HEATING AND AIR CONDITIONING

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FRONT HEATING AND AIR CONDITIONING SYSTEM

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GENERAL INFORMATION

INTRODUCTION

Both the heater and the heater/air conditioning systems share many of the same components. This group will deal with both systems together when component function is common, and separately when they are not.

For proper operation of the instrument panel controls, refer to the Owner's Manual provided with the vehicle.

All vehicles are equipped with a common A/C-heater unit housing assembly. When the vehicle has only a heater system, the evaporator and recirculating air door are omitted.

An optional zone control HVAC unit is available. This unit has dual blend-air doors that can be regulated independently of each other. The temperature setting can be different from driver's side to passenger side. There is also a rear (aux.) heating and A/C system available when the vehicle is equipped with zone control.

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.

DESCRIPTION AND OPERATION

AIR DISTRIBUTION DUCTS

The air distribution ducts for the A/C, Heater, Defroster, and Second Seating Air Distribution are not serviceable in vehicle. The procedures for service of these ducts are covered in Group 8E, Instrument Panel and Gauges.

The only ducts that are serviceable in the vehicle are the side window demister ducts and the ducts that feed the front door outlets for the first rear passenger(s) seating. To service the door ducts refer to Group 23, Body.

A/C PRESSURE TRANSDUCER

The A/C Pressure Transducer (Fig. 1) monitors the refrigerant gas pressure on the high side of the system. The transducer is located on the liquid line. The pressure transducer turns off the voltage to the compressor clutch coil when refrigerant gas pressure drops to levels that could damage the compressor. The transducer also is used to adjust condenser fan speeds and will turn off compressor at high refrigerant pressures. The pressure transducer is a sealed factory calibrated unit. It must be replaced if defective. O-ring replacement is required whenever the pressure transducer is serviced. Be sure to use the O-ring specified for the transducer.

A/C SERVICE PORTS

The A/C service port valve cores are located within the A/C lines (Fig. 2). The High Side (Discharge) valve service port is located on the liquid line near the right frame rail. The Low Side (Suction) valve service port is located on the suction line near the compressor.

DESCRIPTION AND OPERATION (Continued)

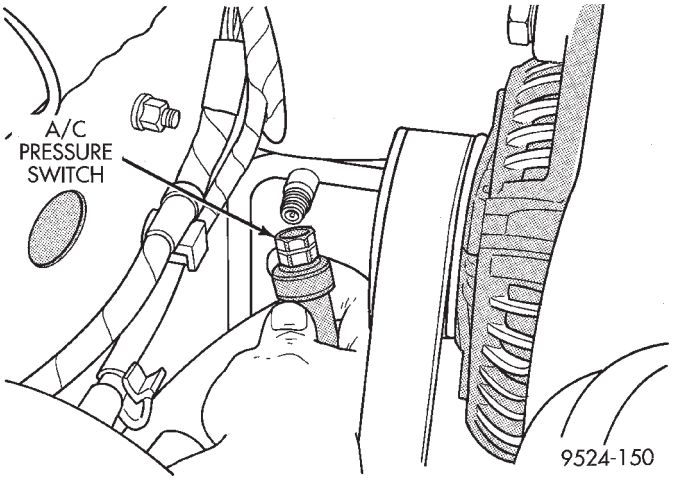

Fig. 1 A/C Pressure Transducer

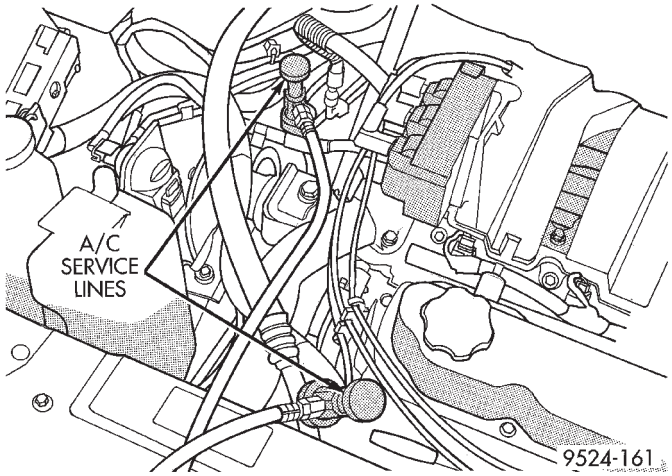

Fig. 2 Valve Service Ports

The High Side service port is a two piece port and is serviceable. The Low Side service port is not serviceable, the suction line would have to be replaced.

REAR BLOWER SPEED SWITCH

The rear blower speed switch controls the rear blower with the choice of low and high speeds. When the switch is on it allows the blower speed switch located on the rear headliner to control rear blower speed. This switch will override the rear headliner blower switch. For operation instructions refer to the Owner's Manual. The rear blower speed switch is serviced separately from the A/C control module. For service procedures, refer to Group 8E, Instrument Panel And Gauges.

COMPRESSOR HIGH-PRESSURE RELIEF VALVE

The High Pressure Relief Valve prevents damage to the air conditioning system if excessive pressure develops. Excessive pressure can be caused by condenser air flow blockage, refrigerant overcharge, or air and moisture in the system.

The high pressure relief valve vents only a small amount of refrigerant necessary to reduce system pressure and then reseats itself. The majority of the refrigerant is conserved in the system. The valve is calibrated to vent at a pressure of 3450 to 4140 kPa (500 to 600 psi). If a valve has vented a small amount of refrigerant, it does not necessarily mean the valve is defective.

The High Pressure Relief Valve is located on the compressor manifold at the discharge passage.

NOTE: Special effort must be used to keep all R-134a system components moisture-free. Moisture in the oil is very difficult to remove and will cause a reliability problem with the compressor.

CONDENSATE DRAIN

Condensation from the evaporator housing is drained through the dash panel and on to the ground. This drain must be kept open to prevent water from collecting in the bottom of the housing.

If the drain is blocked condensate cannot drain, causing water to back up and spill into the passenger compartment. It is normal to see condensate drainage below the vehicle.

ENGINE COOLING SYSTEM REQUIREMENTS

To maintain ample temperature levels from the heating-A/C system, the cooling system must be in proper working order. Refer to Group 0, Lubrication and Maintenance or Group 7, Cooling System of this manual.

The use of a bug screen is not recommended. Any obstructions forward of the condenser can reduce the effectiveness of the air conditioning system.

EVAPORATOR PROBE

The Evaporator probe is located on the HVAC. The probe prevents evaporator freeze-up by signaling the Powertrain Control Module to cycle the compressor ON and OFF. The probe monitors the temperature of the refrigerant after expansion.

The evaporator probe is inserted into the evaporator between the coils. The probe is a sealed unit and cannot be adjusted or repaired. It must be replaced if found defective.

HANDLING TUBING AND FITTINGS

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

DESCRIPTION AND OPERATION (Continued)

absorb moisture readily out of the air. This moisture will convert into acids within a closed system.

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.

HVAC CONTROL MODULE

The HVAC control module regulates the operation of the various actuator motors. The actuator motors are used to move the mode, blend- air, and RECIRC. doors (Fig. 3).

The control module is included in the A/C control head located on the instrument panel. The control head includes the blower speed switch, rear wiper and washer operation, front & rear window defogger, recirculation door operation, and A/C compressor operation if equipped. Refer to Group 8E, Instrument Panel and Systems for service procedures.

NOTE: The RECIRC. function on the HVAC control module automatically defaults to the OFF position after a ignition key cycle. To reactivate the RECIRC. function, the RECIRC. button must be repressed

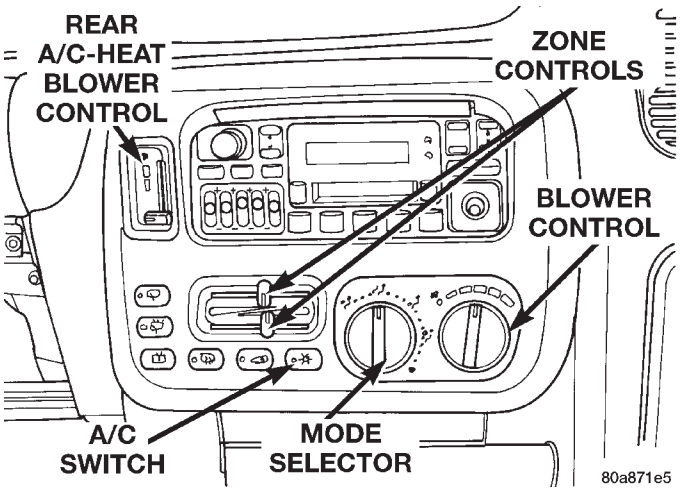

Fig. 3 HVAC Control Module

The rear blower speed switch is serviced separately from the control head.

SIDE DOOR HEATER A/C OUTLETS

The driver's and passenger side doors have supplemental air outlets and duct work. The air is channeled from the instrument panel to the door duct and either to the lower floor or upper door outlets (Fig. 4). The air can be adjusted to blow on the first rear passenger seat(s).

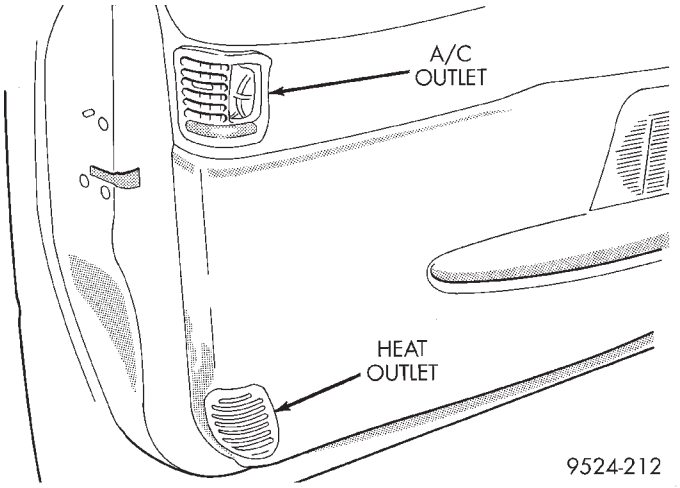

Fig. 4 Door Outlets

SIDE WINDOW DEMISTER

The side window demisters direct air from the heater assembly. The outlets are located on the top forward corners of the front door panels (Fig. 5). The demisters operate when the control mode selector is on FLOOR, MIX or DEFROST setting.

SYSTEM AIRFLOW

The system pulls outside (ambient) air through the cowl opening at the base of the windshield. Then it goes into the plenum chamber above the heater—A/C

DESCRIPTION AND OPERATION (Continued)

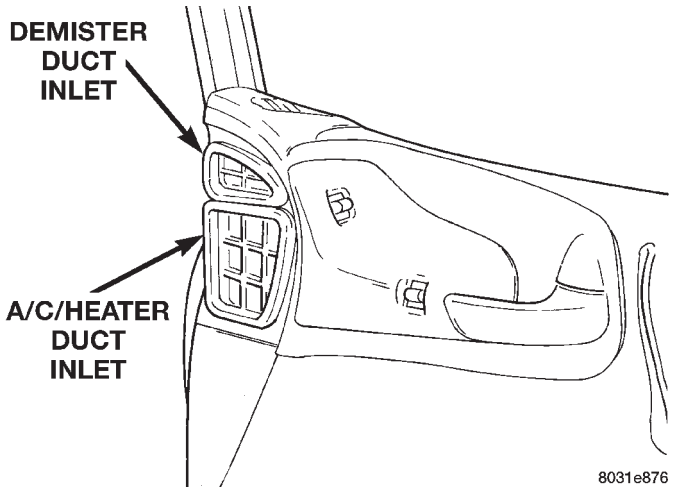

Fig. 5 Demister Inlet

unit housing. On air conditioned vehicles, the air passes through the evaporator. At this point the air flow 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. An optional zone control HVAC control module is available. This unit has dual blend-air doors that can be regulated independently of each other. The temperature setting can be different from driver's side to passenger side. After the air passes the blend-air door(s), the air flow can then be directed from the Panel, Floor, and Defrost outlets. Air flow velocity can be adjusted with the blower speed selector switch on the control head.

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 depressing the Recirc. button on the control head. On air conditioned vehicles, moving the control to Mix or Defrost depresses the A/C button and 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.

CAUTION: In cold weather, use of the Recirculation mode may lead to excessive window fogging. The Recirculation mode is automatically deactivated in Mix and Defrost modes to improve window clearing operation.

SYSTEM OIL LEVEL

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

NOTE: The oil used in the compressor is ND8 PAG R134a refrigerant oil. Only refrigerant oil of the same type should be used to service the system. Do not use any other oil. The oil container should be kept tightly capped until it is ready for use. Tightly cap afterwards to prevent contamination from dirt and moisture. Refrigerant oil will quickly absorb any moisture it comes in contact with. Special effort must be used to keep all R-134a system components moisture-free. Moisture in the oil is very difficult to remove and will cause a reliability problem with the compressor.

It will not be necessary to check oil level in the compressor or to add oil unless there has been an oil loss. Oil loss at a leak point will be evident by the presence of a wet, shiny surface around the leak.

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 R134a refrigerant and operated, the oil in the compressor is dispersed through the lines and components. The evaporator, condenser, and filter-drier will retain a significant amount of oil, refer to the Refrigerant Oil Capacities chart. 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 filter-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 a dual system the evaporator retains 60 ml (2 oz). The condenser retains 30 ml (1 oz) of oil, and system capacity may be 220 ml (7.40 oz) of oil.

220 ml minus 90 ml = 130 ml (4.40 oz).

DESCRIPTION AND OPERATION (Continued)

REFRIGERANT OIL CAPACITIES

Refrigerant Oil Capacities	Front A/C		Dual A/C	
Component	**ml**	**oz**	**ml**	**oz**
Compressor	150 ml	5.0 oz	220 ml	7.4 oz
Filter-Drier	30 ml	1.0 oz	30 ml	1.0 oz
Condenser	30 ml	1.0 oz	30 ml	1.0 oz
Evaporator	60 ml	2.0 oz	60 ml	2 .0 oz
Rear Evap.	N/A	N/A	60 ml	2.0 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 designated for this vehicle is ND8 PAG (polyalkalene glycol).

SERVICING REFRIGERANT OIL LEVEL

(1) Using a refrigerant recovery machine, remove refrigerant from the A/C system.

(2) Remove refrigerant lines from A/C compressor.

(3) Remove compressor from vehicle.

(4) From suction port on top of compressor, drain refrigerant oil from compressor.

(5) Add system capacity minus the capacity of components that have not been replaced through suction port on compressor. Refer to the Refrigerant Oil Capacity Chart.

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

DIAGNOSIS AND TESTING

ACTUATOR CALIBRATION/DIAGNOSTICS AND COOLDOWN TEST

GENERAL INFORMATION

If the HVAC control module is replaced, the Calibration Diagnostic and Cooldown tests will need to be performed. Once this group of tests have successfully passed, they can be performed individually. The engine must be running during the test to provide hot coolant for the heater, A/C compressor operation and to assure that the actuators are calibrated correctly. The HVAC control module is capable of troubleshooting the system in approximately 120 seconds. If a condition is detected, an error code is displayed. The error code cannot be erased until the condition is repaired and the diagnostic test is performed. Check wire before replacing components, refer to Group 8W, Wiring Diagrams.

CAUTION: Do not remove the actuators from the Heater-A/C unit assembly with power applied. Removal should only be done with the Ignition OFF. The actuators have no mechanical stops to limit the travel. If the actuator rotates and is not connected to the unit assembly, it will become out of calibration.

ACTUATOR CALIBRATION

Mode, Blend and Zone (if equipped) door calibration compensates for mechanical variations in the actuators, HVAC control module and its linkages. In-vehicle calibration can be entered from the control's front panel. If the REAR WIPE and INTERMITTENT LED's flash simultaneously when Ignition is cycled ON, the actuators have not been calibrated or during the previous calibration a failure occurred (Fig. 6) and (Fig. 7). Diagnostics will always occur during Calibration Diagnostic and Cooldown test.

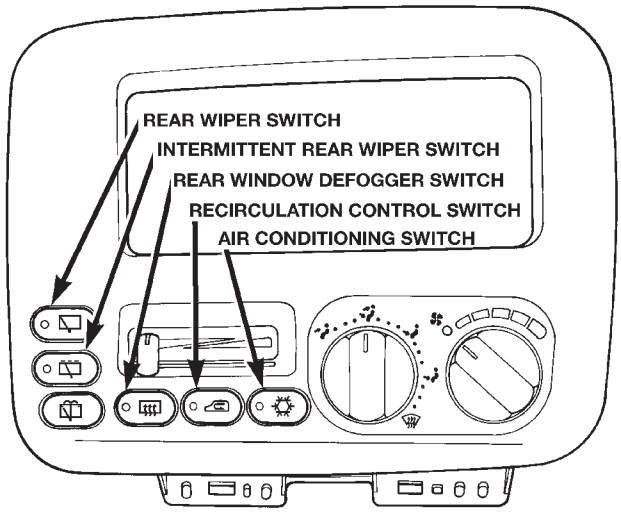

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Fig. 6 Radio Bezel and HVAC Control

DIAGNOSIS AND TESTING (Continued)

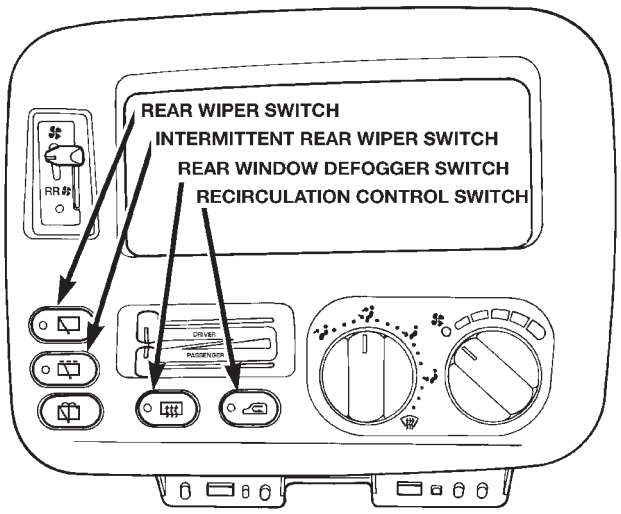


Fig. 7 Radio Bezel and HVAC Control, Rear Blower Motor Switch and Zone Control

DIAGNOSTICS

During the Actuator calibration, diagnostics are performed on the actuators and evaporator temperature Fin Sensor. Once diagnostics are completed the REAR WIPER and INTERMITTENT LED's will flash to indicate either a successful calibration or the appropriate fail code(s). At this time manual testing of the Blend, Mode and Driver (if equipped) potentiometers can be performed. If a failure is detected during Diagnostics a fault will be set in the control. When Ignition is cycled OFF and then ON or Diagnostics is aborted, the REAR WIPER and INTERMITTENT LED's will flash simultaneously showing that a failure has occurred. The control will not indicate the fail code, but only that a failure had occurred during the last diagnostics test. The only way to clear the failure codes is repeat the Calibration Diagnostic and Cooldown test, after all repairs are completed.

COOLDOWN TEST

This test has been designed for performance testing of the A/C system at the manufacturing facility. If the HVAC control module is replaced, the Cooldown test will occur during Calibration test. Cooldown will not occur on Heater Only units. During the Cooldown test the control will monitor the temperature of the Fin Sensor. The A/C system must be able to bring the evaporator temperature down a predetermined minimum amount in less than 2 minutes.

CALIBRATION/COOLDOWN LED DISPLAY CODES

See table for definition of flashing LED's. If no problems are found, the control functions normally.

CALIBRATION/COOLDOWN LED DISPLAY CODES

LED'S	PASS/FAIL	CORRECTIVE ACTION
NO LED'S FLASHING-NORMAL OPERATION	PASSED CALIBRATION, DIAGNOSTICS AND COOLDOWN	NONE
REAR WIPER AND INTERMITTENT LED'S FLASH SIMULTANEOUSLY	FAILED CALIBRATION DIAGNOSTICS	RUN CALIBRATION TEST
A/C AND RECIRC LED'S FLASH SIMULTANEOUSLY	FAILED COOLDOWN	RUN COOLDOWN TEST
REAR WIPER AND INTERMITTENT LED'S ARE FLASHING SIMULTANEOUSLY A/C AND RECIRC LED'S ARE FLASHING SIMULTANEOUSLY	FAILED CALIBRATION, DIAGNOSTICS AND FAILED COOLDOWN TEST	RUN CALIBRATION TEST

CALIBRATION/DIAGNOSTICS TEST ENTRY

TO INITIATE TESTS:

- Set Blower motor ON HIGH
- Set Mode position to Panel
- Open all A/C outlets
- Set Temperature to Cold (Both slide pots if equipped)
- Depress WASH and REAR WIPER button simultaneously for 5 Seconds (Until all LED's light)

RESULTS:

- All LED's will turn on for 5 Seconds
- Calibration Test is running when REAR WIPER and INTERMITTENT are alternately flashing. Cooldown test is running if A/C and RECIRC are alternately flashing.
- Acceptable results is REAR WIPER LED is the only LED flashing. Push Rear Wiper to exit.
- After all tests have passed, Calibration Diagnostics and Cooldown can be run separately.

DIAGNOSIS AND TESTING (Continued)

COOLDOWN TEST ENTRY

TO INITIATE TESTS:

- Set Blower motor ON HIGH
- Set Mode position to Panel
- Open all A/C outlets
- Set Temperature to Cold (Both slide pots if equipped)
- Depress WASH and A/C simultaneously for 5 Seconds

NOTE: Prior to start of test, If the evaporator is already cold, the system will fail test. To correct, operate system with A/C OFF and the blower motor ON high for three minutes prior to starting test.

RESULTS:

- All LED's will turn on for 5 Seconds
- Cooldown Test is running when A/C and RECIRC. are alternately flashing. If A/C and RECIRC. are flashing simultaneously, Cooldown has failed.

CALIBRATION DIAGNOSTICS AND COOLDOWN ABORT

Test can be aborted by doing one of the following:

- Depressing Rear Window Defogger, RECIRC and Rear Wiper buttons.
- Cycling Ignition OFF and then ON.
- Control will automatically abort after 15 minutes from the time Calibration Diagnostics and Cooldown was entered.

The HVAC control module will return to normal operation or may indicate unsuccessful Calibration Diagnostics or Cooldown test by LED's flashing simultaneously.

EEPROM DATA

Calibration Diagnostics, Cooldown Status and evaporator temperature Fin Sensor values are stored in an EEPROM memory internal to the control. The microcomputer within the HVAC control module uses this information:

- To determine if Cooldown needs to run
- For proper position of the Heater-A/C unit assembly doors

ACTUATOR CALIBRATION AND DIAGNOSTICS.

NOTE: Do not run actuators unless they are properly mounted on the HVAC control module.

Actuator end point calibration takes approximately 60 seconds. The REAR WIPER and INTERMITTENT LED's will flash alternately during the test. The control will cycle the Blend actuator(s) to the Heat stop first then back to Cold. After the Blend actuator(s) have been calibrated the Mode actuator will be cycled to Defrost and then to Panel. Successful calibration is defined as actuator travel falling within their minimum and maximum limits.

BLEND/PASSENGER ACTUATOR BACKGROUND

The Blend/Passenger Actuator can move the temperature door in two directions. When the voltage at Pin 12 of the control module is high, about 11.5 volts, and the voltage at Pin 17 is low, about 1.5 volts, the door will move towards the Heat position. When Pin 17 is High and Pin 12 is Low the door will move towards the Cold position. When both Pins are high or both Pins are low, the actuator will not move. The Blend/Passenger feedback signal is a voltage signal that is supplied by the actuator to the control. The signal will be about 4.0 volts in the Heat position and 1.0 volt in the Cold position. As the position of the Blend/Passenger actuator changes, so will the feedback signal. The feedback signal is necessary for the correct positioning of the temperature door.

DRIVER ACTUATOR BACKGROUND

The Driver Actuator can move the temperature door in two directions. When the voltage at Pin 15 of the control module is high, about 11.5 volts, and the voltage at Pin 13 is low, about 1.5 volts the door will move towards the Cold position. When Pin 13 is High and Pin 15 is Low the door will move towards the Heat position. When both Pins are high or when both Pins are low, the actuator will not move. The Driver feedback signal is a voltage signal that is supplied by the actuator to the control. The signal will be about 4.0 volts in the Heat position and 1.0 volt in the Cold position. As the position of the Driver Actuator changes, so will the feedback signal. The feedback signal is necessary for the correct positioning of the temperature door.

MODE ACTUATOR BACKGROUND

The Mode actuator can move the mode door in two directions. When the voltage at Pin 18 of the control module is high, about 11.5 volts, and the voltage at Pin 12 is low, about 1.5 volts the door will move towards the Panel position. When Pin 12 is High and Pin 18 is Low the door will move towards the Defrost position. When both Pin are high or when both Pins are low, the actuator will not move. The Mode door feedback signal is a voltage signal that is supplied by the actuator to the control. The signal will be about 4.5 volts in the Panel position and 0.5 volts in the Defrost position. As the position of the Mode actuator changes, so will the feedback signal. The feedback signal is necessary for the correct positioning of the mode door.

DIAGNOSIS AND TESTING (Continued)

FAIL CODES/LEVEL DISPLAY

Fail Codes/Level are displayed using the REAR WIPER and INTERMITTENT LED's flashing in the sequence indicated below. The REAR WIPER LED represents the Level and the INTERMITTENT LED represents the Value. After Calibration/Diagnostics is completed, the control will begin flashing Level 1 codes. Depressing the WASH button will cycle to Level 2, depressing WASH again will cycle to Level 3. Each time the WASH button is depressed will cycle to the next level. After Level 5 is reached, you will cycle back to Level 1. If the Control is a Heater Only you will only cycle from Levels 1 to 3.

WIPE BUTTON LED

LEVEL	DISPLAY
1	FAIL CODES
2	MODE POTENTIOMETER TEST
3	BLEND/PASS. POTENTIOMETER TEST
4	EVAPORATOR PROBE (A/C AND ZONE UNITS ONLY)
5	DRIVER POTENTIOMETER (ZONE UNITS ONLY)

LEVEL 1–FAILURE CODE VALUES (INTERMITTENT WIPE BUTTON LED)

CODE	DEFINITION
0	PASSED ALL TESTS
1	MODE ACTUATOR DID NOT REACH DEFROST POSITION
2	MODE ACTUATOR DID NOT REACH PANEL POSITION
3	BLEND/PASS. ACTUATOR DID NOT REACH COLD STOP
4	BLEND PASS. ACTUATOR DID NOT REACH HEAT STOP
5	EVAPORATOR PROBE OPEN
6	EVAPORATOR PROBE SHORTED
7	DRIVER ACTUATOR DID NOT REACH COLD STOP
8	ZONE/DRIVER ACTUATOR DID NOT REACH HEAT STOP
9	CONTROL HEAD INTERNAL FAILURE

TEMPERATURE AND MODE POTENTIOMETER DIAGNOSTICS

The Temperature and Mode Potentiometer can be tested after calibration is complete by pressing the WASH button and cycling to Levels 2, 3 or 5 as displayed by the REAR WIPER LED. On Heater Only units you can only cycle to Levels 2 and 3. In each individual test the INTERMITTENT LED flash rate will change as the Temperature or Mode potentiometer is moved from one end to the other, see Potentiometer vs. Position and Flash Rate table.

POTENTIOMETER VS. POSITION AND FLASH RATE

POTENTIOMETER	INTERMITTENT LED FASTER FLASH RATE	INTERMITTENT LED SLOWER FLASH RATE
MODE	PANEL	DEFROST
BLEND/PASS.	HOT	COLD
DRIVER	HOT	COLD

EVAPORATOR PROBE TEMPERATURE DIAGNOSTICS

The evaporator probe can be tested by using the INTERMITTENT LED to display the actual temperature the sensor is reading. The HVAC control module can only display temperatures from 1 to 99 degrees. To read the temperature, perform the following:

- Set Blower motor to any speed other than OFF
- Set A/C to ON, if A/C Clutch does not engage make sure Fail Codes 5 and 6 are cleared.To clear the error code 5 and 6 the evaporator probe and/or the wiring repair needs to be completed. Then, press and hold the intermittent wipe button for 5 seconds.
- Run Diagnostics (Depress REAR WIPER and REAR WASH)
- When Diagnostics is complete, Cycle to Level 4. Display Sequence is as follows:
- REAR WIPER LED will display the Level
- INTERMITTENT LED will display ten's digit
- Short Pause
- INTERMITTENT LED will display the one's digit.

The HVAC control module will continue to cycle the Level and then Temperature until the level is changed or Calibration Diagnostics and Cooldown test is exited.

HVAC CONTROL DIAGNOSTIC CONDITIONS

For wiring circuits, wiring connectors, and Pin numbers, refer to Group 8W, Wiring Diagrams.

After calibration, Rear Wiper LED flashing once, Intermittent LED not flashing.

The system has passed calibration. Press the Rear Wiper button to exit calibration.

DIAGNOSIS AND TESTING (Continued)

After calibration, Rear Wiper LED flashing once, Intermittent LED flashing once. The mode actuator did not reach defrost position.

(1) Using a voltmeter, check the mode door actuator wiring connector. Check Pin 1 for battery voltage. Move the HVAC control from the defrost to panel position, and check Pin 6 voltage it should change from 0.5 - 1 volts to 3.5 - 4.5 volts. If voltage is OK, go to Step 2. If not OK, check for loose or corroded connector, open or shorted circuit and repair as necessary.

(2) Remove actuator, and check if the gear pins are in the correct track on cam or if they are binding. If OK, go to Step 3. If not OK, repair as necessary.

(3) Check for binding door, if door is binding repair as necessary. If gears and door are OK, replace actuator.

(4) Once repairs are completed repeat the Calibration Diagnostic and Cooldown test. Repeating the test is necessary to clear the fault codes.

After calibration, Rear Wiper LED flashing once, Intermittent LED flashing twice. The mode actuator did not reach panel position.

(1) Using a voltmeter, check the mode door actuator wiring connector. Check Pin 1 for battery voltage. Move the HVAC control from panel to defrost position, and check Pin 6 voltage it should change from 3.5 - 4.5 volts to 0.5 - 1 volts. If voltage is OK, go to Step 2. If not OK, check for loose or corroded connector, open or shorted circuit and repair as necessary.

(2) Remove actuator, and check if the gear pins are in the correct cam track or binding. If OK, go to Step 3. If not OK, repair as necessary.

(3) Check for binding door, if door is binding repair as necessary. If gears and door are OK, replace actuator.

(4) Once repairs are completed repeat the Calibration Diagnostic and Cooldown test. Repeating the test is necessary to clear the fault codes.

After calibration, Rear Wiper LED flashing once, Intermittent LED flashing three times. The main temperature actuator/passenger temperature actuator on a zone system did not reach cold stop.

(1) Check if the correct HVAC control module was used.

(2) Using a voltmeter, check the temperature door actuator wiring connector. Check Pin 1 for battery voltage. Move the HVAC control from the cold to hot position, and check Pin 5 voltage it should change from 0.5 - 4 volts to 3.5 - 4.5 volts. If voltage is OK, go to Step 3. If not OK, check for loose or corroded connector, open or shorted circuit and repair as necessary.

(3) Remove actuator, and check if gear pins are in the correct cam track or binding. If OK, go to Step 4. If not OK, repair as necessary.

(4) Check for binding door, if door is binding repair as necessary. If gears and door are OK, replace actuator.

(5) Once repairs are completed repeat the Calibration Diagnostic and Cooldown test. Repeating the test is necessary to clear the fault codes.

After calibration, Rear Wiper LED flashing once, Intermittent LED flashing four times. The main temperature actuator/passenger temperature actuator on a zone system did not reach hot stop.

(1) Check if the correct HVAC control module was used.

(2) Using a voltmeter, check the temperature door actuator wiring connector. Check Pin 1 for battery voltage. Move the HVAC control from hot to cold position and check Pin 5 voltage it should change from 3.5 -4.5 volts 0.5 - 1.5 volts. If voltage is OK, go to Step 3. If not OK, check for loose or corroded connector, open or shorted circuit and repair as necessary.

(3) Remove actuator, and check if the gear pins are in the correct track on cam or if they are binding. If OK, go to Step 4. If not OK, repair as necessary.

(4) Check for binding door, if door is binding repair as necessary. If gears and door are OK, replace actuator.

(5) Once repairs are completed repeat the Calibration Diagnostic and Cooldown test. Repeating the test is necessary to clear the fault codes.

After calibration, Rear Wiper LED flashing once, Intermittent LED flashing five times. The evaporator probe is open.

(1) Using a voltmeter, check Pin 1 of the evaporator probe wiring connector for 0.1 - 4.75 volts. If OK, go to Step 2. If not OK, if greater than 4.75 volts check for loose or corroded connector, open circuit and repair as necessary.

(2) Using a ohmmeter, check Pin 2 for a good ground, If OK, go to Step 3. If not OK, check for loose or corroded connector, open or shorted circuit and repair as necessary.

(3) If ground and power circuit are OK, replace Evaporator Probe.

(4) Once repairs are completed, press the intermittent button about 5 seconds until all LED's light to remove fault code from memory. Then repeat the Calibration Diagnostic and Cooldown test. Repeating the test is necessary to clear the fault codes.

DIAGNOSIS AND TESTING (Continued)

After calibration, Rear Wiper LED flashing once, Intermittent LED flashing six times. The evaporator probe is shorted.

(1) Using a voltmeter, check Pin 1 of the evaporator probe wiring connector for 0.1 - 4.75 volts. If OK, go to Step 2. If less than 0.1 volts, check for loose or corroded connector, open or shorted circuit and repair as necessary.

(2) Using a ohmmeter, check Pin 2 for a good ground, If OK, go to Step 3. If not OK, check for shorted circuit and repair as necessary.

(3) If ground and power circuit are OK, replace Evaporator Probe

(4) Once repairs are completed, press the intermittent button about 5 seconds until all LED's light to remove fault code from memory. Then repeat the Calibration Diagnostic and Cooldown test. Repeating the test is necessary to clear the fault codes.

After calibration, Rear Wiper LED flashing once, Intermittent LED flashing seven times. The Driver's temperature actuator on a zone system did not reach cold stop.

(1) Check if the correct HVAC control module was used.

(2) Using a voltmeter, check at the temperature door actuator wiring connector, check Pin 1 for battery voltage. Move the HVAC control from cold to the hot position, check Pin 4 voltage it should change from 0.5 - 1.5 volts 3.5 - 4.5 volts. If voltage is OK, go to Step 3. If not OK, check for loose or corroded connector, open or shorted circuit and repair as necessary.

(3) Remove actuator, and check if the gear pins are in the correct track on cam or if they are binding. If OK, go to Step 4. If not OK, repair as necessary.

(4) Check for binding doors, if door are binding repair as necessary. If gears and door are OK, replace actuator.

(5) Once repairs are completed repeat the Calibration Diagnostic and Cooldown test. Repeating the test is necessary to clear the fault codes.

After calibration, Rear Wiper LED flashing once, Intermittent LED flashing eight times. The Driver's temperature actuator on a zone system did not reach hot stop.

(1) Check if the correct HVAC control module was used.

(2) Using a voltmeter, check at the temperature door actuator wiring connector, check Pin 1 for battery voltage. Move the HVAC control from hot to cold position, Pin 4 voltage it should change from 3.5 - 4.5 volts to 0.5 - 1.5 volts. If voltage is OK, go to Step 3. If not OK, check for loose or corroded connector, open or shorted circuit and repair as necessary.

(3) Remove actuator, and check if the gear pins are in the correct track on cam or if they are binding. If OK, go to Step 4. If not OK, repair as necessary.

(4) Check for binding door, if door is binding repair as necessary. If gears and door are OK, replace actuator.

(5) Once repairs are completed repeat the Calibration Diagnostic and Cooldown test. Repeating the test is necessary to clear the fault codes.

After calibration, Rear Wiper LED flashing once, Intermittent LED flashing nine times. The HVAC control module, has a internal failure.

(1) Replace the HVAC control module.

(2) Once repairs are completed repeat the Calibration Diagnostic and Cooldown test. Repeating the test is necessary to clear the fault codes.

After calibration and testing the A/C and RECIRC LED flashing simultaneously. Failed Cooldown test.

(1) Determine if the refrigerant system is operating correctly:

- Check the outlet air temperature
- Feel the compressor suction plumbing, is it hot?

(2) If not OK, go to Step 3. If OK, repeat the Calibration Diagnostic and Cooldown test.

(3) If system does not seem to be operating correctly, perform diagnostics for poor performance:

- Low refrigerant charge
- No charge
- Compressor not operating

Verify that the test was done with the evaporator at room temperature. The test consists of starting the compressor and measuring the time it takes for the evaporator temperature to fall 7°C (20°F). If the compressor has been running, the evaporator is cold already and will not be capable of falling 7°C (20°F). If the test was run with a cold evaporator, turn A/C off and turn the blower motor switch to high position for 3 to 5 minutes till the evaporator is to room temperature. Then repeat the Calibration Diagnostic and Cooldown test.

If refrigerant system is performing properly and the system will not pass test. Repeat the Calibration Diagnostic and Cooldown test to determine if the evaporator temperature FIN sensor has developed an open or a short circuit. If the HVAC control module still passes Calibration test, verify Cooldown test manually with a pocket thermometer. The outlet air temperature must drop at least 7°C (20°F) within two minutes. If the vehicle passes with the manual thermometer, take HVAC control to level 4 (evaporator probe temperature readout) and repeat the Cooldown test. Ensure the evaporator is at room temperature before starting test. Check if evaporator

DIAGNOSIS AND TESTING (Continued)

probe will drop the temperature 7°C (20°F) in two minutes. If the Evaporator Probe is found to be faulty, check that the sensor is positioned in the evaporator fins properly. If not, correct and repeat test. If OK, replace the evaporator probe.

Once the repairs are completed, repeat the Calibration Diagnostic and Cooldown test. Repeating the test is necessary to clear the fault codes.

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 evaporators ability to absorb heat. During periods of high heat and humidity, an air conditioning system will be less effective. With the instrument control 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.

(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.

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

(5) Insert a thermometer 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 A/C Performance Temperatures table.

(7) If the discharge air temperature fails to meet the specifications in the performance temperature chart. Refer to the Refrigerant Service Procedures for further diagnosis.

A/C PRESSURE TRANSDUCER

The work area temperature must not be below 10°C (50°F) to test the compressor clutch circuit. Before starting to test the transducer ensure that the wire connector is clean of corrosion and connected properly.

(1) With gear selector in park or neutral and park brake set, start engine and allow to idle.

(2) Install scan tool (DRB):

- Go to main menu
- Select stand alone scan tool (DRB)
- Select refer to the proper year diagnostics
- Select climate control
- Select sensor display
- Select A/C high side volts

For A/C system to operate a voltage between .451 (Low Pressure Cutout) to 4.519 (High Pressure Cutout is required. Voltages outside this range indicate a low or high pressure condition and **will not** allow the compressor to cycle.

Refer to the A/C Pressure Transducer Voltage table for the appropriate condition(s):

A/C PERFORMANCE TEMPERATURES

AMBIENT TEMPERATURE	21°C (70°F)	26.5°C (80°F)	32°C (90°F)	37°C (100°F)	43°C (110°F)
AIR TEMPERATURE AT LEFT CENTER PANEL OUTLET	1-8°C (34-46°F)	3-9°C (37-49°F)	4-10°C (39-50°F)	6-11°C (43-52°F)	7-18°C (45-65°F)
COMPRESSOR DISCHARGE PRESSURE AFTER THE FILTER DRIER	1034-1724 kPa (150-250 PSI)	1517-2275 kPa (220-330 PSI)	1999-2620 kPa (290-380 PSI)	2068-2965 kPa (300-430 PSI)	2275-3421 kPa (330-496 PSI)
EVAPORATOR SUCTION PRESSURE	103-207 kPa (15-30 PSI)	117-221 kPa (17-32 psi)	138-241 kPa (20-35 PSI)	172-269 kPa (25-39 PSI)	207-345 kPa (30-50 PSI)

DIAGNOSIS AND TESTING (Continued)

A/C PRESSURE TRANSDUCER VOLTAGE

VOLTAGE	CONDITION
0	TRANSDUCER FAULTY OR NO VOLTAGE FROM PCM
.150 TO .450	TRANSDUCER GOOD/LOW PRESSURE CUTOUT CONDITION
.451 TO 4.519	NORMAL OPERATING CONDITION
4.520 TO 4.850	TRANSDUCER GOOD/HIGH PRESSURE CUTOUT CONDITION
5	TRANSDUCER FAULTY

BLOWER MOTOR AND WHEEL ASSEMBLY

VIBRATION AND/OR NOISE DIAGNOSIS

The blower speed switch, in conjunction with the resistor block, supplies the blower motor with varied voltage.

CAUTION: Stay clear of the blower motor and resistor block (Hot). Do not operate the blower motor with the resistor block removed from the heater A/C housing.

Refer to the Blower Motor Vibration/Noise chart in this section for diagnosis.

COMPRESSOR NOISE DIAGNOSIS

Excessive noise while the A/C is being used, can be caused by loose mounts, loose clutch, or high operating pressure. Verify compressor drive belt condition, proper refrigerant charge and head pressure before compressor repair is performed.

If the A/C drive belt slips at initial start-up, it does not necessarily mean the compressor has failed.

With the close tolerances of a compressor it is possible to experience a temporary lockup. The longer the A/C system is inactive, the more likely the condition to occur.

This condition is the result of normal refrigerant movement within the A/C system caused by temperature changes. The refrigerant movement may wash the oil out of the compressor.

COMPRESSOR CLUTCH/COIL

The air conditioning compressor clutch electrical circuit is controlled by the Powertrain Control Module. It is located in the engine compartment outboard of the battery.

If the compressor clutch does not engage verify refrigerant charge.

If the compressor clutch still does not engage check for battery voltage at the pressure transducer located on the liquid line. If voltage is not detected, refer to:

- Group 8W, Wiring diagrams.
- Powertrain Diagnostic Procedures manual for diagnostic information.

If voltage is detected at the pressure transducer, connect pressure transducer and check for battery voltage between the compressor clutch connector terminals.

If voltage is detected, perform A/C Clutch Coil Tests.

TESTS

(1) Verify battery state of charge. (Test indicator in battery should be green).

(2) Connect an ampmeter (0-10 ampere scale) in series with the clutch coil terminal. Use a voltmeter (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 two volts of the battery voltage. If the A/C clutch does not engage, test the fuse.

(5) The A/C clutch coil is acceptable if the current draw is 2.0 to 3.7 amperes at 11.5-12.5 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 4 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.

EXPANSION VALVE

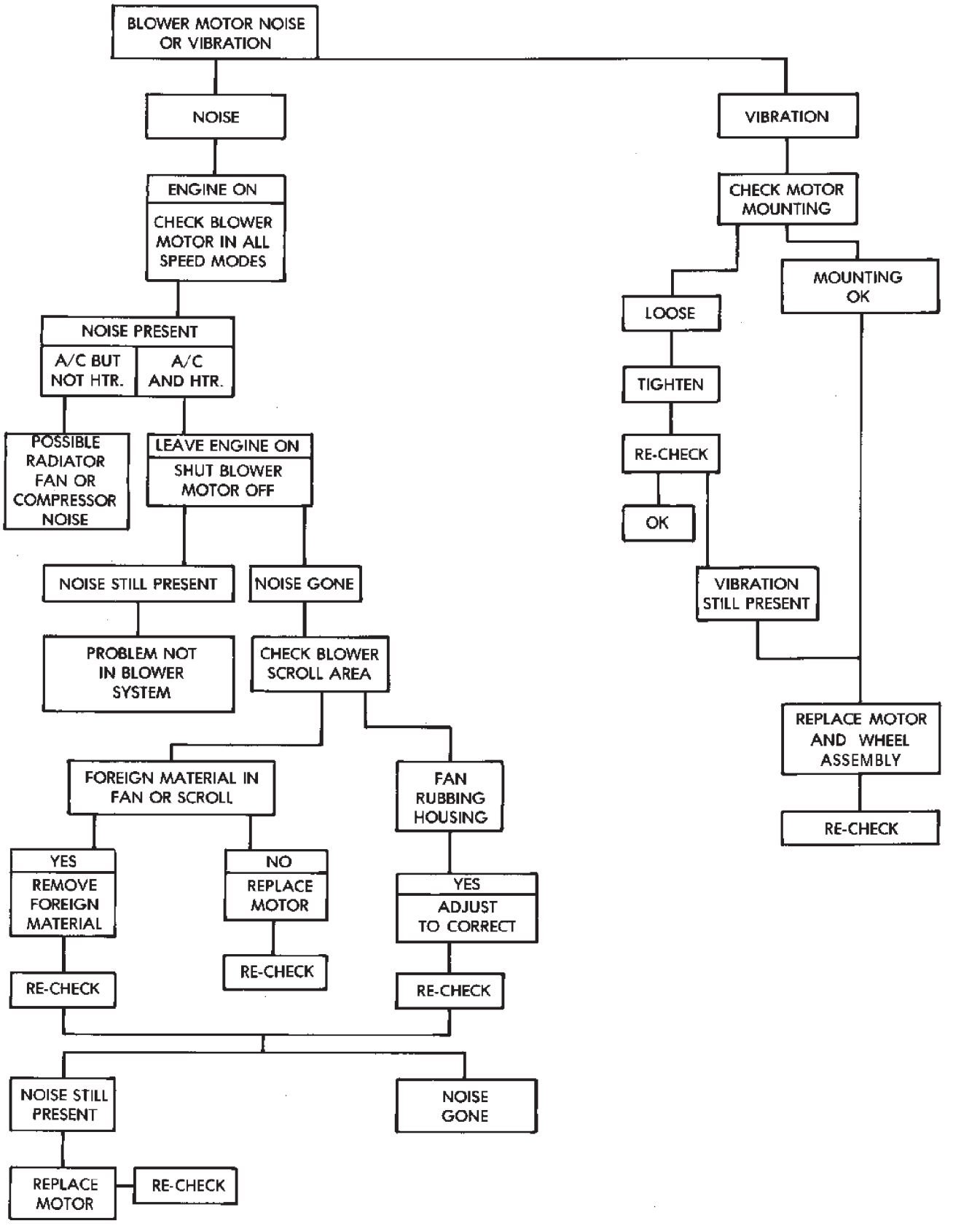
NOTE: Special effort must be used to keep all R-134a system components moisture-free. Moisture in the oil is very difficult to remove and will cause a reliability problem with the compressor.

TESTS

NOTE: Expansion valve tests should be performed after compressor tests.

Review Safety Precautions and Warnings in this group. The work area and vehicle temperature must

DIAGNOSIS AND TESTING (Continued)



Blower Motor Noise/Vibration Diagnosis

DIAGNOSIS AND TESTING (Continued)

be 21°C to 27°C (70°F to 85°F). To test the expansion valve:

NOTE: Liquid CO2 is required to test the expansion valve. It is available from most welding supply facilities. CO2 is also available from companies which service and sell fire extinguishers.

(1) Connect a charging station or manifold gauge set to the refrigerant system service ports. Verify the refrigerant charge level.
(2) Close all doors, windows and vents to the passenger compartment.
(3) Set heater A/C control to A/C, full heat, FLOOR, and high blower.
(4) Start the engine and allow to idle (1000 rpm). After the engine has reached running temperature, allow the passenger compartment to heat up. This will create the need for maximum refrigerant flow into the evaporator.
(5) If the refrigerant charge is sufficient, discharge (high pressure) gauge should read 965 to 1655 kPa (140 to 240 psi). Suction (low pressure) gauge should read 140 kPa to 207 kPa (20 psi to 30 psig). If system cannot achieve proper pressure readings, replace the expansion valve. If pressure is correct, proceed with test.

WARNING: PROTECT SKIN AND EYES FROM CONTACTING CO2 PERSONAL INJURY CAN RESULT.

(6) If suction side low pressure is within specified range, freeze the expansion valve control head for 30 seconds. Use a super cold substance (liquid CO2). **Do not spray R-134a or R-12 Refrigerant on the expansion valve for this test.** Suction side low pressure should drop by 10 psi. If not, replace expansion valve.
(7) Allow expansion valve to thaw. The low pressure gauge reading should stabilize at 140 kPa to 240 kPa (20 psi to 30 psig). If not, replace expansion valve.
(8) When expansion valve test is complete, test A/C overall performance. Remove all test equipment before returning vehicle to use.

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.

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 TEMPERATURE		MINIMUM FLOOR OUTLET TEMPERATURE	
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, Cooling Systems 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.

DIAGNOSIS AND TESTING (Continued)

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) Faulty blend-air door motor.
(3) Improper engine coolant temperature.
(4) Faulty Instrument Panel Control.

SYSTEM CHARGE LEVEL TEST

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

NOTE: The amount of R134a refrigerant that the air conditioning system holds is:

- Without rear A/C– .96 kg (34 oz. or 2.13 lbs.)
- With Rear A/C– 1.36 kg (48 oz. or 3.00 lbs.)

NOTE: Low Charge, condition may be described as:

- **Loss of A/C performance**
- **Fog from A/C outlets**
- **evaporator may have a HISS sound**

There are two different ways the system can be tested:

- With a scan tool (DRB), thermocouple and the Charge Determination Graph. Use the scan tool (DRB) diagnostic topic: Engine–System Monitors, A/C Pressure.
- Using a manifold gauge set, a thermocouple and the Charge Determination Graph.

It is recommended to use the gauges or reclaim/recycle equipment.

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.

(1) Establish your preferred method of measuring liquid line pressure. Use a manifold gauge set or a DRB scan tool.

(2) Attach a clamp-on thermocouple (P.S.E. 66-324-0014 or 80PK-1A) or equivalent to the liquid line. It must be placed as close to the A/C Pressure Transducer as possible to observe liquid line temperature. Refer to “Thermocouple Probe” in this section for more information on probe.

(3) The vehicle must be in the following modes:

- Transaxle in Park
- Engine Idling at 700 rpm
- A/C Controls Set to Outside Air
- Panel Mode
- Full Cool
- High Blower motor, (vehicle equipped with rear A/C turn rear blower motor ON HIGH)
- A/C Button in the ON position
- Vehicle Windows Open.
- Recirc. button turned OFF

(4) Operate system for a couple of minutes to allow the system to stabilize.

(5) Set system pressure to about 1793 kPa (260 psi) by placing a piece of cardboard over part of the front side of the condenser. To place cardboard properly, remove the upper radiator-condenser cover. Insert cardboard between condenser and radiator front. This will maintain a constant pressure.

(6) Observe Liquid Line pressure and Liquid line temperature. Using the **Charge Determination Chart** determine where the system is currently operating. If the system is in the undercharged region, ADD 0.057 Kg. (2 oz.) to the system and recheck readings. If the system is in the overcharged region, RECLAIM 0.057 Kg. (2 oz.) from the system and recheck readings. Continue this process until the system readings are in the proper charge area on the **Charge Determination Chart**.

(7) The same procedure can be performed using the scan tool (DRB). To determine liquid line pressure, attach the scan tool, go to System Monitors–A/C Pressure. Observe liquid line pressure from A/C Pressure Transducer on digital display and digital thermometer. Refer to **Charge Determination Chart** and determine where the system is operating.

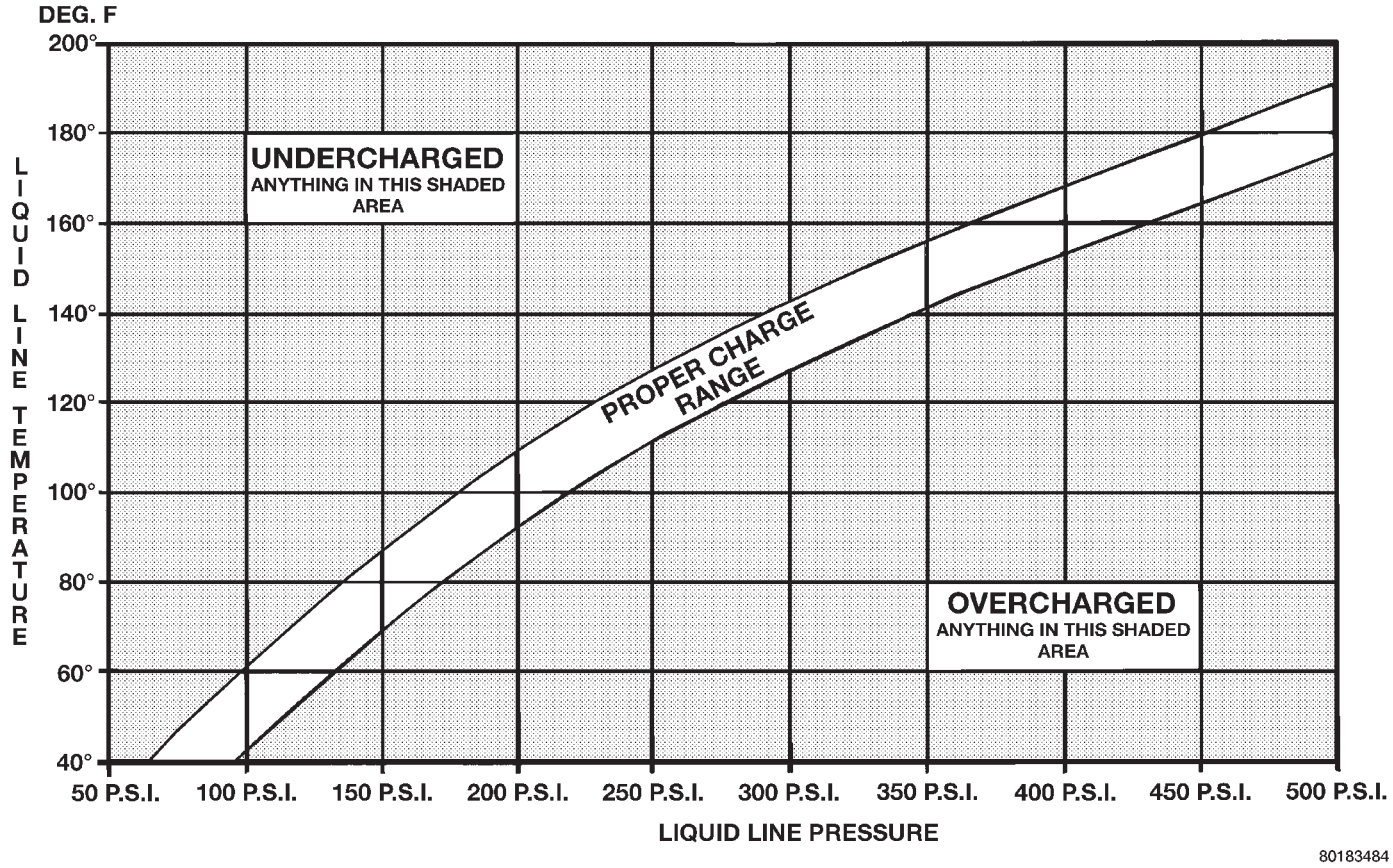
SERVICE PROCEDURES

R-134a REFRIGERANT

This vehicle uses a new type of refrigerant called R-134a. It is a non-toxic, non-flammable, clear colorless liquefied 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 to sludge and/or poor performance. **Never add any other type of refrigerant to a system designed to use R-134a refrigerant. System failure will occur.**

SERVICE PROCEDURES (Continued)



Charge Determination Chart

The high pressure service port is located on the liquid line near the strut tower. The low pressure service port is located on the suction line near the compressor manifold.

When servicing a system, it is required that an air conditioning charging recovery/recycling machine be used (Fig. 8). 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. 9) 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 to use the oil that is specified on the under hood label.

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

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

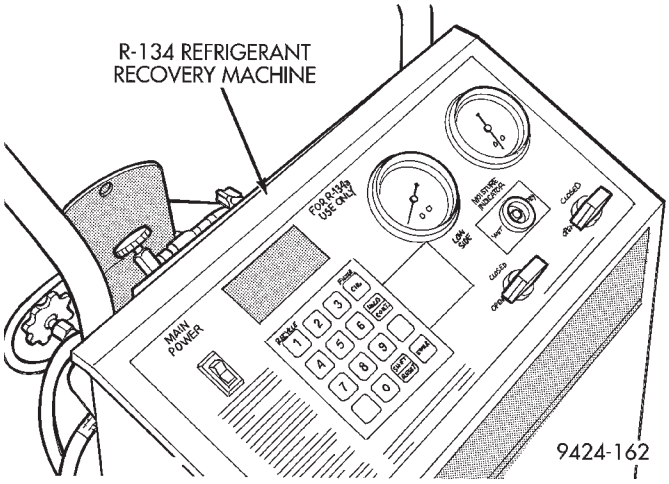


Fig. 8 Refrigerant Recovery/Recycling Station (Typical)

CHARGING REFRIGERANT SYSTEM

CAUTION: Do not overcharge refrigerant system, as excessive compressor head pressure can cause noise and system failure.

After the system has been tested for leaks and evacuated, a refrigerant (R-134a) charge can be injected into the system.

SERVICE PROCEDURES (Continued)

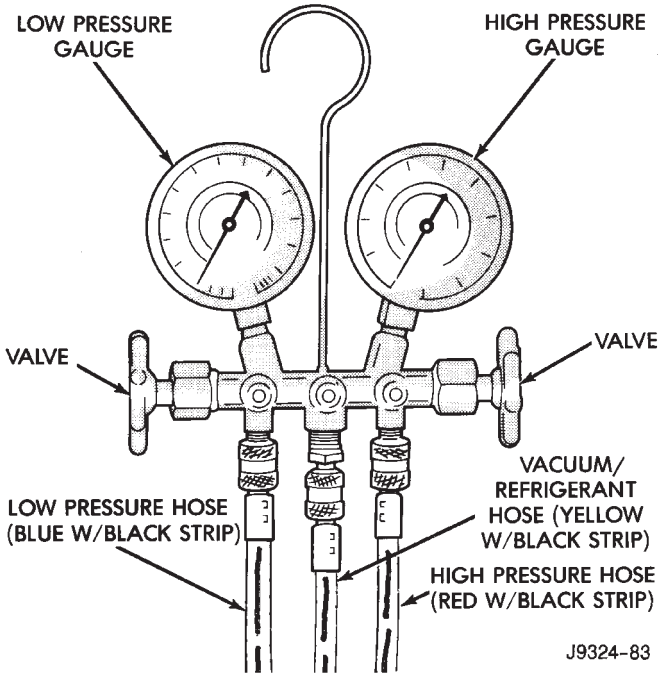


Fig. 9 Manifold Gauge Set- Typical

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 manifold gauge set.

(2) Measure refrigerant (refer to capacities) and heat to 52°C (125°F) with the charging station. Refer to the instructions provided with the equipment being used.

REFRIGERANT CAPACITIES

- Without Rear A/C = .96 kg (34 oz. or 2.13lb.)
- With Rear A/C = 1.36 kg (48 oz. or 3.00 lb.)

(3) Open the suction and discharge valves. Open the charge valve to allow the heated refrigerant to flow into the system. When the transfer of refrigerant has stopped, close the suction and discharge valve.

(4) If all of the charge did not transfer from the dispensing device, run engine at a high idle (1400 rpm). Set the A/C control to A/C, low blower speed, and open windows. If the A/C compressor does not engage, test the compressor clutch control circuit and correct any failure. Refer to Group 8W, Wiring Diagrams.

(5) Open the suction valve to allow the remaining refrigerant to transfer to the system.

WARNING: TAKE CARE NOT TO OPEN THE DISCHARGE (HIGH-PRESSURE) VALVE AT THIS TIME.

(6) Close all valves and test the A/C system performance.

(7) Disconnect the charging station or manifold gauge set. Install the service port caps.

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:

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 suitable charging station, refrigerant recovery machine, and a manifold gauge set with vacuum pump (Fig. 10).

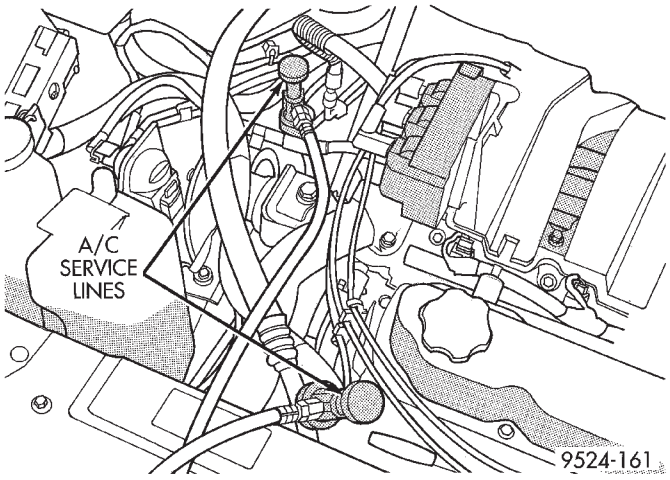


Fig. 10 Refrigerant Recovery Machine Hookup

(2) Open the suction and discharge valves and start the vacuum pump. The vacuum pump should run a minimum of 45 minutes prior to charge to

SERVICE PROCEDURES (Continued)

eliminate all moisture in system. When the 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.

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 to can be ordered through Professional Service Equipment program.

STICKING HVAC CONTROL MODULE PUSH BUTTONS

To service HVAC control module push buttons that are sticking, spray between the buttons with Mopar® MP-50. The MP-50 is a all purpose lubricant for mechanical and electrical uses. After spraying around the push buttons wipe any excess off the radio bezel and HVAC control module push buttons. Operate the buttons to ensure that they are operating freely.

SYSTEM LEAK CHECKING

WARNING: 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.

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 207 kPa (30 psi) proceed to Empty Refrigerant System Leak Test. If liquid line pressure is greater than 207 kPa (30 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.

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.

EMPTY REFRIGERANT SYSTEM LEAK TEST

(1) Evacuate the refrigerant system to the lowest degree of vacuum possible (about 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 two of Low Refrigerant Level Leak Test.

LOW REFRIGERANT LEVEL LEAK TEST

(1) Determine if there is any (R-134a) refrigerant in the system. Use the scan tool (DRB) under the menu Systems Sensors–A/C Pressure test or pressure gauge liquid line temperature partial charge check. See system charge level check or fill for procedure.

(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:

SERVICE PROCEDURES (Continued)

- Transaxle in Park
- Engine Idling at 700 rpm
- A/C Controls Set in 100 percent outside air
- Full Panel Mode
- Blower motor ON HIGH
- A/C in the ON position
- Front Windows Open.
- Rear Air Off (If Equipped)

CAUTION: A leak detector designed for R-12 refrigerant 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 recirculating air door opening or a heat duct.

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

REMOVAL AND INSTALLATION

A/C PRESSURE TRANSDUCER

REMOVAL

(1) Disconnect the wire connector at the pressure transducer.

(2) Using an open end wrench, remove the transducer from the liquid line (Fig. 11).

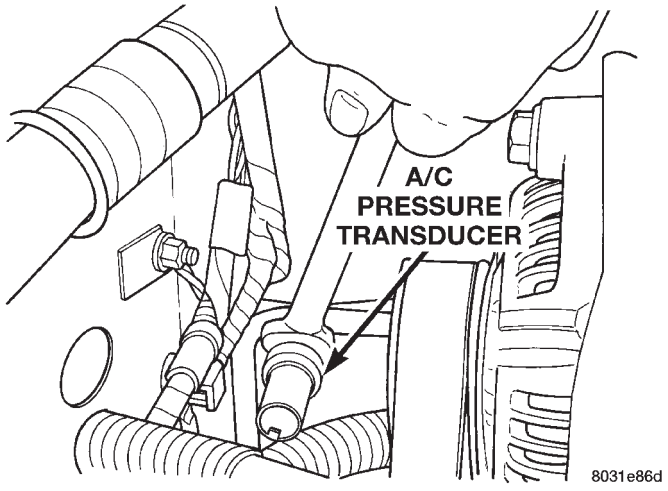


Fig. 11 A/C Pressure Transducer Removal

INSTALLATION

(1) Replace transducer O-ring.

(2) For installation, reverse the above procedures.

A/C SERVICE PORTS

WARNING: THE REFRIGERATION SYSTEM MUST BE COMPLETELY EMPTY BEFORE PROCEEDING WITH THIS OPERATION.

The High Side service port is serviceable, the Low Side is not serviceable.

REMOVAL

(1) Disconnect the battery negative cable.

(2) Recover A/C system refrigerant.

(3) Unscrew the High Side service port from the liquid line.

(4) Remove O-ring

INSTALLATION

For installation, reverse the above procedures.

- **Install new O-ring.**
- Evacuate and recharge A/C system.

BLEND-AIR DOOR ACTUATOR

REMOVAL

The air conditioning system can be equipped with either a standard, single blend-air door actuator, or it can be equipped with dual actuators. The dual system has separate blend-air controls. This allows for separate control of the driver's side air, and the passenger side air (Fig. 12).

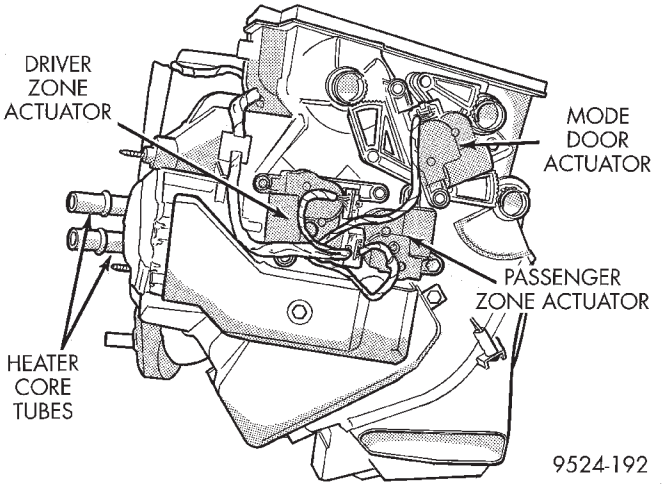


Fig. 12 Side View Of HVAC With Actuators

(1) Remove the lower left side steering column cover. Refer to Group 8E, Instrument Panel and Systems.

(2) Remove ABS control module (Fig. 13).

(3) Remove blend-air actuator connector.

(4) Remove blend-air actuator (Fig. 14).

INSTALLATION

(1) For installation, reverse the above procedures.

REMOVAL AND INSTALLATION (Continued)

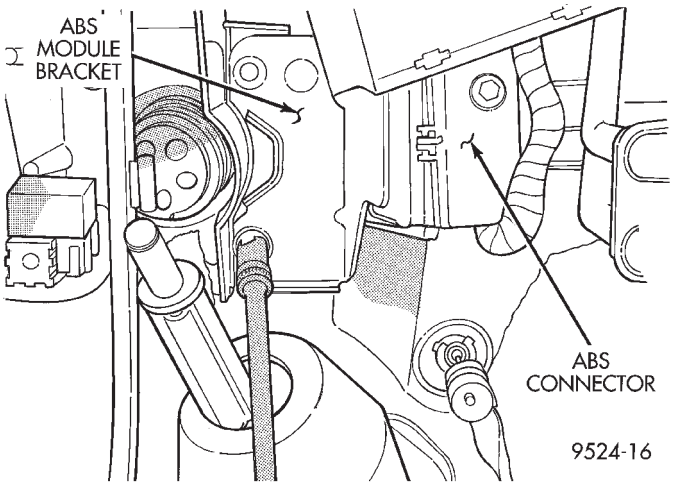


Fig. 13 ABS Control Module

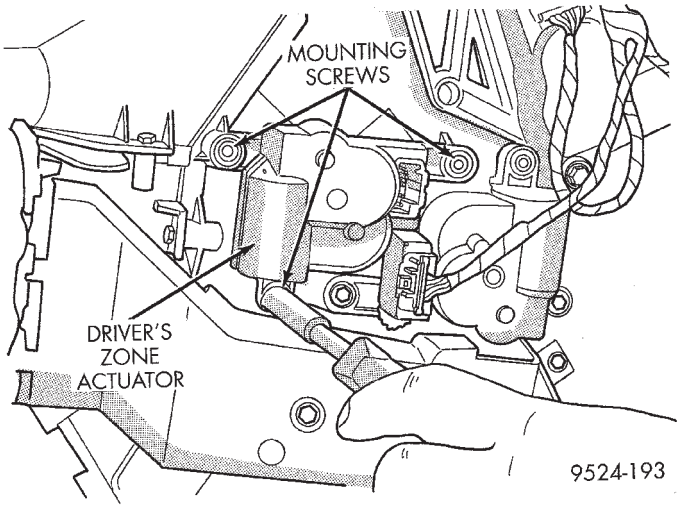


Fig. 14 Blend-Air Actuator

(2) Perform the HVAC Control Calibration Diagnostic and Cooldown test. Repeating the test is necessary to clear the fault codes.

BLOWER MOTOR AND WHEEL ASSEMBLY

REMOVAL

(1) Remove glove box. Refer to Group 8E, Instrument Panel and Systems.

(2) Remove (4) hex head screws to blower motor cover (Fig. 15).

(3) Disconnect blower motor wiring.

(4) Remove grommet for wiring (Fig. 16). Feed wiring through blower housing (Fig. 17).

(5) Remove mounting screws for blower motor (Fig. 18).

(6) Allow the blower assembly to drop down, and remove assembly from vehicle.

INSTALLATION

For installation, reverse the above procedures.

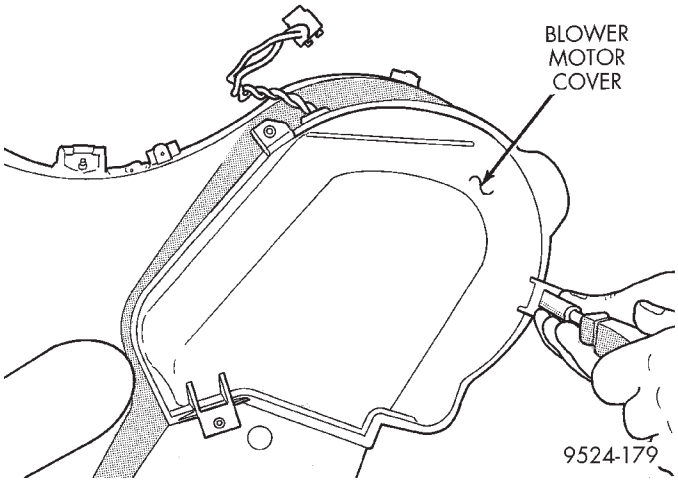


Fig. 15 Blower Motor Cover

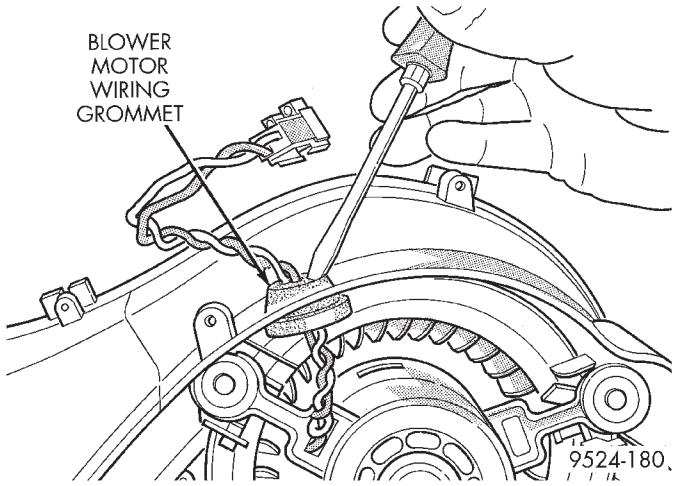


Fig. 16 Wiring Grommet

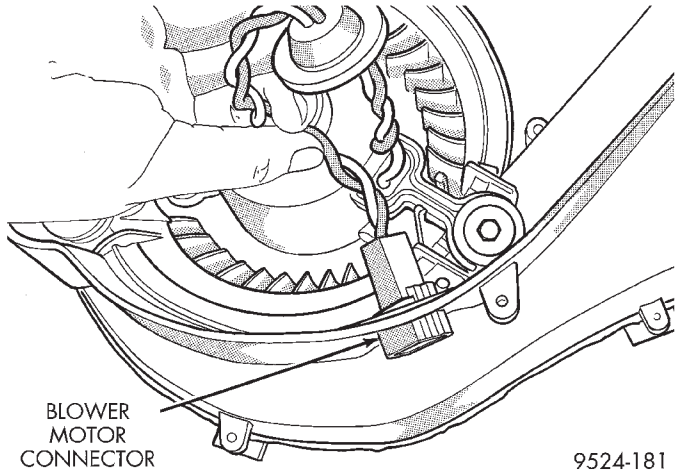


Fig. 17 Feeding Wiring Through Housing

BLOWER MOTOR RESISTOR BLOCK

REMOVAL

(1) Open hood.

(2) Disconnect and isolate negative battery cable.

REMOVAL AND INSTALLATION (Continued)

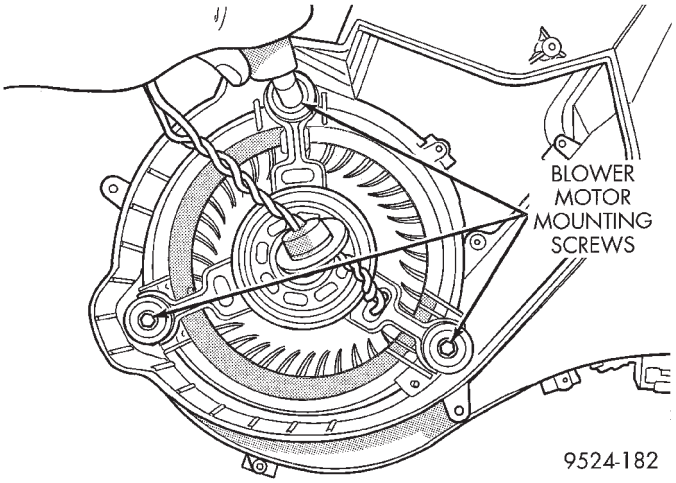


Fig. 18 Blower Motor Screws

(3) Locate and remove the wire connector from the blower resistor block. Block is located at the back of the engine compartment on the passenger side of the vehicle under the wiper module (Fig. 19).

NOTE: It may not necessary to remove the wiper module to access the resistor block.

(4) Using a long flad blade screwdriver, gently push in on drivers side of resistor. Be careful to catch the inner release tang and gently pry outward (Fig. 20).

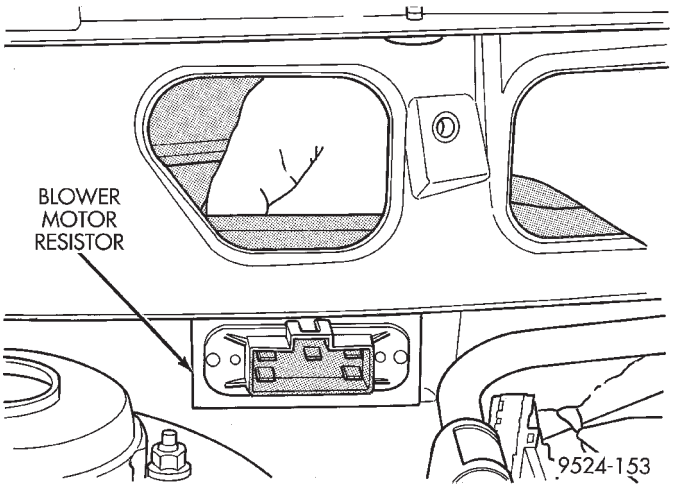


Fig. 19 Resistor Block Location

WARNING: THE RESISTOR BLOCK MAY BE HOT. DO NOT ATTEMPT TO SERVICE THE RESISTOR BLOCK IF THE SYSTEM HAS BEEN RUNNING RECENTLY. LET THE SYSTEM COOL DOWN BEFORE REPAIRS ARE INITIATED.

(5) Remove resistor block by inserting a flat blade pry tool on the side of the resistor block and pushing inward. Two guide lines are shown on the right hand edge of the resistor block to help guide the blade

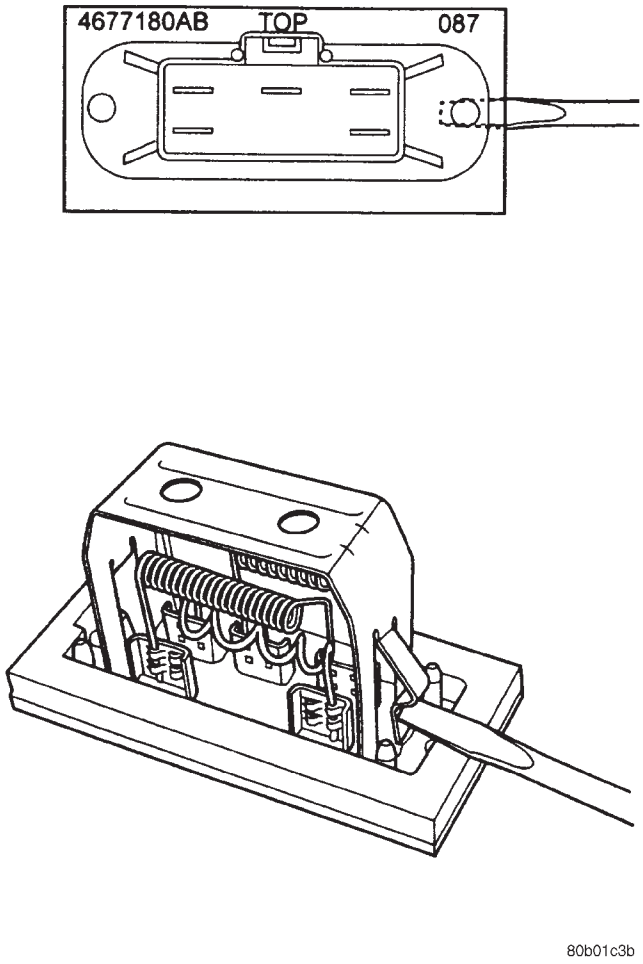


Fig. 20 Resistor Block Removal

position. This will release the clips on the side of the resistor block. Pull resistor block out.

INSTALLATION

For installation, reverse the above procedures. Make sure the “TOP” lettering is on the top of the resistor. The coils on the Resistor Block should not be contacting one another. Before installation, gently separate the coils (with fingers only) if one coil is contacting another.

BLOWER MOTOR WHEEL

The blower motor wheel is not serviced separately. If the wheel needs to be replaced it is serviced as an assembly of the blower motor. For service procedure information, refer to Blower Motor Replacement in this group.

REMOVAL AND INSTALLATION (Continued)

COMPRESSOR

REMOVAL

WARNING: REFER TO REFRIGERANT SERVICE PROCEDURES FOR INFORMATION REGARDING PROPER RECOVERY OF THE REFRIGERANT BEFORE ATTEMPTING TO REMOVE THE COMPRESSOR.

(1) Disconnect negative battery cable.
(2) Pinch off coolant lines to rear Heat unit (if equipped). Drain engine coolant.
(3) Remove upper radiator hose.
(4) Remove drive belt (refer to Group 7, Cooling System). Disconnect compressor clutch wire lead.
(5) Remove refrigerant lines from compressor (Fig. 21) and (Fig. 22).

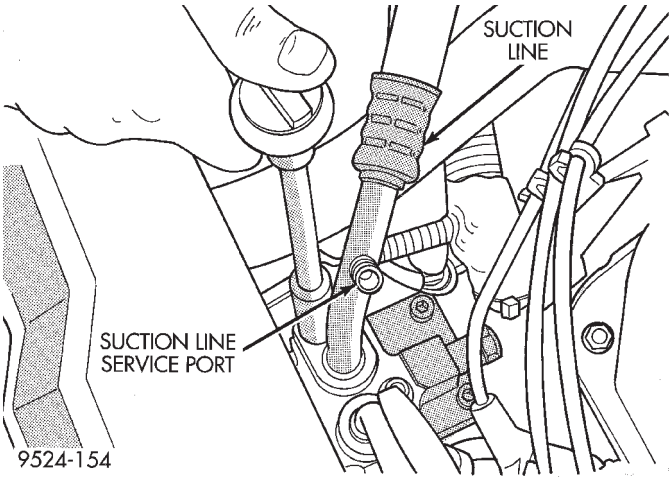


Fig. 21 Suction Line

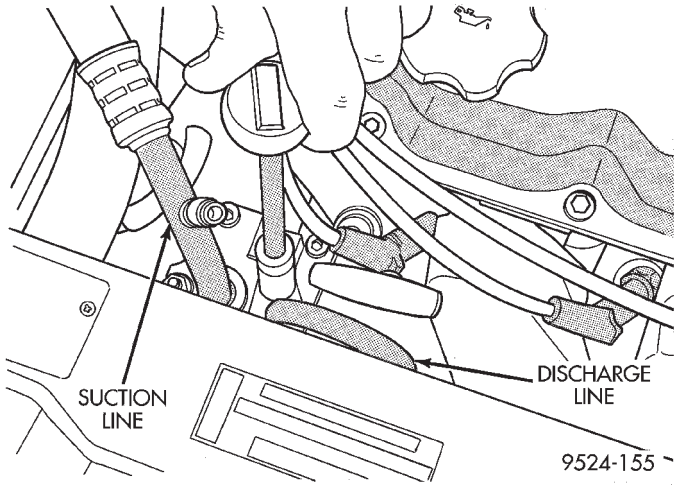


Fig. 22 Discharge line

(6) Remove compressor nuts and bolts (Fig. 23).
(7) Remove compressor (Fig. 24).

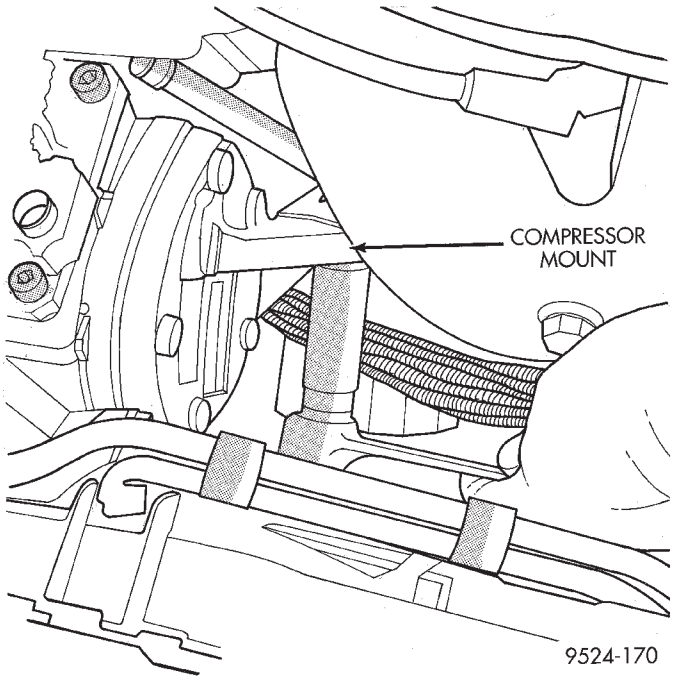


Fig. 23 Compressor Mounts

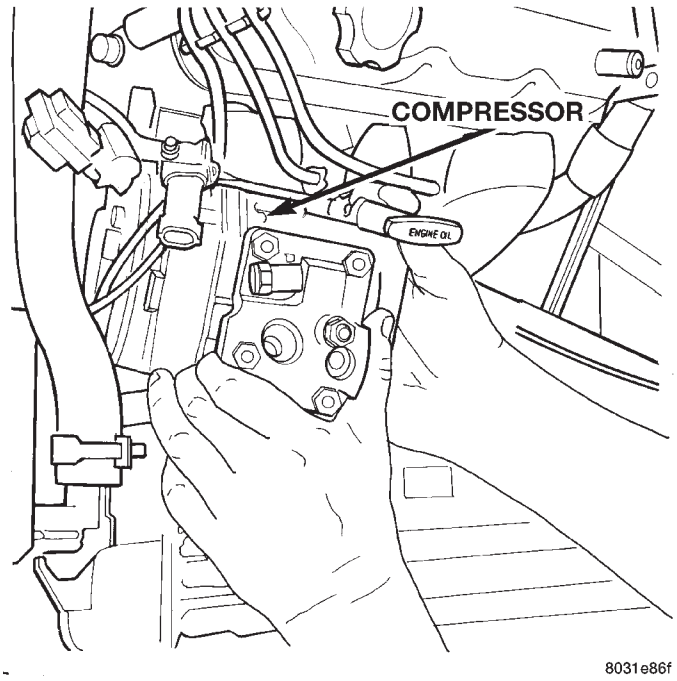


Fig. 24 Compressor Removal

INSTALLATION

For installation, reverse the above procedures.

COMPRESSOR CLUTCH/COIL

REMOVAL

(1) Remove the compressor shaft bolt (Fig. 25). A band type oil filter removal tool can be placed around the clutch plate to aid in bolt removal.

REMOVAL AND INSTALLATION (Continued)

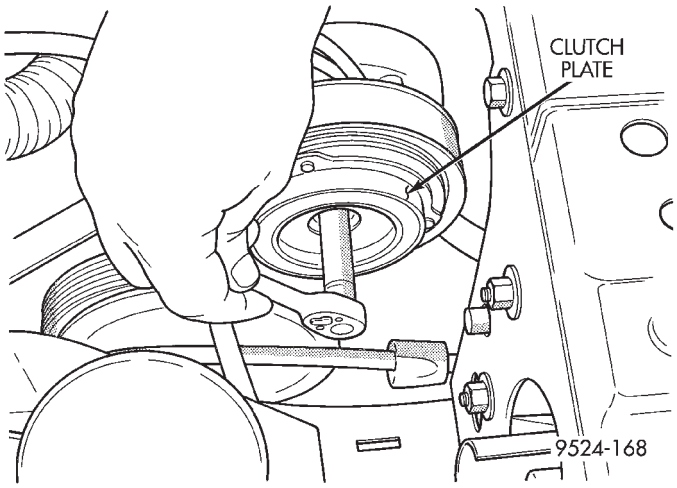


Fig. 25 Compressor Shaft Bolt and Clutch Plate

CAUTION: Do not use screwdrivers between the clutch plate assembly and pulley to remove front plate as this may damage the front plate assembly.

(2) Tap the clutch plate with a plastic hammer and remove clutch plate and shim (Fig. 26).

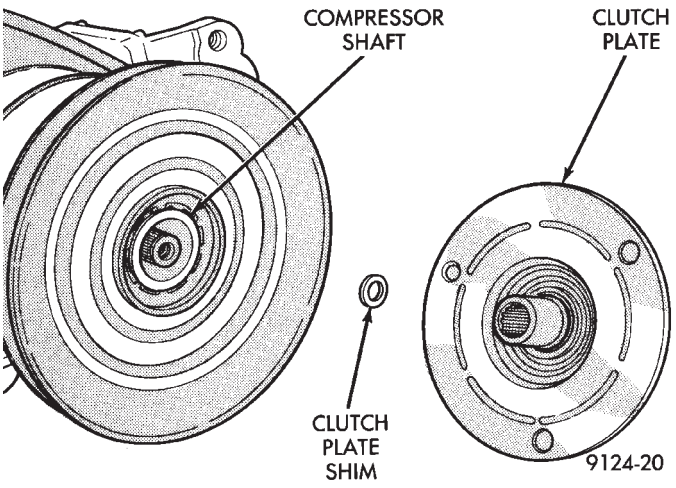


Fig. 26 Clutch Plate and Shim(s)

(3) Remove pulley retaining snap ring with snap ring pliers (C-4574), and slide pulley assembly off of compressor (Fig. 27).

(4) Remove coil wire clip screw and wire harness.

(5) Remove snap ring retaining field coil onto compressor housing (Fig. 28). Slide field coil off of compressor housing.

(6) Examine frictional faces of the clutch pulley and front plate for wear. The pulley and front 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 oil and remove the felt from the front cover. If the compressor felt is saturated with oil, the shaft seal is leaking and will have to be replaced.

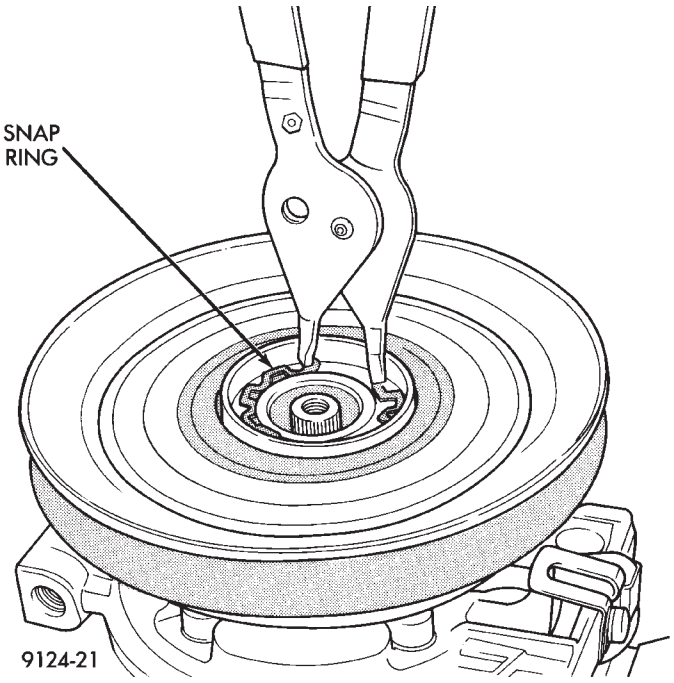


Fig. 27 Removing Pulley Snap Ring

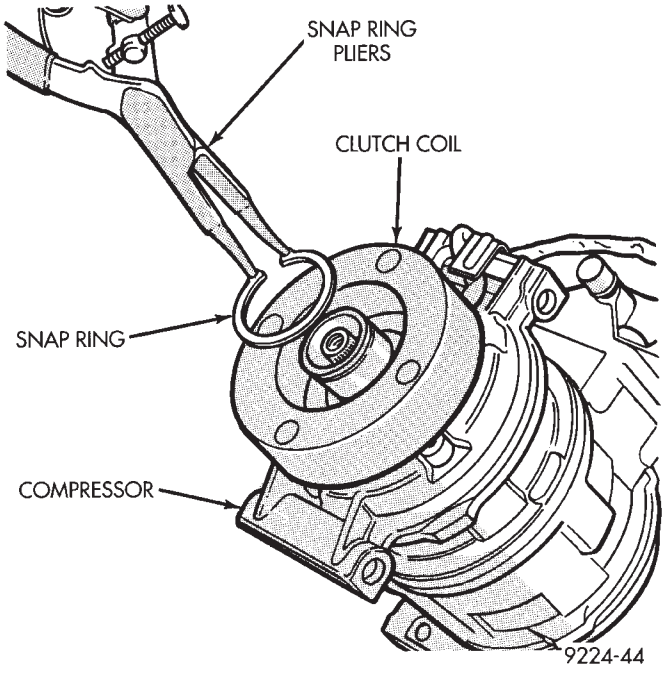


Fig. 28 Clutch Coil Snap Ring

(7) Check bearing for roughness, excessive leakage or grease. If grease from bearing has contaminated the faces of the pulley or front plate, they should be replaced. If the bearing is rough or binds, replace clutch pulley and front plate assembly.

REMOVAL AND INSTALLATION (Continued)

CAUTION: The clutch pulley and the front 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.

INSTALLATION

(1) Align pin in back of field coil with hole in compressor end housing, and position field coil into place. Make sure that lead wires are properly routed, and fasten with the wire clip screw.

(2) Install field coil retaining snap ring with snap ring pliers. The bevel side of the snap ring facing outward. Also both snap ring eyelets must be to the right or left of the pin on compressor. Press snap ring to make sure it is properly seated in the groove.

CAUTION: If snap ring is not fully seated it will vibrate out, resulting in a clutch failure and severe damage to the front face of the compressor.

(3) Install pulley assembly to compressor. If necessary, tap gently with a block of wood on the friction surface (Fig. 29).

CAUTION: Do not mar the pulley frictional surface.

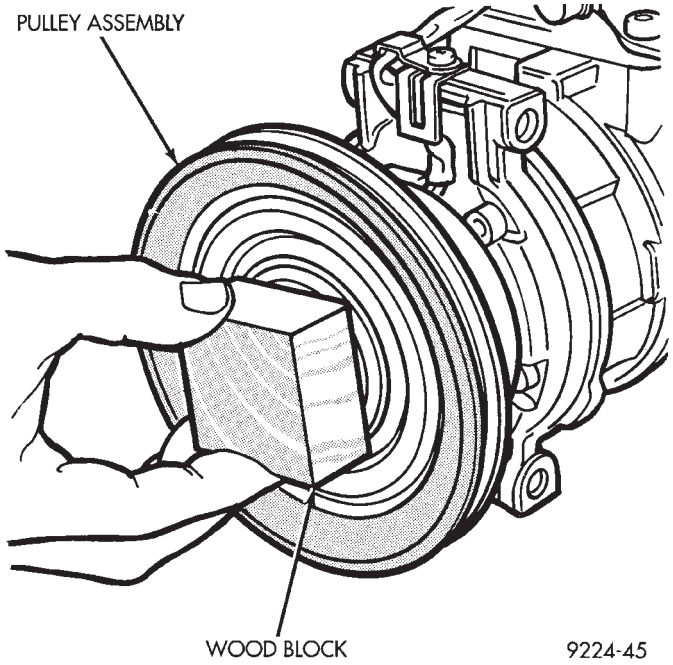


Fig. 29 Installing Pulley Assembly

(4) Install pulley assembly retaining snap ring (bevel side outward) with snap ring pliers. Press the snap ring to make sure it is properly seated in the groove.

(5) If the original front plate assembly and pulley assembly are to be reused, the old shim(s) can be used. If not, place a trial stack of shims, 1 mm (0.040 in.) thick, on the shaft against the shoulder.

(6) Install front plate assembly onto shaft.

(7) With the front plate assembly tight against the shim(s), measure the air gap between front plate and pulley face with feeler gauges. The air gap should be between 0.5 and 0.9 mm (.020 and .035 inch) If proper air gap is not obtained, add or subtract shims until desired air gap is obtained.

(8) Install compressor shaft bolt. Tighten to 17.5±2 N·m (155±20 in. lbs.).

NOTE: Shims may compress after tightening shaft nut. Check air gap in four or more places to verify if air gap is still correct. Spin pulley for final check.

CLUTCH BREAK-IN

After a new clutch has been installed, check the voltage and amperage to the clutch (determine it to be satisfactory). Then cycle the A/C clutch approximately 20 times (5 sec. on and 5 sec. off). For this procedure, set the system to the A/C mode, using high blower, and engine rpm at 1500-2000. This procedure (burnishing) will seat the opposing friction surfaces and provide a higher clutch torque capability.

CONDENSER ASSEMBLY

WARNING: THE REFRIGERATION SYSTEM MUST BE COMPLETELY EMPTY BEFORE PROCEEDING WITH THIS OPERATION.

NOTE: Special effort must be used to keep all R-134a system components moisture-free. Moisture in the oil is very difficult to remove and will cause a reliability problem with the compressor.

REMOVAL

(1) Recover A/C system refrigerant.

(2) Remove liquid line at filter-drier (Fig. 30).

(3) Remove (2) bolts attaching filter-drier to radiator module (Fig. 31).

(4) Remove upper radiator crossmember.

(5) Tilt radiator rearward.

(6) Remove upper discharge line at condenser (Fig. 32).

(7) Through fascia, remove lower liquid line from filter-drier.

(8) Remove (2) lower condenser mounting bolts.

(9) Remove (2) upper mounting bolts.

(10) Remove condenser from vehicle (Fig. 33).

REMOVAL AND INSTALLATION (Continued)

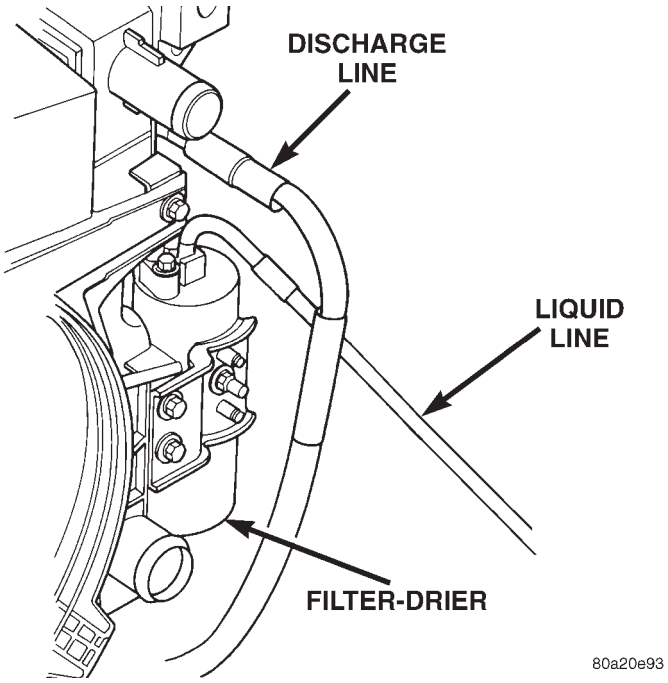


Fig. 30 Liquid Line

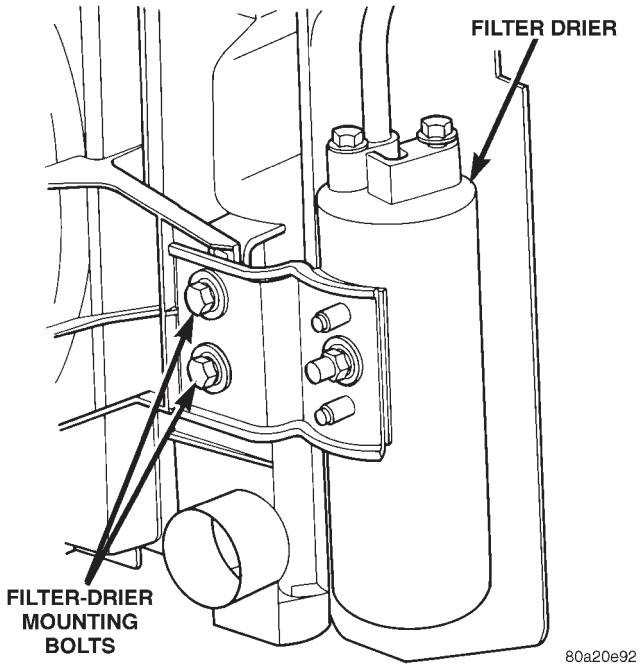


Fig. 31 Filter-Drier

INSTALLATION

NOTE: Inspect Cooling Module for presence of seals. Verify seals are available for re-installation.

(1) Before installation, replace all O-rings and gaskets, coat all sealing surfaces with approved wax-free refrigerant oil. Then, reverse the above procedures.

(2) Torque the following components to specifications:

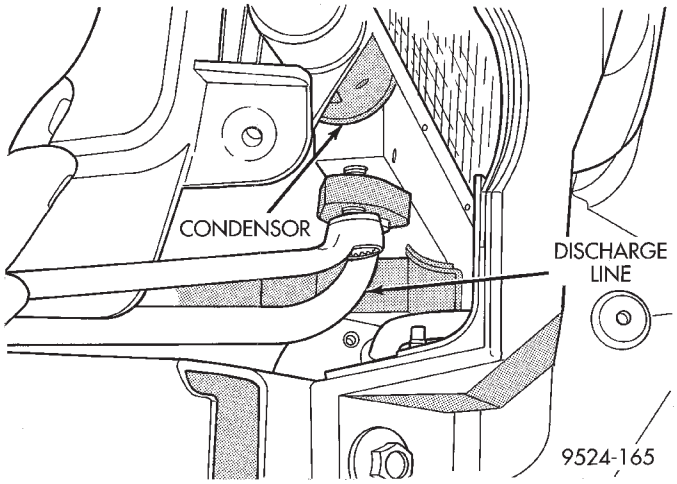


Fig. 32 Upper Discharge Line

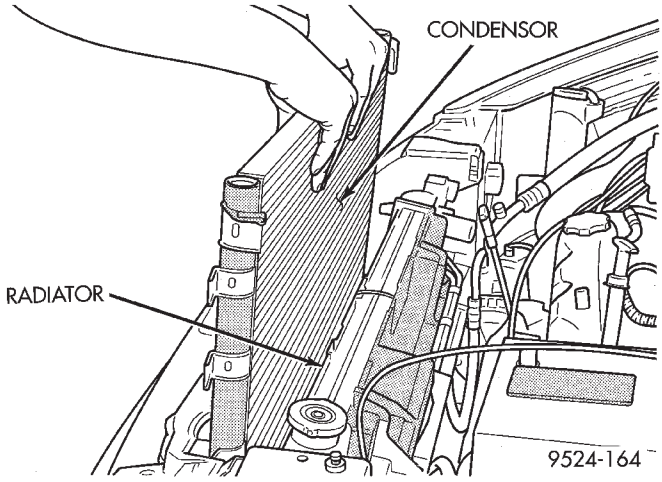


Fig. 33 Condenser Removal

- Liquid line at filter/drier – 45 in. lbs. ± 10.
- Upper discharge line at condenser – 180 in. lbs. ± 20
- Lower liquid line to condenser – 180 in. lbs. ± 20.
- (2) lower, condenser mounting bolts – 45 in. lbs. ± 10.
- (2) upper, condenser mounting bolts – 45 in. lbs. ± 10.

(3) Evacuate and charge system.

DISCHARGE LINE

REMOVAL

(1) Recover A/C system refrigerant.

(2) Remove discharge line mounting nut at compressor (Fig. 34).

(3) Remove discharge line at the top fitting on the condenser (Fig. 35).

REMOVAL AND INSTALLATION (Continued)

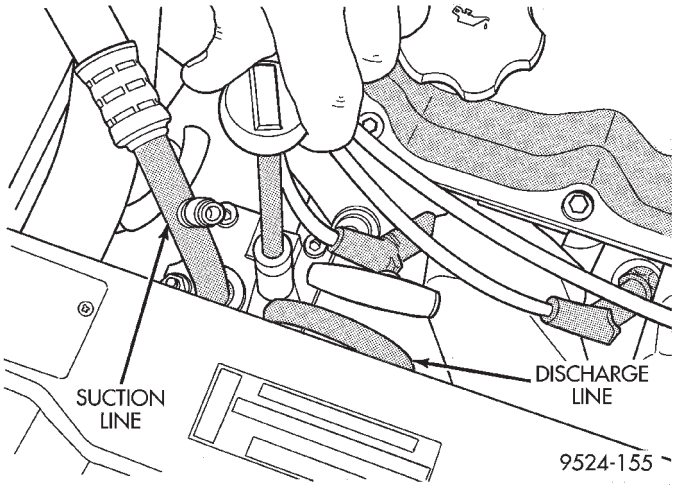


Fig. 34 Compressor Discharge Line

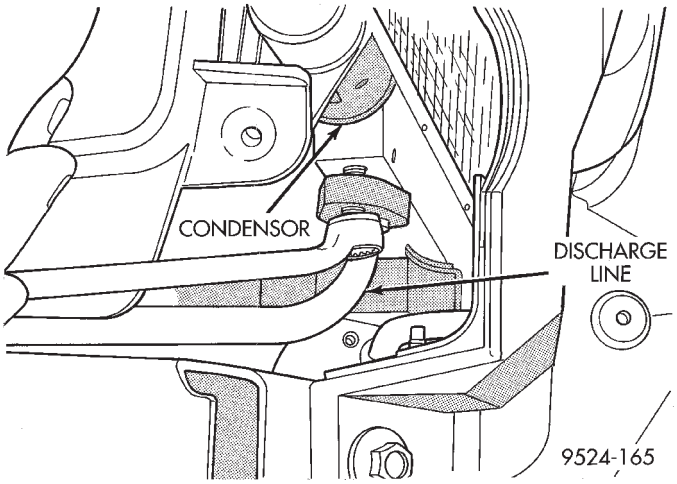


Fig. 35 Condenser Discharge Line

INSTALLATION

(1) For installation, reverse the above procedures. Replace all O-rings. Torque discharge line at condenser bolt to 180 in. lbs. ± 10.

(2) Evacuate and recharge A/C system.

(3) Perform the HVAC Control Calibration Diagnostic and Cooldown test.

EVAPORATOR PROBE

REMOVAL

(1) Remove the glove box. Refer to Group 8E, Instrument Panel and Systems.

(2) Disconnect the evaporator probe connector (Fig. 36).

(3) Using a flat blade pry tool, pry the evaporator probe grommet from the HVAC housing (Fig. 37).

(4) Remove evaporator probe from evaporator (Fig. 38).

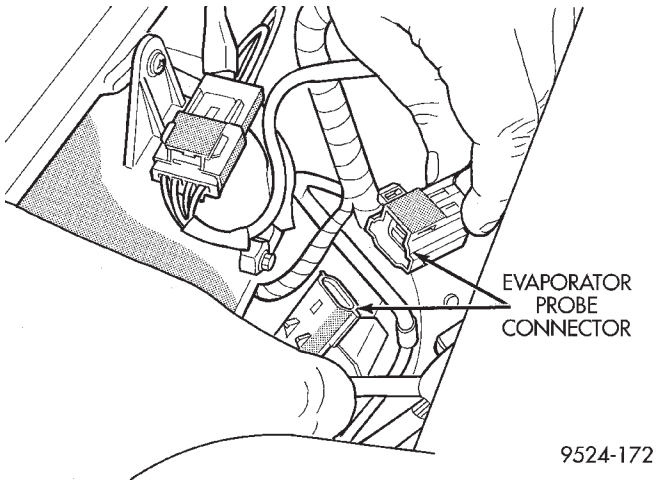


Fig. 36 Evaporator Probe Connector

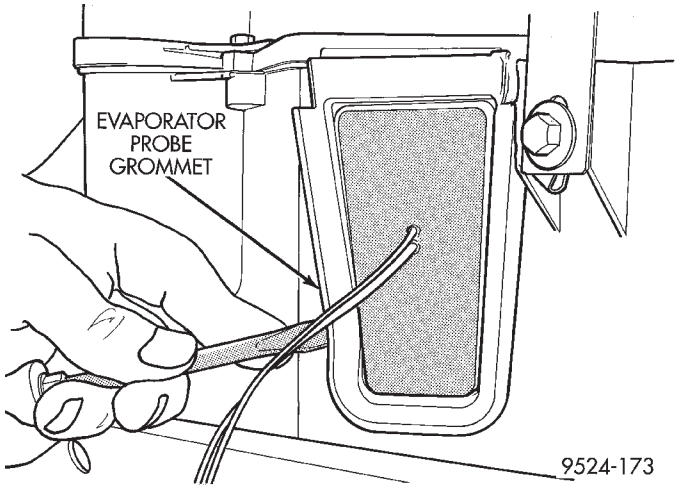


Fig. 37 Evaporator Probe Grommet

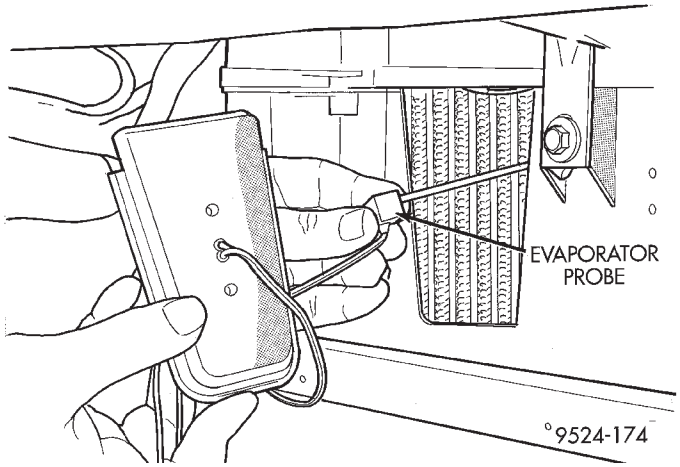


Fig. 38 Evaporator Probe

INSTALLATION

For installation, reverse the above procedures. Three holes are provided in evaporator for probe location. When reinstalling probe, use a different hole than original one. If a new evaporator is installed, insert the probe in the uppermost hole provided.

REMOVAL AND INSTALLATION (Continued)

EXPANSION VALVE

WARNING: THE REFRIGERATION SYSTEM MUST BE COMPLETELY EMPTY BEFORE PROCEEDING WITH THIS OPERATION.

REMOVAL

(1) Disconnect the battery negative cable.
(2) Recover A/C system refrigerant.
(3) Remove the accessory drive belt.
(4) Remove upper generator bracket.
(5) Disconnect generator field wire connector.
(6) Push generator forward.
(7) Remove ground wire at dash panel.
(8) Remove the nut retaining the refrigerant line sealing plate to the expansion valve (Fig. 39).
(9) Remove the stud from the expansion valve (Fig. 40).
(10) Carefully pull the refrigerant line sealing plate assembly from expansion valve towards the front of the vehicle. Use care not to scratch the expansion valve sealing surfaces with pilot tubes.
(11) Cover the openings to prevent contamination.
(12) Remove two screws securing the expansion valve to the evaporator sealing plate (Fig. 40).
(13) Carefully remove expansion valve (Fig. 41).
(14) Remove the old O-rings.

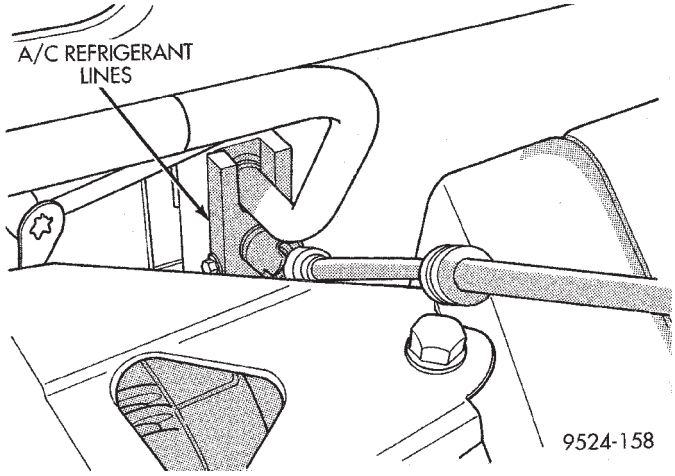


Fig. 39 A/C Refrigerant Line Plate

INSTALLATION

(1) Ensure old O-rings are removed. Install new O-rings on the refrigerant lines and evaporator sealing plate.
(2) Hand-start the stud into the expansion valve and torque to 7 - 11 N·m (64 - 96 in. lbs.).
(3) Carefully install the expansion valve to the sealing plate. Install the two screws and tighten 8 to 14 N·m (70 to 130 in. lbs.) torque.

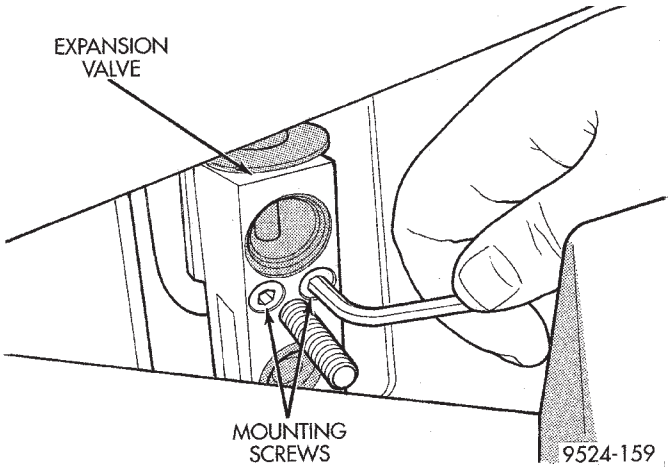


Fig. 40 Expansion Valve Stud and Mounting Screws

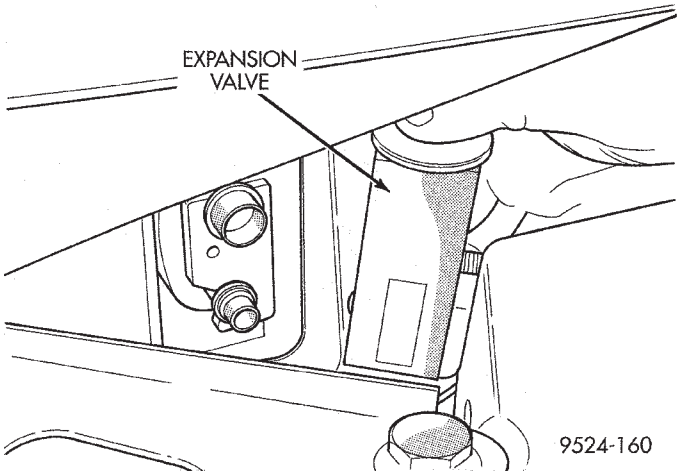


Fig. 41 Expansion Valve Removal

(4) Carefully install the refrigerant lines and sealing plate to the expansion valve. Install the nut and tighten 20 to 26 N·m (170 to 230 in. lbs.) torque.
(5) Install the ground wire at dash panel.
(6) Pull generator back into the proper position for bracket mounting.
(7) Install generator field wire connector.
(8) Install the upper generator bracket.
(9) Install accessory drive belt.
(10) Evacuate and recharge system.
(11) After expansion valve is installed, the system is charged, and leaks have checked repeat the A/C performance check.

FILTER-DRIER ASSEMBLY

REMOVAL

WARNING: THE REFRIGERATION SYSTEM MUST BE COMPLETELY EMPTY BEFORE PROCEEDING WITH THIS OPERATION.

(1) Recover A/C system refrigerant.

REMOVAL AND INSTALLATION (Continued)

(2) Remove liquid line at filter-drier (Fig. 42).

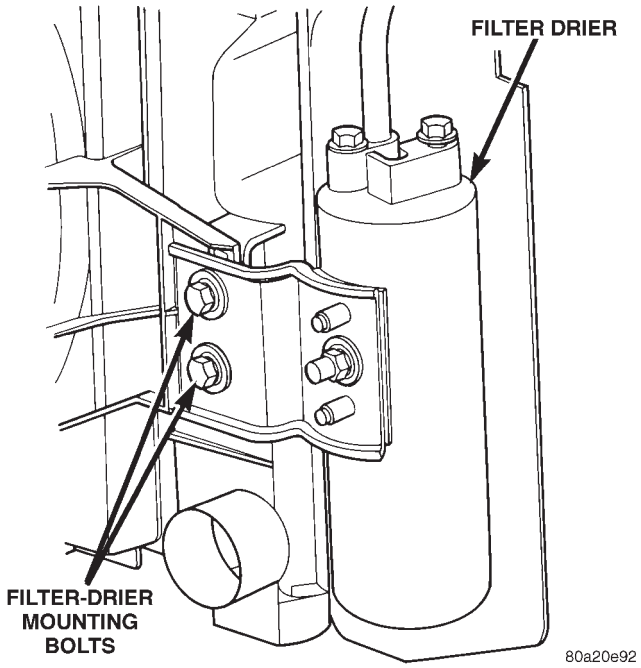


Fig. 42 Filter-Drier Assembly

(3) Remove the (2) bolts holding filter-drier bracket to radiator fan module bracket.

(4) Remove the lower liquid line at condenser.

(5) Remove the upper radiator crossmember.

(6) Pull up on radiator and slide filter-drier from the mounting location.

INSTALLATION

(1) Before installation, replace both refrigerant line O-rings. Then reverse the above procedures. Torque filter/drier mounting bolts to 45 in. lbs. ± 10.

(2) Evacuate and recharge system.

HEATER A/C UNIT HOUSING

REMOVAL

WARNING: IF EQUIPPED WITH AIR CONDITIONING, THE REFRIGERATION SYSTEM MUST BE COMPLETELY EMPTY BEFORE PROCEEDING.

(1) Set parking brake.

(2) Disconnect battery negative cable.

(3) Using a refrigerant recovery machine, remove refrigerant from the A/C system (Fig. 43).

(4) Remove wiper module. Refer to Group 8K, Windshield Wipers and Washers.

(5) Pinch off rear heater lines if equipped.

(6) Drain engine coolant. Remove heater hoses at the heater core (Fig. 44). Plug coolant lines.

(7) Remove suction and liquid lines at the expansion valve (Fig. 45).

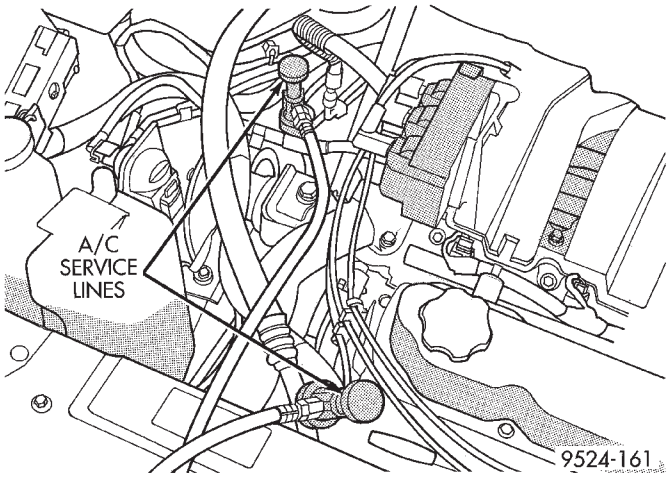


Fig. 43 A/C Service Ports

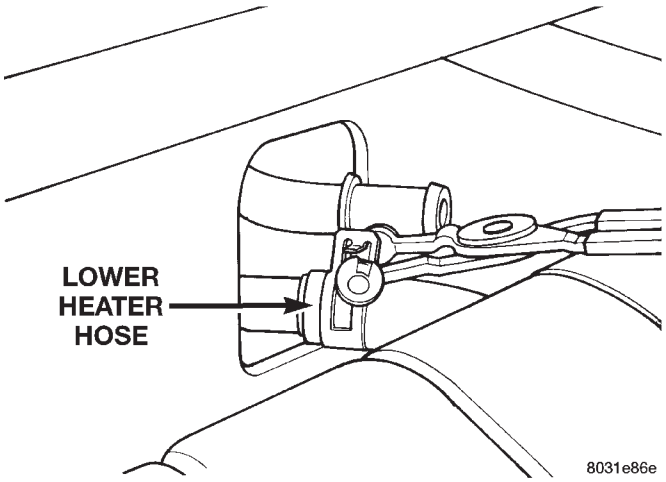


Fig. 44 Heater Hoses

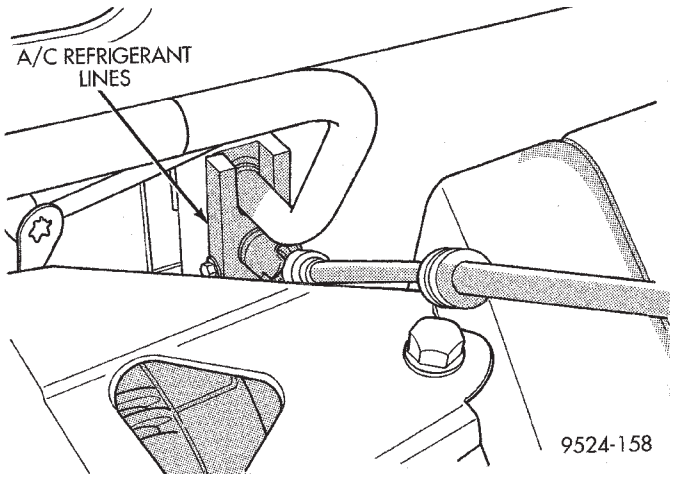


Fig. 45 Expansion Valve Plate

(8) Remove the Instrument Panel Assembly. Refer to Group 8E, Instrument Panel and Gauges.

(9) Remove heater ducts.

REMOVAL AND INSTALLATION (Continued)

(10) Disconnect the two upper mounts from the upper reinforcement and the lower mount from the tunnel.

(11) Remove the (3) nuts (in the engine compartment) securing the unit to the dash panel (Fig. 46).

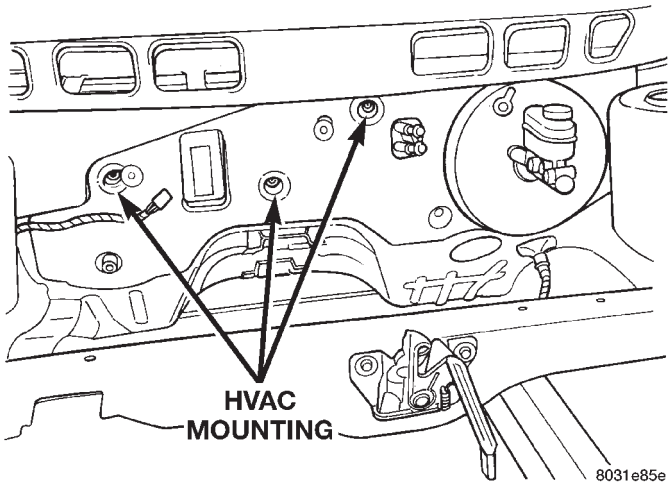


Fig. 46 HVAC Bolt-Up

(12) Disconnect the HVAC housing wiring harness.

(13) Pull the entire unit rearward until the studs on the unit clear the dash panel. Drop the unit down. Pull it rearward to remove it from vehicle.

INSTALLATION

(1) For installation of the assembly, reverse the above procedures. Install new O-rings on plumbing inlets

(2) Evacuate and recharge the A/C system.

(3) Perform HVAC control Calibration Diagnostic and Cooldown test.

HEATER CORE

REMOVAL

(1) Drain coolant system.

(2) Remove left side lower column cover.

(3) Remove steering column assembly. Refer to Group 19, Steering for service procedure.

(4) Remove ABS module, bracket and wiring (Fig. 47).

(5) Remove I/P to body harness interconnect and bracket (Fig. 48).

(6) Remove lower silencer boot at base of steering shaft (Fig. 49)

(7) Pinch off heater lines under the hood.

(8) Remove heater core cover. Insert a small amount of towels under the heater core tubes. Remove heater core plate and tubes (Fig. 50).

(9) Depress heater core retaining clips (Fig. 51).

(10) Pull up on accelerator pedal and slide heater core past (Fig. 52).

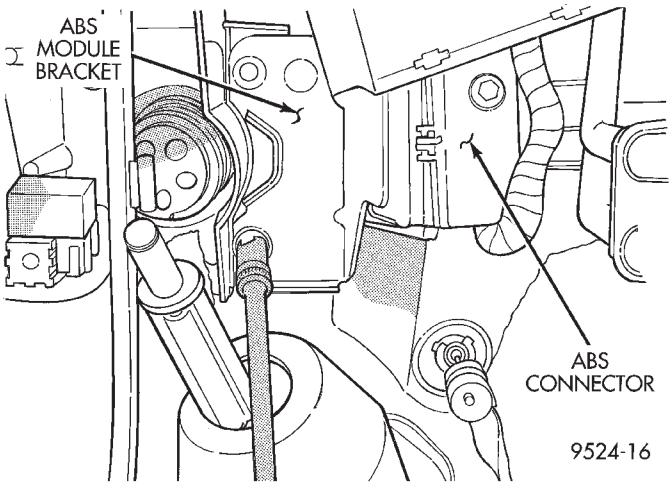


Fig. 47 ABS MODULE

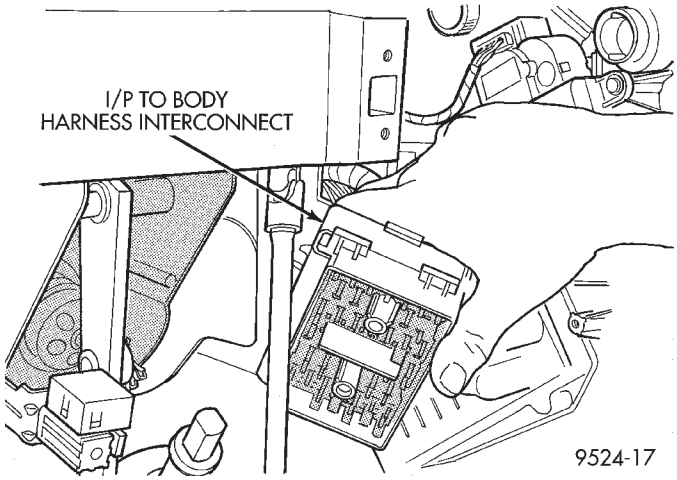


Fig. 48 Interconnect And Bracket

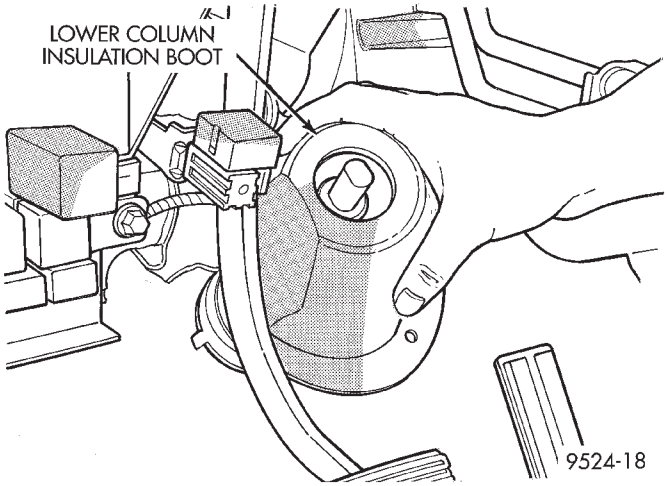


Fig. 49 Lower Silencer Boot

(11) Depress brake pedal (Fig. 53) and remove heater core from HVAC housing.

REMOVAL AND INSTALLATION (Continued)

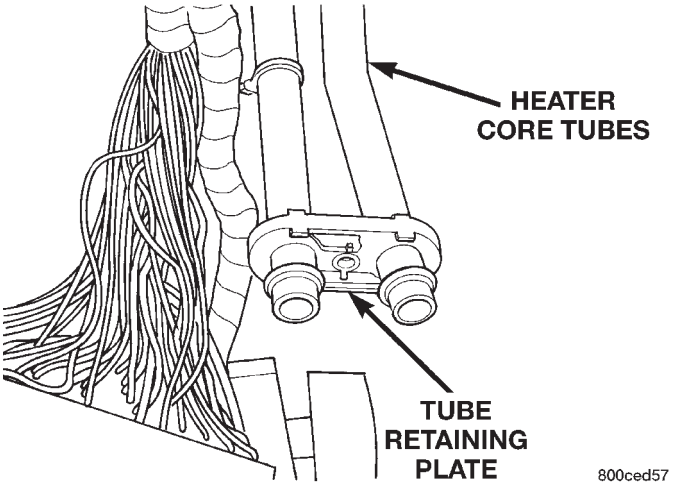


Fig. 50 Heater Core Plate And Tubes

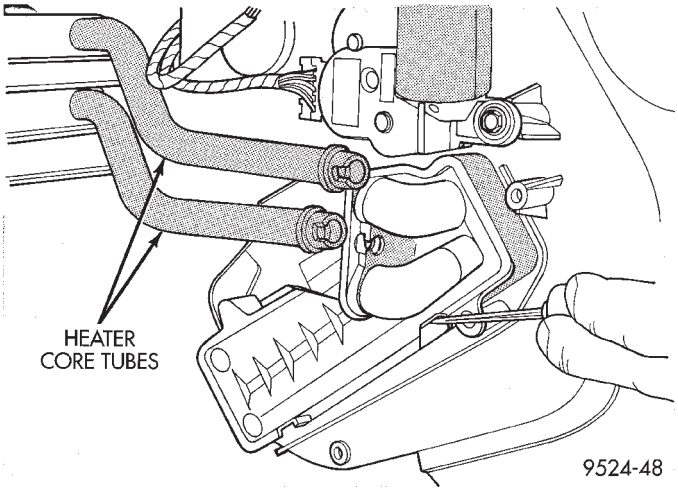


Fig. 51 Depress Clips

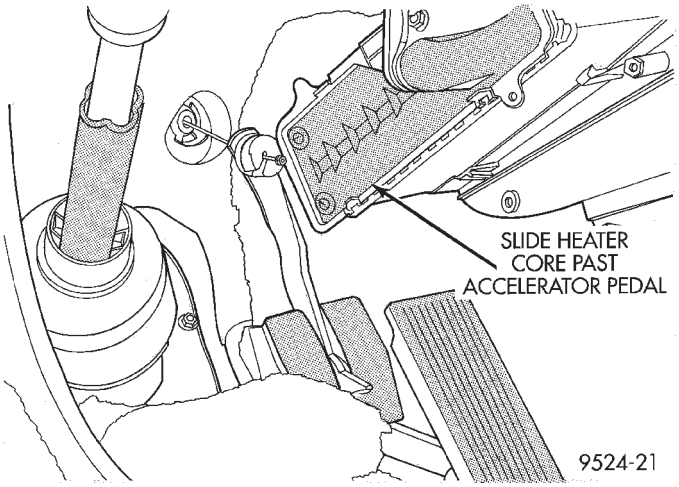


Fig. 52 Accelerator Pedal

INSTALLATION

For installation, reverse the above procedures. Install screws to retain heater core in housing. Replace heater core tube inlet O-rings. Tighten heater core tube retaining plate to 3 ± 1 N·m (27 ± 9 in. lbs.) torque.

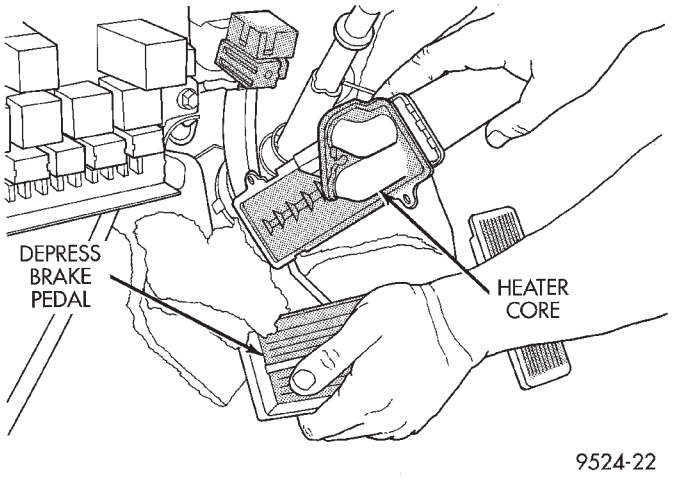


Fig. 53 Brake Pedal

HEATER HOSES

REMOVAL

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

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

(2) Loosen clamps at each end of heater hose to be removed (Fig. 54) and (Fig. 55).

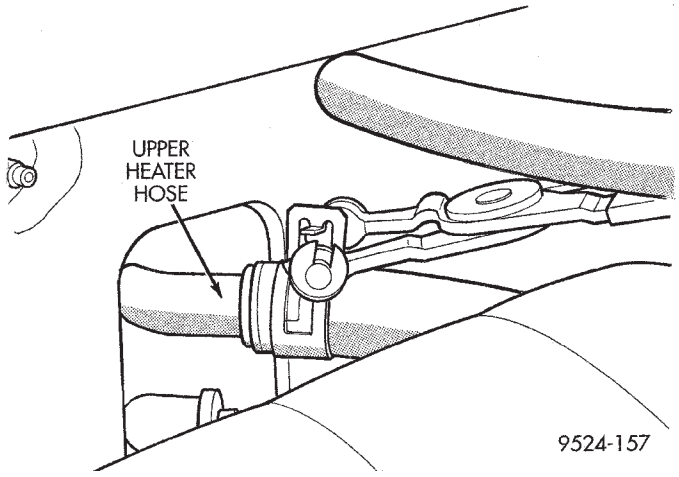


Fig. 54 Upper Heater Hose

REMOVAL AND INSTALLATION (Continued)

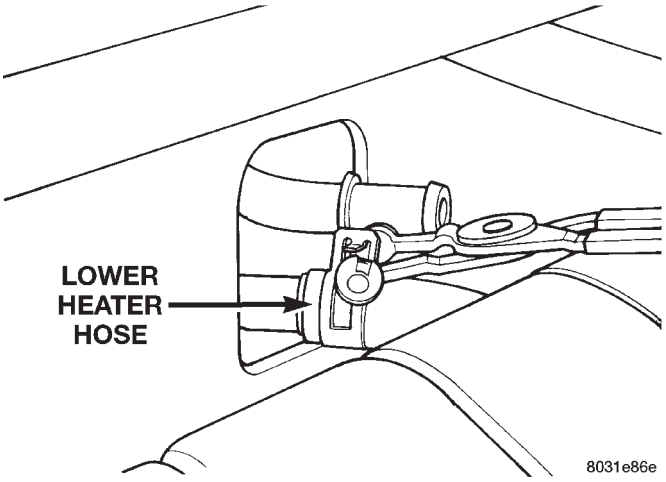


Fig. 55 Lower Heater Hose

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.

(3) Carefully rotate hose back and forth while tugging slightly away from connector nipple. If the hose will not come off, slice the hose at the connector nipple and peel off heater hose. This method will require heater hose replacement.

INSTALLATION

For installation, reverse the above procedures.

LIQUID LINE

REMOVAL

(1) Disconnect the battery negative cable.
(2) Recover A/C system refrigerant.
(3) Remove the accessory drive belt.
(4) Remove upper generator bracket.
(5) Remove ground wire at dash panel.
(6) Remove the nut retaining the refrigerant line sealing plate to the expansion valve (Fig. 39).
(7) Remove the stud from the expansion valve (Fig. 40).
(8) Remove liquid line from expansion valve.
(9) Cover the openings to prevent contamination.
(10) Disconnect wire connector at pressure transducer.
(11) Remove liquid line mounting bracket at right frame rail.
(12) Using access slot between radiator crossmember and grille, loosen liquid line mounting plate at filter-drier. Remove liquid line from filter-drier. It may be necessary to bend liquid line in half to remove line. The replacement line is a two-piece assembly.
(13) Remove the old O-rings.

INSTALLATION

For installation, reverse the above procedures.

- Install the stud to the evaporator sealing plate and tighten 7 to 11 N·m (64 to 96 in. lbs.) torque.
- **Install new O-rings.**
- Install two-piece line in place of original part.
- Assemble line halves after it is installed on vehicle.
- Evacuate and recharge A/C system.

MODE DOOR ACTUATOR

REMOVAL

(1) Remove the lower left side steering column cover. Refer to Group 8E, Instrument Panel and Systems.
(2) Remove ABS control module (Fig. 56).

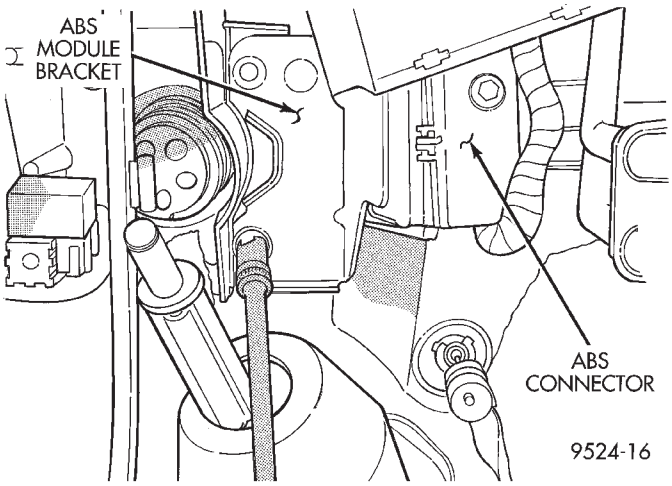


Fig. 56 ABS Control Module

(3) Remove mode actuator connector (Fig. 57).

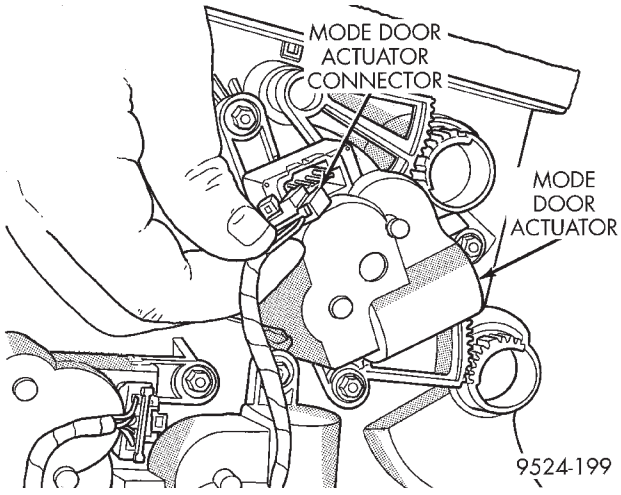


Fig. 57 Mode Door Actuator Connector

(4) Remove mode door actuator (Fig. 58).

INSTALLATION

(1) For installation, reverse the above procedures.

REMOVAL AND INSTALLATION (Continued)

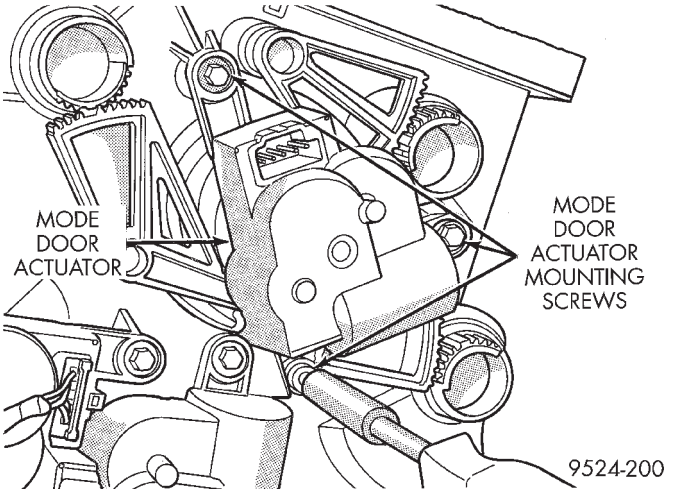


Fig. 58 Mode Door Actuator

(2) Perform the HVAC control Calibration Diagnostic and Cooldown test.

SIDE WINDOW DEMISTER DUCTS

LEFT SIDE

The LEFT side window demister duct is a two piece design. The left side has a long duct that attaches to an intermediate duct and then to the distribution housing. The duct is located on top of the instrument panel. To service the duct, remove the I/P cover and remove duct retainers/fasteners. (Fig. 59).

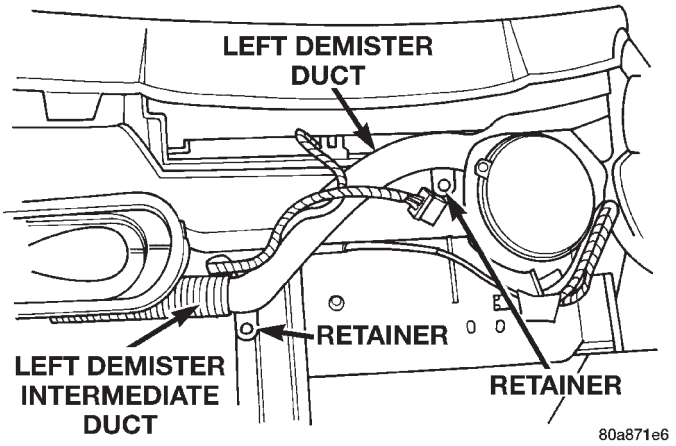


Fig. 59 Left Side Demister Duct

RIGHT SIDE

The demister duct on the right side is a one piece design. It is one long duct that attaches to the distribution housing. The duct is located on top of the instrument panel and it is not serviceable (Fig. 60).

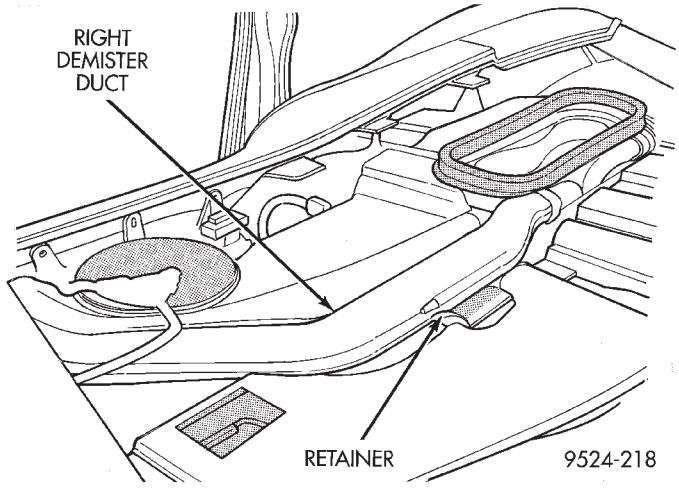


Fig. 60 Right Side Demister Duct

SUCTION LINE

REMOVAL

(1) Disconnect the battery negative cable.
(2) Recover A/C system refrigerant.
(3) Remove the accessory drive belt.
(4) Remove upper generator bracket.
(5) Remove ground wire at dash panel.
(6) Remove the nut retaining the refrigerant line sealing plate to the expansion valve (Fig. 39).
(7) Remove the stud from the expansion valve (Fig. 40).
(8) Remove suction line from expansion valve.
(9) Remove suction line mounting nut at compressor (Fig. 61).
(10) Remove suction line mounting bracket.
(11) Remove suction line.

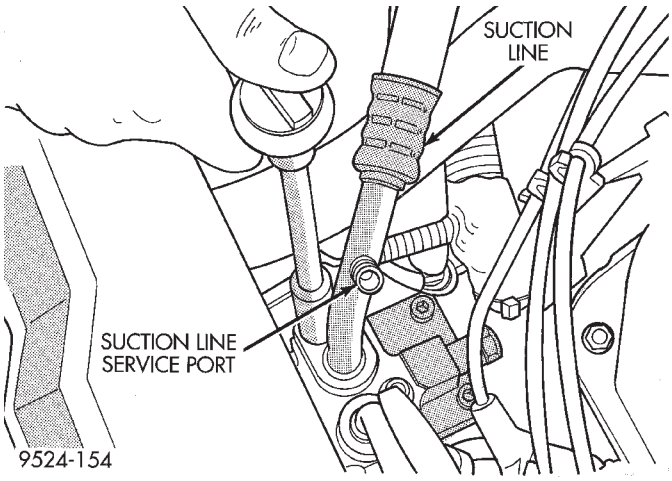


Fig. 61 Suction Line At Compressor

INSTALLATION

For installation, reverse the above procedures.

- Install the stud to the evaporator sealing plate and tighten 7 to 11 N·m (64 to 96 in. lbs.) torque.
- **Install new O-rings.**

REMOVAL AND INSTALLATION (Continued)

- Install two-piece line in place of original part.
- Assemble line halves after it is installed on vehicle.
- Evacuate and recharge A/C system.

RECIRC DOOR ACTUATOR

REMOVAL

(1) Pull back on carpeting on the right lower floor.
(2) Remove Recirc. door actuator connector.
(3) Remove (3) mounting screws for Recirc. actuator (Fig. 62).

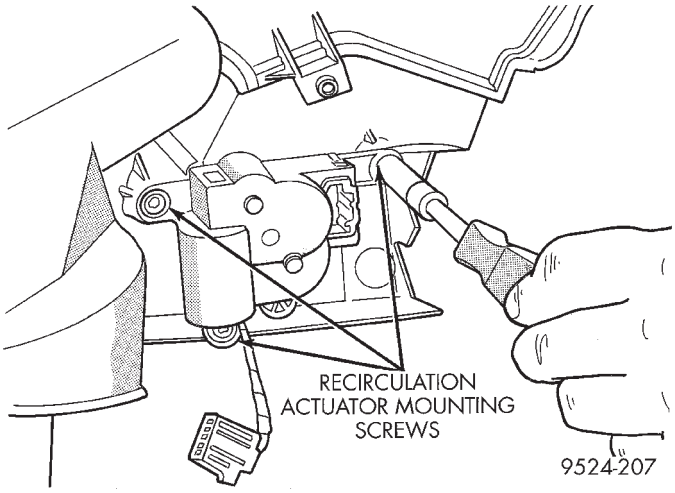


Fig. 62 Recirculation Door Actuator

(4) Remove Recirc. actuator.
(5) Disengage actuator linkage at Recirc. door.
(6) Remove actuator from vehicle.

INSTALLATION

(1) For installation, reverse the above procedures.
(2) Perform the HVAC control Calibration Diagnostic and Cooldown test.

DISASSEMBLY AND ASSEMBLY

HEATER A/C UNIT RECONDITION

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

DISASSEMBLY—EVAPORATOR HOUSING

(1) Place HVAC unit assembly on workbench.
(2) Remove distribution housing mounting screws (Fig. 63).
(3) Remove blower motor cover (Fig. 64).
(4) Remove blower motor wiring grommet and feed wiring through blower housing (Fig. 65).
(5) Remove blower motor screws. Remove blower motor from housing (Fig. 66) and (Fig. 67).
(6) Remove recirculation door cover (Fig. 68).

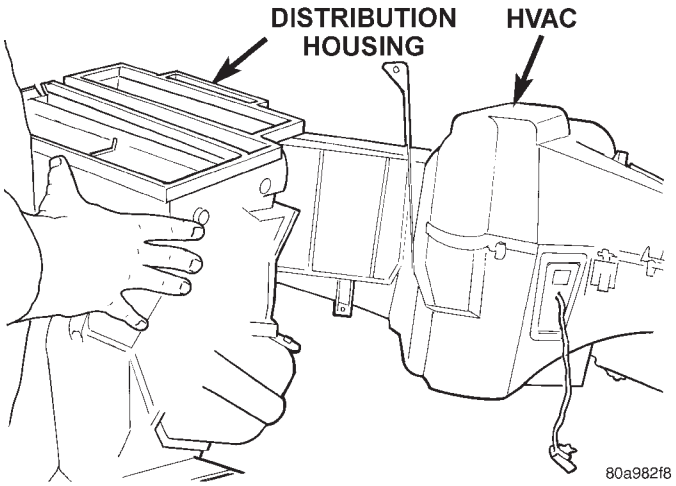


Fig. 63 Distribution Housing

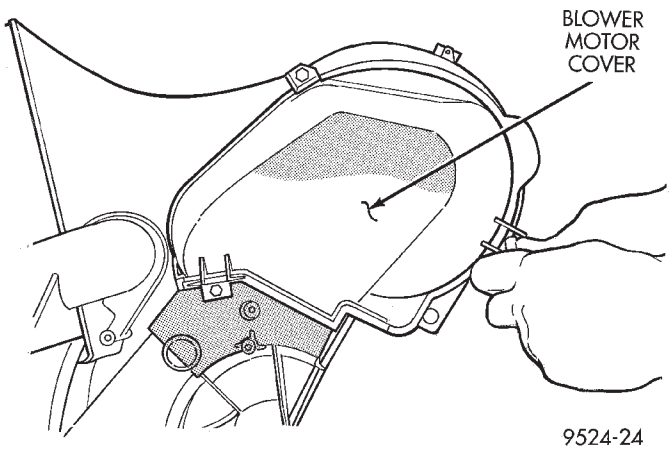


Fig. 64 Blower Motor Cover

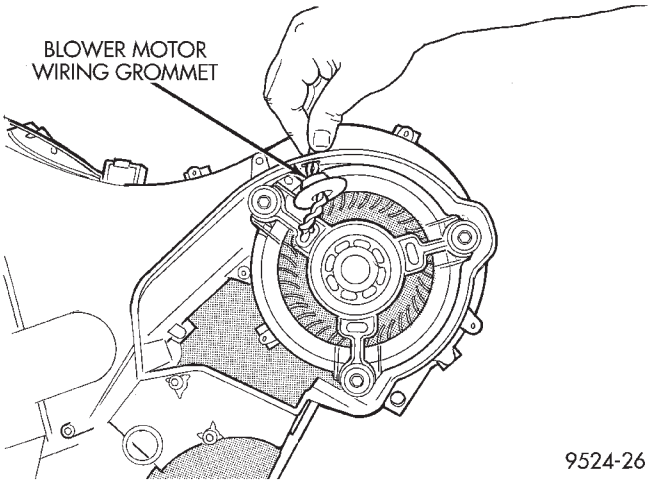


Fig. 65 Blower Motor Grommet

(7) Remove Recirc. door (Fig. 69).
(8) Remove screws around the perimeter of the upper HVAC housing (Fig. 70).

DISASSEMBLY AND ASSEMBLY (Continued)

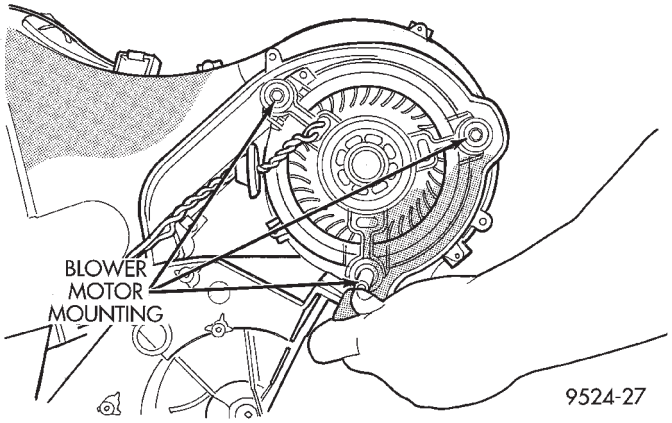


Fig. 66 Blower Motor Screws

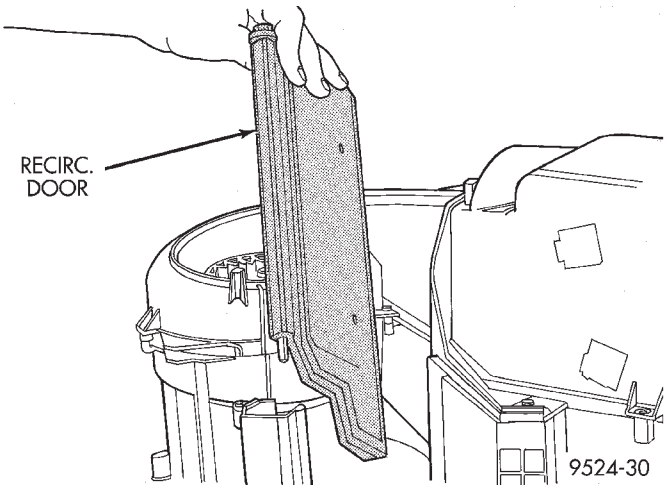


Fig. 69 Recirc. Door

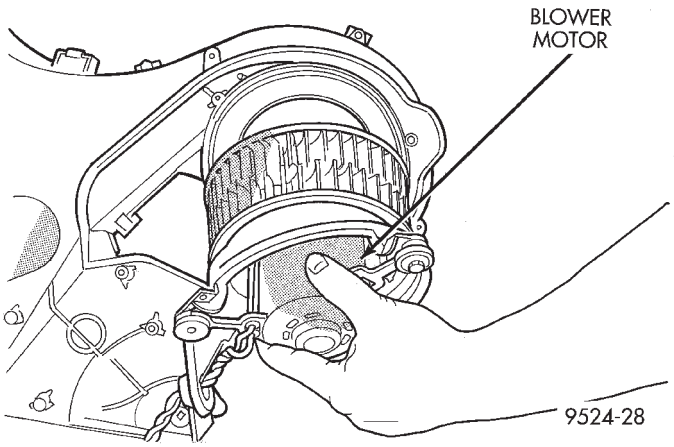


Fig. 67 Blower Motor

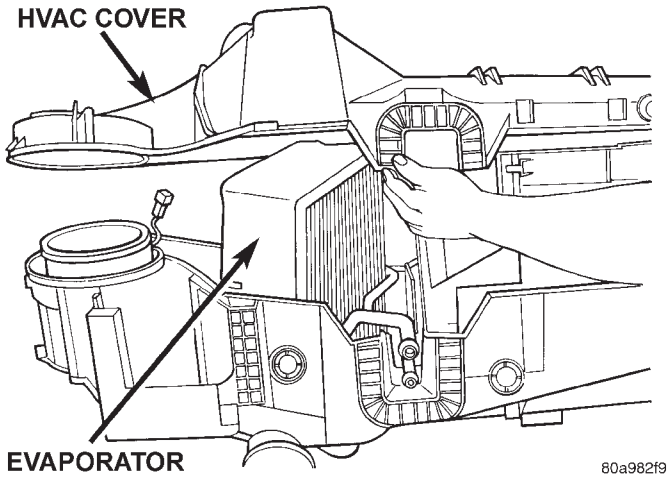


Fig. 70 HVAC Cover

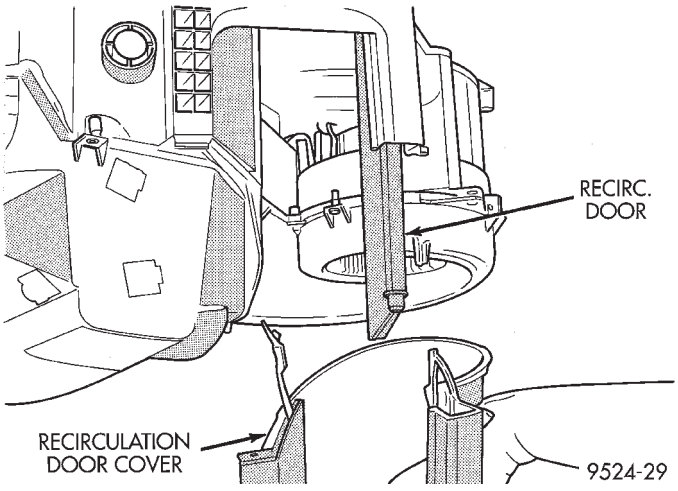


Fig. 68 Recirculation Door Cover

CAUTION: Do not damage the insulation barrier surrounding the evaporator.

(9) Carefully pull up on evaporator and remove from housing (Fig. 71).

(10) If replacing evaporator, drain and measure amount of oil from old evaporator and add new oil of the same amount (ND8 PAG) to the new evaporator before installing. Use SP 10 PAG oil for 2.5L diesel and 2.0L gasoline engine vehicles.

ASSEMBLY—EVAPORATOR HOUSING

(1) For reassembly of the evaporator housing, reverse the above procedures.

(2) Perform the HVAC control Calibration Diagnostic and Cooldown test.

DISASSEMBLY—DISTRIBUTION HOUSING

(1) Place distribution housing on workbench (Fig. 72).

(2) Remove heater core cover (Fig. 73).

(3) Remove heater core tube plate (Fig. 74) and (Fig. 75).

(4) Remove heater core tubes (Fig. 76).

DISASSEMBLY AND ASSEMBLY (Continued)

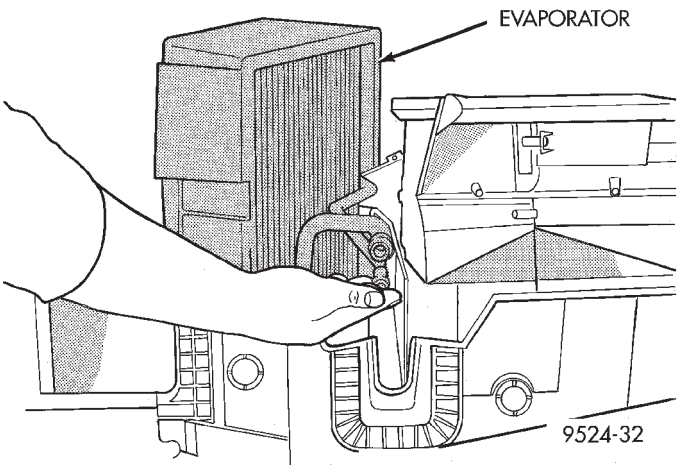


Fig. 71 Evaporator

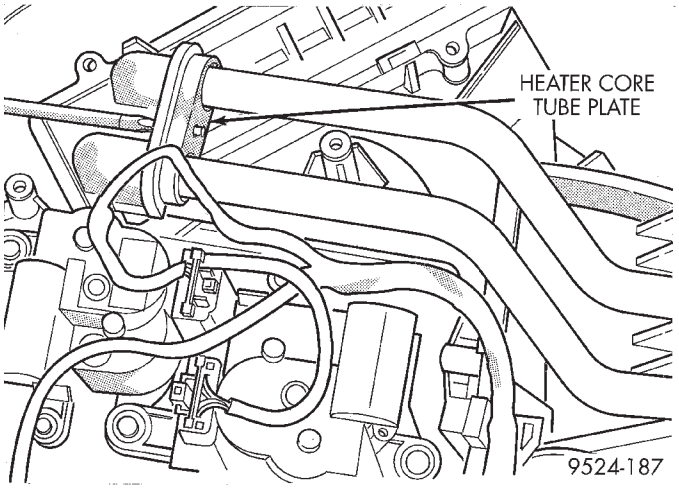


Fig. 74 Heater Core Tube Plate

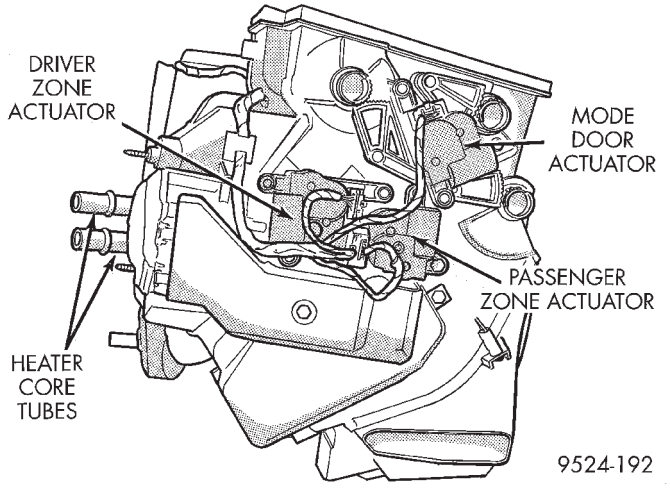


Fig. 72 Distribution Housing

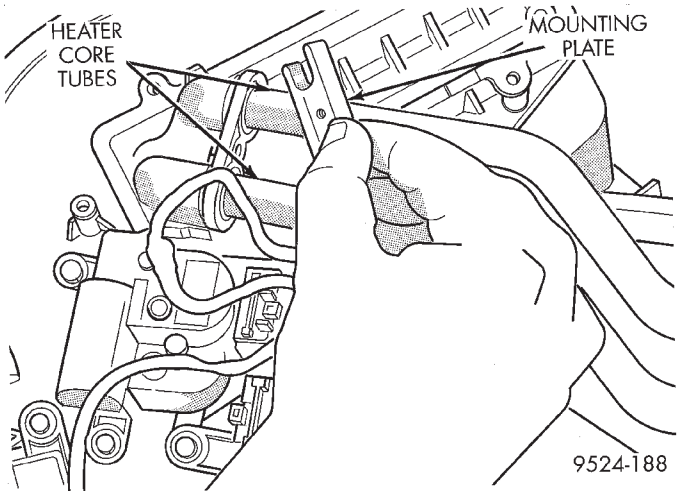


Fig. 75 Plate Removal

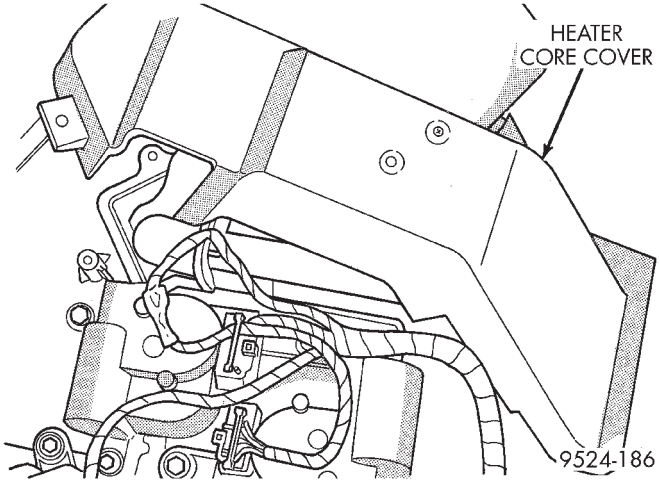


Fig. 73 Heater Core Cover

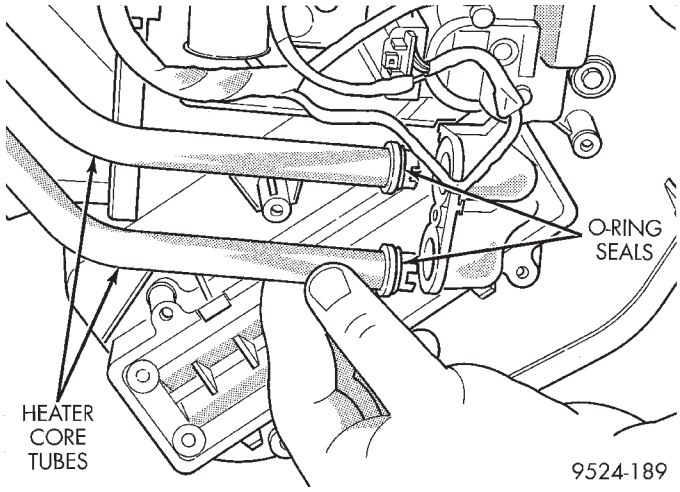


Fig. 76 Heater Core Tube Removal

(5) Depress heater core retaining clips at housing. When reinstalling core use screws to fasten the heater core to the housing.

(6) Slide heater core out of the housing.

(7) Remove driver's zone actuator from distribution housing (Fig. 77).

(8) Remove passenger zone actuator from distribution housing (Fig. 78).

DISASSEMBLY AND ASSEMBLY (Continued)

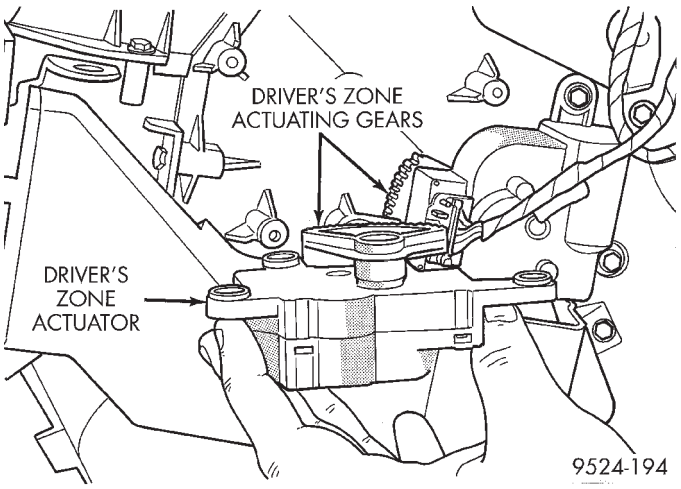


Fig. 77 Driver's Zone Actuator

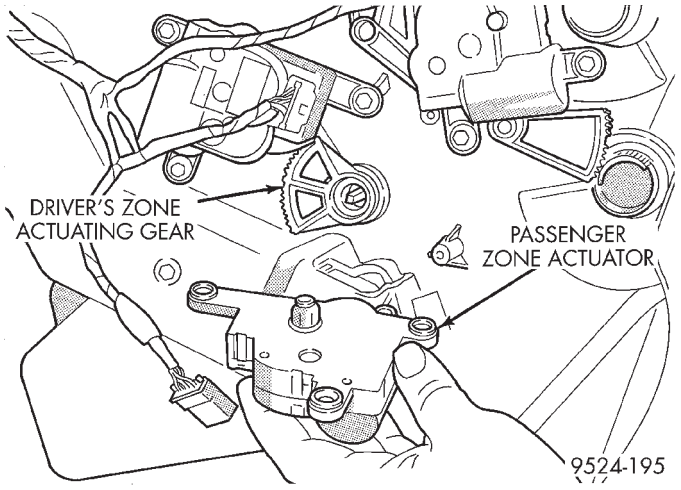


Fig. 78 Passenger Zone Actuator

(9) Using a long thin flat blade tool, insert tool through blend-air opening on top of distribution housing (Fig. 79). Depress clip retaining the driver's blend-air door drive gear. Pull out on gear and remove from the housing (Fig. 80).

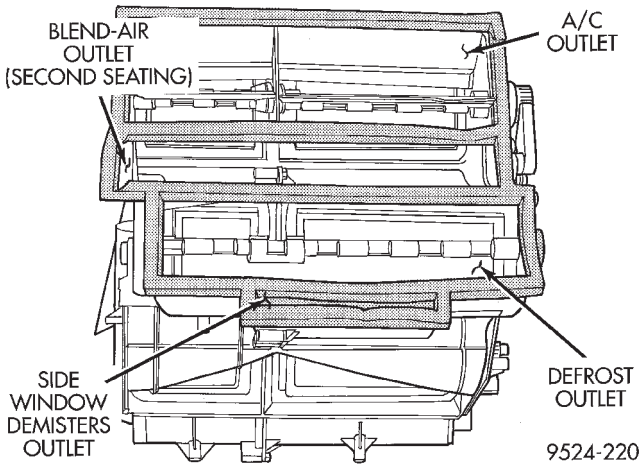


Fig. 79 Distribution Housing

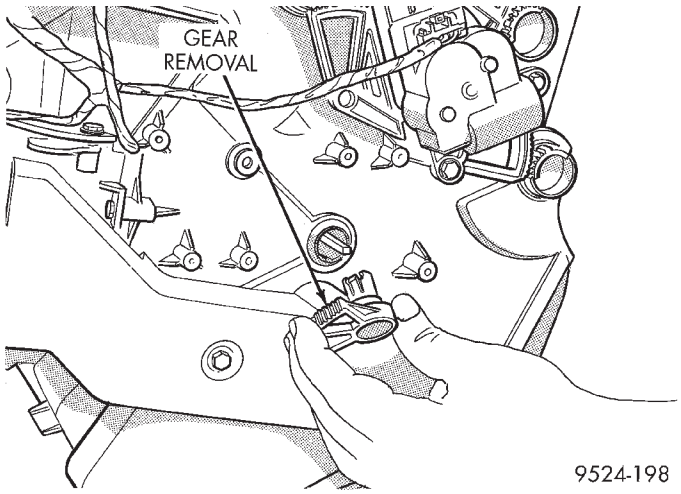


Fig. 80 Blend-Air Door Drive Gear

(10) Remove mode door motor.

(11) Remove Panel door actuator gear (Fig. 81).

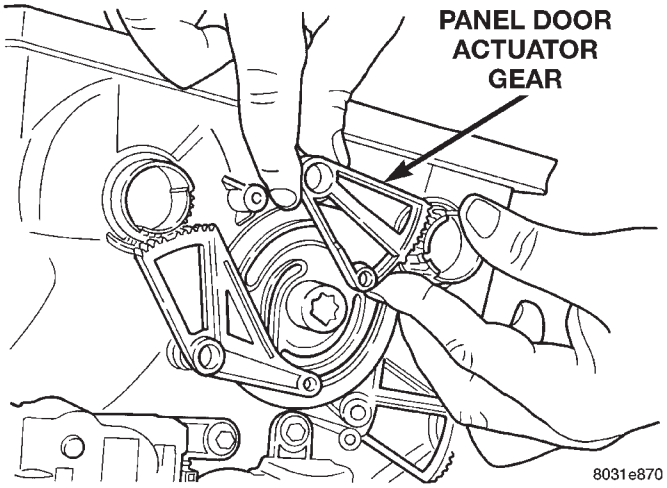


Fig. 81 Panel Door Gear

(12) Remove defrost door actuator gear (Fig. 82).

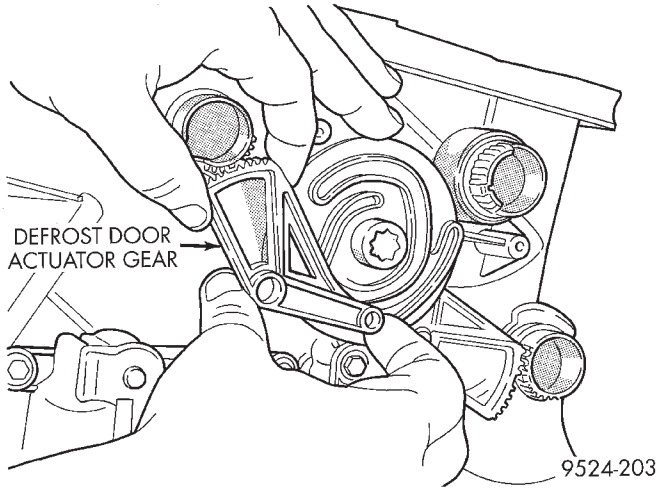


Fig. 82 Defrost Door Gear

DISASSEMBLY AND ASSEMBLY (Continued)

(13) Remove cam wheel (Fig. 83).

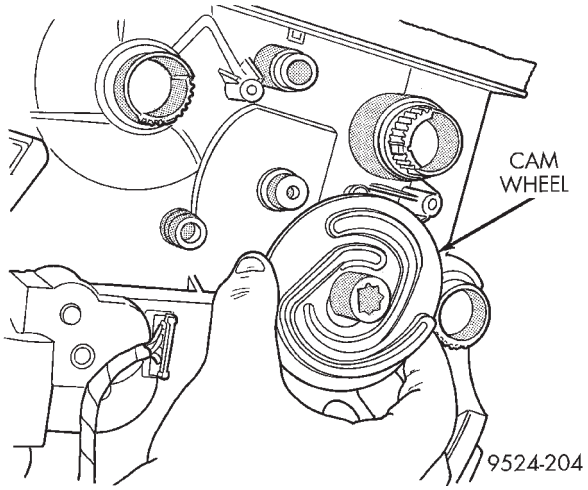


Fig. 83 Cam Wheel

(14) Remove heat door actuator gear (Fig. 84).

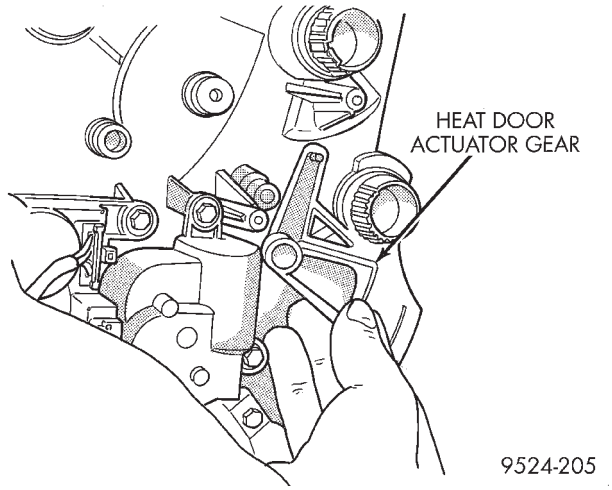


Fig. 84 Heat Door Gear

(15) Remove distribution housing lower cover screws (Fig. 85).

(16) Remove distribution housing half screws (Fig. 86).

(17) Remove distribution housing front cover (Fig. 87) and (Fig. 88).

(18) Remove weather-strip at fresh-air vent.

(19) Separate housing halves (Fig. 89).

(20) Pull up on separator plate and remove defrost door (Fig. 90).

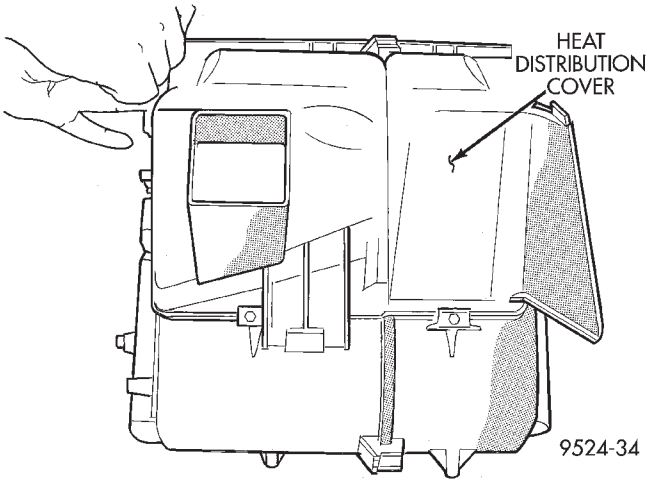


Fig. 85 Distribution Housing

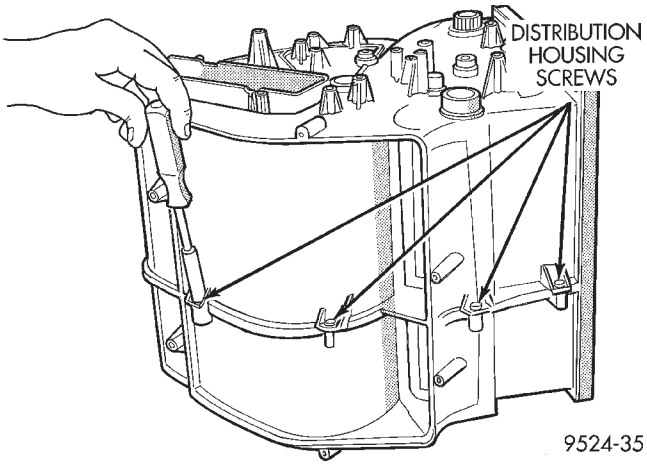


Fig. 86 Distribution Housing Half Screws

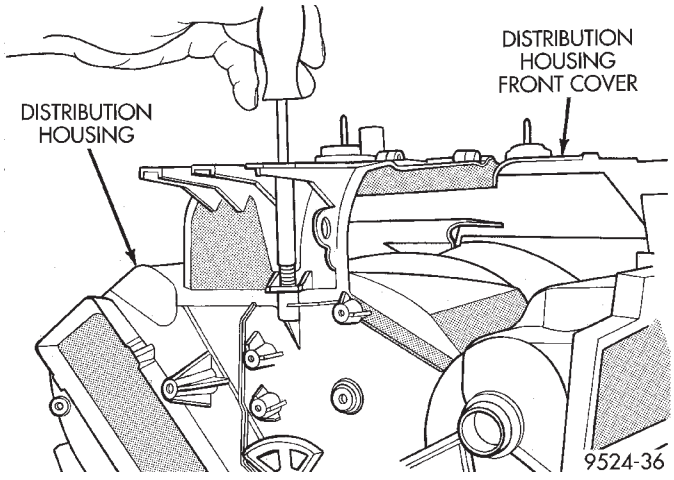


Fig. 87 Front Cover

DISASSEMBLY AND ASSEMBLY (Continued)

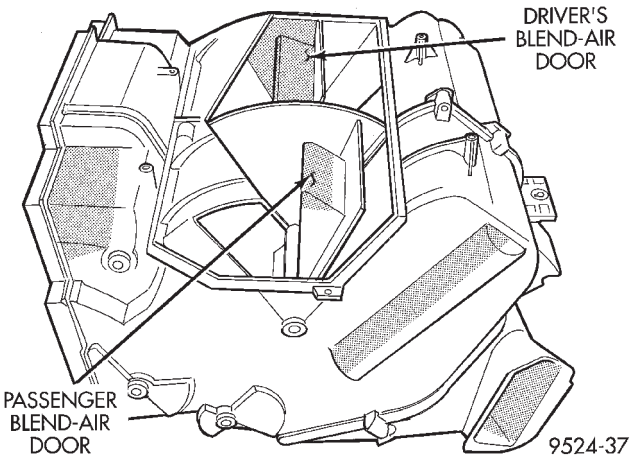


Fig. 88 View of Zone Control Doors

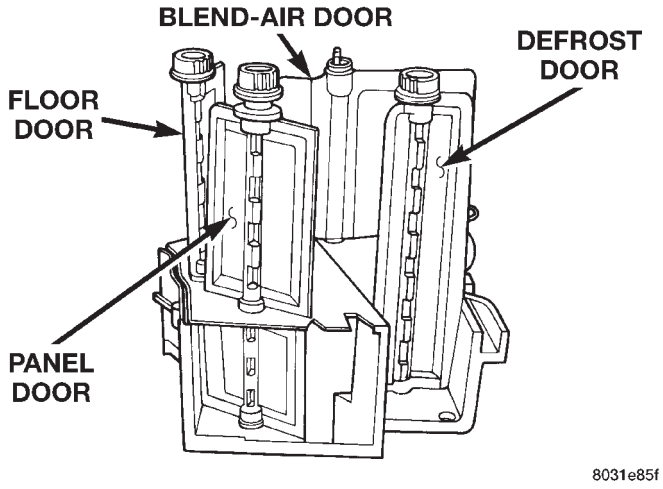


Fig. 89 Distribution Housing Halves

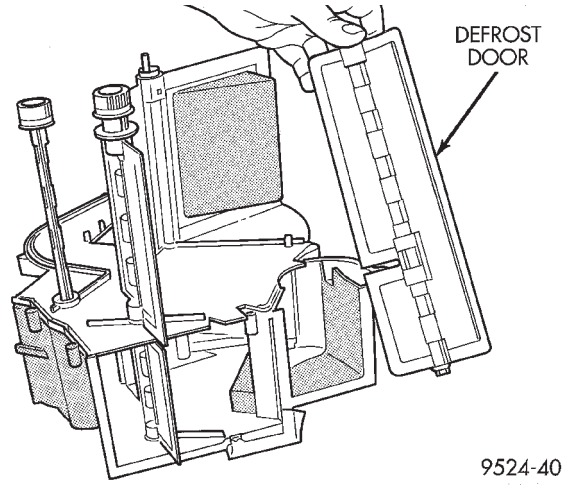


Fig. 90 Defrost Door

(21) Remove upper half Panel door (Fig. 91).

(22) Remove upper half of Floor door (Fig. 92).

(23) Remove upper half of the blend-air door (slide off of shaft) (Fig. 93).

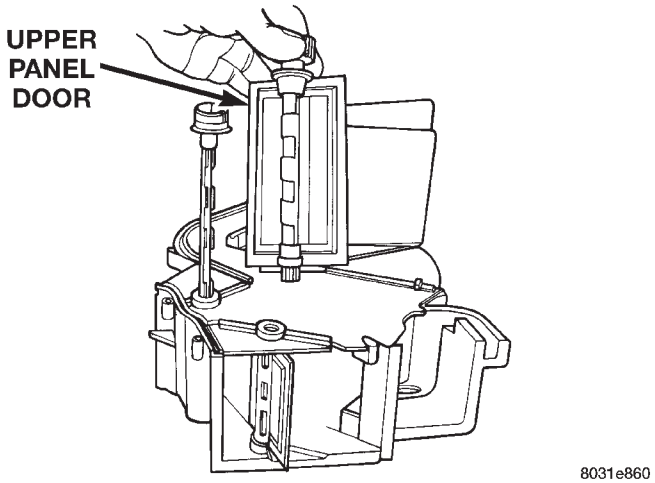


Fig. 91 Panel Door

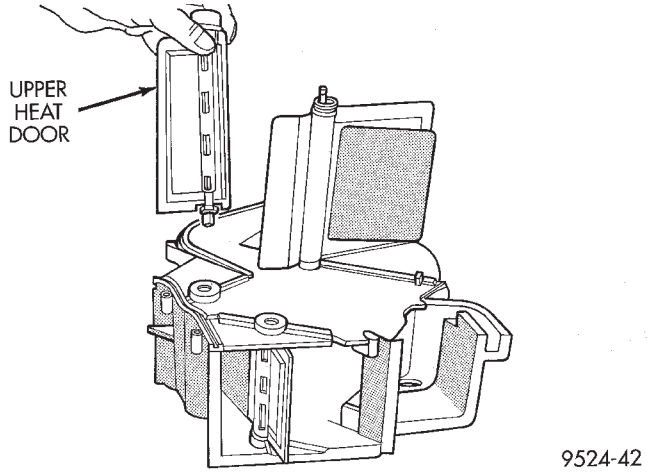


Fig. 92 Floor Door

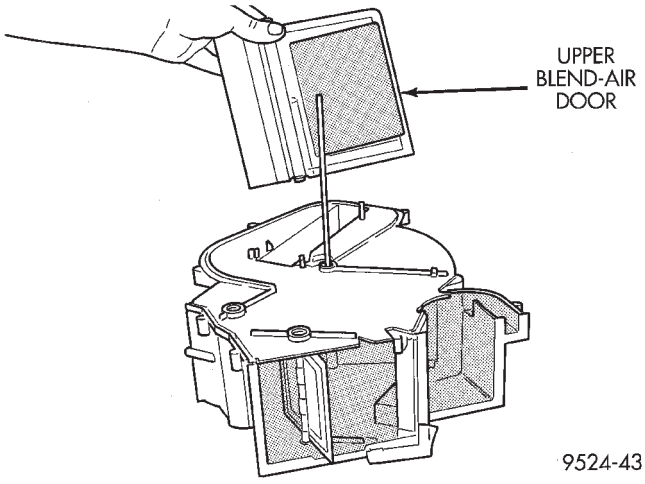


Fig. 93 Blend-Air Door

(24) Remove separator plate from distribution housing (Fig. 94).

(25) Remove lower half of the blend-air door (Fig. 95).

(26) Remove lower half of the Panel door (Fig. 96).

DISASSEMBLY AND ASSEMBLY (Continued)

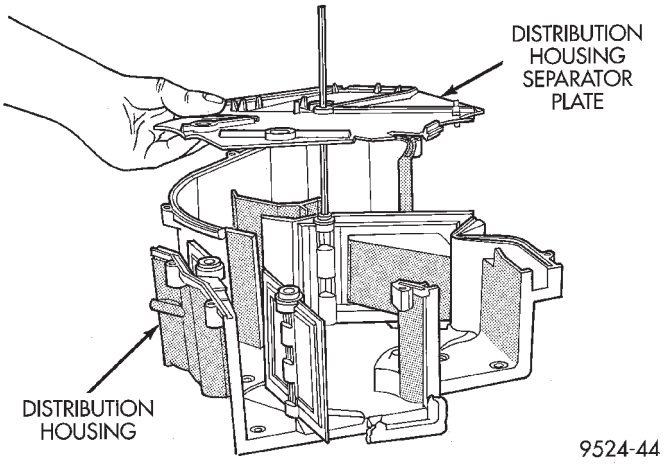


Fig. 94 Separator Plate

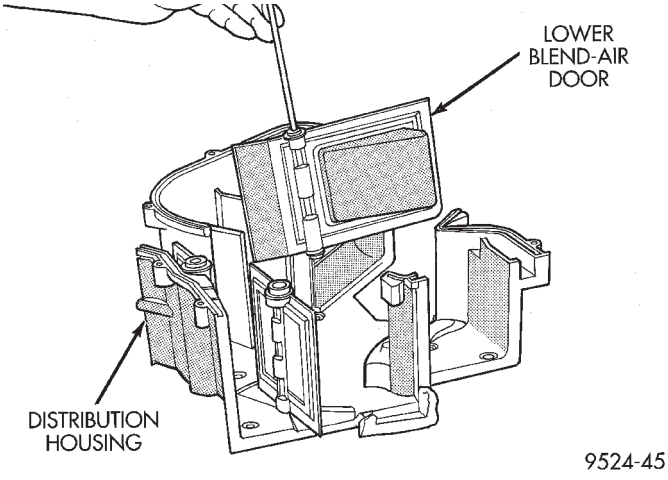


Fig. 95 Lower Blend-Air Door

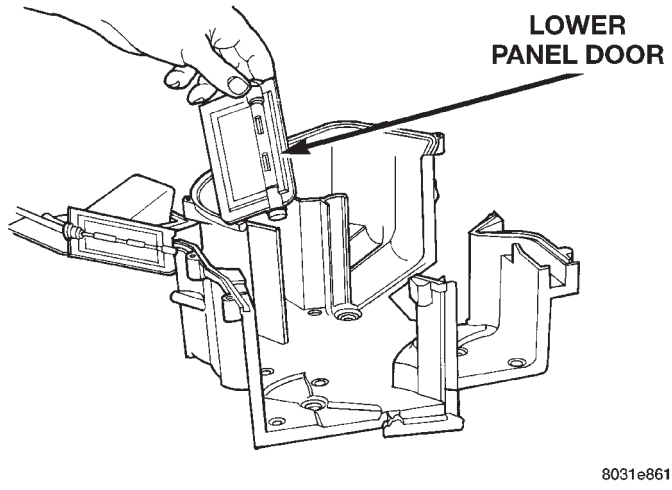


Fig. 96 Lower Panel Door

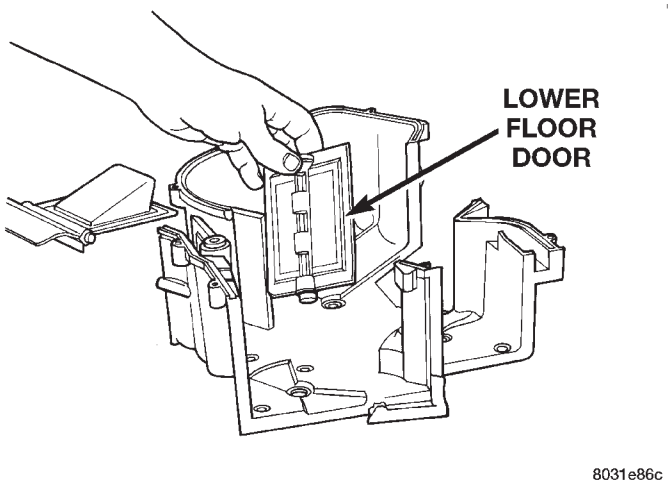


Fig. 97 Lower Floor Door

(27) Remove lower half of the Floor door (Fig. 97).

ASSEMBLY—DISTRIBUTION HOUSING

For reassembly of the distribution housing, reverse the above procedures.

To reassemble the distribution housing actuator gears an assembly procedure of the gears and cam is necessary.

ACTUATOR GEARS ALIGNMENT PROCEDURE

(1) Install lower FLOOR door actuator gear to housing. Match master spline of FLOOR door actuator gear to master spline on door.

(2) Install cam wheel. Align cam wheel track to FLOOR door actuator gear.

(3) Align cam wheel slot with the post on the distribution housing marked “1”.

(4) Install PANEL door actuator gear. Align master spline of PANEL door actuator gear to master spline on PANEL door. Position actuator gear within cam wheel track.

(5) Install DEFROST door actuator gear to housing. Match master spline of DEFROST door actuator to master spline on DEFROST door. Position actuator gear within cam wheel track.

(6) Reinstall housing in vehicle.

(7) Perform the HVAC control Calibration Diagnostic and Cooldown test.

REAR HEATING AND AIR CONDITIONING SYSTEM

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GENERAL INFORMATION

INTRODUCTION

For proper operation of the rear heating A/C system, refer to Owner's Manual supplied with the vehicle.

DESCRIPTION AND OPERATION

REAR BLOWER RESISTOR BLOCK

The rear blower motor resistor is not serviceable separately. The resistor is integral to the blower motor. If resistor is faulty, it is necessary to replace the complete blower motor.

REAR HEATER AND A/C LINES

The rear heater and A/C lines are all serviced as individual pieces. When disconnecting any line or block ensure that the area around it is clean of any contaminations that can get in to the system (Fig. 1), (Fig. 2), (Fig. 4), (Fig. 3) and (Fig. 5).

SYSTEM OPERATION

The auxiliary rear heating-air/conditioning unit is located in the right rear quarter panel. The rear heater A/C control operates in conjunction with the front heater A/C control. A four position two speed blower (override) switch is located on the front Heater A/C control panel (Fig. 6). The operator can use the rear heater A/C blower switch to operate the blower, regardless of the rear control setting. In the OFF position, the rear control will not function. In the ON (RR) position, the rear control will function normally providing three speeds (Fig. 7). The mode setting is controlled by the front A/C control panel.

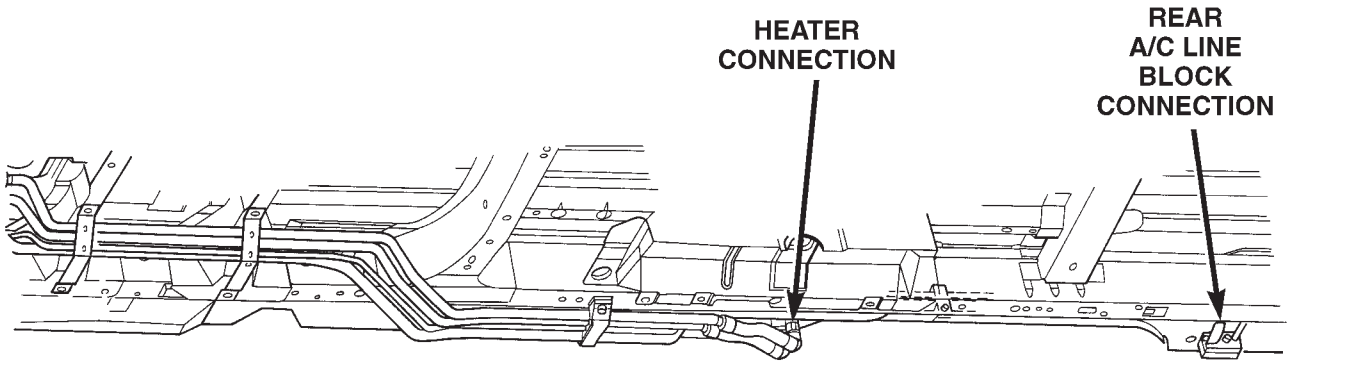

Fig. 1 Rear Heater and A/C Lines

DESCRIPTION AND OPERATION (Continued)

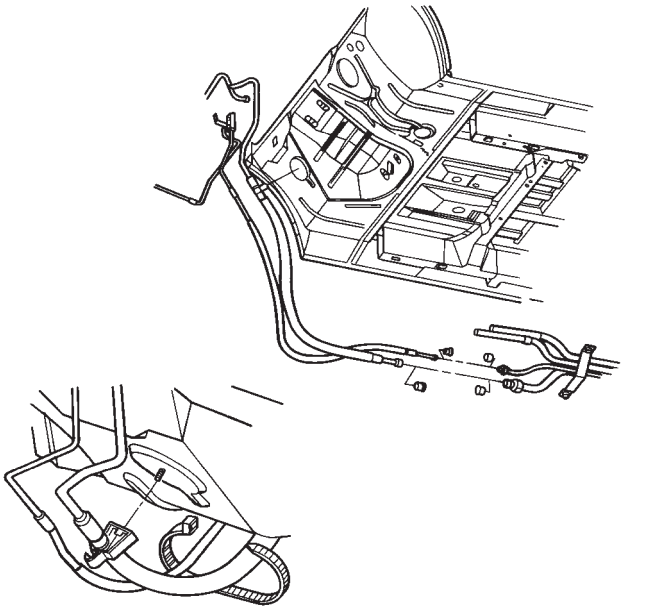

Fig. 2 Front Lines Connected to Rear Lines

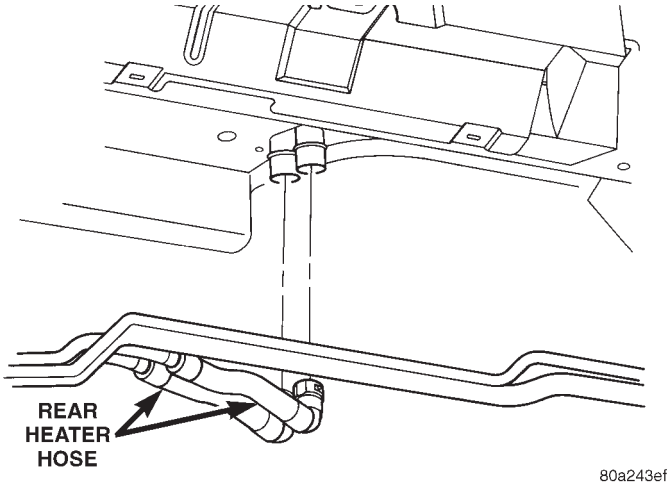

Fig. 3 Rear Heater Hose Connection

Air from inside the vehicle is drawn into the air intake grille in the right rear quarter trim panel. The air enters the blower and is pushed through the heater core and A/C evaporator coil. The air direction, floor or overhead, is determined by the position of the driver's temperature control lever on the front HVAC system control. If the temperature control lever is below 20% heat, the auxiliary HVAC system airflow will come from the overhead air outlets. In between 20% and 80%, the airflow will remain in the last position selected. In other words, if the driver started out in full heat and then adjusted their temperature lever to 30% heat as they became comfortable, the rear air would come out the floor outlets the whole time.

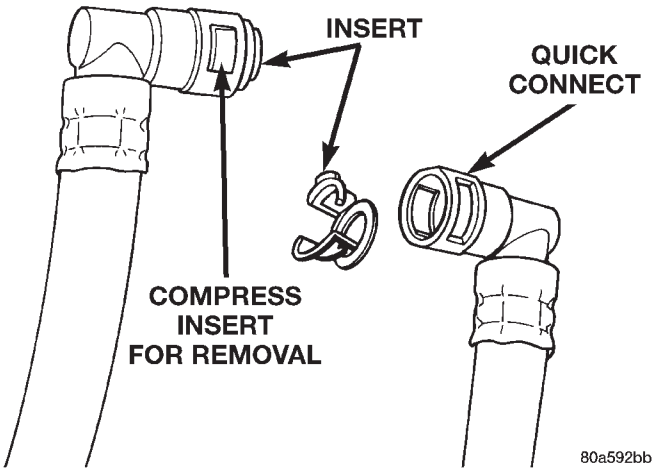

Fig. 4 Rear heater hose quick connects

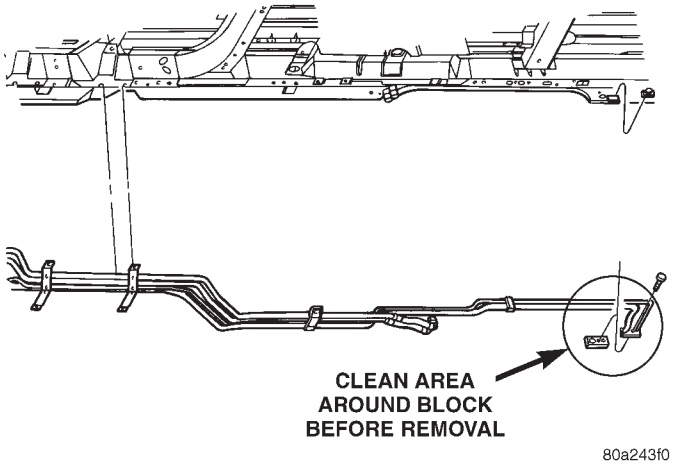

Fig. 5 Rear A/C Block Connection

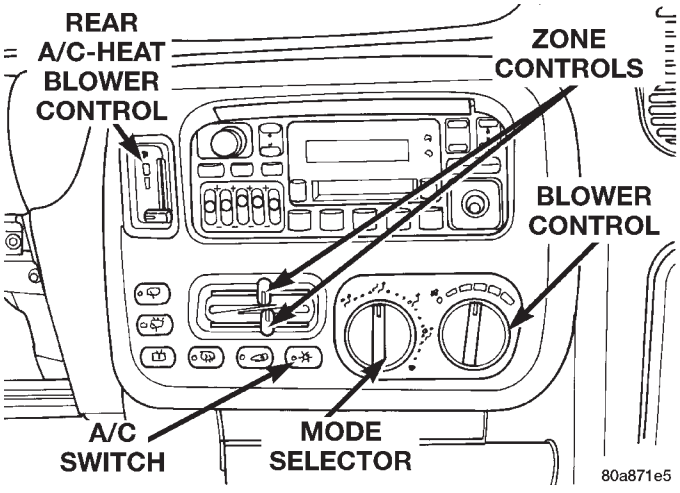

Fig. 6 A/C Control Panel

DESCRIPTION AND OPERATION (Continued)

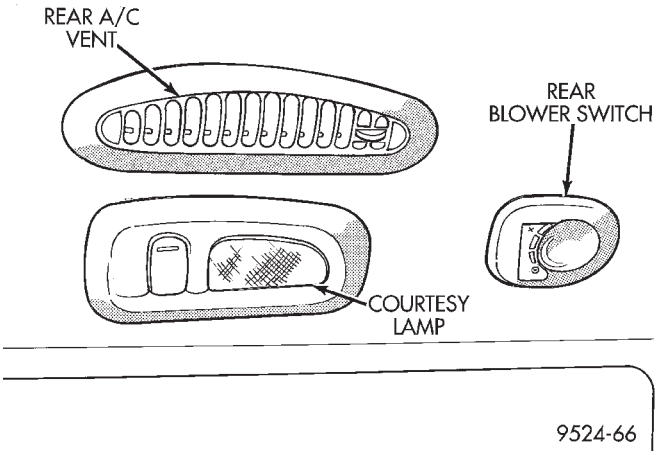

Fig. 7 Rear Blower Switch

DIAGNOSIS AND TESTING

DIAGNOSTIC PROCEDURES

When diagnosing electrical problems in the auxiliary rear heater or rear A/C system, refer to Group 8W, Wiring Diagrams.

When diagnosing problems in the auxiliary systems, refer to diagnostic sections for front heater A/C.

REMOVAL AND INSTALLATION

AIR DISTRIBUTION DUCT-A/C

REMOVAL

(1) Remove quarter trim panel, D-pillar, and headliner (Fig. 8). Refer to Group 23, Body.

(2) Remove screws securing D-pillar duct to quarter panel. Pull duct up and away from unit.

(3) Remove screws securing duct to rear header (Fig. 9).

(4) Remove screws securing duct to right and left rails (Fig. 10).

INSTALLATION

For installation, reverse the above procedures.

AIR DISTRIBUTION DUCT-HEATER

REMOVAL

(1) Remove quarter trim panel and D-pillar (Fig. 8) and (Fig. 11). Refer to Group 23, Body.

(2) Remove screws securing lower heat duct to housing.

INSTALLATION

For installation, reverse the above procedures.

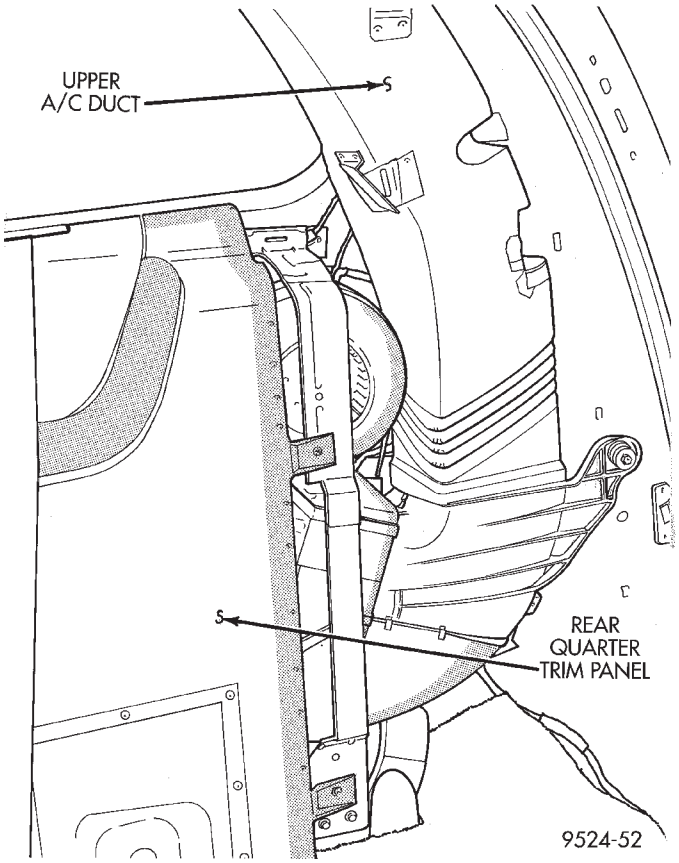

Fig. 8 Quarter Trim Panel

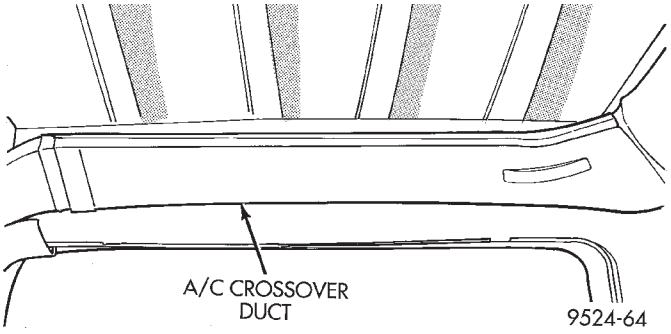

Fig. 9 Rear Crossover Duct

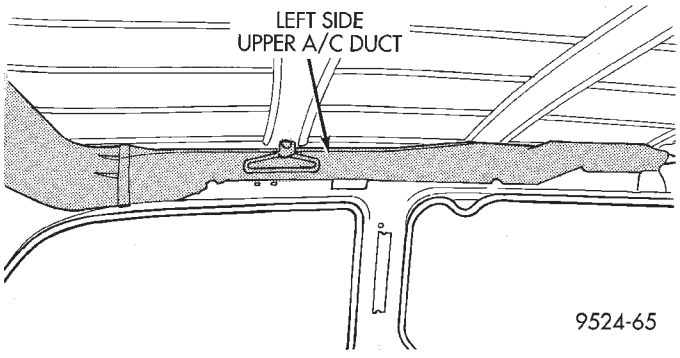

Fig. 10 Upper A/C Duct

REMOVAL AND INSTALLATION (Continued)

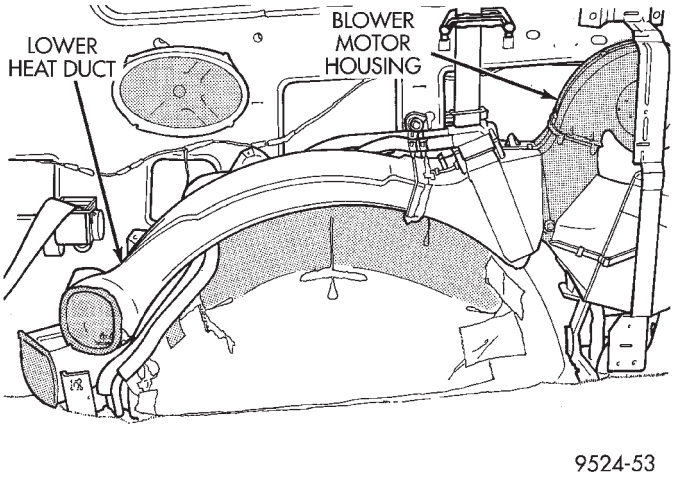

Fig. 11 Rear Heat-A/C Unit

EVAPORATOR AND EXPANSION VALVE

NOTE: Special effort must be used to keep all R-134a system components moisture-free. Moisture in the oil is very difficult to remove and will cause a reliability problem with the compressor.

REMOVAL

WARNING: THE REFRIGERANT SYSTEM MUST BE EMPTY BEFORE PERFORMING THE FOLLOWING OPERATION. THE ENGINE COOLING SYSTEM MUST ALSO BE RELIEVED OF ALL PRESSURE.

(1) Remove right quarter trim panel and D-pillar trim. Refer to Group 23, Body.
(2) Remove fan A/C distribution duct.
(3) Remove rear A/C unit.
(4) Remove blower scroll.
(5) Remove evaporator cover (Fig. 12).
(6) Remove the nut that mounts the refrigerant plumbing block to the expansion valve (Fig. 13).
(7) Carefully pull the evaporator and expansion valve straight out of unit (Fig. 14). Do not scratch the sealing surfaces with the plumbing extension tube pilots.
(8) Remove and discard the O-rings between the plumbing extension and the expansion valve.
(9) Cover the plumbing extension sealing surface to prevent contamination.
(10) Bring evaporator and expansion valve to a clean work space.
(11) Remove two 1/4-20 Torx Head screws.
(12) Remove expansion valve.
(13) Measure and record the amount of residual oil from the removed evaporator.

INSTALLATION

(1) Replace the O-rings.

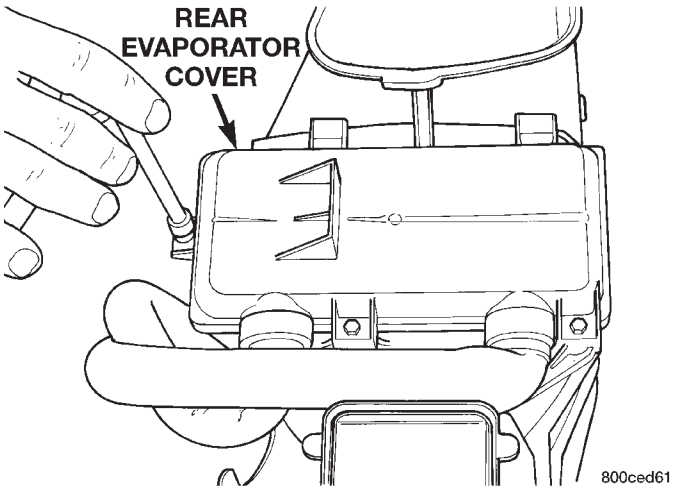

Fig. 12 Evaporator Cover

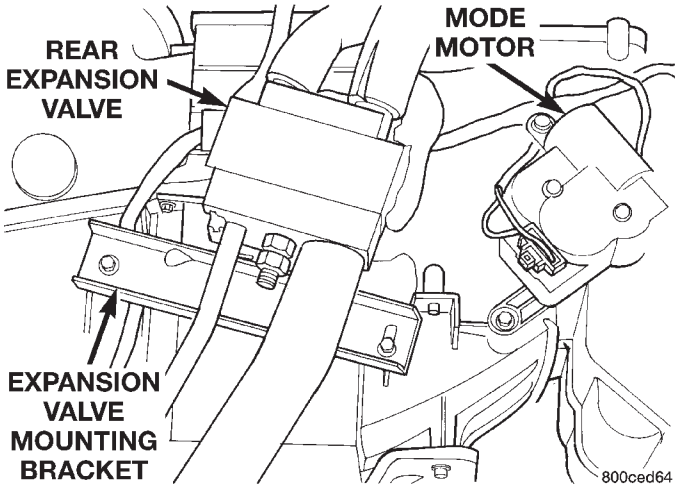

Fig. 13 Expansion Valve

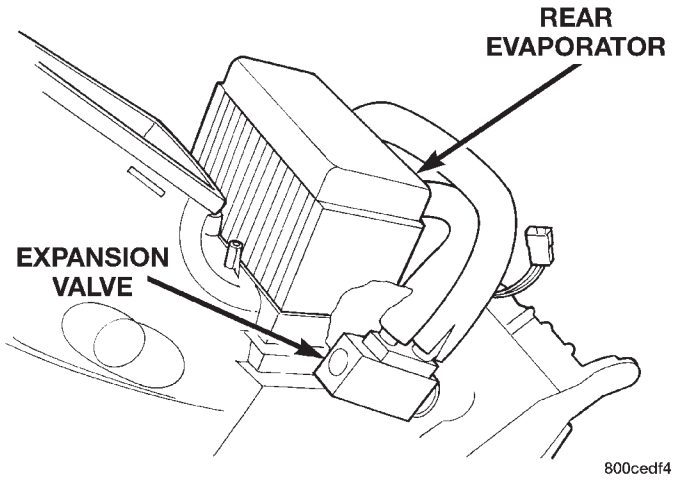

Fig. 14 Evaporator Removal

(2) Hold expansion valve against evaporator sealing plate (do not scratch the sealing surface). Install two screws and tighten to 11 ± 3 N·m (100 ± 30 inch pounds) torque.

REMOVAL AND INSTALLATION (Continued)

CAUTION: Do not damage the evaporator insulation liner during installation.

(3) Carefully install the evaporator and expansion valve straight into the unit. Do not scratch the sealing surfaces with the plumbing extension tube pilots.
(4) Determine the amount of old refrigerant oil drained from the evaporator. Add this amount (of clean refrigerant oil) back into the system.
(5) Carefully align the expansion valve onto the pilot tubes of the plumbing extension (do not scratch the sealing surface). Install the bolt through the plumbing plate into the unit sealing plate. Tighten bolts to 23 ± 3 N·m (200 ± 30 inch pounds) torque.
(6) Install evaporator cover and blower scroll.
(7) Install quarter trim panel, evacuate/charge system, and perform the performance test.

REAR AIR CONDITIONING LINES

WARNING: THE REFRIGERATION SYSTEM MUST BE COMPLETELY EMPTY BEFORE PROCEEDING WITH THIS OPERATION.

REMOVAL
(1) Hoist vehicle
(2) Remove compression fittings to the suction and liquid lines located on the right, outboard side of the underbody, rearward of the front crossmember. (Fig. 2)
(3) remove (1) bolt securing a/c lines to block located on the right, outboard side of the underbody, rearward of the rear wheel and tire. (Fig. 5)
(4) Remove (3) straps securing underbody lines. (Fig. 1)
(5) Separate and remove a/c lines from vehicle.

INSTALLATION
(1) Before installation, replace all O-rings and gaskets. Coat all sealing surfaces with approved wax-free refrigerant oil. Then, reverse the above procedures.
(2) Evacuate and recharge system.

REAR HEATER A/C AIR OUTLETS

REMOVAL
Separate barrel from bezel by pulling outward.

INSTALLATION
For installation, push the outlet firmly into the opening until it locks into place.

REAR HEATER-A/C AUXILIARY CONDENSER

If vehicle is equipped with a 3.3L or 3.8L engine with rear heater and air conditioning, it will be equipped with an auxiliary condenser. The auxiliary condenser is mounted on the primary condenser in front of the radiator. Both condenser must be removed as an assembly and then separated.

WARNING: THE REFRIGERATION SYSTEM MUST BE COMPLETELY EMPTY BEFORE PROCEEDING WITH THIS OPERATION.

NOTE: Special effort must be used to keep all R-134a system components moisture-free. Moisture in the oil is very difficult to remove and will cause a reliability problem with the compressor.

The condenser assembly must first be removed from vehicle. Refer to CONDENSER ASSEMBLY removal and installation in this section for service procedures.

REMOVAL
(1) After condenser assembly removal, place on bench for disassembly.
(2) Remove (1) bolt to liquid line on auxiliary condenser.
(3) Remove (4) attaching bolts and separate auxiliary from primary condenser. (Fig. 15)

INSTALLATION
(1) Before installation, replace all O-rings and gaskets. Coat all sealing surfaces with approved wax-free refrigerant oil. Then, reverse the above procedures.
(2) Evacuate and recharge system.

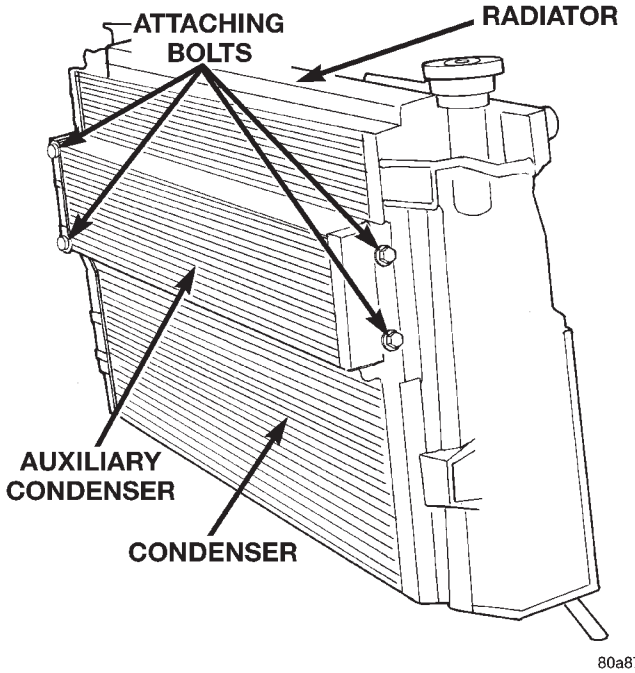

Fig. 15 3.3L/3.8L REAR HEAT-A/C AUXILIARY CONDENSER

REMOVAL AND INSTALLATION (Continued)

REAR HEATER A/C BLOWER MOTOR

REMOVAL

(1) Remove the right quarter trim panel and D-pillar trim. Refer to Group 23, Body for service procedures.

(2) Remove (5) screws securing the blower motor housing to the rear of the HVAC housing (one screw located on evaporator cover) (Fig. 16).

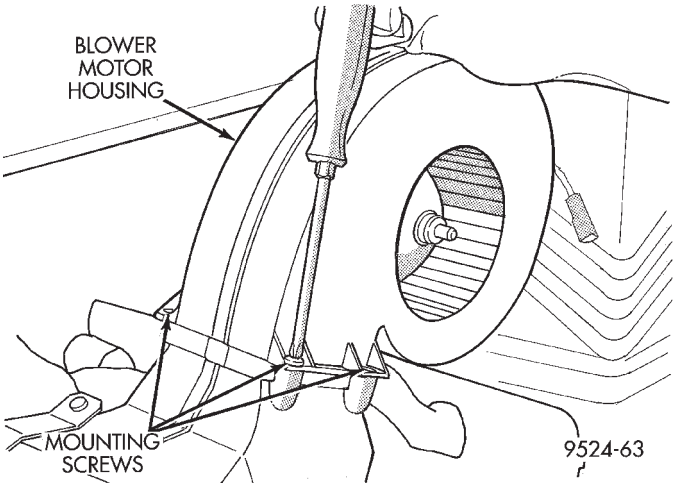

Fig. 16 Blower Motor

(3) Twist motor out of scroll housing.

(4) Disconnect blower motor wiring connector.

INSTALLATION

For installation, reverse the above procedures.

REAR HEATER-A/C CONTROL ILLUMINATION BULB

REMOVAL

(1) Remove rear heater-A/C control from trim panel.

(2) On the back of control opposite from the wire connectors, locate the bulb socket lug.

(3) Rotate the socket counterclockwise and pull the socket from the control.

INSTALLATION

For installation, reverse the above procedures. Refer to Group 8L, Lamps for bulb usage.

REAR HEATER A/C UNIT

NOTE: Special effort must be used to keep all R-134a system components moisture-free. Moisture in the oil is very difficult to remove and will cause a reliability problem with the compressor.

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH REAR A/C, THE REFRIGERANT SYSTEM MUST BE EMPTIED BEFORE PERFORMING THE FOLLOWING OPERATION. THE ENGINE COOLING SYSTEM MUST ALSO BE RELIEVED OF ALL PRESSURE.

(1) Using a refrigerant recovery machine, remove refrigerant from the A/C system. Disconnect A/C plumbing from rear heater A/C unit.

(2) Hoist vehicle.

(3) Remove A/C lines at lower floor pan flange (Fig. 17).

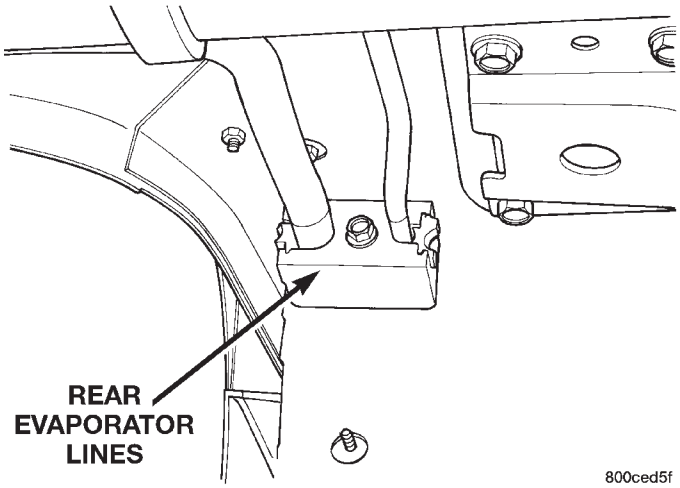

Fig. 17 A/C Lines

(4) Remove (3) A/C unit floor mounting nuts (Fig. 18).

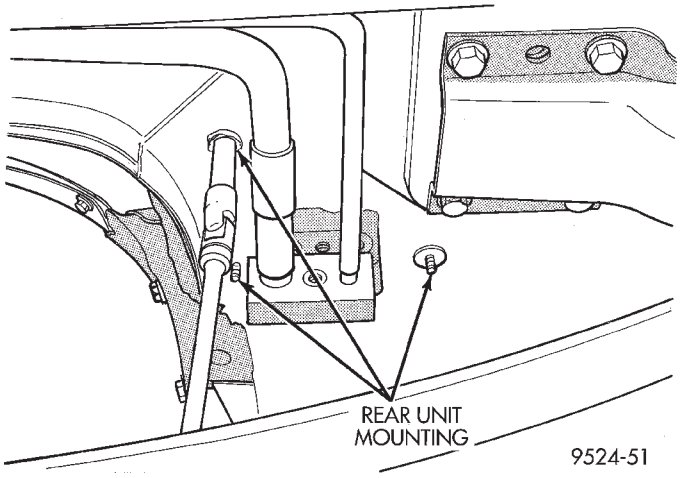

Fig. 18 A/C Mounting

(5) Lower vehicle.

(6) Remove right quarter trim panel and D-pillar trim (Fig. 8). Refer to Group 23, Body.

(7) Remove screws securing air distribution duct to the rear wheel housing (Fig. 19).

REMOVAL AND INSTALLATION (Continued)

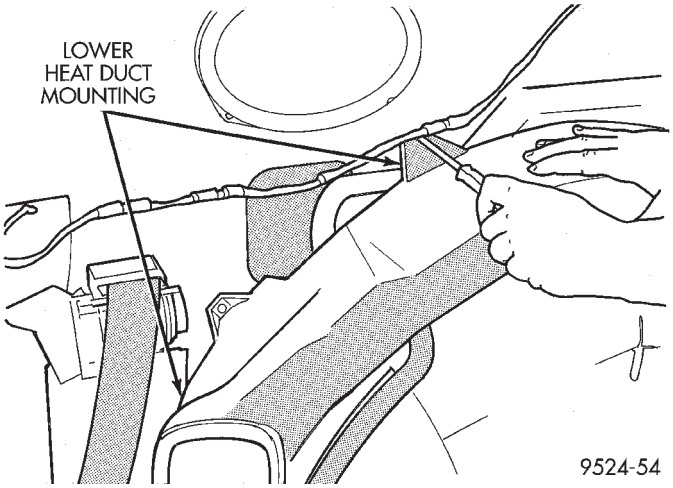

Fig. 19 Lower Heater Duct

(8) Pinch off heater lines at heater core hookup (Fig. 20).

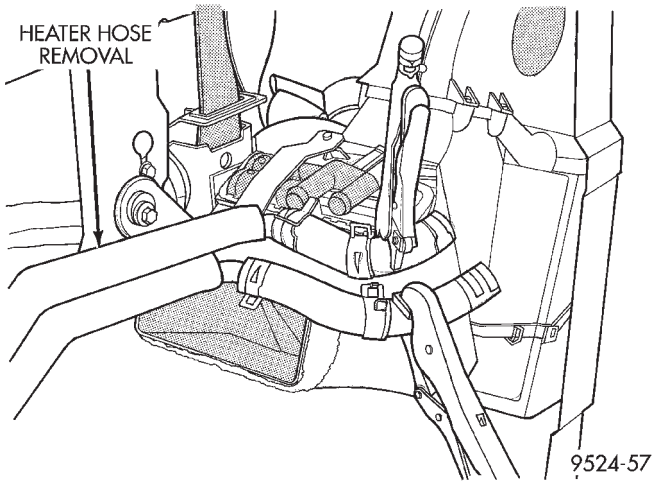

Fig. 20 Heater Core Lines

(9) Remove heater hoses at heater core (Fig. 21).

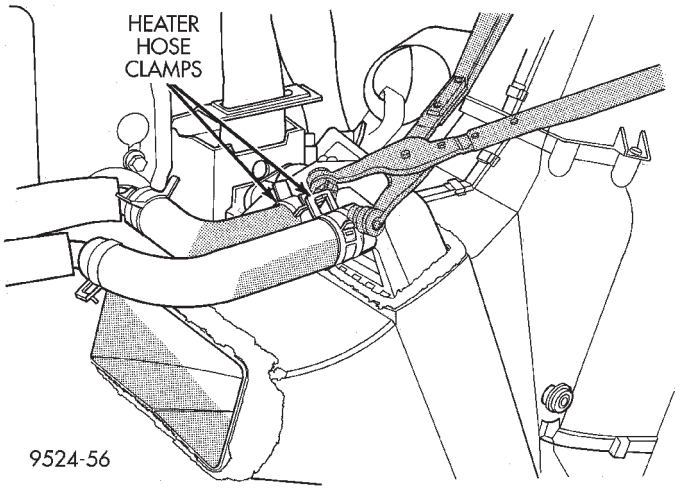

Fig. 21 Heater Hoses

(10) Remove quarter trim panel mounting bracket (Fig. 22).

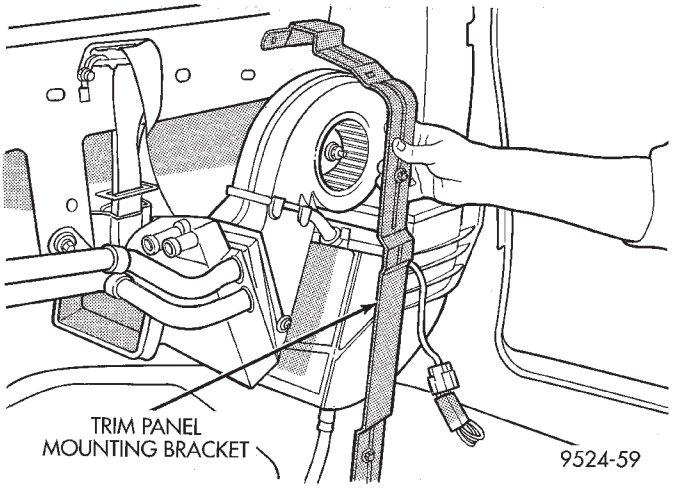

Fig. 22 Trim Panel Mounting Bracket

(11) Remove blower motor wiring harness connector.

(12) Remove rear upper duct trim screw (Fig. 23).

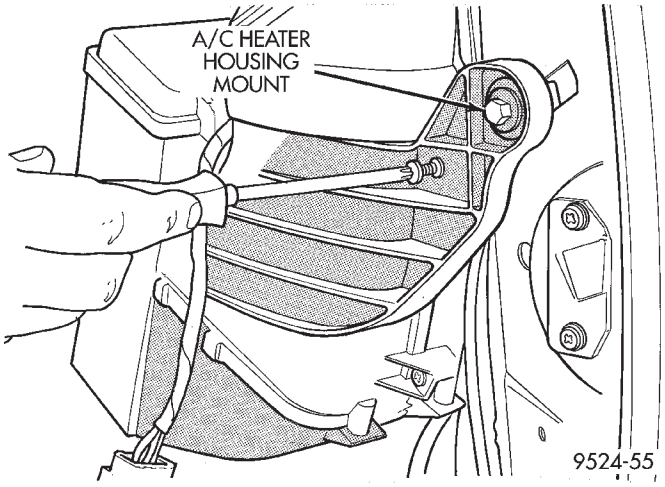

Fig. 23 Upper Duct Trim

(13) Remove (2) Heater-A/C housing mounting bolts (Fig. 24).

(14) Pull up on upper A/C duct. Tilt A/C unit outward (Fig. 25).

(15) Lift the unit enough to clear floor pan. Remove unit from the vehicle.

INSTALLATION

For installation, reverse the above procedures. Install new O-rings at refrigerant lines. Evacuate and charge the refrigerant system. Fill the heater core (Fig. 26). Test for leaks and overall performance.

REMOVAL AND INSTALLATION (Continued)

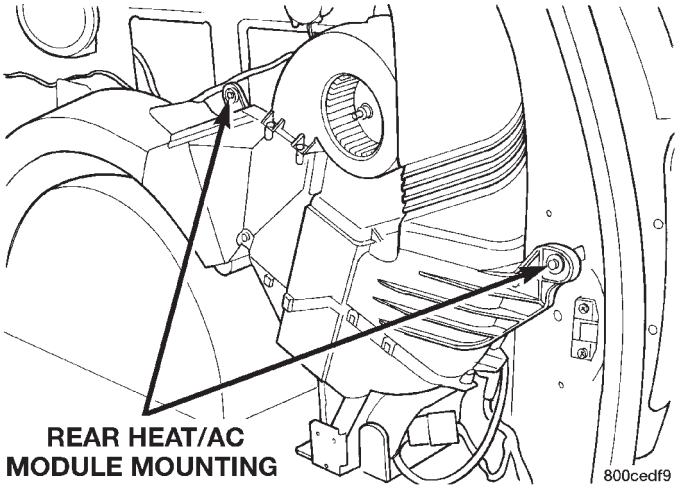

Fig. 24 Mounting Bolts

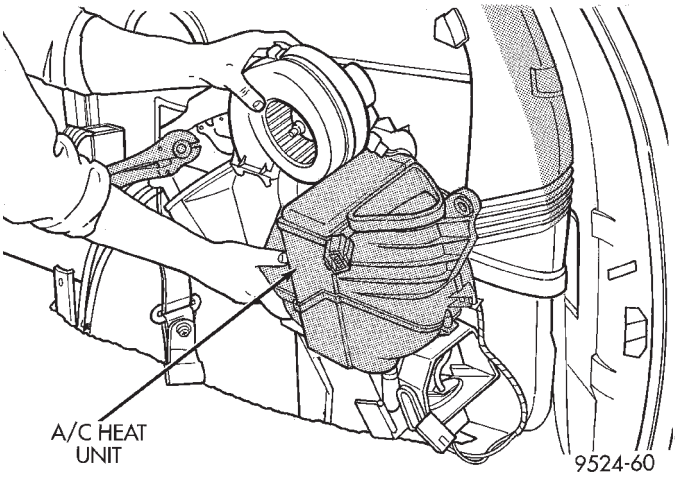

Fig. 25 A/C Unit Replacement

NOTE: If the heater core was emptied and was not prefilled, it is necessary to thermal cycle the vehicle TWICE. The heater core is positioned higher than the radiator fill cap. Therefore the heater core will not gravity fill to level. To thermal cycle the vehicle, it must be operated till the thermostat opens, then turned off and allowed to cool. In order to verify that the auxiliary unit is filled completely, the following procedure can be used:

- Vehicle at room temperature.
- Engine is brought up to operating temperature.
- Front unit is OFF, temperature slides are at full HEAT position.
- Engine is at idle.
- With rear blower motor ON HIGH.
- Discharge air temperature, measured at the dual register located on the C-pillar base, is between 135° and 145° F.

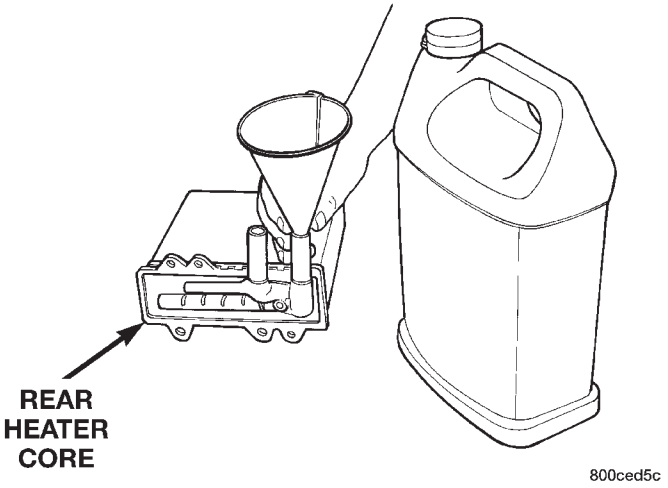

Fig. 26 Filling Heater Core

REAR HEATER CORE

REMOVAL

(1) Remove the lower right quarter trim panel. Refer to Group 23, Body.

(2) Isolate and disconnect lines from heater core (Fig. 27).

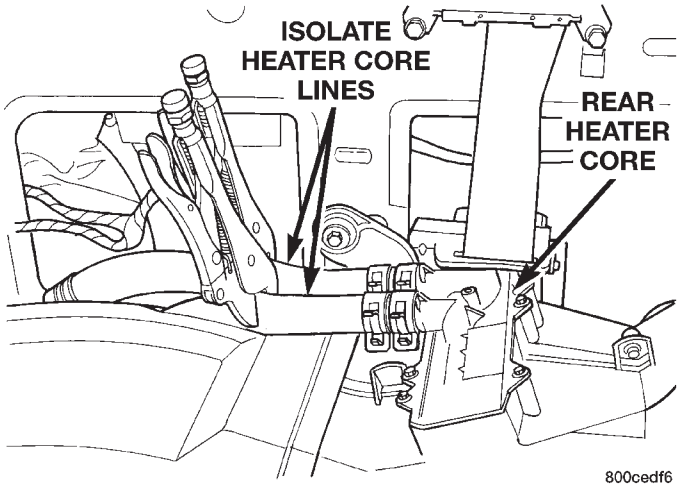

Fig. 27 Heater Core Lines

(3) Remove heater core retaining screws.

(4) Carefully pull the heater core and tubes up and straight out of the unit.

INSTALLATION

For installation, reverse the above procedures. Prefill the heater core (Fig. 26). Test for leaks and overall performance.

REMOVAL AND INSTALLATION (Continued)

NOTE: If the heater core was emptied and was not prefilled, it is necessary to thermal cycle the vehicle TWICE. The heater core is positioned higher than the radiator fill cap. Therefore the heater core will not gravity fill to level. To thermal cycle the vehicle, it must be operated till the thermostat opens, then turned off and allowed to cool. In order to verify that the auxiliary unit is filled completely, the following procedure can be used:

- Vehicle at room temperature.
- Engine is brought up to operating temperature.
- Front unit is OFF, temperature slides are at full HEAT position.
- Engine is at idle.
- With rear blower motor ON HIGH
- Discharge air temperature, measured at the dual register located on the C-pillar base, is between 57°C to 62°C (135° and 145° F).

REAR HEATER LINES

REMOVAL

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

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

(2) Loosen clamp at the front end of the hose located at the right, outboard side of the underbody, rearward of the front crossmember. (Fig. 2)

(3) Carefully rotate hose back and forth while tugging slightly away from connector nipple. If the hose will not come off, slice the hose at the connector nipple and peel off heater hose. This method will require heater hose replacement.

CAUTION: When removing hoses from outlet nipples, do not use excessive force. Outlet nipples may become damaged and leak engine coolant.

(4) Compress insert in rear heater hose quick connection and pull downward on hose. (Fig. 4)

(5) Remove (3) straps securing underbody lines. (Fig. 1)

(6) Separate and remove rear heater lines from vehicle.

INSTALLATION

For installation, reverse the above procedures.

MODE DOOR

REMOVAL

(1) Remove A/C unit.
(2) Place unit on bench.
(3) Remove heater core.
(4) Remove blower scroll.
(5) Remove evaporator cover.
(6) Remove A/C line to expansion valve mounting nut.
(7) Carefully pull evaporator out of housing.
(8) Remove mode door actuator and gear extension.
(9) Remove Heater-A/C housing clips and screws.
(10) Separate housing halves.
(11) Remove mode door.

INSTALLATION

For installation, reverse the above procedures.

MODE DOOR ACTUATOR

REMOVAL

(1) Remove A/C unit.
(2) Place unit on bench.
(3) Remove mode door actuator connector.
(4) Remove mode door actuator mounting screws and remove actuator.

INSTALLATION

For installation, reverse the above procedures.