HEATING & AIR CONDITIONING

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HEATING & AIR CONDITIONING

DESCRIPTION

An automatic temperature control (ATC) single zone type heating-A/C system is standard equipment on this model.

To maintain the performance level of the heating, ventilation and air conditioning (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 A/C condenser will reduce the performance of the A/C and engine cooling systems.

The engine cooling system includes the radiator, thermostat, radiator hoses and the engine coolant pump. Refer to 7 - Cooling for more information before opening or attempting any service to the engine cooling system.

All vehicles are equipped with a common ventilation housing (Fig. 1) located in the engine compartment which includes:

- Blower motor
- Blower motor resistor block
- Recirculation door and actuator

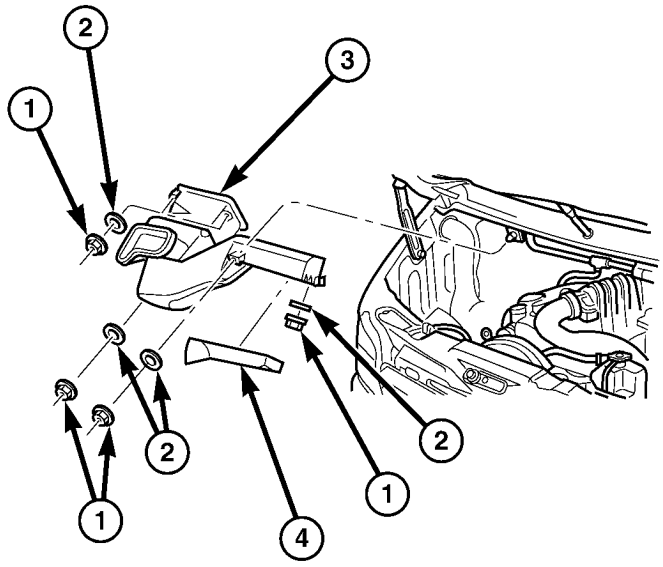

Fig. 1 Ventilation Housing

1 - NUT (5)
2 - WASHER (5)
3 - VENTILATION HOUSING
4 - HOUSING COVER

All vehicles are also equipped with a common heater housing (Fig. 2) mounted under the instrument panel which includes:

- Heater core
- Evaporator core
- Evaporator temperature sensor
- Expansion valve
- Air outlet temperature sensor
- Mode doors

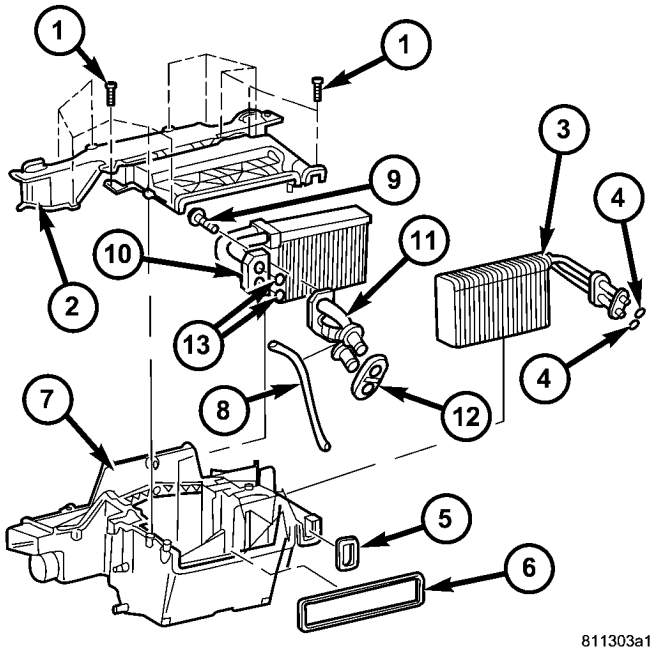

Fig. 2 Heater Housing

1 - SCREW (12)
2 - UPPER HOUSING
3 - A/C EVAPORATOR
4 - EVAPORATOR O-RING SEAL (2)
5 - EVAPORATOR GASKET
6 - VENTILATION HOUSING GASKET
7 - LOWER HOUSING
8 - WIRING HARNESS
9 - BOLT (3)
10 - HEATER CORE
11 - HEATER CORE TUBE ASSEMBLY
12 - HEATER CORE TUBE GASKET
13 - HEATER CORE TUBE O-RING SEAL (2)

Some vehicles are equipped with an additional Denso 10S17 A/C compressor mounted to the engine which is used for the optional rear A/C system and various add-on A/C systems (Fig. 3).

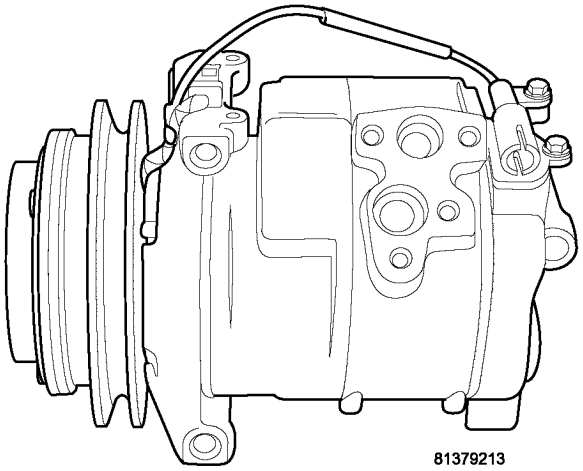

Fig. 3 Denso 10S17 A/C Compressor

A heater booster is used to aid in warming the engine coolant. The heater booster system can be switched on while the vehicle is being driven to help the engine reach its normal operating temperature quickly and will help aid in heating up the air within the passenger compartment quickly when requested by the operator (Fig. 4).

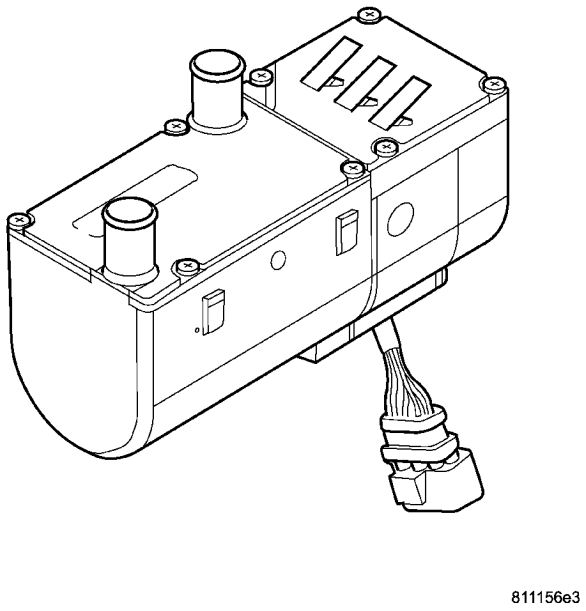

Fig. 4 Heater Booster

OPERATION

Outside air enters the vehicle through the hood opening at the base of the windshield, and passes through the ventilation housing located in the engine compartment into the heater housing located behind the instrument panel. Air flow velocity is adjusted with the blower motor speed selector thumbwheel on the A/C-heater control. The air intake openings must be kept free of snow, ice, leaves, and other obstructions for the HVAC system to receive a sufficient volume of outside air.

The automatic temperature control (ATC) system controls interior temperature by taking actual values from the temperature sensors and the CAN bus and comparing them to the nominal value of the temperature control switch. The electric pulsed heater valve is then energized depending on the requested quantity of heat and an electrically-operated water pump gives a nearly constant water flow for exact temperature regulation. If the solenoid is not energized, the coolant circuit to the heat exchanger is fully open. To control the temperature the solenoid valve is pulsed by the ATC in periods of four seconds.

The mode control knob on the A/C-heater control is used to direct the conditioned air flow to the selected air outlets. The mode control knob operates the mode doors by cables connected to the mode doors.

When the outside air contains smoke, odors, high humidity, or if rapid cooling is desired, interior air can by recirculated by selecting the Recirculation Mode with the mode control knob. The mode control knob operates the recirculation door through use of a vacuum actuator. When the Recirculation Mode is selected, the recirculation door is closed to prevent outside air from entering the passenger compartment.

To maintain minimum evaporator temperature and prevent evaporator freezing, an evaporator temperature sensor is used.

The A/C system is designed for the use of non-CFC, R-134a refrigerant only and uses an expansion valve to meter refrigerant flow to the evaporator.

DIAGNOSIS AND TESTING

A / C PERFORMANCE

The A/C system is designed to provide the passenger compartment with low temperature and low humidity air. The A/C evaporator, located in the HVAC housing is cooled to temperatures near the freezing point. As warm damp air passes over the fins of the A/C evaporator, the air transfers its heat to the refrigerant in the evaporator coils and the moisture in the air condenses on the evaporator fins. During periods of high heat and humidity, an A/C system will be more effective in the Recirculation mode (max-A/C). With the system in the Recirculation mode, only air from the passenger compartment passes through the A/C evaporator. As the passenger compartment air dehumidifies, the A/C system performance levels rise.

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 A/C system. When humidity is high, the A/C 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 coils. This reduces the amount of heat the A/C evaporator can absorb from the air. High humidity greatly reduces the ability of the A/C evaporator to lower the temperature of the air.

However, evaporator capacity used to reduce the amount of moisture in the air is not wasted. Wringing 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 their A/C system on humid days. A performance test is the best way to determine whether the system is performing up to design standards. This test also provides valuable clues as to the possible cause of trouble with the A/C system. The ambient air temperature in the location where the vehicle will be tested must be a minimum of 21° C (70° F) for this test.

A / C PERFORMANCE TEST

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

NOTE: Very specific instructions and conditions pertain to this procedure which are significantly different than procedures used in other vehicle applications. Follow each step in the order they are presented. Do not skip steps or change conditions from those stated or results will be adversely affected and invalid.

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

(1) Check for diagnostic trouble codes using a DRBIII® scan tool. If no DTCs are found in the engine control module (ECM), go to Step 2. If any DTCs are found, repair as required, then proceed to Step 2.

(2) Place the vehicle in the shade and operate the heating-A/C system under the following conditions.

- Engine at idle at operating temperature
- All doors or windows open
- Transaxle in Neutral
- All A/C duct louvers open
- A/C-heater controls set to fresh air (NOT Recirculate), full cool, panel mode, high blower and with A/C compressor engaged.

NOTE: The A/C compressor clutch is de-energized under any of the following conditions:

- **Restricted compressor (thermal fuse in the pulley)**
- **Low pressure in the system**
- **Low evaporator temperature**
- **Hard acceleration (WOT)**
- **High coolant temperatures**

(3) Insert a thermometer in the driver side center panel air outlet and operate the A/C system until the thermometer temperature stabilizes.

(4) With the A/C compressor clutch engaged, duct temperature should not be less than 2° C (35° F) or more than 12° C (54° F). The compressor clutch may cycle, depending upon the ambient temperature and humidity. If the clutch cycles, use the readings obtained before the clutch disengaged.

(5) If the A/C compressor clutch has not cycled off and the duct temperature is less than 2° C (35° F), check the evaporator temperature sensor and circuit by performing the ATC Function Test (Refer to 24 - HEATING & AIR CONDITIONING - DIAGNOSIS AND TESTING - ATC FUNCTION TEST).

(6) If the air outlet temperature fails to meet the specifications, refer to the A/C System Diagnosis chart.

A/C SYSTEM DIAGNOSIS

Condition	Possible Causes	Correction
Rapid A/C compressor clutch cycling (ten or more cycles per minute).	Very low refrigerant system charge.	See 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.	1. See Refrigerant System Leaks in this group. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
	2. Faulty fuse.	2. Check the fuses in the Power distribution block and junction block. Repair the shorted circuit or component and replace the fuses, if required. Refer to Group 8.
	3. Faulty A/C compressor clutch coil.	3. See A/C Compressor Clutch Coil in this group. Test the compressor clutch coil and replace, if required.
	4. Improperly installed or faulty evaporator temperature sensor.	4. See Evaporator Temperature Sensor in this group. Test the sensor and replace, if required.
	5. Faulty A/C pressure transducer.	5. See A/C Pressure Transducer in this group. Test the sensor and replace, if required.
	6. Faulty engine Control Module (ECM).	6. Refer to Group 9 - Engine Electrical Diagnostics for testing of the ECM. Test the ECM 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.	1. See 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. Blend door cable improperly installed or faulty.	2. See Mode Door Cables in this group. Inspect the cable for proper operation and replace, if required.
	3. Blend-air door(s) inoperative or sealing improperly.	3. See HVAC Housing in this group. Inspect the blend-air door(s) for proper operation and sealing. Repair if required.

Condition	Possible Causes	Correction
The low side pressure is normal or slightly low, and the high side pressure is too low.	1. Low refrigerant system charge.	1. See Refrigerant System Leaks in this group. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
	2. Refrigerant flow through the A/C evaporator is restricted.	2. See A/C Evaporator in this group. Replace the restricted A/C evaporator, if required.
	3. Faulty A/C compressor.	3. See A/C Compressor in this group. Replace the A/C compressor, if required.
The low side pressure is normal or slightly high, and the high side pressure is too high.	1. A/C condenser air flow restricted.	1. Check the A/C condenser for damaged fins, foreign objects obstructing air flow through the condenser fins, and missing or improperly installed air seals. Clean, repair, or replace components as required.
	2. Refrigerant flow through the receiver/drier is restricted.	2. See Receiver/Drier in this group. Replace the restricted receiver/drier, if required.
	3. Inoperative radiator cooling fan.	3. Test the radiator cooling fan and replace, if required. Refer to Group 7 - Cooling.
	4. Refrigerant system overcharged.	4. See Refrigerant System Charge in this group. Recover the refrigerant from the refrigerant system. Charge the refrigerant system to the proper level, if required.
	5. Air in the refrigerant system.	5. See Refrigerant System Leaks in this group. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
	6. Engine overheating.	6. Test the engine cooling system and repair, if required. Refer to Group 7 - Cooling.
The low side pressure is too high, and the high side pressure is too low.	1. Accessory drive belt slipping.	1. Inspect the accessory drive belt condition and tension. Repair as required. Refer to Group 7 - Cooling.
	2. Faulty A/C expansion valve.	2. See A/C Expansion Valve in this group. Replace the valve, if required.
	3. Faulty A/C compressor.	3. See A/C Compressor in this group. Replace the A/C 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.	1. See Liquid Line, Suction Line 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. Restricted refrigerant flow through the A/C expansion valve.	2. See A/C Expansion Valve in this group. Replace the valve, if required.
	3. Restricted refrigerant flow through the A/C condenser.	3. See A/C Condenser in this group. Replace the restricted A/C condenser, if required.

HEATER PERFORMANCE TEST

Before performing the following tests, perform the ATC Function Test using the DRBIII® and refer to Cooling for the procedures to check the radiator coolant level, serpentine drive belt tension, radiator air flow and the radiator fan operation.

MAXIMUM HEATER OUTPUT

Engine coolant is provided to the heater core through a heater valve and heater hose. With the engine idling at normal operating temperature, set the heater-A/C controls as follows:

- Temperature control in the full hot position

- Mode control in the floor heat position
- Blower motor control in the highest speed position

Using a test thermometer, check the temperature of the air being discharged at the floor outlets. Compare the test thermometer reading to the Temperature Reference chart.

TEMPERATURE REFERENCE CHART

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

If the floor outlet air temperature is insufficient, check for a faulty heater valve (perform ATC Function Test) and verify that the cooling system is operating to specifications (Refer to 7 - COOLING/ ENGINE/COOLANT - DIAGNOSIS AND TESTING). Both of the heater hoses should be HOT to the touch (the coolant return heater hose should be slightly cooler than the supply hose. If the coolant return hose is much cooler than the supply hose, locate and repair the engine coolant flow obstruction in the heater system.

POSSIBLE LOCATIONS OR CAUSE 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.
- Inoperative or stuck heater water valve.
- Plugged heater core.

If proper coolant flow is verified, and heater floor outlet air temperature is insufficient, a mechanical problem may exist.

POSSIBLE LOCATIONS OR CAUSE OF INSUFFICIENT HEAT

- An obstructed cowl air intake.
- Obstructed heater system outlets.
- Heater water valve not functioning properly.

TEMPERATURE CONTROL

If outlet air temperature cannot be adjusted with the A/C-heater temperature control, one of the following could require service:

- Faulty A/C-heater control switch.
- Faulty temperature sensor.
- Faulty A/C-heater control cable or actuator.
- Faulty A/C-heater control module.

ATC FUNCTION TEST

The automatic temperature control (ATC) system can perform an self-test, which can be activated by the DRBIII® scan tool to confirm that the A/C system is performing satisfactorily. This test provides a quick confirmation of heating and A/C system performance to the service technician. Refer to Body Diagnostic Procedures for the appropriate diagnostic information.

SPECIFICATIONS

HEATING - A / C SYSTEM

FRONT A/C SYSTEM

Item	Description	Notes
A/C Compressor	Denso 7SBU16C	ND-8 PAG oil
Freeze-up Control	Evaporator temperature sensor	HVAC housing mounted - input to A/C-heater control - operating range of -10° C (14° F) to 40° C (104° F)

Item	Description	Notes
Low psi Control	A/C Pressure Transducer	Liquid line mounted - input to PCM - operating range of 200 kPa (29 psi) to 2799 kPa (406 psi)
High psi Control	High Pressure Relief Valve	Receiver/drier mounted - opens at a discharge pressure over 3999 kPa (580 psi)
Refrigerant Charge Capacity	Refer to the A/C Underhood Specification Label located in the engine compartment	R-134a refrigerant
A/C Clutch Coil Draw	2.0-3.7 amps @ 12V ± 0.5V @ 21° C (70° F)	
A/C Clutch Air Gap	0.5 - 0.88 mm (0.020 - 0.035 in.)	

REAR A/C SYSTEM

Item	Description	Notes
A/C Compressor	Denso 10S17	ND-8 PAG oil
Freeze-up Control	Evaporator Temperature Sensor	Input to rear A/C control module - evaporator fin mounted - cycles clutch off below 1.6° C (35° F), cycles clutch back on above 3.9° C (39° F)
Low psi Control	A/C Low Pressure Switch	Input to rear A/C control module - suction line mounted - cycles clutch off below 30 kPa (4.4 psi)
High psi Control	A/C High Pressure Switch	Input to rear A/C control module - condenser inlet tube mounted - cycles clutch off above 2551 kPa (370 psi)
Refrigerant Charge Capacity	Refer to the Rear A/C Specification Label	R-134a refrigerant
A/C Clutch Coil Draw	3.3 amps @ 12V ± 0.5V @ 21° C (70° F)	
A/C Clutch Air Gap	0.35 - 0.60 mm (0.014 - 0.024 in.)	

CONTROLS - FRONT

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A / C COMPRESSOR CLUTCH

DESCRIPTION

The A/C compressor clutch assembly consists of a stationary electromagnetic field coil, a hub bearing and pulley assembly, and a clutch plate (Fig. 1). The field coil and the hub bearing and pulley assembly are each retained on the nose of the compressor front housing with snap rings. The clutch plate is splined to the compressor shaft and secured with a bolt.

The compressor clutch plate and pulley and the clutch field coil are available for service replacement.

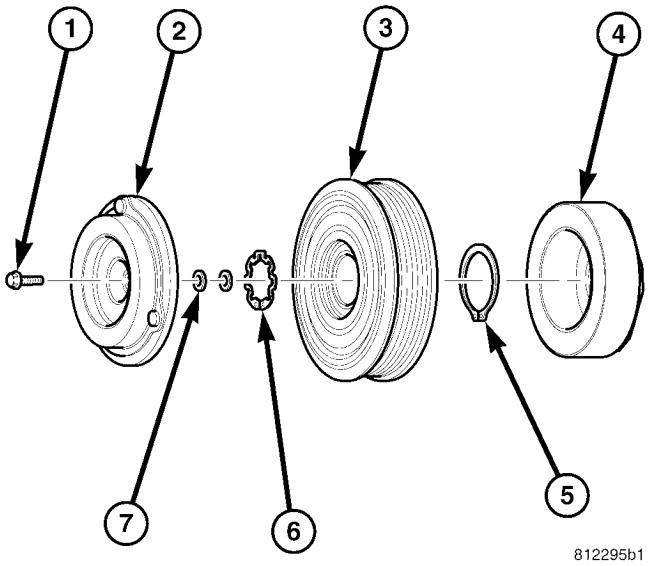

Fig. 1 A/C Compressor Clutch

1 - BOLT
2 - CLUTCH PLATE
3 - PULLEY AND BEARING
4 - FIELD COIL
5 - SNAP RING
6 - SNAP RING
7 - SHIM (2)

OPERATION

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

The compressor clutch engagement is controlled by several components:

- A/C switch on the A/C-heater control panel
- Evaporator temperature sensor
- A/C pressure transducer
- Air temperature sensor
- CAN bus messages

The compressor clutch is de-energized under any of the following conditions:

- Blocked compressor (thermal fuse in the pulley)
- Low pressure in the system
- Low evaporator temperature
- Hard acceleration (WOT)
- High coolant temperatures

STANDARD PROCEDURE

A / C COMPRESSOR CLUTCH AIR GAP

If a new clutch plate and/or clutch pulley are being used, the air gap between the clutch plate and clutch pulley must be checked using the following procedure:

(1) Using feeler gauges, measure the air gap between the clutch plate and the clutch pulley friction surfaces.

(2) If the air gap is not between specifications (Refer to 24 - HEATING & AIR CONDITIONING - SPECIFICATIONS), add or subtract shims until the desired air gap is obtained.

NOTE: The shims may compress after tightening the compressor shaft bolt. Check the air gap in four or more places on the clutch plate to verify that the air gap is still correct. Spin the clutch pulley before making the final air gap check.

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 heater-A/C control in the Recirculation Mode, the A/C button in the on position, the blower motor switch in the highest speed position, and the engine speed at 1500 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, pulley, 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) Disconnect the engine wire harness connector for the compressor clutch coil from the clutch coil wire harness connector on the top of the compressor.

(4) Remove the retainer securing the compressor clutch coil lead on the top of the compressor.

(5) Remove the bolt that secures the compressor clutch to the compressor shaft (Fig. 2). If necessary, a band-type oil filter wrench or strap wrench can be placed around the clutch plate to aid in bolt removal.

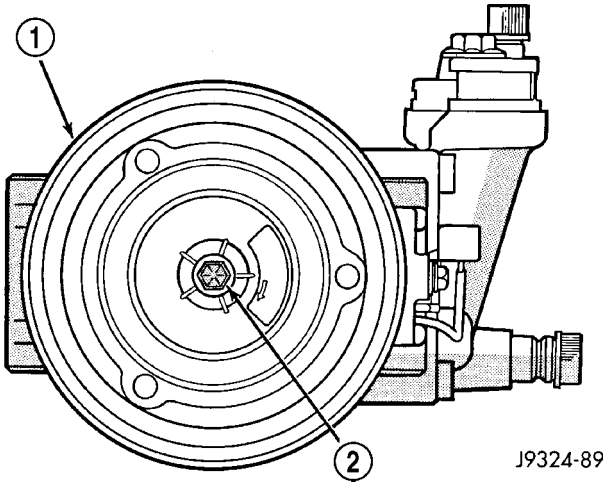

Fig. 2 Compressor Shaft Bolt and Clutch Plate

1 - COMPRESSOR CLUTCH PLATE
2 - COMPRESSOR SHAFT BOLT

(6) Tap the clutch plate lightly with a plastic mallet to release it from the splines on the compressor shaft. Remove the clutch plate and shim(s) from the compressor shaft (Fig. 3). **Be certain not to lose the shim or shims.**

CAUTION: Do not pry between the clutch plate and the pulley to remove it from the compressor shaft. Prying may damage the clutch plate.

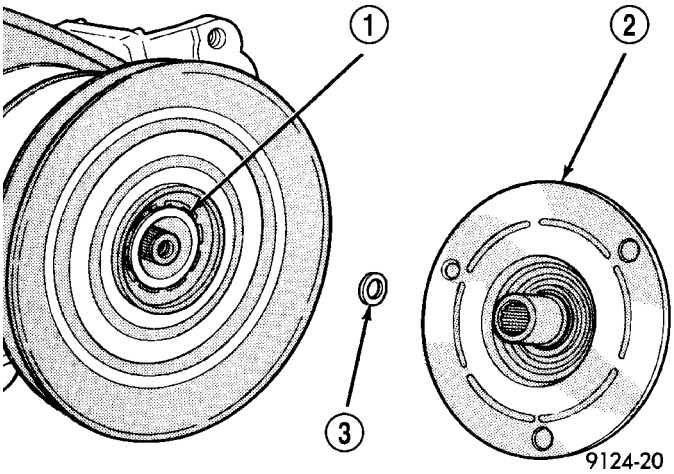

Fig. 3 Clutch Plate And Shim(s)

1 - COMPRESSOR SHAFT
2 - CLUTCH PLATE
3 - CLUTCH PLATE SHIM

(7) Using snap ring pliers (Special Tool C-4574 or equivalent), remove the external snap ring that secures the compressor clutch pulley to the front of the compressor, then slide the pulley off of the compressor (Fig. 4).

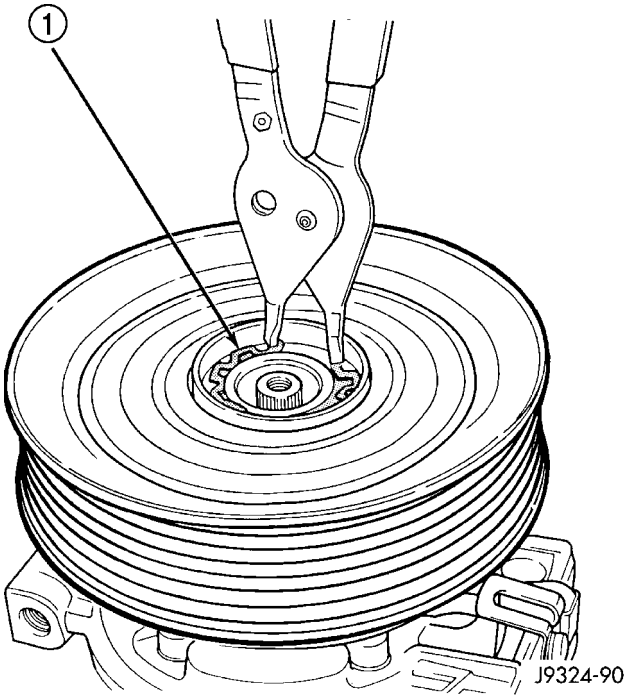

Fig. 4 Pulley Snap Ring

1 - SNAP RING

(8) Remove the screw that secures the clutch coil wire harness connector bracket and ground clip to the top of the compressor housing.

(9) Using snap ring pliers (Special Tool C-4574 or equivalent), remove the external snap ring that secures the compressor clutch coil to the front of the compressor, then slide the clutch coil off of the compressor (Fig. 5).

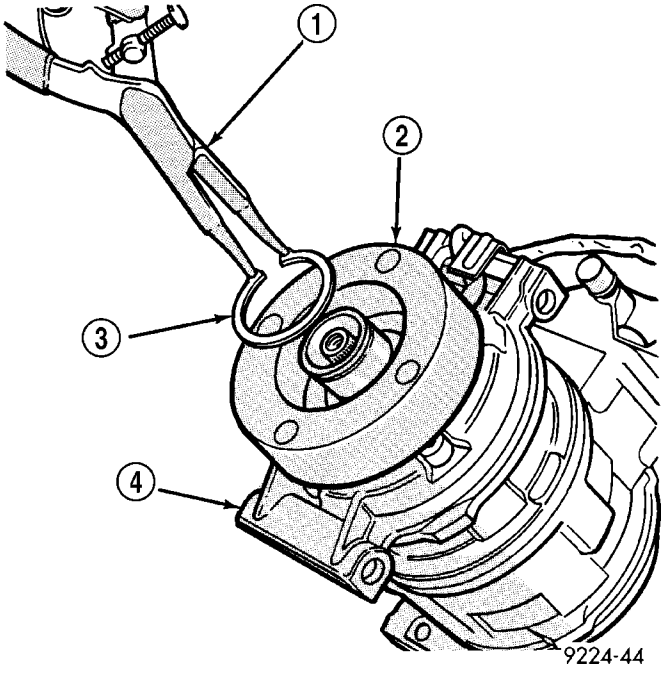

Fig. 5 Clutch Coil Snap Ring

1 - SNAP RING PLIERS
2 - CLUTCH COIL
3 - SNAP RING
4 - COMPRESSOR

INSPECTION

Compressor clutch components should always be inspected closely before they are reinstalled. The clutch plate and clutch pulley are mated at the factory using a burnishing operation. No attempt should be made to separately replace the compressor clutch pulley or clutch plate. The clutch coil may be serviced separately.

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

(2) Examine the friction surfaces of the clutch pulley and the clutch plate for oil contamination. If the friction surfaces are oily, the clutch pulley and clutch plate should be replaced. Also inspect the shaft and nose area of the compressor for oil. Remove the felt packing from around the compressor shaft in the compressor front cover. If the felt is saturated with oil, the compressor front shaft seal is leaking and the compressor will also have to be replaced.

(3) Check the clutch pulley bearing for roughness or excessive leakage of grease. Replace the clutch pulley and clutch plate if the bearing is faulty.

INSTALLATION

(1) Align the dowel pin on the back of the clutch field coil with the hole in the compressor front cover, and position the clutch coil onto the compressor. Be certain that the cluch coil wire harness leads are properly oriented and routed so that they are not pinched between the compressor front cover and the clutch coil.

NOTE: A new snap ring must be used to secure the clutch coil to the compressor. The bevel side of the snap ring must face outward.

(2) Using snap ring pliers (Special Tool C-4574 or equivalent), install the external snap ring that secures the clutch coil to the front cover of the compressor. The bevel side of the snap ring must be facing outward and both snap ring eyelets must be oriented to the right or left of the clutch coil dowel pin on the compressor. Be certain that the snap ring is fully and properly seated in the groove.

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 compressor front cover.

(3) Install and tighten the screw that secures the clutch coil wire harness connector bracket and ground clip to the top of the compressor housing.

(4) Install the pulley onto the front of the compressor. If necessary, place a block of wood on the friction surface and tap gently with a hammer (Fig. 6).

CAUTION: Do not mar the friction surfaces of the pulley.

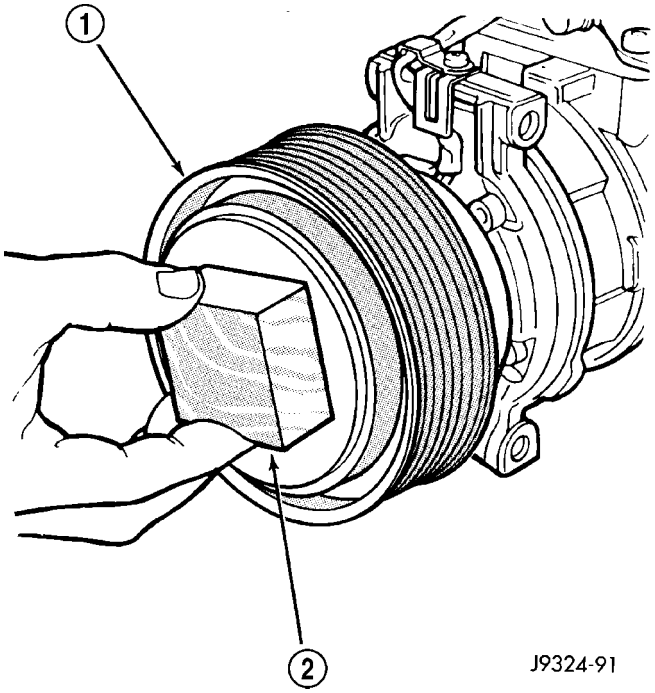

Fig. 6 Pulley Assembly Install

1 - PULLEY ASSEMBLY
2 - WOOD BLOCK

(5) Using snap ring pliers (Special Tool C-4574 or equivalent), install the external snap ring (bevel side facing outward) that secures the clutch pulley to the

front cover of the compressor. Be certain that the snap ring is properly fully and properly seated in the groove.

(6) If the original clutch plate and clutch pulley are to be reused, reinstall the original shim(s) on the compressor shaft against the shoulder. If a new clutch plate and/or clutch pulley are being used, install a trial stack of shims 1.0 mm (0.040 in.) thick on the compressor shaft against the shoulder.

(7) Install the clutch plate onto the compressor shaft.

(8) Install and tighten the compressor shaft bolt. If necessary, a band-type oil filter wrench or a strap wrench can be placed around the clutch plate to aid in bolt tightening. Tighten the bolt to 17.5 N·m (155 in. lbs.).

NOTE: The shims may compress after tightening the shaft bolt. Check the air gap in four or more places to verify the air gap is still correct. Spin the pulley before performing a final check of the air gap.

(9) If a new clutch plate and/or clutch pulley are being installed, the air gap between the clutch plate and clutch pulley must be checked (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C COMPRESSOR CLUTCH - STANDARD PROCEDURE).

(10) Install the retainer that secures the compressor clutch coil lead to the top of the compressor.

(11) Reconnect the engine wire harness connector to the clutch coil lead on the top of the compressor.

(12) Reinstall the serpentine accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - INSTALLATION).

(13) Reconnect the battery negative cable.

(14) If a new clutch plate and/or clutch pulley are being installed, the new clutch components must be burnished (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C COMPRESSOR CLUTCH - STANDARD PROCEDURE).

A / C COMPRESSOR CLUTCH COIL

DIAGNOSIS AND TESTING

A / C COMPRESSOR CLUTCH COIL

The air conditioning compressor clutch coil electrical circuit is controlled by the ATC control module which is integral to the heater-A/C control. Begin testing of a suspected compressor clutch coil problem by performing the ATC Function Test using the DRBIII® scan tool.

PRELIMINARY CHECKS

(1) If no diagnostic trouble codes (DTCs) are found in the A/C-heater control or the powertrain control module (PCM), go to Step 2. If any DTCs are found, repair as required.

(2) If the A/C compressor clutch still will not engage, verify the refrigerant charge level (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - DIAGNOSIS AND TESTING - REFRIGERANT SYSTEM LEAKS). If the refrigerant charge level is OK, go to TESTS. If the refrigerant charge level is not OK, adjust the refrigerant charge as required.

TESTS

(1) Verify the battery state of charge (Refer to 8 - ELECTRICAL/BATTERY SYSTEM/BATTERY - DIAGNOSIS AND TESTING).

(2) Connect an ammeter (0 to 10 ampere scale selected) in series with the clutch coil feed terminal. Connect a voltmeter (0 to 20 volt scale selected) to measure voltage across the battery and the clutch coil.

(3) With the A/C-heater control in the A/C mode and the blower motor at low speed, start the engine and allow it to run at a normal idle speed.

(4) The A/C compressor clutch should engage immediately, and the clutch coil supply voltage should be within two volts of the battery voltage. If the coil supply voltage is OK, go to Step 5. If the coil supply voltage is not within two volts of battery voltage, test the clutch coil feed circuit for excessive voltage drop and repair as necessary.

(5) For the acceptable A/C clutch coil current draw specifications refer to 24 - HEATING & AIR CONDITIONING - SPECIFICATIONS. Specifications apply for a work area temperature of 21° C (70° F). If voltage is more than 12.5 volts, add electrical loads by turning on electrical accessories until voltage reads below 12.5 volts.

(a) If the A/C clutch coil current reading is zero, the coil is open and must be replaced.

(b) If the A/C clutch coil current reading is above specifications, the coil is shorted and must be replaced.

A / C HEATER CONTROL

DESCRIPTION

This ATC system uses a combination of electrical and mechanical controls. These controls provide the vehicle operator with a number of setting options to help control the climate and comfort within the vehicle.

The A/C-heater control is located on the instrument panel inboard of the steering column and below the

radio (Fig. 7). The A/C-heater control contains a rotary-type temperature control, a rotary-type mode control, a thumbwheel-type blower motor speed control and an A/C mode push button switch and indicator lamp. The A/C-heater control also features a push button switch and indicator lamp for the residual engine heat utilization (REST) function, cabin heater or the heater booster (as equipped).

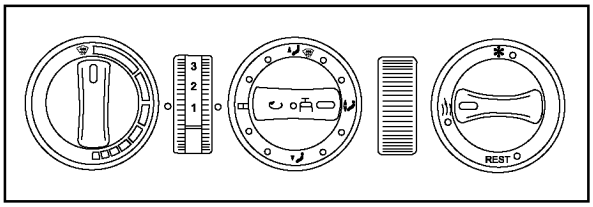

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Fig. 7 A/C-Heater Control

OPERATION

To control the interior temperature, the A/C-heater control uses the actual values from the temperature sensors and the CAN bus and compares them with the nominal value of the temperature control switch. The A/C-heater control is diagnosed using a DRBIII® scan tool. Refer to Body Diagnostic Procedures.

The A/C-heater control is diagnosed using a DRBIII® scan tool. Refer to Body Diagnostic Procedures.

The A/C-heater control cannot be adjusted or repaired and, if faulty or damaged, it must be replaced.

REMOVAL

WARNING: To avoid personal injury or death, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

(1) Disconnect and isolate the negative battery cable.

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

(3) Remove the two screws that secure the A/C-heater control to the instrument panel (Fig. 8).

(4) Pull the A/C-heater control away from the instrument panel far enough to access the connections on the back of the control.

(5) Mark and disconnect the two control cables from the A/C-heater control.

(6) Disconnect the two wiring harness connectors from the A/C-heater control.

(7) If A/C-heater control is to be replaced, remove the two mounting brackets from the A/C-heater control.

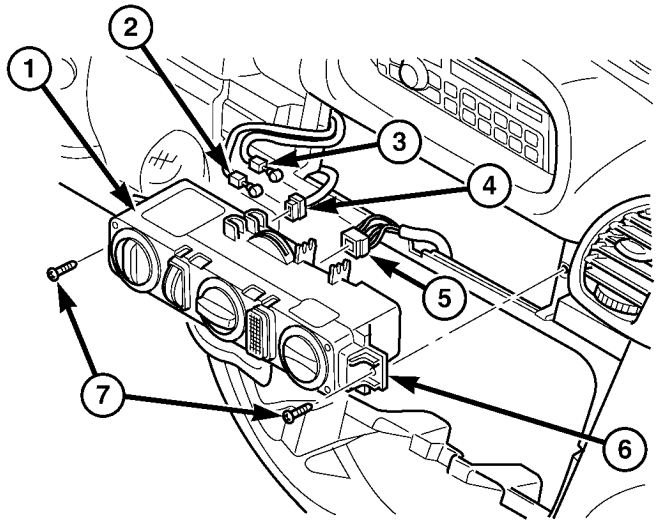

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Fig. 8 A/C-Heater Control

1 - A/C-HEATER CONTROL
2 - CONTROL CABLE
3 - CONTROL CABLE
4 - WIRE HARNESS CONNECTOR
5 - WIRE HARNESS CONNECTOR
6 - MOUNTING BRACKET (2)
7 - SCREW (2)

INSTALLATION

(1) If removed, install the two mounting brackets to the A/C-heater control.

(2) Connect the two wire harness connectors into the back of the A/C-heater control.

(3) Connect the two control cables to the A/C-heater control.

NOTE: Install the control cable of bottom adjustment lever to the front adjustment wheel of the A/C-heater control.

(4) Position the A/C-heater control into the instrument panel.

(5) Install the two A/C-heater control retaining screws. Tighten the screws to 2 N·m (17 in. lbs.).

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

(7) Reconnect the negative battery cable.

A / C PRESSURE TRANSDUCER

DESCRIPTION

The A/C pressure transducer is installed on the liquid line fitting located at the top of the receiver/drier (Fig. 9). A rubber O-ring seals the connection between the transducer and the fitting. Three terminals within a molded plastic connector receptacle on the top of the transducer connect it to the vehicle electrical system through a wire lead and connector.

The A/C pressure transducer cannot be adjusted or repaired and, if faulty or damaged, it must be replaced.

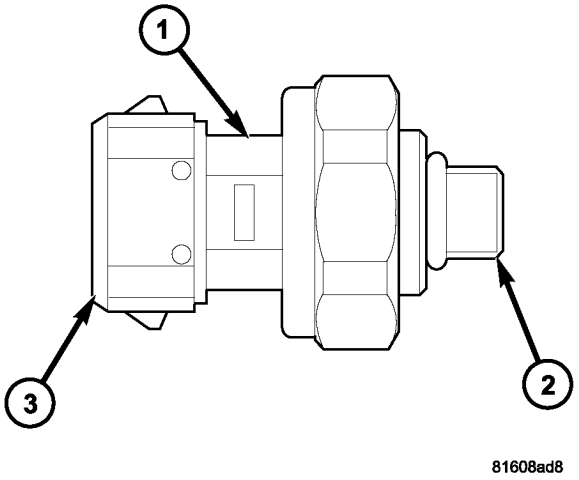

Fig. 9 A/C Pressure Transducer

1 - A/C PRESSURE TRANSDUCER
2 - PIEZORESISTIVE ELEMENT
3 - WIRE CONNECTOR

OPERATION

The A/C pressure transducer monitors the pressures in the high side of the refrigerant system through its connection to a fitting on the liquid line. The transducer will change its internal resistance in response to the pressures it monitors. The ATC control module provides a five volt reference signal and monitors the output voltage of the transducer on the transducer return circuit to determine refrigerant pressure. The ATC module is preprogrammed to respond to this and other sensor inputs by controlling the operation of the air conditioning compressor clutch and the auxiliary radiator cooling fan to help optimize air conditioning system performance and to protect the system components from damage. The A/C pressure transducer input to the ATC module also prevents the A/C compressor clutch from engaging when the ambient temperature is below 0.556° C (33° F) due to the pressure/temperature relationship of the refrigerant.

The A/C pressure transducer is diagnosed by performing the ATC Function Test using the DRBIII® scan tool. Refer to Body Diagnostic Procedures.

The A/C pressure transducer cannot be adjusted or repaired and, if faulty or damaged, it must be replaced.

DIAGNOSIS AND TESTING

A / C PRESSURE TRANSDUCER

The A/C pressure transducer is tested using a DRBIII® scan tool. Refer to Body Diagnostic Procedures. Before testing the A/C pressure transducer, be certain that the transducer wire harness connections are clean of corrosion and properly connected. For the air conditioning system to operate, an A/C pressure transducer voltage reading between 0.7 and 4.56 volts is required. Voltage outside this range indicate a low or high refrigerant system pressure condition to the ATC control module. The control module is programmed to respond to a low or high refrigerant system pressure by suppressing operation of the compressor. Refer to the A/C Pressure Transducer Voltage chart for the possible condition indicated by the transducer voltage readings.

A/C PRESSURE TRANSDUCER VOLTAGE

Voltage	Possible Cause
0.0	1. No transducer supply voltage from ATC control module. 2. Shorted transducer circuit. 3. Faulty transducer.
0.150 to 0.450	1. Ambient temperature below 10° C (50° F). 2. Low refrigerant system pressure.
0.451 to 4.519	1. Normal refrigerant system pressure.
4.520 to 4.850	1. High refrigerant system pressure.
5.0	1. Open transducer circuit. 2. Faulty transducer.

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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

(2) Disconnect and isolate the battery negative cable.

(3) Disconnect the wire harness connector from the A/C pressure transducer (Fig. 10).

(4) Using an open end wrench, remove the A/C pressure transducer from the fitting on the liquid line.

(5) Remove the O-ring seal from the A/C pressure transducer and discard.

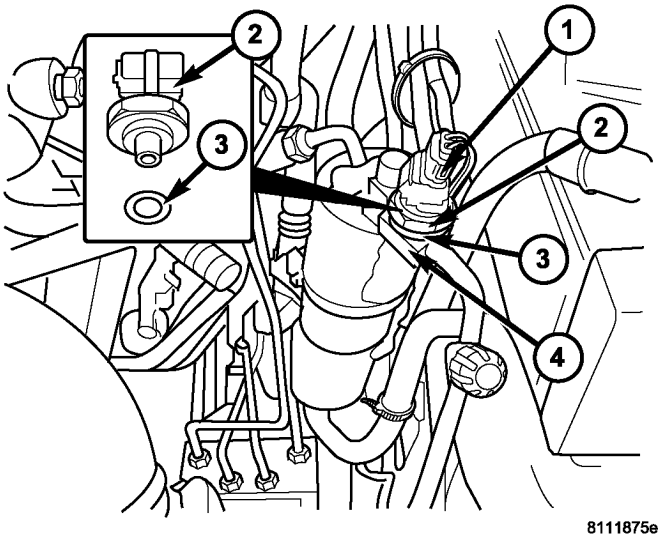

Fig. 10 A/C Pressure Transducer

1 - WIRE HARNESS CONNECTOR
2 - A/C PRESSURE TRANSDUCER
3 - O-RING SEAL
4 - LIQUID LINE FITTING

INSTALLATION

(1) Lubricate a new O-ring seal with clean refrigerant oil and install it on the A/C pressure transducer.

(2) Using an open end wrench, install and tighten the A/C pressure transducer into the fitting on the liquid line. Tighten the transducer to 12 N·m (106 in. lbs.).

(3) Reconnect the wire harness connector to the transducer.

(4) Reconnect the battery negative cable.

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

(6) Charge the refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE).

AIR OUTLET TEMPERATURE SENSOR

DESCRIPTION

The air outlet temperature sensor is a two-wire temperature sensing element that detects the temperature of the air coming out of the heater housing unit (Fig. 11). The sensor is attached to heater housing unit directly behind the ATC heater-A/C control panel. The thermistor will change resistance as the temperature changes.

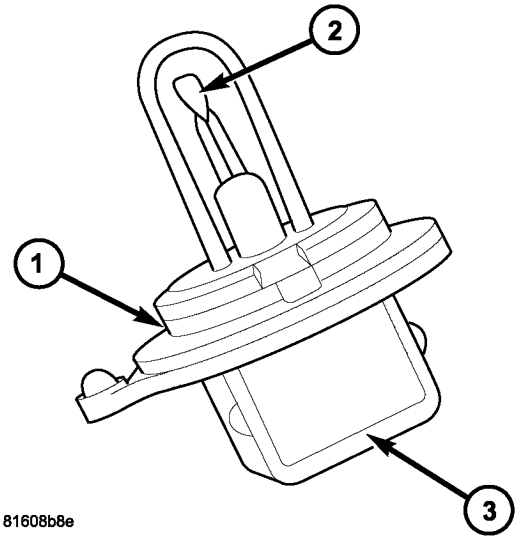

Fig. 11 Air Outlet Temperature Sensor

1 - AIR OUTLET TEMPERATURE SENSOR
2 - NTC THERMISTOR
3 - WIRE CONNECTOR

OPERATION

The air outlet temperature sensor monitors the temperature of the air coming out of the heater housing unit. The sensor will change its internal resistance in response to the temperatures it monitors. The ATC control module is connected to the sensor through a sensor ground circuit and a sensor signal circuit. As the air temperature increases, the resistance of the sensor decreases and the voltage monitored by the module decreases. The operating range of the air outlet temperature sensor is 0° C (32° F) and 95° C (203° F). The module uses this monitored voltage reading to an indication of the outlet air temperature. The ATC control module makes adjustments to maintain the requested interior temperature by cycling both the A/C compressor and solenoid heater valve on and off.

The air outlet temperature sensor is diagnosed by performing the ATC Function Test using the DRBIII® scan tool. Refer to Body Diagnostic Procedures.

The air outlet temperature sensor cannot be adjusted or repaired, and if faulty or damaged, it must be replaced.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the heater-A/C control from the instrument panel (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C HEATER CONTROL - REMOVAL).

(3) Disconnect the wire harness connector from the air outlet temperature sensor (Fig. 12).

(4) Remove the air outlet temperature sensor from the heater housing.

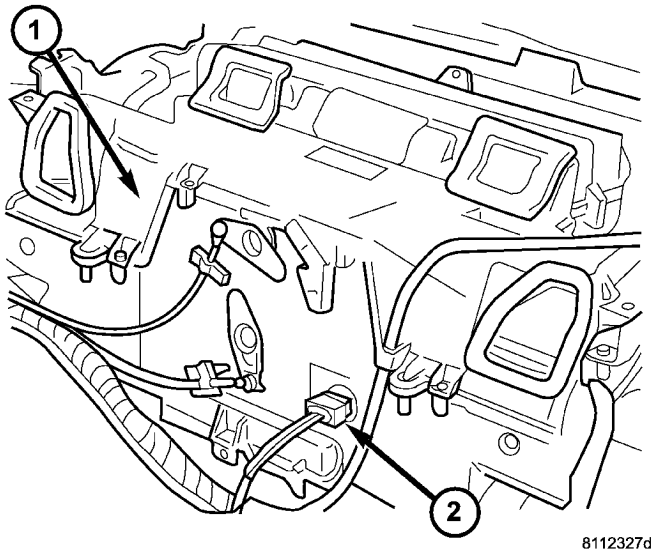

Fig. 12 Air Outlet Temperature Sensor

1 - HEATER HOUSING
2 - AIR OUTLET TEMPERATURE SENSOR

INSTALLATION

(1) Install the air outlet temperature sensor onto the heater housing.

(2) Connect the wire harness connector to the air outlet temperature sensor.

(3) Install the heater-A/C control into the instrument panel (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C HEATER CONTROL - INSTALLATION).

(4) Reconnect the battery negative cable.

AMBIENT TEMPERATURE SENSOR

DESCRIPTION

The ambient air temperature sensor is a variable resistor that monitors the air temperature outside of the vehicle. The ambient air temperature sensor is connected to the instrument cluster through a two-wire harness lead and connector of the vehicle electrical system (Fig. 13). The instrument cluster sends out a message on the CAN bus to the ATC control module which uses the sensor data to maintain optimum cabin temperature levels.

The ambient air temperature sensor is mounted to the front licence plate bracket by three integral retaining tabs.

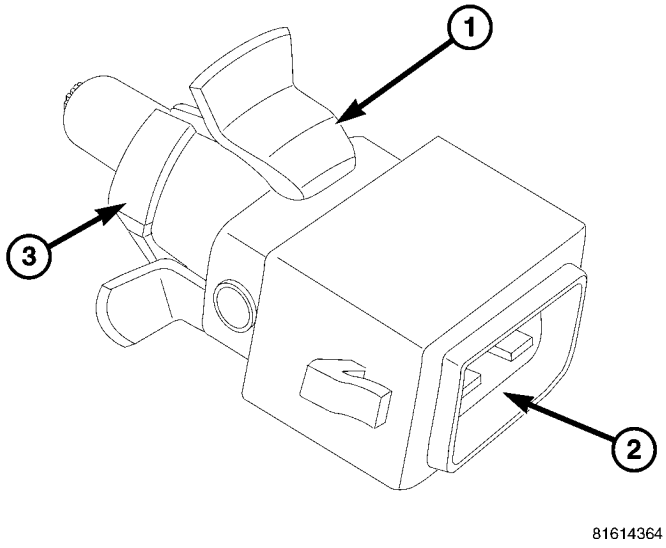

Fig. 13 Ambient Air Temperature Sensor

1 - AMBIENT TEMPERATURE SENSOR
2 - WIRE HARNESS CONNECTOR
3 - RETAINING TABS (3)

OPERATION

The ambient temperature sensor is a variable resistor that operates on a five-volt reference signal sent to it by the instrument cluster. The resistance in the sensor changes as temperature changes. Based upon the resistance in the sensor, the instrument cluster sends the ATC control module a specific voltage on the temperature sensor signal circuit, which is programmed to correspond to a specific temperature.

The ambient temperature sensor is diagnosed using the DRBIII® scan tool. Refer to Body Diagnostic Procedures.

The ambient temperature sensor cannot be adjusted or repaired and, if faulty or damaged, it must be replaced.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Remove the front license plate bracket (Refer to 23 - BODY/EXTERIOR/LICENSE PLATE BRACKET - REMOVAL).

(3) Disconnect the wire harness connector from the ambient temperature sensor (Fig. 14).

(4) Disengage the sensor retaining tabs and remove the ambient temperature sensor from the front license plate bracket.

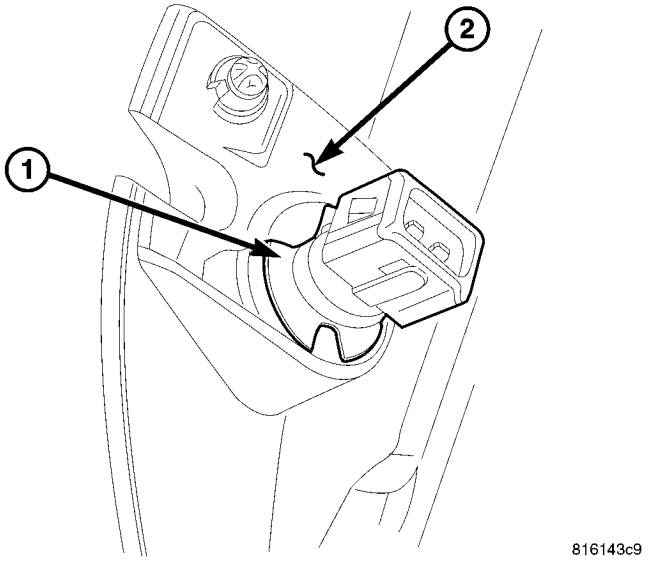

Fig. 14 Ambient Temperature Sensor

1 - AMBIENT TEMPERATURE SENSOR
2 - FRONT LICENSE PLATE BRACKET

INSTALLATION

(1) Install the ambient temperature sensor onto the front license plate bracket. Make sure the retaining tabs are fully engaged.

(2) Connect the wire harness connector to the ambient temperature sensor.

(3) Install the front license plate bracket (Refer to 23 - BODY/EXTERIOR/LICENSE PLATE BRACKET - INSTALLATION).

(4) Reconnect the battery negative cable.

BLOWER MOTOR RESISTOR

DESCRIPTION

This temperature control system uses a blower motor resistor (Fig. 15). The blower motor resistor is mounted to the top of ventilation housing located in the engine compartment. The blower motor resistor consists of a molded plastic mounting plate with an integral retaining tab and wire connector receptacle. Concealed behind the mounting plate are coiled resistor wires contained within a ceramic heat sink.

The blower motor resistor is accessed for service without removing any other components.

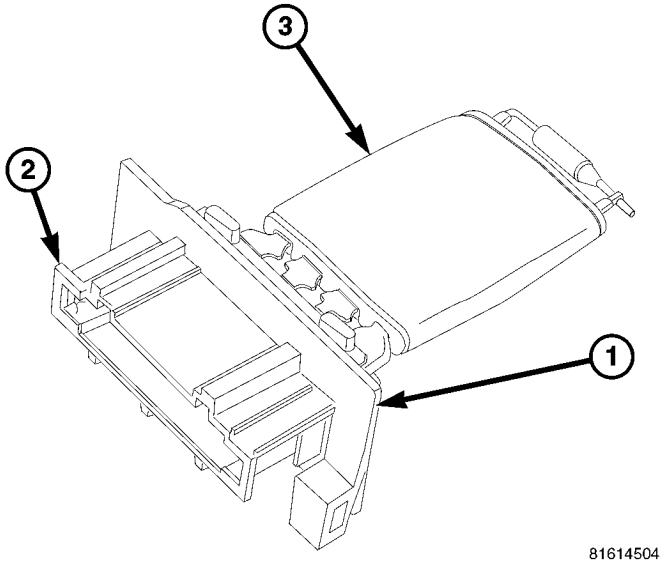

Fig. 15 Front Blower Motor Resistor

1 - MOUNTING PLATE
2 - WIRE CONNECTOR RECEPTACLE
3 - CERAMIC HEAT SINK

OPERATION

The blower motor resistor block has multiple resistor wires. Each resistor wire changes the resistance in the blower motor current path to change the blower motor speed. The blower motor switch directs the current through the correct resistor wire to obtain the selected speed.

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

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

DIAGNOSIS AND TESTING

BLOWER MOTOR RESISTOR

NOTE: For circuit descriptions and diagrams, refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pinout and location views for the various wire harness connectors, splices and grounds.

(1) Disconnect and isolate the negative battery cable.

(2) Disconnect 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 as required. If not OK, replace the faulty blower motor resistor.

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Depress the locking tab and remove the blower motor resistor from the ventilation housing by sliding the resistor inboard (Fig. 16).

(3) Depress the two locking tabs and disconnect the wire harness connector from the blower motor resistor.

(4) Remove the blower motor resistor from the engine compartment.

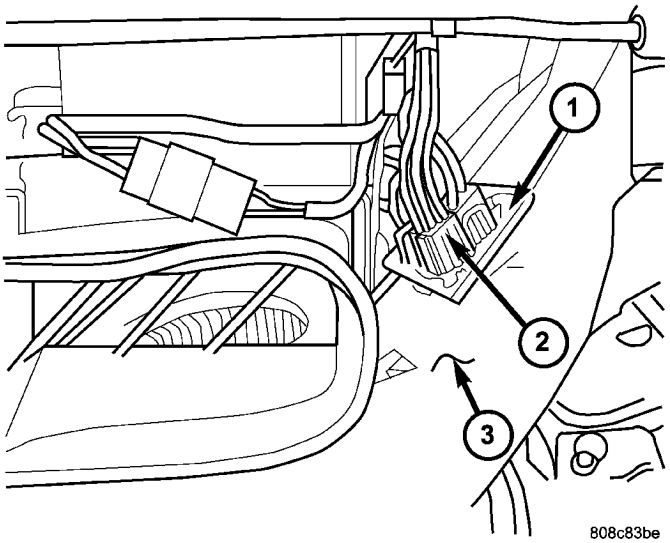

Fig. 16 Blower Motor Resistor Block

1 - BLOWER MOTOR RESISTOR
2 - ELECTRICAL CONNECTOR
3 - VENTILATION HOUSING

INSTALLATION

(1) Connect the wire harness connector to the blower motor resistor and engage the two locking tabs.

(2) Install the blower motor resistor into the ventilation housing and engage the locking tab. The housing is indexed to allow mounting in only one position.

(3) Reconnect the negative battery cable.

BLOWER MOTOR SWITCH

DESCRIPTION

The blower motor is controlled by a thumbwheel-type blower motor control, mounted in the A/C-heater control (Fig. 17). The switch allows the selection of four blower motor speeds with the ignition switch in the On position.

NOTE: The blower motor will operate only at the lowest speed when the Residual Engine Heat Utilization (REST) function is selected, regardless of the blower speed setting on the A/C-heater control.

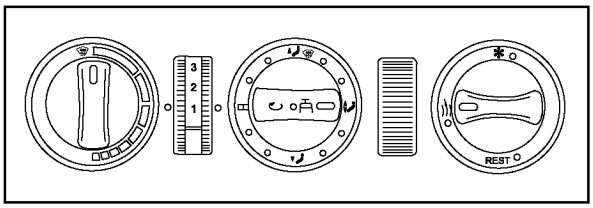

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Fig. 17 A/C-Heater Control

OPERATION

When the ignition is turned to On, the integral blower motor switch within the ATC A/C-heater control supplies power to the blower motor switch. The switch directs power to the individual blower driver circuits through the blower motor resistor block to the blower motor and then to ground.

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

DIAGNOSIS AND TESTING

BLOWER MOTOR SWITCH

The blower motor switch can be diagnosed by using the DRBIII® scan tool. Refer to Body Diagnostic Procedures. For circuit descriptions and diagrams, refer to the appropriate wiring information.

EVAPORATOR TEMPERATURE SENSOR

DESCRIPTION

The evaporator temperature sensor measures the temperature of the conditioned air downstream of the A/C evaporator (Fig. 18). The evaporator temperature sensor is an electrical thermistor within a molded plastic case that is inserted into the HVAC housing near the coldest point of the A/C evaporator. Two terminals within the connector receptacle connect the sensor to the vehicle electrical system through a wire lead and connector of the HVAC wire harness.

The external location of the evaporator temperature sensor allows the sensor to be removed or installed without disturbing the refrigerant in the A/C system.

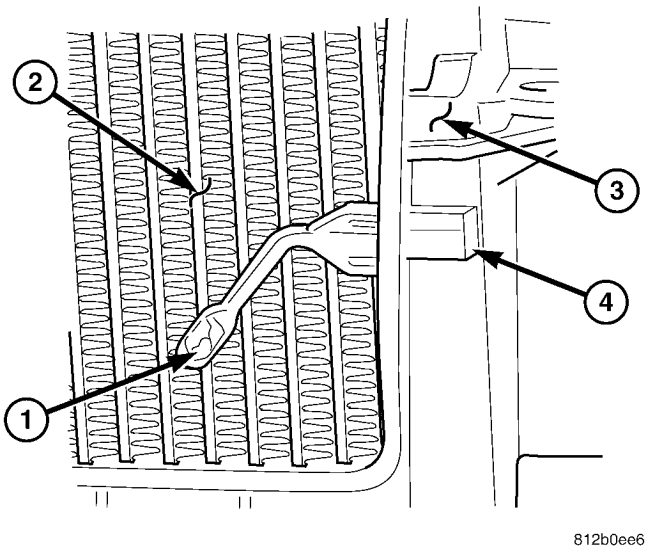

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Fig. 18 Sensor-Evaporator Temperature

1 - EVAPORATOR TEMPERATUE SENSOR
2 - A/C EVAPORATOR
3 - HVAC HOUSING
4 - WIRE CONNECTOR

OPERATION

The evaporator temperature sensor monitors the temperature of the A/C evaporator. The sensor will change its internal resistance in response to the temperatures it monitors. The A/C-heater control is connected to the sensor through a sensor ground circuit and a sensor signal circuit. As the evaporator temperature increases, the resistance of the sensor decreases and the voltage monitored by the A/C-heater control decreases. The A/C-heater control uses this monitored voltage reading to an indication of the evaporator temperature. The A/C-heater control is programmed to respond to this input by cycling the A/C compressor clutch off if the evaporator temperature sensor reads between 1° C (33° F) and 3.5° C (38° F) to protect the A/C evaporator from freezing.

The external location of the sensor allows the sensor to be removed or installed without disturbing the refrigerant in the A/C system.

The evaporator temperature sensor is diagnosed by performing the ATC Function Test using a DRBIII® scan tool. Refer to Body Diagnostic Procedures.

The evaporator temperature sensor cannot be adjusted or repaired and, if faulty or damaged, it must be replaced.

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the radio (Refer to 8 - ELECTRICAL/ AUDIO/RADIO - REMOVAL).

(3) Remove glove compartment.

(4) Remove cover from instrument cluster (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL TOP COVER - REMOVAL).

(5) Remove the instrument cluster (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - REMOVAL).

(6) Remove passenger side airbag.

(7) Remove cover above air nozzle on passenger side.

(8) Remove speaker.

(9) Remove center section of instrument panel.

(10) Remove A/C-heater control from the instrument panel (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C HEATER CONTROL - REMOVAL).

(11) Remove instrument panel top section.

(12) Remove electrical connections.

(13) Remove air bezels from instrument panel.

(14) Disconnect the wire harness connector from evaporator temperature sensor (Fig. 19).

(15) Remove evaporator temperature sensor from HVAC housing.

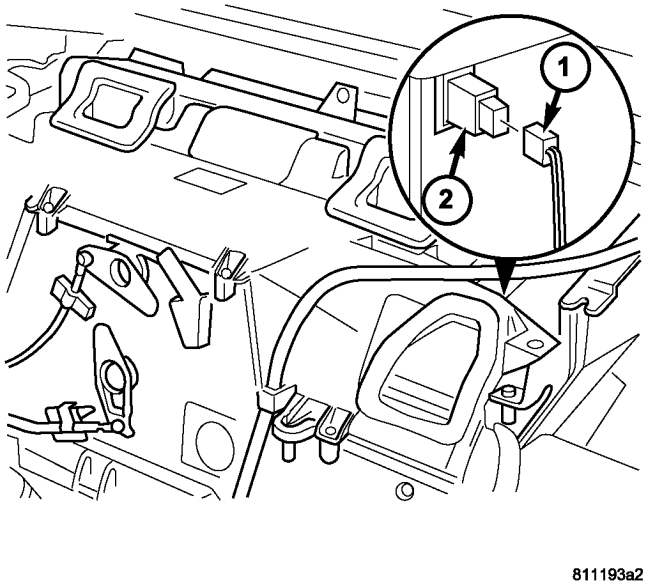

Fig. 19 Evaporator Temperature Sensor

1 - WIRE HARNESS CONNECTOR
2 - EVAPORATOR TEMPERATURE SENSOR

INSTALLATION

(1) Install the probe of the evaporator temperature sensor between the fins of the A/C evaporator.

NOTE: The probe must not go into the same hole (in the A/C evaporator) that the probe was removed from.

(2) Install the wire harness connector to the evaporator temperature sensor.

(3) Install the air bezels to the instrument panel.

(4) Install the electrical connections.

(5) Install the instrument panel top section (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL TOP COVER - INSTALLATION).

(6) Install the A/C-heater control (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C HEATER CONTROL - INSTALLATION).

(7) Install the center section of the instrument panel.

(8) Install the speaker (Refer to 8 - ELECTRICAL/ AUDIO/SPEAKER - INSTALLATION).

(9) Install the cover above the air nozzle on the passenger side.

(10) Install the passenger side airbag.

(11) Install the instrument cluster (Refer to 8 - ELECTRICAL/INSTRUMENT CLUSTER - INSTALLATION).

(12) Install the cover to the instrument cluster.

(13) Install glove compartment.

(14) Install the radio (Refer to 8 - ELECTRICAL/ AUDIO/RADIO - INSTALLATION).

(15) Reconnect the negative battery cable.

IN - CAR TEMPERATURE SENSOR

DESCRIPTION

The in-car temperature sensor measures the actual air temperature within the passenger compartment. The in-car temperature sensor is located inside of the A/C-heater control behind a vented panel (Fig. 20) and is not a separate serviceable component. The A/C-heater control must be replaced if there is a fault relating to the in-car temperature sensor.

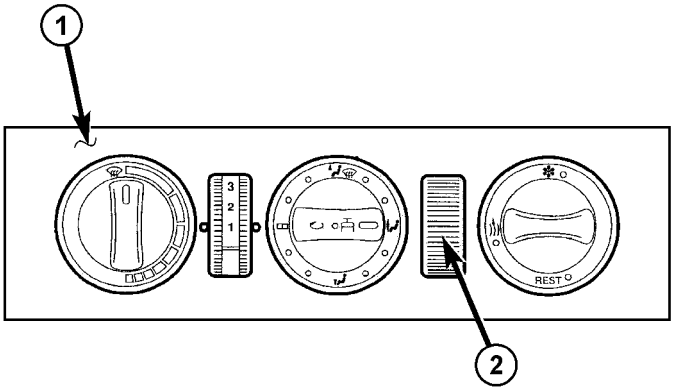

Fig. 20 In-Car Temperature Sensor

1 - A/C-HEATER CONTROL
2 - IN-CAR TEMPERATURE SENSOR

OPERATION

Air from the passenger compartment flows over the thermistor of the in-car temperature sensor. The thermistor changes resistance with air temperature. The ATC A/C-heater control measures this resistance and calculates the temperature of the air. The A/C-heater control then makes adjustments to maintain the selected passenger compartment temperature.

The in-car temperature sensor cannot be adjusted or repaired, and if faulty or damaged, the A/C-heater control must be replaced (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C HEATER CONTROL - REMOVAL).

DIAGNOSIS AND TESTING

IN - CAR TEMPERATURE SENSOR

The in-car temperature sensor is diagnosed by performing the ATC Function Test using the DRBIII® scan tool. Refer to Body Diagnostic Procedures. For circuit descriptions and diagrams, refer to the appropriate wiring information.

MODE DOOR CABLES

REMOVAL

The air distribution control cables (mode door cables) can be removed and installed without having to remove the instrument panel from the vehicle.

(1) Disconnect and isolate the negative battery cable.

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

(3) Remove the A/C-heater control (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C HEATER CONTROL - REMOVAL).

(4) Mark and disconnect the control cables from the A/C-heater control.

(5) Mark and disconnect the control cables from the HVAC housing retainers (Fig. 21).

(6) Disconnect the control cables from the mode door levers and remove the cables from the vehicle.

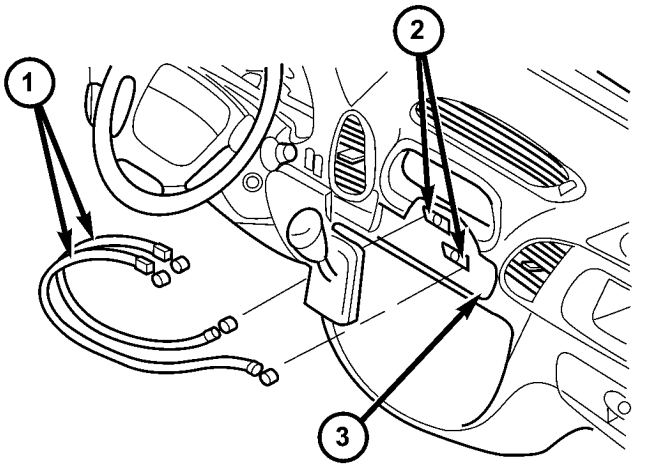

Fig. 21 Air Distribution Control Cables

1 - AIR DISTRIBUTION CONTROL CABLES
2 - ADJUSTMENT LEVERS
3 - HVAC HOUSING

INSTALLATION

(1) Connect the two control cables to the mode door levers (Fig. 22).

(2) Connect the two control cables to the A/C-heater control.

NOTE: Install the control cable of bottom adjustment lever to the front adjustment wheel of the A/C-heater control.

(3) Hold the A/C-heater control in its installation position.

NOTE: While holding the A/C-heater control in the installation position, verify that the control cables are not twisted.

(4) Turn the mode control knob on the A/C-heater control to the nine-o-clock position.

(5) Turn the upper mode door lever counter-clockwise until it reaches its stop and install the cable into the retainer in this position (arrow).

(6) Turn the lower mode door lever clockwise until it reaches its stop and install the cable into the retainer in this position (arrow).

(7) Operate the mode control and verify that the mode door cables are properly adjusted.

(8) Install the A/C-heater control and the two retaining screws. Tighten the screws to 2 N·m (17 in. lbs.).

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

(10) Reconnect the negative battery cable.

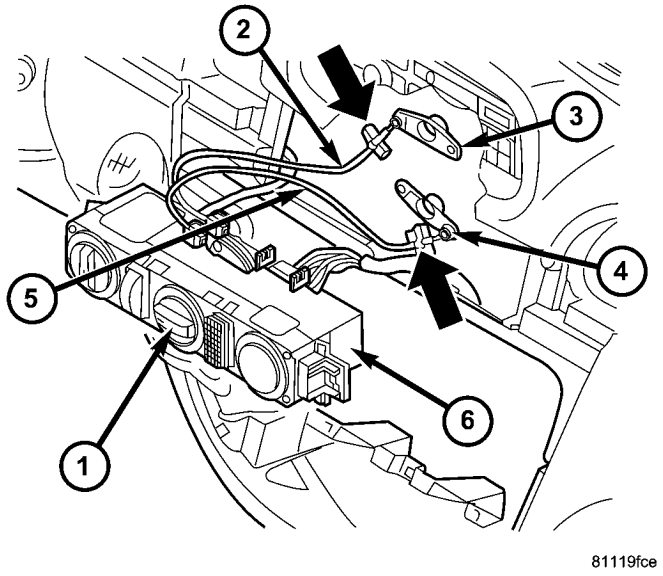

Fig. 22 Adjusting Air Distribution Control Cables

1 - MODE CONTROL KNOB
2 - UPPER MODE DOOR CABLE
3 - UPPER MODE DOOR LEVER
4 - LOWER MODE DOOR LEVER
5 - LOWER MODE DOOR CABLE
6 - HEATER-A/C CONTROL

RECIRCULATION DOOR ACTUATOR

DESCRIPTION

This vehicle uses a two-position vacuum operated recirculation door actuator to move the recirculation door (Fig. 23). Vacuum supply to the recirculation door actuator is controlled by an integral electronic control solenoid. The recirculation door actuator is mounted on the outboard side of the ventilation housing above the blower motor in the engine compartment.

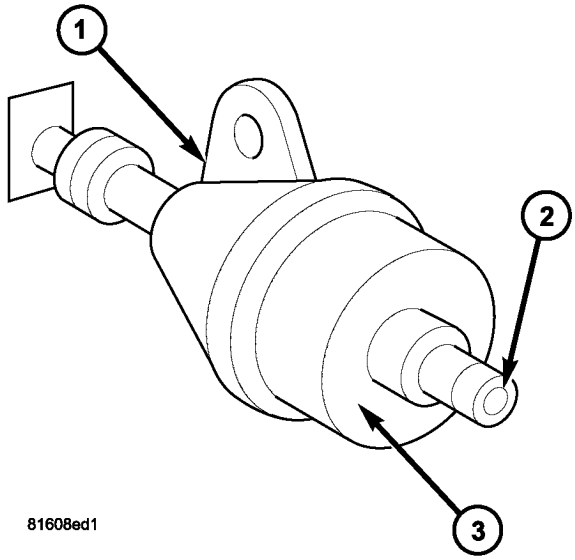

Fig. 23 Recirculation Door Actuator

1 - RECIRCULATION DOOR ACTUATOR
2 - VACUUM CONNECTOR
3 - ELECTRONIC CONTROL SOLENOID

OPERATION

The recirculation door actuator uses engine vacuum, which is controlled by an integral electrical solenoid. The electrical solenoid is connected to the A/C-heater control through the vehicle electrical system by a dedicated two-wire lead and connector. The output shaft of the recirculation door actuator is keyed to a pivot shaft, which is keyed to the recirculation door shaft. The recirculation door actuator can move the recirculation door in two directions.

The recirculation door actuator is controlled by an electrical switch that is integral to the A/C-heater control. When the rotary-type mode control is moved to the recirculation position, a signal is sent to the electrical solenoid within the recirculation door actuator. This signal causes the solenoid to open a port to engine vacuum which pulls the output shaft into the actuator, which moves the recirculation-air door. The actuator is spring loaded so the door moves to the fresh-air position when no vacuum is supplied through the electrical solenoid.

The recirculation door actuator can be diagnosed by performing the ATC Function Test using a DRBIII® scan tool. Refer to Body Diagnostic Procedures.

The recirculation door actuator cannot be repaired and, if faulty or damaged, it must be replaced.

REMOVAL

(1) Disconnect and isolate the battery negative cable.

(2) Disconnect the wire harness connector from the recirculation door actuator (Fig. 24).

(3) Disconnect the vacuum line from the recirculation door actuator.

(4) Remove the two screws that secure the recirculation door actuator to the ventilation housing.

(5) Disconnect the actuator shaft from the recirculation door pivot lever and remove the actuator from the vehicle.

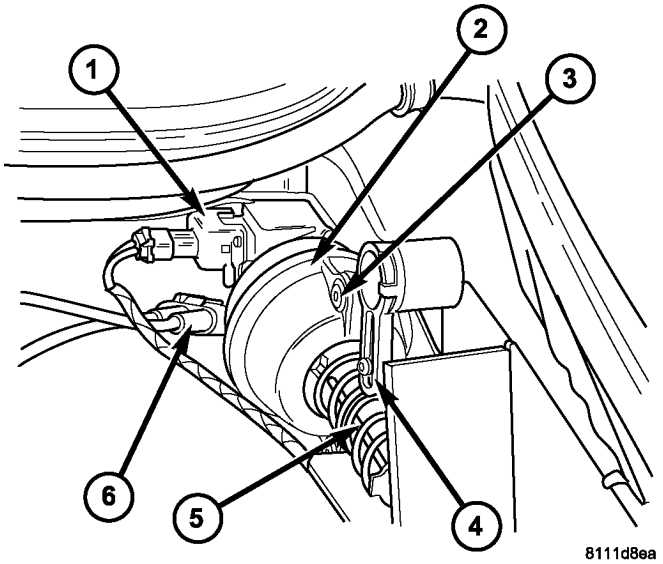

Fig. 24 Recirculation Door Actuator

1 - WIRE HARNESS CONNECTOR
2 - RECIRCULATION DOOR ACTUATOR
3 - SCREW (2)
4 - PIVOT LEVER
5 - ACTUATOR SHAFT
6 - VACUUM LINE

INSTALLATION

(1) Connect the actuator shaft to the recirculation door pivot lever.

(2) Install the two screws that secure the recirculation door actuator to the ventilation housing. Tighten the screws to 2 N·m (17 in. lbs.).

(3) Connect the vacuum line to the recirculation door actuator.

(4) Connect the wire harness connector to the recirculation door actuator.

(5) Reconnect the battery negative cable.

CONTROLS - REAR

TABLE OF CONTENTS

A / C CLUTCH RELAY

DESCRIPTION

The rear A/C clutch relay for the rear A/C system is an International Standards Organization (ISO)-type relay (Fig. 1). Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal functions and patterns. The rear A/C clutch relay is an electromechanical device that uses a low current input controlled by the rear A/C control module to control the high current output to the A/C clutch field coil for the rear A/C system.

The rear A/C clutch relay is located in the relay block in the rear A/C evaporator housing.

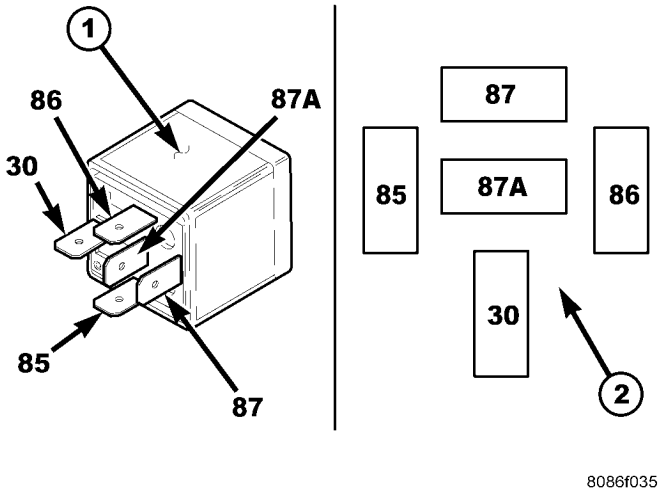

Fig. 1 Rear A/C Clutch Relay

1 - STANDARD ISO RELAY
2 - TERMINAL PATTERN

OPERATION

The ISO-standard rear A/C clutch relay is an electromechanical switch that uses a low current input from the rear A/C control module to control the high current output to the rear A/C clutch. The movable, common feed relay contact is held against the fixed, normally closed relay contact by spring pressure. When the electromagnetic relay coil is energized, it draws the movable common feed relay contact away from the fixed, normally closed relay contact and, holds it against the fixed, normally open relay contact. This action allows high current to flow to the A/C clutch field coil.

When the relay coil is de-energized, spring pressure returns the movable relay contact back against the fixed, normally closed contact point. The resistor or diode is connected in parallel with the relay coil, and helps to dissipate voltage spikes and electromagnetic interference that can be generated as the electromagnetic field of the relay coil collapses.

The rear A/C clutch relay terminals are connected to the vehicle electrical system through a receptacle in the relay block located in the rear A/C evaporator housing.

The rear A/C clutch relay cannot be repaired and, if faulty or damaged, it must be replaced. Refer to the appropriate wiring information for diagnosis and testing of the ISO-standard relay and for complete HVAC wiring diagrams.

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the air filter from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - REMOVAL).

(3) Reach up into the rear A/C evaporator housing and remove the rear A/C clutch relay from the relay block (Fig. 2).

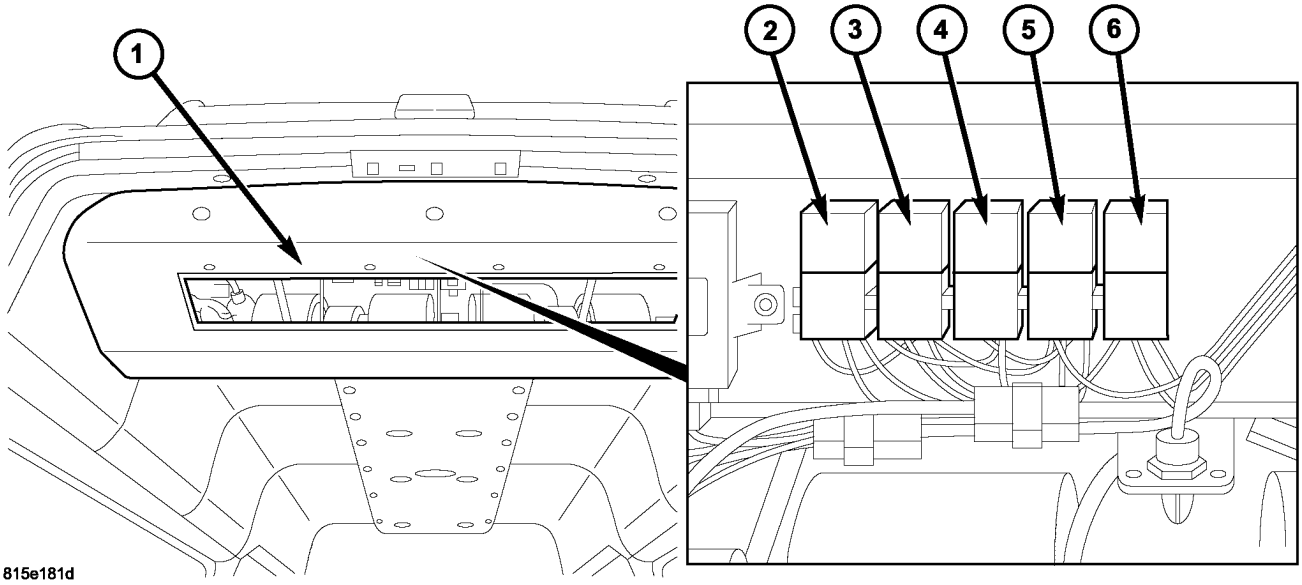

Fig. 2 Rear A/C Clutch Relay

1 - REAR A/C EVAPORATOR HOUSING
2 - BLOWER MOTOR RELAY K204
3 - BLOWER MOTOR RELAY K203
4 - BLOWER MOTOR RELAY K201
5 - REAR CONDENSER FAN RELAY K205
6 - REAR COMPRESSOR RELAY K206

INSTALLATION

(1) Position the rear A/C clutch relay into the proper receptacle of the relay block located in the rear A/C evaporator housing.

(2) Align the A/C clutch relay terminals with the terminal cavities in the relay block receptacle and push down firmly on the relay until the terminals are fully seated.

(3) Install the rear air filter (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - INSTALLATION).

(4) Reconnect the negative battery cable.

A / C CONDENSER FAN RELAY

DESCRIPTION

The rear A/C condenser fan relay for the rear A/C system is an International Standards Organization (ISO)-type relay (Fig. 3). Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal functions and patterns. The rear A/C condenser fan relay is an electromechanical device that uses a low current input to control the high current output to the A/C condenser fan for the rear heating-A/C system.

The rear A/C condenser fan relay is located in the relay block in the rear A/C evaporator housing.

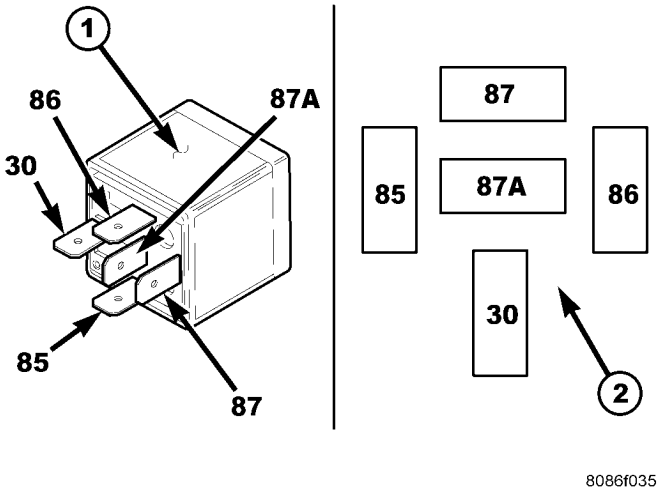

Fig. 3 Rear A/C Condenser Fan Relay

1 - STANDARD ISO RELAY
2 - TERMINAL PATTERN

OPERATION

The ISO-standard rear A/C condenser fan relay is an electromechanical switch that uses a low current input from the rear A/C control module to control the high current output to the rear A/C condenser cooling fan. The movable, common feed relay contact is held against the fixed, normally closed relay contact by spring pressure. When the electromagnetic relay coil

is energized, it draws the movable common feed relay contact away from the fixed, normally closed relay contact and, holds it against the fixed, normally open relay contact. This action allows high current to flow to the electric cooling fan motor.

When the relay coil is de-energized, spring pressure returns the movable relay contact back against the fixed, normally closed contact point. The resistor or diode is connected in parallel with the relay coil, and helps to dissipate voltage spikes and electromagnetic interference that can be generated as the electromagnetic field of the relay coil collapses.

The rear A/C condenser fan relay terminals are connected to the vehicle electrical system through a receptacle in the relay block located in the rear A/C evaporator housing.

The rear A/C condenser fan relay cannot be repaired and, if faulty or damaged, it must be replaced. Refer to the appropriate wiring information for diagnosis and testing of the ISO-standard relay and for complete HVAC wiring diagrams.

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the air filter from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - REMOVAL).

(3) Reach up into the rear A/C evaporator housing and remove the rear A/C condenser fan relay from the relay block (Fig. 4).

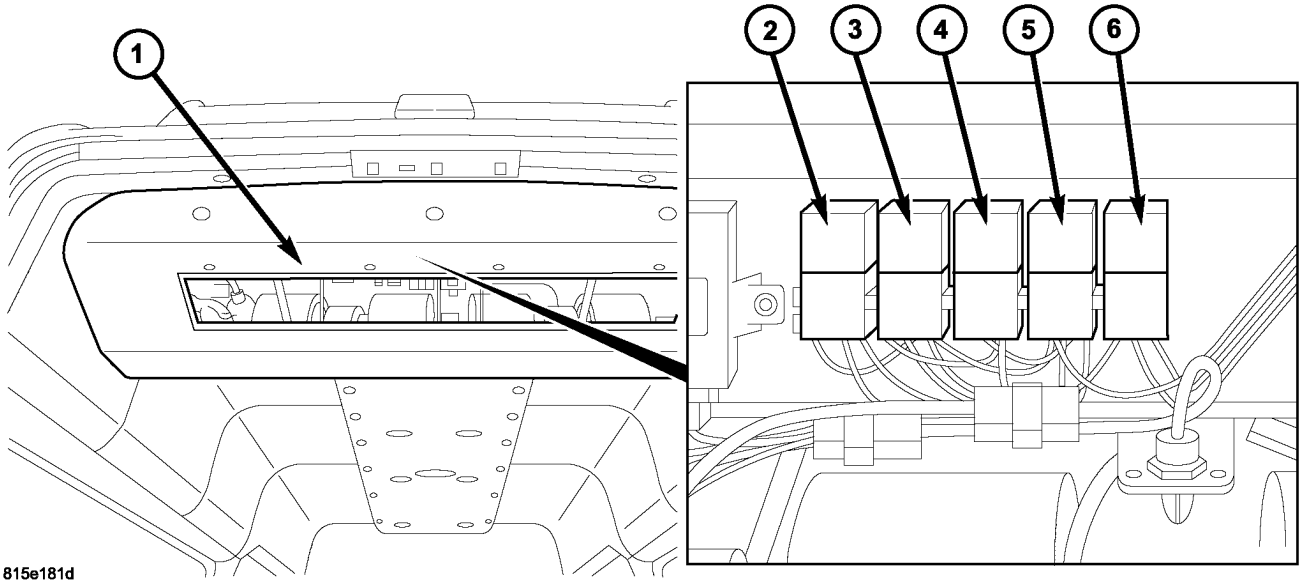

Fig. 4 Rear A/C Condenser Fan Relay

1 - REAR A/C EVAPORATOR HOUSING
2 - BLOWER MOTOR RELAY K204
3 - BLOWER MOTOR RELAY K203
4 - BLOWER MOTOR RELAY K201
5 - REAR CONDENSER FAN RELAY K205
6 - REAR COMPRESSOR RELAY K206

INSTALLATION

(1) Position the rear A/C condenser fan relay into the proper receptacle of the relay block located in the rear A/C evaporator housing.

(2) Align the A/C condenser fan relay terminals with the terminal cavities in the relay block receptacle and push down firmly on the relay until the terminals are fully seated.

(3) Install the rear air filter (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - INSTALLATION).

(4) Reconnect the negative battery cable.

A / C CONTROL MODULE

DESCRIPTION

The rear A/C control module (Fig. 5) is connected to the rear A/C blower motor switch, rear evaporative temperature sensor, rear A/C temperature control and the temperature sensor.

The rear A/C control module is located in the upper left side of the rear A/C evaporator housing.

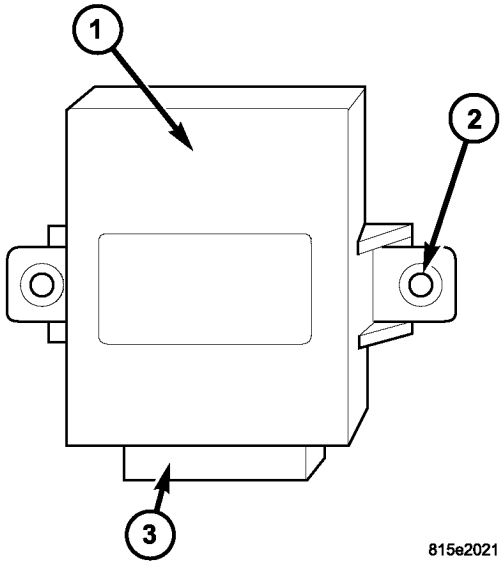

Fig. 5 Rear A/C Control Module

1 - REAR A/C CONTROL MODULE
2 - MOUNTING TABS
3 - WIRE HARNESS CONNECTOR

OPERATION

The rear A/C control module is supplied fused battery power through the rear blower switch. The control module receives input signals from the rear A/C blower motor switch, rear A/C temperature control, rear temperature sensor and the rear evaporator temperature sensor when the front A/C switch is turned on. The rear A/C control module uses the

input signals to control rear blower motor speed and output air temperature, and to prevent freezing of the rear evaporator core.

The rear A/C control module cannot be repaired and, if faulty or damaged, it must be replaced. Refer to the appropriate wiring information for complete HVAC wiring diagrams.

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the air filter from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - REMOVAL).

(3) Reach up into the rear A/C evaporator housing and disconnect the wire harness connector from the rear A/C control module (Fig. 6).

(4) Remove the two screws that secure the rear A/C control module to the rear A/C evaporator housing and remove the control module.

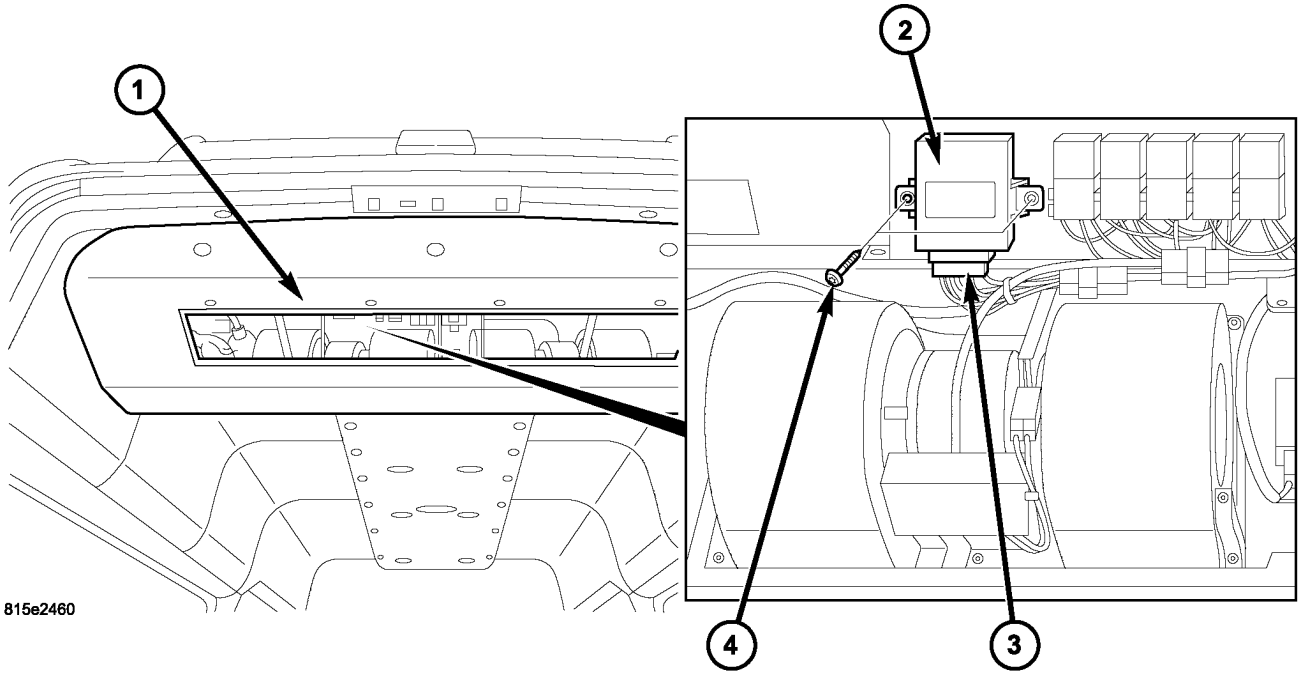

Fig. 6 Rear A/C Control Module

1 - REAR A/C EVAPORATOR HOUSING
2 - REAR A/C CONTROL MODULE
3 - WIRE HARNESS CONNECTOR
4 - SCREW (2)

INSTALLATION

(1) Position the rear A/C control module to the rear A/C evaporator housing.

(2) Install the two screws that secure the rear A/C control module to the rear A/C evaporator housing. Tighten the screws to 2 N·m (17 in. lbs.).

(3) Connect the wire harness connector to the rear A/C control module.

(4) Install the rear air filter (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - INSTALLATION).

(5) Reconnect the negative battery cable.

A / C HIGH PRESSURE SWITCH

DESCRIPTION

The rear A/C high pressure switch provides a signal to the rear A/C control module to control rear A/C compressor clutch engagement/disengagement and, control rear A/C condenser cooling fan operation (Fig. 7). The rear A/C control module will disengage the rear A/C clutch if the rear refrigerant system pressure exceeds approximately 2551 kPa (370 psi).

The rear A/C high pressure switch is mounted on a fitting located on the inlet tube of the rear A/C condenser.

The rear refrigerant system must be discharged prior to removing the rear A/C high pressure switch.

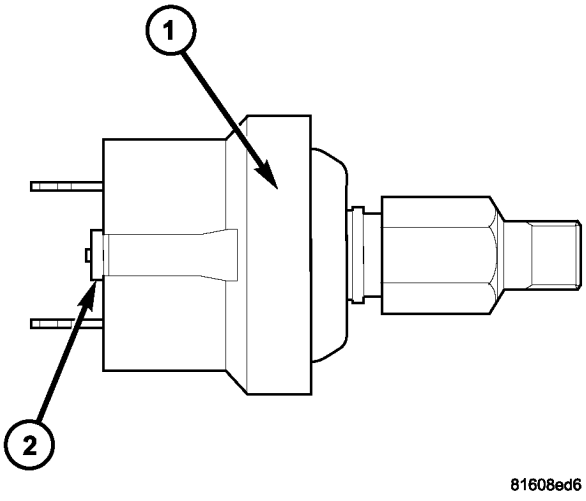

Fig. 7 Rear A/C High Pressure Switch

1 - REAR PRESSURE SWITCH
2 - WIRE CONNECTOR

OPERATION

The contacts in the rear A/C high pressure switch open and close causing the rear A/C control module to turn the rear A/C clutch on and off. This prevents

rear A/C compressor operation when the rear discharge line pressure approaches high levels, and also reduces electrical surging from rear A/C clutch engagement.

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

The rear A/C high pressure switch contacts open when the rear discharge line pressure rises above approximately 3100 to 3375 kPa (450 to 490 psi). The rear A/C high pressure switch contacts close when the rear discharge line pressure drops to approximately 1860 to 2275 kPa (270 to 330 psi).

The rear A/C high pressure switch is factory-calibrated and cannot be adjusted or repaired and, if faulty or damaged, it must be replaced. Refer to the appropriate wiring information for complete HVAC wiring diagrams.

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

(1) Disconnect and isolate the negative battery cable.

(2) Remove the air filter from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - REMOVAL).

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

(4) Remove the cover from the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - REMOVAL).

(5) Disconnect the wire harness connector from the rear A/C high pressure switch (Fig. 8).

(6) Remove the rear A/C high pressure switch and install a plug into, or tape over the opened rear discharge line fitting.

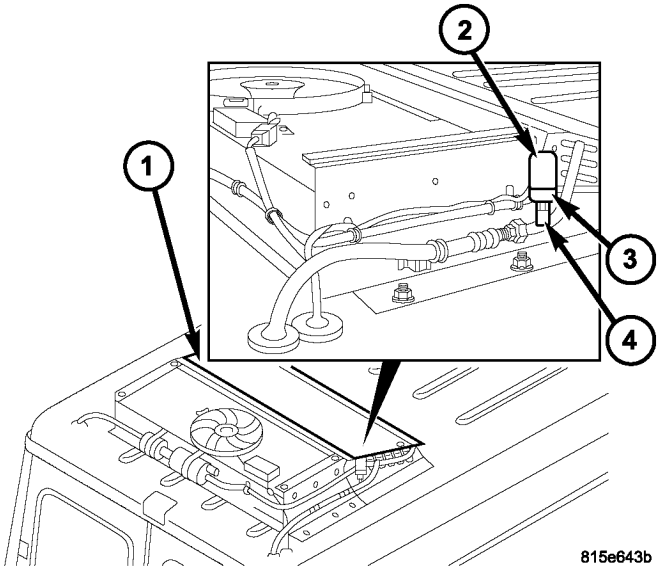

Fig. 8 Rear A/C High Pressure Switch

1 - REAR A/C CONDENSER
2 - WIRE HARNESS CONNECTOR
3 - REAR A/C HIGH PRESSURE SWITCH
4 - REAR DISCHARGE LINE FITTING

INSTALLATION

NOTE: Replacement of the PTFE thread sealing tape is required anytime the rear A/C high pressure switch is removed from the rear discharge line. Failure to replace the sealing tape could result in a rear refrigerant system leak.

(1) Remove the tape or plug from the rear discharge line fitting.

(2) Install PTFE thread sealing tape onto the rear A/C high pressure switch and install the switch onto the rear discharge line. Tightened the A/C high pressure switch to 10 N·m (88 in. lbs.).

(3) Connect the wiring harness connector to the rear A/C high pressure switch.

(4) Reconnect the negative battery cable.

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

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

(7) Install the rear air filter (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - INSTALLATION).

(8) Install the cover onto the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - INSTALLATION).

A / C LOW PRESSURE SWITCH

DESCRIPTION

The rear A/C low pressure switch provides a signal to the rear A/C control module to regulate the rear refrigerant system pressure and control rear A/C evaporator temperature (Fig. 9). The rear A/C control module will disengage the rear A/C clutch if the rear refrigerant system suction line pressure falls below 30 kPa (4.4 psi).

The rear A/C low pressure switch is mounted on a fitting located on the rear suction line near the left side of the rear A/C evaporator housing.

The rear refrigerant system must be discharge prior to removing the rear A/C low pressure switch.

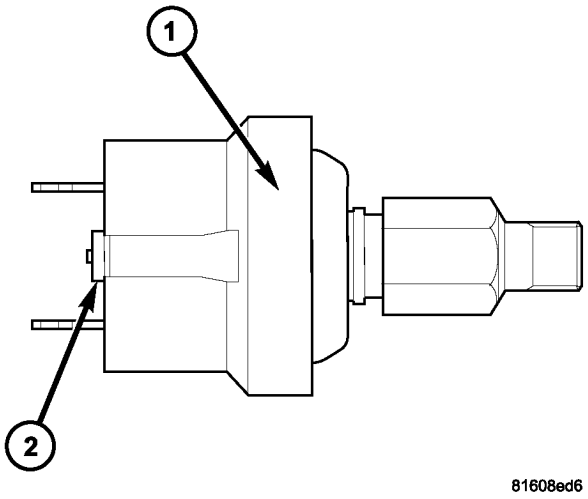

Fig. 9 Rear A/C Low Pressure Switch

1 - REAR PRESSURE SWITCH
2 - WIRE CONNECTOR

OPERATION

The rear A/C low pressure switch is electrically connected in series with the rear A/C high pressure switch, between ground and the rear A/C control module.

The rear A/C low pressure switch contact opens or closes the path the ground, signaling the rear A/C control module to turn the rear A/C clutch on and off. This regulates the rear refrigerant system pressure and controls rear A/C evaporator temperature. Controlling the rear evaporator temperature prevents condensate water on the evaporator fins from freezing and obstructing rear A/C system air flow.

The rear A/C low pressure switch contacts are open when the rear suction line pressure is approximately 152 kPa (22 psi) or lower. The rear A/C low pressure switch contacts will close when the rear suction line 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 rear A/C low pressure switch contacts to open due to the pressure/temperature relationship of the refrigerant in the system.

The rear A/C low pressure switch is factory-calibrated and cannot be adjusted or repaired and, if faulty or damaged, it must be replaced. Refer to the appropriate wiring information for complete HVAC wiring diagrams.

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

(1) Disconnect and isolate the negative battery cable.

(2) Remove the cover from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - REMOVAL).

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

(4) Remove the insulating tape from around the area of the rear A/C low pressure switch (Fig. 10).

(5) Disconnect the wire harness connector from the rear A/C low pressure switch.

(6) Remove the rear A/C low pressure switch and install a plug into, or tape over the opened rear suction line fitting.

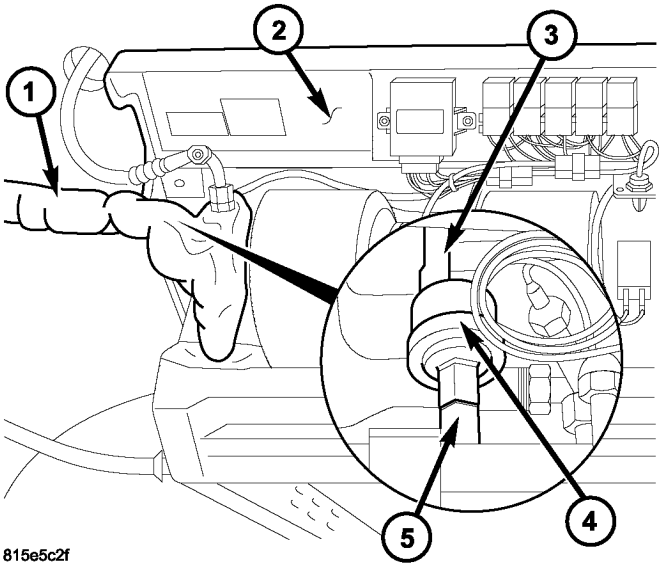

Fig. 10 Rear A/C Low Pressure Switch

1 - INSULATING TAPE
2 - REAR A/C EVAPORATOR HOUSING
3 - WIRE HARNESS CONNECTOR
4 - REAR A/C LOW PRESSURE SWITCH
5 - REAR SUCTION LINE FITTING

INSTALLATION

NOTE: Replacement of the PTFE thread sealing tape is required anytime the rear A/C low pressure switch is removed from the rear suction line line. Failure to replace the sealing tape could result in a rear refrigerant system leak.

(1) Remove the tape or plug from the rear suction line fitting.

(2) Install PTFE thread sealing tape onto the rear A/C low pressure switch and install the switch onto the rear suction line. Tightened the A/C low pressure switch to 10 N·m (88 in. lbs.).

(3) Connect the wiring harness connector to the rear A/C low pressure switch.

(4) Install new insulating tape around the rear A/C low pressure switch area.

(5) Reconnect the negative battery cable.

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

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

(8) Install the cover onto the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - INSTALLATION).

BLOWER MOTOR RELAY

DESCRIPTION

The three rear blower motor relays used for the rear A/C system are International Standards Organization (ISO)-type relays (Fig. 11). Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal functions and patterns. The rear blower motor relays are electromechanical devices that switches fused battery current directly to the rear blower motors. The rear blower motor relays are energized when the relay coils are provided battery current by the rear blower motor switch (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/BLOWER MOTOR SWITCH - DESCRIPTION).

The rear blower motor relays are located in the relay block in the rear A/C evaporator housing.

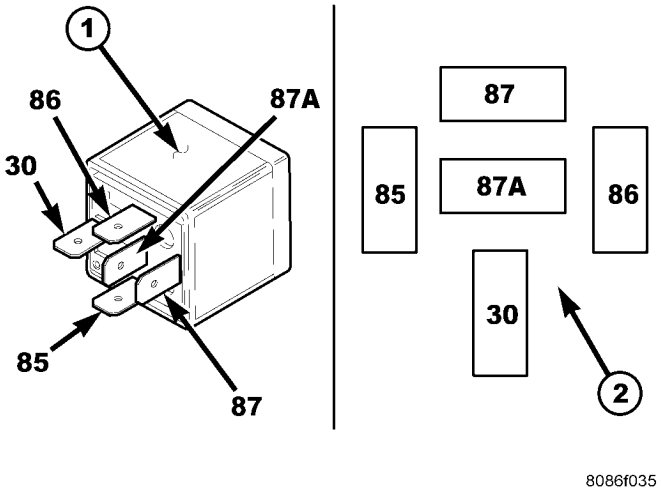

Fig. 11 Rear Blower Motor Relays

1 - STANDARD ISO RELAY
2 - TERMINAL PATTERN

OPERATION

The three ISO-standard rear blower motor relays are electromechanical switches that uses a low current input from the rear blower motor switch to control the high current output to the rear blower motors. The movable, common feed relay contact is held against the fixed, normally closed relay contact by spring pressure. When the electromagnetic relay coil is energized, it draws the movable common feed relay contact away from the fixed, normally closed relay contact and, holds it against the fixed, normally open relay contact. This action allows high current to flow to the rear blower motors.

When the relay coil is de-energized, spring pressure returns the movable relay contact back against the fixed, normally closed contact point. The resistor

or diode is connected in parallel with the relay coil, and helps to dissipate voltage spikes and electromagnetic interference that can be generated as the electromagnetic field of the relay coil collapses.

The rear blower motor relay terminals are connected to the vehicle electrical system through receptacles in the relay block located in the rear A/C evaporator housing.

The rear blower motor relays cannot be repaired and, if faulty or damaged, they must be replaced. Refer to the appropriate wiring information for diagnosis and testing of the ISO-standard relay and for complete HVAC wiring diagrams.

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the air filter from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - REMOVAL).

(3) Reach up into the rear A/C evaporator housing and remove the rear blower motor relays as necessary from the relay block (Fig. 12).

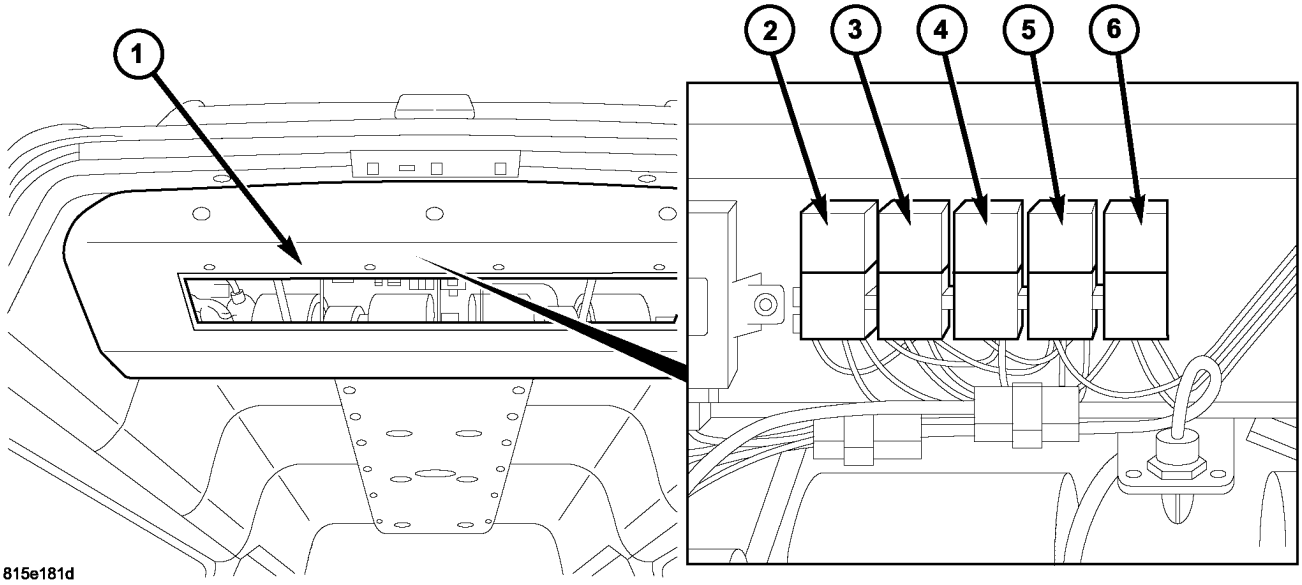

Fig. 12 Rear Blower Motor Relays

1 - REAR A/C EVAPORATOR HOUSING
2 - BLOWER MOTOR RELAY K204
3 - BLOWER MOTOR RELAY K203
4 - BLOWER MOTOR RELAY K201
5 - REAR CONDENSER FAN RELAY K205
6 - REAR COMPRESSOR RELAY K206

INSTALLATION

(1) Position the rear blower motor relays into the proper receptacle of the relay block located in the rear A/C evaporator housing as necessary.

(2) Align the blower motor relay terminals with the terminal cavities in the relay block receptacle and push down firmly on the relay until the terminals are fully seated.

(3) Install the rear air filter (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - INSTALLATION).

(4) Reconnect the negative battery cable.

BLOWER MOTOR SWITCH

DESCRIPTION

The blower motor for the optional rear A/C system is controlled by a three position rocker switch mounted in the switch panel located on the instrument panel (Fig. 13). The rear A/C blower motor switch allows the selection of one of two blower motor speeds and an Off position.

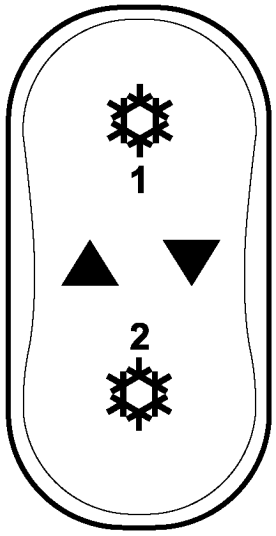

Fig. 13 Rear Air Conditioning Switch

OPERATION

With the front A/C switch activated, the rear blower motor speed can be selected by pressing the rocker switch upwards (high speed) or downwards (low speed). To turn the rear blower motor off, switch the blower motor switch to the center position. Depending on the blower motor switch position, a blower motor speed command signal is sent to one of the two blower motor relays. When activated, relay 1 sends power through an integral resistor within the rear A/C control module and then to the blower

motor, while relay 2 when activated, sends power directly to the blower motor.

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

DIAGNOSIS AND TESTING

REAR BLOWER MOTOR SWITCH

Before testing the rear blower motor switch, verify that the front A/C system is functional by performing the ATC Fuction Test using the DRBIII® scan tool. Use a volt/ohmmeter to test the rear blower motor switch. For circuit descriptions and diagrams, refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: To avoid personal injury or death, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

(1) Disconnect and isolate the battery negative cable.

(2) Unplug the wire harness connector from the rear blower motor switch.

(3) Check for continuity between terminal 10 and terminals 1, 7 and 4 of the blower motor switch. In all instances, there should be continuity.

NOTE: To check the switch's internal circuits, connect the negative lead of the ohmmeter to terminal 10 and the positive ohmmeter lead to terminals 1, 7 and 4. To check the switch's integral light emitting diodes, reverse the ohmmeter leads.

(4) Check for continuity between the rear blower motor switch terminals 3 and 7 as you move the blower motor switch to each of the two speed positions, and the Off position. There should be continuity in only one blower motor switch speed position.

(5) Check for continuity between the rear blower motor switch terminals 4 and 8 as you move the blower motor switch to each of the two speed positions, and the Off position. There should be continuity in only the other blower motor switch speed position.

(6) If OK, test and repair the rear blower motor switch wire harness circuits. If not OK, replace the faulty rear blower motor switch.

REMOVAL

WARNING: To avoid personal injury or death, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: The rear A/C blower motor switch is used on vehicles with the optional rear A/C system.

(1) Disconnect and isolate the negative battery cable.

(2) Remove the accessory switch panel from the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/ACCESSORY SWITCH BEZEL - REMOVAL).

(3) Disconnect the wire harness connector from the rear A/C blower motor switch (Fig. 14).

(4) Disengage the retaining tabs and remove the rear A/C blower motor switch from the accessory switch panel.

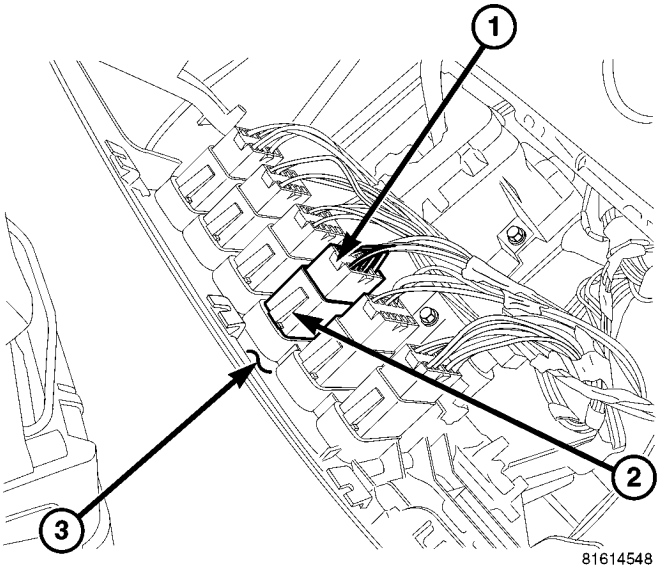

Fig. 14 Rear A/C Blower Motor Switch

1 - WIRE HARNESS CONNECTOR
2 - REAR A/C BLOWER MOTOR SWITCH
3 - ACCESSORY SWITCH PANEL

INSTALLATION

(1) Install the rear A/C blower motor switch into the accessory switch panel. Make sure the retaining tabs are fully engaged.

(2) Connect the wire harness connector to the rear A/C blower motor switch.

(3) Install the accessory switch panel (Refer to 23 - BODY/INSTRUMENT PANEL/ACCESSORY SWITCH BEZEL - INSTALLATION).

(4) Reconnect the negative battery cable.

EVAPORATOR TEMPERATURE SENSOR

DESCRIPTION

The rear evaporator temperature sensor (Fig. 15) is used to signal the rear A/C control module to cycle the rear A/C clutch in order to control rear evaporator temperature. Controlling the evaporator temperature prevents condensation on the evaporator fins from freezing and obstructing rear A/C system air flow.

The rear evaporator temperature sensor consists of a probe and a switch unit. The probe, which is a Negative Temperature Coefficient (NTC) thermistor in a capillary tube, is inserted between the rear evaporator coil fins to monitor evaporator temperature. The switch unit contains internal control logic that monitors the input from the probe in order to switch an internal transistor that controls the output signal to the rear A/C control module.

The rear evaporator temperature sensor is located in the rear A/C evaporator housing.

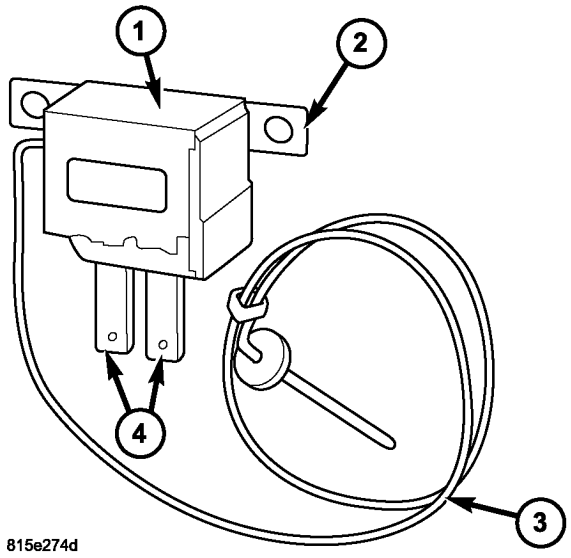

Fig. 15 Rear Evaporator Temperature Sensor

1 - SWITCH UNIT
2 - MOUNTING TAB (2)
3 - CAPILLARY TUBE
4 - WIRE CONNECTORS

OPERATION

The rear evaporator temperature sensor signals the rear A/C control module to cycle the rear A/C clutch off if the rear evaporator temperature goes below approximately 1.6° C (35° F). When the temperature reaches above approximately 3.9° C (39° F), the rear evaporator temperature sensor signals the rear A/C control module to cycle the rear A/C clutch back on.

The rear evaporator temperature sensor cannot be adjusted or repaired. If faulty or damaged, it must be replaced. Refer to the appropriate wiring information for complete HVAC wiring diagrams.

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the air filter from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - REMOVAL).

(3) Reach up into the rear A/C evaporator housing and disconnect the two wire harness connectors from the rear evaporator temperature sensor (Fig. 16).

(4) Carefully remove the sensor probe from the rear A/C evaporator.

(5) Remove the two screws that secure the rear evaporator sensor to the rear A/C evaporator housing and remove the sensor.

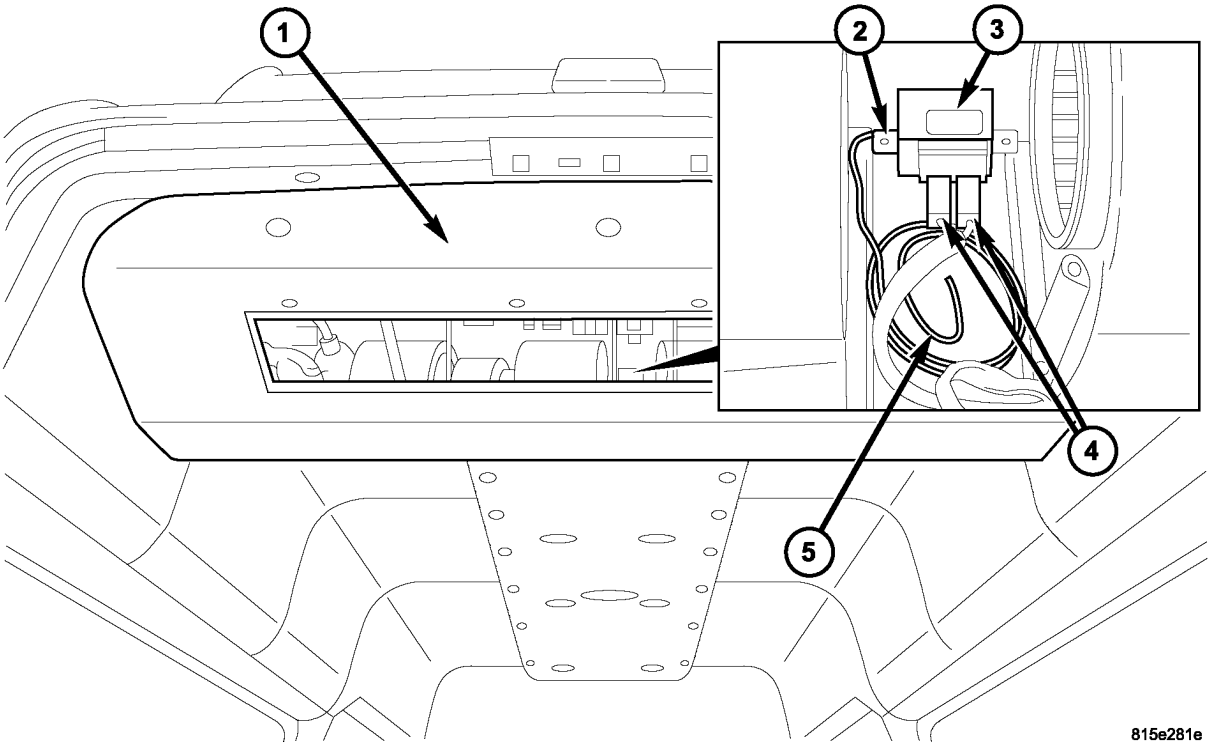

Fig. 16 Rear Evaporator Temperature Sensor

1 - REAR A/C EVAPORATOR HOUSING
2 - SCREWS (2)
3 - REAR EVAPORATOR SENSOR SWITCH UNIT
4 - WIRE HARNESS CONNECTORS
5 - REAR EVAPORATOR SENSOR PROBE

INSTALLATION

(1) Position the rear evaporator temperature sensor to the rear A/C evaporator housing.

(2) Install the two screws that secure the rear evaporator temperature sensor to the rear A/C evaporator housing. Tighten the screws to 2 N·m (17 in. lbs.).

(3) Install the sensor probe into the rear A/C evaporator.

(4) Connect the two wire harness connectors to the rear evaporator temperature sensor.

(5) Install the rear air filter (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - INSTALLATION).

(6) Reconnect the negative battery cable.

TEMPERATURE CONTROL

DESCRIPTION

The temperature control for the optional rear A/C system is a thumbwheel-type control mounted in the switch panel on the instrument panel (Fig. 17). The rear A/C temperature control allows the selection of four temperature settings when the rear A/C blower motor is activated.

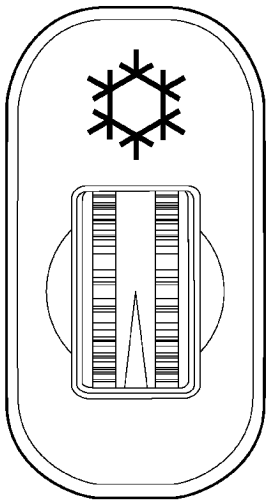

Fig. 17 Rear A/C Temperature Control

OPERATION

With the front A/C switch and rear blower motor activated, the rear A/C output temperature can be selected by rotating the thumbwheel control upwards (increase cooling) or downwards (decrease cooling). Depending on the rear A/C temperature control position, a temperature command signal is sent to the

rear A/C control module. The temperature of the circulated internal air of the rear compartment is measured by a temperature sensor located in the rear evaporator unit. The value of the temperature sensor is compared in the rear A/C control module with an adjusted value at the rear A/C temperature control.

The rear A/C temperature control cannot be repaired and, if faulty or damaged, it must be replaced.

DIAGNOSIS AND TESTING

REAR A / C TEMPERATURE CONTROL

Before testing the rear A/C temperature control, verify that the front A/C system is operating correctly by performing the ATC Function Test using the DRBIII® scan tool. Use a volt/ohmmeter to test the control. For circuit descriptions and diagrams, refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

WARNING: To avoid personal injury or death, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

(1) Disconnect and isolate the battery negative cable.

(2) Unplug the wire harness connector from the rear A/C temperature control.

(3) Check for continuity between terminal 9 and terminals 3 and 5 of the A/C temperature control. In all instances, there should be continuity.

NOTE: To check the switch's internal circuits, connect the positive lead of the ohmmeter to terminal 9 and the negative lead to terminals 3 and 5. To check the switches integral light emitting diode, reverse the ohmmeter leads.

(4) Check for resistance between terminal 3 and 5 of the A/C temperature control as you move the control to each temperature position. Resistance should be present and should change for each position.

(5) If OK, test and repair the rear A/C temperature control wire harness circuits. If not OK, replace the faulty rear A/C temperature control.

REMOVAL

WARNING: To avoid personal injury or death, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: The rear A/C temperature control is used only on models with the optional rear A/C unit.

(1) Disconnect and isolate the negative battery cable.

(2) Remove the accessory switch panel from the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/ACCESSORY SWITCH BEZEL - REMOVAL).

(3) Disconnect the wire harness connector from the rear A/C temperature control (Fig. 18).

(4) Disengage the retaining tabs and remove the rear A/C temperature control from the accessory switch panel.

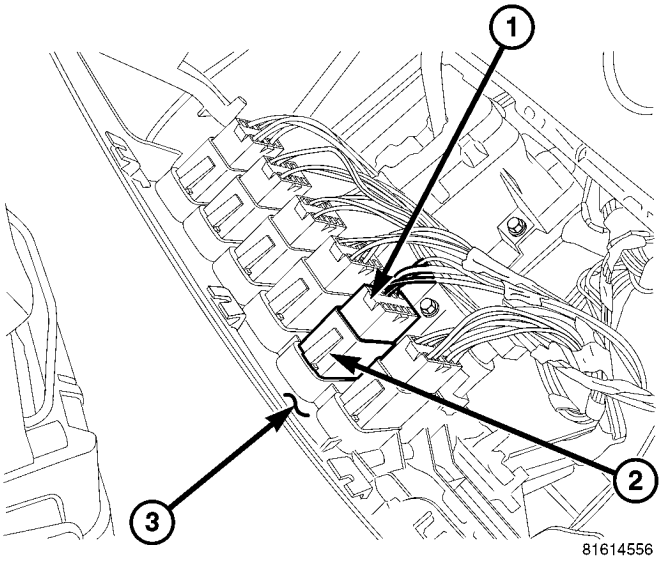

Fig. 18 Rear A/C Temperature Control

1 - WIRE HARNESS CONNECTOR
2 - REAR A/C TEMPERATURE CONTROL
3 - ACCESSORY SWITCH PANEL

INSTALLATION

(1) Install the rear A/C temperature control into the accessory switch panel. Make sure the retaining tabs are fully engaged.

(2) Connect the wire harness connector to the rear A/C temperature control.

(3) Install the accessory switch panel (Refer to 23 - BODY/INSTRUMENT PANEL/ACCESSORY SWITCH BEZEL - INSTALLATION).

(4) Reconnect the negative battery cable.

TEMPERATURE SENSOR

DESCRIPTION

The rear temperature sensor (Fig. 19) provides an air outlet temperature signal to the rear A/C control module through a two-wire harness lead and connector.

The rear temperature sensor is located in the rear A/C evaporator housing.

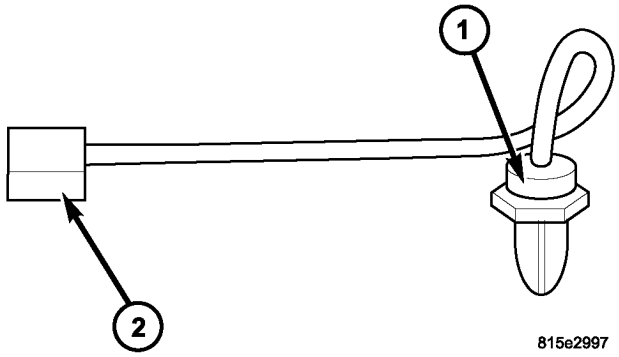

Fig. 19 Rear Temperature Sensor

1 - REAR TEMPERATURE SENSOR
2 - WIRE HARNESS CONNECTOR

OPERATION

The rear A/C temperature sensor is a variable resistor that operates on a five-volt reference signal sent to it by the rear A/C control module. The resistance in the sensor changes as air temperature changes. Based upon the resistance in the sensor, a specific voltage on the temperature sensor signal circuit is returned to the rear A/C control module, which is programmed to correspond to a specific temperature.

The rear A/C temperature sensor cannot be adjusted or repaired and, if faulty or damaged, it must be replaced.

DIAGNOSIS AND TESTING

REAR TEMPERATURE SENSOR

(1) Disconnect and isolate the negative battery cable.

(2) Disconnect the wire harness connector from the rear temperature sensor.

(3) Measure the resistance of the rear temperature sensor. At –40° C (–40° F), the sensor resistance should be approximatley 336 kilohms. At 55° C (131° F), the sensor resistance is should be approximaytly 25 kilohms. The rear sensor resistance should read between these two values.

(4) If OK, test and repair the rear temperature sensor wire harness circuits. Refer to the appropriate wiring information for rear temperature sensor circuit descriptions and for complete HVAC wiring diagrams. If not OK, replace the faulty temperature sensor (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS - REAR/TEMPERATURE SENSOR - REMOVAL).

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the air filter from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - REMOVAL).

(3) Reach up into the rear A/C evaporator housing and disconnect the wire harness connector from the rear temperature sensor (Fig. 20).

(4) Carefully remove the rear temperature sensor from the bracket.

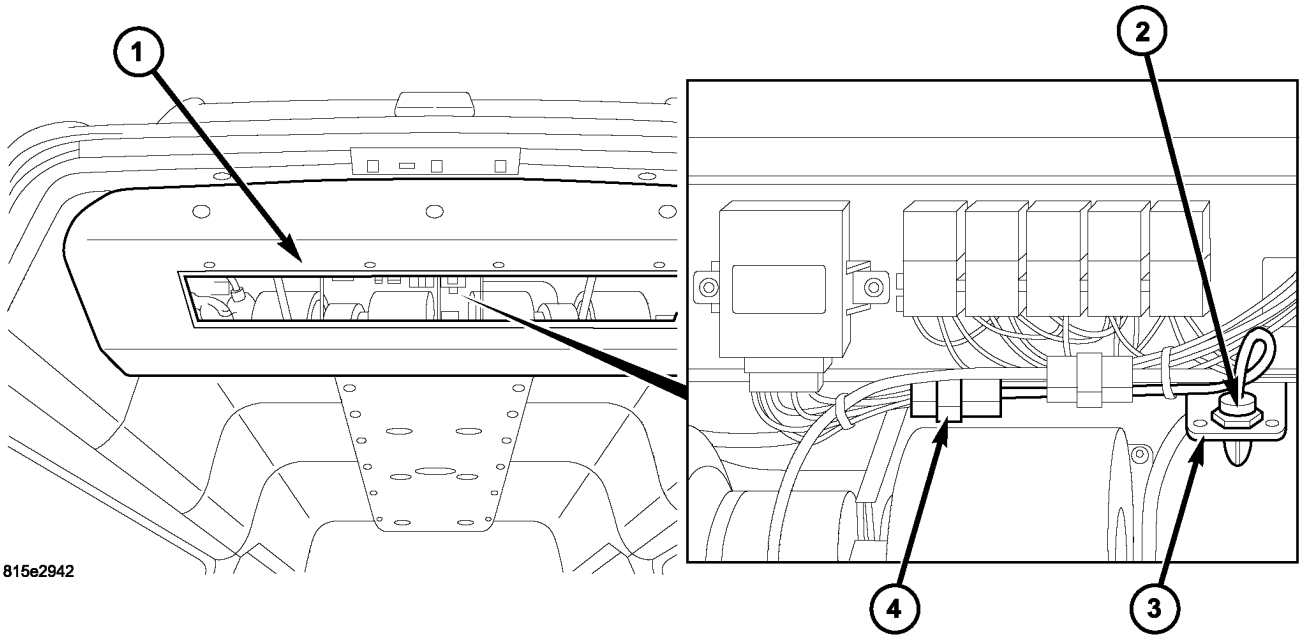

Fig. 20 Rear Temperature Sensor

1 - REAR A/C EVAPORATOR HOUSING
2 - TEMPERATURE SENSOR
3 - BRACKET
4 - WIRE HARNESS CONNECTOR

INSTALLATION

(1) Carefully install the rear temperature sensor onto the bracket located in the rear A/C evaporator housing.

(2) Connect the temperature sensor wire harness connector.

(3) Connect the wire harness connector to the rear temperature sensor.

(4) Install the rear air filter (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - INSTALLATION).

(5) Reconnect the negative battery cable.

SUPPRESSOR FILTER - REAR BLOWER MOTOR

DESCRIPTION

The two interference suppression filters (Fig. 21) for the two rear blower motors protects the rear A/C control circuits and the vehicles electrical system from voltage spikes which may be generated by the two blower motors or the three rear blower motor relays. The suppression filters also impede the propagation of RF interference into the vehicles electrical system by the rear blower motors to ensure interference-free radio reception.

The rear blower motor suppression filters are located near the rear blower motors in the rear A/C evaporator housing.

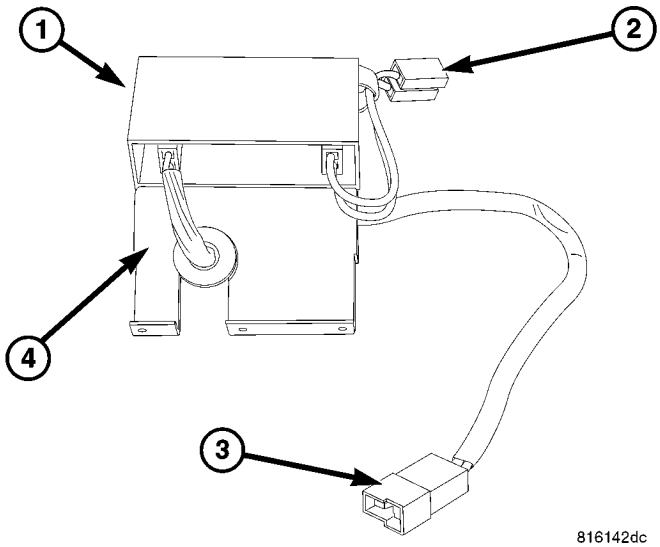

Fig. 21 Rear Blower Motor Suppression Filter

1 - REAR BLOWER MOTOR SUPPRESSION FILTER (2)
2 - WIRE CONNECTOR (TO BLOWER MOTOR)
3 - WIRE CONNECTOR (TO REAR A/C HARNESS)
4 - MOUNTING BRACKET

OPERATION

The rear blower motor suppression filters provide protection against transient interference signals or similar interference to the electronic rear blower motor circuits which can effect the performance of

the rear A/C control module circuits and radio reception quality. The suppression filters for the rear blower motors consist of capacitors and inductance coils.

The rear blower motor suppression filters cannot be repaired and, if faulty or damaged, they must be replaced. Refer to the appropriate wiring information for complete HVAC wiring diagrams.

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the cover from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - REMOVAL).

(3) Disconnect the two wire harness connectors from the rear blower motor suppression filter being serviced (Fig. 22).

(4) Remove the screw that secures the each rear blower motor suppression filter to the rear A/C evaporator housing and remove the suppression filters as required.

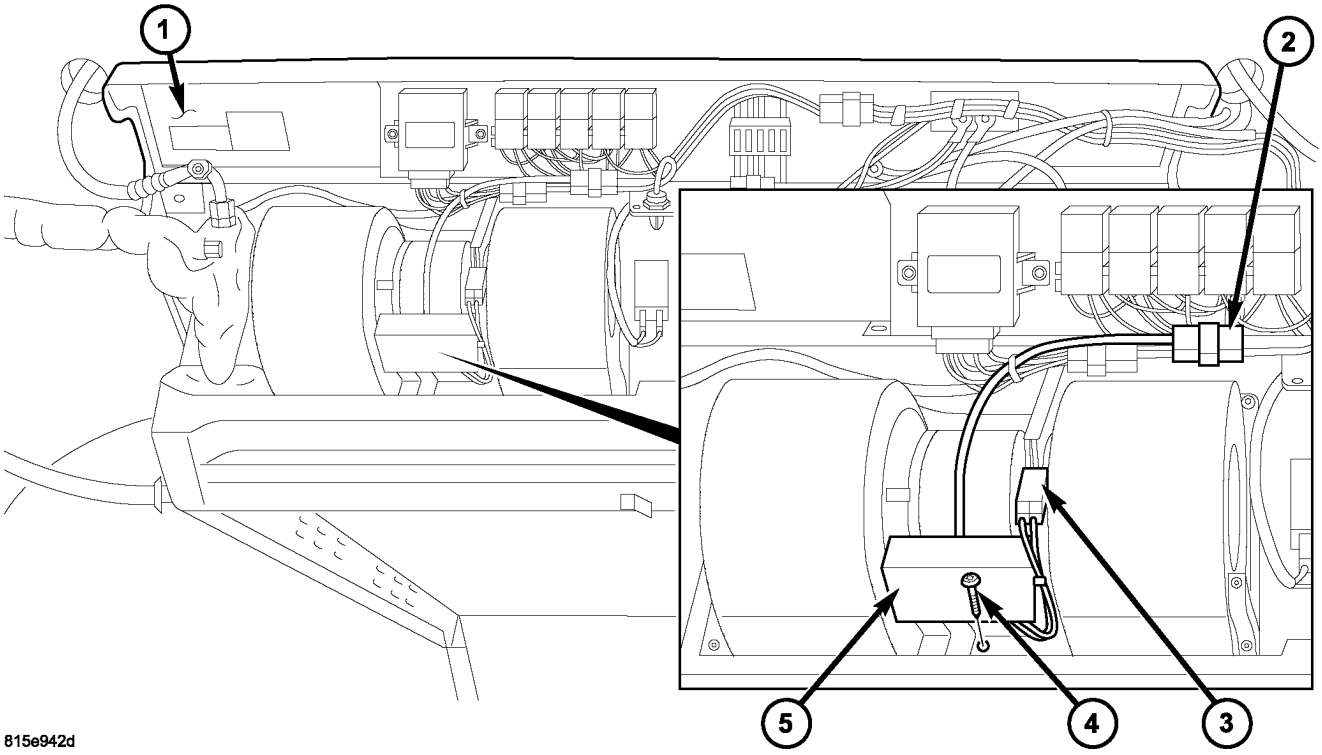

Fig. 22 Rear Blower Motor Suppression Filter – LH shown, RH similar

1 - REAR A/C EVAPORATOR HOUSING
2 - SUPPRESSION FILTER WIRE CONNECTOR
3 - BLOWER MOTOR WIRE CONNECTOR
4 - SCREW
5 - REAR BLOWER MOTOR SUPPRESSION FILTER (2)

INSTALLATION

(1) Position the rear blower motor suppression filter being serviced to the rear A/C evaporator housing.

(2) Install the screw that secures each rear blower motor suppression filter to the rear A/C evaporator housing. Tighten the screw(s) to 2 N·m (17 in. lbs.).

(3) Connect the two suppression filter wire harness connectors.

(4) Install the cover onto the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - INSTALLATION).

(5) Reconnect the negative battery cable.

SUPPRESSOR FILTER - REAR CONDENSER FAN

DESCRIPTION

The interference suppression filter (Fig. 23) for the rear A/C condenser fan protects the rear A/C control circuits and the vehicles electrical system from voltage spikes which may be generated by the rear condenser fan motor or the rear condenser fan relay. The suppression filter also impedes the propagation of RF interference into the vehicles electrical system by the rear condenser fan to ensure interference-free radio reception.

The rear condenser fan suppression filter is located in the rear A/C condenser housing near the rear condenser fan.

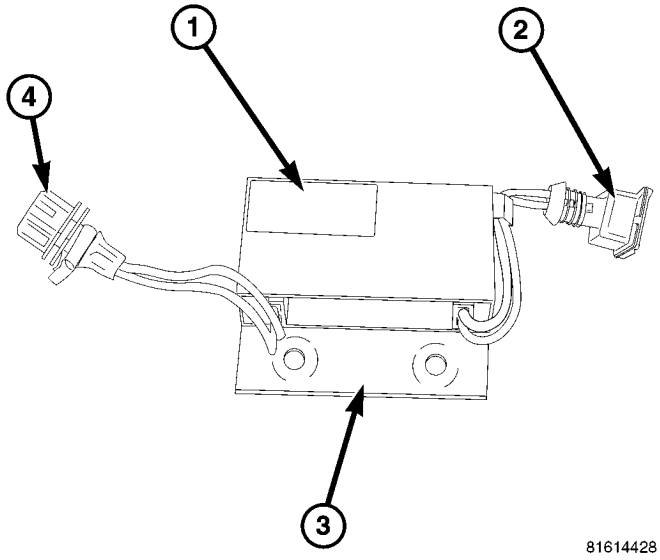

Fig. 23 Rear Condenser Fan Suppression Filter

1 - REAR CONDENSER FAN SUPPRESSION FILTER
2 - WIRE CONNECTOR (TO CONDENSER FAN)
3 - MOUNTING BRACKET
4 - WIRE CONNECTOR (TO REAR A/C HARNESS)

OPERATION

The rear condenser fan suppression filter provides protection against transient interference signals or similar interference to the electronic rear condenser fan circuits which can effect the performance of the rear A/C control module circuits and radio reception quality. The suppression filter for the rear condenser fan consist of capacitors and inductance coils.

The rear condenser fan suppression filter cannot be repaired and, if faulty or damaged, it must be replaced. Refer to the appropriate wiring information for complete HVAC wiring diagrams.

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the cover from the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER-REAR - REMOVAL).

(3) Disconnect the two wire harness connectors from the rear condenser fan suppression filter (Fig. 24).

(4) Remove the rear condenser fan (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ REAR A/C CONDENSER FAN - REMOVAL).

(5) Remove the two bolts, washers and nuts that secure the rear condenser fan suppression filter to the rear A/C condenser housing and remove the suppression filter.

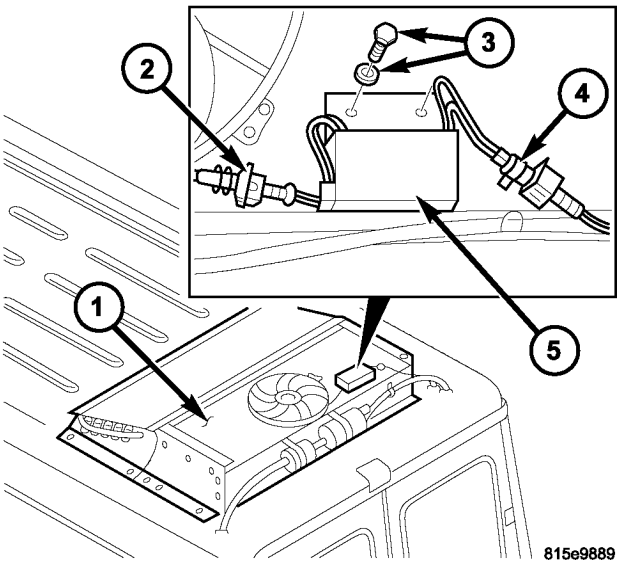

Fig. 24 Rear Condenser Fan Suppression Filter

1 - REAR A/C CONDENSER HOUSING
2 - CONDENSER FAN WIRE CONNECTOR
3 - BOLT, WASHER AND NUT (2)
4 - SUPPRESSION FILTER WIRE CONNECTOR
5 - REAR CONDENSER FAN SUPPRESSION FILTER

INSTALLATION

(1) Position the rear condenser fan suppression filter to the rear A/C condenser housing.

(2) Install the two bolts, washers and nuts that secure the rear condenser fan suppression filter to the rear A/C condenser housing. Tighten the bolts to 5 N·m (44 in. lbs.).

(3) Install the rear condenser fan (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ REAR A/C CONDENSER FAN - INSTALLATION).

(4) Connect the wiring harness connectors to the rear condenser fan suppression filter and the rear condenser fan.

(5) Install the cover onto the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - INSTALLATION).

(6) Reconnect the negative battery cable.

DISTRIBUTION - FRONT

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AIR FILTER

REMOVAL

(1) Remove the insulation blanket from the ventilation housing in the engine compartment (Fig. 1).
(2) Open the locking clips at the front and rear of the ventilation housing.
(3) Slide the ventilation housing cover in the direction of the arrow shown.
(4) Remove the air filter.

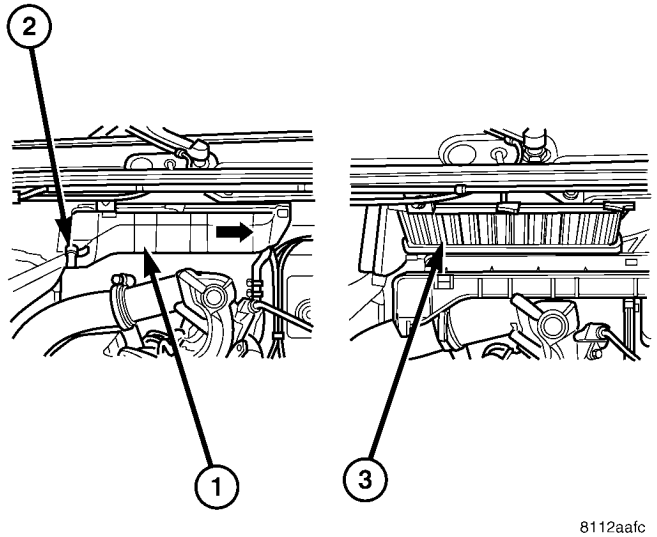

Fig. 1 Air Filter Element

1 - VENTILATION HOUSING INSULATION BLANKET
2 - LOCKING CLIP (2)
3 - AIR FILTER

INSTALLATION

(1) Install the air filter into the ventilation housing.
(2) Install the ventilation housing cover
(3) Close the locking clips at the front and rear of the ventilation housing.

NOTE: The locking tabs should retain the ventilation housing cover securely.

(4) Install the insulation blanket onto the ventilation housing.

AIR OUTLETS

REMOVAL

WARNING: To avoid personal injury or death, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

(1) Disconnect and isolate the battery negative cable.
(2) If servicing the driver side air outlets, remove the instrument cluster bezel (Refer to 23 - BODY/INSTRUMENT PANEL/CLUSTER BEZEL - REMOVAL).
(3) If servicing the passenger side air outlets, remove the passenger side airbag (Refer to 8 - ELECTRICAL/RESTRAINTS/PASSENGER AIRBAG - REMOVAL).

(4) If servicing the passenger side air outlets, remove the passenger side air nozzle reinforcing plate screws and the reinforcing plate (Fig. 2).

(5) If servicing the passenger side air outlets, remove the passenger side air nozzle assembly using a trim stick or other suitable wide flat blade tool, until the snap features on the nozzle assembly are released.

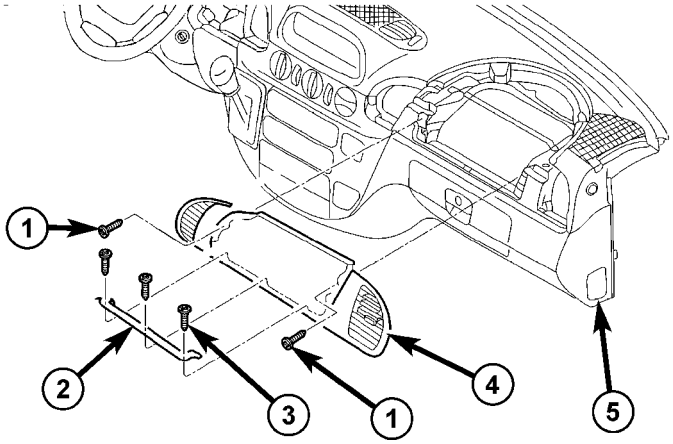

Fig. 2 Passenger Side Air Nozzle Cover

1 - FRONT SCREWS (2)
2 - BRACKET
3 - BRACKET SCREWS
4 - NOZZLE COVER
5 - INSTRUMENT PANEL

(6) If servicing the passenger side air outlets, remove the air outlet retaining bracket from the right side of the instrument panel (Fig. 3).

(7) Remove the instrument panel end cover screws and the left and/or right side cover.

(8) Remove the air outlet retaining screws and the air outlets as required.

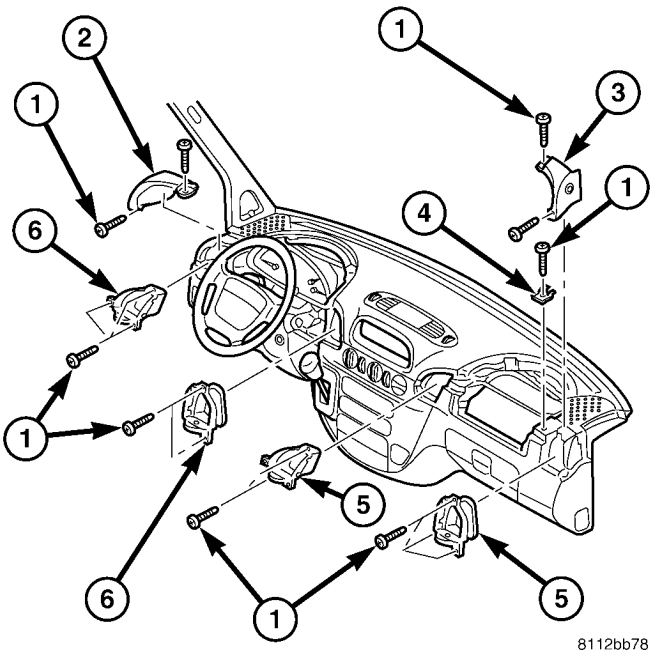

Fig. 3 Instrument Panel Air Outlets

1 - SCREW (15)
2 - LH END COVER
3 - RH END COVER
4 - BRACKET
5 - PASSENGER SIDE AIR OUTLET (2)
6 - DRIVER SIDE AIR OUTLET (2)

INSTALLATION

(1) Install the air outlets and retaining screws as required. Tighten the screws to 2 N·m (17 in. lbs.).

(2) Install the left and/or right side instrument panel end cover and retaining screws as required. Tighten the screws to 2 N·m (17 in. lbs.).

(3) If servicing the passenger side air outlets, install the air outlet retaining bracket to the right side of the instrument panel. Tighten the screw to 2 N·m (17 in. lbs.).

(4) If servicing the passenger side air outlets, install the passenger side air nozzle assembly by pressing the nozzle assembly firmly and evenly into the instrument panel, until the snap features are fully engaged.

(5) If servicing the passenger side air outlets, install the passenger side air nozzle reinforcing plate and retaining screws. Tighten the screws to 2 N·m (17 in. lbs.).

(6) If servicing the passenger side air outlets, install the passenger side airbag (Refer to 8 - ELECTRICAL/RESTRAINTS/PASSENGER AIRBAG - INSTALLATION).

(7) If servicing the driver side air outlets, install the instrument cluster bezel (Refer to 23 - BODY/INSTRUMENT PANEL/CLUSTER BEZEL - INSTALLATION).

(8) Reconnect the battery negative cable.

BLOWER MOTOR

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the engine air cleaner housing cover (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR CLEANER ELEMENT - REMOVAL).

(3) Position the ventilation housing insulation blanket out of the way of the blower motor assembly.

(4) Disconnect the wire harness connector from the blower motor (Fig. 4).

(5) Remove the three blower motor retaining screws.

(6) Remove the blower motor assembly from the ventilation housing.

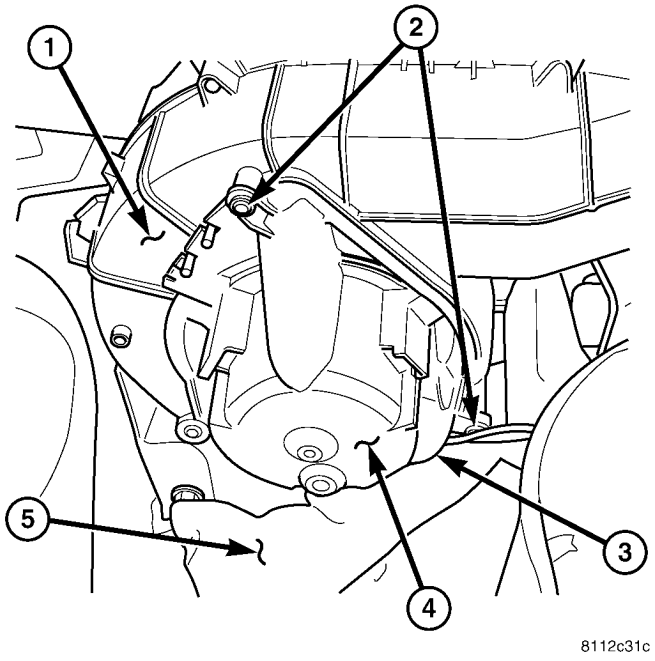

Fig. 4 Blower Motor Assembly

1 - VENTILATION HOUSING
2 - SCREWS (3)
3 - WIRE HARNESS CONNECTOR
4 - BLOWER MOTOR
5 - INSULATION BLANKET

INSTALLATION

(1) Install the blower motor assembly into the ventilation housing.

(2) Install the three blower motor retaining screws. Tighten the screws to 2 N·m (17 in. lbs.).

(3) Connect the wire harness connector to the blower motor.

(4) Install the ventilation housing insulation blanket.

(5) Install the engine air cleaner cover (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR CLEANER HOUSING - INSTALLATION).

(6) Reconnect the negative battery cable.

DEFROSTER DUCTS

REMOVAL

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

(2) Remove the screw that secures the left and/or right side defroster duct to the heater housing, depending on the duct being removed (Fig. 5).

(3) Remove the defroster duct(s) from the housing.

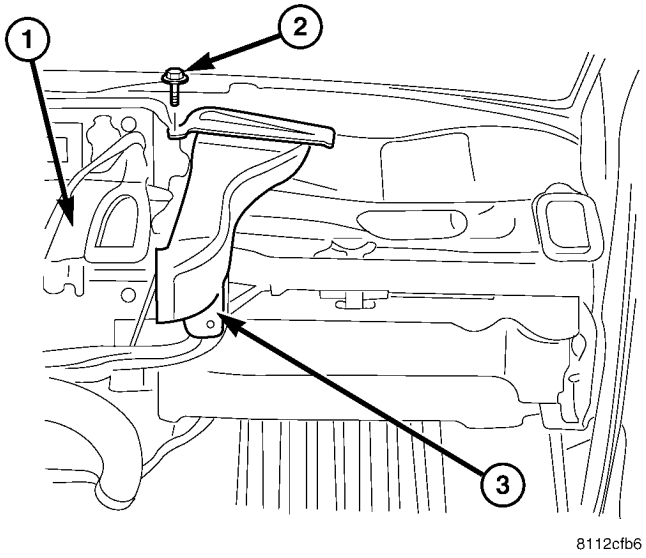

Fig. 5 Defroster Duct - RH Shown, LH Typical

1 - HEATER HOUSING
2 - SCREW
3 - DEFROSTER DUCT

INSTALLATION

(1) Install the left and/or right side defroster duct on to the heater housing.

(2) Install the screw that secures the defroster duct to the housing. Tighten the screw(s) to 2 N·m (17 in. lbs.).

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

FLOOR DISTRIBUTION DUCTS

REMOVAL

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

(2) Remove the defroster ducts (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/ DEFROSTER DUCTS - REMOVAL).

(3) Remove the screws that secure the left and right floor distribution ducts to the instrument panel support (Fig. 6).

(4) Remove floor distribution ducts from the center floor distribution duct.

(5) Remove the shift mechanism (Refer to 21 - TRANSMISSION/TRANSAXLE/AUTOMATIC - NAG1/SHIFT MECHANISM - REMOVAL).

(6) Remove center floor distribution duct from the heater housing.

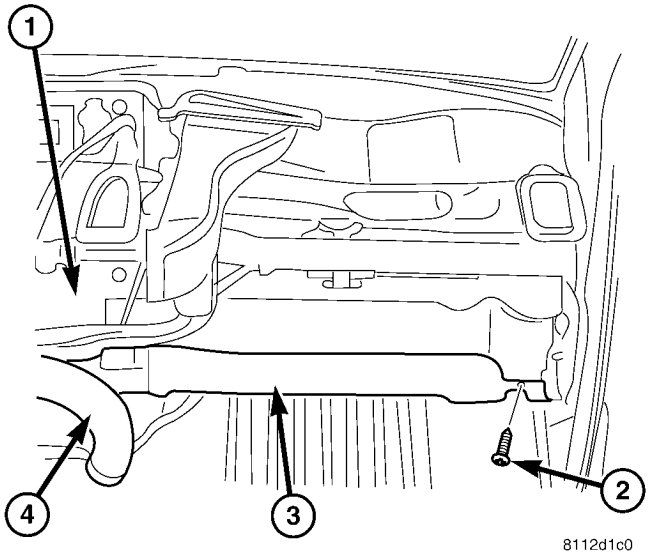

Fig. 6 Floor Distribution Duct, RH Shown, LH Typical

1 - HEATER HOUSING
2 - SCREW (1)
3 - RH FLOOR DUCT
4 - CENTER FLOOR DUCT

INSTALLATION

(1) Install the center floor distribution duct onto the heater housing.

(2) Install the shift mechanism (Refer to 21 - TRANSMISSION/TRANSAXLE/AUTOMATIC - NAG1/SHIFT MECHANISM - INSTALLATION).

(3) Install the left and right floor distribution ducts onto the center floor distribution duct.

(4) Install the left and right floor distribution duct retaining screws to the instrument panel support. Tighten the screws to 2 N·m (17 in. lbs.).

(5) Install the defroster ducts (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/DEFROSTER DUCTS - INSTALLATION).

(6) Install the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - INSTALLATION).

HVAC HOUSING

REMOVAL

WARNING: To avoid personal injury or death, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

NOTE: The HVAC housing must be removed from the vehicle and the two halves of the housing separated for service access of the heater core, A/C evaporator and each of the various mode doors.

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

(2) Partially drain the engine cooling system (Refer to 7 - COOLING/ENGINE/COOLANT - STANDARD PROCEDURE - DRAINING COOLING SYSTEM).

(3) Disconnect and isolate the negative battery cable.

(4) Remove the air cleaner housing (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR CLEANER HOUSING - REMOVAL).

(5) Remove the windshield washer reservoir (Refer to 8 - ELECTRICAL/WIPERS/WASHERS/WASHER RESERVOIR - REMOVAL).

(6) Remove the air filter from the ventilation housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/AIR FILTER - REMOVAL).

(7) Disconnect the wire harness and vacuum connectors from the recirculation door actuator (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/RECIRCULATION DOOR ACTUATOR - REMOVAL).

(8) Disconnect the wire harness connector from the blower motor resistor block (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/BLOWER MOTOR RESISTOR BLOCK - REMOVAL).

(9) Disconnect the wire harness connector from the blower motor (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/BLOWER MOTOR - REMOVAL).

(10) Remove the nuts and washers that secure the ventilation housing to the body and remove the ventilation housing from the vehicle (Fig. 7).

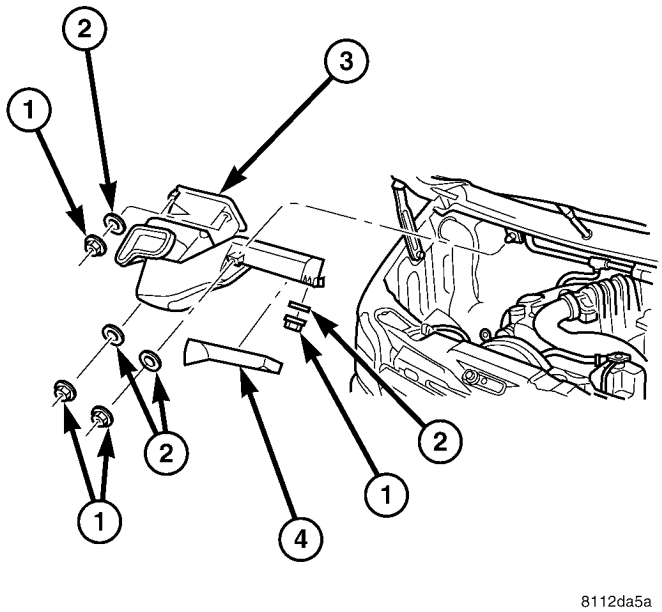

Fig. 7 Ventilation Housing

1 - NUT (5)
2 - WASHER (5)
3 - VENTILATION HOUSING
4 - HOUSING COVER

(11) Disconnect the heater hoses from the heater core.

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

(13) Remove the two bolts securing the refrigerant lines to the evaporator tubes and disconnect the lines from the tubes. Install plugs in, or tape over all of the opened refrigerant line fittings.

(14) Remove the seals from the refrigerant line fittings and discard.

(15) Install plugs in, or tape over the opened refrigerant line fittings and evaporator tubes.

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

(17) Remove the defroster, floor distribution and instrument panel ducts (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/DEFROSTER DUCTS - REMOVAL), (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/FLOOR DISTRIBUTION DUCTS - REMOVAL) and (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/INSTRUMENT PANEL DUCTS - REMOVAL).

(18) Disconnect the two bulkhead ground connections near instrument cluster area.

(19) Remove the passenger airbag bracket (Refer to 8 - ELECTRICAL/RESTRAINTS/PASSENGER AIRBAG - REMOVAL).

(20) Disconnect the wire harness connector from the evaporator temperature sensor and air outlet temperature sensor (Fig. 8).

(21) Remove the wire harness from the bracket located on the right side of the heater housing and position the wire harness out of the way.

(22) Disconnect the A/C-heater control cables from the mode door levers (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/MODE DOOR CABLE - REMOVAL).

(23) Disconnect the evaporator drain tube from the HVAC housing.

(24) Remove the five bolts securing the HVAC housing to the body.

NOTE: Make sure that the interior is protected in case of loss of residual fluids from the heater core and the A/C evaporator.

(25) Remove the HVAC housing from the vehicle.

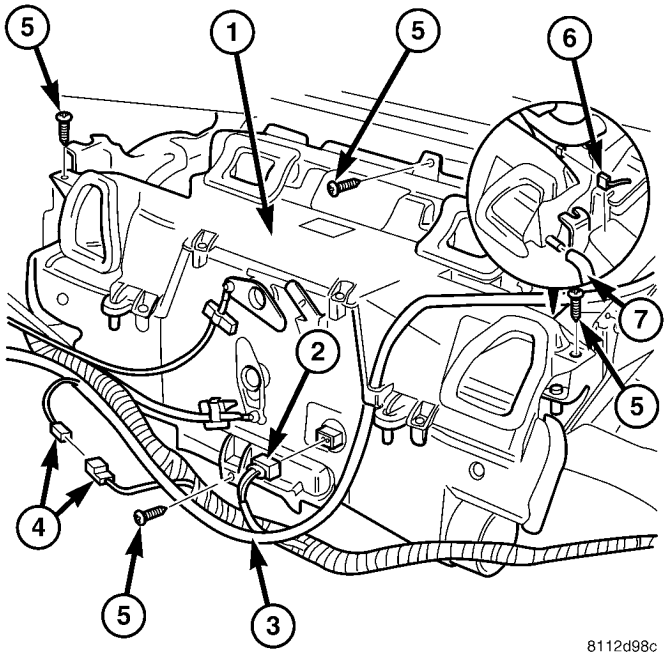

Fig. 8 Heater Housing

1 - HEATER HOUSING
2 - AIR TEMP SENSOR WIRE CONNECTOR
3 - WIRE HARNESS
4 - WIRE HARNESS CONNECTOR
5 - BOLT (4)
6 - EVAP TEMP SENSOR WIRE CONNECTOR
7 - EVAPORATOR DRAIN TUBE

DISASSEMBLY

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

(2) Place the HVAC housing in the upright position on a work bench, making allowance for leakage of fluids.

(3) Remove the gasket located at the A/C evaporator and heater core tubes and the gasket that seals the ventilation housing to the HVAC housing (Fig. 9).

(4) Remove the 12 screws that secure the two housing halves together.

(5) Seperate the two housing halves.

(6) Remove the heater core from the lower housing.

(7) Remove the wire harness.

(8) Remove the three heater core tube retaining bolts and the heater core tube assembly from the heater core.

(9) Remove the heater core tube seals and discard.

(10) Install plug in, or tape over the opened heater core fittings.

(11) Remove the A/C evaporator from the lower housing.

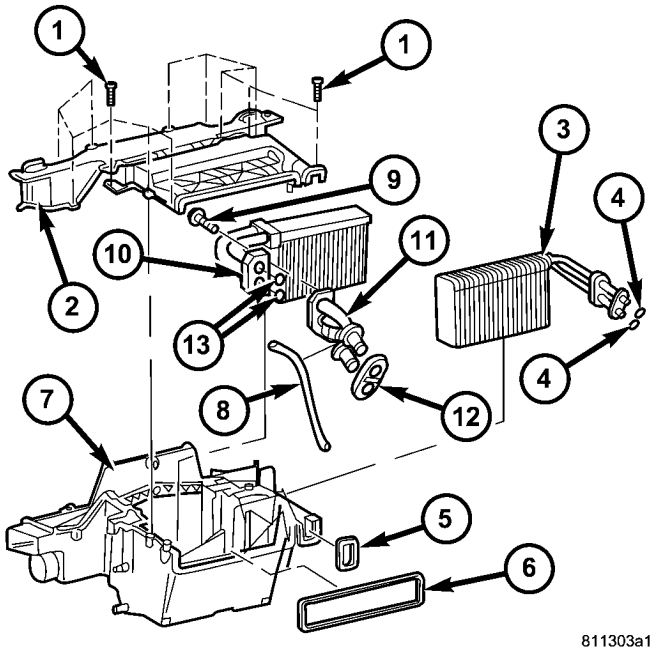

Fig. 9 HVAC Housing

1 - SCREW (12)
2 - UPPER HOUSING
3 - A/C EVAPORATOR
4 - EVAPORATOR O-RING SEAL (2)
5 - EVAPORATOR GASKET
6 - VENTILATION HOUSING GASKET
7 - LOWER HOUSING
8 - WIRING HARNESS
9 - BOLT (3)
10 - HEATER CORE
11 - HEATER CORE TUBE ASSEMBLY
12 - HEATER CORE TUBE GASKET
13 - HEATER CORE TUBE O-RING SEAL (2)

ASSEMBLY

(1) Install the A/C evaporator into the lower housing.

(2) Remove the tape or plugs from the heater core fittings.

(3) Lubricate two new rubber O-ring seals with clean engine coolant and install them onto the heater core fitting.

(4) Connect the heater core tube assembly to the heater core and install the three retaining bolts. Tighten the bolts to 5 N·m (45 in. lbs.).

(5) Install the wire harness.

(6) Install the heater core into the lower housing.

(7) Install the two housing halves together.

(8) Install the 12 screws that secure the two housing halves together. Tighten the screws to 2 N·m (17 in. lbs.).

(9) Install the gasket for the A/C evaporator and heater core tube outlets and the gasket that seals the ventilation housing to the HVAC housing.

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

INSTALLATION

NOTE: High pressures are produced in the refrigerant system when the A/C compressor is operating. Extreme care must be exercised to make sure that each of the refrigerant system connections is pressure-tight and leak free.

(1) Position the HVAC housing to the dash panel. Be certain that the evaporator condensate drain tube is positioned correctly.

(2) Install the screws that secure the HVAC housing to the dash panel. Tighten the screws to 4.5 N·m (40 in. lbs.).

(3) Connect the HVAC housing wire harness connectors and install the wiring harness to the bracket.

(4) Connect the A/C-heater control cables to the mode door levers (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/MODE DOOR CABLE - INSTALLATION).

(5) Reinstall the passenger airbag bracket (Refer to 8 - ELECTRICAL/RESTRAINTS/PASSENGER AIRBAG - INSTALLATION).

(6) Reconnect the two bulkhead ground connection near the instrument cluster area.

(7) Reinstall the defroster, floor distribution and instrument panel ducts.

(8) Reinstall the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - INSTALLATION).

(9) Unplug or remove the tape from the opened refrigerant line fittings.

(10) Lubricate two new rubber O-ring seals with clean refrigerant oil and install them onto the evaporator core fittings.

(11) Connect the refrigerant line terminal block to the evaporator tubes.

(12) Install the two bolts that secure the refrigerant line terminal block to the A/C evaporator. Tighten the bolts to 5 N·m (45 in. lbs.).

(13) Unplug or remove the tape from the heater core hoses and tubes.

(14) Connect the heater hoses to the heater core tubes and install the heater hose clamps.

(15) Install the ventilation housing to the dash panel.

(16) Install the nuts and washers that secure the ventilation housing to the dash panel. Tighten the nuts to 5 N·m (45 in. lbs.).

(17) Connect the wire harness connectors to the blower motor, blower motor resistor block and the recirculation door actuator.

(18) Connect the vacuum harness connector to the recirculation door actuator.

(19) Install the air filter into the ventilation housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/AIR FILTER - INSTALLATION).

(20) Install the windshield washer reservoir (Refer to 8 - ELECTRICAL/WIPERS/WASHERS/WASHER RESERVOIR - INSTALLATION).

(21) Install the air cleaner housing (Refer to 9 - ENGINE/AIR INTAKE SYSTEM/AIR CLEANER HOUSING - INSTALLATION).

(22) Reconnect the negative battery cable.

(23) If the heater core is being replaced, flush the cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE - COOLING SYSTEM CLEANING/ REVERSE FLUSHING).

(24) Refill the engine cooling system (Refer to 7 - COOLING/ENGINE/COOLANT - STANDARD PROCEDURE - COOLANT SYSTEM FILL).

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

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

INSTRUMENT PANEL DUCTS

REMOVAL

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

(2) Remove the defroster ducts (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/ DEFROSTER DUCTS - REMOVAL).

(3) Remove the floor distribution ducts (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/FLOOR DISTRIBUTION DUCTS - REMOVAL).

(4) If removing the right instrument panel duct, remove the passenger air bag module and bracket (Refer to 8 - ELECTRICAL/RESTRAINTS/PASSENGER AIRBAG - REMOVAL).

(5) Remove the screws that secure the left and/or right instrument panel duct and remove the duct(s) as required (Fig. 10).

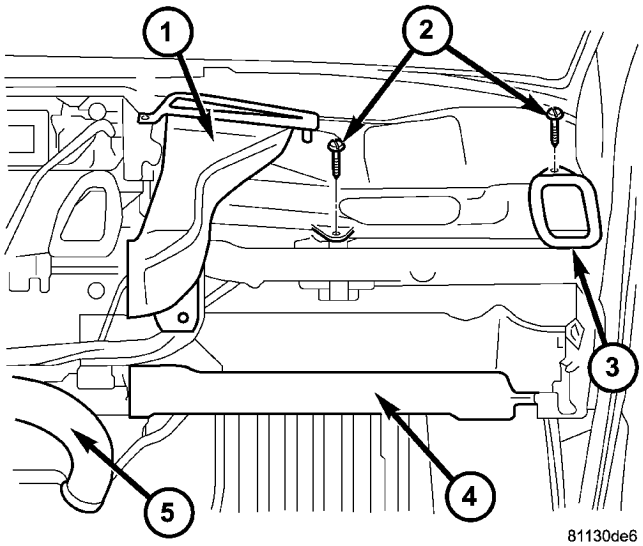

Fig. 10 Instrument Panel Duct - RH Shown, LH Typical

1 - RH DEFROSTER DUCT
2 - SCREW (2)
3 - RH INSTRUMENT PANEL DUCT
4 - RH FLOOR DISTRIBUTION DUCT
5 - CENTER FLOOR DISTRIBUTION DUCT

INSTALLATION

(1) Connect the instrument panel duct(s) to the heater housing as required.

(2) Install the instrument panel duct retaining screws. Tighten the screws to 2 N·m (17 in. lbs.).

(3) If servicing the right instrument panel duct, install the passenger air bag module and bracket (Refer to 8 - ELECTRICAL/RESTRAINTS/PASSENGER AIRBAG - INSTALLATION).

(4) Install the floor distribution ducts (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/FLOOR DISTRIBUTION DUCTS - INSTALLATION).

(5) Install the defroster ducts (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/DEFROSTER DUCTS - INSTALLATION).

(6) Install the instrument panel (Refer to 23 - BODY/INSTRUMENT PANEL/INSTRUMENT PANEL ASSEMBLY - INSTALLATION).

DISTRIBUTION - REAR

TABLE OF CONTENTS

A / C CONDENSER COVER

REMOVAL

(1) Unlock the six quick-release fasteners by turning them 90 degrees in either direction (Fig. 1).

(2) Remove the rear A/C condenser cover from the rear A/C condenser housing.

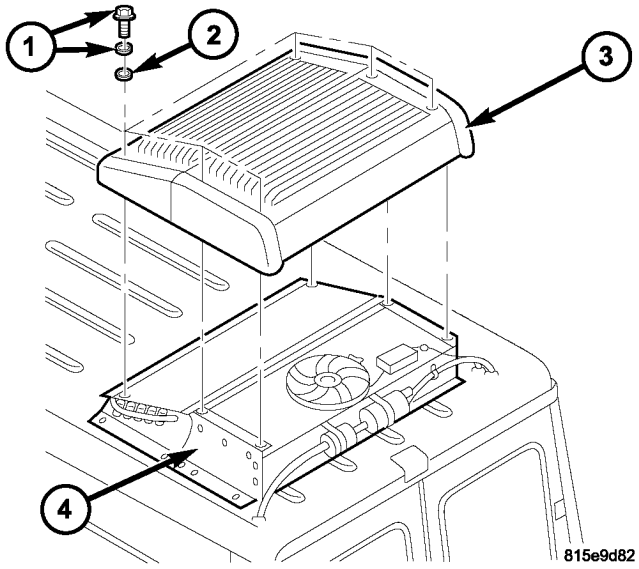

Fig. 1 Rear A/C Condenser Cover

1 - QUICK-RELEASE FASTENER AND WASHER (6)
2 - RUBBER DAMPING WASHER (6)
3 - REAR CONDENSER COVER
4 - REAR A/C CONDENSER HOUSING

INSTALLATION

(1) Inspect the six rubber damping washers for correct sealing. Replace the washers as required.

(2) Position the rear A/C condenser cover over the rear A/C condenser housing.

(3) Lock the six quick-release fasteners by turning them 90 degrees in either direction.

A / C CONDENSER HOUSING

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

(1) Disconnect and isolate the negative battery cable.

(2) Remove the air filter from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - REMOVAL).

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

(4) Remove the cover from the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - REMOVAL).

(5) Disconnect the rear A/C wire harness from the rear blower motor suppression filter and the rear A/C high pressure switch (Fig. 2).

(6) Remove the retaining straps that secure the rear A/C wire harness to the rear liquid line and position the wire harness out of the way.

(7) Remove the screw and bracket that secures the rear discharge line to the right side of the rear condenser housing.

(8) Disconnect the rear discharge line from the rear A/C condenser and remove and discard the O-ring seal.

(9) Disconnect the rear liquid line from the rear refrigerant reservoir outlet and remove and discard the O-ring seal.

(10) Install plugs into, or tape over the rear refrigerant line fittings and condenser and reservoir ports.

(11) Remove the eight nuts and washers that secure the rear A/C condenser housing to the roof panel.

(12) Carefully separate the body sealer between the rear A/C condenser housing and the roof panel and with help from an assistant, remove the condenser housing.

(13) Remove any shims and trim the body sealer on top of the roof panel down to a thickness of 2 mm (0.078 in.).

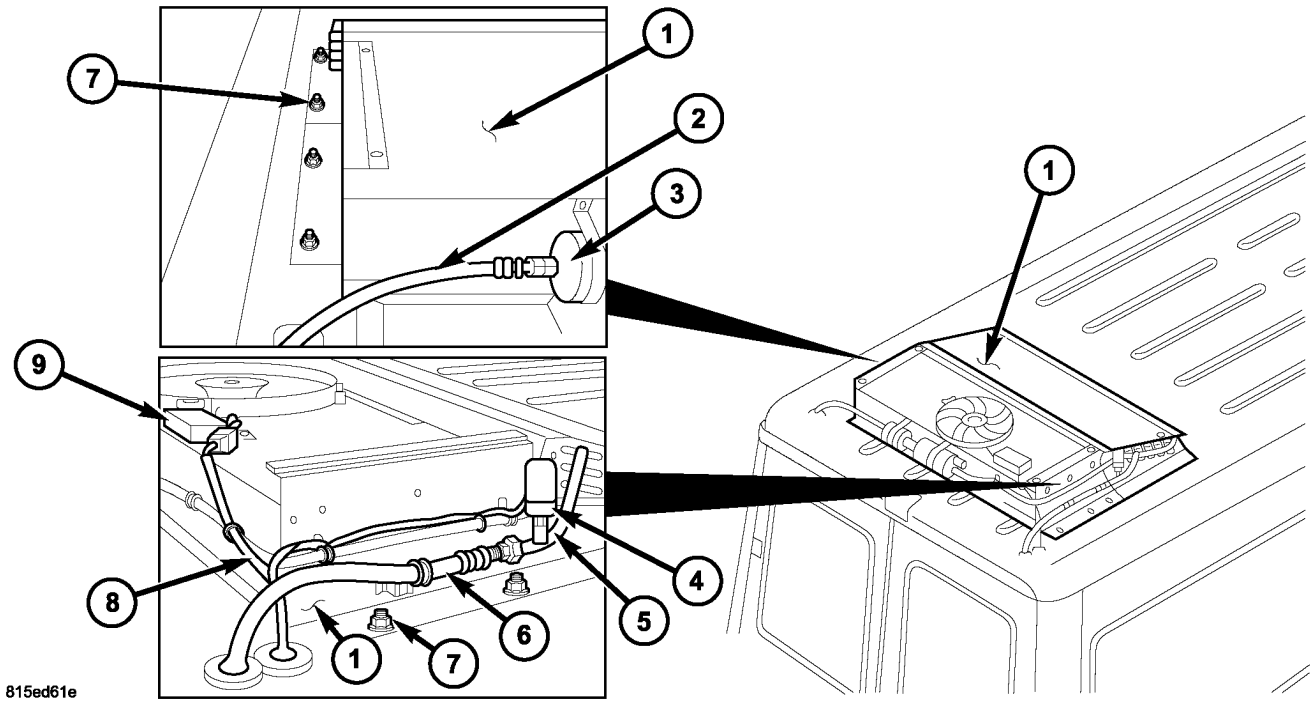

Fig. 2 Rear A/C Condenser Housing

1 - REAR A/C CONDENSER HOUSING
2 - LIQUID LINE
3 - REAR REFRIGERANT RESERVOIR
4 - REAR A/C HIGH PRESSURE SWITCH
5 - REAR CONDENSER OUTLET TUBE
6 - SUCTION LINE
7 - NUT AND WASHER (8)
8 - REAR A/C WIRE HARNESS
9 - REAR BLOWER MOTOR SUPPRESSION FILTER

INSTALLATION

NOTE: Be certain to add refrigerant oil if the rear A/C condenser is being replaced. The refrigerant oil must be drained from the old condenser and measured to determine the amount of refrigerant oil to add to the new condenser. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(1) If the rear A/C condenser is being replaced, install the correct amount and type of refrigerant oil into the new rear A/C condenser. Drain the old condenser and measure the refrigerant oil. Fill the new condenser with the same amount of new refrigerant oil that was drained out of the old condenser.

(2) Install new body sealant and any removed shims onto the top of the roof panel.

(3) With help from an assistant, position the rear A/C condenser housing onto the top of the roof panel.

(4) Install the eight nuts and washers that secure the rear A/C condenser housing to the roof panel. Tighten the nuts to 25 N·m (18 ft. lbs.).

(5) Remove the tape or plugs from the rear liquid line fitting and rear refrigerant reservoir port.

(6) Lubricate a new O-ring seal with clean refrigerant oil and install it onto the rear liquid line fitting. Use only the specified O-ring seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(7) Connect the rear liquid line to the rear refrigerant reservoir outlet. Tighten the liquid line nut to 35 N·m (26 ft. lbs.).

(8) Remove the tape or plugs from the rear discharge line fitting and rear condenser port.

(9) Lubricate a new O-ring seal with clean refrigerant oil and install it onto the rear discharge line fitting. Use only the specified O-ring seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(10) Connect the rear discharge line to the rear A/C condenser. Tighten the discharge line nut to 35 N·m (26 ft. lbs.).

(11) Install the bracket and screw that secures the rear discharge line to the right side of the rear condenser housing. Tighten the screw securely.

(12) Connect the rear A/C wire harness to the rear blower motor suppression filter and to the rear A/C high pressure switch.

(13) Install new retaining straps to secure the rear A/C wire harness to the rear liquid line.

(14) Install a new rear receiver/drier (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ REAR RECEIVER/DRIER - INSTALLATION).

(15) Reconnect the negative battery cable.

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

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

(18) Install the rear air filter (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - INSTALLATION).

(19) Install the cover onto the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - INSTALLATION).

A / C EVAPORATOR COVER

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the rear dome lamps from the center and rear roof duct panels (Fig. 3).

(3) Remove the push-pin fasteners that secure the center and rear roof duct panels to the roof duct and remove the panels.

(4) Disconnect the dome light wire harness connector and remove the dome light wire harness from the roof duct.

(5) Remove the six screws that secure the rear A/C evaporator cover to the front of the rear A/C evaporator housing.

(6) Remove the three push-pin fasteners that secure the rear A/C evaporator cover to the rear of the evaporator housing and remove the cover.

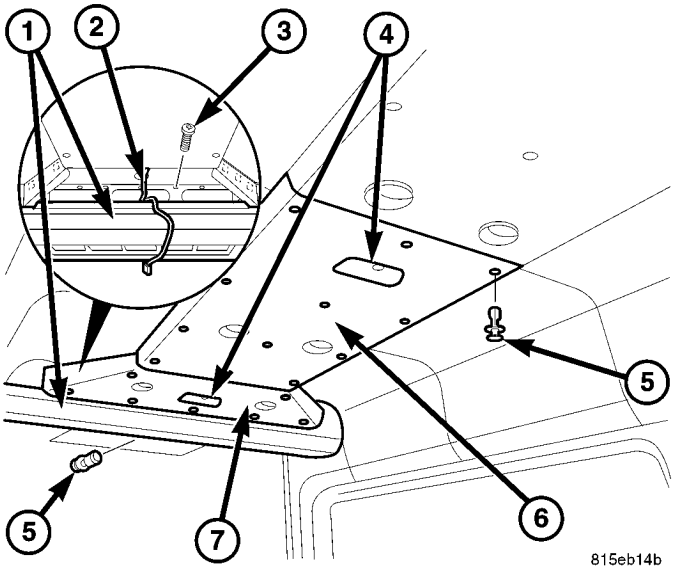

Fig. 3 Rear A/C Evaporator Cover

1 - REAR A/C EVAPORATOR COVER
2 - DOME LAMP WIRE HARNESS
3 - SCREW (6)
4 - REAR DOME LAMPS
5 - PUSH-PIN FASTENER (22)
6 - CENTER ROOF DUCT PANEL
7 - REAR ROOF DUCT PANEL

INSTALLATION

(1) Position the rear A/C evaporator cover to the rear A/C evaporator housing.

(2) Install the three push-pin fasteners that secure the rear A/C evaporator cover to the rear of the evaporator housing.

(3) Install the six screws that secure the rear A/C evaporator cover to the front of the evaporator housing. Tighten the screws to 2.2 N·m (21 in. lbs.).

(4) Install the dome light wire harness to the roof duct and reconnect the harness.

(5) Position the center and rear roof duct panels to the roof duct and install the push-pin fasteners.

(6) Install the rear dome lamps into the center and rear roof duct panels.

(7) Reconnect the negative battery cable.

A / C EVAPORATOR HOUSING

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

(1) Disconnect and isolate the negative battery cable.

(2) Remove the cover from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - REMOVAL).

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

(4) Remove the cover from the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - REMOVAL).

(5) Disconnect the rear A/C wire harness from the rear condenser fan suppression filter and the rear A/C high pressure switch and remove the retaining straps that secure the wire harness to the rear liquid line (Fig. 4).

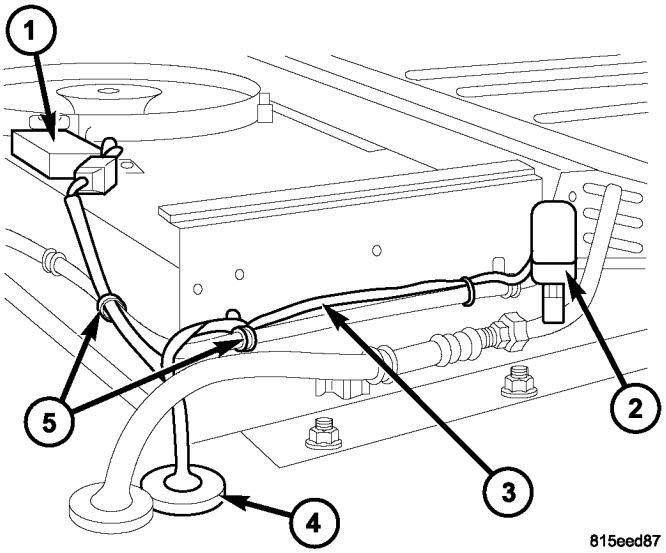

Fig. 4 Rear A/C Wire Harness - Condenser Side

1 - REAR CONDERSER FAN SUPPRESSION FILTER
2 - REAR A/C HIGH PRESSURE SWITCH
3 - REAR A/C WIRE HARNESS
4 - GROMMET
5 - RETAINING STRAPS

(6) Disengage the rear A/C wire harness grommet from the roof panel and pull the wire harness down into the vehicle (Fig. 5).

(7) Disconnect the rear body wire harness connector from the rear A/C wire harness.

(8) Remove the retaining straps that secure the rear dome lamp harness to the rear A/C evaporator housing and position the rear dome lamp harness out of the way.

(9) Remove the nut that secures the positive wire lead to the rear A/C system terminal block and position the wire lead out of the way.

(10) Remove the insulating tape from around the rear evaporator connections.

(11) Disconnect the rear liquid line from the rear A/C expansion valve and remove and discard the O-ring seal.

(12) Disconnect the rear suction line from the rear evaporator outlet tube and remove and discard the O-ring seal.

(13) Install plugs into, or tape over the opened refrigerant line fittings and rear expansion valve and evaporator tube ports.

(14) Disconnect and install plugs into the two rear evaporator drain hoses.

(15) Support the rear A/C evaporator housing and remove the nine screws, four bolts and washers and four damping washers that secure the rear A/C evaporator housing to the roof panel.

(16) With help from an assistant, remove the rear A/C evaporator housing from the vehicle.

(17) If required, remove the rear A/C evaporator from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REAR A/C EVAPORATOR - REMOVAL).

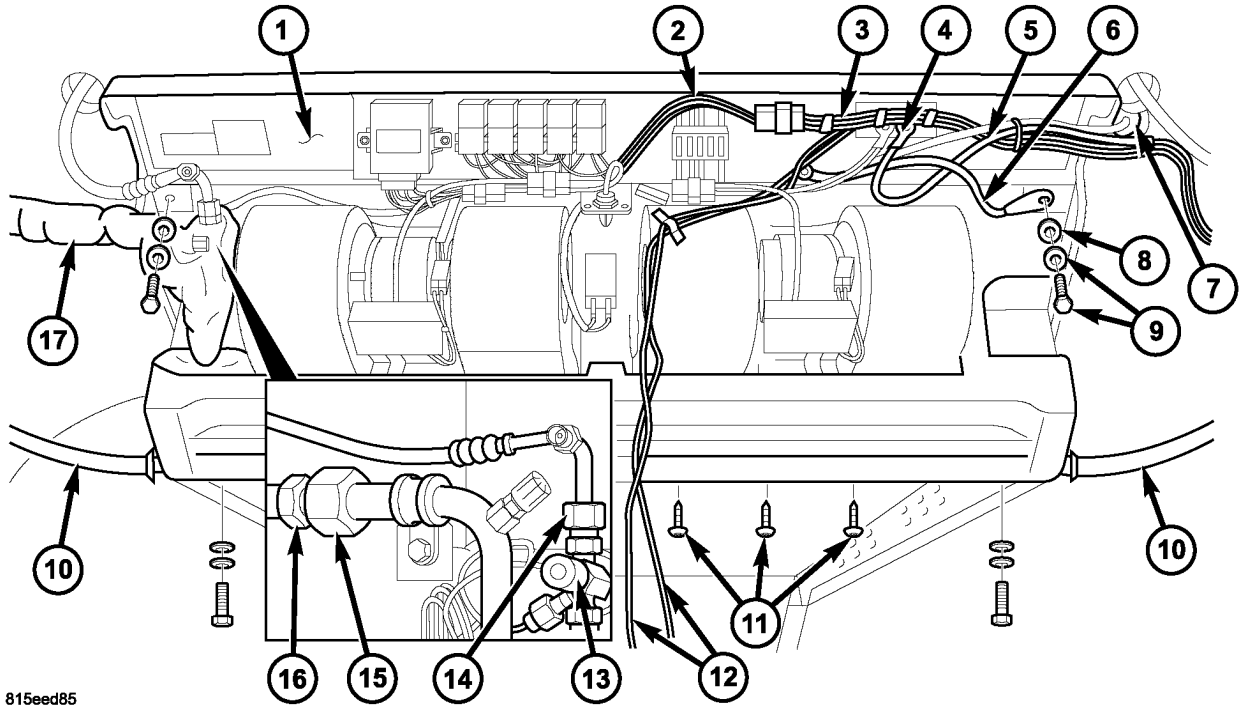

Fig. 5 Rear A/C Evaporator Housing

1 - REAR A/C EVAPORATOR HOUSING
2 - REAR A/C WIRE HARNESS
3 - REAR BODY WIRE HARNESS
4 - NUT
5 - POSITIVE WIRE LEAD
6 - GROUND LEAD
7 - GROMMET
8 - SEALING WASHER (4)
9 - BOLT AND WASHER (4)
10 - REAR EVAPORATOR DRAIN HOSES
11 - SCREW (9)
12 - REAR DOME LAMP HARNESS
13 - REAR A/C EVAPANSION VALVE
14 - REAR LIQUID LINE FITTING
15 - REAR A/C EVAPORATOR OUTLET TUBE
16 - REAR SUCTION LINE FITTING
17 - INSULATING TAPE

INSTALLATION

NOTE: Be certain to add refrigerant oil if the rear A/C evaporator is being replaced. The refrigerant oil must be drained from the old evaporator and measured to determine the amount of refrigerant oil to add to the new evaporator. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(1) If the rear A/C evaporator is being replaced, install the correct amount and type of refrigerant oil into the new rear A/C evaporator. Drain the old evaporator and measure the refrigerant oil. Fill the new evaporator with the same amount of new refrigerant oil that was drained out of the old evaporator.

(2) With help from an assistant, position and support the rear A/C evaporator housing into the vehicle.

(3) Inspect the four rubber damping washers for correct sealing. Replace the washers as required.

CAUTION: Be sure to install the rear A/C system ground lead with one of the rear evaporator housing retaining bolts. Failure to correctly install the ground lead could result in improper operation or possible damage to the rear A/C system.

(4) Position the ground lead to the rear A/C evaporator housing and install the four bolts and washers and four damping washers that secure the evaporator housing to the roof panel. Tighten the bolts to 25 N·m (18 ft. lbs.).

(5) Install the nine screws that secure the rear A/C evaporator housing to the roof panel. Tighten the screws to 5 N·m (45 in. lbs.).

(6) Unplug and connect the two rear evaporator drain hoses.

(7) Remove the tape or plugs from the refrigerant line fittings and the rear expansion valve and evaporator tube ports.

(8) Lubricate a new O-ring seal with clean refrigerant oil and install it onto the rear liquid line fitting. Use only the specified O-ring seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(9) Connect the rear liquid line to the rear A/C expansion valve. Tighten the liquid line nut to 35 N·m (26 ft. lbs.).

(10) Lubricate a new O-ring seal with clean refrigerant oil and install it onto the rear suction line fitting. Use only the specified O-ring seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(11) Connect the rear suction line to the rear evaporator outlet tube. Tighten the suction line nut to 35 N·m (26 ft. lbs.).

(12) Install new insulating tape around the rear evaporator connections.

(13) Install the positive wire lead onto the rear A/C system terminal block and install the retaining nut. Tighten the nut securely.

(14) Reposition the rear dome lamp harness and install the retaining straps that secure the harness to the rear A/C evaporator housing.

(15) Connect the rear A/C wire harness connector to the rear body wire harness.

(16) Route the rear A/C wire harness up through the roof panel and install the grommet.

(17) Connect the rear A/C wire harness to the rear condenser fan suppression filter and the rear A/C high pressure switch and install the retaining straps that secure the wire harness to the rear liquid line.

(18) Reconnect the negative battery cable.

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

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

(21) Install the cover onto the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - INSTALLATION).

(22) Install the cover onto the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - INSTALLATION).

AIR FILTER

REMOVAL

(1) Unlock the eight quick-release fasteners by turning them 90 degrees counter clockwise (Fig. 6).

(2) Remove the rear air inlet grate from the rear A/C evaporator cover.

(3) Remove the rear particulate air filter by disengaging the velcro-type retainers.

(4) Carefully clean the rear particulate air filter using compressed air.

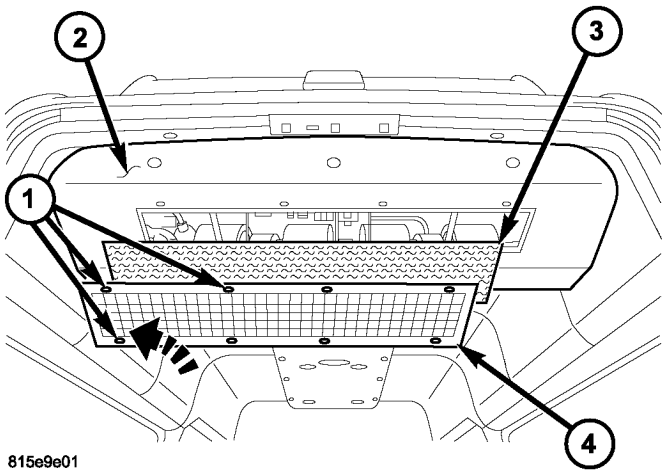

Fig. 6 Rear Particulate Air Filter

1 - QUICK-RELEASE FASTENER (8)
2 - REAR A/C EVAPORATOR COVER
3 - REAR PARTICULATE AIR FILTER
4 - REAR AIR INLET GRATE

INSTALLATION

NOTE: Replace the rear particulate air filter if it is heavily soiled or damaged.

(1) Position the rear particulate air filter and engage the velcro-type retainers.

(2) Install the rear air inlet grate onto the rear A/C evaporator cover.

(3) Lock the eight quick-release fasteners by turning them 90 degrees clockwise.

BLOWER MOTOR

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the cover from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - REMOVAL).

(3) Disconnect the wire harness connectors from the rear blower motor suppression filter and from the rear blower motor being serviced and remove the suppression filter (Fig. 7).

(4) Remove the body sealer from around the rear blower motor area being serviced.

(5) Remove the screws that secure each rear blower motor to the rear evaporator housing and remove blower motor.

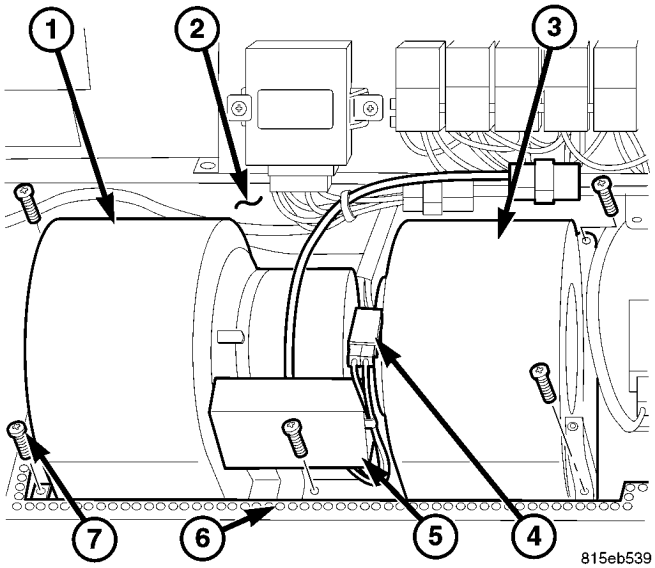

Fig. 7 Rear Blower Motors - LH shown, RH similar

1 - REAR BLOWER MOTOR (2)
2 - REAR A/C EVAPORATOR HOUSING
3 - SUPPRESSION FILTER WIRE CONNECTOR
4 - BLOWER MOTOR WIRE CONNECTOR
5 - REAR BLOWER MOTOR SUPPRESSION FILTER
6 - SEALER
7 - SCREW (5 PER MOTOR)

INSTALLATION

(1) Position the rear blower motor being serviced to the rear A/C evaporator housing.

(2) Install the screws that secure each rear blower motor to the rear A/C evaporator housing. Tighten the screws to 5 N·m (45 in. lbs.).

(3) Install a new bead of body sealant to the blower motor area being serviced.

(4) Install the rear blower motor suppression filter and connect the wiring harness connectors to the suppression filter and to the rear blower motor being serviced.

(5) Install the cover onto the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - INSTALLATION).

(6) Reconnect the negative battery cable.

PLUMBING

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PLUMBING

DESCRIPTION

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

OPERATION

High pressures are produced in the refrigerant system when the air conditioning compressor is operating. Extreme care must be exercised to make sure that each of the refrigerant system connections is pressure-tight and leak free. It is a good practice to inspect all flexible hose refrigerant lines at least once a year to make sure they are in good condition and properly routed.

The refrigerant lines and hoses cannot be repaired and, if faulty or damaged, they must be replaced.

WARNINGS

WARNING: The A/C system contains refrigerant under high pressure. Repairs should only be performed by qualified service personnel. Severe personal injury or death may result from improper service procedures.

WARNING: 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 A/C refrigerant system. Serious eye injury can result from direct contact with the refrigerant. If eye contact occurs, seek medical attention immediately.

WARNING: Do not expose the refrigerant to open flame. Poisonous gas is created when refrigerant is burned. An electronic leak detector is recommended. Severe personal injury or death may result from improper service procedures.

WARNING: 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 and death.

WARNING: 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.

WARNING: 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 property damage, personal injury or death.

WARNING: The engine cooling system is designed to develop internal pressures of 97 to 123 kilopascals (14 to 18 pounds per square inch). Do not remove or loosen the coolant pressure cap, cylinder block drain plugs, radiator drain, radiator hoses, heater hoses, or hose clamps while the engine cooling system is hot and under pressure. Allow the vehicle to cool for a minimum of 15 minutes before opening the cooling system for service. Failure to observe this warning can result in serious burns from the heated engine coolant.

CAUTIONS

CAUTION: Never add R-12 to a refrigerant system designed to use R-134a. Do not use R-12 equipment or parts on a R-134a A/C system. These refrigerants are not compatible and damage to the A/C system will result.

CAUTION: Never use R-12 refrigerant oil in a A/C system designed to use R-134a refrigerant oil. These refrigerant oils are not compatible and damage to the A/C system will result.

CAUTION: The use of A/C system sealers may result in damage to A/C refrigerant recovery/evacuation/recharging equipment and/or A/C system. Many federal, state/provincial and local regulations prohibit the recharge of A/C systems with known leaks. DaimlerChrysler recommends the detection of A/C system leaks through the use of approved leak detectors and fluorescent leak detection dyes. Vehicles found with A/C system sealers should be treated as contaminated and replacement of the entire A/C refrigerant system is recommended. A/C systems found to be contaminated with A/C system sealers, A/C stop-leak products or seal conditioners voids the warranty for the A/C system.

CAUTION: 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.

CAUTION: If equipped, 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.

CAUTION: The internal parts of the A/C system will remain stable as long as moisture-free refrigerant and refrigerant oil is used. Abnormal amounts of dirt, moisture or air can upset the chemical stability. This may cause operational troubles or even serious damage if present in more than very small quantities. Before disconnecting a component, clean the outside of the fittings thoroughly to prevent contamination from entering the refrigerant system. Keep service tools and the work area clean. Do not open the refrigerant system or uncap a replacement component until you are ready to service the system. Immediately after disconnecting a component from the refrigerant system, seal the open fittings with a cap or plug. This will prevent contamination from entering the A/C system.

CAUTION: 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.

CAUTION: Do not overcharge the refrigerant system. Overcharging will cause excessive compressor head pressure and can cause compressor noise and A/C system failure.

DIAGNOSIS AND TESTING

REFRIGERANT SYSTEM LEAKS

WARNING: R-134a service equipment or vehicle A/C system should not be pressure tested or leak tested with compressed air. Mixture of air and R-134a can be combustible at elevated pressures. These mixtures are potentially dangerous and may result in fire or explosion causing property damage, personal injury or death.
Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved service equipment meeting SAE requirements to discharge R-134a system. If accidental system discharge occurs, ventilate work area before resuming service.

If the A/C system is not cooling properly, determine if the refrigerant system is fully charged with R-134a. This is accomplished by performing a Refrigerant System Charge Level test (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - DIAGNOSIS AND TESTING - REFRIGERANT SYSTEM CHARGE LEVEL) or by completely evacuating and recharging the A/C system. If the A/C liquid line pressure is found to be less than 345 kPa (50 psi) while performing the Refrigerant System Charge Level test, proceed to the System Empty procedure below. If liquid line pressure is found to be greater than 345 kPa (50 psi), proceed to the System Low procedure. If the refrigerant system is empty or low in refrigerant charge, a leak at any line fitting or component seal is likely. A review of the fittings, lines and components for oily residue is an indication of the leak location. To detect a leak in the refrigerant system, perform one of the following procedures as indicated by the symptoms.

SYSTEM EMPTY

(1) Evacuate the refrigerant system to the lowest degree of vacuum possible (approximately 28 in Hg.) (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM EVACUATE). Determine if the system holds a vacuum for 15 minutes. If vacuum is held, a leak is probably not present. If system will not maintain vacuum level, proceed to Step 2.

(2) Prepare and dispense 0.284 kilograms (10 ounces) of R-134a refrigerant into the evacuated refrigerant system (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT SYSTEM CHARGE) and proceed to Step 1 of the System Low procedure.

SYSTEM LOW

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

(2) Operate the heating-A/C system with the engine at idle under the following conditions for at least five minutes.

- Doors or windows open
- Transmission in Park
- A/C-heater controls set to outside air, full cool, panel mode, high blower and with A/C compressor engaged

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

(3) Shut the vehicle Off and wait 2-7 minutes. Then use an electronic leak detector that is designed to detect R-134a refrigerant and search for leaks. Fittings, lines or components that appear to be oily usually indicate a refrigerant leak. To inspect the A/C evaporator for leaks, insert the leak detector probe into the drain tube opening or an air outlet. A dye for R-134a is available to aid in leak detection. Use only DaimlerChrysler approved refrigerant dye.

STANDARD PROCEDURE

REFRIGERANT SYSTEM SERVICE EQUIPMENT

WARNING: Eye protection must be worn when servicing an A/C refrigerant system. Turn off (rotate clockwise) all valves on the equipment being used, before connecting to or disconnecting from the refrigerant system. Failure to observe these warnings may result in possible personal injury.

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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.

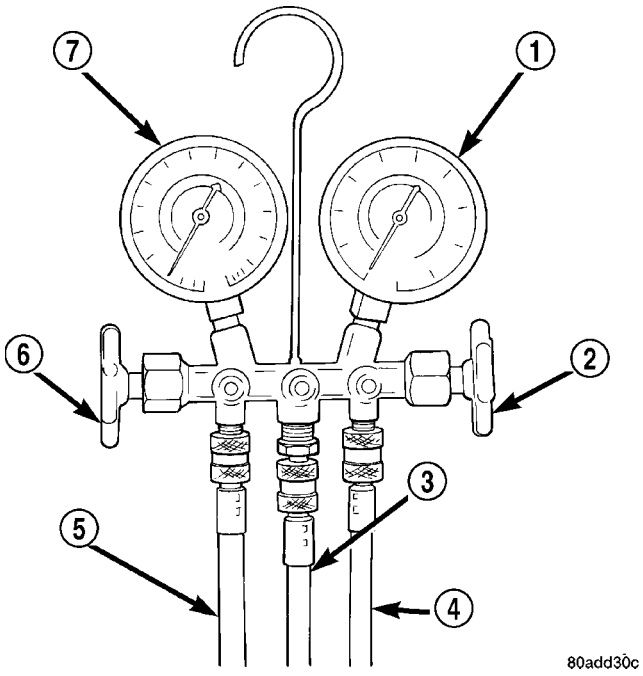

Fig. 1 Manifold Gauge Set - Typical

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

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.

FRONT A / C SYSTEM

- **LOW PRESSURE GAUGE HOSE**—The low pressure hose (Blue with Black stripe) attaches to the suction line service port. This port is located on the suction line near the dash panel.
- **HIGH PRESSURE GAUGE HOSE**—The high pressure hose (Red with Black stripe) attaches to the discharge line service port. This port is located on the liquid line between the condenser and the reciver-drier.
- **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.

REAR A / C SYSTEM

- **LOW PRESSURE GAUGE HOSE**—The low pressure hose (Blue with Black stripe) attaches to the suction line service port. This port is located within the rear A/C evaporator housing near the left side of the evaporator, below the high-pressure service port.
- **HIGH PRESSURE GAUGE HOSE**—The high pressure hose (Red with Black stripe) attaches to the liquid line service port. This port is located within the rear A/C evaporator housing near the left side of the evaporator, above the low-pressure service port.
- **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.

REFRIGERANT SYSTEM RECOVERY

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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.

REFRIGERANT SYSTEM EVACUATE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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)

REFRIGERANT SYSTEM CHARGE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

CAUTION: A small amount of refrigerant oil is removed from the A/C system each time the refrigerant system is recovered and evacuated. Before charging the A/C system, you MUST replenish any oil lost during the recovery process. Refer the equipment manufacturer instructions for more information.

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 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.

PARTIAL CHARGE METHOD

The partial charge method is used to add a partial charge to a refrigerant system that is low on refrigerant. To perform this procedure the evaporator inlet and outlet tube temperatures are measured. The temperature difference is measured with a temperature meter with one or two clamp-on thermocouple probes. The difference between the evaporator inlet and outlet tube temperatures will determine the amount of refrigerant needed.

Before adding a partial refrigerant charge, check for refrigerant system leaks. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - DIAGNOSIS AND TESTING - REFRIGERANT SYSTEM LEAKS) If a leak is found, make the necessary repairs before attempting a full or partial refrigerant charge.

(1) Attach a manifold gauge set to the refrigerant system service ports.

(2) Attach the two clamp-on thermocouple probes to the inlet and outlet tubes of the evaporator coil.

- If a single thermocouple probe is used, attach the probe to the evaporator inlet tube just before the collar of the refrigerant line connector fitting. The probe must make contact with the bottom surface of the evaporator inlet tube.
- If dual thermocouple probes are used, attach probe 1 to the evaporator inlet tube, and probe 2 to the evaporator outlet tube. Attach both probes to the evaporator tubes just before the collar of the refrigerant line connector fittings. The probes must make contact with the bottom surfaces of the evaporator inlet and outlet tubes.

(3) Open all of the windows or doors of the passenger compartment.

(4) Set the A/C button on the A/C Heater controls to the on position, the temperature control knob in the full cool position, select Recirculation Mode, and place the blower motor switch in the highest speed position.

(5) Start the engine and hold the engine idle speed at 1,000 rpm. Allow the engine to warm up to normal operating temperature.

(6) The compressor clutch may cycle, depending upon ambient temperature, humidity, and the refrigerant system charge level.

(7) Hold the engine idle speed at 1,000 rpm.

(8) Allow three to five minutes for the refrigerant system to stabilize, then record the temperatures of the evaporator inlet and outlet tubes.

- If a single probe is used, record the temperature of the evaporator inlet tube. Then remove the probe from the inlet tube and attach it to the evaporator outlet tube just before the collar of the refrigerant line connector fitting. The probe must make contact with the bottom surface of the evaporator outlet tube. Allow the thermocouple and meter time to stabilize, then record the temperature of the evaporator outlet tube. Subtract the inlet tube temperature reading from the outlet tube temperature reading.
- If dual probes are used, record the temperatures of both the evaporator inlet and outlet tubes. Then subtract the inlet tube temperature reading from the outlet tube temperature reading.

(9) If the measured temperature differential is higher than 22° C to 26° C (40° F to 47° F), add 0.4 kilograms (14 ounces) of refrigerant.

(10) Allow three to five minutes for the refrigerant system to stabilize, then take a second set of thermocouple measurements. Record the temperature difference to determine if an additional charge is required.

(11) Record the compressor discharge pressure. If the reading is higher than the pressure shown in the Compressor Discharge Pressure Chart, the system could be overcharged. If the reading is equal to, or lower, than the pressure shown in the chart, continue with this procedure.

Compressor Discharge Pressure Chart						
Ambient Temperature	16°C (60°F)	21°C (70°F)	27°C (80°F)	32°C (90°F)	38°C (100°F)	43°C (110°F)
Compressor Discharge Pressure	1378 kPa (200 psi)	1516 kPa (220 psi)	1723 kPa (250psi)	1930 kPa (280 psi)	2206 kPa (320 psi)	2413 kPa (350 psi)

(12) **EXAMPLE:** The ambient temperature is 21° C (70° F). The evaporator inlet tube temperature is 12° C (54° F) and the evaporator outlet tube temperature is 10° C (50° F). Subtract the inlet tube temperature from the outlet tube temperature. The difference is -2° C (-4° F). With a -2° C (-4° F) temperature differential at 21° C (70° F) ambient temperature, the system is fully charged.

(13) Add enough refrigerant to bring the refrigerant system up to a full charge.

(14) Remove the jumper wire from the low pressure cycling clutch switch wire harness connector and plug the connector back into the switch.

A / C COMPRESSOR

DESCRIPTION

The standard front A/C system uses a Denso 7SBU16C seven cylinder, variable displacement swash plate-type A/C compressor (Fig. 2). This A/C compressor has a volume control which is regulated by an internal control valve and has both the suction and discharge ports located at the rear of the compressor.

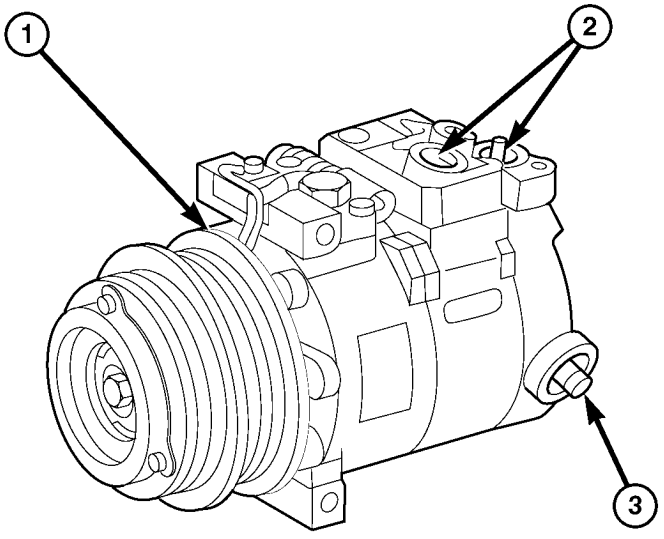

Fig. 2 Denso 7SBU16C A/C Compressor

1 - A/C COMPRESSOR (DENSO 7SBU16C)
2 - SUCTION AND DISCHARGE PORT
3 - INTERNAL CONTROL VALVE

The optional independant Konvekta rear A/C system uses theDenso 10S17C ten cylinder, double-acting swash plate-type A/C compressor (Fig. 3). This A/C compressor has a fixed displacement of 170 cubic centimeters (10.374 cubic inches), and has both the suction and discharge ports located on the cylinder head at the rear of the compressor.

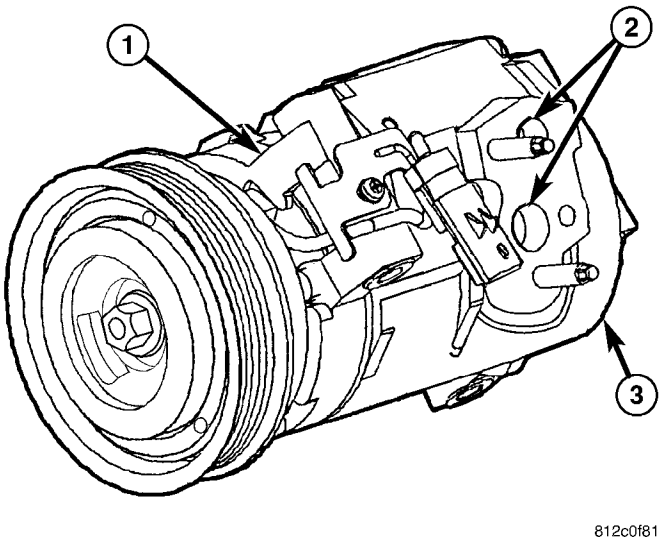

Fig. 3 Denso 10S17C A/C Compressor

1 - A/C COMPRESSOR (DENSO 10S17C)
2 - SUCTION AND DISCHARGE PORT
3 - CYLINDER HEAD

A label identifying the use of R-134a refrigerant is located on both A/C compressors.

OPERATION

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

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

The A/C compressor cannot be repaired and, if faulty or damaged, it must be replaced. The compressor clutch, pulley and bearing assembly, and clutch field coil are available for service. If an internal failure of the A/C compressor has occurred, the receiver/ drier must also be replaced.

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 pulley are properly aligned and have the correct air gap. (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C COMPRESSOR CLUTCH - INSTALLATION)

(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 - REFRIGERANT HOSES/LINES/TUBES PRECAUTIONS)

(5) If the noise is from opening and closing of the high pressure relief valve, reclaim, evacuate, and recharge the refrigerant system. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - STANDARD PROCEDURE - REFRIGERANT RECOVERY) (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 a/c compressor. (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/A/C COMPRESSOR - REMOVAL)

(6) If the noise is from liquid slugging on the suction line, 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).

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

REMOVAL

DENSO 7SBU16C A / C COMPRESSOR

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

NOTE: The A/C 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, clutch coil or the engine.

NOTE: If an internal failure of the A/C compressor has occurred, the receiver/drier must be replaced.

(1) Disconnect and isolate the negative battery cable.

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

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

(4) Disconnect the wire harness connector from the A/C compressor clutch coil.

(5) Remove the bolts that secure the A/C suction and discharge lines to the A/C compressor.

(6) Disconnect the A/C suction and discharge lines from the A/C compressor and remove and discard the O-ring seals (Fig. 4).

(7) Install plugs in, or tape over the opened refrigerant line fittings and the compressor ports.

(8) Raise the vehicle on a hoist.

(9) If equipped with an add-on rear A/C system, remove the lower A/C compressor and position it out of the way (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/A/C COMPRESSOR - REMOVAL - DENSO 10S17).

(10) Support the A/C compressor and remove the compressor mounting bolts.

(11) Remove the A/C compressor from the engine compartment.

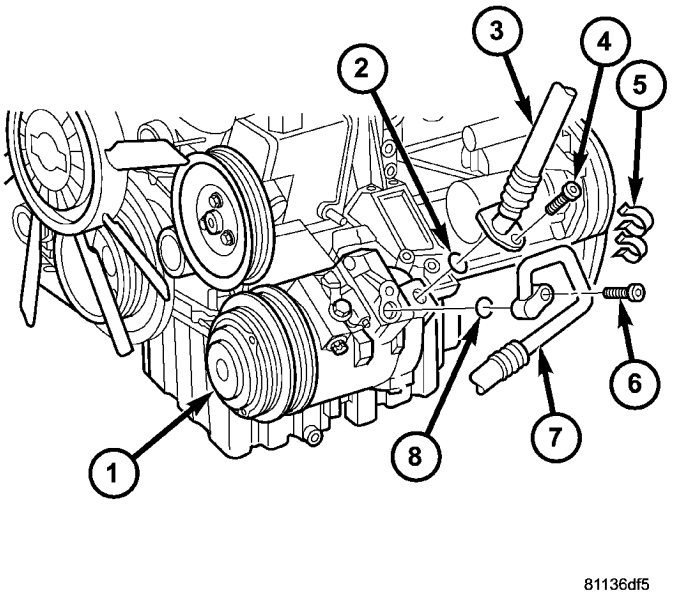

Fig. 4 Denso 7SBU16C A/C Compressor

1 - A/C COMPRESSOR
2 - O-RING SEAL
3 - A/C SUCTION LINE
4 - BOLT
5 - RETAINING CLIP
6 - BOLT
7 - A/C DISCHARGE LINE
8 - O-RING SEAL

DENSO 10S17 A / C COMPRESSOR

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

NOTE: The A/C 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, clutch coil or the engine.

NOTE: If an internal failure of the A/C compressor has occurred, the receiver/drier must be replaced.

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

(2) Disconnect and isolate the negative battery cable.

(3) Raise and support the vehicle.

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

(5) Disconnect the wire harness connector from the clutch field coil of the A/C compressor (Fig. 5).

(6) Remove the bolts that secure the underbody suction and discharge lines to the A/C compressor.

(7) Disconnect the underbody suction and discharge lines from the A/C compressor and remove and discard the O-ring seals.

(8) Install plugs in, or tape over the opened refrigerant line fittings and the compressor ports.

(9) Remove the bolts that secure the A/C compressor to the mounting bracket.

(10) Remove the A/C compressor from the engine compartment.

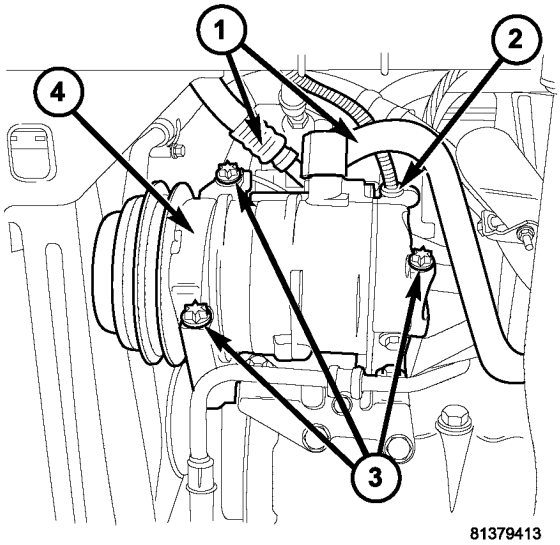

Fig. 5 Denso 10S17 A/C Compressor

1 - REFRIGERANT LINES
2 - WIRE HARNESS CONNECTOR
3 - BOLTS (3)
4 - A/C COMPRESSOR

INSTALLATION

DENSO 7SBU16C A / C COMPRESSOR

NOTE: Be certain to check the refrigerant oil level if the A/C compressor is being replaced. See Refrigerant Oil Level in this group for the procedures. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

NOTE: If an internal failure of the A/C compressor has occurred, the receiver/drier must be replaced.

(1) Position the A/C compressor in the engine compartment and loosely install the three compressor retaining bolts. Tighten the bolts using the following sequence to 20 N·m (15 ft. lbs.).

- The upper bolt at the front of the compressor.
- The lower bolt at the front of the compressor.
- The bolt at the rear of the compressor.

(2) If equipped with an add-on rear A/C system, install the lower A/C compressor (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/A/C COMPRESSOR - INSTALLATION - DENSO 10S17).

(3) Lower the vehicle.

(4) Remove the tape or plugs from the opened suction line fitting and the discharge line fitting and the compressor ports.

(5) Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the suction and the discharge line fittings. 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 A/C compressor in the vehicle.

(6) Connect the A/C suction and discharge lines to the A/C compressor.

(7) Install the bolts that secure the A/C suction and discharge lines to the A/C compressor. Tighten the bolts to 23 N·m (17 ft. lbs.).

(8) Connect the wire harness connector to the A/C compressor clutch coil.

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

(10) Replace the receiver/drier if the A/C compressor is being replaced due to an internal failure (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/RECEIVER/DRIER - REMOVAL) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/RECEIVER/DRIER - INSTALLATION).

(11) Reconnect the negative battery cable.

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

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

DENSO 10S17 A / C COMPRESSOR

NOTE: Be certain to check the refrigerant oil level if the A/C compressor is being replaced. See Refrigerant Oil Level in this group for the procedures. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

NOTE: If an internal failure of the A/C compressor has occurred, the receiver/drier must be replaced.

(1) Position the A/C compressor in the engine compartment and loosely install the three compressor retaining bolts. Tighten the bolts using the following sequence to 20 N·m (14 ft. lbs.).

- The upper bolt at the front of the compressor.
- The lower bolt at the front of the compressor.
- The bolt at the rear of the compressor.

(2) Remove the tape or plugs from the opened underbody suction and discharge line fittings and compressor ports.

(3) Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the suction and the discharge line fittings. 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 A/C compressor in the vehicle.

(4) Connect the underbody suction and discharge lines to the A/C compressor.

(5) Install the bolts that secure the underbody suction and discharge lines to the A/C compressor. Tighten the bolts to 21 N·m (15 ft. lbs.).

(6) Connect the wire harness connector to the A/C compressor clutch coil.

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

(8) Lower the vehicle.

(9) Replace the receiver/drier if the A/C compressor is being replaced due to an internal failure (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/RECEIVER/DRIER - REMOVAL) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/RECEIVER/DRIER - INSTALLATION).

(10) Reconnect the negative battery cable.

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

(12) 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: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

(1) Disconnect and isolate the negative battery cable.

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

(3) Remove the front fascia.

(4) Remove the grille (Refer to 23 - BODY/EXTERIOR/GRILLE - REMOVAL).

(5) Remove the headlamps from their mounts.

(6) Remove the radiator crossmember (Refer to 23 - BODY/EXTERIOR/RADIATOR CROSSMEMBER - REMOVAL).

(7) Disconnect the A/C discharge and liquid lines from the A/C condenser and remove and discard the O-ring seals (Fig. 6).

(8) Install plug in, or tape over the opened liquid line fitting and the condenser ports.

(9) Disconnect the wire harness connector from the auxiliary fan.

(10) Remove the auxiliary fan and upper bracket assembly.

(11) Remove the auxiliary fan lower bracket retainers and bracket.

(12) Remove the four condenser retaining screws.

(13) Carefully remove the condenser from the vehicle.

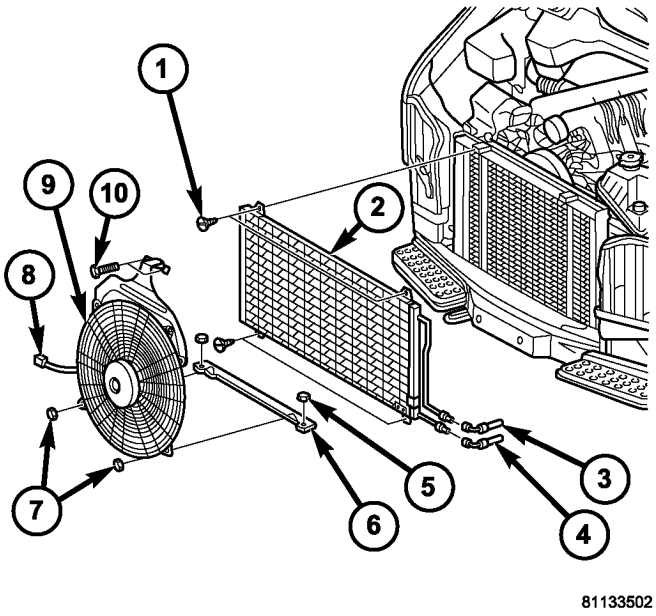

Fig. 6 A/C Condenser

1 - SCREW (4)
2 - CONDENSER
3 - LIQUID REFRIGERANT LINE
4 - COMPRESSOR DISCHARGE LINE
5 - NUT (2)
6 - LOWER AUXILIARY FAN BRACKET
7 - NUT (2)
8 - WIRE HARNESS CONNECTOR
9 - AUXILIARY COOLING FAN
10 - SCREW (2)

INSTALLATION

NOTE: If the A/C condenser is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

(1) Carefully position the A/C condenser into the engine compartment.

(2) Install the four screws that secure the A/C condenser. Tighten the screws to 2 N·m (17 in. lbs.).

(3) Install the lower auxiliary fan bracket and retaining nuts. Tighten the nuts to 5 N·m (45 in. lbs.).

(4) Install the auxiliary fan and upper bracket assembly. Tighten the screws to 5 N·m (45 in. lbs.).

(5) Connect the wire harness connector to the auxiliary fan.

(6) Remove the tape or plug from the condenser ports and the opened refrigerant line fittings.

(7) Lubricate a new rubber O-ring seal with clean refrigerant oil and install it on the refrigerant line fittings.

(8) Connect the A/C discharge and liquid lines to the A/C condenser.

(9) Install the nuts that secure the A/C discharge and liquid lines to the A/C condenser. Tighten the nuts to 33 N·m (24 ft. lbs.).

(10) Install the radiator crossmember (Refer to 23 - BODY/EXTERIOR/RADIATOR CROSSMEMBER - INSTALLATION).

(11) Install the headlamps into their mounts.

(12) Install the grille (Refer to 23 - BODY/EXTERIOR/GRILLE - INSTALLATION).

(13) Install the front fascia.

(14) Reconnect the negative battery cable.

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

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

A / C DISCHARGE LINE

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

(1) Disconnect and isolate the negative battery cable.

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

(3) Remove the grille (Refer to 23 - BODY/EXTERIOR/GRILLE - REMOVAL).

(4) Remove the nut that secures the discharge line fitting to the condenser on the left side of the condenser.

(5) Disconnect the discharge line fitting from the condenser inlet port.

(6) Remove the seal from the discharge line fitting and discard.

(7) Install plug in, or tape over the opened discharge line fitting and the condenser inlet port.

(8) Remove the bolt that secures the discharge line fitting to the top of the compressor (Fig. 7).

(9) Disconnect the discharge line fitting from the compressor discharge port.

(10) Remove the seal from the discharge line fitting and discard.

(11) Install plug in, or tape over the opened discharge line fitting and the compressor discharge port.

(12) Disconnect the discharge line from the retaining clip and remove the discharge line from the vehicle.

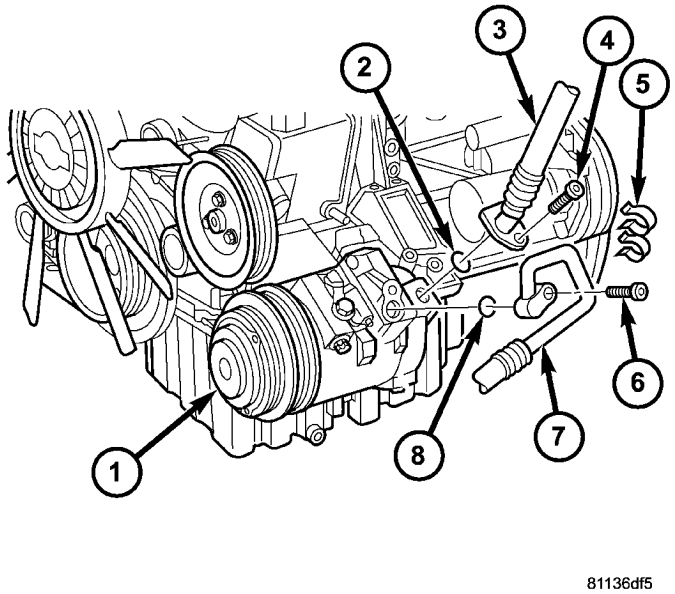

Fig. 7 A/C Compressor - Refrigerant Lines

1 - A/C COMPRESSOR
2 - O-RING SEAL
3 - A/C SUCTION LINE
4 - BOLT
5 - RETAINING CLIP
6 - BOLT
7 - A/C DISCHARGE LINE
8 - O-RING SEAL

INSTALLATION

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

(1) Position the discharge line into the engine compartment.

(2) Remove the tape or plugs from the compressor discharge port and the discharge line fitting.

(3) Lubricate a new rubber O-ring seal with clean refrigerant oil and install it on the discharge line fitting.

(4) Connect the discharge line fitting to the compressor discharge port on the top of the compressor.

(5) Install the bolt that secures the discharge line fitting to the compressor. Tighten the bolt to 23 N·m (17 ft. lbs.).

(6) Remove the tape or plugs from the condenser inlet port and the discharge line fitting.

(7) Lubricate a new rubber O-ring seal with clean refrigerant oil and install it on the discharge line fitting.

(8) Connect the discharge line fitting to the condenser inlet port.

(9) Install the nut that secures the discharge line fitting to the condenser. Tighten the nut to 33 N·m (24 ft. lbs.).

(10) Install the grille (Refer to 23 - BODY/EXTERIOR/GRILLE - INSTALLATION).

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

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

(13) Reconnect the negative battery cable.

A / C EVAPORATOR

DESCRIPTION

The A/C evaporator for the heating-A/C system is located within the HVAC housing, behind the instrument panel (Fig. 8). The A/C evaporator is positioned within the HVAC housing so that all air entering the housing must pass over the evaporator fins before it is distributed through the heating-A/C system ducts and outlets. However, air passing over the evaporator fins will only be conditioned when the A/C compressor is engaged and circulating refrigerant through the A/C evaporator.

The A/C evaporator tubes are connected and sealed to the A/C expansion valve by use of rubber O-rings and a tapping block.

The A/C evaporator is serviced by removing and disassembling the HVAC housing.

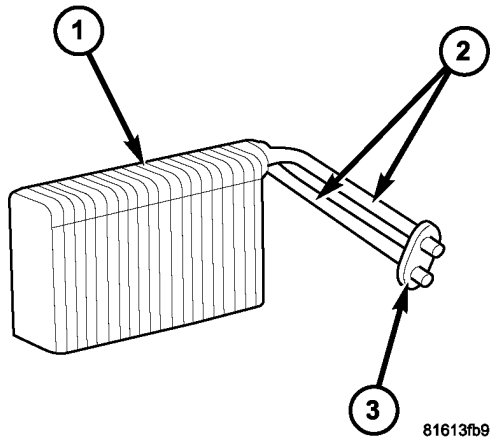

Fig. 8 Front A/C Evaporator

1 - A/C EVAPORATOR
2 - EVAPORATOR TUBES
3 - TAPPING BLOCK

OPERATION

Refrigerant enters the evaporator from the expansion valve 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 before it leaves the evaporator.

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

REMOVAL

WARNING: To avoid personal injury or death, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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

(2) Disassemble the HVAC housing to access the A/C evaporator (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - DISASSEMBLY).

(3) Lift the A/C evaporator out of the lower half of the HVAC housing (Fig. 9).

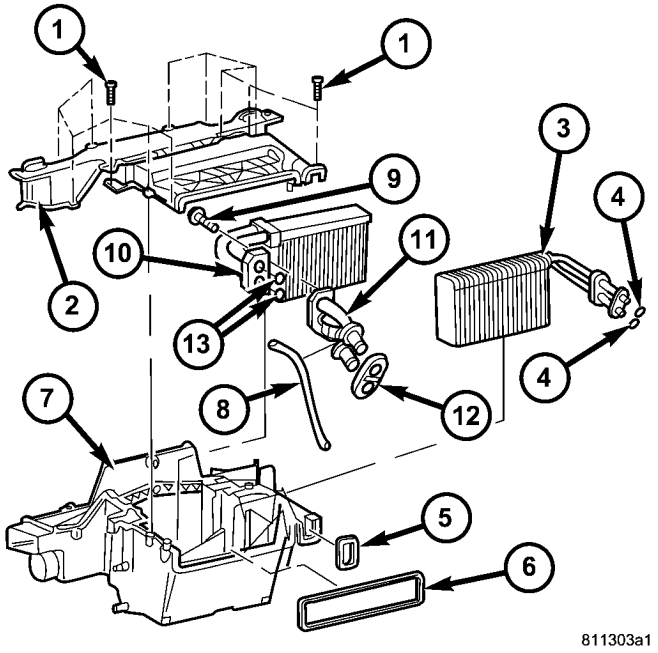

Fig. 9 HVAC Housing

1 - SCREW (12)
2 - UPPER HOUSING
3 - A/C EVAPORATOR
4 - EVAPORATOR O-RING SEAL (2)
5 - EVAPORATOR GASKET
6 - VENTILATION HOUSING GASKET
7 - LOWER HOUSING
8 - WIRING HARNESS
9 - BOLT (3)
10 - HEATER CORE
11 - HEATER CORE TUBE ASSEMBLY
12 - HEATER CORE TUBE GASKET
13 - HEATER CORE TUBE O-RING SEAL (2)

INSTALLATION

NOTE: If the A/C evaporator is being replaced, add 60 milliliters (2 fluid ounces) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

(1) Install the A/C evaporator into 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 (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - INSTALLATION).

A / C EXPANSION VALVE

DESCRIPTION

The A/C expansion valve controls the amount of refrigerant entering the A/C evaporator and is of a thermostatic expansion valve (TXV) design (Fig. 10). The A/C expansion valve consists of an aluminum H-valve type body with an integral thermal sensor.

The A/C expansion valve is located at the dash panel between the A/C refrigerant lines and the A/C evaporator.

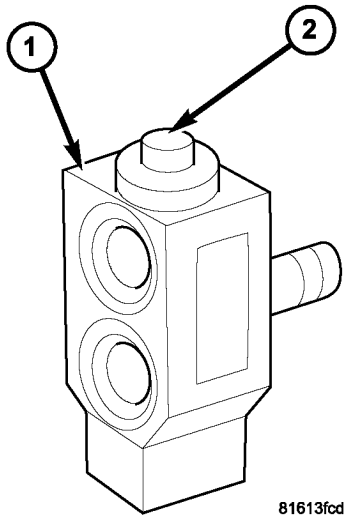

Fig. 10 Front A/C Expansion Valve

1 - A/C EXPANSION VALVE
2 - THERMAL SENSOR

OPERATION

High-pressure, high temperature liquid refrigerant from the liquid line passes through the expansion valve orifice, converting it into a low-pressure, low-temperature mixture of liquid and gas before it enters the A/C evaporator. A thermal sensor in the A/C expansion valve monitors the temperature of the refrigerant leaving the A/C evaporator and adjusts the orifice size at the evaporator inlet to allow the proper amount of refrigerant into the A/C evaporator

in order to meet vehicle cooling requirements. Controlling the refrigerant flow through the A/C evaporator ensures that none of the refrigerant leaving the evaporator is still in a liquid state, which could cause damage to the A/C compressor.

The A/C expansion valve is factory calibrated and cannot be adjusted or repaired and, if faulty or damaged, it must be replaced.

DIAGNOSIS AND TESTING

A / C EXPANSION VALVE

The A/C expansion valve is located on the engine side of the dash panel near the shock tower.

The A/C expansion valve can fail in three different positions (open, closed or restricted).

In an Open Position: this will result in a noisy A/C compressor or no cooling. The cause can be broken spring, broken ball or excessive moisture in the A/C system. If the spring or ball are found to be defective, replace the A/C expansion valve. If excessive moisture is found in the A/C system, recycle the refrigerant.

In a Closed Position: There will be low suction pressure and no cooling. This may be caused by a failed power dome or excessive moisture in the A/C system. If the power dome on the A/C expansion valve is found to be defective replace the A/C expansion valve. If excessive moisture is found recycle the refrigerant.

A Restricted Orifice: There will be low suction pressure and no cooling. This may be caused by debris in the refrigerant system. If debris is believed to be the cause, recycle the refrigerant and replace the A/C expansion valve and the receiver-drier.

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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

(2) Disconnect and isolate the negative battery cable.

(3) Remove the nut that secures the suction and liquid line fittings to the stud on the A/C expansion valve (Fig. 11).

(4) Disconnect the suction and liquid lines from the expansion valve.

(5) Remove the seals from the suction and liquid line fitting and discard.

(6) Install plugs in, or tape over the opened liquid and suction line fittings and both expansion valve ports.

(7) Remove the two bolts that secure the expansion valve to the evaporator tube tapping plate.

(8) Remove the expansion valve from the evaporator tube tapping plate.

(9) Remove the seals from the evaporator inlet and outlet tube fittings and discard.

(10) Install plugs in, or tape over the opened evaporator inlet and outlet tube fittings and both expansion valve ports.

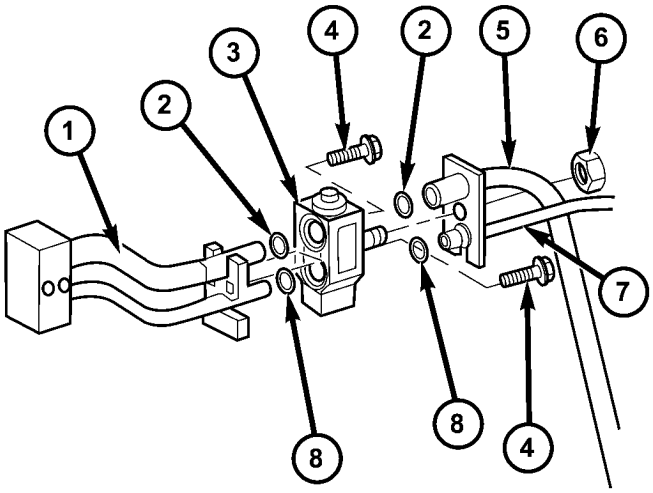

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Fig. 11 A/C Expansion Valve

1 - EVAPORATOR TUBE TAPPING PLATE
2 - O-RING SEAL (2)
3 - A/C EXPANSION VALVE
4 - BOLT (2)
5 - A/C SUCTION LINE
6 - NUT
7 - A/C LIQUID LINE
8 - O-RING SEAL (2)

INSTALLATION

(1) Remove the tape or plugs from the tapping plate evaporator inlet and outlet tube fittings and both ports on the back of the A/C expansion valve.

(2) Lubricate new rubber O-ring seals with clean refrigerant oil and install them on the tapping plate evaporator inlet and outlet tube fittings.

(3) Position the A/C expansion valve onto the tapping plate evaporator inlet and outlet tube fittings.

(4) Install the two bolts that secure the A/C expansion valve to the evaporator tube tapping plate. Tighten the bolts to 5 N·m (45 in. lbs.).

(5) Remove the tape or plugs from the liquid and suction line fittings and both expansion valve ports.

(6) Lubricate new rubber O-ring seals with clean refrigerant oil and install them on the liquid and suction line fittings.

(7) Connect the liquid line fitting to the A/C expansion valve.

(8) Connect the suction line fitting to the A/C expansion valve.

(9) Install the nut that secures the suction line and liquid line fittings to the stud on the A/C expansion valve. Tighten the nut to 10 N·m (89 in. lbs.).

(10) Reconnect the negative battery cable.

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

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

ELECTRIC COOLANT PUMP

DESCRIPTION

The electric coolant pump ensures the uniform flow of coolant through the heater core without bubbles, even at low speeds (Fig. 12). The electric coolant pump is located in the left side of the engine compartment near the battery and is controlled by the A/C-heater control.

The electric coolant pump housing contains two coolant hose connections and an electric motor which drives the vane-type pump using a magnetic clutch.

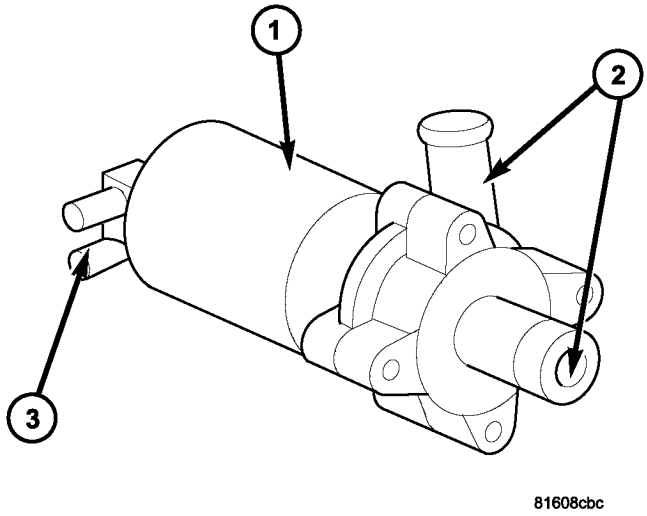

Fig. 12 Electric Coolant Pump

1 - ELECTRIC COOLANT PUMP
2 - COOLANT HOSE CONNECTIONS
3 - WIRE CONNECTOR

OPERATION

The electric coolant pump is controlled by the ATC A/C-heater control and is only operational when the ignition switch is on under the following conditions:

(1) Vehicle speed below 27 Km/h (17 mph).

(2) Coolant temperature above 65° C (150° F) but less than 110° C (230 ° F).

(3) Any blower motor speed setting.

(4) Temperature heat setting above the halfway setting (60% heat).

(5) The pump will turn off at speeds above 48 Km/h (30 mph).

(6) The pump will turn off if the coolant temperature rises above 110° C (230 ° F).

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Partially drain the engine cooling system (Refer to 7 - COOLING/ENGINE/COOLANT - STANDARD PROCEDURE - DRAINING COOLANT SYSTEM).

(3) Disconnect the wire harness connector from the electric coolant pump (Fig. 13).

(4) Loosen both hose clamps from the electric coolant pump.

(5) Using a twisting motion gently remove both heater hoses from the electric coolant pump.

(6) Remove the two electric coolant pump bracket retaining nuts from the body studs.

(7) Remove the electric coolant pump from the vehicle.

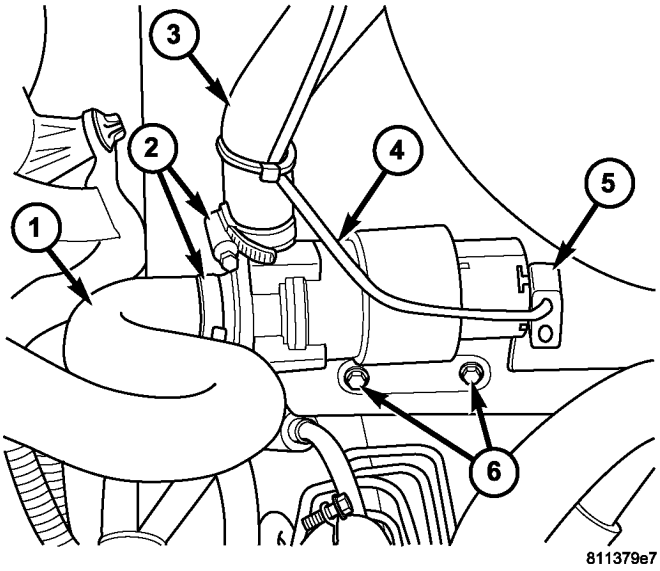

Fig. 13 Electric Coolant Pump

1 - HEATER HOSE
2 - HOSE CLAMP (2)
3 - HEATER HOSE
4 - ELECTRIC COOLANT PUMP
5 - WIRE HARNESS CONNECTOR
6 - NUT (2)

INSTALLATION

(1) Install the electric coolant pump and mounting bracket onto the body studs.

(2) Install the two bracket retaining nuts. Tighten the nuts to 5 N·m (45 in. lbs.).

(3) Using a twisting motion gently install both hoses onto the electric coolant pump.

(4) Tighten both hose clamps securely.

(5) Connect the wire harness connector to the electric coolant pump.

(6) Reconnect the negative battery cable.

(7) Fill the engine cooling system (Refer to 7 - COOLING/ENGINE/COOLANT - STANDARD PROCEDURE - COOLING SYSTEM FILL).

HEATER CORE

DESCRIPTION

The heater core is mounted into the HVAC housing, located behind the instrument panel (Fig. 14). The heater core is a heat exchanger made of rows of tubes and fins. The heater core tubes are attached to the heater core by using O-ring seals and bolts.

The heater core is serviced by removing and disassembling the HVAC housing.

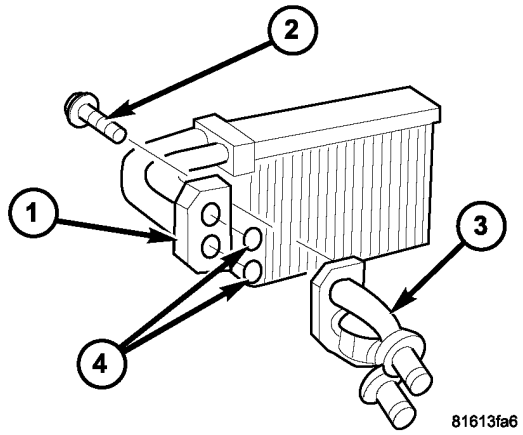

Fig. 14 Front Heater Core

1 - HEATER CORE
2 - BOLT (3)
3 - HEATER CORE TUBES
4 - O-RING SEALS

OPERATION

Engine coolant is circulated through the heater hoses to the heater core whenever the heater water valve is cycled open by the ATC A/C-heater control. 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 heater water valve controls the heater output air temperature by controlling the amount of heated engine coolant flowing 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.

REMOVAL

WARNING: To avoid personal injury or death, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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

(2) Disassemble the HVAC housing to access the heater core (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/HVAC HOUSING - DISASSEMBLY).

(3) Lift the heater core out of the lower half of the HVACr housing (Fig. 15).

(4) If necessary, remove the three heater core tube retaining bolts and the heater core tube assembly from the heater core.

(5) Remove the heater core tube seals and discard as required.

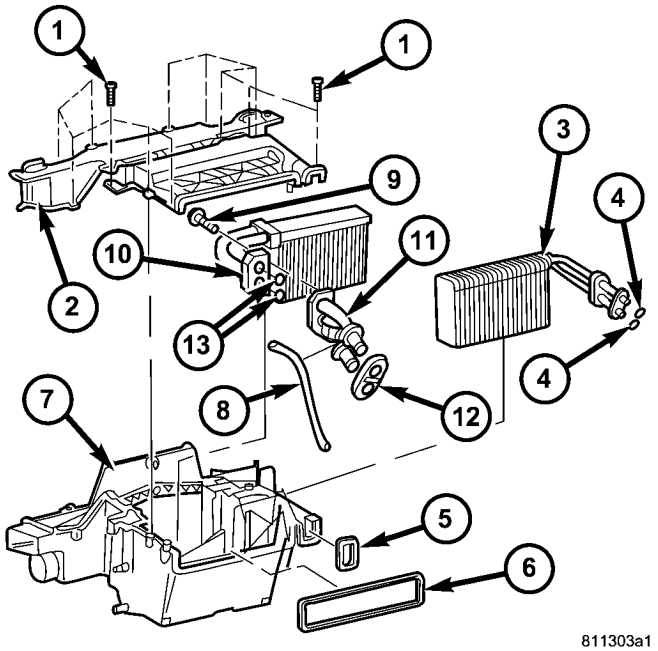

Fig. 15 HVAC Housing

1 - SCREW (12)
2 - UPPER HOUSING
3 - A/C EVAPORATOR
4 - EVAPORATOR O-RING SEAL (2)
5 - EVAPORATOR GASKET
6 - VENTILATION HOUSING GASKET
7 - LOWER HOUSING
8 - WIRING HARNESS
9 - BOLT (3)
10 - HEATER CORE
11 - HEATER CORE TUBE ASSEMBLY
12 - HEATER CORE TUBE GASKET
13 - HEATER CORE TUBE O-RING SEAL (2)

INSTALLATION

(1) If the heater core tube assembly was removed from the heater core, lubricate two new rubber O-ring seals with clean engine coolant and install them onto the heater core fitting.

(2) If required, connect the heater core tube assembly to the heater core and install the three retaining bolts. Tighten the bolts to 5 N·m (45 in. lbs.).

(3) Install the heater core into the bottom half of the HVAC housing.

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

NOTE: If the heater core is being replaced, flush the cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE - COOLING SYSTEM CLEANING/REVERSE FLUSHING).

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

LIQUID LINE

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

NOTE: The A/C liquid line is serviced in two sections. The front section connects between the A/C condenser and the receiver/drier and includes the high side service port and the A/C pressure sensor on the fitting for the receiver/drier. The rear section connects between the receiver/drier and the A/C expansion valve.

FRONT SECTION

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

(2) Disconnect and isolate they negative batter cable.

(3) Remove the grille (Refer to 23 - BODY/EXTERIOR/GRILLE - REMOVAL).

(4) Remove the nut that secures the A/C liquid line to the A/C condenser.

(5) Disconnect the A/C liquid line to the A/C condenser and remove and discard the O-ring seal.

(6) Install plug in, or tape over the opened liquid line fitting and the condenser outlet port.

(7) Remove the routing clip retaining nut and disengage the routing clip retainer on top of the left frame rail from the front section of the liquid line.

(8) Remove the A/C pressure sensor from the front liquid line fitting (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C PRESSURE TRANSDUCER - REMOVAL).

(9) Remove the bolt that secures the front section of the liquid line to the top of the receiver/drier (Fig. 16).

(10) Disconnect the front section of the liquid line from the receiver/drier and remove and discard the O-ring seal.

(11) Install plug in, or tape over the opened liquid line fitting and the receiver/drier inlet port.

(12) Remove the front section of the A/C liquid line from the engine compartment.

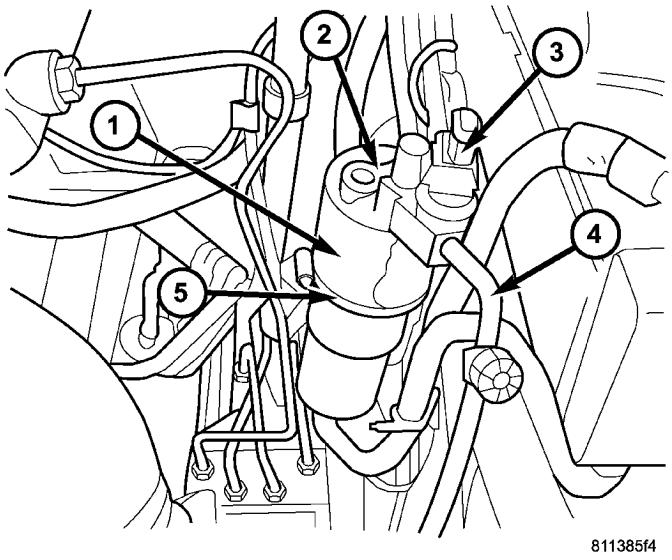

Fig. 16 Receiver-Drier

1 - RECEIVER/DRIER
2 - A/C LIQUID LINE (REAR SECTION)
3 - A/C PRESSURE TRANSDUCER
4 - A/C LIQUID LINE (FRONT SECTION)
5 - CLAMP

REAR SECTION

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

(2) Disconnect and isolate the negative battery cable.

(3) Remove the grille (Refer to 23 - BODY/EXTERIOR/GRILLE - REMOVAL).

(4) Remove the nut that secures the A/C suction and liquid lines to the stud on the A/C expansion valve (Fig. 17).

(5) Disconnect the A/C suction and liquid lines from the A/C expansion valve and remove and discard the O-ring seals.

(6) Disengage the routing clip retainer from the rear section of the A/C liquid line.

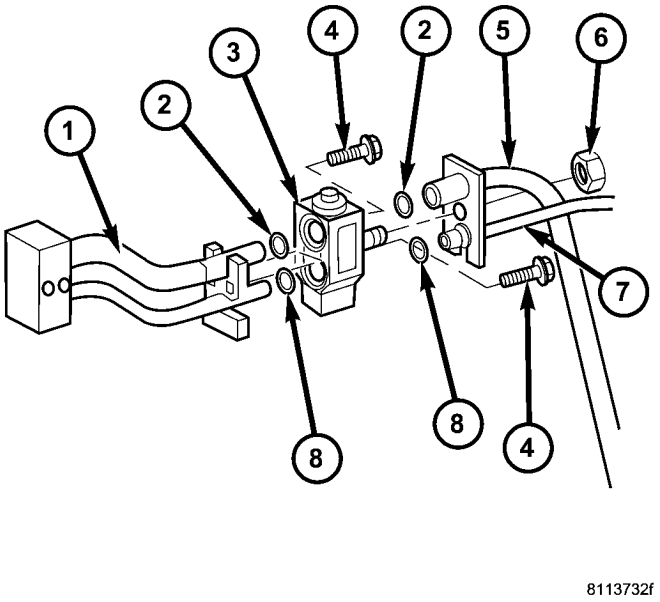

Fig. 17 A/C Expansion Valve

1 - EVAPORATOR TUBE TAPPING PLATE
2 - O-RING SEAL (2)
3 - A/C EXPANSION VALVE
4 - BOLT (2)
5 - A/C SUCTION LINE
6 - NUT
7 - A/C LIQUID LINE
8 - O-RING SEAL (2)

(7) Remove the bolt that secures the rear section of the liquid line to the top of the receiver/drier (Fig. 16).

(8) Disconnect the rear section of the liquid line from the receiver/drier.

(9) Remove the seal from the liquid line fitting outlet port and discard.

(10) Install plugs in, or tape over the opened liquid and suction line fittings, both receiver/drier ports and both expansion valve ports.

(11) Remove the rear section of the liquid line from the engine compartment.

INSTALLATION

NOTE: The A/C liquid line is serviced in two sections. The front section connects between the A/C condenser and the receiver/drier and includes the high side service port and the A/C pressure transducer on the fitting for the receiver/drier. The rear section connects between the receiver/drier and the A/C expansion valve.

FRONT SECTION

(1) Position the front section of the A/C liquid line into the engine compartment.

(2) Remove the tape or plugs from the liquid line fitting and the receiver/drier inlet port.

(3) Lubricate a new rubber O-ring seal with clean refrigerant oil and install it on the liquid line fitting.

(4) Connect the front section of the liquid line to the receiver/drier.

(5) Install the bolt that secures the liquid line fitting to the receiver/drier. Tighten the bolt to 7 N·m (62 in. lbs.).

(6) Position the front section of the liquid line into the routing clip and install the routing clip onto the body stud on the left frame rail.

(7) Install the routing clip retaining nut. Tighten the nut to 5 N·m (45 in. lbs.).

(8) Remove the tape or plugs from the condenser outlet port and the liquid line fitting.

(9) Lubricate a new O-ring seal with clean refrigerant oil and install it on the liquid line fitting.

(10) Connect the liquid line fitting to the condenser outlet port on the right side of the condenser.

(11) Install the nut that secures the liquid line fitting to the condenser. Tighten the nut to 17 N·m (12 ft. lbs.).

(12) Reinstall the A/C pressure transducer (Refer to 24 - HEATING & AIR CONDITIONING/CONTROLS/A/C PRESSURE TRANSDUCER - INSTALLATION).

(13) Install the grille (Refer to 23 - BODY/EXTERIOR/GRILLE - INSTALLATION).

(14) Reconnect the battery negative cable.

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

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

REAR SECTION

(1) Position the rear section of the A/C liquid line into the engine compartment.

(2) Remove the tape or plugs from the liquid and suction line fittings, the receiver/drier outlet port and both expansion valve ports.

(3) Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the suction and liquid line fittings for the expansion valve.

(4) Connect the liquid line and suction line fittings to the A/C expansion valve.

(5) Install the nut that secures the suction line and liquid line fittings to the stud on the A/C expansion valve. Tighten the nut to 10 N·m (89 in. lbs.).

(6) Lubricate new rubber O-ring seal with clean refrigerant oil and install it on the liquid line fitting.

(7) Connect the liquid line fitting to the receiver/drier outlet port.

(8) Install the bolt that secures the liquid line fitting to the receiver/drier. Tighten the bolt to 7 N·m (62 in. lbs.).

(9) Install the routing clip retainer to the rear section of the liquid line.

(10) Install the grille (Refer to 23 - BODY/EXTERIOR/GRILLE - INSTALLATION).

(11) Reconnect the negative battery cable.

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

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

RECEIVER / DRIER

DESCRIPTION

The receiver/drier is mounted in a bracket secured to the left front strut tower in the engine compartment. The receiver/drier is connected between the front and rear sections of the A/C liquid line between the condenser outlet and the evaporator inlet.

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

OPERATION

The receiver/drier performs a filtering action to prevent foreign material in the refrigerant from contaminating the A/C expansion valve. Refrigerant enters the receiver/drier as a high-pressure, low temperature liquid. Desiccant inside the receiver/drier absorbs any moisture which may have entered and become trapped within the refrigerant system. In addition, during periods of high demand operation of the A/C system, the receiver/drier acts as a reservoir to store surplus refrigerant.

The receiver/drier cannot be repaired. If the receiver/drier is faulty or damaged, or if an internal failure of the A/C compressor has occurred, the receiver/drier must be replaced.

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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

(2) Remove the bolts that secure the front and rear sections of the A/C liquid line to the top of the receiver/drier (Fig. 18).

(3) Disconnect the liquid line fittings from the receiver/drier and remove and discard the O-ring seals.

(4) Install a plug in, or tape over the opened liquid line fittings and the receiver/drier ports.

(5) Loosen the clamp that secures the receiver/drier to the mounting bracket.

(6) Remove the receiver/drier from the engine compartment.

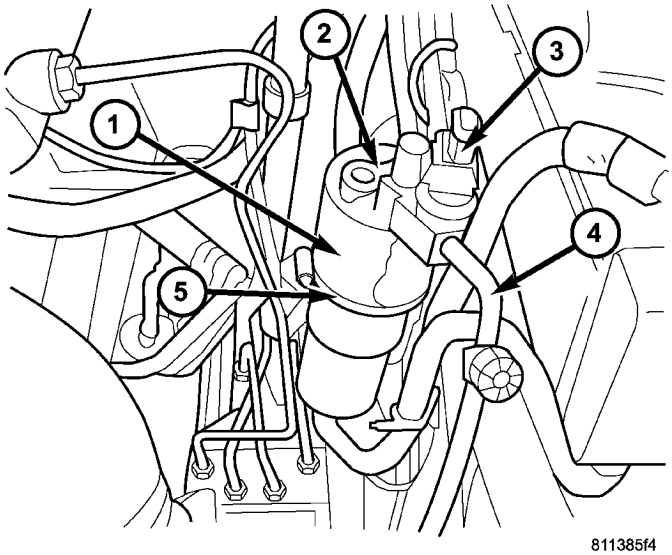

Fig. 18 Receiver/Drier

1 - RECEIVER/DRIER
2 - A/C LIQUID LINE (REAR SECTION)
3 - A/C PRESSURE TRANSDUCER
4 - A/C LIQUID LINE (FRONT SECTION)
5 - CLAMP

INSTALLATION

NOTE: If the receiver/drier is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

(1) Position the receiver/drier onto the mounting bracket on the front left strut tower.

(2) Tighten the clamp that secures the receiver/drier to the mounting bracket.

(3) Remove the tape or plugs from the liquid line fittings and the receiver/drier ports.

(4) Lubricate new rubber O-ring seals with clean refrigerant oil and install them on the liquid line fittings.

(5) Connect the front and rear sections of the liquid line to the receiver/drier.

(6) Install the bolts that secures the liquid line fittings to the receiver/drier. Tighten the bolts to 7 N·m (62 in. lbs.).

(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).

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 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 A/C compressors for this vehicle are designed to use an ND-8 PAG refrigerant oil. Use only the refrigerant oil of this 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 A/C 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 receiver-drier, 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 lubrication of the A/C compressor. Too little oil will result in damage to the A/C compressor. Too much oil will reduce the cooling capacity of the A/C system.

It will not be necessary to check the oil level in the A/C 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 receiver/drier, A/C evaporator, or A/C condenser are replaced. See the Refrigerant Oil Capacities chart. When an A/C 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
Total A/C System Fill	410	13.9
Receiver/Drier	30	1.0
A/C Condenser	30	1.0
A/C Evaporator	60	2.0
A/C Compressor	Drain and measure the oil from the old compressor - see text.	

SUCTION LINE

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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

(2) Disconnect and isolate the negative battery cable.

(3) Remove the routing clip retaining nut and disengage the metal routing clip from the A/C suction line.

(4) Disengage the plastic routing clip located near the A/C expansion valve from the A/C suction line.

(5) Remove the nut that secures the A/C suction and liquid lines to the stud on the A/C expansion valve (Fig. 19).

(6) Disconnect the A/C suction and liquid lines from the A/C expansion valve and remove and discard the O-ring seals.

(7) Install plugs in, or tape over the opened liquid and suction line fittings and both expansion valve ports.

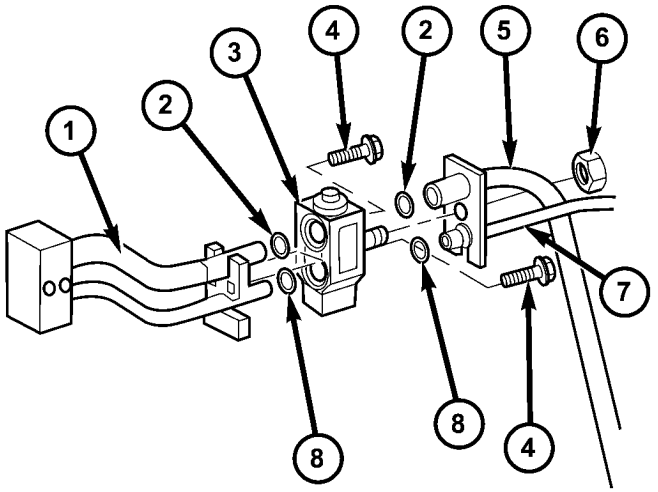

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Fig. 19 A/C Expansion Valve

1 - EVAPORATOR TUBE TAPPING PLATE
2 - O-RING SEAL (2)
3 - A/C EXPANSION VALVE
4 - BOLT (2)
5 - A/C SUCTION LINE
6 - NUT
7 - A/C LIQUID LINE
8 - O-RING SEAL (2)

(8) Remove the bolt that secures the A/C suction line to the A/C compressor (Fig. 20).

(9) Disconnect the A/C suction line from the A/C compressor and remove and discard the O-ring seal.

(10) Install plugs in, or tape over the opened suction line fitting and the compressor suction port.

(11) Remove the A/C suction line from the engine compartment.

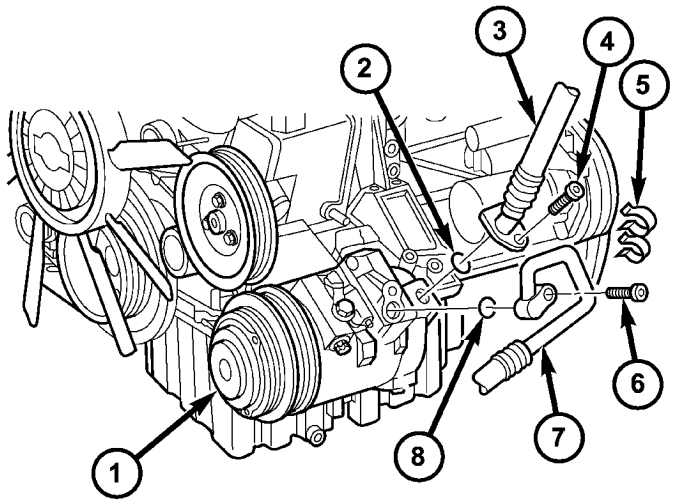

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Fig. 20 A/C Compressor - Refrigerant Lines

1 - A/C COMPRESSOR
2 - O-RING SEAL
3 - A/C SUCTION LINE
4 - BOLT
5 - RETAINING CLIP
6 - BOLT
7 - A/C DISCHARGE LINE
8 - O-RING SEAL

INSTALLATION

(1) Position the A/C suction line into the engine compartment.

(2) Remove plugs or tape from the suction line fitting and the compressor suction port.

(3) Lubricate a new rubber O-ring seal with clean refrigerant oil and install it onto the suction line fitting.

(4) Connect the A/C suction line to the A/C compressor.

(5) Install the bolt that secures the A/C suction line to the A/C compressor. Tighten the bolt to 23 N·m (17 ft. lbs.).

(6) Remove the tape or plugs from the liquid and suction line fittings and both expansion valve ports.

(7) Lubricate new rubber O-ring seals with clean refrigerant oil and install them on the liquid and suction line fittings.

(8) Connect the A/C liquid and suction lines to the A/C expansion valve.

(9) Install the nut that secures the A/C liquid and suction lines to the A/C expansion valve. Tighten the nut to 10 N·m (89 in. lbs.).

(10) Position the metal routing clip around the A/C suction line and install the routing clip onto the body stud.

(11) Install the routing clip retaining nut. Tighten the nut to 5 N·m (45 in. lbs.).

(12) Install the plastic routing clip retainer onto the A/C suction line.

(13) Reconnect the negative battery cable.

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

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

WATER VALVE

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Partially drain the engine cooling system (Refer to 7 - COOLING/ENGINE/COOLANT - STANDARD PROCEDURE - DRAINING COOLING SYSTEM).

(3) Disconnect the wire harness connector from the heater water valve (Fig. 21).

(4) Loosen the hose clamps from the heater water valve.

(5) Using a twisting motion gently remove the heater hoses from the heater water valve.

(6) Remove the bolts that secure the heater water valve bracket.

(7) Remove the bracket and pulsed water control valve from the engine compartment.

(8) Turn the bracket slightly and remove the water valve from the rubber mounts.

(9) If necessary, remove the rubber mounts from the bracket or water valve.

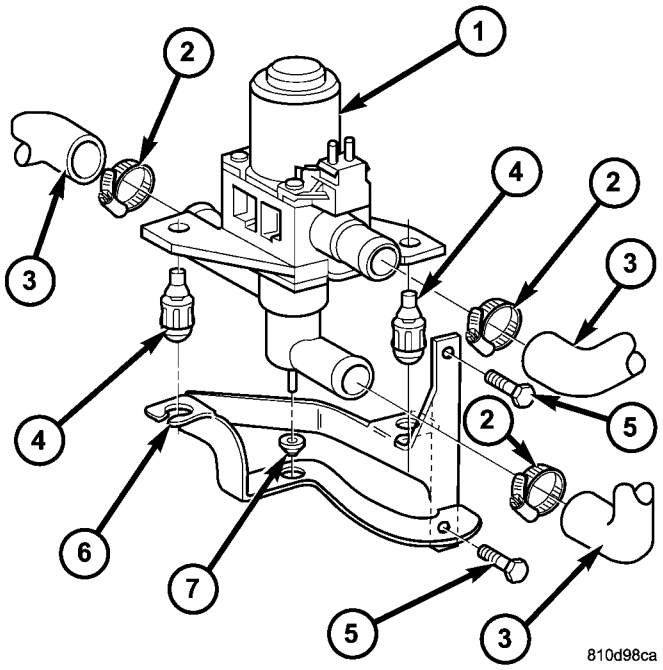

Fig. 21 Heater Water Valve

1 - HEATER WATER VALVE
2 - HOSE CLAMP (3)
3 - HEATER HOSE (3)
4 - RUBBER MOUNT (2)
5 - BOLTS (2)
6 - BRACKET
7 - RUBBER MOUNT

INSTALLATION

(1) If removed, install the rubber mounts to the heater water valve or bracket.

(2) Turn bracket slightly to the right and install the heater water valve to the bracket.

(3) Install the water valve and mounting bracket into the engine compartment.

(4) Install the two bracket retaining bolts. Tighten the bolts to 5 N·m (45 in. lbs.).

(5) Using a twisting motion gently install the heater hoses onto the water valve.

(6) Tighten the hose clamps securely.

(7) Connect the wire harness connector to the heater water valve.

(8) Reconnect the negative battery cable.

(9) Fill the engine cooling system (Refer to 7 - COOLING/ENGINE/COOLANT - STANDARD PROCEDURE - COOLING SYSTEM FILL).

REAR A / C CONDENSER FAN

REMOVAL

(1) Disconnect and isolate the negative battery cable.

(2) Remove the cover from the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - REMOVAL).

(3) Disconnect the condenser fan wire harness from the condenser fan suppression filter (Fig. 22).

(4) Loosen the four bolts that secure the rear A/C condenser fan to the top of the rear A/C condenser housing.

(5) Rotate the rear A/C condenser fan counterclockwise and remove the fan from the top of the rear A/C condenser housing.

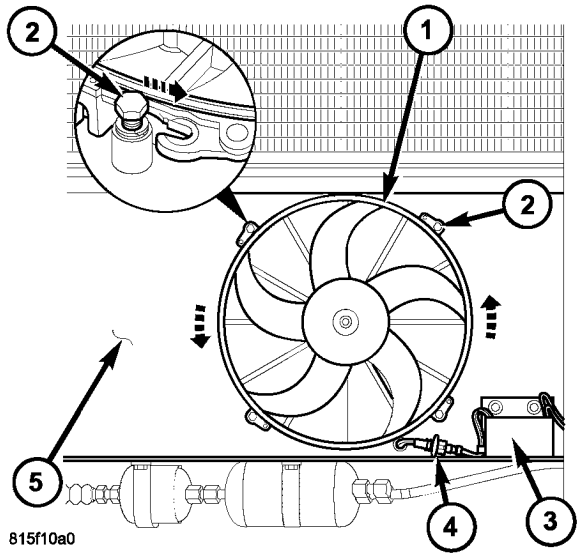

Fig. 22 Rear A/C Condenser Fan

1 - REAR A/C CONDENSER FAN
2 - BOLT (4)
3 - REAR CONDENSER FAN SUPPRESSION FILTER
4 - FAN WIRE HARNESS CONNECTOR
5 - REAR A/C CONDENSER HOUSING

INSTALLATION

(1) Position the rear A/C condenser fan to the top of the rear A/C condenser housing.

(2) Rotate the rear A/C condenser fan clockwise to engage the fan to the four retaining bolts. Tighten the bolts to 12 N·m (106 in. lbs.).

(3) Connect the condenser fan wire harness to the rear condenser fan suppression filter.

(4) Reconnect the negative battery cable.

(5) Install the cover onto the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - INSTALLATION).

REAR A / C EVAPORATOR

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

(1) Remove the rear A/C evaporator housing and place it on a workbench (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/ REAR A/C EVAPORATOR HOUSING - REMOVAL).

(2) Remove the five screws and washers that secure the condensate drain pan to the bottom of the rear A/C evaporator and remove the drain pan (Fig. 23).

(3) Remove the insulating tape from around the area of the rear A/C expansion valve and disconnect the expansion valve from the rear A/C evaporator (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING/REAR A/C EXPANSION VALVE - REMOVAL).

(4) Remove the left blower motor from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/ BLOWER MOTOR - REMOVAL).

CAUTION: Be careful when drilling out rivets to prevent damage to the rear A/C components.

(5) Remove the rivets that secure the three covers to the rear A/C evaporator and remove the covers.

(6) Remove the four rivets that secure the rear A/C evaporator the bottom of the rear A/C evaporator housing and remove the evaporator.

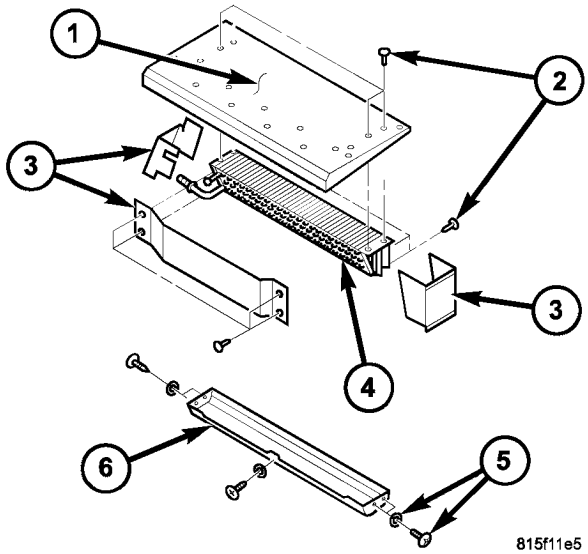

Fig. 23 Rear A/C Evaporator

1 - REAR A/C EVAPORATOR HOUSING
2 - RIVET (12)
3 - COVERS
4 - REAR A/;C EVAPORATOR
5 - SCREW AND WASHER (5)
6 - CONDENSATE DRAIN PAN

INSTALLATION

NOTE: Be certain to add refrigerant oil if the rear A/C evaporator is being replaced. The refrigerant oil must be drained from the old evaporator and measured to determine the amount of refrigerant oil to add to the new evaporator. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(1) If the rear A/C evaporator is being replaced, install the correct amount and type of refrigerant oil into the new rear A/C evaporator. Drain the old evaporator and measure the refrigerant oil. Fill the new evaporator with the same amount of new refrigerant oil that was drained out of the old evaporator.

(2) Position the rear A/C evaporator to the bottom of the rear A/C evaporator housing and install four new rivets.

(3) Position the three covers to the rear A/C evaporator and install eight new rivets.

(4) Install the left blower motor onto the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/BLOWER MOTOR - INSTALLATION).

(5) Connect the rear A/C expansion valve to the rear A/C evaporator and install new insulating tape (Refer to 24 - HEATING & AIR CONDITIONING/ PLUMBING/REAR A/C EXPANSION VALVE - INSTALLATION).

(6) Position the condensate drain pan to the bottom of the rear A/C evaporator and install the five screws and washers that secure the drain pan to the evaporator. Tighten the screws to 2.2 N·m (20 in. lbs.).

(7) Install the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION/REAR A/C EVAPORATOR HOUSING - INSTALLATION).

REAR A / C EXPANSION VALVE

DESCRIPTION

The rear A/C expansion valve controls the amount of refrigerant entering the rear A/C evaporator (Fig. 24). The rear A/C expansion valve is of an externally-equalized thermostatic expansion valve (TXV) design and consists of a cast metal body with a removable equalizer tube and an integral thermal sensor which uses a capillary tube and sensing bulb.

The rear A/C expansion valve is located to the left of the rear blower motors in the rear evaporator housing.

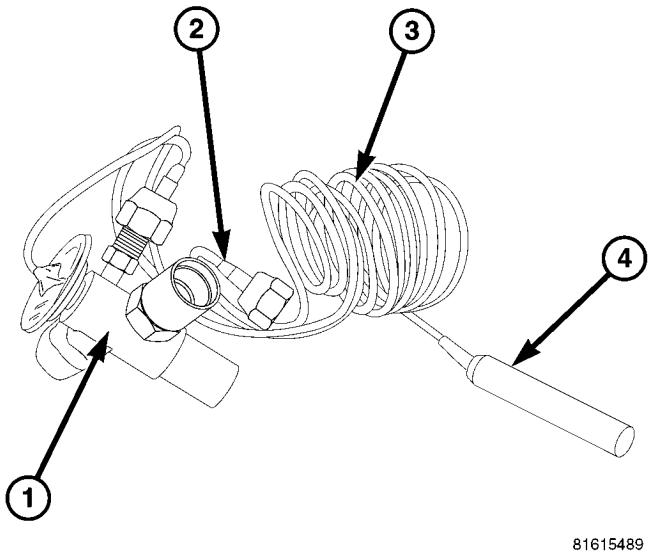

Fig. 24 Rear A/C Expansion Valve

1 - REAR A/C EXPANSION VALVE
2 - EQUALIZER TUBE
3 - CAPILLARY TUBE
4 - SENSING BULB

OPERATION

High-pressure, high temperature liquid refrigerant from the liquid line passes through the expansion valve orifice, converting it into a low-pressure, low-temperature mixture of liquid and gas before it enters the A/C evaporator. A thermal sensor in the rear A/C expansion valve monitors the temperature of the refrigerant leaving the rear evaporator by use of a sensing bulb positioned next to the evaporator outlet tube. The thermal sensor adjusts the orifice size at the evaporator inlet to allow the proper amount of refrigerant into the rear A/C evaporator in order to meet vehicle cooling requirements. Controlling the refrigerant flow through the A/C evaporator ensures that none of the refrigerant leaving the evaporator is still in a liquid state, which could cause damage to the A/C compressor.

To overcome the effect of the pressure drop within the rear A/C evaporator, an external equalizer tube is connected to the evaporator outlet tube and runs to the underside if the diaphragm within the expansion valve.

The rear A/C expansion valve is factory calibrated and cannot be adjusted or repaired and, if faulty or damaged, it must be replaced.

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

(1) Disconnect and isolate the negative battery cable.

(2) Remove the cover from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - REMOVAL).

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

(4) Remove the insulating tape from around the area of the rear A/C expansion valve (Fig. 25).

(5) Disconnect the equalizer tube from the rear evaporator outlet tube.

(6) Disconnect the rear liquid line from the rear A/C expansion valve and remove and discard the O-ring seal.

(7) Disconnect the rear A/C expansion valve from the rear evaporator inlet tube and remove and discard the O-ring seal.

(8) Remove the retaining clamp that secures the sensor bulb to the evaporator outlet tube and remove the expansion valve, capillary tube and sensor bulb as an assembly.

(9) Install plugs into, or tape over the opened refrigerant line and evaporator tube fittings and expansion valve ports.

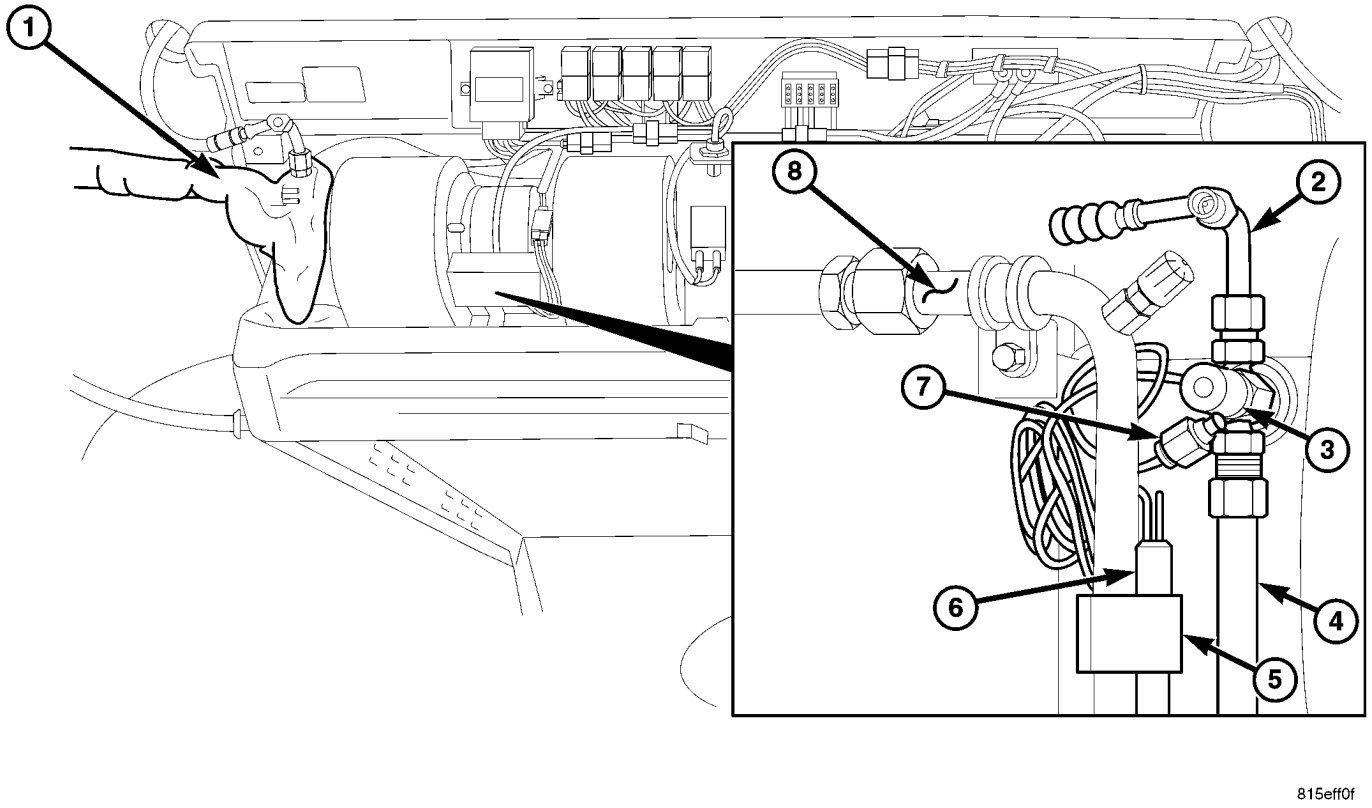

Fig. 25 Rear A/C Expansion Valve

1 - INSULATING TAPE
2 - REAR LIQUID LINE
3 - REAR A/C EXPANSION VALVE
4 - REAR A/C EVAPORATOR INLET TUBE
5 - RETAINING CLAMP
6 - SENSING BULB AND CAPILLARY TUBE
7 - EQUALIZER TUBE
8 - REAR A/C EVAPORATOR OUTLET TUBE

INSTALLATION

(1) Remove the tape or plugs from the rear refrigerant line and evaporator tube fittings and the rear expansion valve ports.

(2) Lubricate a new O-ring seal with clean refrigerant oil and install it onto the rear evaporator inlet tube fitting. Use only the specified O-ring seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(3) Install the rear A/C expansion valve onto the rear evaporator inlet tube. Tighten the nut to 35 N·m (26 ft. lbs.).

(4) Lubricate a new O-ring seal with clean refrigerant oil and install it onto the rear liquid line fitting. Use only the specified O-ring seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(5) Connect the rear liquid line to the rear A/C expansion valve. Tighten the nut to 35 N·m (26 ft. lbs.).

(6) Connect the equalizer tube to the rear evaporator outlet tube. Tighten the nut to 10 N·m (88 in. lbs.).

(7) Position the rear expansion valve sensing bulb onto the rear evaporator outlet tube and install the retaining clamp securely.

(8) Install new insulating tape around the rear A/C expansion valve area.

(9) Reconnect the negative battery cable.

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

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

(12) Install the cover onto the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - INSTALLATION).

REAR DISCHARGE LINE

DESCRIPTION

The rear A/C discharge line is the refrigerant line that carries refrigerant from the underbody discharge line to the rear A/C condenser (Fig. 26). The rear A/C discharge line is retained to the right quarter panel by two plastic retaining clips.

CAUTION: Use only seals specified for the vehicle. Failure to use the correct seals will cause the refrigerant system connections to leak.

The rear A/C discharge line has no serviceable parts except for the O-ring seals. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant and must be replaced whenever the rear discharge line is removed and installed.

If the rear A/C discharge line is found to be leaking or damaged, it must be replaced.

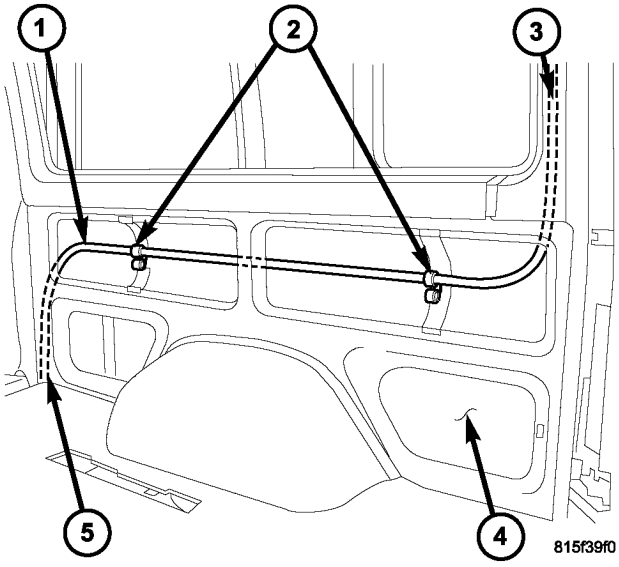

Fig. 26 Rear A/C Discharge Line

1 - REAR A/C DISCHARGE LINE
2 - RETAINING CLIPS
3 - TO REAR A/C CONDENSER
4 - RIGHT INNER QUARTER PANEL
5 - TO UNDERBODY DISCHARGE LINE

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

(1) Disconnect and isolate the negative battery cable.

(2) Remove the cover from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - REMOVAL).

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

(4) Remove the cover from the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - REMOVAL).

(5) Remove the screw and bracket that secures the rear A/C discharge line to the right side of the rear A/C condenser housing (Fig. 27).

(6) Disconnect the rear A/C discharge line from the rear A/C condenser and remove and discard the O-ring seal.

(7) Disengage the discharge line grommet from the roof panel and push the grommet down into the cargo compartment.

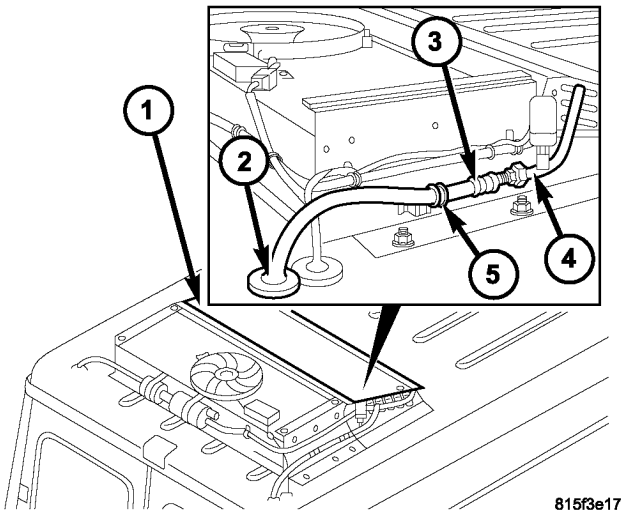

Fig. 27 Rear A/C Discharge Line to Rear Condenser

1 - REAR A/C CONDENSER
2 - GROMMET
3 - REAR A/C DISCHARGE LINE
4 - CONDENSER INLET TUBE
5 - SCREW AND BRACKET

(8) Remove the right quarter trim panel (Refer to 23 - BODY/INTERIOR/QUARTER TRIM PANEL - REMOVAL).

(9) Remove the retaining strap that secures the rear A/C wire harness to the rear A/C discharge line at the ceiling and position the wire harness out of the way (Fig. 28).

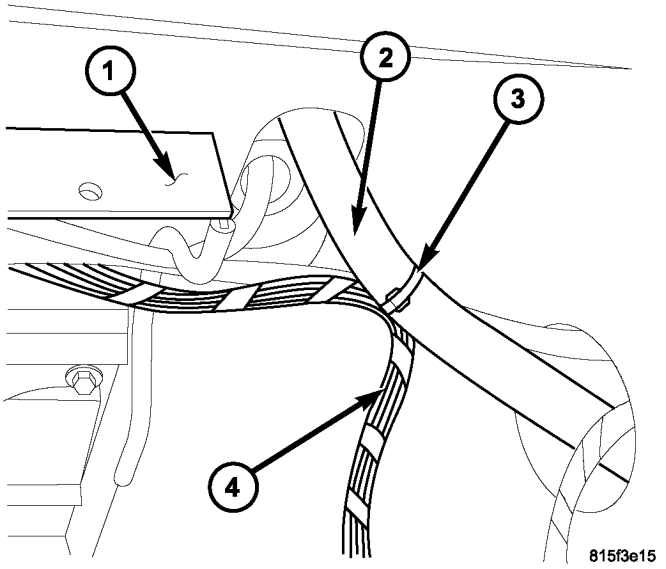

Fig. 28 Rear A/C Wire Harness

1 - REAR A/C EVAPORATOR HOUSING
2 - REAR A/C DISCHARGE LINE
3 - RETAINING STRAP
4 - REAR A/C WIRE HARNESS

(10) Remove the three foam insulators from the right inner quarter panel (Fig. 29).

(11) Disengage the rear A/C discharge line from the two retaining clips located on the inner quarter panel and pull the discharge line down from the top of the vehicle into the cargo compartment.

(12) Disengage the rear A/C discharge line from the two retaining clips located underneath of the vehicle.

(13) Disconnect the rear A/C discharge line from the underbody discharge line and remove and discard the O-ring seal.

(14) Remove the foam rubber seal from the opening in the floor of the cargo compartment and pull the rear A/C discharge line out from underneath the vehicle.

(15) Install plugs into, or tape over the opened rear discharge and underbody line fittings and condenser tube.

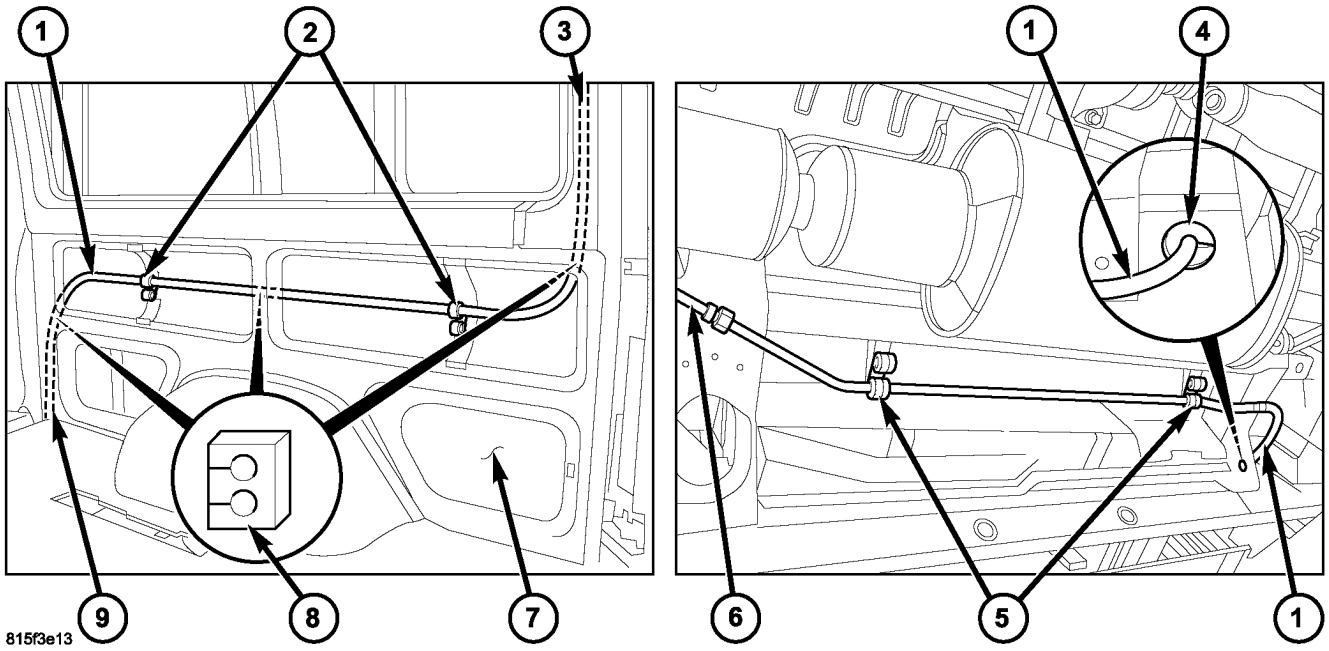

Fig. 29 Rear A/C Discharge Line to Underbody

1 - REAR A/C DISCHARGE LINE
2 - RETAINING CLIPS
3 - TO REAR CONDENSER
4 - FOAM RUBBER SEAL
5 - BRACKETS
6 - UNDERBODY DISCHARGE LINE
7 - RIGHT INNER QUARTER PANEL
8 - FOAM INSULATORS
9 - TO UNDERBODY

INSTALLATION

(1) Remove the tape or plugs from the rear discharge and underbody line fittings and the rear condenser tube.

(2) Lubricate new O-ring seals with clean refrigerant oil and install them onto the rear discharge line fittings. Use only the specified O-ring seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(3) From underneath the vehicle, route the rear A/C discharge line into the cargo compartment and install it into the two retaining clips located under the vehicle.

(4) Connect the rear A/C discharge line to the underbody discharge line. Tighten the nut to 35 N·m (26 ft. lbs.).

(5) Install the foam rubber seal into the floor panel.

(6) From inside the vehicle, install the rear A/C discharge line into the two retaining clips located on the inner quarter panel and route the discharge line through the opening in the roof.

(7) Seat the grommet to the roof panel and install a new rear A/C wire harness retaining strap.

(8) Install the three foam insulators to the right inner quarter panel.

(9) Install the right quarter trim panel (Refer to 23 - BODY/INTERIOR/QUARTER TRIM PANEL - INSTALLATION).

(10) Connect the rear discharge line to the rear A/C condenser. Tighten the nut to 35 N·m (26 ft. lbs.).

(11) Install the bracket and screw that secures the rear discharge line to the right side of the rear condenser housing. Tighten the screw securely.

(12) Reconnect the negative battery cable.

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

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

(15) Install the cover onto the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - INSTALLATION).

(16) Install the cover onto the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - INSTALLATION).

REAR LIQUID LINE

DESCRIPTION

The rear liquid line is the refrigerant line that carries refrigerant from the rear condenser to the rear A/C expansion valve. The rear A/C liquid line on this vehicle is serviced in two sections (Fig. 30).

CAUTION: Use only seals specified for the vehicle. Failure to use the correct seals will cause the refrigerant system connections to leak.

The rear A/C liquid lines have no serviceable parts except for the O-ring seals. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant and must be replaced whenever the rear liquid line is removed and installed.

If either of the rear liquid lines is found to be leaking or damaged, it must be replaced.

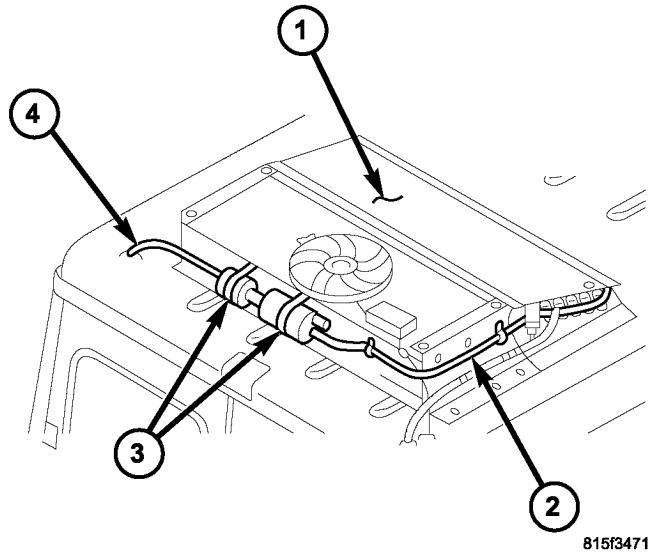

Fig. 30 Rear A/C Liquid Lines

1 - REAR A/C CONDENSER
2 - REAR LIQUID LINE (FROM CONDENSER)
3 - REAR RECIEVER/DRIER AND RESERVOIR
4 - REAR LIQUID LINE (TO EXPANSION VALVE)

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

CONDENSER TO RECEIVER / DRIER

(1) Disconnect and isolate the negative battery cable.

(2) Remove the air filter from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - REMOVAL).

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

(4) Remove the cover from the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - REMOVAL).

(5) Disconnect the rear liquid line from the rear receiver/drier and remove and discard the O-ring seal (Fig. 31).

(6) Disconnect the rear liquid line from the rear condenser and remove and discard the O-ring seal.

(7) Remove the retaining straps that secure the rear A/C wire harness to the rear liquid line and remove the liquid line.

(8) Install plugs into, or tape over the opened rear liquid line fittings and receiver/drier and condenser ports.

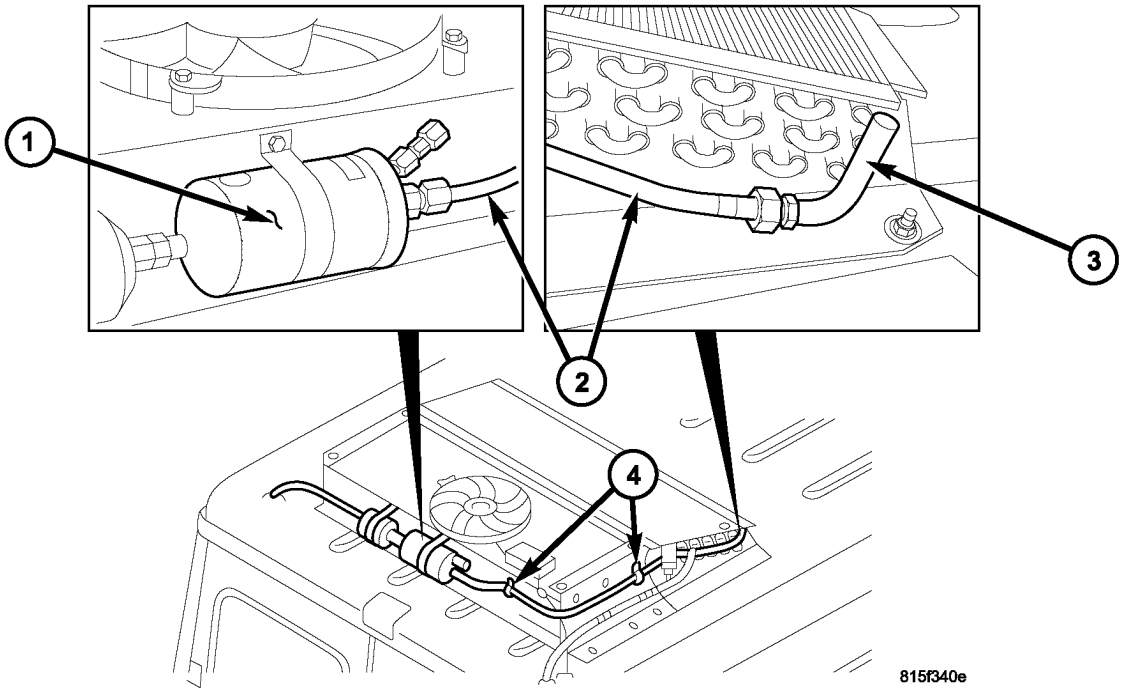

Fig. 31 Rear Liquid Line - Condenser to Receiver/drier

1 - REAR RECEIVER/DRIER
2 - LIQUID LINE (FROM CONDENSER)
3 - REAR A/C CONDENSER
4 - RETAINING STRAPS

RESERVOIR TO EXPANSION VALVE

(1) Disconnect and isolate the negative battery cable.

(2) Remove the cover from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - REMOVAL).

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

(4) Remove the cover from the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - REMOVAL).

(5) Disconnect the rear liquid line from the reservoir and remove and discard the O-ring seal (Fig. 32).

(6) Disconnect the rear liquid line from the rear expansion valve and remove and discard the O-ring seal.

(7) Disengage the liquid line grommet from the roof panel and remove the liquid line.

(8) Install plugs into, or tape over the opened rear liquid line fittings and reservoir and expansion valve ports.

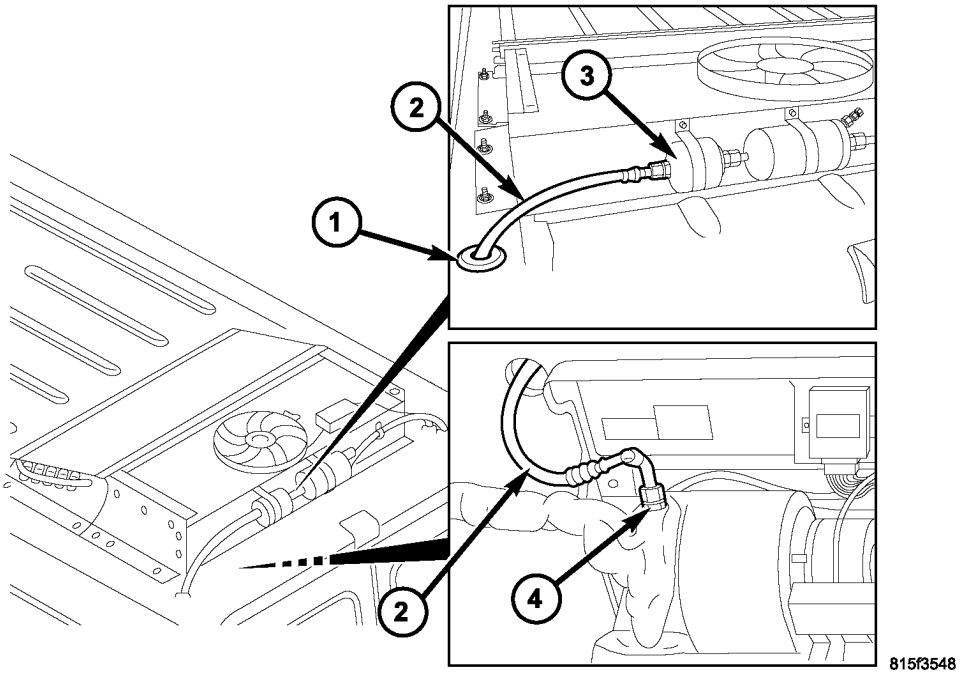

Fig. 32 Rear Liquid Line - Reservoir to Expansion Valve

1 - GROMMET
2 - LIQUID LINE (TO EXPANSION VALVE)
3 - REAR REFRIGERANT RESERVOIR
4 - REAR A/C EXPANSION VALVE

INSTALLATION

CONDENSER TO RECEIVER / DRIER

(1) Remove the tape or plugs from the rear liquid line fittings and receiver/drier and condenser ports.

(2) Lubricate new O-ring seals with clean refrigerant oil and install them onto the rear liquid line fittings. Use only the specified O-ring seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(3) Connect the rear liquid line to the rear receiver/drier. Tighten the nut to 35 N·m (26 ft. lbs.).

(4) Connect the rear liquid line to the rear A/C condenser. Tighten the nut to 35 N·m (26 ft. lbs.).

(5) Install the retaining straps that secure the rear A/C wire harness to the rear liquid line.

(6) Reconnect the negative battery cable.

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

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

(9) Install the rear air filter (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - INSTALLATION).

(10) Install the cover onto the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - INSTALLATION).

RESERVOIR TO EXPANSION VALVE

(1) Remove the tape or plugs from the rear liquid line fittings and the reservoir and expansion valve ports.

(2) Lubricate new O-ring seals with clean refrigerant oil and install them onto the rear liquid line fittings. Use only the specified O-ring seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(3) Connect the rear liquid line to the rear A/C expansion valve. Tighten the nut to 35 N·m (26 ft. lbs.).

(4) Route the liquid line through the opening in the roof and engage the grommet to the roof panel.

(5) Connect the rear liquid line to the rear refrigerant reservoir. Tighten the nut to 35 N·m (26 ft. lbs.).

(6) Reconnect the negative battery cable.

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

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

(9) Install the cover onto the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - INSTALLATION).

(10) Install the cover onto the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - INSTALLATION).

REAR RECEIVER / DRIER

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

(1) Disconnect and isolate the negative battery cable.

(2) Remove the air filter from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - REMOVAL).

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

(4) Remove the cover from the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - REMOVAL).

(5) Disconnect the rear refrigerant reservoir from the rear receiver/drier and remove and discard the O-ring seal (Fig. 33).

(6) Disconnect the liquid line from the rear receiver/drier and remove and discard the O-ring seal.

(7) Remove the bolt and retaining bracket that secures the rear receiver/drier to the rear A/C condenser housing and remove the receiver/drier.

(8) Install plugs into, or tape over the opened rear liquid line fitting and reservoir and receiver/drier ports.

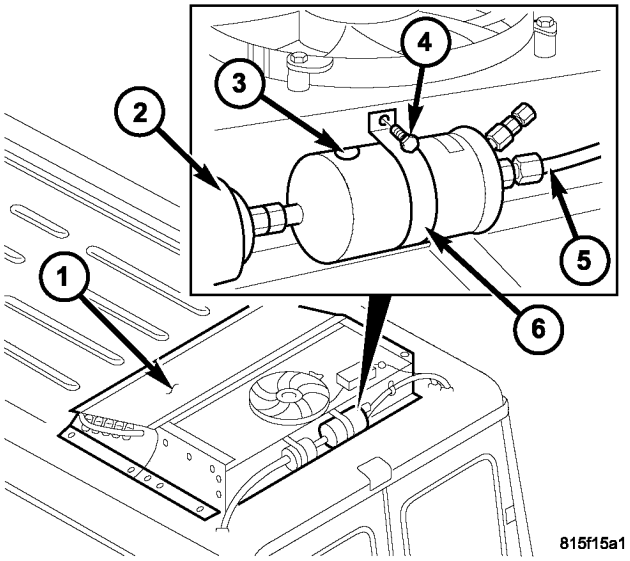

Fig. 33 Rear Receiver/Drier

1 - REAR A/C CONDENSER HOUSING
2 - REFRIGERANT RESEVOIR
3 - REAR RECEIVER/DRIER
4 - BOLT
5 - LIQUID LINE
6 - RETAINING BRACKET

INSTALLATION

NOTE: Be certain to add refrigerant oil if the rear receiver/drier is being replaced. The refrigerant oil must be drained from the old receiver/drier and measured to determine the amount of refrigerant oil to add to the new receiver/drier. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(1) If the rear receiver/drier is being replaced, install the correct amount and type of refrigerant oil into the new rear receiver/drier. Drain the old receiver/drier and measure the refrigerant oil. Fill the new receiver/drier with the same amount of new refrigerant oil that was drained out of the old receiver/drier.

NOTE: The rear receiver/drier is labeled with a direction-of-flow arrow to indicate refrigerant flow through the receiver/drier. Make sure to properly install the rear receiver/drier in the correct direction.

(2) Position the rear receiver/drier to the rear A/C condenser housing and install the retaining bracket and bolt. Tighten the bolt to 25 N·m (18 ft. lbs.).

(3) Remove the tape or plugs from the rear liquid line fitting and reservoir and receiver/drier ports.

(4) Lubricate a new O-ring seal with clean refrigerant oil and install it onto the rear liquid line fitting. Use only the specified O-ring seal as it is made of a special material for the R-134a system. Use only

refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(5) Connect the rear liquid line to the rear receiver/drier. Tighten the nut to 35 N·m (26 ft. lbs.).

(6) Lubricate a new O-ring seal with clean refrigerant oil and install it onto the receiver/drier outlet fitting. Use only the specified O-ring seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(7) Connect the rear refrigerant reservoir to the rear receiver/drier. Tighten the nut to 35 N·m (26 ft. lbs.).

(8) Reconnect the negative battery cable.

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

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

(11) Install the rear air filter (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - INSTALLATION).

(12) Install the cover onto the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - INSTALLATION).

REAR REFRIGERANT RESERVOIR

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

(1) Disconnect and isolate the negative battery cable.

(2) Remove the air filter from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - REMOVAL).

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

(4) Remove the cover from the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - REMOVAL).

(5) Disconnect the rear liquid line from the rear refrigerant reservoir and remove and discard the O-ring seal (Fig. 34).

(6) Disconnect the rear refrigerant reservoir from the rear receiver/drier and remove and discard the O-ring seal.

(7) Remove the bolt and retaining bracket that secures the rear refrigerant reservoir to the rear A/C condenser housing and remove the reservoir.

(8) Install plugs into, or tape over the opened rear liquid line fitting and receiver/drier and reservoir ports.

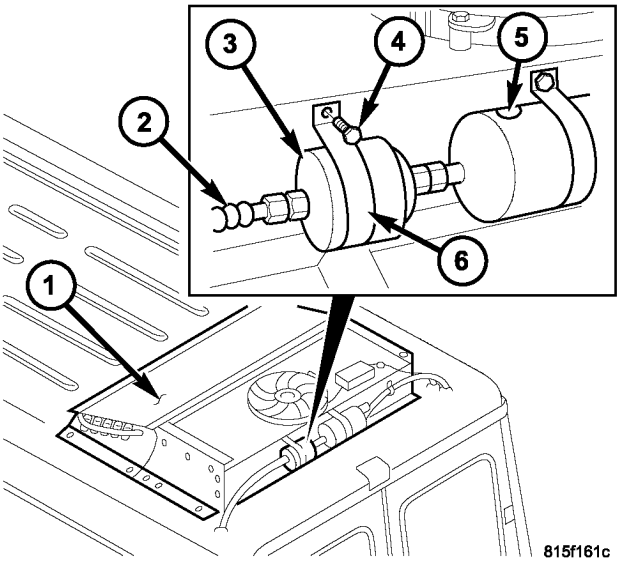

Fig. 34 Rear Refrigerant Reservoir

1 - REAR A/C CONDENSER HOUSING
2 - LIQUID LINE
3 - REAR REFRIGERANT RESERVOIR
4 - BOLT
5 - REAR RECEIVER/DRIER
6 - RETAINING BRACKET

INSTALLATION

NOTE: Be certain to add refrigerant oil if the rear refrigerant reservoir is being replaced. The refrigerant oil must be drained from the old refrigerant reservoir and measured to determine the amount of refrigerant oil to add to the new reservoir. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(1) If the rear refrigerant reservoir is being replaced, install the correct amount and type of refrigerant oil into the new rear refrigerant reservoir. Drain the old refrigerant reservoir and measure the refrigerant oil. Fill the new refrigerant reservoir with the same amount of new refrigerant oil that was drained out of the old reservoir.

(2) Install a new rear receiver/drier (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/ REAR RECEIVER/DRIER - INSTALLATION).

(3) Position the rear refrigerant reservoir to the rear A/C condenser housing and install the retaining bracket and bolt. Tighten the bolt to 25 N·m (18 ft. lbs.).

(4) Remove the tape or plugs from the rear liquid line fitting and receiver/drier and reservoir ports.

(5) Lubricate a new O-ring seal with clean refrigerant oil and install it onto the rear receiver/drier fitting. Use only the specified O-ring seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(6) Connect the rear receiver/drier to the rear refrigerant reservoir. Tighten the nut to 35 N·m (26 ft. lbs.).

(7) Lubricate a new O-ring seal with clean refrigerant oil and install it onto the rear liquid line fitting. Use only the specified O-ring seal as it is made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(8) Connect the rear liquid line to the rear refrigerant reservoir. Tighten the nut to 35 N·m (26 ft. lbs.).

(9) Reconnect the negative battery cable.

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

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

(12) Install the rear air filter (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/AIR FILTER - INSTALLATION).

(13) Install the cover onto the rear A/C condenser housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C CONDENSER COVER - INSTALLATION).

REAR SUCTION LINE

DESCRIPTION

The rear A/Csuction line is the refrigerant line that carries refrigerant from the rear A/C evaporator to the A/C underbody suction line (Fig. 35). The rear A/C suction line is retained to the left quarter panel by two plastic retaining clips.

CAUTION: Use only seals specified for the vehicle. Failure to use the correct seals will cause the refrigerant system connections to leak.

The rear A/C suction line has no serviceable parts except for the O-ring seals. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant and must be replaced whenever the rear A/C suction line is removed and installed.

If the rear A/C suction line is found to be leaking or damaged, it must be replaced.

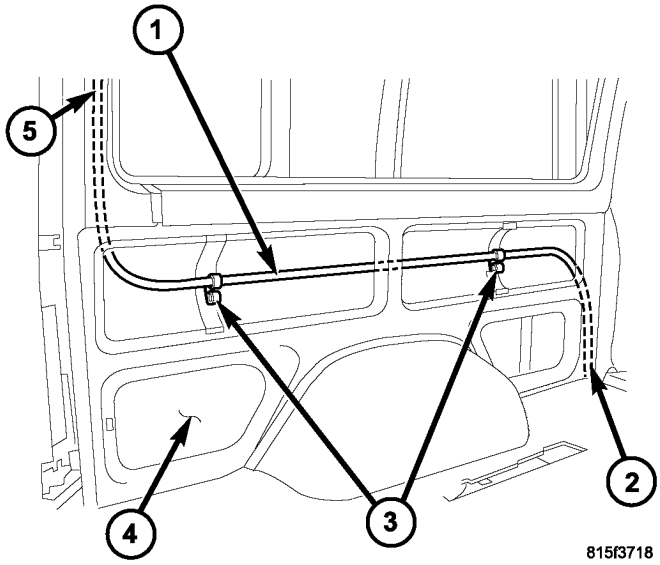

Fig. 35 Rear A/C Suction Line

1 - REAR A/C SUCTION LINE
2 - TO UNDERBODY SUCTION LINE
3 - RETAINING CLIPS
4 - LEFT INNER QUARTER PANEL
5 - TO REAR A/C EVAPORATOR

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

(1) Disconnect and isolate the negative battery cable.

(2) Remove the cover from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - REMOVAL).

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

(4) Remove the insulating tape from around the area of the rear A/C suction line and evaporator outlet tube (Fig. 36).

(5) From inside the vehicle, disconnect the rear A/C suction line from the rear A/C evaporator and remove and discard the O-ring seal.

(6) From underneath the vehicle, disconnect the rear A/C suction line from the underbody suction line and remove and discard the O-ring seal.

(7) Remove the left quarter trim panel (Refer to 23 - BODY/INTERIOR/QUARTER TRIM PANEL - REMOVAL).

(8) Remove the three foam insulators from the left inner quarter panel.

(9) Remove the foam rubber seal from the opening in the floor of the cargo compartment.

(10) Disengage the rear A/C suction line from the two retaining clips located on the inner quarter panel and remove the suction line.

(11) Install plugs into, or tape over the opened rear suction and underbody line fittings and evaporator tube.

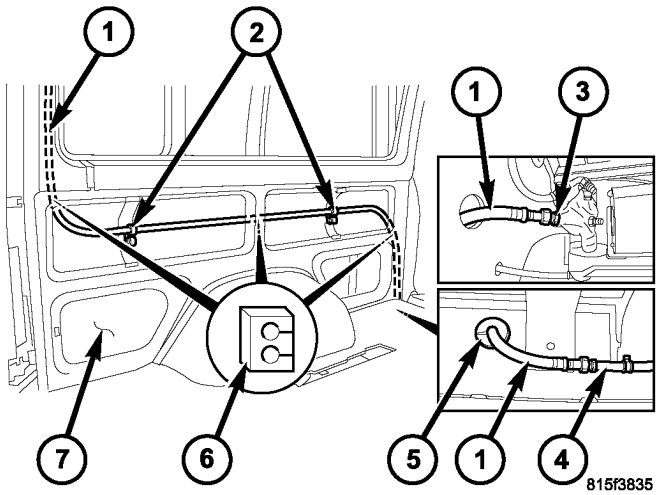

Fig. 36 Rear A/C Suction Line

1 - REAR A/C SUCTION LINE
2 - RETAINING CLIPS
3 - EVAPORATOR OUTLET TUBE
4 - UNDERBODY SUCTION LINE
5 - FOAM RUBBER SEAL
6 - FOAM INSULATORS
7 - LEFT INNER QUARTER PANEL

INSTALLATION

(1) Remove the tape or plugs from the rear suction and underbody line fittings and the rear evaporator tube.

(2) Lubricate new O-ring seals with clean refrigerant oil and install them onto the rear suction line fittings. Use only the specified O-ring seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the rear A/C compressor in the vehicle.

(3) Position the rear A/C suction line to the left inner quarter panel and install it into the two retaining clips.

(4) From inside the vehicle, connect the rear A/C suction line to the rear A/C evaporator. Tighten the nut to 35 N·m (26 ft. lbs.).

(5) From underneath the vehicle, connect the rear A/C suction line to the underbody suction line. Tighten the nut to 35 N·m (26 ft. lbs.).

(6) Install the three foam insulators to the left inner quarter panel.

(7) Install the foam rubber seal into the floor panel.

(8) Install the left quarter trim panel (Refer to 23 - BODY/INTERIOR/QUARTER TRIM PANEL - INSTALLATION).

(9) Reconnect the negative battery cable.

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

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

(12) Install the cover onto the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - INSTALLATION).

REFRIGERANT LINE COUPLER

DESCRIPTION

A spring-lock type refrigerant line coupler is used to connect the front section of the underbody discharge line to the compressor section of the discharge line. A secondary retaining clip may be installed over the connected coupler for added protection.

The spring-lock refrigerant line coupler requires a special disconnect tool for disengaging the two coupler halves.

OPERATION

The spring-lock coupler is held together by a garter spring inside a circular cage on the male half of the fitting (Fig. 37). When the two coupler halves are connected, the flared end of the female fitting slips behind the garter spring inside the cage on the male fitting. The garter spring and cage prevent the flared end of the female fitting from pulling out of the cage.

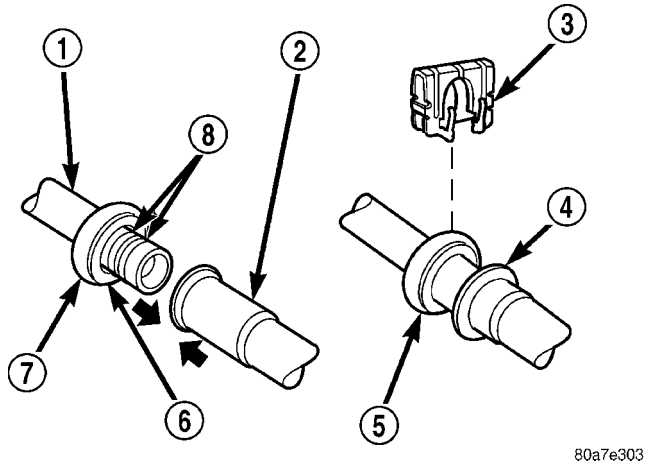

Fig. 37 Spring-Lock Coupler - Typical

1 - MALE HALF SPRING-LOCK COUPLER
2 - FEMALE HALF SPRING-LOCK COUPLER
3 - SECONDARY CLIP
4 - CONNECTION INDICATOR RING
5 - COUPLER CAGE
6 - GARTER SPRING
7 - COUPLER CAGE
8 - O-RING SEALS

Two O-rings on the male half of the fitting are used to seal the connection. These O-rings are compatible with R-134a refrigerant and must be replaced with O-rings made of the same material.

Secondary clips are installed over the two connected coupler halves at the factory for added blowoff protection. In addition, some models have a plastic ring that is used at the factory as a visual indicator to confirm that these couplers are connected. After the coupler is connected, the plastic indicator ring is no longer needed; however, it will remain on the refrigerant line near the coupler cage.

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

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

(2) Remove the secondary retaining clip from the spring-lock coupler.

(3) Fit the proper size A/C line disconnect tool (Special Tool Kit 7193) over the spring-lock coupler cage (Fig. 38).

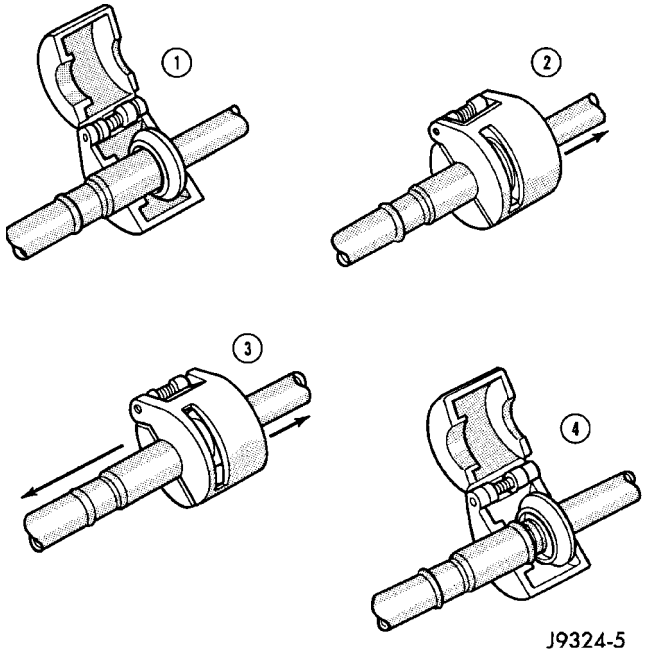

Fig. 38 Refrigerant Line Spring-Lock Coupler Disconnect

(4) Close the two halves of the A/C line disconnect tool around the spring-lock coupler.

(5) Push the A/C line disconnect tool into the open side of the coupler cage to expand the garter spring. Once the garter spring is expanded and while still pushing the disconnect tool into the open side of the coupler cage, pull on the refrigerant line attached to the female half of the coupler fitting until the flange on the female fitting is separated from the garter spring and cage on the male fitting within the disconnect tool.

NOTE: The garter spring may not release if the A/C line disconnect tool is cocked while pushing it into the coupler cage opening.

(6) Open and remove the A/C line disconnect tool from the disconnected spring-lock coupler.

(7) Complete the separation of the two halves of the coupler fitting.

INSTALLATION

(1) Check to ensure that the garter spring is located within the cage of the male coupler fitting, and that the garter spring is not damaged.

(a) If the garter spring is missing, install a new spring by pushing it into the coupler cage opening.

(b) If the garter spring is damaged, remove it from the coupler cage with a small wire hook (DO NOT use a screwdriver) and install a new garter spring.

(2) Clean any dirt or foreign material from both halves of the coupler fitting.

(3) Install new O-rings on the male half of the coupler fitting.

CAUTION: Use only the specified O-rings as they are made of a special material for the R-134a system. The use of any other O-rings may allow the connection to leak intermittently during vehicle operation.

(4) Lubricate the male fitting and O-rings, and the inside of the female fitting with clean R-134a refrigerant oil. Use only refrigerant oil of the type recommended for the compressor in the vehicle.

(5) Fit the female half of the coupler fitting over the male half of the fitting.

(6) Push together firmly on the two halves of the coupler fitting until the garter spring in the cage on the male half of the fitting snaps over the flanged end on the female half of the fitting.

(7) Ensure that the spring-lock coupler is fully engaged by trying to separate the two coupler halves. This is done by pulling the refrigerant lines on either side of the coupler away from each other.

(8) Reinstall the secondary retaining clip over the spring-lock coupler cage.

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

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

UNDERBODY LINES

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - WARNINGS) and (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING - CAUTIONS). Failure to follow the warnings and cautions could result in possible personal injury or death.

NOTE: The underbody refrigerant lines for the optional rear A/C system are serviced in five sections. Two sections are connected the A/C compressor. Two sections of the underbody suction line (low-side) are connected together by a tapping block with an O-ring seal. The underbody A/C discharge line uses a spring-lock type refrigerant line coupler with an O-ring seal.

DISCHARGE LINE

(1) Remove the cover from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - REMOVAL).

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

(3) Raise and support the vehicle.

(4) Using the proper A/C line disconnect tool, disconnect the underbody discharge line spring-lock coupler from the compressor section of the underbody discharge line and remove and discard the O-ring seal (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REFRIGERANT LINE COUPLER - REMOVAL) (Fig. 39).

(5) Disconnect the underbody discharge line from the rear A/C discharge line and remove and discard the O-ring seal.

(6) Install plug in, or tape over all of the opened discharge line fittings.

(7) Disengage the fuel lines from the retaining clip located near the transmission and position the fuel lines out of the way.

(8) Remove the screws and brackets that secure the discharge line to the underneath of the vehicle.

(9) Support transmission with a suitable lifting device and remove the rear transmission crossmember (Refer to 13 - FRAME & BUMPERS/FRAME/REAR CROSSMEMBER-TRANSMISSION - REMOVAL).

(10) Remove the underbody discharge line from the vehicle. Push the discharge line forward and over the transmission, then pull it rearward to remove.

(11) If necessary, remove the bolt that secures the compressor section of the underbody discharge line to the A/C compressor and remove and discard the O-ring seal. Make sure to plug in, or tape over the opened discharge line fitting and compressor port.

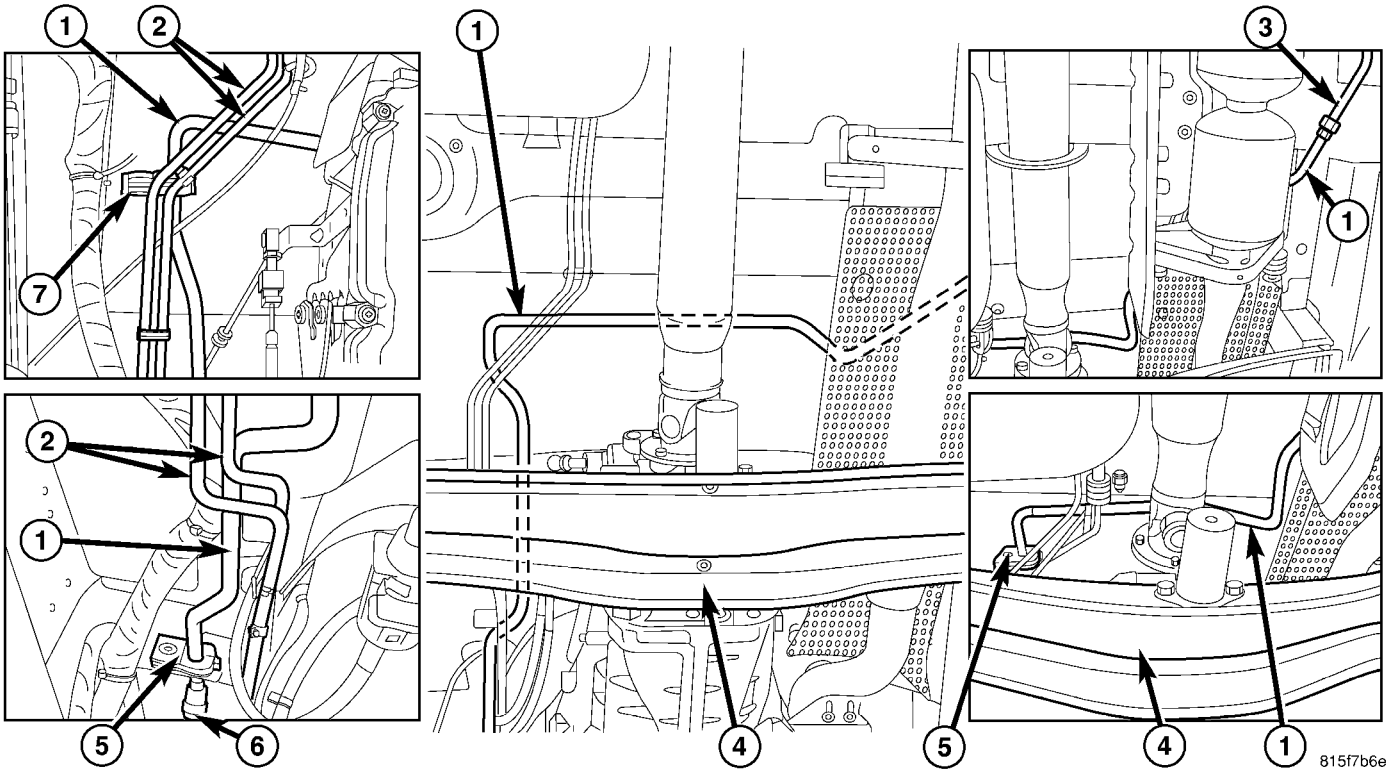

Fig. 39 Underbody Discharge Line

1 - UNDERBODY DISCHARGE LINE
2 - FUEL LINES
3 - REAR A/C DISCHARGE
4 - REAR TRANSMISSION CROSSMEMBER
5 - SCREW AND BRACKET (2)
6 - DISCHARGE LINE-COMPRESSOR SECTION
7 - RETAINING CLIP

SUCTION LINE - FRONT SECTION

(1) Remove the cover from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - REMOVAL).

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

(3) Raise and support the vehicle.

(4) Disconnect the connection of the front section of the underbody suction line from the compressor section of the underbody suction line and remove and discard the O-ring seal (Fig. 40).

(5) Remove the bolt that secures the connection of the front section of the underbody suction line to the rear section of the underbody suction line.

(6) Disconnect the front section of the underbody suction line from the rear section and remove and discard the O-ring seal.

(7) Install plug in, or tape over all of the opened suction line fittings.

(8) Remove the screws and brackets that secure the front section of the underbody suction line to the underneath of the vehicle and remove the front section of the suction line.

(9) If necessary, remove the bolt that secures the compressor section of the underbody suction line to the A/C compressor and remove and discard the O-ring seal. Make sure to plug in, or tape over the opened underbody suction line fitting and compressor port.

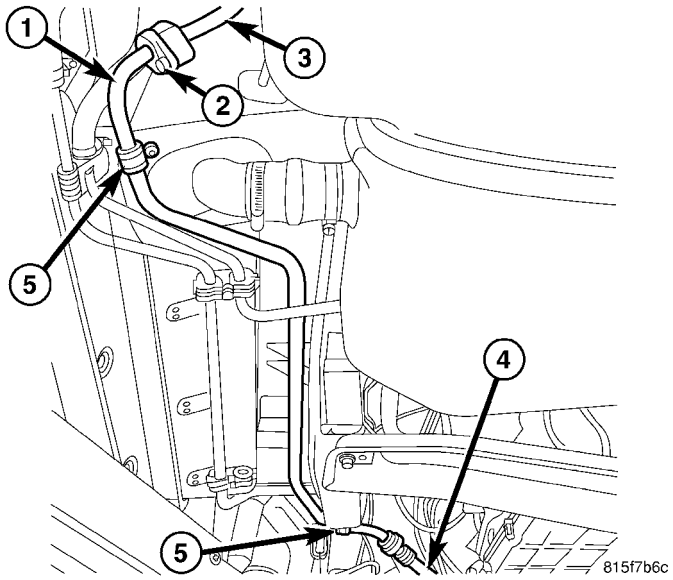

Fig. 40 Underbody Suction Line - Front Section

1 - UNDERBODY SUCTION LINE-FRONT SECTION
2 - BOLT
3 - UNDERBODY SUCTION LINE-REAR SECTION
4 - SUCTION LINE-COMPRESSOR SECTION
5 - SCREW AND BRACKET (2)

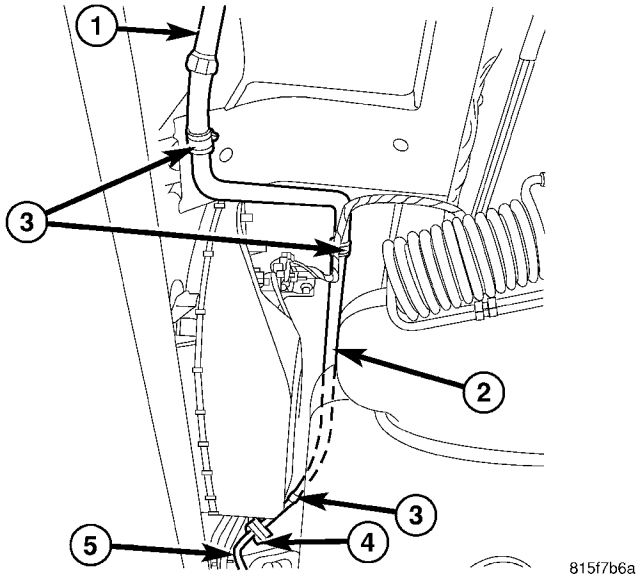

Fig. 41 Underbody Suction Line - Rear Section

1 - REAR A/C DISCHARGE LINE
2 - UNDERBODY SUCTION LINE-REAR SECTION
3 - SCREW AND BRACKET (3)
4 - BOLT
5 - UNDERBODY SUCTION LINE-FRONT SECTION

SUCTION LINE - REAR SECTION

(1) Remove the cover from the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - REMOVAL).

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

(3) Raise and support the vehicle.

(4) Remove the bolt that secures the connection of the front section of the underbody suction line to the rear section of the underbody suction line (Fig. 41).

(5) Disconnect the front section of the underbody suction line from the rear section and remove and discard the O-ring seal.

(6) Disconnect the rear section of the underbody suction line from the rear A/C suction line and remove and discard the O-ring seal.

(7) Install plug in, or tape over all of the opened suction line fittings.

(8) Remove the screws and brackets that secure the rear section of the underbody suction line to the underneath of the vehicle and remove the rear section of the suction line.

INSTALLATION

DISCHARGE LINE

(1) If the compressor section of the underbody discharge line was removed from the A/C compressor, remove plugs or tape from the discharge line fitting, lubricate a new rubber O-ring seal with clean refrigerant oil, install it onto the discharge line fitting and install the bolt that secures the discharge line to the compressor. Tighten the bolt to 21 N·m (15 ft. lbs.).

(2) Position the underbody discharge line to the vehicle.

(3) Install the brackets and screws that secure the underbody discharge line to the underneath of the vehicle. Tighten the screws to 8 N·m (70 in. lbs.).

(4) Engage the fuel lines to the retaining clips located near the transmission.

(5) Install the rear transmission crossmember (Refer to 13 - FRAME & BUMPERS/FRAME/REAR CROSSMEMBER-TRANSMISSION - INSTALLATION).

(6) Remove the plugs or tape from the discharge line fittings.

(7) Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the discharge line fittings.

(8) Connect the underbody discharge line spring-lock coupler to the compressor section of the discharge line and install the secondary retaining clip (if equipped) (Refer to 24 - HEATING & AIR CONDITIONING/PLUMBING/REFRIGERANT LINE COUPLER - INSTALLATION).

(9) Connect the rear A/C discharge line to the underbody discharge line. Tighten the nut to 35 N·m (26 ft. lbs.).

(10) Lower the vehicle.

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

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

(13) Install the cover onto the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - INSTALLATION).

SUCTION LINE - FRONT SECTION

(1) If the compressor section of the underbody suction line was removed from the A/C compressor, remove plugs or tape from the suction line fitting, lubricate a new rubber O-ring seal with clean refrigerant oil, install it onto the suction line fitting and install the bolt that secures the suction line to the compressor. Tighten the bolt to 21 N·m (15 ft. lbs.).

(2) Position the front section of the underbody suction line to the vehicle.

(3) Install the brackets and screws that secure the front section of the underbody suction line to the underneath of the vehicle. Tighten the screws to 8 N·m (70 in. lbs.).

(4) Remove the plugs or tape from the suction line fittings.

(5) Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the suction line fittings.

(6) Connect the front section of the underbody suction line to the compressor section of the suction line. Tighten the nut to 35 N·m (26 ft. lbs.).

(7) Connect the front section of the underbody suction line to the rear section of the suction line and install the retaining bolt. Tighten the bolt to 25 N·m (18 ft. lbs.).

(8) Lower the vehicle.

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

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

(11) Install the cover onto the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - INSTALLATION).

SUCTION LINE - REAR SECTION

(1) Position the rear section of the underbody suction line to the vehicle.

(2) Install the brackets and screws that secure the rear section of the underbody suction line to the underneath of the vehicle. Tighten the screws to 8 N·m (70 in. lbs.).

(3) Remove the plugs or tape from the suction line fittings.

(4) Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the suction line fittings.

(5) Connect the rear section of the underbody suction line to the front section of the suction line and install the retaining bolt. Tighten the bolt to 25 N·m (18 ft. lbs.).

(6) Connect the rear section of the underbody suction line to the rear A/C suction line. Tighten the nut to 35 N·m (26 ft. lbs.).

(7) Lower the vehicle.

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

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

(10) Install the cover onto the rear A/C evaporator housing (Refer to 24 - HEATING & AIR CONDITIONING/DISTRIBUTION - REAR/A/C EVAPORATOR COVER-REAR - INSTALLATION).

CABIN HEATER

TABLE OF CONTENTS

CABIN HEATER

DESCRIPTION

Vehicles equipped with the diesel engine are also equipped with a supplemental cabin heater. This cabin heater is mounted under the vehicle and operates similar to an oil fired furnace. The heater burns small amounts of fuel to provide additional heat to the coolant. Coolant is routed from the engine, to the supplemental cabin heater and then to the front heater core. This provides additional heat to the passenger compartment. The supplemental cabin heater system is interfaced to the vehicles on-board computer systems and DRBIII® diagnostics.

The supplemental cabin heater has an electronic control module that monitors the heat output of the heater. The cabin heater operates at full load (5 kW), half load or idle mode (no additional heat) depending on engine coolant temperature.

OPERATION

The supplemental cabin heater is activated by using the temperature control on the A/C-heater control. The supplemental cabin heater is activated when the temperature control is set to/or above the upper set point. The supplemental cabin heater can operate in a full or partial load range as well as an idle mode, all dependent on the engine coolant temperature. The heater unit will also turn off if the temperature control is set to less than the lower set point. The supplemental cabin heater can take up to three minutes to completely shut down when either the heater temperature is set below the lower set point or the vehicle ignition is turned off.

The supplemental cabin heater only operates when the engine is running, the mileage exceeds 8 kilometer (5 mph) and the fuel tank volume exceeds 1/8 of a tank. The heater should start if the coolant temperature is below 40° C (104° F).

NOTE: Do not apply a strong vacuum directly on the supplemental cabin heater exhaust line. Place the vacuum within 75 mm (3 inches) of the exhaust port. Too strong of a vacuum can prevent the heater from starting. The heater control module monitors the blower speed and combustion during its start-up.

DIAGNOSIS AND TESTING

SUPPLEMENTAL CABIN HEATER

Refer to the Symptoms Diagnosis table for basic checks of the diesel fueled supplemental cabin heater.

SYMPTOMS DIAGNOSIS

Symptom	Possible Causes
Smell of diesel fuel.	Check cabin heater system integration in vehicle's fuel system. Check fuel lines for leakage, kinks or obstructions. If OK, Inspect the inlet muffler, drain as necessary. Re-test the cabin heater and re-inspect. Inspect the exhaust tube and cabin heater for the presence of external fuel. If presence of external fuel is observed on the heater unit or in the exhaust tube or after draining and testing. Remove the cabin heater from vehicle and repair or replace components as required.
Heater does not achieve full load operation.	Check cabin heater operation with DRBIII® scan tool and replace components as required.
Continuous white smoke from heater exhaust during combustion operation.	Check cabin heater operation with DRBIII® scan tool and replace components as required. White smoke is typical in extreme weather conditions.
Heater can not be switched off.	Check cabin heater operation with DRBIII® scan tool and replace components as required.
Heater does not operate.	Diagnosis cabin heater control module using the DRBIII® scan tool and the procedures listed in Vehicle Performance under Cabin Heater Diagnosis in Group 18.
Loss of coolant (Leakage) or heater develops smoke during combustion operation and exhaust has an extremely sweet smell.	Inspect coolant hoses for leakage, kinks or loose hose connection. Inspect the exhaust tube assembly for continuous flow, if OK there is an internal heater leak and cabin heater should be inspected and components should be replaced as required.
Loss of fuel (dripping).	Check cabin heater system integration in vehicles fuel system. Check fuel line connection for leakage. If OK there is an internal leak and cabin heater should be inspected and replaced as required.

EXHAUST TUBE

REMOVAL

WARNING: There is a potential danger of skin burns as the supplemental cabin heater unit and its components can become very hot. Make sure the heater unit is allowed to cool down before any service work on the cabin heater system is attempted. Failure to observe this warning may result in possible personal injury.

(1) Raise and support the vehicle while taking note of the location of the flexible exhaust tube section.

(2) Remove the exhaust clamp at the flexible pipe and steel pipe connection (Fig. 1).

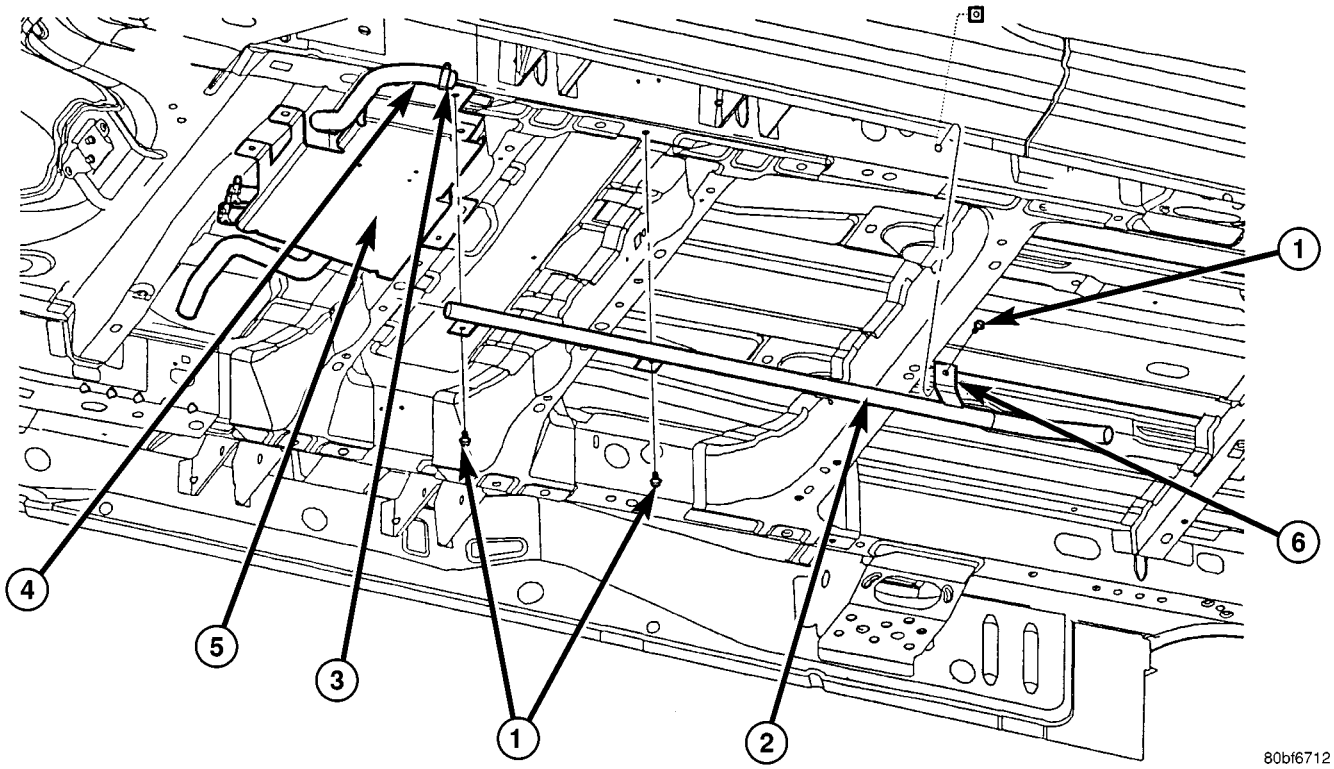

Fig. 1 Cabin Heater Exhaust System

1 - MOUNTING SCREW (3)
2 - STEEL HEATER EXHAUST PIPE
3 - EXHAUST CLAMP (2)
4 - FLEXIBLE HEATER EXHAUST PIPE
5 - HEATER SHIELD
6 - EXHAUST PIPE MOUNTING CLIP (3)

(3) Remove the clamp at the flexible pipe connection and the supplemental heater housing (if required).

(4) Remove the three screws holding the exhaust pipe to the body.

(5) Remove the steel exhaust pipe from the vehicle.

(6) Remove the flexible exhaust pipe from the vehicle (if required).

INSTALLATION

(1) Install the flexible exhaust pipe to the heater unit. Tighten mounting clamp securely.

(2) Position the steel exhaust pipe to the flexible exhaust and install and tighten the mounting clamp securely.

(3) Install the three exhaust pipe screws, adjust pipe placement as needed and tighten the screws securely.

(4) Install the clamp to connect the steel exhaust pipe to the flexible exhaust pipe and tighten clamp securely.

(5) Check exhaust pipe exhaust end placement and make any final adjustments.

(6) Lower the vehicle.

FUEL DOSING PUMP

DESCRIPTION

The dosing pump is a combined delivery, dosing and shut-off system for the fuel supply to the supplemental cabin heater from the vehicle fuel tank.

OPERATION

The dosing pump is an electrically operated pump that receives its operation instructions from the supplemental cabin heater control module. The pump supplies diesel fuel from the vehicle fuel tank to the cabin heater.

REMOVAL

NOTE: The dosing pump is serviceable without removing the component from the vehicle.

(1) Disconnect the rubber hose at the fuel line to heater fuel pump. Leave the rubber hose on the fuel line (Refer to 24 - HEATING & AIR CONDITIONING/CABIN HEATER/FUEL LINE - REMOVAL) (Fig. 2).

(2) Disconnect the fuel line between the dosing pump and the cabin heater unit.

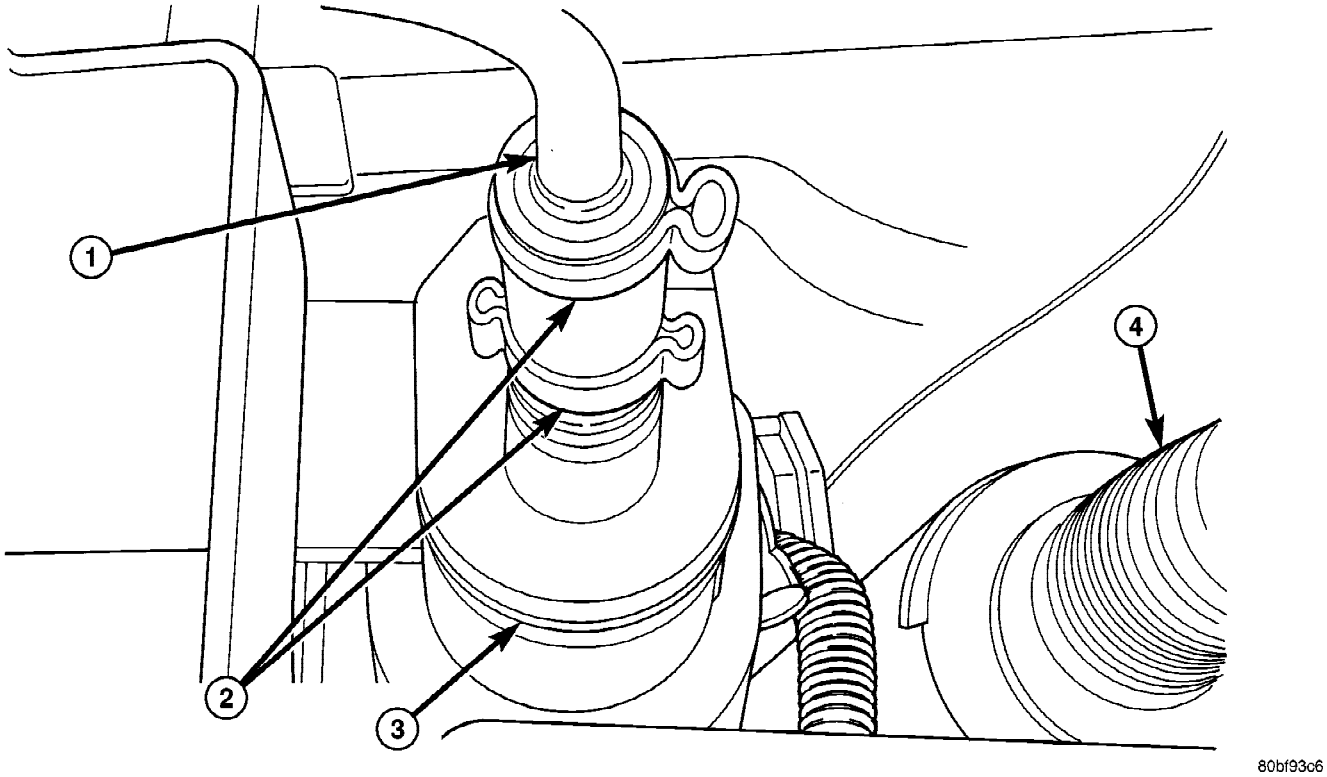

Fig. 2 Cabin Heater Dosing Pump Fuel Line

1 - FUEL LINE
2 - RETAINING CLAMP
3 - DOSING PUMP
4 - HEATER AIR INTAKE PIPE

NOTE: Position and retain the heater fuel line to prevent fuel leakage while servicing the dosing pump.

NOTE: Utilize an approved fuel storage container to catch any residual fuel.

(3) Disconnect the wiring harness connector to the fuel pump by depressing the integral spring and pulling the connector away from the pump.

(4) Remove the dosing pump from the rubber isolator.

INSTALLATION

(1) Install the dosing pump onto the rubber isolator.

(2) Connect the fuel lines to the dosing pump and the cabin heater unit.

NOTE: The connectors should point towards the cabin heater fuel line.

(3) Use aviation style clamps to attach the hose to the fuel pump nipples (Refer to 24 - HEATING & AIR CONDITIONING/CABIN HEATER/FUEL LINE - INSTALLATION).

(4) Connect the wire harness connector to the fuel pump by depressing the integral spring and pushing the connector towards the dosing pump. Pull the connector towards the cabin heater to verify the installation.

(5) Verify function of the supplemental cabin heater.

FUEL LINE

STANDARD PROCEDURE

CLEANING

(1) Remove the cabin heater fuel line (Refer to 24 - HEATING & AIR CONDITIONING/CABIN HEATER/FUEL LINE - REMOVAL).

(2) With the cabin heater fuel line removed from the vehicle, place a shop cloth on the fuel tank end of the fuel line to catch any residue, then apply a small amount of air pressure to the other end of the fuel line.

(3) Check to see if air pressure is coming from the tank end of the line. If pressure is flowing unrestricted the line is clean.

(4) If the fuel line shows any signs of being restricted after air pressure is applied, the fuel line should be replaced.

(5) Install the cabin heater fuel line (Refer to 24 - HEATING & AIR CONDITIONING/CABIN HEATER/FUEL LINE - INSTALLATION).
(6) Verify function of the cabin heater.

REMOVAL

(1) Raise and support the vehicle. Take note of the location of the flexible section of the cabin heater exhaust tube.

NOTE: Have an approved fuel holding device ready to capture any diesel fuel that drains from the fuel line or cabin heater unit.

(2) Remove clamps on dosing pump end of fuel line and separate line from the pump (Fig. 3).

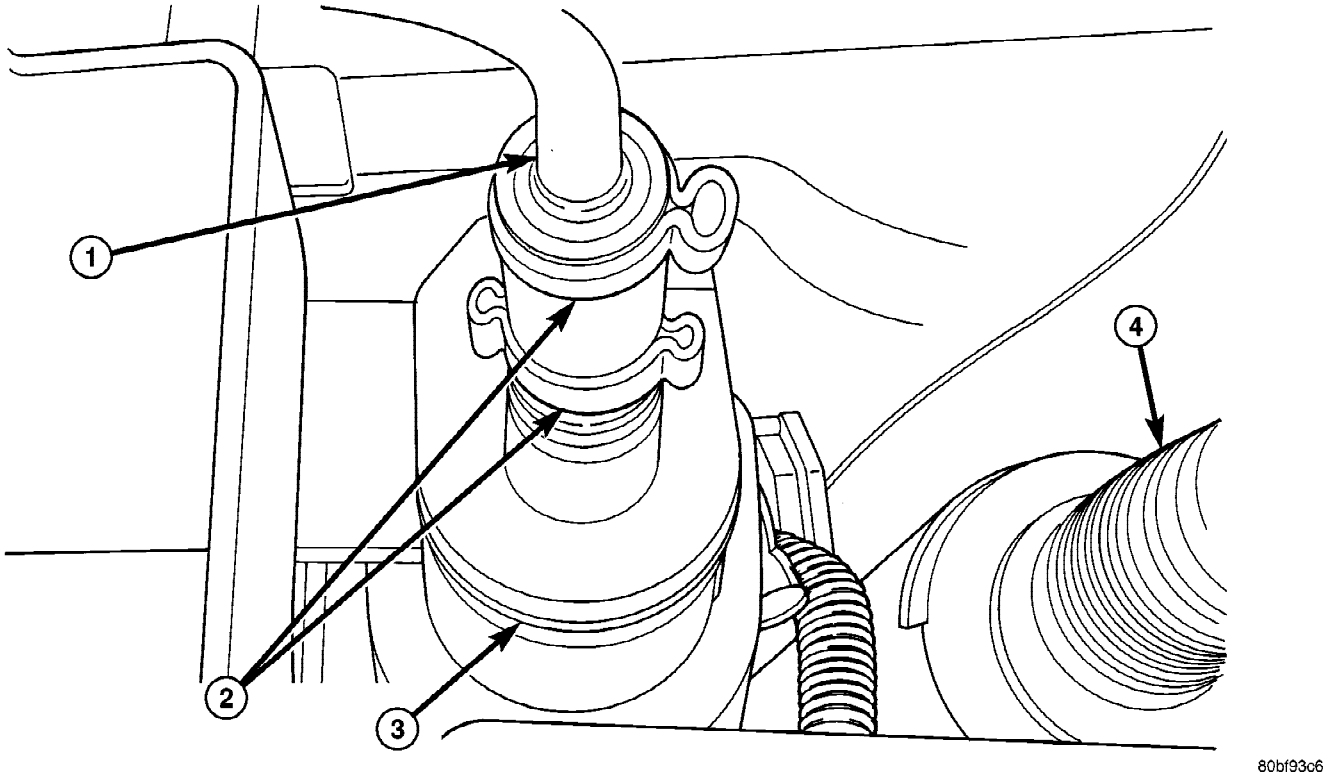

Fig. 3 Cabin Heater Dosing Pump Fuel Line

1 - FUEL LINE
2 - RETAINING CLAMP
3 - DOSING PUMP
4 - HEATER AIR INTAKE PIPE

(3) Remove clamp from the fuel line at the fuel tank connection and separate the line from the tank.
(4) Remove any retaining clips and remove the fuel line from vehicle.

INSTALLATION

WARNING: Do not operate the diesel supplemental cabin heater in an enclosed area such as a garage that does not have exhaust ventilation facilities. Always vent the cabin heater exhaust when operating the cabin heater. Allow the diesel supplemental cabin heater to cool before performing any service procedures to the cabin heater. Verify that all diesel supplemental cabin heater fuel lines are securely fastened to their respective components before performing any service procedures to the cabin heater. Failure to follow these warnings may result in possible personal injury or death.

NOTE: Verify that there is more than 1/8 of a tank of fuel in the vehicle's fuel tank before performing this procedure. Add fuel, if necessary.

(1) Install the cabin heater fuel supply line into vehicle and fuel line retainers.
(2) Install the fuel line connection at the fuel tank and tighten the connection securely.
(3) Install the fuel line at the dosing pump and tighten the connection securely.
(4) Lower the vehicle.

NOTE: Failure to prime the dosing pump after draining the supplemental cabin fuel line will prevent cabin heater activation during the first attempt to start the cabin heater. This will also set a diagnostic trouble code (DTC) in the cabin heater control's memory. Do not perform the Dosing Pump Priming procedure if an attempt was made to start the cabin heater without priming the dosing pump first. This will put excess fuel in the cabin heater and cause smoke to emit from the cabin heater exhaust pipe when cabin heater activation occurs.

(5) Connect the DRBIII® scan tool to the diagnostic link connector.
(6) Turn the ignition to the ON position.

NOTE: Do not activate the dosing pump prime more than one time. This will put excess fuel in the supplemental cabin heater and cause smoke to emit from the cabin heater exhaust pipe when cabin heater activation occurs.

NOTE: A clicking noise heard coming from the dosing pump indicates that the pump is operational.

(7) With the DRBIII® scan tool in Cabin Heater, select System Tests and Dosing Pump Prime. Allow the dosing pump to run for the full 45 second cycle time. When the 45 second cycle is complete, press Page Back on the DRBIII® scan tool key pad to exit the Dosing Pump Prime. The Dosing Pump Priming procedure is now complete.

HEATER UNIT

REMOVAL

HEATER UNIT

WARNING: Do not operate the diesel supplemental cabin heater in an enclosed area such as a garage that does not have exhaust ventilation facilities. Always vent the cabin heater exhaust when operating the cabin heater. Allow the diesel supplemental cabin heater to cool before performing any service procedures to the cabin heater. Verify that all diesel supplemental cabin heater fuel lines are securely fastened to their respective components before performing any service procedures to the cabin heater. Failure to follow these warnings may result in possible personal injury or death.

(1) Raise and support the vehicle. Take note of the location of the flexible section of the cabin heater exhaust tube.

(2) Drain the engine cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE - DRAINING COOLING SYSTEM).

(3) Carefully open one hose to the underbody tube assembly and drain the remaining coolant. A salvage hose is a good idea to control the residual coolant, as flow will occur from both the cabin heater and the hose and tube assemblies.

(4) Remove the second hose from the underbody hose and tube assembly.

(5) Loosen the hose and tube assembly from the toe-board crossmember at two locations.

(6) Disconnect the electrical connector from the body harness near the toe-board crossmember and rail.

(7) Remove the wiring harness from the toe-board crossmember (Refer to 24 - HEATING & AIR CONDITIONING/CABIN HEATER/HEATER UNIT - REMOVAL - WIRE HARNESS).

(8) Open the fuel filler cap. Disconnect the rubber fuel hose between the body tube assembly and the fuel pump nipple at the body tube joint. A minimal amount of fuel may flow from the open port.

NOTE: Utilize an approved fuel storage container to catch any residual fuel.

(9) Loosen the two fasteners at the rail. Take care to notice that the exhaust tube bracket tab is on top of the heater bracket and that there are two spacer washers installed between the rubber grommets.

(10) Remove the flexible section of the cabin heater exhaust tube from the exhaust tube by loosening the clamp. Remove the hose from the exhaust tube. Removal of the rail tube assembly may aid in this service operation (Refer to 24 - HEATING & AIR CONDITIONING/CABIN HEATER/EXHAUST TUBE - REMOVAL).

(11) Remove seat hex nut at the heater mounting flange to crossmember.

(12) Loosen the remaining fasteners which mount the exhaust tube assembly to the vehicle.

(a) Install a suitable support device under the cabin heater and secure the cabin heater to the support.

(13) Loosen the remaining three fasteners to the crossmembers.

(14) Remove the loosened fasteners that support the cabin heater while supporting the weight of the heater.

(15) Swing the cabin heater mounting bracket from between the exhaust bracket and rail mounting location. Drain any residual coolant from the cabin heater.

(16) Remove the cabin heater from the vehicle.

WIRE HARNESS

(1) Raise and support the vehicle while taking note of the location of the flexible exhaust tube section.

(2) Disconnect the cabin heater wire harness connector from the vehicle wiring harness.

(3) Disconnect the cabin heater wire harness connector from the dosing pump.

(4) Disconnect the two cabin heater wire harness connectors from the cabin heater controller.

(5) Remove two wiring harness retainers from the underbody.

(6) Remove two wiring harness retainers from the cabin heater shield.

(7) Carefully route the cabin heater wire harness out the left side between the heater unit and the heater shield.

INSTALLATION

HEATER UNIT

(1) Install the cabin heater mounting bracket between the exhaust bracket and the rail mounting location.

(2) Support the cabin heater and install the fasteners that secure the cabin heater to the mounting bracket.

(3) Install the three fasteners to the crossmembers. Tighten the M6 fasteners to 7 N·m (62 in. lbs.).

(4) Position the two spacer washers between the body and the rubber grommets for the two mounting points on the rail.

(5) Tighten the remaining M6 fasteners to 7 N·m (62 in. lbs.) and the M8 fasteners to 23 N·m (17 ft. lbs.) which mount the exhaust tube assembly to the vehicle.

(6) Install the seat hex nut at the heater mounting flange to the crossmembers. Tighten the nut to 60 N·m (44 ft. lbs.)

(7) Install the flexible section of the cabin heater exhaust tube to the exhaust tube. Tighten the M6 bolt of the clamp securley. Install the hose to the exhaust tube.

(8) Tighten the two M8 fasteners at the rail to 23 N·m (17 ft. lbs.). Taking care so that the exhaust tube bracket tab is on the top of the heater bracket.

(9) Install the wiring harness (Refer to 24 - HEATING & AIR CONDITIONING/CABIN HEATER/ HEATER UNIT - INSTALLATION - WIRE HARNESS).

(10) Tighten the hose and tube assembly to the toe-board crossmember at two locations.

(11) Install the second hose to the underbody hose and tube assembly.

(12) Connect the rubber fuel hose between the body tube assembly and the fuel pump nipple at the body tube joint. Close the fuel fill cap.

(13) Remove the cabin heater support device from under the vehicle.

(14) Lower the vehicle.

(15) Fill the engine cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE - COOLING SYSTEM FILL).

(16) Verify function of the heater unit.

WIRE HARNESS

(1) Carefully route the cabin heater wire harness from the left side between the heater unit and the heater shield.

(2) Install the two wiring harness retainers to the cabin heater shield.

(3) Route the wiring harness along the underside of the vehicle and install the two wiring harness retainers to the underbody.

(4) Connect the two cabin heater wire harness connectors to the cabin heater controller.

(5) Connect the cabin heater wire harness to the dosing pump.

(6) Connect the cabin heater wire harness connector to the vehicle wiring harness.

(7) Lower the vehicle.

(8) Verify function of the heater unit.

INLET HOSE

REMOVAL

NOTE: The air intake tube for the supplemental cabin heater is part of an assembly that includes the heater cooling intake and return pipes. If the cabin heater air intake tube requires removal or replacement the entire cabin heater assembly will require removal or replacement.

(1) Drain the engine cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE - DRAINING COOLING STSTEM).

(2) Remove clamps from the cabin heater tubes at the lower heater port and the lower EGR connector which are located under the hood.

(3) Remove the retaining clamp at the cabin heater air intake muffler connection (Refer to 24 - HEATING & AIR CONDITIONING/CABIN HEATER/INLET MUFFLER - REMOVAL).

(4) Remove the clamp at the flexible tube to steel tube connection (Fig. 4).

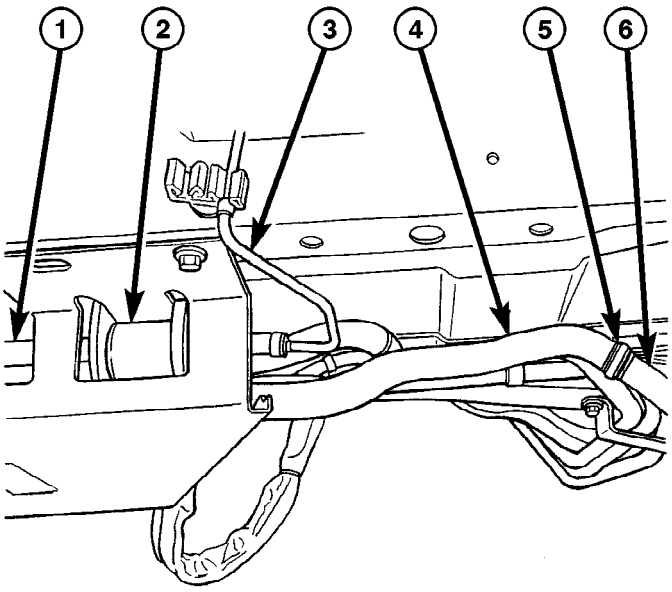

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Fig. 4 Cabin Heater Flexible Air Intake Line

1 - CABIN HEATER AND SPLASH SHIELD
2 - DOSING PUMP
3 - DOSING PUMP FUEL LINE
4 - FLEXIBLE INTAKE LINE
5 - CLAMP
6 - STEEL INTAKE PIPE

(5) Remove the two retaining screws and remove pipe assembly (Fig. 5).

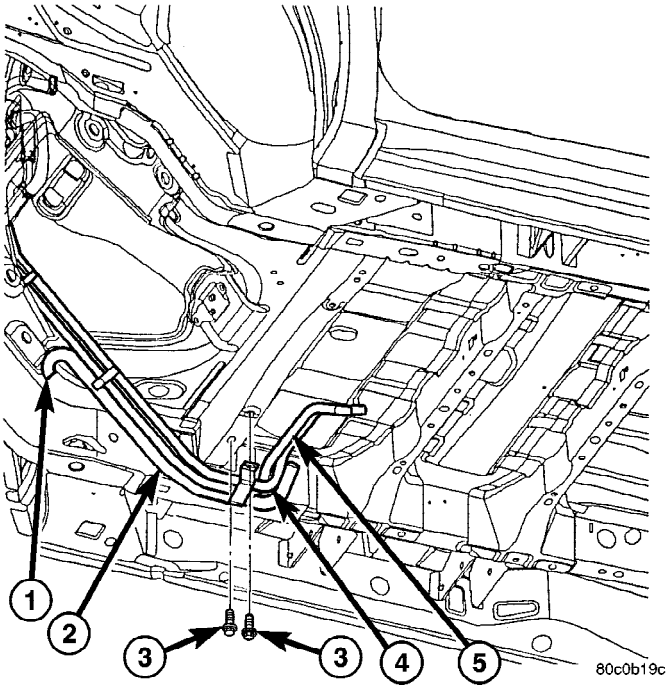

Fig. 5 Cabin Heater Air Intake And Heater Pipe Assembly

1 - INTAKE TUBE AIR INTAKE
2 - INTAKE PIPE
3 - RETAINING SCREWS
4 - INTAKE HEATER LINE
5 - RETURN HEATER LINE

INSTALLATION

(1) Install the air intake pipe assembly and install the two retaining screws. Tighten the screws to 7 N·m (62 in. lbs.).

(2) Attach the steel tube to the flexible tube and position and then tighten the retaining clamp securely.

(3) Install the flexible tube to the cabin heater air intake muffler and install and tighten the retaining clamp securely.

(4) Install the cabin heater tubes to the lower heater connection and the lower EGR cooler connection and tighten the retaining clamps.

(5) Lower the vehicle.

(6) Refill the engine cooling system (Refer to 7 - COOLING - STANDARD PROCEDURE - COOLING SYSTEM FILL).

(7) Verify function of the heater unit.