SECTION 2

HEATER AND AIR CONDITIONING

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HEATER

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GENERAL DESCRIPTION

DESCRIPTION OF SYSTEM

The heater system is a system in which outside air is forced into the heater unit assembly, heated and then distributed into the passenger compartment to maintain the desired temperature. The system consists basically of four parts: (1) the blower and air inlet assembly, (2) the heater assembly, (3) the heater control assembly and (4) the water valve assembly. The operation of the system is as follows:

1. **Blower and Air Inlet Assembly** — The Blower and air inlet assembly draws outside air through the outside air inlet grille located forward of the windshield and channels the air into the heater assembly. The operation of the blower motor is controlled by a fan switch on the heater control. To insure adequate ventilation of the passenger compartment, the heater blower fan is on continuously.
2. **Heater Assembly** — The heater assembly houses the heater core, diverter door and defroster door. The heater cores water flow is controlled by a water valve which is located on the left side of the blower motor assembly.
3. **Heater Control Assembly** — The heater control assembly consists of 3 levers, the Selector lever, the Temperature lever, Air-Source Select lever and Rotary fan Switch.

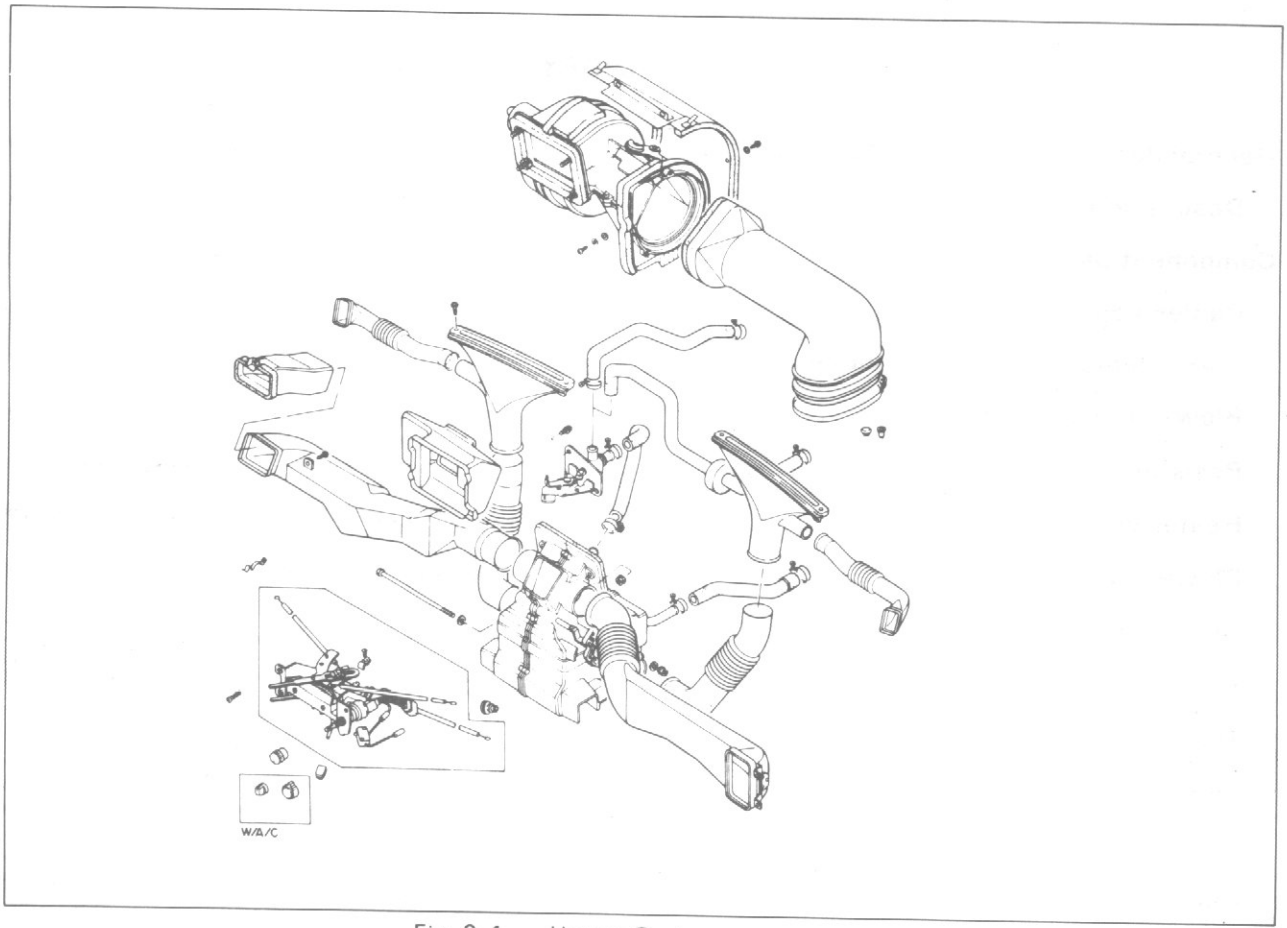

Fig. 2-1 — Heater System components

COMPONENT PARTS REPLACEMENT

CABLES ADJUSTMENT

Selector lever cable adjustment

1. Position control lever to "DEF".
2. The heater unit (in car) set actuating mechanism to position "A".
3. Insert bowden cable and install clip and secure with bolt.
4. Check adjustment with selector lever.
   Position "A" Air is out Defroster Ducts ("DEF")
   Position "B" Air is out Heater Outlet ("FOOT")
   Position "C" Air is out Vent Outlets and Heater Outlet ("BI-LEVEL").
   Position "D" Air is out Vent Outlets ("FACE").

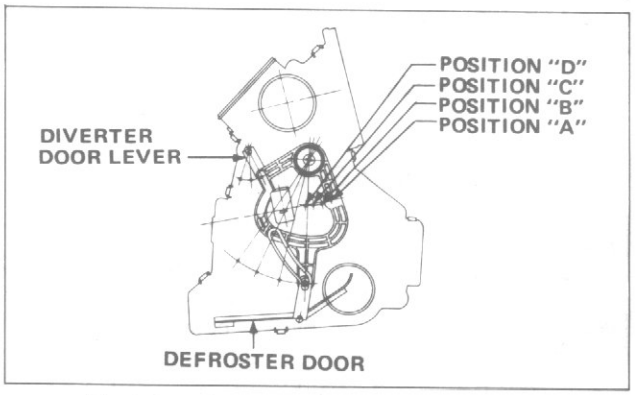

Fig.2-2 — Actuating Mechanism Positions

Fresh air inlet door cable adjustment

1. Position control lever to "CIRC".
2. On the blower unit (Engine Compartment) shut the fresh air inlet door.
3. Connect the bowden cable and install clip.
4. Door adjustment should be completely shut in the "CIRC" position.

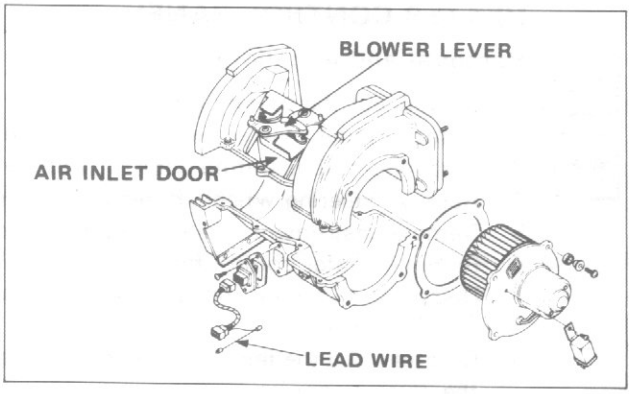

Fig. 2-3 — Air Inlet Door

Temperature control cable adjustment

1. Position control lever to "COLD".
2. Position water valve shaft in full "COLD" position.
3. Connect bowden cable and install clip.
4. Check to make sure valve opens fully with temperature lever in "HOT" position.

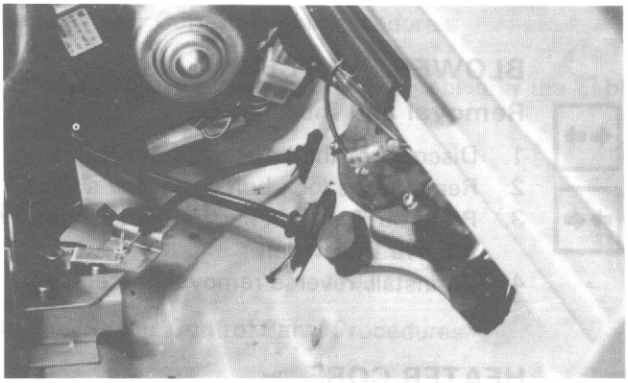

Fig. 2-4 — Water Temperature Valve

WATER TEMPERATURE CONTROL VALVE (FIG. 2-4)

Removal and installaton

1. Remove heater hoses and plug ends to prevent foreign material from entering.
2. Disconnect temperature cable.
3. Remove water valve.
4. To install, reverse removal procedures adjusting temperature cable so that when temperature lever is in cold, water valve shaft is in the full cold position. Idle engine with radiator cap off to allow any trapped air to escape from coolant system.

BLOWER MOTOR

Removal and installation

1. Disconnect the battery ground cable.
2. Disconnect wiring at blower motor.
3. Remove retaining screws and pull out blower motor and squirrel cage.
4. Remove retaining clip holding squirrel cage to motor and remove squirrel cage.
5. To install reverse removal procedures.

RESISTOR ASSEMBLY

Removal and installation

1. Remove the dush wall (Diesel engine model only).
2. Disconnect the battery ground cable.
3. Remove outer blower case cover.
4. Disconnect resistor wiring harness.
5. Remove 2 attaching screws and remove resistor.
6. To install, reverse removal procedures.

HEATER CONTROL PANEL

Removal and installation

1. Disconnect the battery ground cable.
2. Remove outer blower unit case cover and disconnect the fresh air door bowden cable.
3. Disconnect temperature cable at water valve.
4. Remove steering wheel. (Refer to Section 4 for Steering Wheel removal procedure).
5. Remove instrument cluster. (Refer to Section 15 for Instrument Cluster removal procedure).
6. Remove heater control face plate.
7. Disconnect selector mode cable from heater unit assembly and remove 3 phillips screws retaining heater control panel.
8. Carefully pull the temperature and fresh air door cables through the cowl and remove control panel through the cluster opening.
9. To install, reverse removal procedures following the adjustment procedures for bowden cables in the cable adjustment section.

BLOWER SWITCH

Removal and installation

1. Disconnect the battery ground cable.
2. Remove the lock bolt fixing the switch knob and remove the knob.
3. Press out the switch toward rear of the instrument panel, disconnect the switch wiring at the connector, then remove the switch.
4. To install, reverse removal procedures.

HEATER CORE

Removal and installation

1. Disconnect the battery ground cable.
2. Drain radiator.
3. Disconnect heater hoses at core connections and plug core tubes to prevent spillage of coolant when removing heater assembly.
4. Remove outer blower unit case cover and disconnect the fresh air door bowden cable.
5. Disconnect the temperature cable at water valve.
6. Remove steering wheel. (Refer to Section 4 for Steering Wheel removal procedure).
7. Remove instrument cluster. (Refer to Section 15 for Instrument Cluster removal procedure).
8. Disconnect wiring for console gauges, remove console retaining screws, untie shift lever leather and remove console.
9. Remove heater control and plate.

10. Remove glove box.
11. Disconnect selector mode cable from drivers side of heater unit assembly.
12. Carefully pull the temperature and fresh air door cables through the cowl and remove control panel through the cluster opening.
13. Remove instrument panel assembly. (Refer to Section 3 Instrument Panel removal procedure).
14. Remove heater unit assembly through-bolt located at the rear and bottom of heater unit assembly. (Fig. 2-5)
15. Remove 4 attaching nuts holding heater unit and blower unit together and remove heater unit assembly. (Fig. 2-5)
16. Remove bolts holding heater unit case halves together and remove heater core.
17. To install, reverse removal procedures.

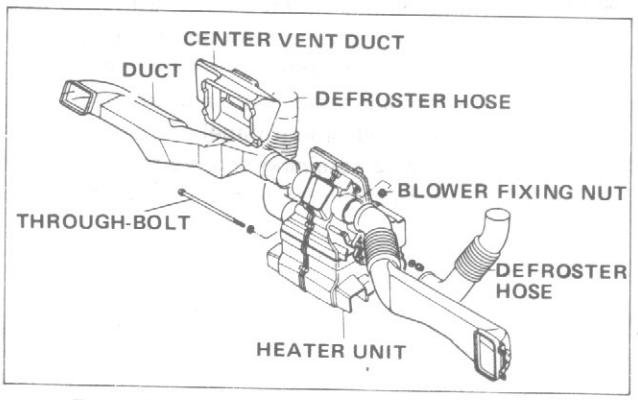

Fig. 2-5 — Heater Assembly Attachments

VENT CABLE (Fresh Air Door)

Removal and installation

1. Disconnect the battery ground cable.
2. Perform steps 2 through 8 of Removal and Installation of Heater Control Panel Procedures.
3. Remove cable from control.
4. To install, reverse removal procedures following adjustment procedures for bowden cables in the cable adjustment section.

TEMPERATURE CABLE (Water Valve)

Removal and installation

1. Disconnect the battery ground cable.
2. Perform steps 2 through 8 of Removal and Installation of Heatr Control Panel Procedures.
3. Remove cable from control.
4. To install, reverse removal procedures following adjustment procedures for bowden cables in the cable adjustment section.

SELECTOR LEVER CABLE (Mode Doors Mechanism)

Removal and installation

1. Disconnect the battery ground cable.
2. Perform steps 2 through 8 of Removal and Installation of Heater Control Panel Procedures.
3. Remove cable from control.
4. To install, reverse removal procedures following adjustment procedures for bowden cables in the cable adjustment section.

UPPER AIR OUTLET VANES (Center Vent)

Removal and installation

1. Using a thin flat screwdriver, carefully pry along outside edge of assembly and remove.

UPPER AIR OUTLET DUCT (Center Vent)

Removal and installation

1. Disconnect the battery ground cable.
2. Remove steering wheel. (Refer to Section 4 for Steering Wheel removal procedure).
3. Remove glove box assembly.
4. Remove instrument cluster. (Refer to Section 15 for Instrument Cluster removal procedure.)
5. Remove heater control and radio face plate.
6. Disconnect heater control from instrument panel. Do not remove.
7. Disconnect radio from instrument panel. Do not remove.
8. Loosen instrument panel and pull far enough rearward to disengage vent duct from heater unit.
9. Remove 2 retaining screws from duct to instrument panel and remove duct.
10. To install, reverse removal procedures.

DIAGNOSIS

Trouble	Possible Cause and Correction
Blower Motor Inoperative	1. Look for burned, broken, or incorrect fuse. 2. Look for loose connectors or broken wires. 3. Visually inspect the resistor assembly. Look for broken or melted coils. 4. Test for continuity. 5. Test for a malfunctioned blower switch.
Insufficient Heating	1. Partially plugged heater core. 2. Malfunctioning water valve. 3. Improperly adjusted temperature lever cable. 4. Test engine thermostat for opening too soon, stuck open, or held open by foreign material. 5. Visually inspect radiator coolant level and add if neccessary.
Inadequate Defrosting	1. Partially plugged heater core. 2. Malfunctioning water valve. 3. Improperly adjusted selector and/or temperature lever cable. 4. Mispositioned defroster outlets and/or hoses. 5. Obstructed defroster outlets and/or hoses. 6. Visually inspect the coolant level in radiator. Add coolant if necessary.

SPECIFICATIONS

Recommended Coolant	Ethylene-Glycol Base
Thermostat Opening Temperature	Refer to engine workshop manual in "Cooling System" Section
Cooling System Capacity	Refer to engine workshop manual in "Cooling System" Section
Blower Motor Type	12 VDC
Blower Motor Fan	Squirrel Cage

AIR CONDITIONING

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GENERAL DESCRIPTION

DESCRIPTION OF AIR CONDITIONING COMPONENTS

Compressor

The compressor is mounted on the engine and driven by a compressor belt. The compressor belt extends form the engine crankshaft pulley to the clutch pulley on the compressor.
The purpose of the unit is to draw low pressure refrigerant gas from the evaporator and compress it into a high temperature high pressure gas.

Magnetic Clutch and Pulley Assembly

The magnetic clutch and pulley assembly are attached to the front of the compressor and are driven by a compressor belt from the crakshaft pulley.
The magnetic clutch is solidly coupled to the compressor shaft and the pulley rotates freely.
When the air conditioner is turned on "ON", a magnetic field is built up in the magnetic clutch coil. The amgnetic force then draws the clutch plate and clutch pulley rearward, locking the clutch plate and pulley together as one unit. The compressor shaft then turns with the pulley.

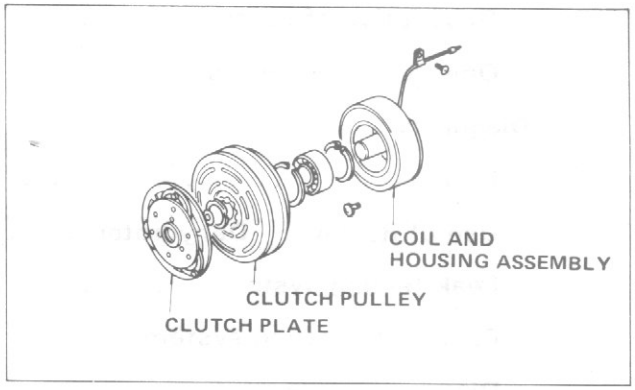

Fig. 2-6 — Compressor, Clutch, Pulley and Coil

Condenser

The aluminum condenser is mounted in front of the radiator and serves as a cooler. The high volume of cooler air that passes over the condenser absorbs heat from the condenser.

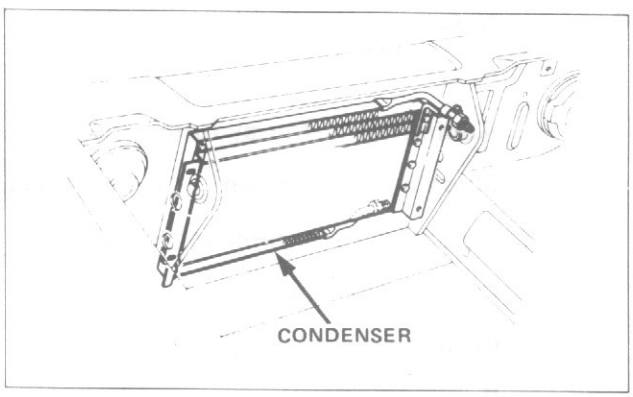

Fig. 2-7 — Condenser Assembly

Receiver-Dehydrator

The receiver-dehydrator acts as a storage tank for liquid refrigerant after it leaves the condenser. This insures a solid column of liquid refrigerant to the expansion valve at all times. A desiccant (moisture absorbing material) is enclosed within the assembly. A sight glass mounted on the unit permits visual checking of the refrigerant flow for bubbles or foam. The unit is also equipped with a filter screen which prevents foreign material from entering the remainder of the system.

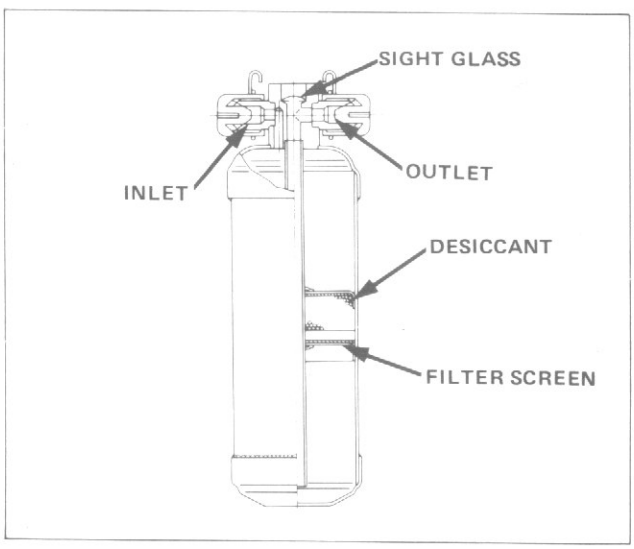

Fig. 2-8 — Receiver-Dehydrator Assembly

Evaporator

The evaporator is mounted within engine compartment.

The evaporator assembly consists of an aluminum core, enclosed in a reinforced plastic housing. A rubber water drain sock is mounted on the bottom. The function of the evaporator is to cool and de-humidify the air in the passenger compartment.

Expansion Valve

The expansion valve is mounted on the evaporator core. Its function is to regulate, the flow of refrigerant into the evaporator. The expansion valve is the dividing point between the high and low pressure liquid refrigerant.

Thermostatic Switch

The evaporator is protected by a thermostatic switch or compressor on/off switch. This switch turns the compressor off when the evaporator gets too cold.

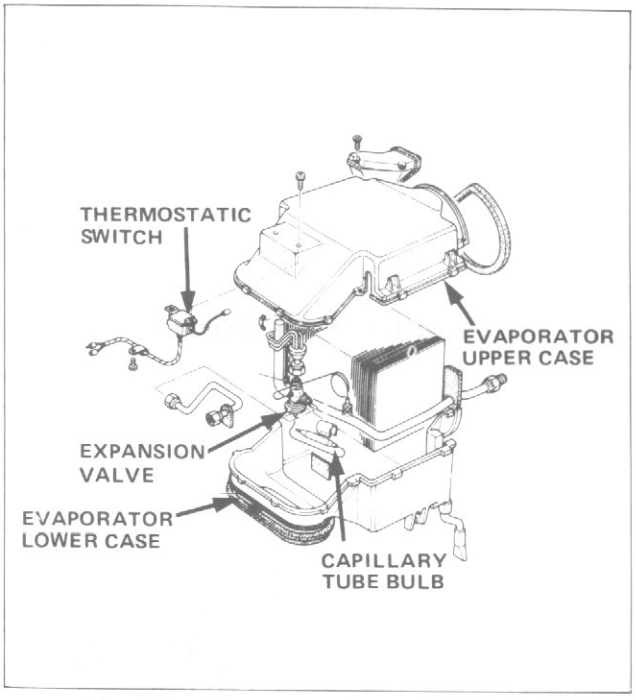

Fig. 2-9 — Evaporator, Expansion Valve and Thermostatic Switch

SYSTEM OPERATION

When the air conditioning is turned on, the magnetic clutch on the compressor engages the clutch plate and the compressor becomes operational.

The compressor draws low pressure refrigerant vapor from the evaporator and compresses it into a high pressure, high temperature vapor.

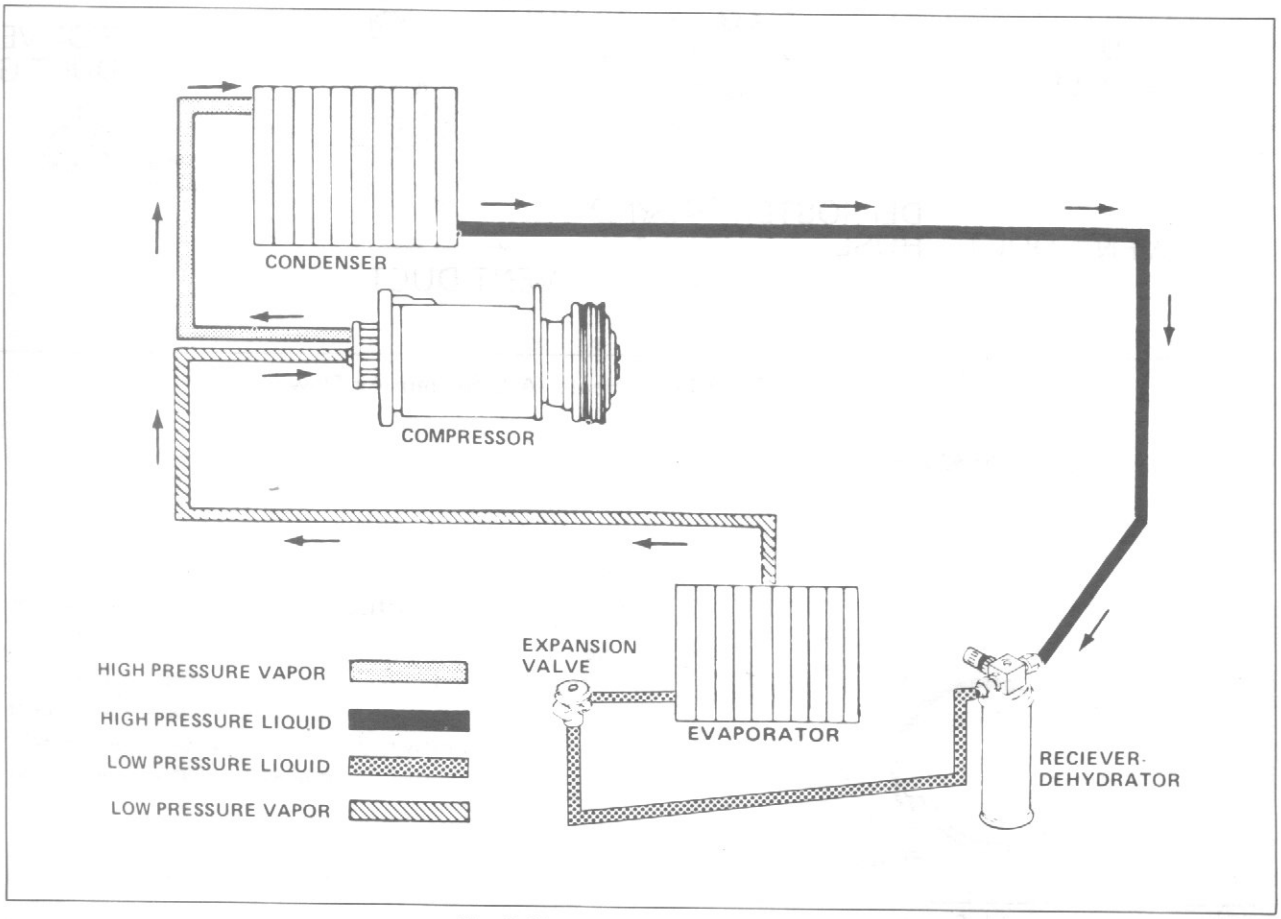

Fig. 2-10 — Refrigeration Circuit

The vapor is then pumped to the condenser. Outside air passing through the condenser absorbs the heat from the high temperature vapor. As the vapor cools, it again turns into a high pressure liquid.
The high pressure liquid passes to the expansion valve. The restriction in the expansion valve converts the high pressure liquid to a low pressure liquid.
The low pressure liquid then enters the evaporator. As the liquid refrigerant is now colder than the air in the car. The warmer in car air which is passing through the evaporator coils gives up its heat to the cooler liquid refrigerant. As the refrigerant warms, it boils into a gas again and is drawn to the compressor to repeat the cycle.

DESCRIPTION OF CONTROLS

The air conditioning system is controlled by the operator with control lever on the dash. The compressor is protected by a thermostatic switch (compressor on/off switch) that shuts the compressor off when the evaporator gets too cold.

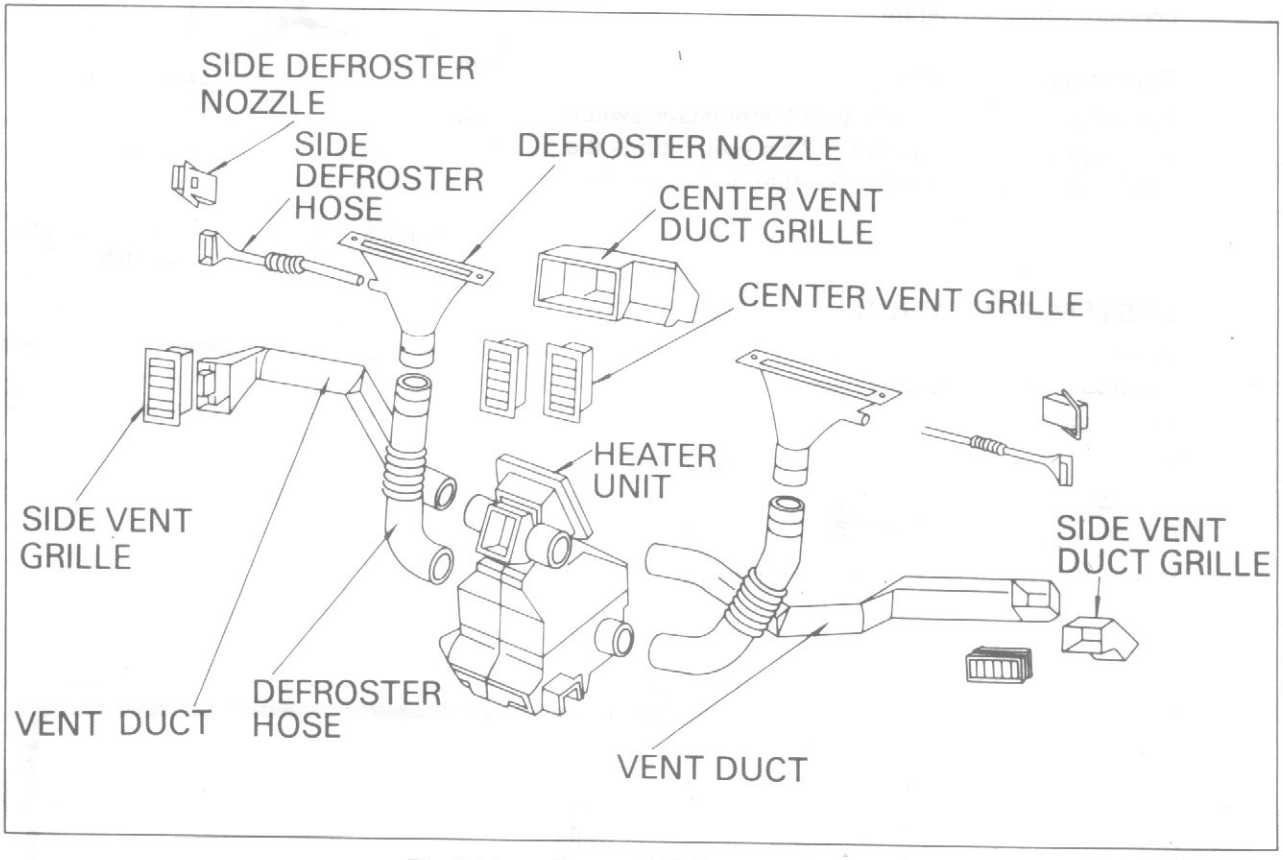

Fig. 2-11 — Heater-A/C System Air Flow

OPERATION OF CONTROLS (FIG. 2-12)

Heater and Airconditioner (If so equipped)

The function of the heater and air conditioner when the engine is running are as follows:

1. Heating
2. Windshield defrosting and defogging
3. Ventilation
4. Cooling

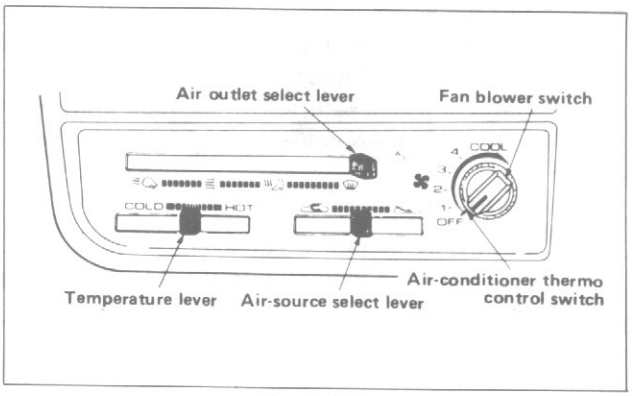

Fig. 2-12

Air outlet Slect lever

(DEFROST) ..... Air to windshield and side defroster.

(FOOT) ..... Air to your feet.

(BI-LEVEL) ..... Air to your face and feet.

(FACE) ..... Air to your face.

Air-Source Slect lever

(FRESH) ..... Outside air brought into the vehicle.

(CIRC) ..... Air circulated in the vehicle.
Some outside air enters passenger compartment.

Temperature lever

HOT ..... Higher temperature
COLD ..... Lower temperature

Fan blower switch

By turning the fan blower switch, air flow can be controlled in 4 steps.

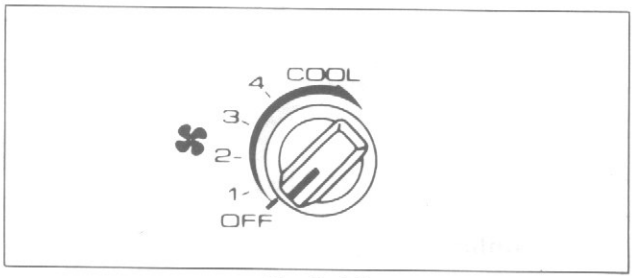

Fig. 2-13

Air conditioner Thermo control switch

For vehicle equipped with an air conditioner, the air conditioner starts and the air conditioner indicator lamp lights when this switch is turned on.
The temperature can be controlled with the air conditioner thermo control switch.

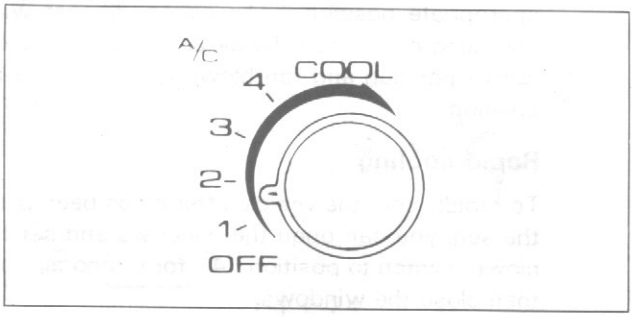

Fig. 2-14

How to set the levers

Set the levers in the positions indicated by the figures.
Set the other levers indicated by the dotted lines and the fan blower switch to desired positions.
Keep the Air-Source Select lever normally in the ( ) (FRESH) position.
Set it in the ( ) (CIRC) position only when you desire strong heating or cooling, or when driving on a dusty road, or you do not want to intake outside air for any reason.

Heating

Set the air-source select lever in ( ) (CIRC) position when the temperature should be raised rapidly or the vehicle is drived on a dusty road.

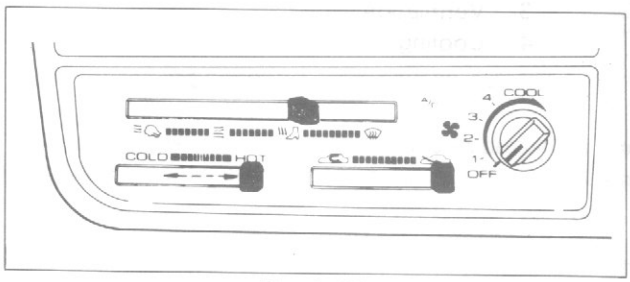

Fig. 2-15

Bi-level heating

This setting is most suitable for heating over a long period and for gentle heating.

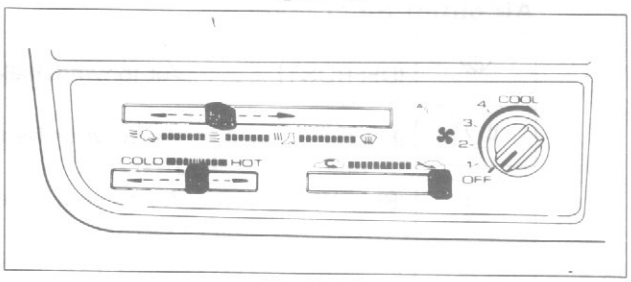

Fig. 2-16

Windshield defrosting and defogging.

In the rainy season, move the Temperature lever to the COLD position as required.

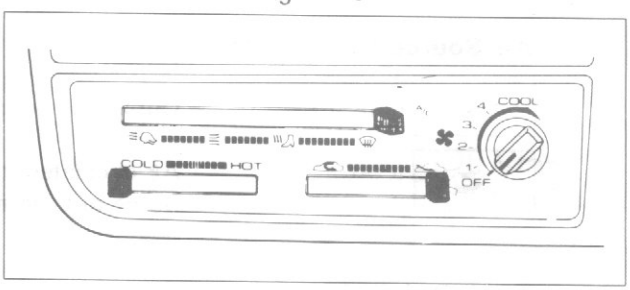

Fig. 2-17

Ventilating

Outside air is derectly brought into the vehicle.

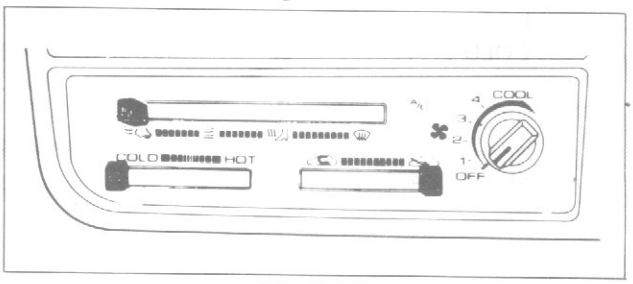

Fig. 2-18

Cooling

Turn the air conditioner thermo control switch to an appropriate position. The air conditioner will start operating only when the air source select lever is in (CIRC) position and fan blower switch is not in OFF position.

Rapid cooling

To rapidly cool the vehicle after it has been parked in the sun, you can open the windows and set the fan blower switch to position "4" for strong air flow and then close the windows.

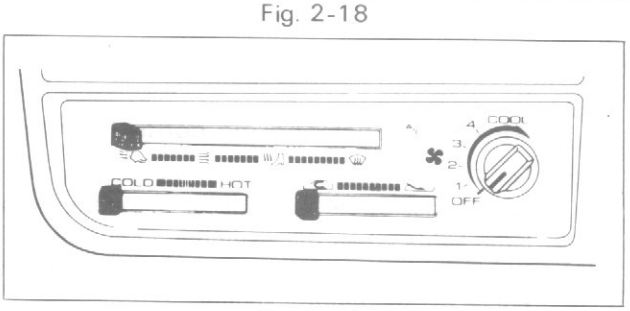

Fig. 2-19

Dehumidified Heating

Adjust the temperature lever and the air conditioner thermo control switch for the most comfortable condition.

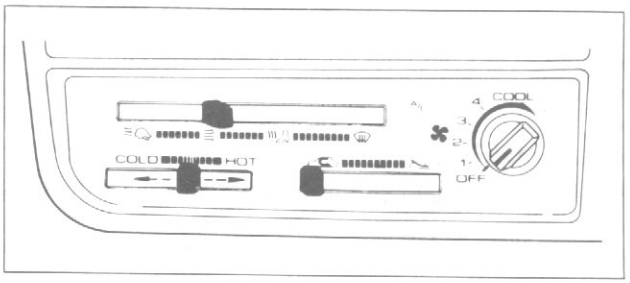

Fig. 2-20

When heating, cooling and ventilation are not required

Set the fan blower and air conditioner thermo control switches to the OFF position. Then set the air-source select lever to the ( ) (CIRC) position.

NOTICE:

- If you operate the air conditioner for a long time when the vehicle is parked, the air conditioner and engine are adversely affected. When you have stoped the engine be sure to turn the fan blower and air conditioner thermo control switches the OFF postion.
- The air conditioner must be started from the OFF position each time the engine is re-started.

Model with cooler (If so equipped)

The function of the cooler when the engine is running are as follows:

1. Windshield defrosting and defogging.
2. Ventilation.
3. Cooling.

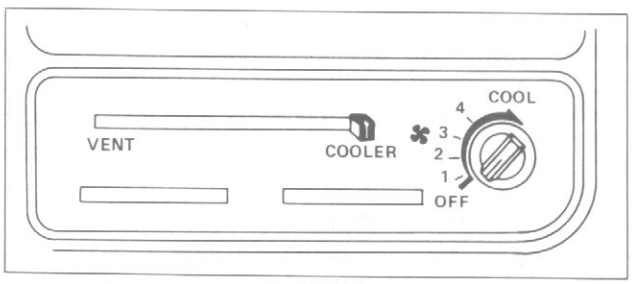

Fig. 2-21

Fan blower switch

By turning the fan blower switch, air flow can be controlled in 4 steps.

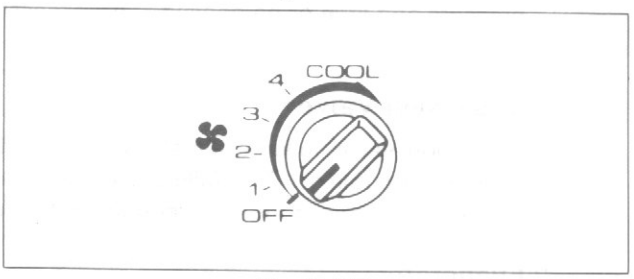

Fig. 2-22

Cooler thermo control switch

The cooler starts and the cooler indicator lamp lights when this switch is turned on.
The temperature can be controlled with the cooler thermo control switch.

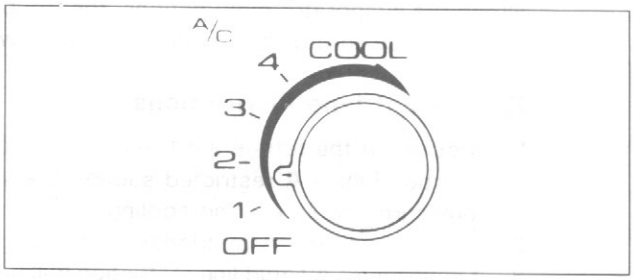

Fig. 2-23

Set the lever in COOLER position when the cooler is operative.

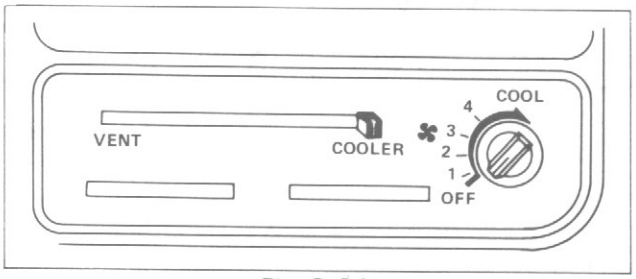

Fig. 2-24

DIAGNOSIS

GENERAL

The following is a brief description of the type of sympton each refrigerant component will evidence if a malfunction occurs:

Compressor

Compressor malfunction will appear in one of four ways: noise, seizure, leakage, or low discharge pressure. Resonant compressor noises are not cause for alarm; however, irregular noise or rattles may indicate broken parts or excessive clearances due to wear. To check seizure, de-energize the magnetic clutch and check to see if the drive plate can be rotated. If rotation is impossible, compressor is seized. Low discharge pressure may be due to a faulty internal seal of the compressor, or a restriction in the compressor.
Low discharge pressure may also be due to an insufficient refrigerant charge or a restriction elsewhere in the system. These possibilities should be checked prior to servicing the compressor. If the compressor is inoperative; but, is not seized, check to see if current is being supplied to the magnetic clutch coil terminals.

Condenser

A condenser may malfunction in two ways: it may leak, or it may be restricted. A condenser restriction will result in excessive compressor discharge pressure. If a partial restriction is present, sometimes ice or frost will form immediately after the restriction as the refrigerant expands after passing through the restriction. If air flow through the condenser or radiator is blocked, high discharge pressures will result. During normal condenser operation, the outlet pipe will be slightly cooler than the inlet pipe.

Receiver-Dehydrator

A receiver-dehydrator may fail due to a restriction inside the body of the unit. A restriction at the inlet to the receiver-dehydrator will cause high head pressures. Outlet tube restrictions will be indicated by low head pressurs and little or no cooling. An excessively cold receiver-dehydrator outlet may be indicative of a restriction.

Expansion Valve

Expansion valve failures usually will be indicated by low suction and discharge pressures, and insufficient evaporator cooling. The failure is generally due to a restricted external equalizing line. A less common cause of the above symptom is a clogged inlet screen.

Evaporator

When the evaporator malfunctions, the trouble will show up as inadequate supply of cool air. A partially plugged core due to dirt or a malfunctioned blower will generally be the cause.

Refrigerant Line Restrictions

Restrictions in the refrigerant lines will be indicated as follows:

1. Suction Line - A restricted suction line will cause low suction pressure at the compressor, low discharge pressure and little or no cooling.
2. Discharge Line - A restriction in the discharge line generally will cause the discharge line to leak.
3. Liquid Line - A liquid line restriction will be evidenced by low discharge and suction pressure, and insufficient cooling.

USE OF RECEIVER-DEHYDRATOR SIGHT GLASS FOR DIAGNOSIS

At temperatures higher than 21 degrees C (70 degress F), the sight glass may indicate whether the refrigerant charge is sufficient. A shortage of liquid refrigerant is indicatd after about five minutes of compressor opertion by the appearance of slow-moving bubbles (vapor) or a broken column of refrigerant under the glass. Continuous bubbles may appear in a properly charged system on a cool day. This is a normal situation. If the sight glass is generally clear and performance is satisfactory, occasional bubbles do not indicate refrigerant shortage.

If the sight glass consistently shows foaming or a broken liquid column, it should be observed after partially blocking the air to the condenser. If under this condition the sight glass clears and the performance is otherwise satisfactory, the charge shall be considered adequate.

In all instances where the indications of refrigerant shortage continues, additional refrigerant should be added in 0.11 kg (0.25 lbs.) increments until the sight glass is clear. An additional charge of 0.11 kg (0.25 lbs.) should be added as a reserve. In no case should the system be overcharged.

LEAK TESTING SYSTEM

The following method is recommended when asttempting to locate refrigerant leaks in the system. Loss of refrigerant is always indicative of a leak since refrigerant is not consumed and does not wear out.

Electronic leak detector

Using an electronic leak detector type tester, move the sensing tip at one inch per second along joints, seams, etc. where a refrigerant leak is suspected. When a leak is found, the signal speed will increase.

Follow manufacturers instructions and recommendations when using an electronic leak detector type tester.

FUNCTIONAL TESTING SYSTEM

Functional testing is a measurement of the air conditioner system performance to determine if discharge air temperature, pressure in suction line, and pressure in discharge line are within specific limitations.

To perform functional test proceed as follows:

1. Remove discharge and suction protective cap located on receiver dehydrator and compressor respectively.
2. Interconnect manifold and gauge set, gauge adapters J-9459 and J-25499 to air conditioning system.
3. Close doors and windows, open hood of the car.
4. Set temperature lever to cold position and selector lever in A/C.
5. Idle engine at 1,500 RPM in neutral.
6. Measure ambient temperature in immediate vicinity of car to be tested.
7. Open all air conditioner outlets and measure temperature at right side outlet.
8. Compare the actual pressurs and temperatures with the pressures and temperatures indicated in the Functional Test Table.

Right Side Outlet Temperature in Degrees	6°-8°C (42°-47°F)	6°-8°C (42°-47°F)	6°-9°C (42°-48°F)	7°-9°C (44°-48°F)	9°-12°C (48°-53°F)
Average Compressor Head Pressure in kg/cm²(psi)	8.4-9.8 (120-140)	10.5-13.0 (150-185)	13.0-14.8 (185-210)	14.8-16.9 (210-240)	17.6-19.7 (250-280)
Average Evaporator Pressure in kg/cm²(psi) AT SEA LEVEL	1.1-1.4 (15-20)	1.4-1.7 (20-24)	1.5-1.8 (21-26)	1.5-1.9 (22-27)	2.1-2.4 (30-34)
Ambient Air in Degrees	21°C (70°F)	27°C (80°F)	32°C (90°F)	38°C (100°F)	43°C (110°F)

Fig. 2-25 — Functional Test Table

Test conditions:

Hood	Raised
Windows	Closed
Doors	Closed
A/C Control Panel	
Select Lever	A/C Mode
Fan Switch	HI
Temperature Lever	Full Cold
Nozzles and Air Outlets	Open
Engine Speed	1500 RPM

DIAGNOSIS GUIDE

Insufficient Cooling (Check Air Flow.)

Normal Air Flow (Inspect system for visual malfunctions.)

Discharge Air - Normal Temp Check for air leaks through dash, car body, windows.

Discharge Air - High Temp Check sight glass for foaming and compressor clutch for engagement.

No Compressor Clutch Engagement Check connections at clutch, harness connectors, and check thermostatic switch.

Foaming System is probably low on refrigerant. Check for leaks, repair, evacuate, and charge. If foaming still occurs, check for restriction in refrigerant lines between condenser and receiver-dehydrator.

Evaporator Pressure Low Ice may be forming on evaporator. Low volume of air discharging at A/C outlet after system has been running above idle condition for approximately 15 - 30 minutes. Discharging air gradually elevating in temperature. Check expansion valve. If valve isn't permitting flow of liquid, this will be indicated by a warm pipe out of the evaporator. This may be caued by: 1) Clogged or plugged inlet screen in the expansion valve; 2) Broken capillary line; 3) Restricted equalizer line; or 4) Discahrged temperature bulb. If the valve is okay, the pipe out of the evaporator will be cold.

Evaporator Pressure High Check the expansion valve to determine if thermobulb is making good contact and is properly insulated. Operate engine at 2000 RPM with maximum air conditioning and blower setting. If evaporator pressure remains high, feel suction line. If line feels frosty or extremely cold with relative high ambient conditions, then partially cover the condenser to obtain head pressures from 18.6 — 19.7 kg/cm^2 (265 psi to 280 psi) maximum. If evaporator pressure rises above 2.1 kg/cm^2 (30 psi) change the expansion valve. Also, check if compressor may be the cause due to some internal or external mechanical trouble which prevents reduction of pressure. Check for external troubles, slipping belt, bad clutch and/or pulley, or improper clutch engagement, before investigating the compressor internally.

Head Pressure High Check for the following: Condenser air flow low, air in system, excessive refrigerant in system, restriction in condenser.

Head Pressure Low Restriction in flow of refrigerant to evaporator, or expansion valve plugged or malfunctioned.

Low Air Flow (Check blower operation and evaporator. Check operation of controls.)

Blower Not Operating Check for the following: Fuse blown, blower switch malfunctioned wire broken or loose connection, poor ground connection, or blower motor malfunctioned.

Blower Operating Normal Check for the following: Restriction or leakage in air ducts, A/C outlets not opening.

GENERAL INFORMATION

All subassemblies are shipped sealed and dehydrated. They are to remain sealed until just prior to making connections, and should be at room temperature before uncapping. This prevents condensation of moisture from air that enters the system.

All precautions should be taken to prevent damage to fittings or connections. Even minute damage to a connection could cause it to leak. Any fittings with grease or dirt on them should be wiped clean with a cloth dipped in alcohol.

Do not clean fitting or hoses with solvents because they are contaminants. If dirt, grease or moisture gets inside the pipes or hoses and cannot be removed, the pipe or hose is to be replaced. Use a small amount of clean refrigeration oil on all tube and hose connecting joints, and lubricate the "O" ring gasket with this oil before assembling the joint (if equipped). The oil will help in effecting a leak-proof joint and assist the "O" ring to slip into the proper location without being cut or damaged. Always use new "O" rings (if equipped).

When tightening joints, use a second wrench to hold the stationary part of the connnection to prevent twisting and to prevent hose kinking. Kinked hoses are apt to transmit noise and vibration. Tighten all connections in accordance with recommended torques (See Specifications Section).

Do not connect receiver-dehydrator assembly until all other connections have been made. This is necessary to insure maximum moisture removal from system.

It is important that air conditioning hoses do not rest on or contact body sheet metal except where necessary. Because of the high frequency at which the compressor operates, the passenger compartment is susceptible to transfer of noise.

SAFETY PRECAUTIONS

The following safety precautions should always be followed when servicing refrigerant charged components:

1. Do not leave Refrigerant-12 cylinder uncapped.
2. Do not carry cylinder in passenger compartment of car.
3. Do not subject cylinder to high temperatures.
4. Do not weld or steam clean on or near cylinder.
5. Do not fill charging cylinder completely when using a charging station.
6. Do not expose eyes to liquid - WEAR SAFETY GOGGLES whenever discharging, charging or leak testing system.

EVACUATING AND CHARGING SYSTEM

Removal of any part in the refrigerant circuit will require discharging of the entire system.

CONVENTIONAL METHOD

Discharging the System

To help prevent the possibility of hooking up the low side to the high side accidently, the high side fitting on the receiver-dehydrator assembly has a 3/8-24 thread. Hose adapter J-25499 will have to be used when connecting the high side refrigerant hose to the high side fitting.

1. Remove cap from gauge fitting on the compressor adapter fitting on the compressor.
2. With both valves on manifold gauge set closed (clockwise), attach manifold to the compressor adapter fitting on the compressor, using J-9459 valve adapter at suction gauge fitting and J-25499 valve adapter at discharge gauge fitting on the Receiver-Dehydrator.
3. Fully open high pressure valve on manifold gauge set to allow escape of refrigerant from system through the manifold gauge set and out the center fitting and hose. (Place end of hose in clean container to collect oil loss due to rapid discharge of system).
4. When hissing ceases, indicating all refrigerant has escaped, close high pressure valve on manifold gauge set by turning valve clockwise.

Evacuating The System

When the refrigeration system is depressurized and opened for service, some air will enter the lines, regardless of how quickly openings are capped. In order to remove this air and as much as possible of the moisture it contains, the complete system must be evacuated. Evacuating is merely the process of removing all air from the system, thereby creating a vacuum in the system.

Under no circumstances should alcohol be used in the system in an attempt to remove moisture, regardless of the successful use of alcohol in other refrigeration systems.

Preparations for Evacuating Complete System

1. Check the low pressure gauge for proper calibration. With the gauge disconnected from the refrigeration system, be sure that the pointer indicates to the center of zero. Lightly tap gauge a few times to be sure pointer is not sticking. If necessary, calibrate as follows:
   A. Remove cover from gauge.
   B. Holding gauge pointer adjusting screw firmly with one hand, carefully force pointer in the proper direction in proper amount to position pointer through the center of "O" position. Tap gauge a few times to be sure pointer is not sticking. Replace gauge cover.
2. If gauge is not already connected to compressor, connect as follows:
   A. Close hand shut-off valves on gauge set by turning clockwise.
   B. Remove cap from gauge fitting on the compressor adapter fitting.
   C. Attach valve adapter (J-9459) to end of the hose from the low pressure gauge and connect this adapter fitted hose to suction gauge fitting.
   D. Attach valve apater (J-25499) to end of hose from the high pressure gauge and connect this adapter fitted hose to the discharge fitting on the Receiver-Dehydrator.
3. Attach a flexible gauge hose to center fitting of the gauge set and attach the other end of this hose to vacuum pump.

Evacuating Complete System

1. Turn hand shut-off valve on low pressure gauge of gauge set to full clockwise position.
2. Slowly turn valve on high pressure gauge counterclockwise from full clockwise position, letting any pressure build-up escape completely. Close high pressure valve.
3. Check oil level in vacuum pump and, if necessary, add refrigeration oil. Make sure dust cap on discharge side of pump has been removed.
4. Start the vacuum pump and slowly open low and high pressure sides of manifold gauge set to avoid forcing oil out of refrigeration system and pump. Pressure is now being reduced on both sides of the refrigeration system. If oil is blown from the vacuum pump, it should be refilled to the proper level.
5. Observe low pressure gauge and operate vacuum pump until gauge shows 711 — 736 mm (28 — 29 in.) vacuum. In all evacuating procedures, specifications of 711 — 736 mm (28 — 29) of vacuum is used. This evacuation can only by attained at or near sea level.
   For each 305 m (1000 ft.) above sea level where this operation is being performed, the specification should be lowered by 25.4 mm (1 in.) of mercury vacuum. At 1525 m (5000 ft.) elevation, only 584 mm to 609 mm (23 in. to 24 in.) of vacuum can normally be obtained.
   If vacuum cannot be pulled to the minimum specification for the respective attitude, it indicats a leak in the system or gauge connections or a malfunctioned vacuum pump. In this case, it will be necessary to check for leaks as described under "Leak Testing Refrigerant System".
   When specified vacuum level (711 — 736 mm (28 — 29 in.) at sea level) is obtained, continue to run vacuum pump for ten (10) additional minutes. During these ten (10) minutes:
   A. Prepare for charging the system. If using a charging station, fill charging cylinder. If using manifold gauge set, make all preparations for charging system as described under "Disposable Can Method" or "Refrigerant Drum Method"
   B. Measure oil loss collected as a result of rapid discharge.
   C. Uncap compressor oil injector (J-24095) and open valve. Flush J-24095 with refrigerant, close valve and insert pick-up tube into graduated container of clean refrigerant oil.
   D. Connect J-24095 to suction fitting at the compressor adapter fitting. When valve on J-24095 is opened, the vacuum applied to the discharge side of the system will suck oil into system from container. Therefore, close observation of oil level in the container is necessary.
   E. Note level of oil n container. Open valve on J-24095 until oil level in container is reduced by an amount equal to that lost during discharge of system, then shut valve. Take care not to add more oil than was lost.

F. Disconnect J-24095 and attach pick-up tube fitting to Schraeder fitting to cap tool.

6. Turn hand shuft-off valves at low and high pressure gauges of gauge set to full clockwise position with vacuum pump operating, then stop pump. Carefully check low pressure gauge approximately for two (2) minutes to see that vacuum remains constant. If vacuum reduces, it indicates a leak in the system or gauge connections.

Charging the System

The system should be charged only after being evacuated as outlined in "Evacuating the System".

Refrigerant Drum Method

1. Connect center flexible line of gauge set to refrigerant drum.
2. Place refrigerant drum in a pail of water which has been heated to a maximum of 52°C (125 degrees F).
   CAUTION: Do not allow temperature of water to exceed 52°C (125 degrees F. temperature will cause excessive pressure and possible softening of fusible safety plugs in the refrigerant drum. It may not be necessary to use hot water if a large drum is used (over approx 45 kg (100 lbs.)
3. Place refrigerant drum (in pail of water) on scales (bathroom or commercial, preferably commercial).
   Do not turn refrigerant drum upside down, as this would allow liquid refrigerant to enter compressor which may cause damage.
4. If line at center gauge fitting has not been purged of air, loosen line at center fitting on gauge set and crack valve on refrigerant drum to blow air from line. Retighten line at center fitting and record exact weight of refrigerant tank in water on the scales.
5. Open valve on refrigerant drum and both valves on gauge set to allow refrigerant to flow into system. Continue charging until the scales show that 0.85 kg (1 lbs. 14 oz.) of refrigerant have been transferred from refrigerant drum to system.
   If full charge cannot be obtained, close both valves on gauge set, start engine, and set selector lever to A/C position with blower in Hi. Open low pressure valve on gauge set slowly and leave open until full charge is added.
   NOTICE: Observe high pressure gauge while charging with compressor running. Shut off engine if pressure exceeds 17.6 kg/cm^2 (250 psi). A large fan placed in front of the car will help reduce excessively high head pressure.
6. Close both valves on gauge set (high pressure valve will already be closed if charging was completed by running compressor) and close valve on refrigerant drum.
   If the engine was used to complete the charge into the system, close valve on refrigerant drum to permit compressor to draw any refrigerant left in the line from the drum to the center fitting of the gauge set, then close the low pressure valve on the gauge set.
7. Operate engine at 2000 RPM with selector lever in A/C, blower speed in Hi. After ten minutes of operation, observe appearance of refrigerant in receiver-dehydrator. If bubbles are observed, open low pressure gauge valve and valve on refrigerant drum to allow more refrigerant to enter system. Close valve when receiver-dehydrator clears up.
   If an air inlet temperature is below 21 degrees C (70 degrees F) when this check is made, bubbles may appear, even though the proper amount of refrigerant is in the system. Air inlet temperature must be 21 degrees C (70 degrees F) or above to make an accurate check.
8. When refrigerant has been installed, continue to operate system and test for proper operation as outlined under "Functional Test".
9. When satisfied that air conditioning system is operating properly, stop engine, remove gauge set and replace protective caps on charging fittings.
   CAUTION: A considerable amount of refrigerant will collect in the high pressure line, since some of this refrigerant will have condensed into liquid refrigerant. Wrap the high pressure gage fitting at the receiver-dehydrator with a shop cloth before disconnecting the valve from the gage fitting to prevent injury to personnel.
10. Using a leak detector, check complete system for leaks.

Disposable Can Method

After having depressurized, repaired (if necessary) and evacuated the refrigerant system, the system may be charged as follows using refrigerant in disposable cans:

1. Obtain two(2) 0.45 kg (1 lbs.) cans or one 5.44 kg (12 lbs.) can of refrigerant.
2. If using 0.45 kg (1 lbs.) cans, mount two(2) cans in J-6272-02 (Multi-opener) or attach J-6271 (single-can opener valve) on one can. If using the 5.44 kg (12 lbs.) disposable can, attach J-23390 (disposable can control valve) on can.

NOTICE: Make sure outlet valve on opener is closed (clockwise) before installing opener.

A. If the J-6272-02 multi-opener is used, raise locking lever, position two(2) cans of refrigerant and force locking lever down to secure cans and at same time puncture top of can to make it ready for charging.

B. If the J-6271 valve is used, back off the valve from the can top retainer, slip the valve onto the can and turn the valve into retainer until tight. DO NOT open outlet valve during this operation, as turning the valve into the retainer punctures top of can to make it ready for charging.

3. Connect center flexible line of gauge set to fitting on a can opener valve. If the line at center gauge fitting has not been purged of air, loosen line at center fitting on gauge set and "crack" valve at can opener (for a second or two) to force air from the line. Retighten line at center fitting.
4. Open valve at refrigerant source and at low and high pressure valves on manifold gauge set. Leave valve open at refrigerant source until all refrigerant (when using 0.45 kg (1 lbs.) can) has entered the refrigeration system or system is fully charged. Close valve on can.
   A. If the system is charged using 0.45 kg (1 lbs.) cans and the J-6271 valve, disconnect valve from can. Leave valve closed to flexible line to the center fitting of the manifold gauge set. Install valve on a new and full disposable can of refrigerant.
   B. If system is charged using J-6272-02, close the valve of opener after all cans are empty. Release the locking lever and discard the two (2) empty cans. If this tool will be used to complete the charge with additional cans to provide the required refrigerant charge, leave the empty cans in position, locate one full can and lock the lever into palce. These empty cans balance the assembly and prevent the loss of refrigerant through the open "series" passage. Align the pierced hole in the empty can with the punch in the cover of the tool.

   If the J-6271 valve for single cans is available, complete charging as explained in 4-A above.
5. Close high side valve on manifold gauge set.

CAUTION: Prior to starting up engine, the high side valve on the charging manifold must be closed due to excessive pressure build-up which can result in bursting of the container(s) causing serious injury. If you are inexperienced in the use of this procedure, seek professional assistance.

6. Operate engine at 2000 RPM with selector lever in A/C position and blower speed on Hi. If air inlet temperature at the condenser is below 21 degrees C (70 degrees F) when this check is made, bubbles may appear, even though the proper amount of refrigerant is in the system. Air inlet temperature must be 21 degrees C (70 degrees F) or above to make an accurate check.
7. When refrigerant has been installed, continue to operate system and test for proper operation as outlined under "functional Test".
8. When satisfied that the air conditioning system is operating properly, stop engine, remove gauge set and replace protective caps on suction and discharge fittings.

CAUTION: A considerable amount of refrigerant will collect in the high pressure line, since some of this refrigrant will have condensed into liquid refrigerant. Wrap the high pressure fitting at the compressor with a shop cloth before disconnecting the valve from the gauge fitting to prevent damage or injury to personnel.

9. Using an electronic type leak detector, check complete system for leaks.

CHARGING STATION METHOD

INSTALLING J-23500-01

1. Be certain all valves on charging station are closed.
2. Connect high pressure on the Receiver-Dehydrator gauge line to high pressure gauge fitting and low pressure gauge line to low pressure gauge fitting on the compressor.

Filling charging cylinder

1. Open Control valve on refrigerant container.
2. Open valve on bottom of charging cylinder, allowing refrigerant to enter cylinder.
3. Bleed charging cylinder to valve (above control panel) only as required to allow refrigerant to enter cylinder. When refrigerant reaches desired charge level, close valve at bottom of charging cylinder, valve on refrigerant container and be certain cylinder bleed valve is closed securely.

   While filling the cylinder, it will be necessary to close the bleed valve periodicaly to allow boiling to subside so that refrigerant level in the charging cylinder can be accurately read.

Evacuation and charging the system using J-23500-01

1. With charging station connected, as previously described, fully open high and low pressure control valves on station and allow refrigerant gas to escape rapidly from system through the center fitting and hose. (Place end of hose in a clean container to collect oil loss due to rapid discharge of system.)
2. When hissing ceases, indicating all refrigerant has escaped, close high pressure valve by turning valve clockwise. Connect the center fitting hose to the vacuum pump and open vacuum control valve.
3. With system discharged, run pump until 660 — 711 mm (26 — 28 in.) of vacuum is obtained. Continue to run pump for 15 minutes after system reaches 660 — 711 mm (26 — 28 in.) vacuum.
   In all evacuating procedures, the specification of 660 — 711 mm (26 — 28 in.) of mercury vacuum is used. These figures are only attainable at or near sea level. For each 305 m (1000 ft.) above sea level where this operation is being performed, the specifications should be lowered by 25.4 mm (1 in.). For example, at 1525 m (5000 ft.) elevation, only 533 — 584 mm (21 — 23 in.) vacuum can normally be obtained.
4. If 660 — 711 mm (26 — 28 in.) vacuum (corrected to sea level) cannot be obtained, close vacuum control valve and shut off vacuum pump. Open refrigerant control valve and allow some refrigerant to enter system. Locate and repair all leaks.
5. After evacuating for 15 minutes, add 0.23 kg (1/2 lbs.) of refrigerant to system. Purge this 0.23 kg (1/2 lbs.) and reevacuate for 15 minutes. Ths second evacuation is to be certain that as much contamination is removed from the system as possible.
6. Only after evacuating as above, system is ready for charging. Note reading on sight glass of charging cylinder. If it does not contain a sufficient amount for a full charge, fill to proper level.
7. Fully open refrigerant control valve and allow all liquid refrigerant to enter the system. When full charge of refrigerant has entered the system, turn off ALL valves.
8. If full charge of refrigerant will not enter system, close high pressure control and refrigerant control valves. Start engine and run at low idle with compressor operating. Crack refrigerant control valve and low pressure control on station. Watch low side gauge and keep gauge below 3.5 kg/cm^2 (50 psi) by regulating refrigerant control valve. Closing valve will lower pressure. This is to prevent liquid refrigerant from reaching the compressor while the compressor is operating. When required charge has entered system, close refrigerant control valve and close low pressure control.
9. System is now charged and should be performance-tested before removing gauges.

Adding Refrigerant

The following procedure should be used in adding small amounts of refrigerant that may have been lost by leaks or while opening system for servicing the compressor. Before adding refrigerant to replace that lost by leaks, check for evidence of oil loss and add oil if necessary.

This procedure will only apply if the air inlet temperature is above 21 degrees C (70 degrees F) at the condenser.

1. Remove cap from compressor gauge fitting. Attach gauge set to gauge fittings, making sure adapter (J-9459) is between low pressure gauge hose and suction gauge fitting, and or J-25499 is between high pressure gauge hose and discahrge gauge fitting on the Receiver-Dehydrator.
2. Start engine, place air conditioning selector lever to A/C position, blower switch to Hi. Operate for ten(10) minutes at 2000 RPM to stabilize system.
3. Observe the refrigerant through the sight glass cover of receiver-dehydrator with the system operating, to see if there are any bubbles evident.
   a. If no bubbles are evident, then bleed system slowly through the discharge valve until bubbles appear in the receiver-dehydrator. Add 0.23 kg (1/2 lbs.) of refrigerant as explained under "Charging the System".
   b. If bubbles are visible in the receiver-dehydrator it indicates a partial or complete plug in a line, a shortage of refrigerant, or both. Correct condition. Add refrigerant until the sight glass clears, then add another 0.23 kg (1/2 lbs.) of refrigerant.
4. Attach flexible hose from center fitting of gauge set loosely to refrigerant drum or on disposable can valves. Open high and low pressure valves on the gauge set slightly to purge pressure gauge lines of air. Tighten fitting of refrigerant drum or can when satisfied that all air has been removed from gauge lines. Close (clockwise) both hand shut-off valves or gauge set.
5. Partially charge system.

Refrigerant drum method

A. Place pail containing hot water that does not have a temperature exceeding 52°C (125 degree F) on scales, place refrigerant drum in pan containing water, note weight and only open low pressure valve on gauge set.
B. Start engine, place selector lever to A/C position and place blower switch in Hi. Operate engine for 10 minutes at 2000 RPM to stabilize system.
C. With compressor operating, slowly open valve on refrigerant drum and allow refrigerant to flow into system (through manifold gauge set) until liquid indicator clears up and immediately shut off valve at gauge set or on refrigerant drum. Check weight of refrigerant drum and pail of water. Then slowly open valve on gauge set (or refrigerant drum) and add 0.23 kg (1/2 lbs.) of refrigerant. Note total amount of refrigrant added.

Disposable can method

A. Make sure the outlet valve on the J-6271 valve is fully clockwise and attach the J-6271 to a 1 lb. can of refrigerant by backing off the valve from the top of the retainer, slipping the valve onto the can and turning the valve into the retainer until tight. DO NOT accidentally open outlet valve during this operation, as turning the valve into the retainer punctures the top of the can to make it ready for charging.
B. Connect center flexible line of gauge set to the fitting on the valve.
C. Start engine, place selector lever to A/C position, set blower switch to Hi. Operate engine for 10 minutes at 2000 RPM to stabilize system.
D. With compressor operating, slowly open valve on refrigerant can and allow refrigerant to flow into system (through manifold gauge set) until liquid indicator clears up and immediately shut off valve at gauge set and on refrigerant can. Check weight of can and valve assembly and record.
E. Add an additional 0.23 kg (1/2 lbs.) of refrigerant by adding refrigerant from the can just weighed until can is empty. Attach another can and add refrigerant until can and valve assembly weight the same as recorded.

6. Close valves at refrigerant drum or can.
7. Test for leaks and make operational check of system.

ADDING OIL TO THE SYSTEM (MAJOR OVERHAUL)

The oil in the refrigeration system does not remain in the compressor during system operation, but circulates throughout the system. The compressor is initially charged with 0.15 liters (5 fluid oz) of 525 viscosity oil. After system has been in operation the oil content in the compressor will vary depending on the engine RPM and air conditioning load. At higher engine RPM's lesser amount of oil will be retained in the compressor reservoir. It is important that the total system oil content does not vary from a total of 0.15 liters (5 fluid oz). Excessive oil content will reduce cooling capacity. Inadequate oil content may result in damage to compressor moving parts.

The refrigeration system will not require adding of oil unless there is an oil loss because of a ruptured line, badly leaking compressor seal, replacement of evaporator, compressor, receiver-dehydrator, or loss due to a collision. Oil is generally added to the system via the oil drain hole in the lower side of the compressor for this condition. To add oil to the system via the compressor, the compressor must be removed. If no major loss of oil has occurred and a component (condenser, receiver-dehydrator or evaporator) is removed for servicing, the oil may be added directly to the component. To add oil to a component removed for servicing and when no major loss has occurred, drain and measure oil in component, then replace with a like amount. To add oil to the system when a major loss of oil is evidenced, or when the compressor is being serviced, remove compressor, drain and measure oil, and replace oil amount specified in the Oil Replacement Table.

If foreign material is noted in oil drained from system or evidence of moisture is obvious in the components removed, it is recommended that the entire system be flushed and the receiver-dehydrator be replaced. A full oil charge of 0.15 liters (5 fluid oz) of 525 viscosity refrigeration oil should be replaced in the system. It should be noted that all service replacement compressors will be supplied with 0.15 liters (5 fluid oz) of oil. In most cases it will be necessary to drain oil from service replacement compressor and refill it with amount as specified in "Checking compressor oil change" section.

Checking compressor oil charge

Oil return operation

In order to remove the compressor when it has recovered oil as much as possible from the air conditioning system, the folowing oil return operations become necessary.

1. Raise the speed of the blower in the cabin to its maximum speed.
2. Run the compressor for more than 15 minutes at 800 — 1,000 r.p.m.

Oil supply

1. Compressor installation to a new air conditioning system .... 0.15 liters (5 fluid oz.)
2. Compressor installation to a used air conditioning system, and the recovered oil from the compressor is free of dirt.

AMOUNT OF RECOVERED OIL FROM COMPRESSOR	AMOUNT OF OIL TO BE SUPPLIED
MORE THAN 0.070 liters (2.3 fluid oz)	SAME AS THE AMOUNT RECOVERED
LESS THAN 0.070 liters (2.3 fluid oz)	0.070 liters (2.3 fluid oz)

2-1 In case where the recovered oil from the compressor is not free of dirt.
- (1) Wash the air conditioning system.
- (2) Replace the receiver-dehydrator.
- (3) Supply 0.15 liters (5 fluid oz) to the compressor.

3. In case where oil return operation is not conducted.

3-1 If recovered oil from the compressor is free of dirt:

If more than 0.070 liters (2.3 flud oz) is recovered from the removed compressor, supply the same amount as the amount recovered.

If the amount of recovered oil is less than 0.070 liters (2.3 flud oz), follow the below mentioned steps.
- (1) Supply 0.050 liters (1.7 fluid oz) of oil to the compressor before installation to the air conditoning system.
- (2) Conduct oil return operation. (See oil return paragraph).
- (3) Remove the compressor again, and check the amount of oil.

AMOUNT OF OIL RECOVERED FROM COMPRESSOR	AMOUNT OF SUPPLY TO COMPRESSOR
MORE THAN 0.070 liters (2.3 fluid oz)	0.070 liters (2.3 fluid oz)
LESS THAN 0.070 liters (2.3 fluid oz)	0.090 liters (3.0 fluid oz)

3-2 In case where recovered oil from the compressor is not free of dirt.
- (1) Wash air conditioning system.
- (2) Replace receiver-dehydrator.
- (3) Supply 0.15 liters (5 fluid oz) to compressor.

4. In case where system components other than compressor are replaced.

4-1 AMOUNT OF OIL TO BE SUPPLIED

Evaporator Core ..... 0.050 liters (1.7 fluid oz)
Condenser ..... 0.030 liters (1 fluid oz)
Receiver-Dehydrator ..... 0.030 liters (1 fluid oz)

4-2 After the oil return operations are conducted, remove the compressor to check the amount of oil

4-3 comply with the previously mentioned paragraphs 2 and 2-1 in order to supply oil to compressor, then install it.

NOTICE: Never add more than 0.06 liters (2 fluid oz.) of oil for replacement of any combinaton of the above components. The total system oil capaicty is 0.15 liters (5 fluid oz.) ..... 0.09 liters (3 fluid oz.) of which should be in the compressor. Too much oil in the system can cause a loss of system performance.

FLUSHING THE SYSTEM

Flushing of the system may involve all the components of the system or individual components in the system. The components may be flushed while mounted in the engine compartment or may be removed for flushing. When a component is not removed, disconnect all refrigerant lines or hoses attached to component. To perform flushing operation, connect a cylinder of refrigerant-11 to the component to be flushed, then invert the cylinder and open the cylinder valve so that the liquid refrigerant pours out and through the component. Insure that area immediately surrounding outlet of component is clear of anything that may be damaged by contact because of the sudden drop in temperature.

COMPONENT PARTS REPLACEMENT

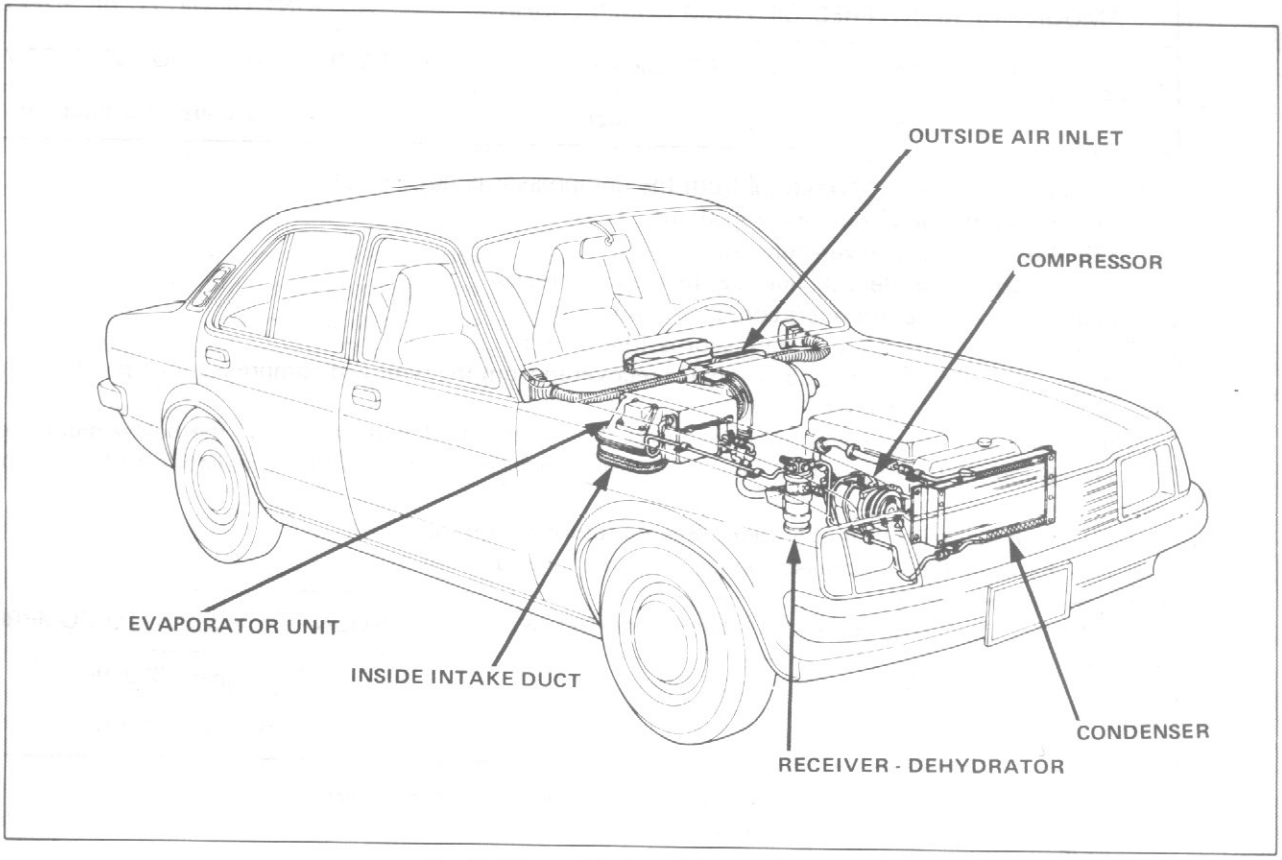

Fig. 2-26 — Air Conditioning System

CABLES ADJUSTMENT

Selector Lever Cable Adjustment (Refer to Fig. 2-2)

1. Position control lever to "DEF".
2. The heater unit (in car) set actuating mechanism to position "A".
3. Insert bowden cable and secure with bolt and install clip.
4. Check adjustment with selector lever:
   Position "A" Air is out Defroster Ducts ("DEF")
   Position "B" Air is out Heater Outlet ("FOOT")
   Position "C" Air is out Vent Outlets and Heater Outlet ("BI-LEVEL").
   Position "D" Air is out Vent Outlets ("FACE").

Fresh Air Inlet Door Cable Adjustment (Refer to Fig. 2-3)

1. Position control lever to "CIRC".
2. Shut the fresh air inlet door on the blower unit in the engine compartment.
3. Connect the bowden cable and install clip.
4. Door should be completely shut in the "CIRC" position.

Temperature Control Cable Adjustment (Refer to Fig. 2-4)

1. Position control lever to "COLD".
2. Position water valve shaft infully "COLD" position.
3. Connect bowden cable and install clip.
4. Check to make sure valve opens fully with temperature lever in "HOT" position.

COMPRESSOR

Removal and installation

1. Discharge system (Refer to "discharging the System").
2. On vehicles with gasoline engine, scribe distributor so assembly can be reinstalled exactly in same position and remove distributor assembly.
3. Remove refrigerant hoses and protect the ends so dirt etc; can't enter. Plug compressor epenings.
4. Loosen idler pulley.
5. Remove 2 top compressor mounting bolts.
6. Remove the protective sheet metal cover from under front of car.
7. Remove bottom compressor mounting bolts and remove compressor. During removal, maintain the compressor position so that the sump is downward. Do not rotate compressor shaft.

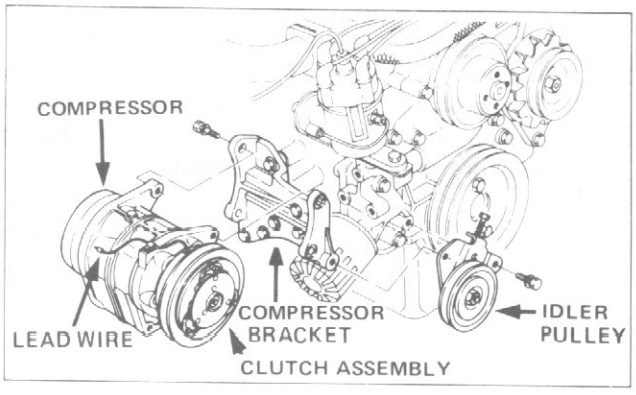

Fig. 2-27 — Compressor Mounting

8. To install reverse removal procedures and charge system. See ("Charging the System").

NOTICE: For Compressor Overhaul See "Compressor overhaul" Section.

EVAPORATOR AND/OR EXPANSION VALVE

Removal and Installation

1. Discharge system. Refer to "Discharging the System".
2. Disconnect liquid line and suction hose from evaporator and tape open ends of evaporator pipes and refrigerant lines.
3. Disconnect retaining band from passenger compartment intake duct.
4. Disconnect bowden cable and fresh air hose.
5. From within the passenger compartment, reach up through intake duct and disconnect electrical connector from compressor on/off thermostatic switch.
6. Remove glove box assembly.
7. Remove 2 evaporator case to cowl retaining bolts.
8. Remove 1 retaining bolt from bottom of evaporator case and carefully lift out assembly.
9. Remove thermostatic switch cover and remove thermostatic switch screws.
10. Remove attaching screws and clips from case and separate case halves.
11. Remove capillary bulb, external equalizer line and expansion valve and tape all open ends.
12. Carefully pull out the thermostatic switch capillary sensing tube from the evaporator core.
13. Install in reverse of removal.

If expansion valve or refrigerant lines have been exposed to the atmosphere for any amount of time and moisture may have entered the valve or the system, flush the system and install a new receiver-dehydrator or valve as necessary.

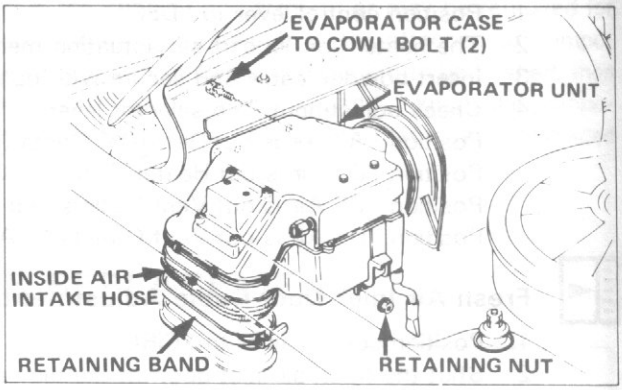

Fig. 2-28 — Evaporator Case Retaining Bolts

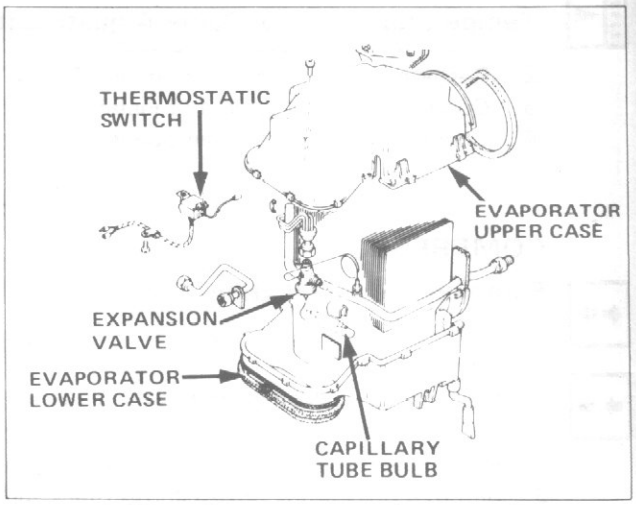

Fig. 2-29 — Evaporator and Attaching Parts

CONDENSER ASSEMBLY

Removal and installation

1. Disconnect the battery ground cable from battery.
2. Discharge the system. Refer to "Discharging the System".
3. Disconnect radiator hoses from radiator and drain coolant into a suitable container.
4. Remove fan shroud and fan blade.
5. On vehicles with automatic transmission, unscrew oil lines from connectors on lower radiator tank and plug lines.
   It is essential that no dirt enters the oil lines. When unscrewing oil lines, hold connectors on lower radiator tank with pliers to avoid leakages. Ensure that no dirt enters oil cooler.
6. Disconnect inlet and outlet hoses from condenser pipes and tape closed the open ends of refrigerant lines and also the open ends of the inlet and outlet pipes of the condenser.
7. Remove radiator-condenser attaching bolts and lift out assembly.
8. To install, reverse removal procedures.
   If refrigerant circuit or condenser has been exposed to the atmosphere and moisture may be present in the circuit, the system and/or component must be flushed prior to installation. Refer to "Flushing the System".

RECEIVER - DEHYDRATOR

Removal and installation

1. Discharge system. Refer to "Discharging the System".
2. Disconnect refrigerant lines to both ends of receiver-dehydrator and tape closed open ends of refrigerant lines and also ends of the inlet and outlet ports on the receiver-dehydrator.
3. Remove bracket attaching screws and lift out assembly.
4. Remove receiver-dehydrator from bracket.
5. To install reverse removal procedures.
   If the receiver-dehydrator has been exposed to the atmosphere for any amount of time (more than 5 minutes). The receiver-dehydrator should be replaced, since the life of the dessicant is probably expended.

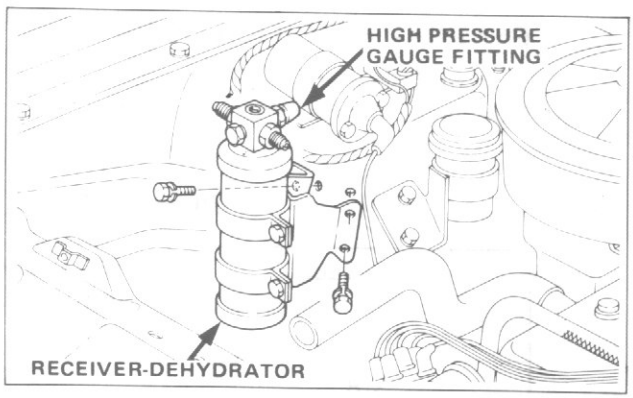

Fig. 2-30 — Receiver-Dehydrator Mounting

SPECIFICATIONS

COMPRESSOR SPECIFICATIONS

Type	6 Cylinder Axial Opposed
Make	Diesel Kiki Co., Ltd. (Japan)
Effective Displacement	0.122 liters (7.44 cu. in.)
Oil	525 Viscosity
Oil Content (New)	0.15 liters (5 fluid oz.)
Air Gap between Clutch Drive Plate and Pulley	0.3 — 0.6 mm (0.012 — 0.023 in.)
Clutch Type	Magnetic

BLOWER MOTOR SPECIFICATIONS

Blower Motor Type	12 VDC
Blower Motor Fan	Squirrel Cage
Blower Motor Voltage	13.5V
Blower Motor Current Draw	12 A

GENERAL SPECIFICATIONS

Type of Refrigerant	Refrigerant 12
Refrigerant Capacity (Fully Charged)	0.85 kg (1 lbs. 14 oz.)

PIPE AND HOSE CONNECTION TORQUE CHART

Metal Tube Outside Dia. (Inch)	Thread and Fitting Size (inch)	Steel Tubing Torque kg-m (ft. lbs.)	Aluminum or Copper Tubing kg-m (ft. lbs.)
3/8	5/8	3-4 (22-29)	2-3 (15-22)
1/2	3/4	4-5 (20-36)	3-4 (22-29)
5/8	7/8	5-6 (36-43)	4-5 (29-36)