

HEATING AND AIR CONDITIONING

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DESCRIPTION AND OPERATION

A/C PRESSURE TRANSDUCER

DESCRIPTION

The a/c pressure transducer is located on the discharge line near the compressor, and functions as the refrigerant system pressure sensor. This switch prevents compressor operation when the discharge line pressure approaches extreme levels.

The a/c pressure transducer is a factory-calibrated unit. The switch cannot be adjusted or repaired, and if faulty or damaged, it must be replaced.

OPERATION

When the discharge line pressure rises above 2971 kPa (431 psi) the switch contacts open and interrupt the A/C clutch relay signal from the PCM. The switch also opens when the pressure drops below 206 kPa (30 psi). The PCM responds by de-energizing the compressor clutch relay, which will disengage the compressor clutch.

A/C REFRIGERANT LINES

DESCRIPTION

The air conditioning lines used on this vehicle are made from reinforced rubber with a nylon liner on the inner walls. The ends of the A/C lines are made with light weight aluminum fittings or quick connects.

The A/C lines use special connectors called quick connects. There are four quick connects in the system. Two are located at the condenser and the other two are located at the expansion valve. Each quick connector has a clip installed on it.

All quick connects use two O-rings to seal the connection. The O-rings are made from a special type of rubber that is not affected by R-134a refrigerant. O-ring replacement is required whenever lines are removed and installed. Use only O-rings specified for this vehicle. Failure to use the correct type of O-ring will cause the connection to leak within a short period of time.

OPERATION

CAUTION: Never attempt to remove a clip or disconnect a quick connect without reclaiming all refrigerant from the air conditioning system. The system must be empty.

When it is necessary to open the refrigeration system, have everything needed to service the system ready. The system should not be left open any longer than necessary. Cap or plug all lines and fittings as

soon as they are opened. This will prevent the entrance of dirt and moisture into the system. All new lines and components should be capped or sealed until they are ready to be used.

WARNING: AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO DISCHARGE R-134a SYSTEM. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

R-134a SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. SOME MIXTURES OF AIR/R-134a HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

BLOWER MOTOR RESISTOR

DESCRIPTION

The blower motor resistor is mounted to the lower right side of the heater-A/C housing in the passenger compartment, where it can be accessed for service. See Blower Motor Resistor in the Removal and Installation section of this group for more information.

The blower motor resistor has multiple resistor wires, each of which will change the resistance in the blower motor ground path to change the blower motor speed. The blower motor switch directs the ground path through the correct resistor wire to obtain the selected blower motor speed.

The blower motor resistor cannot be repaired and, if faulty or damaged, it must be replaced.

OPERATION

With the blower motor switch in the lowest speed position the ground path for the motor is applied through all of the resistor wires. Each higher speed selected with the blower motor switch applies the blower motor ground path through fewer of the resistor wires, increasing the blower motor speed. When the blower motor switch is in the highest speed position, the blower motor resistor is bypassed and the blower motor receives a direct path to ground.

COMPRESSOR

DESCRIPTION

The TRS90 is a fixed displacement type compressor (Fig. 1). This compressor uses an integral thermal

DESCRIPTION AND OPERATION (Continued)

limiter switch to protect it from overheating. The system uses polyalkylene glycol synthetic wax-free refrigerant oil SP-15 PAG.

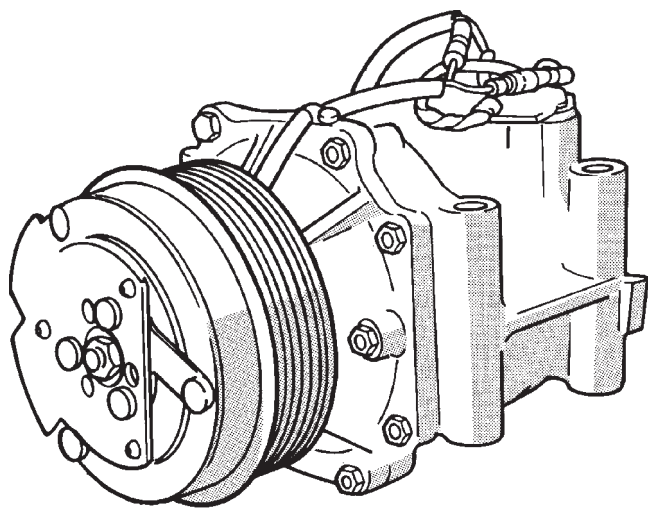
CAUTION: Cleanliness is extremely important. Clean the surfaces around the suction and discharge ports of the compressor before opening the system. If compressor is removed from vehicle, apply tape to the opened ports to prevent any contamination.

OPERATION

The compressor is driven by the engine through an electric clutch, drive pulley and belt arrangement. The compressor is lubricated by refrigerant oil that is circulated throughout the refrigerant system with the refrigerant.

The compressor draws in low-pressure refrigerant vapor from the evaporator through its suction port. It then compresses the refrigerant into a high-pressure, high-temperature refrigerant vapor, which is then pumped to the condenser through the compressor discharge port.

The compressor cannot be repaired. If faulty or damaged, the entire compressor must be replaced. The compressor clutch, pulley, clutch coil, and thermal limiter switch are available for service.



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Fig. 1 TRS90 Compressor

COMPRESSOR CLUTCH, PULLEY, AND COIL

DESCRIPTION

The compressor clutch components provide a way to drive the compressor. The compressor clutch assembly consists of a stationary electromagnetic coil, a hub bearing and pulley assembly, and a clutch plate. The electromagnetic coil unit and the hub

bearing and pulley assembly are each retained on the nose of the compressor front housing with snap rings. The clutch plate is mounted on the compressor shaft and secured with a nut. The compressor clutch and coil assembly are the only serviced parts on the compressor.

OPERATION

These components provide the means to engage and disengage the compressor from the engine serpentine accessory drive belt. When the clutch coil is energized, it magnetically draws the clutch into contact with the pulley and drives the compressor shaft. When the coil is not energized, the pulley freewheels on the clutch hub bearing, which is part of the pulley. The compressor clutch and coil are the only serviced parts on the compressor.

The compressor clutch is controlled by several components: the heater-A/C mode control switch, the a/c pressure transducer, the evaporator probe, the thermal limiter switch, the compressor clutch relay, and the Powertrain Control Module (PCM).

CONDENSER

DESCRIPTION

The condenser is a heat exchanger that allows the high-pressure refrigerant gas being discharged by the compressor to give up its heat to the air passing over the condenser fins.

OPERATION

The condenser is located in the air flow in front of the engine cooling radiator. When the refrigerant gas gives up its heat, it condenses. When the refrigerant leaves the condenser, it has become a high-pressure liquid refrigerant. The volume of air flowing over the condenser fins is critical to the proper cooling performance of the air conditioning system. Therefore, it is important that there are no objects placed in front of the radiator grille openings in the front of the vehicle or foreign material on the condenser fins that might obstruct proper air flow. Also, any factory-installed air seals or shrouds must be properly reinstalled following radiator or condenser service.

The condenser cannot be repaired and, if faulty or damaged, it must be replaced.

ENGINE COOLING SYSTEM REQUIREMENTS

DESCRIPTION

To maintain ample temperature levels from the heating-A/C system, the cooling system must be in proper working order.

DESCRIPTION AND OPERATION (Continued)

OPERATION

The use of a bug screen is not recommended. Any obstructions forward of the condenser can reduce the effectiveness of the air conditioning system. Refer to Group 0, Lubrication and Maintenance or Group 7, Cooling System of this manual.

EVAPORATOR COIL**DESCRIPTION**

The evaporator coil is located in the heater-A/C housing, on the passenger side of the vehicle. The evaporator coil is positioned in the heater-A/C housing so that all air that enters the housing must pass over the fins of the evaporator before it is distributed through the system ducts and outlets. However, air passing over the evaporator coil fins will only be conditioned when the compressor is engaged and circulating refrigerant through the evaporator coil tubes.

The evaporator coil cannot be repaired and, if faulty or damaged, it must be replaced.

OPERATION

Refrigerant enters the evaporator from the expansion valve as a low-temperature, low-pressure mixture of liquid and gas. As air flows over the fins of the evaporator, the humidity in the air condenses on the fins, and the heat from the air is absorbed by the refrigerant. Heat absorption causes the refrigerant to boil and vaporize. The refrigerant becomes a low-pressure gas before it leaves the evaporator.

EVAPORATOR PROBE**DESCRIPTION**

The evaporator probe is a 2 wire temperature sensing element located at the coldest point on the face of the evaporator. The switch is attached to the evaporator coil with the sensing probe inserted into the coil fins. The evaporator temperature probe prevents condensate water on the evaporator coil from freezing and obstructing A/C system air flow.

OPERATION

The probe is used to switch the clutch OFF before evaporator freeze-up occurs. Output from the probe is sampled by the Body Control Module. The clutch is switched OFF when the probe temperature reaches 1.1°C (34°F). It is allowed to switch ON when the probe temperature reaches 2.2°C (36°F).

EXPANSION VALVE**DESCRIPTION**

The "H" valve-type thermal expansion valve (TXV) is located at the front of the heater-A/C housing

between the liquid and suction lines and the evaporator coil.

The expansion valve is a factory calibrated unit and cannot be adjusted or repaired. If faulty or damaged, the expansion valve must be replaced.

OPERATION

High-pressure, high temperature liquid refrigerant from the liquid line passes through the expansion valve orifice, converting it into a low-pressure, low-temperature mixture of liquid and gas before it enters the evaporator coil. A temperature sensor in the expansion valve control head monitors the temperature of the refrigerant leaving the evaporator coil through the suction line, and adjusts the orifice size at the liquid line to let the proper amount of refrigerant into the evaporator coil to meet the vehicle cooling requirements. Controlling the refrigerant flow through the evaporator ensures that none of the refrigerant leaving the evaporator is still in a liquid state, which could damage the compressor.

FILTER-DRIER**DESCRIPTION**

The filter-drier is mounted on the right side of the engine compartment in front of the heater-A/C housing. It is located in the liquid line between the condenser outlet and the evaporator inlet.

OPERATION

High-pressure liquid refrigerant from the condenser flows into the filter-drier. The filter-drier performs a filtering action to prevent foreign material in the refrigerant from contaminating the expansion valve. A desiccant bag is mounted inside the filter-drier canister to absorb any moisture which may have entered and become trapped within the refrigerant system. In addition, during periods of high demand air conditioner operation, the filter-drier acts as a reservoir to store surplus refrigerant.

The filter-drier cannot be repaired. If the filter-drier is faulty or damaged, if the refrigerant system has been contaminated, or if the system has been left open to the atmosphere for an indeterminable period, it must be replaced.

HANDLING TUBING AND FITTINGS**DESCRIPTION**

Kinks in the refrigerant tubing or sharp bends in the refrigerant hose lines will greatly reduce the capacity of the entire system.

DESCRIPTION AND OPERATION (Continued)

CAUTION: The system must be completely empty before opening any fitting or connection in the refrigeration system. Open fittings with caution even after the system has been emptied. If any pressure is noticed as a fitting is loosened, retighten fitting and evacuate the system again.

A good rule for the flexible hose lines is to keep the radius of all bends at least 10 times the diameter of the hose. Sharper bends will reduce the flow of refrigerant. The flexible hose lines should be routed so they are at least 3 inches (80 mm) from the exhaust manifold. Inspect all flexible hose lines to make sure they are in good condition and properly routed.

The use of correct wrenches when making connections is very important. Improper wrenches or improper use of wrenches can damage the fittings.

The internal parts of the A/C system will remain stable as long as moisture-free refrigerant and refrigerant oil is used. Abnormal amounts of dirt, moisture or air can upset the chemical stability. This may cause operational troubles or even serious damage if present in more than very small quantities.

When opening a refrigeration system, have everything you will need to repair the system ready. This will minimize the amount of time the system must be opened. Cap or plug all lines and fittings as soon as they are opened. This will help prevent the entrance of dirt and moisture. All new lines and components should be capped or sealed until they are ready to be used.

All tools, including the refrigerant dispensing manifold, the manifold gauge set, and test hoses should be kept clean and dry.

OPERATION

High pressures are produced in the system when it is operating. Extreme care must be exercised to make sure that all connections are pressure tight. Dirt and moisture can enter the system when it is opened for repair or replacement of lines or components. The refrigerant oil will absorb moisture readily out of the air. This moisture will convert into acids within a closed system.

HIGH PRESSURE RELIEF VALVE

DESCRIPTION

The high pressure relief valve is located on the rear surface of the compressor housing. This mechanical valve is designed to vent refrigerant from the system to protect against damage to the compressor and other system components, caused by condenser air flow restriction or an overcharge of refrigerant.

The high pressure relief valve vents the system when a discharge pressure of 3445 to 4135 kPa (500 to 600 psi) or above is reached. The valve closes with a minimum discharge pressure of 2756 kPa (400 psi) is reached.

The high pressure relief valve is only serviced as part of the compressor assembly, and must not be removed or otherwise disturbed.

OPERATION

The high pressure relief valve vents only enough refrigerant to reduce the system pressure, and then re-seats itself. The majority of the refrigerant is conserved in the system. If the valve vents refrigerant, it does not mean the valve is faulty.

On new compressor assemblies, a mylar disc is applied to the venting port of the valve. The disc is primarily intended for protection of the valve during the painting operation. A missing or damaged disc does not indicate failure. If the mylar disc has loosened or come off, apply a drop or two of refrigerant oil into the valve mechanism through the venting holes. This will prevent salt, dirt, or moisture from affecting the operation of the valve.

REFRIGERANT

DESCRIPTION

The refrigerant used in this air conditioning system is a HydroFluoroCarbon (HFC), type R-134a. Unlike R-12, which is a ChloroFluoroCarbon (CFC), R-134a refrigerant does not contain ozone-depleting chlorine. R-134a refrigerant is a non-toxic, non-flammable, clear, and colorless liquefied gas.

Even though R-134a does not contain chlorine, it must be reclaimed and recycled just like CFC-type refrigerants. This is because R-134a is a greenhouse gas and can contribute to global warming.

OPERATION

R-134a refrigerant is not compatible with R-12 refrigerant in an air conditioning system. Even a small amount of R-12 added to an R-134a refrigerant system will cause compressor failure, refrigerant oil sludge or poor air conditioning system performance. In addition, the PolyAlkylene Glycol (PAG) synthetic refrigerant oils used in an R-134a refrigerant system are not compatible with the mineral-based refrigerant oils used in an R-12 refrigerant system.

R-134a refrigerant system service ports, service tool couplers and refrigerant dispensing bottles have all been designed with unique fittings to ensure that an R-134a system is not accidentally contaminated with the wrong refrigerant (R-12). There are also labels posted in the engine compartment of the vehicle and on the compressor identifying to service tech-

DESCRIPTION AND OPERATION (Continued)

nicians that the air conditioning system is equipped with R-134a.

REFRIGERANT SYSTEM SERVICE PORT**DESCRIPTION**

The high pressure service port is located on the discharge line between the compressor and the condenser over the cooling fans, near the front of the engine compartment. The low pressure service port is located on the suction line, near the right strut tower.

Each of the service ports has a threaded plastic protective cap installed over it from the factory. After servicing the refrigerant system, always reinstall both of the service port caps.

OPERATION

The two refrigerant system service ports are used to charge, recover/recycle, evacuate, and test the air conditioning refrigerant system. Unique service port coupler sizes are used on the R-134a system, to ensure that the refrigerant system is not accidentally contaminated by the use of the wrong refrigerant (R-12), or refrigerant system service equipment.

SYSTEM AIRFLOW**DESCRIPTION**

The system draws outside air through the cowl opening at the base of the windshield. It flows into the plenum chamber above the Heater A/C unit housing and passes through the evaporator. At this point airflow can be directed either through or around the heater core. This is done by adjusting the blend-air door with the TEMP control on the control head. After the air passes the blend air door, the air flow is then directed from the PANEL, BI-LEVEL (panel and floor), and FLOOR-DEFROST outlets. Air flow velocity can be adjusted with the blower speed selector switch on the control head.

OPERATION

Ambient air intake can be shut off by closing the recirculating air door. This will recirculate the air that is already inside the vehicle. This is done by rotating the RECIRC. knob on the control head. Rotating the MODE control knob to the Defrost/Floor or Defrost setting on the control head will engage the compressor. This will send refrigerant through the evaporator, and remove heat and humidity from the air before it goes through the heater core. The compressor can also be engaged by depressing the A/C button on the control head.

THERMAL LIMITER SWITCH**DESCRIPTION**

The thermal limiter switch is used to measure the compressor surface temperature. If the compressor surface temperature is excessive, the switch will cut the battery feed voltage to the compressor clutch coil. The switch will reset itself, once the compressor surface temperature returns to normal. The switch itself is not adjustable or serviceable. If faulty the compressor must be replaced.

OPERATION

The thermal limiter switch will interrupt the battery feed to the compressor clutch coil at a temperature of about 122 to 128° C (250 to 260° F). The switch will reset and restore the clutch coil operation at a temperature of about 104 to 116° C (220 to 240° F).

DIAGNOSIS AND TESTING**A/C PERFORMANCE TEST**

The air conditioning system is designed to remove heat and humidity from the air entering the passenger compartment. The evaporator, located in the heater A/C unit, is cooled to temperatures near the freezing point. As warm damp air passes over the fins in the evaporator, moisture in the air condenses to water, dehumidifying the air. Condensation on the evaporator fins reduces the evaporator's ability to absorb heat. During periods of high heat and humidity, an air conditioning system will be less effective. With the control module set to RECIRC, only air from the passenger compartment passes through the evaporator. As the passenger compartment air dehumidifies, A/C performance levels rise.

PERFORMANCE TEST PROCEDURE

Review Safety Precautions and Warnings in this group before proceeding with this procedure. Air temperature in test room and on vehicle must be 21° C (70°F) minimum for this test.

NOTE: When connecting the service equipment coupling to the line fitting, verify that the valve of the coupling is fully closed. This will reduce the amount of effort required to make the connection.

- (1) Connect a tachometer and manifold gauge set. Attach a thermocouple to the evaporator inlet line.
- (2) Set control to A/C, RECIRC, and PANEL, temperature lever on full cool and blower on high.
- (3) Start engine and hold at 1000 rpm with A/C clutch engaged.

DIAGNOSIS AND TESTING (Continued)

(4) Engine should be warmed up with doors and windows closed.

(5) Insert a thermometer or place a thermocouple in the left center A/C outlet and operate the engine for five minutes. The A/C clutch may cycle depending on ambient conditions.

(6) With the A/C clutch engaged, compare the discharge air temperature to the evaporator inlet line temperature. The evaporator inlet line temperature should be no more than 5.5°C (10°F) cooler than the discharge air temperature.

(7) If the discharge air temperature fails to meet the specifications, refer to the System Charge Level.

COMPRESSOR CLUTCH COIL

(1) Verify battery state of charge.

(2) Connect an ammeter (0-10 ampere scale) in series with the clutch coil terminal. Use a volt meter (0-20 volt scale) with clip leads measuring voltage across the battery and A/C clutch.

(3) With A/C control in A/C mode and blower at low speed, start the engine and run at normal idle.

(4) The A/C clutch should engage immediately and the clutch voltage should be within 2 volts of the battery voltage. If the A/C clutch does not engage, test the fusible link.

(5) The A/C clutch coil is acceptable if the current draw is 2.0 to 4.15 amperes at 11.5 to 12.5 volts at clutch coil. This is with the work area temperature at 21°C (70°F). If voltage is more than 12.5 volts, add electrical loads by turning on electrical accessories until voltage reads below 12.5 volts.

(6) If coil current reads zero, the coil is open and should be replaced. If the ammeter reading is 5 amperes or more, the coil is shorted and should be replaced. If the coil voltage is not within two volts of the battery voltage, test clutch coil feed circuit for excessive voltage drop.

COMPRESSOR NOISE TEST

When investigating an air conditioning related noise, you must first know the conditions when the noise occurs. These conditions are: weather, vehicle speed, in gear or neutral, engine temperature, or any other special condition.

Noises that develop during air conditioning operation can often be misleading. For example: what sounds like a failed front engine bearing or connecting rod, may be caused by loose bolts, nuts, mounting brackets, or a loose clutch assembly. Improper drive belt tension can cause a misleading noise when compressor is engaged. The noise may not occur when compressor is disengaged.

Drive belt(s) are speed sensitive. At different engine speeds and depending upon belt tension,

belt(s) can develop noises that are mistaken for a compressor noise.

(1) Select a quiet area for testing. Duplicate conditions as much as possible. Switch compressor on and off several times to clearly identify compressor noise. Listen to compressor clutch while engaged and disengaged.

(2) To duplicate high-ambient condition (high-head pressure), restrict air flow through condenser. Install manifold gauge set to make sure discharge pressure doesn't exceed 2070 kPa (300 psi).

(3) Tighten ALL compressor mounting bolts, clutch mounting bolt, clutch coil mounting screws

(4) Check refrigerant hoses for rubbing or interference which can cause unusual noises.

(5) Check refrigerant charge (refer to Charging the System).

(6) Check compressor noise as in Step 1.

(7) If noise still exists, loosen compressor mounting bolts and torque. Repeat Step 1.

(8) If noise continues, replace compressor and repeat Step 1.

CONTROL MODULE

The control switch and timer circuit may be tested in the vehicle with or without scan tool (DRB).

TESTING WITH SCAN TOOL

If using the scan tool, refer to the proper Body Diagnostic Procedures Manual.

TESTING WITHOUT SCAN TOOL

(1) Remove the control switch from console and disconnect control switch (Fig. 2).

(2) Using a ohmmeter, check leads between Pins 5 and 8 of the 8-Way connector. Turn the control module to each position shown on Control Module Test table. The resistance reading should be within the specifications shown. If not OK, replace the control module. If OK, check:

- Blown fuse
- Cut wire
- Poor ground
- Poor connection
- Defective BCM
- Bulkhead connector inoperative

Refer to Group 8W, Wiring Diagrams.

HEATER PERFORMANCE TEST

PRE-DIAGNOSTIC PREPARATIONS

Review Safety Precautions and Warnings in this group before performing the following procedures.

Check the coolant level, drive belt tension, vacuum line connections, radiator air flow and fan operation. Start engine and allow to warm up to normal temperature.

DIAGNOSIS AND TESTING (Continued)

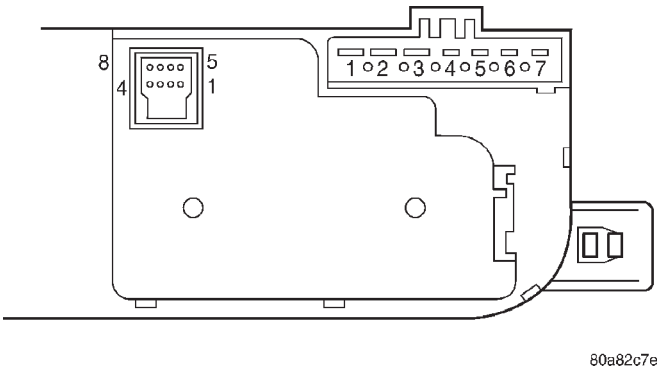


Fig. 2 HVAC Control Module Connectors

CONTROL MODULE TEST

SWITCH POSITION	OHM RANGE
Panel	828 to 856 ohms
Bi-Level	1.279 to 1.315 K ohms
Floor	2.302 to 2.358 K ohms
Mix	5.202 to 5.318 K ohms
Defrost	99.5 to 101.5 K ohms

WARNING: DO NOT REMOVE RADIATOR CAP WHEN ENGINE IS HOT, PERSONAL INJURY CAN RESULT.

If vehicle has been run recently, wait 15 minutes before removing cap. Place a rag over the cap and turn it to the first safety stop. Allow pressure to escape through the overflow tube. When the system stabilizes, remove the cap completely.

MAXIMUM HEATER OUTPUT: TEST AND ACTION

Engine coolant is provided to the heater system by two 16 mm (5/8 inch inside diameter) heater hoses. With engine idling at normal running temperature, set the control to maximum heat, floor, and high blower setting. Using a test thermometer, check the air temperature coming from the floor outlets, refer to Temperature Reference Table.

TEMPERATURE REFERENCE TABLE

Ambient Temp.		Minimum Floor Outlet Temp.	
Celsius	Fahrenheit	Celsius	Fahrenheit
15.5°	60°	62.2°	144°
21.1°	70°	63.8°	147°
26.6°	80°	65.5°	150°
32.2°	90°	67.2°	153°

If the floor outlet air temperature is insufficient, refer to Group 7, Engine Cooling for specifications. Both heater hoses should be HOT to the touch (coolant return hose should be slightly cooler than the supply hose). If coolant return hose is much cooler than the supply hose, locate and repair engine coolant flow obstruction in heater system.

POSSIBLE LOCATIONS OR CAUSE OF OBSTRUCTED COOLANT FLOW

- (1) Pinched or kinked heater hoses.
- (2) Improper heater hose routing.
- (3) Plugged heater hoses or supply and return ports at cooling system connections, refer to Group 7, Cooling System.
- (4) Plugged heater core.
- (5) Air locked heater core.
- (6) If coolant flow is verified and outlet temperature is insufficient, a mechanical problem may exist.

POSSIBLE LOCATION OR CAUSE OF INSUFFICIENT HEAT

- (1) Obstructed cowl air intake.
- (2) Obstructed heater system outlets.
- (3) Blend-air door not functioning properly.

TEMPERATURE CONTROL

If temperature cannot be adjusted with the TEMP lever on the control panel, the following could require service:

- (1) Blend-air door binding.
- (2) Improper engine coolant temperature.
- (3) Faulty Instrument Panel Control.

SYSTEM OIL LEVEL

It is important to have the correct amount of lubricant in the A/C system to ensure proper lubrication of the compressor. Too little lubricant will result in damage to the compressor. Too much lubricant will reduce the cooling capacity of the system and consequently result in higher discharge air temperatures.

The lubricant used in the compressor is polyalkylene glycol PAG lubricant. Only PAG refrigerant lubricant approved for use with R-134a should be used to service the system. Do not use any other lubricant. The lubricant container should be kept tightly capped until it is ready for use. Refrigerant lubricant will quickly absorb any moisture it comes in contact with.

It is not necessary to check or add lubricant unless it has been lost. Lubricant loss at the leak point will be evident by the presence of a wet, shiny surface around the leak.

DIAGNOSIS AND TESTING (Continued)

REFRIGERANT OIL LEVEL CHECK

When an air conditioning system is first assembled, all components (except the compressor) are refrigerant oil free. After the system has been charged with (R-134a) refrigerant and operated, the oil in the compressor is dispersed through the lines and components. The evaporator, condenser, and receiver/drier will retain a significant amount of oil. Refer to the A/C Component Refrigerant Oil Capacities table. When a component is replaced, the specified amount of refrigerant oil must be added. When the compressor is replaced, the amount of oil that is retained in the rest of the system must be drained from the replacement compressor. When a line or component has ruptured and oil has escaped, the compressor should be removed and drained. The receiver/drier must be replaced along with the ruptured part. The oil capacity of the system, minus the amount of oil still in the remaining components, can be measured and poured into the suction port of the compressor.

Example: On an A/C system the evaporator retains 60 ml. (2 oz.). The condenser retains 30 ml. (1 oz.) of oil, and system capacity may be 150 ml. (5.00 oz.) of oil. 150 ml. minus 90 ml. equals 60 ml. (2.00 oz.).

A/C COMPONENT REFRIGERANT OIL
CAPACITIES

COMPONENT NAME	ml.	oz.
Total Air Conditioning System	150 ml.	5.00 oz.
Condenser	30 ml.	1.00 oz.
Evaporator	59 ml.	2.00 oz.
Filter/Drier	30 ml.	1.00 oz.
Line Blown	44 ml.	1.50 oz.

CAUTION: The refrigerant oil used in a R-134a A/C system is unique. Use only oils which were designed to work with R-134a refrigerant. The oil designed for this vehicle is SP-15 PAG (polyalkylene glycol).

VERIFY REFRIGERANT LUBRICANT LEVEL

- (1) Discharge refrigerant system using a recycling/reclaiming equipment if a charge is present.
- (2) Disconnect refrigerant lines from A/C compressor. Cap the open lines to prevent moisture from entering system.
- (3) Remove compressor from vehicle.
- (4) From suction and discharge ports on top of compressor, drain lubricant from compressor.
- (5) Add system capacity minus the capacity of components that have not been replaced. Refer to the A/C Component Refrigerant Oil Capacities chart above. Add lubricant through the suction and dis-

charge ports on compressor. This is not to exceed 150 ml. (5.00 oz.) in total.

- (6) Install compressor and connect refrigerant lines. Then evacuate and charge refrigerant system.

- (7) Most reclaim/recycling equipment will measure the lubricant being removed. This is the amount of lubricant to be added back to the system. If a new compressor is being installed, drain lubricant from old compressor, measure the amount drained and discard old lubricant. Drain the lubricant from the new compressor into a clean container. Return the amount of lubricant measured from the old compressor, plus the amount reclaimed from the system back into the new compressor.

THERMAL LIMITER SWITCH

- (1) Unplug Thermal Limiter wiring connector.
- (2) With an ohmmeter check for continuity between the two terminals. If no continuity is present, replace the compressor.
- (3) The Thermal Limiter is calibrated to open and close at:
 - Open circuit (no continuity) at 122 to 128°C (252 to 262°F)
 - Close circuit (continuity) at 106 to 116°C (225 to 235°F)

There is no serviceability of the thermal limiter switch. If the thermal limiter switch fails, the compressor must be replaced. To replace the compressor, refer to Compressor Removal and Installation in this section.

SERVICE PROCEDURES**EVACUATING REFRIGERANT SYSTEM**

NOTE: Special effort must be used to prevent moisture from entering the A/C system oil. Moisture in the oil is very difficult to remove and will cause a reliability problem with the compressor.

If a compressor designed to use R-134a refrigerant is left open to the atmosphere for an extended period of time. It is recommended that the refrigerant oil be drained and replaced with new oil or a new compressor be used. This will eliminate the possibility of contaminating the refrigerant system.

If the refrigerant system has been open to the atmosphere, it must be evacuated before the system can be filled. Moisture and air mixed with the refrigerant will raise the compressor head pressure above acceptable operating levels. This will reduce the performance of the air conditioner and damage the compressor. Moisture will boil at near room temperature when exposed to vacuum. To evacuate the refrigerant system:

SERVICE PROCEDURES (Continued)

NOTE: When connecting the service equipment coupling to the line fitting, verify that the valve of the coupling is fully closed. This will reduce the amount of effort required to make the connection. If connection is still difficult to make refer to TSB #24-02-93.

(1) Connect a suitable charging station, refrigerant recovery machine, and a manifold gauge set with vacuum pump (Fig. 3).

(2) Open suction and discharge valves and start vacuum pump. The vacuum pump should run a minimum of 45 minutes prior to charge, to eliminate all moisture in system. When suction gauge reads -88 kPa (-26 in. Hg) vacuum or greater for 45 minutes, close all valves and turn off vacuum pump. If the system fails to reach specified vacuum, the refrigerant system likely has a leak that must be corrected. If the refrigerant system maintains specified vacuum for at least 30 minutes, start the vacuum pump, open the suction and discharge valves. Then allow the system to evacuate an additional 10 minutes.

(3) Close all valves. Turn off and disconnect the vacuum pump.

(4) The refrigerant system is prepared to be charged with refrigerant.

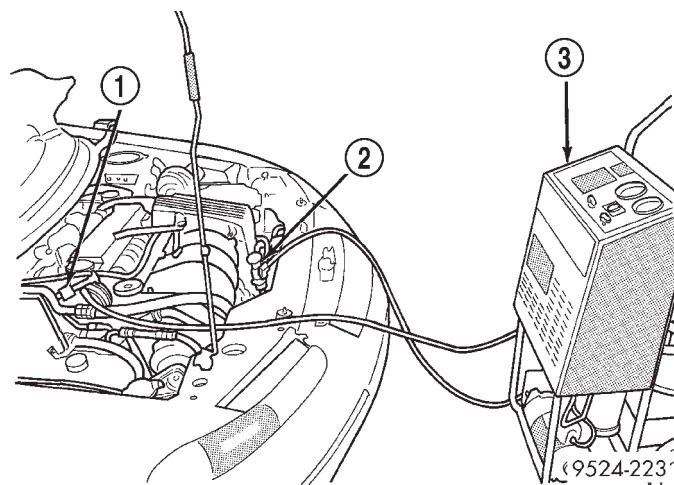


Fig. 3 Refrigerant Recovery Machine Hookup

- 1 - SUCTION PORT
- 2 - DISCHARGE PORT
- 3 - A/C RECOVERY MACHINE

R-134a REFRIGERANT

This vehicle uses a new type of refrigerant called R-134a. It is a non-toxic, non-flammable, clear colorless liquified gas.

R-134a refrigerant is not compatible with R-12 refrigerant in an air conditioning system. Even a small amount of R-12 in a R-134a system could cause compressor failure, refrigerant oil sludging or poor performance. **Never add R-12 to a system designed to use R-134a. System failure will occur.**

Both of the service ports to charge the air conditioning system are located on the hoses (Fig. 4). New design of service ports have been used to ensure that the system is not accidentally filled with the wrong refrigerant (R-12).

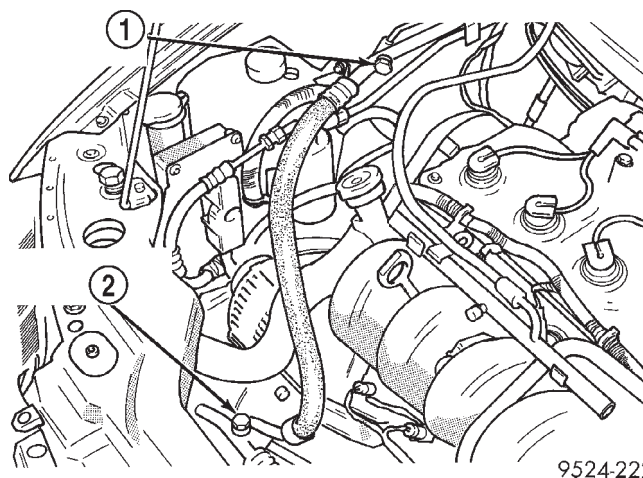


Fig. 4 A/C Service Ports

- 1 - SUCTION LINE SERVICE PORT
- 2 - DISCHARGE LINE SERVICE PORT

When servicing a system, it is required that an air conditioning charging recovery/recycling machine be used (Fig. 5). Contact an automotive service equipment supplier for proper equipment. Refer to the operating instructions provided with the equipment for proper operation.

A manifold gauge set (Fig. 6) must also be used in conjunction with the charging and/or recovery/recycling device. Only use gauges that have not been used for R-12. The service hoses on the gauge set should have manual (turn wheel) or automatic back flow valves at the service port connector ends. This will prevent refrigerant R-134a from being released into the atmosphere.

R-134a refrigerant requires a special type of compressor oil. When adding oil, make sure that it is designed to be used in a R-134a system. Refer to the label under the hood for proper oil and refrigerant charge levels (Fig. 7).

Due to the different characteristics of R-134a it requires all new service procedures.

SERVICE PROCEDURES (Continued)

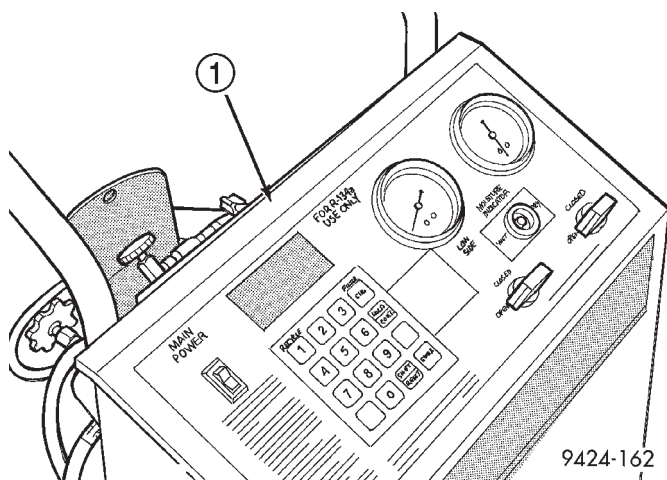


Fig. 5 Refrigerant Recovery/Recycling Station - Typical

1 - R-134a REFRIGERANT RECOVERY MACHINE

ATTENTION

R-134a A/C REFRIGERANT
FACTORY CHARGE 0.57Kg
(20 oz./1.25 lbs.)
SERVICE PART No. 82300101
SP15 PAG COMPRESSOR OIL
SERVICE PART No. 82300350

WARNING: HIGH-PRESSURE REFRIGERANT SYSTEM TO BE SERVICED BY QUALIFIED PERSONNEL ONLY.

CONSULT SERVICE MANUAL. IMPROPER SERVICE METHODS MAY CAUSE PERSONAL INJURY. SYSTEM MEETS SAFETY REQUIREMENTS OF SAE STANDARD J639.



80b8986b

Fig. 7 Underhood Label

WARNING: AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO RECLAIM R-134a SYSTEMS. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

R-134a SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. SOME MIXTURES OF AIR and R-134a HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

The use of R-134a will have a positive environmental impact due to it's zero ozone depletion and low global warming impact.

SYSTEM CHARGE LEVEL

TO CHECK OR FILL SYSTEM

The procedure below should be used to check and/or fill the refrigerant charge in the air conditioning system.

NOTE: The air conditioning system in this vehicle holds 0.54 Kg. (19 oz. or 1.19 lbs.) of R-134a refrigerant.

NOTE: The System Charge Level Specifications and Charge Determination Graph were not available at the time of printing. A Technical Service Bulletin will be issued for insertion into the manual when data becomes finalized.

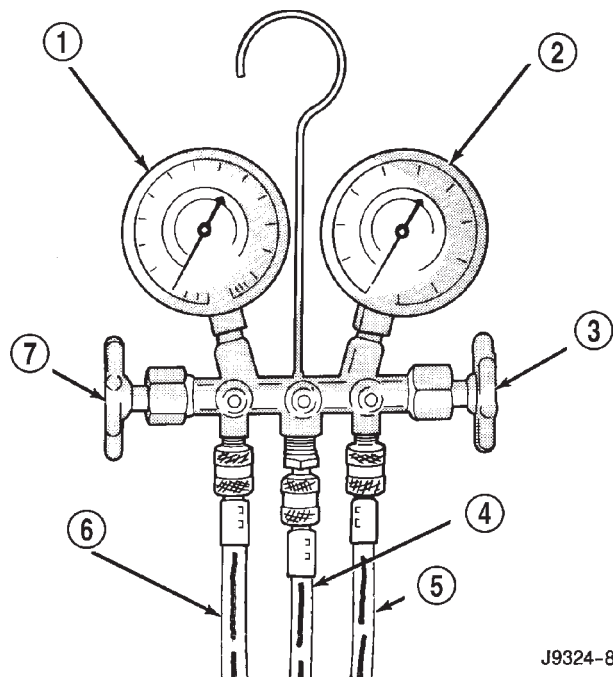


Fig. 6 Manifold Gauge Set - Typical

- 1 - LOW PRESSURE GAUGE
- 2 - HIGH PRESSURE GAUGE
- 3 - VALVE
- 4 - VACUUM/REFRIGERANT HOSE (YELLOW W/BLACK STRIP)
- 5 - HIGH PRESSURE HOSE (RED W/BLACK STRIP)
- 6 - LOW PRESSURE HOSE (BLUE W/BLACK STRIP)
- 7 - VALVE

SERVICE PROCEDURES (Continued)

SYSTEM LEAK CHECKING

WARNING: R-134a SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. MIXTURE OF AIR and R-134a CAN BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO DISCHARGE R-134a SYSTEM. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

If the A/C system is not cooling properly, determine if the refrigerant system is fully charged with R-134a. This is accomplished by performing a system Charge Level-Check or Fill. If while performing this test A/C liquid line pressure is less than 345 kPa (50 psi) proceed to Empty Refrigerant System Leak Test. If liquid line pressure is greater than 345 kPa (50 psi) proceed to low refrigerant level leak test. If the refrigerant system is empty or low in refrigerant charge, a leak at any line fitting or component seal is likely. A review of the fittings, lines and components for oily residue is an indication of the leak location. To detect a leak in the refrigerant system, perform one of the following procedures as indicated by the symptoms.

EMPTY REFRIGERANT SYSTEM LEAK TEST

(1) Evacuate the refrigerant system to the lowest degree of vacuum possible (approx. 28 in Hg.). Determine if the system holds a vacuum for 15 minutes. If vacuum is held, a leak is probably not present. If system will not maintain vacuum level, proceed with this procedure.

(2) Prepare a .284 Kg. (10 oz.) refrigerant charge to be injected into the system.

(3) Connect and dispense .284 Kg. (10 oz.) of refrigerant into the evacuated refrigerant system.

(4) Proceed to Step 2 of Low Refrigerant Level Leak Test.

LOW REFRIGERANT LEVEL LEAK TEST

(1) Determine if there is any (R-134a) refrigerant in the system.

(2) Position the vehicle in a wind free work area. This will aid in detecting small leaks.

(3) Bring the refrigerant system up to operating temperature and pressure. This is done by allowing

the engine to run for five minutes with the system set to the following:

- Transaxle in Park
- Engine Idling at 700 rpm
- A/C Controls Set in 100 percent outside air
- Blower switch in the high A/C position
- A/C in the ON position
- Open all windows

CAUTION: A leak detector designed for R-12 refrigerant (only) will not detect leaks in a R-134a refrigerant system.

(4) Shut off the vehicle and wait 2 to 7 minutes. Then use an Electronic Leak Detector that is designed to detect R-134a type refrigerant and search for leaks. Fittings, lines, or components that appear to be oily usually indicates a refrigerant leak. To inspect the evaporator core for leaks, insert the leak detector probe into the drain tube opening or a heat duct.

NOTE: A R-134a dye is available to aid in leak detection. Use only Chrysler approved refrigerant dye.

If a thorough leak check has been completed without indication of a leak, proceed to System Charge Level.

THERMOCOUPLE PROBE

To diagnose the A/C system, a temperature probe is required to measure liquid line temperature. The clamp-on type K probe shown in this manual is available through the Chrysler Professional Service Equipment (PSE) program. This probe is compatible with temperature-measuring instruments that accept Type K Thermocouples and have a miniature connector input. Other temperature probes are available through aftermarket sources. All references in this manual will reflect the use of the probe made available through the Professional Service Equipment program.

In order to use the temperature probe, a digital thermometer will be required. If a digital thermometer is not available, an adapter is available through the Professional Service Equipment program. It can convert any standard digital multimeter into a thermometer. This adapter is designed to accept any standard K-type thermocouple.

If a digital multimeter is not available, it too can be ordered through Professional Service Equipment program.

REMOVAL AND INSTALLATION

SAFETY PRECAUTIONS AND WARNINGS

WARNING: WEAR EYE PROTECTION WHEN SERVICING THE AIR CONDITIONING REFRIGERANT SYSTEM. SERIOUS EYE INJURY CAN RESULT FROM EYE CONTACT WITH REFRIGERANT. IF EYE CONTACT IS MADE, SEEK MEDICAL ATTENTION IMMEDIATELY.

DO NOT EXPOSE REFRIGERANT TO OPEN FLAME. POISONOUS GAS IS CREATED WHEN REFRIGERANT IS BURNED. AN ELECTRONIC TYPE LEAK DETECTOR IS RECOMMENDED.

LARGE AMOUNTS OF REFRIGERANT RELEASED IN A CLOSED WORK AREA WILL DISPLACE THE OXYGEN AND CAUSE SUFFOCATION.

THE EVAPORATION RATE OF REFRIGERANT AT AVERAGE TEMPERATURE AND ALTITUDE IS EXTREMELY HIGH. AS A RESULT, ANYTHING THAT COMES IN CONTACT WITH THE REFRIGERANT WILL FREEZE. ALWAYS PROTECT SKIN OR DELICATE OBJECTS FROM DIRECT CONTACT WITH REFRIGERANT. R-134a SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR.

SOME MIXTURES OF AIR and R-134a HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

ANTIFREEZE IS AN ETHYLENE GLYCOL BASE COOLANT AND IS HARMFUL IF SWALLOWED OR INHALED. SEEK MEDICAL ATTENTION IMMEDIATELY IF SWALLOWED OR INHALED. DO NOT STORE IN OPEN OR UNMARKED CONTAINERS. WASH SKIN AND CLOTHING THOROUGHLY AFTER COMING IN CONTACT WITH ETHYLENE GLYCOL. KEEP OUT OF REACH OF CHILDREN AND PETS.

DO NOT OPEN A COOLING SYSTEM WHEN THE ENGINE IS AT RUNNING TEMPERATURE. PERSONAL INJURY CAN RESULT.

CAUTION: The engine cooling system is designed to develop internal pressure of 97 to 123 kPa (14 to 18 psi). Allow the vehicle to cool a minimum of 15 minutes before opening the cooling system. Refer to Group 7, Cooling System.

A/C PRESSURE TRANSDUCER

CAUTION: A/C pressure transducer switch connector terminal contacts can be damaged by probing

tools during system diagnosis and repair. Failure to use their respective mating terminals or pin gauge to check for tightness will cause contact beam spreads. This will result in loss of continuity.

NOTE: O-ring replacement is required whenever the pressure transducer is serviced. Be sure to use the O-ring specified for this vehicle.

REMOVAL

- (1) If equipped with a 2.4L engine, hoist vehicle.
- (2) Disconnect the wire harness connector from the A/C pressure transducer.

NOTE: A slight release of pressure trapped in the fitting may be experienced. It is not necessary to discharge the refrigerant system.

- (3) Remove the transducer with a counterclockwise rotation using a 14 mm open-end wrench (Fig. 8) and (Fig. 9).

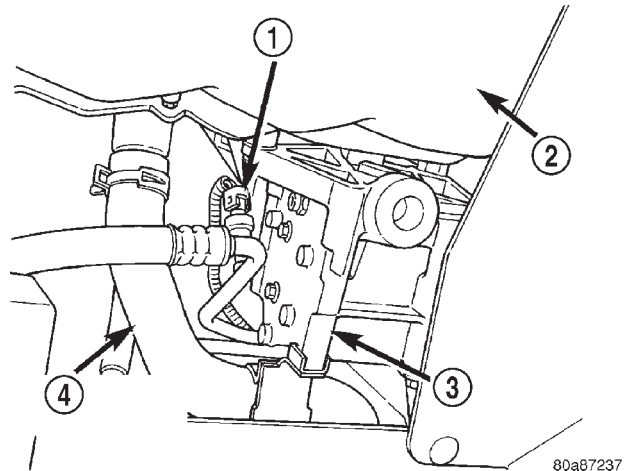


Fig. 8 Pressure Transducer (2.4L engine, viewed from beneath vehicle)

- 1 - A/C PRESSURE TRANSDUCER
- 2 - OIL PAN
- 3 - A/C COMPRESSOR
- 4 - LOWER RADIATOR HOSE

INSTALLATION

For installation, reverse above procedures. Tighten pressure transducer to 6 N·m (50 in. lbs.).

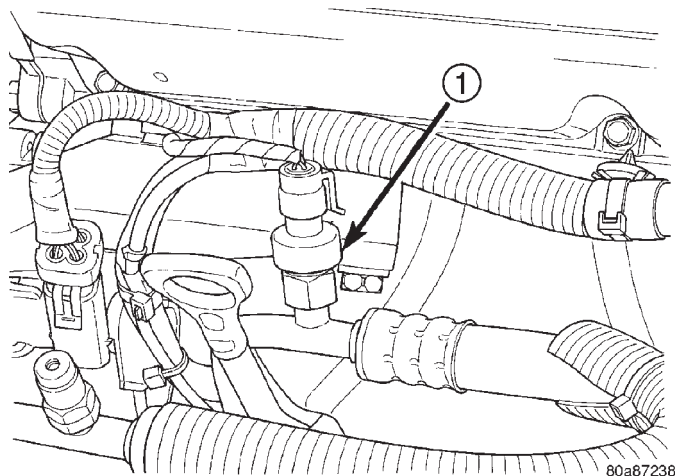
BLOWER MOTOR AND WHEEL ASSEMBLY

The blower motor is located on the right side of the heater housing.

REMOVAL

- (1) Disconnect battery.
- (2) Remove lower right under panel silencer duct.

REMOVAL AND INSTALLATION (Continued)

**Fig. 9 Pressure Transducer (2.5L engine)**

1 - A/C PRESSURE TRANSDUCER

(3) Remove blower motor connector from resistor block (Fig. 10).

(4) Remove blower motor case retaining screws.

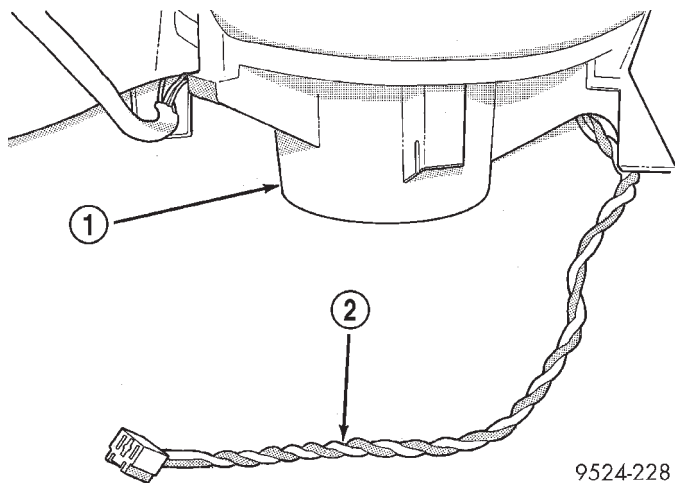
(5) Lower blower motor case from housing (Fig. 11).

(6) Remove fan scroll from motor shaft.

(7) Remove motor from motor case.

INSTALLATION

For installation, reverse the above procedures.

**Fig. 10 Blower Motor Wiring**

1 - BLOWER MOTOR

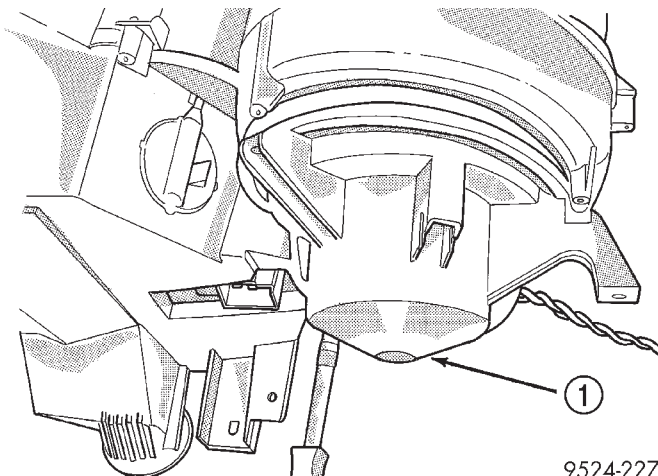
2 - BLOWER MOTOR WIRING

BLOWER MOTOR RESISTOR

The blower motor resistor is located on the lower right side of the heater housing.

REMOVAL

(1) Remove lower right underpanel silencer/duct.

**Fig. 11 Blower Motor**

1 - BLOWER MOTOR

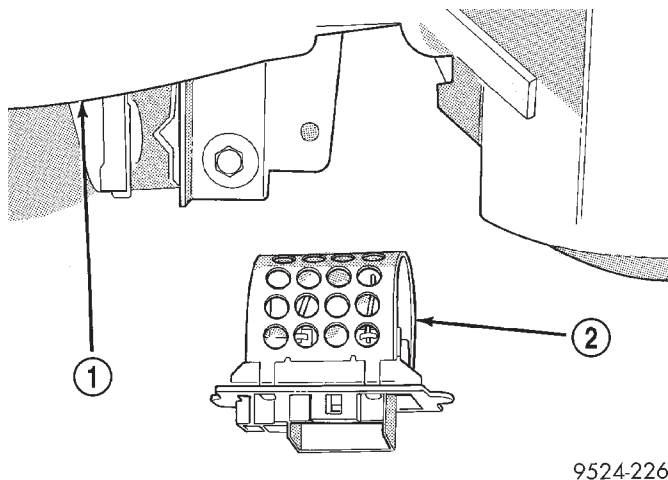
(2) Disconnect wiring connectors on blower motor resistor.

(3) Remove blower motor resistor retaining screws.

(4) Pull blower motor resistor out of heater housing (Fig. 12).

INSTALLATION

For installation, reverse the above procedures.

**Fig. 12 Blower Motor Resistor**

1 - A/C HOUSING

2 - BLOWER MOTOR RESISTOR

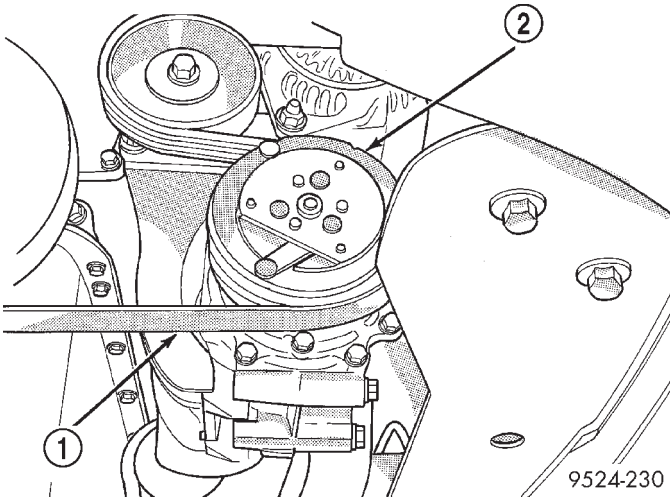
BLOWER MOTOR WHEEL

The blower motor wheel is only serviced with the blower motor. The wheel and the motor are balanced as an assembly. If the blower motor wheel requires replacement, the blower motor must also be replaced. Refer to blower motor for replacement procedure.

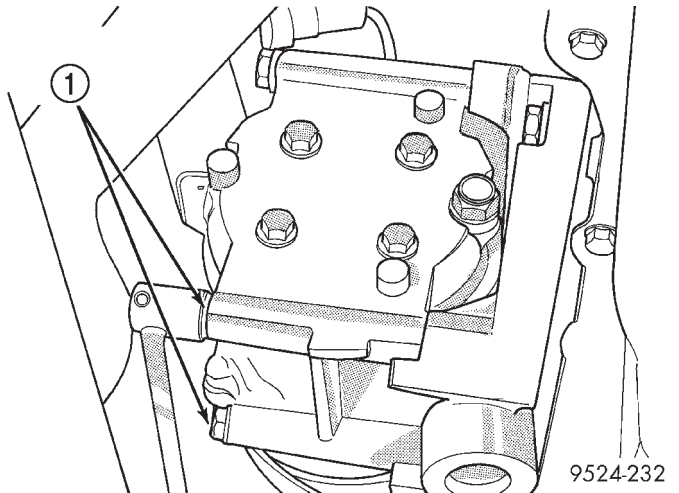
REMOVAL AND INSTALLATION (Continued)

COMPRESSOR**REMOVAL**

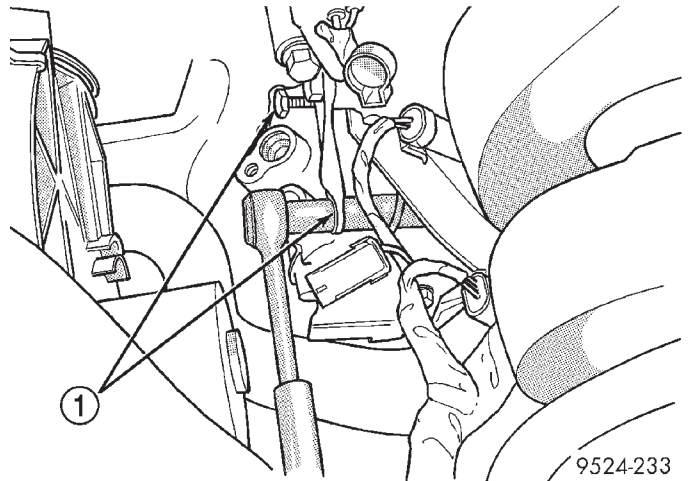
- (1) Disconnect the battery negative remote cable.
- (2) Loosen and remove drive belt (Fig. 13). Refer to Group 7, Engine Cooling.
- (3) Disconnect compressor clutch wire lead.
- (4) Recover refrigerant system with R-134a recovery unit.
- (5) Remove refrigerant lines from compressor (Fig. 14).
- (6) Remove compressor attaching bolts (Fig. 15) and (Fig. 16).
- (7) Remove compressor (Fig. 17).

**Fig. 13 Drive Belt**

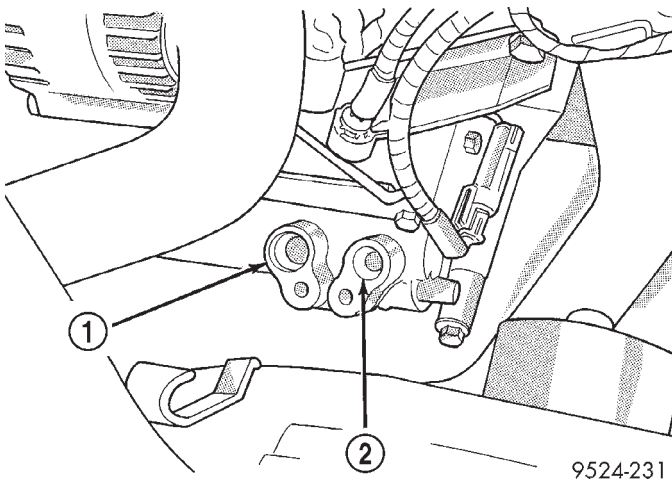
- 1 - DRIVE BELT
2 - A/C COMPRESSOR

**Fig. 15 Lower Attaching Bolts**

- 1 - LOWER MOUNTING BOLTS

**Fig. 16 Upper Attaching Bolts**

- 1 - UPPER MOUNTING BOLTS

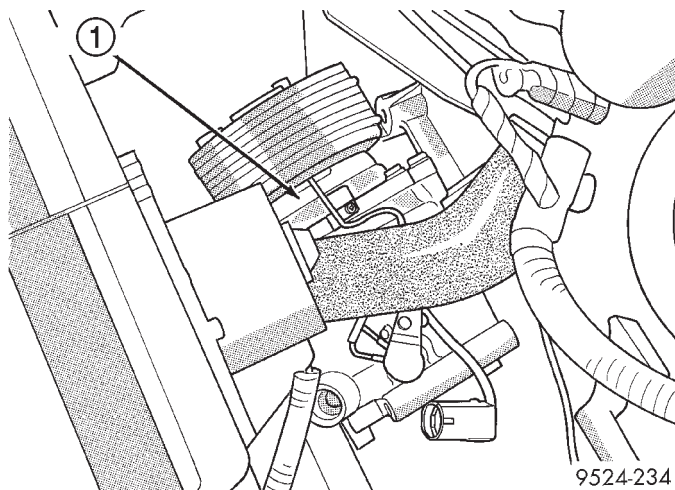
**Fig. 14 A/C Lines**

- 1 - SUCTION PORT
2 - DISCHARGE PORT

INSTALLATION

- (1) Position the compressor on the mount.
- (2) Install the compressor attaching bolts. Tighten bolts to 41 N·m (30 ft. lbs.) torque.
- (3) Install drive belt (refer to Group 7, Cooling System).
- (4) Install refrigerant hoses and new seals.
- (5) Connect the clutch wire.
- (6) Charge the system.
- (7) Connect the negative cable to the battery.

REMOVAL AND INSTALLATION (Continued)

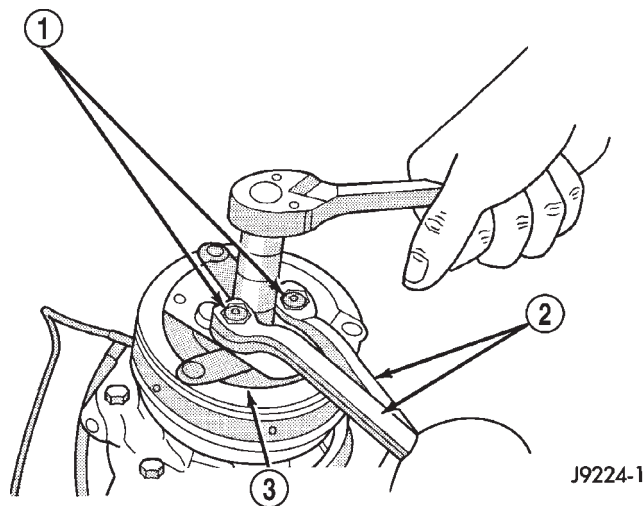
**Fig. 17 Compressor Removal**

1 - COMPRESSOR

COMPRESSOR CLUTCH/COIL ASSEMBLY

REMOVAL

- (1) Remove the compressor from the mount.
- (2) Install two (6 mm) bolts into the threaded holes in the armature plate. Hold bolts with two wrenches to prevent shaft from turning (Fig. 18). Remove compressor shaft nut.

**Fig. 18 Compressor Shaft Nut Removal/Installation**

1 - BOLTS
 2 - BOX-END WRENCHES
 3 - ARMATURE PLATE

- (3) Lightly tap clutch plate with a plastic hammer and remove plate and shim(s) (Fig. 19).

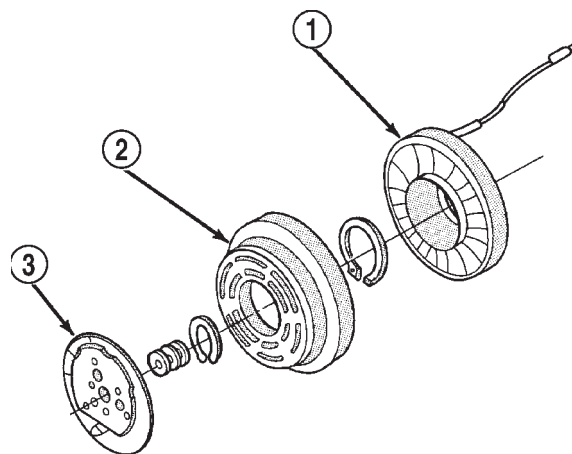
CAUTION: Do not use screwdrivers between the armature plate assembly and rotor-pulley to remove the armature plate. This may damage the armature plate assembly.

- (4) Remove pulley retaining snap ring with snap ring pliers. Remove pulley assembly from compressor. Use a plastic hammer, if necessary.

- (5) Loosen the lead wire retaining clamps and remove lead wire from the compressor front end cover. Disconnect the lead wire from the thermal limiter switch.

- (6) Remove snap ring which secures field coil-core assembly to the front cover (Fig. 19). Note the alignment of field coil-core assembly when removing.

WARNING: TAKE CARE THAT THE SNAP RING DOES NOT FLY OUT FROM THE GROOVE.



J9124-108

Fig. 19 Clutch Plate/Pulley/Field Coil

1 - FIELD COIL-CORE
 2 - ROTOR-PULLEY
 3 - ARMATURE PLATE

INSPECTION

Examine frictional faces of the rotor-pulley and armature plate for wear. The pulley and plate should be replaced if there is excessive wear or scoring. If the friction surfaces are oily, inspect the shaft nose area of the compressor for excess oil. If excess oil is present, the shaft seal is leaking and the compressor must be replaced.

Check pulley hub bearing for roughness or excessive grease leakage. Check for bearing grease contamination on armature plate faces.

CAUTION: The pulley and clutch plate were mated at the factory by a burnishing operation. No attempt should be made to separately replace either part. This will result in clutch slippage due to insufficient contact area.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

(1) Position the back of the field coil on the compressor front cover. Be sure the locating nipple on the back of the coil lines up with the locating indentation on the front cover. This ensures correct position of the coil and lead wire.

(2) Fasten lead wire to the compressor front cover with the retaining clip. Connect the lead wire to the thermal limiter switch.

(3) Install field coil retaining snap ring (bevel side outward) with snap ring pliers. Insure snap ring is properly seated into groove.

CAUTION: If snap rings on field coil or pulley assembly are not fully seated, they will vibrate out. A clutch failure and possible severe damage to the compressor could result.

(4) Position pulley assembly onto compressor.

CAUTION: Do not mar the pulley frictional surface.

(5) Install pulley assembly retaining snap ring (bevel side outward) with snap ring pliers. Insure snap ring is properly seated into groove.

(6) Place a trial stack of shims, 2.54 mm (0.10 in.) thick, on the compressor shaft.

(7) Install clutch plate on compressor shaft. Note the machined mating splines (Fig. 20).

(8) With the front clutch plate assembly tight against the shims, measure the air gap between clutch plate and pulley face with feeler gauges (Fig. 21). The air gap should be between 0.35 and 0.65 mm (0.013 and 0.025 inch). If proper air gap is not obtained, add or subtract shims until desired air gap is obtained.

(9) Install compressor shaft nut. Tighten nut to 17.6 N·m (13 ft. lbs.) torque.

(10) Shims may compress after tightening shaft bolt. Check air gap in four or more places to verify if air gap is still correct. Spin pulley for final check.

(11) Install the compressor onto the mount.

CLUTCH BREAK-IN

After installing a new field coil-core, check for correct voltage/amperage. Cycle the A/C clutch approximately 20 times (5 seconds on and 5 seconds off). For this procedure run engine at 1,500 to 2,000 rpm and set the system to MAX A/C mode. This procedure will seat the opposing friction surfaces and provide a higher clutch torque capability.

CONDENSER

The condenser is located between the radiator and the front bumper. The condenser can be serviced without having to drain the cooling system or remove the radiator.

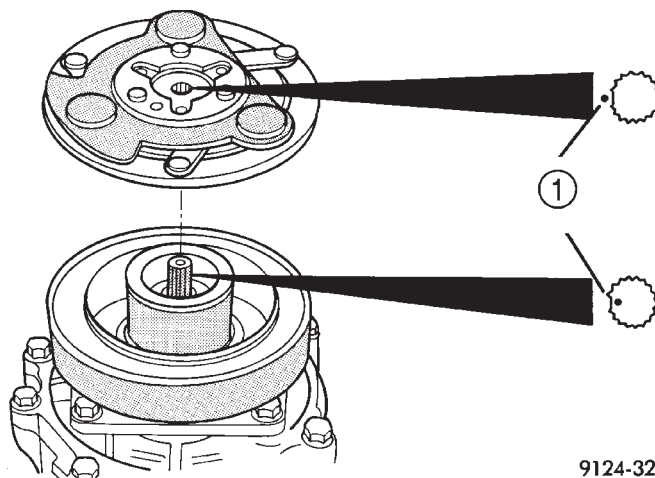


Fig. 20 Aligning Clutch Plate Splines

1 – MATING MARK: WHERE THERE IS NO SPLINE

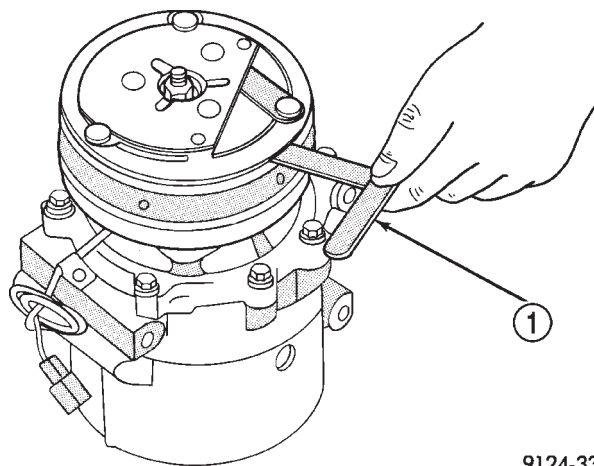


Fig. 21 Measuring Air Gap

1 – FEELER GAUGE

WARNING: AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO RECOVER R-134a SYSTEM. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

R-134a SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. SOME MIXTURES OF AIR/R-134a HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) Remove refrigerant from the A/C system using a refrigerant recovery machine.

(2) Remove grille retainers (Fig. 22). Refer to Group 23, Body for removal procedures.

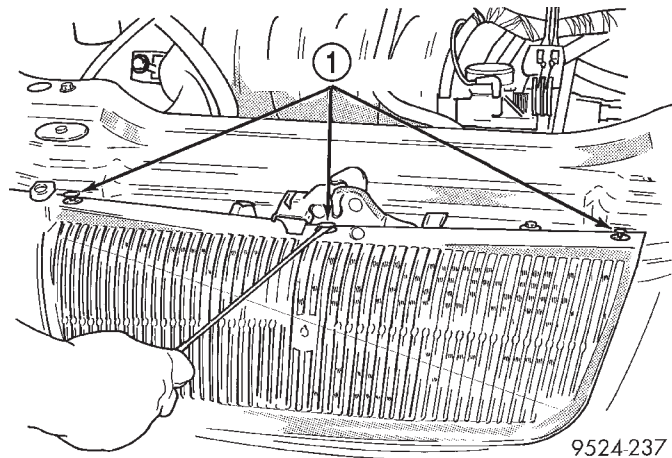


Fig. 22 Grille Retainers

1 – GRILLE RETAINERS

(3) Remove upper radiator support crossmember (Fig. 23).

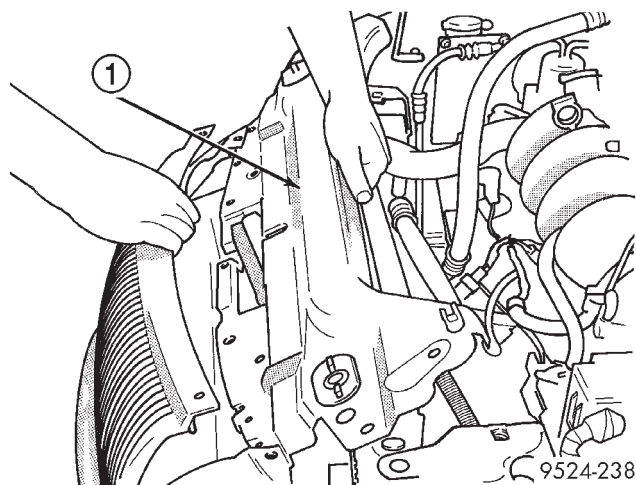


Fig. 23 Radiator Support Crossmember

1 – UPPER RADIATOR CROSSMEMBER

(4) Disconnect and cap A/C lines at the condenser.

(5) Remove condenser line support bracket.

(6) Remove condenser mounting bolts (Fig. 24).

CAUTION: Avoid bending or breaking condenser inlet tube when lifting condenser from the vehicle.

(7) Lift condenser from vehicle (Fig. 25).

INSTALLATION

For installation, reverse above procedures.

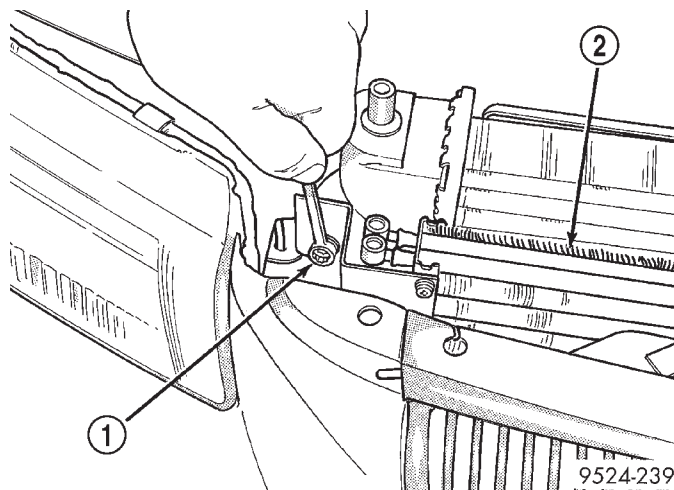


Fig. 24 Condenser Mounting

1 – CONDENSER MOUNTING
2 – CONDENSER

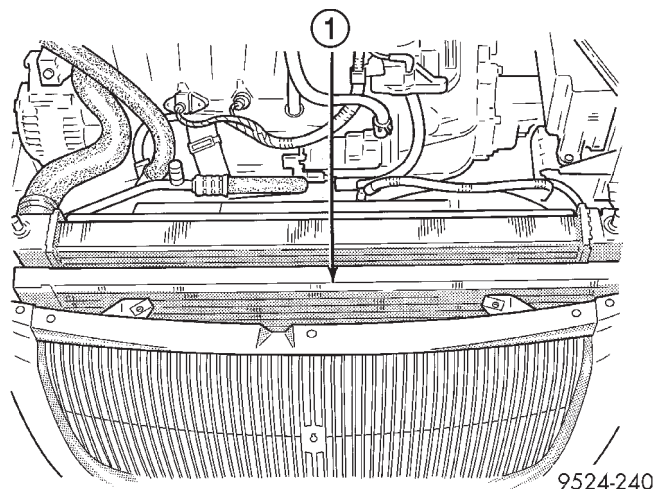


Fig. 25 Condenser Removal

1 – CONDENSER

CONTROL MODULE

The control module is located below the radio.

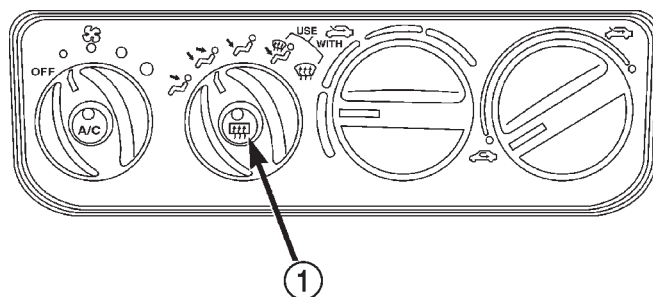


Fig. 26 HVAC Control Module

1 – REAR WINDOW DEFOGGER SWITCH

REMOVAL AND INSTALLATION (Continued)

REMOVAL

- (1) Place the ignition key in the OFF position before removing control module.
- (2) Remove trim bezel (Fig. 27).

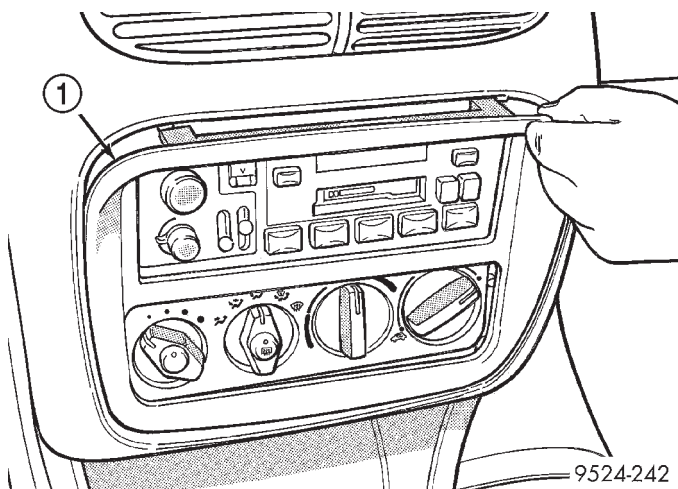


Fig. 27 Control Module

1 - TRIM BEZEL

- (3) Remove cluster hood bezel retaining screws in the trim bezel opening (Fig. 28).

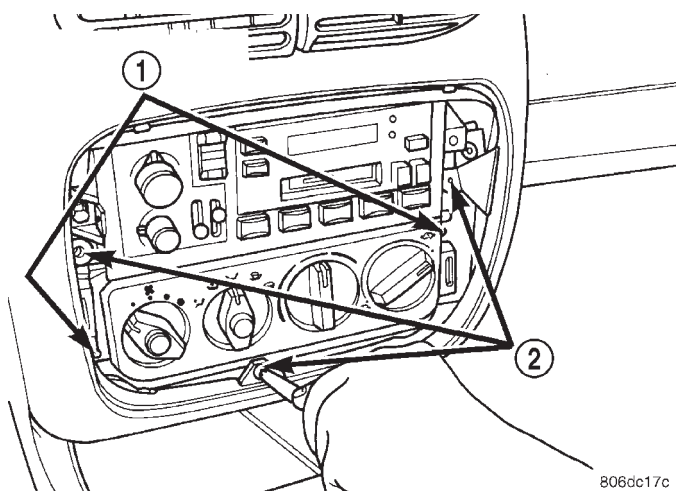


Fig. 28 Control Module Screws

1 - CONTROL MODULE SCREWS
2 - CLUSTER HOOD SCREWS

- (4) Pry up the cluster hood bezel a few inches to expose the cubby bin/cigar lighter bezel screws.

- (5) Remove the cubby bin/cigar lighter bezel and wiring.

- (6) Remove the control module retaining screws.

- (7) Drop the A/C control module into the cigar lighter/cubby bin bezel opening (Fig. 29). Then disconnect the wiring on the rear of the control module.

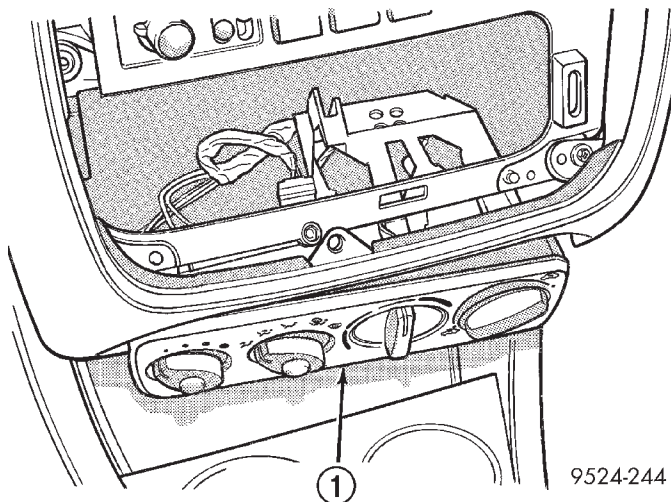


Fig. 29 Control Module At Bezel Opening

1 - CONTROL MODULE

- (8) Release the cable clips from the top of the control module. Retain the clips for future use. Then disconnect the temperature control and recirculation control cables.

- (9) Remove the control module.

INSTALLATION

For installation, reverse the above procedures. Verify that the cables are properly adjusted and the module is seated properly.

CABLE ADJUSTMENT

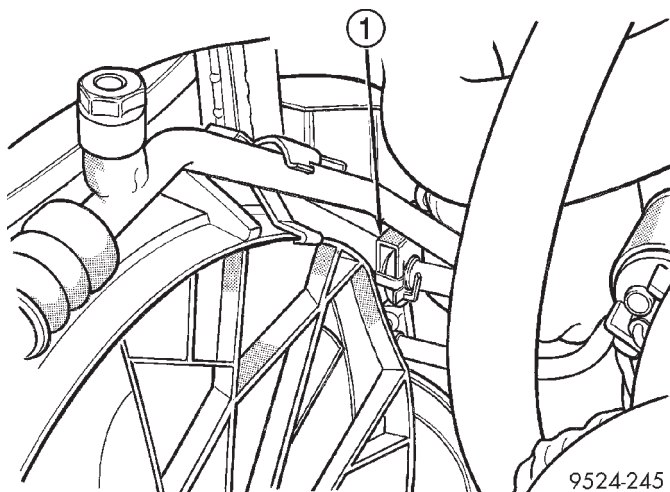
The cables must be adjusted for proper function of the control module. To adjust the cable, attach the cable to the lever arm of the control module. Turn the knob fully counterclockwise. Pull the cable jacket away from the cable end until taut. Clip the cable jacket to the control module. The knob should travel a full 180° if the cable is properly adjusted.

REMOVAL AND INSTALLATION (Continued)

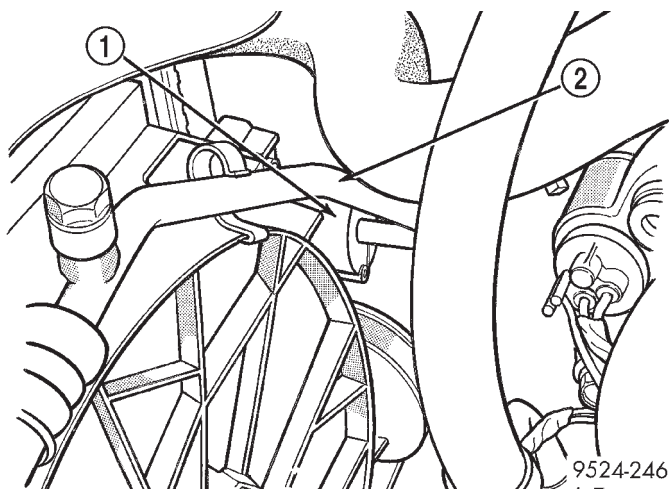
DISCHARGE LINE

REMOVAL

- (1) Remove refrigerant from the A/C system using a refrigerant recovery machine.
- (2) Disconnect A/C pressure transducer wire harness.
- (3) Remove quick connect clip and disconnect quick connect at condenser using Special Tool kit 7193 (Fig. 30) and (Fig. 31).

**Fig. 30 Quick Connect Clip**

1 - DISCHARGE LINE CLIP

**Fig. 31 Special Tool For Line At Condenser**

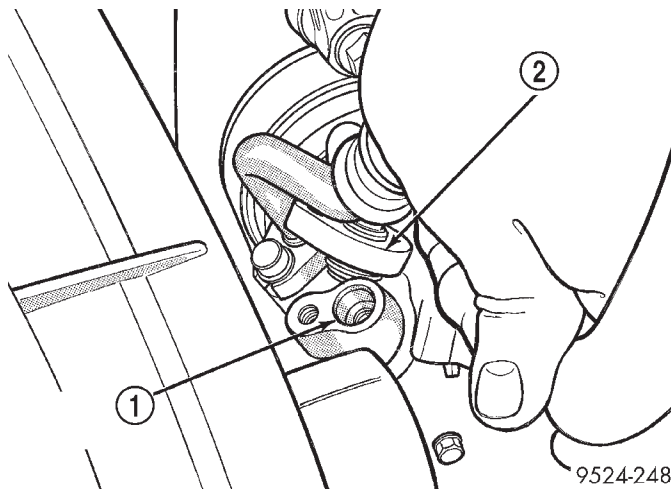
1 - SPECIAL TOOL OTC 7241
2 - DISCHARGE LINE

CAUTION: Cap all lines that are not being replaced and cap the expansion valve tubes.

- (4) Disconnect line at A/C compressor (Fig. 32). Remove discharge line.

INSTALLATION

For installation, reverse the above procedures. Tighten bolts to 22 N·m (200 in. lbs.).

**Fig. 32 Line at Compressor**

1 - DISCHARGE PORT
2 - DISCHARGE LINE

EVAPORATOR

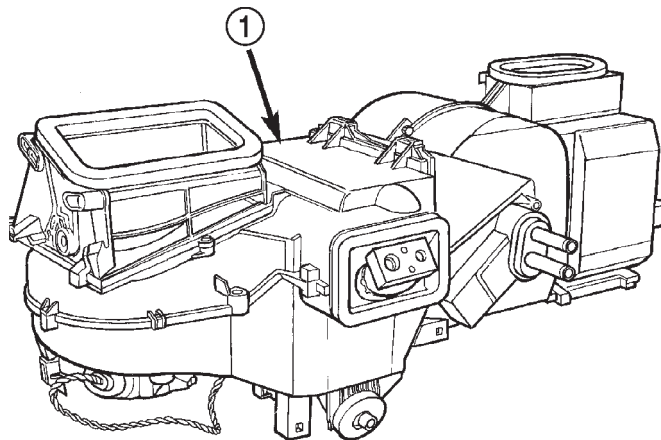
The Heater A/C housing must be removed from the vehicle when replacing the evaporator.

REMOVAL

- (1) Disconnect battery negative remote cable.

CAUTION: The refrigerant must be removed from the system before removing Heater-A/C housing. Use a refrigerant recovery machine.

- (2) Remove A/C housing from vehicle (Fig. 33). Refer to Heater-A/C Housing Removal and Installation in this section for procedure.

**Fig. 33 A/C Housing**

1 - HVAC MODULE

REMOVAL AND INSTALLATION (Continued)

- (3) Remove recirculation door inlet cover.
- (4) Remove evaporator temperature probe.
- (5) Remove clips retaining evaporator housing to heater/distribution housing (Fig. 34).
- (6) Separate evaporator housing from heater/distribution housing (Fig. 35) and (Fig. 36).
- (7) Remove seal around evaporator tube inlet.
- (8) Remove evaporator housing upper cover (Fig. 37).
- (9) Lift evaporator out of lower housing (Fig. 38).
- (10) Remove styrofoam seal around evaporator.
- (11) Transfer evaporator sensor. Place the evaporator sensor in the same location as on the previous evaporator.

INSTALLATION

For installation, reverse the above procedure.

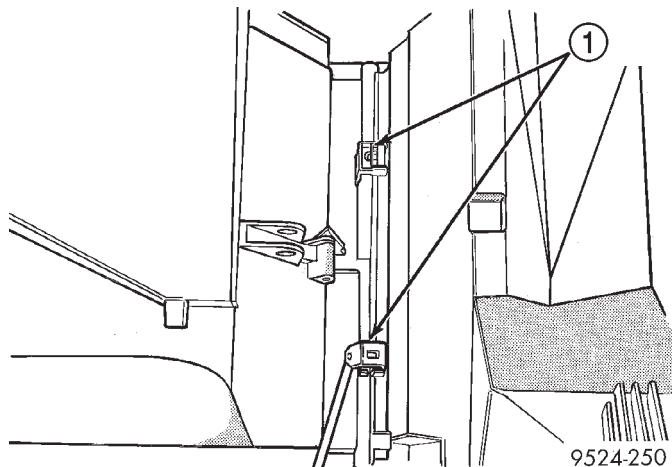


Fig. 34 Housing Clips

1 - HOUSING CLIPS

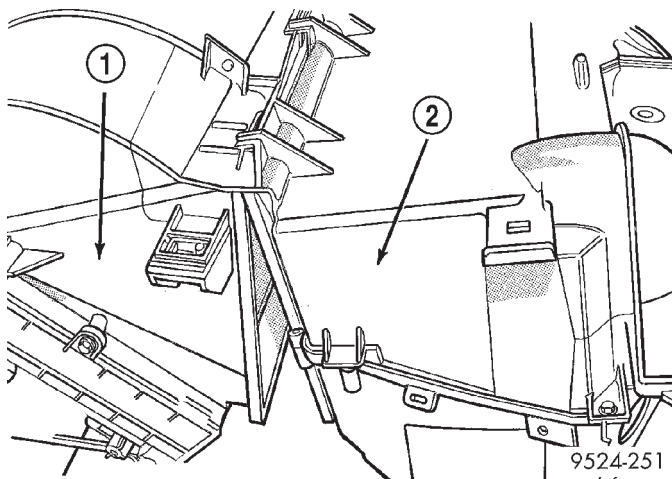


Fig. 35 Separate Housings

1 - HEATER HOUSING
2 - EVAPORATOR HOUSING

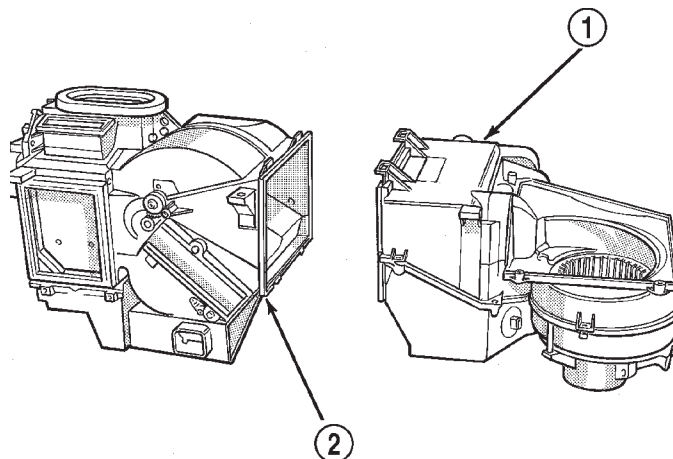


Fig. 36 Housings

1 - EVAPORATOR HOUSING
2 - HEATER DISTRIBUTION HOUSING

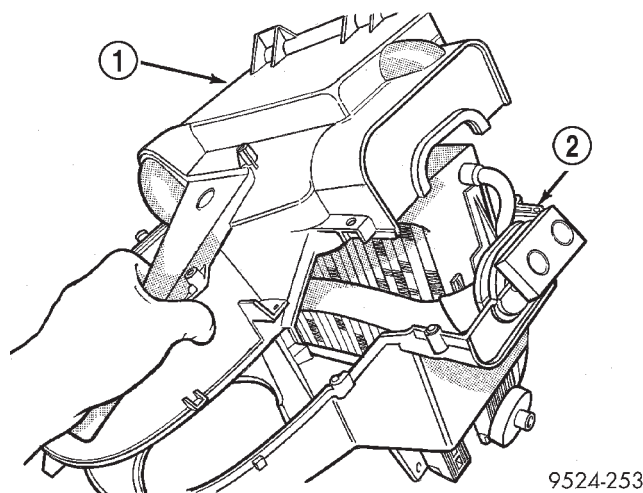


Fig. 37 Evaporator Housing Upper Cover

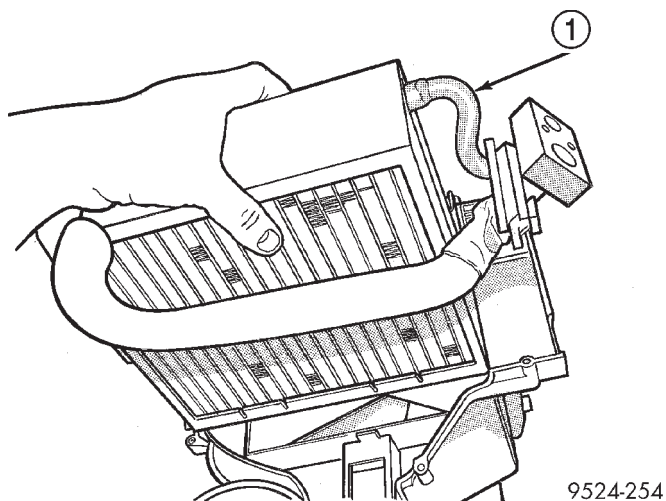
1 - EVAPORATOR HOUSING COVER
2 - EVAPORATOR HOUSING

EVAPORATOR PROBE

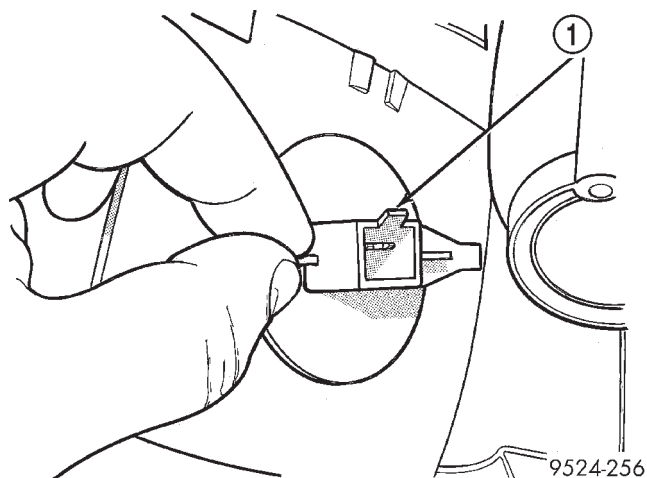
REMOVAL

- (1) Disconnect battery.
- (2) Remove right under panel silencer/duct.
- (3) Disconnect wiring connector for evaporator probe (Fig. 39).
- (4) Using a flat blade pry tool, pull back on the locking tab. Twist the access plate clockwise one-quarter turn and remove plate (Fig. 40).
- (5) Pull probe out of evaporator core (Fig. 41). This plate must be pushed inside the A/C unit and oriented in such a way that the plate can be removed.

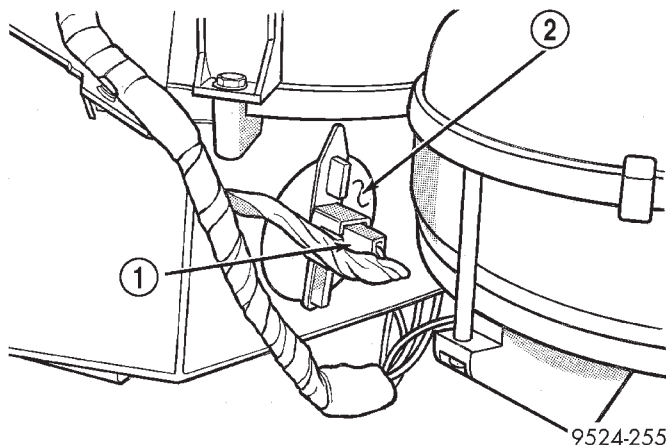
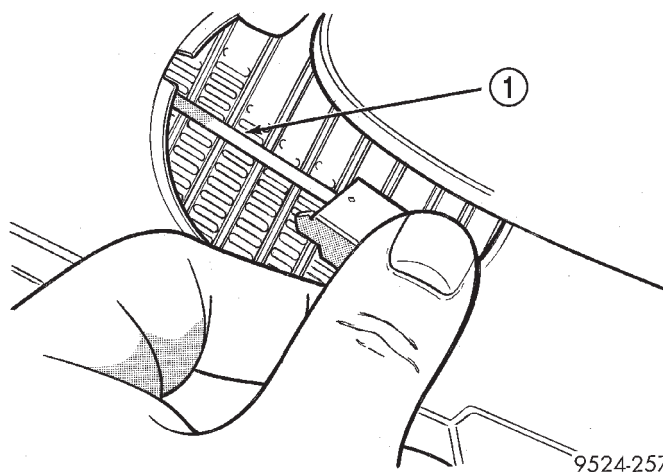
REMOVAL AND INSTALLATION (Continued)

**Fig. 38 Remove Evaporator From Housing**

1 - EVAPORATOR

**Fig. 40 Evaporator Probe**

1 - EVAPORATOR PROBE

**Fig. 39 Evaporator Probe Wiring**1 - PROBE CONNECTOR
2 - EVAPORATOR PROBE**Fig. 41 Remove Probe**

1 - EVAPORATOR PROBE NEEDLE

INSTALLATION

(1) Install new probe into the evaporator. **The new probe must not go into the same hole (in the evaporator core) that the old probe was removed.** The evaporator is manufactured with three holes for probe insertion. Insert the probe in the uppermost hole.

- (2) Install evaporator probe access panel.
- (3) Connect probe wiring harness.
- (4) Reconnect battery.

EXPANSION VALVE

WARNING: AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO DISCHARGE R-134a SYSTEM. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

R-134a SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. SOME MIXTURES OF AIR/R-134a HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

REMOVAL AND INSTALLATION (Continued)

REMOVAL

(1) Remove refrigerant from the A/C system using a refrigerant recovery machine.

(2) Disconnect clips from expansion valve lines (Fig. 42) and (Fig. 43).

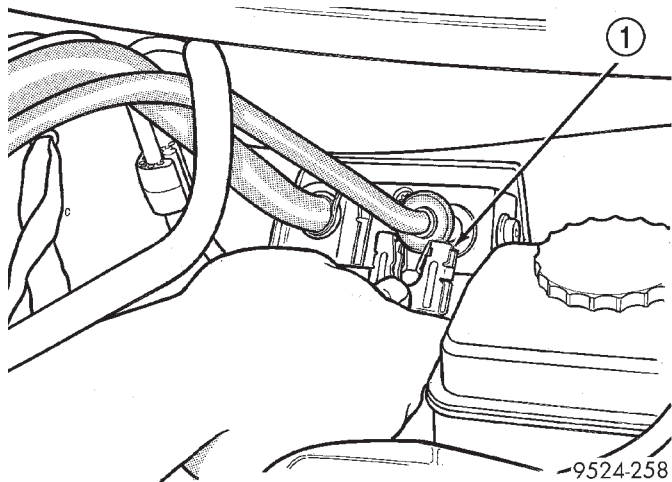


Fig. 42 Liquid Line Clip

1 - LIQUID LINE CLIP

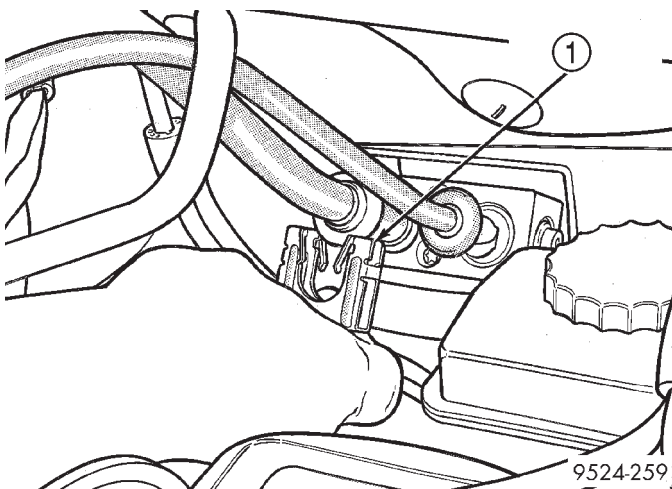


Fig. 43 Suction Line Clip

1 - SUCTION LINE CLIP

(3) Use special tool kit 7193 to disconnect quick connectors on expansion valve (Fig. 44) and (Fig. 45).

(4) Remove lines at expansion valve (Fig. 46).

(5) Remove two retaining bolts from expansion valve (Fig. 47).

(6) Remove expansion valve (Fig. 48).

(7) Remove expansion valve gasket.

INSTALLATION

CAUTION: Always install a new gasket when replacing expansion valve.

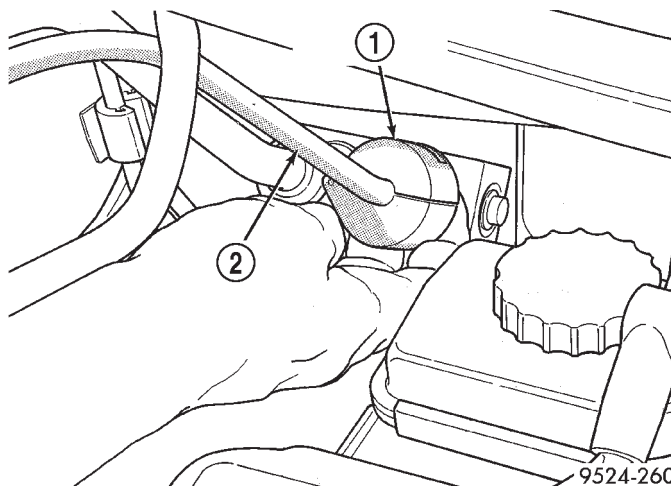


Fig. 44 Special Tool 7240 For Liquid Line

1 - SPECIAL TOOL OTC 7240

2 - LIQUID LINE

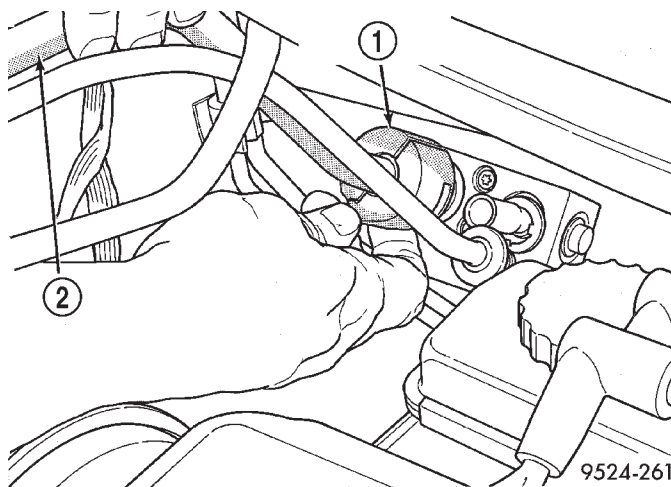


Fig. 45 Special Tool 7242 For Suction Line

1 - SPECIAL TOOL OTC 7242

2 - SUCTION LINE

For installation, reverse the above procedures. Tighten new expansion valve to 11 N·m (100 in. lbs.).

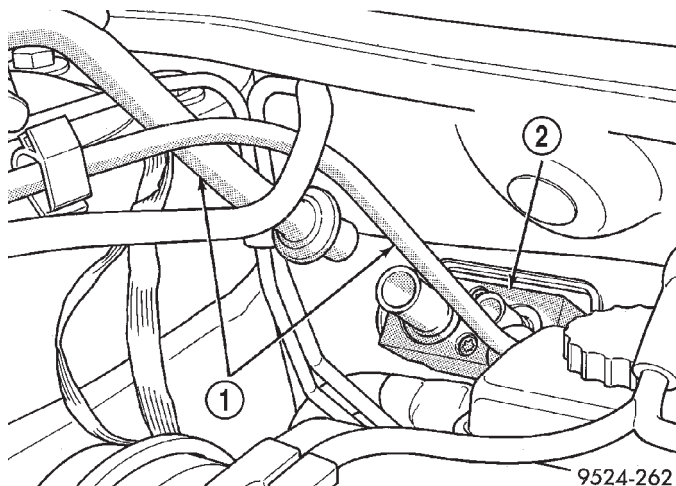
FILTER/DRIER

The filter/drier is a receiver for reserve refrigerant. It also has a desiccant bag and a filter. This is used to absorb moisture and filter the refrigerant as it passes through the filter/drier.

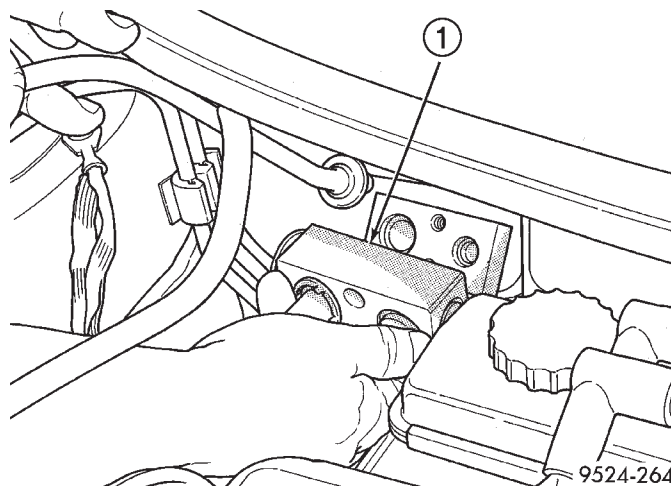
The filter/drier is located left of the coolant bottle (Fig. 49). The A/C refrigerant must be removed from the system before removing the filter/drier. Always use a refrigerant recovery machine.

Replace the filter/drier if an A/C system is left open for an extended period of time.

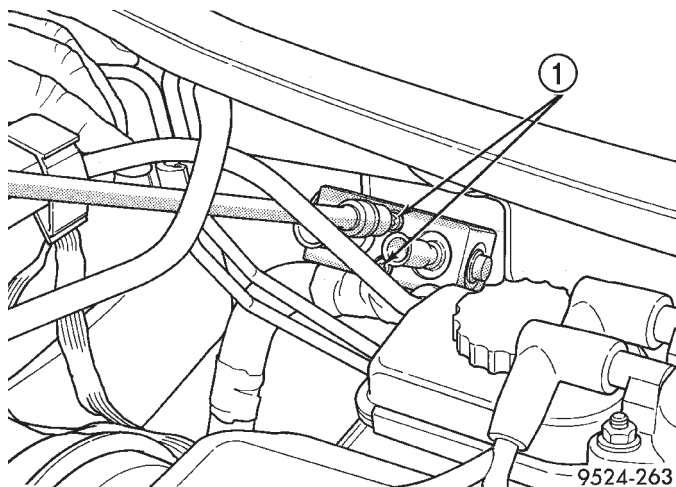
REMOVAL AND INSTALLATION (Continued)

**Fig. 46 Lines At Expansion Valve**

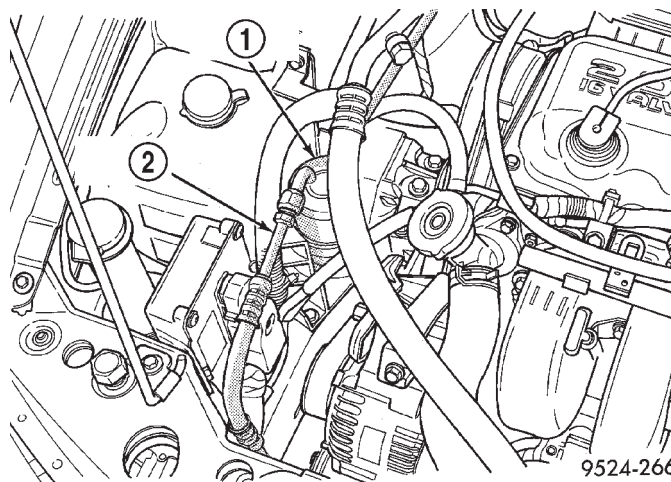
- 1 - A/C LINES
2 - EXPANSION VALVE

**Fig. 48 Expansion Valve**

- 1 - EXPANSION VALVE

**Fig. 47 Expansion Valve Bolts**

- 1 - EXPANSION VALVE MOUNTING SCREWS

**Fig. 49 Filter/Drier Location**

- 1 - RECEIVER DRIER
2 - LIQUID LINE

REMOVAL

- (1) Remove refrigerant from A/C system using a refrigerant recovery machine.
- (2) Remove liquid line at filter/drier from condenser (Fig. 50).
- (3) Remove liquid line at filter/drier from expansion valve (Fig. 51).
- (4) Remove filter/drier bracket bolt at base of filter/drier (Fig. 52).
- (5) Cap liquid line and condenser threaded fitting while system is open to prevent moisture from entering system.

INSTALLATION

CAUTION: When installing new filter/drier do not leave open to atmosphere for a long period of time.

The filter/drier contains moisture absorbing materials which will absorb moisture in the atmosphere.

For installation, reverse the above procedures.

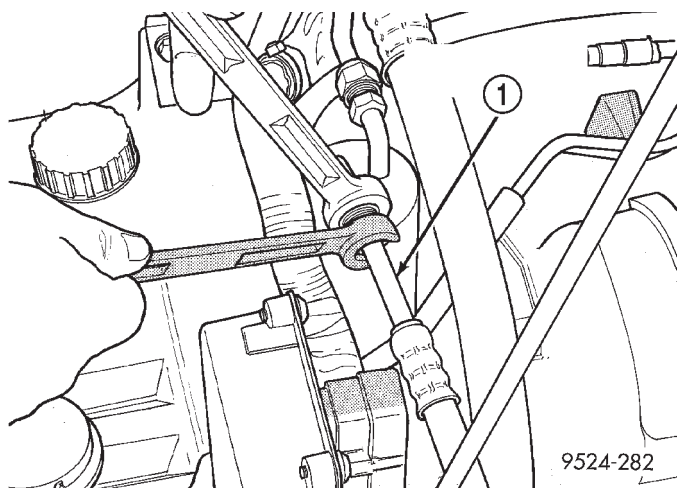
HEATER CORE

The heater core is serviceable inside the vehicle. However, if the core has leaked a significant amount of coolant, the A/C housing must be removed. The housing should be disassembled and cleaned thoroughly before heater core replacement. If housing removal is necessary, refer to Heater-A/C Housing, Removal and Installation in this section.

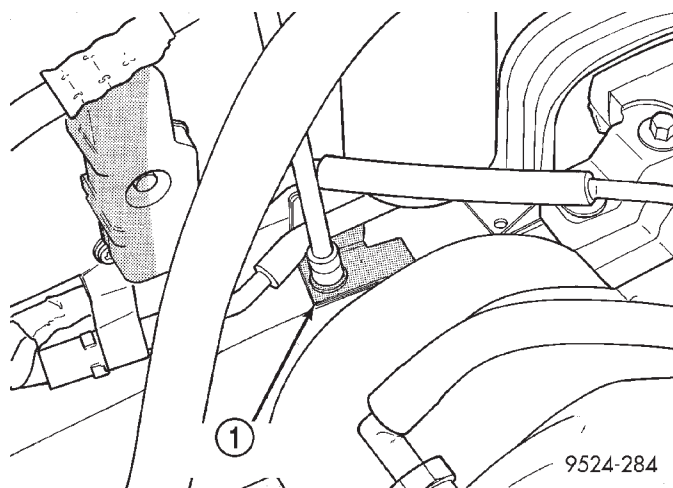
REMOVAL

- (1) Disconnect battery negative remote cable.
- (2) Remove radio/control module bezel (Fig. 27).

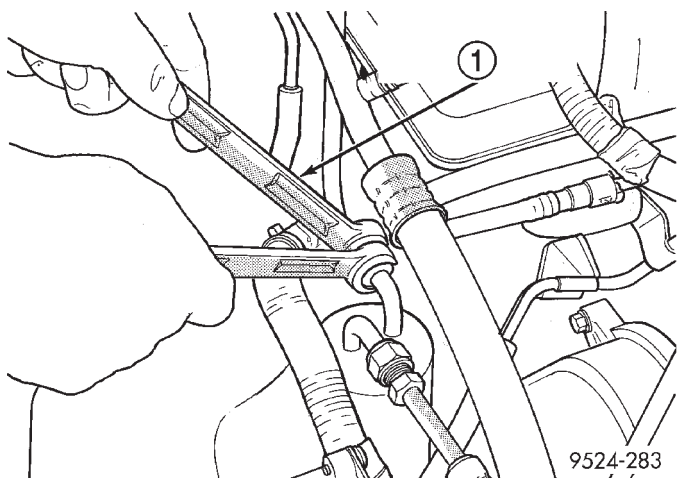
REMOVAL AND INSTALLATION (Continued)

**Fig. 50 Liquid Line From Condenser**

1 - LIQUID LINE TO CONDENSER

**Fig. 52 Receiver/Drier Bracket**

1 - RECEIVER/DRIER BRACKET

**Fig. 51 Liquid Line From Expansion Valve**

1 - LIQUID LINE TO EXPANSION VALVE

- (3) Remove right instrument panel side trim.
- (4) Remove two screws at lower right side support beam.
- (5) Remove bolt for instrument panel support at A-pillar.
- (6) Remove left instrument panel side trim.
- (7) Remove upper instrument panel bezel.
- (8) Remove lower knee bolster.
- (9) Remove console screws at instrument panel.
- (10) Remove gearshift knob.
- (11) Remove shifter bezel.
- (12) Remove console screws at rear. Remove rear half of console.
- (13) Remove front console screws. Remove front half of console.
- (14) Remove right side instrument panel support strut.
- (15) Drain coolant.

- (16) Remove heater hoses at cowl.
- (17) Remove heater core cover screws and cover.
- (18) Remove heater core.

INSTALLATION

- (1) Carefully install new heater core into the heater housing.
- (2) Fasten heater core cover to housing with screws provided.
- (3) Reinstall all necessary trim.
- (4) Fill coolant to level.
- (5) Reconnect battery.

HEATER HOSES

The heater hoses attach at the engine compartment cowl onto the heater core inlet/outlet and on the left side of the engine.

HEATER HOSES (2.0L-2.4L)

The heater hoses are serviced separately of each other. The hoses can not be serviced with bulk roll heater hose. If it is necessary to replace a hose, use hose of the exact diameter and size and shape. The hoses are attached using spring tension clamps.

REMOVAL

NOTE: Review Safety Precautions and Warnings before proceeding with this operation.

- (1) Drain engine cooling system. Refer to Group 7, Cooling System.
- (2) Using spring tension clamp pliers, remove clamps at each end of hose to be removed (Fig. 53) and (Fig. 54).
- (3) Carefully rotate hose back and forth while tugging slightly away from connector nipple.

REMOVAL AND INSTALLATION (Continued)

CAUTION: When removing hoses from heater core inlet or outlet nipples, do not use excessive force. Heater core may become damaged and leak engine coolant into heater unit.

INSTALLATION

For installation, reverse the above procedures.

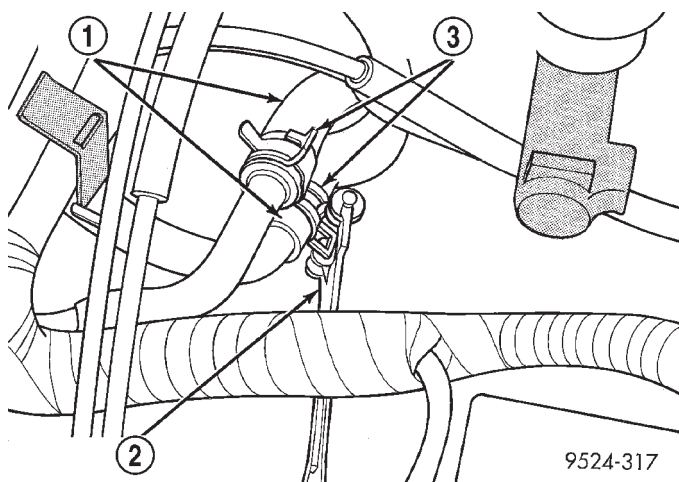


Fig. 53 Heater Hose Connection At Engine

- 1 - HEATER HOSES
- 2 - SPRING TENSION CLAMP PLIERS
- 3 - HEATER HOSE CLAMPS

OEM parts. The hoses are attached at the heater core using spring tension clamps.

NOTE: Review Safety Precautions and Warnings before proceeding with this operation.

(1) Drain engine cooling system. Refer to Group 7, Engine Cooling.

(2) Using thin slide-jaw pliers, pinch quick connect fitting in, of hose to be removed (Fig. 55).

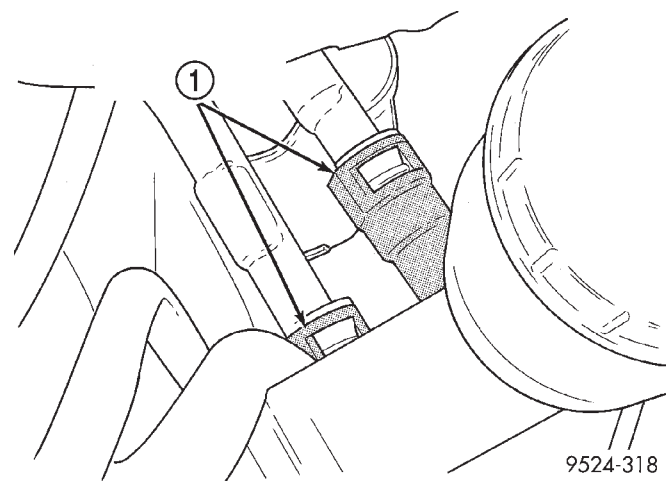


Fig. 55 Heater Hose Connection At Engine

- 1 - HEATER HOSE QUICK CONNECT FITTINGS

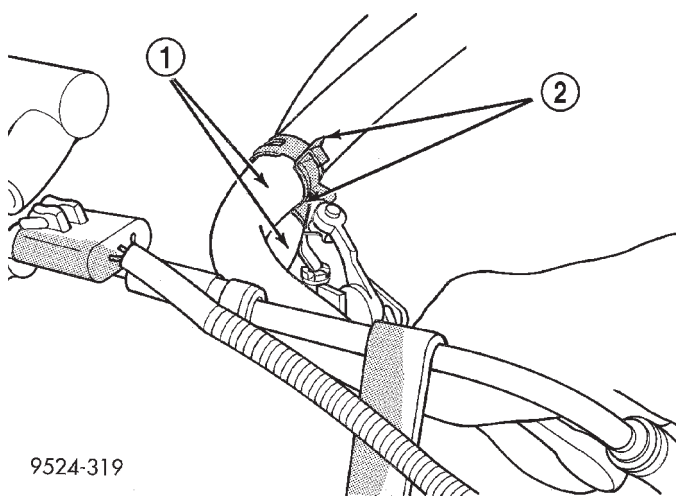


Fig. 54 Heater Hose Connection At Heater Core

- 1 - HEATER HOSES
- 2 - HEATER HOSE SPRING TENSION CLAMPS

(3) Remove intake manifold plenum. Refer to Group 11, Exhaust System And Intake Manifold for service information.

(4) Using spring tension clamp pliers, remove clamp at heater core end of hose to be removed (Fig. 54).

(5) Carefully rotate hose back and forth while tugging slightly away from connector nipple.

CAUTION: When removing hoses from heater core inlet or outlet nipples, do not use excessive force. Heater core may become damaged and leak engine coolant into heater unit.

INSTALLATION

For installation, reverse the above procedures.

LIQUID LINE**TO EXPANSION VALVE****REMOVAL**

(1) Remove refrigerant from the A/C system using a refrigerant recovery machine.

(2) Remove A/C quick connect clip at expansion valve (Fig. 56).

HEATER HOSES (2.5L)**REMOVAL**

The heater hoses for the 2.5L engine are preformed hoses with quick connect fittings at the engine. These hoses are not serviceable and must be replaced using

REMOVAL AND INSTALLATION (Continued)

(3) Disconnect quick connector on expansion valve. Remove liquid line from expansion valve. Use Special Tool kit 7193 to disconnect quick connector (Fig. 57).

CAUTION: Cap all lines that are not being replaced and cap the expansion valve tubes.

(4) Disconnect liquid line from the receiver/drier (Fig. 58).

(5) Remove the liquid line from the vehicle.

INSTALLATION

For installation, reverse the above procedures.

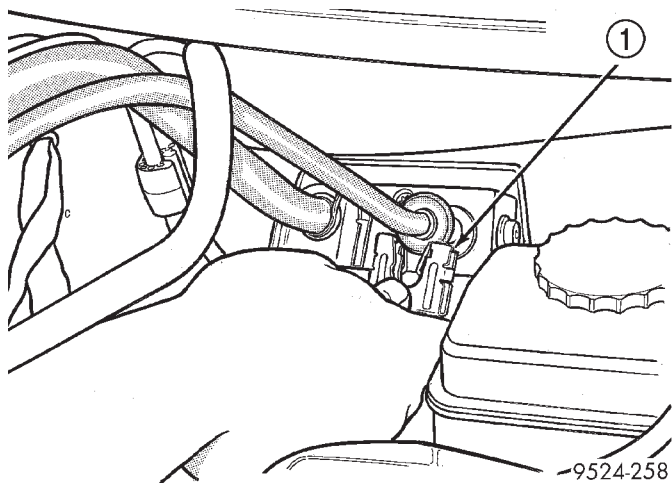


Fig. 56 Liquid Line Clip At Expansion Valve

1 - LIQUID LINE CLIP

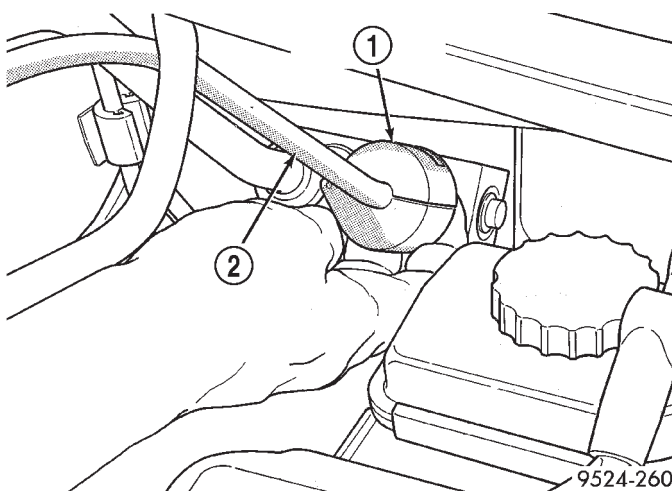


Fig. 57 Use Special Tool 7240 For Quick Connect

1 - SPECIAL TOOL OTC 7240

2 - LIQUID LINE

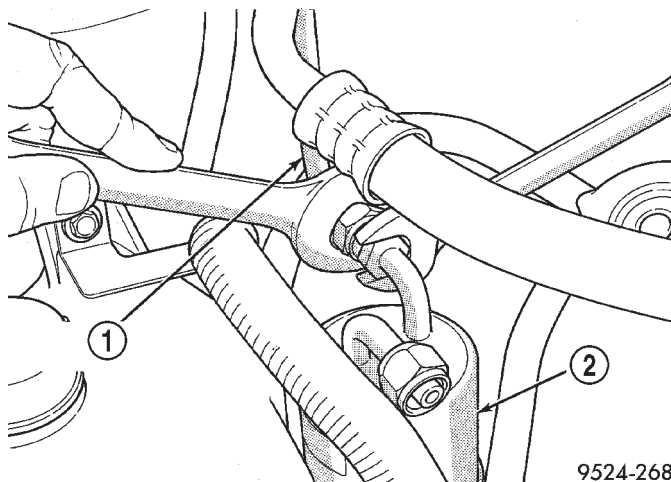


Fig. 58 Liquid Line At Receiver/Drier

1 - LIQUID LINE AT RECEIVER DRIER

2 - RECEIVER DRIER

TO CONDENSER

REMOVAL

(1) Remove refrigerant from the A/C system using a refrigerant recovery machine.

(2) Remove A/C quick connect clip at condenser (Fig. 59).

(3) Disconnect quick connector at condenser. Remove liquid line from condenser. Use special tool kit 7193 to disconnect quick connector (Fig. 60). Remove line at condenser (Fig. 61).

CAUTION: Cap all lines that are not being replaced and cap the condenser inlet.

(4) Disconnect liquid line from the receiver/drier (Fig. 62).

(5) Remove the liquid line from the vehicle.

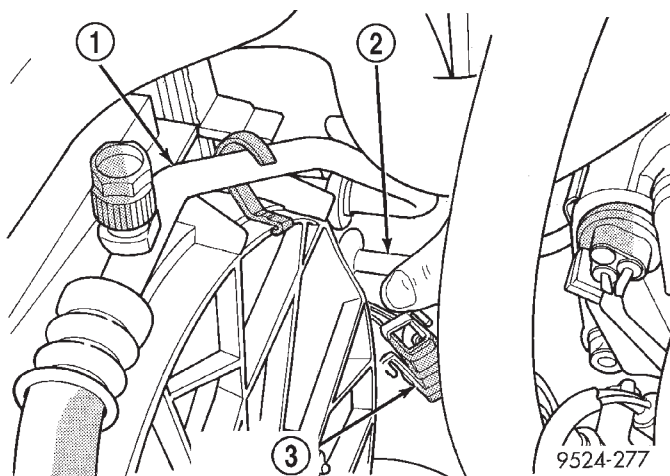
INSTALLATION

For installation, reverse the above procedures.

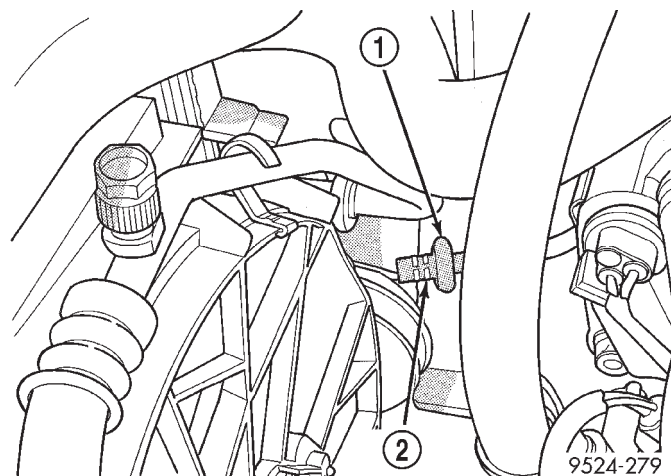
MODE DOOR ACTUATOR MOTOR

NOTE: If battery voltage is low or not sensed at the actuator/motor for less than a (60) second interval, the actuator/motor will be out of calibration. Remove the M1 (I. O. D.) fuse for a minimum of (60) seconds. The actuator/motor will then self calibrate itself upon reinstallation of fuse.

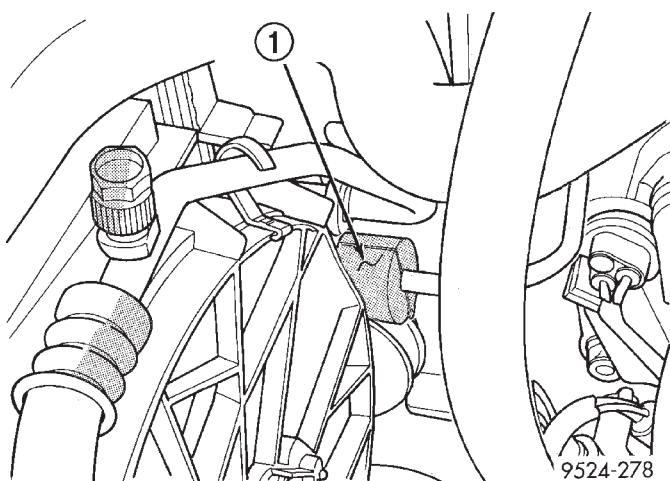
REMOVAL AND INSTALLATION (Continued)

**Fig. 59 Clip Removal**

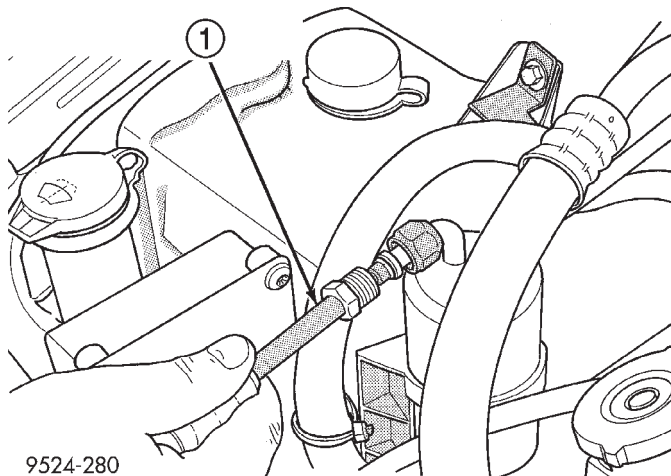
- 1 - DISCHARGE LINE
- 2 - LIQUID LINE
- 3 - LIQUID LINE CLIP

**Fig. 61 Line At Condenser**

- 1 - LIQUID LINE
- 2 - DOUBLE O-RINGS

**Fig. 60 Quick Coupler Using Special Tool 7240**

- 1 - SPECIAL TOOL OTC 7240

**Fig. 62 Liquid Line at Receiver/Drier**

- 1 - LIQUID LINE AT RECEIVER-DRIER

The mode door actuator is an electric motor. It mechanically positions the A/C unit panel/bi-level door and the floor/defrost door. Prior to part replacement, re-calibration of the HVAC actuator is recommended. Calibration is performed by disconnecting the battery negative cable or the removal of the instrument panel M-1 fuse. Electrical power should be re-established after (60) seconds which will automatically initiate the software calibration procedure. If this procedure fails, it will be necessary to replace the mode door actuator/motor. The mode door actuator/motor is not serviceable and must be replaced if found to be defective.

The mode door actuator is located on the upper left side of the A/C- Heater housing (Fig. 63).

REMOVAL

- (1) Disconnect battery negative cable.
- (2) Remove left underpanel silencer/duct.
- (3) Remove electrical connection on actuator (Fig. 64).
- (4) Remove actuator retaining screws. Then pull actuator straight down. Upon removal, note the shaft position of the actuator, because the shaft on this motor is keyed. When installing new actuator, its shaft must be positioned in the same location.

INSTALLATION

For installation, reverse the above procedures.

RECIRCULATION DOOR CABLE

The RECIRC door is actuated by a cable which mechanically positions the door.

REMOVAL AND INSTALLATION (Continued)

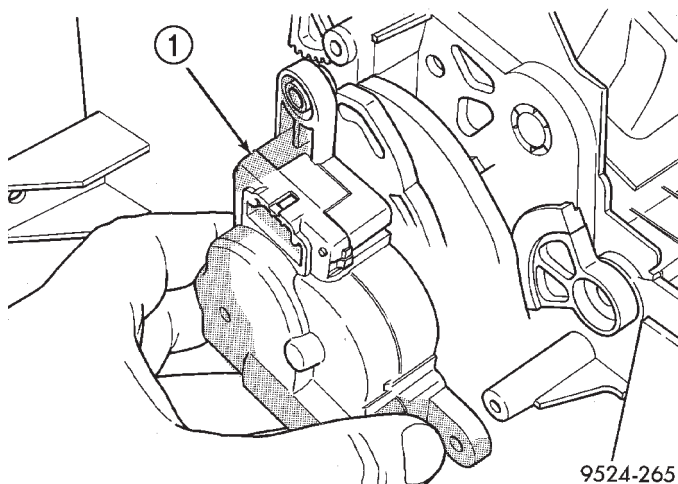


Fig. 63 Mode Door Motor Location

1 – MODE DOOR MOTOR

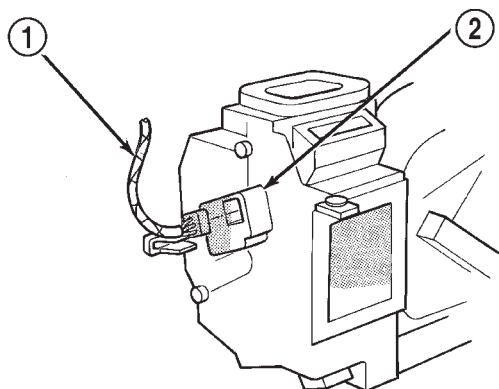


Fig. 64 Mode Motor Connector

1 – CONNECTOR
2 – MODE MOTOR

The RECIRC door actuator is located at the far right of the A/C Heater housing near the right A-pillar (Fig. 65).

REMOVAL

- (1) Place the ignition key in the OFF position before removing control module.
- (2) Remove trim bezel (Fig. 66).
- (3) Remove cluster hood bezel retaining screws in the trim bezel opening (Fig. 67).
- (4) Pry up the cluster hood bezel a few inches to expose the cubby bin/cigar lighter bezel screws.
- (5) Remove the cubby bin/cigar lighter bezel and wiring.
- (6) Remove the control module retaining screws.
- (7) Drop the A/C control module into the cigar lighter/cubby bin bezel opening (Fig. 68). Then disconnect the wiring on the rear of the control module.

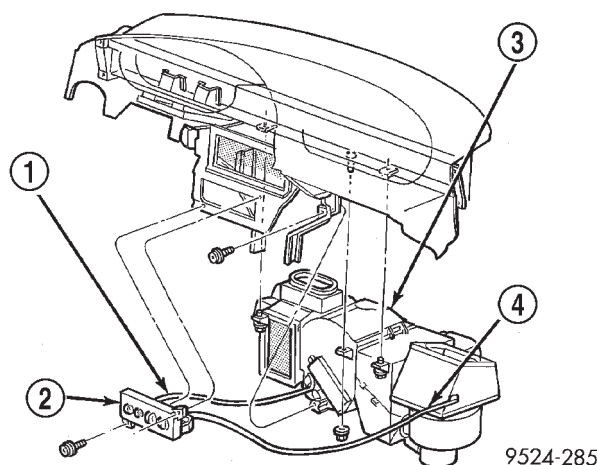


Fig. 65 Recirculation Cable Location

1 – TEMPERATURE DOOR CABLE
2 – CONTROL MODULE
3 – A/C HOUSING
4 – RECIRCULATION DOOR CABLE

(8) Release the recirculation cable retaining clip from the top of the control module. Retain the clip for future use. Then disconnect the recirculation control cable.

(9) Remove right under panel silencer/duct.

(10) Disconnect cable flag at right of recirculation housing (Fig. 69).

(11) Remove cable core end from recirculation actuator lever.

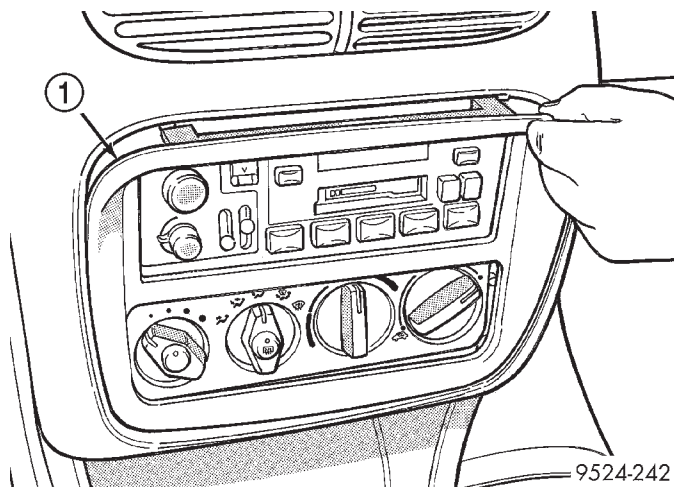


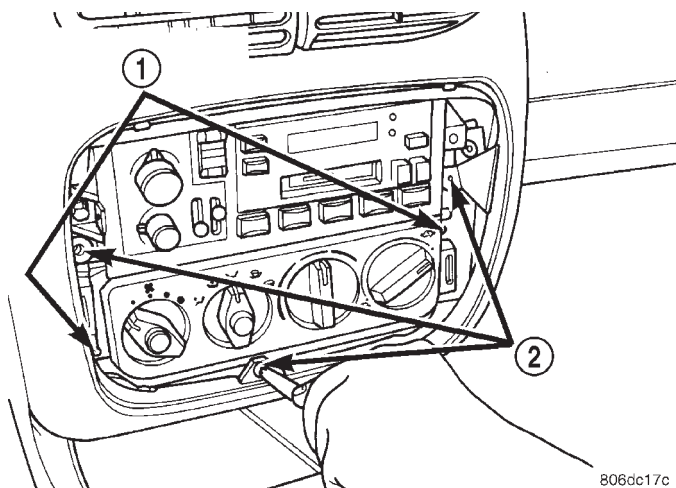
Fig. 66 Trim Bezel

1 – TRIM BEZEL

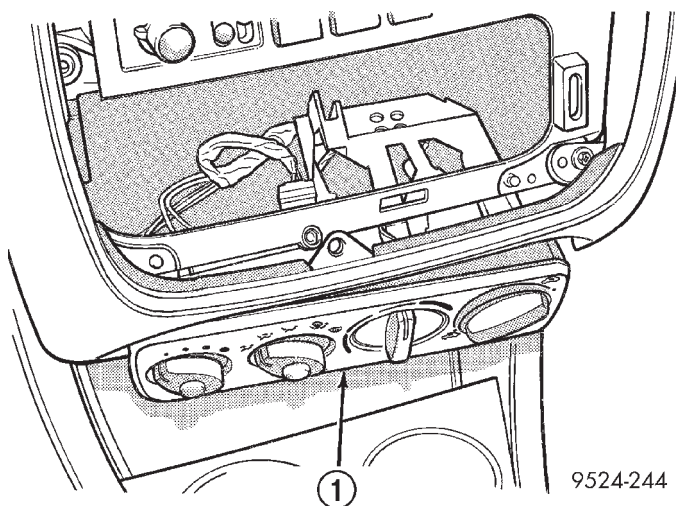
INSTALLATION

For installation, reverse the above procedures. Verify that the cables are properly adjusted, free of interference, and the module is seated properly.

REMOVAL AND INSTALLATION (Continued)

**Fig. 67 Control Module Screws**

- 1 - CONTROL MODULE SCREWS
2 - CLUSTER HOOD SCREWS

**Fig. 68 Control Module At Bezel Opening**

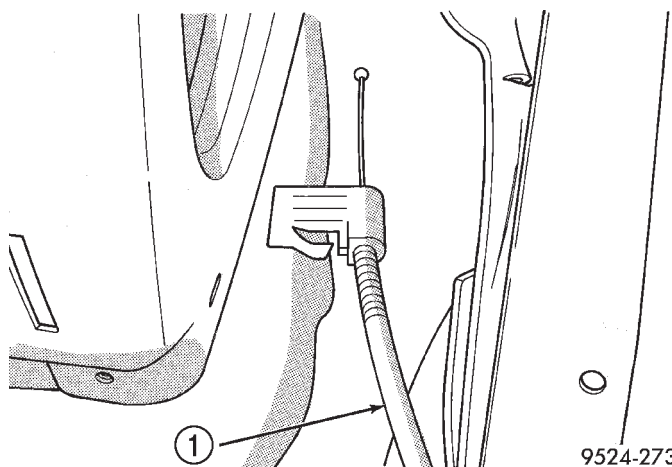
- 1 - CONTROL MODULE

CABLE ADJUSTMENT

The cables must be adjusted for proper function of the control module. To adjust the cable, attach the cable to the lever arm of the control module. Turn the knob fully counterclockwise. Pull the cable jacket away from the cable end until taut. Clip the cable jacket to the control module. The knob should travel a full 180° if the cable is properly adjusted.

SUCTION LINE**REMOVAL**

- (1) Remove refrigerant from the A/C system using a refrigerant recovery machine.
- (2) Remove suction line clip at right strut tower (Fig. 70).

**Fig. 69 Disconnect Recirculation Cable**

- 1 - RECIRCULATION CABLE

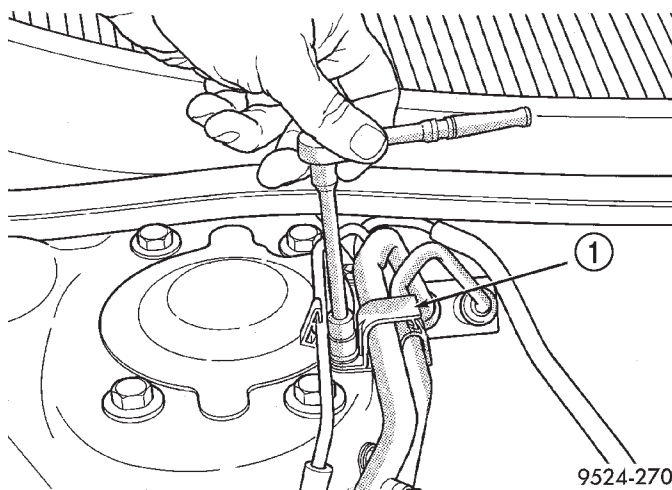
(3) Remove quick connect clip (Fig. 71). Disconnect quick connect at expansion valve end using Special Tool Kit 7193.

CAUTION: Cap all lines that are not being replaced and cap the expansion valve tubes.

- (4) Disconnect line at compressor end (Fig. 72).
- (5) Remove suction line from vehicle.

INSTALLATION

For installation, reverse the above procedures. Tighten bolts to 22 N·m (200 in. lbs.).

**Fig. 70 Suction Line Routing Clip**

- 1 - A/C LINES CLIP

REMOVAL AND INSTALLATION (Continued)

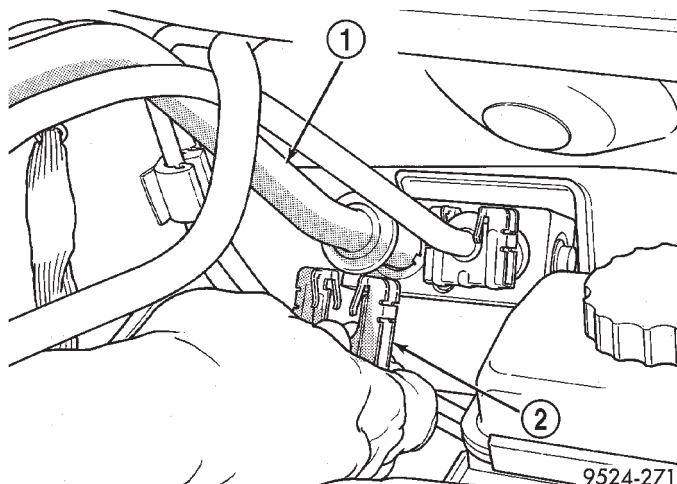


Fig. 71 Quick Connect Clip

- 1 - SUCTION LINE
2 - SUCTION LINE CLIP

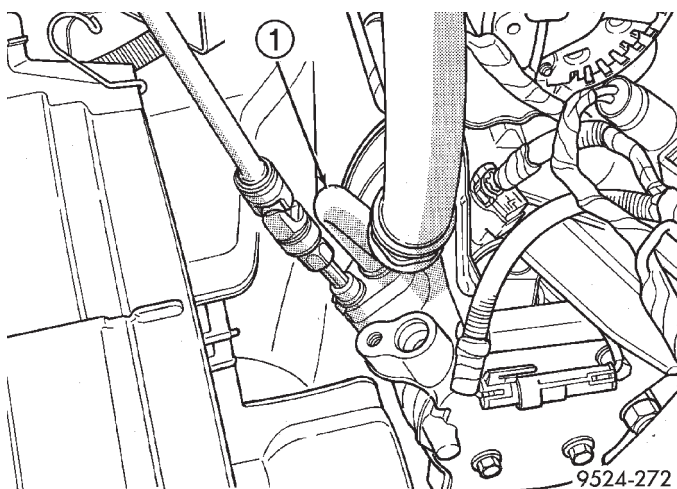


Fig. 72 Suction Line At Compressor

- 1 - SUCTION LINE

TEMPERATURE DOOR CABLE

The blend-air (temperature) door is actuated by a cable which mechanically positions the temperature door.

The temperature door actuator is located at the center of the A/C Heater housing at the center tunnel.

REMOVAL

- (1) Place the ignition key in the OFF position before removing control module.
- (2) Remove trim bezel (Fig. 66).
- (3) Remove cluster hood bezel retaining screws in the trim bezel opening (Fig. 67).
- (4) Pry up the cluster hood bezel a few inches to expose the cubby bin/cigar lighter bezel screws.

(5) Remove the cubby bin/cigar lighter bezel and wiring.

(6) Remove the control module retaining screws.

(7) Remove control module and disconnect the wire connectors.

(8) Release the temperature control cable retaining clip from the top of the control module. Retain the clip for future use. Then disconnect the temperature control cable.

(9) Disconnect cable at A/C housing (Fig. 73).

(10) Remove cable core end from temperature actuator lever.

INSTALLATION

For installation, reverse the above procedures.

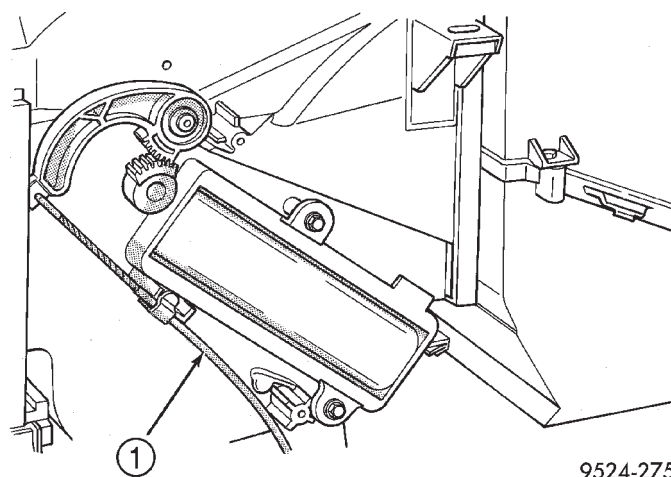


Fig. 73 Temperature Cable At A/C Housing

- 1 - TEMPERATURE CABLE

THERMAL LIMITER SWITCH

There is no serviceability of the thermal limiter switch. If the thermal limiter switch fails, the compressor must be replaced. To replace the compressor, refer to Compressor Replacement in this section.

UNIT HOUSING

REMOVAL

The heater core may be removed without removing the unit housing. Refer to heater core replacement in this section.

(1) Disconnect battery negative remote cable. This must be done to prevent accidental air bag deployment.

REMOVAL AND INSTALLATION (Continued)

WARNING: AVOID BREATHING A/C REFRIGERANT AND LUBRICANT VAPOR OR MIST. EXPOSURE MAY IRRITATE EYES, NOSE AND THROAT. USE ONLY APPROVED SERVICE EQUIPMENT MEETING SAE REQUIREMENTS TO DISCHARGE R-134a SYSTEM. IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE WORK AREA BEFORE RESUMING SERVICE.

R-134a SERVICE EQUIPMENT OR VEHICLE A/C SYSTEM SHOULD NOT BE PRESSURE TESTED OR LEAK TESTED WITH COMPRESSED AIR. SOME MIXTURES OF AIR/R-134a HAVE BEEN SHOWN TO BE COMBUSTIBLE AT ELEVATED PRESSURES. THESE MIXTURES ARE POTENTIALLY DANGEROUS AND MAY RESULT IN FIRE OR EXPLOSION CAUSING INJURY OR PROPERTY DAMAGE.

(2) Using an A/C recovery unit, remove all R-134a refrigerant from the A/C system.

(3) Remove air cleaner hose and air distribution duct from the engine.

(4) Drain the engine cooling system.

NOTE: If equipped with 2.5L engine, the upper intake manifold has to be removed at this time to access the heater hose connections at the bulkhead. Refer to group 11, Exhaust System And Intake Manifold for service information.

(5) Disconnect heater hoses at the dash panel. Plug the heater core inlet and outlet tubes to prevent antifreeze from spilling on the vehicle interior during removal. If an appropriate plug cannot be found pull back carpet and use caution when removing unit. Keep the heater tubes elevated to prevent spillage of coolant.

(6) Remove both A/C lines from expansion valve. Use Special Tool Kit 7193 to disconnect quick connectors on A/C lines. Refer to A/C line removal in this section for complete procedure. After removing lines cap the expansion valve openings and the A/C hose openings. This will prevent any dirt or moisture from entering the refrigerant system during servicing.

CAUTION: The lubricant used in this air conditioning system absorbs moisture readily (similar to brake fluid). Do not leave any portion of the system open for extended periods of time.

(7) Remove trim bezel (Fig. 66).

(8) Remove cluster hood bezel retaining screws in the trim bezel opening (Fig. 67).

(9) Pry up the cluster hood bezel a few inches to expose the cubby bin/cigar lighter bezel screws.

(10) Remove the cubby bin/cigar lighter bezel and wiring.

(11) Remove the control module retaining screws.

(12) Drop the A/C control module into the cigar lighter/cubby bin bezel opening (Fig. 68). Then disconnect the wiring on the rear of the control module.

(13) Release the cable clips from the top of the control module. Retain the clips for future use. Then disconnect the temperature control and recirculation control cables.

(14) Remove the control module.

(15) Remove upper instrument panel bezel.

(16) Remove right and left instrument panel end caps.

(17) Remove left lower knee bolster. Disconnect mode door motor wiring.

(18) Remove right and left interior door post kick panel.

(19) Remove front and rear halves of floor console.

(20) Remove the radio.

(21) Remove right side lower silencer/duct.

(22) Remove glove box assembly.

(23) Remove right side vertical support strut brace.

(24) Remove left side vertical support strut brace.

(25) Remove center lower distribution housing.

(26) Remove bolts securing Heater-A/C housing to metal I/P frame.

(27) Remove upper instrument panel cowl trim cover.

(28) Disconnect steering column from instrument panel. Lower steering column.

(29) Remove instrument panel bolts at cowl fence.

(30) Remove bolts at lower A-posts.

(31) Remove instrument panel frame and wiring.

(32) Remove bolts securing Heater-A/C housing to cowl.

INSTALLATION

For installation, reverse the above procedure. Verify that the cables are properly adjusted, free of interference, and the control module is seated properly.

CABLE ADJUSTMENT

The cables must be adjusted for proper function of the control module. To adjust the cable, attach the cable to the lever arm of the control module. Turn the knob fully counterclockwise. Pull the cable jacket away from the cable end until taut. Clip the cable jacket to the control module. The knob should travel a full 180° if the cable is properly adjusted.

DISASSEMBLY AND ASSEMBLY

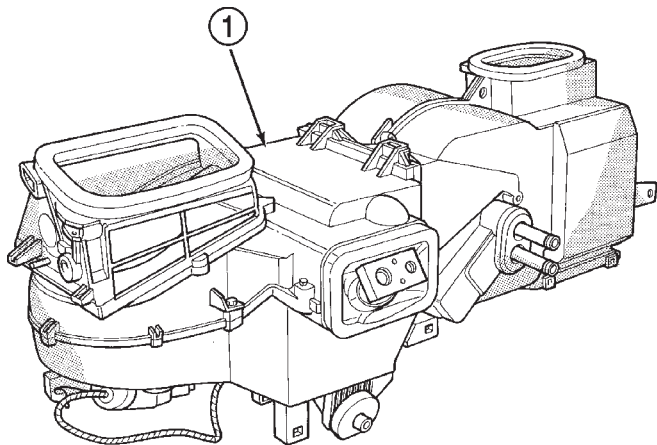
UNIT HOUSING RECONDITION

Heater-A/C housing must be removed from vehicle before performing this operation. Refer to Heater-A/C Unit Housing—Removal and Installation.

The heater a/c unit need not be disassembled to replace the heater core. Refer to Heater Core replacement in this section.

DISASSEMBLE

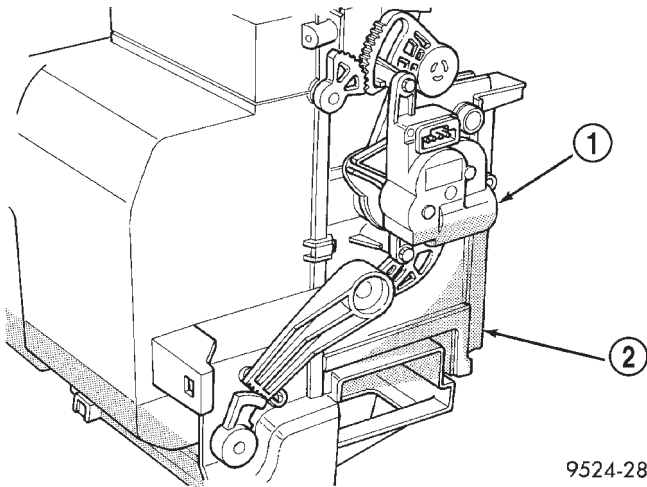
(1) Place Heater-A/C unit assembly on workbench (Fig. 74) and (Fig. 75).



9524-286

Fig. 74 Heater-A/C Unit

1 – HVAC UNIT

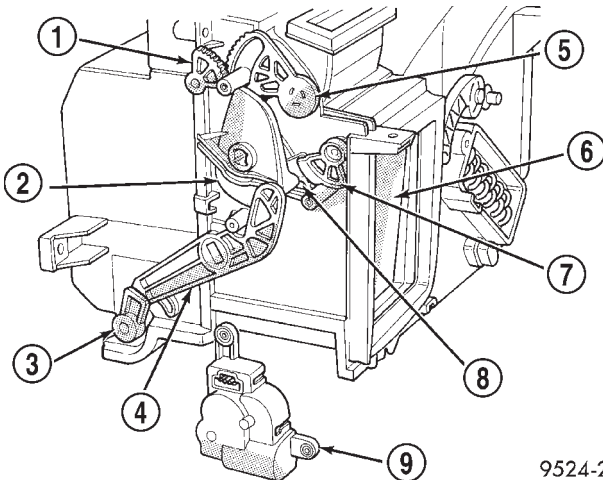


9524-287

Fig. 75 Mode Motor Linkage

1 – MODE MOTOR
2 – HVAC UNIT

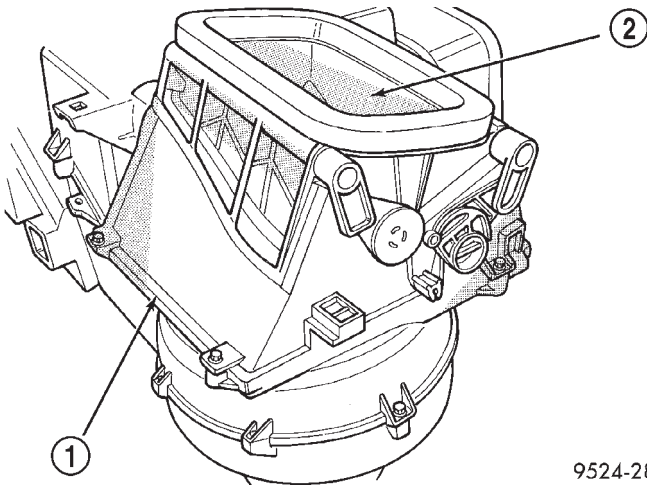
- (2) Remove A/C mode motor (Fig. 76).
(3) Remove upper recirculation air inlet housing (Fig. 77) and (Fig. 78).



9524-288

Fig. 76 Mode Motor

- 1 – DEFROST DOOR LEVER
2 – MODE CAM
3 – FLOOR DOOR LEVER
4 – FLOOR DOOR LEVER LINK
5 – DEFROST DOOR LINK LEVER
6 – PANEL DOOR
7 – PANEL DOOR LEVER
8 – PANEL DOOR LEVER LINK
9 – MODE MOTOR

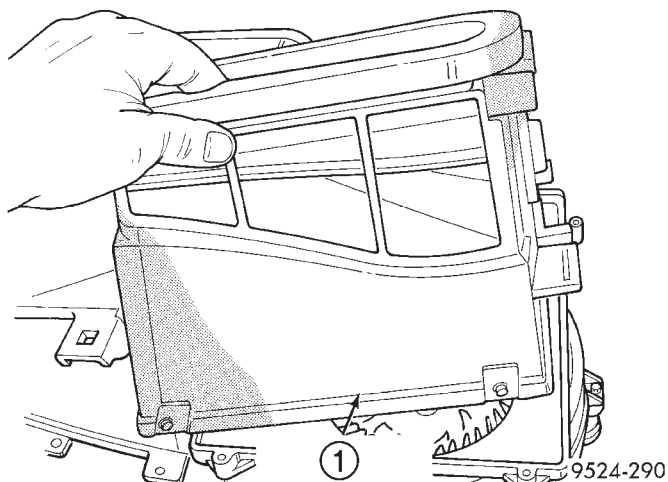


9524-289

Fig. 77 Recirculation Air Inlet

- 1 – RECIRCULATION HOUSING
2 – AIR INLET

DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 78 Recirculation Housing Removal**

1 - RECIRCULATION HOUSING

(4) From inside of air inlet, depress release tang on rear inlet door (Fig. 79).

(5) Remove rear Y-cam actuator lever (Fig. 80).

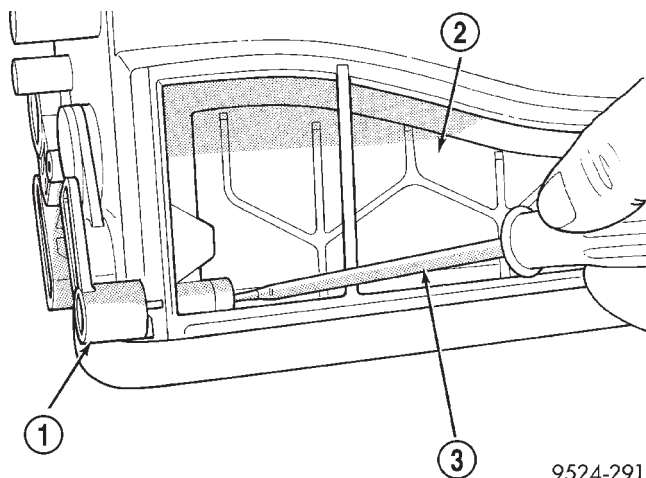
(6) Turn front toggle lever until it lines up with slots on housing.

(7) Pull straight up on toggle lever and slide toggle lever from underneath front actuator lever (Fig. 80).

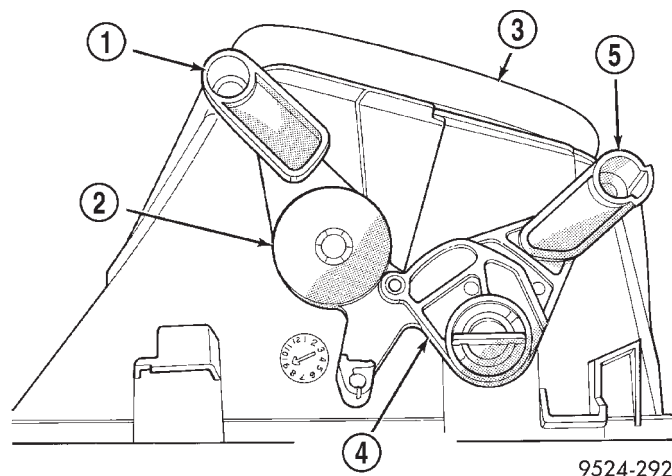
(8) Remove front toggle lever (Fig. 80).

(9) Remove Y-cam rear lever (Fig. 80).

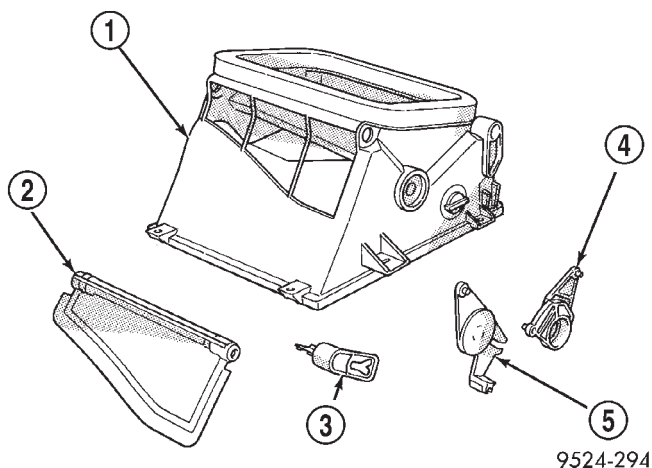
(10) Unsnap and remove rear air inlet door (Fig. 81).

**Fig. 79 Rear Y-Cam Release**

1 - Y-CAM ACTUATOR LEVER
2 - REAR DOOR
3 - FLAT BLADE PRY TOOL

**Fig. 80 Rear Y-Cam Actuator**

1 - REAR Y-CAM ACTUATOR LEVER
2 - REAR LEVER
3 - AIR INLET
4 - FRONT TOGGLE LEVER
5 - FRONT ACTUATOR LEVER

**Fig. 81 Rear Air Inlet Door**

1 - RECIRC HOUSING
2 - REAR DOOR
3 - REAR Y-CAM ACTUATOR LEVER
4 - FRONT TOGGLE LEVER
5 - REAR LEVER

(11) Front air inlet door and lever is serviced with recirculation housing.

(12) Remove blower motor wiring at resistor (Fig. 82).

(13) Remove blower motor (Fig. 83).

(14) Using a flat blade pry tool, Pull up on tab at evaporator probe cover (Fig. 84). Turn evaporator probe cover clockwise 90°.

(15) Remove evaporator probe cover. Pull evaporator needle from evaporator (Fig. 85).

DISASSEMBLY AND ASSEMBLY (Continued)

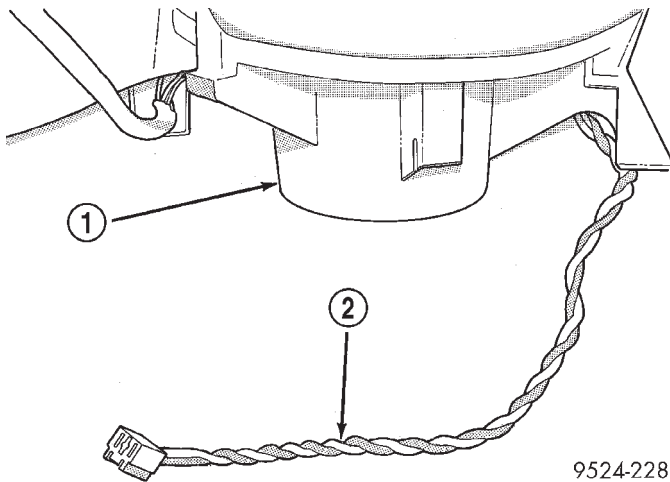


Fig. 82 Blower Motor Wiring

- 1 - BLOWER MOTOR
2 - BLOWER MOTOR WIRING

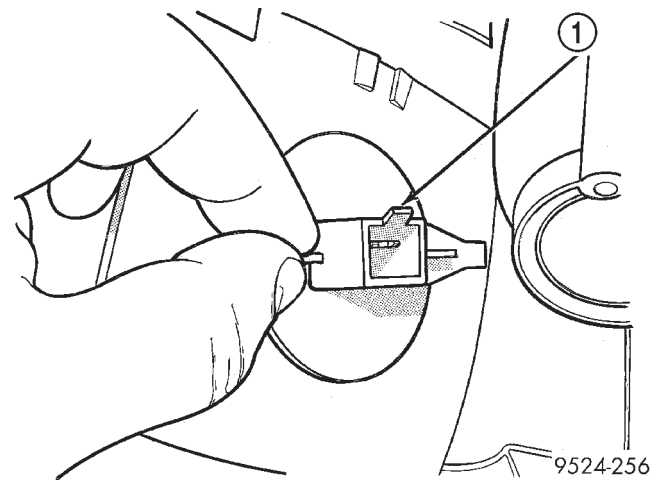


Fig. 84 Evaporator Probe

- 1 - EVAPORATOR PROBE

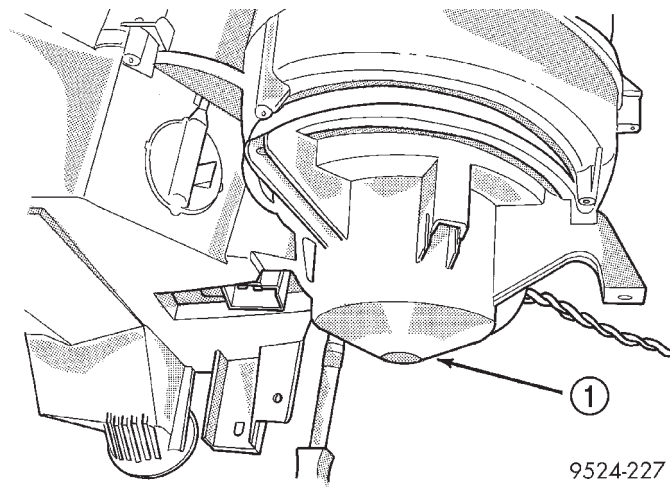


Fig. 83 Blower Motor

- 1 - BLOWER MOTOR

- (16) Remove blower motor resistor (Fig. 86).
(17) Remove clips retaining evaporator housing to heater/distribution housing (Fig. 87).
(18) Separate evaporator housing from heater/distribution housing (Fig. 88).
(19) Remove seal around evaporator tube inlet (Fig. 89).
(20) Remove evaporator housing upper cover (Fig. 90).
(21) Lift evaporator out of lower housing (Fig. 91).

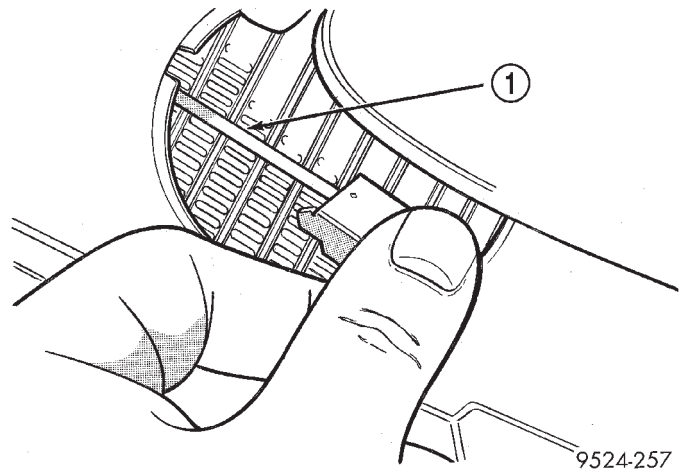


Fig. 85 Evaporator Probe Needle

- 1 - EVAPORATOR PROBE NEEDLE

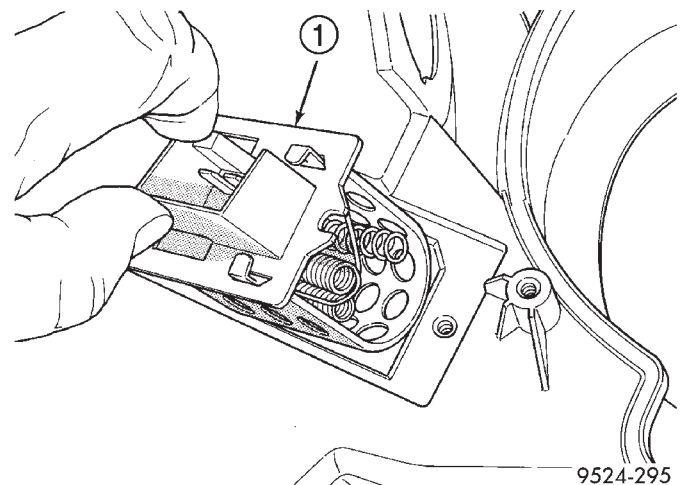
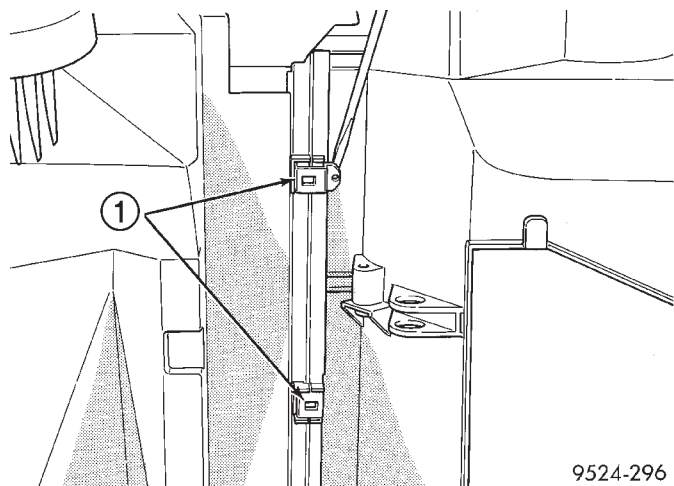


Fig. 86 Blower Motor Resistor

- 1 - BLOWER RESISTOR

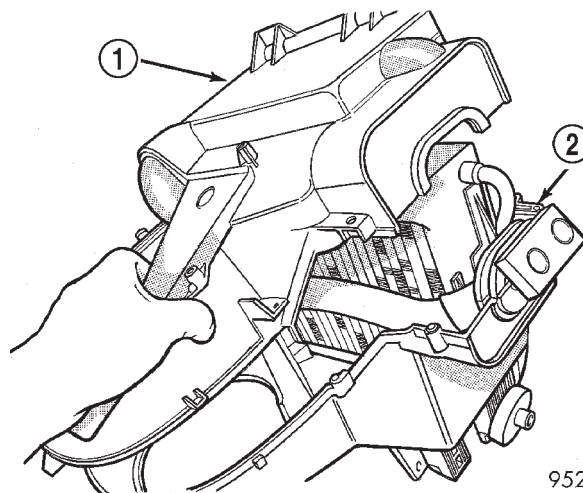
DISASSEMBLY AND ASSEMBLY (Continued)



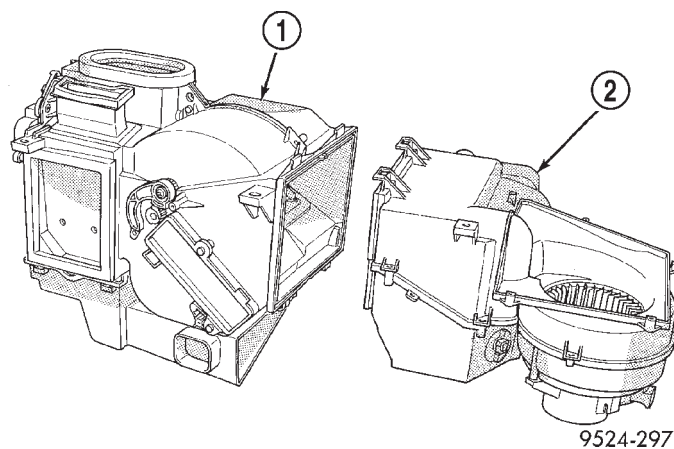
9524-296

Fig. 87 Housing Clips

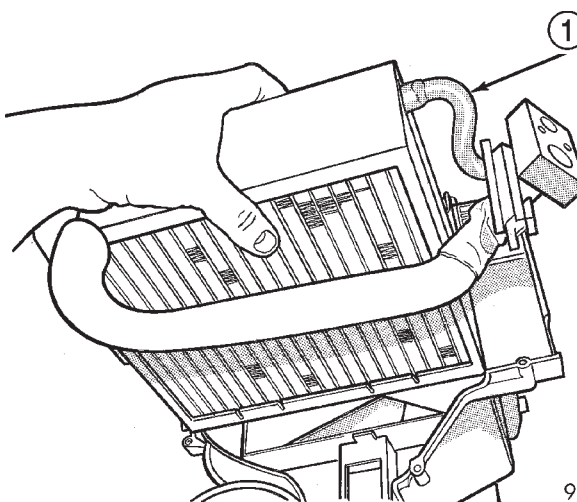
1 - MOUNTING CLIPS



9524-253

Fig. 90 Evaporator Housing Upper Cover1 - EVAPORATOR HOUSING COVER
2 - EVAPORATOR HOUSING

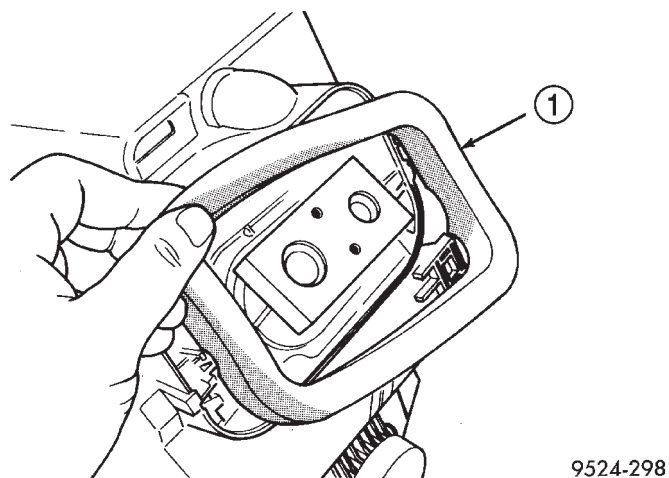
9524-297

Fig. 88 Separate Housings1 - HEATER DISTRIBUTION HOUSING
2 - A/C EVAPORATOR HOUSING

9524-254

Fig. 91 Remove Evaporator From Housing

1 - EVAPORATOR



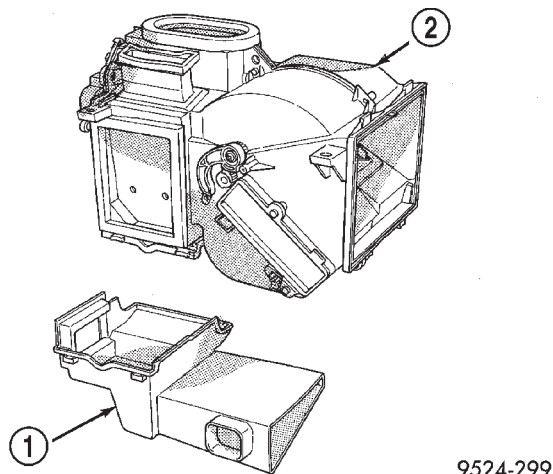
9524-298

Fig. 89 Evaporator Tube Inlet Seal

1 - EVAPORATOR CORE SEAL

- (22) Remove styrofoam seal around evaporator.
- (23) Remove lower heat/distribution housing clips. Remove housing (Fig. 92).
- (24) Remove heater core cover (Fig. 93) and (Fig. 94).
- (25) Slide heater core out of heater housing (Fig. 95).
- (26) Remove temperature door lever link retaining screw (Fig. 96).
- (27) Remove temperature door lever link (Fig. 97).
- (28) From the panel door air opening, using a long thin screwdriver, push in clip for floor door gear. Remove floor door gear (Fig. 98).
- (29) Turn floor door lever link until it aligns with slots cut into it (Fig. 99). Remove floor door lever link (Fig. 100).

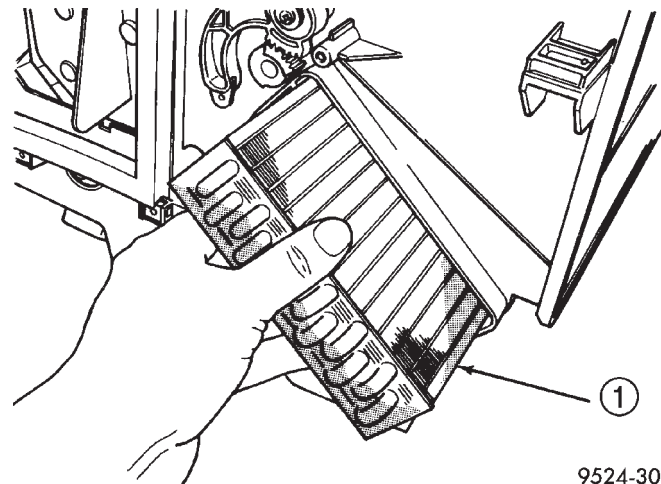
DISASSEMBLY AND ASSEMBLY (Continued)



9524-299

Fig. 92 Lower Floor Distribution Housing

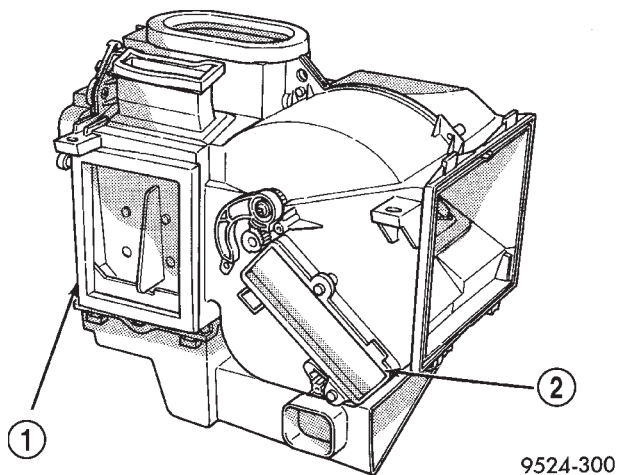
- 1 - FLOOR DISTRIBUTION HOUSING
2 - HEATER DISTRIBUTION HOUSING



9524-302

Fig. 95 Slide Out Core

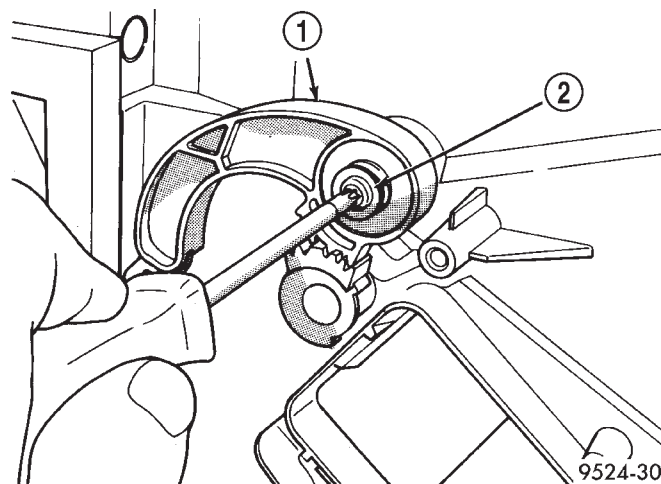
- 1 - HEATER CORE



9524-300

Fig. 93 Heater Core Cover

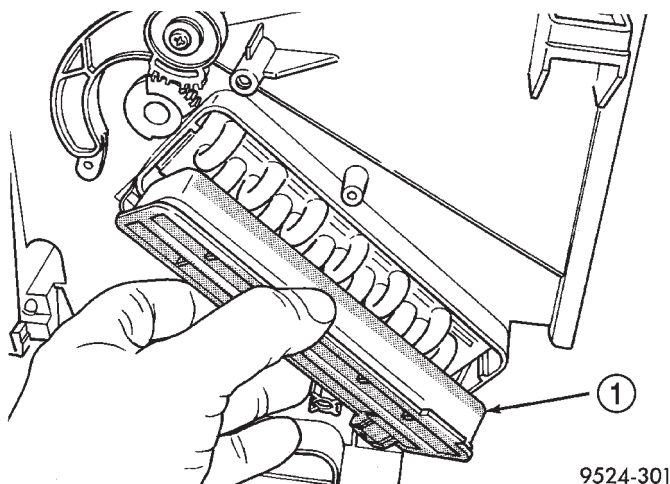
- 1 - HEATER DISTRIBUTION HOUSING
2 - HEATER CORE COVER



9524-303

Fig. 96 Temperature Door Lever Link

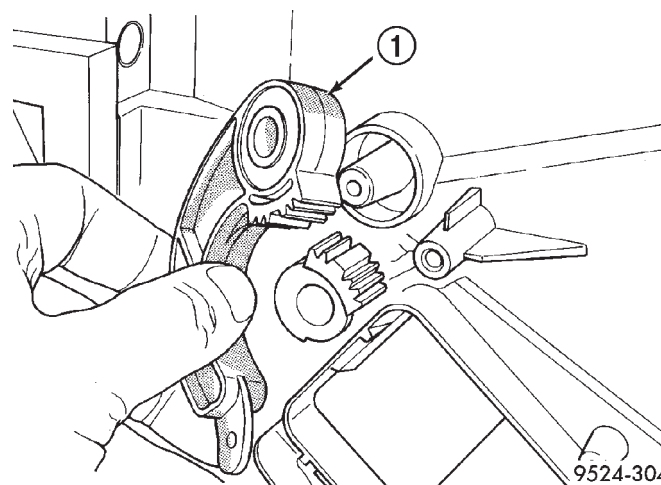
- 1 - TEMPERATURE DOOR LEVER LINK
2 - MOUNTING SCREW



9524-301

Fig. 94 Heater Core Cover Removal

- 1 - HEATER CORE COVER

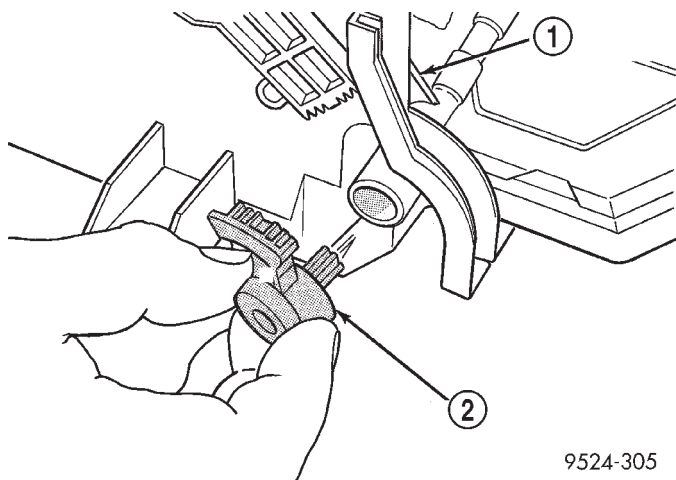


9524-304

Fig. 97 Temperature Door Lever Link Removal

- 1 - TEMPERATURE DOOR LEVER LINK

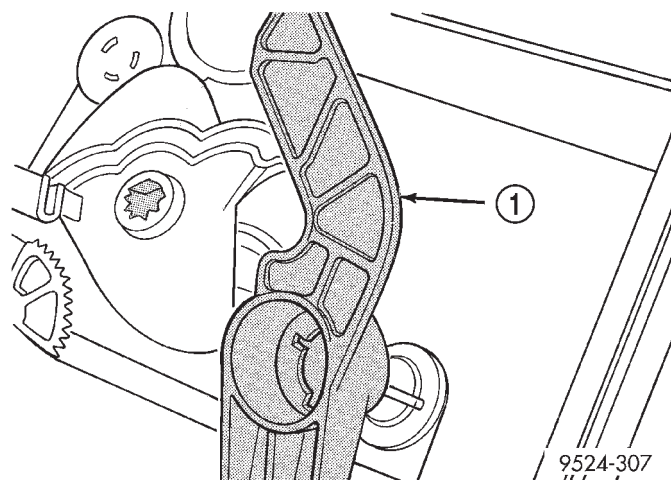
DISASSEMBLY AND ASSEMBLY (Continued)



9524-305

Fig. 98 Floor Door Gear

- 1 - FLAT BLADE PRY TOOL
2 - FLOOR DOOR GEAR



9524-307

Fig. 100 Remove Lever Link

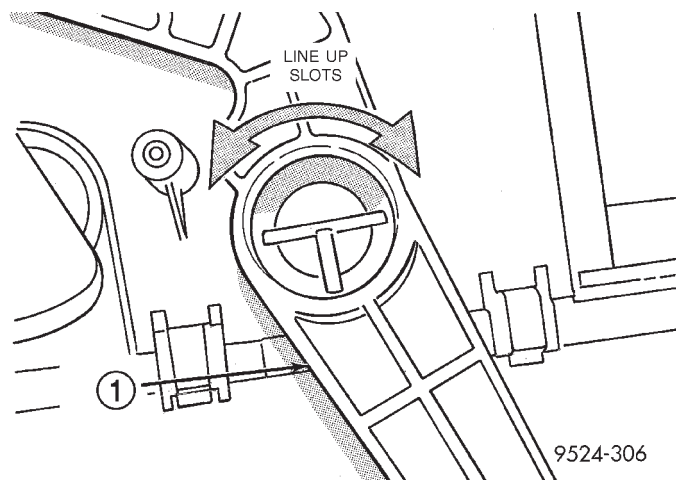
- 1 - FLOOR DOOR LEVER

(30) Remove mode motor cam from housing (Fig. 101) and (Fig. 102).

(31) From panel door access, using a long thin screwdriver, push in release tang on panel door gear (Fig. 103).

(32) Remove panel door gear from housing.

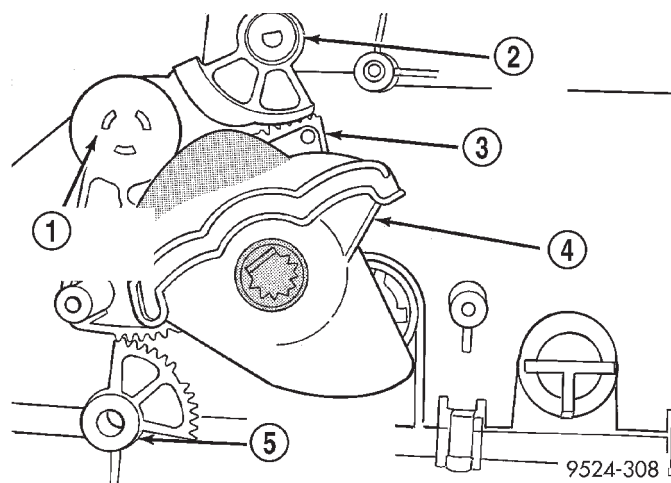
(33) Line up slots on panel door lever link. Remove panel door lever link from housing (Fig. 104).



9524-306

Fig. 99 Align Slots

- 1 - FLOOR DOOR LEVER LINK



9524-308

Fig. 101 Mode Motor Cam

- 1 - DEFROST DOOR LEVER LINK
2 - PANEL DOOR LEVER
3 - PANEL DOOR LEVER LINK
4 - MODE CAM
5 - DEFROST DOOR LEVER

DISASSEMBLY AND ASSEMBLY (Continued)

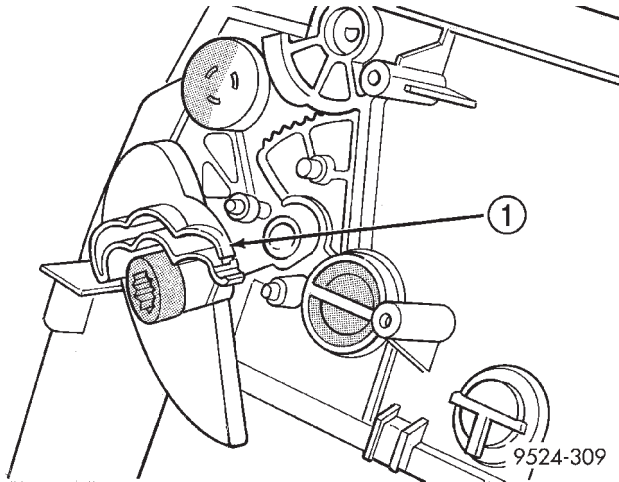


Fig. 102 Mode Motor Cam Removal

1 - MODE CAM

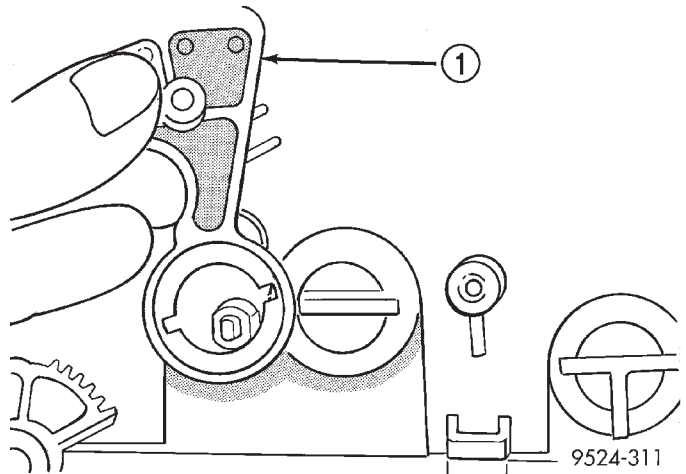


Fig. 104 Panel Door Lever Link

1 - PANEL DOOR LEVER LINK

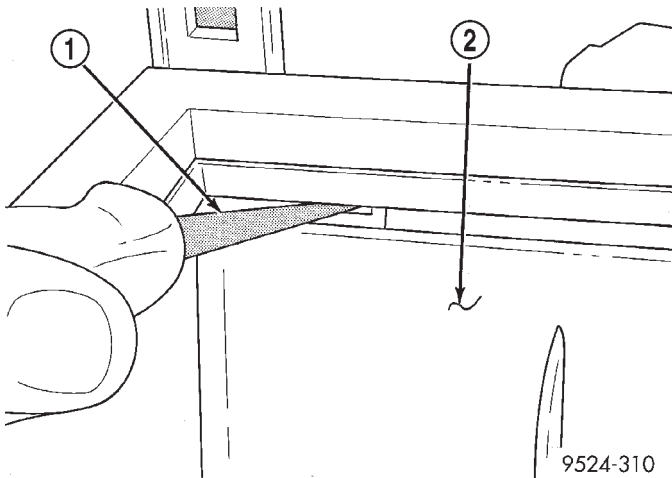


Fig. 103 Panel Door Gear Release

1 - FLAT BLADE PRY TOOL
2 - PANEL DOOR

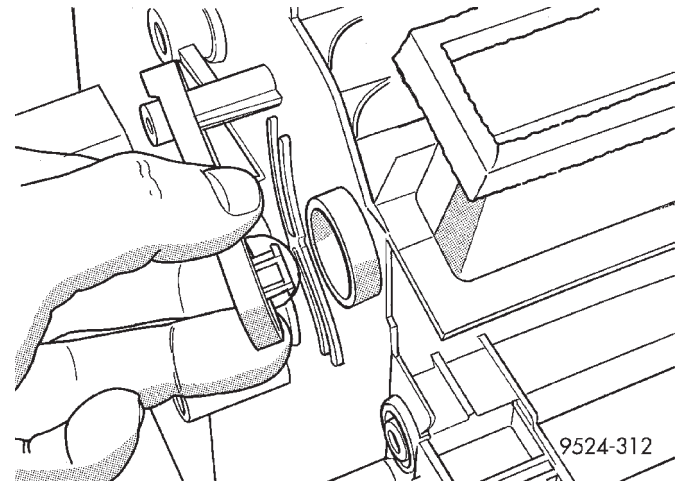


Fig. 105 Defrost Door Lever Link

(34) Unsnap defrost door lever link from housing (Fig. 105).

(35) Remove defrost door seal from housing.

(36) Remove A/C housing rear cover half from front half (Fig. 106).

(37) Remove defrost door from housing (Fig. 107).

(38) Depress retaining clip at temperature control door, remove temperature control door (Fig. 108).

(39) Unsnap panel door from rear half of housing. Remove door from housing.

(40) Unsnap floor door from front half of housing. Remove door from housing (Fig. 109).

ASSEMBLE

(1) Install floor, panel, temperature, and defrost doors in housings.

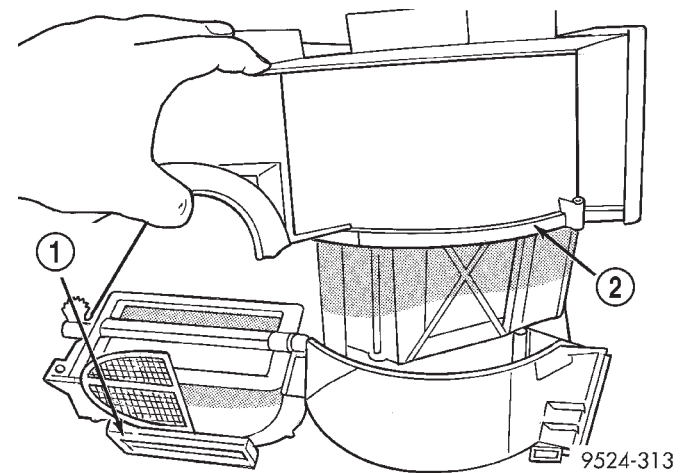
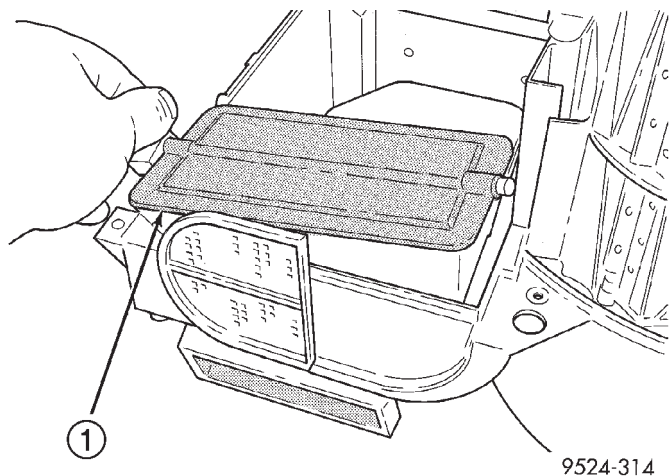


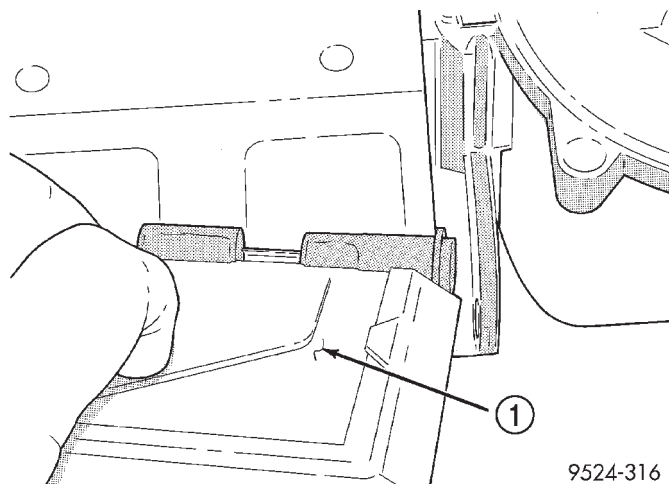
Fig. 106 Front And Rear Housing Halves

1 - REAR COVER
2 - FRONT COVER

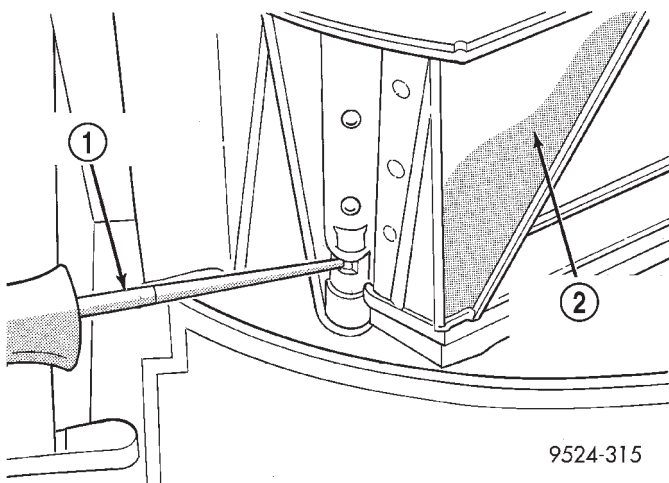
DISASSEMBLY AND ASSEMBLY (Continued)

**Fig. 107 Defrost Door Removal**

1 - DEFROST DOOR

**Fig. 109 Floor Door Removal**

1 - FLOOR DOOR

**Fig. 108 Temperature Control Door Removal**1 - FLAT BLADE PRY TOOL
2 - TEMPERATURE CONTROL DOOR

(2) Position front A/C housing half to rear half. Install retaining screws.

(3) Install defrost door seal.

(4) Snap defrost door lever link to door.

(5) Install panel door lever link. Install panel door lever gear.

(6) Install mode motor cam.

(7) Install floor door lever link.

(8) Install floor door lever gear.

(9) Install temperature door lever gear.

(10) Install temperature door lever link.

(11) Slide heater core into housing. Install cover.

(12) Install lower distribution housing and clips.

(13) Install styrofoam to evaporator. Install evaporator into the evaporator housing.

(14) Install upper cover to evaporator housing.

(15) Install seal around evaporator tube inlet.

(16) Install evaporator probe into evaporator and housing.

(17) Install blower motor and resistor.

(18) Install air inlet housing to evaporator housing.

(19) Install evaporator housing to heat/distribution housing.

(20) Install mode motor.

SPECIFICATIONS

A/C APPLICATION TABLE

COMPRESSOR

DESCRIPTION

Displacement per Revolution . . . 85.7 cc/rev (5.2 cu. in./rev.)

Maximum Allowable rpm 12000 rpm

Maximum Allowable Continuous rpm . . 10000 rpm

Refrigerant R-134A

Oil SP15PAG 150cc (5.08 fl. oz.)

Weight 39.2 N·m (8.82 lbs., 4.0 kgf.)

CLUTCH

DESCRIPTION

Rated Voltage 12 VDC

Minimum Breakaway Torque 31.4 N·m
(23 ft. lbs., 3.2 Kgf.m) at 12VDC

Minimum Engagement Voltage . . . 7.5 AT AIR GAP
0.5 mm REF

Power Consumption 50 WATTS MAX.

Pulley Diameter 110 mm DIA. (4.3 in.)

Weight 18.9 N·m (4.23 lbs., 1.92 Kgf.)

Clutch Type Standard

SPECIFICATIONS (Continued)

Item	Description	Notes
VEHICLE	Sebring Convertible	2-door convertible
SYSTEM	R134a w/expansion valve	
COMPRESSOR	Sanden TRS-090 (Scroll)	SP-15 PAG Oil
Freeze-up Control	evaporator temp probe (2-wire)	BCM input, signals OFF < 33.7° F, ON > 35.7° F
Low psi Control	pressure transducer to PCM	opens < 29.4 psi
High psi Control		opens > 431 psi
Thermal Limiter Switch	cut Out > 252-262° F, cut In < 225-235° F	scroll compressors only serviced with clutch
CONTROL HEAD	manual type	resistive multiplex signal for A/C request to BCM
Mode Door	electric actuator w/feedback	BCM controlled
Blend Air Door	cable	
Fresh/Recirc door	cable	
Blower Motor	hardwired to control head	resistor block
COOLING FANS	PCM controlled module, two fan motors - low/high	low & high relays
CLUTCH		
Control	relay	PCM
Draw	2-4.15 amps @ 12V	± 0.5V
Gap	0.013"-0.025"	
DRB III®		
Reads	Mode door, TPS, RPM, A/C switch test	
Actuators	clutch and fan relays	

THERMAL LIMITER SWITCH

DESCRIPTION

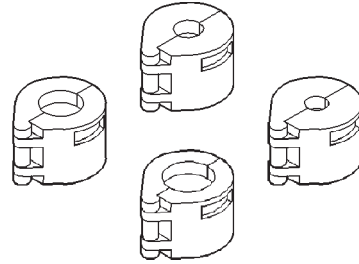
TEMPERATURE

Cut OFF Temperature . . . 122 to 128°C (252 to 262°F)

Cut IN Temperature 104 to 116°C (225 to 235°F)

SPECIAL TOOLS

AIR CONDITIONING

**A/C Line Disconnect Tool 7193**

