AIR CONDITIONING SYSTEM

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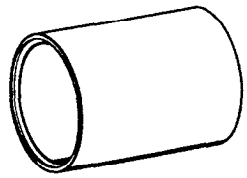
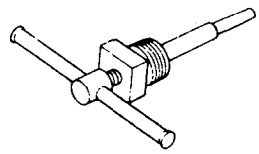
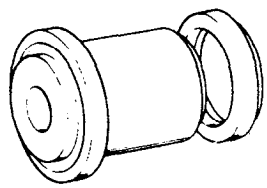
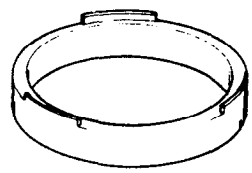
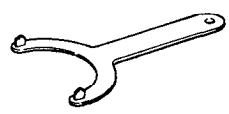
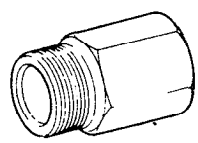
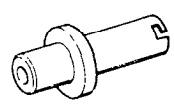
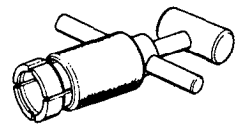
SPECIFICATION

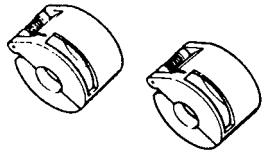
Heater assembly	
Type	Air-mix warm water type
Heating capacity	4,400 Kcal/h (17,460 BTU/h)
Air conditioner	
Cooling capacity	4,200 Kcal/h (16,660 BTU/h)
Compressor	
Type/Model	Swash plate/10P15C
Bore x stroke	ø28x24.8
No. of cylinders	10
Displacement	152.8cc/rev (9.3 cu in/rev)
Maximum speed	6000 rpm
Lubricant	DENSO OIL-6,230 cc
Magnetic clutch	
Type	148P (A)
Voltage/Power consumption	DC 12V/40W Max.
Protective equipment	
Clutch cycling switch	OFF; 167 kPa (24 psi, 1.7 kg/cm^2)
	ON ; 324 kPa (47 psi, 3.3 kg/cm^2)
Pressure switch	OFF; 1,265-1,363 kPa (183-198 psi, 12.9-13.9 kg/cm*)
	ON; 1.608-1.706 kPa (233-247 psi, 16.4-17.4 kg/cm^2)
Pressure relief valve (operation)	3,138-3,825 kPa (455-555 psi, 32-39 kg/cm^2)
Refrigerant and quantity	R-12, 850-900 gr. (30-32 oz, 1.9-2.1 lb)

SERVICE STANDARD

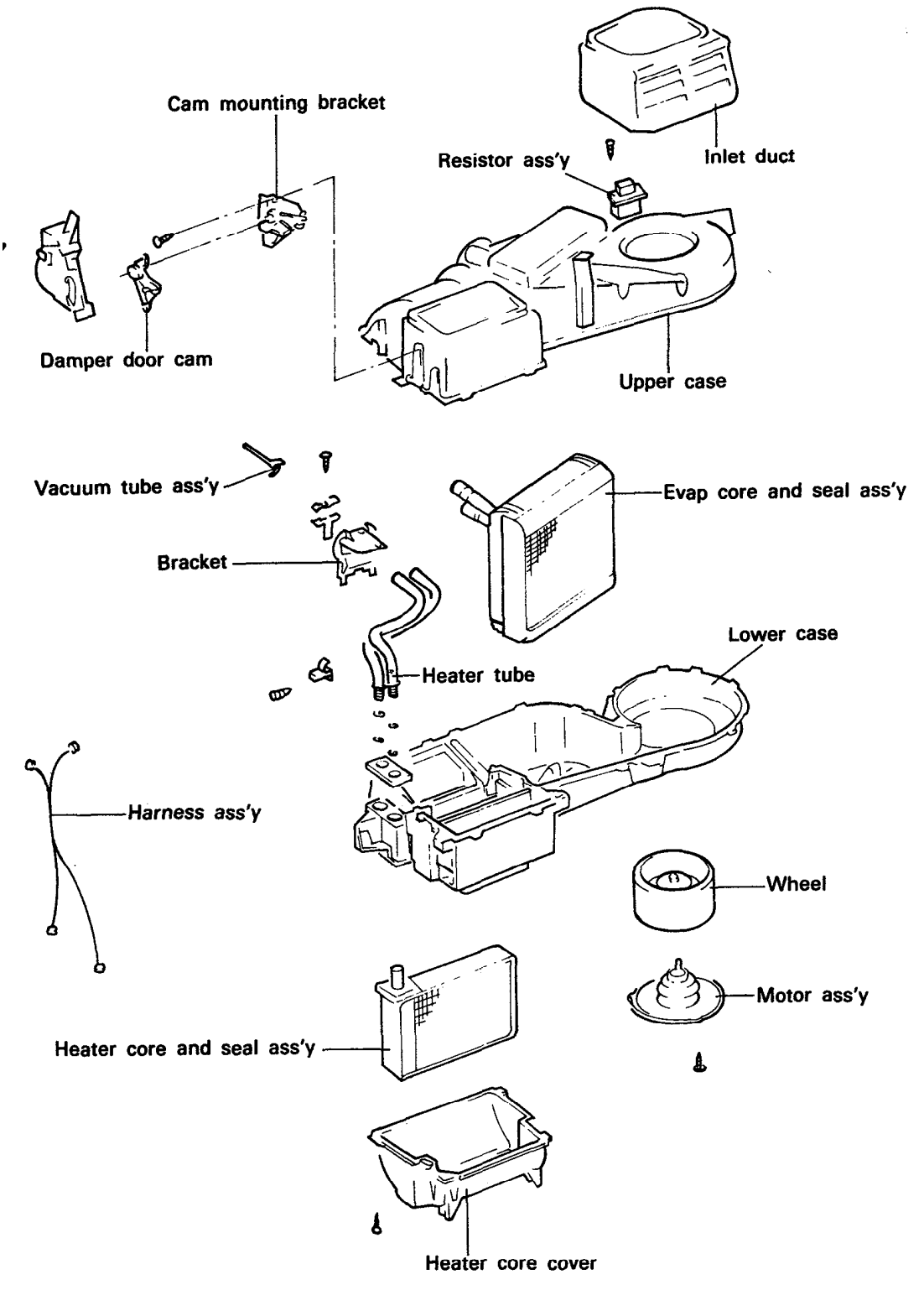
Air conditioner	
Amount of deflection of V-belt	4.5-5.5 mm (0.177-0.216 in.)
Clutch clearance	0.6-1.0 mm (0.024-0.039 in.)

SPECIAL SERVICE TOOLS

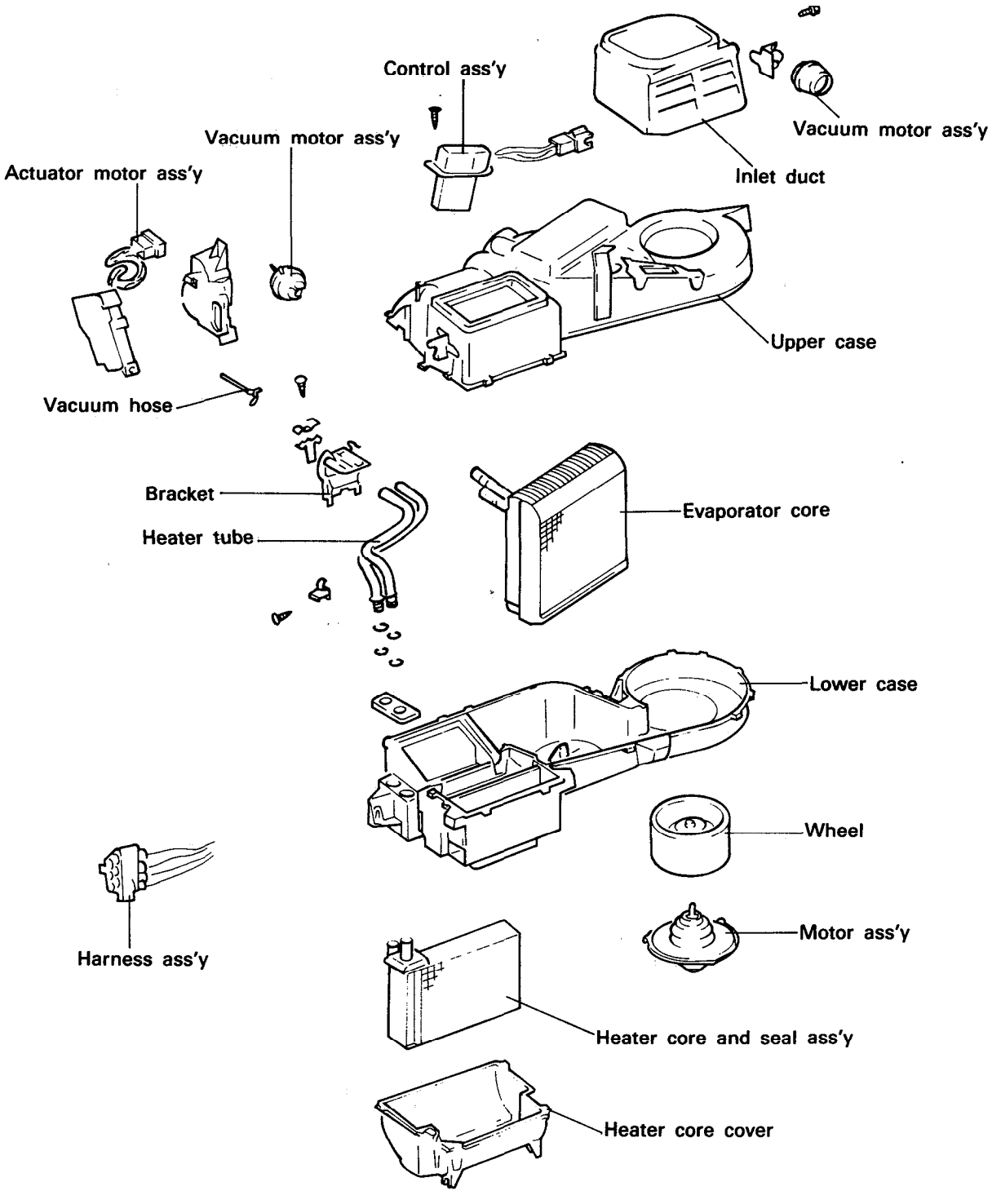
Tool (Number and name)	Illustration	Use
09216—21100 Mount bushing remover and installer base		Removal and installation of rotor bearing (use with 09977—21820)
09977—21100 Drive plate puller		Removal of pressure plate (use with 09977—33100 and 09977—33000)
09977—21810 Bearing remover, installer and pulley installer		1) Installation of pulley to compressor assembly 2) Removal and installation of rotor bearing (use with 09216—21100 and 09977—21820)
09977—21820 Pulley supporter		1) Support of removal and installation of bearing from the pulley 2) Pulley supporter when removing the bearing (use with 09977—21810 and 09216—21100)
09977—33000 Pressure plate nut remover		Removal of pressure plate (use with 09977—21100)
09977—33100 Pressure plate pulley adapter		Removal of pressure plate (use with 09977—21100)
09977—33200 Shaft seal remover, installer and seal seat installer		Removal and installation of shaft seal and seal seat
09977—33300 Seal seat remover and installer		Removal and installation of seal seat

Tool (Number and name)	Illustration	Use
09977-33600 (A/B) Tube remover		Removal of A/C tube

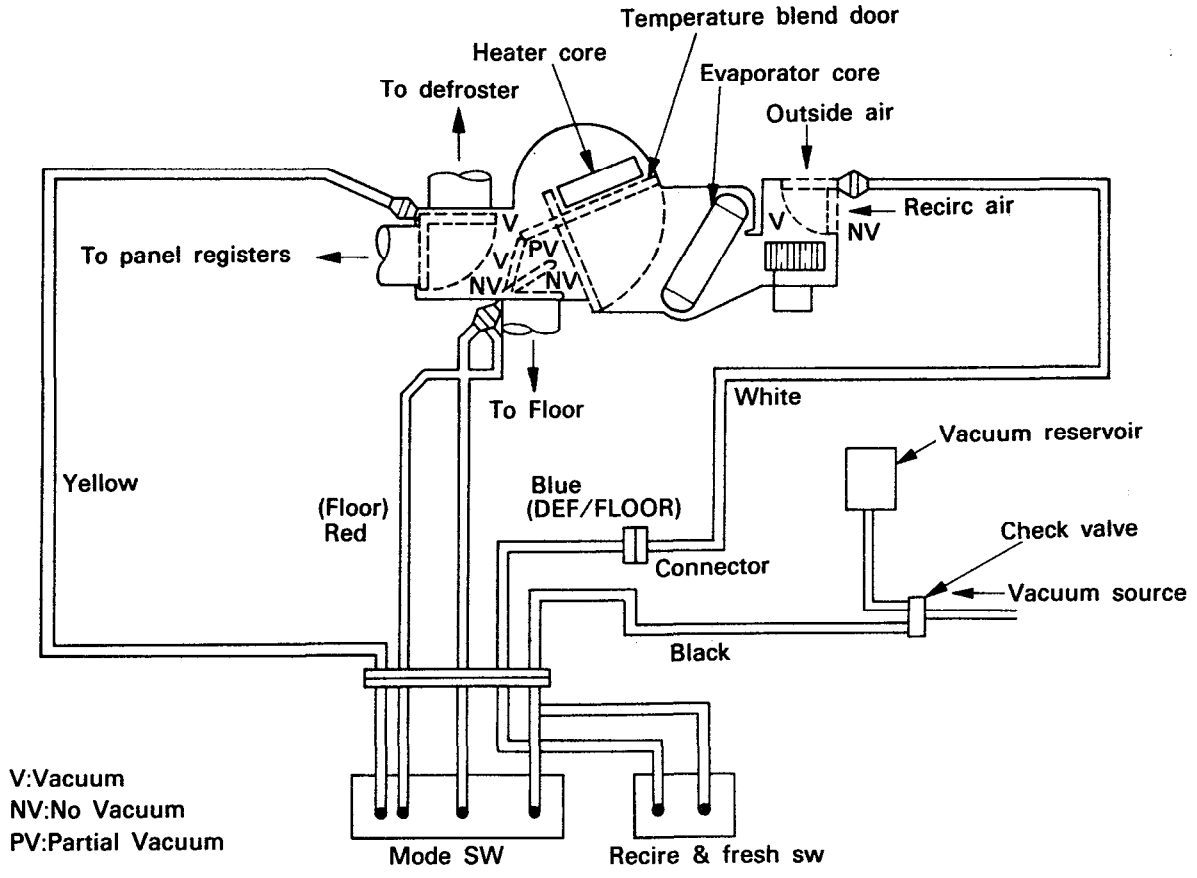
HEATER COMPONENTS (MANUAL)

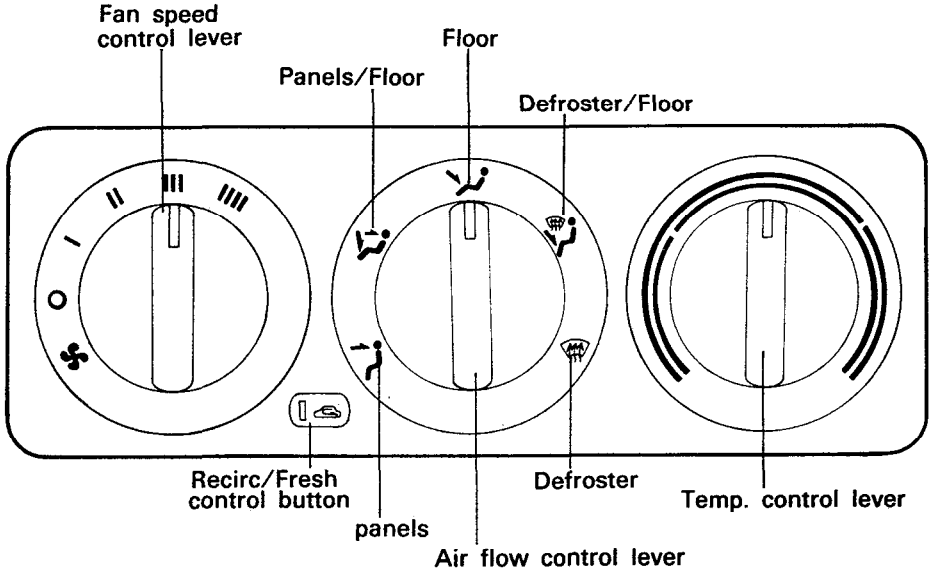


HEATER COMPONENTS (SATC ONLY)



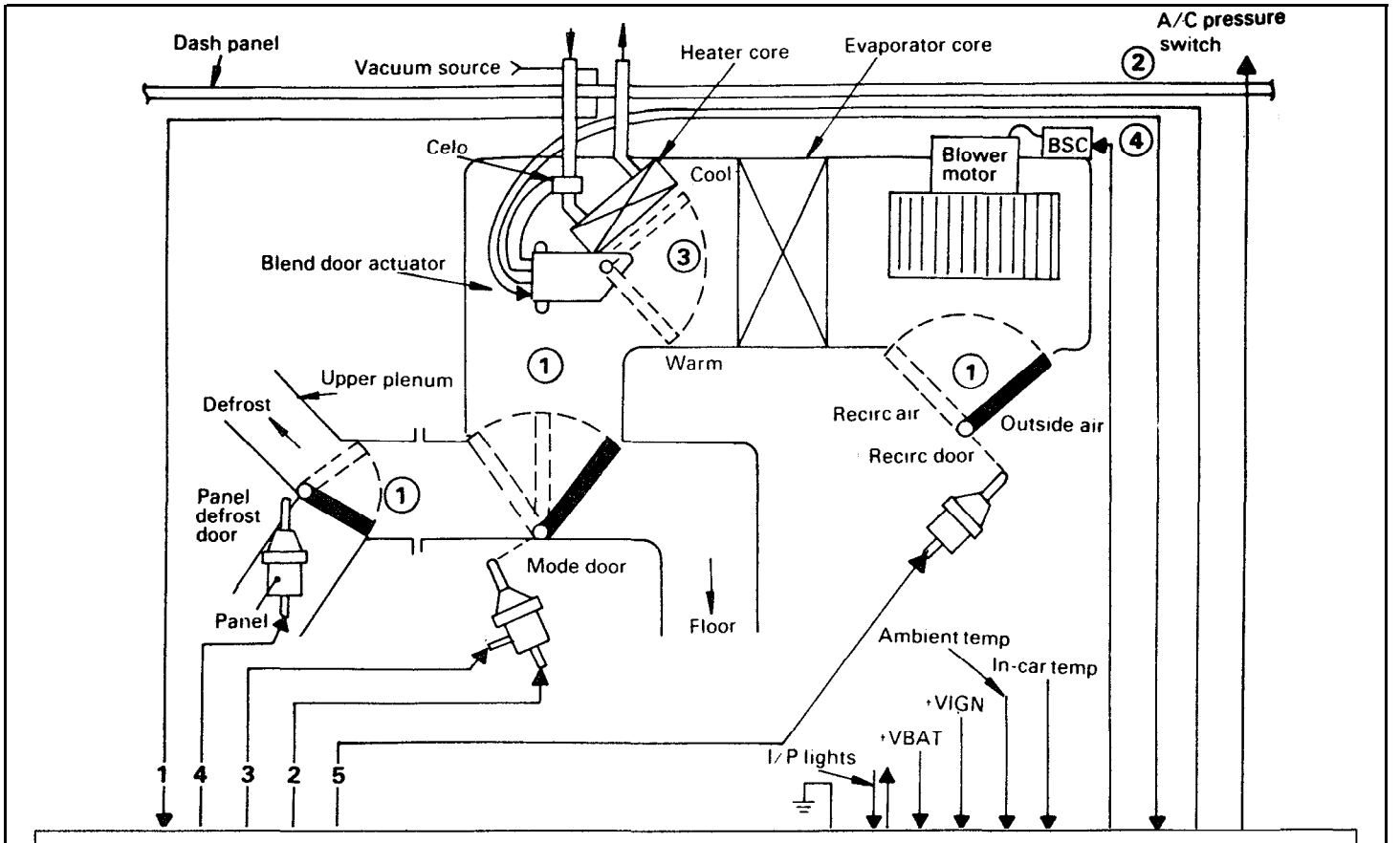
VACUUM SYSTEM SYMPTOM AND PROBABLE CAUSE





Symptom	Probable cause
On "FLOOR" position. All air through defroster or DEF/FLOOR.	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 A/C source hose pinched or disconnected at the vacuum manifold. o Defective vacuum motor.
On "DEF/FLOOR" position. All air through defroster.	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 A/C source hose pinched or disconnected at the vacuum manifold. o Defective vacuum motor.
On "PANEL VENTS" position. All air through defroster.	o Yellow vacuum hose pinched or disconnected at vacuum motor. o Black source hose pinched or disconnected at the connector. o Engine compartment A/C source hose pinched or disconnected at the vacuum manifold. o Defective vacuum motor.
On "PANEL/FLOOR" position. All air through defroster or panel	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 A/C 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.	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 A/C source hose pinched or disconnected at the vacuum manifold. o Defective vacuum motor.

AIR DISTRIBUTION SYSTEM (SATC ONLY)



CON-NECTION		FUNCTION	VACUUM SWITCHING BUTTON								
			OFF	PANEL	PANEL FLOOR	FLOOR	FLOOR DEF	DEF	A/C	RECIRC	FRESH
	P1	SOURCE	V	V	V	V	V	V	V	V	V
	P2	FLOOR (PARTIAL)	A	A	V	V	V	A	**	**	**
	P3	FLOOR (PULL)	A	A	A	V	A	A	**	**	**
	P4	PANEL	A	V	V	A	A	A	**	**	**
	P5	RECIRC	V	*	*	*	*	A	***	V	A

V = Vacuum A = Atmosphere

* = Controlled by "RECIRC" and "FRESH" buttons.

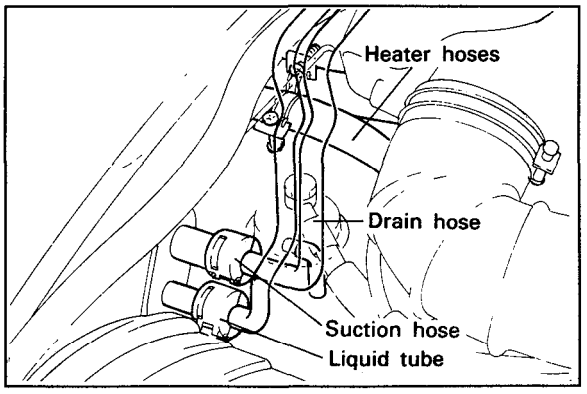
** = Controlled by "OFF" "PANEL" "PANEL/FLOOR" FLOOR" "FLOOR/DEF" and "DEF" buttons.

*** = Controlled by "OFF" "DEF" "RECIRC" and "FRESH" buttons.

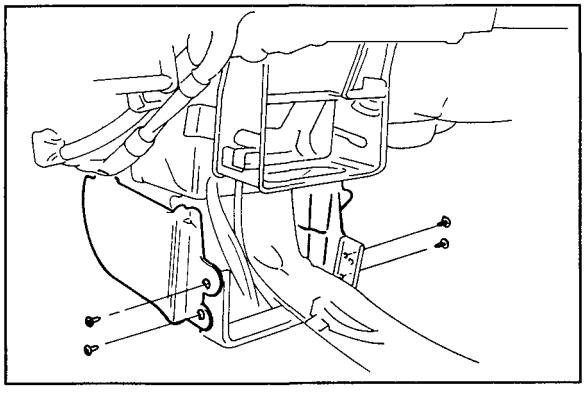
HEATER

REMOVAL

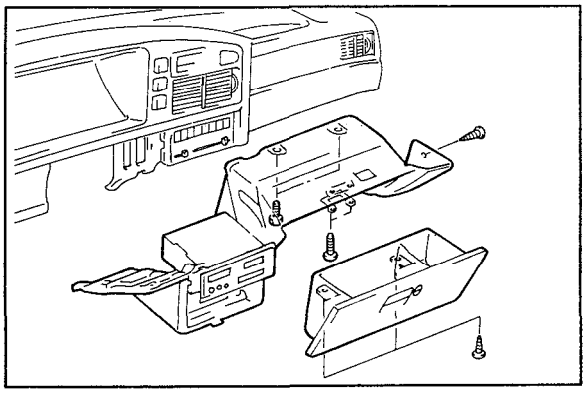
1. Disconnect the negative terminal of the battery.
2. Drain the coolant from the radiator.
3. Remove the heater hoses and drain hose.
4. Using the special tool 09977-33600(A/B), remove the suction hose and the liquid tube.



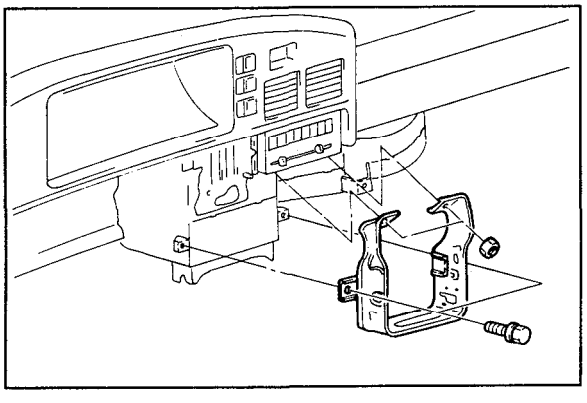
5. Remove the front and the rear console assembly.
6. Remove both side covers.



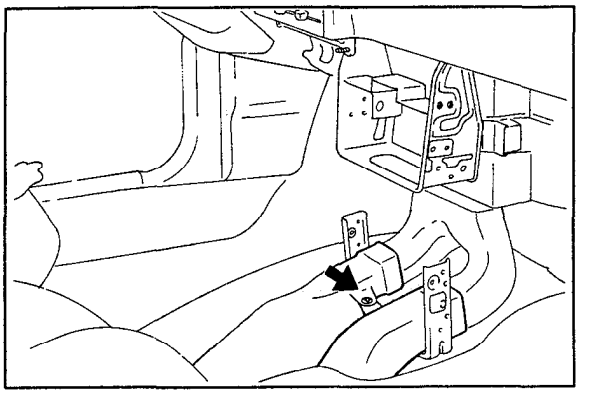
7. Remove the glove box, center crash pad cover, center crash pad and the cassette assembly.



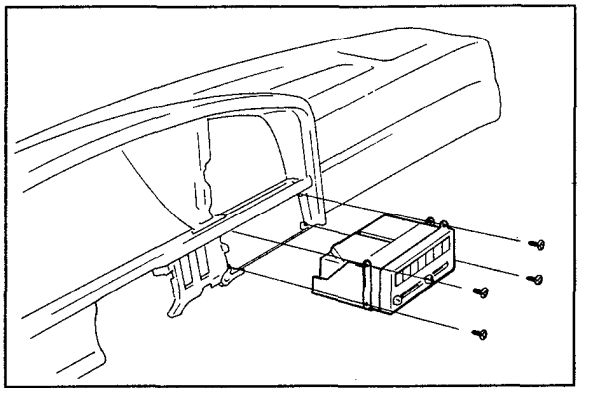
8. Remove the lower crash pad.
9. Remove the console mounting bracket and the center support bracket.



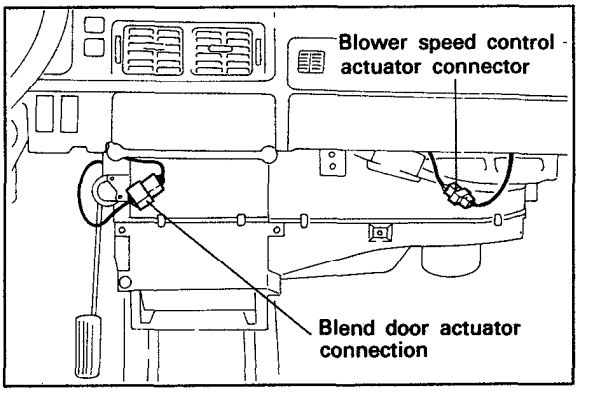
10. Remove the rear heating duct assembly (LH/RH) and the rear heating joint duct.



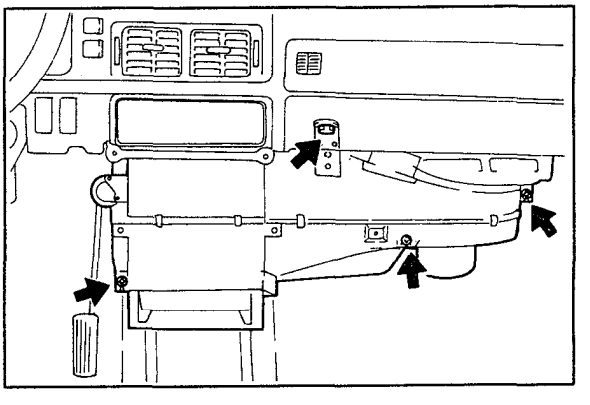
11. Remove the control assembly.



12 Disconnect the blower speed control actuator connector and the blend door actuator connector. (SATC only)



13. Remove the heater assembly.



INSPECTION

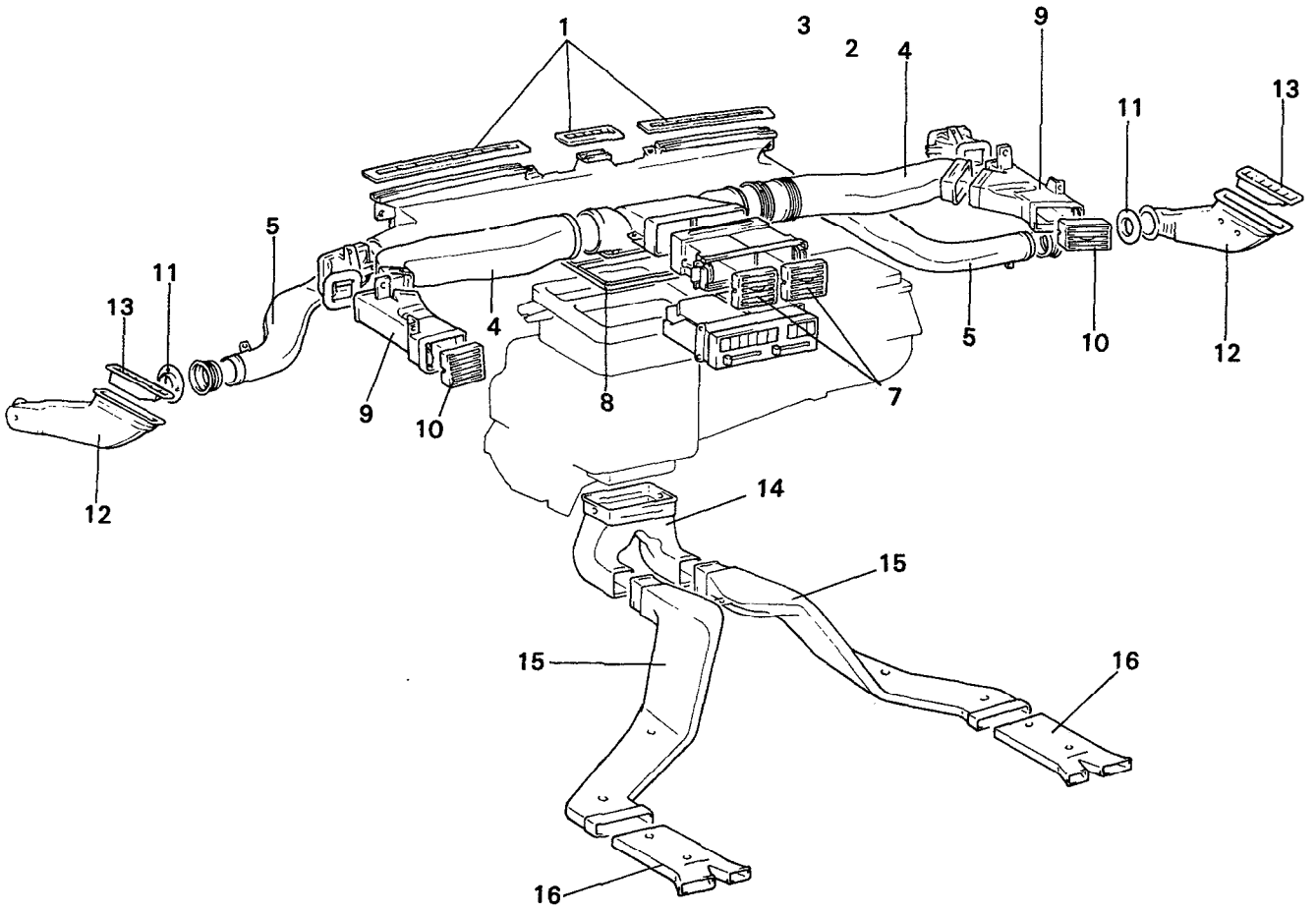
1. Check the link mechanism for operation.
2. Check the heater core for restriction or water leakage.
3. Check the water valve for operation and clogging.

INSTALLATION

Installation is the reverse of the removal procedures.

VENTILATORS

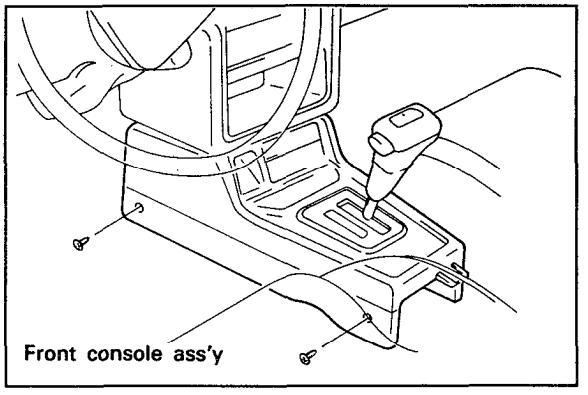
COMPONENTS



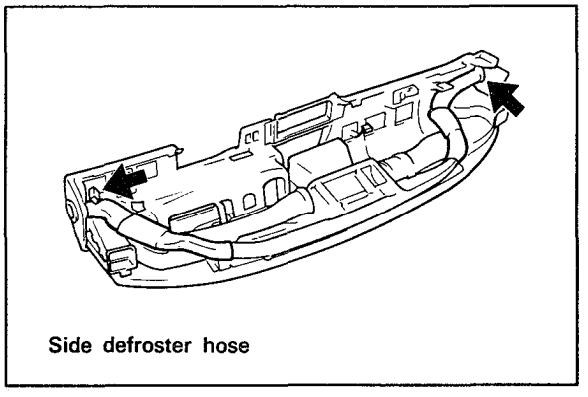
1. Defroster nozzle upper cover
2. Defroster nozzle assembly
3. Heater connection
4. Side air/vent hose assembly (LH/RH)
5. Side defroster hose assembly (LH/RH)
6. Center air/vent louver nozzle
7. Center air/vent louver duct
8. Plenum duct assembly
9. Side air/vent louber duct (LH/RH)
10. Side air/vent louver nozzle (LH/RH)
11. Door side defroster joint (LH/RH)
12. Door side defroster nozzle assembly (LH/RH)
13. Door side defroster grille (LH/RH)
14. Rear heating joint duct
15. Rear heating side duct (LH/RH)
16. Rear duct (LH/RH)

REMOVAL

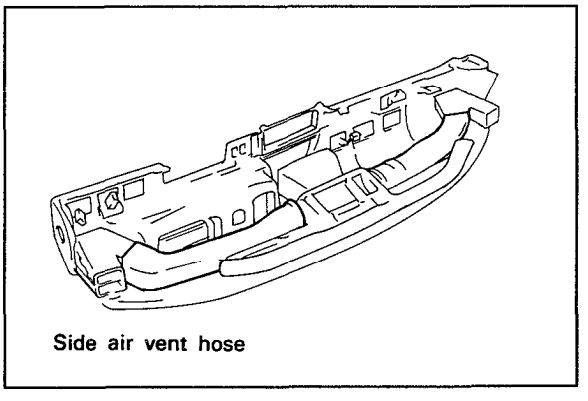
1. Remove the front and the rear console assembly.
2. Remove the glove box and crash pad assembly.



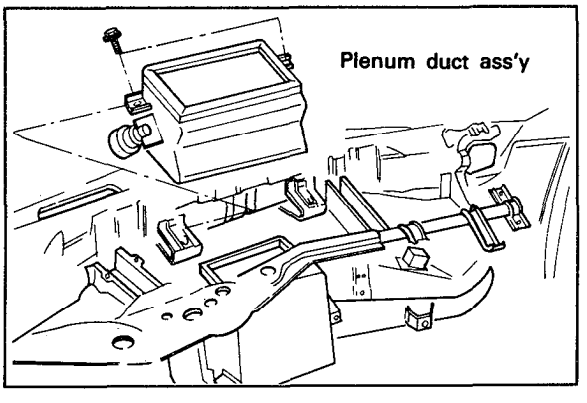
3. Remove the side defroster hose assembly.
4. Remove the defroster air guide and the defroster nozzle assembly.



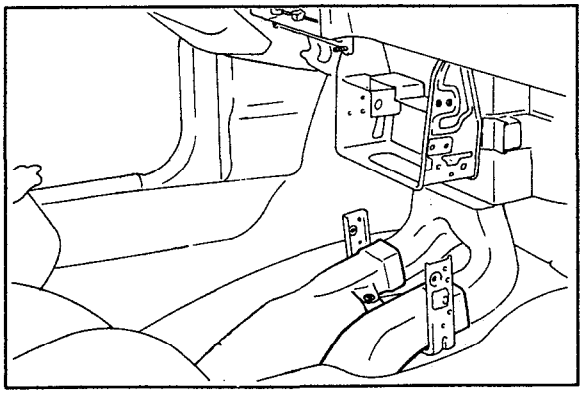
5. Remove the side air vent hose assembly (LH/RH).
6. Remove the heater connection assembly.



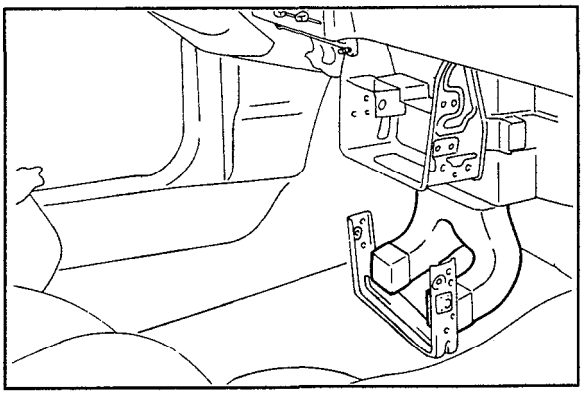
7. Remove the plenum duct assembly.



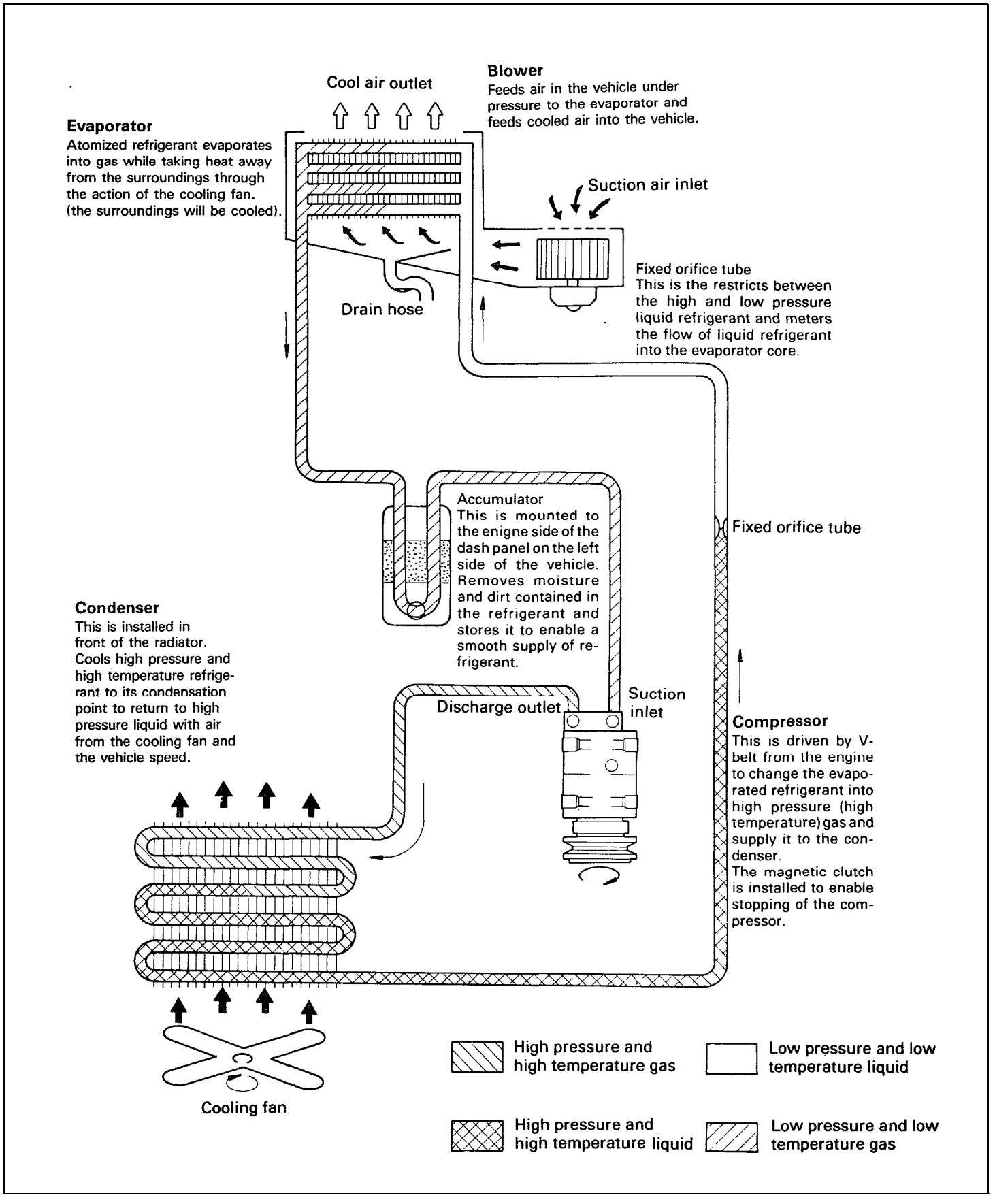
8. Remove the rear heating side duct assembly (LH/RH) and the rear duct (LH/RH) - Deluxe type.
9. Remove the rear heating duct assembly (LH/RH) - Standard type.



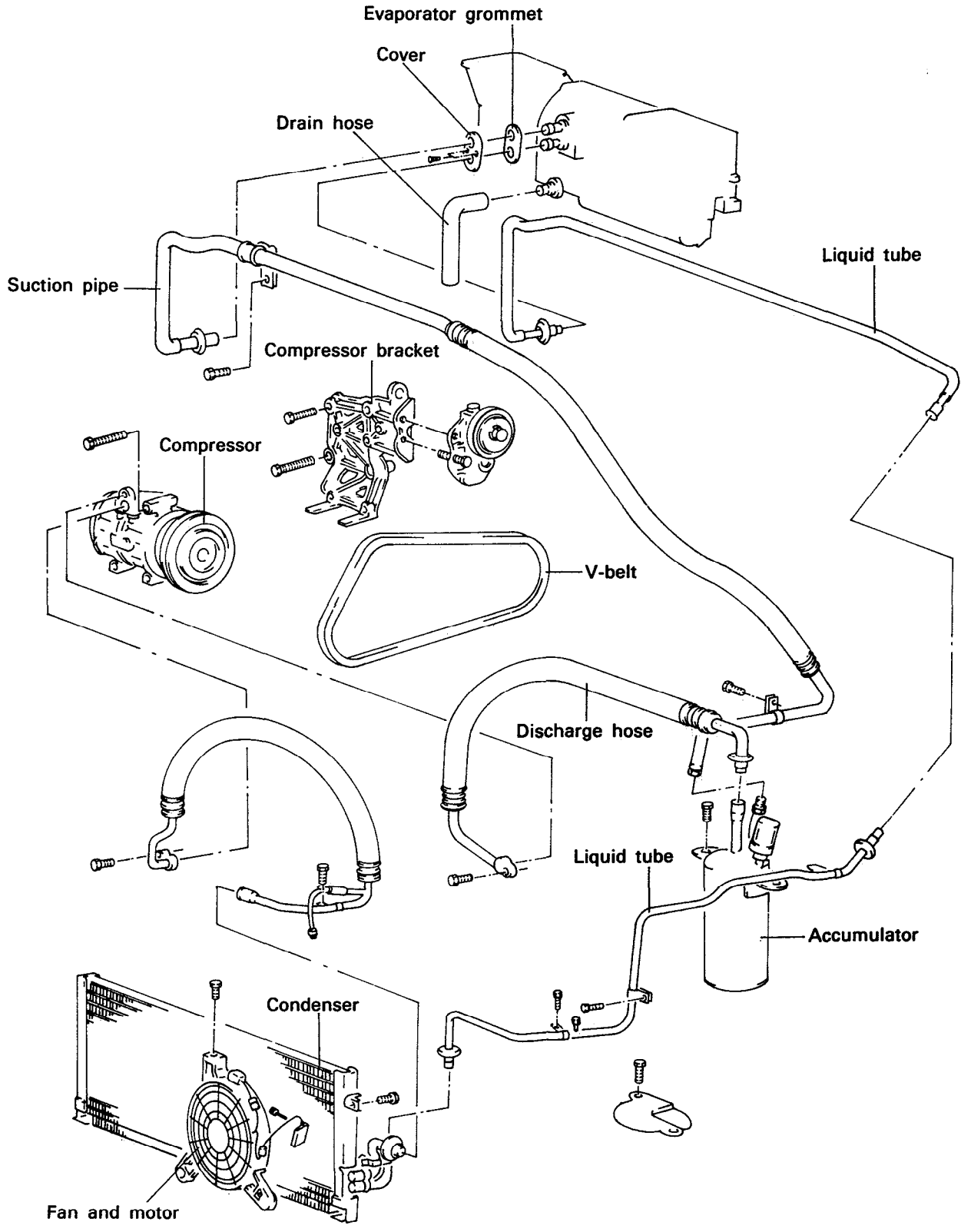
10. Remove rear heating joint duct assembly.
Installation is the reverse of the removal procedures.



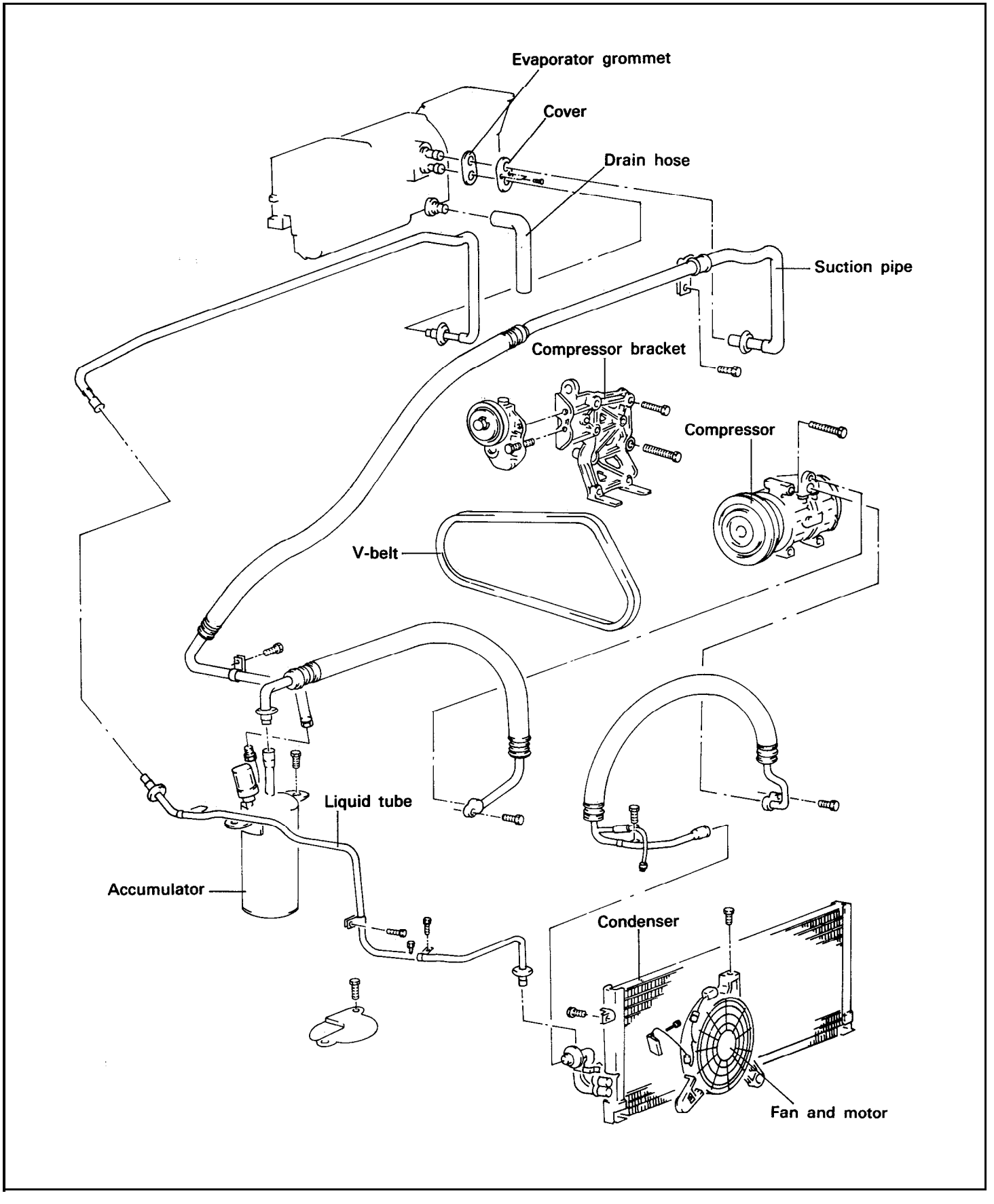
REFRIGERATION CYCLE



AIR CONDITIONER COMPONENTS (LHD)



AIR CONDITIONER COMPONENTS (RHD)



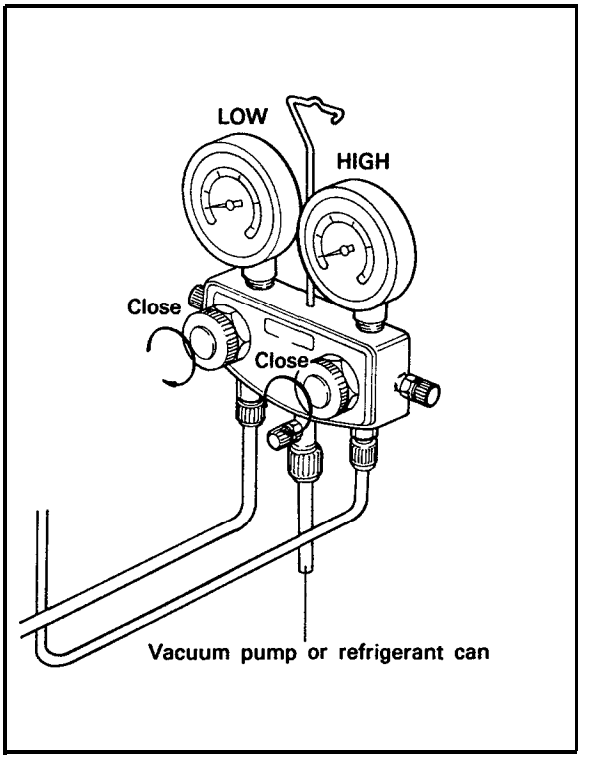
SAFETY PRECAUTIONS

1. The R-12 liquid refrigerant is highly volatile. A drop on the skin of your hand 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 a highly pressurized vessel. Never leave it in a hot place, and check to be sure 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.

INSTALLATION OF MANIFOLD GAUGE SET

1. Close both hand valves of the manifold gauge fittings.
2. Install the charging hoses of the gauge set to the fittings. Connect the low-pressure hose to the low-pressure service port, and the high-pressure hose to the high-pressure service port.
   Tighten the hose nuts by hand.

   NOTE
   Fittings for attaching the manifold gauge set are located on the compressor and the high pressure hose.

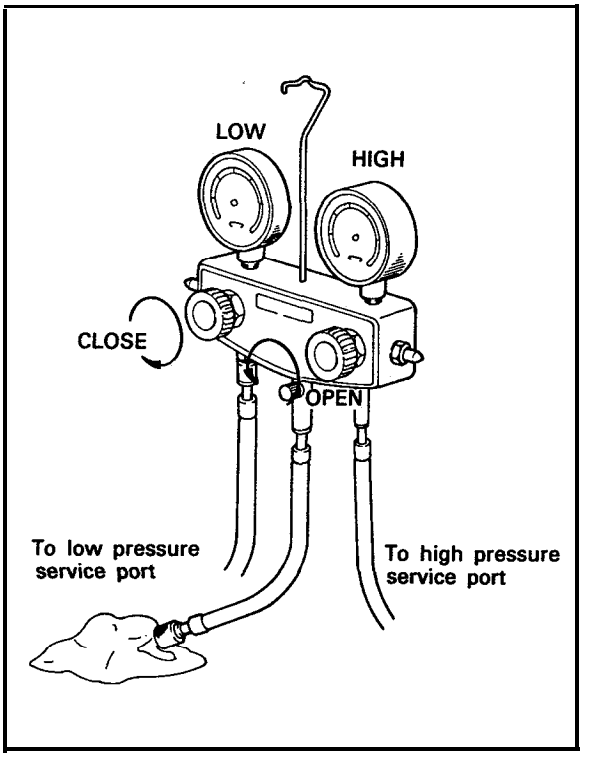


DISCHARGING THE REFRIGERATION SYSTEM

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/cm^2, 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 0 kPa (0 kg/cm^2, 0 psi).

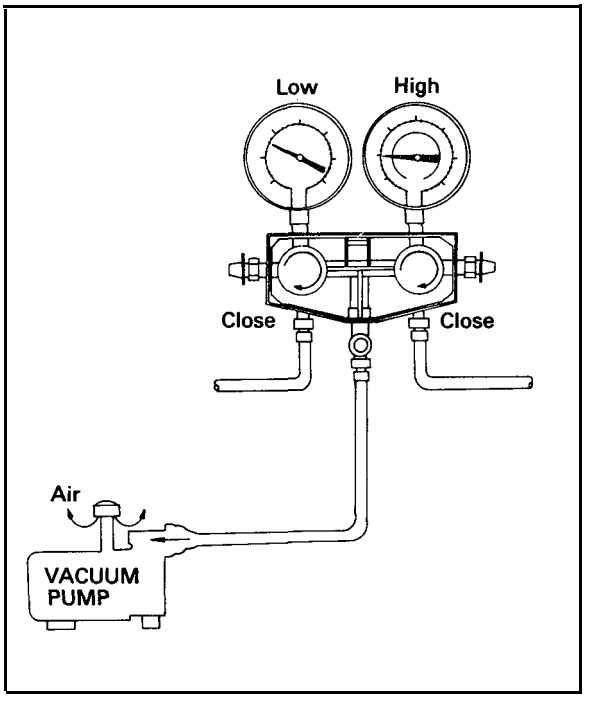


EVACUATING REFRIGERANT SYSTEM

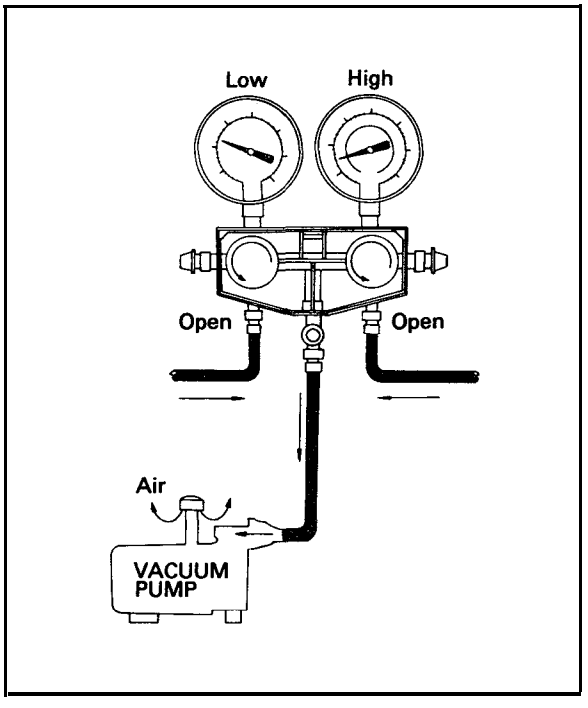
NOTE

It is necessary to evacuate the air conditioning system any time the system has been opened. Evacuation is necessary to rid the system of all air and moisture that may have been allowed to enter the unit.

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.

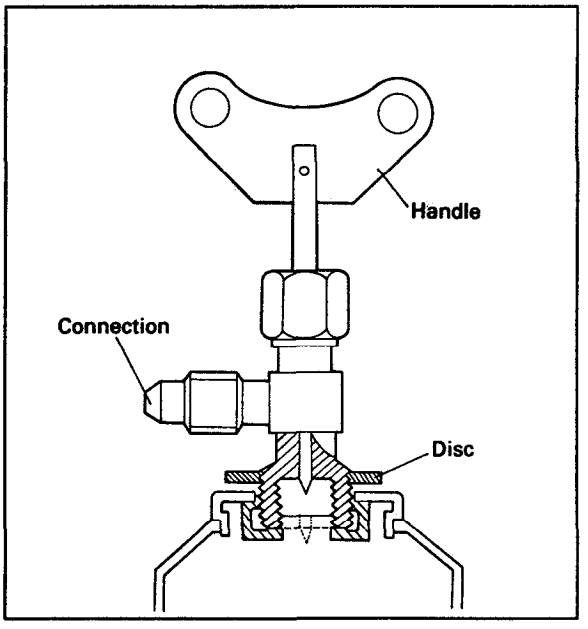


1. **Engine should be off.**
2. **Connect a manifold gauge set to the compressor gauge fittings. Close both high and low pressure valves.**
3. **Make sure the refrigerant has been discharged from the system.**
4. **Connect the center hose of the gauge set to the vacuum pump inlet.**
5. **Start the vacuum 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/cm^2, 13.7 psi) 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. Repair any leakage found. Refer to checking refrigerant leaks.**
   4) **Discharge refrigerant again, and then evacuate the system. If no leaks are found, continue evacuating the system.**
7. **Start the vacuum pump.**
8. **Open both manifold pressure valves to obtain 94.39 kPa (0.96 kg/cm^2, 13.7 psi) of vacuum.**
9. **After the low pressure manifold gauge indicates as close to 94.39 kPa (0.96 kg/cm^2, 13.7 psi) 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 disc counterclockwise until it reaches its highest position.
3. Connect the center hose to the valve fitting. Turn the disc 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.

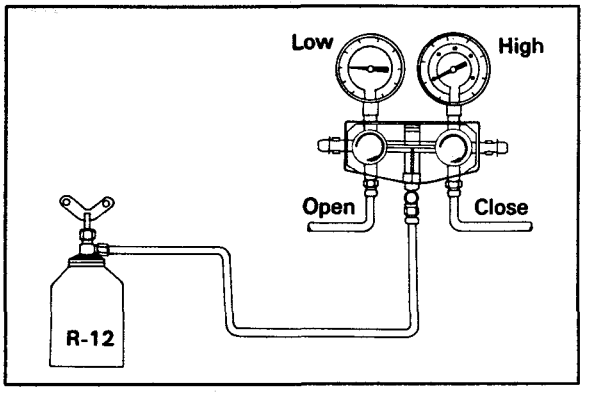


CHARGING REFRIGERANT SYSTEM (VAPOR)

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/cm^2, 60 psi)
3. Put the refrigerant in a pan of warm wate (maximum termperature 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.

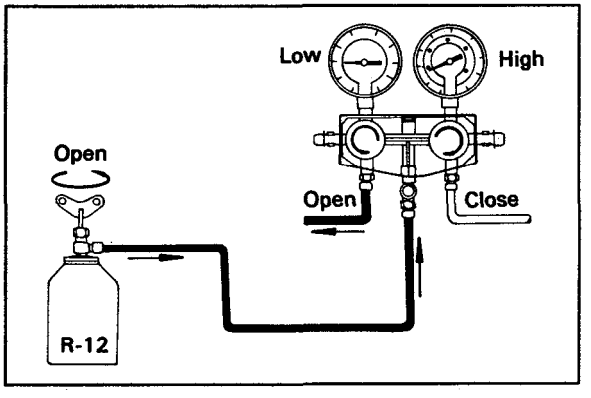


NOTE

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: 0.854.9 kg(1.9-2.1 lb)

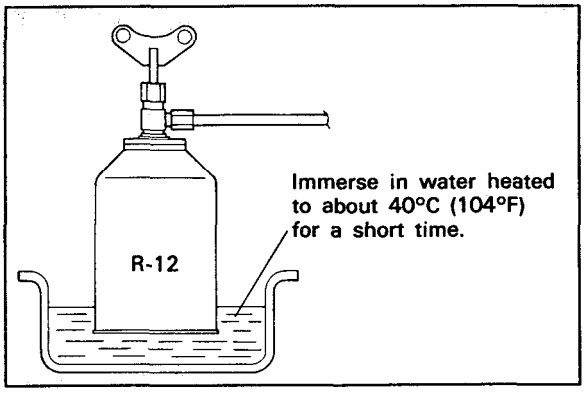


When refrigerant charging speed "is slow, immerse the refrigerant can in water, heated to a termperature of about 40°C (104°F).

WARNING

o. Under any circumstances the refrigerant can must not 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.



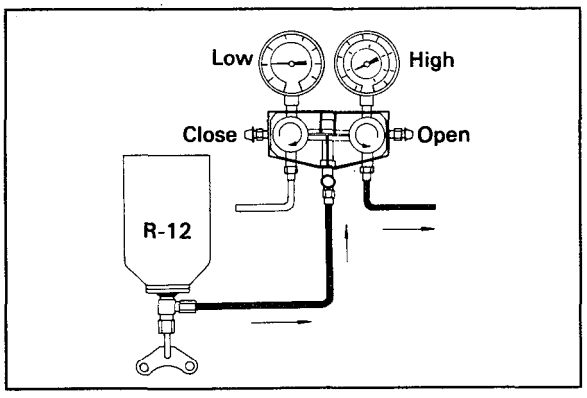
CHARGING REFRIGERANT SYSTEM (LIQUID)

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.

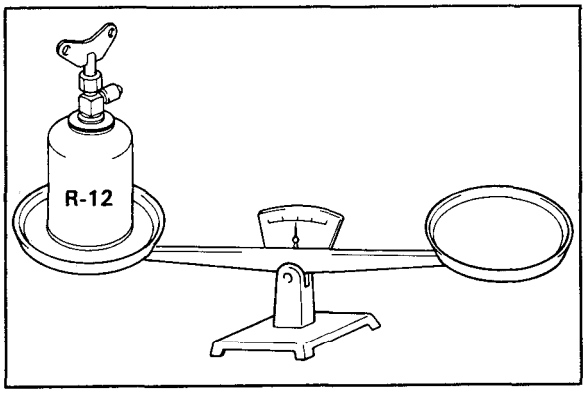
CAUTION

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 high and low pressure valves completely after the system is evacuated.
2. Install the refrigerant can 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: 0.854.9 kg (1.9-2.1 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. Confirm that there are no leaks in the system by checking 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: 230 cc (7.6 oz)

Handling of Oil

1. **The oil should be free from moisture, dust, metal filings, etc.**
2. **Do not mix oils.**
3. **The moisture content in the oil increases when exposed to the air for prolonged periods.**
   After use, seal the container immediately.

Oil Return Operatinon

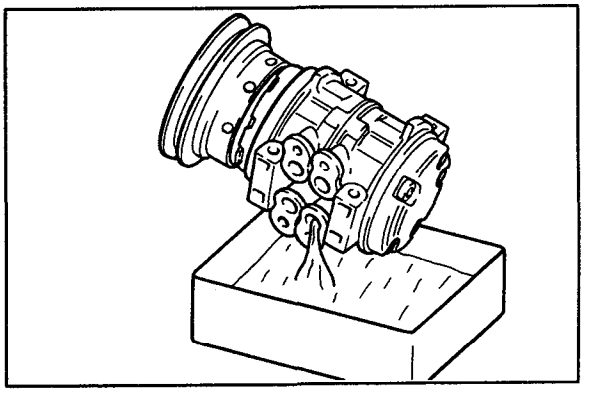
Before checking and adjusting the oil level, operate the compressor at engine idle speed, with the controls set for maximum cooling and high blower speed, for 20 to 30 minutes in order to return the oil to the compressor.

Checking and Adjusting a Used Compressor

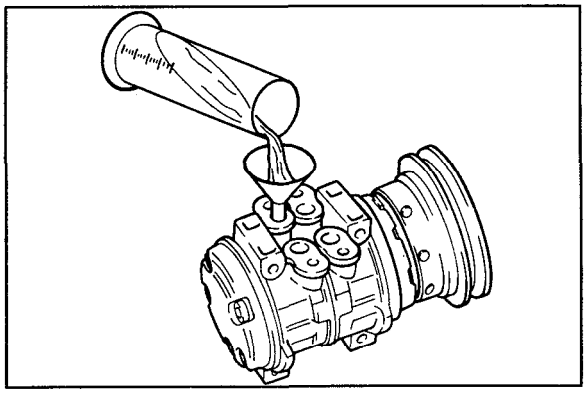
The compressor oil should be checked in the following order when being introduced into a used system.

1. **After the oil return operation, stop the engine, and discharge the refrigerant and then remove the compressor from the vehicle.**
2. **Drain the oil from the system line connecting ports.**

   Oil is sometimes hard to extract when the compressor is cooled. Remove oil while the compressor is warm [maintained at 40°-50°C (104-122°F)].



3. Measure the amount of the extracted oil. If the amount is less than 70cc (2.1 US fl oz. 2.5 Imp fl oz), some oil may have leaked out. Conduct leak tests for connections of each system, and if necessary, repair or replace faulty parts.
4. Check the purity of the oil and then adjust oil level following the procedure below.
   1) If the oil is clean



Unit: cc (US fl 02, Imp fl oz)

Amount of oil drained	Adjusting procedure
More than 70 (2.3, 2.5)	Oil level is right. Pour in same amount of oil as was drained out.
Less than 70 (2.3, 2.5)	Oil level may be low. Pour in 70 (2.3, 2.5) of oil

   2) If the oil contains chips or other foreign material, After the air conditioner system has been flushed with refrigerant, replace the receiver-drier or accumulator. Then pour in 230 cc.

Adding Oil for Replacement Component Parts

When replacing the system's component parts, be sure to supply the following amount of oil to the component parts to be mounted.

Components parts to be replaced	Amount of oil (cc US fl 02, Imp fl oz)
Evaporator core	90 (3.0, 3.3)
Condenser	30 (1.0, 1.1)
Accumulator	30 (1.0, 1.1)

HOSE AND PIPE CHECK

Check the heater and air conditioner hoses and lines for damage due to interference with adjoining parts. If damage is major, replace the affected parts.

Carefully check the hoses and lines, especially those located close to moving parts or sharp panel edges.

CHECKING REFRIGERANT LEAKS

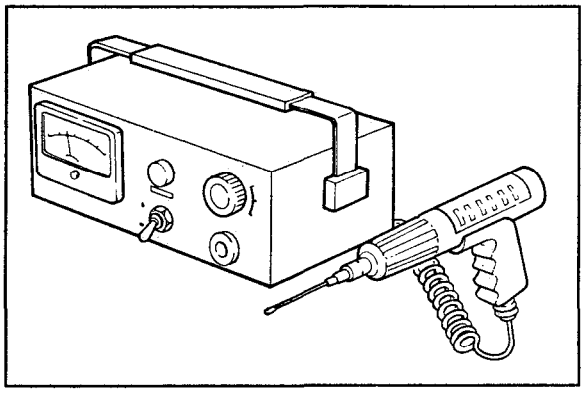
Conduct a leak test with an electronic leak detector whenever leakage or refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening or connection fittings.

Electric 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 too loose, tighten to the proper torque. Check for gas leakage with a leak detector.
2. If leakage continues even after the fitting has been retightened, discharge the refrigerant from the system, disconnect the fittings, and check its seating face for damage. Always replace, even if the damage is slight.
3. Check compressor oil and add oil if required.
4. Charge the system and recheck for gas leaks. If no leaks are found, evacuate and charge the system.

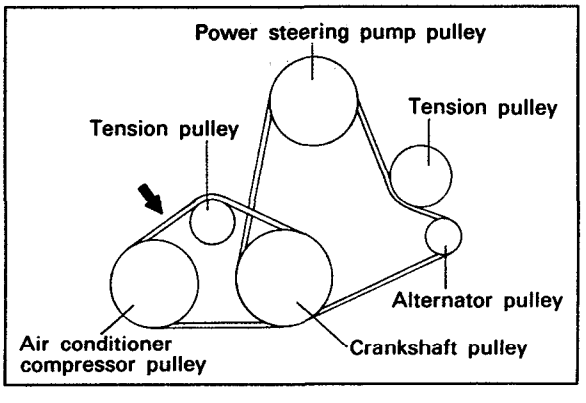


OFF-SEASON MAINTENANCE

Even in the off-season, turn the compressor on for 10 minutes at least once a month by running the engine at idle.

Check the compressor belt for drive proper tension.

Belt deflection	
A/C compressor belt	4.5-5.5 mm (0.177-0.216 in.)



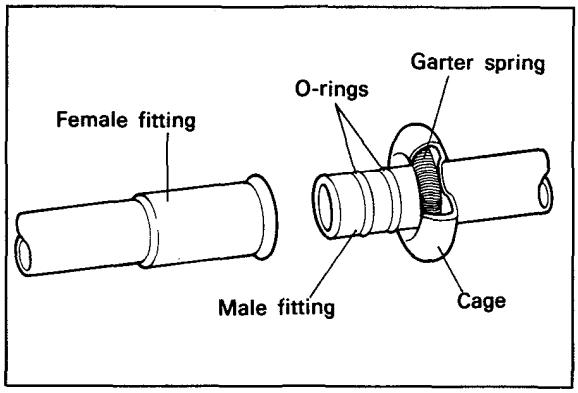
SPRING LOCK COUPLING

DISASSEMBLY

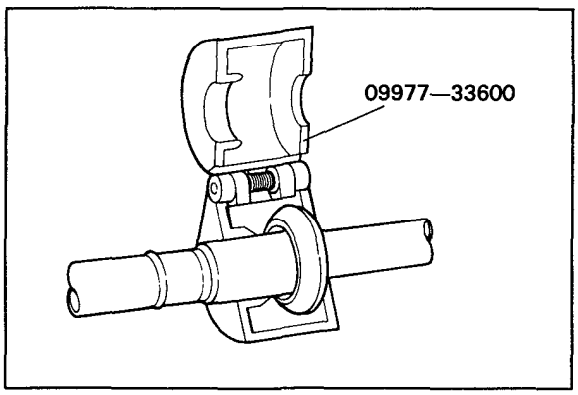
CAUTION

Discharge the system before disconnecting a coupling.

1. **Install the special tool, 09977-33600 (A/B) on the coupling.**
2. **Push the special tool into the cage opening to release the female fitting from the garter spring.**

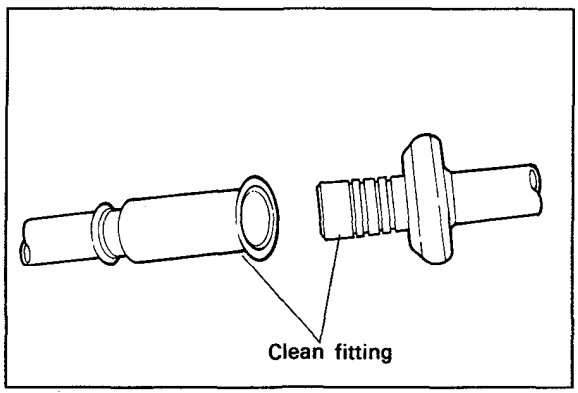


3. **Pull the male and female fittings apart.**
4. **Remove the tool from the spring lock coupling.**

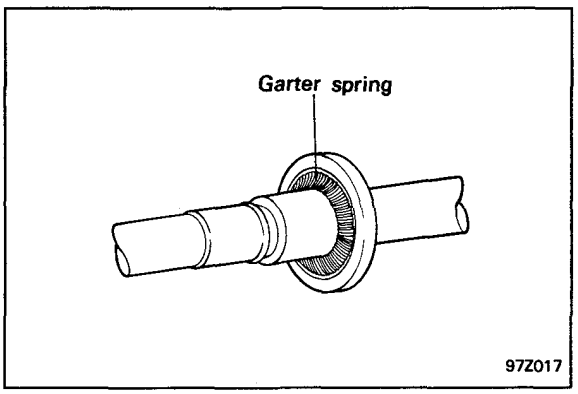


ASSEMBLY

1. **Check for a missing or damaged garter spring.**
   Remove the damaged spring with a small hooked wire. Install a new spring if damaged or missing.
2. **After cleaning the fittings, installing new O-rings. Lubricated with clean refrigerant oil, Assemble the fitting together by pushing with a slight twisting motion.**



3. **To ensure engagement, visually check that the garter spring is over the flared end of the female fitting.**



REFRIGERANT SYSTEM PERFORMANCE EVALUATION

The best way to diagnose a problem in the refrigerant system is to note the system pressures (shown by the manifold gauges) and the clutch cycle rate and times. Then, compare the findings with the charts (Figures 1 and 2).

- The system pressures are low (compressor suction) and high (compressor discharge).
- Clutch cycle times are the lengths of time (in seconds) that the clutch is ON and OFF.

The following procedure is recommended for achieving accurate diagnosis results in the least amount of time.

1. Connect a manifold gauge set.

   NOTE:
   The test conditions, specified at the top of each chart, must be met to obtain accurate test results.

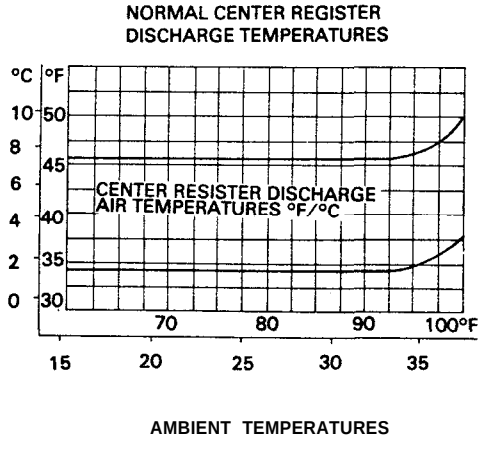
2. As soon as the system is stabilized, record the high and low-pressures as shown by the manifold gauges.
3. Determine the clutch cycle time.
4. Record clutch off time in seconds.
5. Record clutch on time in seconds.
6. Record center register discharge temperature.
7. Determine and record ambient temperatures.
8. Compare test readings with the applicable chart. (Figures 2 and 3)

- Plot a vertical line for recorded ambient temperature from scale at bottom of each chart to top of each chart.
- Plot a horizontal line for each of the other test readings from scale at LH side of appropriate chart.

If the point where the two lines cross or each of the charts falls within the band of acceptable limits, the system is operating normally. If the lines cross outside the band on one or more of the charts, there is a problem and the specific cause must be determined. this is easily done by using the Refrigerant System and Clutch Cycle Timing Evaluation chart (Figure 3).
Refer to the following five system operating conditions indicated by where the lines cross on the charts.

- System high (discharge) pressure is high, low, or normal.
- System low (suction) pressure is high, low, or normal.
- Clutch cycle rate is fast, slow, or the clutch runs continuously.

IMPORTANT TEST REQUIREMENTS
The following test conditions must be established to obtain accurate clutch cycle rate and cycle time readings.
- Run engine at 1500 rpm for 10 minutes.
- Operate A/C system on max A/C (recirculating air)
- Run blower at max speed.
- Stabilize in temperature 70°F to 80°F (21°C to 22°C)



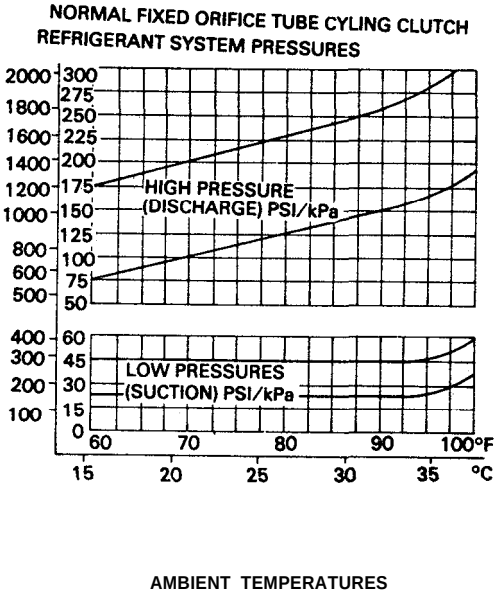
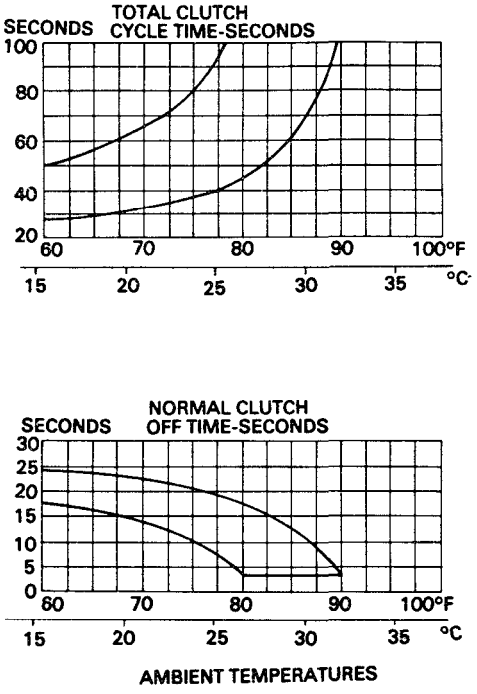


Fig.1 Normal Fixed Orifice Tube Refrigerant System Pressure/Temperature Relationships

IMPORTANT TEST REQUIREMENTS

The following test conditions must be established to obtain accurate clutch cycle rate and cycle time readings.

- **o Run engine at 1500 rpm for 10 minutes.**
- **o Operate A/C system on max A/C (recirculating air)**
- **o Run blower at max speed.**
- **o Stabilize in temperature 70°F to 80°F (21°C to 22°C)**



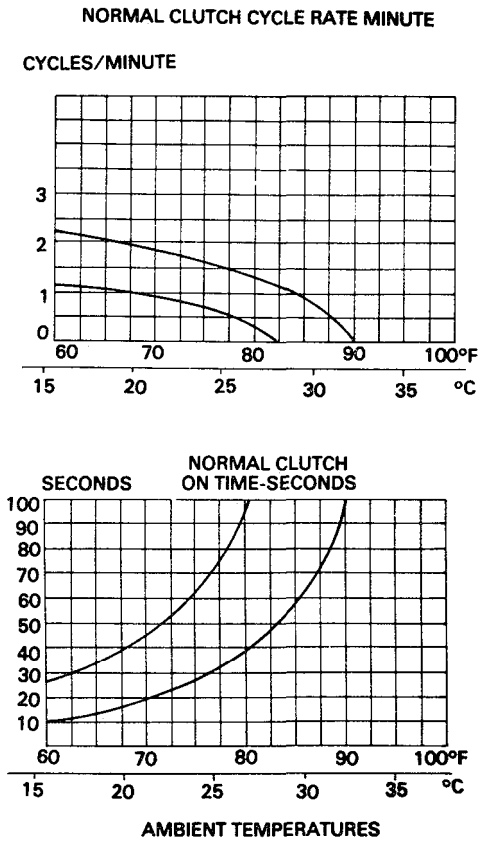


Fig. 2 Normal Fixed Orifice Tube Refrigerant System Clutch Cycling Timing Rates

o Clutch on time is long or short.
o Clutch off time is long or short.

Match these conditions to the conditions shown in the five columns toward the left in the System Pressure and Clutch Cycle Timing Evaluation chart (Figure 2). All five system conditions will be indicated on one line. The most likely component or components causing the problem are listed in the column at the RH side of the chart.

Example:

- **o High (discharge) pressure is low.**
- **o Low (suction) pressure is normal.**
- **o Clutch cycle rate is very fast.**
- **o Clutch on time is very short.**
- **o Clutch off time is very short.**

- The component causing the problem is the clutch cycling pressure switch. The cycling range is too close. Replace the switch and recheck the system.

Example:

- **o High (discharge) pressure is normal to low.**
- **o Low (suction) pressure is normal.**
- **o Clutch cycle rate is fast.**
- **o Clutch on time is short.**
- **o Clutch off time is short.**

The component causing the problem is the evaporator core. Airflow is restricted, indicating debris entering through the cowl air inlet and plugging the core.

The condition can also be detected by checking the center register discharge temperature. An abnormally low temperature would mean air is spending more time in the evaporator and is very cold when discharged, although the volume is not enough to cool the vehicle properly.

At the bottom of the chart (Figure 3). additional cause components are listed for poor compressor operation or a damaged compressor condition.

The two diagnosis charts which follow Figure 3 provide the most direct and sure way to determine the cause of any problem in a poorly performing refrigerant system. These charts are titled:

- Insufficient or No A/C Cycling-Fixed Orifice Tube Cycling Clutch System (Test Steps Al through Al 1).
- Compressor Clutch Circuit Diagnosis (Test Steps B1 through B11)

After servicing and correcting a refrigerant system problem, take additional pressure readings and observe the clutch cycle rate while meeting the conditional requirements (Figure 34) to ensure that the problem has been corrected.

In ambient temperatures above 38°C (100°F), the compressor clutch will not normally cycle off and in many instances, the clutch will not cycle off when temperatures are above 32°C. (90°F) This will depend on local conditions and engine/vehicle speed. Also, clutch cycling will normally not occur when the engine is operating at curb idle speed. If the system contains no refrigerant or is extremely low in refrigerant, the clutch will not engage for compressor operation. A rapid cycling compressor clutch is usually and indication that the system is low on refrigerant. Refer to Insufficient or No A/C Cooling-Fixed Orifice Tube Cycling Clutch System Diagnosis chart.

REFRIGERANT SYSTEM PRESSURE AND CLUTCH CYCLE TIMING EVALUATION CHART

NOTE

Normal system conditional requirements must be maintained to properly evaluate retrigerant system pressures. Refer to charts applicable to system being tested.

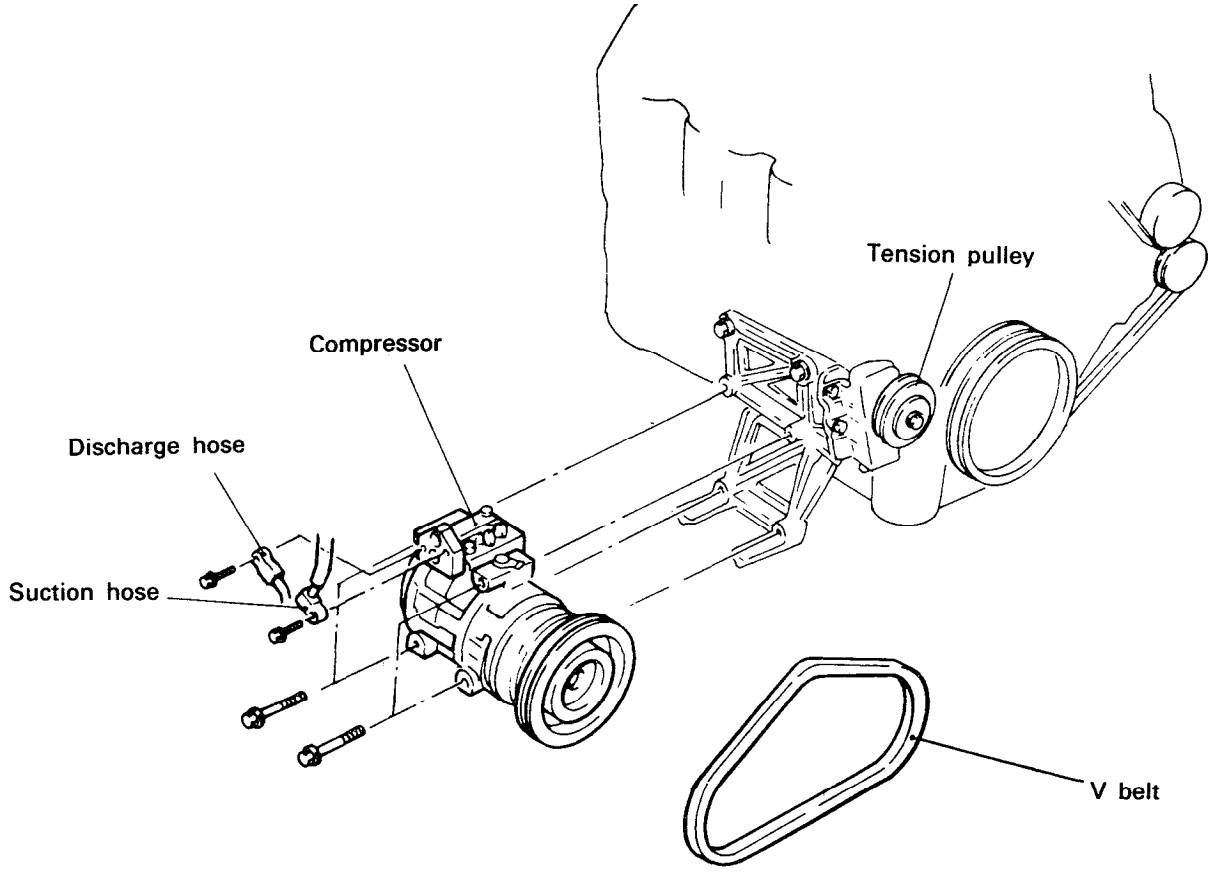
High (Discharge) pressure	Low (suction) pressure	Clutch cycle time			Component-Causes
		Rate	ON	OFF	
High	High	Continuous run			Condenser-Inadequate Airflow
High	Normal to high				Engine overheating
Normal to High	Normal				Air in system refrigerant overcharge(a) Humidity or ambient temp very high(b)
Normal	High				Fixed orifice tube-Missing. O-rings Leaking/Missing
Normal	High	Slow	Long	Long	Clutch cycling switch-High Cut-in
Normal	Normal	Slow or no cycle	Long or continuous	Normal or no cycle	Moisture in refrigerant system. Excessive refrigerant oil.
		Fast	Short	Short	Clutch cycling switch- Low Cut-in or High Cut-Out
Normal	Low	Slow	Long	Long	Clutch cycling switch- Low Cut-Out
Normal to low	High	Continuous run			Compessor-Low Performance
Normal to low	Normal to high				A/C suction line-Partially Restricted or Plugged(c)
Normal to low	Normal	Fast	Short	Normal	Evaporator-Low Airflow
			Short to very short	Normal to long	Condenser, fixed orifice tube, or A/C liquid line-Partially Restricted or Plugged
			Short to very short	Short to very short	Low refrigerant charge
			Short to very short	Long	Evaporator core-Partially Restricted or Plugged
Normal to low	Low	Continuous run			A/C suction line-Partially Restricted or Plugged.(d). Clutch cycling switch-Sticking Closed

High (Discharge) pressure	Low (Suction) pressure	Clutch cycle time			Component-Causes
		Rate	ON	OFF	
Low	Normal	Very fast	Very short	Very short	Clutch cycling switch-Cycling Range Too Close
Erratic operation or compressor not running		-	-	-	Clutch cycling switch-Dirty Contacts or Sticking Open. Poor connection at A/C clutch connector or clutch cycling switch connector. A/C electrical circuit erratic-See A/C Electrical Circuit Wiring Diagram
Additional possible causes associated with inadequate compressor operation					
o Compressor clutch slipping. o Loose drive belt o Clutch coil open-Shorted or loose mounting o Control assembly switch-Dirty contacts or sticking open o Clutch wiring circuit-High resistance. Open or blown fuse					
Additional possible causes associated with a, damaged compressor					
o Clutch cycling switch-Sticking closed or compressor clutch seized o Suction accumulator drier-Refrigerant oil bleed hole plugged o Refrigerant leaks					
1) Compressor may make noise on initial start-up. This condition can be caused by excessive liquid refrigerant. 2) Compressor clutch may not cycle in ambient temperatures above 80°F depending on humidity. 3) Low pressure reading will be normal to high if the pressure readings are taken at the accumulator and if the restriction is down stream of the service access valve. 4) Low pressure reading will be low if pressure readings are taken near the compessor and the restriction is upstream of the service access valve.					

Fig.3 Refrigerant System Pressure and Clutch Cycle Timing Evaluation-Fixed Orifice Tube Cycling Clutch System.

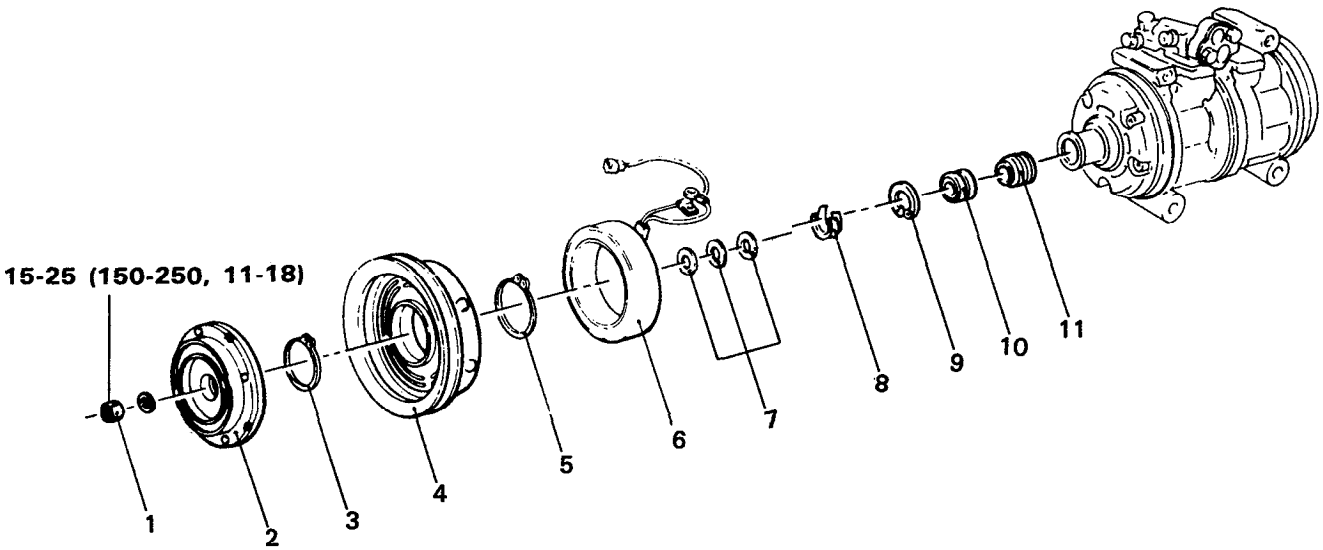
REMOVAL AND INSTALLATION

COMPONENTS



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

COMPONENTS



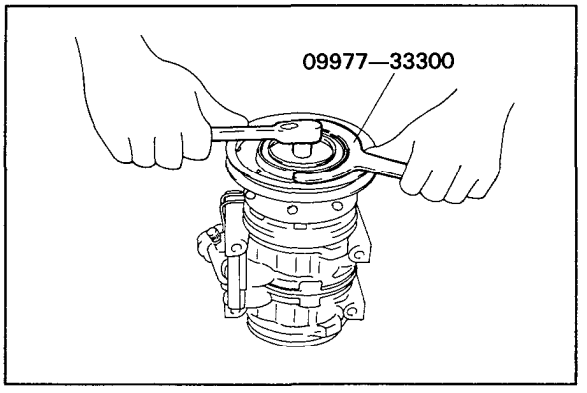
1. Nut
2. Pressure plate
3. Snap ring
4. Rotor
5. Snap ring
6. Stator
7. Shims
8. Dust seal
9. Snap ring
10. Shaft plate
11. Shaft seat

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

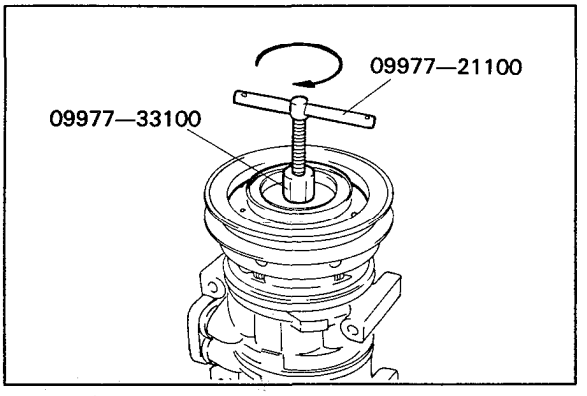
MAGNETIC CLUTCH

DISASSEMBLY

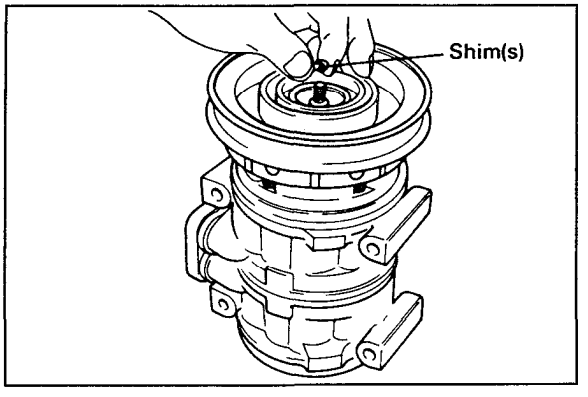
1. Using the special tool (09977-33000) and socket, remove the shaft nut.



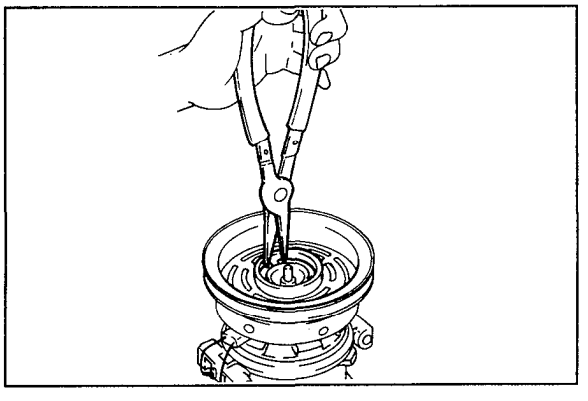
2. Using Drive Plate Puller 09977-21100, Pressure Plate Pulley Adapter 09977-33100 and socket, remove the pressure plate.



3. Remove the shim(s) from the shaft.

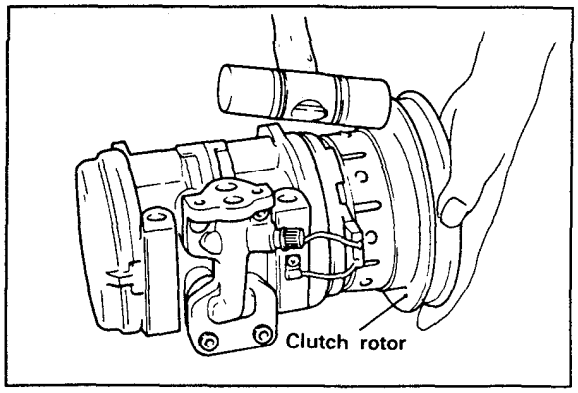


4. Remove the snap ring.

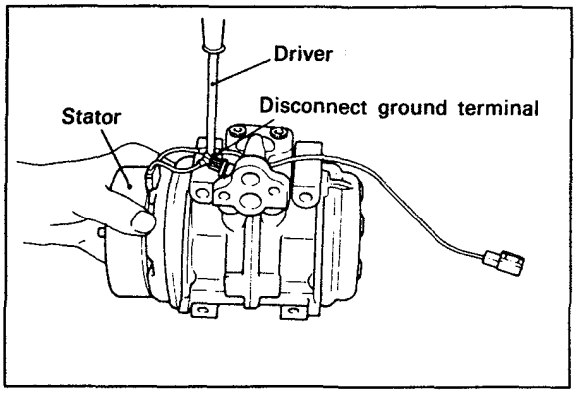


5. Using a plastic hammer, tap the rotor off the shaft.

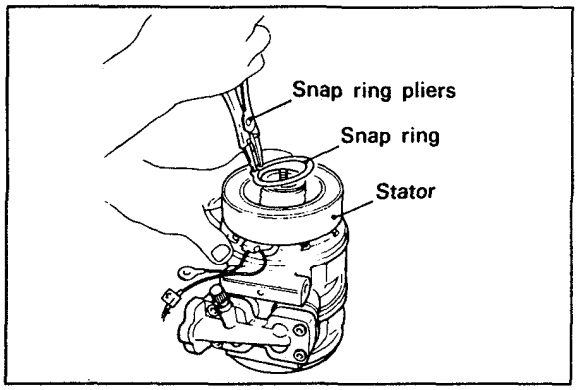
NOTE
Be careful not to damage the pulley when tapping on the rotor.



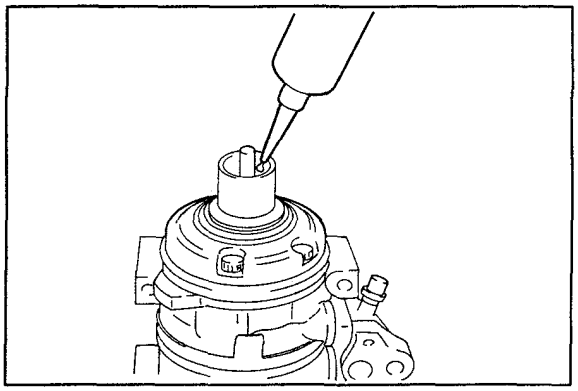
6. Disconnect the lead wires from the compressor housing.



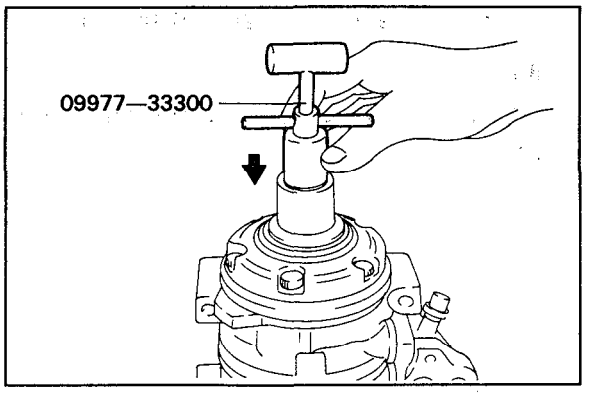
7. Remove the snap ring and then remove the stator.



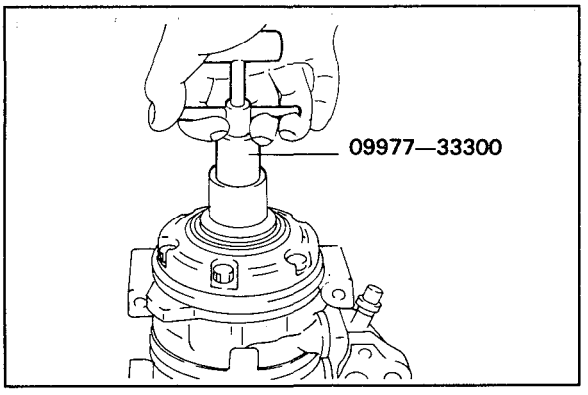
8. Removal of shaft plate.
   1) Apply compressor oil to the inner bore.



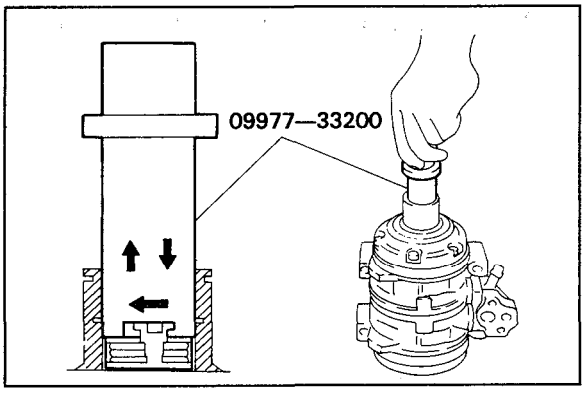
2) Insert the special tool (09977-33300) onto the compressor shaft.
3) Push the holder ring downward.



4) Pull up on the cross bar, then pull up on the special tool (09977-33300) to remove the shaft seal plate.

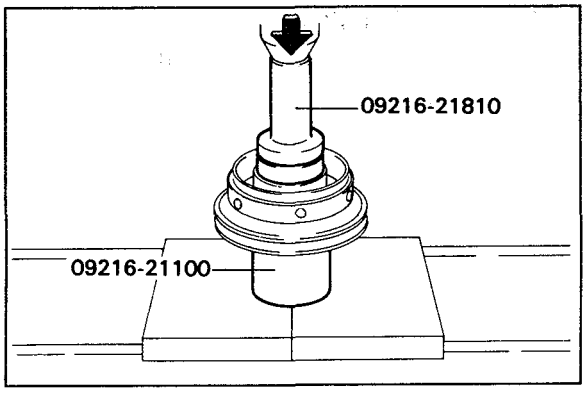


9. Insert the special tool (09977-33200) against the shaft seal and turn it to the right while pressing down.
10. Pull the special tool (09977-33200) up to remove the shaft seal.



11. Remove the bearing snap ring from the rotor.
12. Using the special tools (09977-21810 and 09216-21100). press out the bearing.

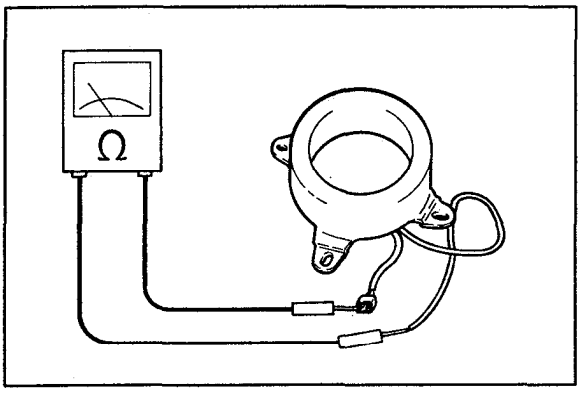
NOTE
Press out the bearings only if they are to be replaced.



INSPECTION

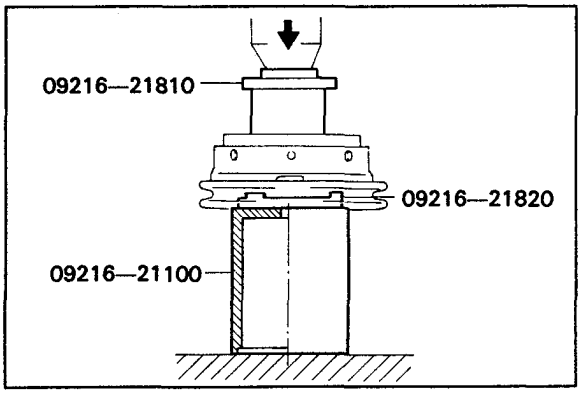
1. Inspect the pressure plate and rotor surfaces for wear and scoring.
   Replace if necessary.
2. Check the rotor bearing for wear and leakage of grease.
   Replace if necessary.
3. Check stator coil for resistance using a circuit tester.

Standard resistance; 3.5-3.9 KΩ at 20°C (68°F)



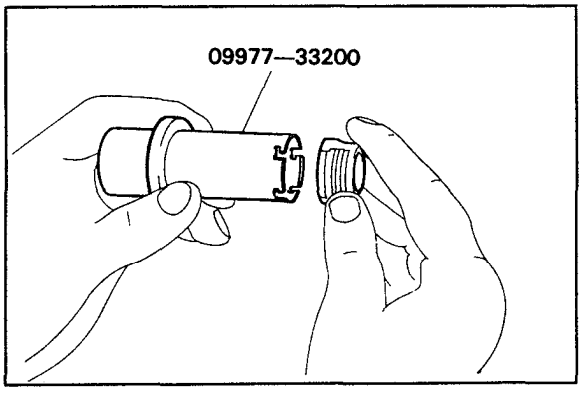
ASSEMBLY

1. Using the special tools (09977-21810, 09977-21820 and 09977-21100), press a shield ring and new bearing into the rotor boss until fully seated.
2. Install the bearing snap ring into the rotor groove.

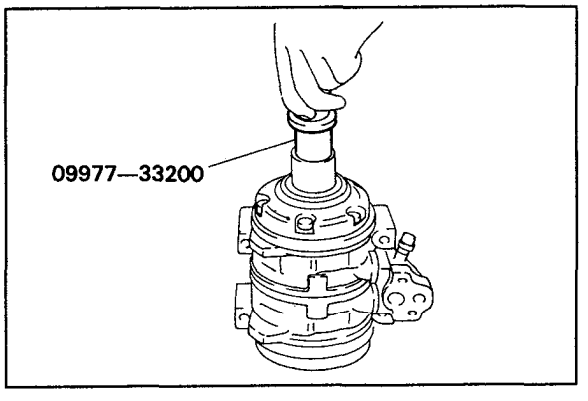


3. Lubricate the shaft seal with compressor oil and install it onto the special tool (09977-33200).

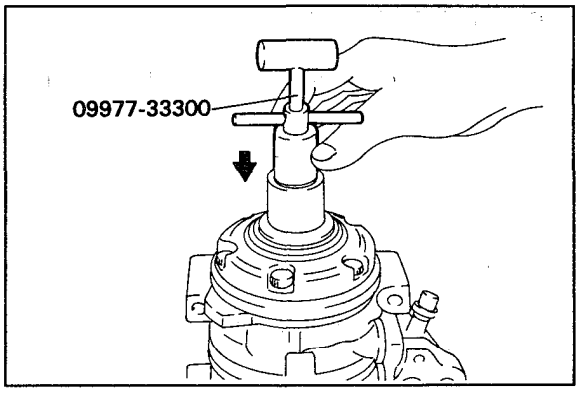
   NOTE
   Do not touch the sealing surfaces of the shaft seal carbon ring and shaft seal plate.



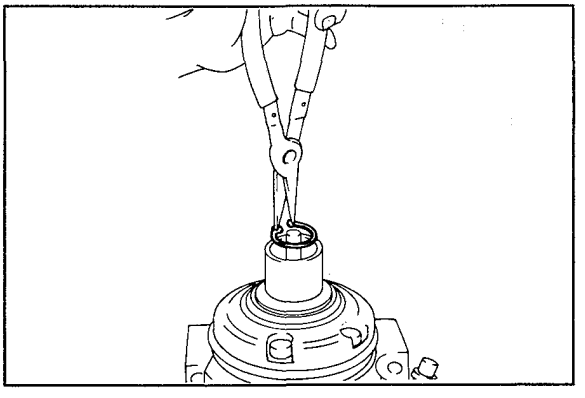
4. Apply oil on the inner bore of the compressor. Insert the special tool (09977-33200), and turn it to the left while pressing lightly downward on the tool. Remove the tool.



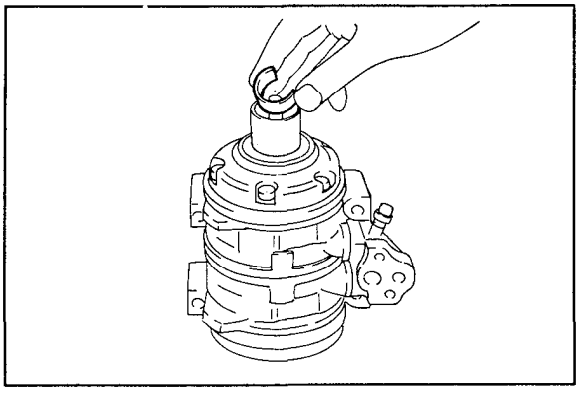
5. Apply compressor oil to the shaft seal plate.
6. With the seat (lapped) surface facing toward the seal, insert the shaft seal plate onto the compressor shaft by hand.
7. Using the other end of the special tool (09977-33300), press the shaft plate down until it comes in contact with the shaft seal (until the snap ring groove is exposed).



8. Install the snap ring with the tapered surface facing upward.



9. Install the dust seal.

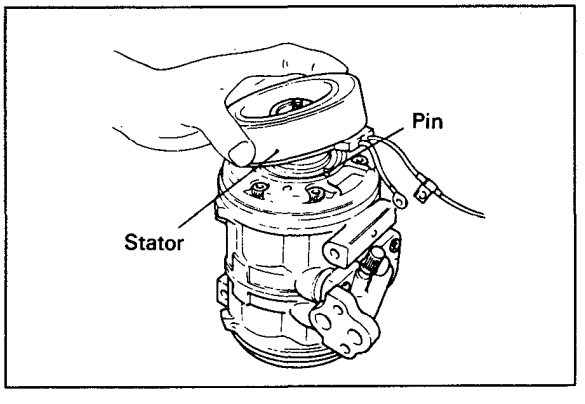


10. Install the stator on the compressor and then install the new snap ring.

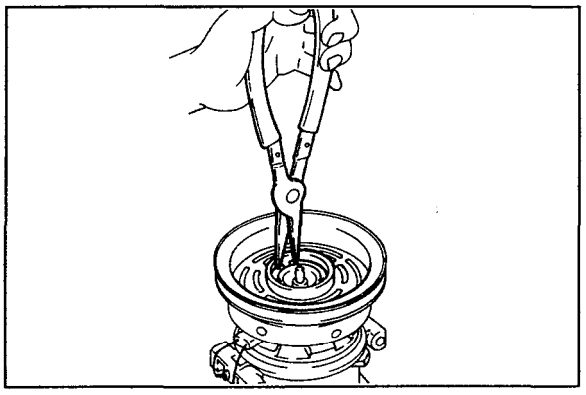
    CAUTION

    The coil must be aligned with the pin in the compressor housing.

11. Connect the stator lead wires to the compressor housing.



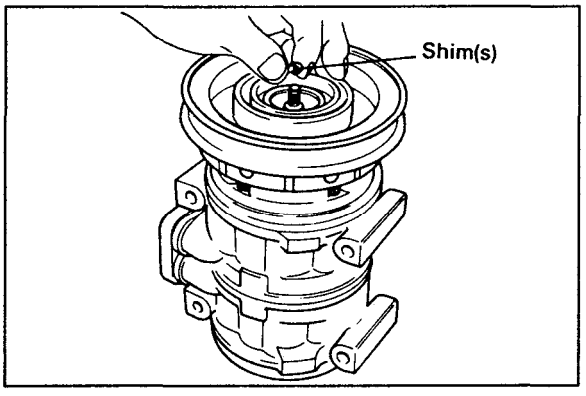
12. Install the rotor on the compressor shaft.
13. Install the new snap ring.



14. Install the pressure plate and adjust the clearance between the pressure plate and rotor with shim(s) on the compressor shaft.

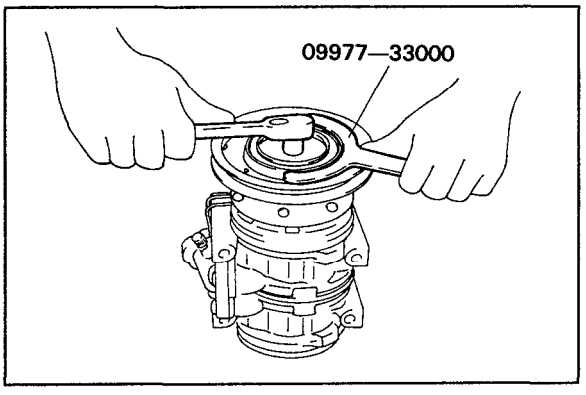
Standard clearance; 0.6-1.0 mm (0.24-0.039 in.)

If the clearance is not within tolerance, add or reduce the number of shims to obtain the standard clearance.

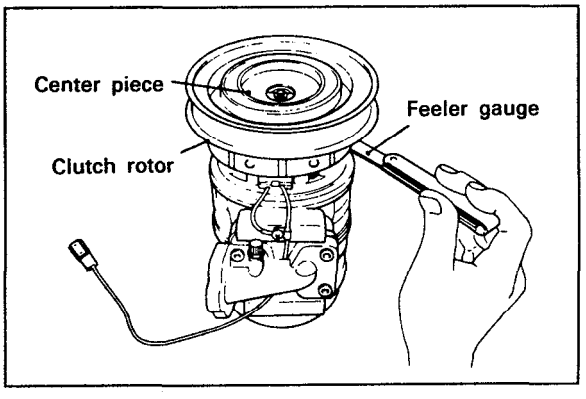


15. Using the special tool (09977-33000) and torque wrench, install the shaft nut.

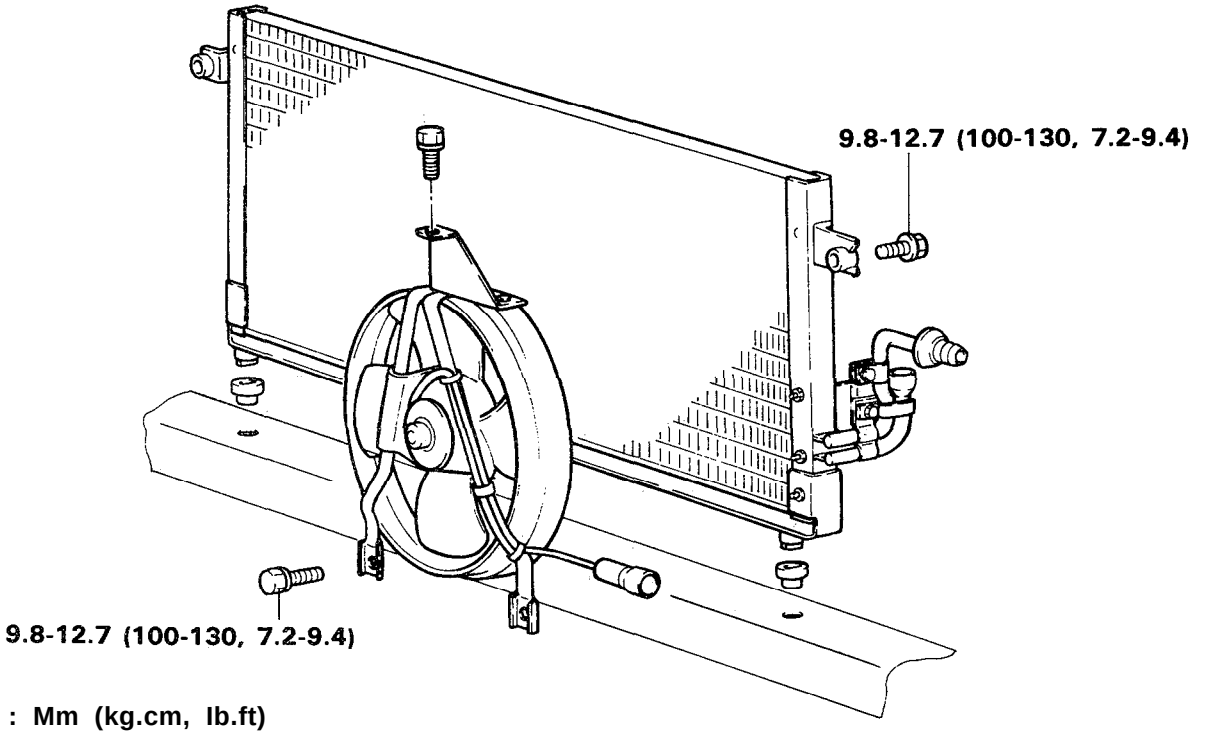
Tightening torque; 19 N.m (200 kg.cm, 14 lb.ft)



16. Recheck the clearance between the pressure plate and the rotor.



CONDENSER



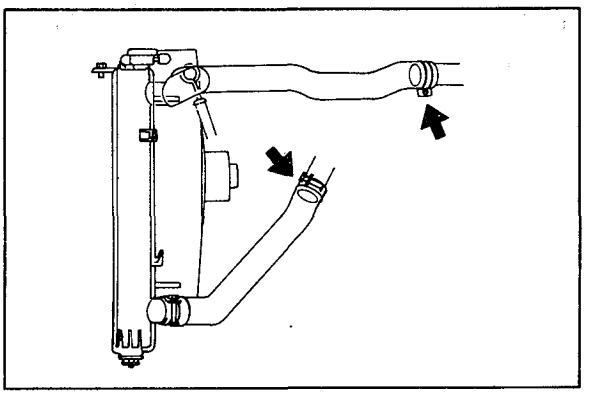
TORQUE : Mm (kg.cm, lb.ft)

ON-VEHICLE INSPECTION

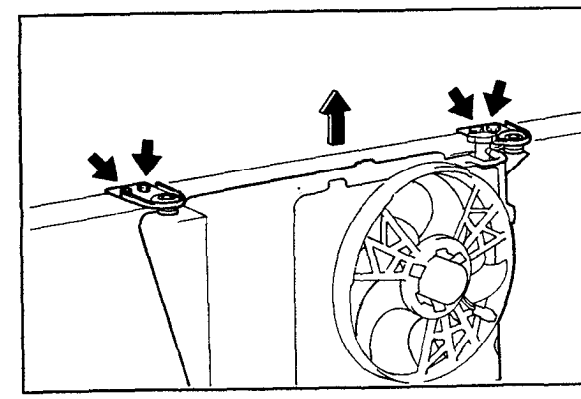
1. Check the condenser fins for blockages or damage. If the fins are clogged, clean them with compressed air. If the fins are bent, straighten them with a screwdriver or a pair of pliers.
2. Check the condenser fittings for leakage. Repair or replace if necessary.

REMOVAL AND INSTALLATION

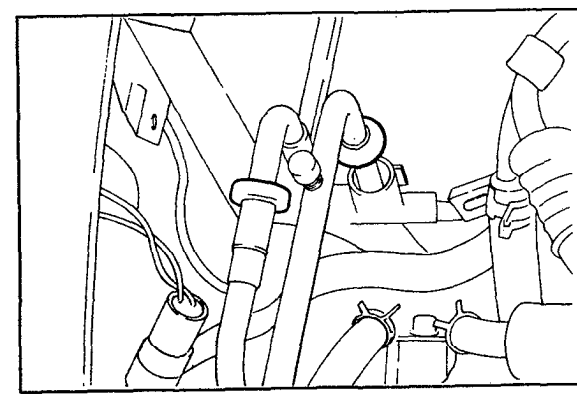
1. Discharge the refrigerant from the system.
2. Drain the coolant from the cooling system.
3. Remove the radiator inlet and outlet hoses.



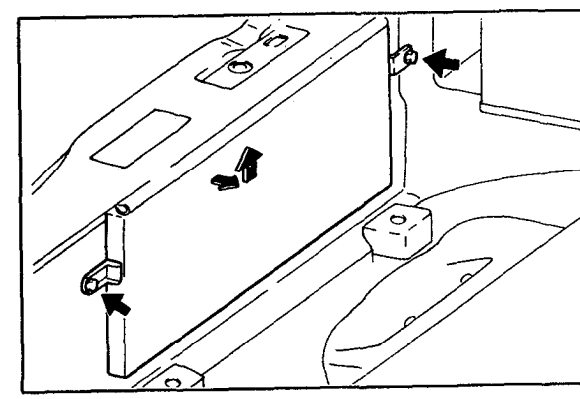
4. Remove the radiator assembly.



5. Separate the discharge hose and the liquid tube by using the special tool 09977-33600 (A/B)



6. Remove the condenser assembly.



INSTALLATION

Installation is the reverse of removal procedures.

NOTE

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

CONDENSER FAN ASSEMBLY

ON-VEHICLE INSPECTION

1. Check the condenser fan for blockage or damage.
2. Check the connection of the harness coupler.

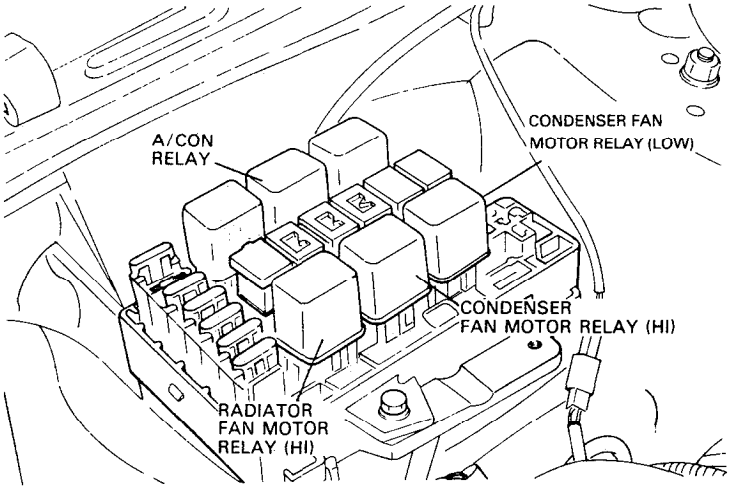
REMOVAL AND INSTALLATION

1. Disconnect the battery ground cable.
2. Remove LH front combination lamp.
3. Remove LH head lamp by loosening 10 mm x 6 bolts.
4. Remove radiator grille.
5. Disconnect the connector from engine wiring harness.
6. Remove the condenser fan and motor assembly by loosening the 10mm x 1 .12mm x 2 bolts.
7. Installation is the reverse of removal.

INSPECTION

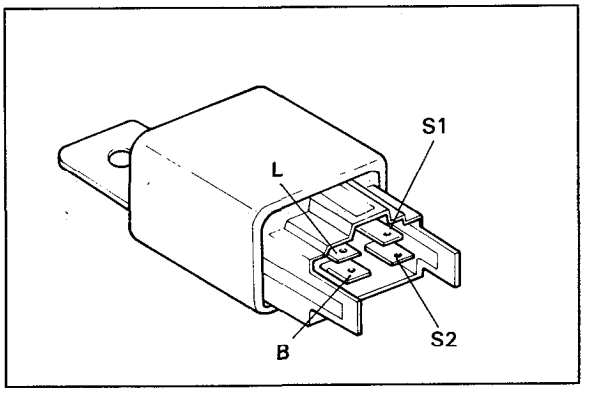
Using an ohmmeter, check to be sure that there is continuity between terminals LR and B and LW and B respectively.

RELAY



INSPECTION

1. Using an electric tester, check to be sure that there is continuity between terminals L and B.
2. Apply 12 volts across terminals Sl and S2, then. check continuity between the terminals, Replace if necessary.



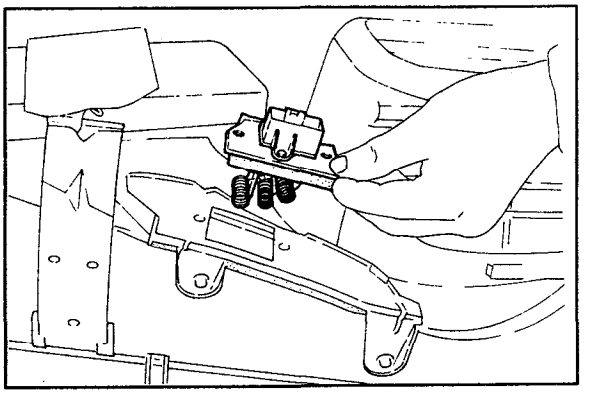
BLOWER MOTOR RESISTOR

SPECIFICATIONS

***Thermal limiter**	
Opening temperature	**121°C (250°F)**
Resistor resistance /Blower current	
Low	**2.4W3.2A**
Medium low	**1.2W6.0A**
Medium high	**0.4W9.5A**
High	**0Ω/1 3.5A**

*** Interrupting blower operation in all speeds except high blower.**

REMOVAL AND INSTALLATION



1. **Open the glove box and release the glove box retainers so that the glove box hangs down.**
2. **Separate the wiring harness connector from the resistor assembly.**
3. **Remove the two resistor attaching screws and remove the resistor from the heater case.**
4. **To install, position the resistor assembly in the heater case opening and install the two attaching screws.**

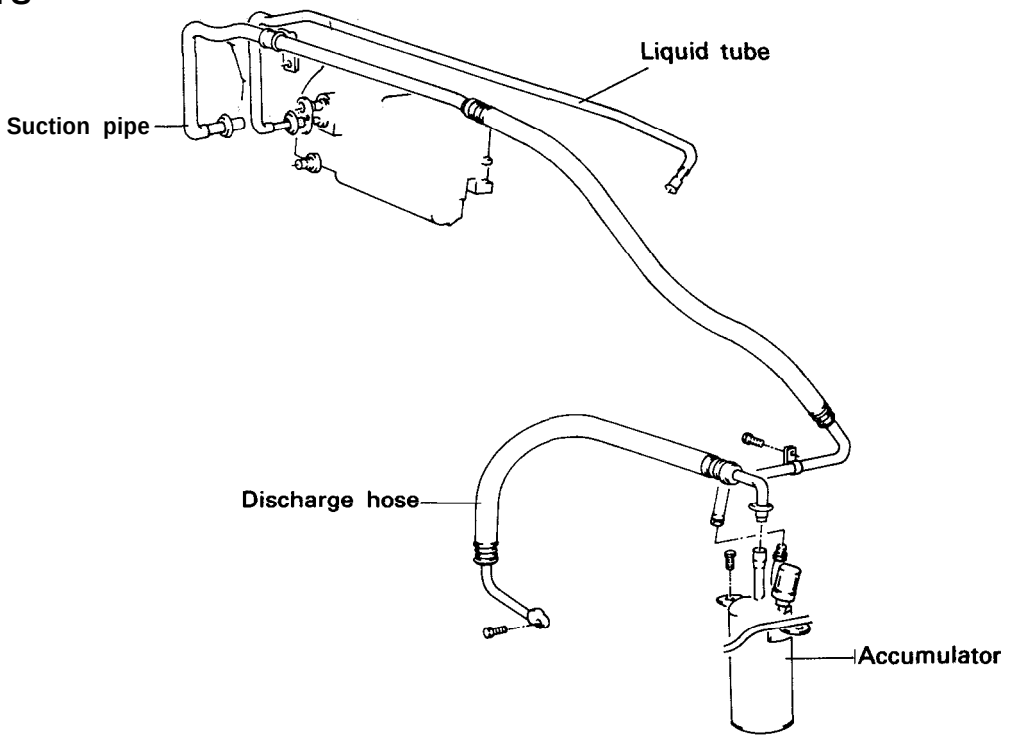
   NOTE
   Use only the specified resistor assembly for service replacement. Do not apply sealer to the resistor board mounting surface.

5. **Attach the wiring harness connector to the resistor.**
6. **Check the operation of the blower motor.**
7. **Close the glove box.**

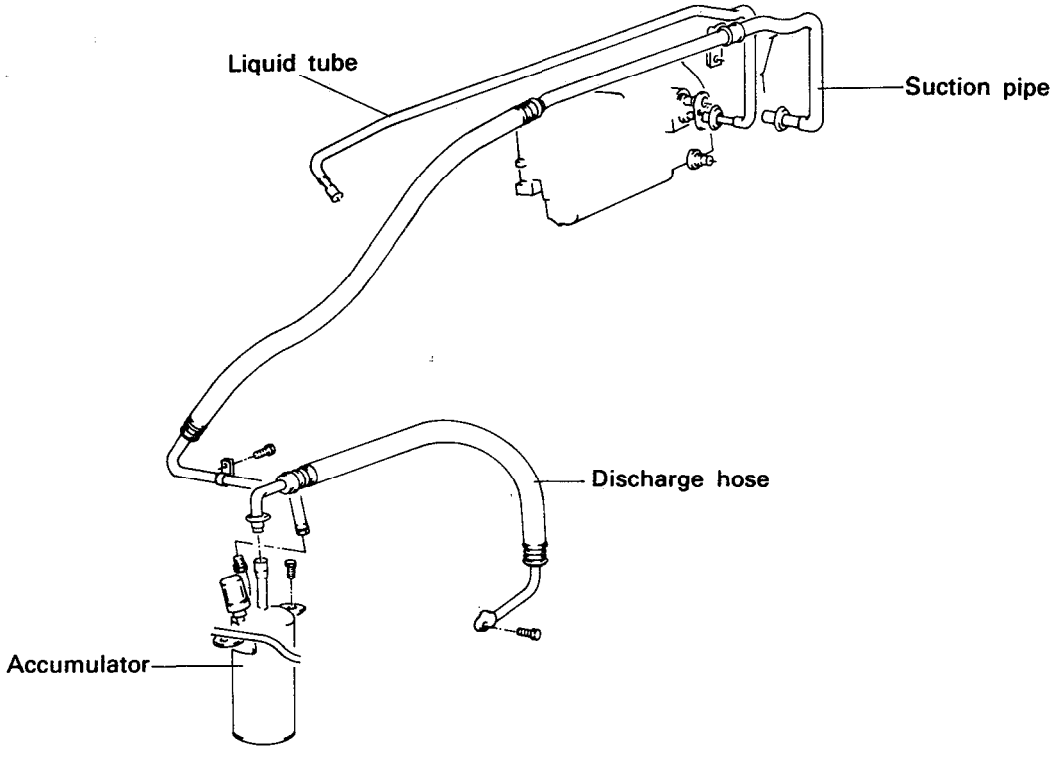
ACCUMULATOR

COMPONENTS

LHD



RHD



REPLACEMENT

It will be necessary to replace the accumulator for the following reasons.

1. **The accumulator is restricted, plugged or perforated.**
2. **The system has been left open for more than 24 hours. (system completely discharged)**
3. **There is evidence of moisture in the system.**
4. **A component such as a condenser, evaporator core, refrigerant line or compressor that has seized is replaced.**

REMOVAL

1. **Discharge the air conditioning system.**
2. **Disconnect the two suction lines from the accumulator.**
3. **Remove the accumulator from the bracket.**

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

INSTALLATION

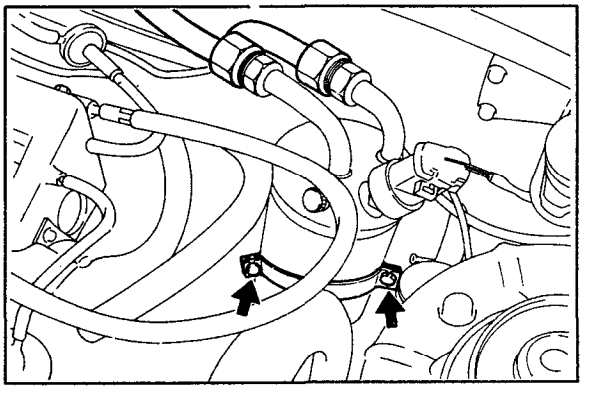
1. **Install the accumulator in the bracket.**

NOTE
Do not remove the plugs until you are ready to make the connection.

2. **Connect the liquid lines to the accumulator and tighten to the specified torque.**

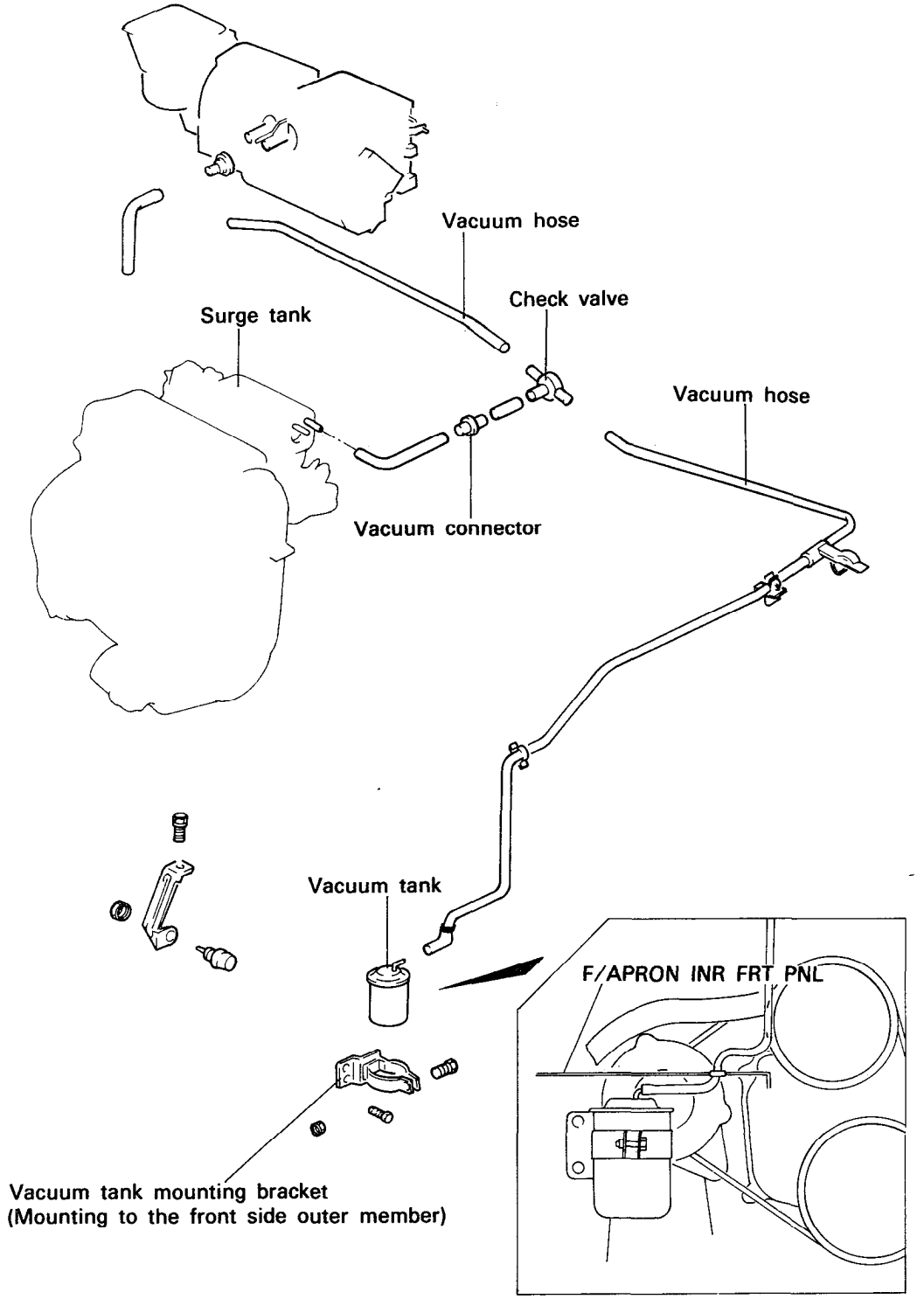
Tightening torque	**39-44 Nm (400450 kg.cm, 29-33 Ib.ft)**

3. **If the accumulator is replaced with a new unit, add 30 cc of compressor oil to the compressor.**



VACUUM HOSE

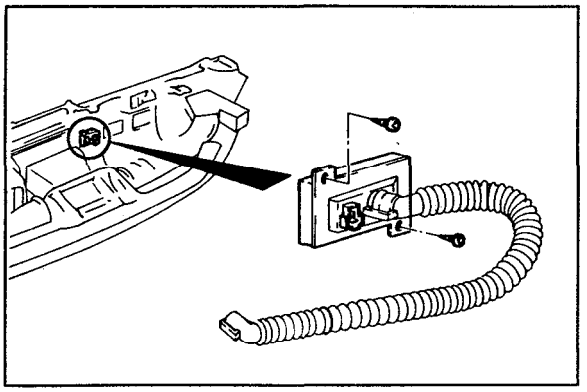
COMPONENTS



IN-CAR SENSOR (SAJC ONLY)

REMOVAL AND INSTALLATION

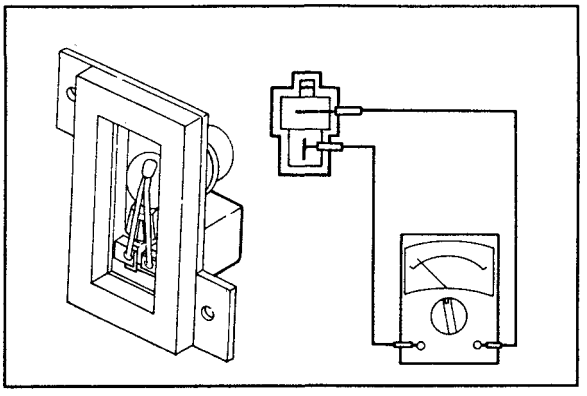
1. Disconnect the battery negative cable.
2. Remove the glove box by loosening the two screws.
3. Remove the lower crash pad.
4. Separate the electric connector from the in-car sensor.
5. Remove the in-car sensor.
6. Installation is the reverse of the removal procedure.



INSPECTION

Using an ohmmeter, measure the resistance between terminals.

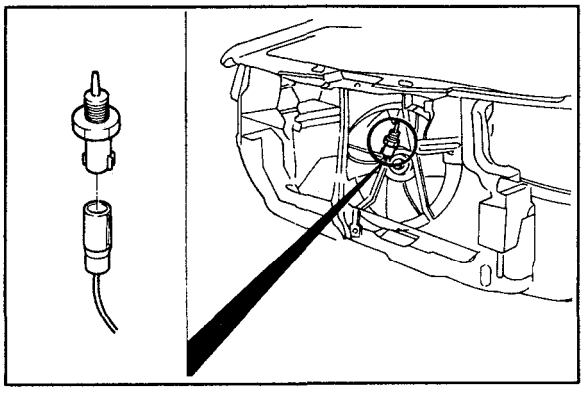
Temperature resistance (KR)	R25°C (77°F) = 30.000 ± 0.360



AMBIENT SENSOR (SATC ONLY)

REMOVAL AND INSTALLATION

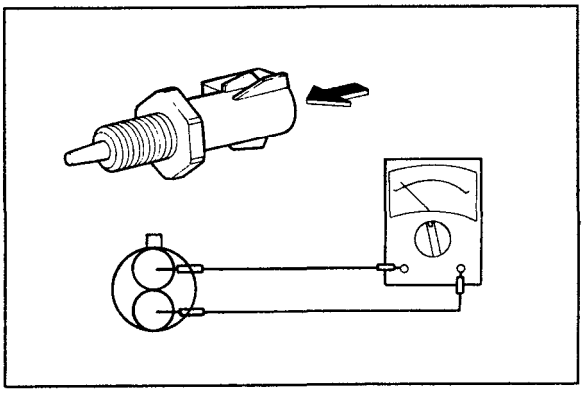
1. Disconnect the battery negative cable.
2. Remove the radiator grille.
3. Separate the electric connector from the ambient sensor.
4. Installation is the reverse of removal procedure.



INSPECTION

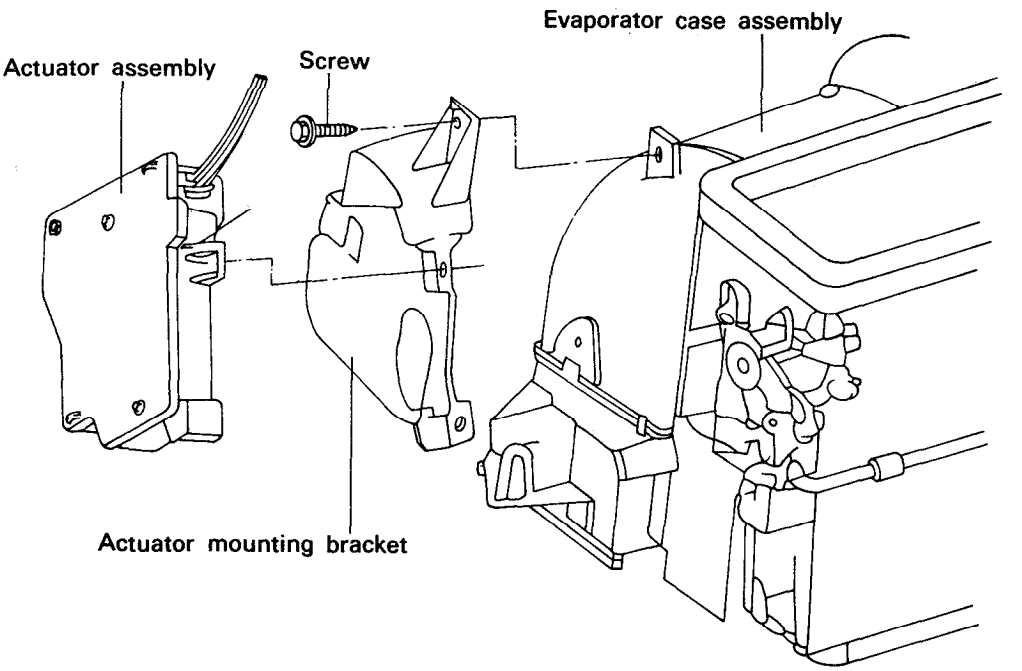
Using an ohmmeter, measure the resistance between the terminals.

Temperature resistance (KD)	R20°C (58°F) = 37.290 ± 2.244



BLEND DOOR ACTUATOR AND CELO SWITCH

COMPONENTS



REMOVAL

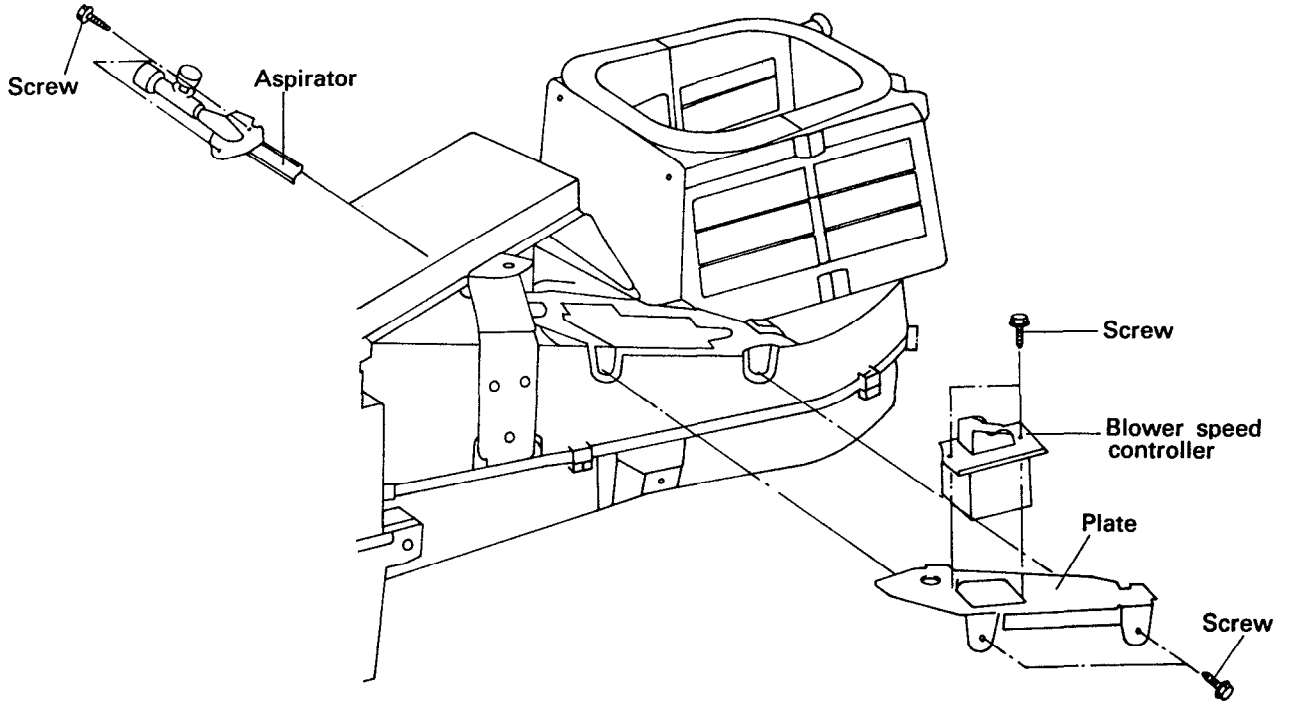
1. Disconnect the ground cable from the negative side of the battery.
2. Remove the three mounting screws holding the blend actuator to the evaporator assembly,
3. Pull the actuator and bracket away from the evaporator assembly enough to expose the CELO switch.
4. Discharge the clip on the CELO switch from the heater inlet pipe.
5. Disconnect the blend actuator connector and remove the actuator/CELO switch and bracket assembly.

INSTALLATION

1. Clip the CELO to the heater inlet pipe.
2. Insert the actuator into the blend door against the keyed surfaces by manually moving the blend door.
3. Attach the actuator bracket with three mounting screws.
4. Reconnect the blend door actuator connector.
5. Connect the ground cable to the battery negative terminal.

BLOWER SPEED CONTROLLER

COMPONENTS



REMOVAL

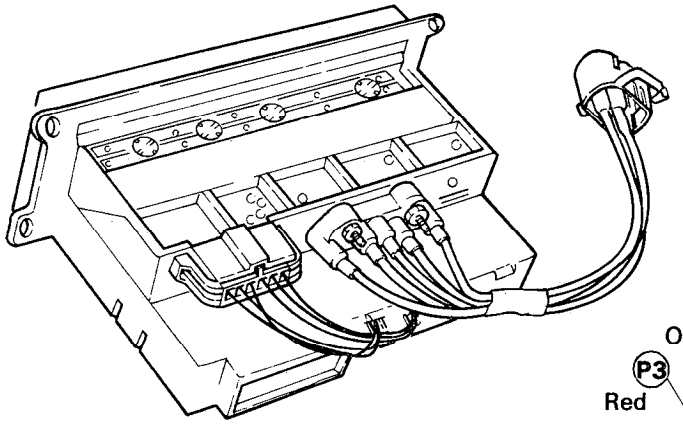
1. Disconnect the ground cable from the battery negative terminal.
2. Disengage the glove compartment door from its stops and let it hang by its hinge.
3. Working through the BSC access opening disconnect the electrical snaplock connector from the BSC module.
4. Remove the two screws attaching the BSC to the evaporator case and then remove the BSC module.

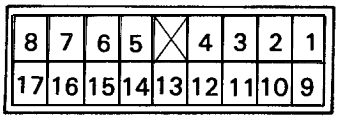
CAUTION
Do not touch the fins of the BSC module until it has had sufficient time to cool.

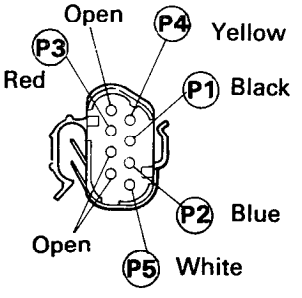
INSTALLATION

1. Position the BSC module on the evaporator case and install the two attaching screws.
2. Connect the electrical connector to BSC module.
3. Push the keyboard connector until a click is heard or felt.
4. Close the glove compartment door. Connect the ground cable to the battery negative terminal.
5. Check the system for proper operation.

CONTROL MODULE







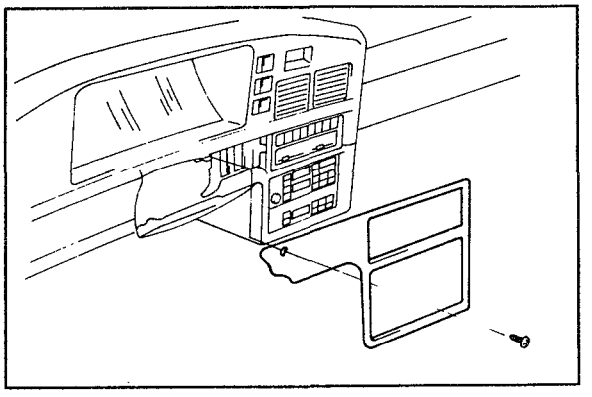
Electric Connection

PIN NO.	CIRCUIT
1	SENSOR (+)
2	BLEND DOOR ACTUATOR
3	RHEOSTAT (ILL.+)
4	BLEND DOOR ACTUATOR
5	GROUND
6	BLEND DOOR ACTUATOR
7	POWER (IGN)
8	A/C PRESSURE SW.
9	RHEOSTAT (ILL.—)
10	BLEND DOOR ACTUATOR
11	BLEND DOOR ACTUATOR
12	BLEND DOOR ACTUATOR
13	HIGH BLOWER RELAY
14	AMBIENT TEMP. SENSOR (—)
15	IN-CAR TEMP. SENSOR (—)
16	POWER (+)
17	NO CONNECTION (N/C)

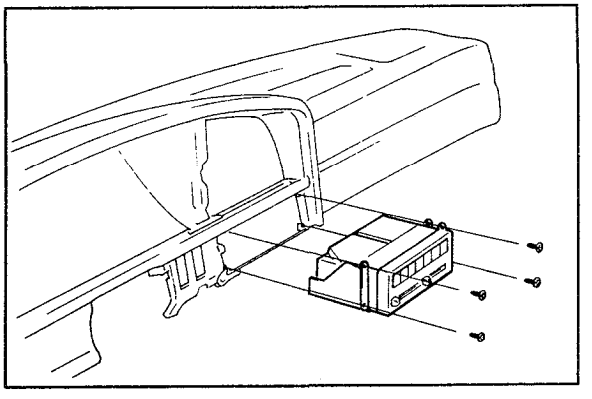
Vacuum connection

PORT NO.	FUNCTION
P1	SOURCE
P2	FLOOR (PARTIAL)
P3	FLOOR (FULL)
P4	PANEL
P5	RECIRC

REMOVAL AND INSTALLATION

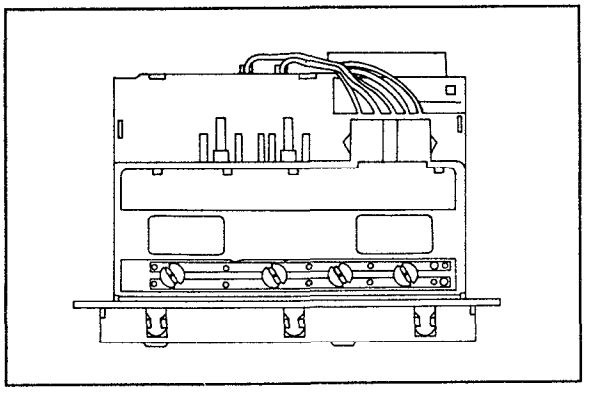


1. Disconnect the ground cable from the battery negative terminal.
2. Remove the center lower crash pad facia panel.



3. Remove the four control assembly mounting screws.
4. Pull the control assembly away from crash pad main assembly to allow access to the rear electrical connector.
5. Separate the electrical connector from the control assembly by depressing the latch at the top of the connector and pulling.
6. Slowly pull the control away from the crash pad main assembly.
   Guide the hard shell portion of the vacuum harness to avoid catching the crash pad main assy bracket.
7. Installation is the reverse of the removal procedure.

CONTROL ASSEMBLY BULB REPLACEMENT



1. Remove the four control mounting screws.
2. Remove the control assembly just far enough to access the illumination bulbs on top of the control.
3. Turn the instrument panel (I/P) illumination ON and verify the defective bulb(s). Then turn I/P illumination OFF and remove the defective bulb assemblies by carefully rotating the bulb socket counter-clockwise. Continue rotation by hand to the stop (approximately 45°) and pull the bulb and socket assembly straight out from the control assembly.
4. Replace the defective bulb(s) and socket assembly with the appropriate part.
5. Reinstall the bulb and socket assembly into the control and rotate clockwise approximately 45° to lock the socket assembly.
6. Turn I/P illumination ON and verify bulb operation.
   Then turn I/P illumination OFF and reiinstall the control.