

HEATING & AIR CONDITIONING

TABLE OF CONTENTS

	page		page
HEATING & AIR CONDITIONING		DIAGNOSIS AND TESTING - HEATER	
DESCRIPTION		PERFORMANCE	6
DESCRIPTION - HEATER AND AIR		DIAGNOSIS AND TESTING - VACUUM	
CONDITIONER	1	SYSTEM	6
DESCRIPTION - COOLING SYSTEM		STANDARD PROCEDURE - DIODE	
REQUIREMENTS.....	1	REPLACEMENT	9
DESCRIPTION - REFRIGERANT SYSTEM		SPECIFICATIONS	9
SERVICE PORT.....	2	A/C APPLICATION TABLE	10
OPERATION		SPECIFICATIONS	10
OPERATION - HEATER AND AIR		CONTROLS	11
CONDITIONER	2	DISTRIBUTION	29
OPERATION - REFRIGERANT SYSTEM		PLUMBING	38
SERVICE PORT.....	2		
DIAGNOSIS AND TESTING			
DIAGNOSIS AND TESTING - A/C			
PERFORMANCE	2		

HEATING & AIR CONDITIONING

DESCRIPTION

DESCRIPTION - HEATER AND AIR CONDITIONER

All vehicles are equipped with a common HVAC housing assembly (Fig. 1). The system combines air conditioning, heating, and ventilating capabilities in a single unit housing mounted under the instrument panel. On heater-only systems, the evaporator coil is omitted from the housing.

DESCRIPTION - COOLING SYSTEM REQUIREMENTS

To maintain the performance level of the HVAC system, the engine cooling system must be properly maintained. The use of a bug screen is not recommended. Any obstructions in front of the radiator or condenser will reduce the performance of the air conditioning and engine cooling systems.

The engine cooling system includes the heater core and the heater hoses. Refer to Engine Cooling for more information before the opening of, or attempting any service to the engine cooling system.

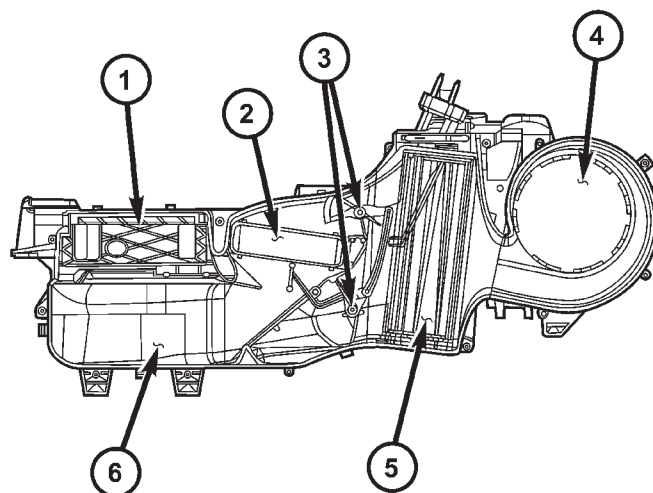


Fig. 1 Blend Door

- 1 - DEFROSTER DOOR
- 2- HEATER CORE
- 3- BLEND DOORS
- 4- BLOWER MOTOR HOUSING
- 5- EVAPORATOR (A/C ONLY)
- 6- LOWER HVAC CASE ASSEMBLY

HEATING & AIR CONDITIONING (Continued)

DESCRIPTION - REFRIGERANT SYSTEM SERVICE PORT

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

OPERATION**OPERATION - HEATER AND AIR CONDITIONER**

The heater and optional air conditioner are blend-air type systems. In a blend-air system, a blend door controls the amount of unconditioned air (or cooled air from the evaporator on models with air conditioning) that is allowed to flow through, or around, the heater core. A temperature control knob on the A/C Heater control panel determines the discharge air temperature by controlling an electric actuator, which moves the blend door. This allows an almost immediate control of the output air temperature of the system.

The mode control knob on the heater-only or A/C Heater control panel is used to direct the conditioned air to the selected system outlets. Both mode control switches use engine vacuum to control the mode doors, which are operated by vacuum actuators.

On all vehicles, the outside air intake can be shut off by selecting the Recirculation Mode with the mode control knob. This will operate a vacuum actuated recirculation door that closes off the outside fresh air intake and recirculates the air that is already inside the vehicle.

The optional air conditioner for all models is designed for the use of non-CFC, R-134a refrigerant. The air conditioning system has an evaporator to cool and dehumidify the incoming air prior to blending it with the heated air. This air conditioning system uses a fixed orifice tube in the liquid line near the condenser outlet tube to meter refrigerant flow to the evaporator coil. To maintain minimum evaporator temperature and prevent evaporator freezing, the A/C low pressure switch on the accumulator cycles the compressor clutch.

OPERATION - REFRIGERANT SYSTEM SERVICE PORT

The high pressure service port is located on the refrigerant line, near the discharge port of the compressor. The low pressure service port is located on the liquid line at the side of the engine compartment, near the condenser.

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

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

The air conditioning system is designed to provide the passenger compartment with low temperature and low humidity air. The evaporator, located in the HVAC housing on the dash panel below the instrument panel, is cooled to temperatures near the freezing point. As warm damp air passes through the cooled evaporator, the air transfers its heat to the refrigerant in the evaporator and the moisture in the air condenses on the evaporator fins. During periods of high heat and humidity, an air conditioning system will be more effective in the Recirculation Mode. With the system in the Recirculation Mode, only air from the passenger compartment passes through the evaporator. As the passenger compartment air dehumidifies, the air conditioning system performance levels improve.

Humidity has an important bearing on the temperature of the air delivered to the interior of the vehicle. It is important to understand the effect that humidity has on the performance of the air conditioning system. When humidity is high, the evaporator has to perform a double duty. It must lower the air temperature, and it must lower the temperature of the moisture in the air that condenses on the evaporator fins. Condensing the moisture in the air transfers heat energy into the evaporator fins and tubing. This reduces the amount of heat the evaporator can absorb from the air. High humidity greatly reduces the ability of the evaporator to lower the temperature of the air.

However, evaporator capacity used to reduce the amount of moisture in the air is not wasted. Removing some of the moisture out of the air entering the vehicle adds to the comfort of the passengers. Although, an owner may expect too much from the air conditioning system on humid days. A performance test is the best way to determine whether the system is performing up to standard. This test also provides valuable clues as to the possible cause of trouble with the air conditioning system.

Before proceeding, (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION). The air temperature in the test room and in the vehicle must be a minimum of 21° C (70° F) for this test.

HEATING & AIR CONDITIONING (Continued)

(1) Connect a tachometer a manifold gauge set or A/C recycling/charging station.

(2) Set the A/C Heater mode control switch knob in the Recirculation Mode position, the temperature control knob in the full cool position, and the blower motor switch knob in the highest speed position.

(3) Start the engine and hold the idle at 1,000 rpm with the compressor clutch engaged.

(4) The engine should be at operating temperature. The doors and windows must be closed.

(5) Insert a thermometer in the driver side center A/C (panel) outlet. Operate the engine for five minutes.

(6) The compressor clutch may cycle, depending upon the ambient temperature and humidity. If the clutch cycles, unplug the a/c low pressure switch harness connector. (Fig. 2). Place a jumper wire across the terminals of the a/c low pressure switch wire harness connector.

(7) With the compressor clutch engaged, record the discharge air temperature and the compressor discharge pressure.

(8) Compare the discharge air temperature to the Performance Temperature and Pressure chart. If the discharge air temperature is high, (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING -

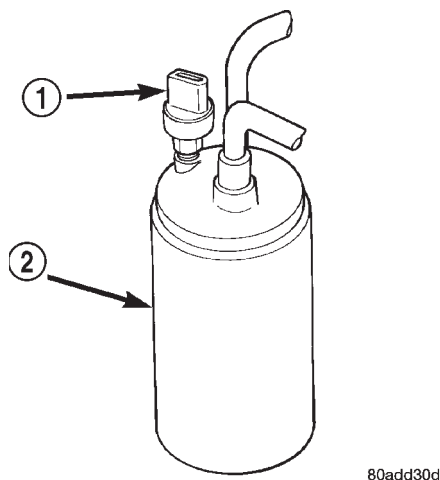


Fig. 2 A/C LOW PRESSURE SWITCH - TYPICAL

- 1 - A/C LOW PRESSURE SWITCH
2 - ACCUMULATOR

DIAGNOSIS AND TESTING - REFRIGERANT SYSTEM LEAKS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - SPECIFICATIONS - CHARGE CAPACITY).

Performance Temperature and Pressure					
Ambient Air Temperature	21° C (70° F)	27° C (80° F)	32° C (90° F)	38° C (100° F)	43° C (110° F)
Air Temperature at Center Panel Outlet	7° C (45° F)	7° C (45° F)	13° C (55° F)	13° C (55° F)	18° C (64° F)
Compressor Inlet Pressure at Service Port (low Side)	138 to 207 kPa (20 to 30 psi)	172 to 241 kPa (25 to 35 psi)	207 to 276 kPa (30 to 40 psi)	241 to 310 kPa (35 to 45 psi)	276 to 345 kPa (40 to 50 psi)
Condensor Out Pressure at Service Port (High Side)	1034 to 1724 kPa (150 to 250 psi)	1379 to 2068 kPa (200 to 300 psi)	1724 to 2413 kPa (250 to 350 psi)	1999 to 2689 kPa (290 to 390 psi)	2413 to 2965 kPa (350 to 430 psi)

(9) Compare the compressor discharge pressure to the Performance Temperature and Pressure chart. If the compressor discharge pressure is high, see the Pressure Diagnosis chart.

HEATING & AIR CONDITIONING (Continued)

Pressure Diagnosis		
Condition	Possible Causes	Correction
Rapid compressor clutch cycling (ten or more cycles per minute).	1. Low refrigerant system charge.	1. See Plumbing/Diagnosis and Testing - Refrigerant System Leaks in this group. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
Equal pressures, but the compressor clutch does not engage.	1. No refrigerant in the refrigerant system. 2. Faulty fuse. 3. Faulty a/c compressor clutch coil. 4. Faulty a/c compressor clutch relay. 5. Improperly installed or faulty a/c low pressure switch. 6. Faulty a/c high pressure switch. 7. Faulty Powertrain Control Module (PCM).	1. See Plumbing/Diagnosis and Testing - Refrigerant System Leaks in this group. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required. 2. Check the fuses in the Power Distribution Center and the junction block. Repair the shorted circuit or component and replace the fuses, if required. 3. See A/C Compressor/Diagnosis and Testing - Compressor Clutch Coil in this group. Test the compressor clutch coil and replace, if required. 4. See A/C Compressor Clutch Relay/Diagnosis and Testing - Compressor Clutch Relay in this group. Test the compressor clutch relay and relay circuits. Repair the circuits or replace the relay, if required. 5. See A/C Low Pressure Switch/Diagnosis and Testing in this group. Test the a/c low pressure switch and tighten or replace, if required. 6. See A/C High Pressure Switch/Diagnosis and Testing in this group. Test the a/c high pressure switch and replace, if required. 7. (Refer to Appropriate Diagnostic Information). Test the PCM and replace, if required.
Normal pressures, but A/C Performance Test air temperatures at center panel outlet are too high.	1. Excessive refrigerant oil in system. 2. Blend door inoperative or sealing improperly. 3. Blend door actuator faulty or inoperative.	1. See Refrigerant Oil/Standard Procedure - Refrigerant Oil Level in this group. Recover the refrigerant from the refrigerant system and inspect the refrigerant oil content. Restore the refrigerant oil to the proper level, if required. 2. See Blend Door in this group. Inspect the blend door for proper operation and sealing and correct, if required. 3. Perform blend door actuator diagnosis, replace if faulty.
The low side pressure is normal or slightly low, and the high side pressure is too low.	1. Low refrigerant system charge. 2. Refrigerant flow through the accumulator is restricted. 3. Refrigerant flow through the evaporator coil is restricted.	1. See Plumbing/Diagnosis and Testing - Refrigerant System Leaks in this group. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required. 2. See Accumulator in this group. Replace the restricted accumulator, if required. 3. See A/C Evaporator in this group. Replace the restricted evaporator coil, if required.

HEATING & AIR CONDITIONING (Continued)

Pressure Diagnosis		
Condition	Possible Causes	Correction
	4. Faulty compressor.	4. See A/C Compressor in this group. Replace the compressor, if required.
The low side pressure is normal or slightly high, and the high side pressure is too high.	1. Condenser air flow restricted. 2. Inoperative cooling fan. 3. Refrigerant system overcharged. 4. Air in the refrigerant system. 5. Engine overheating.	1. Check the condenser for damaged fins, foreign objects obstructing air flow through the condenser fins, and missing or improperly installed air seals. Refer to Cooling for more information on air seals. Clean, repair, or replace components as required. 2. Refer to Cooling for more information. Test the cooling fan and replace, if required. 3. See Plumbing/Standard Procedure - Refrigerant System Charge in this group. Recover the refrigerant from the refrigerant system. Charge the refrigerant system to the proper level, if required. 4. See Plumbing/Diagnosis and Testing - Refrigerant System Leaks in this group. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required. 5. Refer to Cooling for more information. Test the cooling system and repair, if required.
The low side pressure is too high, and the high side pressure is too low.	1. Accessory drive belt slipping. 2. Fixed orifice tube not installed. 3. Faulty compressor.	1. Refer to Cooling for more information. Inspect the accessory drive belt condition and tension. Tighten or replace the accessory drive belt, if required. 2. See A/C Orifice Tube in this group. Replace the liquid line, if required. 3. See A/C Compressor in this group. Replace the compressor, if required.
The low side pressure is too low, and the high side pressure is too high.	1. Restricted refrigerant flow through the refrigerant lines. 2. Restricted refrigerant flow through the fixed orifice tube. 3. Restricted refrigerant flow through the condenser.	1. See Liquid, Suction, and Discharge Line in this group. Inspect the refrigerant lines for kinks, tight bends or improper routing. Correct the routing or replace the refrigerant line, if required. 2. See A/C Orifice Tube in this group. Replace the liquid line, if required. 3. See A/C Condenser in this group. Replace the restricted condenser, if required.

HEATING & AIR CONDITIONING (Continued)

DIAGNOSIS AND TESTING - HEATER PERFORMANCE

Before performing the following tests, refer to Cooling for the procedures to check the radiator coolant level, serpentine drive belt tension, radiator air flow and the radiator fan operation. Also be certain that the accessory vacuum supply line is connected at the engine intake manifold.

MAXIMUM HEATER OUTPUT

Engine coolant is delivered to the heater core through two heater hoses. With the engine idling at

normal operating temperature, set the temperature control knob in the full hot position, the mode control switch knob in the floor heat position, and the blower motor switch knob in the highest speed position. Using a test thermometer, check the temperature of the air being discharged at the HVAC housing floor outlets. Compare the test thermometer reading to the Temperature Reference chart.

Temperature Reference				
Ambient Air Temperature	15.5° C (60° F)	21.1° C (70° F)	26.6° C (80° F)	32.2° C (90° F)
Minimum Air Temperature at Floor Outlet	52.2° C (126° F)	56.1° C (133° F)	59.4° C (139° F)	62.2° C (144° F)

If the floor outlet air temperature is too low, refer to Cooling to check the engine coolant temperature specifications. Both of the heater hoses should be hot to the touch. The coolant return heater hose should be slightly cooler than the coolant supply heater hose. If the return hose is much cooler than the supply hose, locate and repair the engine coolant flow obstruction in the cooling system. Refer to Cooling for the procedures.

OBSTRUCTED COOLANT FLOW Possible locations or causes of obstructed coolant flow:

- Pinched or kinked heater hoses.
- Improper heater hose routing.
- Plugged heater hoses or supply and return ports at the cooling system connections.
- A plugged heater core.

If proper coolant flow through the cooling system is verified, and heater outlet air temperature is still low, a mechanical problem may exist.

MECHANICAL PROBLEMS Possible locations or causes of insufficient heat:

- An obstructed cowl air intake.
- Obstructed heater system outlets.
- A blend door not functioning properly.

TEMPERATURE CONTROL

If the heater outlet air temperature cannot be adjusted with the temperature control knob on the

A/C Heater control panel, the following could require service:

- The A/C Heater control.
- The blend door actuator.
- The blend door.
- Improper engine coolant temperature.

DIAGNOSIS AND TESTING - VACUUM SYSTEM

Vacuum control is used to operate the mode doors in the heater-only and a/c heater housings. Testing of the heater-only and A/C Heater mode control switch operation will determine if the vacuum, electrical, and mechanical controls are functioning. However, it is possible that a vacuum control system that operates perfectly at engine idle (high engine vacuum) may not function properly at high engine speeds or loads (low engine vacuum). This can be caused by leaks in the vacuum system, or a faulty vacuum check valve.

A vacuum system test will help to identify the source of poor vacuum system performance or vacuum system leaks. Before starting this test, stop the engine and make certain that the problem is not a disconnected vacuum supply tube at the engine intake manifold vacuum tap or at the vacuum reservoir.

HEATING & AIR CONDITIONING (Continued)

Use an adjustable vacuum test set (Special Tool C-3707-B) and a suitable vacuum pump to test the HVAC vacuum control system. With a finger placed over the end of the vacuum test hose probe (Fig. 3), adjust the bleed valve on the test set gauge to obtain a vacuum of exactly 27 kPa (8 in. Hg.). Release and block the end of the probe several times to verify that the vacuum reading returns to the exact 27 kPa (8 in. Hg.) setting. Otherwise, a false reading will be obtained during testing.

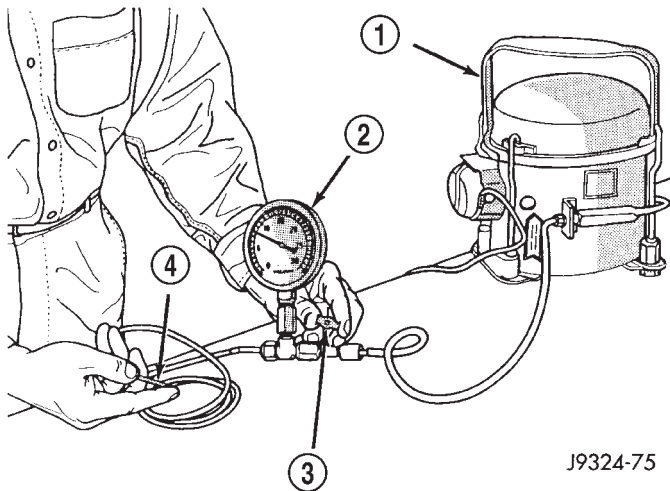


Fig. 3 ADJUST VACUUM TEST BLEED VALVE

- 1 - VACUUM PUMP TOOL C-4289
- 2 - VACUUM TEST SET C-3707
- 3 - BLEED VALVE
- 4 - PROBE

VACUUM CHECK VALVE

(1) Remove the vacuum check valve. The valve is located in the vacuum supply tube (black) at the HVAC system vacuum tee.

(2) Connect the test set vacuum supply hose to the A/C Heater Control side of the valve. When connected to this side of the check valve, no vacuum should pass and the test set gauge should return to the 27 kPa (8 in. Hg.) setting. If OK, go to Step 3. If not OK, replace the faulty valve.

(3) Connect the test set vacuum supply hose to the engine vacuum side of the valve. When connected to this side of the check valve, vacuum should flow through the valve without restriction. If not OK, replace the faulty valve.

A/C HEATER CONTROLS

(1) Connect the test set vacuum probe to the HVAC vacuum supply (black) tube at the tee in the engine compartment. Position the test set gauge so that it can be viewed from the passenger compartment.

(2) Place the A/C Heater Mode Control switch knob in each mode position, one position at a time, and pause after each selection. The test set gauge should return to the 27 kPa (8 in. Hg.) setting shortly after each selection is made. If not OK, a component or vacuum line in the vacuum circuit of the selected mode has a leak. See the procedure in Locating Vacuum Leaks.

CAUTION: Do not use lubricant on the switch ports or in the holes in the plug, as lubricant will ruin the vacuum valve in the switch. A drop of clean water in the connector plug holes will help the connector slide onto the switch ports.

LOCATING VACUUM LEAKS

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

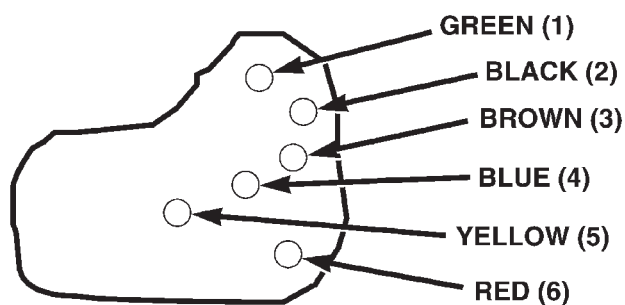
(1) Disconnect the vacuum harness connector from the back of the HVAC control head (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C HEATER CONTROL - REMOVAL).

(2) Connect the test set vacuum hose probe to each port in the HVAC housing half of the vacuum harness connector, one port at a time, and pause after each connection. The test set gauge should return to the 27 kPa (8 in. Hg.) setting shortly after each connection is made. If OK, replace the faulty A/C Heater Control. If not OK, go to Step 3.

(3) Determine the vacuum line color of the vacuum circuit that is leaking. To determine the vacuum line colors, refer to the Vacuum Circuits chart (Fig. 4).

(4) Disconnect and plug the vacuum line from the component (fitting, actuator, valve, switch, or reservoir) on the other end of the leaking circuit. Instrument panel disassembly or removal may be necessary to gain access to some components. See the appropriate service procedures.

HEATING & AIR CONDITIONING (Continued)



2002 KJ VACUUM LOGIC - HEATER ONLY CONTROL

PORT	1-GREEN	2-BLACK	3-BROWN	4-BLUE	5-YELLOW	6-RED
Actuation	Recirc Door	Source	Panel Door-Full	Floor/Def Floor	Floor/Def Mid-Pos	Panel Door-Mid
Off	Vacuum	Vacuum	Vent	Vent	Vent	Vent
Recirc	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum
Panel	Vent	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum
Bi-Level	Vent	Vacuum	Vent	Vacuum	Vacuum	Vacuum
Floor	Vent	Vacuum	Vent	Vacuum	Vacuum	Vent
Floor/Def	Vent	Vacuum	Vent	Vent	Vacuum	Vent
Defrost	Vent	Vacuum	Vent	Vent	Vent	Vent

2002 KJ VACUUM LOGIC - A/C CONTROL

PORT	1-GREEN	2-BLACK	3-BROWN	4-BLUE	5-YELLOW	6-RED
Actuation	Recirc Door	Source	Panel Door-Full	Floor/Def Floor	Floor/Def Mid-Pos	Panel Door-Mid
Off	Vacuum	Vacuum	Vent	Vent	Vent	Vent
Recirc a/c	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum
Panel a/c	Vent	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum
Bi-Level a/c	Vent	Vacuum	Vent	Vacuum	Vacuum	Vacuum
Bi-Level	Vent	Vacuum	Vent	Vacuum	Vacuum	Vacuum
Panel	Vent	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum
Floor	Vent	Vacuum	Vent	Vacuum	Vacuum	Vent
Floor/Def	Vent	Vacuum	Vent	Vent	Vacuum	Vent
Defrost	Vent	Vacuum	Vent	Vent	Vent	Vent

HEATING & AIR CONDITIONING (Continued)

(5) Connect the test set hose or probe to the open end of the leaking circuit. The test set gauge should return to the 27 kPa (8 in. Hg.) setting shortly after each connection is made. If OK, replace the faulty disconnected component. If not OK, go to Step 6.

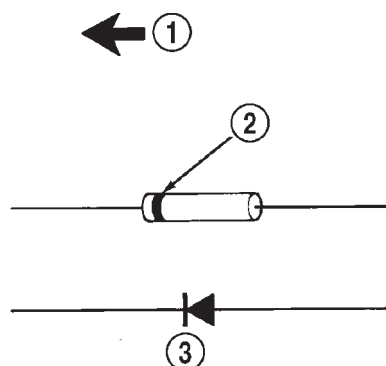
(6) To locate a leak in a vacuum line, leave one end of the line plugged and connect the test set hose or probe to the other end of the line. Run your fingers slowly along the line while watching the test set gauge. The vacuum reading will fluctuate when your fingers contact the source of the leak. To repair the vacuum line, cut out the leaking section of the line. Then, insert the loose ends of the line into a suitable length of 3 millimeter (0.125 inch) inside diameter rubber hose.

STANDARD PROCEDURE - DIODE REPLACEMENT

(1) Disconnect the battery negative cable and isolate it.

(2) Locate the diode in the harness, and remove the protective covering.

(3) Remove the diode from the harness, pay attention to the current flow direction (Fig. 5).



948W-197

Fig. 5 DIODE IDENTIFICATION

1 - CURRENT FLOW

2 - BAND AROUND DIODE INDICATES CURRENT FLOW

3 - DIODE AS SHOWN IN THE DIAGRAMS

(4) Remove the insulation from the wires in the harness. Only remove enough insulation to solder in the new diode.

(5) Install the new diode in the harness, making sure current flow is correct. If necessary refer to the appropriate wiring diagram for current flow.

(6) Solder the connection together using rosin core type solder only. **Do not use acid core solder.**

(7) Tape the diode to the harness using electrical tape making, sure the diode is completely sealed from the elements.

(8) Re-connect the battery negative cable, and test affected systems.

SPECIFICATIONS**A/C APPLICATION TABLE**

Item	Description	Notes
Vehicle	KJ- Liberty	
System	R134a w/ fixed orifice tube	
Compressor	Sanden PXF-18	SP-10 PAG oil
Freeze-up Control	A/C low pressure switch	accumulator mounted
Low psi Control	opens < 25 psi - resets > 43 psi	
High psi Control	switch - opens > 450-490 psi - resets < 270-330 psi	discharge line
Control Head	manual type	
Mode Door	vacuum	
Blend Door	electric	
Recirculation Door	vacuum	
Blower Motor	hardwired to control head	resistor block
Cooling Fan	viscous for cooling, single speed electric for A/C	
Clutch	Electro-mechanical	
Control	relay	PCM
Draw	2 - 3.7 amps @ 12V	± 0.5V @ 70° F
Gap	0.016" - 0.031"	
DRB III®		
Reads	TPS, RPM, A/C switch test	
Actuators	clutch and fan relay	

HEATING & AIR CONDITIONING (Continued)

SPECIFICATIONS*TORQUE SPECIFICATIONS*

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
A/C COMPRESSOR CLUTCH PLATE NUT	14.4	10.5	127.4
A/C COMPRESOR LINE MANIFOLD FASTENER	28 (±6)	21 (±4)	250 (±50)
A/C COMPRESSOR TO MOUNTING BRACKET BOLTS - 3.7L and 2.4L	27	20	239
A/C COMPRESSOR TO MOUNTING BRACKET BOLTS - 2.5L DIESEL	33	25	292
ACCUMULATOR RETAINING BAND	5	3.7	44
BLEND DOOR ACTUATOR SCREWS	2.4 (±.34)	1.8 (±.25)	21 (±3)
HVAC HOUSING SCREWS	2.4 (±.34)	1.8 (±.25)	21 (±3)
HVAC HOUSING TO DASH PANEL NUTS	6.2	4.6	55
SUCTION LINE TO ACCUMULATOR FITTING	9	6.6	80

CONTROLS

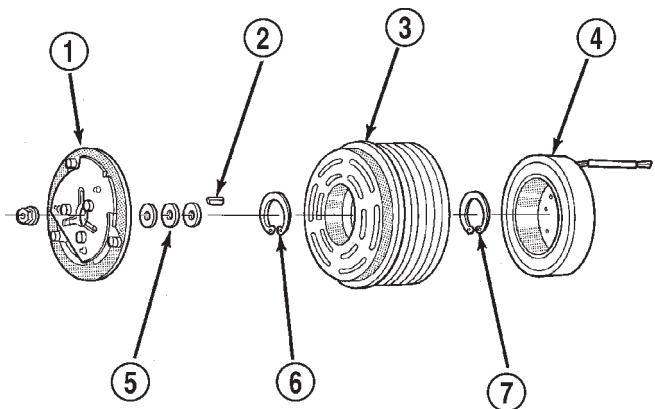
TABLE OF CONTENTS

	page		page
A/C COMPRESSOR CLUTCH		BLOWER MOTOR RELAY	
DESCRIPTION - 3.7L and 2.4L	12	DESCRIPTION	20
OPERATION - 3.7L and 2.4L	12	OPERATION	20
DIAGNOSIS AND TESTING - A/C		DIAGNOSIS AND TESTING - BLOWER	
COMPRESSOR CLUTCH COIL	12	MOTOR RELAY	21
STANDARD PROCEDURE - A/C		REMOVAL	21
COMPRESSOR CLUTCH BREAK-IN	12	INSTALLATION	22
REMOVAL	13	BLOWER MOTOR RESISTOR	
INSPECTION	14	DESCRIPTION	22
INSTALLATION	14	OPERATION	22
A/C COMPRESSOR CLUTCH RELAY		DIAGNOSIS AND TESTING - BLOWER	
DESCRIPTION	15	MOTOR RESISTOR	22
OPERATION	15	REMOVAL	22
DIAGNOSIS AND TESTING - COMPRESSOR		INSTALLATION	22
CLUTCH RELAY	15	BLOWER MOTOR SWITCH	
REMOVAL	16	DESCRIPTION	23
INSTALLATION	16	OPERATION	23
A/C HEATER CONTROL		DIAGNOSIS AND TESTING - BLOWER	
DESCRIPTION	16	MOTOR SWITCH	23
REMOVAL	17	REMOVAL	23
INSTALLATION	17	INSTALLATION	23
A/C HIGH PRESSURE SWITCH		MODE DOOR ACTUATOR	
DESCRIPTION	17	REMOVAL	
OPERATION	18	REMOVAL - PANEL DOOR ACTUATOR	24
DIAGNOSIS AND TESTING - A/C HIGH		REMOVAL - FLOOR - DEFROST DOOR	
PRESSURE SWITCH	18	ACTUATOR	24
REMOVAL	18	INSTALLATION	
INSTALLATION	18	INSTALLATION - PANEL DOOR ACTUATOR	25
A/C LOW PRESSURE SWITCH		INSTALLATION - FLOOR - DEFROST DOOR	
DESCRIPTION	18	ACTUATOR	25
OPERATION	18	RECIRCULATION DOOR ACTUATOR	
DIAGNOSIS AND TESTING - A/C LOW		REMOVAL	26
PRESSURE SWITCH	19	INSTALLATION	26
REMOVAL	19	VACUUM CHECK VALVE	
INSTALLATION	19	DESCRIPTION	28
BLEND DOOR ACTUATOR		OPERATION	28
REMOVAL	20	REMOVAL	28
INSTALLATION	20	INSTALLATION	28

A/C COMPRESSOR CLUTCH

DESCRIPTION - 3.7L and 2.4L

The compressor clutch assembly consists of a stationary electromagnetic coil, a rotor bearing and rotor assembly, and a clutch plate (Fig. 1). The electromagnetic coil unit and the rotor bearing and rotor assembly are each retained on the nose of the compressor front housing with snap rings. The clutch plate is keyed to the compressor shaft and secured with a nut. These components provide the means to engage and disengage the compressor from the engine serpentine accessory drive belt.



J9524-33

Fig. 1 COMPRESSOR CLUTCH - TYPICAL

- 1 - CLUTCH PLATE
- 2 - NOT USED ON KJ
- 3 - ROTOR
- 4 - COIL
- 5 - CLUTCH SHIMS
- 6 - SNAP RING
- 7 - SNAP RING

OPERATION - 3.7L and 2.4L

When the clutch coil is energized, it magnetically draws the clutch into contact with the rotor and drives the compressor shaft. When the coil is not energized, the rotor freewheels on the clutch rotor bearing, which is part of the rotor. The compressor clutch and coil are the only serviced parts on the compressor.

The compressor clutch engagement is controlled by several components: the A/C Heater mode control switch, the A/C low pressure switch, the A/C high pressure switch, the compressor clutch relay, and the Powertrain Control Module (PCM). The PCM may delay compressor clutch engagement for up to thirty seconds. Refer to Electronic Control Modules for more information on the PCM controls.

DIAGNOSIS AND TESTING - A/C COMPRESSOR CLUTCH COIL

For circuit descriptions and diagrams, (Refer to Appropriate Wiring Information). The battery must be fully-charged before performing the following tests. Refer to Battery for more information.

(1) Connect an ammeter (0 to 10 ampere scale) in series with the clutch coil terminal. Use a voltmeter (0 to 20 volt scale) with clip-type leads for measuring the voltage across the battery and the compressor clutch coil.

(2) With the A/C Heater mode control switch in any A/C mode, and the blower motor switch in the lowest speed position, start the engine and run it at normal idle.

(3) The compressor clutch coil voltage should read within 0.2 volts of the battery voltage. If there is voltage at the clutch coil, but the reading is not within 0.2 volts of the battery voltage, test the clutch coil feed circuit for excessive voltage drop and repair as required. If there is no voltage reading at the clutch coil, use a DRB III[®] scan tool and (Refer to Appropriate Diagnostic Information) for testing of the compressor clutch circuit and PCM control. The following components must be checked and repaired as required before you can complete testing of the clutch coil:

- Fuses in the junction block and the Power Distribution Center (PDC)
- A/C heater mode control switch
- Compressor clutch relay
- A/C high pressure switch
- A/C low pressure switch
- Powertrain Control Module (PCM).

(4) The compressor clutch coil is acceptable if the current draw measured at the clutch coil is 2.0 to 3.9 amperes with the electrical system voltage at 11.5 to 12.5 volts. This should only be checked with the work area temperature at 21° C (70° F). If system voltage is more than 12.5 volts, add electrical loads by turning on electrical accessories until the system voltage drops below 12.5 volts.

(a) If the clutch coil current reading is four amperes or more, the coil is shorted and should be replaced.

(b) If the clutch coil current reading is zero, the coil is open and should be replaced.

STANDARD PROCEDURE - A/C COMPRESSOR CLUTCH BREAK-IN

After a new compressor clutch has been installed, cycle the compressor clutch approximately twenty times (five seconds on, then five seconds off). During this procedure, set the A/C Heater control to the Recirculation Mode, the blower motor switch in the highest speed position, and the engine speed at 1500

A/C COMPRESSOR CLUTCH (Continued)

to 2000 rpm. This procedure (burnishing) will seat the opposing friction surfaces and provide a higher compressor clutch torque capability.

REMOVAL

The refrigerant system can remain fully-charged during compressor clutch, rotor, or coil replacement. The compressor clutch can be serviced in the vehicle.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the serpentine drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - REMOVAL).

(3) Unplug the compressor clutch coil wire harness connector.

(4) Remove the four bolts that secure the compressor to the mounting bracket.

(5) Remove the compressor from the mounting bracket. Support the compressor in the engine compartment while servicing the clutch.

(6) Insert the two pins of the spanner wrench (Special Tool C-4489 or equivalent) into the holes of the clutch plate. Hold the clutch plate stationary and remove the hex nut (Fig. 2).

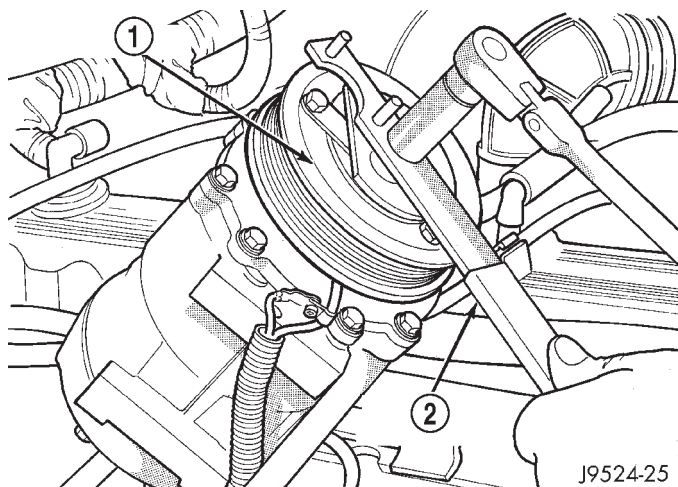


Fig. 2 CLUTCH NUT REMOVE

- 1 - CLUTCH PLATE
- 2 - SPANNER

(7) Remove the clutch plate.

(8) Remove the compressor clutch shims.

(9) Remove the external front housing snap ring with snap ring pliers (Fig. 3).

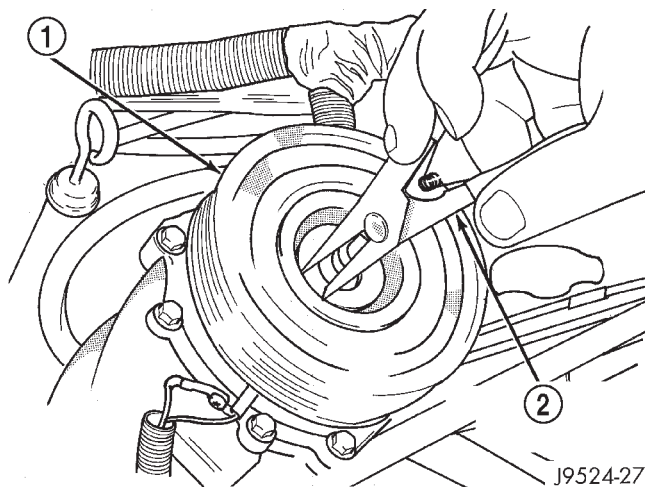


Fig. 3 EXTERNAL SNAP RING REMOVE

- 1 - PULLEY
- 2 - SNAP RING PLIERS

(10) Install the lip of the rotor puller (Special Tool C-6141-1 or equivalent) into the snap ring groove exposed in the previous step, and install the shaft protector (Special Tool C-6141-2 or equivalent) (Fig. 4).

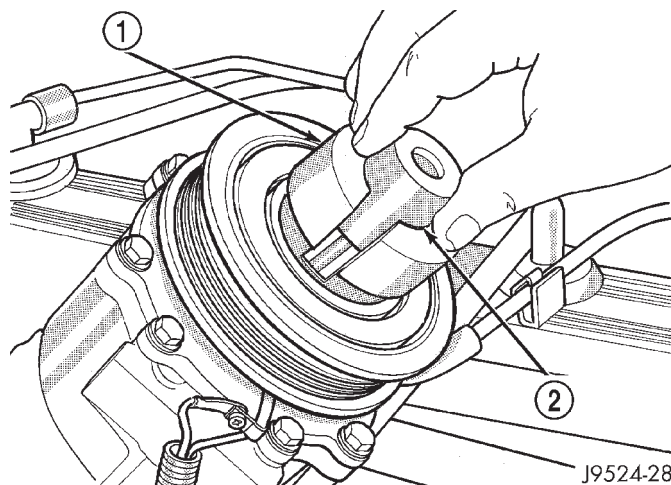


Fig. 4 SHAFT PROTECTOR AND PULLER

- 1 - PULLER JAW
- 2 - SHAFT PROTECTOR

A/C COMPRESSOR CLUTCH (Continued)

(11) Install the puller through-bolts (Special Tool C-6461 or equivalent) through the puller flange and into the jaws of the rotor puller and tighten (Fig. 5). Turn the puller center bolt clockwise until the rotor is free.

CAUTION: DO NOT APPLY FORCE TO THE END OF THE COMPRESSOR SHAFT.

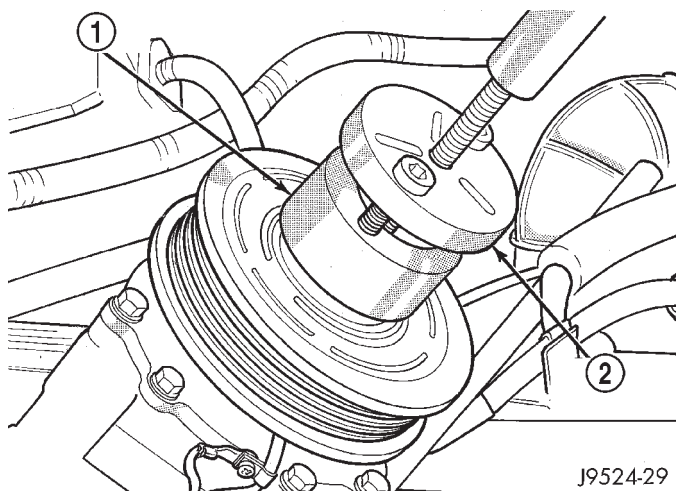


Fig. 5 INSTALL PULLER PLATE

- 1 - PULLER JAW
- 2 - PULLER

(12) Remove the screw and retainer from the clutch coil lead wire harness on the compressor front housing (Fig. 6).

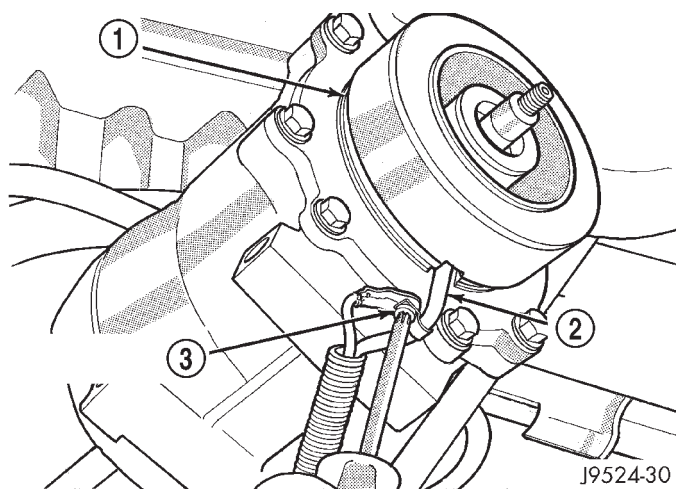


Fig. 6 CLUTCH COIL LEAD WIRE HARNESS

- 1 - COIL
- 2 - COIL WIRE
- 3 - RETAINER SCREW

(13) Remove the snap ring from the compressor hub and remove the clutch field coil (Fig. 7). Slide the clutch field coil off of the compressor hub.

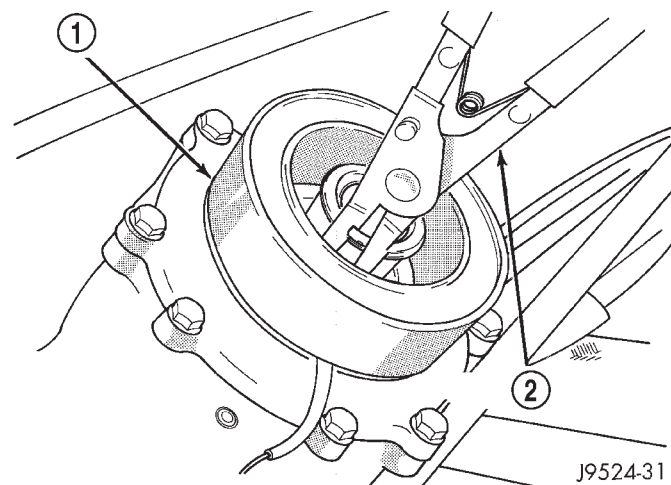


Fig. 7 CLUTCH FIELD COIL SNAP RING REMOVE

- 1 - COIL
- 2 - SNAP RING PLIERS

INSPECTION

Examine the friction surfaces of the clutch rotor and the clutch plate for wear. The rotor and clutch plate should be replaced if there is excessive wear or scoring.

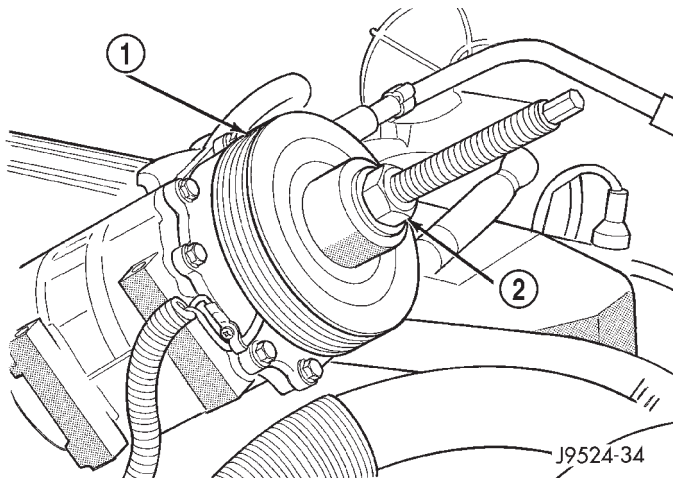
If the friction surfaces are oily, inspect the shaft and nose area of the compressor for oil. Remove the felt from the front cover. If the felt is saturated with oil, the shaft seal is leaking and the compressor must be replaced.

Check the rotor bearing for roughness or excessive leakage of grease. Replace the rotor and clutch plate, if required.

INSTALLATION

- (1) Install the clutch field coil and snap ring.
- (2) Install the screw and retainer on the clutch coil lead wire harness on the compressor front housing. Tighten screw to 2.2 N·m (20 in. lbs.).
- (3) Align the rotor assembly squarely on the front compressor housing hub.
- (4) Install the rotor bearing assembly with the installer (Special Tool C-6871 or equivalent) (Fig. 8). Thread the installer on the shaft, then turn the nut until the rotor assembly is seated.
- (5) Install the external front housing snap ring with snap ring pliers. The bevel side of the snap ring must be facing outward. Press the snap ring to make sure it is properly seated in the groove.

A/C COMPRESSOR CLUTCH (Continued)

**Fig. 8 CLUTCH PULLEY INSTALL**

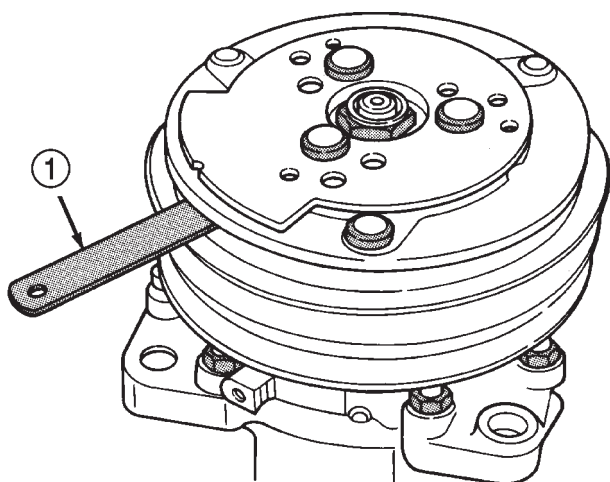
- 1 - ROTOR BEARING ASSEMBLY
2 - INSTALLER

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

(6) Install the original clutch shims on the compressor shaft.

(7) Install the clutch plate. Install the shaft hex nut and tighten to 15–20 N·m (11–15 ft. lbs.).

(8) Check the clutch air gap with a feeler gauge (Fig. 9). If the air gap does not meet the specification, add or subtract shims as required. The air gap specification is 0.41 to 0.79 millimeter (0.016 to 0.031 inch).



J8924-28

Fig. 9 CHECK CLUTCH AIR GAP

- 1 - FEELER GAUGE

NOTE: The air gap is determined by the spacer shims. When installing an original, or a new clutch assembly, try the original shims first. When installing a new clutch onto a compressor that previously did not have a clutch, use a 1.0, 0.50, and 0.13 millimeter (0.040, 0.020, and 0.005 inch) shims from the new clutch hardware package that is provided with the new clutch.

(9) To complete the procedure, (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/A/C COMPRESSOR - INSTALLATION).

A/C COMPRESSOR CLUTCH RELAY

DESCRIPTION

The compressor clutch relay is a International Standards Organization (ISO) micro-relay. The terminal designations and functions are the same as a conventional ISO relay. However, the micro-relay terminal orientation (footprint) is different, the current capacity is lower, and the relay case dimensions are smaller than those of the conventional ISO relay.

The compressor clutch relay is located in the Power Distribution Center (PDC) in the engine compartment. Refer to the PDC label for relay identification and location.

OPERATION

The compressor clutch relay is a electromechanical device that switches battery current to the compressor clutch coil when the Powertrain Control Module (PCM) grounds the coil side of the relay. The PCM responds to inputs from the A/C Heater mode control switch, the A/C low pressure switch, and the A/C high pressure switch. (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C COMPRESSOR CLUTCH RELAY - DIAGNOSIS AND TESTING)

The compressor clutch relay cannot be repaired and, if faulty or damaged, it must be replaced.

DIAGNOSIS AND TESTING - COMPRESSOR CLUTCH RELAY

RELAY TEST

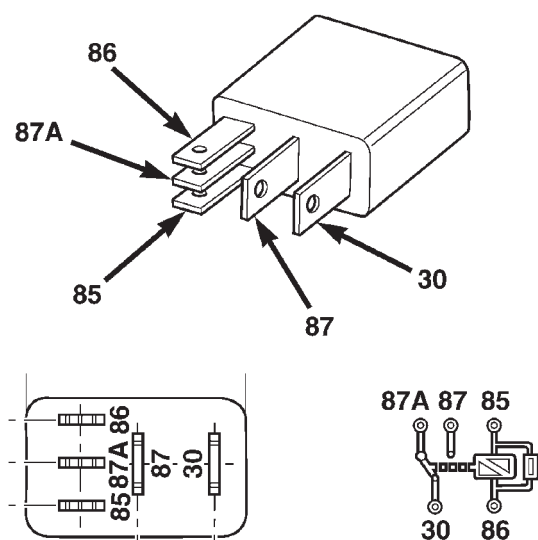
The compressor clutch relay (Fig. 10) is located in the Power Distribution Center (PDC). Refer to the PDC label for relay identification and location. Remove the relay from the PDC to perform the following tests:

(1) A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30. If OK, go to Step 2. If not OK, replace the faulty relay.

A/C COMPRESSOR CLUTCH RELAY (Continued)

(2) Resistance between terminals 85 and 86 (electromagnet) should be 67.5 to 82.5 ohms. If OK, go to Step 3. If not OK, replace the faulty relay.

(3) Connect a battery to terminals 85 and 86. There should now be continuity between terminals 30 and 87, and no continuity between terminals 87A and 30. If OK, see Relay Circuit Test. If not OK, replace the faulty relay.



80877170

Fig. 10 COMPRESSOR CLUTCH RELAY

30 - COMMON FEED
85 - COIL GROUND
86 - COIL BATTERY
87 - NORMALLY OPEN
87A - NORMALLY CLOSED

RELAY CIRCUIT TEST

For circuit descriptions and diagrams, (Refer to Appropriate Wiring Information).

(1) The relay common feed terminal cavity (30) is connected to fused battery feed. There should be battery voltage at the cavity for relay terminal 30 at all times. If OK, go to Step 2. If not OK, repair the open circuit to the fuse in the PDC as required.

(2) The relay normally closed terminal (87A) is not used in this application. Go to Step 3.

(3) The relay normally open terminal cavity (87) is connected to the compressor clutch coil. There should be continuity between this cavity and the A/C compressor clutch relay output circuit cavity of the compressor clutch coil wire harness connector. If OK, go to Step 4. If not OK, repair the open circuit as required.

(4) The relay coil battery terminal (86) is connected to the fused ignition switch output (run/start)

circuit. There should be battery voltage at the cavity for relay terminal 86 with the ignition switch in the On position. If OK, go to Step 5. If not OK, repair the open circuit to the fuse in the junction block as required.

(5) The coil ground terminal cavity (85) is switched to ground through the Powertrain Control Module (PCM). There should be continuity between this cavity and the A/C compressor clutch relay control circuit cavity of the PCM wire harness connector C (gray) at all times. If not OK, repair the open circuit as required.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the cover from the Power Distribution Center (PDC).

(3) Refer to the label on the PDC for compressor clutch relay identification and location.

(4) Unplug the compressor clutch relay from the PDC.

INSTALLATION

(1) Install the compressor clutch relay by aligning the relay terminals with the cavities in the PDC and pushing the relay firmly into place.

(2) Install the PDC cover.

(3) Connect the battery negative cable.

(4) Test the relay operation.

A/C HEATER CONTROL

DESCRIPTION

Both the heater-only and A/C heater systems use a combination of mechanical, electrical, and vacuum controls. These controls provide the vehicle operator with a number of setting options to help control the climate and comfort within the vehicle. Refer to the owner's manual in the vehicle glove box for more information on the features, use, and suggested operation of these controls.

The heater-only or A/C heater control panel is located to the right of the instrument cluster on the instrument panel. The control panel contains a rotary-type temperature control knob, a rotary-type mode control switch knob, and a rotary-type blower motor speed switch knob. The control also has a push button to activate the rear window defogger.

The heater-only or A/C heater control panel cannot be repaired. If faulty or damaged, the entire unit must be replaced. The illumination lamps are available for service replacement.

A/C HEATER CONTROL (Continued)

REMOVAL

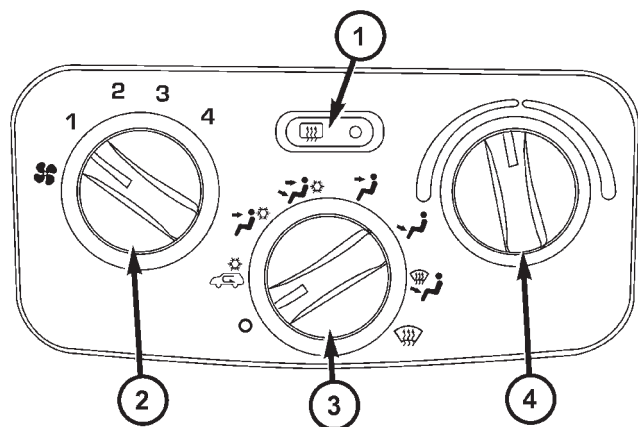
WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the center bezel from the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL CENTER BEZEL - REMOVAL).

(3) Release the vacuum harness from the A/C Heater control.

(4) Remove the four screws that secure the A/C Heater control to the instrument panel (Fig. 11).



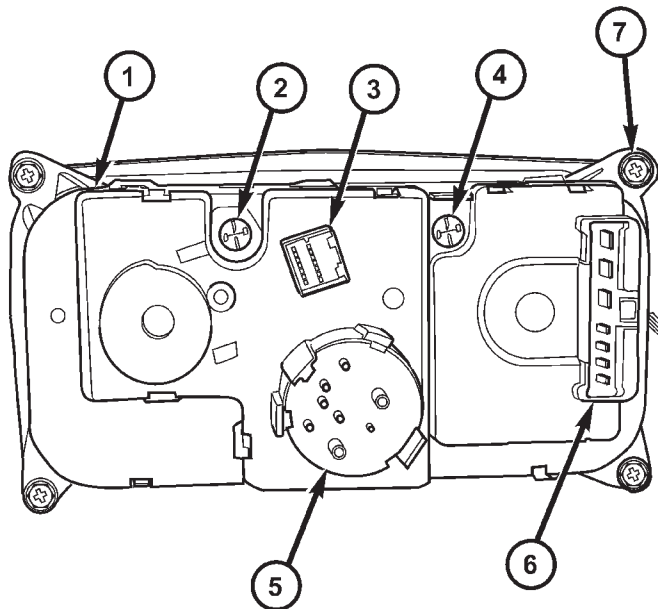
80c62f2e

Fig. 11 A/C HEATER CONTROL

- 1 - REAR WINDOW DEFOGGER SWITCH
- 2 - BLOWER SPEED CONTROL
- 3 - MODE SELECT CONTROL
- 4 - TEMPERATURE SELECT CONTROL

(5) Pull the A/C Heater control assembly away from the instrument panel far enough to access the connections on the back of the control.

(6) Unplug the wire harness connectors from the back of the A/C Heater control (Fig. 12).



80c62f2c

Fig. 12 A/C HEATER CONTROL HEAD (Rear View)

- 1 - A/C HEATER CONTROL HEAD
- 2 - A/C HEATER CONTROL HEAD LIGHT
- 3 - REAR WINDOW DEFOGGER SWITCH AND TEMPERATURE BLEND DOOR- CONNECTOR B (12 PIN)
- 4 - A/C HEATER CONTROL HEAD LIGHT
- 5 - MODE SELECT CONTROL
- 6 - BLOWER SPEED CONTROL- CONNECTOR A (7 PIN)
- 7 - MOUNTING SCREWS (4)

INSTALLATION

(1) Plug the two wire harness connectors and one vacuum connector into the back of the A/C Heater control.

(2) Position the A/C Heater control in the instrument panel bezel and secure it with four screws. Tighten the screws to 2.2 N·m (20 in. lbs.).

(3) Reinstall the center bezel onto the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL CENTER BEZEL - INSTALLATION).

(4) Connect the battery negative cable.

A/C HIGH PRESSURE SWITCH

DESCRIPTION

The A/C high pressure switch controls both A/C compressor clutch engagement/disengagement, and

A/C HIGH PRESSURE SWITCH (Continued)

electric cooling fan operations. The switch is located on the discharge line near the compressor. The switch is screwed onto a fitting that contains a Schrader-type valve, which allows the switch to be serviced without discharging the refrigerant system. The discharge line fitting is equipped with an O-ring to seal the switch connection.

OPERATION

The A/C high pressure switch is connected in series electrically with the A/C low pressure switch between ground and the Powertrain Control Module (PCM). The switch contacts open and close causing the PCM to turn the compressor clutch on and off. This prevents compressor operation when the discharge line pressure approaches high levels, and also reduces electrical surging from compressor clutch engagement.

The A/C high pressure switch controls the electric cooling fan operation by monitoring refrigerant line pressures. When the discharge line pressure rises above 1900 to 2200 kPa (280 to 320 psi) the fan will turn on. The cooling fan will turn off when the discharge line pressure drops to 1600 kPa (235 psi).

The A/C high pressure switch controls the A/C clutch operation by disengaging the clutch when the discharge line pressure rises above 3100 to 3375 kPa (450 to 490 psi). The switch contacts will close and allow A/C clutch engagement when the discharge line pressure drops to 1860 to 2275 kPa (270 to 330 psi).

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

DIAGNOSIS AND TESTING - A/C HIGH PRESSURE SWITCH

Before performing diagnosis of the A/C high pressure switch, verify that the refrigerant system has the correct refrigerant charge. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE)

For circuit descriptions and diagrams, (Refer to Appropriate Wiring Information).

(1) Disconnect and isolate the battery negative cable.

(2) Unplug the A/C high pressure switch wire harness connector from the switch on the refrigerant system fitting.

(3) On the four terminal A/C high pressure switch, check for continuity between terminals C and D. On the two terminal A/C high pressure switch, check for continuity between both terminals of the switch. There should be continuity. If OK, test and repair the

A/C switch sense circuit as required. If not OK, replace the faulty switch.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Unplug the wire harness connector from the A/C high pressure switch, which is mounted to a fitting on the non-flexible section of the discharge line nearest the compressor.

(3) Unscrew the A/C high pressure switch from the discharge line fitting.

(4) Remove the A/C high pressure switch from the vehicle.

(5) Remove the O-ring seal from the discharge line fitting and discard.

INSTALLATION

(1) Lubricate a new O-ring seal with clean refrigerant oil and install it on the discharge line fitting. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the compressor in the vehicle (Refer to 24 - HEATING & AIR CONDITIONING - SPECIFICATIONS). (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REFRIGERANT OIL - DESCRIPTION)

(2) Install and tighten the a/c high pressure switch on the discharge line fitting. The switch should be hand-tightened onto the discharge line fitting.

(3) Plug the wire harness connector into the a/c high pressure switch.

(4) Connect the battery negative cable.

A/C LOW PRESSURE SWITCH

DESCRIPTION

The a/c low pressure switch is located on the top of the accumulator. The switch is screwed onto an accumulator fitting that contains a Schrader-type valve, which allows the switch to be serviced without discharging the refrigerant system. The accumulator fitting is equipped with an O-ring to seal the switch connection.

OPERATION

The a/c low pressure switch is connected in series electrically with the a/c high pressure switch, between ground and the Powertrain Control Module (PCM). The switch contacts open and close causing the PCM to turn the a/c compressor clutch on and off. This regulates the refrigerant system pressure and controls evaporator temperature. Controlling the evaporator temperature prevents condensate water

A/C LOW PRESSURE SWITCH (Continued)

on the evaporator fins from freezing and obstructing air conditioning system air flow.

The a/c low pressure switch contacts are open when the suction pressure is approximately 141 kPa (20.5 psi) or lower. The switch contacts will close when the suction pressure rises to approximately 234 to 262 kPa (34 to 38 psi) or above. Lower ambient temperatures, below approximately -1° C (30° F), will also cause the switch contacts to open. This is due to the pressure/temperature relationship of the refrigerant in the system.

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

DIAGNOSIS AND TESTING - A/C LOW PRESSURE SWITCH

Before performing diagnosis of the a/c low pressure switch, be certain that the switch is properly installed on the accumulator fitting. If the switch is too loose it may not open the Schrader-type valve in the accumulator fitting, which will prevent the switch from correctly monitoring the refrigerant system pressure. Remember that lower ambient temperatures, below about -1° C (30° F), during cold weather will open the switch contacts and prevent compressor operation due to the pressure/temperature relationship of the refrigerant.

Also verify that the refrigerant system has the correct refrigerant charge. (Refer to 24 - HEATING & AIR CONDITIONING - DIAGNOSIS AND TESTING - A/C PERFORMANCE) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - SPECIFICATIONS).

For circuit descriptions and diagrams, (Refer to Appropriate Wiring Information).

(1) Disconnect and isolate the battery negative cable.

(2) Unplug the a/c low pressure switch wire harness connector from the switch on the accumulator fitting.

(3) Install a jumper wire between the two cavities of the a/c low pressure switch wire harness connector.

(4) Connect a manifold gauge set to the refrigerant system service ports. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM SERVICE EQUIPMENT) and (Refer to 24 - HEATING & AIR CONDITIONING - DESCRIPTION - REFRIGERANT SYSTEM SERVICE PORT)

(5) Connect the battery negative cable.

(6) Place the A/C Heater mode control switch knob in any A/C position and start the engine.

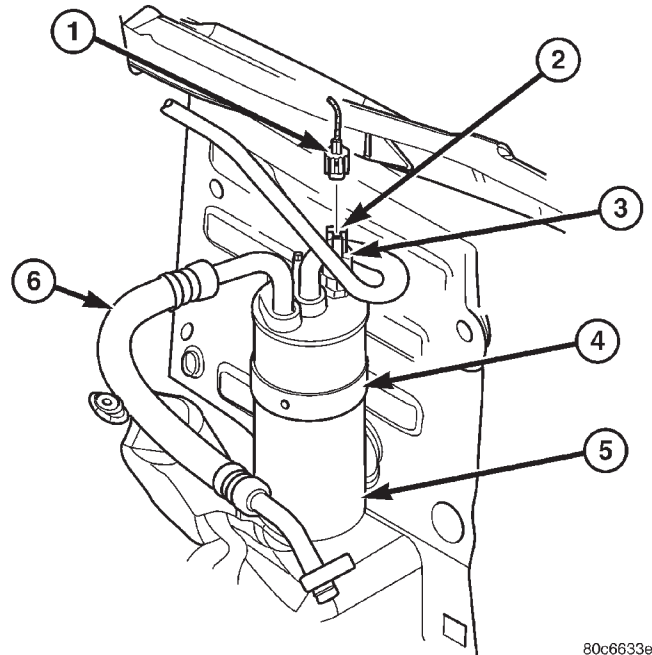
(7) Check for continuity between the two terminals of the a/c low pressure switch. There should be continuity with a suction pressure reading of 262 kPa

(38 psi) or above, and no continuity with a suction pressure reading of 141 kPa (20.5 psi) or below. If OK, test and repair the A/C switch sense circuit as required. If not OK, replace the faulty switch.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Unplug the wire harness connector from the a/c low pressure switch on the top of the accumulator (Fig. 13).



80c6633e

Fig. 13 A/C LOW PRESSURE SWITCH

- 1 - WIRING HARNESS CONNECTOR
- 2 - A/C LOW PRESSURE SWITCH
- 3 - A/C LINE TO EVAPORATOR
- 4 - ACCUMULATOR MOUNTING BRACKET
- 5 - ACCUMULATOR
- 6 - A/C LOW PRESSURE LINE

(3) Unscrew the a/c low pressure switch from the fitting on the top of the accumulator.

(4) Remove the O-ring seal from the accumulator fitting and discard.

INSTALLATION

(1) Lubricate a new O-ring seal with clean refrigerant oil and install it on the accumulator fitting. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the compressor in the vehicle. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REFRIGERANT OIL - DESCRIPTION)

A/C LOW PRESSURE SWITCH (Continued)

(2) Install and tighten the a/c low pressure switch on the accumulator fitting. The switch should be hand-tightened onto the accumulator fitting.

(3) Plug the wire harness connector into the a/c low pressure switch.

(4) Connect the battery negative cable.

BLEND DOOR ACTUATOR

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove A/C housing from vehicle(Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - REMOVAL).

(3) Remove the screws that secure the blend door actuator to the top of the HVAC housing. (Fig. 14).

(4) Remove the blend door actuator.

INSTALLATION

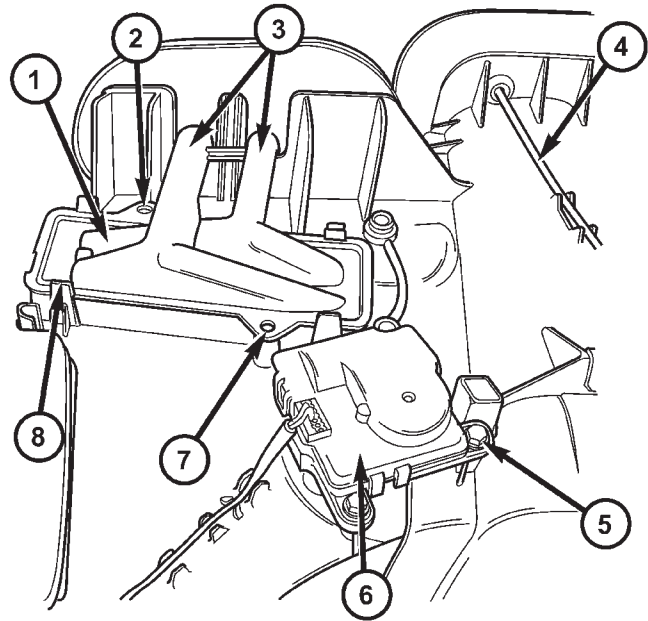
(1) Install the blend door actuator in place.

(2) Install and tighten the screws that secure the blend door actuator to the housing. Tighten the mounting screws to 2.4 ($\pm$.34) N·m (21 ($\pm$ 3) in. lbs.).

(3) Install the HVAC housing into the vehicle(Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - INSTALLATION).

(4) Install the blend door actuator electrical connector from the wiring harness through the glove box.

(5) Connect the battery negative cable.



80c8b9ba

Fig. 14 HEATER CORE REMOVAL/INSTALLATION

- 1 - HEATER CORE
- 2- MOUNTING SCREW HOLE
- 3- INLET AND OUTLET TUBES
- 4- VACUUM HARNESS
- 5- ACTUATOR SCREWS (3)
- 6- ELECTRIC BLEND DOOR ACTUATOR
- 7- MOUNTING SCREW HOLE
- 8- HEATER CORE RETAINER TABS (4)

BLOWER MOTOR RELAY

DESCRIPTION

The blower motor relay is a International Standards Organization (ISO)-type relay. The relay is a electromechanical device that switches battery current from a fuse in the Power Distribution Center (PDC) directly to the blower motor. The relay is energized when the relay coil is provided a voltage signal by the ignition switch. (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/BLOWER MOTOR RELAY - DIAGNOSIS AND TESTING)

OPERATION

The blower motor relay is installed in a wire harness connector that is secured to the passenger side outboard end of the HVAC housing in the passenger compartment, next to the HVAC wire harness connector.

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

BLOWER MOTOR RELAY (Continued)

DIAGNOSIS AND TESTING - BLOWER MOTOR RELAY

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

RELAY TEST

The blower motor relay (Fig. 15) is located in the PDC which is located under the hood.. Remove the relay from the PDC to perform the following tests:

(1) A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30. If OK, go to Step 2. If not OK, replace the faulty relay.

(2) Resistance between terminals 85 and 86 (electromagnet) should be 60.7 to 80.3 ohms. If OK, go to Step 3. If not OK, replace the faulty relay.

(3) Connect a battery to terminals 85 and 86. There should now be continuity between terminals 30 and 87, and no continuity between terminals 87A and 30. If OK, see the Relay Circuit Test. If not OK, replace the faulty relay.

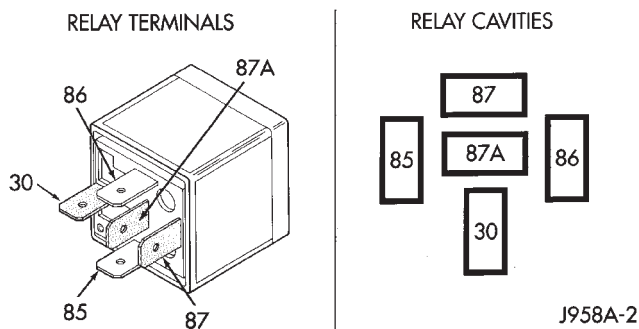


Fig. 15 BLOWER MOTOR RELAY

- 30 - COMMON FEED
- 85 - COIL GROUND
- 86 - COIL BATTERY
- 87 - NORMALLY OPEN
- 87A - NORMALLY CLOSED

RELAY CIRCUIT TEST

For circuit descriptions and diagrams, (Refer to Appropriate Wiring Information).

(1) The relay common feed terminal cavity (30) is connected to fused battery feed directly from a fuse in the Power Distribution Center (PDC), and should be hot at all times. Check for battery voltage at the connector cavity for relay terminal 30. If OK, go to Step 2. If not OK, repair the open circuit to the PDC fuse as required.

(2) The relay normally closed terminal cavity (87A) is not used for this application. Go to Step 3.

(3) The relay normally open terminal cavity (87) is connected to the blower motor. When the relay is energized, terminal 87 is connected to terminal 30 and provides full battery current to the blower motor feed circuit. There should be continuity between the connector cavity for terminal 87 and the blower motor at all times. If OK, go to Step 4. If not OK, repair the open circuit to the blower motor as required.

(4) The coil battery terminal cavity (86) is connected to the ignition switch. When the ignition switch is placed in the On position, fused ignition switch output is directed from a fuse in the junction block to the relay electromagnetic coil to energize the relay. There should be battery voltage at the connector cavity for relay terminal 86 with the ignition switch in the On position. If OK, go to Step 5. If not OK, repair the open circuit to the junction block fuse as required.

(5) The coil ground terminal cavity (85) is connected to ground. This terminal supplies the ground for the relay electromagnet coil. There should be continuity between the connector cavity for relay terminal 85 and a good ground at all times. If not OK, repair the open circuit as required.

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

BLOWER MOTOR RELAY (Continued)

- (1) Disconnect and isolate the battery negative cable.
- (2) Unplug the blower motor relay from the PDC located under the hood.
- (3) Remove the blower motor relay.

INSTALLATION

- (1) Install the blower motor relay by aligning the relay terminals with the cavities in the PDC and pushing the relay firmly into place.
- (2) Connect the battery negative cable.
- (3) Test the relay operation.

BLOWER MOTOR RESISTOR

DESCRIPTION

The blower motor resistor is mounted to the rear side of the HVAC housing on the passenger side of the vehicle.

OPERATION

The resistor is a credit card resistor that utilizes resistor circuit tracers to reduce current flow to the blower. The blower motor switch directs the ground path through the correct resistor circuit to obtain the selected speed.

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

DIAGNOSIS AND TESTING - BLOWER MOTOR RESISTOR

For circuit descriptions and diagrams, (Refer to Appropriate Wiring Information).

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

- (1) Disconnect and isolate the battery negative cable.

- (2) Open the glove box door and reach in and unplug the wire harness connector from the blower motor resistor.

- (3) Check for continuity between each of the blower motor switch input terminals of the resistor and the resistor output terminal. In each case there should be continuity. If OK, repair the wire harness circuits between the blower motor switch and the blower motor resistor or blower motor relay as required. If not OK, replace the faulty blower motor resistor.

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

- (1) Disconnect and isolate the battery negative cable.
- (2) Open the glove box door to gain access to the blower motor resistor.
- (3) Pull out the lock on the blower motor resistor wire harness connector to unlock the connector latch.
- (4) Depress the latch on the blower motor resistor wire harness connector and unplug the connector from the resistor.
- (5) Remove the two screws that secure the resistor to the HVAC housing.
- (6) Remove the resistor from the HVAC housing.

INSTALLATION

- (1) Install the new resistor in the HVAC housing.
- (2) Install the two screws that secure the resistor to the HVAC housing and tighten to 2.2 N·m (20 in. lbs.).
- (3) Plug in the blower motor harness connector.
- (4) Push in the lock on the blower motor resistor harness connector.
- (5) Close the glove box door.
- (6) Connect the battery negative cable.

BLOWER MOTOR SWITCH

DESCRIPTION

The heater-only or A/C Heater blower motor is controlled by a four position rotary-type blower motor switch, mounted in the A/C Heater control panel. The switch allows the selection of one of four blower motor speeds, but can only be turned off by selecting the Off position with the heater-only or A/C Heater mode control switch knob.

OPERATION

The blower motor switch directs the blower motor ground path through the mode control switch to the blower motor resistor, or directly to ground, as required to achieve the selected blower motor speed.

The blower motor switch cannot be repaired and, if faulty or damaged, the entire heater-only or A/C Heater control unit must be replaced.

DIAGNOSIS AND TESTING - BLOWER MOTOR SWITCH

For circuit descriptions and diagrams, (Refer to Appropriate Wiring Information).

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Check for battery voltage at the fuse in the Power Distribution Center (PDC). If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.

(2) Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Remove the A/C Heater control from the instrument panel. Check for continuity between the ground circuit cavity of the A/C Heater control wire harness connector and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the open circuit to ground as required.

(3) With the A/C Heater control wire harness connector unplugged, place the A/C Heater mode control switch knob in any position except the Off position. Check for continuity between the ground circuit ter-

minal and each of the blower motor driver circuit terminals of the A/C Heater control as you move the blower motor switch knob to each of the four speed positions. There should be continuity at each driver circuit terminal in only one blower motor switch speed position. If OK, test and repair the blower driver circuits between the A/C Heater control connector and the blower motor resistor as required. If not OK, replace the faulty A/C Heater control unit.

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

The blower motor switch cannot be repaired and, if faulty or damaged, the entire heater-only or A/C Heater control unit must be replaced. (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C HEATER CONTROL - REMOVAL)

INSTALLATION

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) The blower motor switch cannot be repaired and, if faulty or damaged the entire heater-only or A/C heater control unit must be replaced(Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C HEATER CONTROL - INSTALLATION).

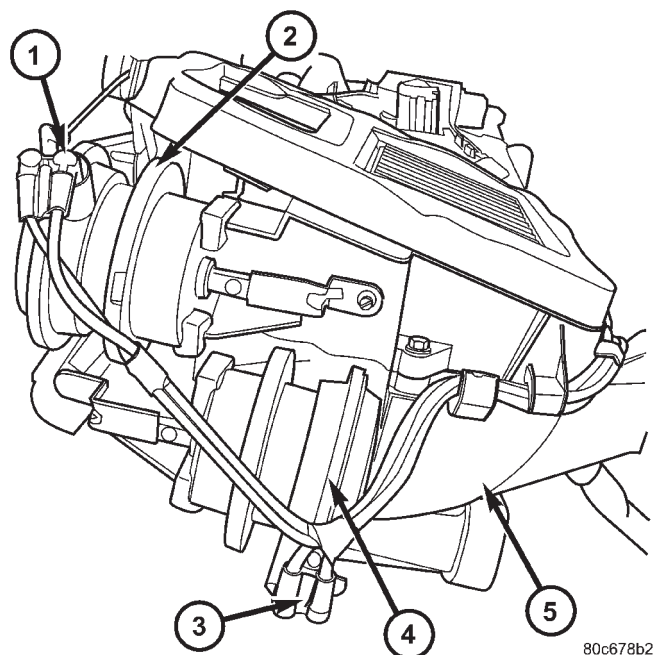
MODE DOOR ACTUATOR

REMOVAL

REMOVAL - PANEL DOOR ACTUATOR

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

- (1) Disconnect and isolate the battery negative cable.
- (2) Remove the instrument panel assembly from the vehicle(Refer to 23 - BODY/INSTRUMENT PANEL - REMOVAL).
- (3) Unplug the vacuum harness connector from the defrost door actuator (Fig. 16).



80c678b2

Fig. 16 HVAC DOOR VACUUM ACTUATORS

- 1 - VACUUM LINE AND CONNECTOR
- 2 - PANEL DOOR ACTUATOR
- 3 - VACUUM LINE AND CONNECTOR
- 4 - FLOOR-DEFROST DOOR ACTUATOR
- 5 - HVAC ASSEMBLY

(4) Insert a trim stick or another suitable wide flat-bladed tool into the latch hole on the HVAC housing actuator mount. Gently pry the actuator latch while pulling firmly outwards on the actuator to remove the actuator from the mount.

(5) Rotate and tilt the vacuum actuator as required to disengage the hole on the end of the actuator link from the hooked pin on the end of the defrost door lever.

(6) Remove the defrost door vacuum actuator from the vehicle.

REMOVAL - FLOOR - DEFROST DOOR ACTUATOR

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Remove the instrument panel assembly from the vehicle(Refer to 23 - BODY/INSTRUMENT PANEL - REMOVAL).

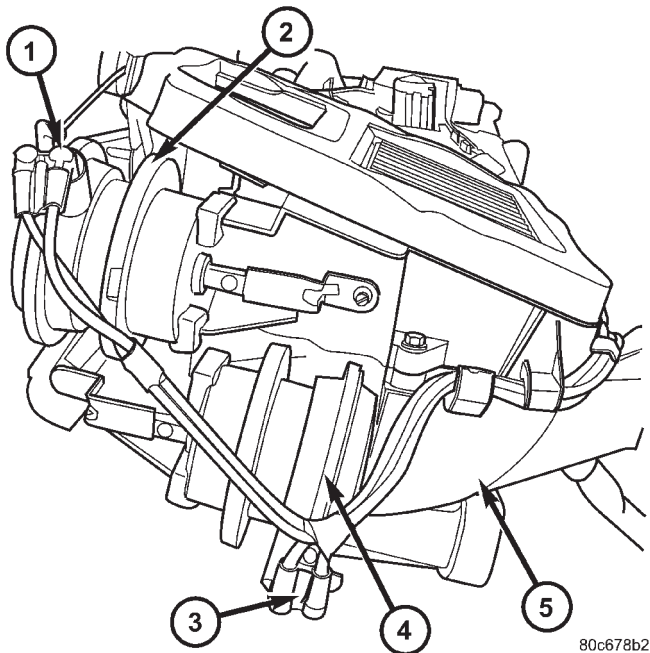
(3) Unplug the vacuum harness connector from the floor door actuator (Fig. 17).

(4) Insert a trim stick or another suitable wide flat-bladed tool into the latch hole on the HVAC housing actuator mount. Gently pry the actuator latch while pulling firmly outwards on the actuator to remove the actuator from the mount. (Fig. 18)

(5) Rotate and tilt the vacuum actuator as required to disengage the hole on the end of the actuator link from the hooked pin on the end of the floor door lever.

(6) Remove the floor door vacuum actuator from the vehicle.

MODE DOOR ACTUATOR (Continued)

**Fig. 17 HVAC DOOR VACUUM ACTUATORS**

- 1 - VACUUM LINE AND CONNECTOR
- 2 - PANEL DOOR ACTUATOR
- 3 - VACUUM LINE AND CONNECTOR
- 4 - FLOOR-DEFROST DOOR ACTUATOR
- 5 - HVAC ASSEMBLY

INSTALLATION

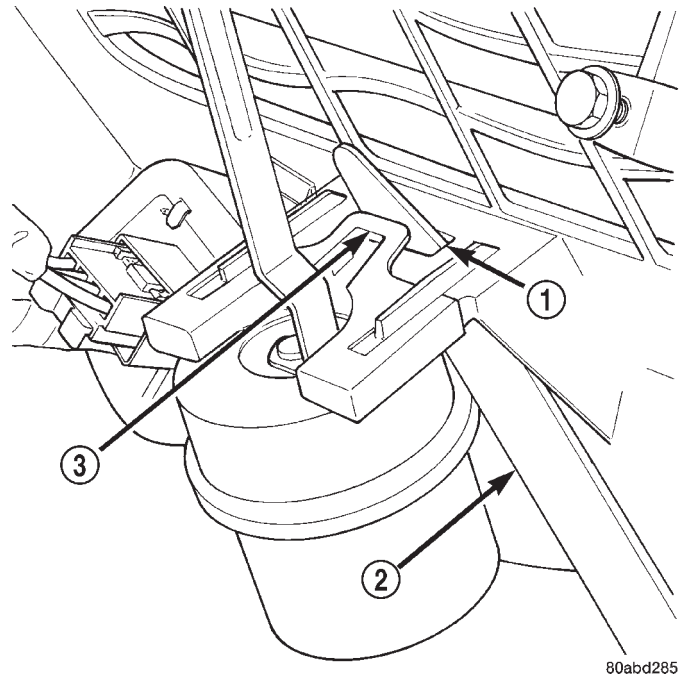
INSTALLATION - PANEL DOOR ACTUATOR

(1) Install the defrost door vacuum actuator by snapping it into place, engage the hole on the end of the actuator link with the hooked pin on the end of the panel/demist door lever.

(2) Plug in the vacuum harness connector to the defrost door actuator.

(3) Install the instrument panel assembly in the vehicle (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - INSTALLATION).

(4) Connect the battery negative cable.

**Fig. 18 VACUUM ACTUATOR REMOVE/INSTALL - TYPICAL**

- 1 - ACTUATOR MOUNT LATCH HOLE
- 2 - TRIM STICK
- 3 - ACTUATOR LATCH

INSTALLATION - FLOOR - DEFROST DOOR ACTUATOR

(1) Engage the hole on the end of the actuator link to the hooked pin. Install the floor-defrost door vacuum actuator to the HVAC assembly, on the end of the floor door lever.

(2) Install the floor door vacuum actuator to the HVAC assembly.

(3) Install the instrument panel assembly into the vehicle (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - INSTALLATION).

(4) Connect the battery negative cable.

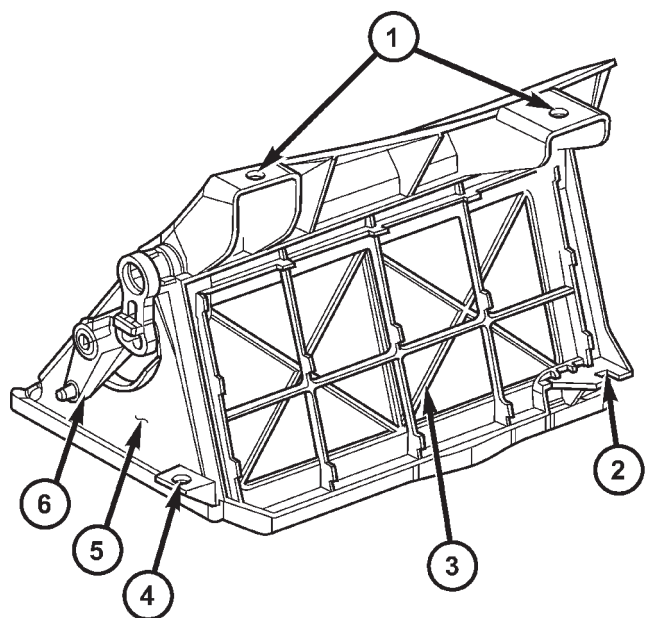
RECIRCULATION DOOR ACTUATOR

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Unplug the vacuum harness connector from the recirculation door actuator (Fig. 19).



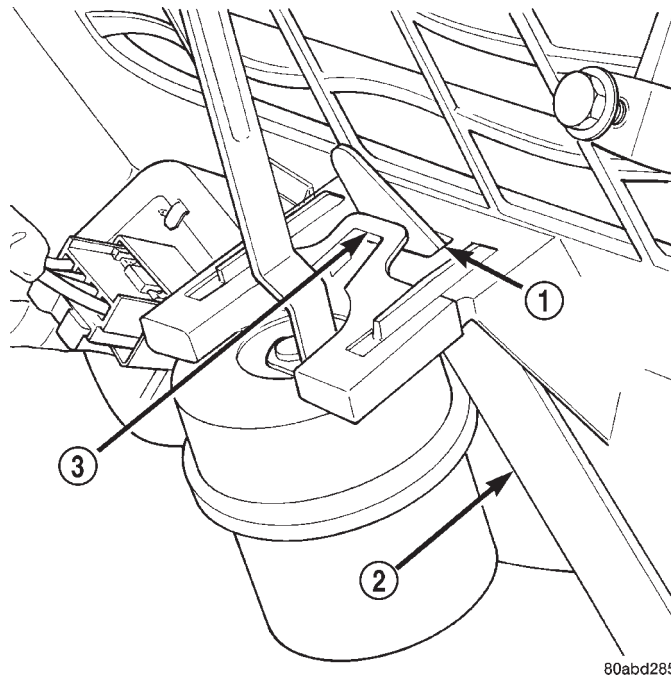
80c8b43a

Fig. 19 RECIRCULATION DOOR ASSEMBLY

- 1- INSTRUMENT PANEL ELECTRICAL HARNESS MOUNTING TABS
- 2- MOUNTING TAB
- 3- RECIRCULATION DOOR
- 4- MOUNTING TAB
- 5- RECIRCULATION DOOR ASSEMBLY
- 6- RECIRCULATION DOOR LEVER

(3) Insert a trim stick or another suitable wide flat-bladed tool into the latch hole on the HVAC housing actuator mount (Fig. 20).

(4) Gently pry the actuator latch while pulling firmly outwards on the actuator to remove the actuator from the mount (Fig. 21).



80abd285

Fig. 20 VACUUM ACTUATOR REMOVE/INSTALL - TYPICAL

- 1 - ACTUATOR MOUNT LATCH HOLE
- 2 - TRIM STICK
- 3 - ACTUATOR LATCH

(5) Disengage the hole on the end of the actuator link from the hooked pin on the end of the recirculation door lever.

(6) Remove the recirculation door vacuum actuator from the vehicle.

INSTALLATION

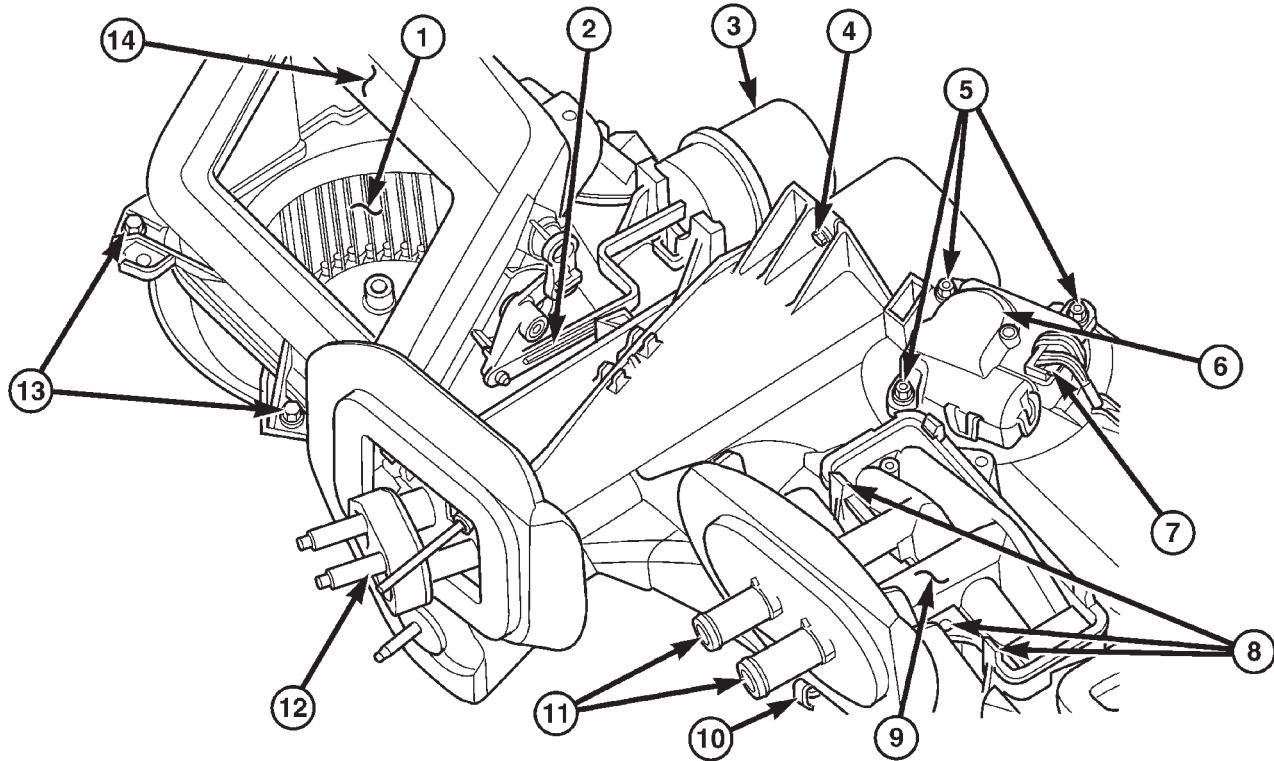
(1) Install the recirculation door vacuum actuator by slipping the arm on to the hole on the end of the actuator link with the hooked pin on the end of the panel/demist door lever.

(2) Snap the actuator back into its mount.

(3) Plug in the vacuum harness connector to the recirculation door actuator.

(4) Connect the battery negative cable.

RECIRCULATION DOOR ACTUATOR (Continued)



80cabo62

Fig. 21 HVAC CASE ASSEMBLY

- | | |
|--|---|
| 1 - BLOWER MOTOR AND CAGE | 9 - HEATER CORE |
| 2 - RECIRCULATION DOOR ACTUATOR LINKAGE | 10 - HVAC CASE RETAINER CLIP |
| 3 - RECIRCULATION DOOR VACUUM ACTUATOR | 11 - HEATER CORE INPUT AND OUTPUT CONNECTIONS |
| 4 - CASE RETAINER SCREW | 12 - EVAPORATOR CONNECTION FLANGE |
| 5 - BLEND DOOR ACTUATOR MOUNTING SCREWS | 13 - HVAC CASE RETAINER SCREWS |
| 6 - ELECTRIC BLEND DOOR ACTUATOR | 14 - HVAC HOUSING |
| 7 - ELECTRICAL CONNECTOR FOR BLEND DOOR ACTUATOR | |
| 8 - HEATER CORE RETAINER TABS (4) AND SCREWS (2) | |

VACUUM CHECK VALVE

DESCRIPTION

A vacuum check valve is installed in the accessory vacuum supply line in the engine compartment, near the vacuum tap on the engine intake manifold, and at the HVAC unit takeout. The vacuum check valve is designed to allow vacuum to flow in only one direction through the accessory vacuum supply circuits.

OPERATION

The use of a vacuum check valve helps to maintain the system vacuum needed to retain the selected A/C Heater mode settings. The check valve will prevent the engine from bleeding down system vacuum through the intake manifold during extended heavy engine load (low engine vacuum) operation.

The vacuum check valve cannot be repaired and, if faulty or damaged, it must be replaced.

REMOVAL

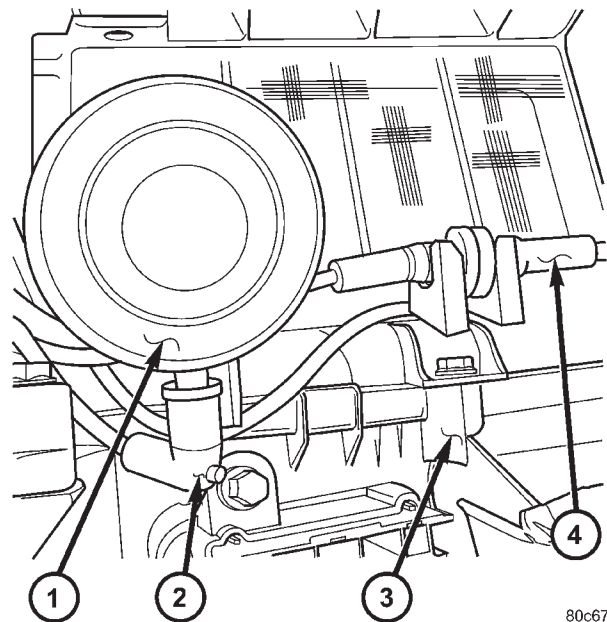
(1) Unplug the HVAC vacuum supply line connector at the vacuum check valve. The check valve is located behind the glove box on the passengers side of the vehicle (Fig. 22).

(2) Note the orientation of the check valve in the vacuum supply line for correct reinstallation.

(3) Unplug the vacuum check valve from the vacuum supply line fittings.

INSTALLATION

(1) Plug in the vacuum check valve at the vacuum supply line fittings making sure of proper orientation.



80c67e14

Fig. 22 RECIRCULATION ACTUATOR AND CHECK VALVE

- 1 - RECIRCULATION ACTUATOR
- 2 - VACUUM LINE TO RESEVOIR
- 3 - HVAC HOUSING
- 4 - VACUUM CHECK VALVE

(2) Plug in the vacuum check valve at the HVAC vacuum supply line connector.

DISTRIBUTION

TABLE OF CONTENTS

	page		page
AIR OUTLETS		INSTALLATION - DEFROST/DEMISTER DUCT	32
DESCRIPTION - DEMISTER OUTLETS	29	HVAC HOUSING	
REMOVAL - PANEL OUTLET BARRELS	29	REMOVAL	33
INSTALLATION - PANEL OUTLET BARRELS	29	DISASSEMBLY	34
BLOWER MOTOR		ASSEMBLY	34
DESCRIPTION	30	INSTALLATION	34
OPERATION	30	BLEND DOOR	
DIAGNOSIS AND TESTING - BLOWER		REMOVAL	35
MOTOR	30	INSTALLATION	35
REMOVAL	30	MODE DOOR	
INSTALLATION	31	REMOVAL	
FLOOR CONSOLE DUCT		REMOVAL - DEFROST DOOR	35
REMOVAL	31	REMOVAL - FLOOR - DEFROST DOOR	36
INSTALLATION	31	INSTALLATION	
FLOOR DUCT		INSTALLATION - PANEL DOOR	36
REMOVAL	32	INSTALLATION - FLOOR - DEFROST DOO	37
INSTALLATION	32	RECIRC DOOR	
DEFROST - DEMISTER DUCT		REMOVAL	37
REMOVAL - DEFROST DUCT/DEMISTER		INSTALLATION	37
ADAPTOR	32		

AIR OUTLETS

DESCRIPTION - DEMISTER OUTLETS

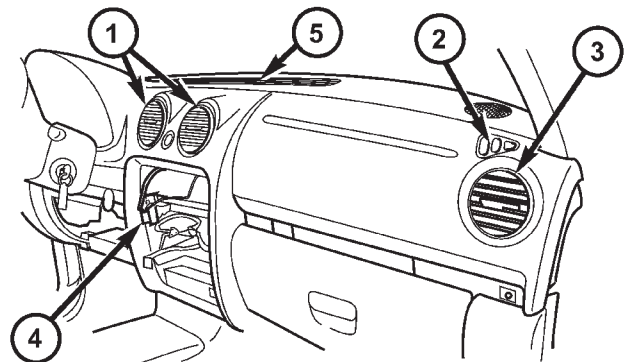
The side window demister outlets are integral to the instrument panel end caps (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL END CAP - REMOVAL) and (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL END CAP - REMOVAL).

REMOVAL - PANEL OUTLET BARRELS

(1) Use a trim stick or another suitable wide flat-bladed tool to gently pry the panel outlet barrels out of the panel outlet housing (Fig. 1). The barrel is retained by a light snap fit.

INSTALLATION - PANEL OUTLET BARRELS

To install, position the barrel in the panel outlet housing and press firmly until the barrel snaps into place.



80c68aa1

Fig. 1 DASH PANEL OUTLETS

- 1 - CENTER OUTLETS
- 2 - SIDE WINDOW DEMISTER OUTLETS
- 3 - SIDE OUTLETS
- 4 - WIRING FOR HVAC CONTROL ASSEMBLY
- 5 - WINDSHIELD DEFROSTER OUTLET

BLOWER MOTOR

DESCRIPTION

The blower motor and blower wheel are located in the passenger side end of the HVAC housing, below the glove box. The blower motor controls the velocity of air flowing through the HVAC housing by spinning a squirrel cage-type blower wheel within the housing at the selected speed. The blower motor and wheel can be removed from the housing inside the vehicle without removing the dash or HVAC housing assembly.

OPERATION

The blower motor will only operate when the ignition switch is in the On position, and the A/C Heater mode control switch knob is in any position, except Off. The blower motor receives a fused battery feed through the blower motor relay whenever the ignition switch is in the On position. The blower motor battery feed circuit is protected by a fuse in the Power Distribution Center (PDC). Blower motor speed is controlled by regulating the ground path through the A/C Heater control blower motor switch and the blower motor resistor.

The blower motor and blower motor wheel cannot be repaired and, if faulty or damaged, they must be replaced. The blower motor and blower wheel are serviced only as a unit.

DIAGNOSIS AND TESTING - BLOWER MOTOR

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

For circuit descriptions and diagrams, (Refer to Appropriate Wiring Information). Possible causes of an inoperative blower motor include:

- Faulty fuse
- Faulty blower motor circuit wiring or wire harness connectors
- Faulty blower motor resistor
- Faulty blower motor relay
- Faulty blower motor switch
- Faulty A/C Heater mode control switch
- Faulty blower motor.

Possible causes of the blower motor not operating in all speeds include:

- Faulty blower motor switch
- Faulty blower motor resistor
- Faulty blower motor circuit wiring or wire harness connectors.

VIBRATION

Possible causes of blower motor vibration include:

- Improper blower motor mounting
- Improper blower wheel mounting
- Blower wheel out of balance or bent
- Blower motor faulty.

NOISE

To verify that the blower is the source of the noise, unplug the blower motor wire harness connector and operate the HVAC system. If the noise goes away, possible causes include:

- Foreign material in the HVAC housing
- Improper blower motor mounting
- Improper blower wheel mounting
- Blower motor faulty.

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

BLOWER MOTOR (Continued)

The blower motor is located on the passenger side of the vehicle under the dash

(1) Disconnect and isolate the battery negative cable.

(2) Unplug the blower motor wire harness connector (Fig. 2).

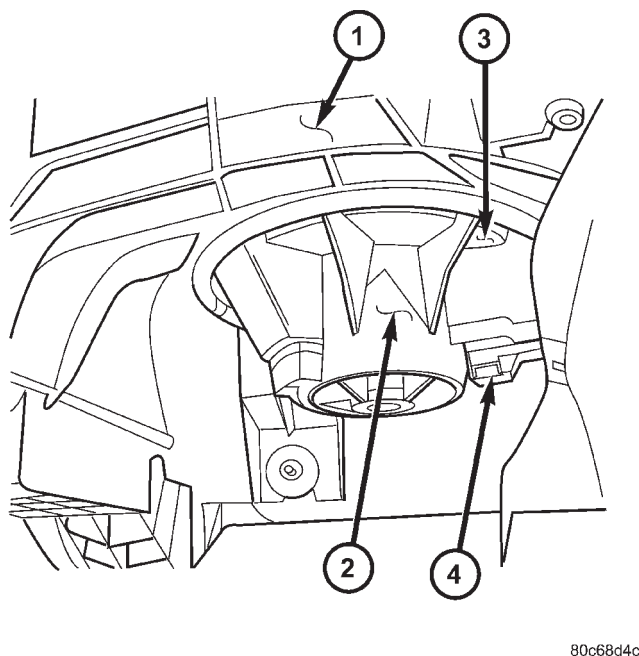


Fig. 2 HVAC BLOWER MOTOR

- 1 - HVAC HOUSING
- 2 - BLOWER MOTOR
- 3 - RETAINER-LOCKING TAB
- 4 - BLOWER MOTOR ELECTRICAL CONNECTOR

(3) Release the locking tab that secures the blower motor and wheel assembly to the HVAC housing.

(4) Rotate and tilt the blower motor unit as needed for clearance to remove the blower motor and wheel from the HVAC housing.

INSTALLATION

(1) Align and install the blower motor and wheel assembly into the HVAC housing.

(2) Rotate the blower assembly until the locking tab secures the blower motor and wheel assembly to the HVAC housing.

(3) Plug in the blower motor wire harness connector.

(4) Connect the battery negative cable.

FLOOR CONSOLE DUCT

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the floor console from the sled (Fig. 3). Refer to Floor Console for the procedures (Refer to 23 - BODY/INTERIOR/FLOOR CONSOLE - REMOVAL).

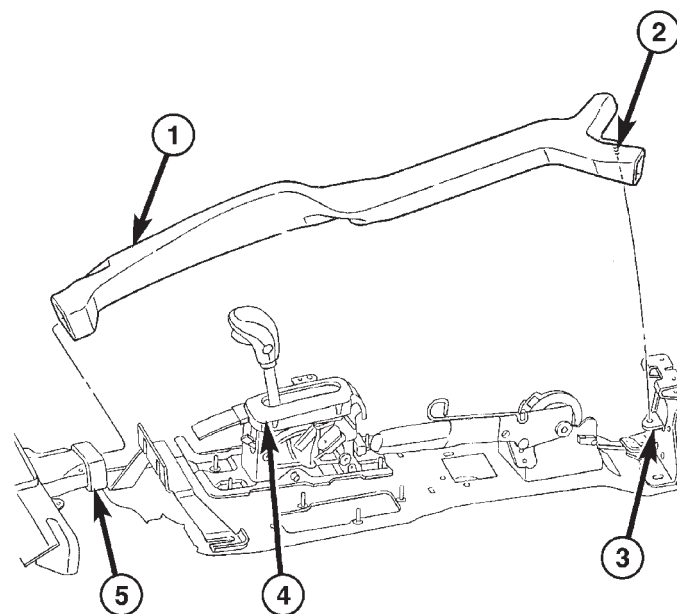


Fig. 3 CONSOLE DUCT REMOVE/INSTALL

- 1 - REAR DUCT ASSEMBLY
- 2 - REAR DUCT RETAINER SCREW
- 3 - REAR DUCT MOUNTING FLANGE
- 4 - TRANSMISSION SHIFT LEVER ASSEMBLY
- 5 - FRONT TO REAR DUCT CONNECTING POINT

(3) Lift the rear of the console duct out of the console rear mounting bracket on the sled and slide the duct rearward to disengage it from the floor duct and adapter.

(4) Remove the console rear duct from the vehicle.

INSTALLATION

(1) Push the console duct forward in place on the HVAC floor duct.

(2) Align the rear tab of the console duct with the hole on the sled bracket.

(3) Insert the push pin in the hole on the sled.

(4) Install the floor console on the floor panel transmission tunnel (Refer to 23 - BODY/INTERIOR/FLOOR CONSOLE - INSTALLATION).

(5) Connect the battery negative cable.

FLOOR DUCT

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Remove the instrument panel from the vehicle(Refer to 23 - BODY/INSTRUMENT PANEL - REMOVAL).

(2) Remove the three screws that secure the floor duct to the HVAC housing.

(3) Remove the floor duct from the HVAC housing.

INSTALLATION

(1) Install the floor duct on the HVAC housing.

(2) Install the three screws that secure the floor duct to the HVAC housing. Tighten the mounting screws to 2.2 N·m (20 in. lbs.).

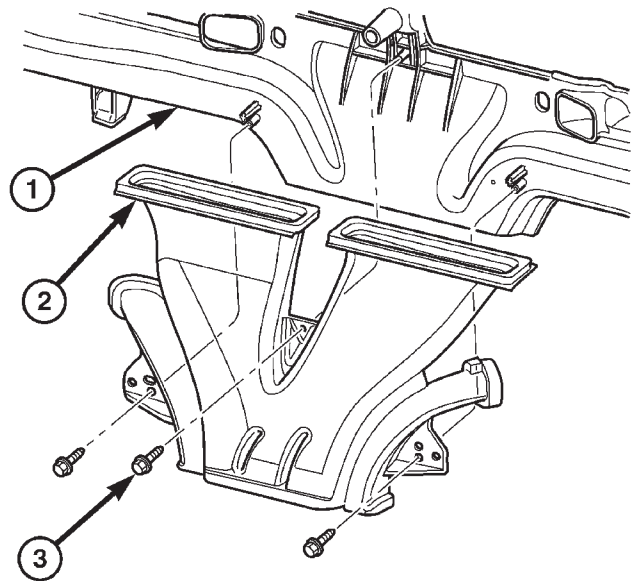
(3) Install the instrument panel in the vehicle(Refer to 23 - BODY/INSTRUMENT PANEL - INSTALLATION).

DEFROST - DEMISTER DUCT

REMOVAL - DEFROST DUCT/DEMISTER ADAPTOR

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Remove the instrument panel assembly from the vehicle(Refer to 23 - BODY/INSTRUMENT PANEL - REMOVAL).



80cb43a1

Fig. 4 DEFROST/DEMISTER DUCT

1 - INSTRUMENT PANEL

2 - DEFROST DUCT/ DEMISTER ADAPTOR

3 - SCREW

(2) Remove the three screws that secure the defrost duct/demister adapter to the instrument panel (Fig. 4).

(3) Remove the defrost duct/demister duct from the instrument panel.

INSTALLATION - DEFROST/DEMISTER DUCT

(1) Install the defrost/demister duct in the instrument panel.

(2) Install the three screws that secure the defrost/demister duct to the instrument panel.

(3) Tighten the mounting screws to 2.2 N·m (20 in. lbs.).

(4) Install the instrument panel assembly in the vehicle(Refer to 23 - BODY/INSTRUMENT PANEL - INSTALLATION).

HVAC HOUSING

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

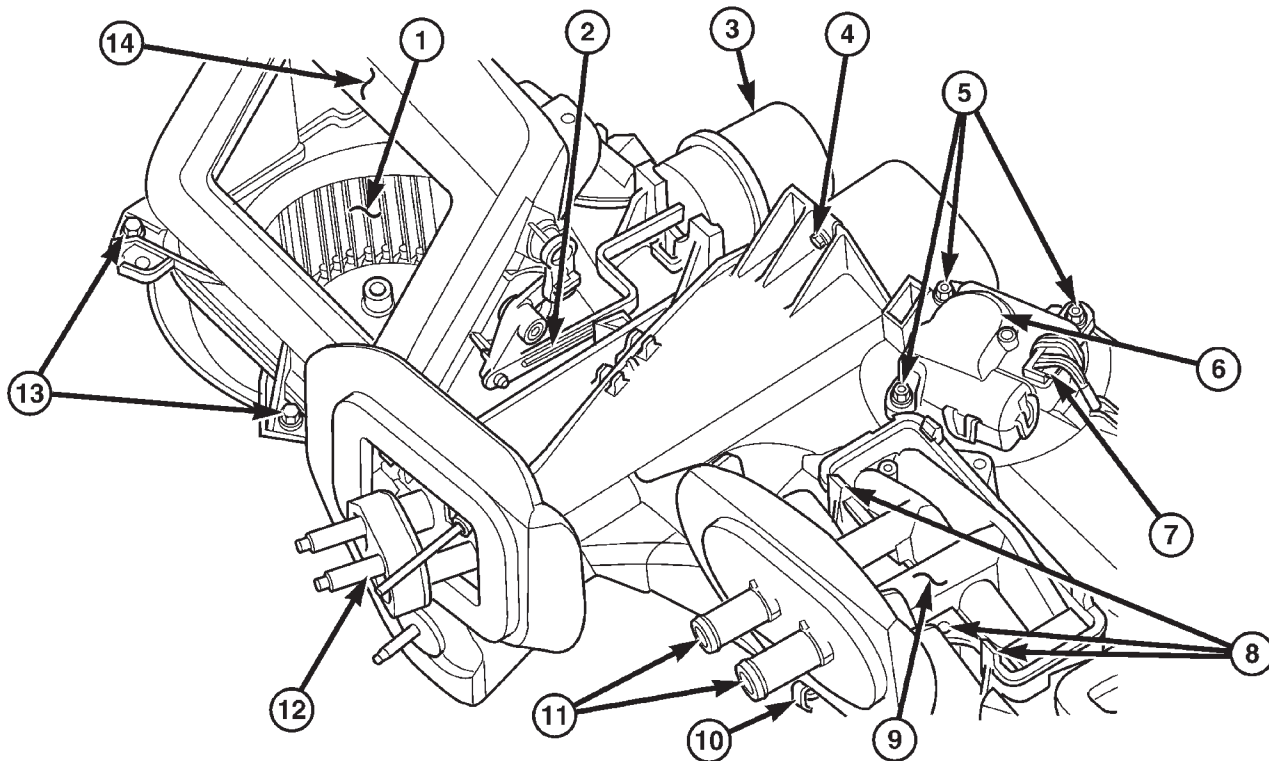
(2) Remove the instrument panel from the vehicle (Refer to 23 - BODY/INSTRUMENT PANEL - REMOVAL).

(3) If the vehicle is not equipped with air conditioning, go to Step 6. If the vehicle is equipped with air conditioning, recover the refrigerant from the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT RECOVERY)

(4) Disconnect the liquid line refrigerant line fitting from the evaporator inlet tube (Fig. 5). (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS)

(5) Disconnect the accumulator inlet tube refrigerant line fitting from the evaporator outlet tube. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS) Install plugs in, or tape over all of the opened refrigerant line fittings.

(6) Drain the engine cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE).



80cabo62

Fig. 5 HVAC CASE ASSEMBLY

- | | |
|--|---|
| 1 - BLOWER MOTOR AND CAGE | 9 - HEATER CORE |
| 2 - RECIRCULATION DOOR ACTUATOR LINKAGE | 10 - HVAC CASE RETAINER CLIP |
| 3 - RECIRCULATION DOOR VACUUM ACTUATOR | 11 - HEATER CORE INPUT AND OUTPUT CONNECTIONS |
| 4 - CASE RETAINER SCREW | 12 - EVAPORATOR CONNECTION FLANGE |
| 5 - BLEND DOOR ACTUATOR MOUNTING SCREWS | 13 - HVAC CASE RETAINER SCREWS |
| 6 - ELECTRIC BLEND DOOR ACTUATOR | 14 - HVAC HOUSING |
| 7 - ELECTRICAL CONNECTOR FOR BLEND DOOR ACTUATOR | |
| 8 - HEATER CORE RETAINER TABS (4) AND SCREWS (2) | |

HVAC HOUSING (Continued)

(7) Disconnect the heater hoses from the heater core tubes. Install plugs in, or tape over the opened heater core tubes.

(8) Unplug the HVAC system vacuum supply line connector from the engine side harness.

(9) Remove the nuts from the HVAC housing mounting studs.

(10) Remove the HVAC housing from inside the vehicle taking care not to allow any remaining coolant to drain on the vehicles interior.

DISASSEMBLY

(1) Remove the HVAC housing from the vehicle and place it on the workbench. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - REMOVAL)

(2) Unplug the vacuum harness connectors from the mode and recirculation door actuators and the recirculation door actuator.

(3) Disengage the vacuum harness from any routing clips located on the lower half of the HVAC housing.

(4) Remove the blower motor and blower wheel unit from the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/BLOWER MOTOR - REMOVAL)

(5) Pop out the grommet on the vacuum supply line and slide hole in housing.

(6) Carefully remove the foam seals from the heater core and evaporator coil tube mounting flange of the HVAC housing. If the either seal is deformed or damaged it must be replaced.

(7) Use a screwdriver to pry off the four snap clips that help secure the upper and lower HVAC housing halves together.

(8) Remove the screws that secure the upper and lower HVAC housing halves together.

(9) Carefully separate the upper HVAC housing from the lower half.

ASSEMBLY

(1) Assemble the upper HVAC housing half to the lower half. During assembly, be certain of the following.

(a) That each of the mode door pivot shaft ends and the two temperature blend door shafts are properly engaged in their pivot holes.

(b) That the blower motor venturi ring is properly indexed and installed.

(c) If the unit is equipped with air conditioning, that the evaporator coil tube rubber seal is properly positioned in the grooves in both the upper and lower HVAC housing halves.

(2) Install the screws and four snap clips that secure the upper and lower HVAC housing halves to

each other. Tighten the screws to 2.2 N·m (20 in. lbs.).

(3) Install the blower motor and wheel unit in the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/BLOWER MOTOR - INSTALLATION)

(4) Install the foam seals on the flanges around the heater core and evaporator coil tube mounting flange of the HVAC housing.

(5) Insert the vacuum supply line and connector through the foam seal on the heater core and evaporator coil tube mounting flange of the HVAC housing. Check that the vacuum grommet is securely seated into the housing hole flange.

(6) Engage the vacuum harness to the routing clips and plug in the vacuum harness connector at the floor door actuator and, if the unit is so equipped, at the recirculation air door actuator.

INSTALLATION

WARNING: IF THE VEHICLE IS EQUIPPED WITH AIR CONDITIONING, REVIEW THE WARNINGS AND CAUTIONS IN PLUMBING BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION - REFRIGERANT HOSES/LINES/TUBES PRECAUTIONS)

(1) Position the HVAC housing to the dash panel. Be certain that the evaporator condensate drain tube and the housing mounting studs are inserted into their correct mounting holes.

(2) Install and tighten the nuts onto the HVAC housing mounting studs. Tighten the nuts to 6.2 N·m (55 in.lbs.).

(3) Connect the HVAC system vacuum supply line connector.

(4) Unplug or remove the tape from the heater core tubes. Connect the heater hoses to the heater core tubes and fill the engine cooling system (Refer to 7 - COOLING/ENGINE - STANDARD PROCEDURE).

(5) If the vehicle is not equipped with air conditioning, go to Step 10.

(6) Unplug or remove the tape from the liquid line and the evaporator inlet tube fittings. Connect the liquid line coupler to the evaporator inlet tube. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS)

(7) Evacuate the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING -

HVAC HOUSING (Continued)

STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE)

(8) Charge the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE)

(9) Install the instrument panel in the vehicle (Refer to 23 - BODY/INSTRUMENT PANEL - INSTALLATION).

(10) Connect the battery negative cable.

(11) Start the engine and check for proper operation of the heating and air conditioning systems.

BLEND DOOR

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Remove and disassemble the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - REMOVAL) (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - DISASSEMBLY)

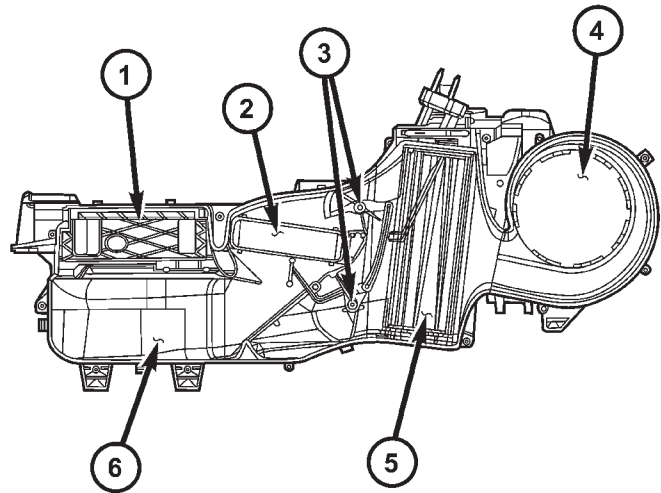
(2) Lift the blend door pivot shaft out of the pivot hole in the bottom of the lower half of the HVAC housing (Fig. 6).

INSTALLATION

(1) Place the blend door pivot shaft in of the pivot hole in the bottom of the lower half of the HVAC housing.

(2) Assemble the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - ASSEMBLY)

(3) Install the HVAC housing in the vehicle. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - INSTALLATION)



80c8b350

Fig. 6 Blend Door

- 1 - DEFROSTER DOOR
- 2 - HEATER CORE
- 3 - BLEND DOORS
- 4 - BLOWER MOTOR HOUSING
- 5 - EVAPORATOR (A/C ONLY)
- 6 - LOWER HVAC CASE ASSEMBLY

MODE DOOR

REMOVAL

REMOVAL - DEFROST DOOR

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

MODE DOOR (Continued)

WARNING: (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION).

(1) Remove and disassemble the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - REMOVAL) (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - DISASSEMBLY)

(2) Insert a screwdriver into the latch hole (Fig. 7) of the panel door pivot shaft to release the latch of the panel door lever, and pull the lever out of the pivot shaft from the outside of the upper half of the HVAC housing.

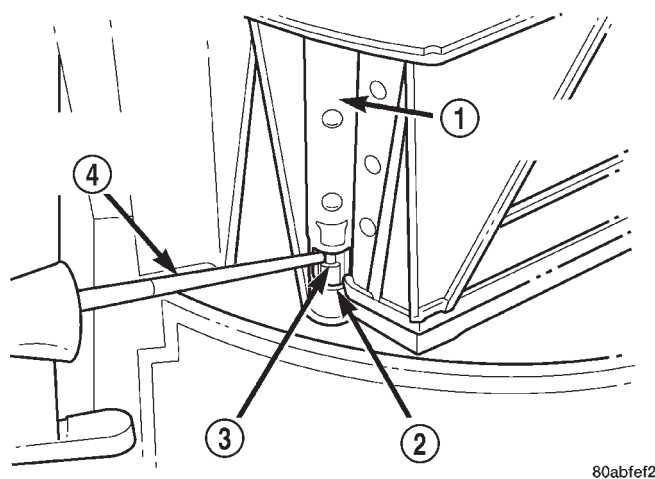


Fig. 7 PANEL DOOR REMOVE/INSTALL

- 1 - DOOR PIVOT SHAFT
- 2 - LATCH HOLE
- 3 - CRANK ARM LATCH
- 4 - FLAT BLADE PRY TOOL

(3) Remove the defrost door from the HVAC housing.

REMOVAL - FLOOR - DEFROST DOOR

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION).

(1) Remove and disassemble the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - REMOVAL) (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - DISASSEMBLY)

(2) Remove the floor door vacuum actuator from the lower HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/MODE DOOR ACTUATOR - REMOVAL - FLOOR DOOR ACTUATOR)

(3) Insert a screwdriver into the latch hole (Fig. 8) of the floor door pivot shaft to release the latch of the floor door lever, and pull the lever out of the pivot shaft from the outside of the lower half of the HVAC housing.

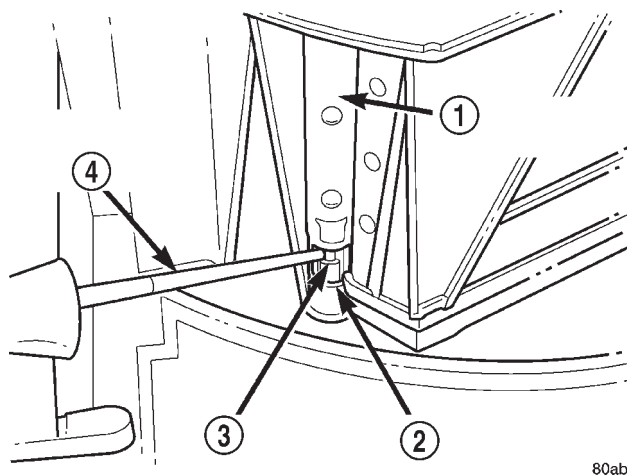


Fig. 8 FLOOR DOOR REMOVE/INSTALL (typical)

- 1 - DOOR PIVOT SHAFT
- 2 - LATCH HOLE
- 3 - CRANK ARM LATCH
- 4 - FLAT BLADE PRY TOOL

(4) Reach inside the lower half of the HVAC housing and carefully flex the floor door (Fig. 9) enough so that the door pivot clears the pivot hole in the housing.

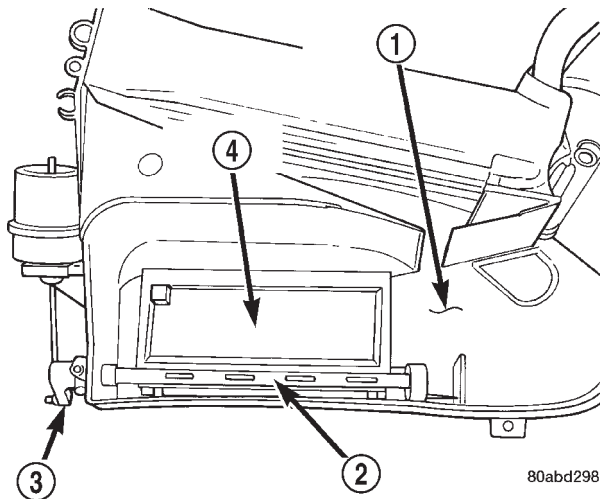
(5) Remove the floor door from the HVAC housing.

INSTALLATION

INSTALLATION - PANEL DOOR

- (1) Install the panel door in the HVAC housing.
- (2) Snap the panel door pivot shaft over the latch of the panel door lever.
- (3) Attach the demist door and lever to the upper HVAC housing. (Refer to 24 - HEATING & AIR CON-

MODE DOOR (Continued)

**Fig. 9 FLOOR DOOR (typical)**

- 1 - LOWER HVAC HOUSING
- 2 - PIVOT SHAFT
- 3 - CRANK ARM
- 4 - FLOOR DOOR

DITIONING/DISTRIBUTION/MODE DOOR -
INSTALLATION - PANEL/DEMIST DOOR)

(4) Assemble the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - ASSEMBLY)

(5) Install the HVAC housing in the vehicle. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - INSTALLATION)

INSTALLATION - FLOOR - DEFROST DOO

(1) Install the floor-defrost door in the HVAC housing by placing the door in the lower housing.

(2) Assemble the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - ASSEMBLY)

(3) Install the floor door vacuum actuator in the lower HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/MODE DOOR ACTUATOR - INSTALLATION - FLOOR DOOR ACTUATOR)

(4) Install the HVAC housing in the vehicle. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - INSTALLATION)

RECIRC DOOR**REMOVAL**

A recirculation door and vacuum actuator are used only on models with the optional air conditioning system.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE

ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: IF THE VEHICLE IS EQUIPPED WITH AIR CONDITIONING, REVIEW THE WARNINGS AND CAUTIONS IN PLUMBING BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

(1) Remove the HVAC housing and disassemble. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - REMOVAL) (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - DISASSEMBLY)

(2) Remove the four screws to remove the recirculation door assembly. (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/RECIRCULATION DOOR ACTUATOR - REMOVAL)

(3) Insert a screwdriver into the latch hole of the panel door pivot shaft to release the latch of the panel door lever and pull the lever out of the pivot shaft from the outside of the upper half of the HVAC housing.

INSTALLATION

(1) Guide the recirculation door lever through the air intake grille of the HVAC housing while installing the door in the housing.

(2) Assemble the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - ASSEMBLY)

(3) Install the HVAC housing in the vehicle. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - INSTALLATION)

(4) Install the recirculation door vacuum actuator on the lower HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/RECIRCULATION DOOR ACTUATOR - INSTALLATION)

PLUMBING

TABLE OF CONTENTS

	page		page
PLUMBING		INSTALLATION	47
DESCRIPTION - REFRIGERANT LINE	38	A/C LIQUID LINE	
WARNING		REMOVAL	47
SERVICE WARNINGS	39	INSTALLATION	47
CAUTION		A/C SUCTION LINE	
SERVICE CAUTIONS	39	REMOVAL	48
CAUTION - REFRIGERANT HOSES/LINES/ TUBES PRECAUTIONS	40	INSTALLATION	49
STANDARD PROCEDURE		A/C EVAPORATOR	
STANDARD PROCEDURE - REFRIGERANT SYSTEM SERVICE EQUIPMENT	40	DESCRIPTION	49
STANDARD PROCEDURE - REFRIGERANT RECOVERY	41	OPERATION	49
STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE	41	REMOVAL	49
STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE	41	INSTALLATION	49
SPECIFICATIONS - CHARGE CAPACITY	42	A/C ORIFICE TUBE	
A/C COMPRESSOR		DESCRIPTION	50
DESCRIPTION		OPERATION	50
DESCRIPTION	42	REMOVAL	50
DESCRIPTION - HIGH PRESSURE RELIEF VALVE	42	INSTALLATION	50
OPERATION		ACCUMULATOR	
OPERATION	42	DESCRIPTION	51
OPERATION - HIGH PRESSURE RELIEF VALVE	42	OPERATION	51
DIAGNOSIS AND TESTING - A/C		REMOVAL	51
COMPRESSOR NOISE	42	INSTALLATION	51
REMOVAL	43	HEATER CORE	
INSTALLATION	44	DESCRIPTION	52
A/C CONDENSER		OPERATION	52
DESCRIPTION	45	REMOVAL	52
OPERATION	45	INSTALLATION	53
REMOVAL	45	REFRIGERANT	
INSTALLATION	46	DESCRIPTION	53
A/C DISCHARGE LINE		OPERATION	53
REMOVAL	46	REFRIGERANT OIL	
		DESCRIPTION	53
		OPERATION	54
		STANDARD PROCEDURE - REFRIGERANT OIL LEVEL	54

PLUMBING

DESCRIPTION - REFRIGERANT LINE

The refrigerant lines and hoses are used to carry the refrigerant between the various air conditioning system components. A barrier hose design with a nylon tube, which is sandwiched between rubber layers, is used for the R-134a air conditioning system on this vehicle. This nylon tube helps to further contain

the R-134a refrigerant, which has a smaller molecular structure than R-12 refrigerant. The ends of the refrigerant hoses are made from lightweight aluminum or steel, and commonly use braze-less fittings.

Any kinks or sharp bends in the refrigerant plumbing will reduce the capacity of the entire air conditioning system. Kinks and sharp bends reduce the flow of refrigerant in the system. A good rule for the flexible hose refrigerant lines is to keep the radius of all bends at least ten times the diameter of the hose.

PLUMBING (Continued)

In addition, the flexible hose refrigerant lines should be routed so they are at least 80 millimeters (3 inches) from an exhaust manifold.

WARNING

SERVICE WARNINGS

WARNING: THE AIR CONDITIONING SYSTEM CONTAINS REFRIGERANT UNDER HIGH PRESSURE. SEVERE PERSONAL INJURY MAY RESULT FROM IMPROPER SERVICE PROCEDURES. REPAIRS SHOULD ONLY BE PERFORMED BY QUALIFIED SERVICE PERSONNEL.

AVOID BREATHING THE REFRIGERANT AND REFRIGERANT OIL VAPOR OR MIST. EXPOSURE MAY IRRITATE THE EYES, NOSE, AND/OR THROAT. WEAR EYE PROTECTION WHEN SERVICING THE AIR CONDITIONING REFRIGERANT SYSTEM. SERIOUS EYE INJURY CAN RESULT FROM DIRECT CONTACT WITH THE REFRIGERANT. IF EYE CONTACT OCCURS, SEEK MEDICAL ATTENTION IMMEDIATELY.

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

IF ACCIDENTAL SYSTEM DISCHARGE OCCURS, VENTILATE THE WORK AREA BEFORE RESUMING SERVICE. LARGE AMOUNTS OF REFRIGERANT RELEASED IN A CLOSED WORK AREA WILL DISPLACE THE OXYGEN AND CAUSE SUFFOCATION.

THE EVAPORATION RATE OF R-134a REFRIGERANT AT AVERAGE TEMPERATURE AND ALTITUDE IS EXTREMELY HIGH. AS A RESULT, ANYTHING THAT COMES IN CONTACT WITH THE REFRIGERANT WILL FREEZE. ALWAYS PROTECT THE SKIN OR DELICATE OBJECTS FROM DIRECT CONTACT WITH THE REFRIGERANT.

THE R-134a SERVICE EQUIPMENT OR THE VEHICLE REFRIGERANT 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.

CAUTION

SERVICE CAUTIONS

CAUTION: Liquid refrigerant is corrosive to metal surfaces. Follow the operating instructions supplied with the service equipment being used.

Never add R-12 to a refrigerant system designed to use R-134a. Damage to the system will result.

R-12 refrigerant oil must not be mixed with R-134a refrigerant oil. They are not compatible.

Do not use R-12 equipment or parts on the R-134a system. Damage to the system will result.

Do not overcharge the refrigerant system. This will cause excessive compressor head pressure and can cause noise and system failure.

Recover the refrigerant before opening any fitting or connection. Open the fittings with caution, even after the system has been discharged. Never open or loosen a connection before recovering the refrigerant. Do not remove the secondary retention clip from any spring-lock coupler connection while the refrigerant system is under pressure. Recover the refrigerant before removing the secondary retention clip. Open the fittings with caution, even after the system has been discharged. Never open or loosen a connection before recovering the refrigerant.

The refrigerant system must always be evacuated before charging.

Do not open the refrigerant system or uncap a replacement component until you are ready to service the system. This will prevent contamination in the system.

Before disconnecting a component, clean the outside of the fittings thoroughly to prevent contamination from entering the refrigerant system.

Immediately after disconnecting a component from the refrigerant system, seal the open fittings with a cap or plug.

Before connecting an open refrigerant fitting, always install a new seal or gasket. Coat the fitting and seal with clean refrigerant oil before connecting.

Do not remove the sealing caps from a replacement component until it is to be installed.

When installing a refrigerant line, avoid sharp bends that may restrict refrigerant flow. Position the refrigerant lines away from exhaust system components or any sharp edges, which may damage the line.

Tighten refrigerant fittings only to the specified torque. The aluminum fittings used in the refrigerant system will not tolerate overtightening.

When disconnecting a refrigerant fitting, use a wrench on both halves of the fitting. This will prevent twisting of the refrigerant lines or tubes.

Refrigerant oil will absorb moisture from the atmosphere if left uncapped. Do not open a container of refrigerant oil until you are ready to use it. Replace the cap on the oil container immediately after using. Store refrigerant oil only in a clean, airtight, and moisture-free container.

Keep service tools and the work area clean. Contamination of the refrigerant system through careless work habits must be avoided.

PLUMBING (Continued)

**CAUTION - REFRIGERANT HOSES/LINES/
TUBES PRECAUTIONS**

Kinks or sharp bends in the refrigerant plumbing will 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 refrigerant system connections are pressure tight.

A good rule for the flexible hose refrigerant lines is to keep the radius of all bends at least ten times the diameter of the hose. Sharp bends will reduce the flow of refrigerant. The flexible hose lines should be routed so they are at least 80 millimeters (3 inches) from the exhaust manifold. It is a good practice to inspect all flexible refrigerant system hose lines at least once a year to make sure they are in good condition and properly routed.

There are two types of refrigerant fittings:

- All fittings with O-rings need to be coated with refrigerant oil before installation. Use only O-rings that are the correct size and approved for use with R-134a refrigerant. Failure to do so may result in a leak.
- Unified plumbing connections with gaskets cannot be serviced with O-rings. The gaskets are not reusable and new gaskets do not require lubrication before installing.

Using the proper tools when making a refrigerant plumbing connection is very important. Improper tools or improper use of the tools can damage the refrigerant fittings. Always use two wrenches when loosening or tightening tube fittings. Use one wrench to hold one side of the connection stationary, while loosening or tightening the other side of the connection with a second wrench.

The refrigerant must be recovered completely from the system before opening any fitting or connection. Open the fittings with caution, even after the refrigerant has been recovered. If any pressure is noticed as a fitting is loosened, tighten the fitting and recover the refrigerant from the system again.

Do not discharge refrigerant into the atmosphere. Use an R-134a refrigerant recovery/recycling device that meets SAE Standard J2210.

The refrigerant system will remain chemically stable as long as pure, moisture-free R-134a refrigerant and refrigerant oil is used. Dirt, moisture, or air can upset this chemical stability. Operational troubles or serious damage can occur if foreign material is present in the refrigerant system.

When it is necessary to open the refrigerant system, have everything needed to service the system ready. The refrigerant system should not be left open to the atmosphere any longer than necessary. Cap or plug all lines and fittings as soon as they are opened to prevent the entrance of dirt and moisture. All lines and components in parts stock should be capped or sealed until they are to be installed.

All tools, including the refrigerant recycling equipment, the manifold gauge set, and test hoses should be kept clean and dry. All tools and equipment must be designed for R-134a refrigerant.

STANDARD PROCEDURE**STANDARD PROCEDURE - REFRIGERANT
SYSTEM SERVICE EQUIPMENT**

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

When servicing the air conditioning system, a R-134a refrigerant recovery/recycling/charging station that meets SAE Standard J2210 must be used. Contact an automotive service equipment supplier for refrigerant recovery/recycling/charging equipment. Refer to the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

A manifold gauge set may be needed with some recovery/recycling/charging equipment (Fig. 1). The service hoses on the gauge set being used should have manual (turn wheel), or automatic back-flow valves at the service port connector ends. This will prevent refrigerant from being released into the atmosphere.

MANIFOLD GAUGE SET CONNECTIONS

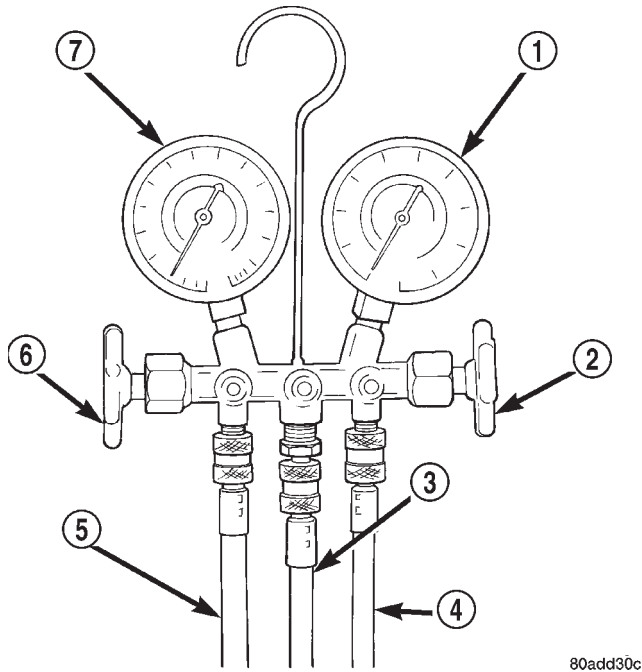
CAUTION: Do not use an R-12 manifold gauge set on an R-134a system. The refrigerants are not compatible and system damage will result.

LOW PRESSURE GAUGE HOSE The low pressure hose (Blue with Black stripe) attaches to the suction service port. This port is located on the suction line between the accumulator outlet and the compressor.

HIGH PRESSURE GAUGE HOSE The high pressure hose (Red with Black stripe) attaches to the discharge service port. This port is located on the discharge line between the compressor and the condenser inlet.

RECOVERY/RECYCLING/EVACUATION/CHARGING HOSE The center manifold hose (Yellow, or White, with Black stripe) is used to recover, evacuate, and charge the refrigerant system. When the low or high pressure valves on the manifold gauge set are opened, the refrigerant in the system will escape through this hose.

PLUMBING (Continued)

**Fig. 1 MANIFOLD GAUGE SET - TYPICAL**

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

STANDARD PROCEDURE - REFRIGERANT RECOVERY

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

A R-134a refrigerant recovery/recycling/charging station that meets SAE Standard J2210 must be used to recover the refrigerant from an R-134a refrigerant system. Refer to the operating instructions supplied by the equipment manufacturer for the proper care and use of this equipment.

STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/

PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

If the refrigerant system has been open to the atmosphere, it must be evacuated before the system can be charged. If moisture and air enters the system and becomes mixed with the refrigerant, the compressor head pressure will rise above acceptable operating levels. This will reduce the performance of the air conditioner and damage the compressor. Evacuating the refrigerant system will remove the air and boil the moisture out of the system at near room temperature. To evacuate the refrigerant system, use the following procedure:

(1) Connect a R-134a refrigerant recovery/recycling/charging station that meets SAE Standard J2210 and a manifold gauge set to the refrigerant system of the vehicle.

(2) Open the low and high side valves and start the charging station vacuum pump. When the suction gauge reads 88 kPa (26 in. Hg.) vacuum or greater, close all of the valves and turn off the vacuum pump.

(a) If the refrigerant system fails to reach the specified vacuum, the system has a leak that must be corrected. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - DIAGNOSIS AND TESTING - REFRIGERANT SYSTEM LEAKS)

(b) If the refrigerant system maintains the specified vacuum for five minutes, restart the vacuum pump, open the suction and discharge valves and evacuate the system for an additional ten minutes.

(3) Close all of the valves, and turn off the charging station vacuum pump.

(4) The refrigerant system is now ready to be charged with R-134a refrigerant. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE)

STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

After the refrigerant system has been tested for leaks and evacuated, a refrigerant charge can be injected into the system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - SPECIFICATIONS - CHARGE CAPACITY)

A R-134a refrigerant recovery/recycling/charging station that meets SAE Standard J2210 must be

PLUMBING (Continued)

used to charge the refrigerant system with R-134a refrigerant. Refer to the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

SPECIFICATIONS - CHARGE CAPACITY

The R-134a refrigerant system charge capacity for this vehicle is 0.737 kilograms (1.63 pounds).

A/C COMPRESSOR**DESCRIPTION****DESCRIPTION**

The air conditioning system uses a Sanden PXF-18, reciprocating swash plate-type compressor on all models. This compressor has a fixed displacement of 180 cubic centimeters (10.984 cubic inches), and has both the suction and discharge ports located on the cylinder head. A label identifying the use of R-134a refrigerant is located on the compressor.

DESCRIPTION - HIGH PRESSURE RELIEF VALVE

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

OPERATION**OPERATION**

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

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

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

OPERATION - HIGH PRESSURE RELIEF VALVE

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

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

The high pressure relief valve is a factory-calibrated unit. The valve cannot be adjusted or repaired, and must not be removed or otherwise disturbed. The valve is only serviced as a part of the compressor assembly.

DIAGNOSIS AND TESTING - A/C COMPRESSOR NOISE

When investigating an air conditioning related noise, you must first know the conditions under which the noise occurs. These conditions include: weather, vehicle speed, transmission in gear or neutral, engine speed, engine temperature, and any other special conditions. Noises that develop during air conditioning operation can often be misleading. For example: What sounds like a failed front bearing or connecting rod, may be caused by loose bolts, nuts, mounting brackets, or a loose compressor clutch assembly.

Drive belts are speed sensitive. At different engine speeds and depending upon belt tension, belts can develop noises that are mistaken for a compressor noise. Improper belt tension can cause a misleading noise when the compressor clutch is engaged, which may not occur when the compressor clutch is disengaged. Check the serpentine drive belt condition and tension as described in Cooling before beginning this procedure.

(1) Select a quiet area for testing. Duplicate the complaint conditions as much as possible. Switch the compressor on and off several times to clearly identify the compressor noise. Listen to the compressor while the clutch is engaged and disengaged. Probe the compressor with an engine stethoscope or a long screwdriver with the handle held to your ear to better localize the source of the noise.

(2) Loosen all of the compressor mounting hardware and retighten. Tighten the compressor clutch mounting nut. Be certain that the clutch coil is mounted securely to the compressor, and that the clutch plate and rotor are properly aligned and have the correct air gap. (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C COMPRESSOR CLUTCH - INSTALLATION)

A/C COMPRESSOR (Continued)

(3) To duplicate a high-ambient temperature condition (high head pressure), restrict the air flow through the condenser. Install a manifold gauge set to be certain that the discharge pressure does not exceed 2760 kPa (400 psi).

(4) Check the refrigerant system plumbing for incorrect routing, rubbing or interference, which can cause unusual noises. Also check the refrigerant lines for kinks or sharp bends that will restrict refrigerant flow, which can cause noises. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

(5) If the noise is from opening and closing of the high pressure relief valve, evacuate and recharge the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE) If the high pressure relief valve still does not seat properly, replace the compressor.

(6) If the noise is from liquid slugging on the suction line, replace the accumulator. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ACCUMULATOR - REMOVAL) Check the refrigerant oil level and the refrigerant system charge. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REFRIGERANT OIL - STANDARD PROCEDURE) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - SPECIFICATIONS - CHARGE CAPACITY) If the liquid slugging condition continues following accumulator replacement, replace the compressor. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/A/C COMPRESSOR - REMOVAL)

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

REMOVAL

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

The compressor may be removed and repositioned without disconnecting the refrigerant lines or discharging the refrigerant system. Discharging is not necessary if servicing the compressor clutch or clutch coil, the engine, the cylinder head, or the generator.

(1) Recover the refrigerant from the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT RECOVERY)

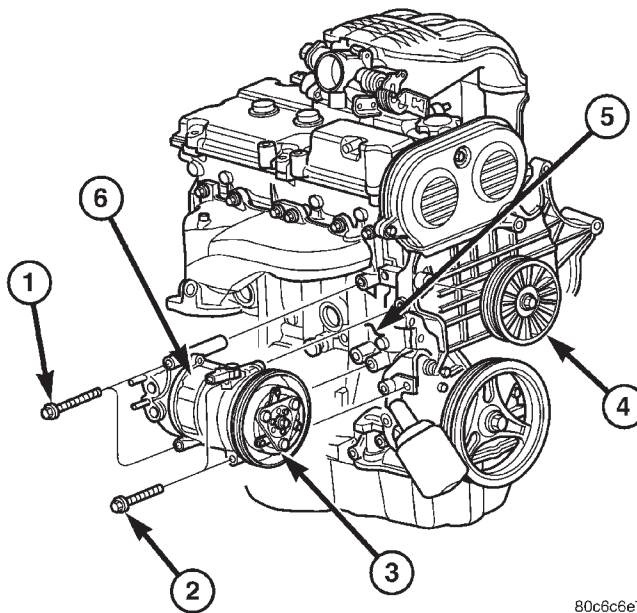
(2) Disconnect and isolate the battery negative cable.

(3) Remove the serpentine drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - REMOVAL).

(4) Unplug the compressor clutch coil wire harness connector.

(5) Remove the suction and discharge refrigerant line manifold from the compressor. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/SUCTION LINE - REMOVAL) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/A/C DISCHARGE LINE - REMOVAL) Install plugs in, or tape over all of the opened refrigerant fittings.

(6) Remove the bolts that secure the compressor to the mounting bracket (Fig. 2) or (Fig. 3) or (Fig. 4).



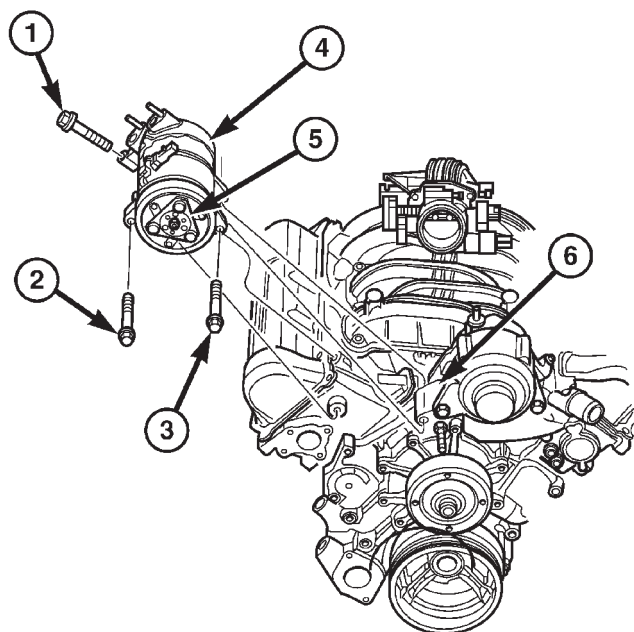
80c6c6e7

Fig. 2 A/C COMPRESSOR - 2.4L ENGINE

- 1 - COMPRESSOR BOLT
- 2 - COMPRESSOR BOLT
- 3 - COMPRESSOR CLUTCH AND PULLEY
- 4 - IDLER PULLEY
- 5 - ENGINE BLOCK
- 6 - A/C COMPRESSOR

(7) Remove the compressor from the mounting bracket.

A/C COMPRESSOR (Continued)



80c6c6e5

Fig. 3 A/C COMPRESSOR - 3.7L ENGINE

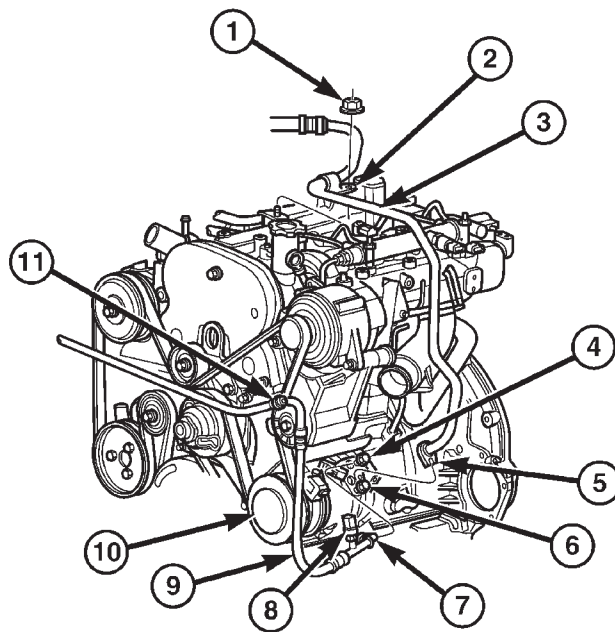
- 1 - COMPRESSOR BOLT #1
- 2 - COMPRESSOR BOLT #2
- 3 - COMPRESSOR BOLT #3
- 4 - A/C COMPRESSOR
- 5 - A/C COMPRESSOR CLUTCH AND PULLEY
- 6 - COMPRESSOR MOUNT

INSTALLATION

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION - REFRIGERANT HOSES/LINES/TUBES PRECAUTIONS)

The compressor may be removed and repositioned without disconnecting the refrigerant lines or discharging the refrigerant system. Discharging is not necessary if servicing the compressor clutch or clutch coil, the engine, the cylinder head, or the generator.

NOTE: If a replacement compressor is being installed, be certain to check the refrigerant oil level. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REFRIGERANT OIL - STANDARD PROCEDURE - REFRIGERANT OIL LEVEL) Use only refrigerant oil of the type recommended for the compressor in the vehicle. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REFRIGERANT OIL - DESCRIPTION)



80c6c6e3

Fig. 4 A/C COMPRESSOR - 2.5L DIESEL ENGINE

- 1 - SUCTION LINE MOUNTING NUT
- 2- SUCTION LINE MOUNTING CLIP
- 3- SUCTION LINE
- 4- MOUNTING SCREW FOR SUCTION LINE
- 5- SUCTION LINE MOUNTING FLANG
- 6- MOUNTING SCREW FOR DISCHARGE LINE
- 7- DISCHARGE LINE MOUNTING FLANG
- 8- A/C PRESSURE SENSOR
- 9- A/C DISCHARGE LINE
- 10- A/C COMPRESSOR ASSEMBLY
- 11- A/C DISCHARGE LINE SERVICE PORT

(1) Install the compressor to the mounting bracket. Tighten the three mounting bolts to 27 N·m (20 ft. lbs.), (2.4L gasoline and 2.5L diesel engines only).

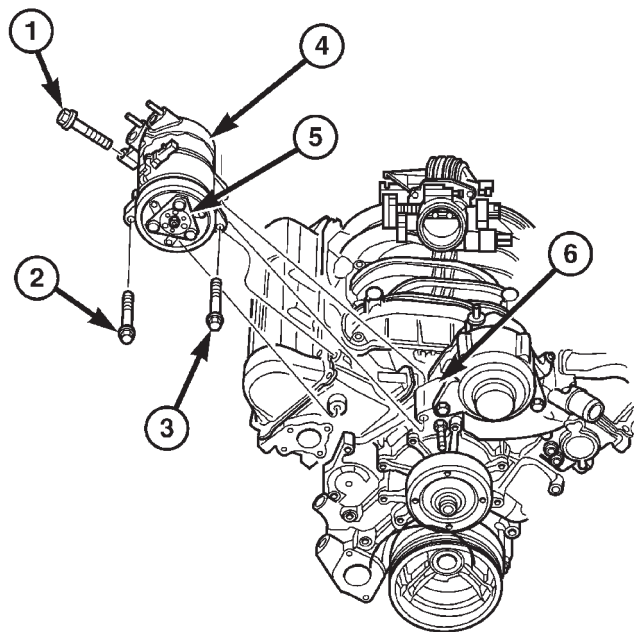
(2) On the 3.7L gasoline engine install and tighten the bolts in the following sequence (Fig. 5):

- The number one bolt (rear) is hand tightened first then tightened to 55 N·m (41 ft. lbs.)
- The number three bolt is then hand tightened and torqued to 40 N·m (30 ft. lbs.)
- The number two bolt is also hand tightened and torqued to 55 N·m (41 ft. lbs.)

(3) Remove the tape or plugs from all of the opened refrigerant line fittings. Install the suction and discharge line manifold to the compressor. Tighten the fastener to 28 N·m (250 in. lbs.).(Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/SUCTION LINE - INSTALLATION) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/A/C DISCHARGE LINE - INSTALLATION)

(4) Install the serpentine drive belt(Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - INSTALLATION).

A/C COMPRESSOR (Continued)



80c6c6e5

Fig. 5 A/C COMPRESSOR - 3.7L ENGINE

- 1 - COMPRESSOR BOLT #1
- 2 - COMPRESSOR BOLT #2
- 3 - COMPRESSOR BOLT #3
- 4 - A/C COMPRESSOR
- 5 - A/C COMPRESSOR CLUTCH AND PULLEY
- 6 - COMPRESSOR MOUNT

(5) Plug in the compressor clutch coil wire harness connector.

(6) Connect the battery negative cable.

(7) Evacuate the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE)

(8) Charge the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE)

A/C CONDENSER

DESCRIPTION

The condenser is located in the air flow in front of the engine cooling radiator. The condenser is a heat exchanger that allows the high-pressure refrigerant gas being discharged by the compressor to give up its heat to the air passing over the condenser fins.

OPERATION

When the refrigerant gas gives up its heat, it condenses. When the refrigerant leaves the condenser, it has become a high-pressure liquid refrigerant. The

volume of air flowing over the condenser fins is critical to the proper cooling performance of the air conditioning system. Therefore, it is important that there are no objects placed in front of the radiator grille openings in the front of the vehicle or foreign material on the condenser fins that might obstruct proper air flow. Also, any factory-installed air seals or shrouds must be properly reinstalled following radiator or condenser service.

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

REMOVAL

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

(1) Disconnect and isolate the battery negative cable.

(2) Recover the refrigerant from the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT RECOVERY)

(3) Disconnect the discharge line refrigerant line fitting at the condenser inlet. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS) Install plugs in, or tape over all of the opened refrigerant line fittings.

(4) Disconnect the liquid line (Left-Hand Drive) or liquid line jumper (Right-Hand Drive) refrigerant line fitting at the condenser outlet. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS) Install plugs in, or tape over all of the opened refrigerant line fittings.

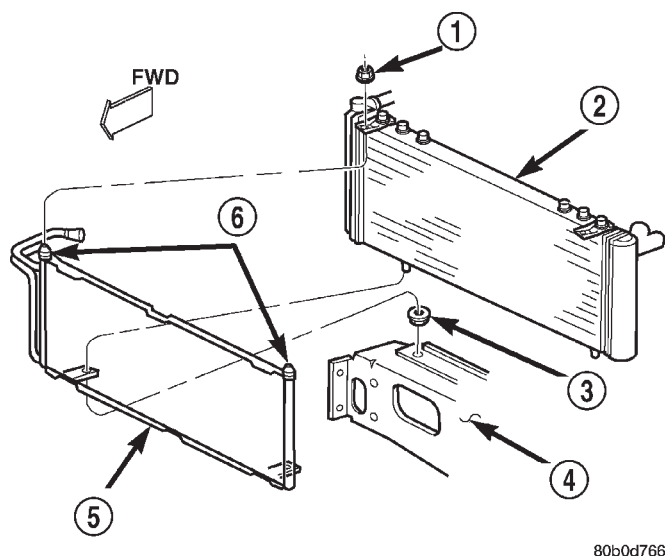
(5) Remove the radiator and the condenser from the vehicle as a unit. Refer to Cooling for the procedures.

(6) Remove the two nuts that secure the condenser studs to the upper brackets of the radiator (Fig. 6).

(7) Slide the condenser down from the radiator far enough for the condenser studs to clear the upper radiator bracket holes, and for the lower condenser bracket holes to clear the dowel pins on the bottom of the radiator.

(8) Remove the condenser from the radiator.

A/C CONDENSER (Continued)

**Fig. 6 CONDENSER REMOVE/INSTALL**

- 1 - NUT
- 2 - RADIATOR
- 3 - GROMMET
- 4 - LOWER CROSSMEMBER
- 5 - CONDENSER
- 6 - STUDS

INSTALLATION

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION - REFRIGERANT HOSES/LINES/TUBES PRECAUTIONS)

- (1) Install the holes of the condenser lower brackets over the dowel pins on the bottom of the radiator.
- (2) Slide the condenser upwards until both of the condenser studs are installed through the holes in the radiator upper brackets. Tighten the mounting nuts to 5.3 N·m (47 in. lbs.).
- (3) Reinstall the radiator and condenser unit in the vehicle (Refer to 7 - COOLING/ENGINE/RADIATOR - INSTALLATION).
- (4) Remove the tape or plugs from the refrigerant line fittings on the condenser outlet and the liquid line (Left-Hand Drive) or the liquid line jumper (Right-Hand Drive). Install the liquid line or the liquid line jumper to the condenser outlet. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS)
- (5) Remove the tape or plugs from the refrigerant line fittings on the condenser inlet and the discharge

line. Connect the discharge line to the condenser inlet. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS)

- (6) Connect the battery negative cable.
- (7) Evacuate the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE)
- (8) Charge the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE)

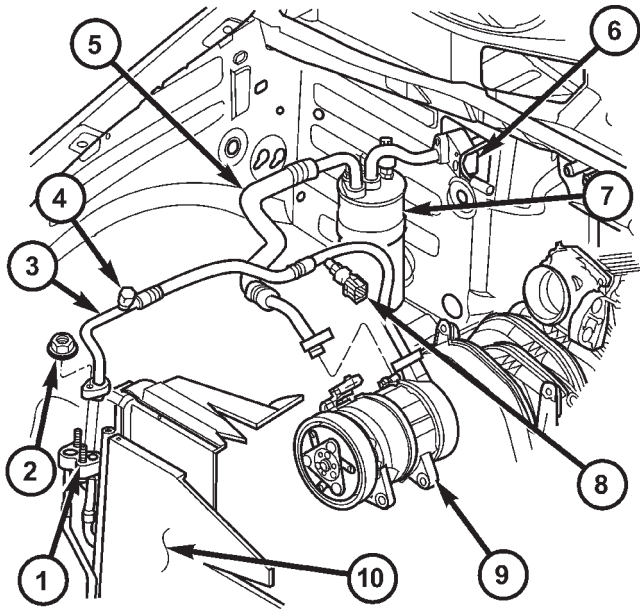
NOTE: If the condenser is replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the compressor in the vehicle. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REFRIGERANT OIL - DESCRIPTION)

A/C DISCHARGE LINE**REMOVAL**

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

- (1) Disconnect and isolate the battery negative cable.
- (2) Recover the refrigerant from the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT RECOVERY)
- (3) Unplug the wire harness connector from the high pressure cut-off switch.
- (4) Disconnect the discharge line refrigerant line fitting from the condenser inlet tube (Fig. 7). (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS) Install plugs in, or tape over all of the opened refrigerant line fittings.
- (5) Remove the nut that secures the suction line block fitting to the accumulator outlet. Install plugs in, or tape over all of the opened refrigerant line fittings.
- (6) Remove the screw that secures the suction and discharge line manifold to the compressor. Install plugs in, or tape over all of the opened refrigerant line fittings.

A/C DISCHARGE LINE (Continued)



80c79e18

Fig. 7 SUCTION AND DISCHARGE LINE REMOVAL

- 1 - Condensor connection
- 2- Discharge line to condensor mounting nut
- 3- Discharge line
- 4- Discharge line charging port
- 5- Suction line
- 6- Evaporator mounting ports
- 7- Accumulator
- 8- High pressure cut off switch
- 9- AC compressor
- 10- AC condensor

(7) Remove the suction and discharge line assembly from the vehicle.

INSTALLATION

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION - REFRIGERANT HOSES/LINES/TUBES PRECAUTIONS)

- (1) Remove the tape or plugs from the suction and discharge line manifold and the compressor. Install the suction and discharge line manifold to the compressor. Tighten the fastener to 28 N·m (250 in. lbs.).
- (2) Remove the tape or plugs from the suction line and the accumulator outlet block fittings. Install the suction line to the accumulator outlet and tighten the mounting nut to 9 N·m (80 in. lbs.).

(3) Remove the tape or plugs from the refrigerant line fittings on the discharge line and the condenser inlet tube. Connect the discharge line refrigerant line coupler to the condenser inlet tube. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS)

(4) Plug in the wire harness connector to the high pressure cut-off switch.

(5) Connect the battery negative cable.

(6) Evacuate the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE)

(7) Charge the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE)

A/C LIQUID LINE**REMOVAL**

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

(1) Disconnect and isolate the battery negative cable.

(2) Recover the refrigerant. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT RECOVERY)

(3) Disconnect the liquid line refrigerant line couplers at the evaporator inlet and the condenser outlet (Fig. 8). (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS) Install plugs in, or tape over all of the opened refrigerant line fittings.

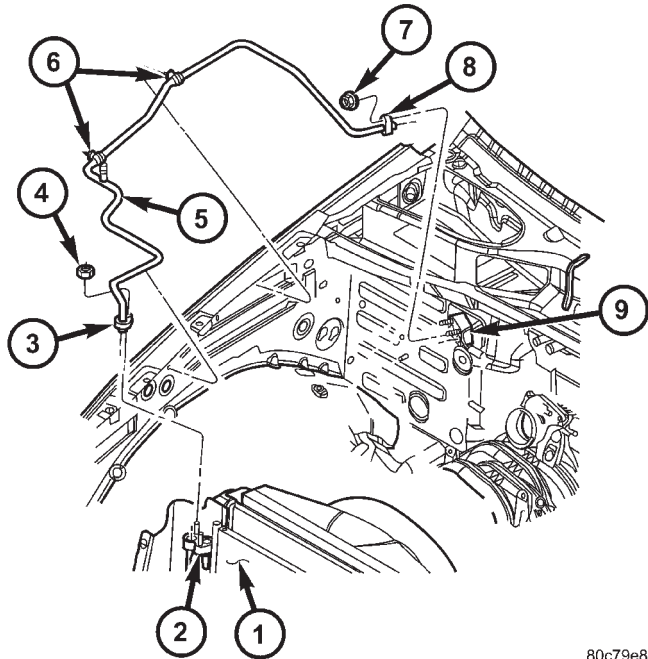
(4) Remove the liquid line from the vehicle.

INSTALLATION

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION - REFRIGERANT HOSES/LINES/TUBES PRECAUTIONS)

(1) Remove the tape or plugs from the refrigerant line fittings on the liquid line, the evaporator inlet

A/C LIQUID LINE (Continued)



80c79e83

Fig. 8 LIQUID LINE REMOVE/INSTALL

- 1 - AC Condensor
- 2 - AC condensor connector ports
- 3 - Liquid line to condensor connector
- 4 - Mounting nut
- 5 - Liquid line
- 6 - Liquid line mounting clips (2)
- 7 - Mounting nut
- 8 - Liquid line to evaporator connection
- 9 - Evaporator connection

and the condenser outlet. Connect the liquid line to the evaporator inlet and condenser outlet refrigerant line couplers. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS)

(2) Connect the battery negative cable.

(3) Evacuate the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE)

(4) Charge the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE)

A/C SUCTION LINE

REMOVAL

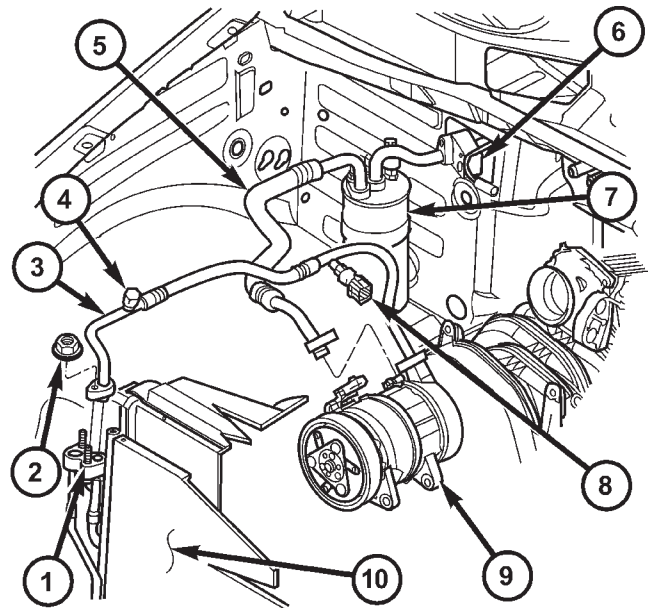
WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/

PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

(1) Disconnect and isolate the negative battery cable.

(2) Recover the refrigerant. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT RECOVERY)

(3) Unplug the wire harness connector from the a/c high pressure switch (Fig. 9).



80c79e18

Fig. 9 SUCTION AND DISCHARGE LINE REMOVAL

- 1 - Condensor connection
- 2 - Discharge line to condensor mounting nut
- 3 - Discharge line
- 4 - Discharge line charging port
- 5 - Suction line
- 6 - Evaporator mounting ports
- 7 - Accumulator
- 8 - High pressure cut off switch
- 9 - AC compressor
- 10 - AC condensor

(4) Disconnect the discharge line refrigerant fitting from the condenser inlet tube. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS) Install plugs in, or tape over all of the opened refrigerant line fittings.

(5) Remove the nut that secures the suction line block fitting to the accumulator outlet. Install plugs in, or tape over all of the opened refrigerant line fittings.

(6) Remove the fastener that secures the suction and discharge line manifold to the compressor. Install plugs in, or tape over all of the opened refrigerant line fittings.

A/C SUCTION LINE (Continued)

(7) Remove the suction and discharge line assembly from the vehicle.

INSTALLATION

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION - REFRIGERANT HOSES/LINES/TUBES PRECAUTIONS)

(1) Remove the tape or plugs from the suction and discharge line manifold and the compressor. Install the suction and discharge line manifold to the compressor. Tighten the fastener to 28 N·m (250 in. lbs.).

(2) Remove the tape or plugs from the suction line and the accumulator outlet block fittings. Install the suction line to the accumulator outlet and tighten the mounting nut to 9 N·m (80 in. lbs.).

(3) Remove the tape or plugs from the refrigerant line fittings on the discharge line and the condenser inlet tube. Connect the discharge line refrigerant line coupler to the condenser inlet tube. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS)

(4) Plug in the wire harness connector on the a/c high pressure switch.

(5) Connect the battery negative cable.

(6) Evacuate the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE)

(7) Charge the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE)

(8) Check the affected areas of the system for leaks.

A/C EVAPORATOR

DESCRIPTION

The evaporator coil is located in the HVAC housing, under the instrument panel. The evaporator coil is positioned in the HVAC housing so that all air that enters the housing must pass over the fins of the evaporator before it is distributed through the system ducts and outlets. However, air passing over the evaporator coil fins will only be conditioned when the compressor is engaged and circulating refrigerant through the evaporator coil tubes.

OPERATION

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

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

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

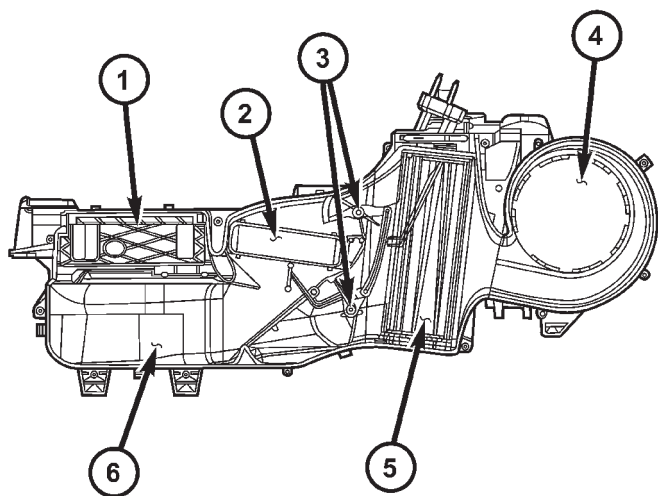
(1) Remove and disassemble the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - REMOVAL) (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - DISASSEMBLY)

(2) Lift the evaporator coil unit out of the lower half of the HVAC housing. (Fig. 10).

INSTALLATION

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION - REFRIGERANT HOSES/LINES/TUBES PRECAUTIONS)

A/C EVAPORATOR (Continued)



80c8b350

Fig. 10 Blend Door

- 1 - DEFROSTER DOOR
- 2 - HEATER CORE
- 3 - BLEND DOORS
- 4 - BLOWER MOTOR HOUSING
- 5 - EVAPORATOR (A/C ONLY)
- 6 - LOWER HVAC CASE ASSEMBLY

(1) Install the evaporator coil unit into of the lower half of the HVAC housing. Be certain that the evaporator foam insulator wrap and rubber tube seal are reinstalled.

(2) Reassemble and install the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - ASSEMBLY) (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - INSTALLATION)

NOTE: If the evaporator was replaced, add 60 milliliters (2 fluid ounces) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the compressor in the vehicle. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REFRIGERANT OIL - DESCRIPTION)

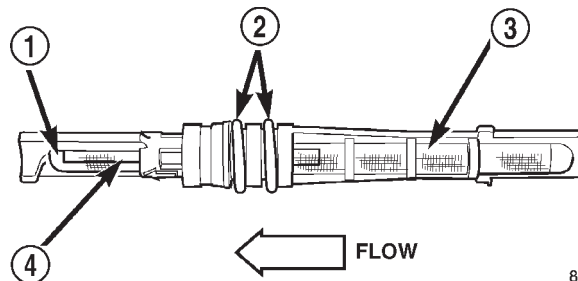
A/C ORIFICE TUBE

DESCRIPTION

The fixed orifice tube is installed in the liquid line (left-hand drive) or liquid line jumper (right-hand drive) between the outlet of the condenser and the inlet of the evaporator. The fixed orifice tube is

located in the end of the liquid line or liquid line jumper that is closest to the condenser outlet tube.

The inlet end of the fixed orifice tube has a nylon mesh filter screen, which filters the refrigerant and helps to reduce the potential for blockage of the metering orifice by refrigerant system contaminants (Fig. 11). The outlet end of the tube has a nylon mesh diffuser screen. The O-rings on the plastic body of the fixed orifice tube seal the tube to the inside of the liquid line and prevent the refrigerant from bypassing the fixed metering orifice.



80ad638f

Fig. 11 FIXED ORIFICE TUBE - TYPICAL

- 1 - DIFFUSER SCREEN
- 2 - "O" RINGS
- 3 - INLET FILTER SCREENS
- 4 - ORIFICE

OPERATION

The fixed orifice tube is used to meter the flow of liquid refrigerant into the evaporator coil. The high-pressure liquid refrigerant from the condenser expands into a low-pressure liquid as it passes through the metering orifice and diffuser screen of the fixed orifice tube.

The fixed orifice tube cannot be repaired and, if faulty or plugged, the liquid line and fixed orifice tube unit or liquid line jumper and fixed orifice tube unit must be replaced.

REMOVAL

The fixed orifice tube is located in the liquid line (Left-Hand Drive) or the liquid line jumper (Right-Hand Drive) near the condenser. The orifice has filter screens on the inlet and outlet ends of the tube body. If the fixed orifice tube is faulty or plugged, the liquid line unit or liquid line jumper unit must be replaced. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LIQUID LINE - REMOVAL)

INSTALLATION

The fixed orifice tube is located in the liquid line (Left-Hand Drive) or the liquid line jumper (Right-Hand Drive) near the condenser. The orifice has filter screens on the inlet and outlet ends of the tube body. If the fixed orifice tube is faulty or plugged, the liquid line unit or liquid line jumper unit must be

A/C ORIFICE TUBE (Continued)

replaced. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/LIQUID LINE - REMOVAL)

ACCUMULATOR

DESCRIPTION

The accumulator is mounted in the engine compartment between the evaporator coil outlet tube and the compressor inlet.

OPERATION

Refrigerant enters the accumulator canister as a low pressure vapor through the inlet tube. Any liquid, oil-laden refrigerant falls to the bottom of the canister, which acts as a separator. A desiccant bag is mounted inside the accumulator canister to absorb any moisture which may have entered and become trapped within the refrigerant system (Fig. 12).

REMOVAL

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

(1) Disconnect and isolate the battery negative cable.

(2) Recover the refrigerant from the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT RECOVERY)

(3) Unplug the wire harness connector from the low pressure cycling clutch switch.

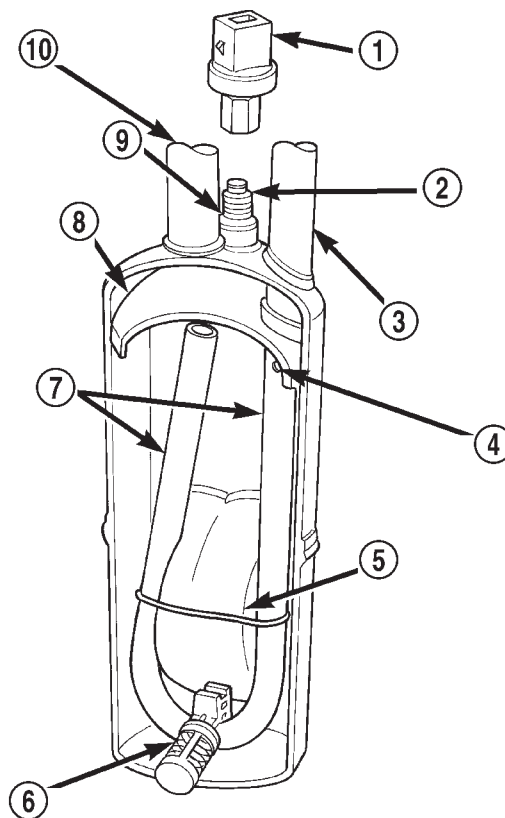
(4) Loosen the screw that secures the accumulator retaining band to the support bracket on the dash panel (Fig. 13).

(5) Disconnect the suction line from the accumulator outlet tube refrigerant line fitting. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS) Install plugs in, or tape over all of the opened refrigerant line fittings.

(6) Disconnect the accumulator inlet tube refrigerant line fitting from the evaporator outlet tube. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS) Install plugs in, or tape over all of the opened refrigerant line fittings.

(7) Pull the accumulator and retaining band unit forward until the screw in the band is clear of the slotted hole in the support bracket on the dash panel.

(8) Remove the accumulator from the vehicle.



80add30t

Fig. 12 ACCUMULATOR - TYPICAL

- 1 - A/C LOW PRESSURE SWITCH
- 2 - PRESSURE SWITCH FITTING
- 3 - OUTLET TO COMPRESSOR
- 4 - ANTI-SIPHON HOLE
- 5 - DESICCANT BAG
- 6 - OIL RETURN ORIFICE FILTER
- 7 - VAPOR RETURN TUBE
- 8 - ACCUMULATOR DOME
- 9 - O-RING SEAL
- 10 - INLET FROM EVAPORATOR

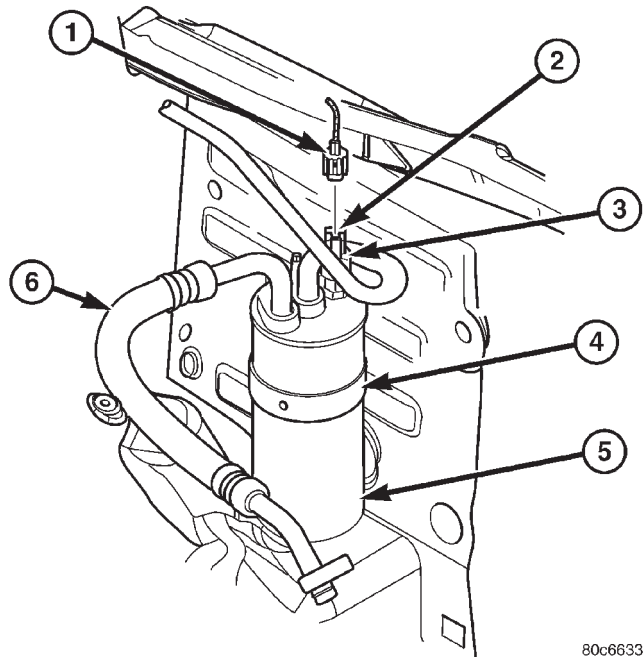
INSTALLATION

WARNING: REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION - REFRIGERANT HOSES/LINES/TUBES PRECAUTIONS)

(1) Install the accumulator and retaining band as a unit by sliding the screw in the band into the slotted hole in the support bracket on the dash panel.

(2) Remove the tape or plugs from the refrigerant line fittings on the accumulator inlet tube and the

ACCUMULATOR (Continued)



80c6633e

Fig. 13 A/C LOW PRESSURE SWITCH

- 1 - WIRING HARNESS CONNECTOR
- 2 - A/C LOW PRESSURE SWITCH
- 3 - A/C LINE TO EVAPORATOR
- 4 - ACCUMULATOR MOUNTING BRACKET
- 5 - ACCUMULATOR
- 6 - A/C LOW PRESSURE LINE

evaporator outlet tube. Connect the accumulator inlet tube refrigerant line coupler to the evaporator outlet tube. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS)

(3) Tighten the accumulator retaining band screw to 5 N·m (45 in. lbs.).

(4) Remove the tape or plugs from the refrigerant line fittings on the suction line and the accumulator outlet tube. Connect the suction line to the accumulator outlet tube refrigerant line coupler. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - A/C LINE COUPLERS)

(5) Plug the wire harness connector into the low pressure cycling clutch switch.

(6) Connect the battery negative cable.

(7) Evacuate the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE)

(8) Charge the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE)

NOTE: If the accumulator is replaced, add 120 milliliters (4 fluid ounces) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the compressor in the vehicle. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REFRIGERANT OIL - DESCRIPTION)

HEATER CORE

DESCRIPTION

The heater core is located in the HVAC housing, under the instrument panel. It is a heat exchanger made of rows of tubes and fins and uses warm engine coolant as its heat source.

OPERATION

Engine coolant is circulated through heater hoses to the heater core at all times. As the coolant flows through the heater core, heat removed from the engine is transferred to the heater core fins and tubes. Air directed through the heater core picks up the heat from the heater core fins. The temperature control door allows control of the heater output air temperature by controlling how much of the air flowing through the HVAC housing is directed through the heater core. The blower motor speed controls the volume of air flowing through the HVAC housing.

The heater core cannot be repaired and, if faulty or damaged, it must be replaced. Refer to Cooling for more information on the engine cooling system, the engine coolant and the heater hoses.

REMOVAL

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, DISABLE THE AIRBAG SYSTEM BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. DISCONNECT AND ISOLATE THE BATTERY NEGATIVE (GROUND) CABLE, THEN WAIT TWO MINUTES FOR THE AIRBAG SYSTEM CAPACITOR TO DISCHARGE BEFORE PERFORMING FURTHER DIAGNOSIS OR SERVICE. THIS IS THE ONLY SURE WAY TO DISABLE THE AIRBAG SYSTEM. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN AN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

HEATER CORE (Continued)

WARNING: IF THE VEHICLE IS EQUIPPED WITH AIR CONDITIONING, REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION)

(1) Remove the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - REMOVAL).

(2) Remove the two heater core retaining screws (if equipped). (Fig. 14).

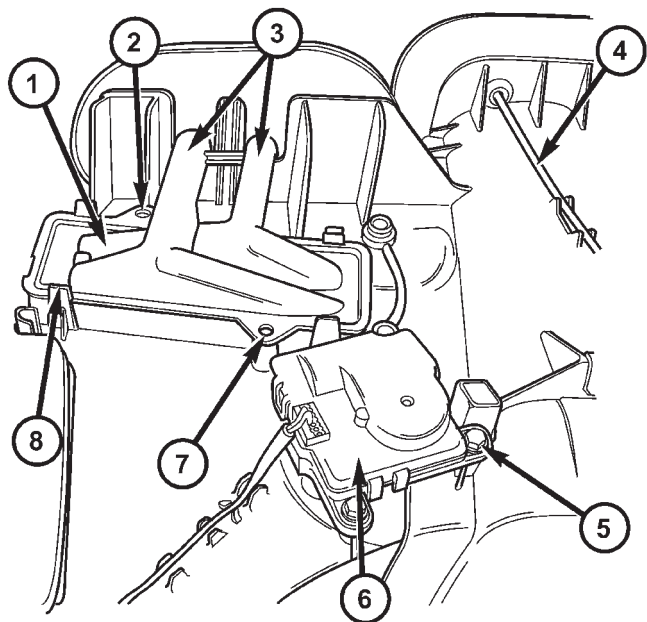


Fig. 14 HEATER CORE REMOVAL/INSTALLATION

- 1 - HEATER CORE
- 2 - MOUNTING SCREW HOLE
- 3 - INLET AND OUTLET TUBES
- 4 - VACUUM HARNESS
- 5 - ACTUATOR SCREWS (3)
- 6 - ELECTRIC BLEND DOOR ACTUATOR
- 7 - MOUNTING SCREW HOLE
- 8 - HEATER CORE RETAINER TABS (4)

(3) Gently push back on two of the heater core retaining tabs and pull up on heater core to remove.

INSTALLATION

WARNING: IF THE VEHICLE IS EQUIPPED WITH AIR CONDITIONING, REVIEW THE WARNINGS AND CAUTIONS IN THE FRONT OF THIS SECTION BEFORE PERFORMING THE FOLLOWING OPERATION. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNING) (Refer to 24 - HEATING &

AIR CONDITIONING/PLUMBING - CAUTION) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTION - REFRIGERANT HOSES/LINES/TUBES PRECAUTIONS)

(1) Install the heater core into the top of the HVAC housing.

(2) Push on top of heater core until all four tabs are locked into place.

(3) Install the two heater core retainer screws.

(4) Install the HVAC housing. (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - INSTALLATION)

REFRIGERANT

DESCRIPTION

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

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

OPERATION

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

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

REFRIGERANT OIL

DESCRIPTION

The refrigerant oil used in R-134a refrigerant systems is a synthetic-based, PolyAlkylene Glycol (PAG), wax-free lubricant. Mineral-based R-12 refrigerant

REFRIGERANT OIL (Continued)

oils are not compatible with PAG oils, and should never be introduced to an R-134a refrigerant system.

There are different PAG oils available, and each contains a different additive package. The PXF-18 compressor used in this vehicle is designed to use an SP-10 PAG refrigerant oil. Use only refrigerant oil of this same type to service the refrigerant system.

OPERATION

After performing any refrigerant recovery or recycling operation, always replenish the refrigerant system with the same amount of the recommended refrigerant oil as was removed. Too little refrigerant oil can cause compressor damage, and too much can reduce air conditioning system performance.

PAG refrigerant oil is much more hygroscopic than mineral oil, and will absorb any moisture it comes into contact with, even moisture in the air. The PAG oil container should always be kept tightly capped until it is ready to be used. After use, recap the oil container immediately to prevent moisture contamination.

STANDARD PROCEDURE - REFRIGERANT OIL LEVEL

When an air conditioning system is assembled at the factory, all components except the compressor are refrigerant oil free. After the refrigerant system has been charged and operated, the refrigerant oil in the compressor is dispersed throughout the refrigerant system. The accumulator, evaporator, condenser, and compressor will each retain a significant amount of the needed refrigerant oil.

It is important to have the correct amount of oil in the refrigerant system. This ensures proper lubrica-

tion of the compressor. Too little oil will result in damage to the compressor. Too much oil will reduce the cooling capacity of the air conditioning system.

It will not be necessary to check the oil level in the compressor or to add oil, unless there has been an oil loss. An oil loss may occur due to a rupture or leak from a refrigerant line, a connector fitting, a component, or a component seal. If a leak occurs, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system after the repair has been made. Refrigerant oil loss will be evident at the leak point by the presence of a wet, shiny surface around the leak.

Refrigerant oil must be added when a accumulator, evaporator coil, or condenser are replaced. See the Refrigerant Oil Capacities chart. When a compressor is replaced, the refrigerant oil must be drained from the old compressor and measured. Drain all of the refrigerant oil from the new compressor, then fill the new compressor with the same amount of refrigerant oil that was drained out of the old compressor.

Refrigerant Oil Capacities		
Component	ml	fl oz
A/C System	240	8
Accumulator	90	3
Condenser	22	.75
Evaporator	45	1.5
Compressor	drain and measure the oil from the old compressor as noted	