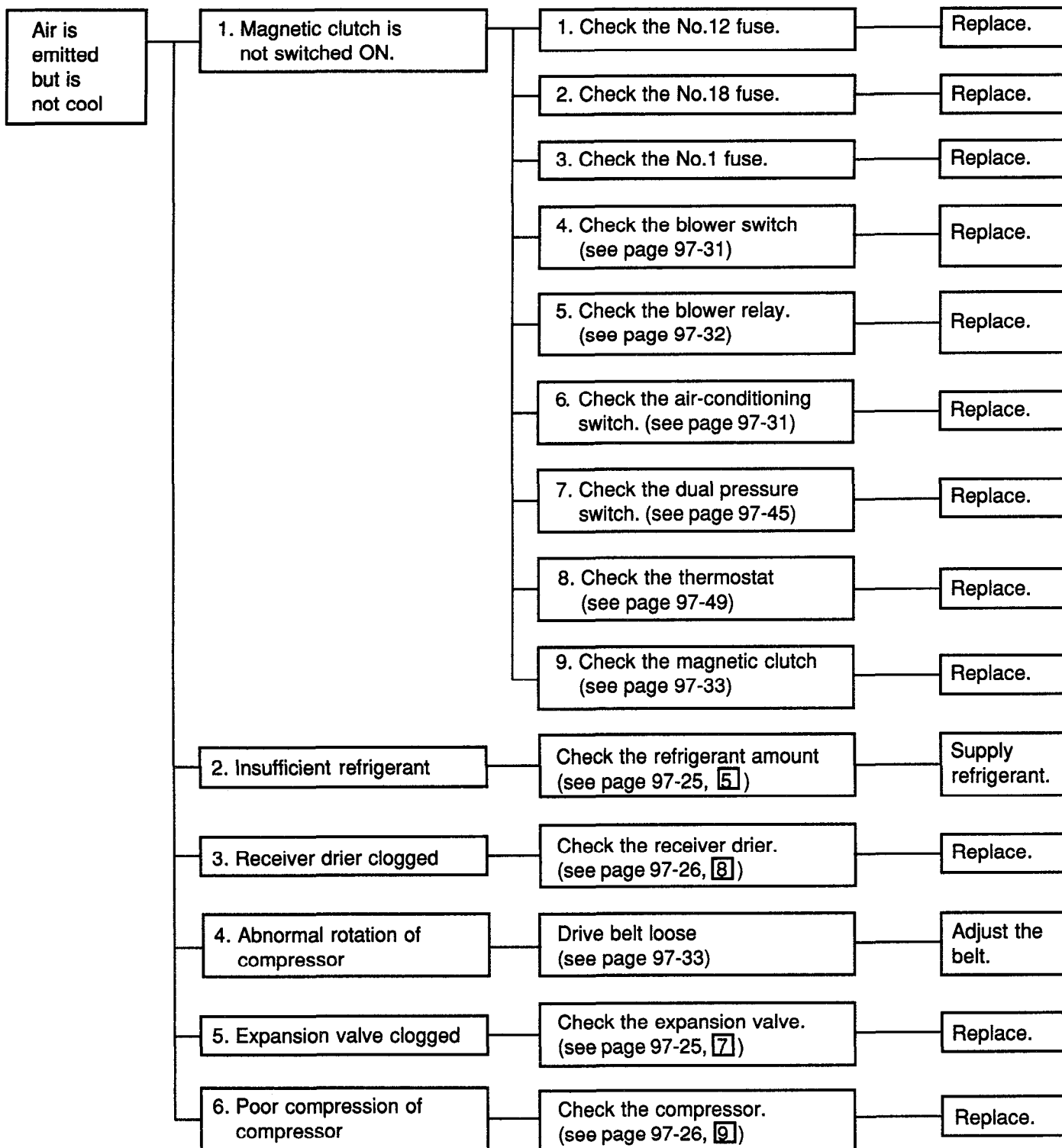
	GAUGE READINGS	OTHER SYMPTOMS	DIAGNOSIS	CORRECTION
8	<p>Low side LOW</p> <p>High side LOW</p>  <p>97DN0470</p>	<ul style="list-style-type: none"> o Discharge air: slightly cool. o High side pipe: Cool and also shows sweating or frost. 	<ul style="list-style-type: none"> o Restriction in high side of 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 refrigerant. 5. Operate system and check performance.
9	<p>Low side HIGH</p> <p>High side LOW</p>  <p>97DN0480</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.
10	<p>Low side HIGH</p> <p>High side HIGH</p>  <p>97DN0490</p>	<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.
11	<p>Low side HIGH</p> <p>High side HIGH</p>  <p>97J036</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 refrigerant. 5. Operate system and check performance.

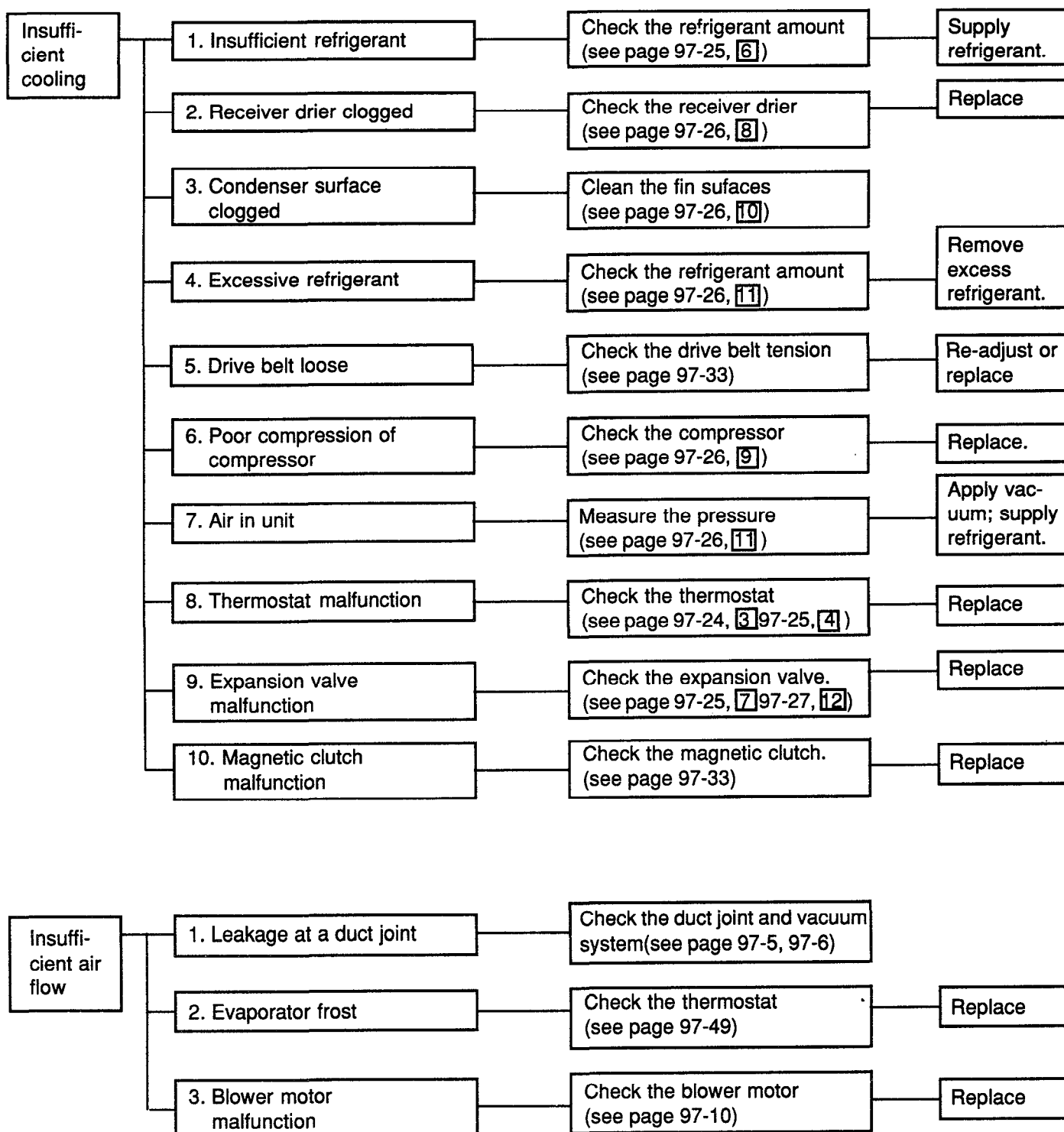
GAUGE READINGS	OTHER SYMPTOMS	DIAGNOSIS	CORRECTION
<div data-bbox="108 226 150 268">12</div> <div data-bbox="165 239 277 302">Low side HIGH</div> <div data-bbox="389 239 501 302">High side HIGH</div> <div data-bbox="197 315 478 625"></div> <div data-bbox="469 617 549 638">97DND490</div>	<ul style="list-style-type: 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 refrigerant.4. Operate system and check performance.

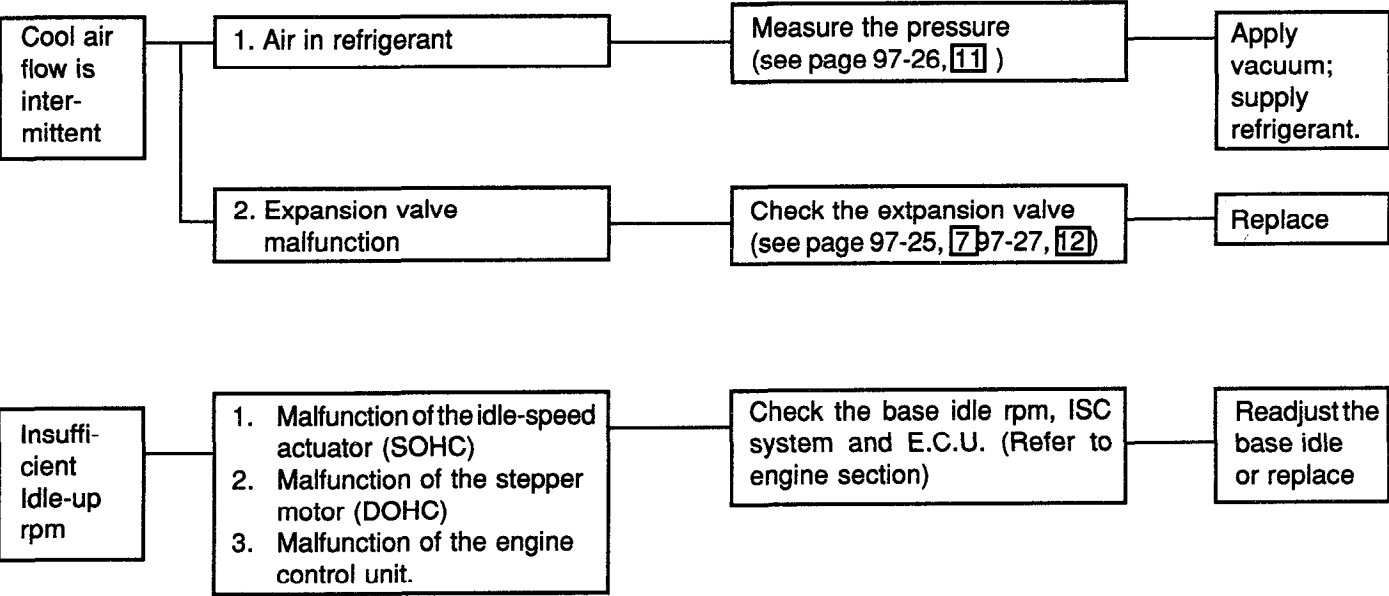
TROUBLESHOOTING-Malfunction Causes and Remedies.

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 CONDITIONING SWITCH CHECK

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

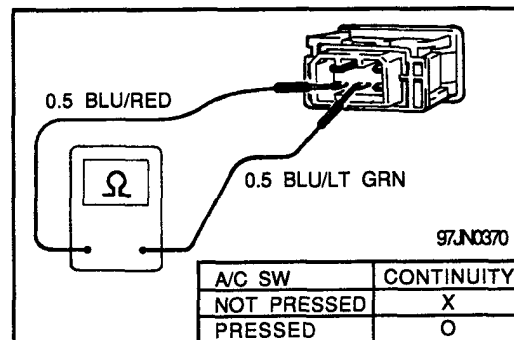
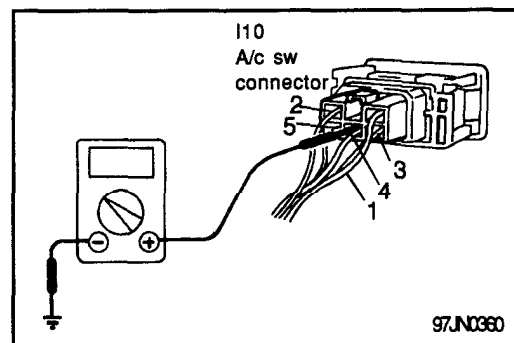
IG SW	A/C sw	Blower sw	Voltage
ON (Do not start)	OFF	OFF	0 V
		ON	Battery Voltage

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

If ok, perform next check 3.

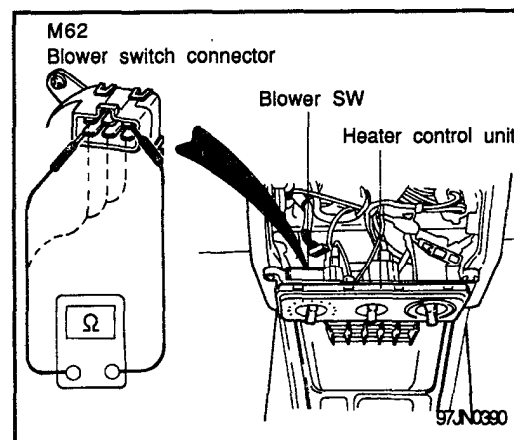
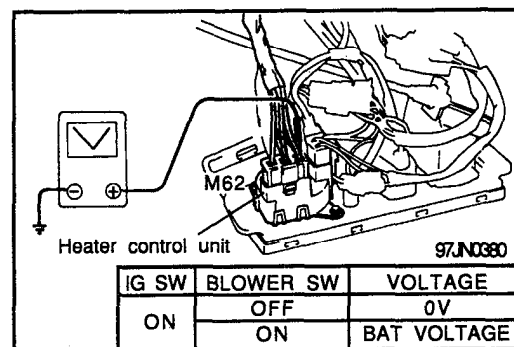
3. Disconnect the I10 connector from the air conditioning switch.
4. Check continuity between terminal 4 and 5 of air conditioning switch.

If not ok, replace the air conditioning switch.



BLOWER SWITCH CHECK

1. Remove the heater control assembly with connector still connected.
2. Connect jumperwire 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					○

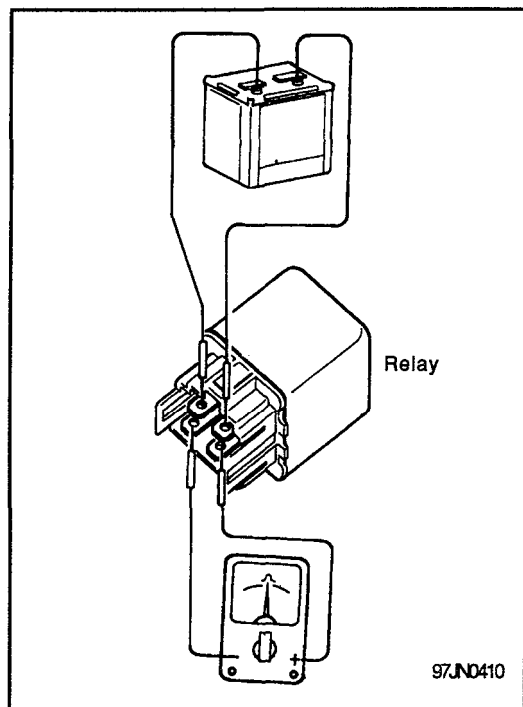
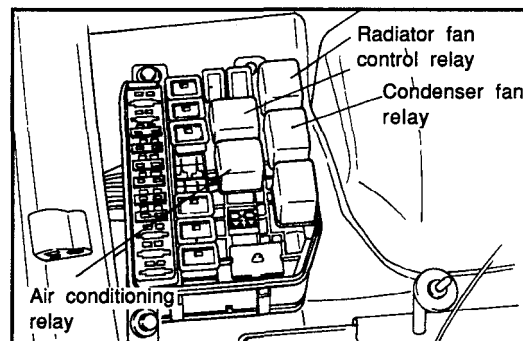
5. If not ok, replace the blower switch.

POWER RELAY CHECK

AIR CONDITIONING RELAY, RADIATOR FAN CONTROL 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.

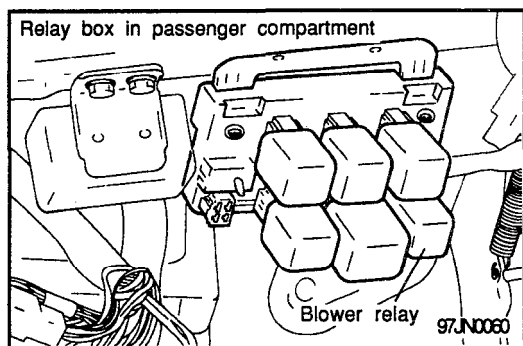
When power is supplied	Between terminals 2 - 4	Continuity
	Between terminals 1 - 3	
When power is not supplied	Between terminals 2 - 4	No Continuity
	Between terminals 1 - 3	Continuity



BLOWER FAN 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.

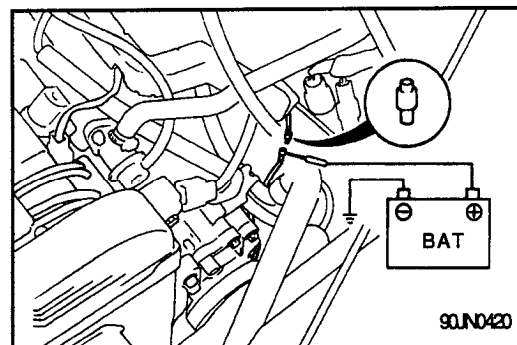
When power is supplied	Between terminals 2 - 4	Continuity
	Between terminals 1 - 3	
When power is not supplied	Between terminals 2 - 4	No Continuity
	Between terminals 1 - 3	Continuity



ON-VEHICLE INSPECTION

Magnetic clutch

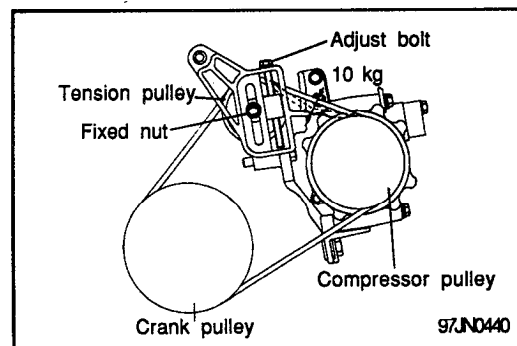
1. Check compressor drive belt tension.
2. Start engine.
3. Inspect clutch bearing for noise.
 - 1) Check for abnormal noise from the compressor when the A/c on switch is off.
 - 3) If abnormal noise is being emitted, replace the compressor pulley bearing or magnetic clutch.
4. Stop engine.
5. Make the 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 \oplus 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.



COMPRESSOR DRIVE BELT

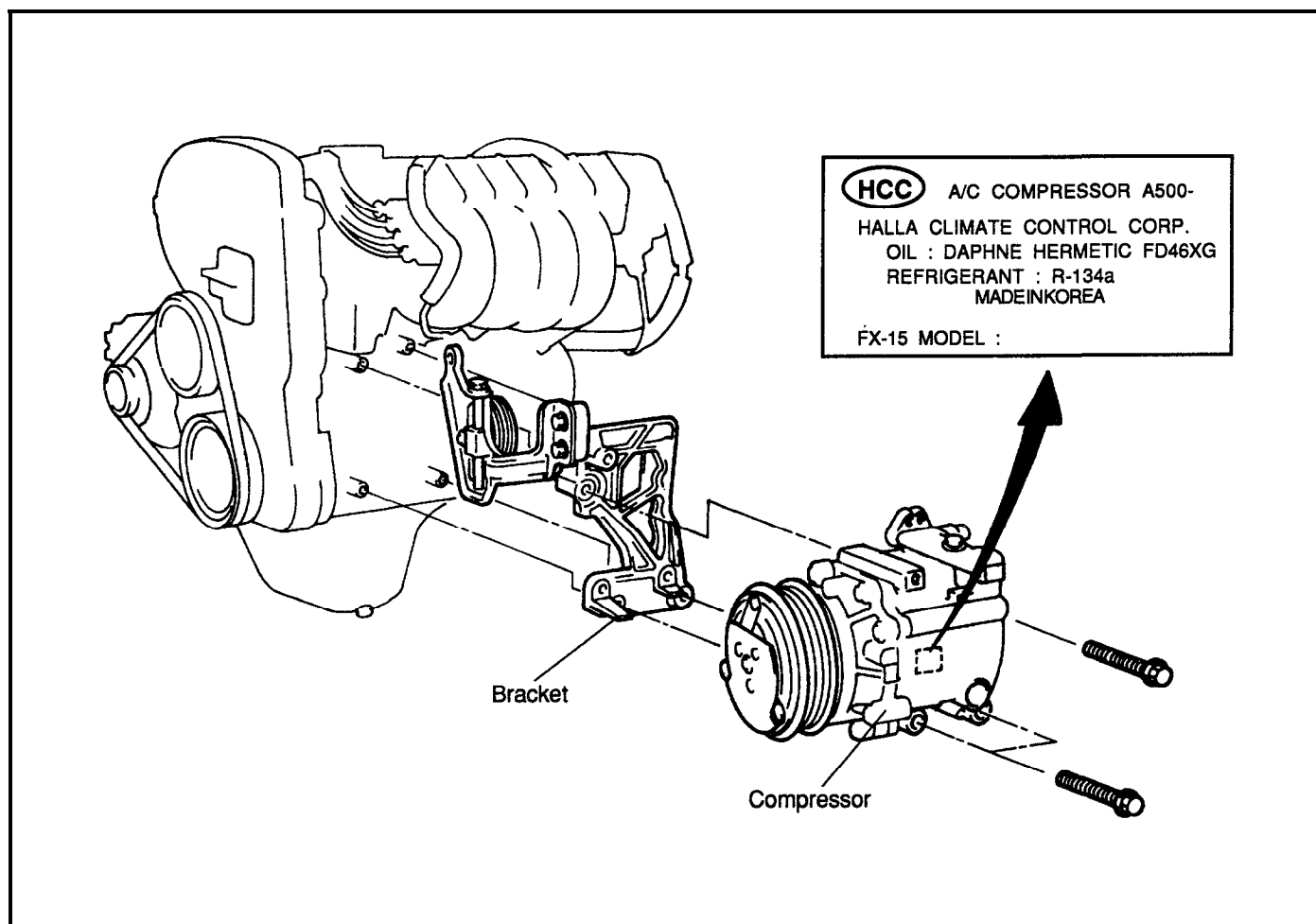
Satisfactory performance of the air conditioning system is dependent upon drive belt condition and tension. If the proper tensions are not maintained, belt slippage will greatly reduce air conditioning performance and drive belt life. To avoid such adverse effects, the following service procedure should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



NEW BELT	5-5.5 mm (0.20-0.21 in.)
USED BELT	6-7 mm (0.23-0.28 in.)
AFTER DRIVING	8 mm (0.31 in.)

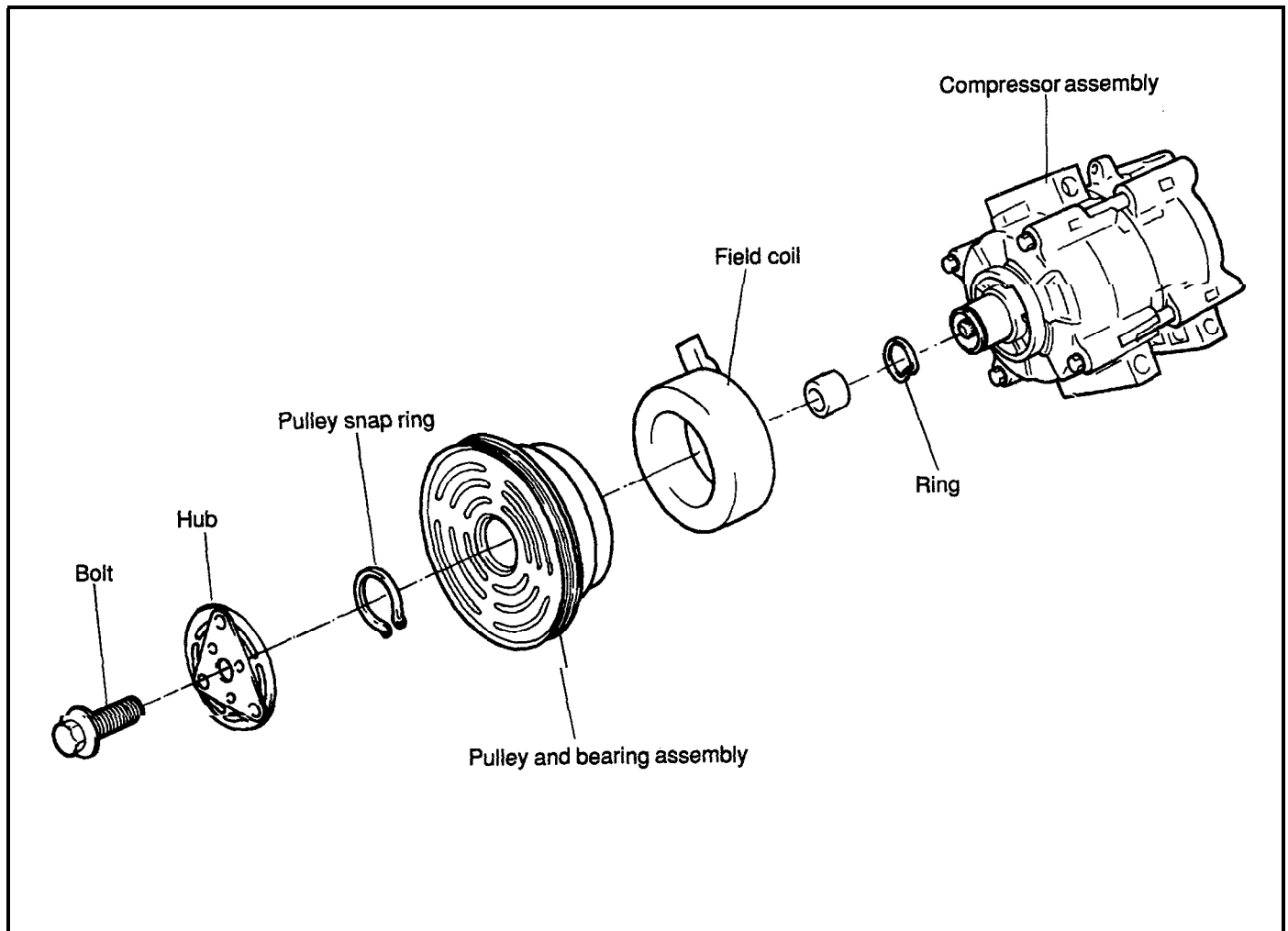
REMOVAL AND INSTALLATION LOCATION



1. Loosen the tension pulley and then remove the V belt.
2. Discharge the refrigerant. (Refer to page to 97-18)
3. Disconnect the magnetic clutch.

4. Remove the discharge hose and suction hose.
5. Remove the compressor.
6. Installation is the reverse of removal.

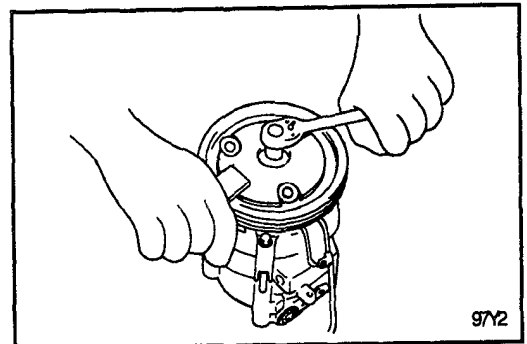
COMPONENTS



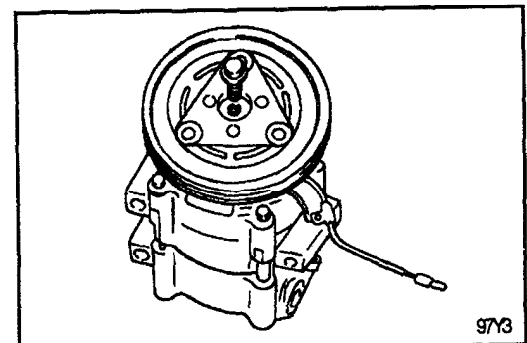
CLUTCH HUB AND PULLEY

Removal

1. Remove the clutch hub retaining bolt with the aid of a spanner wrench.
2. Pull the clutch hub and shims from the compressor shaft. If the hub cannot be pulled from the compressor shaft, screw an 8-mm bolt into the shaft hole of the clutch hub to force the hub from the shaft.

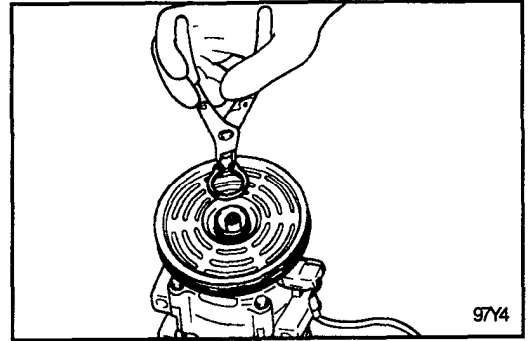


97Y2

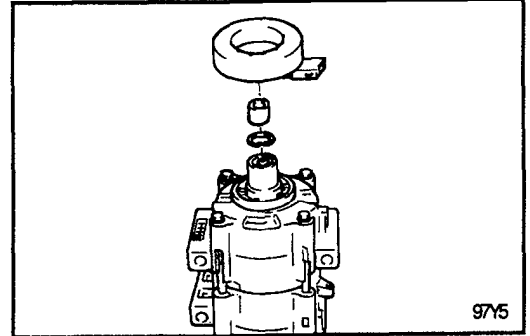


97Y3

3. Remove the pulley retaining snap ring.

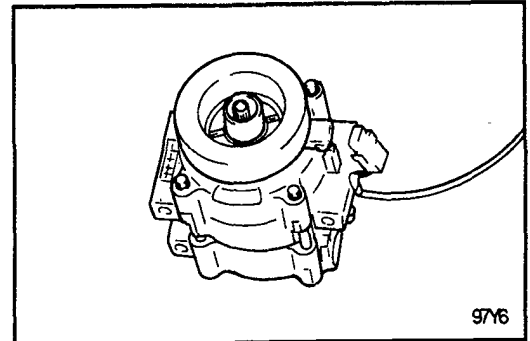


4. Pull the pulley and bearing assembly from the compressor.

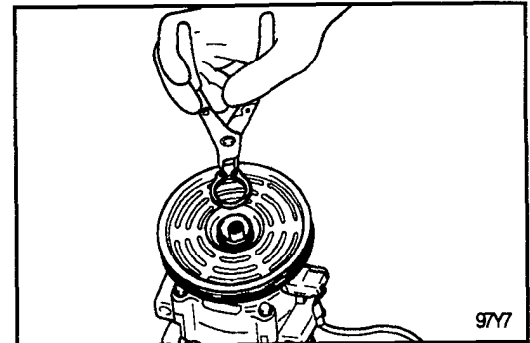


Installation

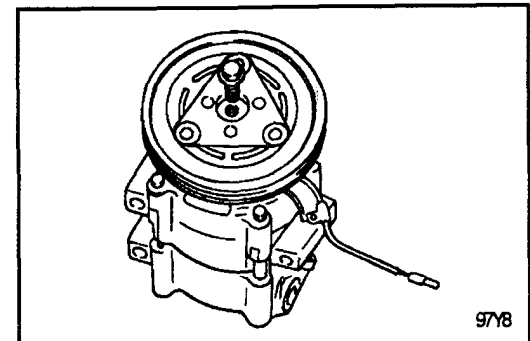
1. Clean the pulley bearing surface of the compressor head to remove any dirt or corrosion
2. Install the pulley and bearing assembly on the compressor. The bearing is a slip fit on the compressor head and, if properly aligned, should slip on the compressor head.



3. Install the pulley retaining snap ring with the bevel side of the snap ring out.



4. Place one nominal thickness spacer shim inside the hub spline opening and slide the hub on the end of the compressor shaft.

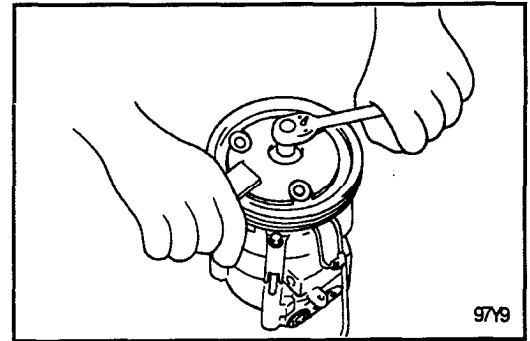


5. Thread a new hub retaining bolt into the end of the compressor shaft. Tighten the hub retaining bolt.

Tightening torque : 10-15 Nm (100-150 kn.cm, 7-11 lb.ft)

NOTE

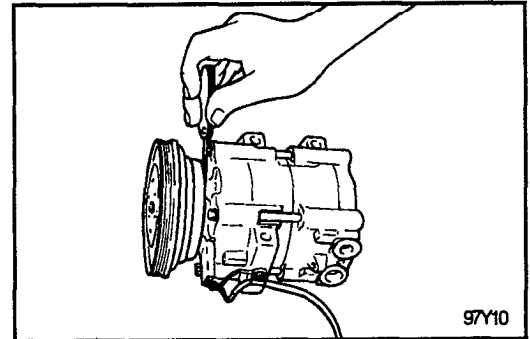
Do not use air tools.



6. Check the clutch air gap between the clutch hub and the pulley mating surfaces with a feeler gauge. The air gap should be as follows:

Between 0.014 and 0.030 inches.

Check at three locations equally spaced around the pulley.



7. If the clutch air gap is not within the dimensions specified above, repeat steps 4 through 6 with the various thickness shims until the air gap is between the specified limits.

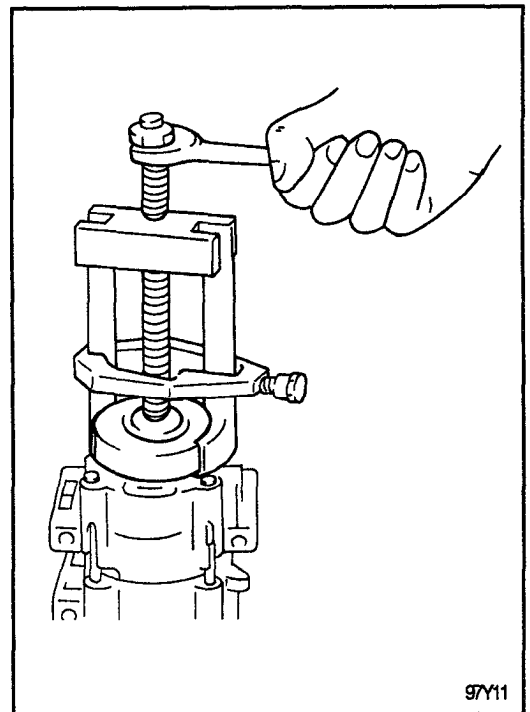
CLUTCH FIELD COIL

Removal

1. Remove the clutch hub and pulley following the procedure given.
2. Install shaft protector tool on the nose opening of the compressor.
3. Install the puller on the compressor as shown in the illustration. Place the tip of the puller forcing screw on the center dimple of the shaft protector and the jaws of the puller around the back side of the field coil.
4. Tighten the forcing screw with a wrench to pull the coil loose from the compressor front head.

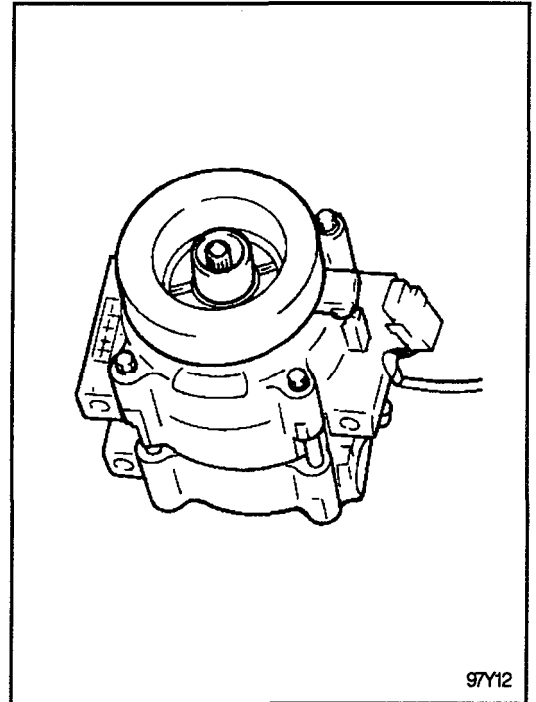
NOTE

DO NOT USE AIR TOOLS.



Installation

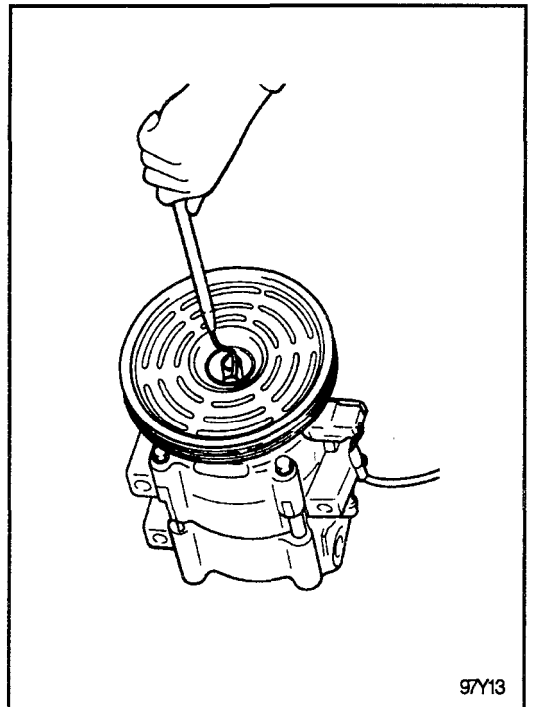
1. Clean the coil press diameter of the front head to remove any dirt or corrosion.
2. With the compressor in a vertical position (nose up), place the coil in position on the front head of the compressor. Assure that the clutch coil electrical connector is positioned correctly.
3. Place the coil pressing tool in position over the compressor nose and the inner radius of the field coil.
4. Position an eight (8) inch, two jaw puller to the compressor and pressing tool as shown in the illustration. The jaws of the puller should be firmly engaged with the rear side of the compressor front mounts and the forcing screw should be piloted on the center of the pressing tool.
5. Tighten the forcing screw with a wrench by hand until the coil is pressed completely onto the compressor front head. Check to assure that the field coil bottoms against the front head at all points around the coil outer diameter.
6. Install the clutch pulley and hub on the compressor as outlined.

**Shaft Seal**

The refrigerant system must be discharged and the compressor must be removed from the vehicle prior to replacing the compressor shaft seal.

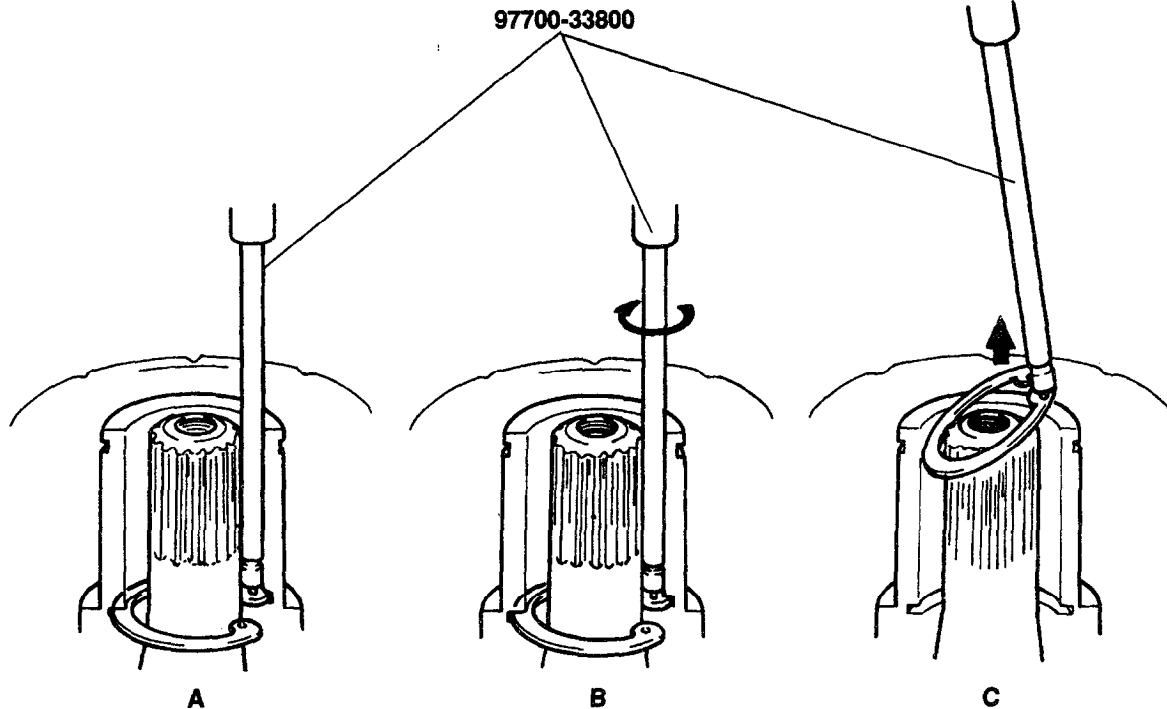
REMOVAL

1. Remove the clutch hub from the compressor.
2. Remove the shaft seal felt from the nose of the compressor with a pick type tool.
3. Blow any debris from inside the compressor nose with low pressure compressed air. Then, clean the inside and outside nose area of the compressor with a lint-free cloth to remove any oil and dirt.



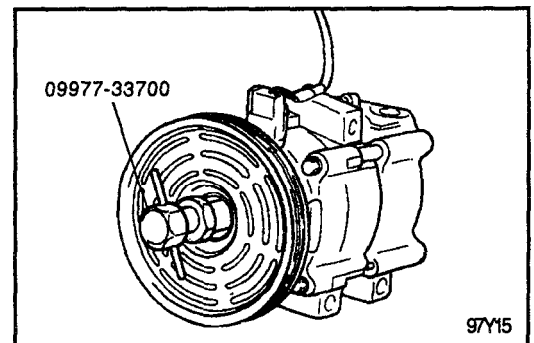
4. Remove the shaft seal retaining snap ring from inside the compressor nose with Snap Ring Remover as follows:

Removing FX15 Shaft Seal Retaining Snap Ring.



97Y14

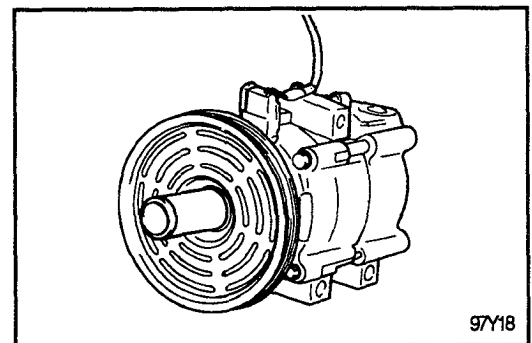
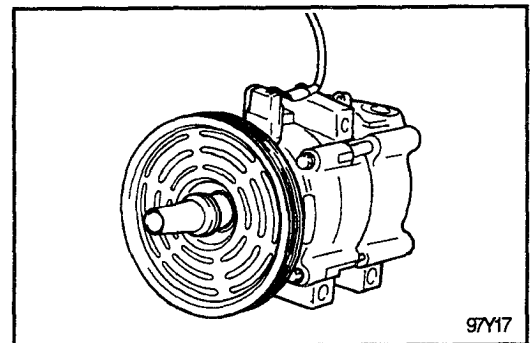
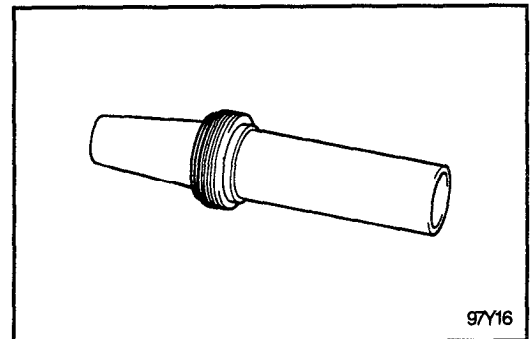
- o Insert tip of Snap Ring Remover into one of the snap ring eyes (View A).
 - o Rotate the Snap Ring Remover to position the tool tip and snap ring eye closest to the compressor shaft (View B).
 - o Pull the Snap Ring Remover tool up quickly while keeping the tool shaft against the side of the nose opening to remove the snap ring (View C).
5. Position the Shaft Seal Remove Tool (09977-33700) over the compressor shaft and push the tool into the nose of the compressor and down against the shaft seal. Engage the end of the tool with the internal diameter of the shaft seal. While holding the hex part of the tool, turn the tool handle clockwise to expand the tool tip inside the seal inner radius. Then, pull the shaft seal from the compressor with the tool.



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Installation

1. Obtain a new shaft seal kit. Carefully remove the contents from the package and locate the plastic shaft seal protector. Inspect the protector for any burrs or other damage. Do not use the protector if it is damaged. Obtain another shaft seal kit and use the protector from it.
3. Using a clean lint-free cloth, clean the shaft and the seal pocket inside the compressor nose.
3. Dip the shaft seal protector and seal in clean refrigerant oil and position the seal on the protector with the lip of the seal pointing toward the large end of the protector.
4. Place the seal protector with shaft seal over the end of the compressor shaft.
5. Place the shaft seal installer tool over the end of the shaft seal protector. Then, slowly push the shaft seal down the protector until it is seated in the compressor.
6. Remove the seal installer and seat protector from the compressor.
7. Place a new seal retaining snap ring into the compressor nose opening and seat the snap ring into the groove with the remover tool.
8. Leak test the shaft seal installation after rotating the shaft about 10 revolutions with the clutch hub.
9. install a new felt into the compressor nose.
10. Install the clutch hub on the compressor as outlined in this section.



HEAD GASKETS AND/OR O-RING SEALS

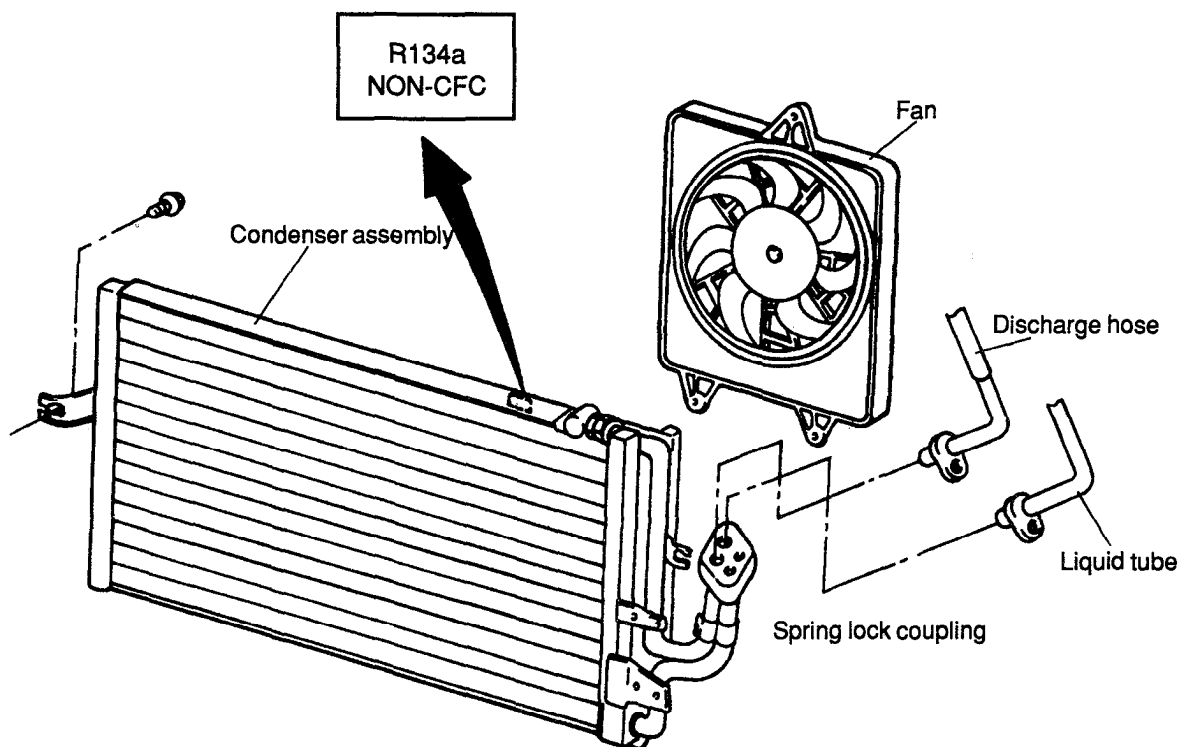
This service procedure was not approved for the FX-15 Compressor at the time this section was approved for printing.

HEAD REPLACEMENT

Head replacement on the FX-15 compressor is not an authorized service procedure at the time this section was approved for publication.

CONDENSER

COMPONENT



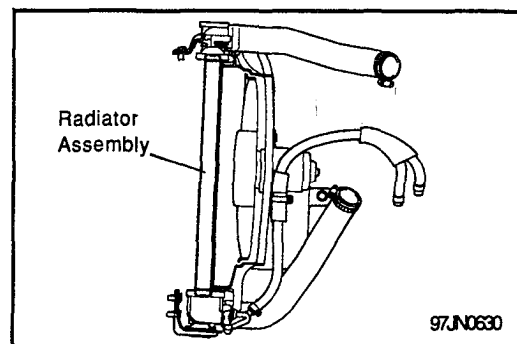
TORQUE : Nm (kg.cm, lb.ft)

ON-VEHICLE INSPECTION

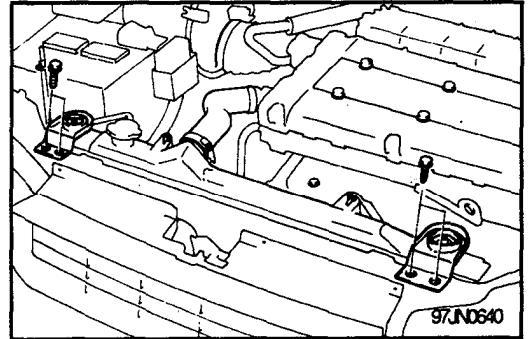
1. Check the condenser fins for blockages or damage. If the fins are clogged, clean them with compressed air. If the fins are bent, straighten them with a screwdriver or a pair of pliers.
2. Check the condenser fittings for leakage. Repair or replace if necessary.

REMOVAL AND INSTALLATION

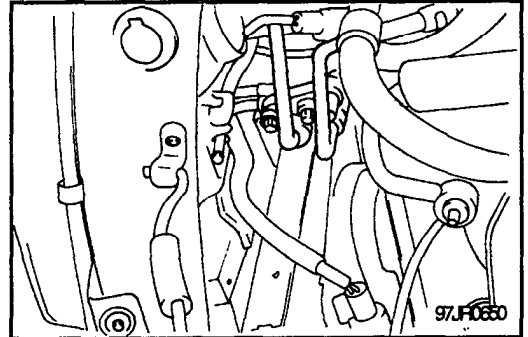
1. Discharge the refrigerant from the A/C system
2. Drain the radiator coolant.
3. Remove the radiator inlet and outlet hose.
4. For vehicles with an automatic transaxle, disconnect the oil cooler from the automatic transaxle.



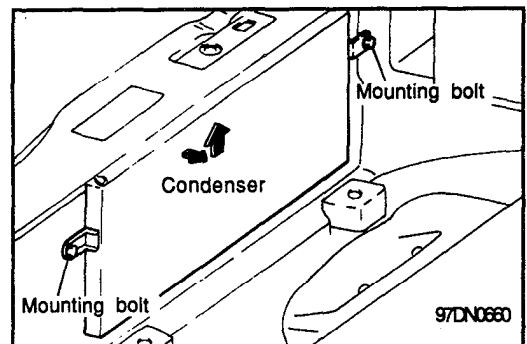
5. Remove the radiator assembly.
 - a) Remove the radiator mounting bolt.
 - b) Remove the radiator with the fan motor.



6. Disconnect the discharge hose and the liquid tube.



7. After removing the condenser mounting bolts (2EA), remove condenser assembly.



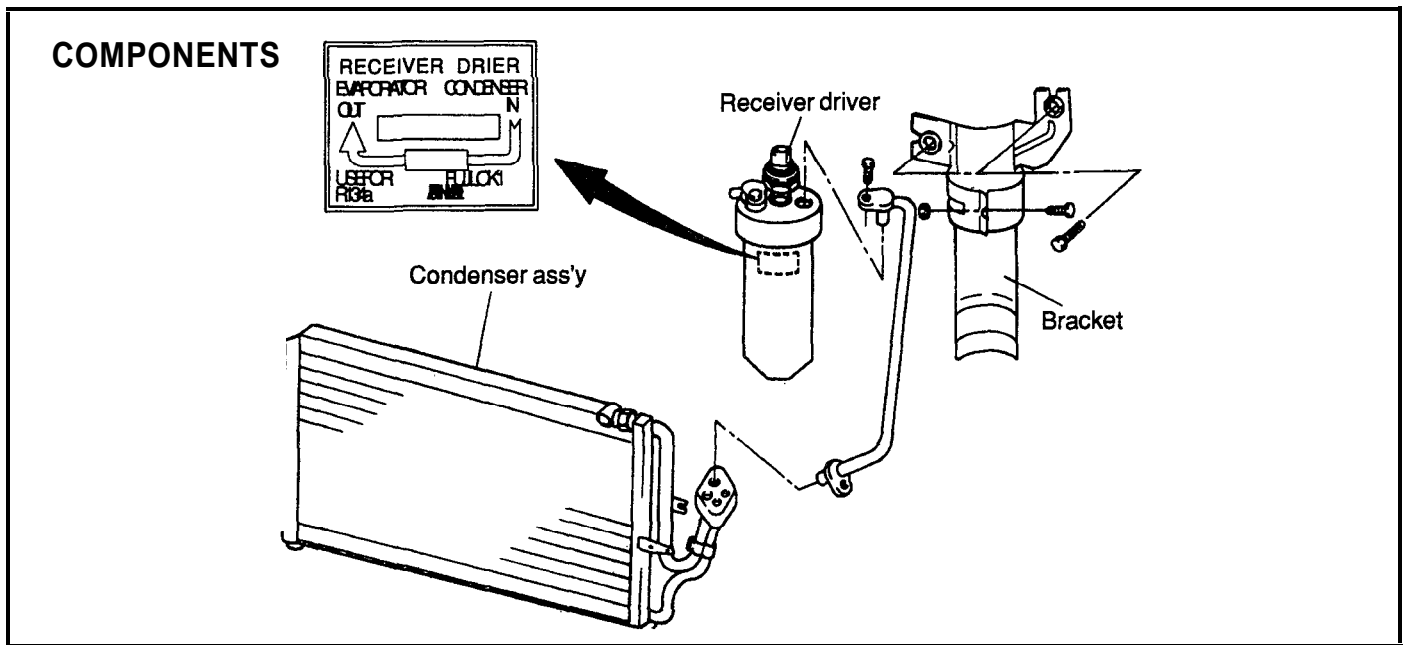
INSTALLATION

Installation is the reverse of removal.

NOTE

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

RECEIVER DRIER



ON-VEHICLE INSPECTION

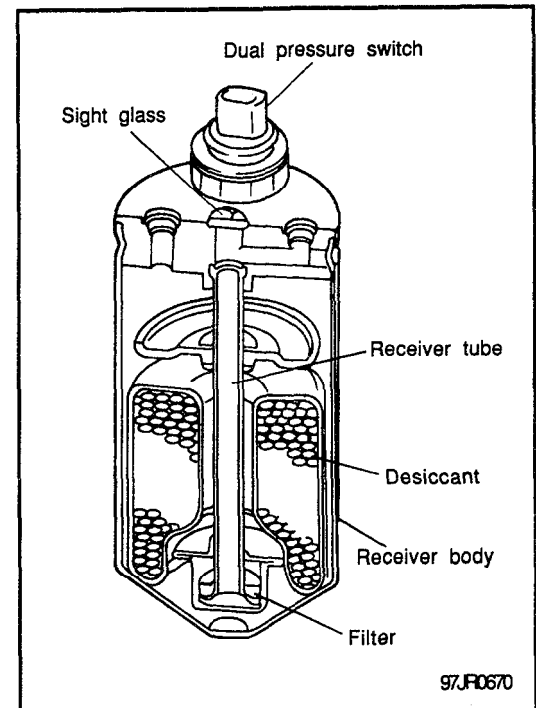
1. Check the sight glass, fusible plug and the fittings for leakage, using a leak detector.
2. Check the receiver-drier for clogging.
 - (a) Run the engine at fast idle with the air conditioner ON.
 - (b) Check both the inlet and outlet temperatures. If difference in temperatures between the inlet and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



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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 40 cc's of compressor oil to the compressor.

DUAL PRESSURE SWITCH

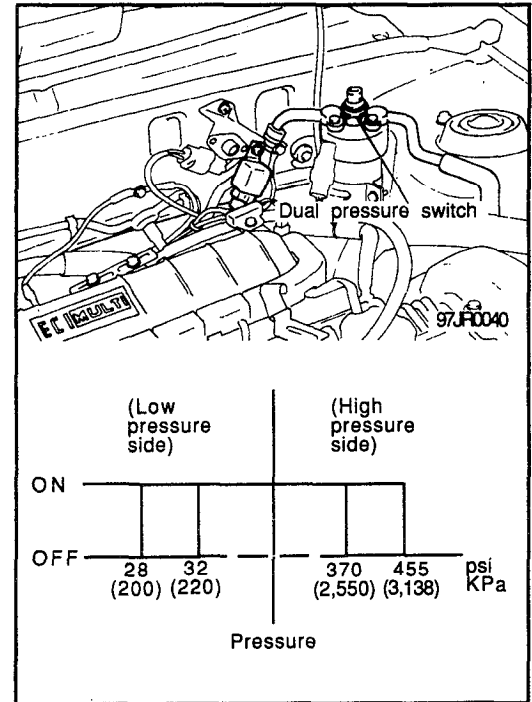
The dual pressure switch is a combination of the low pressure switch (for checking the quantity of refrigerant) and the high pressure switch (for prevention of overheating). It is installed in the receiver, and, when the pressure becomes approximately 200 KPa (28 psi) or lower, the compressor stops, thus preventing the compressor from being damaged by heat.

When the pressure reaches 3,138 KPa (455 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.

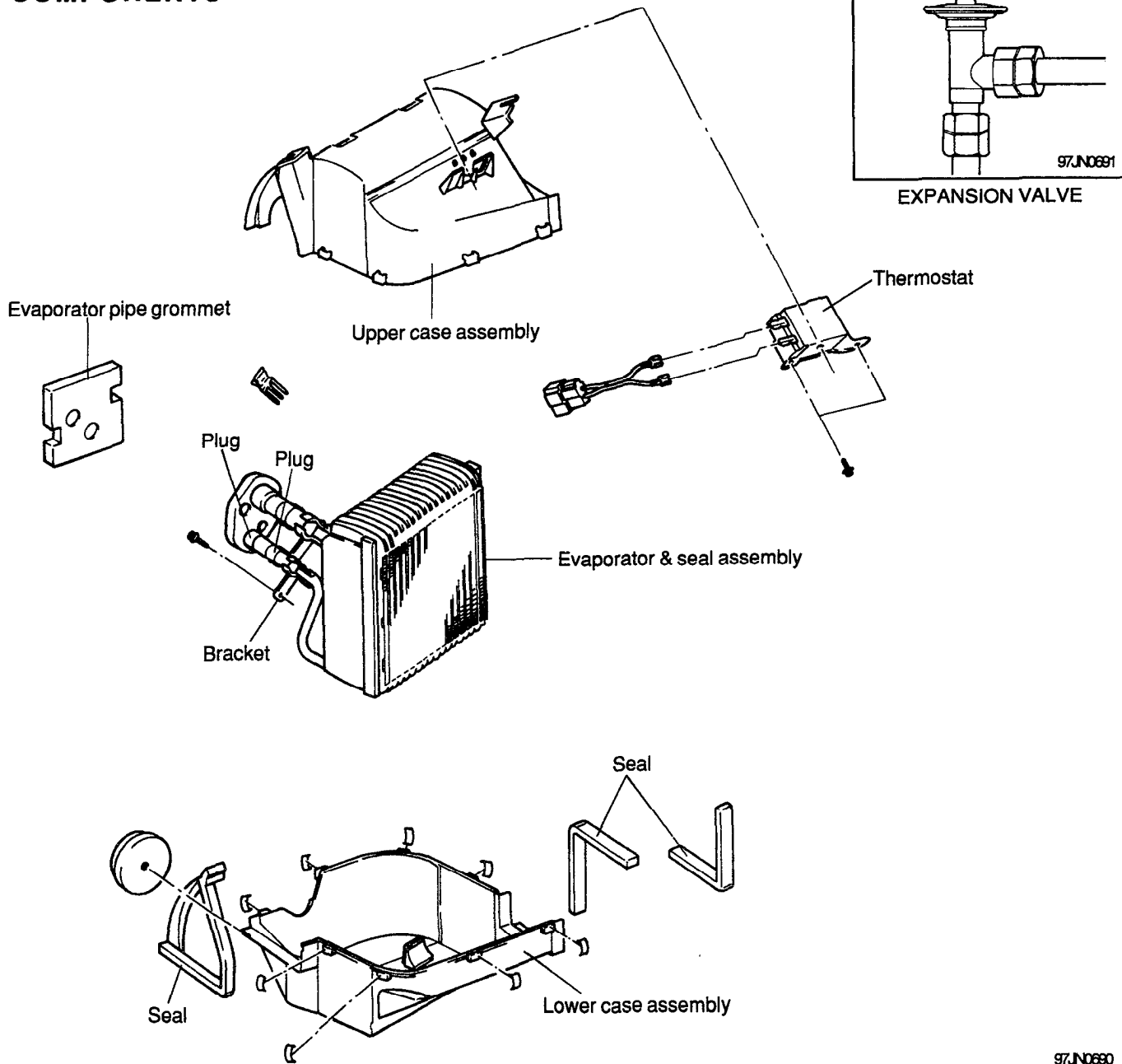
Usual condition	Continuity
Insufficient refrigerant	No continuity
Unusually high temperature	

- (2) If there is an insufficient amount of refrigerant, check the refrigerant amount by looking through the sight glass of the receiver; supply refrigerant is 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.



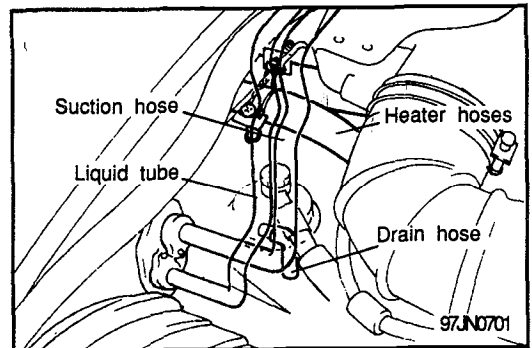
EVAPORATOR

COMPONENTS

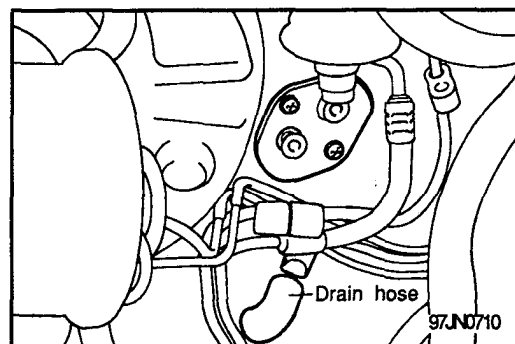


REMOVAL AND INSTALLATION

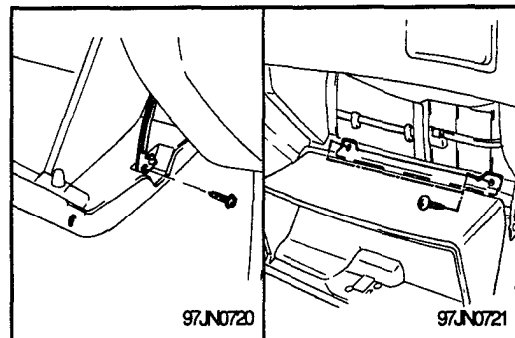
1. Disconnect the negative terminal from the battery.
2. Discharge the refrigerant from the system.
3. Remove the air intake hose.
4. Disconnect the suction and liquid lines.



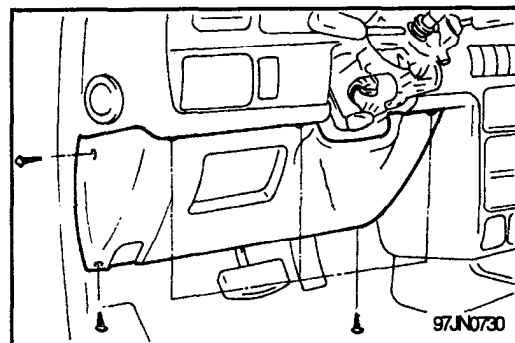
5. Remove the water drain hose from the evaporator.
6. Remove the grommet cover from the dash pannel. (2 screws)



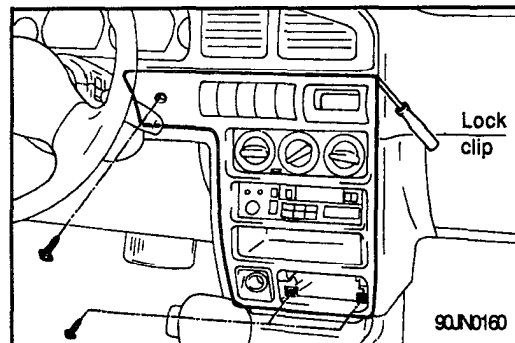
7. Remove the glove box assembly. (3 screws)



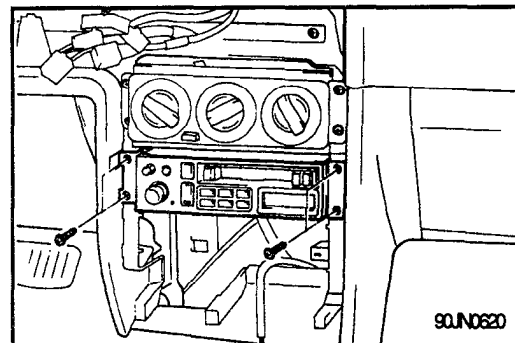
8. Remove the side lower crash pad. (6 screws)



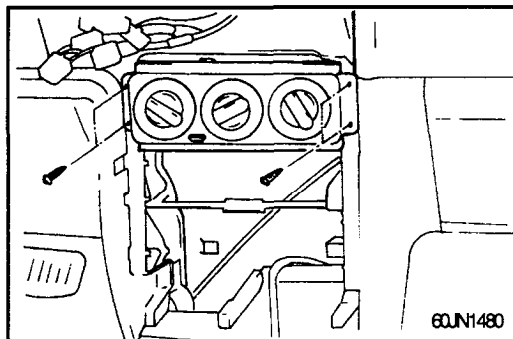
9. Remove the ash tray.
10. Remove the lower crash pad center facia panel and disconnect the connectors.
NOTE : Using a screwdriver, pry loose one clip.
* Tape the screwdriver tip before use.



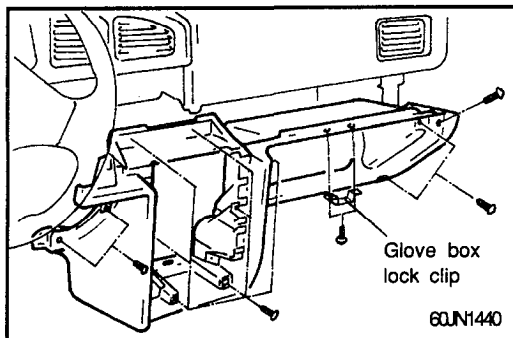
11. Remove the radio and disconnect the connectors.



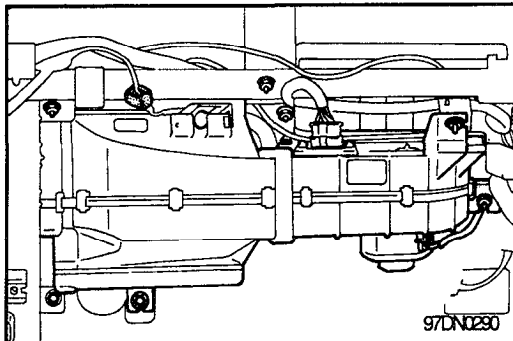
12. Remove 4 mounting bolts for heater control unit assembly.



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

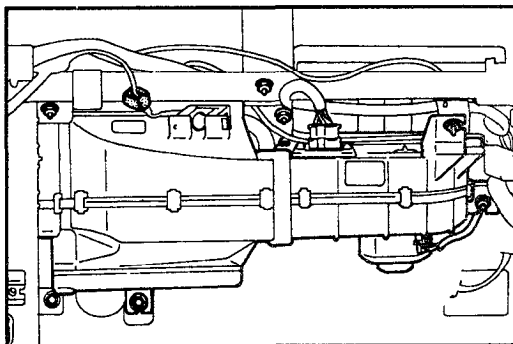


14. Disconnect the connectors for blower resistor (M63), blower motor (M61), thermostat (I12), and the vacuum hose from the recirc/fresh vacuum motor.



15. Remove the blower motor and the evaporator assembly. (2 bolts and 3 nuts)

16. Installation is the reverse of removal.



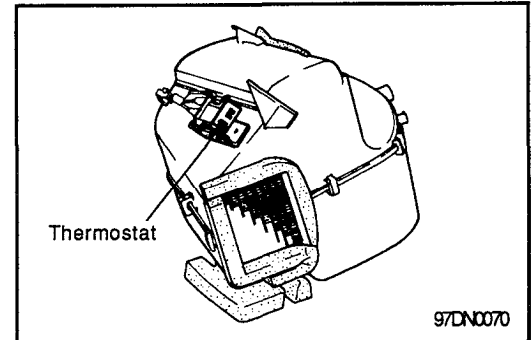
INSPECTION

- 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.

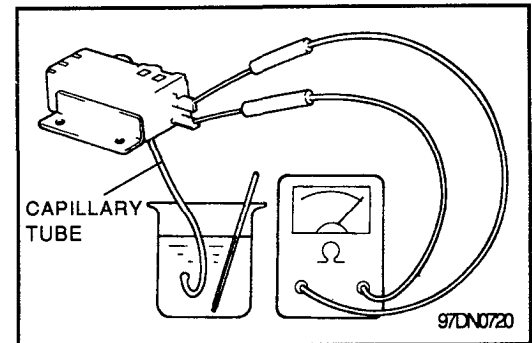
THERMOSTAT

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

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

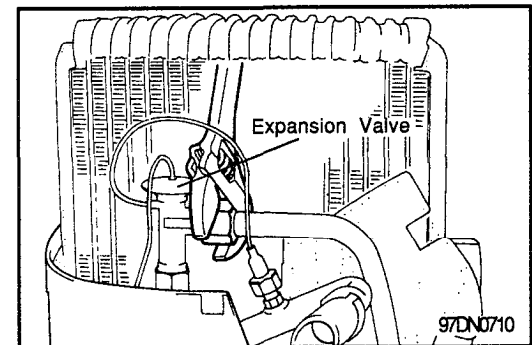


2. If cut-off or cut-in temperature is too low or too high, replace the thermostat.

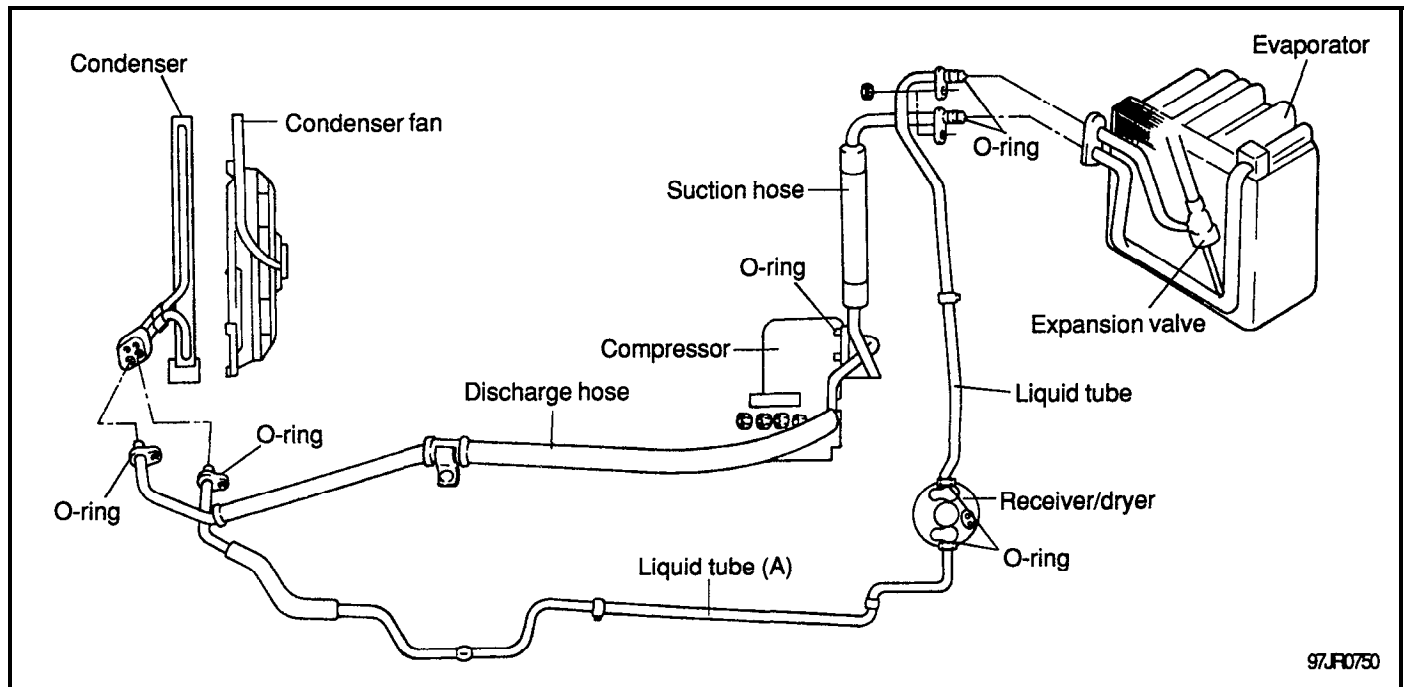


EXPANSION VALVE

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.



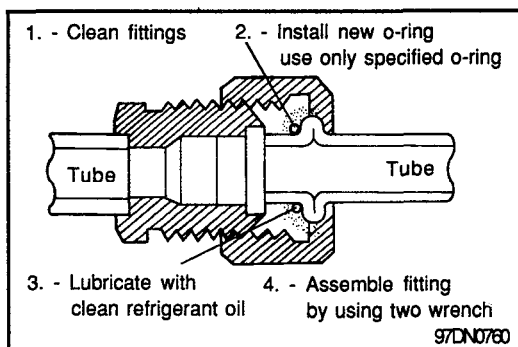
HANDLING TUBING AND FITTINGS



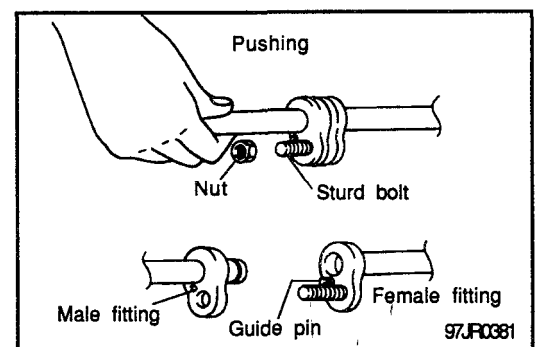
The internal parts of the refrigeration system will remain in a state of chemical stability as long as pure-moisture free refrigerant and refrigerant oil is used. Abnormal amounts of dirt, moisture or air can upset the chemical stability and cause troubles or even serious damage.

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



FLANGE WITH GUIDE PIN TYPE