SECTION 1

HEATING AND AIR CONDITIONING

CONTENTS

SECTION 1A

HEATER AND VENTILATION

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.

CONTENTS

CONTENTS (cont'd)

GENERAL DESCRIPTION

BASE HEATER SYSTEM

The heater system that is base equipment provides heating, ram air, power ventilation, and windshield defrosting. Outside air is drawn from the plenum at the base of the windshield into the heater module by the blower fan. Additional outside air, called ram air, is forced into the heater module by the forward movement of the vehicle. Within the heater module, the air is heated as required and then routed through ducts to the proper outlets for discharge into the passenger compartment. A control assembly in the instrument panel allows the operator to control blower speed, mode of operation and temperature of the air coming from the heater system.

CONTROLS

The control assembly in the instrument panel contains a blower switch, a mode lever, and a temperature lever. The controls are lit when the headlamps are on. Electrical power is provided by the instrument panel lighting circuit from the instrument panel harness.

Brightness of the dial illumination is controlled by the instrument panel dimmer control. The control assembly bulbs are in parallel with the radio bulb and instrument cluster illumination bulbs.

TEMPERATURE LEVER

The temperature lever operates the temperature control cable that goes to the heater module. When the temperature lever is in the "-" (Cold) or the left end of the slot, all of the air delivered by the heater system is unheated. When the temperature lever is in the "+" (Hot) or the right end of the slot, all of the air passing through the heater module is heated before it is discharged. Intermediate positions of the temperature lever result in a mixture of heated and unheated air to provide more moderate air temperatures.

MODE LEVER

The mode lever operates the defrost control cable that goes to the heater module. This cable operates a crank lever and shaft that controls the position of an air valve in the heater module. Mode lever positions are "Vent," "Heater," and "Defrost."

BLOWER SPEED CONTROL

The blower switch provides a choice of various blower speeds. It receives power through a fuse in the fuse block when the ignition is "ON." In the "Lo (-)" position, the circuit continues through the heater wiring harness to two resistors in the resistor assembly near the blower motor.

When the blower switch is in a medium-speed position, the circuit continues through the heater wiring harness to the resistor assembly, but it bypasses one of the two resistors.

When the blower switch is in the "Hi (+)" position, the circuit continues through the heater wiring harness to the resistor assembly, but it bypasses both resistors to provide full power to the blower motor.

From the resistor assembly, the circuit goes to the blower motor terminal to operate the blower motor. The blower motor circuit is completed to ground by a wire in the heater wiring harness that goes from the blower motor terminal to a terminal at the dash panel sheet metal near the blower assembly in the engine compartment.

AIR DISTRIBUTION SYSTEM

Within the heater module is a series of air valves called the temperature valve, vent valve, and the defroster valve. These air valves are hinged parts that act like doors to direct the airflow through various sections of the heater module to provide the proper airflow for the selected operating mode. Each air valve is controlled by a control cable from the heater control assembly.

TEMPERATURE VALVE AND HEATER CORE

The temperature of the air coming from the heater duct and defroster nozzle is regulated by controlling the relative amounts of warm and cool air in the airflow coming from the heater module. The part of the total airflow through the heater module that is allowed to pass through the heater core is governed by the temperature valve. The temperature valve is operated by the temperature control cable, working through a lever on the temperature valve shaft.

When the temperature lever in the control assembly is in the extreme left end of its slot, or the full "-" (Cold) position, the temperature valve is positioned to stop all of the airflow through the heater core so only unheated air is sent to the heater duct and defroster nozzle.

As the temperature lever is moved away from the full "-" (Cold) position, the temperature control cable opens the temperature valve to allow an increasing amount of air to pass through the heater core. At the same time, the temperature valve reduces the amount of unheated air that is allowed to enter the mixture. This results in a very responsive control of the temperature of the air discharged through the heater ducts and defroster nozzle.

When the temperature lever reaches the full "+" (Hot) position at the extreme right end of its slot, the temperature control cable holds the temperature valve in a position that diverts all of the airflow through the heater core for maximum heating.

Hot coolant from the engine is directed through the heater core and returned to the cooling system when the engine is running.

MODE VALVES

The heater system provides a choice of three basic operating modes consisting of "Vent," "Heater," and "Defrost."

OPERATING MODES

VENT MODE

When the mode lever is in the "Vent" position or the extreme left end of the slot, the defroster valve and heater valve remains closed. As a result, air coming from the instrument panel vents should be nearly the same temperature as the outside air.

HEATER MODE

When the mode lever is in the "Heater" position or the center of the slot, the defroster valve remains closed. As a result, air from the blower fan is heated as necessary and directed to the defroster valve which sends most of the airflow to the heater duct, with some going to the defroster nozzle.

DEFROST MODE

When the mode lever is in the "Defrost" position or the extreme right end of the slot, the defroster control cable moves the defroster valve to fully uncover the opening to the defroster nozzle and restrict the opening to the heater duct. This delivers the maximum airflow to the defroster nozzle, with only a small amount of airflow coming out of the heater duct.

VENTILATION

Two push-pull controls under the steering column operate vent cables to the left and right air vents in the heater module that admit ram air to the vehicle interior. The left and right air vents discharge air directly to the floor area by the heater module. Because the air is taken dircetly from the plenum, bypassing the heater core as well as the blower fan, it is always delivered at the temperature of the outside air.

AUXILIARY HEATER

An auxiliary heater provides additional heating capacity for the rear of the Suburban model.

This unit operates independently of the standard heater, and is regulated through its own controls in the instrument panel (Aux. Heater Models) or roof panel (Aux. Heater and A/C Models). This system consists of a separate core and fan unit mounted in the rear of the vehicle.

CONTROLS

Blower Switch

The auxiliary heater blower switch is located in the instrument panel to the right of the steering column (Aux. Heater Models) or the roof panel (Aux. Heater and A/C Models).

DIAGNOSIS

FUNCTIONAL TEST

Before beginning the functional test of the heater system, the vehicle should be idling with the coolant hot and the thermostat open. Coolant temperature should be close to 90°C (194°F). During the functional test, the operating efforts of the mode lever and the temperature lever should be evaluated. Even if a problem is found during any intermediate step of the functional test, the test should be completed before repair is started (figure 1).

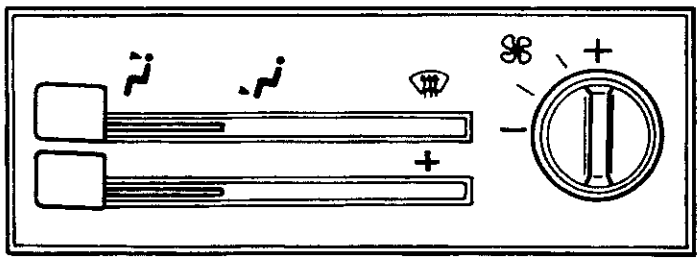
1. Cycle the temperature lever to the extreme ends of travel in the slot of the control assembly dial to assure that the cable is properly adjusted.
2. Move the mode lever to the "Vent" position.
   - Air at nearly the same temperature as the outside air should come from the instrument panel outlets.
   - Air should not come from the floor outlets, the defroster nozzles, or the side window defogger outlets.
3. Move the mode lever to the "Heater" position.
   - Most of the air should come from the floor outlets with the remainder coming out of the defroster nozzles and defogger outlets.
   - Air should not come from the instrument panel outlets in the "Heater" position.
4. Move the mode lever from the "Heater" position to the "Defrost" position.
   - Most of the air should be discharged onto the windshield from the defroster nozzles.
   - A small amount of air should also be discharged from the floor outlets.
5. Move the temperature lever back to the full "-" (Cold) position and check to be sure the air temperature drops back to nearly the temperature of the outside air once again.
6. Slowly turn the blower switch toward "-" stopping briefly at each intermediate blower speed position to notice the force of the airflow coming from the instrument panel center outlets and the sound of the blower.
   - Both the airflow and the blower noise should reduce noticeably at each intermediate step.

HEATER OUTPUT TEMPERATURE CHECK

The heat output of the heater system can be checked with the following procedure.

Preparation

With the engine sufficiently cool, the radiator cap should be removed and the engine started and allowed to idle. Heater controls should be set to "Heater" mode,



HEATER CONTROL ASSEMBLY

	FAN SWITCH POSITION			
Term	Off	M_1	M_2	HI
B +	Continuity to LO	Continuity to M_1	Continuity to M_2	Continuity to HI
HI	No Continuity	No Continuity	No Continuity	Continuity to B+
LO	No Continuity	Continuity to B +	No Continuity	No Continuity
MED	No Continuity	No Continuity	Continuity to B +	No Continuity
OFF	Continuity to B +	No Continuity	No Continuity	No Continuity

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Figure 1—Control Assembly Functional Test

full "+" (Hot) temperature and "Hi (+)" blower speed. When coolant flow in the radiator is visible through the filler neck, the radiator cap should be installed.

Temperature Check

When the engine is warmed up (after approximately 20 minutes of operation), the vehicle should be driven. An accurate thermometer should be used to determine the temperature of the outside air and the temperature of the air discharged at the floor outlets with the vehicle being driven at 48 km/h (30 mph). Minimum acceptable heater output temperatures at four different outside air temperatures are shown in the table below.

Outside Air Temperature	-18°C (0°F)	-4°C (25°F)	10°C (50°F)	24°C (75°F)
Heater Air Temperature	54°C (130°F)	59°C (139°F)	64°C (147°F)	68°C (155°F)

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Minimum acceptable heater output temperatures for outside air temperatures other than those shown can be approximated by using the Fahrenheit scale and rounding off the outside air temperature to the nearest 5 degrees. For every additional 5 degrees of outside temperature, an additional 1.8 degrees of heater output temperature should be allowed when the outside temperature is below 50 degrees. An additional 1.6 degrees of heater output temperature should be allowed for every 5 degrees of outside temperature when the outside temperature is above 50 degrees.

INSUFFICIENT HEATING OR DEFROSTING

The most likely causes of insufficient heating outside the heater system include a low coolant level, a faulty thermostat, a partially or fully clogged heater core or hose, an obstruction to air circulation or an air leak past a faulty seal into the passenger compartment. For an organized diagnosis procedure, refer to figures 2 and 3.

IMPROPER AIR DELIVERY

If the "Functional Test" or other diagnosis indicates improper air delivery or a failure to shift modes when the mode lever is moved, check the attachment of the affected control cable at the heater module. Be sure the cable loop is connected to the crank pin and the cable sheath is retained.

If the cause of the problem is not discovered, disconnect the control cable at the crank pin and check the air control valve travel and effort. If there is proper valve travel and effort, check the control cable travel at the heater module end while moving the mode lever. If the cable end doesn't move, check for a broken cable or control assembly part and for an unattached cable end at the control assembly. Also, check for a sharp kink in the control cable sheath that could cause severe binding.

HIGH OR LOW TEMPERATURE CONTROL EFFORT

A kinked control cable, a binding valve or a faulty control assembly are possible causes of excessive temperature control lever effort. For an organized diagnosis procedure and an effective "fix" for too little temperature control effort, refer to figure 4.

BLOWER NOISE

A constant air rush noise is typical of all heater systems, some may be louder than others. If possible, check a similar vehicle to determine whether the noise is typical or excessive. For diagnosis of excessive blower noise, refer to figures 5 and 6.

EXCESSIVE HEAT

The most likely cause of excessive heat from the heater system is an out-of-adjustment temperature control cable. Other related causes of excessive heat include a slipping self-adjusting clip at the temperature control cable end, a loose control cable sheath retainer or bracket at the bottom of the heater assembly, or a binding or obstructed temperature air valve. A hot air leak from the engine compartment to the blower inlet is also a remote possibility.

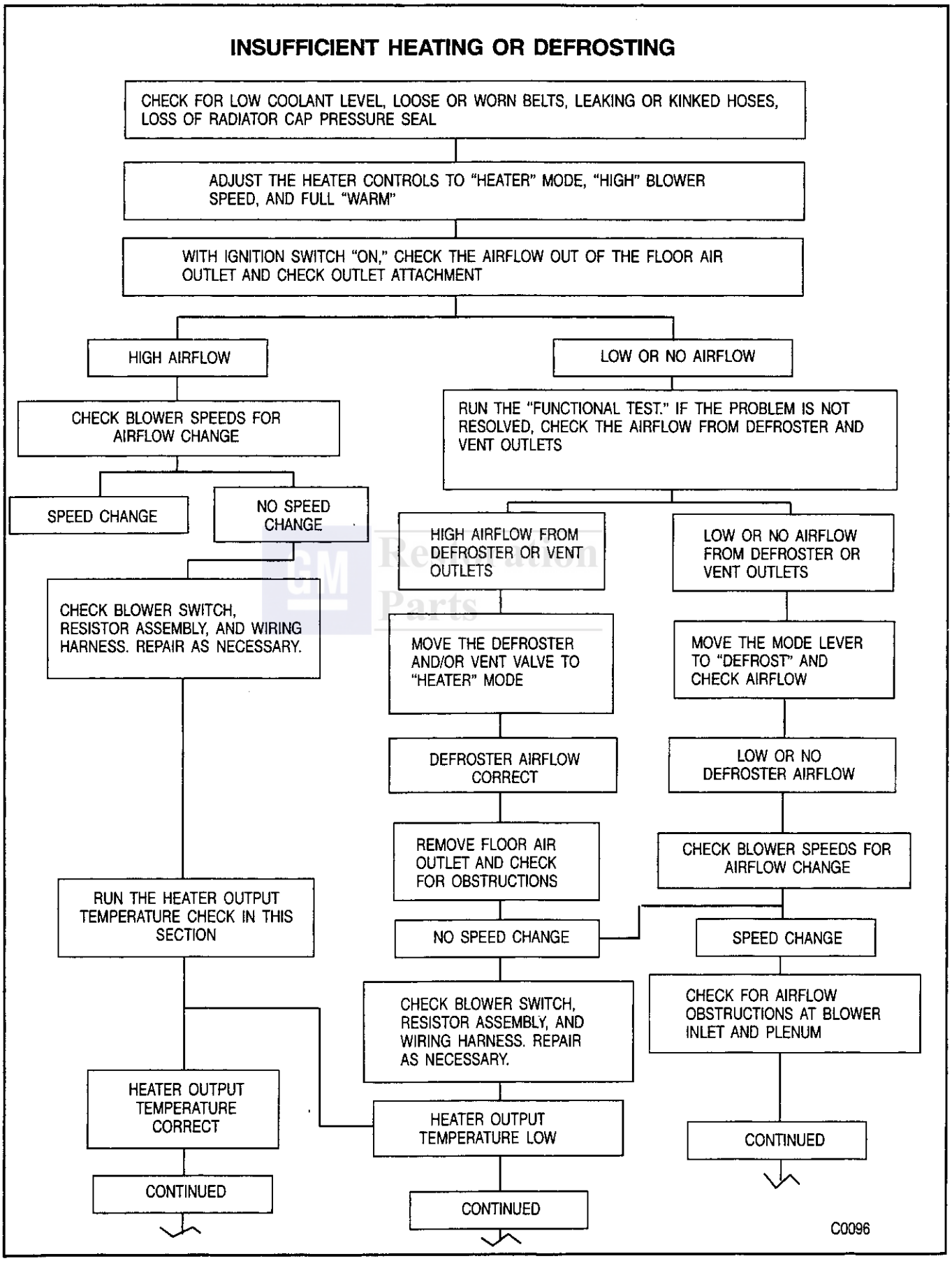


Figure 2—Insufficient Heating or Defrosting (1 of 2)

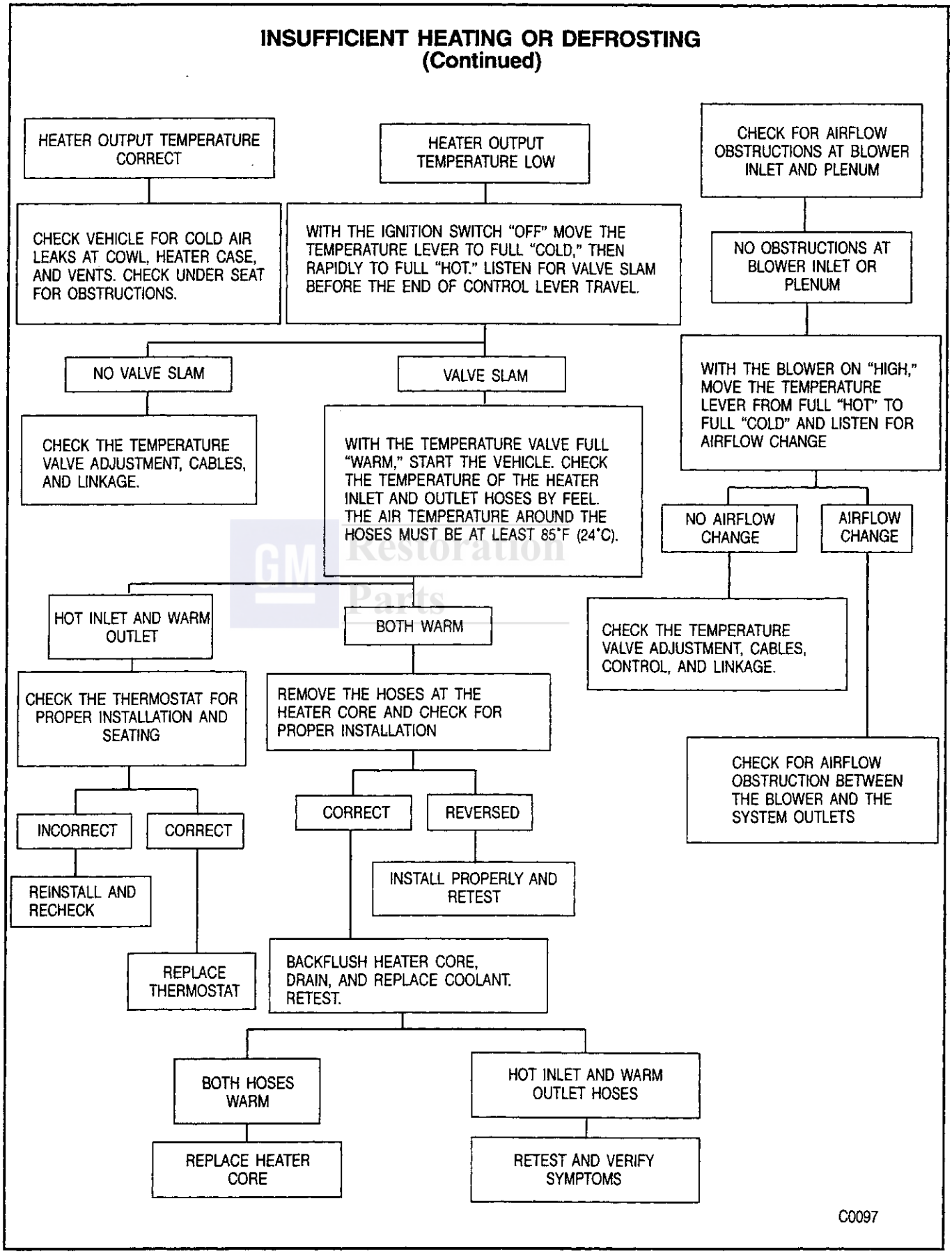


Figure 3—Insufficient Heating or Defrosting (2 of 2)

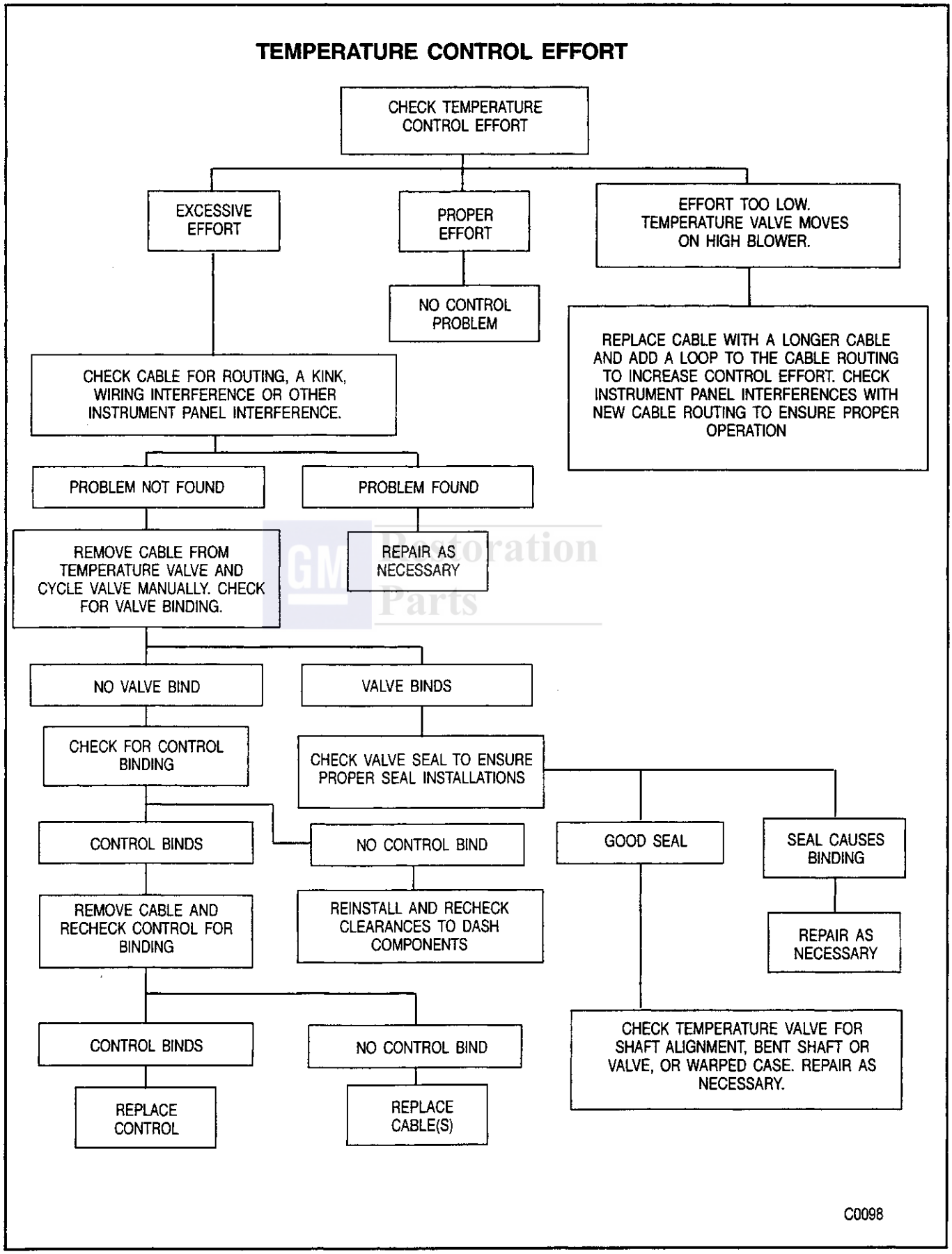


Figure 4—Temperature Control Effort Diagnosis Procedure

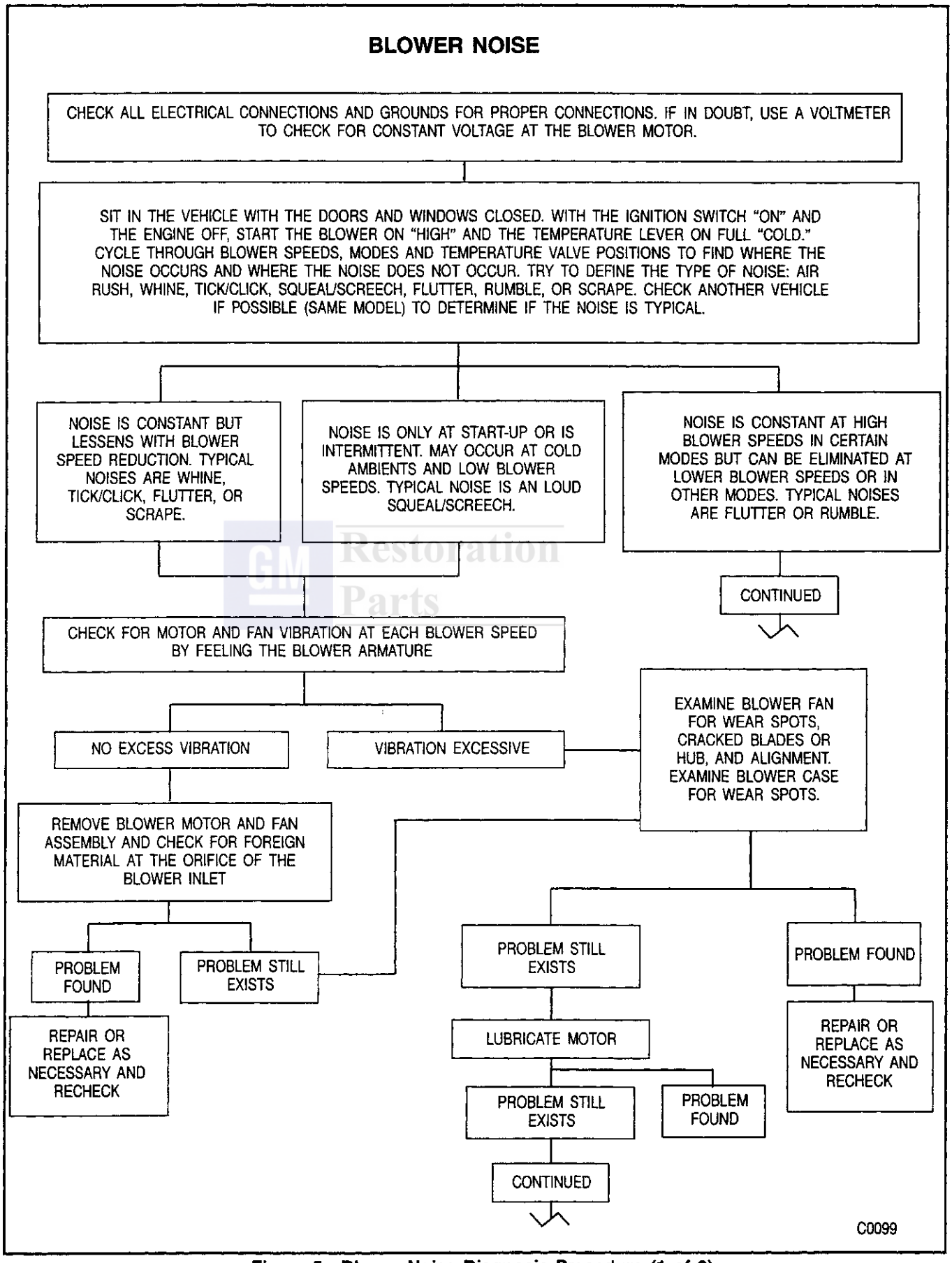


Figure 5—Blower Noise Diagnosis Procedure (1 of 2)

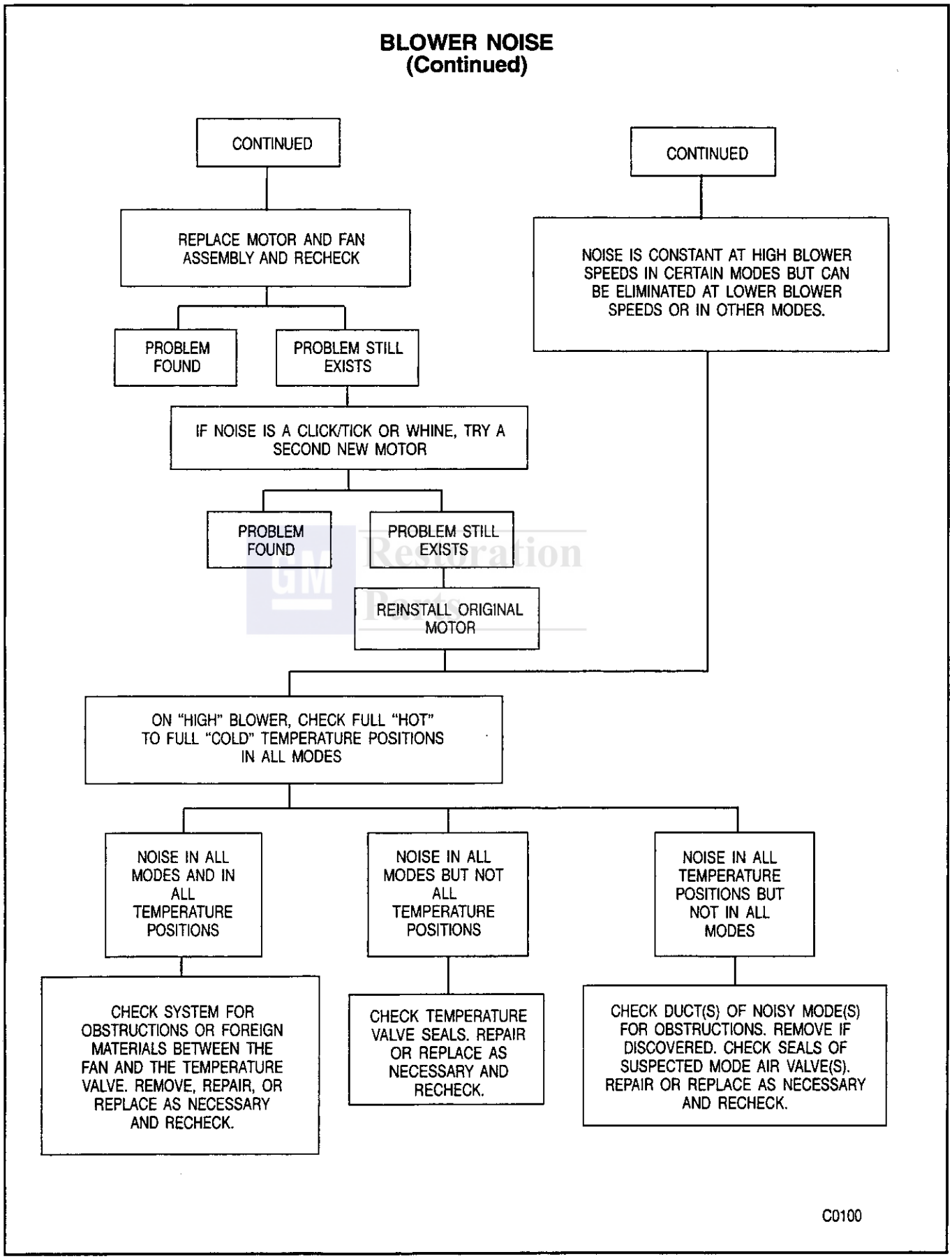


Figure 6—Blower Noise Diagnosis Procedure (2 of 2)

ON-VEHICLE SERVICE

CONTROL ASSEMBLY AND BLOWER SWITCH

Remove or Disconnect (Figure 7)

1. Instrument panel bezel. Refer to SECTION 8C.
2. Screws (2).
3. Heater control assembly (1) from instrument panel.
4. Electrical connectors, as necessary.
5. Temperature control cable. Refer to "Temperature Control Cable."
6. Defrost control cable. Refer to "Defrost Control Cable."
7. Blower switch.
   - Remove the blower switch knob and the retaining clip from the shaft of the blower switch.

Install or Connect (Figure 7)

1. Blower switch.
   - Hold the blower switch in position and install the retaining clip.
   - Install the blower switch knob.
2. Defrost control cable. Refer to "Defrost Control Cable."
3. Temperature control cable. Refer to "Temperature Control Cable."
4. Electrical connectors, as necessary.
5. Heater control assembly (1) to instrument panel.

NOTICE: Refer to "Notice" on page 1A-1.

6. Screws (2).

Tighten

- Screws (2) to 1.6 N·m (14 lbs. in.).

7. Instrument panel bezel. Refer to SECTION 8C.
   - Check circuit operation.

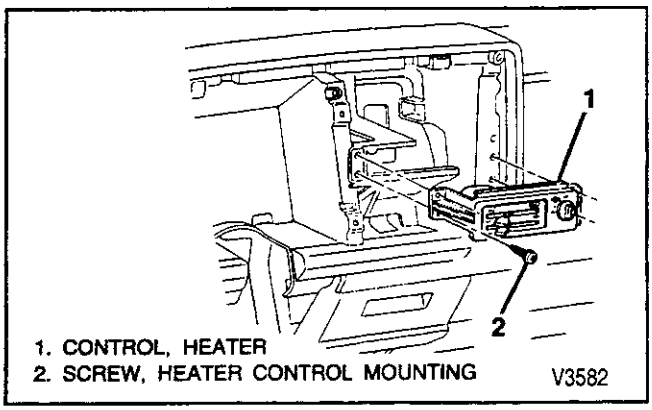


Figure 7—Heater Control Assembly

CONTROL ASSEMBLY LAMP BULB

Remove or Disconnect

1. Heater control assembly. Refer to "Control Assembly and Blower Switch."
   - Pull the heater control assembly out far enough to reach the control assembly lamp socket.
2. Bulb and socket.
3. Bulb from socket.
   - Pull the bulb straight out from the socket.

Inspect

- Control assembly lamp socket for corrosion and damage. Clean or replace as necessary.
- Wires for damage and secure connection to the bulb socket. Repair or replace as necessary.

Install or Connect

1. New bulb.
   - Push the bulb straight into the socket.
2. Bulb and socket.
3. Heater control assembly. Refer to "Control Assembly and Blower Switch."
   - Check circuit operation.

TEMPERATURE CONTROL CABLE

Remove or Disconnect (Figure 8)

1. Instrument panel trim plate. Refer to SECTION 10A4.
2. Heater control assembly (1). Refer to "Control Assembly and Blower Switch."
3. Electrical connectors, as necessary.
4. Nuts (5).
5. Temperature cable (4) from the heater control assembly (1).
6. Instrument panel compartment. Refer to SECTION 10A4.
7. Temperature cable (4) from the heater case.

Install or Connect (Figure 8)

1. Temperature cable (4) to the heater case.
2. Temperature cable (4) to the heater control assembly (1).
   - Route the cable in the same location as removed.
3. Nuts (5).
4. Instrument panel compartment. Refer to SECTION 10A4.
5. Electrical connectors, as necessary.
6. Heater control assembly (1). Refer to "Control Assembly and Blower Switch."
7. Instrument panel trim plate. Refer to SECTION 10A4.

DEFROST CONTROL CABLE

Remove or Disconnect (Figure 8)

1. Instrument panel trim plate. Refer to SECTION 10A4.
2. Heater control assembly (1). Refer to "Control Assembly and Blower Switch."
3. Electrical connectors, as necessary.
4. Nuts (5).
5. Defrost cable (3) from the heater control assembly (1).
6. Instrument panel compartment. Refer to SECTION 10A4.
7. Defrost cable (3) from the heater case.

Install or Connect (Figure 8)

1. Defrost cable (3) to the heater case.
2. Defrost cable (3) to the heater control assembly (1).
   - Route the cable in the same location as removed.
3. Nuts (5).
4. Instrument panel compartment. Refer to SECTION 10A4.
5. Electrical connectors, as necessary.
6. Heater control assembly (1). Refer to "Control Assembly and Blower Switch."
7. Instrument panel trim plate. Refer to SECTION 10A4.

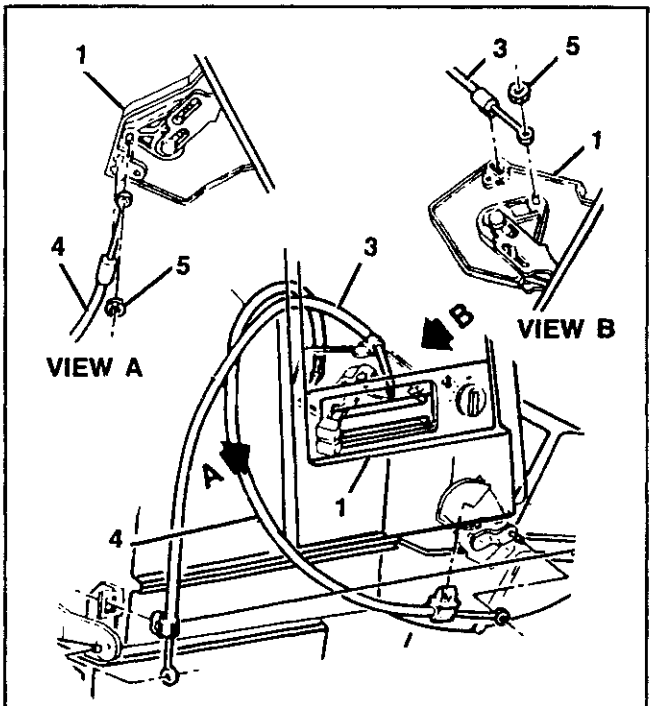


Figure 8—Temperature and Defrost Control Cable

NOTICE: Refer to "Notice" on page 1A-1.

AIR INLET VALVE

Remove or Disconnect (Figure 9)

1. Left vent cable. Refer to "Vent Control Cables."
2. Screw (8) from instrument panel (7).
3. Air inlet valve (6) from deflector (9).

Install or Connect (Figure 9)

1. Air inlet valve (21) to deflector (9).
2. Screw (8) to instrument panel (7).

Tighten

- Screw (8) to 1.9 N·m (17 lbs. in.).

3. Left vent cable. Refer to "Vent Control Cables."

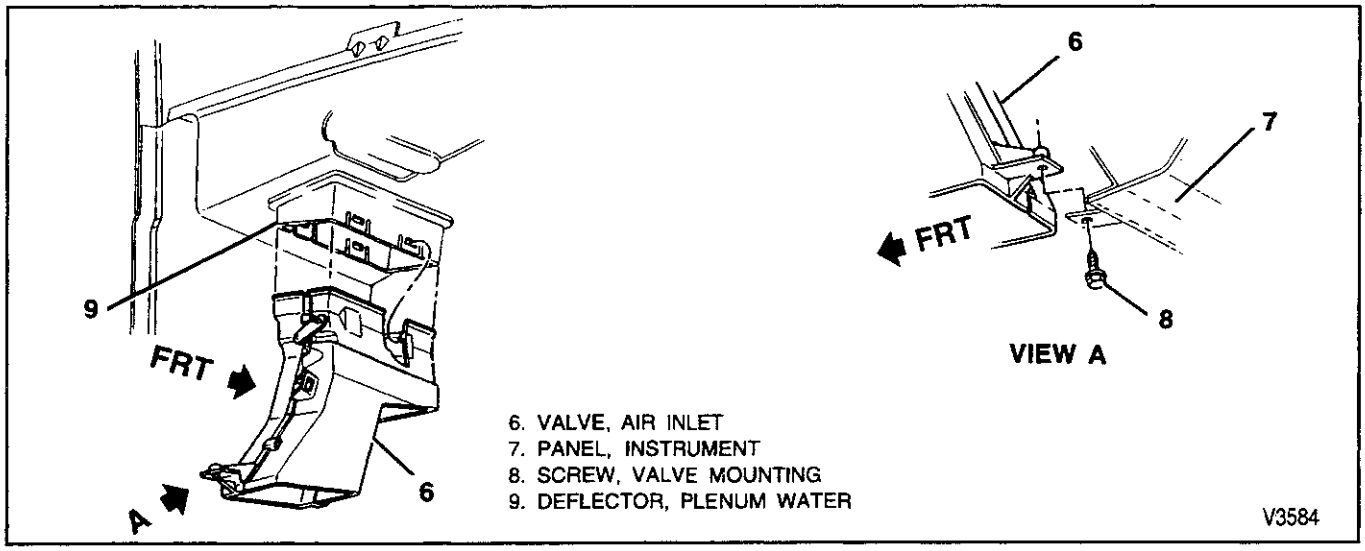


Figure 9—Air Inlet Valve

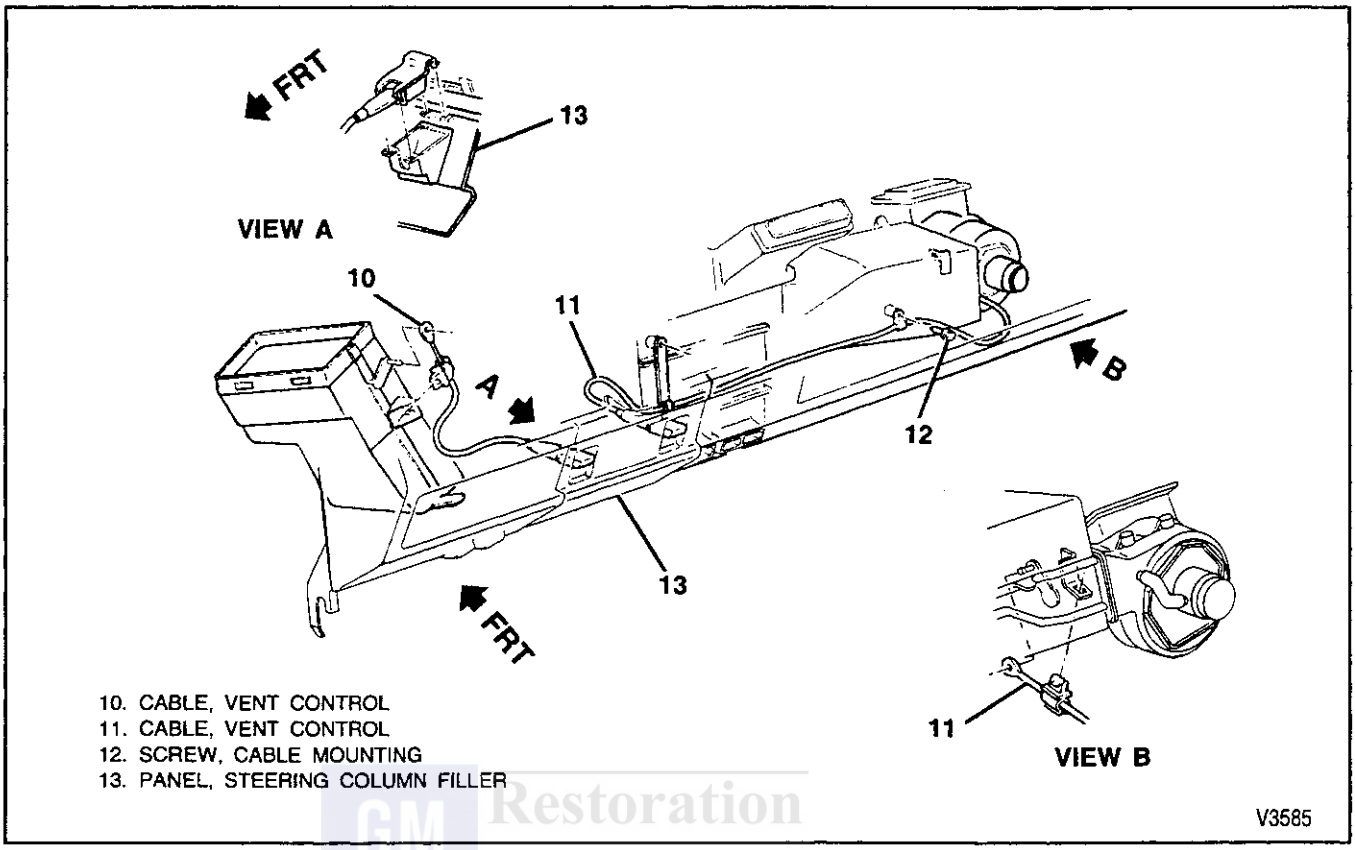


Figure 10—Vent Control Cable

VENT CONTROL CABLES

LEFT VENT CABLE

Remove or Disconnect (Figure 10)

1. Steering column filler panel (13). Refer to SECTION 10A4.
2. Cable (10) from steering column filler panel (13).
3. Cable (10) from air inlet valve.

Install or Connect (Figure 10)

1. Cable (10) to air inlet valve.
2. Cable (10) to steering column filler panel (13).
3. Steering column filler panel (13). Refer to SECTION 10A4.

RIGHT VENT CABLE

Remove or Disconnect (Figure 10)

1. Instrument panel compartment. Refer to SECTION 10A4.
2. Steering column filler panel (13). Refer to SECTION 10A4.
3. Screw (12).
4. Cable (11) from heater module.
5. Cable (11) from steering column filler panel (13).

Install or Connect (Figure 10)

1. Cable (11) to steering column filler panel (13).
2. Cable (11) to heater module.

NOTICE: Refer to "Notice" on page 1A-1.

3. Screw (12).

Tighten

- Screw (12) to 1.4 N.m (12 lbs. in.).

4. Steering column filler panel. Refer to SECTION 10A4.
5. Instrument panel compartment. Refer to SECTION 10A4.

BLOWER MOTOR RESISTOR

Remove or Disconnect (Figure 11)

1. Negative battery cable. Refer to SECTION 0A.
2. Instrument panel compartment. Refer to SECTION 10A4.

   - Remove the compartment through the instrument panel opening. The resistor is installed on top the heater case.

3. Electrical connectors, as necessary.
4. Screws (15).
5. Resistor (14).

Install or Connect (Figure 11)

1. Resistor (14).

NOTICE: Refer to "Notice" on page 1A-1.

2. Screws (15).

Tighten

- Screws (15) to 1.4 N.m (12 lbs. in.).

3. Electrical connectors, as necessary.
4. Instrument panel compartment. Refer to SECTION 10A4.
5. Negative battery cable.
   - Check circuit operation.

BLOWER MOTOR AND FAN

Remove or Disconnect (Figure 12)

1. Negative battery cable. Refer to SECTION 0A.
2. Instrument panel compartment. Refer to SECTION 10A4.
3. Front screw from right door sill plate.
4. Right hinge pillar trim panel. Refer to SECTION 10A4.
5. Electrical connectors from ECM, as necessary.
6. ECM and mounting bracket.
7. Electrical connectors from blower motor (16), as necessary.
8. Courtesy lamp (if equipped).
9. Bolt from right lower dash support.
10. Blower motor cover.
11. Blower motor cooling tube (26).
12. Blower motor flange screws (22).
13. Blower motor (16).
    - Pull the blower motor forward carefully to avoid distorting the blower fan.

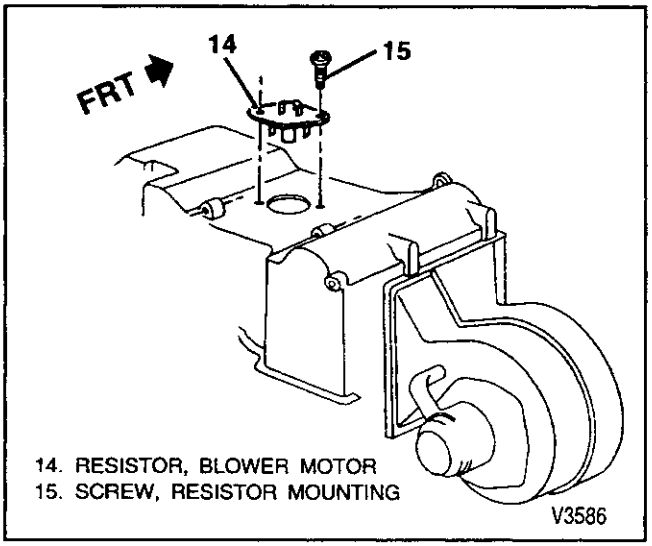


Figure 11—Blower Motor Resistor

- May be necessary to pry back right side of instrument panel.

Inspect

- Blower motor terminals for distortion. Clean corrosion from the terminals or replace the blower motor (16) as necessary.
- Flange of the blower motor (16) for damage or distortion that could cause an air leak. Repair as necessary.
- Blower fan for damage and distortion.

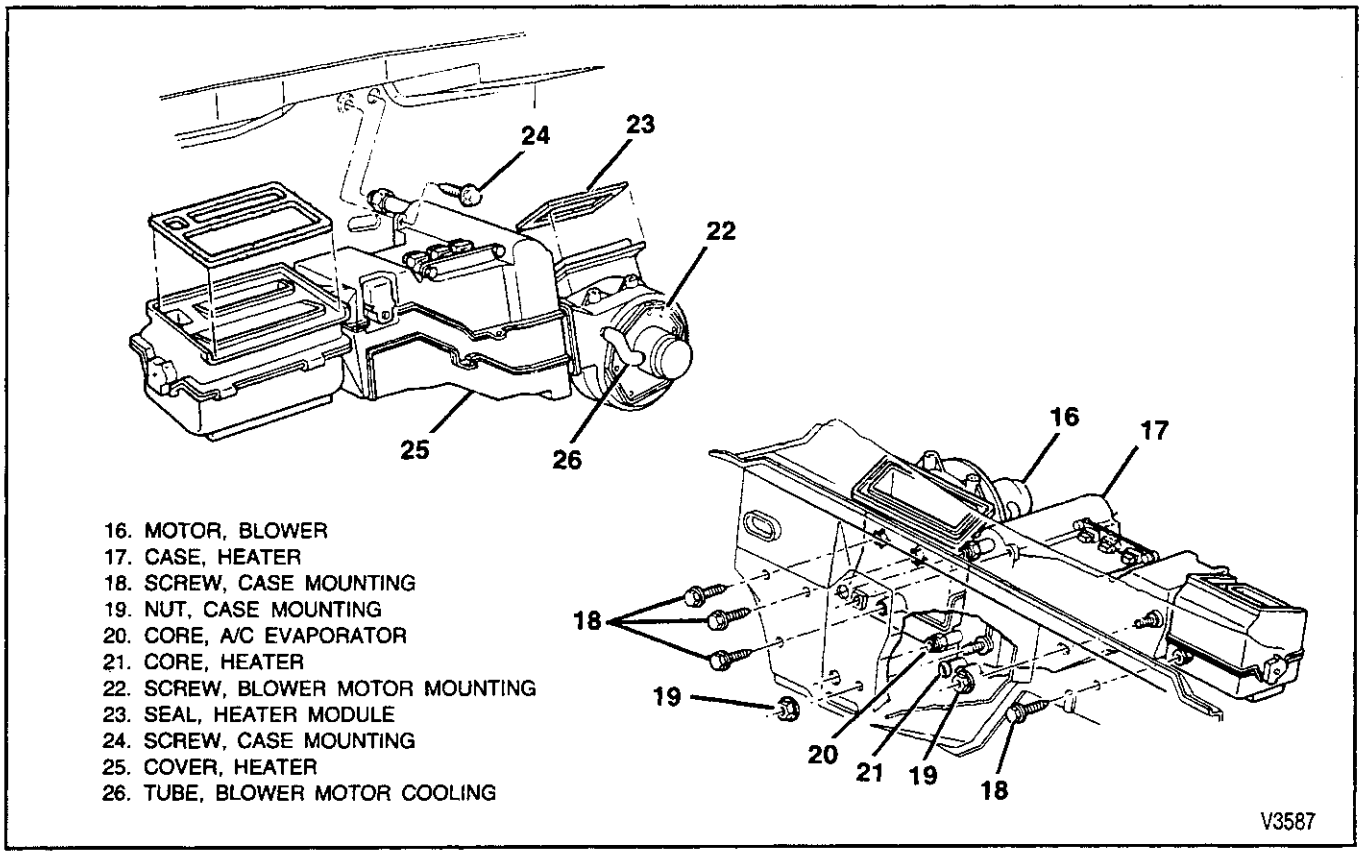
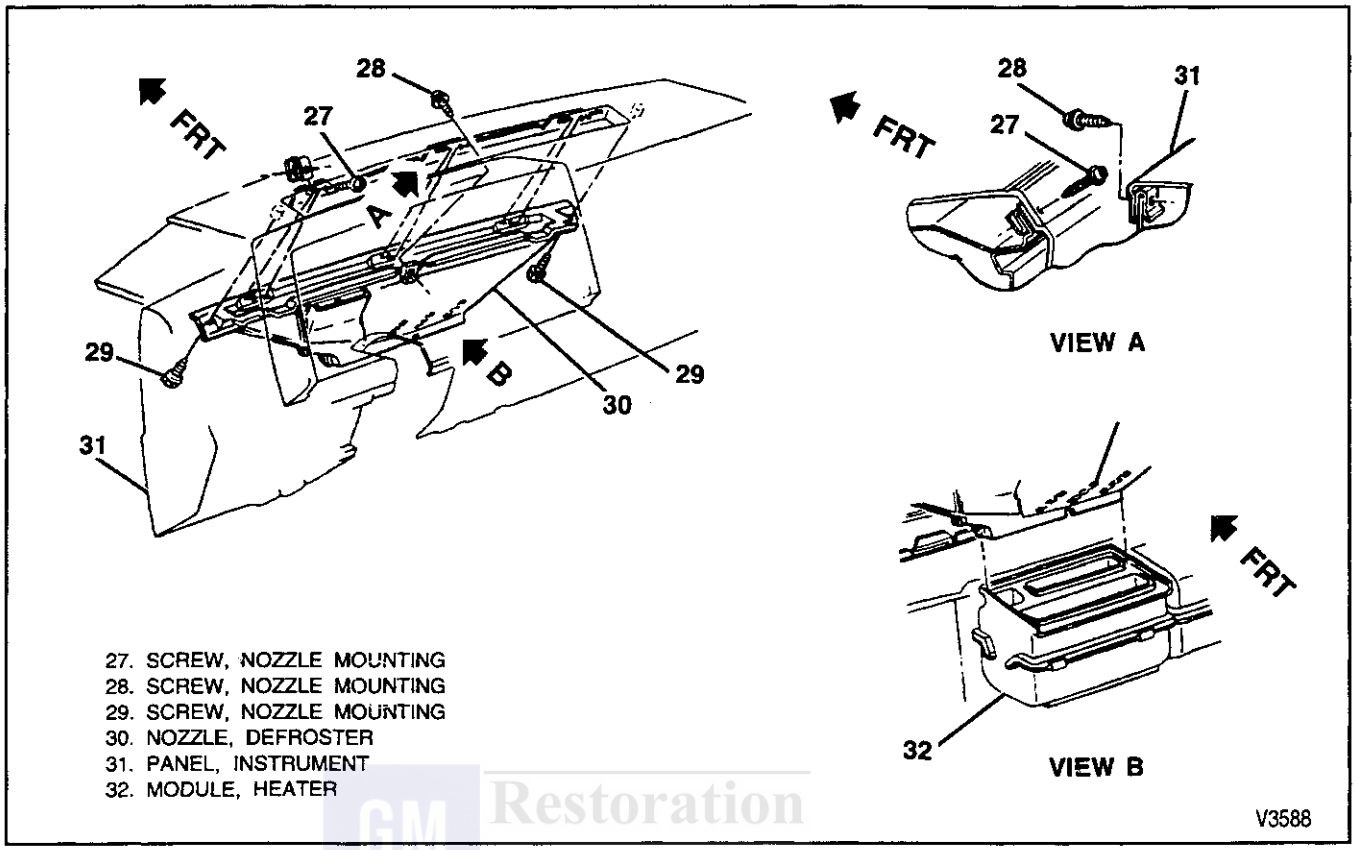


Figure 12—Heater Case Component View



27. SCREW, NOZZLE MOUNTING
28. SCREW, NOZZLE MOUNTING
29. SCREW, NOZZLE MOUNTING
30. NOZZLE, DEFROSTER
31. PANEL, INSTRUMENT
32. MODULE, HEATER

Figure 13—Defroster Nozzle

Install or Connect (Figure 12)

1. Blower motor (16).
   - Guide the blower motor and blower fan into position, being careful not to catch the blower fan on protruding parts.

NOTICE: For steps 2, 5, and 11, refer to "Notice" on page 1A-1.

2. Blower motor flange screws (22).
3. Blower motor cooling tube (26).
4. Blower motor cover.
5. Bolt to right lower dash support.
6. Courtesy lamp (if equipped).
7. Electrical connectors to blower motor (16), as necessary.
8. Mounting bracket and ECM.
9. Electrical connectors to ECM, as necessary.
10. Right hinge pillar trim panel. Refer to SECTION 10A4.
11. Front screw into front door sill plate.
12. Instrument panel compartment. Refer to SECTION 10A4.
13. Negative battery cable.
    - Check circuit operation.

DEFROSTER NOZZLE

Remove or Disconnect (Figure 13)

1. Tilt back instrument panel assembly (31). Refer to SECTION 10A4.
2. Screws (27).
3. Screws (28).
4. Screws (29).
5. Defroster nozzle (30).

Install or Connect (Figure 13)

1. Defroster nozzle (30).

NOTICE: For steps 2, 3, and 4, refer to "Notice" on page 1A-1.

2. Screws (29).

Tighten

   - Screws (29) to 1.4 N·m (12 lbs. in.).

3. Screws (28).
4. Screws (27).

Tighten

   - Screws (27 and 28) to 1.9 N·m (17 lbs. in.).

5. Instrument panel. Refer to SECTION 10A4.

AIR DISTRIBUTOR DUCT

Remove or Disconnect (Figure 14)

1. Defroster nozzle (30). Refer to "Defroster Nozzle."
2. Five duct mounting screws (33).
   - Two from each side dash vent outlet.
   - One from center dash vent outlet.

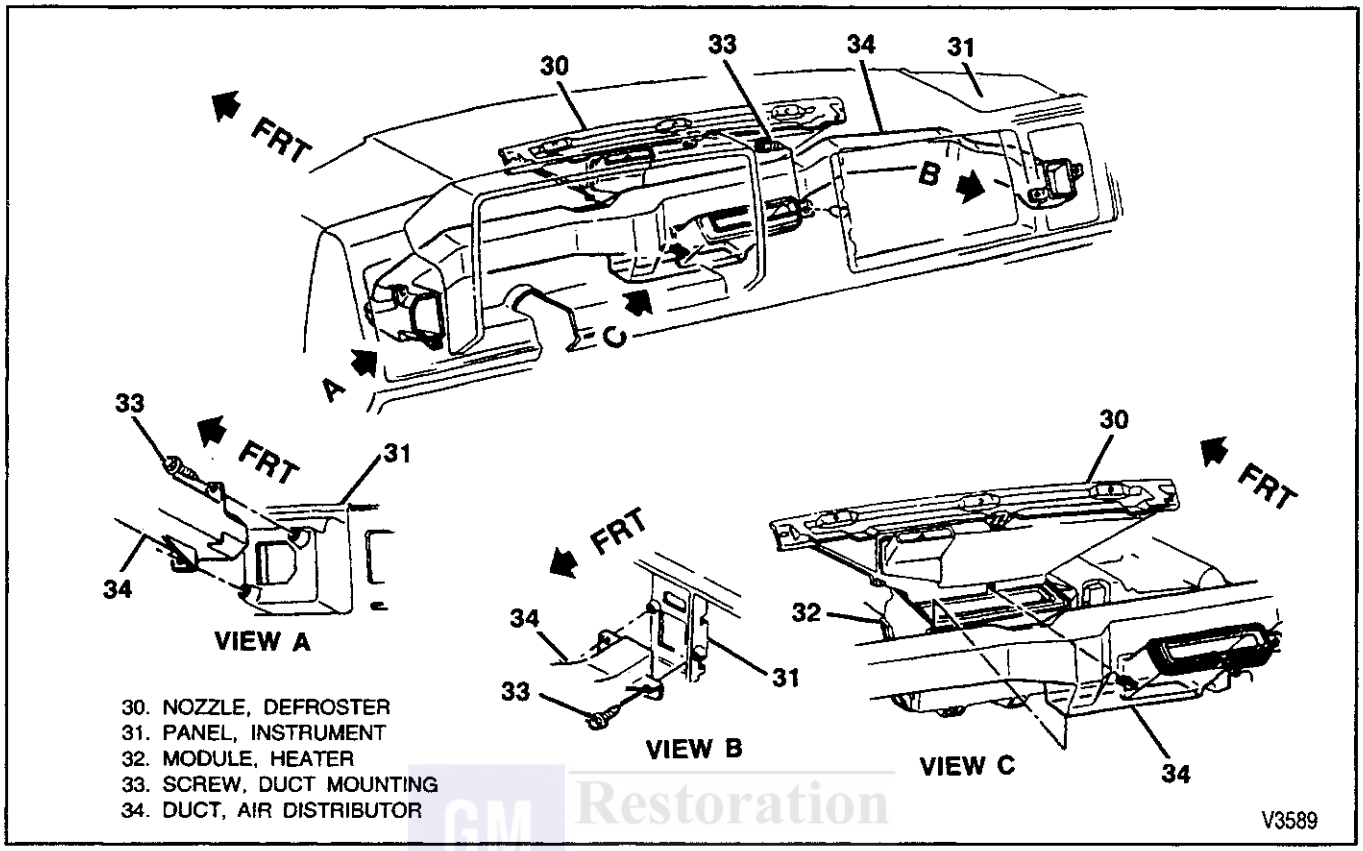


Figure 14—Air Distributor Duct

3. Duct (34) from instrument panel (31).

Install or Connect (Figure 14)

1. Duct (34) to instrument panel (31).

NOTICE: Refer to "Notice" on page 1A-1.

2. Duct mounting screws (33).

Tighten

- Screws (33) to 1.9 N·m (17 lbs. in.).

3. Defroster nozzle (30). Refer to "Defroster Nozzle."

HEATER HOSES

4.3L, 5.0L, 5.7L, AND 7.4L ENGINES

Heater Inlet Hose

Remove or Disconnect (Figures 15, 16, and 18)

Tool Required:
J 38723 Heater Line Quick Connect Separator or Equivalent

1. Air cleaner.
2. Engine coolant. Refer to SECTION 6B1.
3. Inlet hose mounting screw (42).
4. Inlet hose clamp (36) at heater core.
   - Loosen the clamp (36) enough to slide the clamp away from the fitting on the inlet hose (35).
5. Inlet hose (35) from heater core.
6. Push inlet hose (35) into connector (40) and insert J 38723 or equivalent into connector to release locking tabs (46) (figure 18).
7. Pull retainer (48) and hose (35) from heater inlet connector (40) (figure 18).

Inspect

- O-ring sealing surface on hose/pipe.

Adjust

- If replacing heater inlet connector, remove retainer from hose and discard, as new connector is equipped with retainer.
- If replacing hose, remove retainer from hose and reinsert in connector.
- If reusing hose and connector, retainer can remain in place on hose.

Install or Connect (Figures 15, 16, and 18)

1. Push hose into connector until retainer tabs lock.
   - Pull back on hose to check for proper engagement.
2. Inlet hose (35) to heater core.
3. Inlet hose clamp (36).

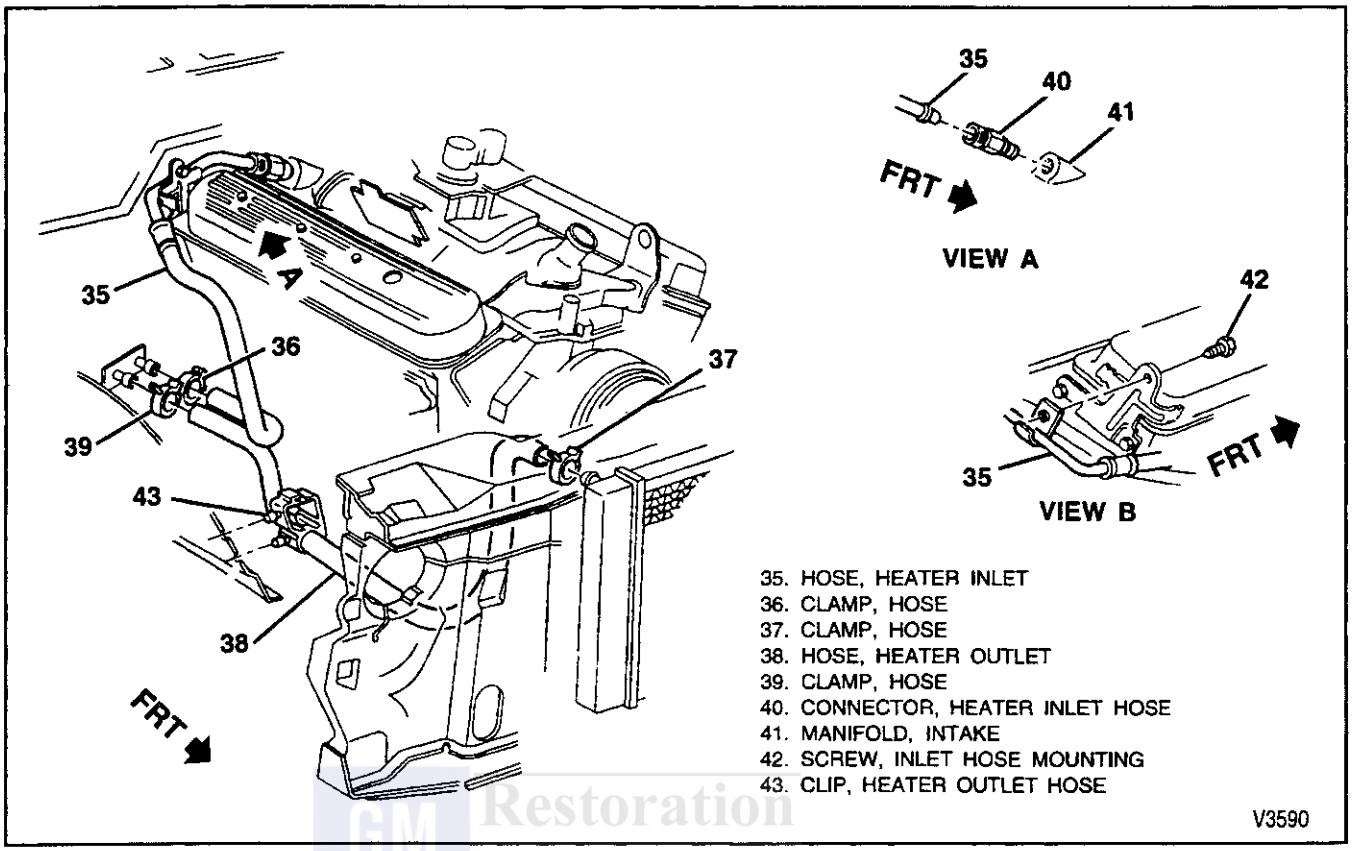


Figure 15—Heater Hose Routing (4.3L, 5.0L, and 5.7L Engines)

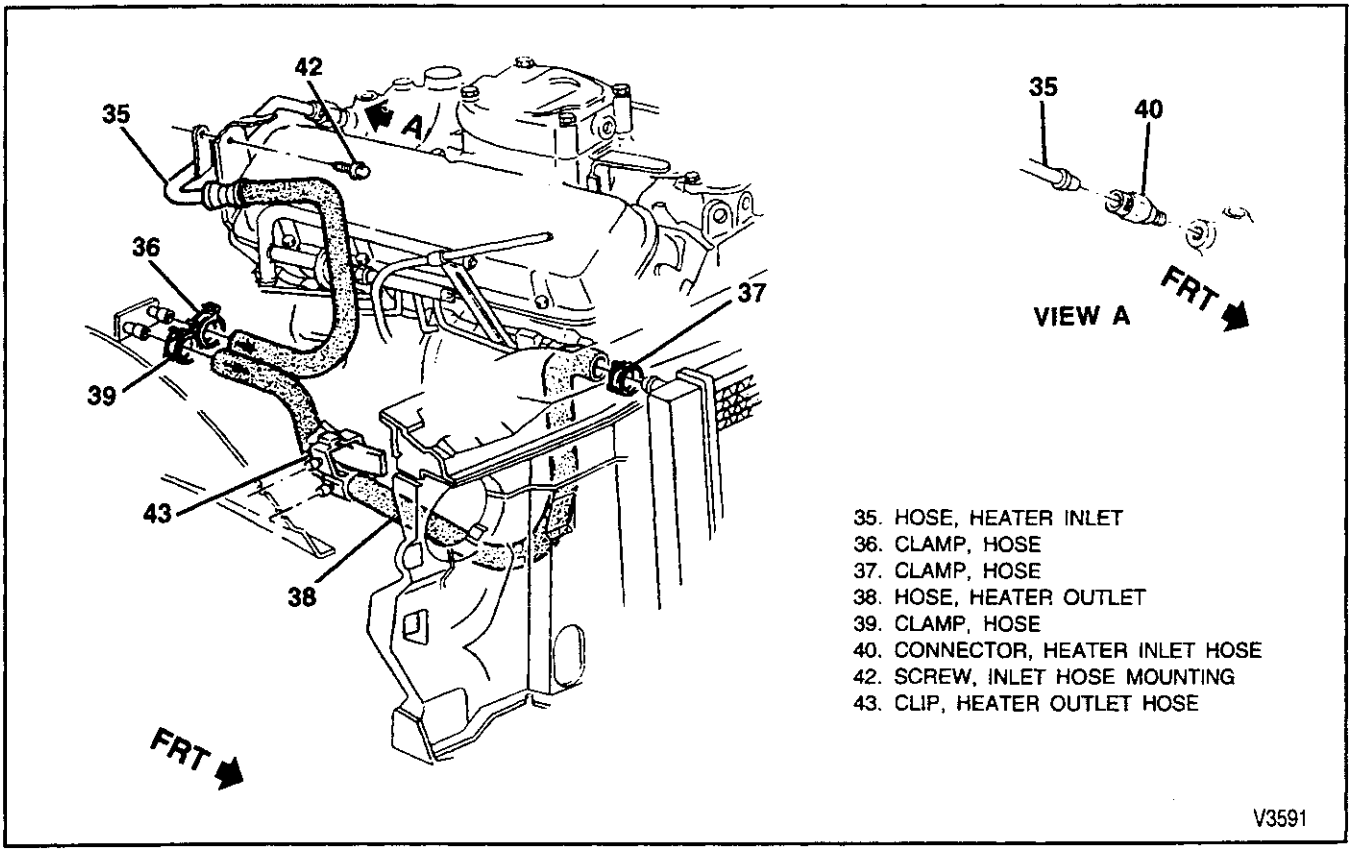


Figure 16—Heater Hose Routing (7.4L Engines)

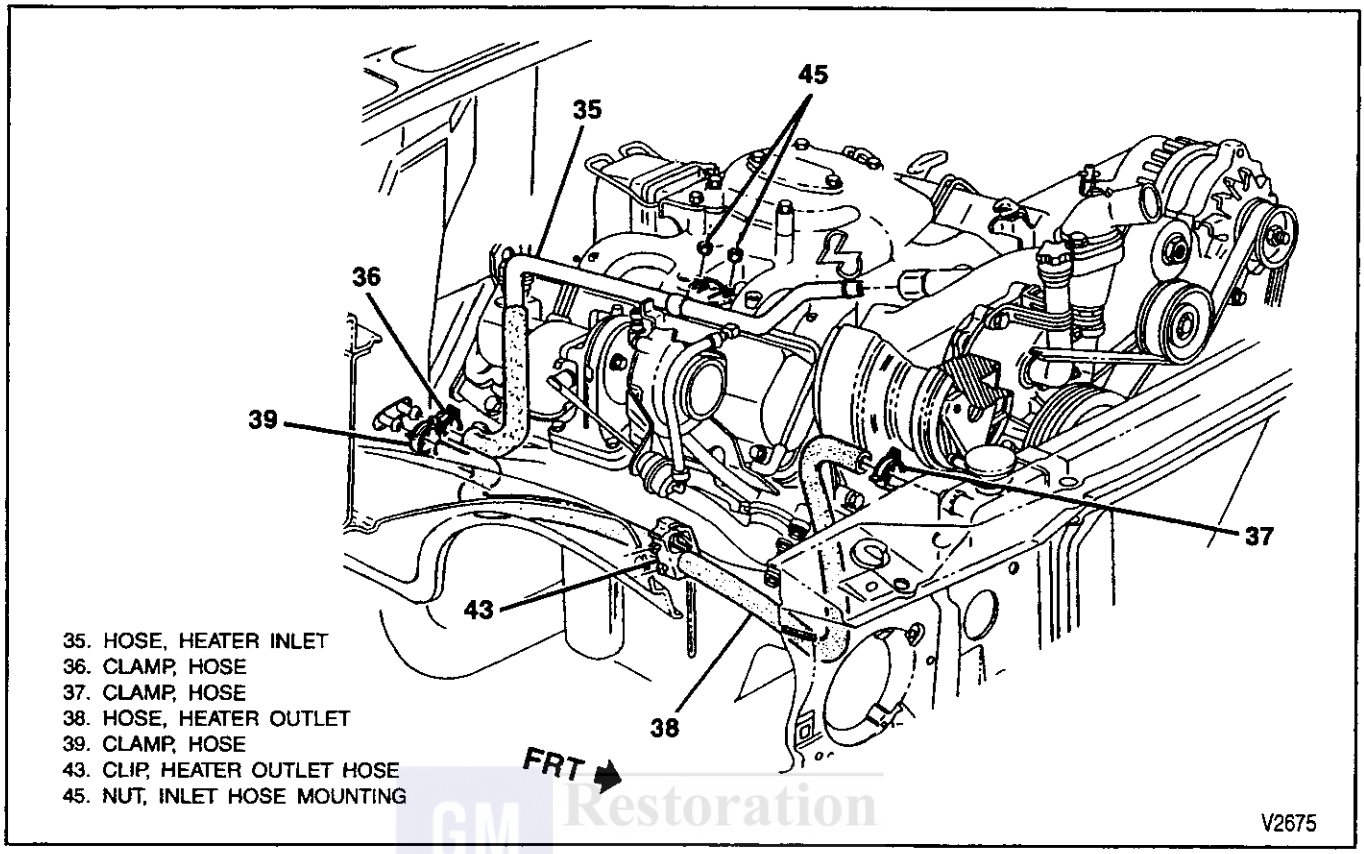


Figure 17—Heater Hose Routing (6.5L Diesel Engines)

NOTICE: Refer to "Notice" on page 1A-1.

4. Inlet hose mounting screw (42).

Tighten

- Screw (42) to 1.4 N.m (12 lbs. in.).

5. Engine coolant. Refer to SECTION 6B1.
6. Air cleaner.

- Check the system for leaks.

Heater Outlet Hose

Remove or Disconnect (Figures 15 and 16)

1. Engine coolant. Refer to SECTION 6B1.
2. Hose clamps (37 and 39).
3. Outlet hose clip (43).
4. Outlet hose (38) from heater core.
5. Outlet hose (38) from radiator.

Install or Connect (Figures 15 and 16)

1. Outlet hose (38) to radiator.
2. Outlet hose (38) to heater core.
3. Outlet hose clip (43).
4. Hose clamps (37 and 39).
5. Engine coolant. Refer to SECTION 6B1.

- Check the system for leaks.

6.5L DIESEL ENGINES

Remove or Disconnect (Figure 17)

1. Engine coolant. Refer to SECTION 6B1.
2. Hose clamps (36, 37, 39, and 44).
3. Inlet hose (35).
4. Outlet hose clip (43).
5. Outlet hose (38).

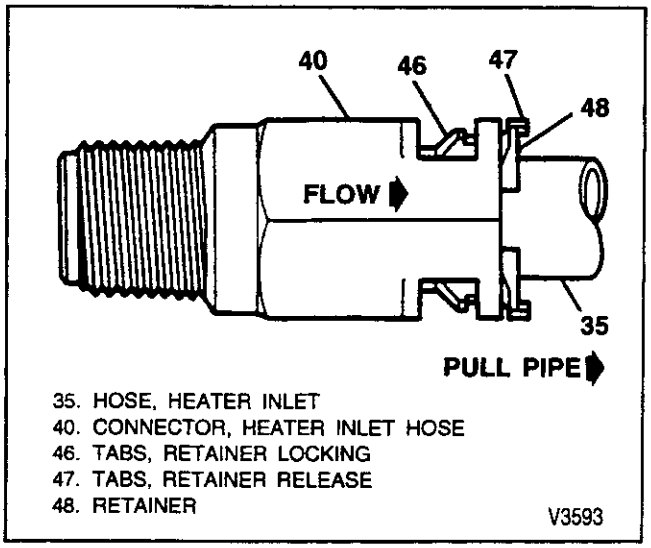


Figure 18—Quick Connect Heater Inlet Connector

Install or Connect (Figure 17)

1. Outlet hose (38).
2. Outlet hose clip (43).
3. Inlet hose (35).
4. Hose clamps (36, 37, 39, and 44).
5. Engine coolant.
   - Check the system for leaks.

HEATER CORE

Remove or Disconnect (Figure 12)

1. Engine coolant. Refer to SECTION 6B1.
2. Instrument panel compartment. Refer to SECTION 10A4.
3. Electrical connectors, as necessary.
4. Center floor air distribution duct.
5. ECM and mounting tray.
6. Hinge pillar trim panels. Refer to SECTION 10A4.
7. Blower motor cover.
8. Blower motor (16). Refer to "Blower Motor and Fan."
9. Steering wheel. Refer to SECTION 3F.
10. Tilt back instrument panel. Refer to SECTION 10A4.
11. Coolant recovery reservoir. Refer to SECTION 6B1.
12. Heater hoses. Refer to "Heater Hoses."
13. Screw (24).
14. Screws (18).
15. Nuts (19).
16. Heater case (17).
    - It may be necessary to have an assistant when removing heater case.
17. Heater cover (25).
    - Remove seven screws that hold heater cover to the heater case.
18. Heater core from retainer.

Install or Connect (Figure 12)

NOTICE: For steps 4, 5, and 6, refer to "Notice" on page 1A-1.

1. Heater core into retainer.
2. Heater cover (25).
   - Make sure heater cover is properly sealed.
   - Install seven screws that hold heater cover to heater case.
3. Heater case (17).
   - May be necessary to have an assistant when installing heater case.
4. Nuts (19).
5. Screws (18).
6. Screw (24).

Tighten

- Screws (18) to 1.9 N·m (17 lbs. in.).
- Nuts (19) to 2.8 N·m (25 lbs. in.).
- Screw (24) to 11 N·m (97 lbs. in.).

7. Heater hoses. Refer to "Heater Hoses."
8. Coolant recovery reservoir. Refer to SECTION 6B1.
9. Instrument panel. Refer to SECTION 10A4.
10. Steering wheel. Refer to SECTION 3F.
11. Blower motor (16). Refer to "Blower Motor and Fan."
12. Blower motor cover.
13. Hinge pillar trim panels. Refer to SECTION 10A4.
14. ECM and mounting tray.
15. Center floor air distribution duct.
16. Electrical connectors, as necessary.
17. Instrument panel compartment. Refer to SECTION 10A4.
18. Engine coolant. Refer to SECTION 6B1.
    - Check the system for leaks.

ON-VEHICLE SERVICE—AUXILIARY HEATER (SUBURBAN)

CONTROL SWITCH

Remove or Disconnect (Figure 19)

1. Instrument panel bezel (1). Refer to SECTION 8C.
2. Electrical connectors (3), as necessary.
3. Control switch (2) from instrument panel bezel (1).

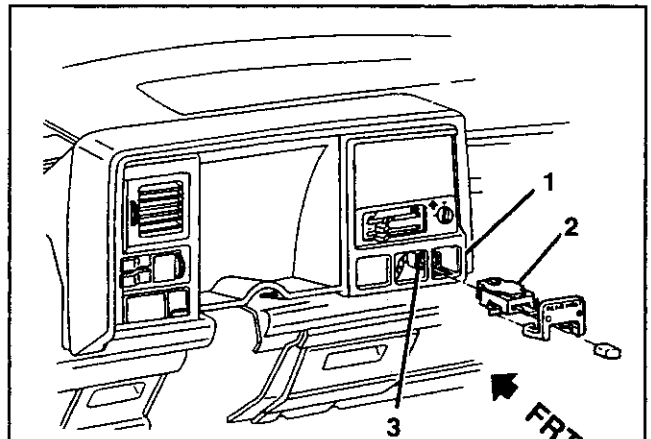
Install or Connect (Figure 19)

1. Control switch (2) to instrument panel bezel (1).
2. Electrical connectors (3), as necessary.
3. Instrument panel bezel (1). Refer to SECTION 8C.
   - Check circuit operation.

FRONT OVERHEAD (AUX. HEATER AND A/C)

Remove or Disconnect (Figure 20)

1. Roof console (4). Refer to SECTION 10A4.
2. Electrical connectors (5), as necessary.



1. BEZEL, INSTRUMENT PANEL
2. SWITCH, AUX. HEATER
3. CONNECTOR, ELECTRICAL

V2677

Figure 19—Auxiliary Heater Control Switch

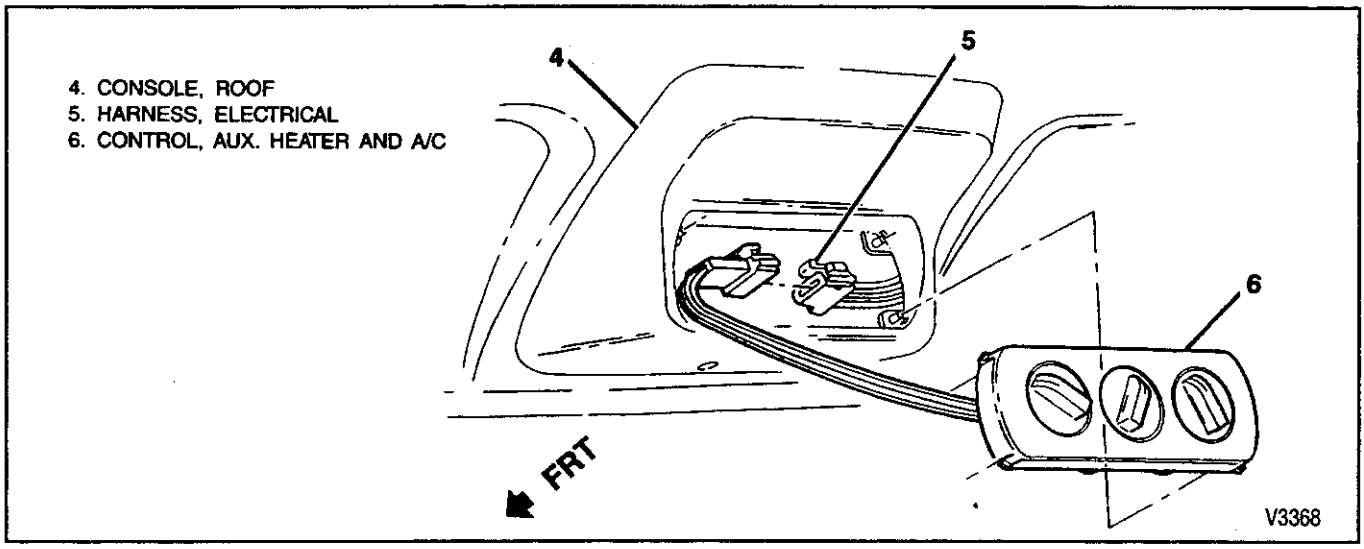


Figure 20—Front Overhead Auxiliary Control Switch

3. Control assembly (6) from roof console (4).

Install or Connect (Figure 20)

1. Control assembly (6) to roof console (4).
2. Electrical connectors (5), as necessary.
3. Roof console (4). Refer to SECTION 10A4.
   • Check circuit operation.

CENTER OVERHEAD (AUX. HEATER AND A/C)

Remove or Disconnect (Figure 21)

1. Bezel (8).
2. Control assembly (6) from roof panel (7).
3. Electrical connectors (5), as necessary.

Install or Connect (Figure 21)

1. Electrical connectors (5), as necessary.
2. Control assembly (6) to roof panel (7).
3. Bezel (8).
   • Check circuit operation.

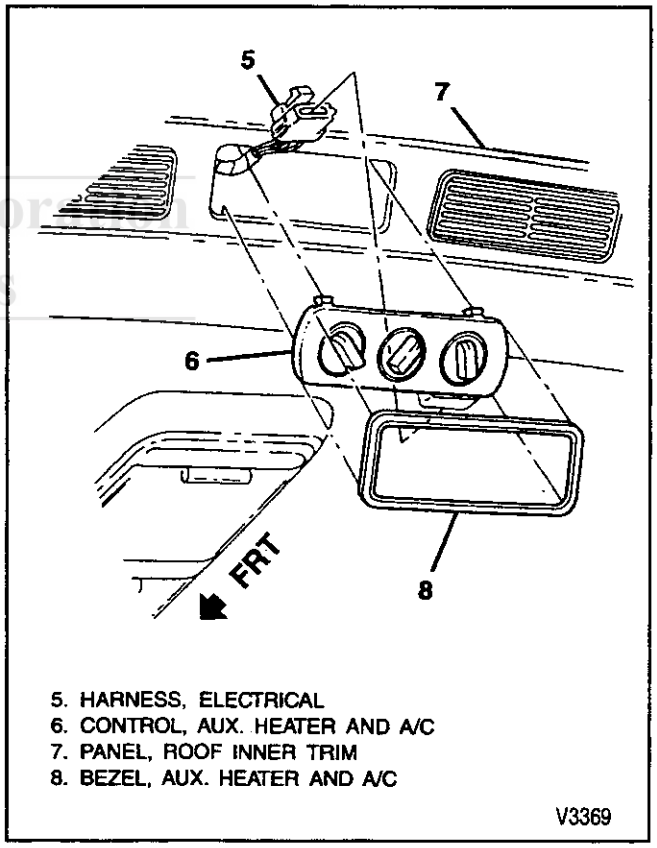


Figure 21—Center Overhead Auxiliary Control Switch

AUXILIARY HEATER PIPE

Remove or Disconnect (Figures 22 and 23)

Tool Required:
J 38723 Heater Line Quick Connect Separator or Equivalent

1. Engine coolant. Refer to SECTION 6B1.
2. Hose clamps (13 and 24).
3. Heater outlet hose (12) from radiator.
4. Heater outlet hose (12) from auxiliary heater pipe (10).
5. Hose clamps (15 and 20).
6. Heater outlet hose (14) from heater core.
7. Heater outlet hose (14) from auxiliary heater pipe (10).
8. Hose clamps (17 and 19).
9. Heater inlet hose (18) from heater core.
10. Heater inlet hose (18) from auxiliary heater pipe (10).
11. Hose clamp (21).
12. Heater inlet hose (16) from auxiliary heater pipe (10).
13. Push auxiliary inlet hose (22) or outlet hose (23) into auxiliary heater pipe (10) and insert J 38723 or equivalent into hose to release locking tabs.
14. Nut (9) (figure 22).
15. Auxiliary heater pipe (10).

Install or Connect (Figures 22 and 23)

1. Auxiliary heater pipe (12) (figure 22).

NOTICE: Refer to "Notice" on page 1A-1.

2. Nut (9).

Tighten

- Nut (9) to 15 N·m (11 lbs. ft.).

3. Push hose(s) (22 or 23) into auxiliary heater pipe (10) until retainer tabs lock.
   - Pull back on hose(s) to check for proper engagement.
4. Heater inlet hose (16) to auxiliary heater pipe (10).
5. Hose clamp (21).
6. Heater inlet hose (18) to auxiliary heater pipe (10).
7. Heater inlet hose (18) to heater core.
8. Hose clamps (17 and 19).
9. Heater outlet hose (14) to auxiliary pipe (10).
10. Heater outlet hose (14) to heater core.
11. Hose clamps (15 and 20).

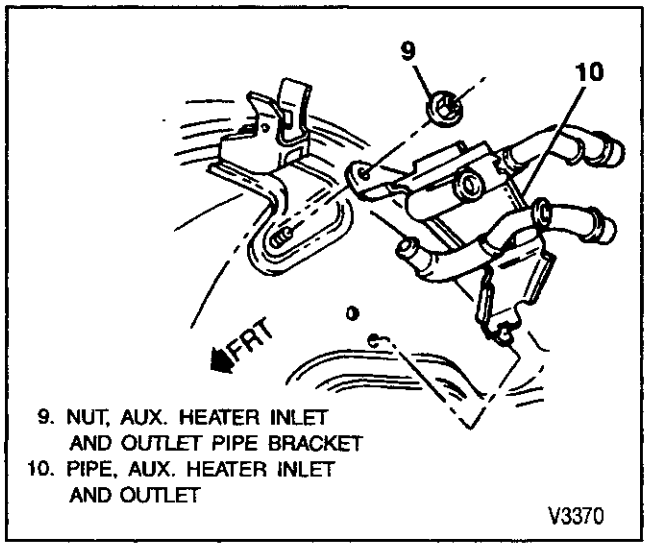


Figure 22—Auxiliary Heater Pipe

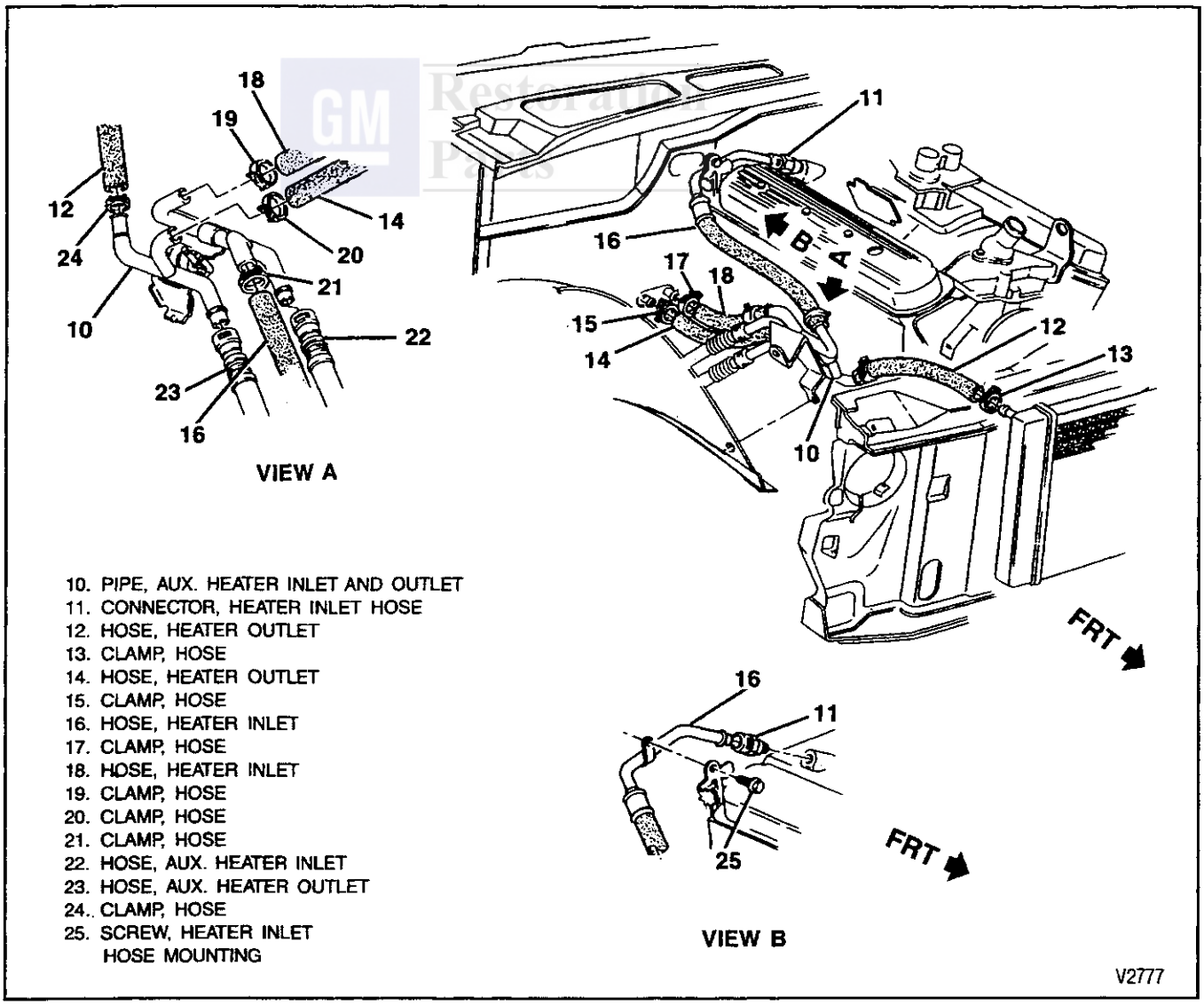


Figure 23—Auxiliary Heater Hose Routing

12. Heater outlet hose (12) to auxiliary heater pipe (10).
13. Heater outlet hose (12) to radiator.
14. Hose clamps (13 and 24).
15. Engine coolant. Refer to SECTION 6B1.
    - Check the system for leaks.

HEATER HOSES

FRONT AUXILIARY HOSE ASSEMBLY

Remove or Disconnect (Figure 24)

Tool Required:
J 38723 Heater Line Quick Connect Separator or Equivalent

- Raise the vehicle and support with suitable safety stands.

1. Engine coolant. Refer to SECTION 6B1.
2. Right front wheelhouse. Refer to SECTION 2B.
3. Bolts (27 and 28).
4. Front hose assembly (26) from auxiliary heater pipe (10).
   - Push front hose assembly (26) into auxiliary heater pipe (10) and insert J 38723 or equivalent into hose to release locking tabs.
5. Front hose assembly (26) from rear hose assembly (30).
   - Push auxiliary hose assembly (26) into rear hose assembly (30) and insert J 38723 or equivalent into hose to release locking tabs.

Install or Connect (Figure 24)

1. Front hose assembly (26) to auxiliary heater pipe (10).
   - Push hose assembly into auxiliary heater pipe until retainer tabs lock.
2. Front hose assembly (26) to rear hose assembly (30).
   - Push hose assembly into rear hose assembly until retainer tabs lock.

NOTICE: Refer to "Notice" on page 1A-1.

3. Bolts (27 and 28).

Tighten

- Bolts (27 and 28) to 17 N·m (13 lbs. ft.).

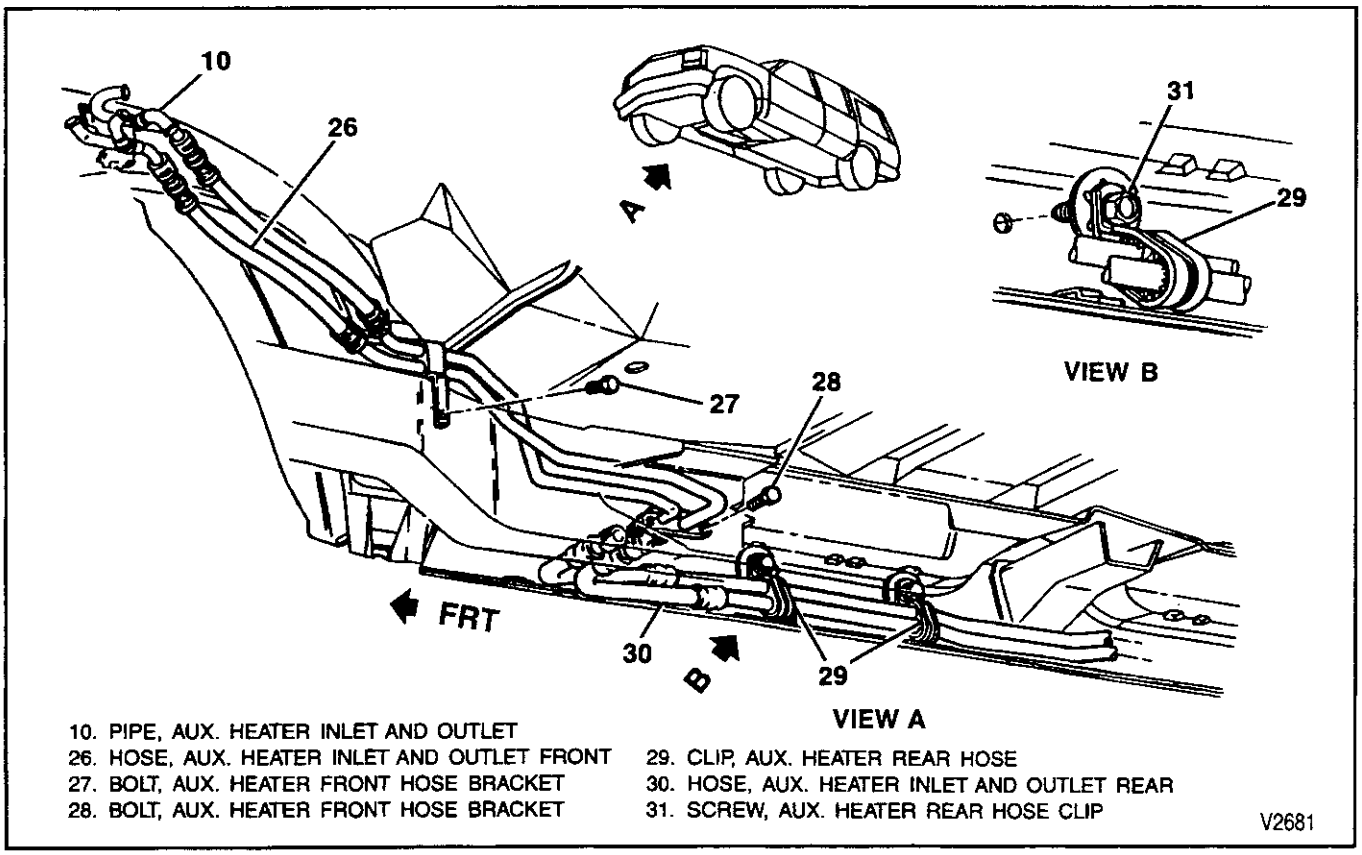
4. Right front wheelhouse. Refer to SECTION 2B.
5. Engine coolant. Refer to SECTION 6B1.
   - Lower the vehicle.
   - Check the system for leaks.

REAR AUXILIARY HOSE ASSEMBLY

Remove or Disconnect (Figures 24 and 25)

Tool Required:
J 38723 Heater Line Quick Connect Separator or Equivalent

- Raise the vehicle and support with suitable safety stands.



10. PIPE, AUX. HEATER INLET AND OUTLET
26. HOSE, AUX. HEATER INLET AND OUTLET FRONT
27. BOLT, AUX. HEATER FRONT HOSE BRACKET
28. BOLT, AUX. HEATER FRONT HOSE BRACKET
29. CLIP, AUX. HEATER REAR HOSE
30. HOSE, AUX. HEATER INLET AND OUTLET REAR
31. SCREW, AUX. HEATER REAR HOSE CLIP

V2681

Figure 24—Auxiliary Heater Hose Assembly Routing (Front)

1. Engine coolant. Refer to SECTION 6B1.
2. Bolts (31).
3. Rear hose assembly (30) from front hose assembly (26) (figure 24).
   - Push rear hose assembly (30) into front hose assembly (26) and insert J 38723 or equivalent into hose to release locking tabs.
4. Rear hose assembly (30) from auxiliary heater core (32).
   - Push rear hose assembly (30) into auxiliary heater core (32) and insert J 38723 or equivalent into hose to release locking tabs.

Install or Connect (Figures 24 and 25)

1. Rear hose assembly (30) to front hose assembly (26) (figure 24).
   - Push rear hose assembly into front hose assembly until retainer tabs lock.
2. Rear hose assembly (30) to auxiliary heater core (32).
   - Push rear hose assembly into auxiliary heater core until retainer tabs lock.

NOTICE: Refer to "Notice" on page 1A-1.

3. Bolts (31).

Tighten

- Bolts (31) to 17 N·m (13 lbs. ft.).

4. Engine coolant. Refer to SECTION 6B1.
   - Lower the vehicle.
   - Check the system for leaks.

HEATER CORE

Remove or Disconnect (Figure 26)

1. Engine coolant. Refer to SECTION 6B1.
2. Rear quarter interior trim, as necessary. Refer to SECTION 10A4.
3. Right rear quarter trim panel. Refer to SECTION 10A4.
4. Right rear wheelhouse. Refer to SECTION 2B.
5. Auxiliary heater hoses from heater core. Refer to 'Heater Hoses."

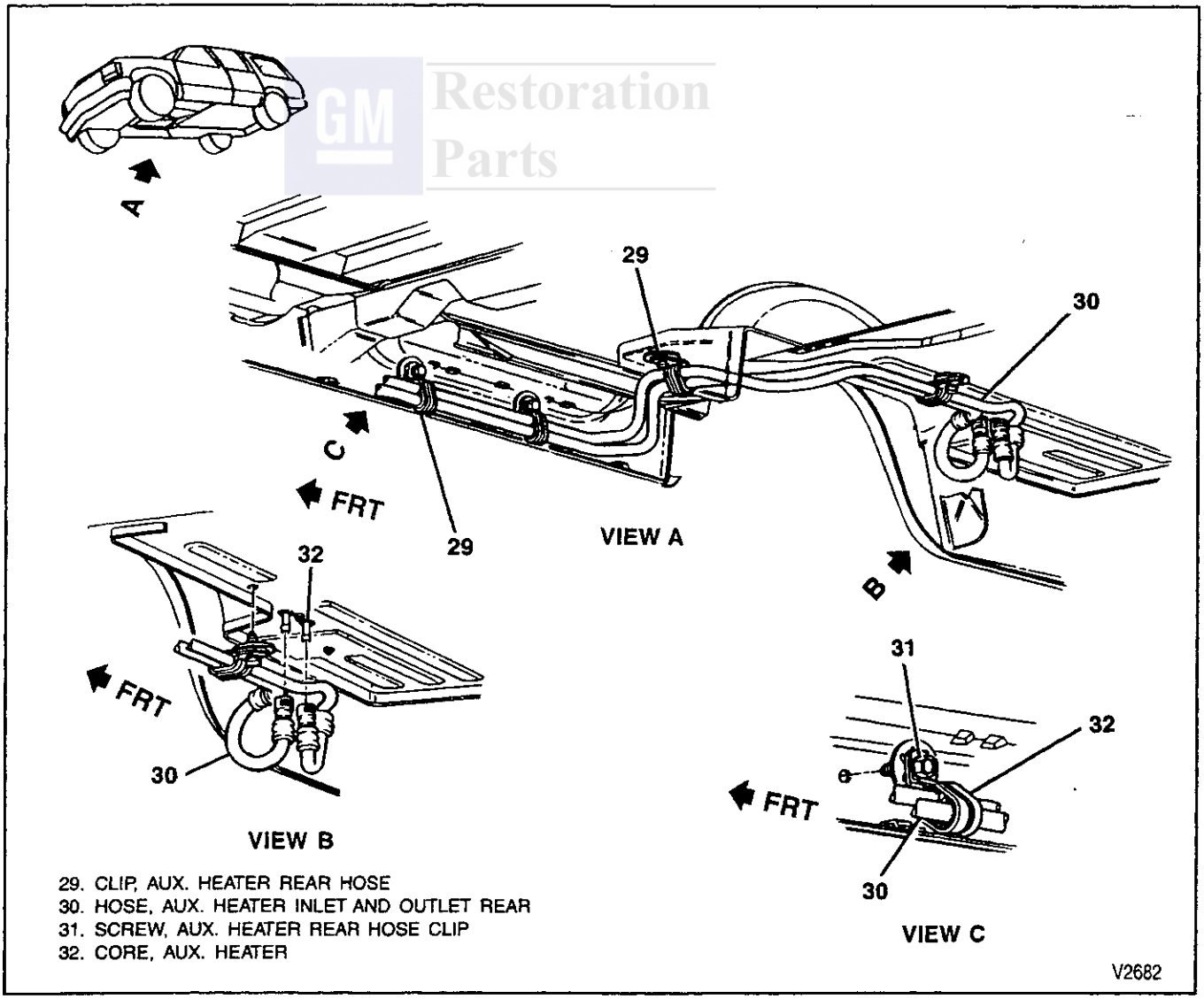


Figure 25—Auxiliary Heater Hose Assembly Routing (Rear)

6. Electrical connectors, as necessary.
7. Drain valve.
8. Bolts (33).
9. Nuts (36).
10. Heater module (37).
11. Blower motor, if necessary.
12. Heater case cover.
13. Heater core.

Install or Connect (Figure 26)

1. Heater core.
2. Heater case cover.
3. Blower motor, if necessary.
4. Heater module (37).

NOTICE: For steps 5 and 6, refer to "Notice" on page 1A-1.

5. Nuts (36).
6. Bolts (33).

Tighten

- Bolts (33) to 1.5 N·m (13 lbs. in.).
- Nuts (36) to 10 N·m (89 lbs. in.).

7. Drain valve.
8. Electrical connectors, as necessary.
9. Auxiliary heater hoses to heater core (29). Refer to "Heater Hoses."
10. Right rear wheelhouse. Refer to SECTION 2B.
11. Right rear quarter trim panel. Refer to SECTION 10A4.
12. Rear quarter interior trim, as necessary. Refer to SECTION 10A4.
13. Engine coolant. Refer to SECTION 6B1.
    - Check the system for leaks.

BLOWER MOTOR AND FAN

Remove or Disconnect (Figure 27)

1. Negative battery cable. Refer to SECTION 0A.
2. Right rear quarter trim panel cover. Refer to SECTION 10A4.
3. Electrical connectors, as necessary.
4. Screws (39).
   - Position blower motor in order to remove blower motor fan.
5. Blower motor fan retaining nut.
6. Blower motor fan.
7. Blower motor (38).

Install or Connect (Figure 27)

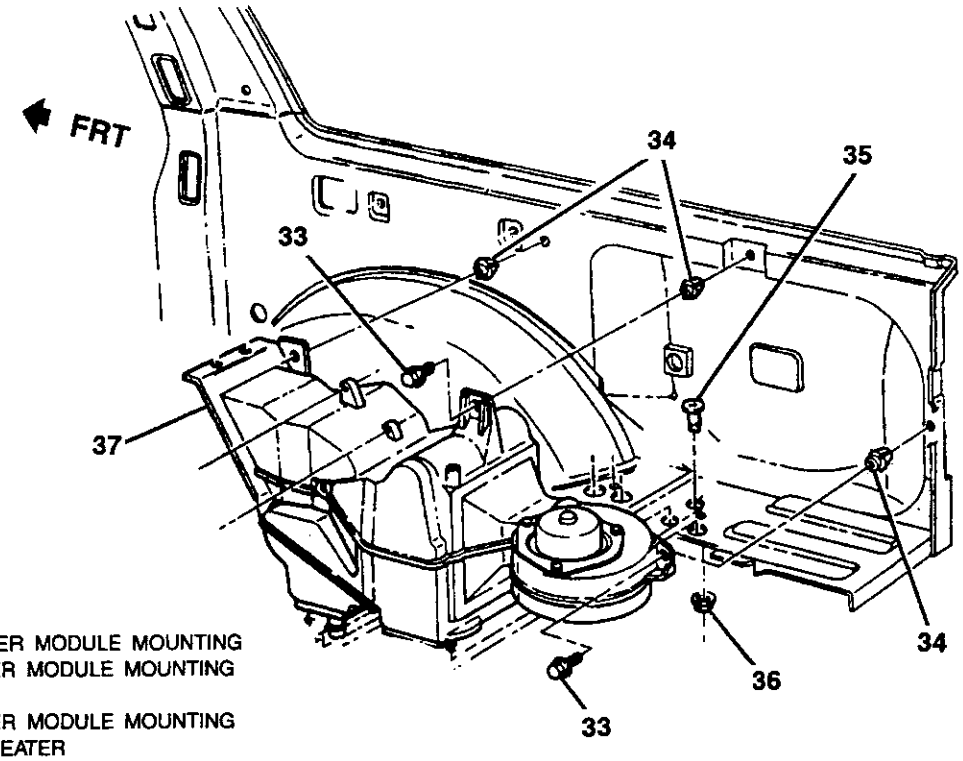
1. Blower motor (38).
2. Blower motor fan.
3. Blower motor fan retaining nut.

NOTICE: Refer to "Notice" on page 1A-1.

4. Screws (39).

Tighten

- Screws (39) to 1.4 N·m (12 lbs. in.).



33. BOLT, AUX. HEATER MODULE MOUNTING
34. NUT, AUX. HEATER MODULE MOUNTING
35. VALVE, DRAIN
36. NUT, AUX. HEATER MODULE MOUNTING
37. MODULE, AUX. HEATER

V3371

Figure 26—Auxiliary Heater Module

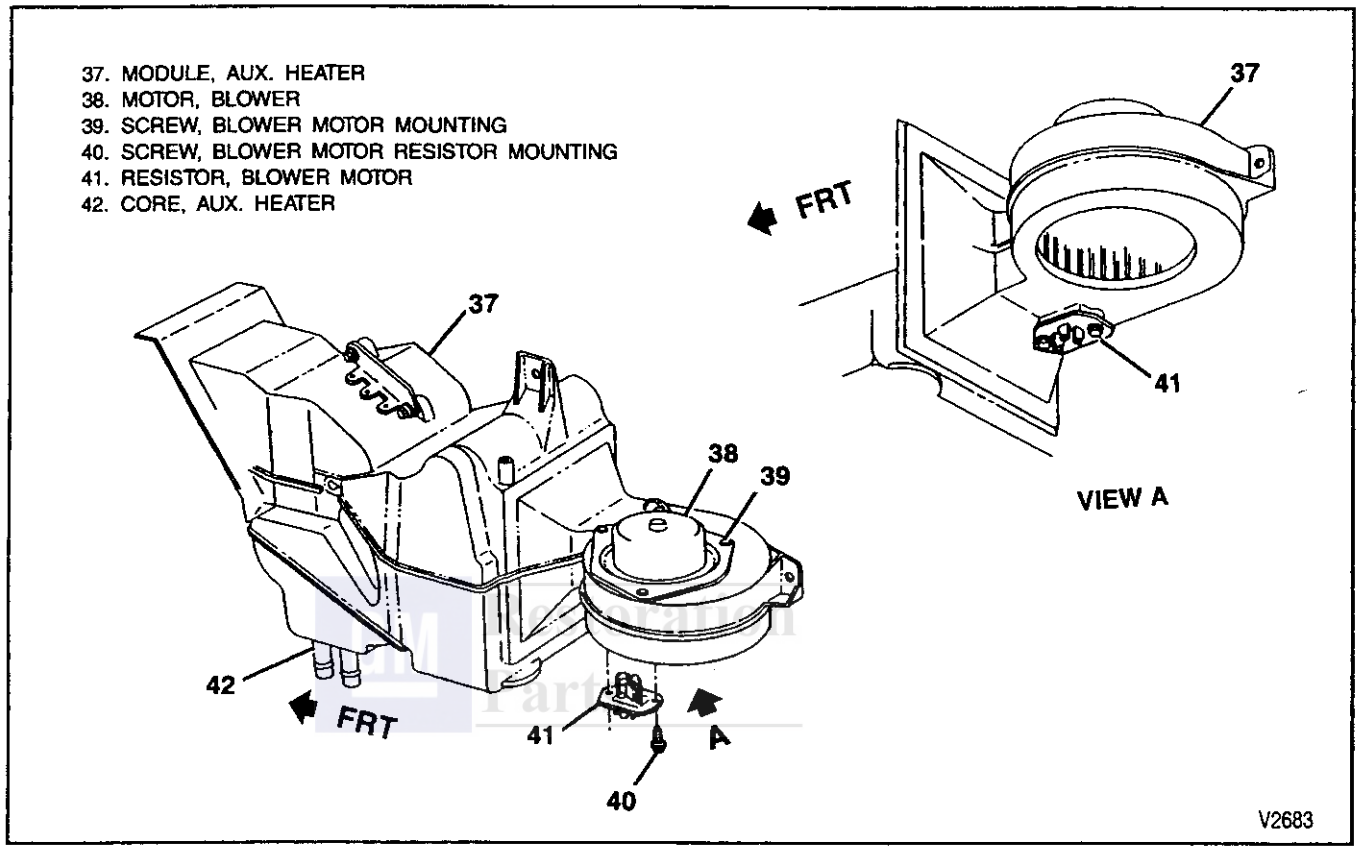


Figure 27—Auxiliary Blower Motor/Resistor

5. Electrical connectors, as necessary.
6. Right rear quarter trim panel cover. Refer to SECTION 10A4.
7. Negative battery cable.

   • Check circuit operation.

BLOWER MOTOR RESISTOR

Remove or Disconnect (Figure 27)

1. Negative battery cable. Refer to SECTION 0A.
2. Right rear quarter trim panel cover. Refer to SECTION 10A4.
3. Electrical connectors, as necessary.
4. Screws (40).
5. Blower motor resistor (41).

Install or Connect (Figure 27)

1. Blower motor resistor (41).

NOTICE: Refer to "Notice" on page 1A-1.

2. Screws (40).

Tighten

   • Screws (40) to 1.4 N·m (12 lbs. in.).

3. Electrical connectors, as necessary.
4. Right rear quarter trim panel cover. Refer to SECTION 10A4.
5. Negative battery cable.

   • Check circuit operation.

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

ITEM	N·m	Lbs. Ft.	Lbs. In.
Air Inlet Valve-to-Instrument Panel Screw	1.9	—	17
Auxiliary Heater Module Mounting Bolts	1.5	—	13
Auxiliary Heater Module Mounting Nuts	10	—	89
Auxiliary Heater Pipe Mounting Nut	15	11	—
Blower Motor Mounting Screw	1.4	—	12
Blower Motor Resistor Mounting Screw	1.4	—	12
Control Assembly Mounting Screw	1.6	—	14
Cowl Panel-to-Heater Case Mounting Screw	1.9	—	17
Defroster Nozzle Mounting Screw	1.9	—	17
Defroster Nozzle-to-Heater Case Mounting Screw	1.4	—	12
Distributor Duct Mounting Screw	1.9	—	17
Front Auxiliary Hose Assembly-to-Frame Mounting Screw	17	13	—
Heater Case-to-Cowl Panel Mounting Nut	2.8	—	25
Heater Case-to-Cowl Panel Mounting Screw	11	—	97
Rear Auxiliary Hose Clip-to-Frame Mounting Bolts	17	13	—
Right Vent Cable-to-Heater Case	1.4	—	12

T2963

SPECIAL TOOLS

1.

J 38723

1. HEATER LINE QUICK CONNECT SEPARATOR

V3437

SECTION 1B

HEATER, VENTILATION, AND AIR CONDITIONING

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.

CONTENTS

CONTENTS (cont'd)

GENERAL DESCRIPTION

CCOT A/C SYSTEM

The cycling clutch orifice tube (CCOT) refrigerant system is designed to cycle a compressor on and off to maintain desired cooling and to prevent evaporator freeze-up. Passenger compartment comfort is maintained by the temperature selector on the controller (figure 1).

Control of the refrigeration cycle (on and off operation of the compressor) is done with a switch which senses low side pressure as an indicator of evaporator pressure. The cycling pressure switch is the freeze protection device in the system and senses refrigerant pressure on the suction side of the system. This switch is located on a standard service low-side fitting. During air temperatures of 16-26°C (60-80°F), the equalized pressures within the charged air conditioning system will close the contacts of the pressure switch.

When an air conditioning mode is selected, electrical energy is supplied to the compressor clutch coil. As the compressor reduces the evaporator pressure to approximately 175 kPa (25 psi), the pressure switch will open, de-energizing the compressor clutch. As the system equalizes and the pressure reaches approximately 315 kPa (46 psi), the pressure switch contacts close, re-energizing the clutch coil. This cycling continues and maintains evaporator discharge air temperature at approximately 1°C (33°F).

Because of this cycling, some slight increases and decreases of engine speed/power may be noticed under certain conditions. This is normal as the system is designed to cycle to maintain desired cooling, thus preventing evaporator freeze-up.

Additional compressor protection results from the operating characteristics of the low-side cycling pressure system. If a massive discharge occurs in the low side of the system, or the orifice tube becomes plugged, low-side pressures could be insufficient to close the contacts of the pressure switch. In the event of a low charge, insufficient cooling accompanied by rapid compressor clutch cycling will be noticed at high air temperatures.

When the engine is turned "OFF" with the air conditioning system operating, the refrigerant in the system will flow from the high-pressure side of the expansion tube (orifice) to the low-pressure side until the pressure is equalized. This may be detected as a hissing sound for 30 to 60 seconds and is a normal condition.

The air conditioning systems that are available for this vehicle are described below:

- C60—Front Manual Controls, HVAC System
- C69—Rear Roof Mounted, HVAC System

UNIT REPAIR INFORMATION

For bench repair of the Harrison HR110-MD air conditioning compressor, refer to the Light Duty Truck Unit Repair Manual.

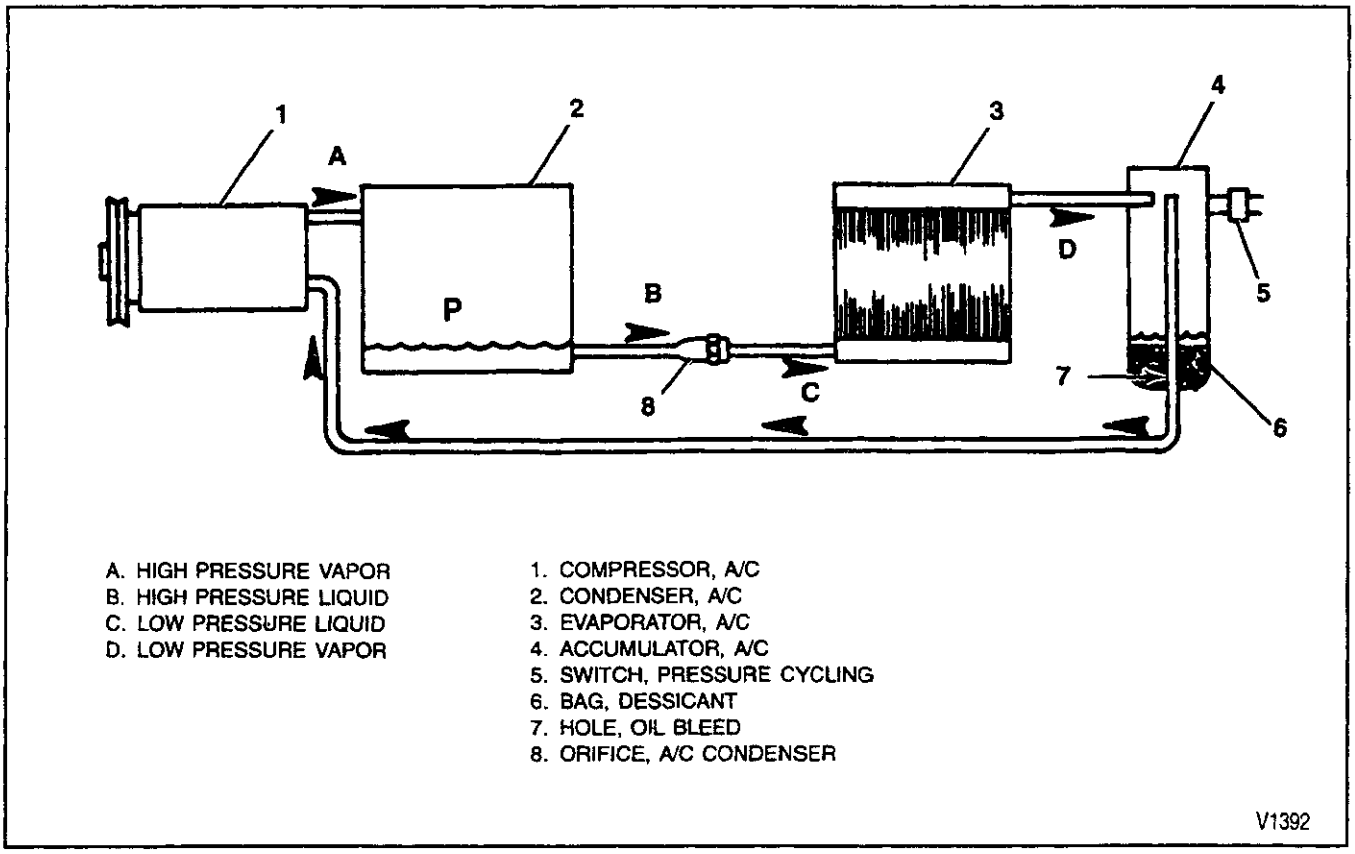


Figure 1—System Components

CONTROLS

All C/K models are equipped with an electronically controlled air conditioning system. The control head functions are controlled by four rocker and three pushbutton switches (figure 2).

The four rocker switches are for "Temperature Select," "Fan Speed," "Upper/Vent-Lower" and "Defrost/Heater-Lower."

The three pushbutton switches are "A/C," "MAX" (Recirculation), and "OFF."

Automatic recirculation will occur when compressor head pressures exceed 2275 kPa (330 psi) and disable after head pressures reach 1724 kPa (250 psi). The system requires a 20 second delay for activation and a 20 minute on-time. When activated, it cannot be manually disabled by the "MAX" button.

AIR DISTRIBUTION SYSTEM

Control of airflow through the HVAC module is regulated by electronic-actuated doors. At various positions of the rocker switches on the control assembly, mode doors mix and direct cooled, heated, and outside air through the air ducts.

DUCTS AND OUTLETS

A system of ducts and outlets directs air to the passenger compartment. In cases of poor air output, defroster, heater, air conditioning, and vent ducts should be checked for obstructions such as leaves, dirt, or objects which may have fallen into the ducts from the passenger compartment.

REFRIGERATION SYSTEM

ACCUMULATOR

The sealed accumulator assembly is connected to the evaporator outlet pipe. It functions as a liquid/vapor separator that receives refrigerant vapor, some liquid refrigerant and refrigerant oil from the evaporator. It only allows refrigerant vapor and oil to continue on to the compressor.

At the bottom of the accumulator is the desiccant that acts as a drying agent for moisture that may have entered the system. An oil bleed hole is also located near the bottom of the accumulator outlet pipe to provide an oil return path to the compressor.

A low-side pressure service fitting is located on the accumulator. A similar service fitting is provided for mounting the cycling pressure switch. It is not necessary to discharge the system to replace the switch. The accumulator is serviced only as a replacement assembly.

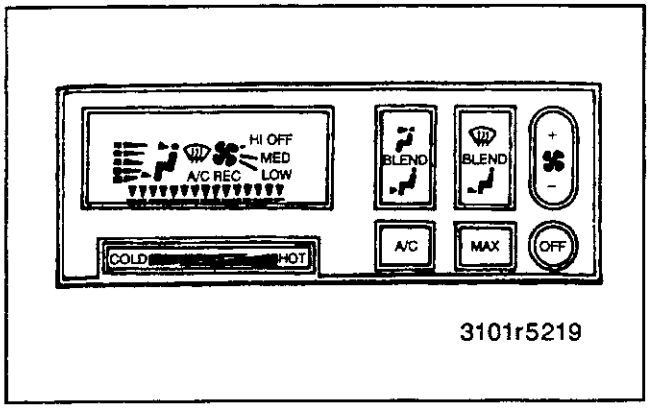


Figure 2—Control Head Description

COMPRESSOR

The Harrison HR110-MD compressor is driven by a belt from the engine crankshaft through the compressor clutch pulley. The compressor pulley rotates freely, without turning the compressor shaft, until an electromagnetic clutch coil is energized. When voltage is applied to energize the clutch coil, a clutch plate and hub assembly is drawn rearward toward the pulley. The magnetic force locks the clutch plate and pulley together as one unit to drive the compressor shaft.

All replacement compressors from service parts will have 240 ml (8 fl. oz.) of oil in the crankcase, the oil must be drained and retained. Then replace the oil in the same amount as previously recorded from the old compressor.

CONDENSER

The condenser assembly in front of the radiator is made up of coils, which carry the refrigerant, and cooling fins, which provide rapid transfer of heat. The air passing through the condenser cools the high-pressure refrigerant vapor causing it to condense into a liquid.

EXPANSION TUBE (ORIFICE)

The plastic expansion tube, with its mesh screen and orifice is located in the condenser outlet pipe. It provides a restriction to the high-pressure liquid refrigerant in the liquid line, metering the flow of refrigerant to the evaporator as a low-pressure liquid. The expansion tube and orifice are protected from contamination by filter screens on both inlet and outlet sides. The tube is serviced only as a replacement assembly.

When the engine is turned "OFF" with the air conditioning operating, the refrigerant in the system will flow from the high-pressure side of the expansion tube (orifice) to the low-pressure side until the pressure is equalized. This may be detected as a faint sound of liquid flowing (hissing) for 30 to 60 seconds and is a normal condition.

When system diagnostics indicate a restricted expansion tube, it may not be necessary to replace it. Metal chips, flakes, or slivers found on the screen may be removed with compressed air and the expansion tube may be reused if:

- The plastic frame is not broken.
- The expansion tube is not damaged or plugged.
- The screen material is not torn.
- The screen is not plugged with fine gritty material.

EVAPORATOR

The evaporator is a device which cools and dehumidifies the air before it enters the vehicle. High pressure liquid refrigerant flows through the orifice tube into the low-pressure area of the evaporator. The heat in the air passing through the evaporator core is lost to the cooler surface of the core, thereby cooling the air. As the process of heat loss from the air to the evaporator core surface is taking place, any moisture (humidity) in the air condenses on the outside surface of the evaporator core and is drained off as water.

HEATER CORE

In any air conditioning mode, the heater core can be used to heat the cool dehumidified air to achieve the desired temperature. The position of the control assembly temperature selector will determine how much heat will be added to the incoming air.

HIGH PRESSURE RELIEF VALVE

The compressor is equipped with a pressure relief valve which is placed in the system as a safety factor. Under certain conditions, the refrigerant on the discharge side may exceed the designed operating pressure. To prevent system damage, the valve is designed to open automatically at approximately 3036 kPa (440 psi). Any condition that causes the valve to open should be corrected, and the refrigerant should be replaced as necessary.

REFRIGERANT-134a

CAUTION: Avoid breathing A/C Refrigerant-134a and lubricant vapor and mist. Exposure may irritate eyes, nose, and throat. To remove R-134a from the A/C system, use service equipment certified to meet the requirements of SAE J2210 (R-134a recycling equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.

Like the coolant in the engine cooling system, the refrigerant is the substance in the air conditioning system that absorbs, carries, and then releases heat. Although various substances are used as refrigerants in other types of refrigeration systems, past automotive air conditioning systems used a type called Refrigerant-12 (R-12).

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

While the R-134a A/C system is very similar to an R-12 A/C system, the differences in the refrigerant, lubricants, and service equipment are important.

NOTICE: R-134a refrigerant is not compatible with R-12 refrigerant in an air conditioning system. R-12 in a R-134a system will cause compressor failure, refrigerant oil sludge, or poor air conditioning system performance.

Refrigerant-134a carries a charge of a special lubricant, polyalkaline glycol (PAG) refrigerant oil. GM (PAG) refrigerant oil will have a slight blue tint. The oil is hydroscopic (absorbs water from the atmosphere) and should be stored in closed containers.

HEATER SYSTEM

The air conditioning system operates on the reheat principle in which all the air passing through the system is chilled almost to a freezing temperature and then reheated to a more comfortable temperature before it is discharged into the passenger compartment.

The dehumidified air is reheated as it passes through the heater core in the air conditioning module. The heater is warmed by engine coolant passing through the tubes of the heater core. This heat is transferred to the heater core fins and given off to the airflowing past the fins. The position of the air temperature air valve in the air conditioning module determines how much of the total airflow is allowed to pass through the heater. In turn, this determines the warmth of the total airflow discharged into the passenger compartment.

RELAYS AND SWITCHES

BLOWER MOTOR RELAY

The blower motor relay is used to provide battery voltage to the blower motor assembly only during high blower motor assembly speed. The blower motor resistor is used to provide power to the blower motor assembly in all other speed settings.

COMPRESSOR PRESSURE SWITCH

This system is equipped with a compressor pressure switch. This switch is normally open, activates at 2069-2482 kPa (300-360 psi) and releases at 1724 kPa (250 psi).

It's function is to drive the air distribution door in the module to recirculation position to reduce the system load and decrease system high-side pressure. It also activates the auxiliary fan on 7.4L (L19) applications.

HIGH PRESSURE CUTOFF SWITCH

The system is also equipped with a high pressure cutoff switch. This switch is normally closed, and opens at 2827-3103 kPa (410-450 psi) to interrupt the voltage to the compressor clutch coil. This will stop the compressor from cycling and prevent the pressure relief valve from discharging refrigerant and oil.

PRESSURE CYCLING SWITCH

The refrigeration cycle (on and off operation of the compressor) is controlled by a switch which senses the low-side pressure as an indicator of evaporator temperature. The pressure cycling switch is the freeze protection device in the system and senses refrigerant pressure on the suction side of the system. This switch is mounted on a standard service low-side fitting. This switch also provides compressor cutoff during cold weather.

Additional compressor protection results from the operating characteristics of the low-side pressure cycling system. If a massive discharge occurs in the low side of the system, or the orifice tube becomes plugged, low-side pressures could be insufficient to close the contacts of the pressure switch. In the event of a low charge, insufficient cooling accompanied by rapid compressor clutch cycling will be noticed at high outside (ambient) air temperatures.

If replacement of the pressure cycling switch is necessary, it is important to note that this may be done without removing the refrigerant charge. A service fitting is located in the pressure switch fitting. During replacement of the pressure switch, a new O-ring seal must be installed and the switch assembled to the specified torque of 4.5 N·m (40 lbs. in.).

REFRIGERANT SYSTEM DIAGNOSIS

REFRIGERANT SYSTEM CHECKS

FUNCTIONAL TEST

To aid in determining whether or not the air conditioning, electrical, air, and refrigeration systems are operating properly, refer to "Performance Test." For additional electrical diagrams and diagnostic information, refer to the Driveability, Emissions, and Electrical Diagnosis Manual for these models.

1. Operation of the air conditioning blower at all speeds, in any position except "OFF" and engagement of the compressor clutch would indicate that the electrical circuits are functioning properly.
2. The same "Hand-Felt" temperature of the evaporator inlet pipe and the accumulator surface of an operating system would indicate a properly charged system.
3. Operation of the air conditioning control head to distribute air from the designed outlets would indicate proper functioning.

PERFORMANCE TEST

Tool Required:

J 21213-A Four Jack-Dual Range Temperature Tester or Equivalent

1. Park vehicle inside or in a shaded area.
2. Open doors or windows to ventilate interior.
3. Vent engine exhaust if necessary.
4. Open hood and install high and low side pressure gages. Route lines over rear hood seal, and tape gages to windshield for viewing.
5. Close hood.
6. Record ambient temperature at vehicle.
7. Record relative humidity. Use psychrometer or consult local weather bureau.

Important

- Be sure to record relative humidity and ambient temperature conditions at time of test.

8. Close doors or windows.
9. Press "A/C" button, adjust blower speed to "HI," and temperature to full "COLD."
10. Open air conditioning outlets.
11. Install J 21213-A or equivalent into right center air conditioning outlet.
12. Place transmission in "PARK" or "NEUTRAL."
13. Start engine, stabilize engine speed at 2000 RPM, and start the timer.
14. Run air conditioning system until outlet air reaches the lowest temperature (about 3 minutes).
15. Record outlet air temperature and high side and low side pressures.
16. Turn the engine off and compare the readings. Normally operating air conditioning systems should not exceed the levels shown (figures 3 and 4).

PSIG	TEMP (°F) R-134A	PSIG	TEMP (°F) R-134A	PSIG	TEMP (°F) R-134A	PSIG	TEMP (°F) R-134A
0	-14.7	25	29.3	70	69.6	200	130.1
1	-12.1	26	30.5	75	72.9	210	133.5
2	-9.6	27	31.7	80	76.1	220	136.7
3	-7.2	28	32.9	85	79.2	230	139.8
4	-4.9	29	34.0	90	82.2	240	142.9
5	-2.7	30	35.1	95	85.0	250	145.9
6	-0.6	32	37.4	100	87.8	260	148.8
7	1.4	34	39.5	105	90.5	270	151.6
8	3.4	36	41.6	110	93.1	280	154.3
9	5.3	38	43.6	115	95.6	290	157.0
10	7.1	40	45.6	120	98.0	300	159.6
11	8.9	42	47.4	125	100.4	310	162.2
12	10.6	44	49.2	130	102.7	320	164.7
13	12.3	46	51.0	135	104.9	330	167.2
14	13.9	48	52.8	140	107.1	340	169.6
15	15.4	50	54.5	145	109.3	350	171.9
16	17.0	52	56.4	150	111.4	360	174.2
17	18.5	54	57.8	155	113.3	370	176.5
18	19.9	56	59.3	160	115.4	380	178.7
19	21.4	58	60.8	165	117.4	390	180.7
20	22.8	60	62.4	170	119.3	400	183.1
21	24.1	62	63.9	175	121.2		
22	25.5	64	65.4	180	123.0		
23	26.8	66	66.8	185	124.8		
24	28.0	68	68.2	190	126.6		

T3127

Figure 3—Pressure-Temperature Relationship of Refrigerant-134a

RELATIVE HUMIDITY	AMBIENT AIR TEMP		MAXIMUM LOW SIDE PRESSURE		ENGINE SPEED	MAXIMUM RIGHT CENTER AIR OUTLET TEMP		MAXIMUM HIGH SIDE PRESSURE	
(%)	°F	°C	PSIG	kPaG	(rpm)	°F	°C	PSIG	kPaG
20	70	21	32	221	2000	43	6	175	1207
	80	27	32	221		44	7	225	1551
	90	32	32	221		50	10	275	1896
	100	38	33	228		51	11	275	1896
30	70	21	32	221	2000	45	7	190	1310
	80	27	32	221		47	8	235	1620
	90	32	34	234		54	12	290	2000
	100	38	38	262		57	14	310	2137
40	70	21	32	221	2000	46	8	210	1448
	80	27	32	221		50	10	255	1758
	90	32	37	255		57	14	305	2103
	100	38	44	303		63	17	345	2379
50	70	21	32	221	2000	48	9	225	1551
	80	27	34	234		53	12	270	1862
	90	32	41	283		60	16	325	2241
	100	38	49	338		69	21	380	2620
60	70	21	32	221	2000	50	10	240	1655
	80	27	37	255		56	13	290	2000
	90	32	44	303		63	17	340	2344
	100	38	55	379		75	24	395	2724
70	70	21	32	221	2000	52	11	255	1758
	80	27	40	276		59	15	305	2103
	90	32	48	331		67	19	355	2448
80	70	21	36	248	2000	53	12	270	1862
	80	27	43	296		62	17	320	2206
	90	32	52	356		70	21	370	2551
90	70	21	40	276	2000	55	13	285	1965
	80	27	47	324		65	18	335	2310

T2476

Figure 4—System Performance Test

If a malfunction in the refrigerant system is suspected due to abnormal system pressures, inspect the following:

1. Outer surfaces of radiator and condenser cores to be sure airflow is not blocked by dirt, leaves, or other foreign material. Be sure to check between the condenser and radiator as well as the outer surfaces.
2. Evaporator core, condenser core, hoses, tubes, etc., for restrictions or kinks.
3. Refrigerant leaks.
4. Air ducts for leaks or restrictions. Low airflow rate may indicate a restricted evaporator core.
5. Compressor clutch for slippage.
6. Drive belt for improper tension.
7. Accumulator for plugging.
8. Expansion (orifice) tube for plugging.

If the problem is not found, continue with diagnostic procedures in figures 5 through 9 for the CCOT system.

LEAK TESTING

CAUTION: Avoid breathing A/C Refrigerant-134a and lubricant vapor or mist. Exposure may irritate eyes, nose, and throat. To remove R-134a from the A/C system, use service equipment certified to meet the requirements of SAE J2210 (R-134a recycling equipment). If accidental discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.

A refrigerant leak test should be performed on the system whenever a leak is suspected and after performing a service operation which disturbs the components, lines, or connections. Many methods and special tools are available for this purpose; however, no matter which tool is used, care and diligence are the biggest keys to success.

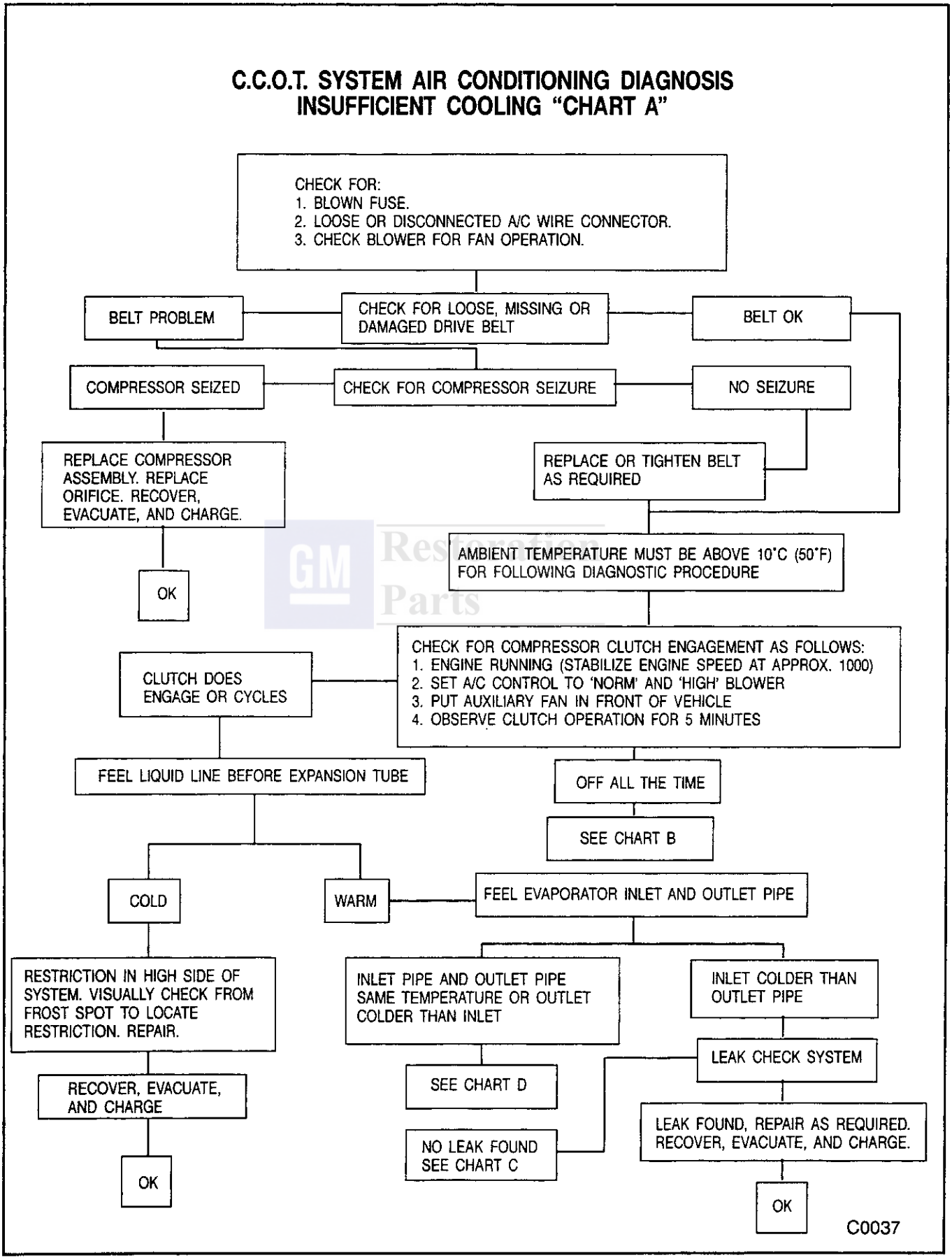


Figure 5—CCOT Air Conditioning System Diagnosis Procedure (1 of 5)

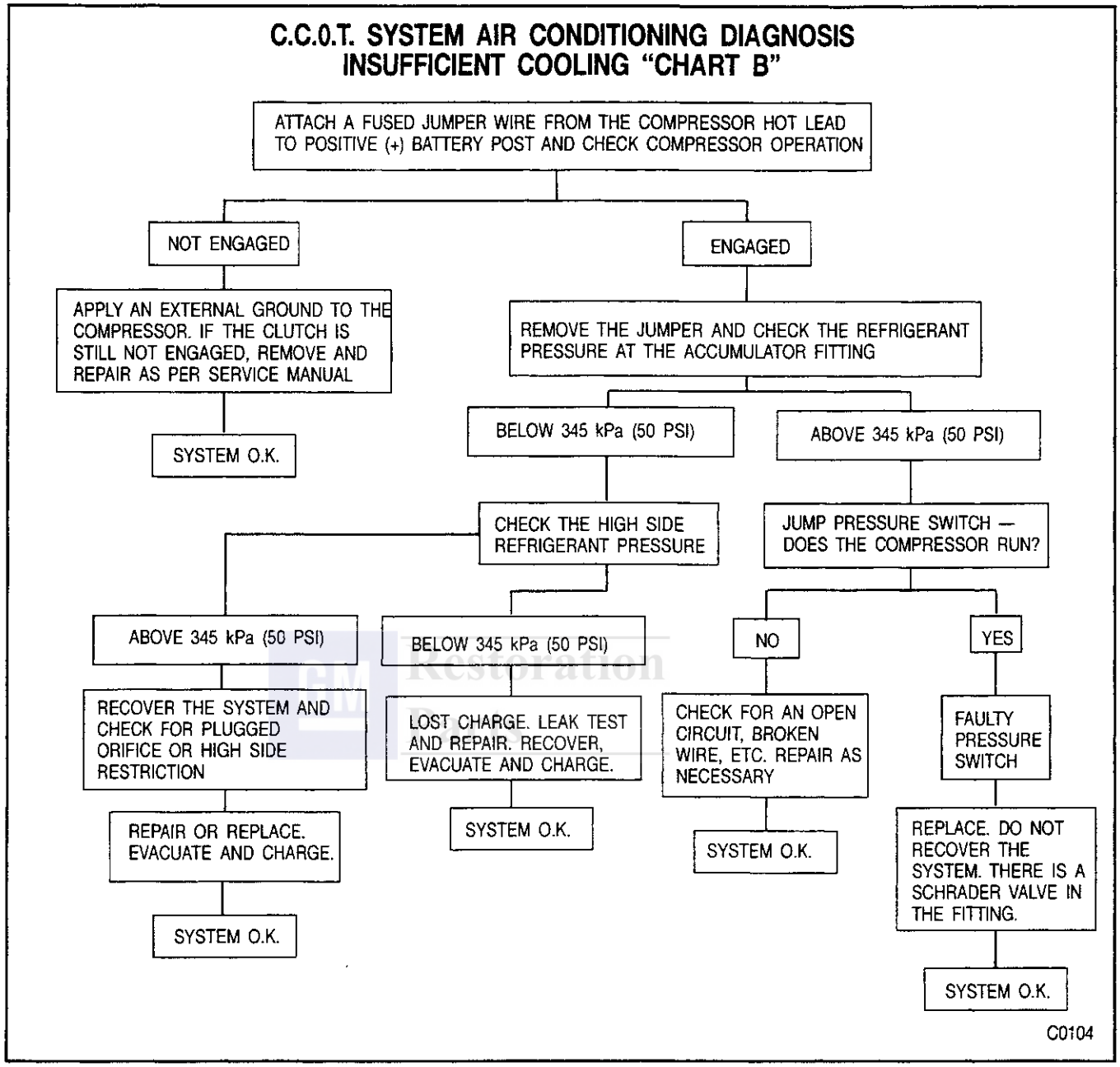


Figure 6—CCOT Air Conditioning System Diagnosis Procedure (2 of 5)

ELECTRONIC LEAK DETECTOR

Tool Required:

J 39400 Electronic Leak Detector

This type of leak detector has been found to be the most useful tool in locating refrigerant leaks. The J 39400 is a small unit which operates on 12V DC and provides an audible signal which increases in frequency as R-134a is detected. Make sure the instrument is properly calibrated, according to the included instructions, and that the detector is used in the proper setting for the type of refrigerant being tested. The detector "GAS" switch should be placed in "R-134a" setting prior to use (figures 10 and 11).

The most common leaks are found at the refrigerant fittings or connections. This may be caused by improper torque, damaged O-ring seals, lack of lubricant on O-ring seals, or dirt/debris across the O-ring seals. Even the smallest piece of lint from cotton gloves or shop cloths can create a leak path across an O-ring seal.

The successful use of this and any other electronic leak detector depends greatly upon the scan rate and upon carefully following the manufacturer's instructions regarding calibration, operation, and maintenance. Each joint must be completely circled moving at 25-51 mm (1-2 inches) per second with the tip of the probe as close to the surface as possible but no more than 6 mm (0.25 inches) away and without blocking the air intake. A leak is indicated when the audible tone goes from a steady 1-2 clicks per second to a solid alarm. The balance knob should be adjusted frequently to maintain the 1-2 clicks per second rate.

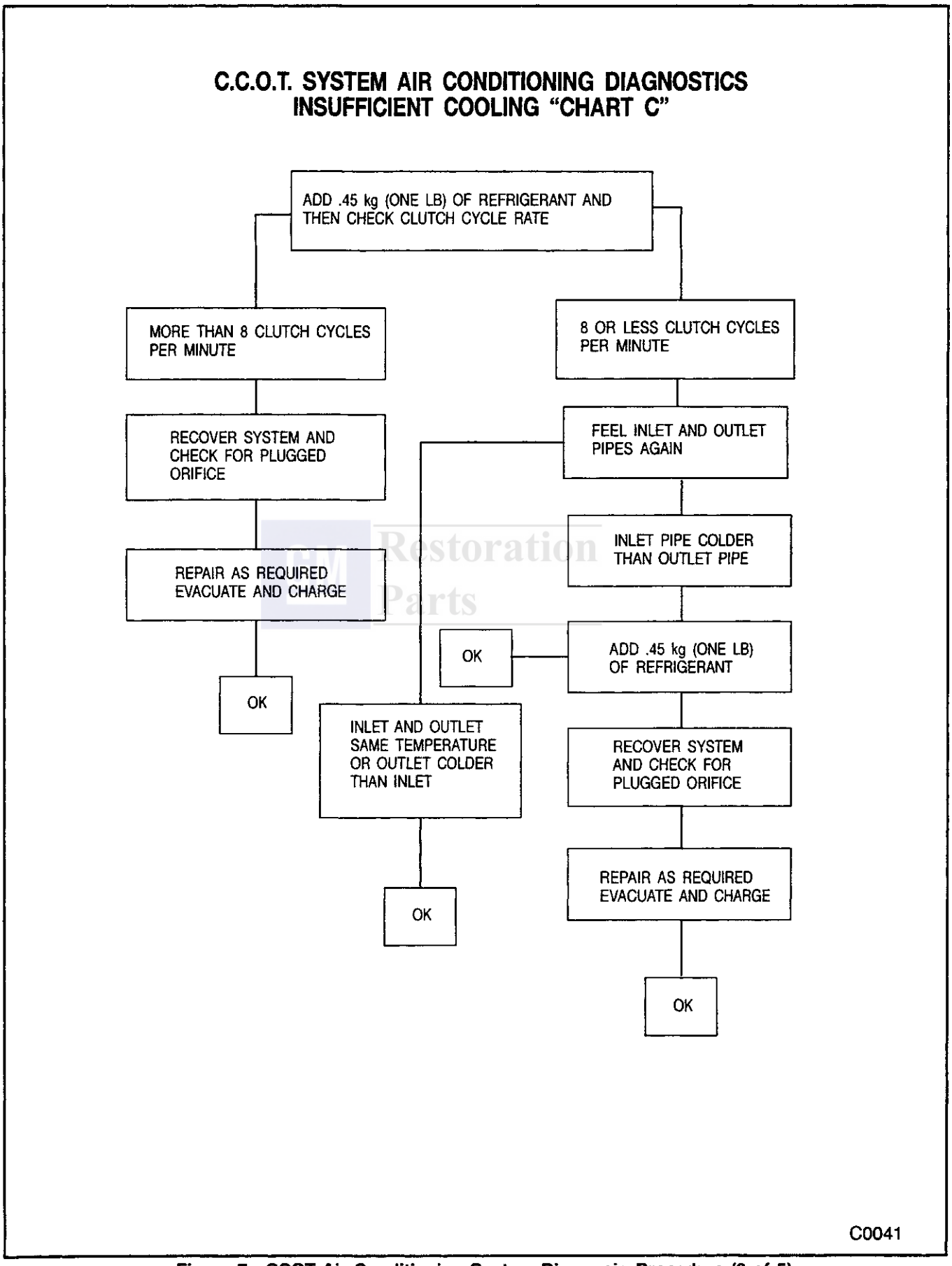


Figure 7—CCOT Air Conditioning System Diagnosis Procedure (3 of 5)

C.C.O.T. SYSTEM AIR CONDITIONING DIAGNOSIS INSUFFICIENT COOLING "CHART D"

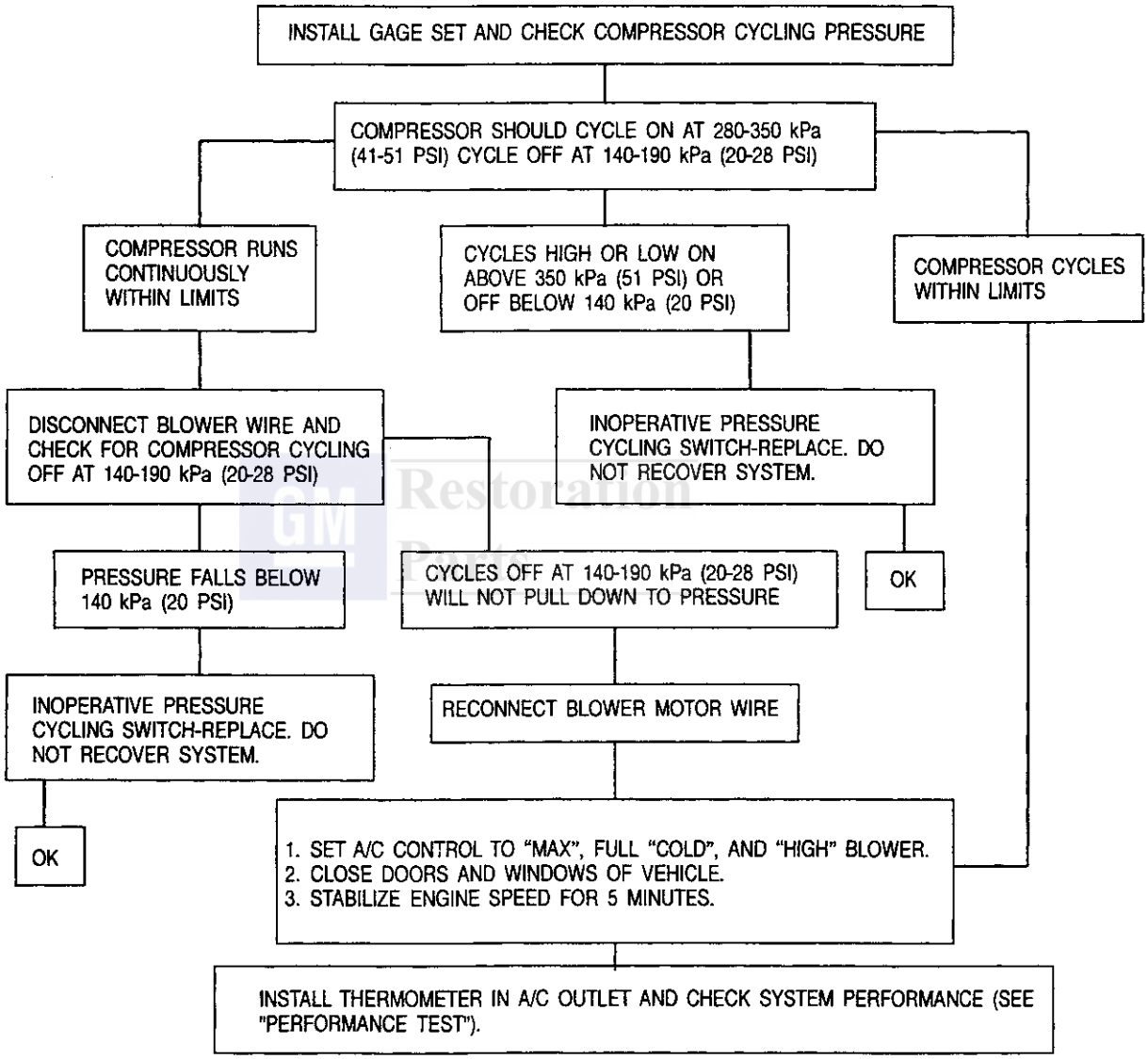


Figure 8—CCOT Air Conditioning System Diagnosis Procedure (4 of 5)

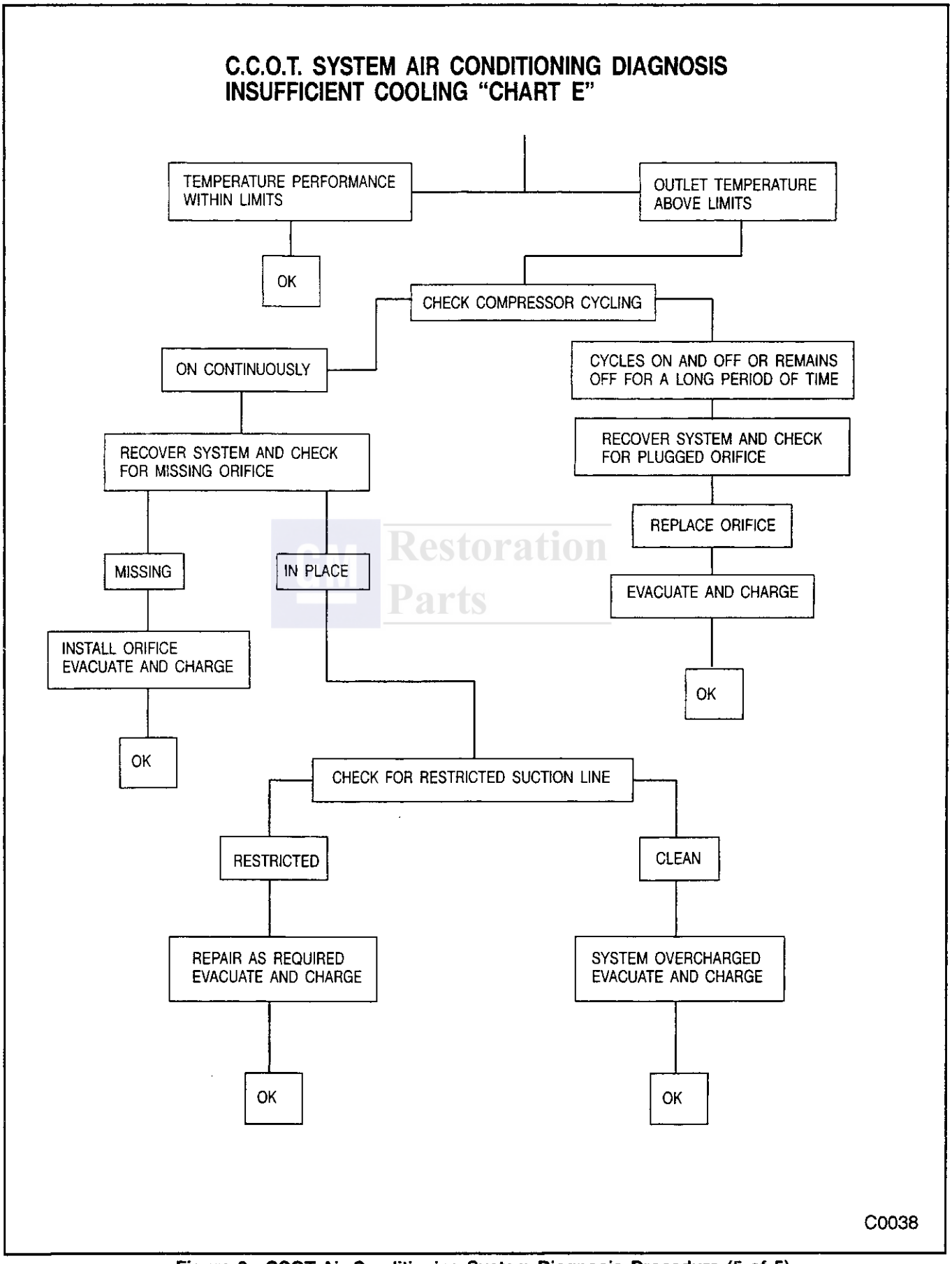


Figure 9—CCOT Air Conditioning System Diagnosis Procedure (5 of 5)

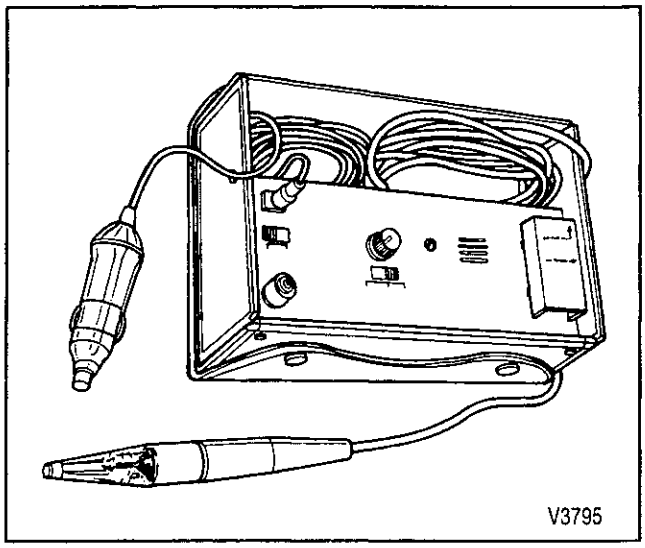


Figure 10—Electronic Leak Detector

Important

- Halogen leak detectors are sensitive to windshield washing solutions, many solvents and cleaners, and some adhesives used in the vehicle. Prevent a false warning by making sure surfaces are clean. Also, surfaces should be dry, since ingestion of liquids will damage the detector.

The evaporator inlet and outlet, accumulator inlet and outlet, condenser inlet and outlet, all brazed and welded areas, areas showing signs of damage, hose couplings, compressor rear head, and housing joints may be tested using this procedure.

Important

- Always follow the refrigerant system around in a continuous path so that no areas of potential leaks are missed. Always test all the above areas to make sure the entire system is leak free, even when one leak is already found.

CAUTION: Take care to prevent personal injury which could occur due to touching a hot engine when testing. Tests should be done with the engine "Off" and as cool as possible. Do not operate the detector in a combustible atmosphere since its sensor operates at high temperature.

Service Ports/Access Valves

The primary seal for the service ports is the sealing cap. This cap contains a specially designed O-ring seal or gasket which provides a leak-free seal. Should the cap be loose, missing, or the wrong cap used, it will result in the loss of refrigerant charge.

Evaporator Core

One of the most difficult leaks to find is in the evaporator core. To leak test the core:

1. Turn the blower fan on "HIGH" for 15 or more seconds then turn it off.
2. Wait 10 minutes.
3. Remove the blower motor resistor. Refer to "Blower Motor Resistor."

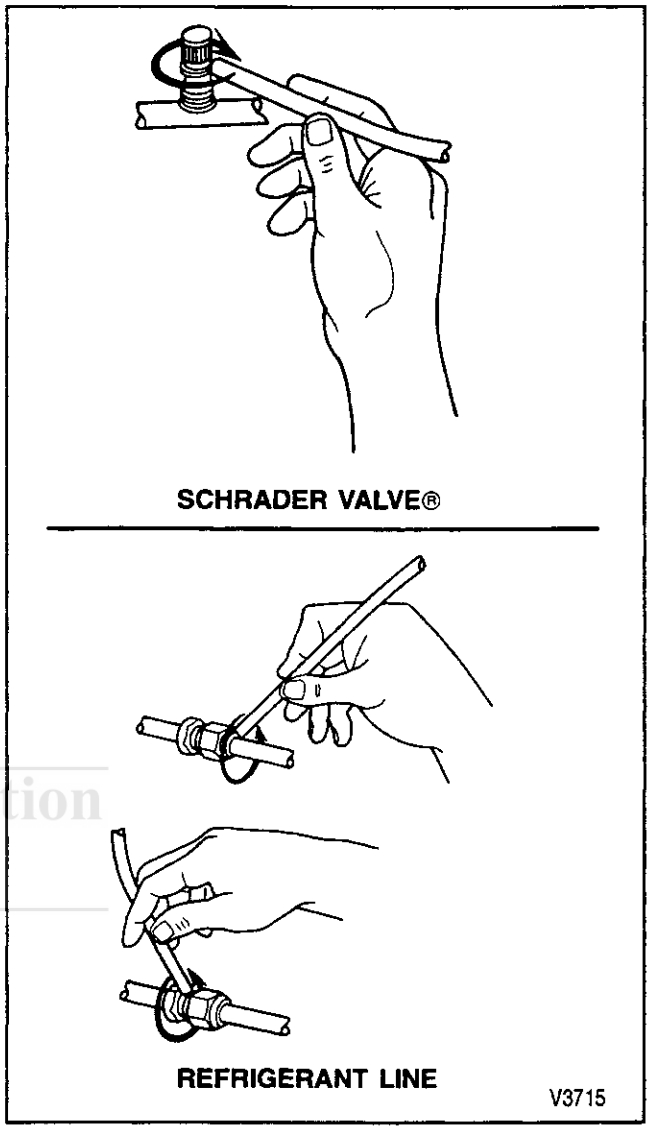


Figure 11—A/C Leak Scan Method

4. Insert the leak detector probe as close to the evaporator as possible. If the detector goes to a sold alarm, a leak has been found.
5. If possible, visually inspect the core face with a flashlight for evidence of refrigerant oil.

Compressor Block Fitting and Shaft Seal

1. Blow shop air behind and in front of the compressor clutch/pulley for at least 15 seconds.
2. Wait 1-2 minutes.
3. Probe the area in front of the pulley. If the detector goes to a solid alarm, a leak has been found.

CCOT AIR CONDITIONING SYSTEM DIAGNOSIS CHARTS

Refer to figures 5 through 9 for diagnosis of the CCOT air conditioning system.

BLOWER NOISE

A constant air rush noise is typical of high-speed blower operation. Some systems and modes may be noisier than others. If possible, check another similar

vehicle to determine whether the noise is typical or excessive.

Sit in the vehicle with the doors and windows closed. With the engine running, run the blower on "HI" speed with the temperature set for maximum cooling. Cycle through the blower speeds, modes, and temperature settings to find where the noise does not occur. Try to define the types of noise.

- Noise is constant, but decreases with blower speed reduction. Typical noises are a whine, tick/click, flutter, or scrape.
- Noise is only at startup or intermittent. This noise may occur at cold ambients and low blower speeds. Typical noise is a squeal/screech.
- Noise is constant at high blower speeds in certain modes, but can be eliminated at lower blower speeds in other modes. Typical noises are a flutter or rumble.

If the noise persists, remove the blower assembly and check for obstructions or foreign material causing noise and remove. If no obstructions are found and the noise is still heard, replace the blower assembly.

DIAGNOSIS OF AIR CONDITIONING (HEATER)

PROBLEM	POSSIBLE CAUSE	CORRECTION
Inadequate Defrosting	1. Obstruction in defroster nozzle.	1. Both defroster nozzle outlets should be inspected. Any foreign objects should be removed. Any loose instrument panel pad that blocks an outlet should be repaired.
	2. Damaged defroster nozzle outlet.	2. The outlet flange should be carefully reshaped with pliers so the outlet opening is uniform. If the outlet flange cannot be reshaped, the air distributor should be replaced.
	3. Faulty defroster air valve vacuum actuator or hose.	3. Defroster air valve operation should be checked. A faulty vacuum actuator or hose should be replaced.
	4. Insufficient heat.	4. Refer to "Insufficient Heating of Passenger Compartment" in this chart.
Inoperative Blower	1. Blown fuse.	1. The fuse should be replaced.
	2. Open circuit.	2. Check the circuit between the ignition switch and the blower motor, and the blower motor ground circuit. Repair as necessary.
	3. Faulty blower switch.	3. A faulty blower switch should be replaced.
Insufficient Heating of Passenger Compartment	1. Incorrect operation of controls.	1. The driver should be advised of proper operation of controls.
	2. Low engine coolant level.	2. Coolant should be added as needed. A check should be made for coolant leaks. The engine should be run to clear any air locks.
	3. Faulty engine thermostat.	3. The thermostat should be checked and replaced if necessary.
	4. Kinked heater hose.	4. Hoses should be checked and kinks should be straightened or hoses replaced as necessary.
	5. Obstructed heater core tubes.	5. An obstruction usually causes a squishing noise in the core. Any foreign material should be removed from the core or the core should be replaced.
	6. Faulty blower motor or blower circuit.	6. Faulty wires or connections must be repaired or replaced. A faulty blower motor must be replaced.

DIAGNOSIS OF AIR CONDITIONING (HEATER) (cont'd)

PROBLEM	POSSIBLE CAUSE	CORRECTION
Cold Drafts on Floor	1. Partially open air inlet valve.	1. The air inlet valve should close properly in all modes except "MAX" air conditioning mode. Repairs should be made as necessary.
	2. Side door seals damaged or missing.	2. All door seals should be inspected. Faulty seals should be repaired or replaced as necessary.
		D0277

A/C ODOR DIAGNOSIS

PROBLEM	POSSIBLE CAUSE	CORRECTION
Musty Smell	1. Water leaks (body). 2. Evaporator drain. 3. Mold/mildew.	1. Seal body. 2. Clean drain. 3. Clean evaporator.
Coolant Smell	1. Anti-freeze.	1. Heater core. 2. Heater pipe/hoses.
Refrigerant Leak	1. Refrigerant oil.	1. Evaporator core.
NOTE: MOLD/MILDEW ODOR PROBLEM — Under certain climate and operating conditions a musty odor develops from mold growth in the evaporator core face. This odor is generally temporary and as climate conditions change will disappear and repair on its own. However, if odor persists, it will become necessary to remove evaporator core and clean the face with appropriate cleaner.		
		D0290

REFRIGERATION SYSTEM SERVICES

Before attempting any service which requires opening of refrigerant lines or components, the person doing the work should be thoroughly familiar with the information under "Handling Refrigerant-134a," "Handling Refrigerant Lines and Fittings," and "Maintaining Chemical Stability." Very carefully follow the instructions in the "Refrigerant Recovery and Recycling, Adding Oil, Evacuating and Recharging Procedures" for the unit being serviced.

REPLACING O-RING SEALS

Install new GM-approved service replacement air conditioning O-ring seals whenever a joint or fitting is installed, except when the O-ring seals are provided on new replacement components. Unless service replacement O-ring seals bearing the specified part numbers are used, excessive leakage of Refrigerant-134a may occur. Refer to the part number for identification.

Air conditioning O-ring seals should be coated with 525 viscosity refrigerant oil just before installation and should be slipped onto the flange tube to ensure proper locating and sealing. To prevent the possibility of swelling and a reduction in sealing effectiveness, O-ring seals should not be soaked in refrigerant oil. Before installation, O-ring seals and fittings should be examined to make sure they have not been nicked or deformed. Replace nicked or deformed parts to prevent refrigerant leakage.

HANDLING REFRIGERANT-134a

CAUTION: Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose, and throat. To remove R-134a from the A/C system, use service equipment certified to meet the requirements of SAE J2210 (R-134a recycling equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.

Important

- R-12 refrigerant and R-134a refrigerant must never be mixed, even in the smallest of amounts, since they are incompatible with each other. If the refrigerants are mixed, compressor failure is likely to occur.
- Use only specified lubricant (PAG) for the R-134a A/C system and R-134a components. If lubricants other than those specified are used, compressor failure is likely to occur. All fittings and O-ring seals should be coated with clean 525 viscosity refrigerant oil to provide a leak-proof seal and to aid in assembly and disassembly.

- Do not store or heat refrigerant containers above 52°C (125°F).
- Do not heat a refrigerant container with an open flame. If the container must be warmed, place the bottom of the container in a pail of warm water.
- Do not intentionally drop, puncture, or incinerate refrigerant containers.
- Refrigerant will displace oxygen, so be certain to work in well-ventilated areas to prevent suffocation.
- Do not introduce compressed air to any refrigerant container or refrigerant component, because contamination will occur.
- If it is necessary to carry a container of "Dot CFR" Refrigerant-134a in a vehicle, do not carry it in the passenger compartment.

All Refrigerant-134a disposable (colored "Blue") containers are shipped with a heavy metal screw cap to protect the valve and safety plug of the container from damage. It is good practice to replace the cap after each use of the container to continue protection.

HANDLING OF REFRIGERANT LINES AND FITTINGS

Important

- Before opening the refrigeration system, make sure the work area is well ventilated. Welding or steam-cleaning operations should not be done on or near refrigeration system lines or other air conditioning parts on the vehicle.

All metal tubing lines should be free of dents or kinks to prevent loss of system capacity due to line restriction.

- The flexible hose lines should never be bent to a radius of less than four times the diameter of the hose.
- The flexible hose lines should never be allowed to come within a distance of 6.5 mm (2.5 inches) of the exhaust manifold.
- Flexible hose lines should be inspected regularly for leaks or brittleness and replaced with new lines if deterioration or leaking is found.
- When disconnecting any fitting in the refrigerant system, the system must be discharged of all Refrigerant-134a. However, proceed very cautiously, regardless of the gage readings. Open very slowly, keeping your face and hands away so that no injury can occur. If pressure is noticed when a fitting is loosened, allow it to bleed off very slowly.

NOTICE: Alcohol should never be used in the refrigeration system in an attempt to remove moisture. Damage to system components could occur.

- If any refrigerant line is opened to the atmosphere, it should be immediately capped to prevent the entrance of moisture and dirt. These can cause internal compressor wear or plugged lines in the condenser and evaporator core and expansion (orifice) tubes or compressor inlet screens.
- Remove sealing caps from subassemblies just before making connections for final assembly. Use a small amount of clean 525 viscosity refrigerant oil on all tube and hose joints. Use new O-ring seals dipped in 525 viscosity refrigerant oil when assembling joints. The oil will aid in assembly and help to provide a leakproof joint. O-ring seals and seats must be in perfect condition because a burr or a piece of dirt can cause a refrigerant leak.
- It is important to use the proper wrenches when making connections on O-ring seal fittings. The use of improper wrenches may damage the connection. The opposing fitting should always be backed up with a wrench to prevent distortion of connecting lines or components. When connecting the flexible hose connections, it is important that the swaged fitting and the flare nut, as well as the coupling to which it is attached, be held at the same time using three different wrenches to prevent turning the fitting and damaging the seat (figure 12).

Tighten tubing connections to the specified torque, refer to "Specifications."

MAINTAINING CHEMICAL STABILITY

The life and efficient operation of the air conditioning system depends upon the chemical stability of the refrigerant system. When foreign materials, such as dirt, air, or moisture, contaminate the refrigeration system, they change the stability of the Refrigerant-134a and polyalkaline glycol (PAG) refrigerant oil. They will also affect the pressure-temperature relationship, reduce efficiency, and could cause internal corrosion and abnormal wear of moving parts.

The following general practices should be followed to ensure chemical stability in the system:

1. Whenever it becomes necessary to disconnect a hose connection, wipe away any dirt or oil at or near the connection to eliminate the possibility of dirt entering the system. Both sides of the connection should be capped, plugged, or taped as soon as possible to prevent the entrance of dirt and moisture. (Remember that all air contains moisture. Air that enters any part of the refrigeration system will carry moisture with it, and the exposed surfaces will collect the moisture quickly.)
2. Keep tools clean and dry. This includes the Manifold Gage Set and all replacement parts.
3. When adding polyalkaline glycol (PAG) refrigerant oil, the container/transfer tube through which the oil will flow should be exceptionally clean and dry. Refrigerant oil must be as moisture-free as possible.
4. When it is necessary to "open" an air conditioning system, have everything needed ready so that as little time as possible will be required to perform the operation. Do not leave the air conditioning system open any longer than necessary.
5. Anytime the air conditioning system has been "opened," it should properly evacuated before recharging.

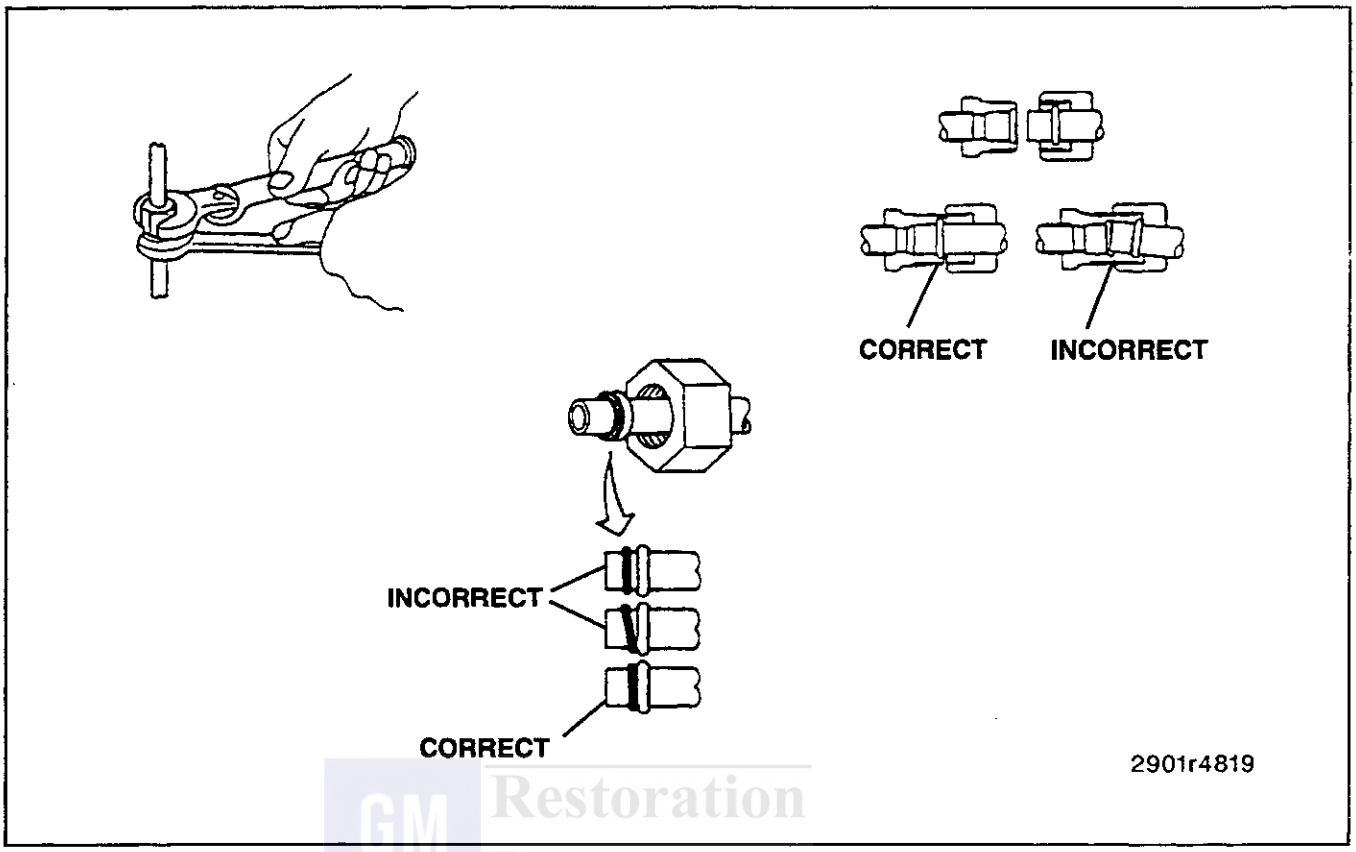


Figure 12—Refrigerant Lines and Fittings

REFRIGERANT AND OIL CAPACITY

The refrigerant system requires refrigerant and oil in the quantities listed below:

1. Refrigerant-134a
   - Pickup Models - 0.91 kg (2.0 lb.)
   - Crew Cab, Suburban, and Utility Models - 1.02 kg (2.25 lb.)
   - Suburban Models with Aux. A/C - 1.81 kg (4.0 lb.)
2. Polyalkaline Glycol (PAG) Refrigerant Oil
   - Front Air Conditioning System (C60) - 240 ml (8 fl. oz.).
   - Front and Rear Air Conditioning System (C69) - 330 ml (11 fl. oz.).

- Overcharging a system may allow liquid Refrigerant-134a to get into the compressor, causing compressor noise and damage. Undercharging will cause insufficient cooling.

REFRIGERANT RECOVERY AND RECYCLING, ADDING OIL, EVACUATING AND RECHARGING PROCEDURES

GENERAL DESCRIPTION

The air conditioning refrigerant (R-134a) recovery, recycling and recharging system (J 39500) removes Refrigerant-134a from the vehicle A/C system, recycles and recharges all with one hookup.

Single-pass filtering during recovery cycle, plus automatic multiple-pass filtering during evacuation cycle ensures a constant supply of clean/dry refrigerant for A/C system charging.

Important

- R-12 and R-134a require separate and non-interchangeable sets of recovery, recycle, and recharge equipment, because the refrigerants

and lubricants are not compatible and cannot be mixed even in the smallest amounts.
- Do not attempt to use one set of equipment for both R-12 and R-134a, as all equipment contains residual amounts of refrigerant and/or lubricant, which will result in contamination and damage to the recover/recycle equipment.
- Adaptors to convert from one size fitting to the other must never be used; refrigerant/lubricant contamination will occur and system failure may result.

STATION (ACR⁴) SETUP AND MAINTENANCE

Initial Setup

Refer to the manufacturer's instructions for all initial setup procedures.

Operational Setup

CAUTION: Always wear goggles and gloves when doing work that involves opening the refrigeration system. If liquid refrigerant comes into contact with the skin or eyes, injury may result.

CAUTION: Use only authorized 23-kg (50-lb.) refillable refrigerant tanks (J 39500-50). Use of other tanks could cause personal injury and void the warranty.

1. Connect high side (Red) and low side (Blue) hoses to the ACR⁴ unit (figure 13). Be sure to route hoses through hose reel bracket grommets.

Important

NOTICE: Refrigerant-134a systems have special fittings (per SAE specifications) to avoid cross-contamination with Refrigerant-12 systems. Do not attempt to adapt this unit to Refrigerant-12 systems as severe system failure will result.

CONTROL PANEL FUNCTIONS

This section explains the functions of the various components of the unit's control panel (figure 14).
- **Main Power Switch**--Supplies electrical power to the control panel.
- **Beeper**--Emits an audible tone to alert the operator to unit operating functions.
- **Digital Display**--Shows the time programmed for vacuum and the weight of refrigerant programmed for recharging. Detailed instructions for programming this display are included in "Digital Display Functions" in this section.
- **Low Side Manifold Gage**--When connected to an A/C system, this gage shows the system's low side pressure.
- **High Side Manifold Gage**--When connected to an A/C system, this gage shows the system's high side pressure.
- **Moisture Indicator**--Shows if the refrigerant is wet or dry.
- **Low Side Valve**--Connects the the low side of the A/C system to the unit.

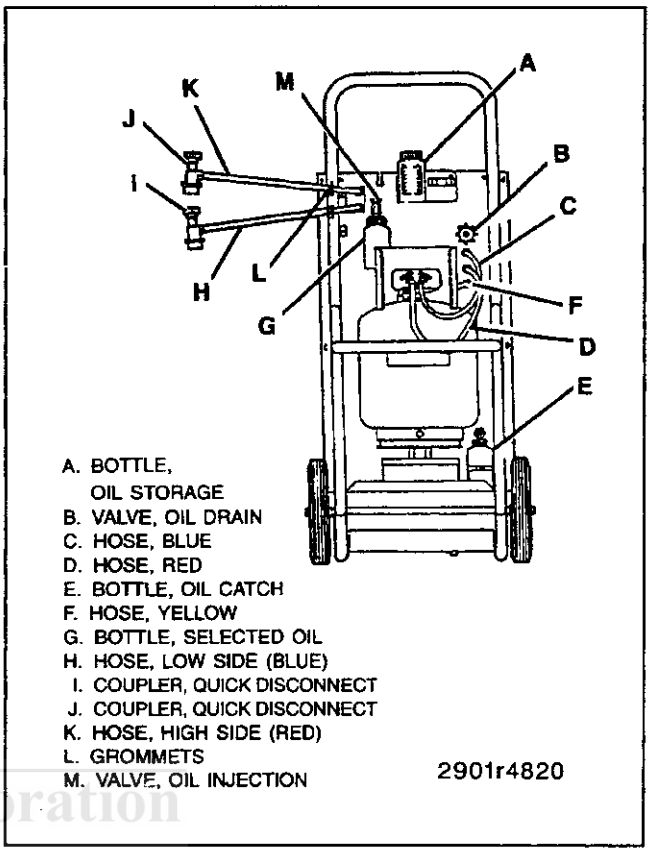


Figure 13—Complete Operational Set-Up

- **High Side Valve**--Connects the high side of the A/C system to the unit.

In addition to the number keys, the control panel contains special keys that accomplish specific operating functions (figure 15).

- **RECYCLE**--Activates the recycling sequence.
- **RECOVER**--Activates the recovery sequence.
- **SHIFT/RESET**--Activates "shifted" positions of keys on the keypad and resets the program mode.
- **FILTER**--Automatically recovers and evacuates to 17 in. Hg. from the filter and low side of the unit.
- **CHG.**--Automatically charges the A/C system with the programmed amount of refrigerant.
- **HOLD/CONT.**--Interrupts the automatic cycle in the "HOLD" position, and then resumes functions in the "CONT" position. Press this button once for "HOLD," and again for "CONT."
- **VACUUM**--Activates the vacuum and automatic recycling sequence.
- **ENTER**--Enters programmed data into the unit's control memory.

Digital Display Functions

For information regarding the functions of the digital display, refer to the manufacturer's instructions.

MAINTENANCE

Refer to manufacturer's instructions for all maintenance procedures.

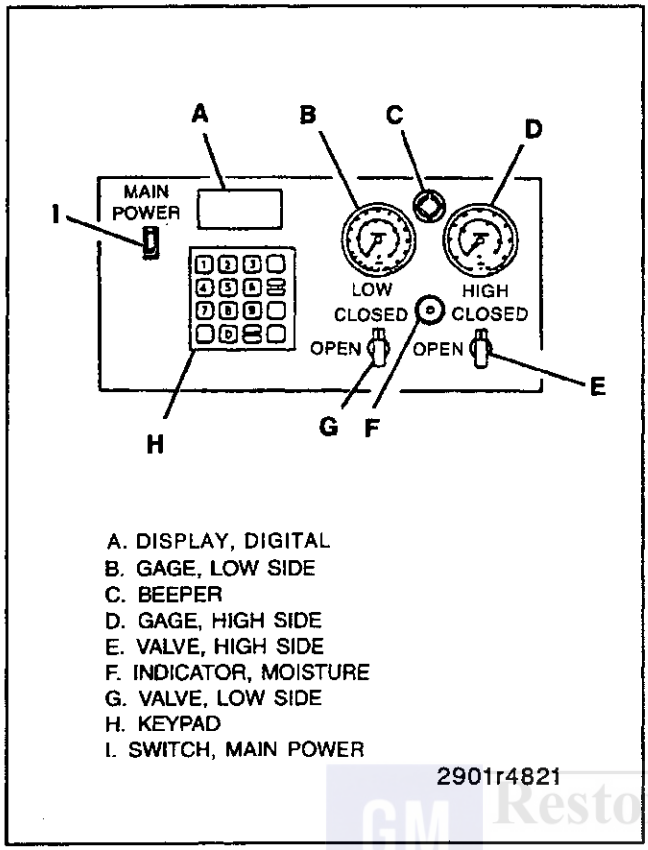


Figure 14—Control Panel

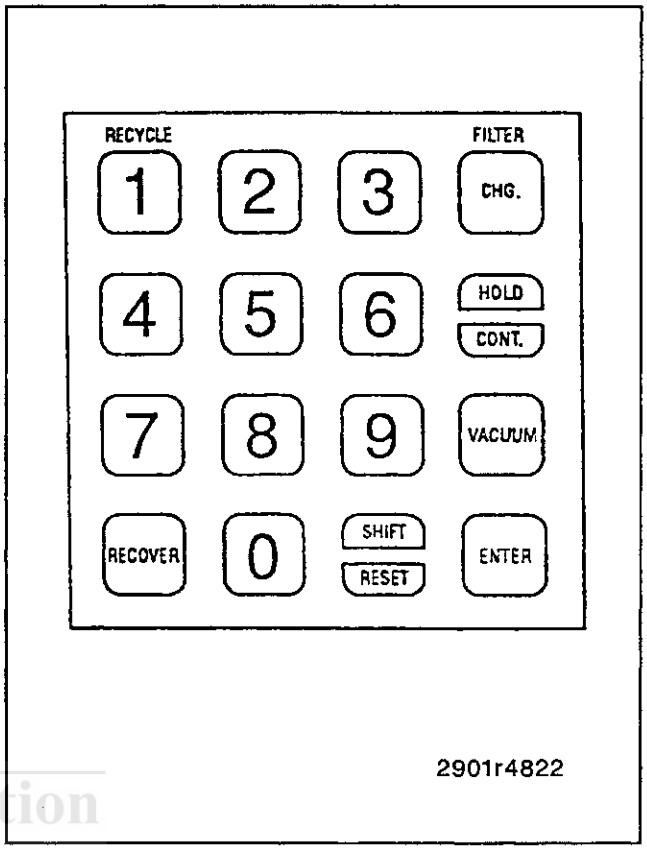


Figure 15—Keypad Functions

REFRIGERANT RECOVERY

Important

- Use only the 23-kg (50-lb.) unit refrigerant tank (J 39500-50) designed for the ACR[4]. The unit's overfill limitation mechanism has been calibrated specifically for use with this tank, and the tank's valving is set up specifically for use with the unit.

1. Attach the high side (Red) hose with the quick disconnect coupler to the high side fitting of the vehicle's A/C system. Open the coupler valve after attachment.
2. Attach the low side (Blue) hose with the quick disconnect coupler to the low side fitting of the vehicle's A/C system. Open the coupler valve after attachment.
3. Check the high side and low side gages on the unit's control panel to be sure the A/C system has pressure. If there is no pressure, there is no refrigerant in the system to recover.

Important

- If there is no refrigerant in the A/C system, do not continue with the recovery operation. Air will be drawn into the recovery tank.

4. Open both the high side (E) and the low side (G) valves on the control panel (figure 14).
5. Open both the red "Gas" (vapor) and the blue "Liquid" valves on the tank.
6. Slowly open the oil drain valve (B) to see if the oil separator contains oil (figure 13).
   - If any oil drains into the catch bottle at the bottom of the unit, allow it to drain until there is no more oil in the separator.
7. Close the oil drain valve.
   - Dispose of the oil in the catch bottle in an appropriate manner and return the bottle to it's place on the unit.
8. Plug the unit into the proper voltage outlet and turn on the "Main Power" switch.
9. Press "RECOVER" on the key pad. Before recovery begins, the unit will clear itself of refrigerant. "CL-L" will appear on the display. The clearing process takes from 30 seconds to 3 minutes to complete (figure 16).
10. When clearing is complete, the unit will automatically start recovery, and the control panel display will show the unit is in the "Recover" mode of the "Automatic" cycle. Also, the weight of refrigerant being recovered will be displayed.
11. The compressor shuts off automatically when initial recovery has occurred (at approximately 17 in. Hg. vacuum).
12. At the end of the initial recovery process, the display shows "CPL" and then alternately flashes the weight of refrigerant recovered and "OIL/OZ."("OIL/GMS").

    Note: After the initial recovery, more refrigerant might be trapped in the system. About 5 minutes is usually required for it to boil out of the oil. Follow step 17 to continue the recovery process.

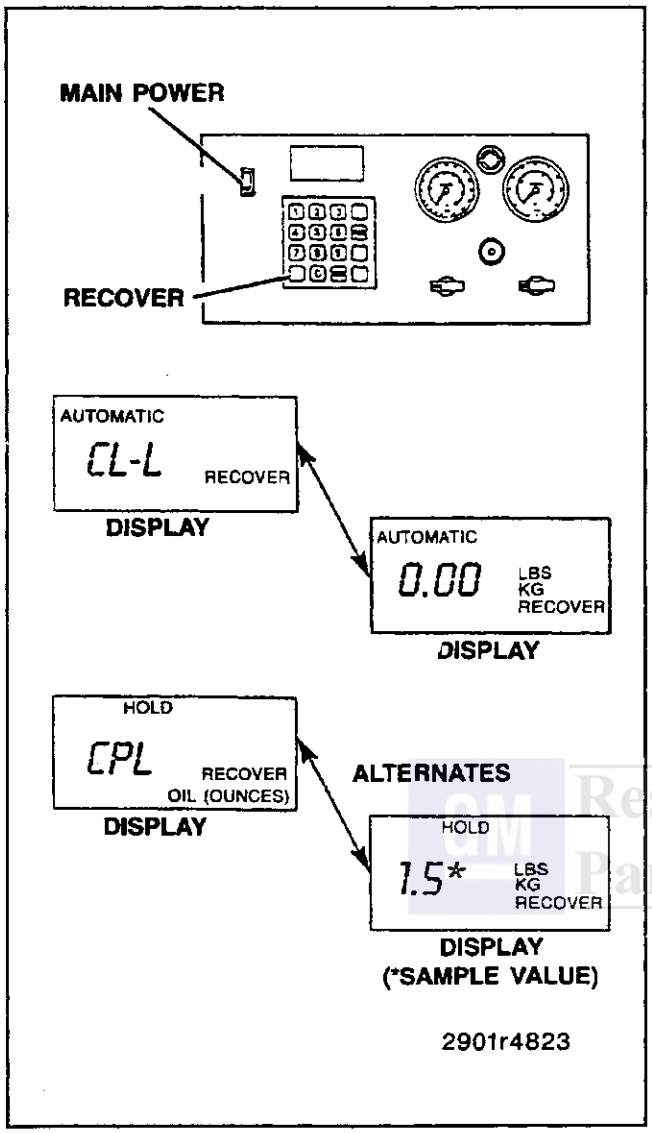


Figure 16—Refrigerant Recovery

Important

- Some A/C system lubricating oil (Polyalkaline Glycol-PAG) might be removed with the refrigerant during recovery. The amount of oil removed (often there will be none) will vary greatly depending on a variety of conditions of the vehicle being serviced. The ACR⁴ separates the oil from the refrigerant.
- The "OIL/OZ" ("OIL/GMS") flashing is a reminder to always drain the recovered oil at this time. The same amount of oil must be replaced in the A/C system later when the system is recharged with refrigerant.

13. Slowly open the oil drain valve (B) and drain the oil into the calibrated oil catch bottle (E) at the bottom of the unit (figure 13).
14. After the oil is completely drained, close the valve.
15. Read and record the amount of oil removed in the catch bottle.
16. Dispose of the recovered oil in an appropriate manner. Never reuse this oil.
17. Wait 5 minutes, then check the control panel "Low Side Gage."
    - If the A/C system has maintained a vacuum, the recovery is complete.
18. If the "Low Side Gage" pressure rises above "0," this indicates the presence of more refrigerant in the system. In this case, press the "HOLD/CONT" key on the keypad to recover the additional refrigerant. Repeat this step as needed until the system maintains vacuum for 2 minutes.

Important

- If the display flashes "Full" during the recovery process, and the unit shuts off, the unit tank is full.
- An empty unit tank (J 39500-50) must be installed to accommodate additional refrigerant proceeding to the next step in the recovery operation. DO NOT USE ANY OTHER KIND OF TANK.
- It is possible to lower the amount of refrigerant in the unit's tank by charging other vehicles.

EVACUATION

The ACR⁴ unit tank must contain sufficient R-134a refrigerant for A/C system charging. Check the amount of refrigerant in the tank by simultaneously pressing "RESET" and "ENTER" on the keypad to enter the diagnostic mode. Once in the diagnostic mode, press "7." When "7" is pressed, the ACR⁴ unit will display the amount of R-134a refrigerant available in the tank. If less than 3.6 kg (8 lbs.) is displayed, add new refrigerant to the tank. Refer to the manufacturer's instructions for adding refrigerant.

1. With the high side and low side hoses connected to the vehicle A/C system, open both the high side (Red) and the low side (Blue) valves on the unit's control panel.
2. Open both the red "Gas"(vapor) and the blue "Liquid" valves on the tank.

Important

- To remove all the air and properly dry the A/C system, the unit automatically goes to a minimum evacuation time of 20 minutes.

It is possible to evacuate longer than 20 minutes. Press keys to enter time desired. New entry will show on the display. Press "ENTER" and the display will blink indicating input of data (figure 17).

3. Press "VACUUM" to start the vacuum pump. The display counts down the vacuum time from 20 minutes to zero to indicate operation time remaining.

The display reads "RECYCLE" 5 seconds after the vacuum pump starts and continues while the process takes place.

Important

- Automatic refrigerant recycling during each evacuation is a feature of the ACR⁴ system. No action is required by the technician.

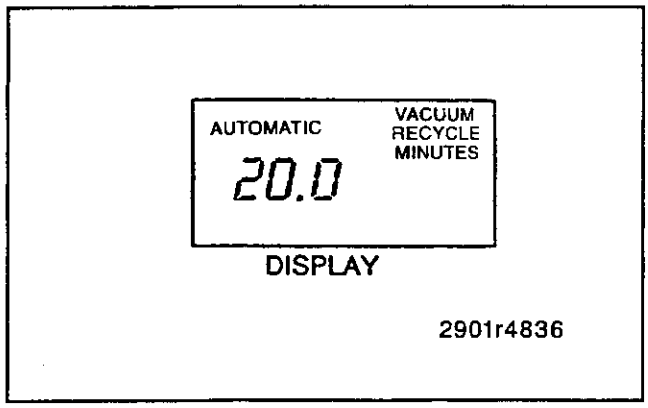


Figure 17—System Evacuation

- The control panel "Moisture Indicator" must be "Green" during recycling verifying refrigerant moisture content is within specification. "Yellow" indicates a wet condition requiring a filter/drier cartridge change. Refer to the manufacturer's instructions for this procedure.
- Non-condensable gases (mostly air) are automatically vented from the tank during the recycling process. An audible sound of pressure release may be heard as this happens. This is a normal function.

4. At approximately the 17 minute mark on the display, (pump has run for 3 minutes) press "HOLD/CONT" key to stop vacuum pump (figure 18).
   A. A "0" vacuum reading indicates a major system leak. Repair leak and restart evacuation procedure.
   B. If a reading of 91-101 kPa (27-30 inch of Hg) is indicated, close the low side and high side valves. Observe the vacuum level for a few minutes as a leak check of the A/C system. If vacuum is not maintained, find and repair the A/C system leak before continuing.
   C. If a reading of 91-101 kPa (27-30 inch of Hg) is maintained, open the high side and low side valves and press the "HOLD/CONT" key to restart the vacuum pump.
5. When the vacuum sequence has run the programmed time, the display shows "CPL" to indicate that evacuation is complete.

Important

- The vacuum pump oil must be changed frequently.
- When the pump has run for a total time of 10 hours, the message "OIL" will flash on the control panel display as a reminder to change the oil.
- If the "OIL" warning flashes during operation, press "CONT" and change the oil before the next operation. Refer to the manufacturer's instructions for this procedure.

A/C SYSTEM OIL CHARGE REPLENISHING

If oil was removed from the A/C system during the recovery process, it must be replenished at this time.

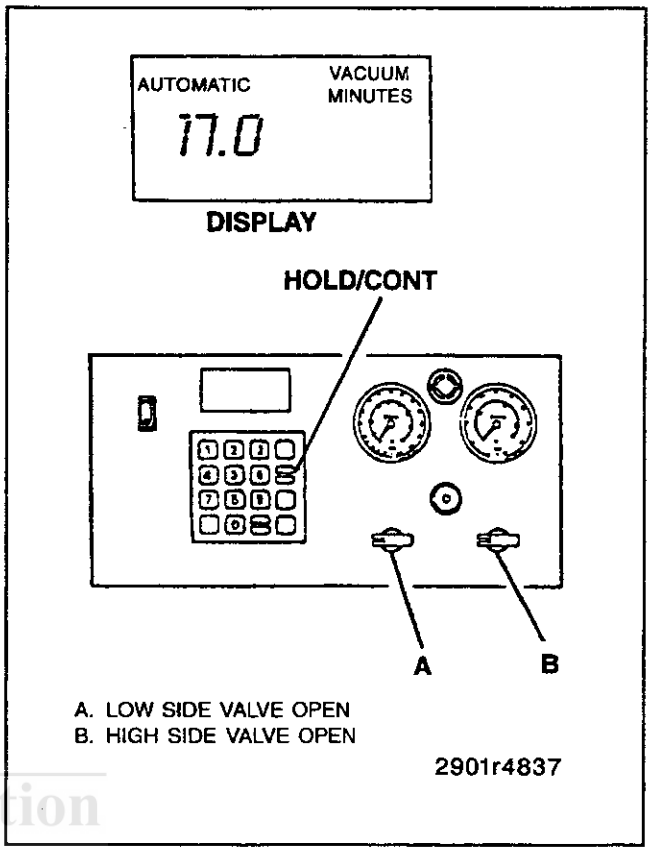


Figure 18—System Evacuation

1. Select the correct graduated bottle of replenishing polyalkaline glycol (PAG) oil for the R-134a A/C system being serviced.
2. Adjust the O-ring seal around the the PAG oil bottle to the required oil charge level.
   Example: If bottle oil level is at 4 oz. and 1/2 oz. of oil is required, adjust O-ring seal to 3 1/2 oz. as final level mark.
3. Install the bottle on the oil injection system on the back of the unit.

Important

- Keep the oil bottles tightly capped at all times to keep out moisture and contamination.
- Never open the oil injection valve while there is positive pressure in the A/C system. This will result in oil blow-back through the bottle vent. A/C system vacuum is required for this operation.
- Never let the oil level drop below the pickup tube while charging or replenishing. This will allow air into the A/C system.

4. Open the valve at the top of the plastic container and watch the level of oil being drawn into the system.
5. Close the valve when the required oil charge has been pulled into the system.

REFRIGERANT OIL DISTRIBUTION

The Harrison HR110-MD compressor system used on all C/K models requires polyalkaline glycol (PAG) refrigerant oil in the quantities listed below:

- Without Aux. A/C - 240 ml (8 fl. oz.)
- With Aux. A/C - 330 ml (11 fl. oz.)

New oil quantities must be added to the system during component replacement and conditions stated as follows:

- With no signs of excessive oil leakage, add:

A. All Compressors (drain and measure the oil)
   - If less than 30 ml (1 fl. oz.) is drained—add 60 ml (2 fl. oz.) to the new compressor.
   - If more than 30 ml (1 fl. oz.) is drained—add same amount that was drained to the new compressor.

B. Accumulator—Add 105 ml (3.5 fl. oz.) of new oil to the replacement accumulator to compensate for oil retained by original accumulator desiccant and bag assemblies. The accumulator should only be replaced if leaking due to a perforation, damaged O-ring seal seat, or damaged threads.

C. Evaporator—Add 90 ml (3 fl. oz.) of new refrigerant oil.

D. Condenser—Add 30 ml (1 fl. oz.) of new refrigerant oil.

Refrigerant Oil Loss Due to a Large Leak

If the refrigerant charge is abruptly lost due to a large refrigerant leak, approximately 90 ml (3 fl. oz.) of refrigerant oil will be carried out of the system suspended in the refrigerant. Any failure that caused a abrupt refrigerant discharge will experience this oil loss. Failures that allow the refrigerant to seep or bleed off over time do not experience this oil loss.

Upon replacement of a component which caused a large refrigerant leak, add 90 ml (3 fl. oz.) of new polyalkaline glycol (PAG) refrigerant oil plus the desired amount of oil for the particular component. Refer to "Refrigerant Oil Distribution."

CHARGING

Important

- The A/C system must be evacuated prior to charging.
- Check that the "Lbs/Kg" switch on the back of the unit to be sure it is set for the desired units of weight system (operate switch with main power "Off").

1. Close the low side valve (A) on the control panel (figure 19).
2. Open the high side valve (B) on the control panel.
3. Press "CHG" on the keypad to be sure the unit is in the program mode.
4. Enter the amount of refrigerant charge to charge the A/C system by pressing the appropriate number keys. Be sure to use correct unit of weight (Lbs. or Kg.).
5. Press "ENTER."
   - A blink of the display indicates the charge amount is in the unit's memory.

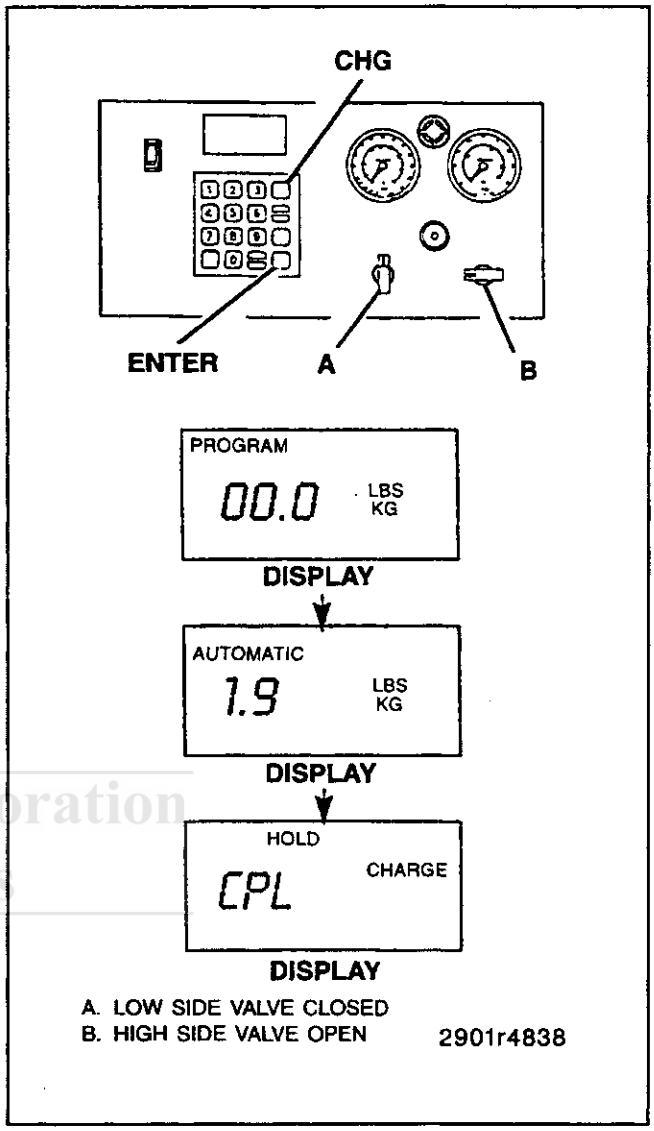


Figure 19—System Charging

6. Press "CHG" on the keyboard to begin the charging process.
7. The display shows "AUTOMATIC" and the amount of refrigerant programmed for charging.
   - The display counts down to zero as the charging process proceeds.
   - At the end of the process, the display shows "CPL."

Important

- If the transfer of refrigerant stops before complete, refer to "Unsuccessful Transfer."

Successful Transfer Complete

1. Close the high side valve on the unit's control panel. (Both valves should be closed.)
2. Start the vehicle and the A/C system and let run until the readings on the high side and low side gages stabilize. Compare readings to system specifications.
3. Check the evaporator outlet temperature to be sure the A/C system is operating to system specifications.

4. With the A/C system running, close the high side coupler valve (J) and disconnect the high side (Red) hose (K) from the vehicle.
5. Open both the high side and low side valves on the control panel.
6. Refrigerant from both hoses will be drawn quickly in to the A/C system through the low side (Blue) hose.
7. Close the low side coupler valve and disconnect from the vehicle.

Unsuccessful Transfer

On rare occasions, the total charge does not transfer to the vehicle A/C system. There are two reasons why this can occur.

1. If the transfer is too slow because the pressure in the unit's tank and the vehicle A/C system are about the same, the unit will emit an audible signal and the display shows the weight remaining for transfer.

   In this case:

   • Close the high side valve (B) (figure 20).
   • Open the low side valve (C) (figure 20).
   • Start the vehicle A/C system, and press "HOLD/CONT" on the keyboard.

   This will put the remainder of the charge into the A/C system, and continue with Step 1 under "Successful Transfer Complete."
2. If the transfer will not complete and the display shows "CHECK REFRIGERANT," there is not enough refrigerant in the tank to complete the process. This condition requires the recovery of the partial charge of refrigerant in the vehicle A/C system and another complete evacuation and charge procedure.
   • Press "HOLD/CONT" on the keypad to interrupt the cycle.
   • Press "RESET" to reset the unit.

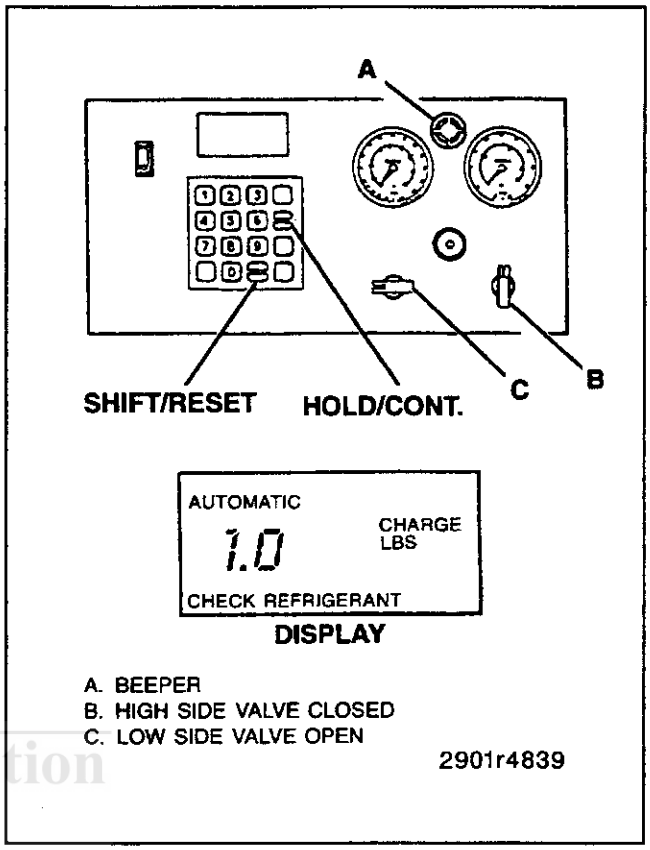


Figure 20—System Charging

   • Recover the refrigerant that has been charged into the system, refer to "Refrigerant Recovery."
3. Add refrigerant to the tank following the manufacturer's instructions, and refer to Step 1 under "Evacuation."

DIAGNOSIS OF THE REFRIGERANT RECOVERY, RECYCLING AND RECHARGING SYSTEM

PROBLEM	POSSIBLE CAUSE	CORRECTION
RECOVERY OPERATION		
Recovery Compressor Does Not Start	• "Main Power" switch off. • Power cord not plugged in or no power at plug. • "Full" on digital display. • "Hi-P" on digital display. • Faulty components.	• Turn on "Main Power" switch. • Check circuit for power. • Change the tank according to the manufacturer's instructions. • Check the valves on the unit tank to be sure they are open. • Operate recycling only to activate automatic air purge. Excessive air raises the tank presure. Refer to manufacturer's instructions. • Call Tech Assist 1-800-345-2233.
Runs A Short Time, But Does Not Complete Recovery	• Tank valves not open. • Manifold valves not open. • Faulty components.	• Open both valves on the tank. • Open both valves on the manifold. • Call Tech Assist 1-800-345-2233.

DIAGNOSIS OF THE REFRIGERANT RECOVERY, RECYCLING AND RECHARGING SYSTEM (cont'd)

PROBLEM	POSSIBLE CAUSE	CORRECTION
Runs But Won't Shut Off	• Oil drain valve not closed. • Leak in vahicle system. • Return oil solenoid valve open. • Faulty components.	• Close the oil drain valve. • Locate and repair system leak. • Replace solenoid valve. • Call Tech Assist 1-800-345-2233.
RECYCLING OPERATION		
Moisture Indicator Will Not Turn Green During Automatic Recycling (Occurs During A/C System Evacuation)	• Saturated filter-drier. • Faulty moisture indicator.	• Remove and replace filter-drier following manufacturer's instructions. • Remove and replace the moisture indicator.
Refrigerant Does Not Flow During Recycling	• Refrigerant supply empty or low. • Faulty moisture indicator.	• Check display for "CHECK REFRIGERANT". If shown, add more refrigerant before recycling. Refer to manufacturer's instructions. • Open the valves.
No Power When POWER Switch Is On—No Display Showing	• Unit unplugged. • No power at wall outlet.	• Plug unit into power source outlet. • Locate problem with outlet or change outlets.
Vacuum Pump Does Not Start	• Vacuum pump unplugged. • Check extension cord (if used). • Faulty components.	• Plug pump into power source. • Try without extension cord. • Call Tech Assist 1-800-345-2233.
Audible Tone Sounds During Refrigerant Transfer	• Transfer stopped or too slow. • Refrigerant supply low.	• Start vehicle A/C system and pull rest of refrigerant into system. • Add refrigerant to the tank. Refer to manufacturer's instructions.
Vacuum Pump Runs, But Low Side Gauge Does Not Register An Appropriate Vacuum	• Low side valve closed. • Pump oil contaminated. • Charging line loose. • Manifold leaking.	• Open low side valve. • Change oil. Refer to manufacturer's instructions. • Check connections. • Check connections.
		D0289

AIR CONDITIONING SYSTEM ODOR PROCEDURE

Odors emitted from the air conditioning system primarily at startup in hot, humid climates. This odor may be the result of debris in the heater/evaporator case or growth of mold on the evaporator core. To address this condition, use the following equipment and procedure.

Tools Required:

J 36645 Air Conditioning Cleaning Gun

GM Goodwrench Air Conditioning System Disinfectant Kit

CAUTION: Procedure should only be performed on a cold vehicle to prevent the disinfectant from coming in contact with hot engine components. Disinfectant can cause substantial but temporary eye injury. Do not get in eyes or clothing. Wash thoroughly with soap and water after handling.

Important

- If disinfectant gets into eyes, hold eyelids open and flush with a steady, gentle stream of water for 15 minutes. Obtain medical attention if irritation persists.

1. Put on rubber gloves and safety goggles.
2. Pour the small bottle of the two-part GM Goodwrench Air Conditioning System Disinfectant Kit into the large bottle. Seal and invert the large container once or twice to mix contents.
3. Check underneath the vehicle to verify that drain outlet is not plugged.
4. Connect battery charger to avoid draining the battery during cleaning procedure.
5. Remove blower resistor, leaving wiring connectors attached. Refer to "Blower Motor Resistor."

NOTICE: Do not allow the metal coils of the blower resistor to become grounded to any metal surface as this may result in internal circuitry damage.

6. Check heater/evaporator case for debris. Remove any debris present through blower resistor opening. If debris is imbedded into the evaporator core face and cannot be removed, the core will have to be removed from the vehicle and cleaned. If a large amount of debris is present in the heater/evaporator case the air inlet screen will require sealing around the air intake in the cowl area.
7. Turn the ignition to the "ON" position but do not start vehicle.
8. Set mode selector to "Vent," blower speed to "LOW," and temperature to full "COLD."
9. Open all windows and doors. Exit vehicle.
10. Place a drain pan with at least a 2-quart capacity below heater/evaporator drain hole to collect disinfectant and rinse water runoff. If necessary, install additional hose onto drain so that all fluid goes into the drain pan.
11. Turn pedestal fan on "High" to provide cross ventilation during cleaning procedure.
12. Using J 36645, or equivalent spray gun, insert the nozzle of the spray gun through the blower resistor opening and insert siphon hose into container of disinfectant. Spray directly toward evaporator face taking extra care to ensure adequate coverage of the corner and edges, completely saturating the entire core. Use the entire container of solution.

Important

- Do not allow disinfectant to come into contact with hot engine components such as the exhaust manifold.

13. Reach into vehicle and turn the ignition to the "OFF" position, and allow the core to soak for 5 minutes.
14. Double check underneath the vehicle to verify proper drain operation. If necessary, unclog and increase drain plug slits with a razor blade or sharp knife.
15. Reach into the vehicle and turn the ignition to the "ON" position, but do not start vehicle.
16. Thoroughly rinse the evaporator core with clean water using the spray gun to remove all disinfectant residue. At least a 2-quart rinse is recommended.
17. Reach into the vehicle and turn the ignition to the "OFF" position and then reinstall the blower resistor. Refer to "Blower Motor Resistor."
18. Dispose of disinfectant properly and rinse water runoff collected in the drain pan in an approved manner.

ON-VEHICLE SERVICE

COMPRESSOR

NOTICE: Refer to "Notice" on page 1B-1.

4.3L, 5.0L and 5.7L ENGINES

Remove or Disconnect (Figure 21)

1. Negative battery cable. Refer to SECTION 0A.
2. Discharge and recover refrigerant from the system.
3. Drive belt. Refer to SECTION 6B1.
4. Refrigerant hose assembly from compressor. Refer to "Compressor and Condenser Hose Assembly."
   - Cap or plug all open connections.
5. Electrical connectors, as necessary.
6. Nuts (4) and bolts (3).
7. Compressor (1) from bracket (2).
   - Drain and measure compressor oil.

Install or Connect (Figure 21)

1. Compressor (1) to bracket (2). Refer to "Refrigerant Oil Distribution," if replacing compressor.
2. Bolts (4) and nuts (3).

Tighten

- Bolts (4) to 33 N·m (24 lbs. ft.).

3. Electrical connectors, as necessary.
4. Refrigerant hose assembly to compressor. Refer to "Compressor and Condenser Hose Assembly."
5. Drive belt. Refer to SECTION 6B1.
6. Negative battery cable.
7. Refrigerant to the system.
   - Check the system for leaks.

7.4L ENGINES

Remove or Disconnect (Figure 22)

1. Negative battery cable. Refer to SECTION 0A.
2. Discharge and recover refrigerant from the system.
3. Drive belt. Refer to SECTION 6B1.

4. Refrigerant hose assembly from compressor. Refer to "Compressor and Condenser Hose Assembly."
   • Cap or plug all open connections.
5. Electrical connectors, as necessary.
6. Bolts (5).
7. Bolt (12).
8. Bolt (15).
9. Bolt (13).
10. Braces (11 and 14).
11. Compressor (1).
    • Drain and measure compressor oil.

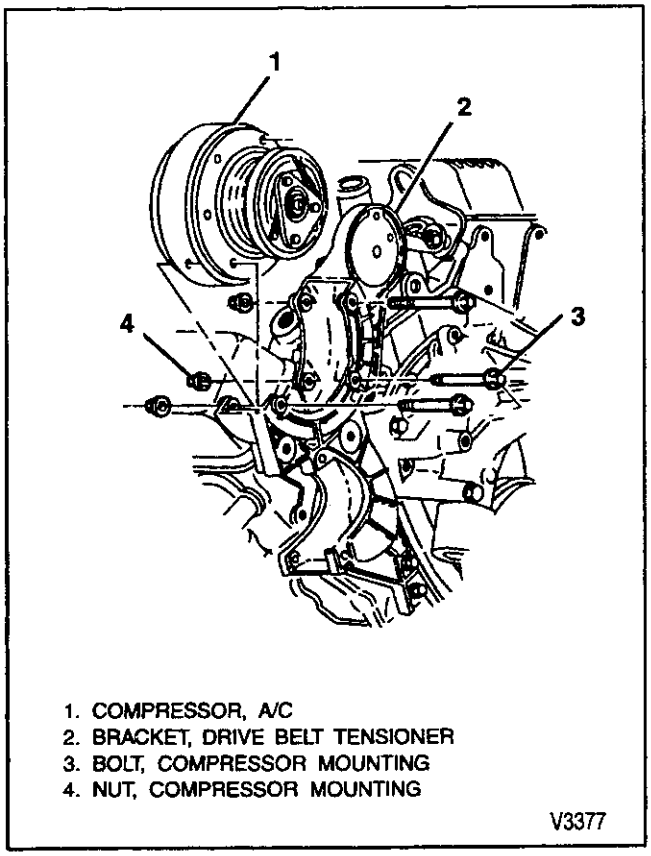
Install or Connect (Figure 22)

NOTICE: For steps 3, 4, 5, and 6, refer to "Notice" on page 1B-1.

1. Compressor (1). Refer to "Refrigerant Oil Distribution," if replacing compressor.
2. Braces (11 and 14).
3. Bolt (13).
4. Bolt (15).
5. Bolt (12).
6. Bolts (5).

Tighten

- Bolts (5) to 50 N·m (37 lbs. ft.).
- Bolts (12 and 15) to 84 N·m (62 lbs. ft.).
- Bolt (13) to 65 N·m (48 lbs. ft.).



1. COMPRESSOR, A/C
2. BRACKET, DRIVE BELT TENSIONER
3. BOLT, COMPRESSOR MOUNTING
4. NUT, COMPRESSOR MOUNTING

V3377

Figure 21—Compressor Mounting (4.3L, 5.0L, and 5.7L Engines)

7. Electrical connectors, as necessary.
8. Refrigerant hose assembly to compressor. Refer to "Compressor and Condenser Hose Assembly."
9. Drive belt. Refer to SECTION 6B1.
10. Negative battery cable.
11. Refrigerant to the system.
    • Check the system for leaks.

6.5L DIESEL ENGINES

Remove or Disconnect (Figure 23)

1. Negative battery cable. Refer to SECTION 0A.
2. Discharge and recover refrigerant from the system.
3. Drive belt. Refer to SECTION 6B1.
4. Refrigerant hose assembly from compressor. Refer to "Compressor and Condenser Hose Assembly."
   • Cap or plug all open connections.
5. Electrical connectors, as necessary.
6. Nuts (23).
7. Bolt (18) and washer (17).
8. Bolt (20) and washer (19).
9. Bolt (21) and washer (22).
10. Bolt (24) and washer (25).
11. Bracket (26).
12. Compressor (1).
    • Drain and measure compressor oil.

Install or Connect (Figure 23)

NOTICE: For steps 3, 4, 5, 6, and 7, refer to "Notice" on page 1B-1.

1. Compressor (1). Refer to "Refrigerant Oil Distribution," if replacing compressor.
2. Bracket (26).
3. Washer (25) and bolt (24).
4. Washer (22) and bolt (21).
5. Washer (19) and bolt (20).
6. Washer (17) and bolt (18).
7. Nuts (23).

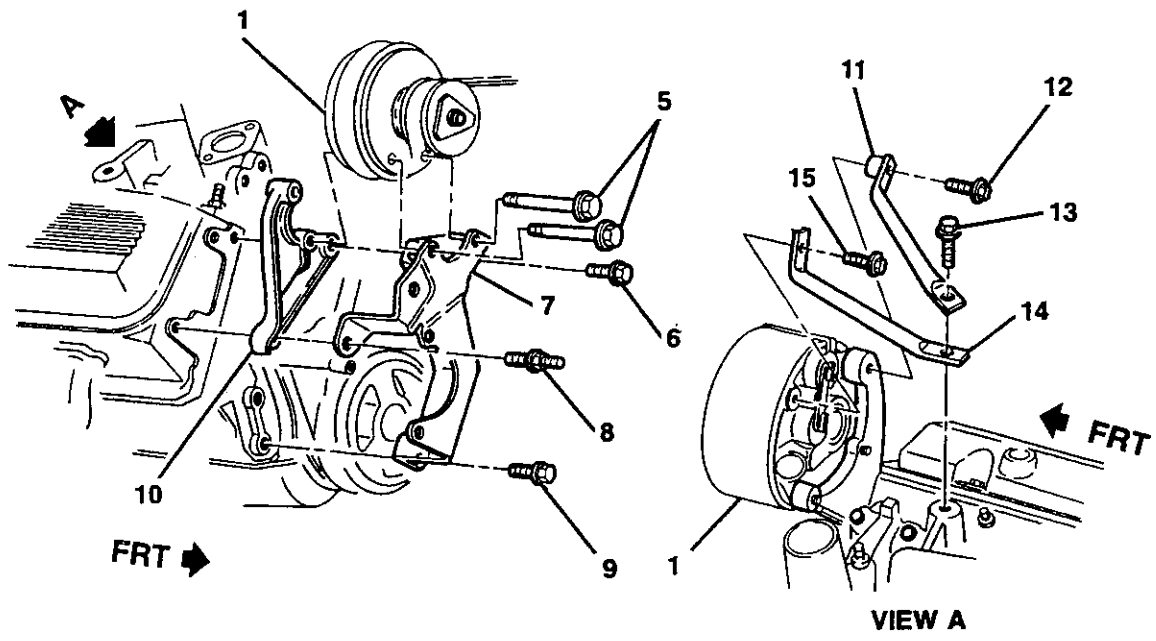
Tighten

- Bolts (18, 20, 21, and 24) to 40 N·m (30 lbs. ft.).
- Nuts (23) to 23 N·m (17 lbs. ft.).

8. Electrical connectors, as necessary.
9. Refrigerant hose assembly to compressor. Refer to "Compressor and Condenser Hose Assembly."
10. Drive belt. Refer to SECTION 6B1.
11. Negative battery cable.
12. Refrigerant to the system.
    • Check the system for leaks.

COMPRESSOR SEALING WASHERS

- When installing sealing washers, keep dirt and foreign material from getting on the sealing surfaces of the washers, hose block, or compressor ports. Clean all sealing surfaces with a lint-free rag.
- Do not reuse sealing washer.



1. COMPRESSOR, A/C
5. BOLT, COMPRESSOR MOUNTING
6. BOLT, COMPRESSOR MOUNTING
7. BRACKET, A/C COMPRESSOR BELT IDLER PULLEY
8. STUD, A/C COMPRESSOR IDLER PULLEY BRACKET
9. BOLT, A/C COMPRESSOR IDLER PULLEY BRACKET
10. BRACE, A/C COMPRESSOR
11. BRACE, A/C COMPRESSOR OUTER
12. BOLT, A/C COMPRESSOR BRACE MOUNTING
13. BOLT, A/C COMPRESSOR BRACE MOUNTING
14. BRACE, A/C COMPRESSOR INNER
15. BOLT, A/C COMPRESSOR BRACE MOUNTING

F9694

Figure 22—Compressor Mounting (7.4L Engines)

- Sealing washers do not have to be oiled prior to assembly.

1. Install sealing washer onto pilots of suction/discharge block fitting. Washers must "bottom" against surface of block fitting (figure 24).
2. Install hose block to the compressor making sure the sealing washers are seated within the compressor machined surfaces (figure 25).

NOTICE: Refer to "Notice" on page 1B-1.

3. Hold block in place, hand tighten attachment bolt (30).

Tighten

- Bolt (30) to 34 N·m (25 lbs. ft.).

Important

- If correct washers are used, there should be a 1.2-mm (0.047-inch) space between the suction/discharge hose block and the compressor rear head.

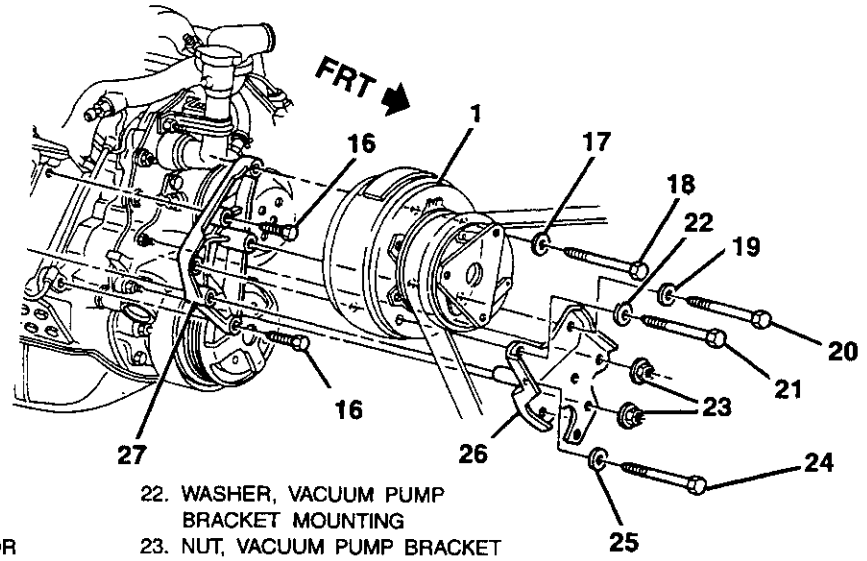
COMPRESSOR AND CONDENSER HOSE ASSEMBLY

Refer to the following figures for the models listed below:

- Pickup/Extended Cab Models (4.3L, 5.0L, 5.7L, and 7.4L Engines): refer to figure 26.
- All Models (6.5L Diesel Engines): refer to figure 26.
- Suburban/Crew Cab Models (7.4L Engines w/o Aux. Heater or A/C): refer to figure 26.
- Suburban/Utility and Crew Cab Models (5.7L Engines w/o Aux. A/C): refer to figure 27.
- Suburban Models (7.4L Engines and Aux. Heater): refer to figure 28.

Remove or Disconnect (Figures 26, 27, and 28)

1. Negative battery cable. Refer to SECTION 0A.
2. Discharge and recover refrigerant from the system.



1. COMPRESSOR, A/C
16. BOLT, A/C COMPRESSOR SUPPORT MOUNTING
17. WASHER, A/C COMPRESSOR MOUNTING
18. BOLT, A/C COMPRESSOR MOUNTING
19. WASHER, VACUUM PUMP BRACKET MOUNTING
20. BOLT, VACUUM PUMP BRACKET MOUNTING
21. BOLT, VACUUM PUMP BRACKET MOUNTING
22. WASHER, VACUUM PUMP BRACKET MOUNTING
23. NUT, VACUUM PUMP BRACKET MOUNTING
24. BOLT, VACUUM PUMP BRACKET MOUNTING
25. WASHER, VACUUM PUMP BRACKET MOUNTING
26. BRACKET, A/C COMPRESSOR FRONT
27. SUPPORT, A/C COMPRESSOR

F9695

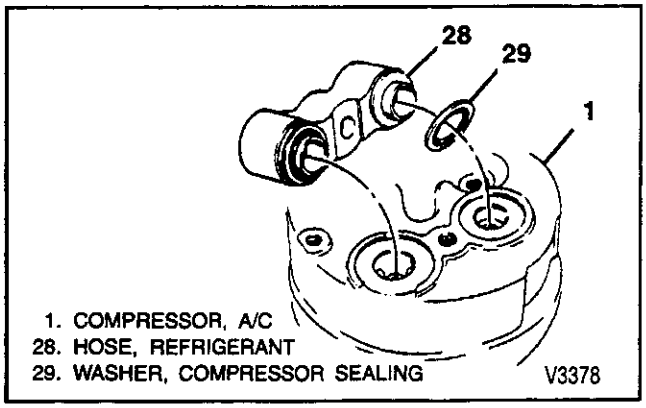
Figure 23—Compressor Mounting (6.5L Diesel Engines)

3. Grille. Refer to SECTION 2B.
4. Bolt (30).
5. Hose assembly (28) from rear of the compressor (1).
6. Sealing washers. Refer to "Compressor Sealing Washers."
7. Hose assembly (28) from accumulator (31).
8. O-ring seal (33).
9. Hose assembly (28) from condenser (32).
10. O-ring seal (34).

- Cap or plug all open connections.

Install or Connect (Figures 26, 27, and 28)

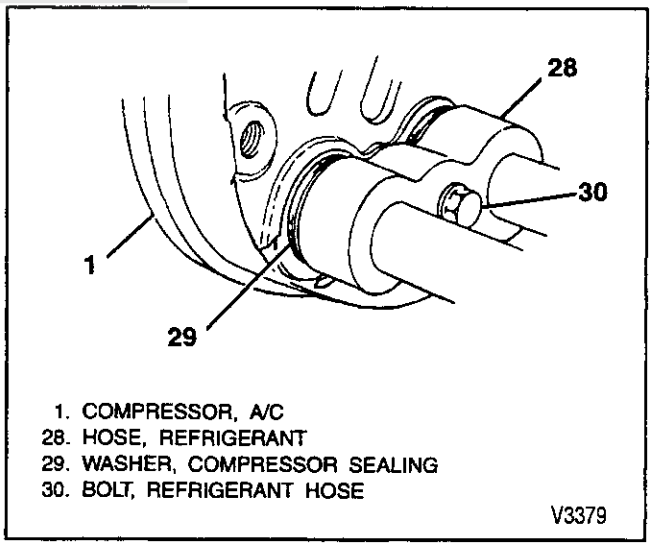
NOTICE: For steps 2, 4, and 7, refer to "Notice" on page 1B-1.



1. COMPRESSOR, A/C
28. HOSE, REFRIGERANT
29. WASHER, COMPRESSOR SEALING

V3378

Figure 24—Sealing Washer Installation (1 of 2)



1. COMPRESSOR, A/C
28. HOSE, REFRIGERANT
29. WASHER, COMPRESSOR SEALING
30. BOLT, REFRIGERANT HOSE

V3379

Figure 25—Sealing Washer Installation (2 of 2)

1. New O-ring seal (34).
   - Coat O-ring seal with 525 viscosity refrigerant oil.
2. Hose assembly (28) to condenser (32).

Tighten

- Hose assembly (28) to 24 N·m (18 lbs. ft.).

3. New O-ring seal (33).
   - Coat O-ring seal with 525 viscosity refrigerant oil.
4. Hose assembly (28) to accumulator (31).

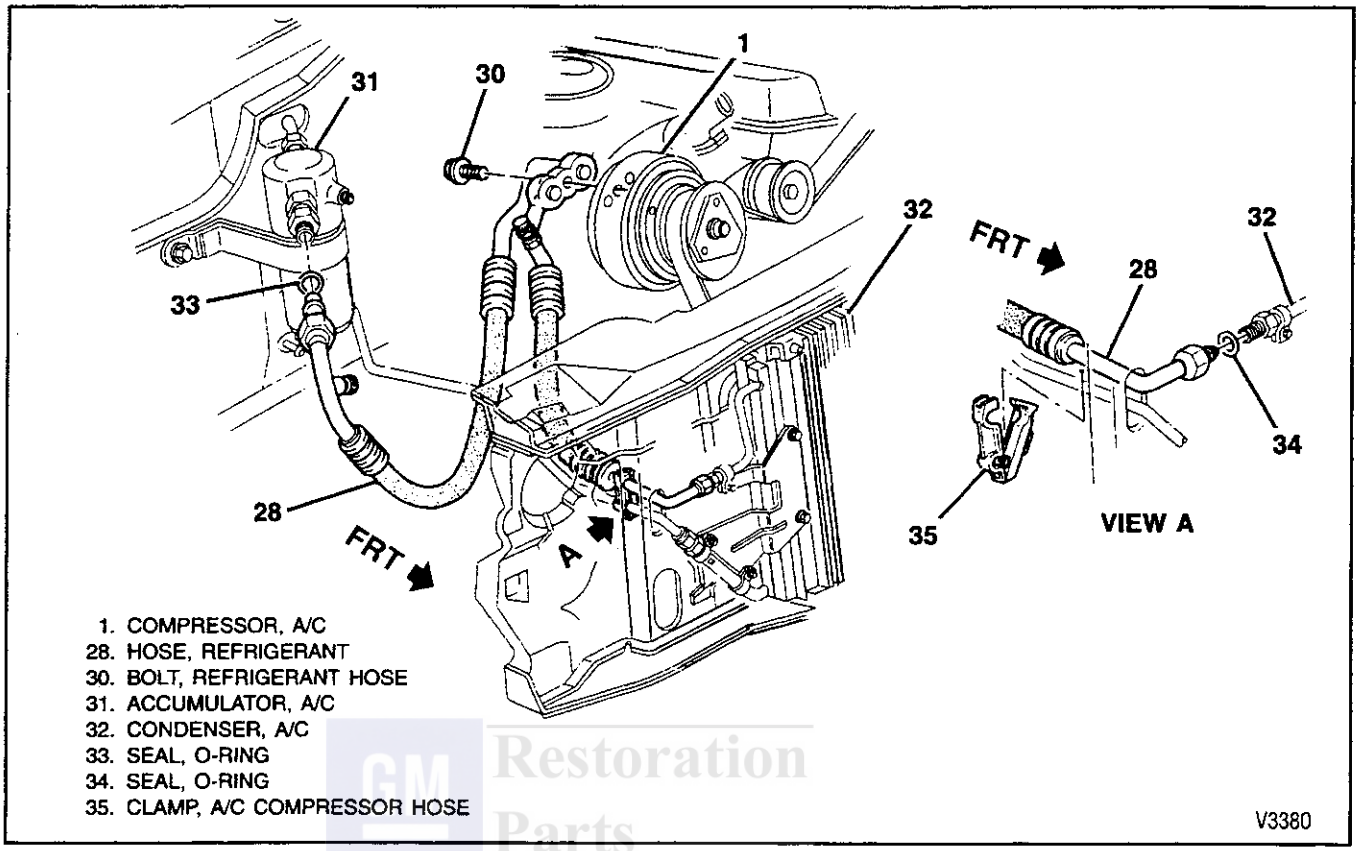


Figure 26—Compressor and Condenser Hose Assembly

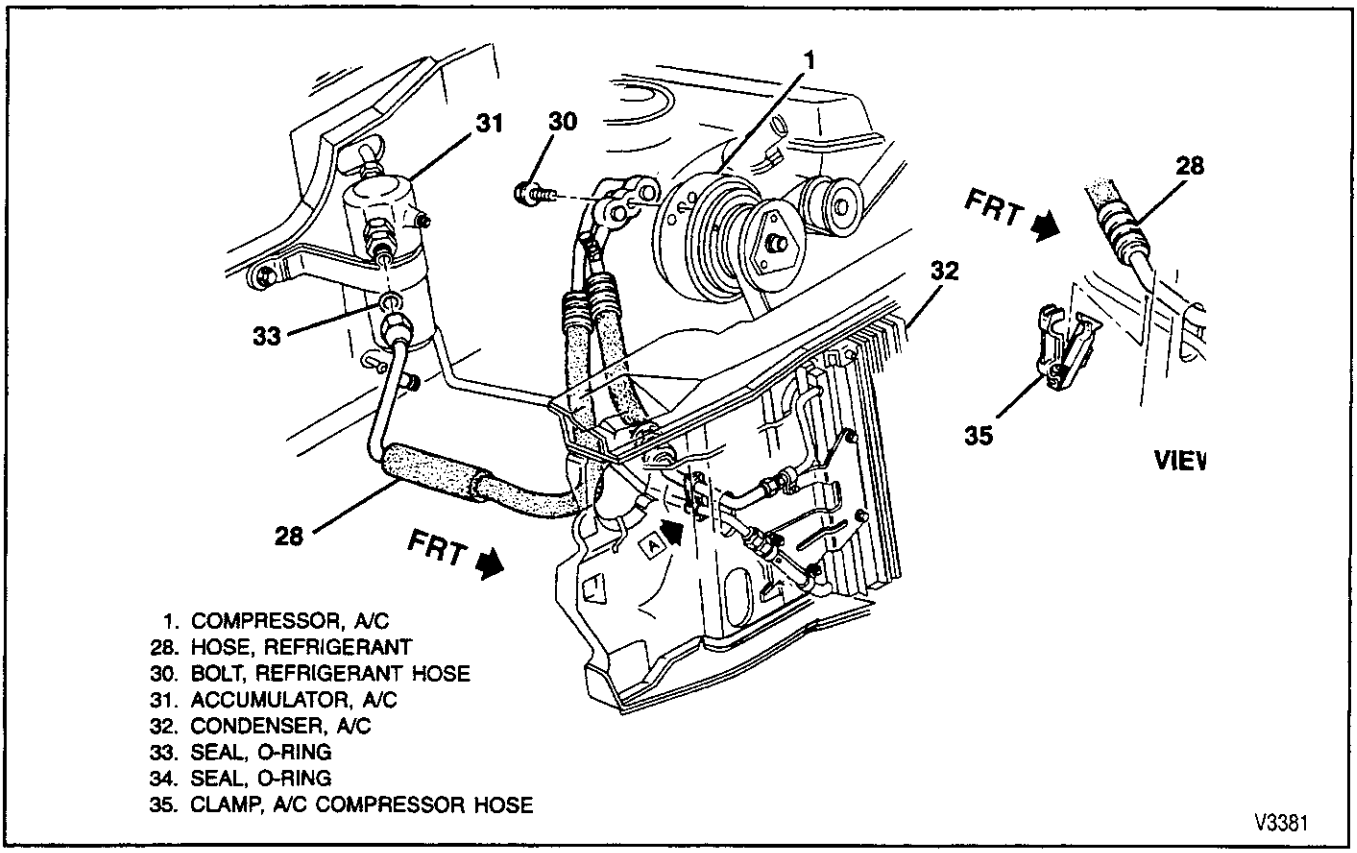


Figure 27—Compressor and Condenser Hose Assembly

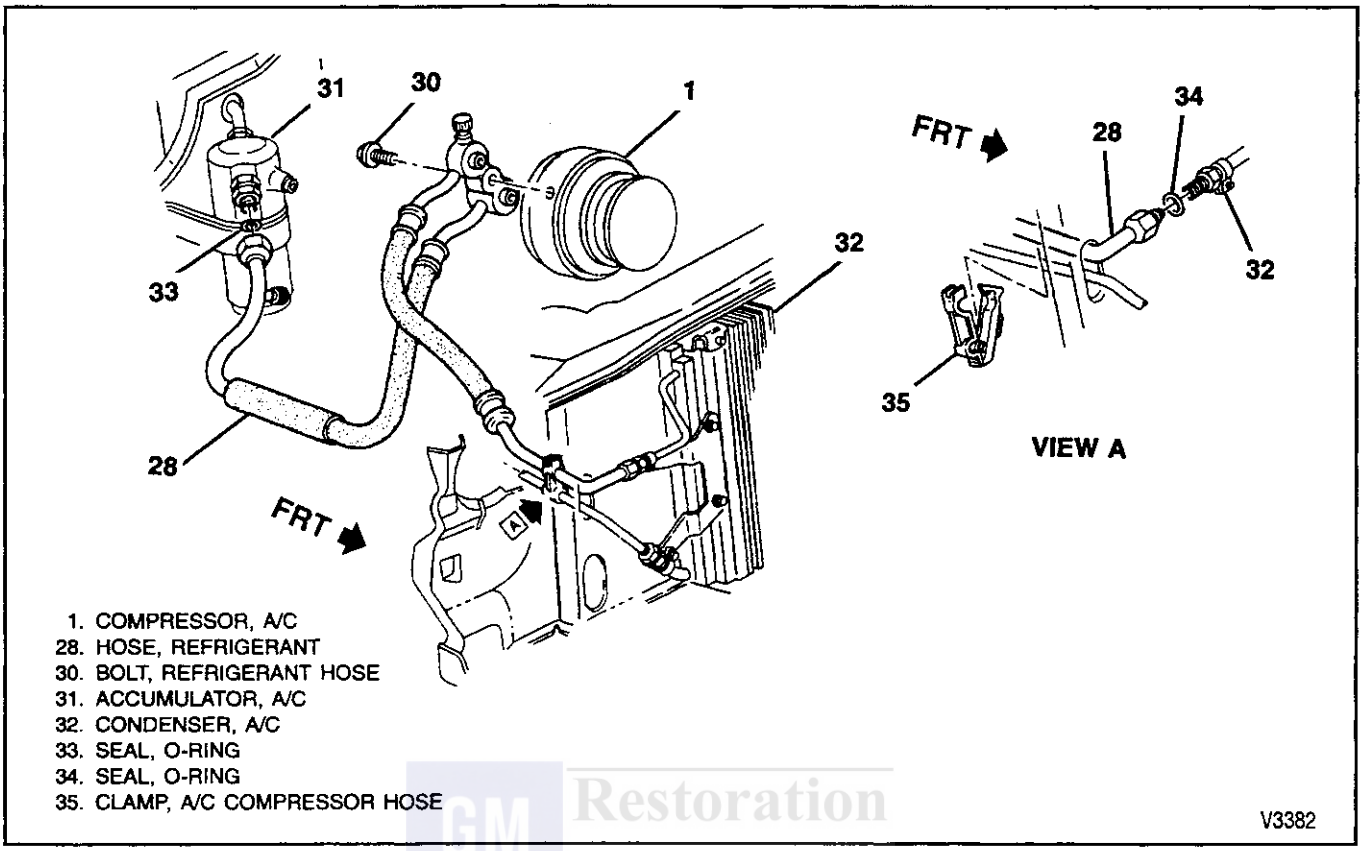


Figure 28—Compressor and Condenser Hose Assembly

Tighten

- Hose assembly (28) to 41 N.m (30 lbs. ft.).

5. Sealing washers. Refer to "Compressor Sealing Washers."
6. Hose assembly (28) to the rear of the compressor (1).

NOTICE: Refer to "Notice" on page 1B-1.

7. Bolt (30).

Tighten

- Bolt (30) to 34 N.m (25 lbs. ft.).

8. Grille. Refer to SECTION 2B.
9. Negative battery cable.
10. Refrigerant to the system.
    - Check the system for leaks.

COMPRESSOR PRESSURE SWITCH

Remove or Disconnect (Figure 29)

1. Negative battery cable. Refer to SECTION 0A.
2. Electrical connectors, as necessary.
3. Compressor pressure switch.
4. O-ring seal.

Install or Connect (Figure 29)

1. New O-ring seal.
    - Coat O-ring seal with 525 viscosity refrigerant oil.
2. Compressor pressure switch.

Tighten

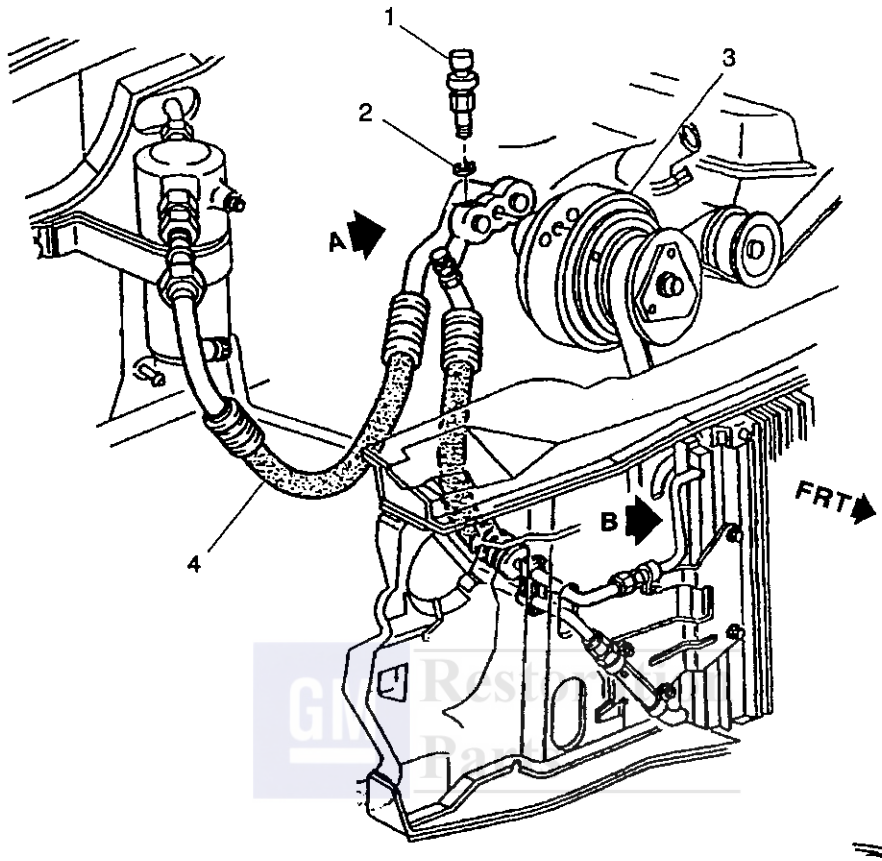
- Compressor pressure switch to 6 N.m (53 lbs. in.).

3. Electrical connectors, as necessary.
4. Negative battery cable.

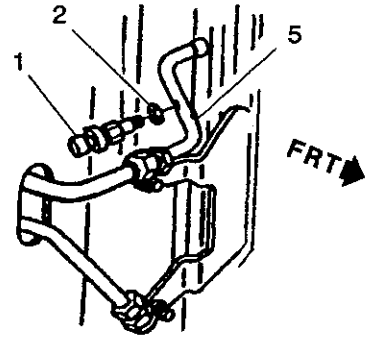
EVAPORATOR TUBE

Remove or Disconnect (Figure 30)

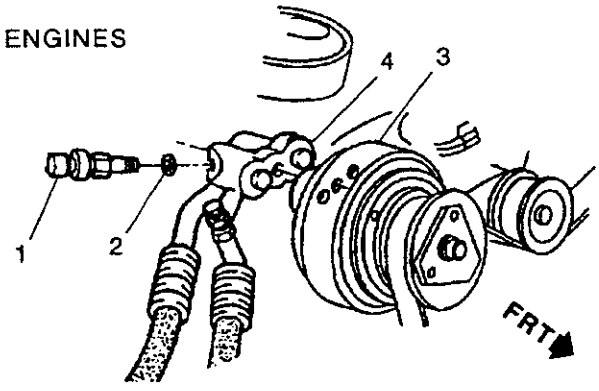
1. Negative battery cable. Refer top SECTION 0A.
2. Discharge and recover refrigerant from the system.
3. Auxiliary heater pipe, if equipped. Refer to SECTION 1A.
4. Coolant recovery reservoir. Refer to SECTION 6B1.
5. Evaporator tube (41) from evaporator (39).
6. O-ring seal (40).
7. Evaporator tube (41) from condenser (32).
8. O-ring seal (42).
9. Evaporator tube (41) from clip (43).



5.0L, 5.7L ENGINES



VIEW B



VIEW A

A. 4.3L ENGINES
B. 7.4L, 6.5L ENGINES
1. SWITCH, A/C COMPRESSOR PRESSURE
2. SEAL, O – RING
3. COMPRESSOR, A/C
4. HOSE ASSEMBLY, COMPRESSOR AND CONDENSER
5. CONDENSER, A/C

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Figure 29—Compressor Pressure Switch

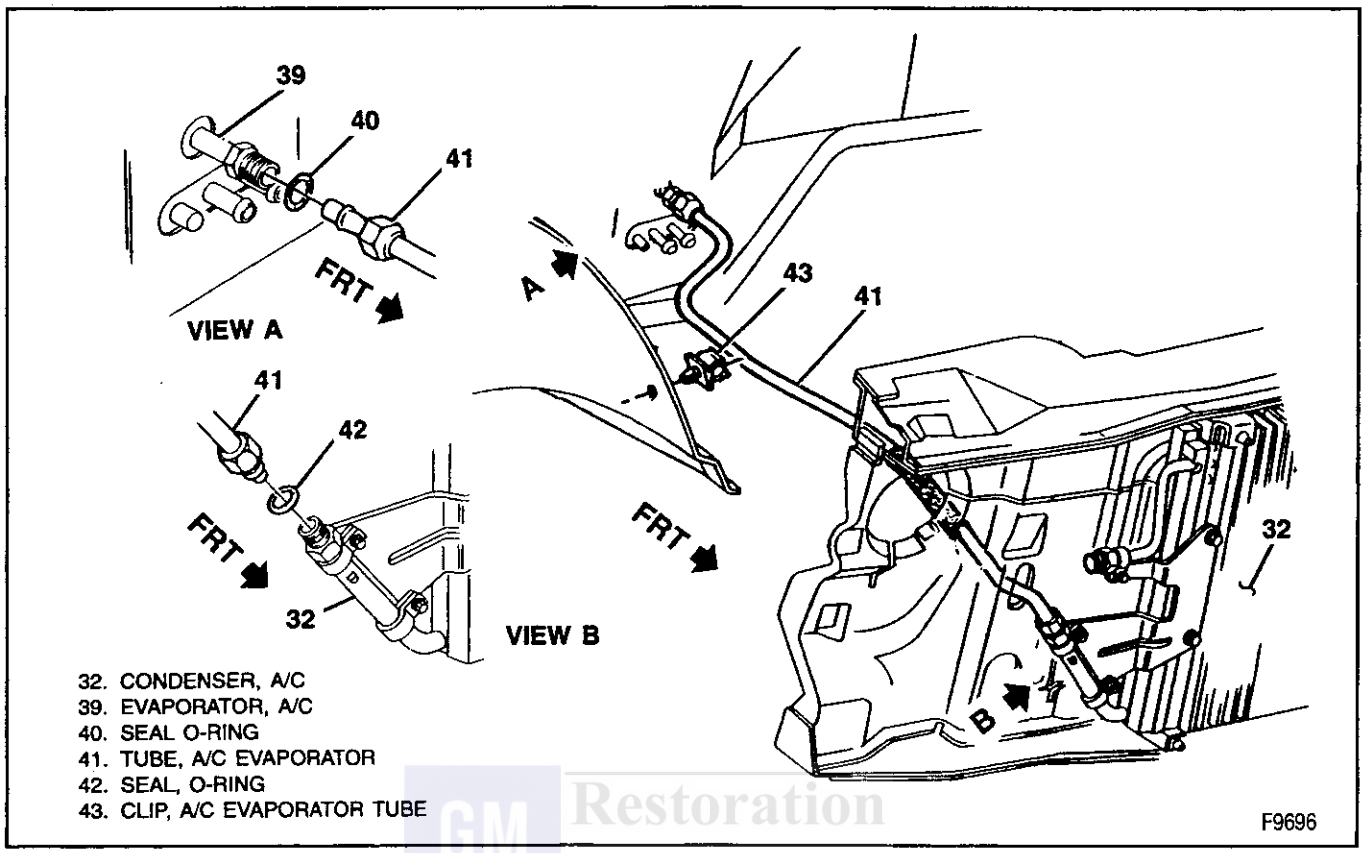


Figure 30—Evaporator Tube

Install or Connect (Figure 30)

NOTICE: For steps 3 and 5, refer to "Notice" on page 1B-1.

1. Evaporator tube (41) into clip (43).
2. New O-ring seal (42).
   - Coat O-ring seal with 525 viscosity refrigerant oil.
3. Evaporator tube (41) to condenser (32).

Tighten

- Evaporator tube (41) to 24 N·m (18 lbs. ft.).

4. New O-ring seal (40).
   - Coat O-ring seal with 525 viscosity refrigerant oil.
5. Evaporator tube (41) to evaporator (39).

Tighten

- Evaporator tube (41) to 24 N·m (18 lbs. ft.).

6. Coolant recovery reservoir. Refer to SECTION 6B1.
7. Auxiliary heater pipie, if equipped. Refer to SECTION 1A.
8. Negative battery cable.
9. Refrigerant to the system.
   - Check the system for leaks.

BLOWER MOTOR RELAY

Remove or Disconnect (Figure 31)

1. Negative battery cable. Refer to SECTION 0A.
2. Instrument panel compartment. Refer to SECTION 10A4.
3. Electrical connectors, as necessary.
4. Relay (76) from relay bracket.

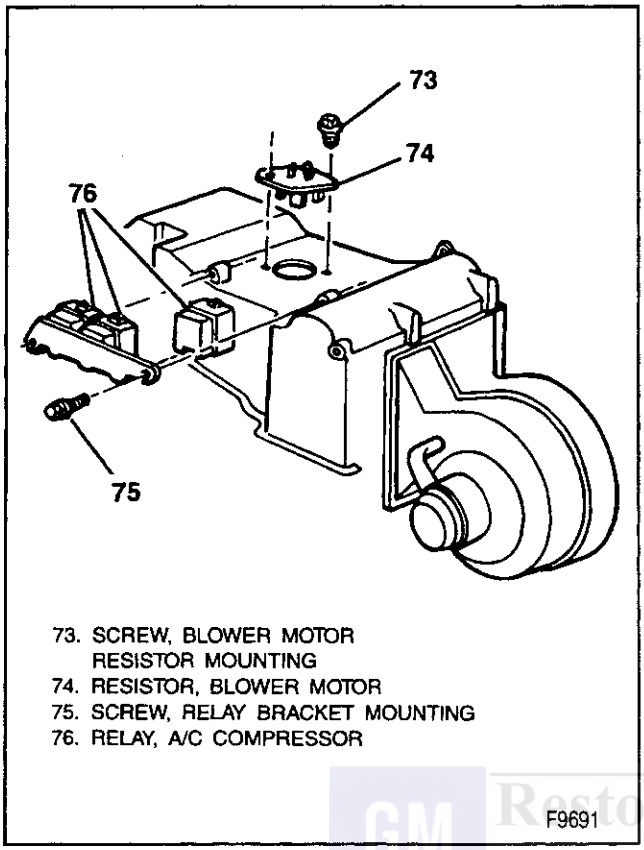
Install or Connect (Figure 31)

1. Relay (76) to relay bracket.
2. Electrical connectors, as necessary.
3. Instrument panel compartment. Refer to SECTION 10A4.
4. Negative battery cable.
   - Check circuit operation.

CONDENSER

Remove or Disconnect (Figure 32)

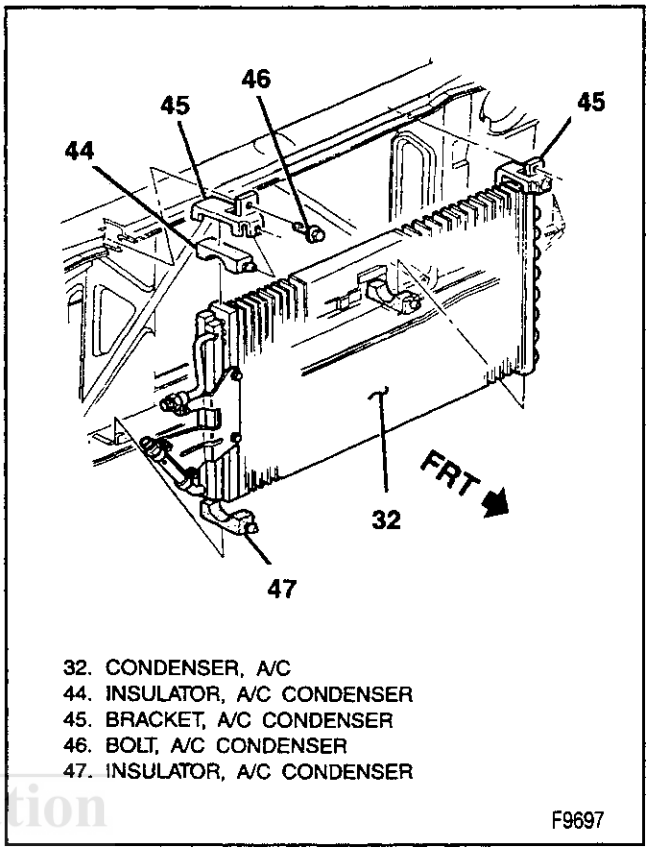
1. Discharge and recover refrigerant from the system.
2. Grille. Refer to SECTION 2B.
3. Hood primary latch support.
4. Auxiliary cooling fan, if equipped. Refer to SECTION 6B1.
5. Refrigerant hose from condenser. Refer to "Compressor and Condenser Hose Assembly."



73. SCREW, BLOWER MOTOR RESISTOR MOUNTING
74. RESISTOR, BLOWER MOTOR
75. SCREW, RELAY BRACKET MOUNTING
76. RELAY, A/C COMPRESSOR

F9691

Figure 31—Blower Motor Relay/Resistor



32. CONDENSER, A/C
44. INSULATOR, A/C CONDENSER
45. BRACKET, A/C CONDENSER
46. BOLT, A/C CONDENSER
47. INSULATOR, A/C CONDENSER

F9697

Figure 32—Condenser Assembly

6. Evaporator tube from condenser. Refer to "Evaporator Tube."
   - Cap or plug all open connections.
7. Bolts (46).
8. Brackets (45).
9. Upper insulators (44).
10. Condenser (32).
    - Bend the left grille support outboard to gain clearance for the condenser removal.
11. Lower insulators (47).

Install or Connect (Figure 32)

1. Lower insulators (47).
2. Condenser (32). Refer to "Refrigerant Oil Distribution," if replacing condenser.
3. Upper insulators (44).
4. Brackets (45).

NOTICE: Refer to "Notice" on page 1B-1.

5. Bolts (46).

Tighten

- Bolts (46) to 4.5 N·m (40 lbs. in.).

6. Evaporator tube to condenser. Refer to "Evaporator Tube."
7. Refrigerant hose to condenser. Refer to "Compressor and Condenser Hose Assembly."
8. Auxiliary cooling fan, if equipped. Refer to SECTION 6B1.
9. Hood primary latch support.
10. Grille assembly. Refer to SECTION 2B.
11. Refrigerant to the system.
    - Check the system for leaks.

ACCUMULATOR

Remove or Disconnect (Figure 33)

1. Negative battery cable. Refer to SECTION 0A.
2. Discharge and recover refrigerant from the system.
3. Electrical connectors, as necessary.
4. Pressure cycling switch.
5. Refrigerant hose from accumulator. Refer to "Compressor and Condenser Hose Assembly."
6. Accumulator from the evaporator.
7. O-ring seal.

Important

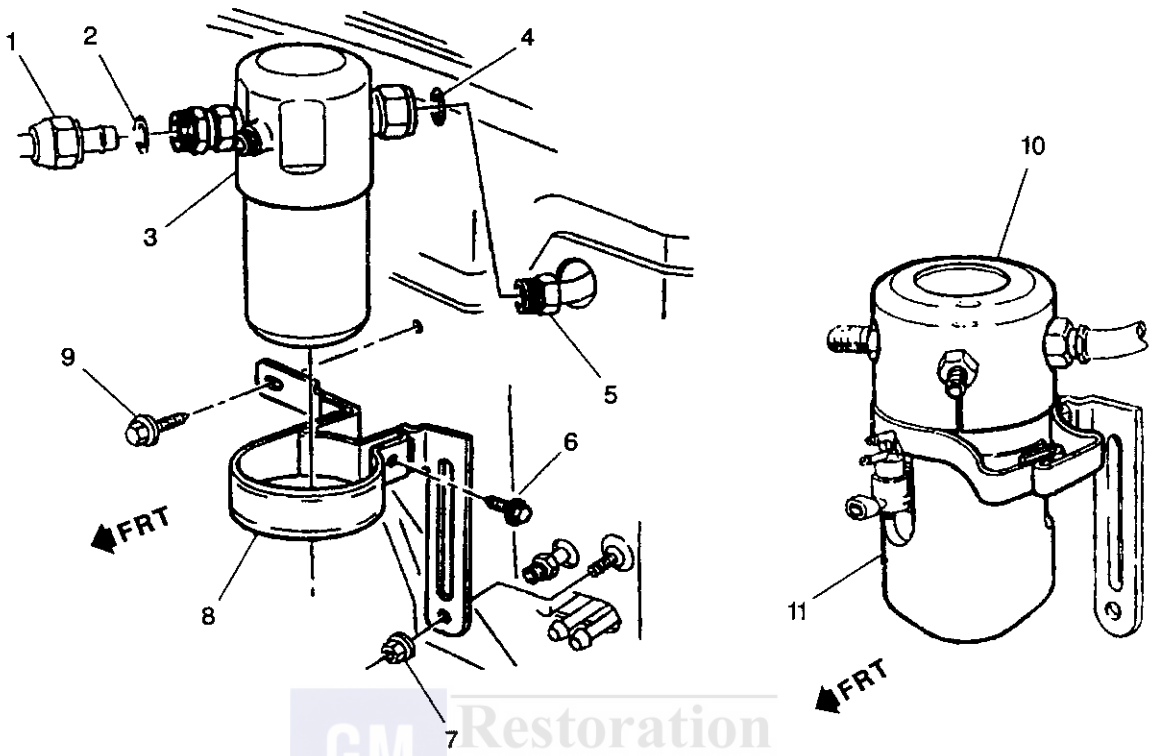
- Cap or plug all open connections.

8. Accumulator bracket screw.
9. Accumulator.
10. Upper and lower accumulator insulators.

Install or Connect (Figure 33)

1. Upper and lower accumulator insulators.
2. Accumulator (31). Refer to "Refrigerant Oil Distribution," if replacing accumulator.

NOTICE: Refer to "Notice" on page 1B-1.



1. HOSE ASSEMBLY, COMPRESSOR AND CONDENSER
2. SEAL, O – RING
3. ACCUMULATOR, A/C
4. SEAL, O – RING
5. EVAPORATOR, A/C
6. SCREW, A/C ACCUMULATOR BRACKET
7. NUT, A/C ACCUMULATOR BRACKET
8. BRACKET, A/C ACCUMULATOR
9. SCREW, A/C ACCUMULATOR BRACKET
10. INSULATOR, A/C ACCUMULATOR UPPER
11. INSULATOR, A/C ACCUMULATOR LOWER

3101r5221

Figure 33—Accumulator

3. Accumulator bracket screw.

Tighten

- Screw to 6 N·m (53 lbs. in.).

4. New O-ring seal.
   - Coat O-ring seal with 525 viscosity refrigerant oil.
5. Accumulator to the evaporator.

Tighten

- Accumulator to 41 N·m (30 lbs. ft.).

6. Refrigerant hose to accumulator. Refer to "Compressor and Condenser Hose Assembly."
7. Pressure cycling switch.
8. Electrical connectors, as necessary.
9. Negative battery cable.
10. Refrigerant to the system.
    - Check the system for leaks.

EXPANSION (ORIFICE) TUBE

FRONT A/C SYSTEM (C60)

Tool Required:
J 26549-E Orifice Tube Remover and Installer or Equivalent

Remove or Disconnect (Figure 30)

1. Discharge and recover refrigerant from the system.
2. Grille. Refer to SECTION 2B.
3. Evaporator tube (41) from condenser (32). Refer to "Evaporator Tube."
4. O-ring seal (42).
   - Cap or plug the open line.
5. Expansion (orifice) tube from the condenser outlet pipe, using J 26549-E or equivalent.

In the event that difficulty is encountered during the removal of a restricted or plugged expansion (orifice) tube, the following procedure is recommended:

A. Remove as much of any impacted residue as possible.
B. Carefully apply heat with heat gun (hair drier, epoxy drier or equivalent) approximately 7 mm (1/4 inch) from dimples on inlet pipe. Do not overheat pipe.

NOTICE: If the system has a pressure switch near the expansion tube location, it should be removed prior to heating the pipe to avoid damage to switch.

C. While applying heat, use expansion tube removal tools J 26549-E or equivalent to grip the expansion (orifice) tube. Use a turning motion along with a push-pull motion to loosen the impacted expansion(orifice) tube and remove it.

Install or Connect (Figure 30)

1. Expansion tube into condenser outlet pipe, using J 26549-E or equivalent.
2. New O-ring seal (42).
   - Coat O-ring seal with 525 viscosity refrigerant oil.
   - Insert the short screen end of the new orifice into the evaporator tube.
3. Evaporator tube (41) to condenser (32). Refer to "Evaporator Tube."
4. Grille. Refer to SECTION 2B.
5. Refrigerant to the system.
   - Check the system for leaks.

EVAPORATOR CORE

Remove or Disconnect (Figure 34)

1. Negative battery cable. Refer to SECTION 0A.
2. Engine coolant. Refer to SECTION 6B1.
3. Discharge and recover refrigerant from the system.
4. Instrument panel compartment. Refer to SECTION 10A4.
5. Electrical connectors, as necessary.
6. Center floor air distribution duct.
7. ECM and mounting tray.
8. Hinge pillar trim panels. Refer to SECTION 10A4.
9. Blower motor cover.
10. Blower motor (60). Refer to "Blower Motor and Fan."
11. Steering wheel. Refer to SECTION 3F.
12. Tilt back instrument panel assembly. Refer to SECTION 10A4.
13. Coolant recovery reservoir. Refer to SECTION 6B1.
14. Heater hoses. Refer to SECTION 1A.
15. Evaporator tube. Refer to "Evaporator Tube."
16. Accumulator. Refer to "Accumulator."
17. Screws (52 and 64).
18. Nut (50).
19. Screw (56).
20. Module assembly (57).
    - May be necessary to have an assistant when removing module assembly.
21. Evaporator case bottom cover plate (63).
    - Remove the seven screws that hold the cover plate to the module assembly.

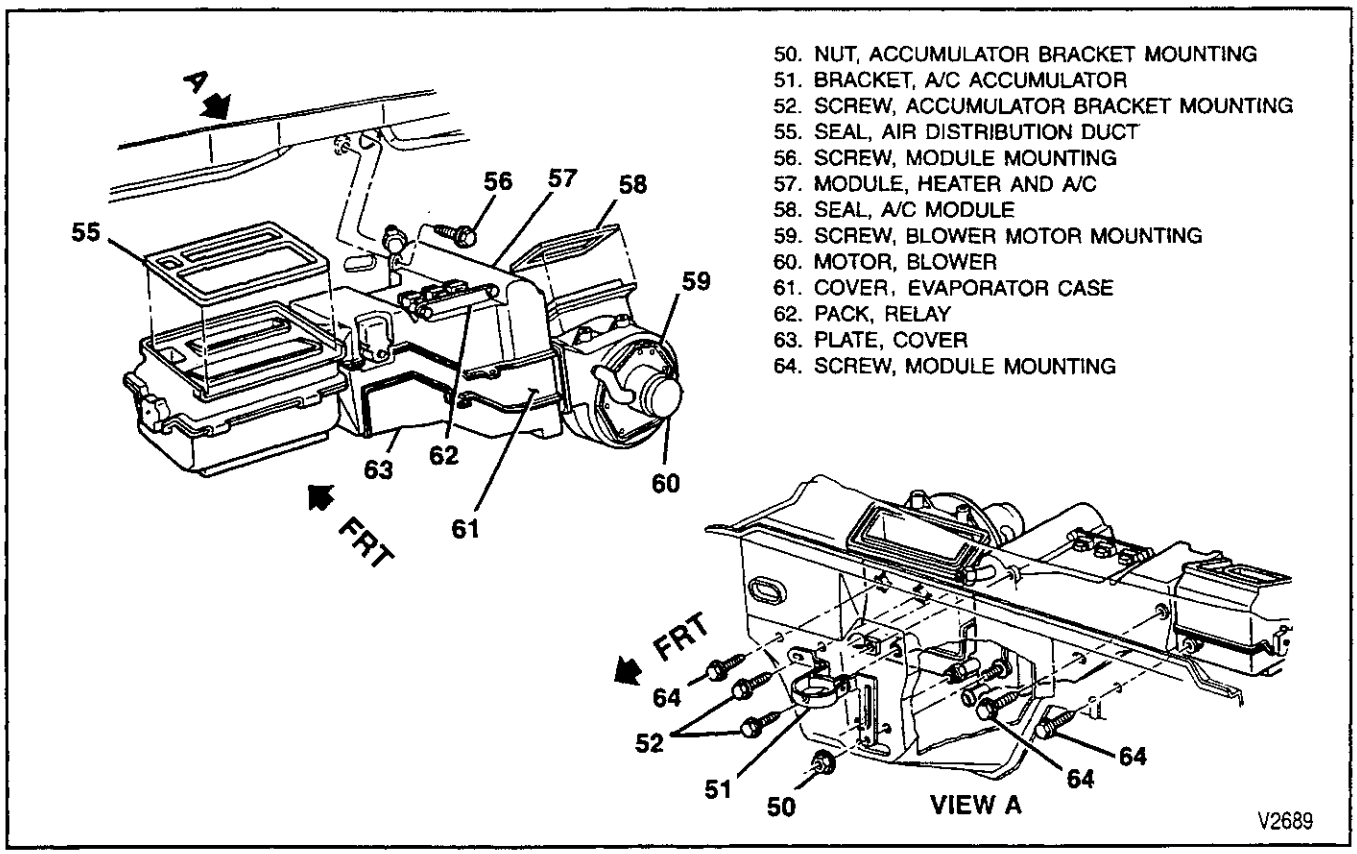


Figure 34—Evaporator/Heater Core Case

22. Heater core and seal from module assembly.
23. Evaporator case cover (61).
    - Remove the four screws that hold the case cover to the module assembly.
24. Evaporator core.

Install or Connect (Figure 34)

1. Evaporator core. Refer to "Refrigerant Oil Distribution," if replacing evaporator core.

NOTICE: For steps 2, 4, 6, 7, and 8, refer to "Notice" on page 1B-1.

2. Evaporator case cover (61).
    - Install the four screws that hold the case cover to the module assembly.
3. Heater core and seal into module assembly.
4. Evaporator case bottom cover plate (63).
    - Install the seven screws that hold the cover plate to the module assembly.
5. Module assembly (57).
    - May be necessary to have an assistant when installing module assembly.
6. Screw (56).
7. Nut (50).
8. Screws (52 and 64).

Tighten

- Screw (56) to 11 N·m (97 lbs. in.).
- Nut (50) to 2.8 N·m (25 lbs. in.).
- Screws (52 and 64) to 1.9 N·m (17 lbs. in.).

9. Accumulator. Refer to "Accumulator."
10. Evaporator tube. Refer to "Evaporator Tube."
11. Heater hoses. Refer to SECTION 1A.
12. Coolant recovery reservoir. Refer to SECTION 6B1.
13. Instrument panel. Refer to SECTION 10A4.
14. Steering wheel. Refer to SECTION 3F.
15. Blower motor (60). Refer to "Blower Motor and Fan."
16. Blower motor cover.
17. Hinge pillar trim panels. Refer to SECTION 10A4.
18. ECM and mounting tray.
19. Center floor air distribution duct.
20. Electrical connectors, as necessary.
21. Instrument panel compartment. Refer to SECTION 10A4.
22. Engine coolant. Refer to SECTION 6B1.
23. Negative battery cable.
24. Refrigerant to the system.
    - Check the system for leaks.

BLOWER MOTOR AND FAN

Remove or Disconnect (Figure 34)

1. Negative battery cable. Refer to SECTION 0A.
2. Instrument panel compartment. Refer to SECTION 10A4.
3. Front screw from right door sill plate.
4. Right hinge pillar trim panel. Refer to SECTION 10A4.
5. Electrical connectors from ECM, as necessary.
6. ECM and mounting bracket.
7. Electrical connectors from blower motor (60), as necessary.
8. Courtesy lamp (if equipped).
9. Bolt from right lower dash support.
10. Blower motor cover.
11. Blower motor cooling tube.
12. Blower motor flange screws (59).
13. Blower motor (60).
    - Pull the blower motor forward carefully to avoid distorting the blower fan.
    - May be necessary to pry back right side of instrument panel.

Inspect

- Blower motor terminals for distortion. Clean corrosion from the terminals or replace the blower motor (60) as necessary.
- Flange of the blower motor (60) for damage or distortion that could cause an air leak. Repair as necessary.
- Blower fan for damage and distortion.

Install or Connect (Figure 34)

1. Blower motor (60).
    - Guide the blower motor and blower fan into position, being careful not to catch the blower fan on protruding parts.
2. Blower motor flange screws (59).
3. Blower motor cooling tube.
4. Blower motor cover.
5. Bolt to right lower dash support.
6. Courtesy lamp (if equipped).
7. Electrical connectors to blower motor (16), as necessary.
8. Mounting bracket and ECM.
9. Electrical connectors to ECM, as necessary.
10. Right hinge pillar trim panel. Refer to SECTION 10A4.
11. Front screw into front door sill plate.
12. Instrument panel compartment. Refer to SECTION 10A4.
13. Negative battery cable.
    - Check circuit operation.

BLOWER MOTOR RESISTOR

Remove or Disconnect (Figure 31)

1. Negative battery cable. Refer to SECTION 0A.
2. Instrument panel compartment. Refer to SECTION 10A4.
3. Electrical connectors, as necessary.
4. Screws (73).
5. Blower motor resistor (74).

Install or Connect (Figure 31)

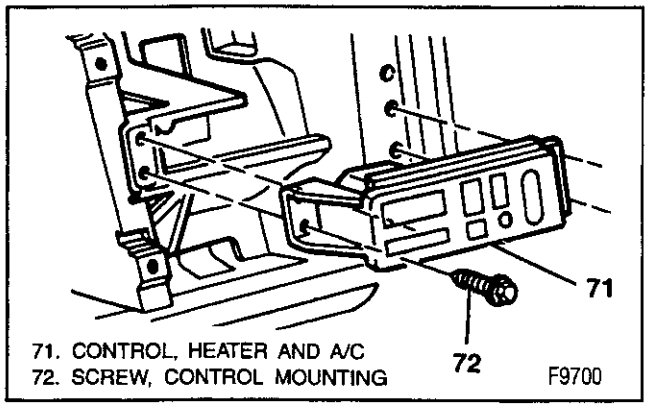
1. Blower motor resistor (74).

NOTICE: Refer to "Notice" on page 1B-1.

2. Screws (73).

Tighten

- Screws (73) to 1.4 N·m (12 lbs. in.).



71. CONTROL, HEATER AND A/C
72. SCREW, CONTROL MOUNTING

Figure 35-Control Assembly

3. Electrical connectors, as necessary.
4. Instrument panel compartment. Refer to SECTION 10A4.
5. Negative battery cable.
   - Check circuit operation.

CONTROL ASSEMBLY AND BLOWER SWITCH

Remove or Disconnect (Figure 35)

1. Instrument panel bezel. Refer to SECTION 8C.
2. Screws (72).
   - Pull the control assembly out from the instrument panel.
3. Electrical connectors, as necessary.
4. Control assembly (71).

Install or Connect (Figure 35)

1. Electrical connectors, as necessary.
2. Control assembly (71).

NOTICE: Refer to "Notice" on page 1B-1.

3. Screws (72).

Tighten

   - Screws (72) to 1.9 N·m (17 lbs. in.).
4. Instrument panel bezel. Refer to SECTION 8C.
   - Check circuit operation.

HEATER HOSES

For complete replacement procedure, refer to SECTION 1A.

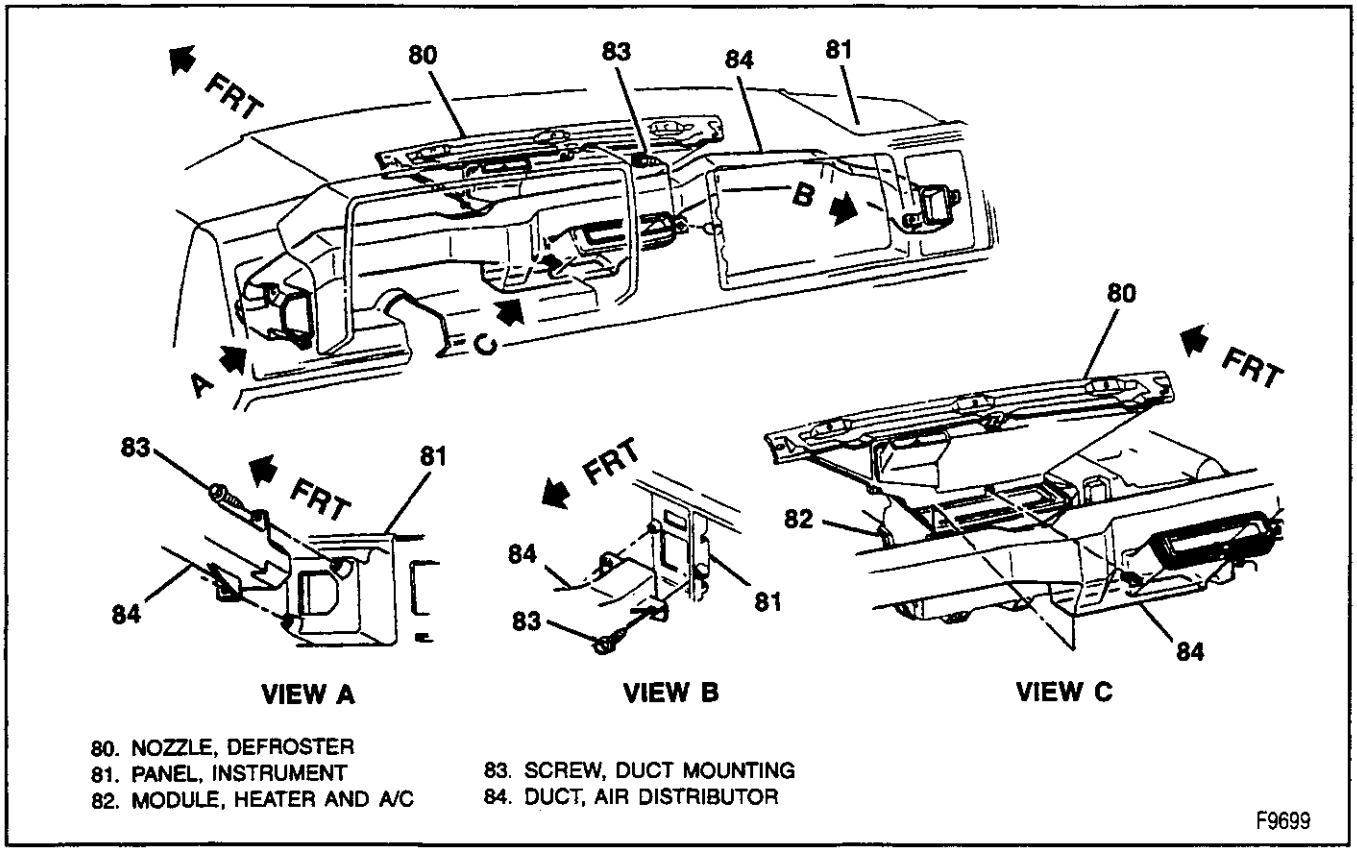
HEATER CORE

For complete replacement procedure, refer to SECTION 1A.

AIR DISTRIBUTOR DUCT

Remove or Disconnect (Figure 36)

1. Negative battery cable. Refer to SECTION 0A.
2. Defroster nozzle (80). Refer to "Defroster Nozzle."



80. NOZZLE, DEFROSTER
81. PANEL, INSTRUMENT
82. MODULE, HEATER AND A/C
83. SCREW, DUCT MOUNTING
84. DUCT, AIR DISTRIBUTOR

Figure 36—Air Distributor Duct

3. Five duct mounting screws (83).
   - Two from each side dash vent outlet.
   - One from center dash vent outlet.
4. Duct (84) from instrument panel (81).

Install or Connect (Figure 36)

1. Duct (84) to instrument panel (81).

NOTICE: Refer to "Notice" on page 1B-1.

2. Duct mounting screws (83).

Tighten

- Screws (83) to 1.9 N·m (17 lbs. in.).

3. Defroster nozzle (80). Refer to "Defroster Nozzle."
4. Negative battery cable.

DEFROSTER NOZZLE

Remove or Disconnect (Figure 37)

1. Negative battery cable. Refer to SECTION 0A.
2. Tilt back instrument panel assembly (81). Refer to SECTION 10A4.
3. Screws (77).
4. Screws (78).
5. Screws (79).
6. Defroster nozzle (80).

Install or Connect (Figure 37)

1. Defroster nozzle (80).

NOTICE: For steps 2, 3, and 4, refer to "Notice" on page 1B-1.

2. Screws (79).

Tighten

- Screws (79) to 1.4 N·m (12 lbs. in.).

3. Screws (78).
4. Screws (77).

Tighten

- Screws (77 and 78) to 1.9 N·m (17 lbs. in.).

5. Instrument panel. Refer to SECTION 10A4.
6. Negative battery cable.

TEMPERATURE/DEFROST ACTUATOR

The temperature/defrost actuator is located on the left side of the air distribution case.

Remove or Disconnect (Figure 38)

1. Negative battery cable. Refer to SECTION 0A.
2. Instrument panel compartment. Refer to SECTION 10A4.

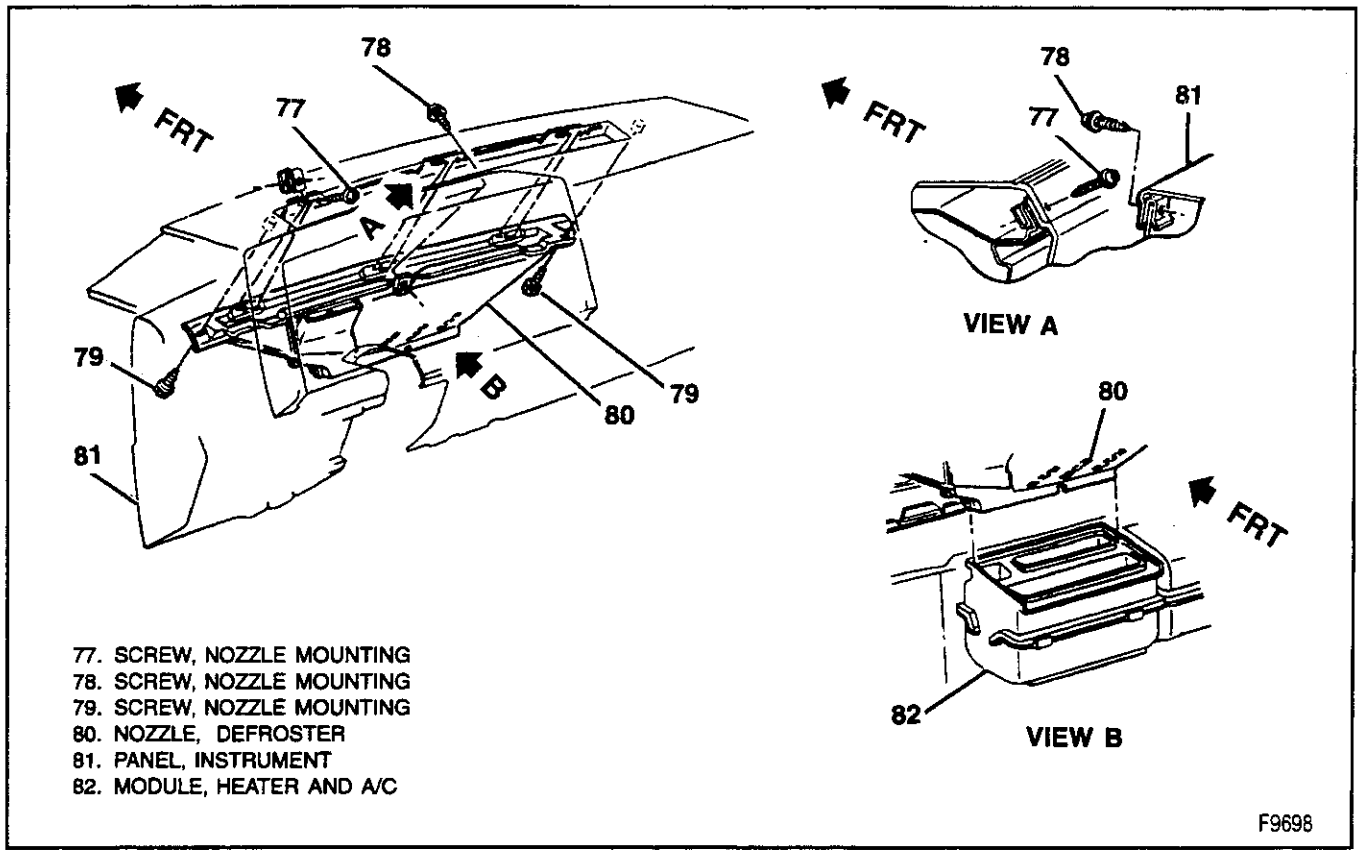


Figure 37—Defroster Nozzle

3. Electrical connectors, as necessary.
4. Adjuster links (66) from control lever (68).
5. Screws (67).
6. Temperature/defrost actuator (69).

Adjust

1. Electrical connection to the actuator.
2. Turn the ignition key to the run position and let the actuator position itself.
3. Turn off the ignition key.
4. Remove the actuator from the electrical connection.

Install or Connect (Figure 38)

1. Temperature/defrost actuator (69).
2. Screws (67).
3. Adjuster links (66) to control lever (68).
4. Electrical connectors, as necessary.
5. Instrument panel compartment. Refer to SECTION 10A4.
6. Negative battery cable.
   - Check circuit operation.

MODE ACTUATOR

The mode actuator is located on the air distributor case between the air distributor and blower assembly.

Remove or Disconnect (Figure 38)

1. Negative battery cable. Refer to SECTION 0A.
2. Instrument panel compartment. Refer to SECTION 10A4.
3. Electrical connectors, as necessary.
4. Screws (70).
5. Mode actuator (65).

Adjust

1. Electrical connection to the actuator.
2. Turn the ignition key to the run position and let the actuator position itself.
3. Turn off the ignition key.
4. Remove the actuator from the electrical connection.

Install or Connect (Figure 38)

1. Mode actuator (65).
2. Screws (70).
3. Electrical connectors, as necessary.
4. Instrument panel compartment. Refer to SECTION 10A4.
5. Negative battery cable.
   - Check circuit operation.

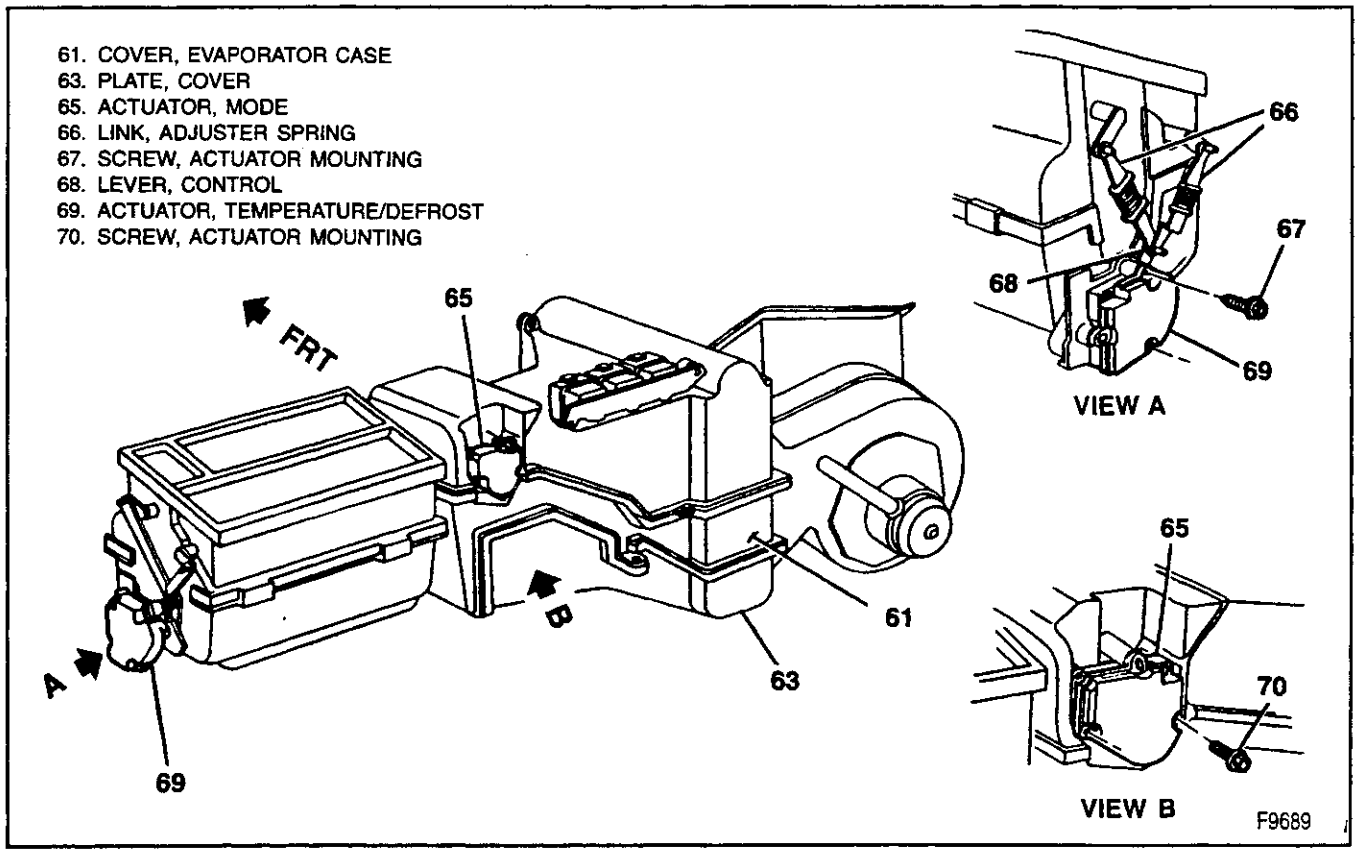


Figure 38—Temperature/Defrost and Mode Actuator

ON-VEHICLE SERVICE—REAR A/C SYSTEM (SUBURBAN)

CONTROL ASSEMBLY

FRONT OVERHEAD (AUX. HEATER AND A/C)

Remove or Disconnect (Figure 39)

1. Roof console (1). Refer to SECTION 10A4.
2. Electrical harness (2) from control assembly (3).
3. Control assembly (3) from roof console (1).

Install or Connect (Figure 39)

1. Control assembly (3) to roof console (1).
2. Electrical harness (2) to control assembly (3).
3. Roof console (1). Refer to SECTION 10A4.
   - Check circuit operation.

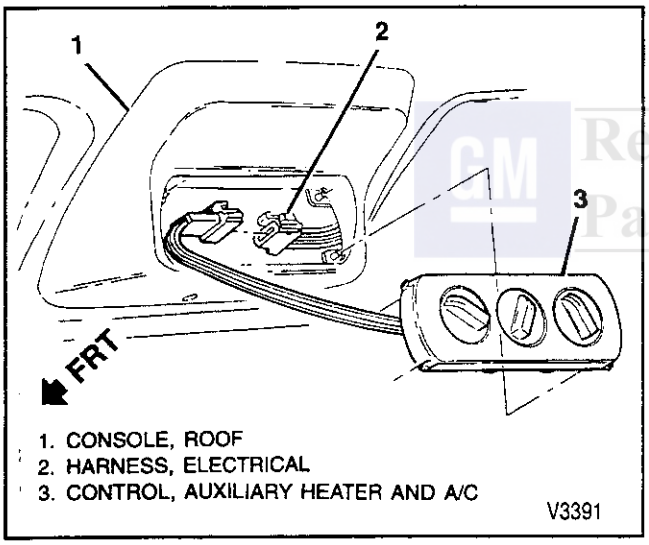


Figure 39—Front Overhead Auxiliary Control Switch

CENTER OVERHEAD (AUX. HEATER AND A/C)

Remove or Disconnect (Figure 40)

1. Bezel (5).
2. Control assembly (3) from roof panel (4).
3. Electrical harness (2) from control assembly (3).

Install or Connect (Figure 40)

1. Electrical harness (2) to control assembly (3).
2. Control assembly (3) to roof panel (4).
3. Bezel (5).
   - Check circuit operation.

EVAPORATOR TUBE

Remove or Disconnect (Figure 41)

1. Discharge and recover refrigerant from the system.
2. Evaporator tube (10) from evaporator (17).
3. O-ring seal (18).
4. Evaporator tube (10) from condenser (9).
5. O-ring seal (18).
6. Evaporator tube (10) from auxiliary evaporator hose (15).
7. O-ring seal.
8. Evaporator tube (10).

Install or Connect (Figure 41)

NOTICE: For steps 3, 5, and 7, refer to "Notice" on page 1B-1.

1. Evaporator tube (10).
2. New O-ring seal.
   - Coat O-ring seal with 525 viscosity refrigerant oil.

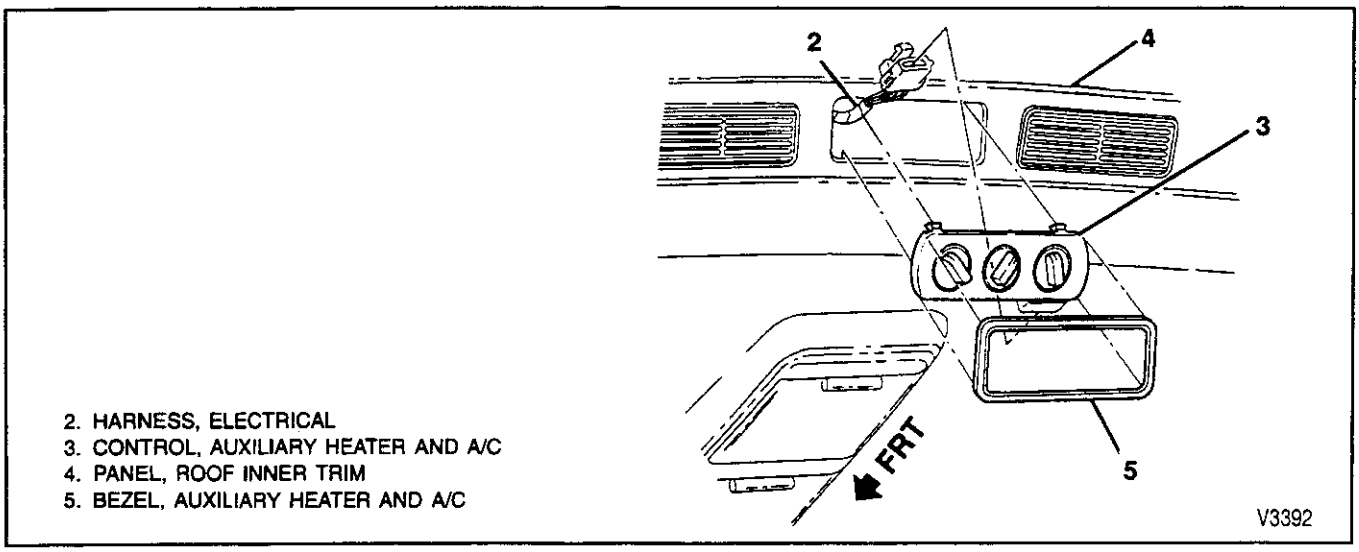


Figure 40—Center Overhead Auxiliary Control Switch

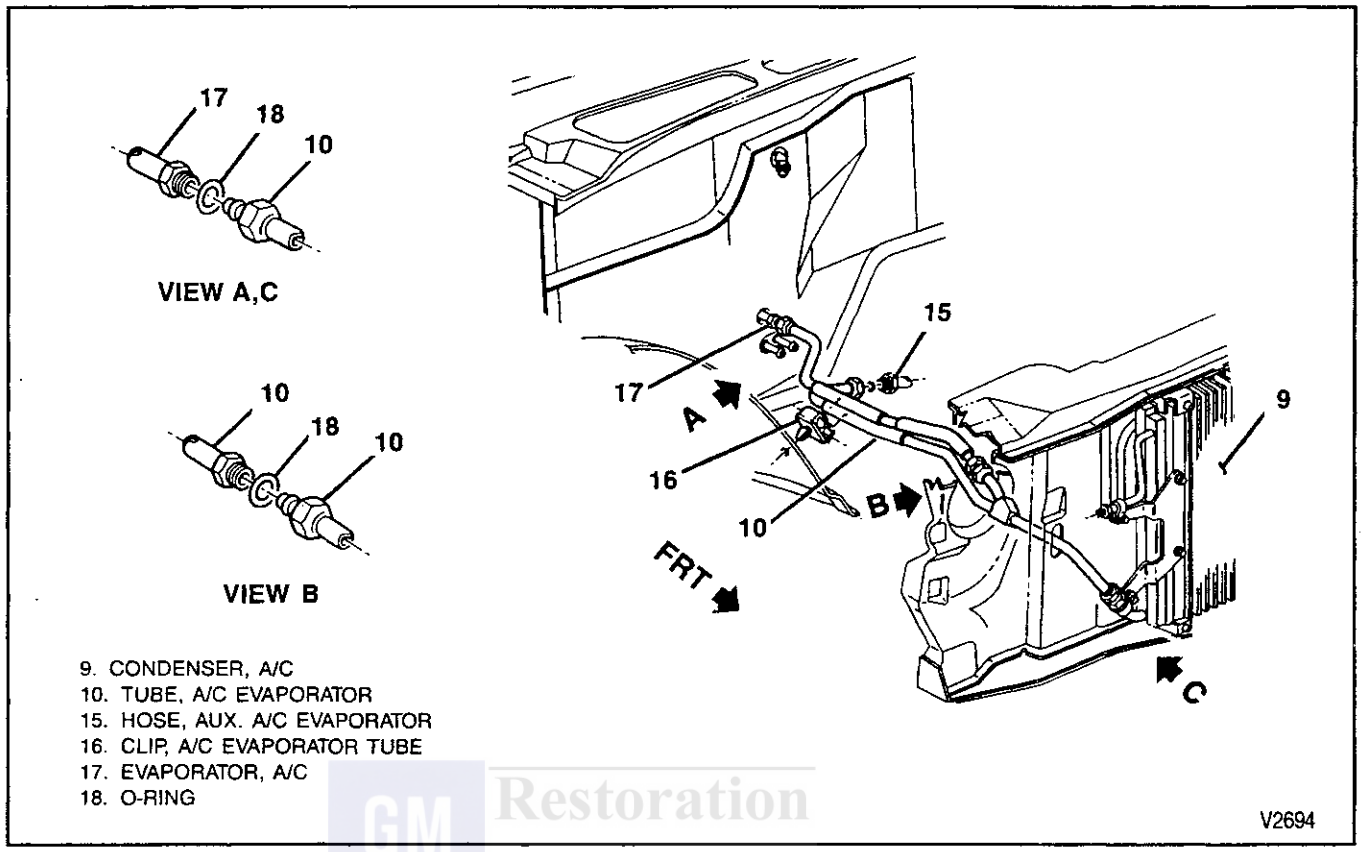


Figure 41—Auxiliary Evaporator Tube

3. Evaporator tube (10) to auxiliary evaporator hose (15).

Tighten

- Evaporator tube (10) to 24 N·m (18 lbs. ft.).

4. New O-ring seal (18).
   - Coat O-ring seal with 525 viscosity refrigerant oil.
5. Evaporator tube (10) to condenser (9).

Tighten

- Evaporator tube (10) to 24 N·m (18 lbs. ft.).

6. New O-ring seal (18).
   - Coat O-ring seal with 525 viscosity refrigerant oil.
7. Evaporator tube (10) to evaporator (17).

Tighten

- Evaporator tube (10) to 24 N·m (18 lbs. ft.).

8. Refrigerant to the system.
   - Check the system for leaks.

COMPRESSOR AND CONDENSER HOSE ASSEMBLY

Remove or Disconnect (Figures 42, 43, and 44)

1. Discharge and recover refrigerant from the system.
2. Auxiliary heater pipe, if equipped. Refer to SECTION 1A.
3. Compressor support braces.
4. Bolt (7).
5. Hose assembly (11) from rear of the compressor (8).
6. Sealing washers. Refer to "Compressor Sealing Washers."
7. Hose assembly (11) from accumulator (6).
8. O-ring seal (12).
9. Vacuum tank.
10. Hose assembly (11) from condenser (9).
11. O-ring seal (13).
12. Hose assembly (11) from auxiliary compressor hose (21) (figure 43).
13. O-ring seal (22).
    - Cap or plug all open connections.

Install or Connect (Figures 42, 43, and 44)

NOTICE: For steps 2, 4, 6, and 8, refer to "Notice" on page 1B-1.

1. New O-ring seal (22).
   - Coat O-ring seal with 525 viscosity refrigerant oil.
2. Hose assembly (11) to auxiliary compressor hose (21) (figure 43).

Tighten

- Hose assembly (11) to 24 N·m (18 lbs. ft.).

3. New O-ring seal (13).
   - Coat O-ring seal with 525 viscosity refrigerant oil.

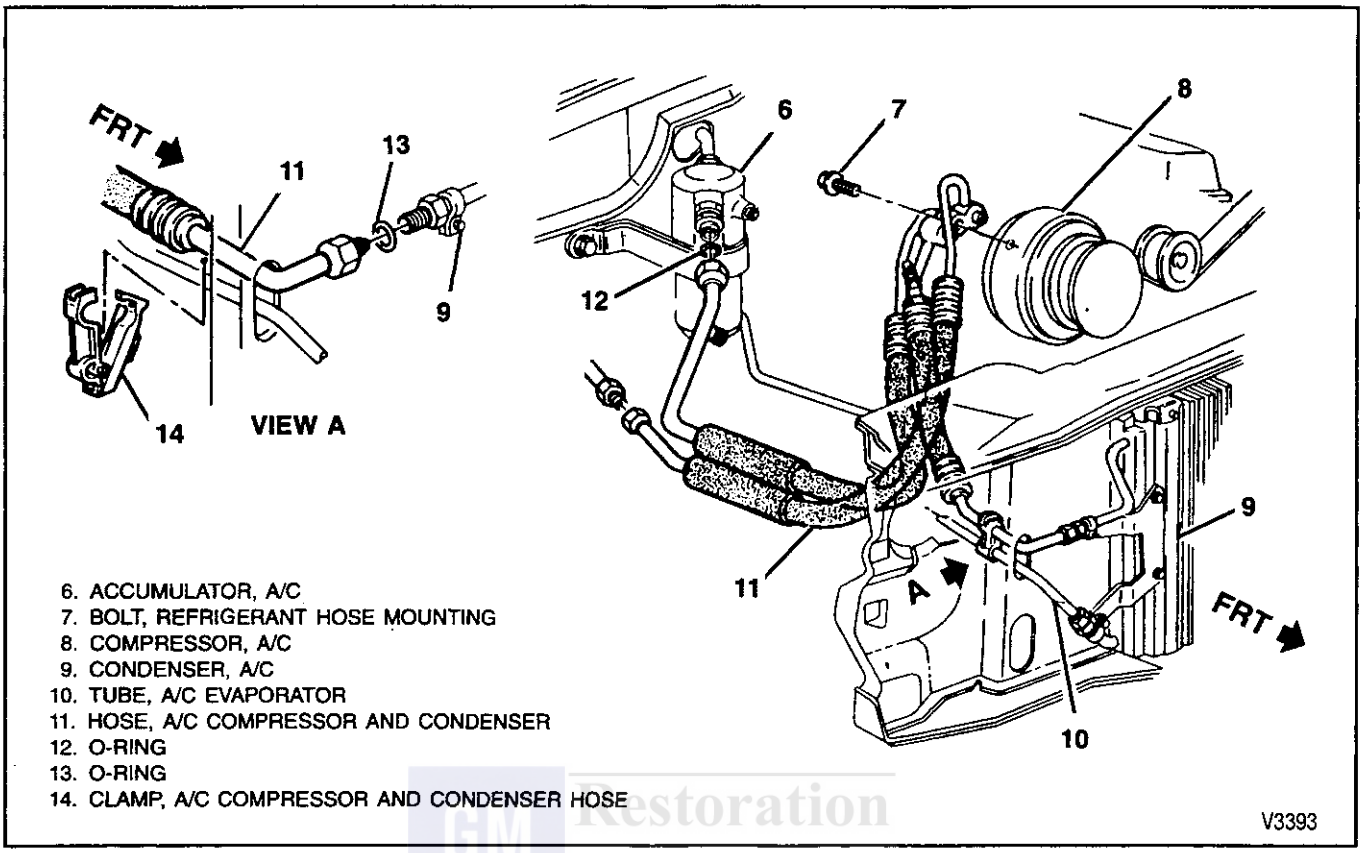


Figure 42—Compressor and Condenser Hose Assembly (5.7L Engines)

4. Hose assembly (11) to condenser (9).

Tighten

- Hose assembly (11) to 24 N·m (18 lbs. ft.).

5. New O-ring seal (12).
   - Coat O-ring seal with 525 viscosity refrigerant oil.
6. Hose assembly (11) to accumulator (6).

Tighten

- Hose assembly (11) to 41 N·m (30 lbs. ft.).

7. Sealing washers. Refer to "Compressor Sealing Washers."
8. Hose assembly (11) to the rear of the compressor (8).

NOTICE: Refer to "Notice" on page 1B-1.

9. Bolt (7).

Tighten

- Bolt (7) to 34 N·m (25 lbs. ft.).

10. Compressor support braces.
11. Auxiliary heater pipe, if equipped. Refer to SECTION 1A.
12. Refrigerant to the system.
    - Check the system for leaks.

REAR AUXILIARY HOSE ASSEMBLY

Remove or Disconnect (Figures 41 through 45)

1. Discharge and recover refrigerant from the system.
2. Air cleaner assembly.
3. Evaporator tube (10) from auxiliary evaporator hose (15) (figure 41).
4. O-ring seal.
   - Raise the vehicle and support with suitable safety stands.
5. Refrigerant hose assembly (11) from auxiliary compressor hose (21) (figure 43).
6. O-ring seal (22).
7. Right front wheelhouse. Refer to SECTION 2B.
8. Auxiliary evaporator hose (20) from auxiliary evaporator (26) (figure 44).
9. O-ring seal (25).
10. Auxiliary compressor hose (21) from auxiliary evaporator (26) (figure 44).
11. O-ring seal (25).
12. Screws (24).
13. Hose clips (23).
14. Auxiliary evaporator hose (20).
15. Auxiliary compressor hose (21).

Install or Connect (Figures 41 through 45)

NOTICE: For steps 4, 6, 8, 11, and 13, refer to "Notice" on page 1B-1.

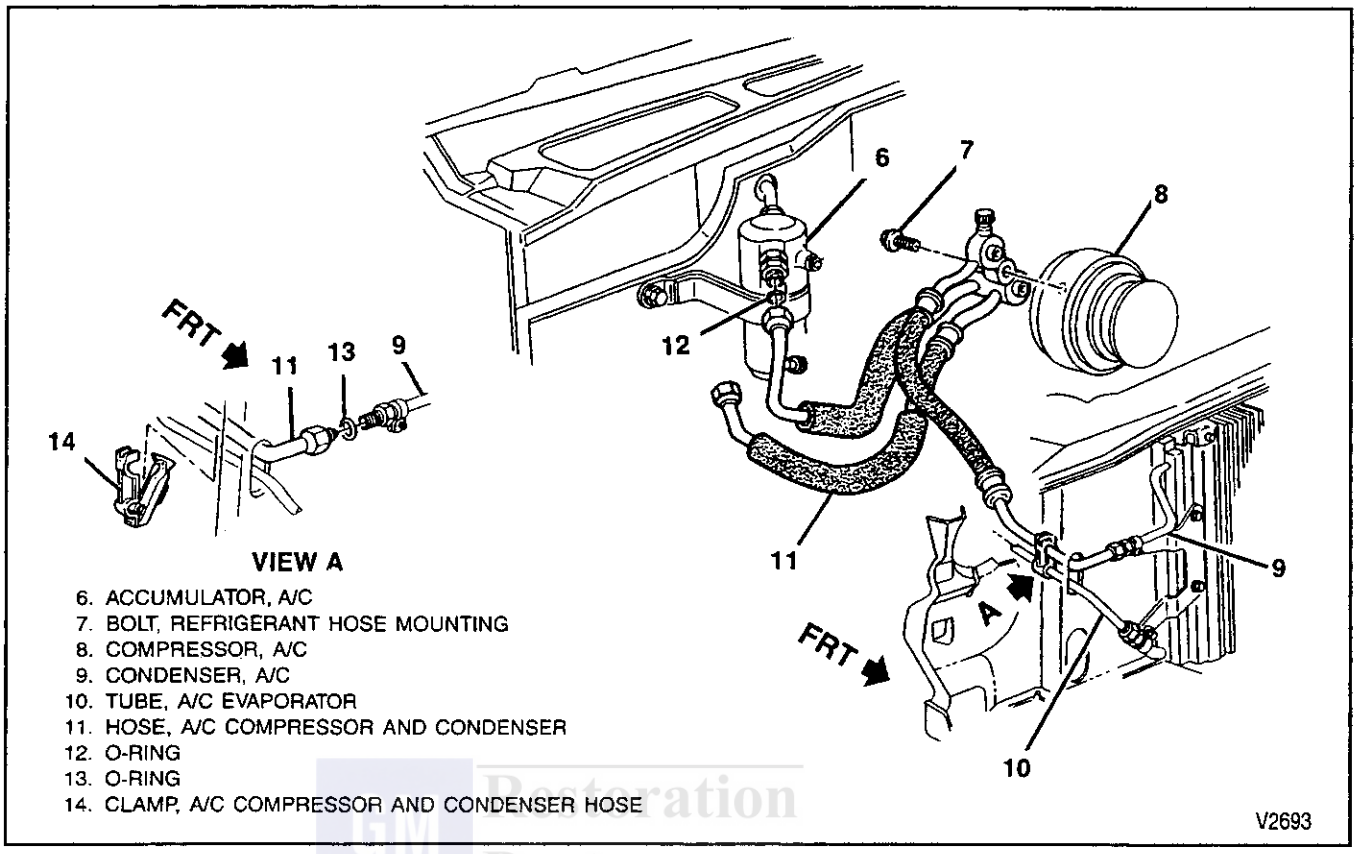


Figure 43—Compressor and Condenser Hose Assembly (7.4L Engines)

1. Auxiliary compressor hose (21).
2. Auxiliary evaporator hose (20).
3. Hose clips (23).
4. Screws (24).

Tighten

- Screws (24) to 6 N·m (53 lbs. in.).

5. New O-ring seal (25).
   - Coat O-ring seal with 525 viscosity refrigerant oil.
6. Auxiliary compressor hose (21) to auxiliary evaporator (26) (figure 44).

Tighten

- Auxiliary compressor hose (21) to 32 N·m (24 lbs. ft.).

7. New O-ring seal (25).
   - Coat O-ring seal with 525 viscosity refrigerant oil.
8. Auxiliary evaporator hose (20) to auxiliary evaporator (26) (figure 44).

Tighten

- Auxiliary evaporator hose (20) to 17 N·m (13 lbs. ft.).

9. Right front wheelhouse. Refer to SECTION 2B.
10. New O-ring seal (22).
    - Coat O-ring seal with 525 viscosity refrigerant oil.
11. Refrigerant hose assembly (11) to auxiliary compressor hose (21) (figure 43).

Tighten

- Refrigerant hose assembly (11) to 24 N·m (18 lbs. ft.).
- Lower the vehicle.

12. New O-ring seal.
    - Coat O-ring seal with 525 viscosity refrigerant oil.
13. Evaporator tube (10) to auxiliary evaporator hose (15) (figure 41).

Tighten

- Evaporator tube (10) to 24 N·m (18 lbs. ft.).

14. Air cleaner assembly.
15. Refrigerant to the system.
    - Check the system for leaks.

EVAPORATOR CORE

Remove or Disconnect (Figures 45 and 46)

1. Discharge and recover refrigerant from the system.
2. Rear quarter interior trim, as necessary. Refer to SECTION 10A4.
3. Right rear quarter trim panel. Refer to SECTION 10A4.
4. Right rear wheelhouse. Refer to SECTION 2B.
5. Rear heater hoses from auxiliary heater core (32), if equipped. Refer to SECTION 1A.

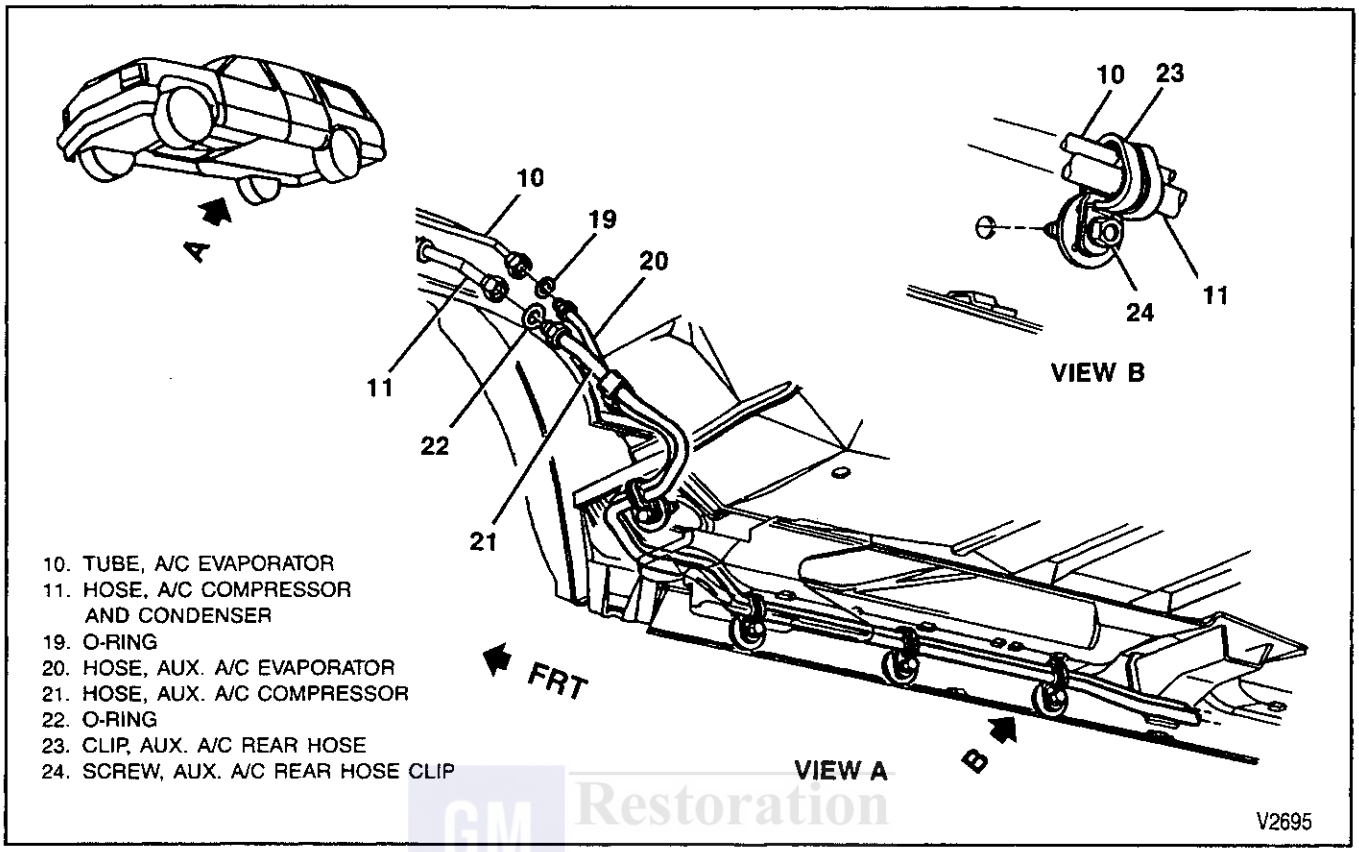


Figure 44—Auxiliary Compressor and Condenser Hose Routing

6. Auxiliary refrigerant hoses (20 and 21) from auxiliary evaporator (26). Refer to "Compressor and Condenser Hose Assembly."
7. Electrical connectors, as necessary.
8. Heater/evaporator case cover.
9. Evaporator core (26).

Install or Connect (Figures 45 and 46)

1. Evaporator core (26). Refer to "Refrigerant Oil Distribution," if replacing evaporator.
2. Heater/evaporator case cover.
3. Electrical connectors, as necessary.
4. Auxiliary refrigerant hoses (20 and 21) to auxiliary evaporator (26). Refer to "Compressor and Condenser Hose Assembly."
5. Rear heater hoses to auxiliary heater core (32), if equipped. Refer to SECTION 1A.
6. Right rear wheelhouse. Refer to SECTION 2B.
7. Right rear quarter trim panel. Refer to SECTION 10A4.
8. Rear quarter interior trim, as necessary. Refer to SECTION 10A4.
9. Refrigerant to the system.
   - Check the system for leaks.

BLOWER MOTOR RESISTOR

Remove or Disconnect (Figure 46)

1. Negative battery cable. Refer to SECTION 0A.
2. Right rear quarter trim panel cover. Refer to SECTION 10A4.
3. Electrical connectors, as necessary.
4. Screws (30).
5. Blower motor resistor (31).

Install or Connect (Figure 46)

1. Blower motor resistor (31).

NOTICE: Refer to "Notice" on page 1B-1.

2. Screws (30).

Tighten

- Screws (30) to 1.4 N·m (12 lbs. in.).

3. Electrical connectors, as necessary.
4. Right rear quarter trim panel cover. Refer to SECTION 10A4.
5. Negative battery cable.
   - Check circuit operation.

BLOWER MOTOR AND FAN

Remove or Disconnect (Figure 46)

1. Negative battery cable. Refer to SECTION 0A.
2. Right rear quarter trim panel cover. Refer to SECTION 10A4.
3. Electrical connectors, as necessary.
4. Screws (29).
5. Blower motor (28).

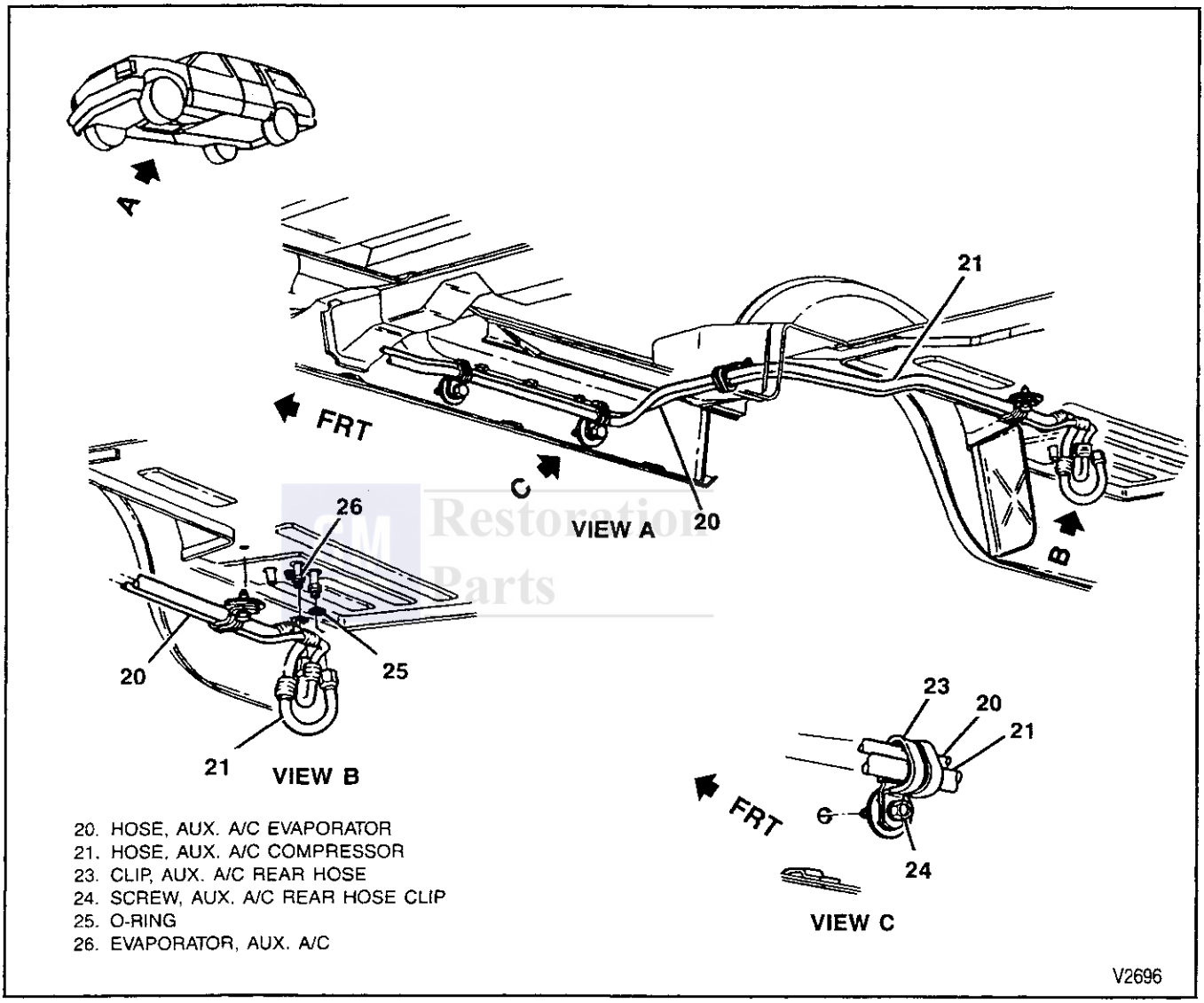


Figure 45—Auxiliary Refrigerant Hose Routing

Install or Connect (Figure 46)

1. Blower motor (28).

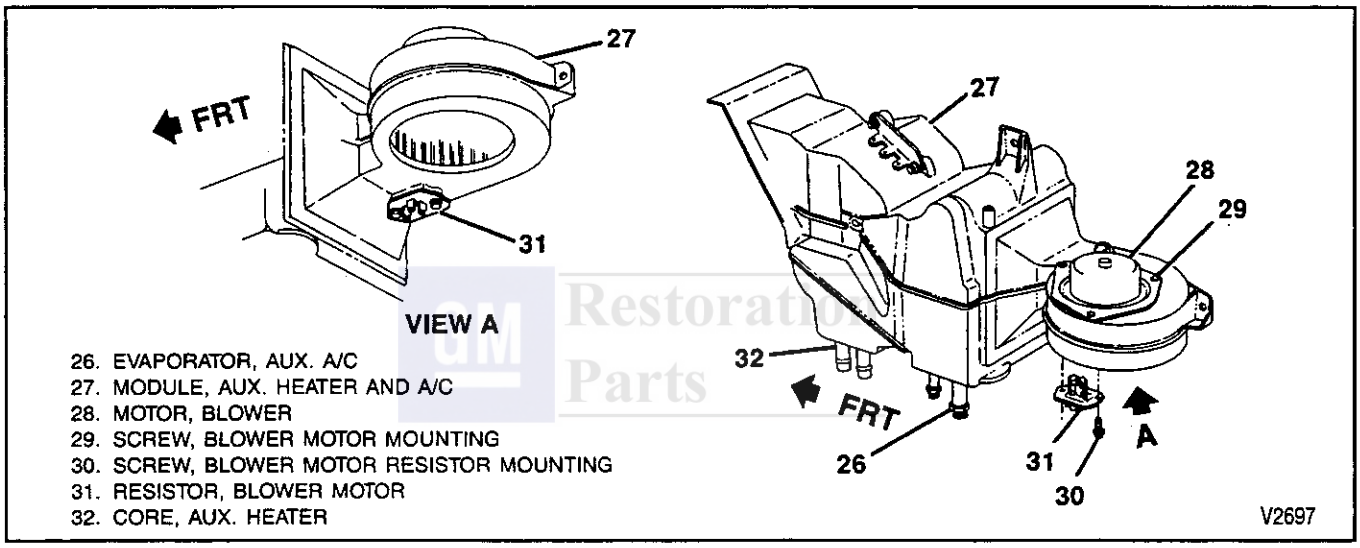
NOTICE: Refer to "Notice" on page 1B-1.

2. Screws (29).

Tighten

- Screws (29) to 1.4 N·m (12 lbs. in.).

3. Electrical connectors, as necessary.
4. Right rear quarter trim panel cover. Refer to SECTION 10A4.
5. Negative battery cable.
   - Check circuit operation.



26. EVAPORATOR, AUX. A/C
27. MODULE, AUX. HEATER AND A/C
28. MOTOR, BLOWER
29. SCREW, BLOWER MOTOR MOUNTING
30. SCREW, BLOWER MOTOR RESISTOR MOUNTING
31. RESISTOR, BLOWER MOTOR
32. CORE, AUX. HEATER

Figure 46—Auxiliary Heater Module

SPECIFICATIONS

GENERAL SPECIFICATIONS

Compressor	Harrison HR110-MD
Type	4 Cylinder Axial
Displacement	11.0 Cu. In.

SYSTEM CAPACITIES

Refrigerant-134a	
Pickup Models	0.91 kg (2.0 lbs.)
Crew Cab, Suburban, and Utility Models	1.02 kg (2.25 lbs.)
Suburban with Aux. A/C	1.81 kg (4.0 lbs.)
Polyalkaline Glycol (PAG) Refrigerant Oil	
Without Aux. A/C	240 ml (8 fl. oz.)
With Aux. A/C	330 ml (11 fl. oz.)

FASTENER TIGHTENING SPECIFICATIONS

Accumulator Bracket Mounting Screw	6 N·m (53 lbs. in.)
Accumulator-to-Evaporator	41 N·m (30 lbs. ft.)
Auxiliary Blower Motor Resistor Mounting Screw (C69)	1.4 N·m (12 lbs. in.)
Auxiliary Compressor Hose Mounting Clip Screws (C69)	6 N·m (53 lbs. in.)
Auxiliary Compressor Hose-to-Auxiliary Evaporator (C69)	32 N·m (24 lbs. ft.)
Auxiliary Evaporator Hose-to-Auxiliary Evaporator (C69)	17 N·m (13 lbs. ft.)
Blower Motor Mounting Screw	1.7 N·m (15 lbs. in.)
Blower Motor Resistor Mounting Screw	1.4 N·m (12 lbs. in.)
Compressor Bracket Mounting Bolts (6.2L, 6.5L)	40 N·m (30 lbs. ft.)
Compressor Bracket Mounting Bolts (7.4L)	50 N·m (37 lbs. ft.)
Compressor Bracket Mounting Nuts (6.2L, 6.5L)	23 N·m (17 lbs. ft.)
Compressor Mounting Bolts (4.3L, 5.0L, and 5.7L)	33 N·m (24 lbs. ft.)
Condenser Mounting Screw	4.5 N·m (40 lbs. in.)
Control Assembly Mounting Screw	1.9 N·m (17 lbs. in.)
Cowl Panel-to-Module Assembly Screw	1.9 N·m (17 lbs. in.)
Defroster Nozzle Mounting Screw	1.9 N·m (17 lbs. in.)
Defroster Nozzle-to-Heater Case Mounting Screw	1.4 N·m (12 lbs. in.)
Distributor Duct Mounting Screw	1.9 N·m (17 lbs. in.)
Evaporator Tube-to-Auxiliary Evaporator Hose (C69)	24 N·m (18 lbs. ft.)
Evaporator Tube-to-Condenser	24 N·m (18 lbs. ft.)
Evaporator Tube-to-Evaporator	24 N·m (18 lbs. ft.)
Module Assembly-to-Cowl Panel Nut	2.8 N·m (25 lbs. in.)
Module Assembly-to-Cowl Panel Screw	11 N·m (97 lbs. in.)
Pressure Cycling Switch-to-Accumulator	4.5 N·m (40 lbs. in.)
Refrigerant Hose-to-Accumulator	41 N·m (30 lbs. ft.)
Refrigerant Hose-to-Auxiliary Compressor Hose	24 N·m (18 lbs. ft.)
Refrigerant Hose-to-Compressor Bolt	34 N·m (25 lbs. ft.)
Refrigerant Hose-to-Condenser	24 N·m (18 lbs. ft.)
Support Bracket-to-Compressor Bracket Bolt (7.4L)	84 N·m (62 lbs. ft.)
Support Bracket-to-Engine Bolt (7.4L)	65 N·m (48 lbs. ft.)

T2964

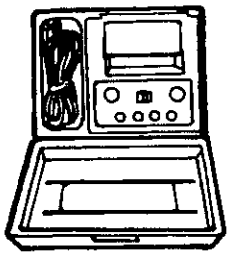
R134A METRIC FITTING SIZES

RPO	HEX FITTING SIZE (mm)	CONNECTION	B/U HEX FITTING SIZE (mm)	TORQUE (N·m)
C60/C69	24	A/C Cond. Hose to Cond. Inlet		27.5 +/- 7.5
C60/C69	24	Evap. Tube to Cond. Outlet		27.5 +/- 7.5
C60/C69	22	Evap. Tube to Module	20	27.5 +/- 7.5
C60/C69	32	A/C Accum. to Module	27	45.0 +/- 7.0
C60/C69	27	A/C Comp. Hose to A/C Accum.	N/A	45.0 +/- 7.0
C69	32	Aux. Comp. Hose (Female) to A/C Comp. Hose (Male Brazed)	27	45.0 +/- 7.0
C69	24	Aux. Evap. Hose (Female) to Evap. Tube (Male Brazed)	20	27.5 +/- 7.5
C69	22	Aux. Evap. to Aux. Module	16	16.5 +/- 1.5
C69	26	Aux. Comp. to Aux. Module	22	32.0 +/- 4.0

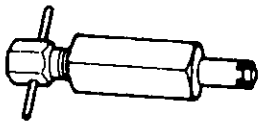
T3122

SPECIAL TOOLS

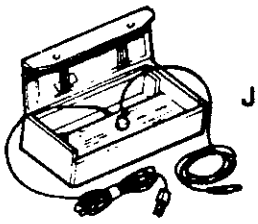
1. J 21213-A



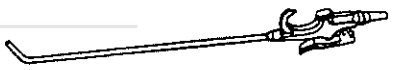
2. J 26549-D



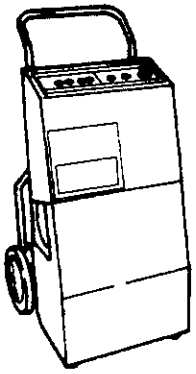
3. J 39400



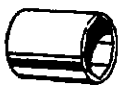
4. J 36645



5. J 39500



6. J 39037



1. FOUR JACK-DUAL RANGE TEMPERATURE TESTER
2. ORIFICE RUBE REMOVER AND EXTRACTOR
3. H-10 LEAK DETECTOR
4. EVAPORATOR CLEANING GUN
5. REFRIGERANT RECOVERY, RECYCLING, AND RECHARGING STATION
6. CHARGE VALVE OCTAGON SOCKET

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